Table A - IR2: Information Requests Derived from the Canadian Malartic Corporation's Reponses to Information Request #1 (IR1) on the Final Environmental Impact Statement /Environmental Assessment Report for the Federal Environmental Assessment of the Hammond Reef Gold Mine Project

Reference #	Link to IR1	Ecosystem Topic	Reference to EIS Guidelines	Reference to EIS	Summary of Comment/ Rationale	Information Request **Response to Information Request**
T(2)-17 (originally R(2)-07 – brought forward to Table A)	T-35, T-39, T-40, T-43, A-11	Water Quality Environmental Management Planning	10.2.3.1, 10.9.4	Environmental Impact Statement (EIS) Sections 5.1.2, 5.2.1.3, 5.2.3 Hydrogeology TSD Parts A and B Site Water Quality TSD Parts A and B, Sections 2.2, 4.5, 4.5.1 Conceptual Closure and Rehabilitation Plan TSD Parts A and B EIS Appendix 1.IV	In the review of the draft EIS, it was noted in the Hydrogeology Technical Supporting Document (TSD), dated February 2013 that a trough of granular material was encountered to depths of approximately 25m at the southwest section of the tailings management facility (TMF). Groundwater elevations at the monitoring well (BRH-0020) are about 2 metres above those of the Upper Marmion Reservoir. This suggests that overburden groundwater in this area readily discharges to Upper Marmion Reservoir through a permeable pathway in granular materials. The proponent plans to collect seepage from the TMF along the downstream toe of the TMF dams but did not consider seepage from the base of the TMF. Thus, it was requested that the proponent provide an evaluation of the potential seepage to groundwater underneath the TMF and assessment of the potential effect the seepage could have on groundwater quality and the resultant surface water quality in Lizard Lake and Upper Marmion Reservoir. In response the proponent used a water balance approach and noted that it contains less uncertainty than a hydrogeological modelling approach. The proponent also stated that In the water balance model all runoff and seepage is captured and the mass is therefore included in the final discharge water quality, indicating that in order for model results to be valid, all seepage must be collected. However, federal reviewers noted that the model results do not take into account the seepage losses from the base of the TMF or through dams. Thus, in the first information request dated March 25, 2014, comment T-39 indicated that in order to collect all seepage, the proponent would need to quantify seepage losses from the base of the TMF, using a groundwater model and determine the proportion of seepage below the TMF versus through dams. Comment T-39 also included the request to assess the effectiveness of the proposed seepage control measures and assess the potential impact of seepage discharge to receptors. In response, the proponent conducted numerical groundwater modelling on a portion of the TMF. The proponent's model assumes that there is a presence of clay lenses within the overburden material that would tend to impede vertical flow. However, federal reviewers noted that Figure 2-5 of the Hydrogeology TSD shows the overburden as primarily comprised of silts and sand, and much of the footprint of the TMF is classified as "Outwash Deltas/Channels" and "Organic Terrain". The clay layers that do exist in some boreholes do not show lateral continuity. It also appears that the 3D groundwater modelling conducted does not adequately characterize the site because it only covers a portion of the TMF and is based on very limited data. This approach does not provide an understanding of the permeability of the overburden underneath the TMF nor does it provide an understanding of groundwater seepage flow paths from the TMF into adjacent waterbodies such as Lizard Lake and Upper Marmion Reservoir. It is not clear what the magnitude and geographic extent (direction and distance) of the	1. Drill additional boreholes to obtain borehole and stratigraphic logs to characterize the permeability of the base of the entire TMF. Develop a plan for the additional boreholes and stratigraphic logs in discussion with relevant government agencies to ensure adequate characterization of baseline conditions within the proposed TMF footprint. 2. If the results indicate that the base of the TMF is permeable (as compared to thick sequences of laterally continuous clay), provide responses to and action on questions 3-7. 3. Drill additional monitoring wells to obtain sufficient information to determine the groundwater flow paths and the fate of chemical constituents in the TMF seepage water. Perform additional single-well response tests and consider performing a pump test to better characterize hydraulic conductivity values and isotropy/anisotropy. Develop a plan for the additional monitoring wells in discussion with relevant government agencies to ensure baseline information is gathered in regions where more granular material is found within the proposed TMF footprint. 4. Using the data from the additional monitoring wells, model the entire TMF using the 3D numerical groundwater model. 5. Re-run the 3D model based on the following: a) perform more robust calibration using additional monitoring well data; b) present a detailed conceptual model using visual depictions to describe the baseline hydrogeological conditions; c) model all project phases including baseline, operations phase, closure (decommissioning), and post-closure (abandonment); d) as described in 2., include the information from the additional boreholes and stratigraphic logs for the entire TMF to determine if the overburden is isotropic or anisotropic, based on the absence or presence of laterally continuous horizontally bedded sedimentary deposits, and if the assumption Khorizontal:Kvertical = 1:0.1 is valid. If it is not, update the model assumption for isotropy/anisotropy. The installation of additional monitoring wells and hydraulic testing will also help better define the Khorizontal:Kvertical relationship; and e) provide a sensitivity analysis for the model that considers possible extremes in such parameters as recharge and hydraulic conductivity. 6. Provide the methodology, analysis and model results. 7. Based on the results from question 1-6 above, provide a detailed description of the mitigation measures proposed to intercept seepage and contingency plans in the event seepage beneath the TMF would be greater than predicted. Response:

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					effects from seepage losses from the base of the TMF are on surface water quality and fish and fish habitat in Lizard Lake and in Upper Marmion Reservoir. The entire TMF needs to be modelled with sufficient monitoring well data and the use of particle tracking in order to determine the groundwater flow paths and the fate of chemical constituents in the TMF seepage water. The 3D groundwater modeling must be re-run and the sensitivity analysis and model results provided. Based on the review of the Technical Memorandum on the 3D groundwater Modelling (dated May 21, 2014), the following deficiencies were noted: • The model is not calibrated properly nor was a detailed conceptual model presented. The conceptual model provides a visual depiction of the existing groundwater system including stratigraphic layers (shown in cross sections or block diagrams) and information on groundwater flow directions. • The hydraulic conductivity for the overburden is poorly characterized and based on limited single-well response tests and estimates based on grain-size distribution. Hydraulic conductivity is an important model parameter that can significantly affect model outcomes. • The assumption Khorizontal:Kvertical = 1:0.1 is not supported by the borehole data. The borehole logs do not show thick sequences of clay that are continuous across the TMF site. • The proponent's response to previous comments about seepage effects on Lizard Lake have focused on the operating phase of the mine, or the immediate post-operating phase when human intervention is still available to manage seepage. Seepage loss during post-closure phase could be a concern if permeability of units underneath TMF is higher than modeled, even with revegetation. The proponent needs to adequately model the post-closure (abandonment) phase to assess the long-term effects of seepage losses to Lizard Lake and the Upper Marmion Reservoir. The proponent indicates that there "are many additional options to intercept seepage" but does not identify other possible mitigation measures. The proponent indicated that the current plan for the seepage collection systems is in the conceptual stage only and that ditching and pumping stations will be utilized. However, no further details are provided. It is important to provide details on the seepage collection systems, taking into consideration the results of the 3D groundwater model for the entire TMF, in order to assess not only the effectiveness and suitability of the proposed mitigation measures, but also the comparative suitability of the proposed site itself. Furthermore, it is important to have information on the framework of the follow-up program to monitor seepage and to identify the response actions that would be undertaken in the event that a malfunction were to occur or in the event seepage beneath the TMF is greater than predicted. This information will assist the Agency in assessing the adverse environmental effects of seepage losses from the TMF, the magnitude and geographic extent (direction and distance) of any seepage that may pass underneath the TMF to Lizard Lake and Upper Marmion Reservoir and the effectiveness of the proposed mitigation measures. This information is required in order for the Agency to provide a recommendation to the federal Minister of Environment on whether the project is likely to cause significant adverse environmental effects.	**Response:** To complete the requested undertaking would require a level of effort commensurate with the detailed feasibility and design phases of a project. The EIS/EA must adequately address potential for impact to the environment at a level that allows for appropriate decision making with respect to the potential for impacts of a given project. The current assessment is suitable and appropriate to make these decisions for the following reasons as documented in the TSD and subsequent IR Responses as provided in the Final EIS/EA Report Addendum (June 2015): 1. All water and chemical mass load placed on the TMF is accounted for in the discharge, and is used in analysis of basin impact, with no resulting aquatic effects (see TSDs as identified and IR T-34, T-39 and IR MOE-NR-GW-16 from the first round of IRS) a. To state this differently, we assign water the same concentration, based on the chemistry of the tailings, weather it leaves as surface water or groundwater, and both of these waters report to Marmion Basin in our assessment – if we increase groundwater discharge, then there will be more infiltration, and less surface runoff so the total amount of water, and mass load, will be the same – regardless of the outcome of any groundwater modelling. 2. Even at full predicted concentrations of the tailings water (i.e. groundwater reporting directly to surface water in the basin) there are no resulting aquatic impacts (IR MOE-NR-GW-16 from the first round of IRS) Therefore it follows that 3. As a result of points 1, and 2, above it is inconsequential weather the water (or chemical mass) reports via a surface water pathway or groundwater pathway, it is all accounted for, and at full concentrations (and full mass loads) does not cause aquatic impacts, either as a point source, or overall mass load to the basin. Based on the above CMC submits that: – there is ample evidence and analyses completed to reasonably conclude there will be no impact to human health, terrestrial life, or aquatic life, regardless of the outcome of any proposed groundwater modelling conducted, – as a result CMC further submits that the current groundwater analyses and model is sufficient to reasonably make decisions regarding potential project impacts at the Hammond reef property. CMC did conduct some supplemental modelling in response to regulator concerns (see IR T-40 located in Appendix 1.IV of the Final EIS/EA Report) , it was directed at responding to questions related to the North and West sides of the TMF, and demonstrating that seepage capture was feasible under typical conditions, as was requested by the reviewers. The intent was not to model the entire basin at the level of detail design.

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						CMC acknowledges that understanding the groundwater will be important during construction and operation of the facility, such that appropriate seepage reduction or collection measures can be incorporated into the final design. CMC is willing to commit to the following course of action (as a condition of approval of the EIS/EA), but only as part of the detailed design engineering work to be completed prior to construction: – collection of the requested additional drilling data in Item 1 of the request during the detailed design phase of the project through installation of 3 to 5 monitoring wells within the central area of the impoundment. – Collection of additional data through drilling, including depth to bedrock, and sediment profiles along all proposed dam alignments. – Re-evaluation of all potential seepage pathways for each proposed dam of the facility, including 2D seepage models (or a 3D model if needed depending on the results of drilling in the center of the impoundment), in order to produce: ○ Phreatic surface detail and seepage rates for dam stability analysis ○ Detailed design drawings for each dam ○ Construction specifications and material specifications for the dam proper ○ Construction specifications for seepage interception and collection, including depths of ditches, pumping requirements, and interception well requirements as needed to achieve the seepage design objectives. ○ This will satisfy the overall request, and in particular Item 7 of the above request To be clear CMC believes that seepage capture objectives as stated in the EIS/EA document are effectively achievable through engineering controls that will be put in place for the project, additional data will be collected and modelling will be completed during the detailed design phase, and CMC is willing to accept these requirements as conditions of EIS/EA approval, however given the cost of the proposed course of action in the request it is not realistic or feasible for CMC to undertake this at this time.