Appendix C6

Feedback and Response Log - Government Review Team - MECP Northern Region

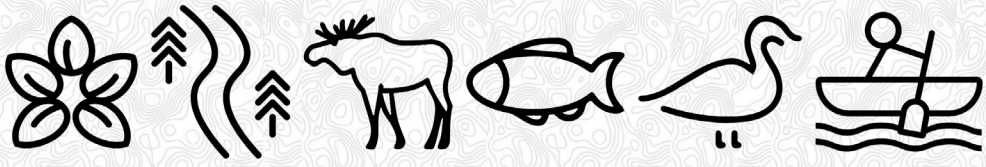

Table: Summary of Feedback Received and Response / Action – MECP Northern Region

Group Name	Comment ID from source	Comment Raised	Response	Addressed in the EA / IS	Internal ID
MECP Northern Region	1	The consultant notes that particles entrained in the groundwater samples contribute significantly to concentrations of parameters. The potential exists for fine particulates (e.g. silt) in groundwater samples to interfere with analytical results. For example, turbid groundwater samples may yield “false-positive” detection for substances adsorbed onto the silt particles. (https://www.pgo.ca/files/APGO_Brownfields_Guidance_Document.pdf) This is not acceptable when making determinations of baseline groundwater quality. Please amend the document to include a thorough comparison of analytical results from sediment laden and non-sediment laden samples. The comparison should determine which analytical parameters are sensitive to total suspended solids (or TSS) in the samples. In lieu of such an analysis, the consultant should caveat data from samples enriched in TSS (i.e. TSS>TDS) should and treat them as a separate statistical population when determining the natural	The TSS values of the samples were assessed for a separate population of high TSS samples however the distribution of TSS values was found to be continuous with only a few high level outliers. An assessment was also made of the population of samples where TSS > TDS (n = 74) compared to the samples where TSS < TDS (n = 187). For total metals parameters, almost all maximum concentrations occur in the TSS > TDS population, however for the dissolved metals parameters no such association is observed. For dissolved metals, only 7 out of 40 parameters had a maximum value in the TSS > TDS population. This suggests that most of the influence of TSS levels is removed in the filtered, dissolved samples results which is why the dissolved metals concentrations were considered more representative and were used to assess the groundwater quality trends in the existing conditions reporting. We suggest a better determination of baseline groundwater quality is site specific values obtained from the pre-construction groundwater monitoring program and permitting studies.	Comment noted; see response for details	1060

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Group Name	Comment ID from source	Comment Raised	Response	Addressed in the EA / IS	Internal ID
		variability of groundwater quality.			
MECP Northern Region	2	In addition to other benchmarks, the consultant has compared groundwater quality to the Provincial Water Quality Objectives (or PWQO's) as a benchmark of quality levels that are protective of aquatic life. Effective April 2022, Ministry staff are advised that the PWQO's are in the process of being updated and replaced with appropriate Canadian Water Quality Guidelines (CWQG's) or other benchmarks. The reviewer concedes that this advice was received after the comment period for the EA Terms of Reference and could not have been known by the previous reviewer or the proponent. This guidance should be reflected in the final version of EA documents. In conformance with 2022 advice, please employ the following hierarchy of water quality benchmarks for groundwater potentially discharging to surface water: (1) Use the most recently developed of: - Provincial Water Quality Objective	The requested edits have not been made as this comment is considered recommended.	Comment noted; see response for details	1062

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Group Name	Comment ID from source	Comment Raised	Response	Addressed in the EA / IS	Internal ID
		(PWQO) or - Canadian Water Quality Guideline (CWQG) or - ECCC Federal Water Quality Guidelines (FWQGs) (2) In absence of above: - British Columbia MOE Approved Water Quality Criteria (WQC, deterministic only) (3) In absence of above, use the following with caution: - British Columbia MOE Approved Water Quality Criteria (WQC, statistical) - European Union Water Quality Standards / Environmental Risk Limits - US EPA Ambient Water Quality Criteria			
MECP Northern Region	3	The consultant reports that leach testing of the non-potentially acid generating samples indicated that boron, copper, fluoride, silver, and vanadium were the only parameters that exceeded the PWQO's and CWQG's Please verify whether any additional exceedances occur according to the above-noted 2022 recommended hierarchy of water quality benchmarks.	Section 5.5 of Appendix H Groundwater Technical Support Document has been updated to include screening results based on the revised list of water quality benchmarks. For the purposes of the geochemistry screening assessment, CCME and PWQO guidelines were used to compare to the SFE leach testing results. Geochemistry applies a screening of an analytical test on the rock and soils rather than a direct comparison to the surface water quality guidelines as described in Section 5.1.4 of the Geochemistry Technical Support	Appendix H Section 5.5	1063

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Group Name	Comment ID from source	Comment Raised	Response	Addressed in the EA / IS	Internal ID
			Document. Screening to be updated based on the revised list of water quality benchmarks.		
MECP Northern Region	4	Consultant reports that aggregate pit dewatering rates could exceed a million litres per day with radii of influence exceeding 700 metres from pit or quarry edge. These water taking amounts also result in concurrent challenges with respect to environmentally responsible disposal of equivalent amounts of wastewater. Although dewatering of bedrock quarries may be unavoidable, the proponent might avoid or minimize similar dewatering of overburden aggregate pits via dredging beneath the water table versus attempting to continuously dewater potentially permeable material. Dredging of aggregate pits should be contemplated as an alternative to pit dewatering to minimize or avoid large water takings and concurrent wastewater disposal burdens.	Aggregate pit details continue to be subject to preliminary investigative activities and geotechnical reporting. Dredging will be evaluated as on option for pit dewatering.	Comment noted; see response for details	1066
MECP Northern Region	5	The consultant used alternative sample storage procedures to allow greater sample shipping flexibility while meeting	Appendix H Groundwater Technical Support Document has been updated to include the laboratory certificates of	Appendix H	1068

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Group Name	Comment ID from source	Comment Raised	Response	Addressed in the EA / IS	Internal ID
		all hold times (i.e. maximum allowable elapsed time between sample acquisition and sample analysis). Chain-of custody records and laboratory certificates of analyses normally contain hold time information. The draft documents provided for review do not seem to include these records. The reviewer is unable to verify sample hold time conformance. This is germane to assessing groundwater quality data reliability. Future iterations of the Groundwater Technical Support Document should include sample chain of custody records and laboratory certificates of analyses.	analysis and chain of custody records.		
MECP Northern Region	6	The original groundwater study plan intent was to report upon the results of a two-year groundwater monitoring program. Due to delays in start of drilling program, current draft is based upon results of 1 year of monitoring. The consultant states that they will incorporate a second year of data in subsequent versions of the reports. The reviewer will reserve comment on baseline groundwater quality variability	Appendix H Groundwater Technical Support Document has been updated to include results from the second year of groundwater monitoring.	Appendix H	1069

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Group Name	Comment ID from source	Comment Raised	Response	Addressed in the EA / IS	Internal ID
		until they receive the originally envisioned multi-year data set. Complete the multi-year groundwater monitoring program as per the original Groundwater Study Plan. During the second year of the monitoring program, also address the issue of widespread and excessive Total Suspended Solids (TSS) levels in groundwater samples either by satisfactory monitoring well development, low-flow sampling techniques, or effective field filtration.			
MECP Northern Region	7	The consultant states that based on the study plan, 20 locations were identified for additional groundwater field characterization. MECP review comments on the draft Groundwater and Geochemistry Study Plan (Penfold, 2021) interpreted the 20 locations as a cost-estimation assumption and not a fixed cap. The reviewer notes that the consultant did not seem to establish boreholes or test pits in two quaternary watersheds designed as 04GD-18 (Gittins Lake) and 04-GD-01 (Robins island-Albany River). Both alternative road routes cross these	The two quaternary watersheds (i.e., Gittins Lake, Robins Island-Albany River) will be sampled as part of the groundwater and geochemistry monitoring program during pre-construction and construction phases.	Comment noted; see response for details.	1070

Table: Summary of Feedback Received and Response / Action – MECP Northern Region

Group Name	Comment ID from source	Comment Raised	Response	Addressed in the EA / IS	Internal ID
		watersheds. These two quaternary watersheds are located immediately upriver of the Marten Falls First Nation and will be subject to disturbance. They seem worthy of inclusion in the hydrogeological baseline investigation on this basis. Expand the groundwater and soils baseline investigation to include sites within the 04GD-18 (Gittins Lake) and 04-GD-01 (Robins island-Albany River) watersheds.			
MECP Northern Region	8	Samples from 29 different monitoring wells contained total suspended solids / particulates at levels that exceeded levels of dissolved constituents. This is not a normal property of natural groundwater. At least 24 groundwater samples from 17 separate monitoring wells screened in all material types contained more than 1,000 mg/L of suspended solids. One sample contained over 9,000 mg/L of suspended solids. Such particulate levels in groundwater are clearly unnatural. These observations suggest that most of the monitoring wells might not have been	Due to the size and remoteness of the Project area, a highly detailed local study was impractical to conduct at the EA/IA stage and a regional study was scoped. The intent of the existing conditions field investigation was to establish general groundwater conditions within the Local Study Area with the monitoring locations selected to be representative of likely areas of disturbance (mostly aggregate source areas or representative terrains). As detailed in the Appendix H Groundwater Technical Support Document and EA/IA reporting, additional site specific studies will be carried out where high risk activities will be needed for project construction/operations (i.e.	Comment noted; see response for details	1071

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Group Name	Comment ID from source	Comment Raised	Response	Addressed in the EA / IS	Internal ID
		adequately developed to a silt free state prior to sampling. Please explain the widespread excessive levels of suspended solids / particulates in the groundwater samples despite reported well development procedures. During the second year of the monitoring program, address the issue of widespread and excessive Total Suspended Solids (TSS) levels in groundwater samples either by satisfactory monitoring well development, low-flow sampling techniques, or effective field filtration.	pits/quarries, major water crossings, peatland crossings, construction camps). These studies will be done during the detailed design and pre-construction phases and will be targeted to areas where potential impacts may be greatest.		
MECP Northern Region	9	The consultant identifies numerous concentrations of multiple constituents greater than various water quality guideline levels. The section does not indicate that samples having high levels of particulates / total dissolved solids were treated as a separate statistical population than low-TSS / low-turbidity samples. The reviewer cannot discount the possibility that combining turbid and non-turbid groundwater samples might yield a	The TSS values of the samples were assessed for a separate population of high TSS samples however the distribution of TSS values was found to be continuous with only a few high level outliers. An assessment was also made of the population of samples where TSS > TDS (n = 74) compared to the samples where TSS < TDS (n = 187). For total metals parameters, almost all maximum concentrations occur in the TSS > TDS population, however for the dissolved metals parameters no such association is observed. For dissolved metals, only 7 out of 40 parameters had a maximum	Comment noted; see response for details	1073

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		non-representative picture of the natural range of groundwater quality. The document should be amended to include a thorough comparison of analytical results from sediment laden and non-sediment laden samples. The comparison should determine which analytical parameters are sensitive to total suspended solids (or TSS) in the samples. Until such an analysis is satisfactorily performed, data from samples enriched in TSS (i.e. TSS>TDS) should be caveated and treated as a separate statistical population when determining the natural variability of groundwater quality.	value in the TSS > TDS population. This suggests that most of the influence of TSS levels is removed in the filtered, dissolved samples results which is why the dissolved metals concentrations were considered more representative and were used to assess the groundwater quality trends in the existing conditions reporting. We suggest a better determination of baseline groundwater quality is site specific values obtained from the pre-construction groundwater monitoring program and permitting studies.		
MECP Northern Region	10	The consultant reports Dichloromethane concentrations ranging from 5,900 to 20,900 ug/L in baseline groundwater samples. Dichloromethane (also known as methylene chloride, or DCM) is a colourless, volatile organic liquid that does not occur naturally. Toxic substances list: dichloromethane - Canada.ca	Additional discussion has been added to the Groundwater Technical Support Document to address these detections. The detections of DCM are regarded as anomalous on the basis that they were only observed in four samples during one sampling event and were not detected subsequently. Additionally it is noted that two of the DCM detections occurred in field duplicate samples where there was no detection in the corresponding parent sample.	Comment noted; see response for details	1074

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Group Name	Comment ID from source	Comment Raised	Response	Addressed in the EA / IS	Internal ID
		The presence of exclusively man-made substances cannot be attributed to natural baseline conditions. The draft document does not appear to explain this observation. Please explain why Dichloromethane concentrations ranging from 5,900 to 20,900 ug/L were reported in natural baseline groundwater quality descriptions. Please caveat any other detections of clearly artificial substances as not representative of natural baseline groundwater quality.			
MECP Northern Region	11	The hydraulic conductivity values reported for monitoring wells MW22-03-1 (clay), MW22-04-01 (silty sand) and MW22-10-4 (silt / clay) are essentially identical. The reviewer has examined the hydraulic test data sheets compiled in Attachment G. Water levels in all three above-noted wells recovered to 90% of pre-test conditions in about 50 seconds. Such results are more consistent with sand. This consistency is implausible for such different geological materials located several 10's of kilometers apart.	The four hydraulic conductivity test results noted were re-examined and the analyses of MW22-03-1 and MW22-18-2 were adjusted to assess the later time recovery data. No different set of later time recovery data was observed for the tests at MW22-04-1 or MW22-10-4. The updated hydraulic conductivity values did not have an appreciable effect on the calculated average hydraulic conductivities used for the dewatering assessment in Section 7.4.1 of Appendix H Groundwater Technical Support Document. The adjusted hydraulic conductivities are lower than the initially	Comment noted; see response for details	1075

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Group Name	Comment ID from source	Comment Raised	Response	Addressed in the EA / IS	Internal ID
		The reviewer suspects that the test results have measured the hydraulic properties of the wells' engineered sand filter packs and not the native geological materials. This suspected "sand pack" effect is also visible in the first minute of the hydraulic response at wells MW22-06-2, MW22-14-2, MW22-18-2, MW22-19-01, and MW22-20-3, In the case of the MW22-18-2 (bedrock) test, the test result uses the 'first minute" well response and predictably also yields a "sand pack" conductivity value almost identical to wells MW22-03-1, MW22-04-01 and MW22-10-4. The true hydraulic conductivity of the bedrock at this location is probably lower. The hydraulic conductivity data is germane to predictions of environmental effects of future dewatering activities. Please caveat hydraulic test results where rapid well recovery is inconsistent with the typical behavior of the natural geological materials at the wells screened intervals.	assessed ones so the average values used in the dewatering assessment remain conservative and appropriate.		

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		Depending on how this data has been used to date, predictions of environmental effects of some activities (e.g. pit dewatering, etc.) in Table 7.4 (page 114) and Attachment I might require revision. Confirmatory re-testing of monitoring wells should be contemplated. Please re-evaluate the hydraulic test of well MW22-18-2.			
MECP Northern Region	12	The consultant reports that leach testing results of soil and bedrock samples were compared to the naturally occurring groundwater and surface water range (of concentrations). As noted above, until the potential influence of significant levels of entrained particles in many of the groundwater samples is understood, the “naturally occurring range” of groundwater quality should be considered tentative at this time. Pending study of the practical effects of TSS on the dataset, the naturally occurring range of groundwater quality for purposes of comparison should be based on groundwater samples having	As described in Section 5.1.4 of Appendix H Groundwater Technical Support Document, the geochemistry characterization applied a screening of an analytical test on the rock and soil rather than a direct comparison to the surface water quality guideline. Screening results in Section 5.5 of Appendix H has been updated to reflect changes to the assessed naturally occurring range of groundwater quality.	Appendix H Section 5.1.4	1076

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		low or non-detect levels of total suspended solids.			
MECP Northern Region	13	The consultant referenced a Project Wide Spill Prevention and Emergency Response Plan. Section X of the Environmental Protection Act includes mandatory actions (e.g. spill notification protocols, etc.) that should be referred to. Please consult Part X of the Environmental Protection Act and associated Regulations to ensure that project proponents and agents are aware of legal responsibilities under the Act.	Reference to the Environmental Protection Act has been added to Appendix H Groundwater Technical Support Document, along with the Spill Prevention and Emergency Response Plan.	Comment noted; see response for details	1078
MECP Northern Region	14	The consultant referenced a Spill Prevention and Emergency Response Plan for the Operation and Maintenance Phase. Section X of the Environmental Protection Act includes mandatory actions (e.g. spill notification protocols, etc.) that should be referred to. Please consult Part X of the Environmental Protection Act and associated Regulations to ensure that project proponents and agents are aware	Reference to the Environmental Protection Act has been added to Appendix H Groundwater Technical Support Document, along with the Spill Prevention and Emergency Response Plan.	Comment noted; see response for details	1079

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Group Name	Comment ID from source	Comment Raised	Response	Addressed in the EA / IS	Internal ID
		of legal responsibilities under the Act.			
MECP Northern Region	15	The reviewer notes that no soil or bedrock samples from the in two quaternary watersheds designed as 04GD-18 (Gittins Lake) and 04-GD-01 (Robins island-Albany River) were submitted for geochemical analyses. Both alternative road routes cross these watersheds. These two quaternary watersheds are located immediately upriver of the Marten Falls First Nation and will be subject to disturbance. They seem worthy of inclusion in the geochemical baseline investigation on this basis. Expand the geochemical baseline investigation to include sites within the 04GD-18 (Gittins Lake) and 04-GD-01 (Robins island-Albany River) watersheds.	The two quaternary watersheds (i.e., Gittins Lake, Robins Island-Albany River) will be sampled as part of the groundwater and geochemistry monitoring program during pre-construction and construction phases.	Comment noted; see response for details.	1080
MECP Northern Region	16	Boreholes BH22-04-1 and BH22-13-1 are located approximately 35 metres apart. The reported ground surface elevation of BH22-04-1 is 240.17 metres. The reported ground surface elevation at BH22-13-1 is 231 metres. This is a reported elevation difference of 9.17	Ground surface elevations recorded on borehole logs for BH22-04-1 and BH22-13-1 in Attachment C of Appendix H Groundwater Technical Support Document have been reviewed. The elevations are correct, the coordinates provided on the borehole log for MW22-04-1 were incorrect. The coordinates have been corrected to N 5695457.6; E	Comment noted; see response for details.	1081

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		metres, or 30 feet. The reviewer questions whether the reported elevations are correct. Please verify the relative elevations at BH22-04-1 and BH22-13-1.	520572.2.		
MECP Northern Region	17	Statement of Limitations The purpose of the preceding review is to provide advice to the Ministry of the Environment, Conservation and Parks regarding subsurface conditions based on a review of the information provided in the above-referenced documents. The conclusions, opinions and recommendations of the reviewer are based on information provided by others, except where otherwise noted. The Ministry cannot guarantee that the information that is provided by others is accurate or complete. A lack of specific comment by the reviewer is not to be construed as endorsing the content or views expressed in the reviewed material. Please acknowledge	We acknowledged MECP's comment.	Comment noted; see response for details.	1082