TMAC Resources Responses to Information Requests Relating to Amendment 1 to Project Certificate 05MN047 and Type A Water Licence 2AM-DOH1323

NIRB IRs

IR Number	Agency/ Department	Subject/Topic	Reference	Issue/Concern	Rationale	Information Request	TMAC Response
IR1	AANDC	Socio-Economic Baseline	Appendix 23, Section 2.1 – 2.6	Baseline data regarding employment, education and training, contracting business opportunities and demographic change is out of date.	Data for the socio-economic baseline presented in Appendix 23 is not taken from the most recent census data released in 2013. Furthermore the listing of Registered Inuit Firms in the Kitikmeot Region was taken from 2011 which is a number of years ago. Updating this information is important for reviewers to accurately understand the impacts the project will have on the Kitikmeot region. This information is also required in order to ensure an accurate baseline to monitor and verify impacts against.	AANDC requests that the proponent provide an updated socio-economic baseline in sections 2.1 to 2.6 of Appendix 23.	A revised Appendix 23 with updated socio-economic baseline information is included as an attachment to the IR responses.
IR2	AANDC	Employment and Expenditures by the Project	Appendix 23, Section 3.1	Confirmation of employment, rationale and sources for employment predictions are not provided on page 3-2.	Page 3-2 indicates it was predicted in the FEIS that during the operations phase, employment of Nunavummiut would represent 42% of the total workforce. It would be helpful for reviewers if the Proponent could clarify if this is still an accurate prediction of employment of Nunavummiut and if this number has taken into consideration other projects in the region.	AANDC requests that the proponent confirm whether or not the employment predictions in Appendix 23 section 3.1 are still valid and provide a rationale for any predictions.	The FEIS predicted that during Operations a total of approximately 165 persons would be employed, with an estimated 69 being Nunavummiut. In arriving at this estimate, the FEIS took into account: 1) the education level profile within the communities and a requirement for a minimum of Grade 10; 2) the types of jobs likely to be required by the Project; and 3) historic data on the number of Inuit employed on previous Hope Bay projects/works. Since the FEIS, the education profile of the Kitikmeot communities and the general types of jobs likely required by the Project have not changed substantially. However, more recent historic employment data is available from the construction phase of the Project. Specifically, in 2010 about 99 employed individuals were Inuit, while in 2011 approximately 150 Inuit were employed and in 2012 about 127 Inuit were employed by the Project. As reported in Section 3.1 of Appendix 23, total employment during Operations is now predicted to be an average of approximately 230 persons over seven years, or about 1,610 person-years of employment. If 42% of the workforce was comprised of Nunavummiut, this would correspond to a total of about 97 workers (compared to 69 in the original FEIS prediction). It is reasonable to anticipate this level of employment being possible during operations based on the experience to date during the construction phase coupled with the mitigating measures planned to support Nunavummiut employment. The amended project is subject to the Doris North Inuit Impact and Benefit Agreement (IIBA). This agreement with the Kitikmeot Inuit Association (KIA) requires the establishment of annual Inuit Employment Targets throughout the life of the project by the IIBA Implementation Committee (IC), consisting of representatives of TMAC and the KIA. It is the responsibility of the IIBA IC to collaboratively monitor Inuit employment and implement measures aimed at increasing

							Inuit employment with the objective of continuous improvement.
IR3	AANDC	Accommodation and Fuel Barges Impact Assessment	Amendment Changes Summary, Section 4.13	There is no description, detailed plan, or impact assessment in the submission pertaining to either the accommodation or fuel barges regarding waste management and fresh water intake, and spill contingency plans, etc.	The application summary states that the amendment to the project certificate is to include the use of overwintering fuel and accommodation barges. It is not clear whether the proposed amendment will utilize previously submitted plans for the fuel and accommodation barges, or if new activities and management plans will be implemented. The NIRB and Proponent have both acknowledged that this project component is considered a significant change in scope to the original project certificate, and requires a comprehensive review of potential impacts. Documents associated with the barges, including a description, management plans, and an impact assessment, should be included in the submission to adequately evaluate potential impacts in the technical review.	AANDC requests the Proponent submit detailed descriptions of project components and activities for both the accommodation barge and fuel barge, including water management plans, wastewater treatment, spill contingency plans, an impact assessment, and any other relevant documents relevant to the impact assessment. These could be submitted as an additional appendix.	To clarify, the addition of the accommodation barges and over-wintering fuel activities are not a significant change in scope to the original Project Certificate (in fact, NIRB previously determined in 2010 that over-wintering of fuel was not a change in scope of the Doris North Project). Rather, TMAC included reference to these activities in this application to acknowledge that both of these activities have taken place at the Doris North Project since the issuance of the Project Certificate (in full consultation with NIRB) and may be utilized from time to time as a contingency in the future. No stand-alone permits have been identified in relation to this activity. However, if regulatory requirements change in the future all required approvals will be sought. During 2010-2011, accommodation barges were utilized at site. During the same period, a double-hulled fuel vessel over-wintered in Roberts Bay. Both activities were undertaken without incident and in full compliance with all regulatory requirements, and in consultation with all applicable regulatory authorities, including Transport Canada and NIRB. <u>Accommodation Barges</u> Prior to undertaking the use of accommodation barges, TMAC's predecessor Hope Bay Mining Limited consulted NIRB about the activity. What follows are links to the relevant materials provided to the regulatory authorities, including a detailed description of the activity as well as correspondence from key regulatory authorities relating to the activity: • Accommodation Barge Project Description (including consideration of potential environmental effects and mitigation measures): ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/01-PROJECT%20CERTIFICATE/02-NON-PERMIT%20EXEMPTIONS/2010%20Accommodation%20%20Barges%20in%20Roberts%20Bay/01-APPLICATION/100716-05MN047-%20Accomodation%20Barge%20Description-IT1E.pdf and project summary: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/01-PROJECT%20CERTIFICATE/02-NON-PERMIT%20EXEMPTIONS/2010%20Accommodation%20%20Barges%20in%20Roberts%20Bay/01-APPLICATION/100720-05MN047-Project%20Summary-IA1EI.pdf • As concluded by EBA in the materials provided: "*Minimal or negligible environmental impacts are expected to occur as a result of this stationary floating operation. All of the proposed activities will be of a highly localized, short term, and completely reversible nature. No residual impacts*

							on water quality, wildlife or other aspects of the environment are expected to occur." Any risks relating to spills will be mitigated by the requirement for the barges to implement spill response plans. TMAC personnel would support the barge operators in responding to any spill at site, including making any necessary personnel, site facilities and equipment available to the barge operators to respond. • DFO comments on barge use: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/01-PROJECT%20CERTIFICATE/02-NON-PERMIT%20EXEMPTIONS/2010%20Accommodation%20%20Barges%20in%20Roberts%20Bay/01-APPLICATION/100716-05MN047-DFO%20E-Mail%20Re%20Acccommodation%20Barges%20Grading-Use%20of%20Spuds-IA1E.pdf • GN-DOE comments on barge use: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/01-PROJECT%20CERTIFICATE/02-NON-PERMIT%20EXEMPTIONS/2010%20Accommodation%20%20Barges%20in%20Roberts%20Bay/01-APPLICATION/100716-05MN047-GN-DOE%20E-Mail%20Re%20Accommodation%20Barges%20in%20Roberts%20Bay-IA1E.pdf • AANDC comments on barge use: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/01-PROJECT%20CERTIFICATE/02-NON-PERMIT%20EXEMPTIONS/2010%20Accommodation%20%20Barges%20in%20Roberts%20Bay/02-CORRESPONDENCE/100723-05MN047-INAC%20Correspondence%20Re%20HBML's%20Accommodation%20Barges-IT1E.pdf • HBML correspondence to NIRB, confirming no approvals are required and conditions upon which activity will proceed: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/01-PROJECT%20CERTIFICATE/02-NON-PERMIT%20EXEMPTIONS/2010%20Accommodation%20%20Barges%20in%20Roberts%20Bay/01-APPLICATION/100716-05MN047-HBML%20Notification%20of%20Use%20of%20Accomodation%20Barges-IT1E.pdf • NIRB correspondence confirming no screening was required before proceeding with the activity: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/01-PROJECT%20CERTIFICATE/02-NON-PERMIT%20EXEMPTIONS/2010%20Accommodation%20%20Barges%20in%20Roberts%20Bay/02-CORRESPONDENCE/100720-05MN047-NIRB%20Ltr%20to%20HBML%20Re%20Accommodation%20Barges-OT1E.pdf

							As per NIRB's July 20, 2010 correspondence, the NIRB has taken the use of accommodation barges into account through its ongoing monitoring of the Doris North project, including the periodic evaluation of the Doris North Project Certificate [#003] and the NIRB's monitoring program for the Project. During this ongoing monitoring, no concerns were raised relating to the ongoing use of accommodation barges. Although specific vessels for this activity have not yet been identified, TMAC expects that similar vessels to those employed in 2010 would be obtained. Accommodation barges may be used in Roberts Bay year-round. As in previous years, site specific protocols would be developed in order to address any potential safety issues relating to windy/changing ice conditions. The accommodation barges will not be permanent features of the Doris North Project and are designed to be self-contained units. As a result, TMAC has not identified any effect on the project footprint. The vessels treat and process all sewage and grey water for the effective removal of BOD_5, TSS and other constituents to meet or exceed all applicable regulatory discharge standards. On-ship water treatment systems convert sea water into drinking water. The barges are self-contained units, including self-contained waste water treatment facilities, incinerator for disposal of solid wastes, and ability to package any hazardous wastes generated for disposal. There will be no interaction between the barge waste and waste use and the project lands. <u>Over-wintering of Fuel Vessels</u> Over-wintering fuel barges is a common shipping practice at suitable land-fast ice locations in the Arctic due to the short open water shipping season and need for contingency planning. Shipment of fuel to the Canadian Arctic is heavily regulated, and TMAC requires its fuel contractors to ensure compliance with all legislation as well as with Transport Canada guidelines and standards related to fuel barges and fuel transfers in the Arctic. There are currently no specific governmental permits or approvals that are required to permit fuel barges to lay up at a moorage. Prior to commencing the over-wintering a fuel vessel in Roberts Bay in 2010, HBML provided detailed correspondence to the NIRB: • HBML correspondence to NIRB, detailing applicable regulatory requirements to over-wintering fuel vessels in Nunavut: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/01-PROJECT%20CERTIFICATE/02-NON-PERMIT%20EXEMPTIONS/2010%20Fuel%20Mooring%20and%20Delivery%20Plan/01-APPLICATION/100528-05MN047-

							HBML%20Ltr%20to%20NIRB%20Re%20%202010-2011%20Hope%20Bay%20Fuel%20Planning-IT1E.pdf • KIA, GN-DOE, EC, GN, AANDC, DFO comments on proposed over-wintering fuel vessel activity: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/01-PROJECT%20CERTIFICATE/02-NON-PERMIT%20EXEMPTIONS/2010%20Fuel%20Mooring%20and%20Delivery%20Plan/02-DISTRIBUTION/COMMENTS/ • HBML Response to over-wintering Fuel Information Requests: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/01-PROJECT%20CERTIFICATE/02-NON-PERMIT%20EXEMPTIONS/2010%20Fuel%20Mooring%20and%20Delivery%20Plan/02-DISTRIBUTION/CORRESPONDENCE/100708-05MN047%20-%20HBML%20Response%20to%20Information%20Requests-IT1E.pdf • Correspondence from NIRB to HBML confirming that the proposed 2010/2011 Fuel Delivery Plan does not change the general scope of the original project activities as reviewed by the Board, and no further formal authorizations are required by HBML in order to proceed: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/01-PROJECT%20CERTIFICATE/02-NON-PERMIT%20EXEMPTIONS/2010%20Fuel%20Mooring%20and%20Delivery%20Plan/03-DECISION/100713-05MN047-NIRB%20Ltr%20to%20HBML%20Re%20Fuel%20Storage%20and%20Delivery-OT1E.pdf TMAC notes that no specific vessels have been identified for this purpose to date, and any over-wintering operational fuel plan would need to be customized to the specific vessel to be utilized. The Hope Bay Oil Pollution Prevention Plan/Oil Pollution Emergency Plan (“OPPP-OPEP”) will provide a detailed review of onsite specific spill response plans, including response time, required personnel and equipment, and would be updated prior to any recommencement of this activity and submitted to Transport Canada for review. We note that Transport Canada previously reviewed the 2010 OPPP-OPEP which included an operations plan and risk assessment relating to the overwintering of fuel barges, which would generally guide the development of any necessary updated plans. TMAC will provide the 2010 OPPP-OPEP to Transport Canada, GN-DOE and any other party that requests a copy for review. The over-wintering of the previous vessel proceeded in compliance with all regulatory requirements and in consultation with NIRB to ensure all Nunavut-specific

							requirements were also met. The overwintering of the vessel proceeded without incident. Generally, a similar approach would be followed in the future, with any updates required to address any changes to applicable regulatory requirements. TMAC would also generally follow the previously employed mooring arrangements as well as pollution prevention and response measures required by the regulatory framework applicable to the activity and as previously described in 2010 documentation to the NIRB. Prior to proceeding with any overwintering of a fuel vessel, TMAC would provide any required operations plan and risk assessment to Transport Canada in order to ensure that the relevant requirements of CSA 2001, AWPPA and the relevant applicable regulations are met.

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1	EC/CWS	Wildlife mitigation and monitoring	9 December, 2013 TMAC Resources Inc. – Doris North Mine Modifications and Related Amendment to Project Certificate No. 003 and Type A Water Licence No. 2AM-DOH1323 Hope Bay Mining Ltd. – Doris North Gold Mine Project Wildlife Mitigation and Monitoring Plan (WMMP) 7 January, 2014 Response by TMAC to comments received on the Doris North WMMP Reports and Plan	In the Proponent's response to comments on the Doris North WMMP Reports and Plan they cite the forthcoming 2013 Wildlife Mitigation and Monitoring Report, while in the project amendment proposal they cite the WMMP. With the proposed changes to the Project, specifically the changes to the Tailings Impoundment Area (TIA) and the addition of a discharge point to Roberts Bay, is the Proponent proposing any changes to the WMMP?	EC requests information as to whether the Proponent expects any updates to the WMMP to address proposed changes to the project description. EC requests information from the Proponent regarding the expected submission date on the 2013 WMMP Report (the review of this information could influence comments provided on proposed project changes related to wildlife and wildlife mitigation and monitoring).	TMAC does not anticipate that the proposed changes to the project description will necessitate any changes to the Wildlife Mitigation and Monitoring Program (WMMP). The WMMP Plan is already designed to monitor and mitigate all activities in the Local Study Area (LSA) and compare those to reference sites in the Regional Study Area (RSA). The proposed changes may result in additional sampling sites, but the overall objectives and methodologies will remain the same. The 2013 WMMP Report will be submitted by April 30, 2014 along with the Doris North project annual report submission to the NIRB.
2	EC/MPD and EPOD/ES	Water Quality Parameters and Discharge Criteria	TMAC Project Proposal (Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water Licence No. 2AM-DOH1323), Subsections 4.3, 4.4; Appendix 4: Roberts Bay Report, Subsection 5.2.3; Appendix 10: Water Quality Model, Subsection 3.1; Subsection 3.2.7; Subsection 3.4, Subsection 4.1, Subsection 5.1.2	A number of significant changes to water management are proposed, including moving to a year-round discharge from the TIA to the marine environment, co-disposal of cyanide treated tailings with flotation tailings, and extended production and associated increases in water use and wastewater disposal. Table 4-1 of Appendix 10 presents a summary of TIA Discharge Standards and Targets. The standards are taken from the existing Type A water licence discharge criteria (Section G, Clause 26) and the targets are taken from a 2011 evaluation of discharge concentrations back-calculated to maintain the water in Roberts Bay at CCME concentrations for contaminants. EC understands that with the change from a seasonal, freshwater effluent discharge to a year-round marine discharge to Roberts Bay there is a need to re-evaluate the discharge criteria and regulated parameters. Metal Mining Effluent Regulations (MMER) limits would not be inappropriate for the marine receiving environment provided protective water quality objectives for a broader range of parameters can be met at the edge of a	Reconsideration of the Project Certificate will be necessary to amend the discharge criteria set for Doris Creek and set appropriate discharge limits for Roberts Bay. Further work is needed on contaminant concentration predictions. EC requests: 1. Further evaluation of ammonia concentrations in the effluent discharge; 2. The Proponent produce a plan to track selenium concentrations closely and identify appropriate treatment options which can be implemented if necessary; 3. Identification of marine-appropriate species for effluent bioassay tests; 4. Nitrate and zinc errata be clarified; and 5. The high groundwater flow scenario be evaluated.	The Project Certificate requires at Section 4 Item 15 that "MHBL shall not permit the water discharged into Doris Creek to exceed the criteria set by the NWB.", while specific discharge criteria is set by the Type A Water Licence. 1. Ammonia was modeled by taking into account contributions from groundwater, degradation of cyanide, cyanate and ammonia, blasting reagents, and treated sewage effluent. For the 800 tpd milling scenario, the Doris North deposit is mined from Year 3 to 5. Mining will be in permafrost and groundwater inflows will be negligible. Groundwater inflows are anticipated when Doris Connector and Doris Central deposits are mined from Year 5 to 7. These deposits are not in permafrost and groundwater inflows will be piped to the TIA along with the ammonia from underground blasting.

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				defined mixing zone in Roberts Bay. It should be noted that the MMER is undergoing review, and the Proponent should be aware of discussions regarding additional regulated parameters and changes to the criteria (lowering allowable discharge concentrations). EC has a number of concerns with the revised effluent quality predictions: 1. Ammonia • Ammonia was modeled taking into account contributions from the groundwater, degradation of cyanide, blasting reagents, and from camp wastewater. Subsection 3.2.7 of Appendix 10 models increases to groundwater concentrations from blasting, but does not appear to carry that forward to the TIA for the first 4-5 years of operations (see Subsection 4.1 of Appendix 10 which states that groundwater doesn't report to the TIA until year 5). • Considerable reliance is placed on natural degradation processes to reduce ammonia concentrations in the TIA during the open water season. Subsection 3.4 of Appendix 10 addresses the cyanide contributions and uses removal rates which are based on enhanced removal using the addition of phosphorus. The enhanced removal was carried through the modeling as the base case in order to meet the 6 mg/L discharge criteria. EC's concern is that enhanced removal has not been demonstrated to occur at high salinity, nor at such high latitudes and cooler temperatures where biological activity is limited by light and temperature. • Under the base case scenario, winter discharge must be stopped for various periods of time to comply with the ammonia discharge limit. As modeled, there was sufficient water retention capacity to accommodate periodically halting discharge, but if concentrations are higher than modeled, the ability to discharge may be further limited, and TIA capacity may become an issue. 2. Selenium • Selenium levels in the proposed mill effluent (Appendix 10, Table 3-7) are as high as 0.25 mg/L, and range from 0.002 to 0.0051 mg/L in the predicted TIA discharge (Appendix 10, Table 5-1). Selenium concentrations should be closely tracked through monitoring, as these values are approaching levels that could cause reproductive impacts to fish. 3. Toxicity testing • The current water licence requirement for effluent to be non-acutely toxic relies on tests using freshwater organisms; this will need to be re-evaluated and marine-appropriate tests discussed. 4. Zinc • Subsection 4.2 Closure shows a target of 0.50 mg/L rather than the CCME value of 0.03; please confirm that this is in error. 5. Nitrate/nitrite • Please confirm that Appendix 10, Table 3-8 numbers for nitrate and nitrite have been switched. 6. Use of base case water inputs • Section 4 of Appendix 10 introduces three discharge scenarios for water management options. These are base case groundwater inflows, low flow groundwater, and no flow groundwater. It would be prudent to include a high flow (i.e. greater than base case) scenario and evaluate implications for effluent quality.		Ammonia loading from blasting residue in groundwater inflow to the underground mine workings for the mill throughput scenario (1,800 tpd), is similar to the 800 tpd scenario. Groundwater inflows are negligible during the mining of Doris North (permafrost) but increase during the mining of Doris Connector and Doris Central deposits in Year 4. The inflows occur sooner because the mining rate is higher. The water quality prediction model was updated to account for two proposed milling rates (800 and 1,800 tpd) and three groundwater scenarios (base case, low flow and no flow). Similar to previous predictions, discharge from the TIA must stop during winter months to meet TIA water quality discharge criteria for ammonia. For each scenario the discharge stops when the predicted ammonia concentration in Tail Lake exceeds the discharge limit of 6 mg/L. Refer to EC/MPD and EPOD/ES IR 13 for a detailed summary of predicted water quality results. The rational for enhanced degradation rates used in the water quality model is addressed in EC/MPD and EPOD/ES IR 12. 2. Selenium concentrations in the TIA discharge during operations range from 0.002 to 0.015 mg/L. These concentrations would decrease significantly in the receiving environment within the discharge's mixing zone. TMAC will monitor selenium and, should concentrations approach levels that can impact aquatic life in the receiving environment, selenium management alternatives will be considered. 3. Roberts Bay is an estuary with a salinity range of approximately 10-27 ppt. TIA salinity is projected to range between 3-32 ppt during operations, which is comparable to Roberts Bay's salinity. An 'estuarine' species will be selected for effluent bioassay tests, in consultation with regulators. 4. Section 4.2 of the amendment submission states that water quality targets are based on the criteria as described in Part G Clause 28 of the current water licence (NWB No: 2AM-DOH1323). The section reference was incorrect. The correct reference for closure is summarized in Part G Clause 30 of the water licence. The target for zinc is 0.03 mg/L. This has been corrected in the updated model. A concentration of 10 mg/L and 1 mg/L were applied to nitrate and nitrite, respectively, in the model. These values were provided by the sewage treatment plant manufacturer for a 360 man camp. The values are not

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						switched. They are based on information from the sewage treatment plant vendor. 5. Higher inflow scenarios are likely only episodic in nature and would result from intersecting an unknown structure. If groundwater flows from these structures are greater than the modelled base case scenario, other management strategies will be considered.
3	EC/MPD and EPOD/ES	Marine Water Quality Objectives	Appendix 4-2: Roberts Bay Report, Table 5.2-3: Calculated Treated TIA Discharge Water Quality Targets to Ensure that Roberts Bay Water Quality Remains Below Marine CCME Guidelines, Page 5-7.	A limited list of parameters have been evaluated (oxygen, pH, nitrate-N, salinity, arsenic, cadmium, chromium, and mercury), with allowable concentrations presented in Table 5.2-3 (Roberts Bay Report). EC acknowledges that there are limited marine guidelines for the protection of aquatic life, and that the Proponent has listed those available from the CCME. Where guidelines are lacking, objectives may be set for other parameters of concern using other procedures, such as the background approach, reviewing guidelines from other jurisdictions, or developing site-specific objectives based on the resident species and literature toxicity data, for example. In the original Environmental Assessment, the receiving environment was evaluated for effects of a wide range of parameters (both with and without CCME guidelines) and acceptable environmental concentrations determined. The change to a marine receiving environment does temper concerns, given the ocean's large assimilative capacity and the opportunity for avoidance. Nonetheless, effluent must be non-deleterious at end of pipe, and the mixing zone around the diffuser must be minimized to reduce the zone where some chronic toxicity might occur. To this end, review of the relevant chemicals of potential concern should be done, and objectives identified. At a minimum, this should include ammonia, BOD5, selenium, zinc, and lead, nickel and copper.	EC requests that a more comprehensive list of contaminants be evaluated in the receiving environment, and discharge targets identified for a defined area in Roberts Bay.	TMAC will take the prudent approach of adhering to Metal Mining Effluent Regulations (MMER) protocols and adaptively managing potential effects to the Roberts Bay marine environment through an expanded Aquatic Effects Monitoring Program (AEMP). The discharge of treated Tailings Impoundment Area (TIA) water into Roberts Bay will meet MMER discharge criteria and will pass effluent toxicity tests as directed by MMER to ensure the discharge effluent chemistry is safe for marine organisms. The Roberts Bay receiving environment will also meet Canadian Council of Ministers of the Environment (CCME) marine water guidelines based on the effluent water quality targets outlined in Appendix 4, Section 5.2 of the amendment submission. The current Doris North AEMP will be expanded to monitor water quality, sediment quality, and biology in the near-field discharge zone, far-field Roberts Bay region, in comparison to reference areas (Appendix 4; Section 8.1 of the amendment submission). If increases to water quality parameters and/or changes to the surrounding biology are identified through the annual AEMP, this could then trigger the development of additional water quality benchmarks for those parameters that lack marine guidelines.
4	EC/MPD and EPOD/ES	Marine Discharge Outfall	TMAC Project Proposal, Section 2; Appendix 4: Roberts Bay Report.	The proponent proposes a marine outfall which will be designed to disperse effluent at a depth of 40 m, such that mixing is optimized and effects on the upper productive layer of the water column are minimized. The diffuser will be anchored on the seafloor by counter-buoyancy weights that will hold the diffuser pipe 40 cm above the sediments. Discharge of the effluent is through 20 lateral ports at a rate of approximately 120 L/s. The seafloor sediment composition is predominantly sand but also includes silt and clay. The turbulence caused by the effluent flow will cause scouring of the adjacent sediments, especially if the pipe rests on the floor of Roberts Bay between the ballast weights, and this will result in disturbance to benthic areas and turbidity in the water column for a period of time.	EC requests that mitigation measures be developed to prevent or minimize disturbance of the sediments at the diffuser site.	The current design of the outfall includes mitigation measures to avoid and prevent the disturbance of bottom sediments. Risers (small diameter pipes) branching off the diffuser have been designed to direct the turbulent jets outward horizontally and upwards. The buoyancy of the discharge will deflect the plumes upward in the water column which will avoid and minimize disturbance of the bottom sediment. See Appendix 4 drawings of the outfall risers; Section 2.2-3-2.2.5 of the amendment submission.
5	EC/MPD and EPOD/ES	Changes to inputs to the TIA and water transfer system	Project Proposal: Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water Licence No. 2AM-DOH1323 Section 4: Description of Proposed Doris North Mine Changes,	The proponent states in Subsection 4.1 (Extended Mine Life) that the new project proposal amendment will add an additional 2-4 years of mine life to the project (in addition to Miramar's original 2 year mine-life estimate). The proponent also states their new TIA plan (modelled and detailed in Appendix 14 - Tail Lake Water Design) will allow for approximately 58 months of use of the TIA (which is approximately 4.83 years). EC is concerned about a lack of contingency planning in the event that the TIA reaches capacity within the proposed 4-6 years of mine operation (e.g. the mine runs for 6 years or more yet the TIA only has capacity for 4.83	EC requests that: 1. The NIRB add a condition to the Doris North Gold Mine Project Certificate, under Section 4: Project Specific Terms and Commitments, that commits the proponent to developing a contingency plan for alternatives for tailings disposal should the project approach the capacity of the TIA before the end of mine life. EC also suggests that it be noted under the same section (suggesting Section 4: The Assessment of Alternatives to Tail Lake for Tailings Disposal, Point 5),	1. TMAC is not requesting a change to the tailings disposal strategy as part of this amendment, and is aware that the mine life is limited by the permitted capacity of the TIA. Potential contingencies include cessation of mining. It is noted that alternative strategies which would maximize the capacity of the TIA are being considered as part of the Phase 2 project proposal (for example, moving from a sub-aqueous to a sub-aerial strategy). TMAC can provide an update on the status of the volume of Tail Lake on an annual basis. We suggest

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			Subsection 4.4.2, Page 42-43	years). There does not appear to be much leeway built into the capacity predictions from the time of first use to the end of deposition. In Section 2, Page 31, it states that "…the actual extent of mining in this phase will ultimately be limited by the amount of subaqueous tailings storage that is available based on the current designs for the TIA." EC also notes that the Proponent states the following on Page 41 of the new project proposal: "In the original application for the Type A Water Licence, it was stated that the cyanide destructed slurry would be filtered and trucked to the underground stope for final deposition and the flotation tails would be pumped to the TIA for subaqueous deposition. TMAC now proposes that the cyanide destructed slurry will be pumped to the flotation tailings pump box where it will be blended with flotation tailings prior to discharging in the TIA." This amended practice will increase the requirement for capacity in the TIA.	that the proponent be required to update the NIRB on the status of the volume of Tail Lake (versus their projections for tailings storage) on a yearly basis, as part of an update on current, planned and future phases of Hope Bay Belt development. This could be tied into the commitment to report on January 1st of each calendar year to the Board. 2. EC requests that the proponent provide additional information on the increase in tailings volume that is anticipated as a result of the revised proposal to deposit the cyanide destructed slurry in the TIA, and the proportion of total tailings volume from each of flotation tailings and cyanide destructed slurry over life of mine.	that the appropriate location for this update would be as a reporting requirement in the annual report submitted annually on April 30. This timing would allow us to calculate and accurately report on volumes deposited up to Dec. 31. 2. Based on a minimum water cover thickness of 2.3 m, the maximum amount of tailings that can be deposited in Tail Lake is 1,100,00 m^3 at a density of 1.293 $t.m^3$, or about 1,442,000 tonnes. The cyanide destruct tailings will be about 7.5% of the total volume, or about 106,700 tonnes.
6	EC/MPD and EPOD/ES	Closure TIA Water Cover Depth	TMAC Project Proposal, Subsection 4.5 - Reduction of water cover in tailings impoundment area, Page 45; Appendix 14: TMAC Tail Lake Water Cover Design	As originally proposed by Miramar, a water cover depth of 4 m would have been maintained over the tailings in the TIA, and a depth of 2.42 m was considered the minimum possible. The proponent now states that in order to maximize the capacity of the TIA they plan to maintain a final water cover of 2.3 m in the TIA. The proponent states that revised modeling supports a conclusion that the 2.3 m water cover is "adequate to prevent re-suspension of tailings under all conditions". In the supporting Appendix 14 Tail Lake Water Cover Design (SRK, November 2011), the Proponent has provided the details of their analysis for arriving at the proposed depth of 2.3 m of water cover in the TIA. EC is concerned that the revised model for the depth of the TIA water cover does not allow for variability in weather patterns due to the effects of climate change. Changing climatic patterns may result in more drastic or extreme fluctuations than the averages used in the Proponent's model (for temperature, wind speed, etc.), even within assumptions the model deemed "conservative". EC recommends that the Proponent select a larger minimum water cover, and have a contingency plan that addresses variability in weather patterns due to climate change (e.g. extreme cold events resulting in greater ice thickness than the model's most conservative case (2.05 m thick, which would result in greater risk of ice entrainment of tailings particles), greater wind-speeds than the conservative case, etc.). It is also unclear to EC how the proponent would operate the proposed TIA in the winter if a water cover of 2.3 m is maintained. If there are 2 m of ice cover, this would leave a very small under-ice capacity for tailings disposal through the winter months.	1. EC requests to the NIRB that the Proponent be required to consider a deeper minimum water cover, and have a contingency plan that helps address variability in weather patterns due to climate change (e.g. extreme cold events resulting in greater ice thickness than the model's most conservative case (2.05 m thick), greater wind-speeds than the conservative case, etc). A comprehensive analysis of the far-future predictions for climate change should be provided in support of the Proponent's recommended cover depth. The requirement for a re-evaluation of the minimum water cover could fall under the Doris North Gold Mine Project Certificate, Section 4: Project Specific Terms. Contingency plans for events that may result in weather patterns outside of the models range/expected values could be added as a requirement under Section 4: Project Specific Terms, Environment, Health and Safety Management System (point 32). 2. EC requests that the proponent provide operational plans for under-ice tailings disposal in the winter months. For example, would the tailings spigot be moved through the winter months, and if so, how?	1. SRK has reviewed the minimum water cover required taking into consideration climate change up to the year 2100. It was determined that a water cover of 2.3 m is adequate to prevent re-suspension of tailings under all conditions. Please refer to the technical memorandum: Water Cover Design for Tail Lake – Climate Change Update, dated March 28, 2013, included as an attachment to the IR responses for the comprehensive analysis requested. 2. The Tailings Deposition Plan is described in the technical memorandum: Doris North Project: Tail Lake Tailings Deposition Plan, dated September 8, 2011, included as an attachment to the IR responses. As stated in the technical memorandum: *"Tailings deposition will be a continuous operation. The tailings slurry will be pumped from the mill to the TCA and deposition into the TCA along the eastern boundary of the TCA following a pre-planned deposition plan to ensure the tailings surface remains as horizontal as practical. When the TCA water surface starts to freeze, the discharge lines will be pushed through the ice so that tailings under no circumstances are deposited on the ice surface."*
7	EC/MPD and EPOD/ES	Camp Wastewater Treatment	TMAC Project Proposal, Subsection 4.7 - Increased Wastewater Treatment Capacity, Page 46.	The Proponent states they are requesting an expansion of the wastewater treatment plant (servicing the Doris Camp) to meet the increase (doubling) in staff at the camp site. They state that the second Waste Water Treatment Plant (WWTP) the Nunavut Water Board (NWB) approved in 2010 to serve as a backup unit for the camp will, however, meet the needs required to treat wastewater for the expanded camp. EC is concerned that there has not been an actual increase in the proponent's wastewater treatment capacity. By utilizing this backup treatment plant for full-time waste treatment, the Proponent now effectively does not have a contingency (backup) unit or plan if one of the	EC requests that the Proponent provide contingency plans which address the event of a wastewater treatment failure or maintenance situation.	Contingency plans addressing possible wastewater treatment plant failure or maintenance situations are described in Section 2.6 of SRK Consulting (Canada) Inc., 2014 Doris North Wastewater Treatment Management Plan. Report Prepared for TMAC Resources Inc. Project Number: 1CT022.001.820. March 2014. This plan is a revision submitted to the Nunavut Water Board (NWB) as per licence 2AM-DOH1323 Part G Item 4. The following text is taken from the revised plan:

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				systems fails or needs maintenance. In the event of a system failure or required maintenance shutdown, waste will be temporarily disposed of into the tundra and may have adverse effects on the environment. EC recommends that the Proponent have enough wastewater treatment capacity available at the site to treat waste should one of the units either fail or be required to shut down for maintenance.		***"Treatment Option Contingency*** *During Hope Bay Project operations, if Doris North Camp population is above 180 people both WTPs would need to be in operation; therefore, no backup treatment plant would be available. To ensure sufficient wastewater treatment capacity during these times, TMAC has multiple bladders and holding tanks available onsite to hold untreated effluent. TMAC would also place restrictions on water usage to minimize the amount of wastewater produced. If required they would reduce the number of people at camp by providing off-site housing."*
8	EC/MPD and EPOD/ES	Accommodation Barges	TMAC Project Proposal, Subsection 4.9 - Roberts Bay: Laydown, Accommodation Barges, and Winter Fuel Barges, Page 48; Appendix 3: Mine Infrastructure Changes, Page 2-7.	The proponent proposes to extend the use of accommodation barges that were "previously on Roberts Bay and operated in fully compliance with applicable laws." The proponent states in the Mine Infrastructure Changes document that they were used in 2010 through 2012 to house extra personnel needed for construction of the Doris North Mine. EC is concerned with the ongoing use and disposal of what were previously "temporary" accommodation barges, so they do not pose a hazard to the marine or terrestrial environment. It is not clear whether modeling of Roberts Bay water quality for nutrients includes barge inputs, or if these would be negligible.	EC requests the proponent evaluate the impacts associated with extended use of the barges (i.e. waste disposal and potential spill risks).	Please refer to AANDC IR 3.
9	EC/MPD and EPOD/ES	Water Management – Contingency Planning	Appendix 19: Design Brief: Doris North Project Expanded Waste Rock Storage Pad, Subsection 3.5 - Pollution Control Pond, Page 3.	The proponent intends to design a lined Pollution Control Pond to capture subsurface and surface drainage emanating from the proposed Waste Rock Dump Pad U. The pond will be designed for the containment of up to 100-year return duration storm events (2708m3 or 48.99mm precipitation events). EC questions the potential capacity of the pollution control pond(s) in light of climate change considerations and potential increased frequency of previously statistically valid "100 year events". EC recommends contingency planning, regardless of pond size, in the event of a precipitation (or other) event that would exceed the pollution control pond(s) design capacity.	EC requests that the NIRB require contingency planning for all pollution control ponds in the event that a greater volume of precipitation than the ponds are designed for occurs at the Doris North Project site. EC recommends this requirement be part of the project certificate (Section 4: Project Specific Terms and Commitments).	(NIRB Rationale/Comment: This request is technical in nature, and is best reserved until submission during the technical comment period.) All pollution control ponds are designed for a 1:100 year storm event and to be pumped empty in six hours. Should a greater volume of precipitation occur, the back-up pumps will be deployed to increase the pumping capacity and the spillway culverts will prevent overtopping of the containment berm.
10	EC/MPD and EPOD/ES	Waste Rock Classification and Volumes	Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water License No. 2AM-DOH1323 - Subsection 3.2 Geochemistry (Page 38).	The Proponent plans to backfill some waste rock in the stopes of the underground mine and store the remaining in waste rock storage areas located on-land.	EC requests the Proponent provide the following information: 1. Breakdown of the total volumes of waste rock from the project expansion that would be classified as mineralized and non-mineralized and how they will be managed. 2. The total volume of mineralized waste rock from the proposed expansions that will be potentially acid generating (PAG) and non-PAG. 3. The total volume of mineralized waste rock that will end up being stored on-land in the waste rock storage pads and whether there will be any PAG materials in these on-land pads.	Please refer to Section 3 of the attached memo Doris Type A Water Licence Expansion Application – IR #10: Waste Rock Quantities and Management.
11	EC/MPD and EPOD/ES	Waste Rock Storage Clarification	TMAC Project Proposal, Section 7 - Environmental Effects Assessment, Page 60.	The Proponent states that there are no water bodies in the proposed ore storage pads expansion area (Pad T). EC requires further clarification on the proposed expanded waste rock storage pad (U) to better assess the potential effects of the project during the technical review phase.	EC requests that the Proponent confirm that there are no water bodies within the proposed waste rock storage pad expansion area (Pad U).	Please refer to: Appendix 19 Design Brief: Doris North Project Expanded Waste Rock Storage Pad (U; SRK, November 2013) Drawing DN-WRE-02, Additional Waste Rock Storage – General Arrangement, updated and included as an attachment to the IR responses. The 2007 Ortho Photo has been added to this drawing to show there are no water bodies within the footprint of Pad U.

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12	EC/MPD and EPOD/ES	Nitrogen Species Degradation	TMAC Project Proposal, Executive Summary, Subsection 4.5; Appendix 10: Water Quality Model, Subsection 3.4 – Natural Degradation Reactions, Page 28.	As stated in the Executive Summary of TMAC's "Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water Licence No. 2AM-DOH1323" the proponent anticipates an initial ore milling rate of 800 tonnes per day (tpd) but that this rate may ultimately increase to 1,800 tpd. As described in Subsection 4.5, the proponent is also proposing a shallower water cover in the TIA of 2.3 m. Given the revised shallow water cover and the rate of tailings inflow into the TIA resulting from the increased ore milling rate, EC is concerned that the retention time in the TIA would be reduced. This could result in reduced effectiveness of natural degradation in the TIA concurrent with increased inputs of residual cyanide and blasting residues. It is not clear to EC if the possibility of reduced retention time has been accounted for in the Proponent's consideration of natural degradation reactions (e.g. cyanide, ammonia) when modeling discharge water quality.	EC recommends that the proponent clarify: 1. Whether reduced retention time is predicted, given the shallower water cover and the likelihood of increased ore millings rates over the mine life; 2. Whether a reduced retention time has been taken into account in consideration of natural degradation; 3. What are the implications of reduced retention time for the effectiveness of natural degradation of nitrogen species; and 4. If the proponent has not taken reduced retention time into account in consideration of natural degradation, they should clarify why, or reconsider their estimates for natural degradation in light of the potential for reduced retention times and provide these revised estimates to EC/the Board.	1. Decreasing the water cover will decrease the residence time in the TIA. The volume of the TIA changes during tailings deposition and discharge from the TIA. The model accounts for the changing volume including the decrease in the water cover at closure. The TIA water and discharge can be managed to meet discharge for the increased mill rate scenario and how this affects the TIA volume during operations and closure. In the absence of groundwater intercepted by the mine workings being pumped to the TIA most of the annual inflow to the TIA is from runoff and precipitation (94% and 86% for the 800 tpd and 1800 tpd scenarios, respectively) and not from the discharge of tailings slurry. The increased mill rate (1800 tpd) increases the annual volume of inflow to the TIA by 8% from the lower mill rate and therefore decreases the residence time only slightly. In scenarios when the groundwater is discharged to the TIA the effect of the increased mill rate on residence becomes even more insignificant. 2. The model has been updated (see the technical memorandum Hope Bay – Tailings Impoundment Area Water and Load Balance Model Update, dated April 11, 2014) to account for a reduced residence time. The retention time in the TIA does not change significantly from the increased milling and therefore does not have a significant effect on ammonia degradation. 3. The updated model accounts for the effect of reduced residence time from decreased water cover thickness and the slightly greater inflows from the mill. Again the increased mill rate does not significantly decrease the residence time. 4. The higher mill rate does not significantly reduce the residence time and this slight decrease in residence time is accounted for by the updated model. See the attached description of the updated model results.
13	EC/MPD and EPOD/ES	Quality of the Water Quality Modelling Result	Appendix 10 Water Quality Model, Hope Bay Project (SRK, November 2011)	In 2011 SRK, engaged by Newmont Resources, used a water and load balance model (GoldSim) to update predicted water quality and tailings over the life of project. The mass load of each potential contaminant source within the project boundary was identified, and the concentrations of contaminants were calculated based on a mass balance while taking into account nutrient degradation reactions. The Proponent concluded that "The model predicts that by using this discharge management strategy, discharges from the TIA would meet both the TIA discharge limits and the proposed TIA marine discharge targets (Rescan 2011). Additionally, the TIA could be operated according to the original design criteria."	EC requests a list of inputs used in the water quality model that reflects the amended activities, and a discussion on the change of the consequent concentrations.	The inputs to the model are the same as those used previously and are presented in Appendix 10 of the amendment application. The only changes are that more waste rock is produced and the loading rates from the mill to the TIA increase for the higher mill throughput scenario. Both of these are accounted for in the updated model. The water quality prediction model in Appendix 10 of the amendment application only presented the 800 tpd milling scenario. The model was updated to include the increased production rate of 1,800 tpd and the increased processed

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						ore and waste rock contribution to determine the effect on predicted water quality concentrations. The water quality model includes the following source inputs: • Mine waste rock stored above ground (1,200,000 tonnes); • Ore stockpiled during milling operations; • Quarried rock used as fill, construction material, road base and other infrastructure construction fill; • Treated mill tailings discharged to the TIA; • Treated sewage effluent discharge to the TIA for a camp of 360 people; • Saline groundwater; • Saline drilling fluids; • Blasting residuals present in waste rock, quarried rock, ore and mine water (groundwater); • Solute and suspended matter released to the TIA from shoreline erosion and re-suspension by wave action; and • Salinity release to the TIA due to thawing where permafrost is present along the shores of the TIA. See attached detailed response in the technical memorandum Hope Bay – Tailings Impoundment Area Water and Load Balance Model Update, dated April 11, 2014.
14	EC/MPD and EPOD/ES	Summary of Assumed Conversion Rates	Appendix 10 Water Quality Model, Hope Bay Project (SRK, November 2011)	In calculating the predicted water quality, the Proponent takes into account the nutrient removal and nutrient gain as a result of a series of degradations. In Table 3-12 Summary of Assumed Conversion rates, two sets of rates (for natural and enhanced reactions) are presented. On Page 28 of Appendix 10, it states "The assumptions related to the degradation of nitrogen species used in the updated model are the same as those used in the original model and are summarized in detail in Appendix A.". However, no information on natural or enhanced degradation rates could be found in Appendix A.	EC requests that the proponent: 1. Identify the information source for both of the conversation rates listed in Table 3-12; and 2. Clarify how the Colomac reaction conditions such as temperature, presence of ice cover and pH correlate to the project site conditions.	1. Please see the document "Tail Lake Water Quality Model, Doris North Project, Hope Bay, Nunavut, Canada. SRK 2005" Section 3.4 for the description of the information source and the derivation of the enhanced ammonia degradation rates. This document was submitted in support of the initial EIS and can be found at: http://ftp.nirb.ca/02-REVIEWS/COMPLETED%20REVIEWS/05MN047-DORIS%20NORTH%20GOLD%20MINE%202006/2-REVIEW/09-FINAL_EIS/103.%20FEIS/Supporting%20Documents/A1%20-%20A2/A2%20WATER%20QUALITY%20REPORT%20%28Appendix%20A-H%29.pdf. 2. Please see Section 3.4 of the referenced report for how site conditions were factored into the enhanced ammonia degradation rates. Degradation of nitrogen compounds only occurs during the ice-free portion of the year.
15	EC/MPD and EPOD/ES	Water Treatment	Model, Hope Bay Project (SRK, November 2011) Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A	The water quality model considers the release of solute contaminants to the TIA including • Mine waste rock stored above ground; • Ore stockpiled during milling operations; • Quarried rock used as fill, construction material, road base and other infrastructure construction fill; • Treated mill tailings discharged to the TIA; • Treated sewage effluent discharge to the TIA;	EC requests that the proponent: 1. Add a section for TSS prediction in Appendix 10 Water Quality Model, and clarify how TSS was handled for modeling metals; and 2. Make the water treatment commitments made in the Amendment of Project Certificate consistent with the conditions used in the water modeling in order to ensure that the model represents the project scenario.	1. Total suspended solids were not predicted in the TIA discharge as suspended solids will be removed by the treatment plant prior to discharge into the receiving environment. This was previously committed to. The treated water will meet discharge limits. 2. Section 4.4 of the project proposal discusses changes to the water management plan and Section 4.4.3 specifically discusses water treatment. Water treatment commitments have not changed and are

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			Water Licence No. 2AM-DOH1323	• Saline groundwater; • Saline drilling fluids; • Blasting residuals present in waste rock, quarried rock, ore and mine water (groundwater); • Solute and suspended matter released to the TIA from shoreline erosion and re-suspension by wave action; and • Salinity release to the TIA due to thawing where permafrost is present along the shores of the TIA. In Subsection 3.4 Natural Degradation Reactions of Appendix 10, it is stated "To ensure compliance with the TIA discharge limit of 6 mg/L ammonia-N, enhanced biological degradation will be used in the lake and the 'enhanced case' is carried through the model as the base case for the TIA." Actually, the set of conversion rates for enhanced treatment is used to calculate the water quality. However, in Subsection 4.4.3 Water Treatment of the Amendment to Project Certificate, the enhanced treatment for ammonia-N is not mentioned. Further, Appendix 10 only estimates parameters of solute contaminants. TSS, one of the parameters listed in Schedule 4 MMER is not included in this Appendix. Although it is acknowledged on Page 23 of the Amendment to Project Certificate that there will be "a treatment plant that removes suspended solids from the excess TIA water", it is not clear whether all TIA effluent will be treated for TSS. Table 3.13 of Appendix A in Appendix 10 used a range of TSS values (from 0.7 to 7.6 mg/L), while discharge limits are typically 15 mg/L. It is not clear what TSS level was used as a model input and how the sediment-associated contribution to contaminant concentrations was accounted for.		the same as previously assessed. Water treatment commitments are TSS treatment and enhanced degradation of ammonia, both of which were committed to previously.
1	GN/Health	Increased wastewater treatment capacity	Doris North Mine Modification and Related Amendments to Project Certificate No.003 and Type A Water License No. 2AM-DOH1323. November 2013, Section 4.7	TMAC proposes to use a second, previously-approved wastewater treatment plant (WWTP) to meet the new capacity needs of an expanded camp. In their previous application, TMAC proposed the construction of a second WWTP as a back-up in order to bring the system down for maintenance when needed. As such, the approved infrastructure was to support throughput capacity for 180 people. Without additional information, and based on the rationale for proposing the second WWTP, it is unclear if increasing throughput to meet the needs of 360 people will affect TMAC's ability to maintain adequate wastewater treatment throughput in the event of maintenance issues.	GN-Health requests TMAC provide information to clarify the impact of operating the backup wastewater treatment plant to accommodate increased staffing and the impacts this proposed change might have on waste water management contingency plans.	Please refer to EC/MPD and EPOD/ES IR 7.
2	GN/ Environment	Roberts Bay: winter fuel barges	Doris North Mine Modification and Related Amendments to Project Certificate No.003 and Type A Water License No. 2AM-DOH1323. November 2013, Section 4.9	The Proponent has proposed to store fuel overwinter in barges/vessels frozen in the sea ice at Roberts Bay. Under strong winds and changing ice conditions, this proposed activity poses a risk to the marine environment. The existing Spill Contingency Plan does not address spill response strategies for a potential spill of this scale in sea ice conditions.	The GN-DOE requests clarification on proposed practices for storing fuel overwinter in Roberts Bay. Further information is required on the methods for monitoring fuel volumes in barges, the preciseness of these measurements, and fuel leak detection methods. The GN-DOE requests clarification on site-specific spill response plans including response time as well as required personnel and equipment.	Please refer to AANDC IR 3.
3	GN/ Environment	Roberts Bay: accommodation barges	As above.	The Proponent has proposed to use accommodation barges at Roberts Bay. Under strong winds and changing ice conditions, this proposed activity poses a safety risk.	The GN-DOE requests clarification on whether accommodation barges would be used in Roberts Bay year-round, safety plans associated with the use of accommodation barges in windy/changing ice conditions, and the effect on project footprint.	Please refer to AANDC IR 3.
4	GN/ Environment	Proposed additional infrastructures and associated footprint increase	Appendix 24, Footprint of Proposed Changes to Phase1 Doris North Mine. October 2013	The Wildlife Mitigation and Monitoring Plan reports that close to 211 hectares of habitat has been lost since the construction phase of the project started. Future modifications to the Doris North Project propose additional developments without apparent reclamation/closure of current	The GN-DOE requests further clarification on the footprint of the proposed infrastructure and the associated loss of habitat in the project area.	The proposed amendment will result in an additional approximately 22 ha of infrastructure footprint. This includes the Roberts Bay laydown area expansion, waste rock storage pads U and T, and footprint of the Doris Central Vent Raise area and Quarry I.

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			Doris North Mine Modification and Related Amendments to Project Certificate No.003 and Type A Water License No. 2AM-DOH1323. November 2013, Section 4	infrastructure. This represents an increased footprint from the previously approved project.		Overall, the project remains a small mining operation on the tundra. The effects on wildlife from this increased footprint are expected to be small. The increased laydown area and waste rock pads are immediately adjacent to existing constructed footprints and therefore no impacts will be associated with habitat fragmentation such as a buffer area with habitat alteration. Overall, the additional 22ha represents <1%, a small relative increase of habitat loss to the Doris North Local Study Area. We note the GN references a footprint calculation from the Wildlife Mitigation and Monitoring Program (WMMP) Plan. This is being updated in the 2014 Wildlife Mitigation and Monitoring Program (to be submitted to the NIRB) as the footprint calculation referenced in the WMMP Plan is incorrect.
5	GN/ Environment	Stand-alone operation of Phase 1 and Phase 2	Doris North Mine Modification and Related Amendments to Project Certificate No.003 and Type A Water License No.2AM-DOH1323. November 2013, Section 1.5	The existing Project Certificate covers Phase 1 of the Doris North Gold Mine. However, the current project amendment states: "In the Phase 2 Project Description, TMAC will describe how it intends to expand existing Doris site infrastructure in the future provided Phase 2 is approved in order to support development in the southern Hope Bay Belt". The use of Phase 1 infrastructure for Phase 2 of the Doris North project will contribute to the persistence of activities on the landscape following Phase 1.	The GN-DOE requests clarification on the potential use/expansion of Phase 1 Doris North site infrastructure to accommodate Phase 2, as this will increase the cumulative effect of the mine.	The Phase 2 Project Description (http://ftp.nirb.ca/02-REVIEWS/ACTIVE%20REVIEWS/12MN001-HBML%20PHASE%202%20HOPE%20BAY%20BELT/1-SCREENING/01-APPLICATION/111221-12MN001-Complete%20Project%20Proposal-IEDE.pdf) provides a description of the existing or planned Phase 1 Doris North Project facilities that would be used or require modification in order to support the Phase 2 Project. However, the Doris North infrastructure changes necessary to support the Phase 2 Project are not being proposed as part of this amendment. Any cumulative effects relating to the potential use/expansion of the Phase 1 Doris North Project facilities to service the Phase 2 Project should be considered in the context of the Phase 2 review, and not in the context of this application.
6	GN/ Environment	Assessment of Alternatives to Tail Lake for Tailings Disposal	Appendix 14 Tail Lake Water Cover Design. November 2011 Doris North Mine Modification and Related Amendments to Project Certificate No.003 and Type A Water License No.2AM-DOH1323. November 2013, Section 4.5	The current certificate states that NIRB shall be notified of any further alternative assessments of the Tail Lake tailings impoundment area, notably if an analysis concludes that Tail Lake would no longer be the preferred option for tailings disposal. Appendix 14 states that "the sufficient capacity in Tail Lake is of 1.4MT of tailing, or 58 months (4.83 years) of operation while maintaining 2.3 m water cover in Tail Lake". Tail Lake seems insufficient for the subaqueous tailing storage for the proposed extension of the mine life of 4 years (6 years totals). An alternate approach of sub-aerial tailings management was proposed.	The GN-DOE requests clarification on the effectiveness of managing the tailings impoundment using a sub-aerial tailing strategy.	Preliminary tailings alternatives studies for future development of the Hope Bay Project have confirmed that Tail Lake is well suited towards ongoing tailings deposition. In fact, preliminary evaluations suggest that the facility could be modified to accommodate in excess of 100 million tonnes of tailings. It will however not be possible to deposit more than 1.4 million tonnes of tailings in Tail Lake without having perpetual water retaining dams should sub-aqueous tailings deposition be continued. Therefore, preliminary indications suggest that for future expansion the tailings deposition strategy would be converted to sub-aerial deposition. This will require revised tailings management practices including making provision for dust management as well as managing ice entrainment along deposition beaches. The tailings chemistry will be carefully evaluated; however, early indications are that the tailings is not highly reactive and therefore the facility would be able to be successfully closed using a dry cover technology such as a permafrost aggregation cover as is being proposed at other Nunavut sites such as Meadowbank. Naturally, comprehensive characterization and evaluation

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						of these aspects will be carried out in future project development stages.
7	GN/ Environment	Roberts Bay Laydown Area	Appendix 3 Doris North Project: Mine Infrastructure Changes-Supporting Memo. November 2013, Section 2.2.3	Grizzly bears are known to use the shoreline to travel along the coast and have been sighted at Roberts Bay regularly. The increase of human activity in the area could have an impact on habitat use, habitat loss (additional 3.9 ha due to laydown footprint expansion) as well as bear-human interactions. In addition, aerials surveys for caribou between 1998 and 2010 have reported few caribou in the Roberts Bay area. GN-DOE is concerned that effects on wildlife are expected as a result of the proposed amendment activities and infrastructures.	The GN-DOE requests further information on the intensity of activity at Roberts Bay and the mitigation, management and monitoring programs associated with the construction of the Roberts Bay laydown area.	The proposed changes in the Water Licence amendment application include the additional expansion of laydown area adjacent to the existing laydown area to provide general laydown and staging areas at Roberts Bay to facilitate safer and more efficient annual sealift operations. The laydown area is located immediately adjacent to the existing laydown area and there are no new activities which may have effects on wildlife. Existing and future mitigation and monitoring measures are detailed in the annual Doris North Wildlife Mitigation and Monitoring Program and will be applied to the amended activities. For grizzly bears, the primary concern is attracting bears to camps and resulting problems between bears, staff and infrastructure. The Doris North Project includes mitigation to limit the attractiveness of the site to bears through 1) waste management, and 2) infrastructure management (securing buildings and skirting). Monitoring is conducted by 1) periodic audits to assess the effectiveness of waste and infrastructure management programs, 2) motion-triggered camera surveys to examine bear use of key infrastructure such as waste facilities, 3) incidental reporting by staff, 4) employee education and 5) regular inspections of waste management facilities and other infrastructure for compliance with management plans and signs of bear use. For caribou, the primary concern is the project acting as a disturbance or barrier to movement. Aerial surveys for caribou tracks and movement corridors have identified that movement by the Dolphin and Union caribou herd (in spring and fall) is largely in a north-south direction and is dispersed throughout the regional study area, with local-level concentrations of movement onto and off the sea ice at the ends of points, where there are islands and where crossing is narrowest. Roberts Bay was not identified as an area that is highly used by caribou for movement. Nonetheless, on site mitigation measures implemented to reduce disturbance and any barriers to movement include 1) design mitigation to limit the use of fencing and other structures that could act as barriers, 2) limiting noise, and 3) active management of vehicles and staff to limit activities when caribou are nearby. Monitoring is conducted through 1) motion-triggered cameras, 2) incidental observations, and 3) site monitoring to ensure mitigation activities are conducted.
8	GN/ Environment	Employee training	Project Certificate NIRB, No 003, Section 4.0 (24) Doris North Mine Modification and Related Amendments to Project Certificate No.003 and Type A Water License No.2AM-	The Project Certificate states that TMAC shall provide training to an on-site wildlife specialist.	The GN-DOE requests more information on the proposed employee training strategy for bear encounters, wilderness safety, and wildlife regulations.	Every worker at Hope Bay is made responsible for avoiding bear conflicts, their own safety and the safety of their team, and complying with wildlife regulations. Based on specific job duties and roles, TMAC staff are provided training and tools to mitigate project effects on wildlife. TMAC training procedures with respect to bear encounters, wilderness safety, and wildlife regulations are

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			DOH1323. November 2013, Section 9			currently in place and have been developed with input from a contracted bear safety specialist. This contractor has over 20 years of experience in northern wildlife management, compliance, and conservation education including being a principal in the production of several bear safety films. All TMAC employees are required to view a bear safety video and pass a bear safety quiz as part of their mandatory site orientation. TMAC employees involved in outdoor or remote work are required to take training in the safe and proper use of bear deterrent kits. This includes classroom instruction and hands on practice with bear deterrent devices, and review of bear safety procedures for remote work locations. TMAC personnel possessing valid Firearms Possession and Acquisition Licences (PALs) are eligible to join our Wildlife Response Team (WRT) and use TMAC firearms in the performance of their WRT duties. Preference for team membership is given to Nunavummiut with extensive prior harvesting experience. Training for Wildlife Response Team members includes classroom instruction in wildlife deterrent procedures and methods and field-based firearms practice using bear deterrent ammunition. Depending on the urgency associated with a wildlife incident, the Wildlife Response Team can have the added benefit of advice and direction from the GN-DOE Senior Wildlife Officer in Cambridge Bay who is advised immediately when an incident occurs. Training and mitigation procedures are periodically updated and improved based on adaptive management principles. More information on wildlife training and mitigation procedures can be found in the most recent Wildlife Monitoring and Mitigation Program Plan at: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/02-MONITORING%20AND%20MANAGEMENT%20PLANS/WILDLIFE%20MITIGATION%20MONITORING%20PLAN/01-PLAN/
9	GN/ Environment	Caribou surveys	Appendix 4 Doris North Project: Roberts Bay Report. November 2013, Section 4.3.5	Caribou surveys were conducted from June 3-5, 2010. This timing coincides with the end of the caribou migration; as such, the caribou present in the area will be underestimated.	The GN-DOE requests further clarification on the Proponent's intention to conduct caribou surveys to coincide with this species' migration.	Given the low number of caribou recorded during aerial surveys, TMAC does not plan to resume aerial surveys and the rationale is as follows: Aerial surveys for caribou in the Doris North study area have been conducted annually between 1996 and 2011 across a variety of seasons, including the northern migration period. A modeling exercise was conducted in 2011 to evaluate if there was sufficient power to detect changes in caribou abundance – whether aerial survey was an effective monitoring technique – the results of this analysis indicated that far fewer caribou were being observed than required to measure changes in distribution and, following discussions with the GN DOE, these surveys were discontinued after 2011. A detailed description of the

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						modelling exercise was reported in the 2011 Wildlife Mitigation and Monitoring Program annual report, submitted to the NIRB and located here: http://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/02-MONITORING%20AND%20MANAGEMENT%20PLANS/WILDLIFE%20MITIGATION%20MONITORING%20PLAN/02-REPORTS/2011/120119-05MN047-HBML%202011%20WMMP%20%20Report-IT1E.pdf. In order to continue monitoring caribou abundance and distribution in the region, TMAC is in discussion with the GN DOE to contribute to caribou monitoring or research programs that will be planned and implemented by the GN DOE. A regional scale approach into the ecology of these herds will be more beneficial to the long-term management of the herds than aerial surveys of limited spatial and temporal scales. TMAC has made concerted efforts to engage the GN DOE and continues to be interested in progressing and fully engaging with the GN to contribute to regional efforts.
10	GN/ED&T, Education, Health	Socio-Economic Baseline Data	Appendix 23: Screening of Socio-Economic Effects…, Section 2.1, 2.2, 2.4, and 2.6	The data presented in the socio-economic baseline for employment opportunities, education and training, community well-being, and demographic change are from the 2006 Census and no longer the most current data available. Specifically, the results of the 2011 Census, the National Household Survey, and other GN led surveys have been released. A brief review of the new data show significant differences from the 2006 Census data, in some cases new trends are created while others persist. An accurate portrayal of the baseline environment is essential to understand the implications of the Project and to design appropriate management plans, policies, and reporting procedures. For the purposes of the technical review, providing updated baseline data will allow the GN and other Interveners an opportunity to adequately assess the proposed mitigation measures for employment opportunities, education and training, and community well-being.	1. Update Tables 2.1-1, 2.2-1, and associated discussions with the most recent data on unemployment rates and education attainment in the Kitikmeot. Expand the associated discussions relating to the Tables to include an emphasis on current trends. This data can be accessed through the Nunavut Bureau of Statistics: http://www.stats.gov.nu.ca/en/Census%202011NHS.aspx 2. Update Table 2.4-3 and the associated discussion with the most recent data on health care utilization through the Nunavut Bureau of Statistics: http://www.stats.gov.nu.ca/en/Social%20health.aspx 3. Update Tables 2.6-1, 2.6-2, and associated discussions with the most recent data on Kitikmeot community population estimates through the Nunavut Bureau of Statistics: http://www.stats.gov.nu.ca/en/Census%202011NHS.aspx	A revised Appendix 23 with updated socio-economic baseline information is included as an attachment to the IR responses.
11	GN/ED&T	Project Employment and Expenditures	Appendix 23: Screening of Socio-Economic Effects, Section 3.1, 3.2, 4.2.2, and 5.	In section 5 'Conclusions', the Proponent states that the extension of the mine life and mining rate are predicted to increase the socio-economic benefits of the Project because of the increase in employment, income, and business activity. Although the general rationale behind this statement is understood, without a proper explanation of these benefits in Section 3 'Employment and Expenditures by the Project' or section 4.2.2 'Residual Socio-Economic Effects', this statement is not adequately demonstrated. Subsequently, this Information Request is broken down into two themes: Employment and Expenditures. 1. In Section 3.1 'Project Employment' the Proponent describes the predicted increase in employment from 370 person-years under the original project to 1610 under the amended project, and that an estimated	1. Employment a. Use the National Occupational Classification 2006 matrix to apply skill level to the types of jobs to be available for the duration of the operations phase. For each category (Level A, B, C, etc.) indicate how many person years are expected to be required for each year of operation. b. Based on the updated data as requested in GN-IR 1 (participation rates, unemployment rates, educational attainment, and population growth), the minimum employment requirements (age, education, criminal record, medical, etc.) and previous experience with direct employment from 2010 (Table 3.1-1), forecast	1. Detailed workforce schedule information (i.e., the number of positions by year, by area of employment, job category, and skill requirements) is not yet developed for the Project. Therefore, it is not feasible to apply the method requested to estimate the number of hires from the Kitikmeot Region. Furthermore, there are a large number of variables that ultimately determine the level of local hiring achieved (as noted in the information request), including the decisions of individual workers. This means that inherently there is uncertainty in the predictions made.

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				42% of the total mine workforce will be Nunavummiut without any supporting labour force analysis. Furthermore, Table 3.1-1 'Doris North HBML Employment, 2010' indicates that the Inuit share of employment only averaged approximately 23% for that year, significantly short of the desired 42%. Section 4.2.2 'Residual Socio-Economic Effects' does not provide any additional clarification. Without a detailed explanation of operation phase employment demand and the potential local labour force supply, it is not possible to properly evaluate the benefits of this Project on employment in the region. 2. In Section 3.2 'Project Expenditures' the Proponent provides a summary of Doris North direct expenditures by contractor from 2008 until 2010 during the construction phase and makes a general statement that the amended project will prolong contract and business opportunities and increase the total value of contracts. Section 4.2.2 'Residual Socio-Economic Effects' does not provide any additional clarification. Since expenditures during the construction phase of a mining project are generally higher than the operations phase and no updated forecast of operation phase expenditures is provided, it is not possible to properly evaluate the benefits of the Project on contracting and business activity in the region.	the local labour supply of the Kitikmeot willing and able for employment in the mining industry for each year of operation. Other operating mines within the Territory may also be a good source of information. c. Provide a discussion that explains how labour force demand will meet supply and achieve the 42% Nunavummiut share of total employment. 2. Expenditures a. Provide an updated forecast of annual expenditures for the duration of the expected operations phase. 3. Provide an additional forecast for annual territorial tax revenue based on expected employee payroll and project expenditures. Reference : National Occupational Classification Matrix 2006: http://www30.hrsdc.gc.ca/NOC/English/NOC/2006/html/Matrix.html	With respect to the estimate that 42% of total employment will be Nunavummiut, the FEIS predicted that during operation a total of approximately 165 persons will be employed, with an estimated 69 being Nunavummiut. In arriving at this estimate, the FEIS took into account: 1) the education level profile within the communities and a requirement for a minimum of Grade 10; 2) the types of jobs likely to be required by the Project; and 3) historic data on the number of Inuit employed on previous Hope Bay projects/works. Since the FEIS, the education profile of the Kitikmeot communities has not changed substantially. And, information is not yet available on if or how the types of jobs likely required by the Project have changed. However, more recent historic employment data is available from the construction phase of the Project. Specifically, in 2010 about 99 employed individuals were Inuit, while in 2011 approximately 150 Inuit were employed and in 2012 about 127 were employed by the Project. As reported in Section 3.1 of Appendix 23, total employment during Operations is now predicted to be an average of approximately 230 persons over seven years, or about 1,610 person-years of employment. If 42% of the workforce was comprised of Nunavummiut, this would correspond to a total of about 97 workers (compared to 69 in the original FEIS prediction). It is reasonable to anticipate this level of employment being possible during operations based on the experience to date during the construction phase coupled with the mitigating measures planned to support Nunavummiut employment. 2. Updated, detailed operational expenditure information is not yet available for the Project. Therefore, it is not possible at this time to provide an updated forecast of annual expenditures for the operations phase. Similarly, updated economic impact modeling, which would provide an estimate of tax revenues, has not been undertaken. However, because of the increase in total expenditures that will occur with the proposed change in Project design, economic impacts (income, GDP, and tax revenues) for Nunavut will be greater than reported in the FEIS.
12	GN/ED&T	Socio-Economic Mitigation Plans	Appendix 23: Screening of Socio-Economic Effects, Section 4.2.4; Project Certificate 003, Appendix C	Project Certificate 003 – Appendix C – Additional Commitments - Terms and Conditions 39 – 46 pertain to the further development, and in some cases finalization, of several management plans that have socio-economic implications. Given the scope of the proposed amendments to the project it is likely that even the most up to date management plans identified in the Project Certificate may require at least some alteration. Since these documents may be readily available it would be helpful if the Proponent could provide access to the most up to date copies and explain how they will be applied to the project in light of the proposed amendments.	1. As per commitments made in Project Certificate 003 - Appendix C - Term and Condition No.'s 39 - 46, provide the most recent versions of the following documents: a. Human Resources Plan b. Occupational Health and Safety Plan c. Inuit Employment Plan d. Community Relations Plan e. Employee and Family Assistance Program f. Education and Orientation Plan	1. The most recent plans are located on the NIRB FTP site. The plans will be updated as required to reflect the operational changes in the project and to reflect the TMAC ownership. a. The most recent version of the Human Resource Plan can be found on the NIRB public registry as follows: ftp://ftp.nirb.ca/02-REVIEWS/COMPLETED%20REVIEWS/05MN047-DORIS%20NORTH%20GOLD%20MINE%202006/2-

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					g. Drug and Alcohol Policy h. Wellness Strategy 2. Provide an explanation as to how each of these documents will be applied to the amended project.	REVIEW/09-FINAL_EIS/103.%20FEIS/Technical%20Reports/Chapter%2006/CHAPTER%2006%20ENVIRONMENT,%20HEALTH%20AND%20SAFETY%20MANAGEMENT%20SYSTEM.pdf b. The most recent version of the Occupational Health and Safety Plan can be found on the NIRB public registry as follows: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/02-MONITORING%20AND%20MANAGEMENT%20PLANS/OCCUPATIONAL%20HEALTH%20AND%20SAFETY%20PLAN/01-PLAN/ c. The most recent version of the Inuit Employment Plan can be found on the NIRB public registry as follows: ftp://ftp.nirb.ca/02-REVIEWS/COMPLETED%20REVIEWS/05MN047-DORIS%20NORTH%20GOLD%20MINE%202006/2-REVIEW/09-FINAL_EIS/103.%20FEIS/Technical%20Reports/Chapter%2006/CHAPTER%2006%20ENVIRONMENT,%20HEALTH%20AND%20SAFETY%20MANAGEMENT%20SYSTEM.pdf d. The most recent versions of the Community Relations Plan can be found on the NIRB public registry as follows: ftp://ftp.nirb.ca/03-MONITORING/05MN047-DORIS%20NORTH%20GOLD%20MINE/02-MONITORING%20AND%20MANAGEMENT%20PLANS/COMMUNITY%20RELATIONS%20PLAN/01-PLAN/ e. There is no documentation available on the Employee and Family Assistance Program. This program was a contracted service obtained by the former owner/operator of the Hope Bay Project to a specialist private counselling firm. The contract provided for confidential access to counselling service to project employees. f. The most recent version of the Education and Orientation Plan can be found on the NIRB public registry as follows: ftp://ftp.nirb.ca/02-REVIEWS/COMPLETED%20REVIEWS/05MN047-DORIS%20NORTH%20GOLD%20MINE%202006/2-REVIEW/09-FINAL_EIS/103.%20FEIS/Technical%20Reports/Chapter%2006/CHAPTER%2006%20ENVIRONMENT,%20HEALTH%20AND%20SAFETY%20MANAGEMENT%20SYSTEM.pdf

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						g. The most recent version of the Drug and Alcohol Policy is included as an attachment to the IR responses. h. The most recent version of the Wellness Strategy can be found on the NIRB public registry as follows: ftp://ftp.nirb.ca/02-REVIEWS/COMPLETED%20REVIEWS/05MN047-DORIS%20NORTH%20GOLD%20MINE%202006/2-REVIEW/09-FINAL_EIS/103.%20FEIS/Technical%20Reports/Chapter%2006/CHAPTER%2006%20ENVIRONMENT,%20HEALTH%20AND%20SAFETY%20MANAGEMENT%20SYSTEM.pdf 2. The Occupational Health and Safety Plan and the Community Relations Plan, as listed in Appendix C of the Project Certificate, have been submitted to NIRB. These plans are operationally valid. The Drug and Alcohol Policy has recently been updated, and is provided as an attachment to this response. The Education and Orientation Plan, Human Resources Plan, Inuit Involvement (Employment) Plan, Employee and Family Assistance Program, and Wellness Strategy have not yet been submitted. These plans will be prepared and submitted to NIRB three months prior to the start of Operations. Plans will be updated as required and as time permits to reflect operational changes in the Project, if any. At that time, they will also be updated to reflect TMAC ownership. The Inuit Involvement (Employment) Plan, Education and Orientation Plan, and Wellness Strategy will be revised in collaboration with the Kitikmeot Inuit Association through the IIBA Implementation Committee.
13	GN/Culture and Heritage	Graphic Representation	Project Proposal Description November 2013	The amended project description indicates that the following components will be added or modified from the original project proposal: • Construction of a 2.4 km pipeline • Expansion of main camp to accommodate 360 occupants • Relocation of waste management facilities • Doris Central Vent Raise Pad (13,252 km^2) • Doris Central Access Road (675 m long) • Overburden Storage Area • Second vent raise (south of Doris Camp) • Spur Road from second to main Doris Road • Expansion of wastewater treatment plant • 3 new laydown areas at Roberts Bay • Expansion of Pad T Expansion of Pad U (waste rock storage) • Exploitation of Quarry I While most of these amended project components are discussed in Appendix 13 'Archaeological Review' and a supporting letter by Points	1. Provide details of archaeological surveys conducted or to be conducted in relation to the pipeline, spur roads, and Quarry I. 2. Produce a detailed map (or a series of mid-to-large scale maps) showing the project footprint and detailed location of all infrastructure components (current, modified, and additional). This map (or maps) should exhibit all inventoried archaeological site locations and individual site status (avoided/protected and monitored/planned for mitigation/mitigated) using color coding in the legend. The scale of the maps has to be such that the limits of individual infrastructure component are well defined; and the location of the archaeological sites within those limits is precise. The overall look should be uncluttered. 3. Provide the map (or maps) directly to the Territorial Archaeologist office and do not post for public viewing.	1. a. Pipeline It is unclear which pipeline is being referred to in this information request. The land-based pipeline is part of the Tailings Impoundment Area (TIA) water management system and this is discussed in Appendix 13 of the amendment application. This pipeline, that is to run from Tail Lake to Roberts Bay, will be placed immediately next to the existing road. The ground covered by this road right of way was thoroughly inspected over several field seasons, most specifically in 2003 and 2005 (see Prager 2004, Prager 2006), prior to development. It is virtually entirely on low lying, occasionally wet tussock, tundra which was rated as low archaeological potential; no archaeological remains were found during those pedestrian surveys. As is stated in Appendix 13 of the amendment application under TIA Water Management, "As long as

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				West, the pipeline, spur roads, and quarry I are not discussed. Furthermore, without visual representation of all these components in relation to known archaeological resources, it is difficult to understand if the appropriate steps are being taken to protect them. As the regulator, the GN has the mandate to ensure the protection of archaeological resources in the Territory and must be afforded sufficient information to make appropriate recommendations to protect the archaeological integrity in the area surrounding the project location.	This information will assist the GN in providing appropriate assessment and recommendations for the protection and management of Nunavut heritage resources.	the pipeline is built immediately adjacent to this existing road network there are no archaeological concerns." There is an underwater pipeline proposed within Roberts Bay for which an archaeological potential assessment was presented in Section 4.4.2 of the amendment application. This assessment concluded that the potential for archaeological remains, particularly undisturbed, is very low due to the generally shallow water, wave and ice action, and the rising of the land since the last ice age. b. Spur roads In terms of the spur roads that are referred to in the information request, there may be one or two possible roads to the Doris Central and Doris connector Vent Raises. This is discussed in Appendix 13 of the amendment application under Doris Central Vent Raise Pad and Road. The proposed route of the road extending east from the Doris-Windy road crosses flat tundra which is rated as low potential for archaeological sites. If a road is proposed to approach from the north, the same general type of terrain is crossed. At least some of this terrain was previously walked in 2004 and 2005 (see Prager 2005, Prager 2006). All developments associated with the Doris Central Vent Raise are covered by the general recommendation, made at the end of that section of Appendix 13, to conduct a final intensive ground survey of all proposed Doris Central infrastructure prior to any ground disturbance. c. Quarry I This quarry is discussed in Appendix 13, under Doris Central Vent Raise Pad and Road. Because this is a moderate sized bedrock outcrop, potential for archaeological sites is considered good. It may have been at least partly examined during the several previous surveys of this area between Doris and Windy lakes. But, in order to ensure complete and thorough coverage of this quarry, as well as the Doris Central facilities, it was recommended at the end of this Doris Central discussion in Appendix 13 that a final intensive ground survey be conducted once exact limits of all proposed Doris Central developments are identified. **Details of archaeological surveys planned for new developments:** 1. The finalized GPS'd limits of the proposed new developments will be compared to recorded archaeological site locations. 2. If the area of new developments is large and has not been previously viewed, a low level helicopter overflight will be used to conduct a terrain potential assessment.

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						3. Closely spaced transects will be walked over elevated, dry terrain judged to offer good potential for archaeological sites, with a sample of low potential ground included. Transects will likely be approximately 10 m to 20 m apart, as is judged appropriate for the terrain being examined. 4. For any archaeological resources found, site limits and content will be assessed and recorded in order to permit consideration of mitigation options. 5. If any known sites are contained within a proposed project component, planners will be asked to consider avoidance possibilities such as project component re-location or boundary revisions or realignment, where at all possible. 6. For any sites that cannot be avoided, appropriate site specific mitigation recommendations will be made, and a mitigation plan for each site will be prepared and submitted to the GN Department of Culture and Heritage for approval. 7. Approved mitigation plans will be implemented prior to initiation of construction. **<u>Bibliography</u>** Prager, G. 2004 Doris North (Hope Bay) Project, Nunavut, Archaeological Investigations in 2003 Final Permit Report. NU Archaeologist's Permit 03-05A. Report on file, Canadian Museum of Civilization, Ottawa. 2005 Hope Bay Belt Project, Nunavut 2004 Archaeological Investigations Final Permit Report (NU Archaeologist's Permit 04-03A). Report on file, Canadian Museum of Civilization, Ottawa. 2006 Hope Bay Belt, Nunavut, 2005 Archaeological Investigations Final Permit Report (NU Archaeologist's Permit 05-10A). Report on file, Canadian Museum of Civilization, Ottawa. 2-3. Maps prepared by Points West Heritage with SRK help and submitted directly to Territorial Archaeologist.
14	GN/Health	Impact on Health Care Services	TMAC Project Proposal, Appendix 23, Section 4.	In the Proponent's amendment they propose to increase the camp size and potential workforce from 180 to 360 people. While Appendix 23 discusses potential impacts of this increase on Health Services in the communities, the Proponent does not provide detail on whether they anticipate the doubling of camp size and workforce to increase the number of on-site medical evacuations that require support from the Cambridge Bay Health Centre or the GN's contracted medevac service.	The Proponent should explain whether they anticipate the increase in camp size and workforce to impact the number of on-site medical evacuations requiring support from the Cambridge Bay Health Centre or the GN's contracted medevac service. They should also explain any mitigation measures they plan to reduce such potential impacts.	TMAC Resources does not anticipate that an increase in camp size and workforce would impact the number of on-site medical evacuations requiring support from the Cambridge Bay Health Center or the GN's contracted medevac service. There are several reasons for this opinion: 1. <u>Proven Safety Record:</u> The Hope Bay project has been operated for over 4 years during construction and 1 year under Care and Maintenance with a very low accident rate. At the height of construction (2010), the Hope Bay work-force was a similar size as planned for the future under this application. With similar safety strategies, plans, and work procedures, TMAC believes

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						that the Hope Bay Project can be operated in the future as safely as in the past. More information on project safety statistics can be found at: http://www.nunavutsemc.com/Kitikmeot 2. Comparative Risk of Injury: Nunavut experiences a high rate of self-injury, injury hospitalizations and potentially avoidable mortality: https://secure.cihi.ca/free_products/HI2013_EN.pdf. Most, if not all, of these reported incidents necessitate interventions by GN Health services up to and including medical evacuations. Nunavummiut who work at Hope Bay experience a safer environment than in their home communities. Long term exposure to our zero harm safety culture could potentially have the effect of reducing injury hospitalizations and potentially avoidable mortality, possibly reducing the need for medical evacuations in the Kitikmeot. 3. Selection of Treatment Facility: In the case of a hypothetical future on-site medical evacuation, patient assessment would determine which medical facility a person would be evacuated to. Depending on the severity of the injury, treatment options, and other factors, an injured worker could be evacuated directly to Stanton Hospital in Yellowknife or a medical facility in southern Canada. For any given potential medical evacuation, it is not certain that support would be required from the Cambridge Bay Health Center or GN contracted medical services.
15	GN/NHC	Reassessment of Projected Impact on Housing	FEIS, section 5; Project Proposal — Doris North Mine Modifications and Related Amendments to Project Certificate (letter to NIRB and NWB); Appendix 23: Socio-Economic Effects Screening, Section 2	The 2006 FIES, Section 5, p. 5-58 states: "As previously mentioned, the Project is relatively small in scope and scale. The anticipated labour force can be fulfilled from communities in the environmental assessment area or sourced from outside the area all serviced by the camp requirements and a fly-in/fly-out arrangement. It is unlikely that large numbers of workers from outside the environmental assessment area will relocate to communities in the environmental assessment area for the purpose of employment on the Project. It is also unlikely that there will be a large demographic shift amongst the communities in the environmental assessment area in order to obtain employment on the Project." In addition, Table 5.18 in the FEIS also states that during the operation phase of the Project, "increased housing demands due to immigration of workers…from employment shifting" has "negligible to minor" significance, with "high to moderate" probability of occurrence and "moderate to high" capacity of communities to meet present and future needs. The accuracy of Projected impacts of the Project on population growth and its corresponding impacts on housing in the region is important for NHC in terms of planning and policy development for public housing and homeownership programs. Given that the proposed amendments to the Project include an extension of operations by 2-4 additional years, as well as increases to mining and milling rates, and additional infrastructure, NHC requests that the Proponent re-evaluate the impact of the Project on the housing situation in the region.	1. In Appendix 23 'Socio-Economic Effects Screening' include a sub-section in the socio-economic baseline for housing demand. The data required for this subsection can be retrieved from the Nunavut Housing Needs Survey through this link: http://www.stats.gov.nu.ca/en/Housing.aspx 2. Reassess the projected impact of the Project on the housing situation in the Kitikmeot, considering the longer timelines, and increased capacity of the operations phase.	1. Updated baseline information for housing demand has been provided for Appendix 23, as requested. Specifically, this includes a sub-section for housing demand based on the data available from the Nunavut Housing Needs Survey. A revised Appendix 23 is included as an attachment to the IR responses. 2. The conclusions of the FEIS remain valid. Specifically, it is unlikely that workers will relocate to communities nearest the Project (e.g., Cambridge Bay) or to the Kitikmeot Region for the purpose of employment on the Project. Evidence from the Doris North Socio-economic Monitoring Program shows that Project employees are not relocating to other communities within the Kitikmeot Region. In 2012 and 2013, no Project employees relocated to other communities due to work at the mine. TMAC maintains points of hire throughout the region and beyond. Because this project is a fly-in/fly-out operation and that there are multiple points of hire, where a person lives has little or no bearing on employment status. For this reason, a reassessment of the impact of the Project on the housing situation in the Kitikmeot Region is not required.

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KIA-IR001	KIA	Effect of the new above ground pipeline to Roberts Bay on movement of caribou and other large mammal VECs not screened into the assessment. Please provide the following: • Scientific rationale for excluding consideration of effects of the new above ground pipeline to Robert's bay on wildlife movement.	• Appendix 1: Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water License No. 2AM-DOH1323; • Appendix 1- NIRB Application Forms, P. 26, Table 1; • Project Proposal: Doris North Mine Modifications and Related Amendments to Project Certificate No. 3 and Type A Water Licence No. 2AMDOH0713. 2011, P. 22, S. 4.4.4	The new above ground pipeline to Roberts Bay may act as a partial barrier to movement of mammalian VECs that resist crossing pipelines at particular heights An impact assessment on effects of above ground pipelines on movement of potentially impacted wildlife VECs (particularly the Dolphin and Union Caribou, now listed on Schedule 1 of the SARA) seems warranted.	Since the time that amendment documents were first written, there has been emerging information from above ground pipeline projects (largely Oil and Gas projects in AB) showing that these structures can affect movement patterns of woodland caribou (particularly fast movements). Some effective mitigation techniques have also been developed to alleviate movement effects. These studies and mitigation techniques should be considered in the project amendment impact assessment.	The oil and gas pipelines in Alberta are dissimilar to the one proposed in this amendment application because the engineering requirements to support those structures are significantly different (i.e. larger and higher off the ground) than what is being proposed in this amendment application. The above-ground pipeline from the Tailing Impoundment Area (TIA) to Roberts Bay will have a maximum diameter of 40 cm (15.75 in) and be placed on the ground alongside the site roads. The design of the pipeline and its placement is not expected to pose any additional risk to wildlife movement in the Doris North Project area. Additionally, there are similar existing pipelines in place at the Doris North Project and effects on the movement patterns of caribou have not been identified to date. The Wildlife Mitigation and Monitoring Program (WMMP) will continue to monitor wildlife interactions at the Doris North project and determine whether predictions that the mine site infrastructure, including this proposed pipeline, pose unanticipated impacts to caribou. Should the WMMP identify impacts, additional mitigation measures, including the addition of caribou ramps, will be considered.
KIA-IR002	KIA	Effects of doubling camp personnel, increasing milling rates, using more equipment, increasing olfactory disturbances, and lengthening operations (overall, an increase in potential disturbance to wildlife) were not screened into project amendments requiring re-assessment. • Provide information on the magnitude and duration of disturbances due to the amendments (e.g. noise models, olfactory models, changes in vehicular rates, disturbance duration); • Provide scientific rationale for not assessing the new disturbance effects on wildlife (particularly grizzly bear and caribou).	• Project Proposal: Doris North Mine Modifications and Related Amendments to Project Certificate No. 3 and Type A Water Licence No. 2AM-DOH0713. 2011, Page 22, Section 4.4.4; • Appendix 3: Mine Infrastructure Changes- Supporting Memo, P. 3-10 to 3-12 S. 3.7; • Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water License No. 2AM-DOH1323. Updated 2013, P. 26, 27. Table 1 of Appendix 1 of the Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water License No. 2AM-DOH1323, updated in 2013.	The document states that the primary effects of the project on wildlife are expected to stem from disturbances (Page 3-10, Second document listed), but the disturbance effects of amendments are not quantified and assessed as potential impacts on wildlife. Table 1 in Appendix 1 of the NIRB forms, (updated in Nov 2013} does not contain a suitable line entry allowing for the screening of the effects of increased overall disturbance on wildlife.	Additional personnel working on site for a longer period of time will result in more disturbance stimuli (visual, noise, olfactory), which should be quantified and considered (both individually and in totality) with respect to predicting impacts on wildlife. Although the newly proposed activities have geographical areas that lie within the geographical area included in the Doris North Project Final EIS, the disturbance effects are not confined to these geographic boundaries. There exists no means to evaluate or "screen in" this effect on wildlife, even though it may be the most important effect occurring as a result of the proposed amendments.	The increase in the number of workers on the site are not expected to increase the level of disturbance to wildlife. The project amendment does not include activities which will introduce new forms of disturbance and the activities of these workers will, almost entirely, be confined to the footprint area, so the area of disturbance is not expected to change either. The three variables which typically do affect the amount of noise produced by a project are: 1) increased helicopter usage, 2) increase in surface blasting and 3) transition to a noisier type of fixed wing aircraft. These variables are expected to remain constant and so the total noise and disturbance are also expected to stay relatively the same with the new amendment. Given the relatively small size of the mine site, and the limited spatial and magnitude effects predicted for wildlife, the additional proposed underground mining activity are not expected to add any additional potential effects for wildlife, nor alter the predictions of no significant effects from the 2005 Doris North EIS. Ongoing monitoring during the pre-construction, construction and care and maintenance phases of the project have not detected any significant effects on wildlife.
KIA-IR003	KIA	Baseline surveys for marine mammals within Roberts Bay are scarce,	Appendix 4-2: Existing Baseline Conditions in	Only one ship-based survey was done for marine mammals in Roberts Bay. This survey was done from a barge en route to or from Cambridge Bay over a short period in August, 2010. The aerial surveys for seals hauled out	The available information on the use of Roberts Bay by marine mammals seems insufficient for an effects assessment of amended project conditions. In the one	(NIRB Rationale/Comment: The NIRB recognizes that the original October 15, 2002 EIS Guidelines as issued for the Doris North Project may not request this information and

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		and an adequate characterization of baseline conditions for marine mammals in Roberts Bay does not appear to be available. Please provide more baseline information on marine mammal presence and timing within Roberts Bay, or supplement information with TK/IQ (if available for the area).	Roberts Bay, Page 4-35 Section 4.3.4.2 Barge Survey	on sea ice appeared to have focused on other, larger geographical areas, or captured conditions in Bathurst Inlet. The baseline community and timing of use, therefore, does not appear adequately characterized for marine mammals. By extension, making informed predictions about the impacts of proposed activities on marine mammals, and required mitigation, seems difficult.	survey of Robert's Bay in August, two ringed seals, one bearded seal, and one unknown seal were observed. Seal pups are also usually born in early spring, and which would not have been captured in the survey described. No whales were recorded, although multiple species could use the area at different times of the year. Information on marine mammals using Roberts Bay is required to determine the likelihood of effects due to project amendments.	as such is not requesting that the Proponent collect substantive additional research data; however it is encouraged to consider providing information in response to the request, noting that desktop research may be an effective means of doing so.) A number of surveys have been conducted at Doris North, directly for marine mammals, or for other species where marine mammals were recorded incidentally. The results of these surveys indicate that two species of marine mammals, ringed seal (*Pusa hispida*), and bearded seal (*Erignathus barbatus*), occur in marine environments surrounding the Doris North Project. These results agree with published accounts of species distribution. Both seal species have a holarctic distribution and frequent the Bathurst Inlet and Coronation Gulf area throughout the year. Ringed seals are the more abundant of the two species (Priest and Usher 2004). This species is common throughout the Arctic, making it difficult to identify important areas of critical habitat. However, higher populations are known to occur in the eastern Arctic, including Lancaster Sound, Barrow Strait, and Baffin Island (NPC 2008). Two other species, beluga whale (*Delphinapterus leucas*) and narwhals (*Monodon monoceros*) occur in the greater regional area. Beluga whales are infrequent summer visitors to Bathurst Inlet based on historical evidence (Stewart and Burton 1994; Priest and Usher 2004; NPC 2008). Narwhals also occur in the region, but has not been observed in Melville Sound. The range of narwhals is predominantly thought to occur in the eastern Arctic, with two populations; the Baffin Bay and Hudson's Bay populations. The area of narwhal habitat closest to the Project site is approximately 500 km east near Gjoa Haven (NPC 2008). Narwhals have not traditionally been observed as far west as Bathurst Inlet. However, in 2011 a pod of narwhals was observed for the first time in recorded memory in Cambridge Bay (Alex Buchan 2011, pers. comm.). Several surveys were conducted which recorded marine mammals in the project area. The results of these surveys agree with published accounts of the species which are expected in Melville Sound. The primary species observed were ringed and bearded seals: 1) A marine mammal survey conducted on a barge during the summer, August 10-12, 2010. 2) A spring survey for caribou distribution on the sea ice in Melville Sound on June 3-4, 2010, was conducted using parallel transect lines that recorded seal holes and seals.

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						3) Spring caribou surveys conducted during (2006-2011) where transects extended in a grid over eastern Melville Sound. 4) Aquatics and marine bird surveys have also been conducted during the open water season and recorded observations of seals. These survey indicated that the majority of seal breathing holes (and use) occurs at greater distances from shore and hence in the larger bays. Locally, 92% of seals breathings holes were observed in Hope Bay with the remainder in Roberts Bay and Reference Bay. Taken together, these surveys indicate that the predominant marine mammals in the project area are ringed and bearded seals and that the majority of activity during the sea ice period is in Hope Bay.
KIA-IR004	KIA	The last 3 paragraphs of this section are unclear. Please provide information on: • The total number of aerial surveys that were conducted that included Roberts Bay; • The time of year of those surveys relative to surveys of the surrounding area; How the conclusion that "Roberts Bay is used infrequently by caribou in comparison to the regional landscape" was arrived at. Please also include TK/IQ on use of this area b caribou.	Appendix 4-2: Conditions in Roberts Bay, Page 4-36-4-37 Section 4.3.5 Caribou.	The limited data that were collected on caribou movement through Roberts Bay as inferred by tracks, present only a snapshot of tracks observed in May, which were compared to track densities in surrounding areas collected in other months. Snow track densities can be influenced by snowfall, wind, or can simply be vary with the seasonal period within which they are observed. A single snapshot of snow tracks cannot be objectively compared to tracks collected at another time in surrounding areas to conclude 'low relative use'. Increased scrutiny will be applied to Dolphin and Union caribou due to their recent addition to Schedule 1 of the SARA. A solid understanding of use of the area prior to project development is needed for IA predictions and establishment of effective mitigation, monitoring and management plans.	Baseline habitat use and movement must be understood to predict impacts, or propose mitigation for wildlife. This is particularly important for Dolphin and Union caribou, which were added to Schedule 1 of the SARA as a species of Special Concern. [The NIRB applications fail to recognize this change]. Species on Schedule 1, and their critical habitats, are afforded enhanced scrutiny and legal protection. The Act also contains provisions to help manage species of special concern to prevent them from becoming endangered or extinct. The proponent must demonstrate that Roberts Bay is not within important migratory habitat, and that sufficient monitoring and adaptive management is in place to meet the requirements of the new SARA designation. Sections of the SARA pertaining to management of species of special are found ins. 65, 66(1)(a)(b)(c) (d)(e), 66(2) and 66 3. S. 73(1), 73(2)(a)(b)(c), and 73(3)(a)(b)(c).	(NIRB Rationale/Comment: The NIRB recognizes that caribou are designated as a VEC within the October 15, 2002 EIS Guidelines as issued for the Doris North Project, and while it is not requesting that the Proponent collect substantive additional research data, it does require that TMAC provide information to support a response to the issues raised by the KIA.) The Doris North Project has assessed the use of the Project area by the Dolphin and Union caribou in four ways: 1) analysis of available satellite collar data, 2) aerial surveys for trails, 3) motion-triggered camera surveys, and 4) incidental observations. The results of these analyses and surveys indicate that Roberts Bay is used seasonally by, but is not a key migratory corridor for, caribou. Poole et al. (2010) used 20 years of collar data to describe the large-scale locations and timing of collared caribou crossing Melville Sound, Coronation Gulf and Dease Strait. They reported that Dolphin and Union caribou wintering to the east of Bathurst Inlet will follow two routes north, either crossing Melville Sound to the Kent Peninsula or travelling directly along the Kent Peninsula where it joins the mainland just east of Melbourne Island. These animals then cross Dease Strait to Victoria Island in May and early June. When crossing Melville Sound, caribou crossed at points of land, or where islands were nearby. An aerial survey was conducted in May 2010 of Melville Sound and Bathurst Inlet to examine crossing locations of migrating Dolphin and Union caribou. This survey recorded 114 caribou trails, the majority of which were located in western Melville Sound using a group of small islands to transit to the Kent Peninsula. Spring surveys for caribou (2006-2011) also covered the eastern portion of Melville Sound and recorded incidental observations of caribou and caribou tracks along the eastern shore of Hope Bay, the point of land between Hope Bay and Roberts Bay and in the islands to the east Roberts Bay.

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						These results indicate that the Dolphin and Union caribou do not make preferential use of Roberts Bay. TMAC continues to monitor caribou interaction with the Project with the use of motion and time-triggered cameras, and is discussing the option of collaborating on more regional-scale caribou research with the GN DoE. Additionally, TMAC has mitigation and management measures in place (outlined in the WMMP) that reduce the project impact on caribou by limiting disturbances to animals.
KIA-IR005	KIA	TMAC now plans to maximize the use of the TIA by depositing more tailings than originally estimated. A final water cover of 2.3 m is determined to be adequate to prevent re-suspension of tailings under all conditions, allowing a greater volume of tailings to be deposited while maintaining the current closure plan. Please provide additional information pertaining to the TIA on: A) Whether the reduction of the TIA water cover is expected to result in changes in pH or contamination of cover water; 8) Whether contamination thresholds in TIA cover water have been established that, when detected, will trigger mitigation to prevent water consumption/ access of the TIA by wildlife. C) How the wildlife monitoring plan (WMMP) will allow for a timely adaptive management response in the case that wildlife are observed to be repeatedly using contaminated TIA water, or if contaminant concentrations detected through monitoring pose a threat to wildlife	Project Proposal: Doris North Mine Modifications and Related Amendments to Project Certificate No. 3 and Type A Water Licence No. 2AM-DOH0713. 2011, Page 26 Section 4.5 and A endix 14	Wildlife will be able to access the TIA Any changes in contaminant concentration of TIA cover water could have impacts on expected health and mortality of animals consuming or coming into contact with the water. If the water contaminant load in the 2.3 m of water covering the TIA is expected to change due to the new tailings management plan, or to experience re-suspensions more frequently, a reassessment of chemical impacts via a risk assessment and the establishment of monitoring threshold triggers for adaptive management for wildlife seems warranted. Thresholds (both in terms of water quality and observed wildlife behaviours) should be identified that trigger adaptive management responses for excluding or deterring wildlife from interacting with the TIA	Water cover depths for TIAs in Arctic environments largely require further research into the long term effectiveness of various depths for various tailings types. Some research needs include a better understanding of the influence of waves and return circulating events on erosion and re-suspension for different tailings types and different cover water depths, and changes that may occur with melting of permafrost. Most design methods fail to consider the complex combination of physical and chemical factors of northern environments, and models must be considered best effort predictions only. Since the amount of cover water is being largely reduced, a re-examination of the wildlife chemical risk assessment and establishing plans for thresholds that would trigger mitigation/adaptive management responses for wildlife interacting with the TIA is encouraged to safeguard against unanticipated events.	SRK prepared an updated water quality model for this amendment. See the details in the technical memorandum: Hope Bay – Tailings Impoundment Area Water and Load Balance Model Update, dated April 11, 2014, included as an attachment to the IR responses. The model predicted that the reduced water cover is expected to have a neutral pH and that water quality will meet the MMER and water licence requirements. As such, the amendment is not expected to result in water quality changes that would result in new impacts to wildlife. If the water quality guidelines of the MMER are surpassed in Tail Lake, then a risk assessment will be conducted to determine the level of risk for various wildlife species, including waterfowl nesting on the site and transient caribou and other mammals that may intermittently use the site. If the level of risk is deemed elevated, TMAC will propose management and monitoring activities in a timely fashion to regulators for approval and implementation.

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		experiencing occasional exposures.				
NRCan-001	NRCan	Permafrost	Project Proposal (TMAC 2013); Supporting Memo Rescan (2013); Appendix 11 and 14.	Design and closure plans for the Tailings Impoundment Area (TIA) The proposed modifications to the Project include changes in the volume of tailings and water that will be directed to the TIA. The extension of underground mining to the Doris Central and Connector deposits means that additional tailings will be produced and stored in the TIA. Since mining will occur within the talik beneath Doris Lake, additional water flowing into the mine, which is likely to be saline, would also be directed to the TIA. Changes in the water management strategy with respect to decanting will also be required to deal with the increased salinity of water in the TIA. Water will be pumped and transported by pipeline to Roberts Bay for disposal in a marine environment rather than directed to Doris Creek as planned in the Approved Project. The Approved Project allowed for a water cover in the TIA of up to 4m deep at full supply level (FSL). The Proponent has conducted further analysis regarding the minimum water covered required and has concluded that 2.3m is required (App. 14). Since the tailing volume will be greater for the modified project, the TIA will need to operate at close to FSL to achieve the minimum water cover (based on the original plans presented for the Approved Project for the TIA and associated dams). This will allow for less capacity to deal with greater volumes of water that may result from extreme events or malfunctions of the pumping system. It is not clear if there will be any modifications to the original dam design to deal with this possibility given the need in the proposed project to ensure that water in the TIA remains isolated from the surrounding environment. The Approved Project described the TIA as a walk-away-solution for tailing disposal. The plans called for breaching of the dam with subsequent lowering of water in year 9 as water quality was expected to meet CCME guidelines at the time. There was therefore no need to ensure stability and integrity in perpetuity of the dams associated with the TIA. It is not clear what modifications will be required to the closure plans for the TIA or whether the integrity of the dams needs to be maintained for a longer period to ensure that water in the TIA is isolated from surrounding environment and Doris Creek.	a. Please provide any new information regarding design of the TIA including modifications to dam design to accommodate the proposed project modifications. Please include with this the results of any additional baseline data collection or analysis conducted to support TIA and dam design. b. Please clarify whether modifications are required to the closure plan for the TIA and associated dams, in particular whether long-term maintenance of dam integrity is required to ensure environmental effects are minimized.	a. No new design modifications will be required to the Tailings Impoundment Area (TIA) and the dams to accommodate the proposed project modifications except for the final water cover depth discussed in Appendix 14 of the amendment application. Baseline data of the North Dam's performance is provided in the 2013 Annual Geotechnical Inspection Doris North Project, Hope Bay, Nunavut, dated March 2014, and recently submitted to the NWB as per Part J, Item 19 of the water licence. b. No modifications are required to the closure plan other than what is discussed in Appendix 14 of the amendment application and in Chapter 7 of the Hope Bay Project, North Dam As-Built Report, dated October 2012, available at: ftp://nunavutwaterboard.org/1%20PRUC/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-DOH1323%20TMAC/3%20TECH/5%20CONSTRUCT%20%28D%29/D26/2012/121116%202AM-DOH0713%202012%20Const%20%20summary-IAAE/.
NRCan-002	NRCan	Hydrogeology	Project Proposal (TMAC 2013); Supporting Memo Rescan (2013); Appendix 9; Appendix 10	Modelling of groundwater inflow to the underground mine One of the proposed modifications of the Project is to extend underground mining to the Doris Central and Connector deposits. These deposits are within the talik (unfrozen ground) beneath Doris Lake and will cause groundwater to flow into the underground mine. The previous plan was to mine only in permafrost areas, which significantly limited groundwater inflows into the mine, as the permafrost was thought to be impermeable to groundwater flow. The proponent has conducted modelling to estimate the inflow of groundwater into the underground mine workings. They suggest that such inflows will occur through three pathways: (1) through fractured bedrock, (2) through structures including faults and permeable sections of the contact with the diabase dyke, and (3) through former exploration drillholes. Since the exact location of faults and permeable structures is not known and will not be known until mining commences, the bedrock was assumed to be homogenous, and for the purposes of modelling, an equivalent porous medium approach was used to estimate bedrock inflows. The proponent used a bulk hydraulic	a. Please provide the updated hydrogeological conceptual model that was updated with additional data collected in 2011 (SRK, 2011b [in prep]. Hope Bay Updated Hydrogeologic Conceptual Models and Groundwater Inflow Estimates. Report in preparation to Newmont). b. Please provide hydraulic conductivity data and locations of data collection, and an assessment of how the bulk hydraulic conductivity value used in the model was determined. c. Please provide hydraulic head data, including the location and depths of wells used to determine hydraulic head, dates of data collection, and values obtained, as well as how these values were utilized in modelling and calibration. Provide information on the monitoring of groundwater levels during operations and closure/postclosure phases.	a. Please refer to the draft report "2011 Stage 2 Geotechnical and Hydrogeological Assessment for Doris Central and Connector Underground Mines", included as an attachment to the IR responses. b. A summary of available data and description of data analysis is included in the report "2011 Stage 2 Geotechnical and Hydrogeological Assessment for Doris Central and Connector Underground Mines". c. Hydraulic head data is presented in the report "Hope Bay 2010 Westbay Program Data and Installation Report", included as an attachment to the IR responses. Because the groundwater boundary conditions will be dominated by the presence of Doris Lake above the mine, the model was not specifically calibrated to head data. The modeling approach is considered conservative for estimating inflows. A description of the modeling method is provided in the report "2011 Stage 2 Geotechnical and

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				conductivity value for bedrock, based on dozens of hydraulic conductivity values determined from fieldwork. Groundwater inflows to the mine were estimated at 3500 m^3/day for the first year of mining in the talik under Doris Lake and at 7000 m^3/day for the second year. The proponent indicated that a grouting program will be put into place in order to prevent excessive groundwater inflows to the mine. This will consist of drilling test holes for water in advance of development and if substantial inflows are anticipated a grout curtain will be put in place. The exact location of former exploration drillholes was also not known, and the proponent incorporated their presence into the model as a small number of boreholes that remain open for a period of one week before being plugged. It is important to know the quantity of inflows to the mine from groundwater as this water will be transported to the surface and stored in the TIA for the 2 years of mining in the talik and for 6 months following cessation of this mining. An accurate estimate of the volume of water to be stored in the TIA is required for water balance calculations and for determining if there is adequate storage capacity in the TIA and for determining the timing of discharges to Roberts Bay. The proponent indicates that the hydrogeological conceptual model is being updated with additional data collected in 2011 and provided a reference. NRCan was not able to locate this document and would like to review this document, in order to assess the methodologies and see if groundwater inflow estimates have changed. Hydraulic conductivity data is not presented. This data would be useful in assessing if the bulk hydraulic conductivity value used in the model is representative of the conditions present in the talik beneath Doris Lake. Specifically, NRCan would like to see the spatial distribution of the test sites used in determining hydraulic conductivity values. It would also be useful to provide the raw data from each test as well as a discussion of how the various sets of data were compiled to produce a single hydraulic conductivity value. No information is presented on hydraulic heads in the talik beneath Doris Lake. Such information is needed to determine the hydraulic gradient and to understand the groundwater flow regime beneath the lake. Presumably, such information was used in the groundwater flow model. It is unclear how groundwater levels will be monitored once mining has commenced and once mining ceases. It is unclear if there are plans to monitor groundwater levels during operations and closure/post-closure phases of the project. While three scenarios were run for the model (base case with groundwater inflows from mine workings, low flow groundwater inflows from mine workings, and no groundwater inflows), the latter two scenarios are unlikely. It would be more useful to present a sensitivity analysis of the model to changing model input parameters (especially hydraulic conductivity). There are no details presented on how open boreholes that discharge groundwater to the mine will be located in a timely manner and plugged. NRCan would need such information in order to determine if leaking boreholes could be effectively plugged within a week, hence, if estimates of groundwater inflow are accurate.	d. Please present a sensitivity analysis of the model to changing model input parameters that includes hydraulic conductivity. e. Please provide an explanation of how open boreholes discharging groundwater to the mine will be located in a timely manner and plugged. f. Please provide a discussion of how groundwater inflows to the mine will be managed once the two years of mining in the talik beneath Doris Lake have been completed. Clarify if the underground mine will be allowed to fill completely with water once the 6-month period is completed or if groundwater inflows will somehow be inhibited? Provide a discussion of how post-closure inflows could affect the water level in Doris Lake?	Hydrogeological Assessment for Doris Central and Connector Underground Mines". Because the groundwater system will be dominated by the presence of Doris Lake, there is no plan or need to monitor groundwater levels during operations or closure/post-closure. Any localized change in groundwater conditions will return to static once the mine has flooded. d. Results of sensitivity analysis are included in the report "2011 Stage 2 Geotechnical and Hydrogeological Assessment for Doris Central and Connector Underground Mines". e. The primary method that will be used to seal holes will involve inserting a margo-type plug to control flow and cementing or closing off as needed based on specific conditions. If necessary, mining equipment will be used to insert plugs. The need for additional contingency control measures will be assessed as part of detailed mine planning. These could include designing mining areas to avoid areas of known higher permeabilities or exploration holes, cover grouting, installation of watertight bulkheads to close off sections of the mine, or utilizing existing or engineered stopes to provide surge storage capacity. f. After mining is completed and the mine decommissioned, it will be allowed to flood. When flooding starts, fifty percent of the total mine workings are assumed to be open; to decrease operational water management requirements, mined-out areas will be opportunistically sealed off and are assumed to already be flooded by the end of mining operations. It is assumed that inflow occurs to only fifty percent of the total mine workings (leaving approximately 350,000 m^3 to be flooded). Assuming a conservative inflow rate of 7,000 m^3/day for the duration of flooding, the remaining mine workings will take approximately 50 days to flood. This inflow rate would result in a lowering of Doris Lake water level on the order of 10 cm during this time. In reality, the inflow rate is likely to decrease as the mine floods and the gradient between Doris Lake and the mine workings decreases. Once flooded, there will be no gradient between the lake and mine workings and there will be no effect on Doris Lake water level as it returns to its original water level.

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				NRCan did not find a discussion of how groundwater inflows to the mine will progress or be prevented once the two years of mining in the talik beneath Doris Lake have been completed. The reclamation and closure plan indicates that pumping of groundwater from the underground mine workings to the TIA will occur for the first 6 months of the post-operations period. It is unclear how this time frame was determined. Will the underground mine be allowed to fill completely with water once the 6 months period is completed? How would this affect the water level in Doris Lake?		
NRCan-003	NRCan	Hydrogeology	Project Proposal (TMAC 2013); Supporting Memo Rescan (2013); Appendix 9	Groundwater quality of underground mine inflows from groundwater The extension of underground mining to the Doris Central and Connector deposits within the talik beneath Doris Lake will cause groundwater to flow into the mine. It is essential to understand the quality of this water, as it will be stored in the TIA for the 2 years of mining in the talik and for 6 months following cessation of this mining. An accurate estimate of water quality is required to determine the most appropriate water treatment and disposal options for water in the TIA. The proponent has indicated that while initial mine inflows from groundwater will be saline based on the quality of water currently present at depth, later mine inflows will resemble the quality of water in Doris Lake. The implication is that existing groundwater will be displaced by Doris Lake water. However, the proponent has explained that they do not know when this shift could occur. The proponent has provided water quality data from a single multi-level well within the talik. Three zones were sampled during one sampling trip in April 2011. There is no information provided on other samples obtained, either at the same set of wells or at other wells. Typically water quality estimations are not based on one set of data from a single sampling trip. A single site is not usually sufficient as there can be variations in groundwater quality throughout a site, which could be dependent on variations in the deposits present at different locations within the site and on the position in the hydrostratigraphic framework relative to sources of groundwater recharge and mixing. Stable isotopic data, which the proponent collected, could be used to clarify the source(s) of water that contributed to the groundwater sampled and could provide information on groundwater age. A single season of groundwater data is not usually sufficient because shallow groundwater often exhibits seasonal variations, which means that any single season's worth of data may not represent the long-term average or even the yearly average for groundwater quality. Additionally, there is the potential for sampling error. Multiple sampling trips minimize this risk. It is not clear if other groundwater quality data from the talik exists or if there are plans to supplement this data. There is no discussion of how groundwater quality and groundwater discharge quality (into the underground mine) will be monitored during the two years of mining in the talik beneath Doris Lake or following the cessation of mining. Again, it is unclear how groundwater inflows to the mine will progress or be prevented once mining ceases.	a. Please indicate if additional water quality data is available for groundwater within the talik beneath Doris Lake. If additional data is available, please provide this data and describe how it is used in determining water quality in the TIA and water treatment and disposal measures. If additional data is not available, provide a plan for supplementation of this data. b. Please provide a discussion of the stable isotopic data collected for groundwater within the talik beneath Doris Lake, in order to assess the provenance and age of this groundwater. c. Please provide information on how groundwater quality and/or groundwater discharge quality to the underground mine will be monitored during mining and following the cessation of mining.	a. The data provided in Appendix 9 of the amendment application are the last of one year of sampling, with samples collected over multiple trips. All available data are provided in the report "Hope Bay 2010 Westbay Program Data and Installation Report", included as an attachment to the IR responses. The data used in the water quality predictions were the highest 75th percentile from any monitoring zone, based on all available samples. Data used in the water quality predictions provides a conservative estimation of groundwater quality that will be observed. b. A discussion of isotope data is presented in "Hope Bay 2011 Groundwater Quality Report", included as an attachment to the IR responses. Broad discussion about possible provenance and age is part of general interpretation. c. In general, the quality of cumulative underground water discharged from the mine will be monitored at end of the dewatering pipe and/or at the pipeline location from where water can be discharged to the Tailings Impoundment Area (TIA) or Roberts Bay. Water quality at specific groundwater inflow locations will not be monitored on a regular basis. During flooding and once reaching a stable flooded water level, there will be no discharge from the underground. During this period, no further testing will be done.
1	TC	Accommodation Barges	Executive Summary on Page 8, paragraph 7 and 4.13 section	Unclear whether additional accommodation barges will be brought to site for the additional 180 staff. A one- time exemption is required to allow Foreign Flagged registered barges to be towed from its originating location to a planned destination.	Are any new accommodation barges being acquired for project? If so, is the vessel Canadian or Foreign flagged and if the vessel is registered?	It is anticipated that TMAC would utilize market vessels and would not acquire any accommodation barges.

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				Should another barge be required TC will need to determine if the barge is Canadian or Foreign Flagged, and if the barge is registered or not, prior to allowing its transit to a permanent location to be in compliance with the Marine Transportation Security Regulations (MTSR).		
2	TC	Accommodation Barges	Executive Summary on Page 8, paragraph 7 and 4.13 section	No registration details regarding the accommodation barge already on-site.	TMAC to provide registration details on the existing accommodation barge on-site.	TMAC is not currently utilizing any accommodation barges at site.
3	TC	Accommodation Barges	Document - Amendment changes summary Section: 4.13 Roberts Bay: Laydown, Water Intake, Accommodation Barges, and Winter Fuel Barges	Compliance with regulatory requirements TMAC has indicated to maintain the option to continue to use the accommodation barges in Roberts Bay. Accommodation Barges are subject to relevant requirements of *Canada Shipping Act 2001* (CSA 2001) and *Arctic Waters Pollution Prevention Act* (AWPPA). ***Canada Shipping Act, 2001*** **(CSA 2001)** The CSA 2001 is the principal statute that governs safety in marine transportation and protects the marine environment. It applies to all vessels operating in Canadian waters and Canadian vessels worldwide. Its regulations include requirements for a vessel's construction, how it manages ballast water, its pollution control equipment, arrangements for emergency response, and its crew qualifications. ***Arctic Waters Pollution Prevention Act*** **(AWPPA)** The AWPPA provides enhanced protection for vessels operating in Canadian jurisdiction north of 60° North latitude. It provides specific construction standards for vessels engaged in Arctic shipping, a system of shipping safety control zones, a ban on discharges of oil, hazardous chemicals, and garbage, and requirements for vessels to carry insurance to cover damages from any these discharges. While the provisions of the CSA 2001 and its associated regulations apply in all Canadian waters, vessels in Arctic waters north of 60° North and out to the 200 nautical mile limit of Canada's Exclusive Economic Zone, are also subject to the provisions of the AWPPA. There is one notable exception to provisions in the Arctic compared to elsewhere in Canada: discharge limits. The AWPPA prohibits discharges of oil, chemicals, garbage and other wastes generated onboard vessels, except untreated sewage which may be discharged. The AWPPA is based on the polluter pays principle. The following key regulations support the AWPPA: • The *Arctic Shipping Pollution Prevention Regulations* which set requirements for how vessels operating in Arctic waters must be built and details conditions of the no-discharge regime. These regulations also establish vessel control systems for preventing a vessel from operating in ice conditions which exceed its capability. • The *Arctic Waters Pollution Prevention Regulations* which include a civil liability regime for vessels to ensure there is insurance to cover damages should deposits of wastes occur.	TMAC to provide details in regards to the Accommodation Barge and compliance with regulatory requirements. Details to include the type of vessels involved, intended purpose, pollution prevention and response measures and planned mooring arrangements.	Please refer to AANDC IR 3.
4	TC	Vessels	Project Proposal IA2M, sec 4.4.5, page 56; Exec Summary, page 22;	Vessels delivering fuel, and sealift materials/resupply Proponent has already delivered fuel and supplies to site; vessels conducting international voyages are required to interface with certified	TMAC to provide a list of which vessels they have and that are interfacing with Doris Bay?	(NIRB: Where the Proponent has not been explicitly required to address some of the following items within its IR Response Package, the NIRB strongly recommends that TMAC thoroughly review each item and make its own

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				marine facilities only. TMAC is required to become an occasional use marine facility prior to interfaces with these vessels. Proponent may be in contravention of the MTSR. ***Marine Liability Act*** **(MLA)** The MLA is the principal legislation dealing with the liability of shipowners and vessel operators in relation to passengers, cargo, pollution and property damage. It establishes uniform rules on liability and compensation by balancing the interests of shipowners and other parties involved in maritime accidents. The MLA sets out a regime that requires vessels operating in Canadian jurisdiction to carry insurance to pay for damages from oil spills. ***Coasting Trade Act*** **(CTA)** The coasting trade refers to Canada's domestic marine trade and includes the carriage of goods and passengers between Canadian points and other marine activities of a commercial nature. The CTA supports domestic marine interests by reserving the coasting trade of Canada to Canadian registered ships, with limited exemptions. The legislation provides an administrative process to temporarily import a foreign vessel under a coasting trade license when a suitable Canadian registered vessel is not available. ***Marine Transportation Security Act*** **(MSTA)** Transport Canada is responsible for increasing the level of protection of Canada's marine transportation system against unlawful interference, terrorism attack, and terrorist exploitation of it as a conduit to attack our allies. The Department helps industry achieve compliance with marine security legislation and regulations through awareness, certification, inspection, and enforcement, and helps ports, marine facilities and vessels implement the International Ship and Port Facility Security (ISPS) Code through the Marine Transportation Security Regulations (MTSRs). As a partner in the Government of Canada's interdepartmental Marine Security Operations Centres, Transport Canada works to detect, assess, prevent, and respond to direct or indirect marine security threats. The MTSA sets out a regime to protect and preserve the efficiency of Canada's marine transportation system against unlawful interference, terrorist attacks or use as a means to attack our allies. The MTSA came into force in 1994 as the legislative framework for securing the Canadian marine transportation system and applies to vessels and marine facilities operated in Canada, Canadian ships outside Canada and marine installations and structures. It does not apply to vessels and marine facilities under the authority of the Minister of National Defense or military vessels of a foreign country to the extent that the Minister of National Defence may exempt them from the application of this Act.		determination regarding the need for, or its ability to, provide an appropriate response.) TMAC has reviewed the applicable requirements in light of previous and planned activities. Any deliveries that Hope Bay receives that originated internationally are met and transferred ashore using domestic vessels. At no time does the Hope Bay facility interface directly with vessels engaged on a voyage from a port in one country to a port in another country. Vessels visiting this facility are all domestic and do not meet the definitions in Part 2 of the Marine Transport Security Regulations. For this reason, it does not appear that the Hope Bay facility meets the definition of "Marine Facility" or "Occasional Use Facility." However, TMAC will engage directly with Transport Canada on this issue and confirm our understanding of the regulatory requirements and the current applicability to the Project.
5	TC	Subsea pipeline and discharge system	Section 4.4.4 (page 4-41)	Impacts to navigation This proposed Tailings Impoundment Area (TIA) discharge proposal is subject to the *Navigable Waters Protection Act* (NWPA)/*Navigation Protection Act* (NPA) and an application should be submitted for review. ***Navigable Waters Protection Act*** **(NWPA)**	The proponent to provide an assessment of any potential impacts to navigation in Roberts Bay resulting from the construction, operation and maintenance of the pipeline system, along with any mitigation measures proposed to reduce any anticipated impacts.	The subsea pipeline and diffuser will not impact navigation into Roberts Bay. The location proposed is situated in the deepest area of the bay to ensure there is adequate clearance between any approaching vessels and the pipeline. In shallower water (<6m), at the final approach to the jetty, the pipeline is buried beneath the mud line to mitigate the potential for any vessels to conflict with the

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				The *Navigable Water Protection Act* (NWPA) is a federal law designed to approve works on waterways while protecting the common law public right of navigation. The NWPA sets out a regime to approve works built in, on, over, under, through or across navigable water in Canada. Transport Canada administers the NWPA through the Navigable Waters Protection Program. It is anticipated that the amendments to the NWPA will come into force in April 2014, under a new legislative name entitled the *Navigation Protection Act* (NPA). The NPA will apply primarily to works constructed or placed in, on, over, under, through, or across a schedule of clearly listed major waterways. Only those waters that are specifically listed under the NPA will be actively regulated for the placement/construction of new works. The NPA will also enable proponents of works in unlisted waterways to opt into the regime and seek approval of their proposed work, to give them additional legal certainty if the common law right of navigation is likely to be infringed. The NWPA currently remains in force and therefore, provisions for approvals of proposed works related to navigable waters will continue to apply under the NWPA up to and until the NPA takes effect. Transport Canada will continue to fulfill its role within these existing processes, regardless of whether projects are in scheduled or non-scheduled waters.		pipeline. Adequate mooring is provided once vessels are at the jetty. With these mitigation measures in place, TMAC does not believe there will be any potential impacts to navigation in Roberts Bay resulting from the pipeline system.
6	TC	Tail Lake - Tailings Impoundment Area (TIA)	SRK Consulting Memo Subject: Tail Lake Water Cover Design: Motivation to Reduce Water Cover Thickness	TMAC still intends to use Tail Lake as a TIA, but will reduce the water cover from the originally proposed 4.3m to the minimum design cover is 2.42m. Throwing or depositing of materials into a navigable water or in water that flows into any navigable water may be subject to Section 21 and/or 22 of the NWPA. To determine if the NWPA applies to Tail Lake, additional information regarding Tail Lake is required.	The proponent should provide the following information regarding Tail Lake: • Any information or evidence related to the past or historical use of Tail Lake for navigation either as an aqueous route as part of a navigation network (connecting waterways or locations) or as a self-contained route (fishing or recreation). • Any information about current use (or predicted future public appeal) on Tail Lake: e.g. Do employees of the mine use Tail Lake for navigational purposes? Is there an expectation that navigation will occur in the area after the mine closure?	Transport Canada previously evaluated the use of Tail Lake as a tailings impoundment area during the 2006 Doris North Project NIRB review and during the subsequent permitting period. TC did not require a *Navigable Waters Protection Act* Approval in relation to the Tail Lake tailings impoundment area (although such an approval was required and issued by Transport Canada in relation to the jetty located in Roberts Bay). Tail Lake is not used for navigational purposes at this time, nor is there an expectation that Tail Lake will be used for navigation after mine closure.
7	TC	Proposed Locations of Compensation Shoals in Roberts Bay	Appendix 5 Doris North Project: No Net Loss Plan for the Roberts Bay - Subsea Pipeline and Diffuser (Rescan, November 2013) Figure 4.1-3 Proposed Locations of Compensation Shoals in Roberts Bay	New fish habitat compensation shoals proposed for Roberts Bay There are 3 new fish habitat compensation shoals proposed for Roberts Bay. These proposed shoals are subject to review and require Approval under the NWPA/NPA.	The proponent should provide an assessment of any potential impacts to navigation resulting from the construction, operation or maintenance of these proposed shoals.	The placement of the fish habitat shoals considered navigation into the jetty during the design process. They are located in shallow water and situated well outside of any vessel approaches to the jetty. The fish habitat shoals will not have any impacts to navigation.
8	TC	Oil Pollution Prevention Emergency Plan (OPEP)	Document - Amendment changes summary. Section 9 Monitoring and Management Plans	Compliance with regulatory Requirements Transport Canada is the lead federal regulatory agency responsible for the National Marine Oil Spill Preparedness and Response Regime. Part 8 and its regulations require oil handling facilities (OHFs) that load or unload oil from vessels to have emergency plans. An OPEP is a regulatory requirement and must be reviewed by TC prior to commencement of the Project.	TMAC to provide a revised and updated OPEP to reflect planned transfer operations and the fact that the facility is now operated under new ownership.	A Transport Canada approved OPPP/OPEP for an oil handling facility at Roberts Bay was last used in 2012 when fuel was removed from the Roberts Bay tank farms prior to the site being placed in care and maintenance. It has not yet been determined whether TMAC will deliver fuel to site during 2014. Once this determination is made, the OPPP/OPEP will be revised and updated in advance of

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				Transport Canada requires project specific plans: • to ensure that operations have the appropriate infrastructures, plans, equipment and trained personnel to manage an immediate and effective response during oil transfer operations to or from a ship as per the regulatory requirements; • to ensure that an appropriate OPEP is available , responsible person identified to implement the plan, facility personnel are well versed in its content and application. • to ensure the OPEP are exercised and tested; • to ensure a preparedness capacity, and; • to ensure proper notification procedures when a spill occurs. TMAC must also ensure that the requirements of the CSA 2001 Part 8, the relevant regulations and standards outlined below can be met prior to commencing this Project and throughout this Project: • Response Organization and Oil Handling Facility Regulations • Vessel Pollution and Dangerous Chemicals Regulations • Environmental Response Arrangement Regulations • Oil Handling Facilities Standards (TP 12402) • Release and Environmental Emergency Notification Regulations		the next fuel transfer to take place at Roberts Bay. At that time, the plans will also be updated to reflect the new ownership of the project. The revised document will be sent to Transport Canada for review prior to use. As in previous years, the OPPP/OPEP will be updated annually in years of planned offload operations and any updated regulatory requirements.
9	TC	Over-wintering of vessels carrying fuel	Document - Amendment changes summary Section:4.13 Roberts Bay: Laydown, Water Intake, Accommodation Barges, and Winter Fuel Barges	Compliance with regulatory requirements Vessels that overwinter are subject to all requirements of the CSA 2001, Arctic Waters Pollution Prevention Act and their associated regulations. TMAC must ensure that relevant requirements of CSA 2001, AWPPA and the relevant applicable regulations are met, in particular: • Compliance with construction, manning, equipments and transfer operations standards. • Pollution prevention, response measures and Marine Liability requirements • Compliance with Arctic Shipping Pollution Prevention Regulations • Information respecting the specific vessel operation and proposed location of the overwintering, along with a risk assessment of overwintering the vessel in that location.	TMAC to provide their operations plan and risk assessment for overwintering of a fuel vessel. The risk assessment must be specific to the overwintering location.	Please refer to AANDC IR 3.
10	TC	Re-location of Anchorage, sub- sea pipeline and Jetty	Document - Project Proposal, Section 4.4.5, Appendix 4.1 Figure 2.2-1, Document- Mine Infrastructure Changes, Appendix 3 section 2.2.4	Safety of Vessels TMAC has identified that fuel vessel anchorage will be relocated, sub-sea pipe will run along the bottom of Roberts Bay and that to date modification work on the damaged jetty has still not been completed.	TMAC to provide: • Their plan as to how the proposed change in anchorage will be communicated to vessels calling Roberts Bay in order to ensure safe navigation. • Contact and share their plans with Canadian Hydrographic Services in regards to construction of sub-sea pipe. • Identify procedures to ensure vessels are anchored at a safe location clear of any obstruction and existence of sub-sea pipe communicated to vessels. • Safe berth to vessels/barges utilizing the Jetty to ensure safe mooring, safety of vessel and crew.	TMAC will implement the following mitigation measures in order to prevent any interaction between ships and the pipeline/diffuser facilities: • The pipeline in the shallow water will be buried beneath the mud line and/or located away from the main navigation access to the jetty. • As an additional measure, as-builts of the pipeline when completed will be included in an updated bathymetric map and distributed to all vessels entering Roberts Bay. This information will be shared with the Canadian Hydrographic Services. • Temporary anchorage is used by sealift vessels in deeper water to offload and lighter their cargo to the jetty with shallow draft barges. TMAC would require all vessels to verify that any temporary anchorage will not conflict with the subsea pipeline. • Adequate moorage including bollard on shore will be provided to allow safe berth of the lightering barges that come to the jetty.

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1	AANDC	Requested 60 Day Timeline for the Approval of Management and Monitoring Plans		The Licensee has not included revised management and monitoring plans in support of its application. Rather, as stated in section 9 of its project proposal (TMAC 2013), they are requesting that "updated plans be provided to the NWB within 60 days of executing any approved activities." Furthermore, as stated in section 5.2 of this document, the Licensee is requesting that plans be "deemed approved once the 60 day time period has passed." Based on an initial review of the application, the following management and monitoring plans referenced in the licence are affected by the proposed changes to project activities: i. Hope Bay Project Quarry A, B, and D Management and Monitoring Plan (SRK 2010a); ii. Hope Bay Doris North Waste Rock Ore Management Plan (SRK 2010c); iii. Doris North Project Interim Water Management Plan – Revision 5 (SRK 2012c); iv. Hazardous Waste Management Plan (HBML 2012a); v. Incinerator Management Plan – Rev 1.1 (HBML 2012b); vi. Waste Water Treatment Management Plan – Rev 3 (HBML 2012c); vii. Spill Contingency Plan (HBML 2012d); viii. Quality Assurance and Quality Control Plan – Rev 7.1 (HBML 2012e); ix. Tailings Management Plan (MHBL 2007); x. Aquatic Effects Monitoring Plan (Rescan 2010); xi. Doris North Closure and Reclamation Plan (SRK 2012b) Existing licence terms and conditions include timelines for the submission of revised plans by project phase (e.g., prior to the start of operations, following operations, and before a facility is commissioned). Furthermore, Part B, Item 6 of the licence allows the Licensee to submit revised plans with Annual Reports. This licence condition states: *The Licensee shall review the Plans referred to in this Licence, as required by changes in status of the Project, operation and/or technology, and modify the Plan accordingly. Revisions to the Plans shall be submitted in the form of an Addendum to be included in the Annual Report.* According to Part B, Item 4 of the licence, submitted plans cannot be implemented without written Board approval and direction. Furthermore, Part Item 7 of the licence states: *Every Plan to be carried out pursuant to the terms and conditions of the Licence shall become a part of this Licence, and any additional terms and conditions imposed upon approval of a Plan by the Board become part of the Licence. All terms and conditions of the Licence should be contemplated in the development of a Plan where appropriate.* The requested 60 day timeline for reviewing and approving revised management and monitoring plans outside of the application stage (i.e., during the licence term) is unreasonable. This would restrict for the Board's decision making process, limit the exchange of information between interested parties and the Licensee, and not consider the resources required by the NWB and interested parties to concurrently review the submissions of other Licensees/Applicants.	The NWB should carefully consider the implications associated with accepting the Licensee's request to submit revised management and monitoring plans 60 days prior to executing approved activities and the deemed approval of these plans following this time period. Adequate time should be allocated for the review and approval of revised plans.	The current approval process combined with the effect of the licence terms causes a potential significant operational impairment to TMAC. Historically, timelines associated with approval of management plans have been very lengthy and it is very different to plan implantation as a result. Our concern is that the current lengthy plan approval timelines have potential to add years to the overall water licencing process, which we do not believe is the NWB's intent. Given the requirements of the licence (in particular, Part B Item 4), in TMAC's review it is a reasonable request for the NWB to set a timeline for actual and deemed approval of management plans. In our view, 60 days from submission is a reasonable timeline. Our understanding is that once the NWB's new registry system is operational, all plans and correspondence should be distributed to reviewers more quickly than has occurred in the past. In order to permit reviewers the full advantage of the 60 day timeline, TMAC could copy all reviewers on the initial submission of the management plan to NWB staff. Alternatively, the licence could be revised to permit TMAC to implement plans once submitted to the Board, provided the plans otherwise comply with licence clauses. With respect to the request to defer updating of plans until after issuance of any amendments related to this application, TMAC notes that most of these plans have already been approved by the NWB and would require minimal updating. It is difficult to update the plans without knowledge of what the final post-amendment licence terms will be. See responses below which address specific management plans.
2	AANDC	Need for a Revised Tailings Management		The Licensee is requesting significant changes to the management of tailings that will be produced at the mill. These include: • Increased tailings production;	Prior to commencing at technical review of the application the Licensee should provide a revised	The changes to the TIA and related facilities, and anticipated inputs and discharges are described in the amendment application. A revised Tailings Management

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		Plan Prior to Commencing Technical Review		• Maximizing the tailings impoundment area's capacity by reducing the water cover from 4.0 m to 2.3 m; • Directing destructed cyanide tailings with flotation tailings to the tailings impoundment area (the previous management strategy was to place destructed cyanide tailings underground as paste backfill); • Directing saline groundwater encountered in the talik beneath Doris Lake (during mining of the Doris Central, Doris Connector, and below the permafrost in the Doris Lower deposits) to the tailings impoundment area; and • Discharging tailings impoundment area water to Roberts Bay rather than Doris Creek (following treatment). Although information related to these activities is provided in supporting memos the Tailings Management Plan should be revised in the application stage. This would allow interested parties to have a better understanding of how the above mentioned changes will be managed and provide meaningful comments to the NWB.	Tailings Management Plan. At a minimum, this plan should: • Addresses and expand on the headings included in the April 2007 plan (MHBL 2007) to incorporate changes that will result from the planned changes to project activities. These headings are: ✓ Purpose and Scope of the Tailings Management Plan; ✓ Construction of the Tailings Impoundment Area; • Construction of Dams and Embankments • Roads, Pipelines, and Distribution Lines ✓ Tailings Deposition; and ✓ Tail Lake Water Management • Objectives • Doris Creek Flow Monitoring • Determination of the Discharge Rate • Discharge Control • Operational Strategy • How the tailings impoundment area will be managed throughout the project's life cycle (i.e., operations, care and maintenance following the commencement of operations, closure, and post closure)	Plan will be developed and submitted 6 months prior to tailings deposition, as required under Part G item 25 of Water Licence 2AM-DOH1323. Also see AANDC IR 4 below for an outline of the suggested additional SNP monitoring appropriate for this amendment.
3	AANDC	Need for Revised Waste Rock and Ore Management and Quarry Management Plans Prior to Commencing Technical Review		The Licensee's Waste Rock and Ore Management Plan (SRK 2010c) and Quarry Management and Monitoring Plan (SRK 2010a) are considered significant components for the management of water within the project area. The application includes supporting memos for the geochemical characterization of the new Quarry I (SRK 2011a) as well as geochemical characterization and kinetic testing of waste rock and ore from the Doris deposits (SRK 2011b, SRK 2012c). The findings presented within these memos and the overall changes in waste rock, ore, and quarry management that will result from the proposed changes to project activities should be incorporated in revised management plans.	Prior to commencing a technical review of the application the Licensee should provide revised Waste Rock and Ore Management and Quarry Management Plans. These plans should incorporate the findings presented in the geochemical characterization and kinetic testing reports that were provided with the application.	No significant changes are anticipated necessary to the currently approved Waste Rock and Ore Management Plan (SRK 2010c) and Quarry Management and Monitoring Plan (SRK 2010a). The management of these activities described in the existing plans will remain appropriate post-amendment.
4	AANDC	Need for a Revised Water Management Plan Prior to Commencing Technical Review		Having a comprehensive Water Management Plan that addresses how contact and noncontact water within the project area will be managed throughout the project's life cycle (i.e., construction, operations, care and maintenance following the commencement of operations, closure, and post-closure) is important for the responsible licensing of this project. A plan that summarizes the various flow paths of water, monitoring regimes (i.e., monitoring locations, frequency of collecting samples, parameters that will be analyzed, reporting structure, etc.), discharge criteria, and hydrology would allow interested parties to have a better understanding of the proposed changes to project activities and provide meaningful comments to the NWB. The current Interim Water Management Plan (SRK 2012c) is limited in scope as it is specific to the project's pre-production phase. According to section 1.1 of SRK 2012c, the Licensee planned to implement the water management strategy presented in the plan until, "the site is either closed and reclaimed or proceeds into operations and tailings are discharged to Tail Lake. A final water management plan will be developed and implemented prior to depositing tailings into Tail Lake." The 2013 application proposes changes in water management that are not included in SRK 2012c. These changes include: • Marine discharge of treated water from the tailings impoundment area; • Reduction in Tail Lake water cover from 4.0 m to 2.3 m; • An expansion to the waste rock storage facilities (Pad U);	Prior to commencing a technical review of the application the Licensee should provide a revised (comprehensive) Water Management Plan that incorporates the proposed changes to project activities and water within the project area will be managed throughout the project's life cycle (i.e., construction, operations, care and maintenance following the commencement of operations, closure, and post-closure). This plan should summarize the various flow paths for water, monitoring regimes (i.e., monitoring locations, frequency of collecting samples, parameters that will be analyzed, reporting structure, etc.), discharge criteria, and local hydrology.	Water management at Doris continues to occur as outlined in the Doris North Project Interim Water Management Plan (December 2012) (see: ftp://nunavutwaterboard.org/1%20PRUC/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-DOH1323%20TMAC/3%20TECH/3%20WATER%20USE%20%28E%29%28F%29/). A full water management plan addressing the changes presented in the amendment application, as well as the fully constructed project, will be provided at least 6 months prior to operations as per Part F item 1 of Water Licence 2AM-DOH1323. Discharge from the Tailings Impoundment Area (TIA) will comply with all requirements of the amendment to the Water Licence. To support the development of licence requirements appropriate for this amendment, TMAC has outlined the proposed changes to the site Surveillance Network Program, including additional suggested SNP sampling locations, sampling frequency and timing, and discharge criteria in the document: Proposed Changes to SNP Outlined in Schedule J of 2AM-DOH1323, included as an attachment to the IR responses.

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				• A new pollution control pond on the waste rock expansion area (above); • A new laydown area near Roberts Bay; • Increased domestic wastewater treatment as a result of increased camp size; and, • An analysis of Windy Lake's capacity to support the water use requirements of the Doris North Project (potable use) and the Hope Bay Regional Exploration Program (drilling and potable use).		
5	AANDC	Need for Revised Closure and Reclamation Plan and Security Estimate		The Licensee has provided a supporting memo (SRK 2013) on changes to closure planning and the associated liabilities based on its application. Although this memo provides a good overview of changes to closure activities it is impractical to adjust the water licence security requirement (financial assurance) without a revised Closure and Reclamation Plan and detailed security estimate. Furthermore, an understanding of additional security requirements imposed by the Kitikmeot Inuit Association's land use authorizations should be evaluated before making any changes to the licensed security requirement.	Prior to commencing a technical review of the application the Licensee should submit a revised Closure and Reclamation Plan and (detailed) security estimate. The model used to estimate the total security estimate should be identified. A teleconference attended by the Nunavut Water Board, Aboriginal Affairs and Northern Development Canada, the Kitikmeot Inuit Association, and possibly, the Licensee may be warranted to discuss the potential discounting of land lease security from water licence reclamation security. Lessons learned from the recent Mary River Project application review may assist in identifying evidence required to consider applying discounting when setting the security amount.	Appendix 21 of the amendment application outlines the reclamation and security procedures, and costs associated with the proposed project changes. Since the submission of the amendment application, TMAC has submitted to the NWB an updated Doris North Mine Closure and Reclamation Plan (March 2014) for the currently permitted Doris North Project. In light of this recent submission, as well as this AANDC information request, the Doris North Mine Closure and Reclamation Plan for Amendment 1 DRAFT (April 2014) has been included as an attachment to the IR responses. It is a redline version of the March 2014 Plan, clearly highlighting the changes that this amendment will have on overall closure costs and approaches.
6	AANDC	Need for a Revised Wastewater Treatment Management Plan		Pursuant to Part G, Item 4 of the licence, the Licensee is required to submit a revised Wastewater Treatment Management Plan at least 60 days prior to re-commissioning the Wastewater Treatment Plant. The revised plan must take into consideration the following: a. Operation, maintenance, and sludge management; and b. Comments received during the review of the March 2012 (Rev 3) Plan as well as technical review comments provided on the October 2012 (Rev 3) Plan through the renewal application process. It appears that there was an oversight when setting this licence condition because according to monthly monitoring reports the Wastewater Treatment Plant has been operational since late March 2013.	Because the project's Wastewater Treatment Plant is operational the Licensee should provide a revised Wastewater Treatment Management Plan for technical review. This revised plan should address the requirements specified in Part G, Item 4 of the licence.	There are no substantial anticipated changes needed to the Doris North Wastewater Treatment Plan for the purposes of this Amendment. The Doris North Wastewater Treatment Plan has recently been revised and submitted to the NWB as per Part G, Item 4 of the licence.
7	AANDC	Water Management Planning		Part F, Item 1 of the licence approves the Licensee's February 2012 Doris North Project Interim Water Management Plan (SRK 2012a). The version included in the Licensee's 2012 renewal application was dated December 2012 (SRK 2012c). Section 4.4.2 of the project proposal (TMAC 2013) references a site wide water management plan that is not included in the application and states that more information on site wide water management is provided in Appendix #4 of the application which is a supporting document specific to the marine discharge of treated tailings impoundment area water (Rescan 2013). It is not known if the site wide water management plan is an actual document or an understanding that water will be managed in such a way to allow for the project to be developed as planned (i.e., the culmination of various operational activities). Section 9 of TMAC 2013 also makes reference to a Hydrology Monitoring Plan that is not included in the application.	Unless the NWB requires the Licensee to submit a revised Water Management Plan that addresses proposed changes to project activities and the anticipated project life cycle, Part F, Item 1 of the licence should be amended to reference the December 2012 Doris North Project Interim Water Management Plan (SRK 2012c) rather than the February 2012 plan (SRK 2012a). The Licensee should provide a copy of its Hydrology Monitoring Plan and site wide water management plan referenced in sections 4.4.2 and 9 of the project proposal (TMAC 2013) prior to the technical review of its application.	TMAC acknowledges this error in citation. The currently approved Doris North Project Interim Water Management Plan is dated December 2012. TMAC performs all required monitoring required under the Water Licence (2AM-DOH1323), as well as Doris North Fisheries Authorizations issued by DFO. Results of hydrology surveys are reported annually as part of a Hydrology Compliance Monitoring Report, which also outlines all survey procedures and compliance requirements. The 2013 Hydrology Compliance Monitoring Report has recently been submitted to the NWB, and the 2012 report can be found here: ftp://nunavutwaterboard.org/1%20PRUC/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-DOH1323%20TMAC/3%20TECH/3%20WATER%20USE%20%28E%29%28F%29/.
8	AANDC	Water use on Accommodation Barges and Fuel Vessels		According to the project proposal's executive summary (TMAC 2013), the Licensee plans to "supplement permanent accommodations located on site with continued use of the accommodation barges located in Roberts Bay or similar activities, which will support 125 additional workers during construction" and "from time to time and as needed, over-winter fuel	The Licensee should confirm whether water from Windy Lake or from other waters sources within the project area will be used to support its accommodation barges and fuel vessels.	As was previously the case, any accommodation barges used will be fully self-contained and will provide their own water through desalination of ocean water.

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				barges and vessels in ice in order to ensure continuous delivery of fuel to site." Section 1.3 of this proposal expands on the use and freezing in of accommodation barges and fuel barges/vessels by stating that these activities "may continue for the life of the project." The project proposal also states that the annual domestic water consumption limit should be increased by 2,555 m^3 to 25,500 m^3 (7 m^3 increase per day) to support the increased scope of project activities (additional 180 project personnel to a total of 360). This water would come from Windy Lake which already permits 22,995 m^3 for domestic use. The Licensee has not requested any change to the project's overall water consumption limit of 480,000 m^3 per year (water used for milling and processing purposes will originate from Doris Lake). It is not known if the requested increase in domestic water use will also support the accommodation barges and fuel vessels. Any water sourced from shore used by accommodation barges or fuel vessels should be authorized though a licence amendment.		
9	AANDC	Waste disposal from Accommodation Barges and Fuel Vessels		The licence amendment application does not describe how wastes originating from the accommodation barges and fuel vessels will be managed (i.e., domestic wastewater, solid waste, hazardous waste materials, etc.). Any waste materials produced by these barges and vessels that are managed on shore should be authorized through a licence amendment.	The Licensee should explain how wastes produced by the accommodation barges and fuel vessels will be managed (i.e., domestic wastewater, solid waste, hazardous waste materials, etc.).	Please refer to AANDC IR 3 in the NIRB IR response section above.
10	AANDC	Review of Landfarm Management and Monitoring Plan		Pursuant to Part G, Item 13 of the licence, the Licensee is required to submit a revised Landfarm Management and Monitoring Plan three months prior to commissioning its landfarm facility. The revised plan is to include the following updates: a. Operation and maintenance considerations including the methods of characterization, segregation, and treatment; b. Confirmation of the Soil Quality Remediation Objectives (SQROs) and distinction between where parkland versus industrial standards will be applied; c. Contingency measure for contaminated soils that do not meet the SWROs; d. As-built drawings signed and stamped by an Engineer; and e. Any proposed future uses. According to the 2012 Annual Report submitted pursuant to Part B, Item 3 of the licence, the project's landfarm facility was completed in 2011 and began receiving contaminated snow and soil shortly afterward. There is no indication that a plan has been approved. Therefore, commissioning of the landfarm appears to have been premature. On July 21, 2010, the NWB (NWB 2010) distributed to interested parties for information purposes a revised Landfarm Management and Monitoring Plan (SRK 2010b) that was submitted by Hope Bay Mining Ltd. (previous licensee) on July 16, 2010 as a requirement of Part G, Item 14 of the original licence. I cannot find review memos from interested parties or NWB approval of this revised plan on the NWB's public registry.	The Licensee's July 16, 2010 Landfarm Management Plan (SRK 2010b) should be included within the scope of the current application review.	The Doris North Landfarm will continue to be operated as per the Doris North Landfarm Management and Monitoring Plan. No significant changes to this Plan are anticipated as a result of this amendment application. The Doris North Landfarm Management and Monitoring Plan (March 2014) was recently revised and submitted to the NWB as per Part G Item 13 of Water Licence 2AM-DOH1323 and will be available on the NWB public registry.
1	EC/MPD and EPOD/ES	Water Quality Parameters and Discharge Criteria	TMAC Project Proposal (Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water Licence No.	A number of significant changes to water management are proposed, including moving to a year-round discharge from the Tailings Impoundment Area (TIA) to the marine environment, co-disposal of cyanide treated tailings with flotation tailings, and extended production and associated increases in water use and wastewater disposal.	Reconsideration of the Project Certificate will be necessary to amend the discharge criteria set for Doris Creek and set appropriate discharge limits for Roberts Bay. Further work is needed on contaminant concentration predictions. EC requests:	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 2.

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			2AM-DOH1323), Subsections 4.3, 4.4; Appendix 4: Roberts Bay Report, Subsection 5.2.3; Appendix 10: Water Quality Model, Subsection 3.1; Subsection 3.2.7; Subsection 3.4, Subsection 4.1, Subsection 5.1.2	Table 4-1 of Appendix 10 presents a summary of TIA Discharge Standards and Targets. The standards are taken from the existing Type A water licence discharge criteria (Section G, Clause 26) and the targets are taken from a 2011 evaluation of discharge concentrations back-calculated to maintain the water in Roberts Bay at CCME concentrations for contaminants EC understands that with the change from a seasonal, freshwater effluent discharge to a year-round marine discharge to Roberts Bay there is a need to re-evaluate the discharge criteria and regulated parameters. Metal Mining Effluent Regulations (MMER) limits would not be inappropriate for the marine receiving environment provided protective water quality objectives for a broader range of parameters can be met at the edge of a defined mixing zone in Roberts Bay. It should be noted that the MMER is undergoing review, and the Proponent should be aware of discussions regarding additional regulated parameters and changes to the criteria (lowering allowable discharge concentrations). EC has a number of concerns with the revised effluent quality predictions: 1. Ammonia • Ammonia was modeled taking into account contributions from the groundwater, degradation of cyanide, blasting reagents, and from camp wastewater. Subsection 3.2.7 of Appendix 10 models increases to groundwater concentrations from blasting, but does not appear to carry that forward to the TIA for the first 4-5 years of operations (see Subsection 4.1 of Appendix 10 which states that groundwater doesn't report to the TIA until year 5). • Considerable reliance is placed on natural degradation processes to reduce ammonia concentrations in the TIA during the open water season. Subsection 3.4 of Appendix 10 addresses the cyanide contributions and uses removal rates which are based on enhanced removal using the addition of phosphorus. The enhanced removal was carried through the modeling as the base case in order to meet the 6 mg/L discharge criteria. EC's concern is that enhanced removal has not been demonstrated to occur at high salinity, nor at such high latitudes and cooler temperatures where biological activity is limited by light and temperature. • Under the base case scenario, winter discharge must be stopped for various periods of time to comply with the ammonia discharge limit. As modeled, there was sufficient water retention capacity to accommodate periodically halting discharge, but if concentrations are higher than modeled, the ability to discharge may be further limited, and TIA capacity may become an issue. 2. Selenium • Selenium levels in the proposed mill effluent (Appendix 10, Table 3-7) are as high as 0.25 mg/L, and range from 0.002 to 0.0051 mg/L in the predicted TIA discharge (Appendix 10, Table 5-1). Selenium concentrations should be closely tracked through monitoring, as these values are approaching levels that could cause reproductive impacts to fish. 3. Toxicity testing • The current water licence requirement for effluent to be non-acutely toxic relies on tests using freshwater organisms; this will need to be re-evaluated and marine-appropriate tests discussed. 4. Zinc	1. Further evaluation of ammonia concentrations in the effluent discharge; 2. The Proponent produce a plan to track selenium concentrations closely and identify appropriate treatment options which can be implemented if necessary; 3. Identification of marine-appropriate species for effluent bioassay tests; 4. Nitrate and zinc errata be clarified; and 5. The high groundwater flow scenario be evaluated.	

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				• Subsection 4.2 Closure shows a target of 0.50 mg/L rather than the CCME value of 0.03; please confirm that this is in error. 5. Nitrate/nitrite • Please confirm that Appendix 10, Table 3-8 numbers for nitrate and nitrite have been switched. 6. Use of base case water inputs • Section 4 of Appendix 10 introduces three discharge scenarios for water management options. These are base case groundwater inflows, low flow groundwater, and no flow groundwater. It would be prudent to include a high flow (i.e. greater than base case) scenario and evaluate implications for effluent quality.		
2	EC/MPD and EPOD/ES	Marine Water Quality Objectives	Appendix 4-2: Roberts Bay Report, Table 5.2-3: Calculated Treated TIA Discharge Water Quality Targets to Ensure that Roberts Bay Water Quality Remains Below Marine CCME Guidelines, Page 5-7.	A limited list of parameters have been evaluated (oxygen, pH, nitrate-N, salinity, arsenic, cadmium, chromium, and mercury), with allowable concentrations presented in Table 5.2-3 (Roberts Bay Report). EC acknowledges that there are limited marine guidelines for the protection of aquatic life, and that the Proponent has listed those available from the CCME. Where guidelines are lacking, objectives may be set for other parameters of concern using other procedures, such as the background approach, reviewing guidelines from other jurisdictions, or developing site-specific objectives based on the resident species and literature toxicity data, for example. In the original Environmental Assessment, the receiving environment was evaluated for effects of a wide range of parameters (both with and without CCME guidelines) and acceptable environmental concentrations determined. The change to a marine receiving environment does temper concerns, given the ocean's large assimilative capacity and the opportunity for avoidance. Nonetheless, effluent must be non-deleterious at end of pipe, and the mixing zone around the diffuser must be minimized to reduce the zone where some chronic toxicity might occur. To this end, review of the relevant chemicals of potential concern should be done, and objectives identified. At a minimum, this should include ammonia, BOD5, selenium, zinc, and lead, nickel and copper.	EC requests that a more comprehensive list of contaminants be evaluated in the receiving environment, and discharge targets identified for a defined area in Roberts Bay.	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 3.
3	EC/MPD and EPOD/ES	Marine Discharge Outfall	TMAC Project Proposal, Section 2; Appendix 4: Roberts Bay Report.	The proponent proposes a marine outfall which will be designed to disperse effluent at a depth of 40 m, such that mixing is optimized and effects on the upper productive layer of the water column are minimized. The diffuser will be anchored on the seafloor by counter-buoyancy weights that will hold the diffuser pipe 40 cm above the sediments. Discharge of the effluent is through 20 lateral ports at a rate of approximately 120 L/s. The seafloor sediment composition is predominantly sand but also includes silt and clay. The turbulence caused by the effluent flow will cause scouring of the adjacent sediments, especially if the pipe rests on the floor of Roberts Bay between the ballast weights, and this will result in disturbance to benthic areas and turbidity in the water column for a period of time.	EC requests that mitigation measures be developed to prevent or minimize disturbance of the sediments at the diffuser site.	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 4.
4	EC/MPD and EPOD/ES	Changes to inputs to the TIA and water transfer system	Project Proposal: Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water Licence No. 2AM-DOH1323 Section 4: Description of Proposed Doris	The proponent states in Subsection 4.1 (Extended Mine Life) that the new project proposal amendment will add an *additional* 2-4 years of mine life to the project (in addition to Miramar's original 2 year mine-life estimate). The proponent also states their new TIA plan (modelled and detailed in Appendix 14 - Tail Lake Water Design) will allow for approximately 58 months of use of the TIA (which is approximately 4.83 years). EC is concerned about a lack of contingency planning in the event that the TIA reaches capacity within the proposed 4-6 years of mine operation (e.g.	EC requests that: 1. The NWB add a condition to the Doris North Gold Mine Water Licence, which commits the proponent to developing a contingency plan for alternatives for tailings disposal should the project approach the capacity of the TIA before the end of mine life. EC also suggests that it be noted under the same section (suggesting Section 4: The Assessment of	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 5.

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			North Mine Changes, Subsection 4.4.2, Page 42-43	the mine runs for 6 years or more yet the TIA only has capacity for 4.83 years). There does not appear to be much leeway built into the capacity predictions from the time of first use to the end of deposition. In Section 2, Page 31, it states that "…the actual extent of mining in this phase will ultimately be limited by the amount of subaqueous tailings storage that is available based on the current designs for the TIA." EC also notes that the Proponent states the following on Page 41 of the new project proposal: "In the original application for the Type A Water Licence, it was stated that the cyanide destructed slurry would be filtered and trucked to the underground stope for final deposition and the flotation tails would be pumped to the TIA for subaqueous deposition. TMAC now proposes that the cyanide destructed slurry will be pumped to the flotation tailings pump box where it will be blended with flotation tailings prior to discharging in the TIA." This amended practice will increase the requirement for capacity in the TIA.	Alternatives to Tail Lake for Tailings Disposal, Point 5), that the proponent be required to update the NWB on the status of the volume of Tail Lake (versus their projections for tailings storage) on a yearly basis, as part of an update on current, planned and future phases of Hope Bay Belt development. 2. EC requests that the proponent provide additional information on the increase in tailings volume that is anticipated as a result of the revised proposal to deposit the cyanide destructed slurry in the TIA, and the proportion of total tailings volume from each of flotation tailings and cyanide destructed slurry over life of mine.	
5	EC/MPD and EPOD/ES	Closure TIA Water Cover Depth	TMAC Project Proposal, Subsection 4.5 - Reduction of water cover in tailings impoundment area, Page 45; Appendix 14: TMAC Tail Lake Water Cover Design;	As originally proposed by Miramar, a water cover depth of 4 m would have been maintained over the tailings in the TIA, and a depth of 2.42 m was considered the minimum possible. The proponent now states that in order to maximize the capacity of the TIA they plan to maintain a final water cover of 2.3 m in the TIA. The proponent states that revised modeling supports a conclusion that the 2.3 m water cover is "adequate to prevent re-suspension of tailings under all conditions". In the supporting Appendix 14 Tail Lake Water Cover Design (SRK, November 2011), the Proponent has provided the details of their analysis for arriving at the proposed depth of 2.3 m of water cover in the TIA. EC is concerned that the revised model for the depth of the TIA water cover does not allow for variability in weather patterns due to the effects of climate change. Changing climatic patterns may result in more drastic or extreme fluctuations than the averages used in the Proponent's model (for temperature, wind speed, etc.), even within assumptions the model deemed "conservative". EC recommends that the Proponent select a larger minimum water cover, and have a contingency plan that addresses variability in weather patterns due to climate change (e.g. extreme cold events resulting in greater ice thickness than the model's most conservative case (2.05 m thick, which would result in greater risk of ice entrainment of tailings particles), greater wind-speeds than the conservative case, etc.). It is also unclear to EC how the proponent would operate the proposed TIA in the winter if a water cover of 2.3 m is maintained. If there are 2 m of ice cover, this would leave a very small under-ice capacity for tailings disposal through the winter months.	1. EC requests to the NWB that the Proponent be required to consider a deeper minimum water cover, and have a contingency plan that helps address variability in weather patterns due to climate change (e.g. extreme cold events resulting in greater ice thickness than the model's most conservative case (2.05 m thick), greater wind-speeds than the conservative case, etc). A comprehensive analysis of the far-future predictions for climate change should be provided in support of the Proponent's recommended cover depth. The requirement for a re-evaluation of the minimum water cover could fall under the Doris North Gold Mine Project Certificate, Section 4: Project Specific Terms. Contingency plans for events that may result in weather patterns outside of the models range/expected values could be added as a requirement under Section 4: Project Specific Terms, Environment, Health and Safety Management System (point 32). 2. EC requests that the proponent provide operational plans for under-ice tailings disposal in the winter months. For example, would the tailings spigot be moved through the winter months, and if so, how?	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 6.
6	EC/MPD and EPOD/ES	Camp Wastewater Treatment	TMAC Project Proposal, Subsection 4.7 - Increased Wastewater Treatment Capacity, Page 46.	The Proponent states they are requesting an expansion of the wastewater treatment plant (servicing the Doris Camp) to meet the increase (doubling) in staff at the camp site. They state that the second Waste Water Treatment Plant (WWTP) the Nunavut Water Board (NWB) approved in 2010 to serve as a backup unit for the camp will, however, meet the needs required to treat wastewater for the expanded camp. EC is concerned that there has not been an actual increase in the proponent's wastewater treatment capacity. By utilizing this backup treatment plant for full-time waste treatment, the Proponent now effectively does not have a contingency (backup) unit or plan if one of the	EC requests that the Proponent provide contingency plans which address the event of a wastewater treatment failure or maintenance situation.	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 7.

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				systems fails or needs maintenance. In the event of a system failure or required maintenance shutdown, waste will be temporarily disposed of into the tundra and may have adverse effects on the environment. EC recommends that the Proponent have enough wastewater treatment capacity available at the site to treat waste should one of the units either fail or be required to shut down for maintenance.		
7	EC/MPD and EPOD/ES	Accommodation Barges	TMAC Project Proposal, Subsection 4.9 - Roberts Bay: Laydown, Accommodation Barges, and Winter Fuel Barges, Page 48; Appendix 3: Mine Infrastructure Changes, Page 2-7.	The proponent proposes to extend the use of accommodation barges that were "previously on Roberts Bay and operated in fully compliance with applicable laws." The proponent states in the Mine Infrastructure Changes document that they were used in 2010 through 2012 to house extra personnel needed for construction of the Doris North Mine. EC is concerned with the ongoing use and disposal of what were previously "temporary" accommodation barges, so they do not pose a hazard to the marine or terrestrial environment. It is not clear whether modeling of Roberts Bay water quality for nutrients includes barge inputs, or if these would be negligible.	EC requests the proponent evaluate the impacts associated with extended use of the barges (i.e. waste disposal and potential spill risks).	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 8.
8		Water Management – Contingency Planning	Appendix 19: Design Brief: Doris North Project Expanded Waste Rock Storage Pad, Subsection 3.5 - Pollution Control Pond, Page 3.	The proponent intends to design a lined Pollution Control Pond to capture subsurface and surface drainage emanating from the proposed Waste Rock Dump Pad U. The pond will be designed for the containment of up to 100-year return duration storm events (2708m^3 or 48.99mm precipitation events). EC questions the potential capacity of the pollution control pond(s) in light of climate change considerations and potential increased frequency of previously statistically valid "100 year events". EC recommends contingency planning, regardless of pond size, in the event of a precipitation (or other) event that would exceed the pollution control pond(s) design capacity.	EC requests that the NWB require contingency planning for all pollution control ponds in the event that a greater volume of precipitation than the ponds are designed for occurs at the Doris North Project site.	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 9.
9	EC/MPD and EPOD/ES	Waste Rock Classification and Volumes	Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water License No. 2AM-DOH1323 - Subsection 3.2 Geochemistry (Page 38)	The Proponent plans to backfill some waste rock in the stopes of the underground mine and store the remaining in waste rock storage areas located on-land.	EC requests the Proponent provide the following information: 1. Breakdown of the total volumes of waste rock from the project expansion that would be classified as mineralized and non-mineralized and how they will be managed; 2. The total volume of mineralized waste rock from the proposed expansions that will be potentially acid generating (PAG) and non-PAG; and 3. The total volume of mineralized waste rock that will end up being stored on-land in the waste rock storage pads and whether there will be any PAG materials in these on-land pads.	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 10.
10	EC/MPD and EPOD/ES	Waste rock storage clarification	TMAC Project Proposal, Section 7 - Environmental Effects Assessment, Page 60.	The Proponent states that there are no water bodies in the proposed ore storage pads expansion area (Pad T). EC requires further clarification on the proposed expanded waste rock storage pad (U) to better assess the potential effects of the project during the technical review phase.	EC requests that the Proponent confirm that there are no water bodies within the proposed waste rock storage pad expansion area (Pad U).	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 11.
11	EC/MPD and EPOD/ES	Nitrogen Species Degradation	TMAC Project Proposal, Executive Summary, Subsection 4.5; Appendix 10: Water Quality Model, Subsection 3.4 – Natural Degradation Reactions, Page 28.	As stated in the Executive Summary of TMAC's "Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water Licence No. 2AM-DOH1323" the proponent anticipates an initial ore milling rate of 800 tonnes per day (tpd) but that this rate may ultimately increase to 1,800 tpd. As described in Subsection 4.5, the proponent is also proposing a shallower water cover in the TIA of 2.3 m. Given the revised shallow water cover and the rate of tailings inflow into the TIA resulting from the increased ore milling rate, EC is concerned that the retention time in the TIA would be reduced. This could result in	EC recommends that the proponent clarify: 1. Whether reduced retention time is predicted, given the shallower water cover and the likelihood of increased ore millings rates over the mine life; 2. Whether a reduced retention time has been taken into account in consideration of natural degradation; 3. What are the implications of reduced retention time for the effectiveness of natural degradation of nitrogen species; and	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 12.

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				reduced effectiveness of natural degradation in the TIA concurrent with increased inputs of residual cyanide and blasting residues. It is not clear to EC if the possibility of reduced retention time has been accounted for in the Proponent's consideration of natural degradation reactions (e.g. cyanide, ammonia) when modeling discharge water quality.	4. If the proponent has not taken reduced retention time into account in consideration of natural degradation, they should clarify why, or reconsider their estimates for natural degradation in light of the potential for reduced retention times and provide these revised estimates to EC/the Board.	
12	EC/MPD and EPOD/ES	Quality of the water quality modelling result	Appendix 10 Water Quality Model, Hope Bay Project (SRK, November 2011)	In 2011 SRK, engaged by Newmont Resources, used a water and load balance model (GoldSim) to update predicted water quality and tailings over the life of project. The mass load of each potential contaminant source within the project boundary was identified, and the concentrations of contaminants were calculated based on a mass balance while taking into account nutrient degradation reactions. The Proponent concluded that "The model predicts that by using this discharge management strategy, discharges from the TIA would meet both the TIA discharge limits and the proposed TIA marine discharge targets (Rescan 2011). Additionally, the TIA could be operated according to the original design criteria."	EC requests a list of inputs used in the water quality model that reflects the amended activities, and a discussion on the change of the consequent concentrations.	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 13.
13	EC/MPD and EPOD/ES	Summary of assumed conversion rates	Appendix 10 Water Quality Model, Hope Bay Project (SRK, November 2011)	In calculating the predicted water quality, the Proponent takes into account the nutrient removal and nutrient gain as a result of a series of degradations. In Table 3-12 Summary of Assumed Conversion rates, two sets of rates (for natural and enhanced reactions) are presented. On Page 28 of Appendix 10, it states "The assumptions related to the degradation of nitrogen species used in the updated model are the same as those used in the original model and are summarized in detail in Appendix A". However, no information on natural or enhanced degradation rates could be found in Appendix A.	EC requests that the proponent: 1. Identify the information source for both of the conversation rates listed in Table 3-12; and 2. Clarify how the Colomac reaction conditions such as temperature, presence of ice cover and pH correlate to the project site conditions.	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 14.
14	EC/MPD and EPOD/ES	Water treatment	Appendix 10 Water Quality Model, Hope Bay Project (SRK, November 2011) Doris North Mine Modifications and Related Amendments to Project Certificate No. 003 and Type A Water Licence No. 2AM-DOH1323	The water quality model considers the release of solute contaminants to the TIA including: • Mine waste rock stored above ground; • Ore stockpiled during milling operations; • Quarried rock used as fill, construction material, road base and other infrastructure construction fill; • Treated mill tailings discharged to the TIA; • Treated sewage effluent discharge to the TIA; • Saline groundwater; • Saline drilling fluids; • Blasting residuals present in waste rock, quarried rock, ore and mine water (groundwater); • Solute and suspended matter released to the TIA from shoreline erosion and re-suspension by wave action; and • Salinity release to the TIA due to thawing where permafrost is present along the shores of the TIA. In Subsection 3.4 Natural Degradation Reactions of Appendix 10, it is stated "To ensure compliance with the TIA discharge limit of 6 mg/L ammonia-N, enhanced biological degradation will be used in the lake and the 'enhanced case' is carried through the model as the base case for the TIA." Actually, the set of conversion rates for enhanced treatment is used to calculate the water quality. However, in Subsection 4.4.3 Water Treatment of the Amendment to Project Certificate, the enhanced treatment for ammonia-N is not mentioned. Further, Appendix 10 only estimates parameters of solute contaminants. TSS, one of the parameters listed in Schedule 4 MMER is not included in this Appendix. Although it is acknowledged on Page 23 of the Amendment	EC requests that the proponent: 1. Add a section for TSS prediction in Appendix 10 Water Quality Model, and clarify how TSS was handled for modeling metals; and 2. Make the water treatment commitments made in the Amendment of Project Certificate consistent with the conditions used in the water modeling in order to ensure that the model represents the project scenario.	Please refer to the NIRB information request responses above at EC/MPD and EPOD/ES IR 15.

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				to Project Certificate that there will be “a treatment plant that removes suspended solids from the excess TIA water”, it is not clear whether all TIA effluent will be treated for TSS. Table 3.13 of Appendix A in Appendix 10 used a range of TSS values (from 0.7 to 7.6 mg/L), while discharge limits are typically 15 mg/L. It is not clear what TSS level was used as a model input and how the sediment-associated contribution to contaminant concentrations was accounted for.		