KUDZ ZE KAYAH PROJECT

ADAPTIVE MANAGEMENT PLAN

REV 01

June 2026

BMC MINERALS LTD.

This Management Plan has been developed to meet the appropriate subject objectives based on existing regulatory requirements, current or planned site activities, existing and expected site conditions, and designed outcomes at the time of writing. Operational processes/practices for achievement of licence terms and conditions may be updated from time to time as appropriate due to changes to relevant legislation and regulations, changes to site activities or conditions, differences from expected objective outcomes, or improvement of management practices. All rates, capacities, dimensions, weights, volumes and durations in text or figures are based on current feasibility level designs and are subject to change based on final design, licence conditions or site conditions encountered. Updates will be resubmitted to government authorities and/or stakeholders as required.

LIST OF REVISIONS

Issue Date	Revision Number	Description of Revision
May 7, 2024	Rev 00	For Issue to Agencies
June 1, 2026	Rev 01	Administrative updates in response to EMR Completeness Check

SUMMARY OF REVISIONS

Information Request/Intervention	Document	Section	Revision
Adaptive Management Plan Revision 00			
YG Intervention (Exhibit 5.2) Recommendation 20: The maximum predicted dewatering flows should not be used as an authorized dewatering limit.	Adaptive Management Plan	3.5	Revised triggers so that the maximum predicted dewatering flow is not itself a trigger.
YG Intervention (Exhibit 5.2) Recommendation 30: Clarify maximum pond levels and develop thresholds that provide sufficient warning of pending water storage issues.	Adaptive Management Plan	3.4	Developed triggers for Water Management Ponds.
YG Intervention (Exhibit 5.2) Recommendation 31: Pond level triggers and designs should be based on time-scales that capture sub-monthly wet conditions.	Adaptive Management Plan	3.4	Developed triggers for Water Management Ponds considering appropriate timeframes for implementation given a range of potential wet conditions.
YG Intervention (Exhibit 5.2) Recommendation 60: Monitor water quality inside the LWMP at KZ-5 in the middle of the water column and use this data as AMP triggers.	Adaptive Management Plan	3.7	Added triggers related to water quality at KZ-5 and KZ-5D.
YG Intervention (Exhibit 5.2) Recommendation 76: Revise adaptive management strategies within the application to align with terminology and processes as defined in the guidelines for developing adaptive management plans in *Yukon: Water-related components of quartz mining projects.*	Adaptive Management Plan	Whole document	This standalone AMP document has been drafted to align with Yukon guidance on AMP development.
YG Intervention (Exhibit 5.2) Recommendation 78b: Revise the 'open pit/underground dewatering' adaptive management based on refined predictions of open pit dewatering flows.	Adaptive Management Plan	3.5	The Mine Dewatering AMI has been updated in accordance with current dewatering flow predictions.
YG Intervention (Exhibit 5.2) Recommendation 79: Revise the current adaptive management strategies prior to the license being issued.	Adaptive Management Plan	Whole document	The adaptive management strategies have been revised from those submitted as part of the EMSRAMP and are included in this standalone AMP.

Information Request/Intervention	Document	Section	Revision
EMR Phase 5a IR 27: Section 6.3.10 states that flows requiring treatment have the greatest potential to exceed water treatment plant capacity during freshet and the months that immediately follow and indicates that these flows may exceed the capacities of the plant. Consideration of this risk and adaptive management measures must be included in the Adaptive Management Plan required in IR-73.	Adaptive Management Plan	3.6	Adaptive management measures for Water Treatment Plant capacity have been included in this AMP.
EMR Phase 5a IR 31: The adaptive management strategies should be separated out of this plan and included in the stand-alone Adaptive Management Plan (AMP) required in IR5-73.	Adaptive Management Plan	Whole document	The AMP is now a standalone document.
EMR Phase 5a IR 32: The requests with respect to adaptive management throughout this information request must be included in the AMP and submitted as a part of the QML application.	Adaptive Management Plan	Whole document	This AMP addresses the QML Phase 5a information requests.
EMR Phase 5a IR 33: Additional information on the mobile water treatment plant referred to in Table 8-1 is required in the Adaptive Management Plan. Specific triggers, action responses and outcomes (i.e., water quality objectives) with respect to the mobilization, commissioning and operation of a mobile water treatment plan are required.	Adaptive Management Plan	3.1, 3.6, 3.7	Staged triggers and actions are now described in the AMP. The deployment of a mobile water treatment plant (WTP) is a potential response indicated for AMIs regarding Class B/C/Overburden collection pond water quality, changes in influent water quality to the site WTP, and changes in water quality discharged from the site.
EMR Phase 5a IR 34: Increasing discharge rates to the environment when management pond volumes are exceeded is included as an adaptive management strategy. Provide justification and additional detail on how Water Quality Objectives will be monitored and met when implementing these strategies and how they link to other strategies (i.e., capacities and throughputs of water treatment plants).	Adaptive Management Plan	3.4, 3.8	Monitoring of the receiving environment is detailed in the EMSRP. The AMI for surface water quality has triggers set below the water quality objectives that link to upstream actions such as increasing the capacity and throughput of the WTP.
EMR Phase 5a IR 35: Directing non-compliant water from overburden stockpiles and the Class C facility to the upper and lower water management ponds is included as an adaptive management strategy. Confirm if the intended management practice is dilution of non- compliant water in the water management ponds to achieve water quality objectives prior to discharge to the environment.	Adaptive Management Plan	3.1	An AMI specific to detection of adverse water quality in the Overburden Stockpile and the Class C Storage Facility collection ponds is now included in the AMP. Potential management/mitigations options are also presented.

Information Request/Intervention	Document	Section	Revision
EMR Phase 5a IR 53: Section 7.5 refers only to annual reporting requirements. Reporting on adaptive management or response actions taken should also be included in this section, reporting requirements for different levels of response actions should be proposed by BMC in the updated EMSRP.	Adaptive Management Plan	4	Reporting requirements are discussed in Section 4 of the AMP.
EMR Phase 5a IR 73: Prepare and submit a standalone Adaptive Management Plan for the construction and operation periods of the project that reflects the comments throughout this information request, previous information requests issued by Mineral Resources Branch and YG's WL Intervention.	Adaptive Management Plan	Whole document	This standalone AMP document has been prepared.
EMR Phase 5a IR 74: Adaptive management triggers and actions with respect to observed trends are ambiguous and unclear throughout the plan. In an updated Adaptive Management Plan provide clarity on how trends are identified, the timeframes that are considered when determining a trend is being observed, the number of triggers that are required to determine a measure is a trend versus an anomaly, and the magnitude of change that must be observed to trigger an action.	Adaptive Management Plan	3.1.5, 3.2, 3.6, 3.7, 3.8	The approach to trend analysis (Mann-Kendall) is discussed in Section 3.1.5. Further details on timeframes for the trend analysis are described in each AMI section where trend analysis is used.
EMR Phase 5a IR 75: Adaptive management strategies within the AMP must align with terminology and processes as defined in the guidelines for developing adaptive management plans in *Yukon: Water-related components of quartz mining projects*.	Adaptive Management Plan	Whole document	This standalone AMP document has been prepared to align with Yukon guidance on AMP development.
EMR Phase 5a IR 77: YG's WL Intervention recommendations 30 and 31 with respect to adaptive management triggers and responses to pond levels applies to our review of the AMP as well. The updated AMP must address the comments and observations raised in YG's Intervention.	Adaptive Management Plan	3.4	An AMI specific to the Water Management Pond levels is provided. This AMI includes triggers developed considering the comments and observations raised in YG's Intervention.
EMR Phase 5a IR 78: YG's WL Intervention information request 78 with respect to dewatering of the open pit and underground workings applies to our review of the AMP as well. The updated AMP must address the comments and observations raised in YG's Intervention.	Adaptive Management Plan	3.5	An AMI specific to mine dewatering is provided.

Information Request/Intervention	Document	Section	Revision
EMR Phase 5a IR 79: No adaptive management measures have been proposed for geochemistry. The AMP must include comment on actions that would be taken in the event that waste rock classification, segregation and management methodologies do not meet the objectives or are insufficient meet objectives in the Tailings and Waste Rock Management Plans. The AMP must consider both neutral metal leaching conditions and acid rock drainage conditions. Changes to monitoring frequencies, increasing laboratory and analytical confirmations and decreasing visual examinations may be necessary actions throughout the mine life.	Adaptive Management Plan	3.1	An AMI specific to geochemistry of the waste storage facilities is included.
EMR Phase 5a IR 80: Update the AMP to include additional fish and fish habitat metrics (i.e. specific population abundance (CPUE) changes) to enact an increasing scale of mitigative measures. This should be detailed further than 'acute or chronic effects'. Detailing such specific metrics and thresholds will allow for accurate effects monitoring and mitigation.	Adaptive Management Plan	3.10	An AMI specific to fish and fish habitat is provided, including an increasing scale of mitigative measures with details of how accurate effects monitoring and mitigation will be achieved.
EMR Phase 5a IR 81: Specific responses for vegetation and soil focus solely on dust abatement which may not be sufficient to address increased metals loading as metal contaminants may also get to soils and vegetation through groundwater movements. Update the AMP to include determination of source pathways for the metal contaminants with specific action to address that pathway.	Adaptive Management Plan	3.9	An AMI specific to metals content in soils and vegetation is provided, including discussion of identifying and mitigating source pathways.
EMR Phase 5a IR 82: Decision Document term and condition 33 required BMC to include adaptive management measures to address potential leakage from the Class A storage facility. The updated AMP must outline monitoring, triggers and actions associated with the Class A storage facility that address leakage scenarios.	Adaptive Management Plan	3.3	An AMI specific to leakage from the Class A and Class B Storage Facilities is provided.
EMR Phase 5a IR 83: Decision Document term and condition 36 required BMC to develop and implement adaptive management measures with respect to monitoring for the onset of acidic conditions, that allowed for early detection, management, and mitigation of acidic conditions and metal leaching developing on site. The updated AMP must include this information.	Adaptive Management Plan	3.1	An AMI specific to changes in water quality in the collection ponds for the Class B and Class C Storage Facilities and Overburden Stockpile is provided. Indicators for this AMI includes those that would reflect development of acidic conditions (e.g., pH, sulphate, alkalinity, metals associated with acid rock drainage).

Information Request/Intervention	Document	Section	Revision
EMR Phase 5a IR 84: Decision Document term and condition 37 required BMC to develop an ambient air monitoring and adaptive management plan for all Criteria Air Contaminants (CACs), based on updated (2025) standards. The updated AMP must include this information.	Adaptive Management Plan	3.11	An AMI specific to ambient air quality is provided, including triggers for CACs based on 2025 standards.
Liard First Nation Intervention (Exhibit 5.6.1) Page 4: Source notes that while the Water Balance Model report refers to the Water Management Plan and the Adaptive Management Plan, very limited information is provided in these plans to allow the reviewer to understand how the range in precipitation and flows will be addressed by the mitigation planning presented, for example how multiple consecutive wet months/years would impact the project's ability to manage water.	Adaptive Management Plan	3.4, 3.5, 3.6	Additional details added to multiple AMIs regarding how the project would manage excess water.
Liard First Nation Intervention (Exhibit 5.6.2) Page 17: Adaptive management plans and decision-making frameworks are insufficient: Limited characterization of the project environment and insufficient monitoring will severely restrict BMC's ability to detect environmental change in the aquatic environment and associated values important to the meaningful practice of Kaska rights. Combined with a lack of appropriate indicators and thresholds, LFN has substantial concerns regarding the Proponent's ability to adaptively and effectively manage potential adverse project effects to Kaska use in the Kudz Ze Kayah region.	Adaptive Management Plan	3	Multiple additional AMIs added to illustrate how BMC intends to adaptively and effectively management potential Project effects. Includes details of the linkages between monitoring and the AMIs, indicators, triggers and management response plans.
Liard First Nation Intervention (Exhibit 5.6.2) Page 17: Adaptive management plans included in the Environmental Monitoring, Surveillance, Reporting, and Adaptive Management Plan are concerningly limited in scope. Adaptive management measures for water quantity, for example, have not been developed because "the unpredictable nature of precipitation events and associated natural variability do not allow for meaningful responses." Adaptive management responses for surface water quality focus on additional sampling and the development and implementation of Management Response Plans, without assurances that threshold exceedances will be addressed in a timely or effective manner. Adaptive management plans for vegetation only include pathways of effect associated with dust, and do not provide a decision-making framework to address the potential contamination of vegetation associated with water. As noted above, monitoring, mitigation, and adaptive management plans for wildlife have not been included in BMC's Water Licence Application package. Where decision-making frameworks for adaptive management have been described, these are lacking a clear and meaningful role for LFN.	Adaptive Management Plan	3.4, 3.5, 3.6, 3.8, 3.9, 5	AMP developed following the *Guidelines for developing adaptive management plans in Yukon*. Multiple additional AMIs added and more details added to the AMIs pertaining to water quantity, surface water quality and vegetation. Consultation and engagement plan included to ensure that the adaptive management decision-making framework includes the opportunity for First Nations to have a meaningful role.
Liard First Nation Intervention (Exhibit 5.6.2) Page 22: LFN's team continues to identify deficiencies in the monitoring, mitigation, adaptive management and reclamation plans proposed by BMC.	Adaptive Management Plan	Whole document	AMP developed following the *Guidelines for developing adaptive management plans in Yukon*.

Information Request/Intervention	Document	Section	Revision
Liard First Nation Intervention (Exhibit 5.6.4) Page 11: Adaptive management plans for geochemical monitoring must be developed. The geochemical modelling process is subject to significant uncertainty and must be validated through monitoring and adaptive management.	Adaptive Management Plan	3.1	Additional details added to AMI for the geochemistry of waste storage facilities.
Liard First Nation Intervention (Exhibit 5.6.4) Page 11: Fish sampling every three years is insufficient for an adaptive management plan.	Adaptive Management Plan	3.10	Revised monitoring frequencies in the Fish and Aquatic Life AMI.

LIST OF ACRONYMS AND ABBREVIATIONS

%	Percent
CN	Full water quality suite with weak acid dissociable cyanide analysis
ALT	Acute Lethality Testing
AMP	Adaptive Management Plan
AMI	Adaptive Management Initiative
BACI	Before-After-Control-Impact
BC ENV	British Columbia Ministry of Environment & Climate Change Strategy
BMC	BMC Minerals Ltd.
CCME	Canadian Council of Ministers of the Environment
COPI	Constituent of Potential Interest
CES	Critical Effect Size
DOC	Dissolved Organic Carbon
EQS	Effluent Quality Standard
FWQG	Federal Water Quality Guideline
ICP	Inductively Coupled Plasma (mass, atomic absorption, or optical emission spectroscopy)
IOC	Investigation of Cause
IOCEM	Investigation of Cause, Extent, and Magnitude
kg	Kilogram
KZK	Kudz Ze Kayah
LWMP	Lower Water Management Pond
m	Metre
m^2	Square metre
m^3	Cubic metre
masl	Metres Above Sea Level
MDMER	Metal and Diamond Mining Effluent Regulations
mg/kg	Milligrams per kilogram
mg/L	Milligrams per litre
ML/ARD	Metal Leaching and/or Acid Rock Drainage
MRP	Management Response Plan
NO_2	Nitrogen Dioxide
$PM_{2.5}$	Fine Particulate Matter (less than 2.5 micrometre diameter)
PM_{10}	Coarse Particulate Matter (less than 10 micrometre diameter)
QA/QC	Quality Assurance/Quality Control
QML	Quartz Mining Licence
SSWQO	Site-Specific Water Quality Objective
SEPA	Socio-Economic Participation Agreement
SD	Standard Deviation
TSP	Total Suspended Particulate
TSS	Total Suspended Solids
µg	Micrograms
µg/m^3	Micrograms Per Cubic Metre
µm	Micrometre
UWMP	Upper Water Management Pond

WAD	Weak acid dissociable
WQO	Water Quality Objective
WTP	Water Treatment Plan
WUL	Water Use Licence
YAAQS	Yukon Ambient Air Quality Standards
YG	Yukon Government

GLOSSARY

Acid Rock Drainage: Drainage with acidic pH from material having an insufficient capacity to neutralize acidic products of sulphide and elemental sulphur oxidation and dissolution products of acidic material.

Active Closure: Post mining removal of Operations Water Management Ponds, Overburden Stockpile, collection ponds, removal of all pipeworks and structures, and the removal and re-grading of all access roads, ditches and borrow areas not required during closure phases.

Bathymetry: The measurement of depth of water in oceans, seas, or lakes.

Bioassay: Analytical method to determine concentration or potency of a substance by its effect on living cells or tissues.

Bray-Curtis Index: Statistic used to quantify the compositional dissimilarity between two different sites, based on counts at each site. The Bray–Curtis dissimilarity is bounded between 0 and 1, where 0 means the two sites have the same composition (that is they share all the species), and 1 means the two sites do not share any species.

Construction Phase: Project phase that will last approximately two years and includes Project site preparation and clearing and establishment of Project infrastructure.

Engineer of Record: Provides technical knowledge related to the safety of the facility and verifies whether or not the facility (and components thereof): has been designed in accordance with performance objectives and indicators, applicable guidelines, standards and regulatory requirements; and is being constructed or has been constructed and is performing, throughout the life of the facility, in accordance with the documented design intent and requirements.

Evapotranspiration: The process by which water is transferred from the land to the atmosphere by evaporation from land and water surfaces and by transpiration from plants.

Gravimetric Analysis: Gravimetric analysis describes a set of methods used in analytical chemistry for the quantitative determination of an analyte based on its mass.

Hess sampler: Samplers intended for sampling macrobenthos in shallow, flowing waters. They are cylindrical with enclosed sides and an open top. They function similarly to the surber-type samplers but are capable of sampling gravel and small cobble bottoms.

Hydrograph: A hydrograph is a graph showing the rate of flow versus time past a specific point in a river, channel, or conduit carrying flow. The rate of flow is typically expressed in cubic metres per second.

Inductively Coupled Plasma (ICP): Analytical spectroscopy technique used for the detection of chemical elements. The ICP source converts the atoms of the elements in the sample to ions. These ions are then separated and detected by the spectrometer.

Kinetic Testing: A procedure used to analyze dynamic physical and chemical processes of materials over time, including reaction rates, mineral alteration and drainage chemistry and loading resulting from the interaction between water and mine material. Kinetic tests are most often performed in controlled laboratory settings where environmental conditions are simplified (e.g., trickle leach columns and humidity cells) but can also be conducted at study sites under conditions that would be encountered in the field (e.g., field bin leaching tests).

Metal Leaching: Extraction of soluble metals by solvents. Leaching can be natural or induced in a laboratory procedure.

Operations Phase: Project phase that will last approximately 10 years and includes ABM open pit and underground development, and ore processing.

Pedon: Basic unit of soil in the Canadian soil classification system. It is the smallest, three-dimensional unit at the surface of the earth that is considered as soil.

Rating Curve: Graph of discharge versus stage for a given point on a stream, usually at gauging stations, where the stream discharge is measured across the stream channel manually.

Receiving Environment: Surface water bodies located downstream of Project footprint. These comprise South Creek, Geona Creek, and Finlayson Creek and associated monitoring stations for which water quality objectives are developed (i.e., KZ-13 on South Creek, KZ-37 on Geona Creek, and KZ-15 and KZ-26 on Finlayson Creek).

Riparian: The interface between terrestrial and river or stream ecosystems.

Salt Dilution Gauging: A salt slug injection involves dissolving a known mass of salt into a volume of water to create a salt tracer solution, and then dumping the tracer into the stream. As the salt slug moves downstream, it disperses and travels as a function of stream discharge. At a point downstream, the concentration of the salt through time (measured through conductivity) can be observed and plotted. The curve can be used to compute discharge by considering continuity equations for the volumetric flow rate of water (discharge) and the mass flow rate of the solute.

Specific Threshold: A defined amount, level, or limit of a quantifiable constituent that when reached, triggers a management response.

Unit Runoff: Direct runoff hydrograph resulting from one unit (e.g. one cm) of constant intensity uniform rainfall occurring over the entire watershed. The concept of unit hydrograph is based on linear systems theory and follow the principles of superposition and proportionality.

Valued Component: Element of the environmental and/or socio-economic systems valued for environmental, scientific, social, aesthetic, or cultural reasons. For the purpose of this environmental assessment, Valued Components are defined to include both environmental and socio-economic aspects.

Velocity-area Method: A method of stream gauging in which depth and vertically averaged velocity measurements are taken at successive locations along a stream cross-section and are numerically integrated to give the streamflow discharge.

Vibrating Wire Piezometer: A piezometer designed such that a change in pressure on the diaphragm causes a change in tension of the wire. An electro-magnetic coil is used to excite the wire, which then vibrates at its natural frequency. It is a device used to measure liquid pressure in a system by measuring the height to which a column of the liquid rises against gravity, or to measure the pressure (more precisely, the piezometric head) of groundwater at a specific point.

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1 INTRODUCTION

1.1 PROJECT DESCRIPTION

The Kudz Ze Kayah (KZK) Project (the Project) is located on the northern flank of the Pelly Mountain Range, approximately 260 km northwest of Watson Lake and 115 km southeast of Ross River, Yukon (Figure 1-1). The Project area lies approximately 24 km south of the Robert Campbell Highway in the upper portion of the Geona Creek valley, at an elevation of approximately 1,400 metres above sea level (masl). The Project is located in the Traditional Territory of the Kaska First Nations.

BMC Minerals Ltd. (BMC) is the owner of the Project. Since acquiring the Project in 2015, BMC has actively engaged in assessing historical work, optimizing design, resource drilling, economic assessment, baseline environmental studies, and First Nations and community engagement as well as the successful completion of the Executive Committee Screening by the Yukon Environmental and Socio-economic Assessment Board.

The Project encompasses the ABM Deposit, comprising two mineralized zones, the ABM Zone and the Krakatoa Zone. The ABM Deposit is a polymetallic volcanogenic massive sulphide deposit containing economic concentrations of zinc, copper, lead, silver, and gold. Mining of the ABM Deposit will be conducted via both open pit and underground mining methods, with ore processed into separate copper, High Precious Metals (silver, gold and lead), and zinc concentrates via sequential flotation through a nominal 2 million tonnes per annum processing plant. Dry stack (filtered) tailings will be co-disposed with waste rock in the Class A Storage Facility on the western slope of the Geona Creek Valley. Waste rock will be stored in separate storage facilities according to its acid generation and metal leaching potential. Strongly acid generating material will be co-disposed with tailings or alternatively stored in mined out areas of the open pit and underground workings. Other waste rock material will be placed on the surface in managed facilities. The Project site layout is presented on Figure 1-2.

The phases of the Mine life are proposed to include:

- Construction: approximately 2 years;
- Operations: approximately 10 years;
- Active Closure: approximately 3 years;
- Transition Closure: approximately 12 years, ending when water discharges via the ABM lake spillway; and
- Post-closure: approximately 10 years.

1.2 OVERVIEW

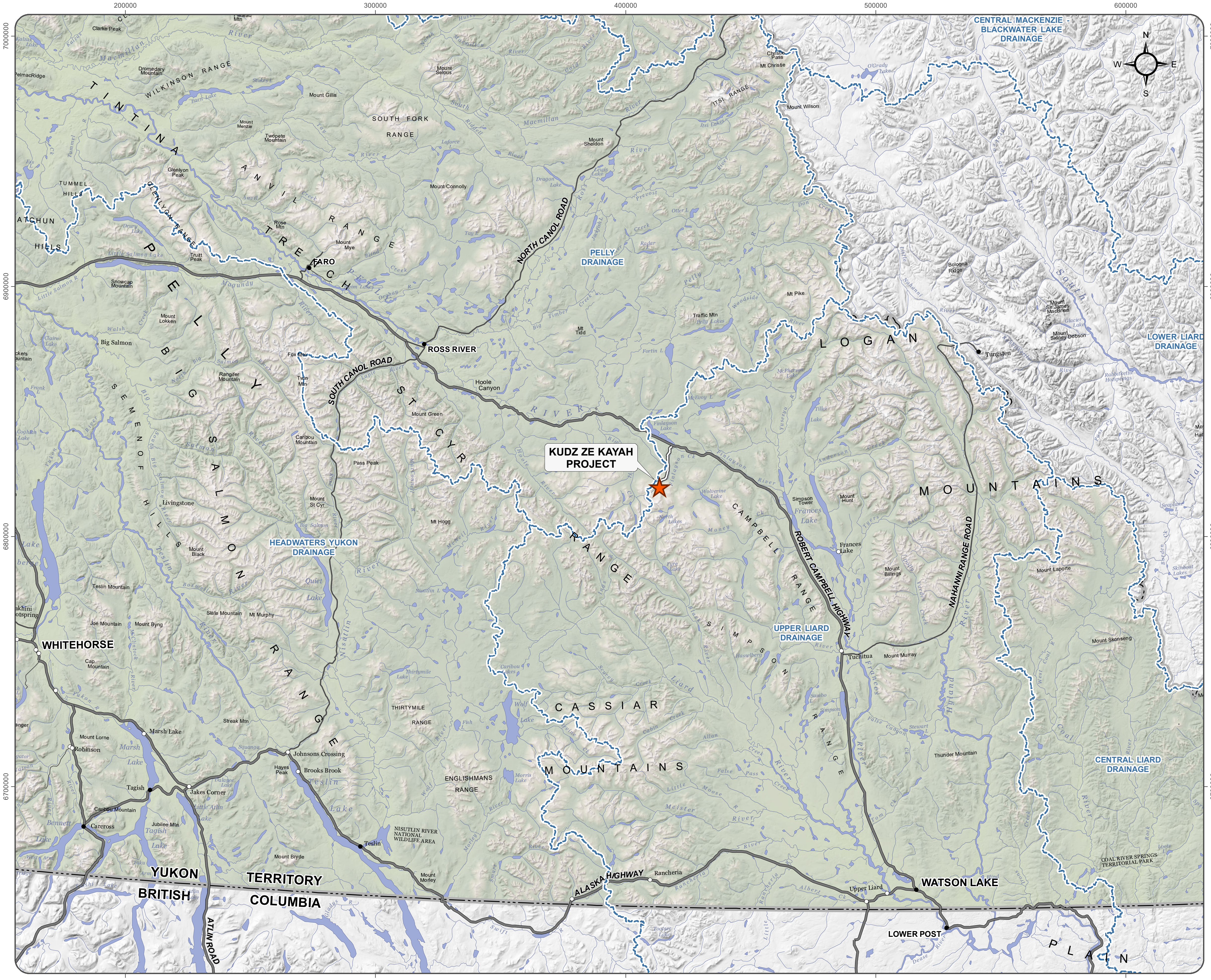
This Adaptive Management Plan (AMP) was developed following the *Guidelines for Developing Adaptive Management Plans in Yukon* (Yukon, 2021) and is intended to be a management tool that provides a consistent and pre-planned approach for understanding and responding to deviations in

Project performance or unforeseen environmental conditions. It addresses the Construction and Operations phases of the Project. Further details of the approach taken in this AMP are presented in Chapter 2. Details of adaptive management procedures for Project closure will be developed in detail once Operations have been underway for some time and this AMP has been implemented and validated, as discussed in the Reclamation and Closure Plan.

1.3 PLAN REVIEW AND EXECUTION

BMC has had extensive engagement with Ross River Dena Council (RRDC) including community meetings in Ross River, Elders Oversight Committee Meetings, meetings with Chief and Council and engagement with RRDC's wholly owned environmental consultancy, Dena Cho Environmental and Remediation Inc. (Dena Cho). As part of this ongoing engagement, Dean Cho conducted a detailed independent review of the draft Environmental Monitoring, Surveillance, Reporting and Adaptive Management Plan (BMC, 2022). Issues raised during the Dena Cho review were addressed collaboratively through a number of workshops and where appropriate this plan was amended and additional commitments added.

BMC and Ross River Dena Council (in its role as lead community for the Kaska Nations, including Liard First Nation) are parties to an existing Socio-Economic Participation Agreement (SEPA) for the KZK Project. In 2019, BMC and RRDC signed a Letter of Intent committing the parties to a modernization process for the existing SEPA. In March 2021, BMC tabled a proposed modernized SEPA with all Kaska leadership. The proposed SEPA includes provision for establishment of a Kaska/BMC Environmental Management Advisory Committee. Under the current proposal before Kaska, this committee will be tasked with, among other things, reviewing and providing input into environmental management plans, reporting on implementation of those plans, reviewing monitoring plans/results, and reviewing incident reports and reporting back to Kaska members.



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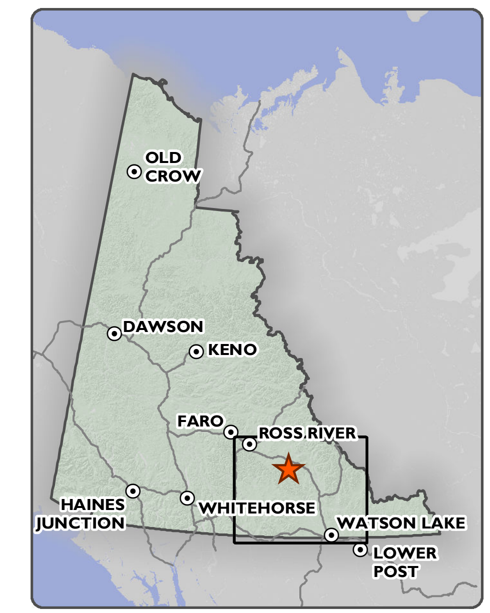
KUDZ ZE KAYAH PROJECT

FIGURE 1-1

PROJECT LOCATION

MAY 2024



KUDZ ZE KAYAH PROJECT

ENSERO solutions

Digital elevation model created by the Yukon Department of the Environment interpolated from the digital 1:50,000 Canadian National Topographic Database (NTDB Edition 2) contour and watercourse layers. Obtained from Geomatics Yukon.

Drainage areas obtained from National Hydrology Network 2011

Datum: NAD 83; Projection UTM Zone 9N

1:1,500,000 when printed on 11 x 17 inch paper

0 20 40 60 80

Kilometres

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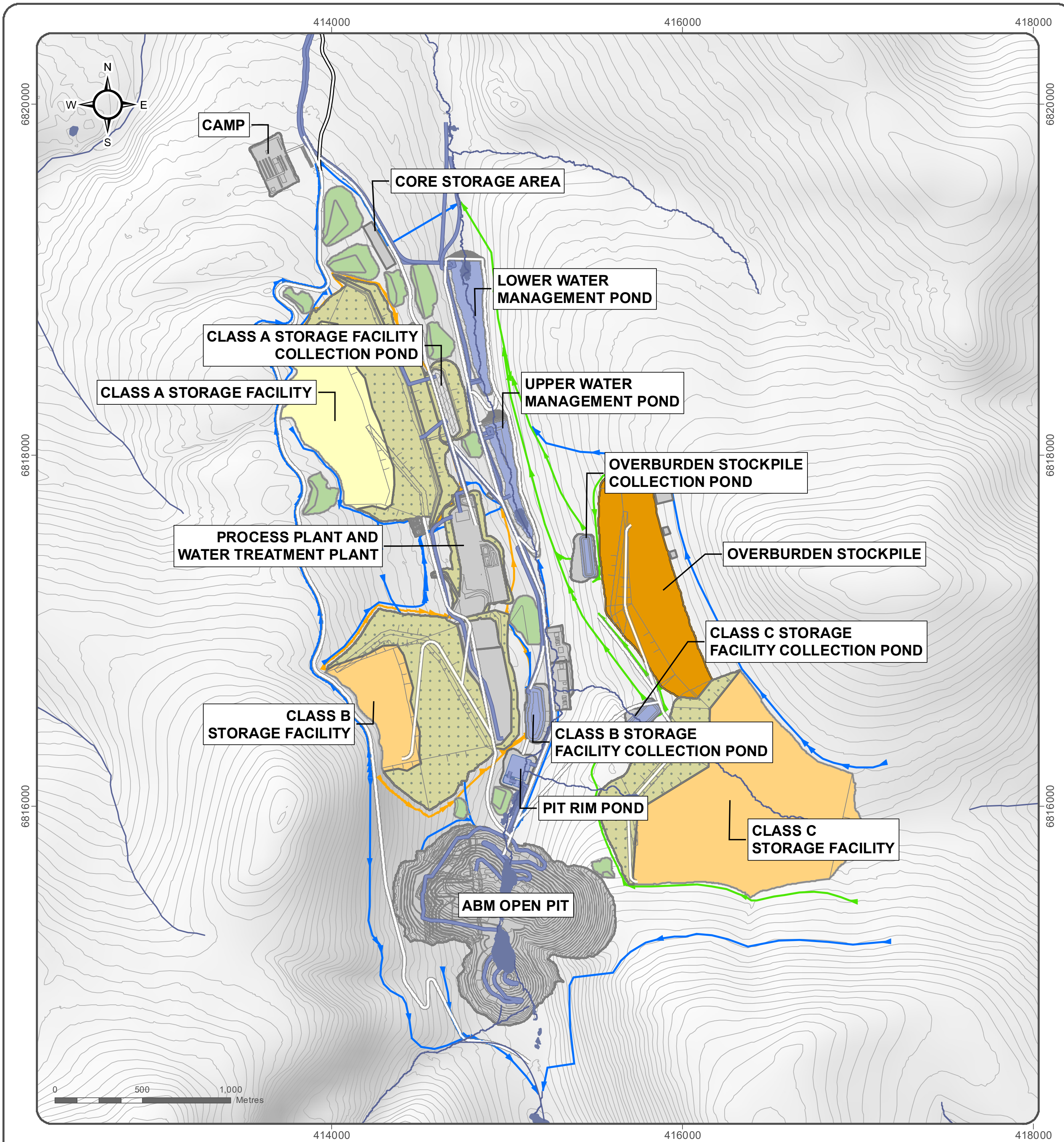

Class A Storage Facility

Class B and C Storage Facility

Overburden Stockpile

Topsoil Stockpile

Progressive Reclamation

Liner

Pond/Water

Non Contact Diversion

Contact Class A & B Collection

Contact Class C & OB Collection

KUDZ ZE KAYAH PROJECT

FIGURE 1-2

PROJECT SITE LAYOUT

MAY 2024

National topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:50,000. Reproduced under license from Her Majesty the Queen, as represented by the Minister of Natural Resources Canada. All rights reserved.
Datum: NAD 83; Projection: UTM Zone 9N

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2 AMP APPROACH

This document presents a comprehensive AMP to guide management decisions arising from unexpected conditions at the Project, in accordance with Yukon (2021).

2.1 OBJECTIVES OF THE AMP

The purpose of the AMP is to provide a pre-planned framework to consistently identify unforeseen conditions at the Project that have the potential to adversely impact the environment, and to rapidly and effectively respond to these conditions. The AMP also intends to provide certainty to regulators, First Nations and other interested parties by outlining how unforeseen conditions will be evaluated and responded to consistently and predictably. The AMP uses a Precautionary Principle approach by providing a method that identifies potential risks to the environment and tools to manage the response to prevent adverse environmental impacts.

2.2 ADAPTIVE MANAGEMENT APPROACH

The AMP comprises multiple Adaptive Management Initiatives (AMIs), presented in Chapter 3. Each AMI is described using common elements throughout the AMP to provide structure for a consistent approach across all AMIs. The approach for each AMI is designed to be proactive in detecting changes, such that appropriate responses can be implemented in a timely manner to minimize the risk of adverse environmental impacts. Each AMI includes:

- *Description* – A description of the specific condition that is addressed by the AMI and the possible environmental impact if an appropriate response is not implemented in a timely manner.
- *Narrative Response* – A qualitative description of the AMI trigger that is the basis for developing specific indicators and trigger values.
- *Indicator* – The environmental component or parameter that is monitored and assessed as part of the AMI, that is indicative of the risk of a potential adverse environmental impact.
- *Triggers and Action Levels* – The staged numerical values and/or trends that will trigger specific management responses for each AMI and govern the level of response.
- *Monitoring Requirements* – A description of the monitoring conducted that supports each AMI, including sampling parameters and frequency at each monitoring location.
- *Evaluation of Monitoring Results* – A description of the methods and appropriate timeframe for evaluation of monitoring data against action level triggers.
- *Development and Implementation of Management Response Plan (MRP)* – A description of the approach for management responses once a given action level trigger has been reached. MRPs generally include a range of actions that could be implemented to address the trigger value exceedance.

It is not possible to precisely predict the nature or magnitude of unforeseen conditions that may occur at the Project. However, the potential range of these conditions can be approximated using knowledge of current site conditions, Project design and experience at other similar operations. Thus, a range of potential unforeseen conditions is included in this AMP, each with an AMI that includes a range of possible management responses appropriate for different triggers and action levels, rather than specific management responses to each trigger and action level. The management responses described in each AMI are general and encompass a range of possible responses. These responses are adaptable and provide guidance on how to tailor the response to specific conditions. Timing of response and the potential magnitude of the environmental impact are important considerations that will determine the level of intervention needed.

As detailed in Yukon (2021), the AMP is a living document, and will be reviewed and updated as new information becomes available through implementation of the AMP and ongoing monitoring activities, discussed in the Environmental Monitoring, Surveillance and Reporting Plan (EMSRP) (BMC, 2026a). An annual AMP review will be completed to assess the adequacy and appropriateness of each AMI, and to assess the need for new AMIs.

2.3 MONITORING

The EMSRP (BMC, 2026a) provides details of the Project monitoring programs proposed to track the performance and impacts of the Project relative to its predicted performance and impacts. These monitoring data are critical to ensure that the required information and data are available to determine when specific AMI triggers and action levels are met.

3 ADAPTIVE MANAGEMENT INITIATIVES

This Chapter describes the AMIs developed for the Project, including:

- Waste Storage Facilities water quality;
- Groundwater quality;
- Class A and B Storage Facility leakage;
- Water Storage Pond levels;
- Mine dewatering;
- Water Treatment Plant capacity;
- Discharge water quality;
- Surface water quality;
- Soil and vegetation metals content;
- Fish and aquatic life; and
- Air quality.

These AMIs were identified to address the Project components with potential to cause significant adverse environment impacts. The annual review of the AMP will assess the need for new or revised AMIs, as discussed in Section 2.2.

3.1 WASTE STORAGE FACILITIES WATER QUALITY

3.1.1 Description

The Class B Storage Facility will contain PAG material with a moderate potential for metal leaching. The Class C Storage Facility is designed to store non-PAG waste rock with a low potential for metal leaching. The Overburden Stockpile will be used to manage overburden materials excavated from the Open Pit and the footprint of Project infrastructure. Runoff and seepage from these facilities will be captured and managed in dedicated collection ponds for each facility.

Water quality modelling indicates that runoff and seepage from the Class B Storage Facility, Class C Storage Facility, and Overburden Stockpile will not require treatment at the Water Treatment Plant (WTP). However, there is a potential risk that waste rock classification, segregation, and management methodologies might be executed improperly, resulting in the misallocation of PAG material (that should be stored in the Class A Storage Facility) into the Class B and/or Class C Storage Facilities. This misallocation could contribute to an unanticipated increase in concentrations of constituents of potential interest (COPIs) in the discharge water from these facilities. There is also a potential risk for unexpected, elevated metal leaching from the Overburden Stockpile that could increase concentrations of COPIs in the drainage water from this facility.

Monitoring of the collection pond water quality will occur at:

- Station KZ-3, located on the outflow of the Class B Storage Facility Collection Pond;
- Station KZ-30, located on the outflow of the Class C Storage Facility Collection Pond; and
- Station KZ-31, located on the outflow of the Overburden Stockpile Collection Pond.

Stations KZ-3, KZ-30, and KZ-31 are shown in Figure 3-1.

3.1.2 Narrative Response

Concentrations of COPIs in drainage water from the Class B and Class C Storage Facilities and Overburden Stockpile increase to levels that could negatively impact aquatic resources in the receiving environment.

3.1.3 Indicators

The COPIs for which WQOs are developed (Ensero and Minnow, 2024) are used as indicators for this AMI:

- Anions and nutrients including ammonia-N, fluoride, nitrate, nitrite, and sulphate;
- Total aluminum, antimony, arsenic, cobalt, iron, nickel, selenium, thallium, and uranium; and
- Dissolved cadmium, copper, lead, manganese, and zinc.

Alkalinity and pH are also included as additional indicators for the potential development of acidic drainage conditions.

3.1.4 Triggers and Action Levels

Action level triggers are summarized in Table 3-1. Low, moderate, and high action level triggers were calculated using the water quality model for the Project. Concentrations in the Class B Storage Facility, Class C Storage Facility, or Overburden Collection Ponds were independently increased until the WQO at KZ-37 was reached during Project Construction and/or Operations. The calculated COPI concentration for each Collection Pond was then adjusted to develop low, moderate, and high action level triggers based on:

- Low trigger: 75% of COPI concentration calculated to result in KZ-37 concentration equal to WQO;
- Moderate trigger: 85% of COPI concentration calculated to result in KZ-37 concentration equal to WQO; and
- High trigger: 95% of COPI concentration calculated to result in KZ-37 concentration equal to WQO.

Water quality modelling indicated that dissolved copper concentrations at KZ-37 were equivalent to the WQO for a single month at the end of the Operations phase (Ensero, 2024a). Therefore, the 85th, 90th, and 95th percentiles of the model calculated concentrations for the Collection Ponds during the Operations Phase were used as the low, moderate, and high action level triggers for dissolved copper, respectively. The numerical triggers of the Class B Storage Facility (KZ-3), Class C Storage Facility (KZ-30), and Overburden Stockpile (KZ-31) are provided in Table 3-2, Table 3-3 and Table 3-4, respectively.

3.1.5 Approach to Trend Analysis

Trend analysis, used to identify statistically significant trends, is the basis of some triggers and action levels throughout this AMP. This analysis aims to account for seasonality that is often present in water quality data. For water quality parameters with seasonal variation, the seasonal Mann-Kendall test will be applied to determine statistically significant increasing or decreasing trends (i.e., $p<0.05$). This test is commonly used to evaluate trends in water sample chemistry because it is designed for time series data and does not require such data to be normally distributed. For water quality data sets that have no clear evidence of seasonality, the (non-seasonal) Mann-Kendall or similar trend analysis test will be used. Where there are not yet enough data available to complete the trend analyses as specified, it may not be possible to identify statistically significant trends. During this period, only the sample-based triggers will be applicable.

Table 3-1: Waste Storage Facilities Water Quality Triggers and Action Levels

Action Level	Triggers [a]
Low	Two consecutive samples exceed the low triggers indicated in Table 3-2 to Table 3-4. If samples are collected weekly, the monthly average will be used for comparison with the AMP trigger; **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the high trigger within 3 years.
Moderate	Two consecutive samples exceed the moderate trigger indicated in Table 3-2 to Table 3-4. If samples are collected weekly, the monthly average will be used for comparison with the AMP trigger; **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the high trigger within 2 years.
High	Two consecutive samples exceed the high trigger indicated in Table 3-2 to Table 3-4. If samples are collected weekly, the monthly average will be used for comparison with the AMP trigger; **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the high trigger within 1 year.

[a] *For field pH and alkalinity, the trigger will occur if the sample result is below the trigger value.*

Table 3-2: Water Quality Numerical Triggers for Class B Storage Facility Collection Pond (KZ-3)

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger
pH	6.5	6.0	5.5
Alkalinity	50	25	10
Ammonia-N	18.5	21.0	23.5
Aluminum, total	1.6	1.8	2.0
Antimony, total	1.7	2.0	2.2
Arsenic, total	0.84	0.95	1.06
Cobalt, total	0.090	0.10	0.11
Fluoride	21	23	26
Iron, total	14	16	18
Nickel, total	3.3	3.8	4.2
Nitrate-N	28.6	32.4	36.2
Nitrite-N	0.44	0.50	0.56
Selenium, total	0.034	0.039	0.043
Sulphate	6098	6911	7724
Thallium, total	0.0059	0.0067	0.0075
Uranium, total	0.19	0.22	0.24
Cadmium, dissolved	0.0071	0.0080	0.0090
Copper, dissolved	0.0020	0.0021	0.0023
Lead, dissolved	0.12	0.14	0.16
Manganese, dissolved	9.1	10.3	11.5
Zinc, dissolved	0.34	0.38	0.43

Table 3-3: Water Quality Numerical Triggers for Class C Storage Facility Collection Pond (KZ-30)

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger
pH	6.5	6.0	5.5
Alkalinity	50	25	10
Ammonia-N	2.8	3.2	3.6
Aluminum, total	0.10	0.11	0.12
Antimony, total	0.22	0.25	0.28
Arsenic, total	0.10	0.12	0.13
Cobalt, total	0.011	0.013	0.014
Fluoride	2.8	3.1	3.5
Iron, total	1.7	1.9	2.1
Nickel, total	0.40	0.46	0.51
Nitrate-N	8.3	9.4	10.6
Nitrite-N	0.17	0.19	0.21
Selenium, total	0.0039	0.0045	0.0050
Sulphate	824	934	1044
Thallium, total	0.00079	0.00089	0.0010
Uranium, total	0.036	0.041	0.046
Cadmium, dissolved	0.0010	0.0011	0.0013
Copper, dissolved	0.00062	0.00071	0.00077
Lead, dissolved	0.014	0.016	0.018
Manganese, dissolved	1.2	1.4	1.6
Zinc, dissolved	0.042	0.047	0.053

Table 3-4: Water Quality Numerical Triggers for Overburden Stockpile Collection Pond (KZ-31)

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger
pH	6.5	6.0	5.5
Alkalinity	50	25	10
Ammonia-N	3.5	4.0	4.4
Aluminum, total	0.44	0.50	0.56
Antimony, total	0.36	0.41	0.45
Arsenic, total	0.17	0.19	0.21
Cobalt, total	0.019	0.021	0.024
Fluoride	4.0	4.5	5.0
Iron, total	2.8	3.2	3.5
Nickel, total	0.66	0.75	0.84
Nitrate-N	4.9	5.6	6.2
Nitrite-N	0.071	0.080	0.089
Selenium, total	0.0068	0.0077	0.0086
Sulphate	1164	1319	1474
Thallium, total	0.0011	0.0013	0.0014
Uranium, total	0.036	0.041	0.046
Cadmium, dissolved	0.0019	0.0021	0.0024
Copper, dissolved	0.0051	0.0056	0.0060
Lead, dissolved	0.026	0.030	0.033
Manganese, dissolved	1.9	2.1	2.4
Zinc, dissolved	0.23	0.26	0.29

3.1.6 Monitoring Requirements

The monitoring schedule for stations KZ-3, KZ-30, and KZ-31 is described in Table 3-5 as specified in the EMSRP (BMC, 2026a). This data will be used to compare to triggers and to update trend analysis for each COPI. The monitoring program requirements involve weekly and monthly measurement frequencies. Analytical requirements include in-situ field parameters, physical parameters, nutrients, total and dissolved metals, and dissolved organic carbon. Aside from in-situ measurements, all analyses will be performed by an external accredited laboratory. Supplemental water quality monitoring data may also be collected in response to trigger activation.

Table 3-5: Waste Storage Facilities Water Quality Monitoring Schedule

Station	Description	Frequency [a]	Parameters [b]
KZ-3	Located at the discharge from the Class B Storage Facility Collection Pond	Wnf	A, N, DOC
KZ-30	Located on the outflow of the Class C Storage Facility Collection Pond	Mnf	A, N, DOC
KZ-31	Located on the outflow of the Overburden Stockpile Collection Pond	Mnf	A, N, DOC

[a] *Wnf: Weekly while not frozen; Mnf: Monthly while not frozen.*
[b] *A: Physical parameters, conductivity, TSS, TDS, hardness, alkalinity, sulphate, ICP-total metals, ICP-dissolved metals. N: Nutrients (Ammonia-N, Nitrate-N, Nitrite-N). DOC: Dissolved organic carbon.*

3.1.7 Evaluation of Monitoring Results

Data review will occur after each sampling event, within two weeks of when the analytical results are received from the laboratory. The typical laboratory turn-around time for standard water quality analysis is two weeks. The evaluation will include a comparison of the water quality data to the AMI trigger values using EQWin environmental data management software, or similar, and the trend analysis will be carried out using Microsoft Excel spreadsheet software, or similar.

If an action level trigger has been reached, verification of the monitoring data will begin within two weeks of when the analytical results are received from the laboratory. This will include review of the laboratory QA/QC data, field QA/QC data, field notes, and historical data associated with the result. Laboratory re-analysis may be warranted pending findings from the data review.

If the data are confirmed as reaching a trigger, the station will be re-sampled within one month of receiving the analytical results from the laboratory, pending current site conditions (e.g., monitoring station may be frozen, dry, or inaccessible). Upon verification of the data following confirmatory sampling the next steps will be taken as outlined in the MRP described below.

3.1.8 Development and Implementation of Management Response Plan

The staged development and implementation of an MRP is detailed in Table 3-6. Individual MRPs will be developed for each location, as required, and Yukon Government and First Nations will be consulted prior to implementation of an MRP as discussed in Chapter 5.

The following is a list of potential mitigation options that may be included in the MRP for this AMI:

- Pump water to the UWMP or LWMP if calculations indicate that dilution will allow for discharge of water from the LWMP that does not exceed effluent quality standards (EQS);
- Pump water to the existing Water Treatment Plan (WTP);
- Deploy a mobile WTP; and
- Broadcast lime to collection ponds for in-situ metals removal.

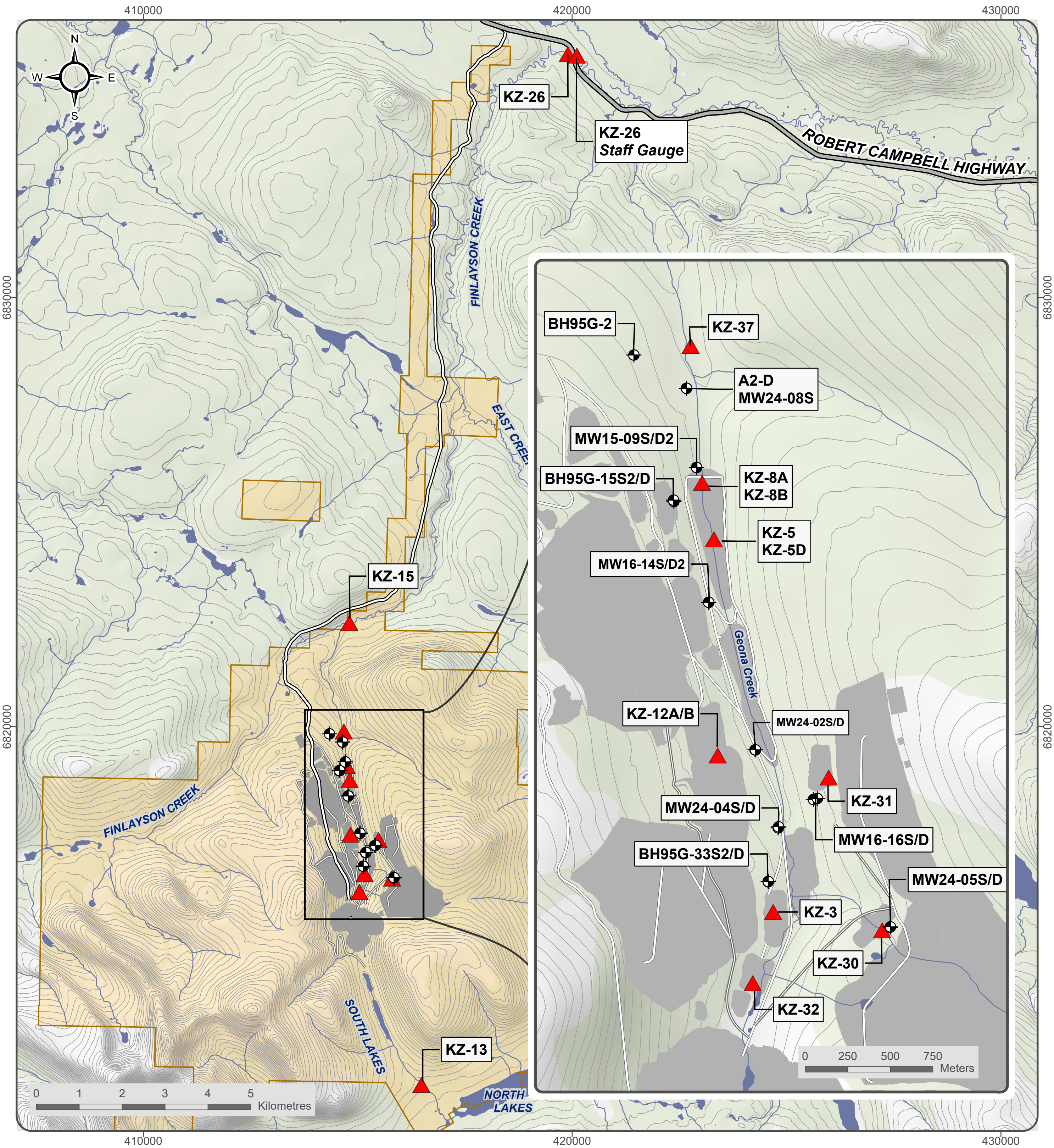
The performance of the mitigation options will be measured by continuing the water quality monitoring program and reviewing indicator concentrations. The corrective action will be deemed successful once the objectives of the MRP are met.

Table 3-6: Waste Storage Facilities Water Quality Staged Response to Trigger Activation

Action Level	Description of Management Plan Elements
Low	Assess and Define the Situation • Review water quality data at existing monitoring stations to assess the potential impact of the trigger being reached. Add additional water quality monitoring station(s) or increase monitoring frequency, as required; • Review existing data (e.g., geochemical characterization data for Class B, C, and/or overburden material) and water quality models to determine the possible cause of the COPI concentration increases. Undertake detailed field investigation if additional data are required; • Prepare a preliminary MRP including re-evaluation of timelines and possible adjustment of low, moderate, and high action level triggers to ensure timely implementation of the MRP when required; • Identify personnel who will be responsible for key decisions related to the development/update and implementation of the MRP; and • Complete updates to the MRP following conclusion of any additional investigations.
Moderate	Design Preferred Mitigation Approach • Update the MRP to include a detailed evaluation of the mitigation options and selection of the preferred management response that will be implemented should the trend continue and high action level triggers be reached; • Design the preferred mitigation approach in sufficient detail to allow for successful implementation should the high action level be reached, including any required assessment and permitting; • Provide recommendations for monitoring that would be implemented to assess the effectiveness of the proposed mitigation and update the AMP as necessary; and • Implement appropriate mitigations, if any, to reverse water quality trends prior to reaching the high trigger.
High	Implement, Monitor, Evaluate, and Adjust • Implement the preferred mitigation approach; • Continue water quality monitoring and update the MRP to include any revisions or adjustments based on more recent information; • Evaluate the effectiveness of the implementation of the management response; and • Adjust the MRP and AMP as needed.

3.1.9 Reporting Requirements

Reporting requirements are discussed in Chapter 4.



Groundwater Monitoring Location

Surface Water Quality/Hydrometric Monitoring Location

Location of Proposed Infrastructure

BMC Minerals Ltd. Mineral Claim Areas

Contours (20 m interval)

Tote Road/Proposed Access Road

Proposed Road

KUDZ ZE KAYAH PROJECT

FIGURE 3-1

WATER QUALITY MONITORING STATIONS USED IN AMP

DECEMBER 2025

Datum: NAD 83; Projection: UTM Zone 9N

BMC MINERALS

D:\Project\AllProjects\Kudz_Ze_Kayah\Maps\01_WaterQuality\04_SWQ_GWQ\WQ_Monitoring_AMP_20251203.aprx
(*Last edited by: JordanYutuc; 2025-12-04/10:21 AM*)

3.2 GROUNDWATER QUALITY

3.2.1 Description

The Class A Storage Facility will provide permanent storage of tailings and waste rock produced by the Project. The Class B and Class C Storage Facilities will provide permanent storage of waste rock. Engineering controls (e.g., low permeability cover and liner systems, diversion channels, compaction, slopes to shed water, progressive reclamation) for the Class A and B Storage Facilities are expected to minimize potential impacts on groundwater from these facilities. Similarly, geochemical screening to ensure that only waste rock with low potential for net acid generation and/or metal leaching is placed in the Class C Storage Facility, is expected to mitigate the potential for groundwater impacts from this facility. Nevertheless, there is potential for unanticipated release of metals and/or acidity from these storage facilities should these controls not perform as intended. The release of metals from tailings and waste rock can potentially seep into the ground, resulting in impacts to downgradient groundwater and surface water quality.

Groundwater monitoring wells will be use used across the site to characterize potential changes to groundwater quality as a result of the Project, with a focus on the areas downgradient of potential COPI sources.

3.2.2 Narrative Response

COPI concentrations in groundwater downgradient of the Class A, Class B, or Class C Storage Facilities or other Project facilities increase to levels that may adversely impact surface water quality.

3.2.3 Indicators

Indicators include the dissolved forms of the COPIs that have surface water WQOs, including:

- Anions and nutrients including ammonia-N, fluoride, nitrate, nitrite, cyanide (WAD), and sulphate; and
- Dissolved aluminum, antimony, arsenic, cadmium, cobalt, copper, iron, lead, manganese, nickel, selenium, thallium, uranium, and zinc.

pH and alkalinity are additional indicators selected to assess the potential for development of acidic conditions:

These parameters will be monitored and evaluated at selected groundwater monitoring wells across the Project, summarized in Table 3-7 and shown in Figure 3-1. These monitoring wells have been selected for their locations downgradient of the storage facility areas and other potential COPI sources.

Table 3-7: Groundwater Monitoring Wells

Project Component	Position relative to Project Component	Unit Monitored	Location	Current Well ID
Whole Project Site	Downgradient	Bedrock	East of Camp	BH95G-2
	Downgradient	Overburden	Downstream of LWMP	MW24-08S
	Downgradient	Bedrock	Downstream of LWMP	A2-D
LWMP	Downgradient	Overburden	Toe of LWMP	MW15-09S
	Downgradient	Bedrock	Toe of LWMP	MW15-09D2
Class A Storage Facility	Downgradient	Overburden	East of Class A Storage Facility	BH95G-15S2
	Downgradient	Bedrock	East of Class A Storage Facility	BH95G-15D
	Downgradient	Overburden	East of Class A Storage Facility	MW16-14S
	Downgradient	Bedrock	East of Class A Storage Facility	MW16-14D2
Process Plant	Downgradient	Overburden	East of Process Plant	MW24-02S
	Downgradient	Bedrock	East of Process Plant	MW24-02D
Class B Storage Facility	Downgradient	Overburden	East of Class B Storage Facility	BH95G-33S2
	Downgradient	Bedrock	East of Class B Storage Facility	BH95G-33D
	Downgradient	Overburden	East of Class B Storage Facility	MW24-04S
	Downgradient	Bedrock	East of Class B Storage Facility	MW24-04D
Class C Storage Facility	Downgradient	Overburden	North of Class C Storage Facility	MW24-05S
	Downgradient	Bedrock	North of Class C Storage Facility	MW24-05D
Overburden Stockpile	Downgradient	Overburden	West of Overburden Stockpile	MW16-16S
	Downgradient	Bedrock	West of Overburden Stockpile	MW16-16D

3.2.4 Triggers and Action Levels

Triggers and action levels are described in Table 3-8. Table 3-9 summarizes the triggers for each COPI. Table 3-10 to Table 3-14 provide the numerical triggers for existing monitoring wells that have been monitored for more than two years, expected to provide enough data to establish baseline water chemistry. Numerical triggers will be developed for other wells once two years of monitoring data is available from them. Trend analysis is to be conducted as described in Section 3.1.5.

The low action level triggers are based on the baseline data from the groundwater monitoring program and Protocol 10 (Determining Background Groundwater Quality) of the Yukon Contaminated Sites Regulations (Yukon, 2017). According to this protocol, the local background concentration is defined as the 95th percentile of the data. Triggers for pH and alkalinity are based on the 5th percentile. Moderate and high action level triggers will be developed based on modelling conducted as part of a response to the exceedance of the low action level trigger and more information becomes available, consistent with Yukon AMP guidance (Yukon, 2021).

Table 3-8: Groundwater Quality Triggers and Action Levels

Action Level	Triggers [a]
Low	The rolling 3-year average concentration exceeds the low trigger in Table 3-10 to Table 3-14; **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the triggers indicated in Table 3-10 to Table 3-14 within 3 years.
Moderate	Moderate action level trigger will be developed based on modelling carried out as part of a response to the exceedance of the low action level trigger.
High	High action level trigger will be developed based on modelling carried out as part of a response to the exceedance of the low action level trigger.

[a] For field pH and alkalinity, the action will be triggered if it is below the low trigger value.

Table 3-9: Groundwater Quality Trigger Description

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger
pH [a]	5th Percentile	-	-
Alkalinity [a]	5th Percentile	-	-
Fluoride	95th Percentile	-	-
Sulphate	95th Percentile	-	-
Ammonia-N	95th Percentile	-	-
Nitrite-N	95th Percentile	-	-
Nitrate-N	95th Percentile	-	-
Aluminum, dissolved	95th Percentile	-	-
Antimony, dissolved	95th Percentile	-	-
Arsenic, dissolved	95th Percentile	-	-
Cadmium, dissolved	95th Percentile	-	-
Cobalt, dissolved	95th Percentile	-	-
Copper, dissolved	95th Percentile	-	-
Iron, dissolved	95th Percentile	-	-
Lead, dissolved	95th Percentile	-	-
Manganese, dissolved	95th Percentile	-	-
Nickel, dissolved	95th Percentile	-	-
Selenium, dissolved	95th Percentile	-	-
Thallium, dissolved	95th Percentile	-	-
Uranium, dissolved	95th Percentile	-	-
Zinc, dissolved	95th Percentile	-	-
Cyanide, WAD	95th Percentile	-	-

[a] pH and alkalinity trigger values are exceeded when the calculated rolling median is below the trigger value.
Moderate and high action level triggers will be developed based on modelling carried out as part of a response to the exceedance of the low action level trigger.

Table 3-10: Groundwater Quality Numerical Triggers at MW15-09S

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger
pH [a]	7.2	-	-
Alkalinity [b]	209	-	-
Fluoride	0.29	-	-
Sulphate	29.6	-	-
Ammonia-N	0.11	-	-
Nitrite-N	0.0061	-	-
Nitrate-N	0.26	-	-
Aluminum, dissolved	0.12	-	-
Antimony, dissolved	0.00018	-	-
Arsenic, dissolved	0.00075	-	-
Cadmium, dissolved	0.00011	-	-
Cobalt, dissolved	0.00085	-	-
Copper, dissolved	0.00063	-	-
Iron, dissolved	0.67	-	-
Lead, dissolved	0.00032	-	-
Manganese, dissolved	0.23	-	-
Nickel, dissolved	0.00095	-	-
Selenium, dissolved	0.003	-	-
Thallium, dissolved	0.0000035	-	-
Uranium, dissolved	0.004	-	-
Zinc, dissolved	0.0022	-	-
Cyanide, WAD	- [c]	-	-

[a] For pH, the trigger will occur if both the field and laboratory sample results are below the trigger value. Both measurements will be considered to account for supersaturation and/or degassing of CO_2.
[b] Alkalinity trigger value is exceeded when the calculated rolling median is below the trigger value.
[c] No baseline cyanide (WAD) data available. Low trigger value will be calculated based on the 95th percentile concentration of first 20 samples collected and analyzed for cyanide (WAD).
Moderate and high action level triggers will be developed based on modelling carried out as part of a response to the exceedance of the low action level trigger.

Table 3-11: Groundwater Quality Numerical Triggers at BH95G-2

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger
pH [a]	7.2	-	-
Alkalinity [b]	213	-	-
Fluoride	0.07	-	-
Sulphate	60.6	-	-
Ammonia-N	0.06	-	-
Nitrite-N	0.0055	-	-
Nitrate-N	0.48	-	-
Aluminum, dissolved	0.006	-	-
Antimony, dissolved	0.000037	-	-
Arsenic, dissolved	0.00013	-	-
Cadmium, dissolved	0.0017	-	-
Cobalt, dissolved	0.00003	-	-
Copper, dissolved	0.0023	-	-
Iron, dissolved	0.02	-	-
Lead, dissolved	0.00007	-	-
Manganese, dissolved	0.0022	-	-
Nickel, dissolved	0.00066	-	-
Selenium, dissolved	0.0062	-	-
Thallium, dissolved	0.00000325	-	-
Uranium, dissolved	0.003	-	-
Zinc, dissolved	0.027	-	-
Cyanide, WAD	- [c]	-	-

[a] For pH, the trigger will occur if both the field and laboratory sample results are below the trigger value. Both measurements will be considered to account for supersaturation and/or degassing of CO_2.
[b] Alkalinity trigger value is exceeded when the calculated rolling median is below the trigger value.
[c] No baseline cyanide (WAD) data available. Low trigger value will be calculated based on the 95th percentile concentration of first 20 samples collected and analyzed for cyanide (WAD).
Moderate and high action level triggers will be developed based on modelling carried out as part of a response to the exceedance of the low action level trigger.

Table 3-12: Groundwater Quality Numerical Triggers at BH95G-15D

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger
pH [a]	6.9	-	-
Alkalinity [b]	163	-	-
Fluoride	0.17	-	-
Sulphate	23	-	-
Ammonia-N	0.05	-	-
Nitrite-N	0.04	-	-
Nitrate-N	0.72	-	-
Aluminum, dissolved	0.014	-	-
Antimony, dissolved	0.00008	-	-
Arsenic, dissolved	0.0012	-	-
Cadmium, dissolved	0.00005	-	-
Cobalt, dissolved	0.000085	-	-
Copper, dissolved	0.0011	-	-
Iron, dissolved	0.38	-	-
Lead, dissolved	0.00016	-	-
Manganese, dissolved	0.095	-	-
Nickel, dissolved	0.0005	-	-
Selenium, dissolved	0.0037	-	-
Thallium, dissolved	0.000005	-	-
Uranium, dissolved	0.004	-	-
Zinc, dissolved	0.0029	-	-
Cyanide, WAD	- [c]	-	-

[a] For pH, the trigger will occur if both the field and laboratory sample results are below the trigger value. Both measurements will be considered to account for supersaturation and/or degassing of CO_2.
[b] Alkalinity trigger value is exceeded when the calculated rolling median is below the trigger value.
[c] No baseline cyanide (WAD) data available. Low trigger value will be calculated based on the 95th percentile concentration of first 20 samples collected and analyzed for cyanide (WAD).
Moderate and high action level triggers will be developed based on modelling carried out as part of a response to the exceedance of the low action level trigger.

Table 3-13: Groundwater Quality Numerical Triggers at BH95G-33D

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger
pH [a]	7.2	-	-
Alkalinity [b]	164	-	-
Fluoride	0.063	-	-
Sulphate	82	-	-
Ammonia-N	0.06	-	-
Nitrite-N	0.0045	-	-
Nitrate-N	0.25	-	-
Aluminum, dissolved	0.0038	-	-
Antimony, dissolved	0.000048	-	-
Arsenic, dissolved	0.00044	-	-
Cadmium, dissolved	0.00001	-	-
Cobalt, dissolved	0.000031	-	-
Copper, dissolved	0.00064	-	-
Iron, dissolved	0.029	-	-
Lead, dissolved	0.00004	-	-
Manganese, dissolved	0.01	-	-
Nickel, dissolved	0.0016	-	-
Selenium, dissolved	0.0077	-	-
Thallium, dissolved	0.000003	-	-
Uranium, dissolved	0.0052	-	-
Zinc, dissolved	0.0017	-	-
Cyanide, WAD	- [c]	-	-

[a] *For pH, the trigger will occur if both the field and laboratory sample results are below the trigger value. Both measurements will be considered to account for supersaturation and/or degassing of CO_2.*
[b] *Alkalinity trigger value is exceeded when the calculated rolling median is below the trigger value.*
[c] *No baseline cyanide (WAD) data available. Low trigger value will be calculated based on the 95th percentile concentration of first 20 samples collected and analyzed for cyanide (WAD).*
Moderate and high action level triggers will be developed based on modelling carried out as part of a response to the exceedance of the low action level trigger.

Table 3-14: Groundwater Quality Numerical Triggers at MW16-16D

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger
pH [a]	7.2	-	-
Alkalinity [b]	182	-	-
Fluoride	0.2	-	-
Sulphate	42.5	-	-
Ammonia-N	0.041	-	-
Nitrite-N	0.0054	-	-
Nitrate-N	0.0064	-	-
Aluminum, dissolved	0.031	-	-
Antimony, dissolved	0.00018	-	-
Arsenic, dissolved	0.00041	-	-
Cadmium, dissolved	0.000015	-	-
Cobalt, dissolved	0.00019	-	-
Copper, dissolved	0.00048	-	-
Iron, dissolved	0.7	-	-
Lead, dissolved	0.00041	-	-
Manganese, dissolved	0.056	-	-
Nickel, dissolved	0.00065	-	-
Selenium, dissolved	0.00002	-	-
Thallium, dissolved	0.000001	-	-
Uranium, dissolved	0.0046	-	-
Zinc, dissolved	0.0051	-	-
Cyanide, WAD	- [c]	-	-

[a] For pH, the trigger will occur if both the field and laboratory sample results are below the trigger value. Both measurements will be considered to account for supersaturation and/or degassing of CO_2.
[b] Alkalinity trigger value is exceeded when the calculated rolling median is below the trigger value.
[c] No baseline cyanide (WAD) data available. Low trigger value will be calculated based on the 95th percentile concentration of first 20 samples collected and analyzed for cyanide (WAD).
Moderate and high action level triggers will be developed based on modelling carried out as part of a response to the exceedance of the low action level trigger.

3.2.5 Monitoring Requirements

The groundwater monitoring program to support this AMI is summarized in Table 3-15, and is further discussed in the EMSRP (BMC, 2026a). Water quality monitoring is also performed at other wells, as described in the EMSRP, and these data may be used to determine appropriate responses to a trigger activation.

Table 3-15: Groundwater Quality Monitoring Schedule

Project Component	Position relative to Project Component	Unit Monitored	Location and Notes	Current Well ID	Water Quality Monitoring	
					Sampling Frequency	Analysis
Whole Project Site	Downgradient	Bedrock	East of Camp	BH95G-2	Quarterly	WQ+CN
	Downgradient	Overburden	Downstream of LWMP	MW24-08S	Quarterly	WQ+CN
	Downgradient	Bedrock	Downstream of LWMP	A2-D	Quarterly	WQ+CN
LWMP	Downgradient	Overburden	Toe of LWMP	MW15-09S	Quarterly	WQ+CN
	Downgradient	Bedrock	Toe of LWMP	MW15-09D2	Quarterly	WQ+CN
Class A Storage Facility	Downgradient	Overburden	East of Class A Storage Facility	BH95G-15S2	Quarterly	WQ+CN
	Downgradient	Bedrock	East of Class A Storage Facility	BH95G-15D	Quarterly	WQ+CN
	Downgradient	Overburden	East of Class A Storage Facility	MW16-14S	Quarterly	WQ+CN
	Downgradient	Bedrock	East of Class A Storage Facility	MW16-14D2	Quarterly	WQ+CN
Process Plant	Downgradient	Overburden	East of Process Plant	MW24-02S	Quarterly	WQ+CN
	Downgradient	Bedrock	East of Process Plant	MW24-02D	Quarterly	WQ+CN
Class B Storage Facility	Downgradient	Overburden	East of Class B Storage Facility	BH95G-33S2	Quarterly	WQ+CN
	Downgradient	Bedrock	East of Class B Storage Facility	BH95G-33D	Quarterly	WQ+CN
	Downgradient	Overburden	East of Class B Storage Facility	MW24-04S	Quarterly	WQ+CN
	Downgradient	Bedrock	East of Class B Storage Facility	MW24-04D	Quarterly	WQ+CN
Class C Storage Facility	Downgradient	Overburden	North of Class C Storage Facility	MW24-05S	Quarterly	WQ+CN
	Downgradient	Bedrock	North of Class C Storage Facility	MW24-05D	Quarterly	WQ+CN
Overburden Stockpile	Downgradient	Overburden	West of Overburden Stockpile	MW16-16S	Quarterly	WQ+CN
	Downgradient	Bedrock	West of Overburden Stockpile	MW16-16D	Quarterly	WQ+CN

WQ: In situ pH, temperature, specific conductance, oxidation, and reduction potential; external laboratory analysis of dissolved metals, pH, specific conductance, TDS, DOC, anions, nitrate, nitrite and ammonia, alkalinity.
CN: Full water quality suite with weak acid dissociable cyanide analysis.

3.2.6 Evaluation of Monitoring Results

Data review will occur after each sampling event, within two weeks of when the analytical results are received from the laboratory. The typical laboratory turn-around time for standard water quality analysis is two weeks. The evaluation will include a comparison of the water quality data to numerical trigger values using EQWin environmental data management software, or similar, and the trend analysis will be carried out using Microsoft Excel spreadsheet software, or similar.

If a trigger is reached, verification of the monitoring data will begin within two weeks of when the analytical results are received from the laboratory. This will include review of the laboratory QA/QC data, field QA/QC data, field notes, and historical data associated with the results that led to trigger activation. Laboratory re-analysis may be warranted pending findings from the data review. The result will then be evaluated to determine if it is a byproduct of the statistical test used for evaluation.

If the data are confirmed as reaching a trigger, the station will be re-sampled within one month of receiving the analytical results from the laboratory, pending current site conditions (e.g., monitoring station may be frozen, dry, or inaccessible). Upon verification of the data following confirmatory sampling, next steps will be taken as outlined in the MRP.

3.2.7 Development and Implementation of Management Response Plan

The staged development and implementation of an MRP is detailed in Table 3-16. MRPs will be developed for each location, as required, and Yukon Government and First Nations will be consulted prior to implementation of an MRP as discussed in Chapter 5.

Table 3-16: Groundwater Quality Staged Response to Trigger Activation

Action Level	Description of Management Plan Elements
Low	Assess and Define the Situation • Review water quality data at existing monitoring wells, seeps (if any) and downstream surface water to assess the potential impact of the trigger being reached. Add additional water quality monitoring well(s) and/or increase monitoring frequency and/or additional investigation methods as required to characterize the impacted groundwater; • Review existing data, groundwater and water quality models to determine the possible cause of the COPI concentration increases. Undertake detailed field investigation if additional data are required; • Prepare a preliminary MRP including re-evaluation of timelines and possible adjustment of low, moderate, and high action level triggers to ensure timely implementation of the MRP when required; • Identify personnel who will be responsible for key decisions related to the development/update and implementation of MRPs; • Complete updates to the MRP following conclusion of any additional investigations; and • Apply water quality model to develop moderate and high level triggers.
Moderate	Design Preferred Mitigation Approach • Update the MRP to include a detailed assessment/evaluation of the mitigation options and selection of the preferred management response that will be implemented should the trend continue and high action level triggers be reached; • Design the preferred mitigation option in sufficient detail to allow for successful implementation should the high action level be reached, including any required assessment and permitting; and • Provide recommendations for monitoring that would be implemented to assess the effectiveness of the proposed mitigation and update the AMP as necessary. • Implement appropriate mitigations, if any, to reverse water quality trends prior to reaching the high trigger.
High	Implement, Monitor, Evaluate, and Adjust • Implement the preferred mitigation approach; • Continue water quality monitoring and update the MRP to include any revisions or adjustments based on more recent information; • Evaluate the effectiveness of the implementation of the management response; and • Adjust the MRP and AMP as needed.

Some potential mitigation options that may be included in the MRP for this AMI include:

- Mitigate the storage facilities as potential sources by installing an inter-lift liner or revising facility design or management practices; and
- Mitigate seepage pathways by installing a cutoff wall, collecting impacted groundwater for treatment and/or installing an in-situ treatment system.

3.2.8 Reporting Requirements

Reporting requirements are discussed in Chapter 4.

3.3 CLASS A AND CLASS B STORAGE FACILITY LEAKAGE

3.3.1 Description

The Class A and Class B Storage Facilities will include a composite basin liner comprising a geomembrane liner underlain by compacted low permeability soil. Composite liners are considered a best practice to minimize seepage even in the case of a poorly constructed or degrading geomembrane. Seepage rates through these composite liners at the Class A and Class B Storage Facilities is predicted to range from 0.001 L/s to 0.007 L/s for the ultimate footprint, and less throughout much of operations. A drainage layer consisting of sand and gravel will be constructed on top of the basin liner to rapidly convey seepage out of the facility and to provide protection from construction vehicle traffic. Tailings and waste rock will be placed over this drainage layer.

The foundation of the Class A and Class B Storage Facilities will be cleared and stripped of topsoil, and foundation drains will be constructed in a herringbone pattern to collect and transport groundwater beneath the composite basin liner to downstream sumps. These drains are intended to minimize foundation pore pressures and to allow for monitoring of potential seepage through the basin liners.

The Class A and Class B Storage Facilities will be progressively covered by a closure cover liner. This closure cover liner will consist of a compacted low permeability soil overlain by a geomembrane. On top of the geomembrane, another drainage layer will also be constructed for seepage collection. Finally, a non-PAG Class C waste rock will be placed over the drainage layer to protect the cover system from frost and erosion and to improve geotechnical stability of each facility. This cover liner system will limit infiltration into the facilities, further decreasing the risk of leakage into the foundation.

Placement of the basin liner will follow a QA/QC program established prior to construction to minimize the development of wrinkles, which can later develop into holes. With the liner installation adhering to a QA/QC program, most of the seepage is anticipated to be transported within the drainage layer and collected downstream of the facility. However, there is still a small risk of leakage through the liner into the foundation, potentially mobilizing acidity and oxidized metals from the Class A and Class B waste material to groundwater. While the Groundwater Quality AMI (Section 3.2) deals with identification of, and responses to, changes in downgradient groundwater quality that may be related to the Class A and Class B Storage Facilities, this AMI concerns leakage from these facilities, with linkages to the Groundwater Quality AMI.

3.3.2 Narrative Response

Seepage from the Class A and/or Class B Storage Facilities leaks through the composite liner, with potential for adverse impacts to groundwater and its surface water receivers.

3.3.3 Indicators

The key indicator for leakage through the Class A and Class B Storage Facilities is sulphate. Additional parameters will be monitored as they may be beneficial if intervention is required, including:

- Anions and nutrients including ammonia-N, fluoride, nitrate, nitrite, cyanide (WAD), and sulphate;
- Dissolved aluminum, antimony, arsenic, cadmium, cobalt, copper, iron, lead, manganese, nickel, selenium, thallium, uranium, and zinc; and
- pH and alkalinity.

These parameters will be monitored at the foundation drainage sumps downstream of the Class A and B Storage Facilities. The exact location of the sumps will be determined during foundation preparation considering as-built foundation conditions.

3.3.4 Triggers and Action Levels

Triggers and action levels related to water quality in the foundation drainage sumps will be developed following at least one year of monitoring sump water quality to establish initial conditions at these locations.

Triggers and action levels related to water quality in downstream monitoring wells are described in the Groundwater Quality AMI.

3.3.5 Monitoring Requirements

Water quality in the Class A and Class B Storage Facilities foundation drain sumps will be monitored monthly during the first year of operations to establish initial conditions, and will decrease to quarterly once theses conditions have been established. The groundwater monitoring program for wells downgradient of the Class A and Class B Storage Facilities is described in the Groundwater Quality AMI.

3.3.6 Evaluation of Monitoring Results

Data review will occur after each sampling event, within two weeks of when the analytical results are received from the laboratory. The typical laboratory turn-around time for standard water quality analysis is two weeks. The evaluation will include a comparison of the water quality data to the AMI numerical trigger values using EQWin environmental data management software, or similar, and the trend analysis will be carried out using Microsoft Excel spreadsheet software, or similar.

If an action level trigger has been reached, verification of the monitoring data will begin within two weeks of when the analytical results are received from the laboratory. This will include review of the laboratory QA/QC data, field QA/QC data, field notes, and historical data associated with the result that led to trigger activation. Laboratory re-analysis may be warranted pending findings from the data review. The result will then be evaluated to determine if it is a byproduct of the statistical test used for evaluation.

If the data are confirmed as reaching a trigger, the station may be re-sampled within one month of receiving the analytical results from the laboratory, if appropriate, and pending current site conditions (e.g., monitoring station may be frozen, dry, or inaccessible). Upon verification of the data following confirmatory sampling the next steps will be taken as outlined in the MRP. YG will be notified within one month of confirming the trigger.

3.3.7 Development and Implementation of Management Response Plan

The staged development and implementation of an MRP is detailed in Table 3-17. Individual MRPs will be developed for each location, as required, and Yukon Government and First Nations will be consulted prior to implementation of an MRP as discussed in Chapter 5.

Table 3-17: Class A/B Storage Facility Leakage Staged Response to Trigger Activation

Action Level	Description of Management Plan Elements
Low	Assess and Define • Review water quality data at existing sumps and/or monitoring wells to assess the potential impact of the trigger being reached. Add additional water quality monitoring well(s) and/or foundation drain sampling locations and/or increase monitoring frequency or different investigation methods, as required; • Review existing data and water quality models to determine the possible cause of the sulphate concentration increases. Undertake detailed field investigation if additional data are required; • Prepare a preliminary MRP including re-evaluation of timelines and possible adjustment of low, moderate, and high action level triggers to ensure timely implementation of the MRP when required; • Identify personnel/consultants who will be responsible for key decisions related to the development/update and implementation of MRPs; • Complete updates to the MRP following conclusion of any additional investigations; and • Apply water quality model to develop moderate and high level triggers.
Moderate	Design Preferred Mitigation Approach • Update the MRP to include a detailed assessment/evaluation of the mitigation options and selection of the preferred management response that will be implemented should the trend continue and high action level triggers be reached; • Design the preferred mitigation option in sufficient detail to allow for successful implementation should the high action level be reached, including any required assessment and permitting; • Provide recommendations for monitoring that would be implemented to assess the effectiveness of the proposed mitigation and update the AMP as necessary; and • Implement appropriate mitigations, if any, to reverse water quality trends prior to reaching the high trigger.
High	Implement, Monitor, Evaluate, and Adjust • Implement the preferred mitigation approach; • Continue water quality monitoring and update the MRP to include any revisions or adjustments based on more recent information; • Evaluate the effectiveness of the implementation of the management response; and • Adjust the MRP and AMP as needed.

The following is a list of potential mitigation options that may be included in the MRP for this AMI:

- Mitigate the leakage by installing an inter-lift liner or revising facility design or management practices; and
- Mitigate the seepage pathway by installing a cutoff wall, collecting impacted groundwater for treatment or installing an in-situ treatment system.

3.3.8 Reporting Requirements

Reporting requirements are discussed in Chapter 4.

3.4 WATER STORAGE POND LEVELS

3.4.1 Description

The Project is predicted to have a surplus of water, meaning that on average, it will collect more water than it consumes. As a result, water management ponds are required to store water prior to discharge to the environment, to ensure that the volume and quality of water discharged to the environment meets EQS and will not lead to exceedances of WQO in downstream receiving waters. Two water management ponds will be constructed in the Geona Creek valley to manage water prior to discharge to the environment:

- The Upper Water Management Pond (UWMP): Collects runoff and seepage from some areas of the Project site. Water is pumped from the UWMP to the LWMP before discharge to the environment.; and
- The Lower Water Management Pond (LWMP): Serves as the final holding pond for site water prior to discharge to the environment (i.e., Geona Creek and/or Finlayson Creek), recycling to the Process Plant, and dust control.

Water will accumulate in the LWMP at times when the rate of inflows exceeds the rate of outflows. Pumping to Geona Creek and/or Finlayson Creek will usually be the largest outflow from the LWMP, with some water also being used for dust control or recycled back to the operation for other purposes. This pumping rate is limited by the maximum discharge ratios established to ensure that WQOs are met in Geona Creek and/or Finlayson Creek, and by the capacity of pumping infrastructure. If accumulation occurs over an extended period without appropriate management responses, there is some risk of unplanned discharges of water from the LWMP to the environment. The results of the Variable Climate Case water balance model (KP, 2024) indicate that there is less than a 3% probability of storage in the LWMP and UWMP exceeding their maximum operational volume, even when assuming conservatively high mine dewatering rates. If the maximum operational volume is reached, both the UWMP and LWMP are designed with an additional allowance to store the 1 in 200-year, 24-hour precipitation event and are equipped with a spillway to safely pass the peak discharge resulting from an additional 1 in 1,000 year, 24-hour precipitation event with a minimum of 1 m freeboard.

Despite the very low risk of unplanned discharges from the Water Management Ponds, specific triggers for pond water levels have been developed to mitigate this risk. Water level monitoring equipment will be installed in the UWMP and LWMP, and water balance models will be maintained and updated regularly to monitor pond storage risk throughout the life of the Project.

3.4.2 Narrative Response

Water stored in the Water Management Ponds exceeds their maximum operational volume, increasing the risk of unplanned discharges to the environment in the event of a large storm event that may lead to WQO exceedances in the receiving environment.

3.4.3 Indicators

The specific indicators that will be monitored to provide the information necessary to assess whether a trigger has been activated is the water level in the LWMP and UWMP.

3.4.4 Water Storage Pond Levels Triggers and Action Levels

The triggers for this AMI were calculated from the maximum operating pond elevations of 1328.4 m for the LWMP and 1346.3 m for the UWMP. The maximum water elevations were used to determine triggers for the low, moderate, and high action levels (Table 3-18). Each trigger was developed in consideration of the time required for the selection and implementation of potential management plans for each trigger, given a range of potential precipitation scenarios.

Table 3-18: Water Storage Pond Levels Action Levels and Triggers

Action Level	Triggers
Low	1325.0 m for the LWMP or 1344.0 m for the UWMP
Moderate	1326.5 m for the LWMP or 1345.2 m for the UWMP
High	1327.5 m for the LWMP or 1345.8 m for the UWMP

3.4.5 Monitoring Requirements

The monitoring schedule for LWMP and UWMP water levels is detailed in the EMSRP (BMC, 2026a). Water levels will be measured continuously by data loggers installed in the WMPs with alerts set at specified levels. Daily visual inspections of the ponds will also be conducted (using either staff gauges or gauges printed on the pond liners).

3.4.6 Evaluation of Monitoring Results

Water level data will be used to compare to triggers. If a trigger is exceeded, steps will be taken as outlined in the MRP.

3.4.7 Development and Implementation of Management Response Plan

The staged development and implementation of an MRP is detailed in Table 3-19. Individual MRPs will be developed for each pond as needed, but all analyses and mitigations will consider the UWMP and LWMP as a connected system, considering the stored volume and remaining storage capacity of both ponds. Yukon Government and First Nations will be consulted prior to implementation of an MRP as discussed in Chapter 5.

Table 3-19: Water Storage Pond Levels Staged Response to Trigger Activation

Action Level	Description of Management Plan Elements
Low	Assess and Define the Situation • Review water level, operations and meteorological data to determine the cause of the elevated water levels; • Prepare a preliminary MRP including re-evaluation of timelines and possible adjustment of low, moderate, and high action level triggers to ensure timely implementation of the MRP when required, utilizing the site-wide water balance model; • Identify personnel who will be responsible for key decisions related to the development/update and implementation of MRPs; and • Complete updates to the MRP following conclusion of any additional investigations.
Moderate	Design Preferred Mitigation Approach • Update the MRP to include a detailed evaluation of the mitigation options and selection of the preferred management response that will be implemented should high action level triggers be reached; • Design the preferred mitigation option in sufficient detail to allow for successful implementation should the high action level be reached, including any required assessment and permitting; • Provide recommendations for monitoring that would be implemented to assess the effectiveness of the proposed mitigation and update the AMP as necessary; and • Implement appropriate mitigations, if any, to reverse pond level trends prior to reaching the high trigger.
High	Implement, Monitor, Evaluate, and Adjust • Implement the preferred mitigation options; • Continue monitoring and update the MRP to include any revisions or adjustments based on more recent information; • Evaluate the effectiveness of the implementation of the management response; and • Adjust the MRP and AMP as needed.

The following is a list of potential mitigation options that may be included in the MRP for this AMI:

- Pump water between the LWMP and UMWP as appropriate to optimize available operational storage;
- Pump water from the Water Management Ponds to the Open Pit for temporary storage;
- Decrease inflows to the ponds by temporarily minimizing mine dewatering; and
- Increase pumping capacity from LWMP to Finlayson Creek, if increased discharge will not exceed discharge ratios. The maximum allowable discharge from LWMP to Finlayson Creek is predicted to range from 600 m3/hour to 1900 m3/hour from May to October in an average year. The pumping system capacity from LWMP to Finlayson Creek is 600 m3/hour, so it is possible to greatly increase pumping capacity without exceeding discharge ratios during and following freshet.

The performance of the mitigation options will be measured by continuing the monitoring program and tracking pond water levels, alongside ongoing analysis of water balance model predictions. The corrective action will be deemed successful once the objectives of the MRP are met.

3.4.8 Reporting Requirements

Reporting requirements are discussed in Chapter 4.

3.5 MINE DEWATERING

3.5.1 Description

The Project involves extraction of the ABM Deposit, which will be mined by open pit and underground mining methods. The mine will be located at the south end of the Geona Creek valley, as shown in Figure 1-2. Water will be pumped from the open pit, underground and dewatering wells to the Pit Rim Pond, located adjacent to the open pit, where it will be stored temporarily. During mine operations, water will be pumped from the Pit Rim Pond to the WTP. Overburden dewatering flows during mine construction are not anticipated to require treatment at the WTP (Ensero, 2024a), so will be pumped directly from the Pit Rim Pond to Geona Creek, or to the LWMP once it has been constructed.

Given that mine dewatering flows during operations are treated and stored prior to being discharged to the environment, water quality objectives in the receiving environment are expected to be met. Nevertheless, specific triggers for dewatering flow rates were developed to ensure that the combined capacity of the Pit Rim Pond for storage and the WTP for treatment are not exceeded, and that permitted water extraction limits are not exceeded. Monitoring of mine dewatering activities, including dewatering rates and groundwater levels, will be conducted throughout construction and operations.

3.5.2 Narrative Response

Mine dewatering rates are higher than expected, requiring additional mine water management measures to avoid exceeding permitted dewatering rates. It is highly unlikely that higher dewatering rates will adversely impact the environment, as permitted rates are much less than WTP capacity (discussed in the AMI for Water Treatment Plant Capacity), and there is significant storage capacity available for treated water (discussed in the AMI for Water Storage Pond Levels) prior to reaching the environment.

3.5.3 Indicators

The specific indicator to assess whether a trigger has been activated is the mine dewatering flow rate pumped to the Pit Rim Pond. This flow includes water that seeps passively into the open pit and underground, precipitation and runoff to the open pit, and water pumped from mine dewatering wells. Supplementary monitoring information such as groundwater levels in dewatering and monitoring wells adjacent to the open pit and underground will also be recorded, and these data may be beneficial if additional mitigation and management measures are required.

3.5.4 Triggers and Action Levels

The maximum permitted rate for mine dewatering flows into Pit Rim Pond is the maximum daily average flow rate of 8,220 m^3/day, which includes an estimated dewatering rate of 5,830 m^3/day and a precipitation and surface runoff of 2,390 m^3/day (Tetra Tech, 2019; BMC, 2026b). This is the maximum permitted extraction rate in BMC's Type A Water Use Licence (WUL) Application. This maximum dewatering rate was used to determine the low, moderate, and high action level triggers (Table 3-20). The time required for the assessment of options and the design, permitting, construction, and implementation of any required mitigations has been incorporated into the selection of the triggers. Triggers are based on average dewatering flows over durations ranging from one week to three months, to reflect the highly variable nature of pit dewatering flows in response to rainfall and snowmelt, geological conditions encountered during mining, and operational decisions such as mining phasing and dewatering methodology.

Table 3-20: Mine Dewatering Triggers and Action Levels

Action Level	Triggers	Rationale
Low	Average dewatering rate exceeding 6,165 m^3/day over a period of three consecutive months; **or** Average dewatering rate exceeding 7,398 m^3/day over a period of one week.	Based on 75% of the estimated maximum rate of 8,220 m^3/day; **or** Based on 90% of the estimated maximum rate of 8,220 m^3/day.
Moderate	Average dewatering rate exceeding 6,987 m^3/day over a period of two consecutive months; **or** Average dewatering rate exceeding 7,809 m^3/day over a period of one week.	Based on 85% of the estimated maximum rate of 8,220 m^3/day; **or** Based on 95% of the estimated maximum rate of 8,220 m^3/day.
High	Average dewatering rate exceeding 7,809 m^3/day over a period of one month.	Based on 95% of the estimated maximum rate of 8,220 m^3/day.

3.5.5 Monitoring Requirements

The monitoring data that is required for this AMI is the rate of dewatering flow pumped into Pit Rim Pond. Dewatering flow rate data, collected as part of routine mining operations, includes daily readings using a flow meter.

Supplementary monitoring information such as groundwater levels in dewatering and monitoring wells adjacent to the open pit and underground will also be recorded.

3.5.6 Evaluation of Monitoring Results

Manual data review will be carried out on a monthly basis, and automated alerts will be sent if weekly action level triggers are reached. The manual evaluation will include a comparison of actual flow rate data to the numerical trigger values using EQWin environmental data management software, or similar.

If an action level trigger is reached, verification of the monitoring data will be initiated. This will include re-measuring the flow rate, confirming flow meter calibration and performing a detailed review of recent flow data alongside relevant operational information. This verification will be performed within one week of initial indication of trigger activation. Dewatering flow rate projections will also be prepared and reviewed annually as part of the annual AMP Report. This will include an evaluation of the previous year's water balance inputs, including pumping data, precipitation, runoff, groundwater, evaporation, and managed inflows and outflows, and updating to the overall Project water balance.

Upon verification of the data following confirmatory flow rate measurement, the next steps will be taken as outlined in the MRP.

3.5.7 Development and Implementation of Management Response Plan

The staged development and implementation of an MRP is detailed in Table 3-21. Yukon Government and First Nations will be consulted prior to implementation of an MRP as discussed in Chapter 5.

Table 3-21: Mine Dewatering Staged Response to Trigger Activation

Action Level	Description of Management Plan Elements
Low	Assess and Define the Situation • Review the existing flow rate data and site-wide water balance to evaluate the potential impact of the trigger being reached; • Review existing flow rate data to determine the possible cause of the trigger activation. Undertake detailed field and desktop investigation if additional data or analysis is required; • Prepare a preliminary MRP including re-evaluation of timelines and possible adjustment of low, moderate, and high action level triggers to ensure timely implementation of the MRP when required; • Identify personnel who will be responsible for key decisions related to the development/update and implementation of MRPs; and • Complete updates to the MRP following conclusion of any additional investigations.
Moderate	Design Preferred Mitigation Approach • Update the MRP to include a detailed assessment/evaluation of the mitigation options and selection of the preferred management response that will be implemented should the high action level trigger be reached; • Design the preferred mitigation approach in sufficient detail to allow for successful implementation should the high action level be reached, including any required assessment and permitting; • Provide recommendations for monitoring that would be implemented to assess the effectiveness of the proposed mitigation and update the AMP as necessary; and • Implement appropriate mitigations, if any, to avoid exceeding the high trigger.
High	Implement, Monitor, Evaluate, and Adjust • Implement the preferred mitigation approach; • Continue monitoring and update the MRP to include any revisions or adjustments based on more recent information; • Evaluate the effectiveness of the implementation of the management response; and • Adjust the MRP and AMP as needed.

Some potential mitigation options that may be included in the MRP for this AMI include:

- Decrease pumping rates from select dewatering wells if this will not adversely impact geotechnical stability;
- Grout select underground features to decrease inflows to the underground mine;
- Temporarily store water in the open pit or underground;
- Install evaporators to minimize the amount of water that needs to be pumped to the Pit Rim Pond; and

- Revise mining practices to decrease inflows to the open pit or underground.

3.5.8 Reporting Requirements

Reporting requirements are discussed in Chapter 4.

3.6 WATER TREATMENT PLANT CAPACITY

3.6.1 Description

The WTP is proposed to treat influent water from two separate feeds, with the following maximum treatment rates:

- Stream 1: Class A Storage Facility runoff and seepage, and Process Plant water – up to 200 m3/hr; and
- Stream 2: ROM Pad/LGO Stockpile runoff, mine dewatering (via the Pit Rim Pond), and runoff from the Process Plant site – up to 390 m3/hr.

The treated water will be discharged to the LWMP for final polishing before discharge to the receiving environment, use in the Process Plant, dust control, or potable use in the camp and administrative offices. Laboratory treatability studies indicate that water treatment objectives can be met using the system as designed (BQE, 2019). As the influent water tested in the laboratory treatability study was prepared based on the 95th percentile water quality predictions, uncertainties arise regarding the treatability of influent water with quality exceeding the predicted values. The influent water feeding into the WTP will be monitored at the following stations:

- KZ-12A for Stream 1; and
- KZ-12B for Stream 2.

Stations KZ-12A and KZ-12B are shown in Figure 3-1.

3.6.2 Narrative Response

The WTP influent flow rate or quality exceeds the treatment capacity of the WTP, resulting in the discharge of water to the LWMP that that may cause concentrations to exceed EQS.

3.6.3 Indicators

The indicators for influent flow rate are the WTP treatment capacity, including 200 m^3/hr for Stream 1 and 390 m^3/hr for Stream 2.

The indicators for the influent water quality are the EQS constituents (i.e. COPI), including:

- Physical parameters, including pH and total suspended solids (TSS);

- Anions and nutrients, including ammonia-N, cyanide (WAD), fluoride, nitrate, nitrite, and sulphate;
- Total aluminum, antimony, arsenic, cobalt, iron, nickel, selenium, thallium, uranium, and radium; and
- Dissolved cadmium, copper, lead, manganese, and zinc.

3.6.4 Triggers and Action Levels

Action level triggers for WTP influent flow rate and quality are described in Table 3-22. Table 3-23 summarizes the triggers applied for each COPI under each action level. Table 3-24 provides the numerical trigger values. Trend analysis is to be conducted as described in Section 3.1.5. Where there are not yet enough data available to complete the trend analyses as specified, it may not be possible to identify statistically significant trends. During this period, only the numerical triggers will be applicable.

The synthetic feed water chemistry used in the treatability laboratory study (BQE, 2019) was used to develop trigger values for this AMI. The low, moderate, and high action level triggers were set at 75%, 85%, and 95% of the synthetic feed water chemistry, respectively. Fluoride, nitrite, antimony, lead, nickel, and uranium were not assessed for treatability. Therefore, the water quality for the Class A Storage Facility Collection Pond during the Operations phase estimated by the water quality model was used to develop action level trigger values for these COPIs.

Action level triggers will be reviewed once COPI treatability is assessed during WTP operations and revised as appropriate at the next AMP update. The action level trigger for cyanide (WAD) will be developed at this time. The current water quality model indicates that the cyanide (WAD) in the WTP outflow is well below the EQS.

Table 3-22: Water Treatment Plant Capacity Triggers and Action Levels

Action Level	Triggers [a]
Low	Average Stream 1 flow rate exceeding 100 m^3/hour over a period of one week between January and the start of freshet, or exceeding 120 m^3/hour between the start of freshet and the end of the year; **or** Average Stream 2 flow rate exceeding 200 m^3/hour over a period of one week between January and the start of freshet, or exceeding 280 m^3/hour between the start of freshet and the end of the year; **or** Two consecutive samples exceed the low trigger developed based on BQE Water (Table 3-24). If samples are collected weekly, the monthly average will be used for comparison with the AMP trigger; **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in an indicator concentration that will exceed the high trigger (Table 3-24) within 3 years.
Moderate	Average Stream 1 flow rate exceeding 120 m^3/hour over a period of one week between January and the start of freshet, or exceeding 140 m^3/hour between the start of freshet and the end of the year; **or** Average Stream 2 flow rate exceeding 250 m^3/hour over a period of one week between January and the start of freshet, or exceeding 300 m^3/hour between the start of freshet and the end of the year; **or** Two consecutive samples exceed the moderate trigger developed based on BQE water (Table 3-24). If samples are collected weekly, the monthly average will be used for comparison with the AMP trigger; **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in an indicator concentration that will exceed the high trigger (Table 3-24) within 2 years.
High	Average Stream 1 flow rate exceeding 160 m^3/hour over a period of three consecutive days; **or** Average Stream 2 flow rate exceeding 360 m^3/hour over a period of three consecutive days; **or** Two consecutive samples exceed the high trigger developed based on BQE water (Table 3-24). If samples are collected weekly, the monthly average will be used for comparison with the AMP trigger; **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in an indicator concentration that will exceed the high trigger (Table 3-24) within 1 year.

[a] for pH, the trigger will occur if the sample result is below the trigger value.

Table 3-23: Water Treatment Plant Capacity Trigger Description for KZ-12A and KZ-12B

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger	Synthetic Feed Water Chemistry (BQE Water) or Class A Modelled Outflow Chemistry (Modelled Water)
pH [a]	BQE Water + 0.3	BQE Water + 0.2	BQE Water + 0.1	BQE Water
TSS [b]	75% BQE Water	85% BQE Water	95% BQE Water	BQE experience
Aluminum, total	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water
Ammonia-N	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water
Antimony, total	75% Modelled Water	85% Modelled Water	95% Modelled Water	Modelled Water
Arsenic, total	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water
Cobalt, total	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water
Cyanide, WAD [c]	-	-	-	-
Fluoride	75% Modelled Water	85% Modelled Water	95% Modelled Water	Modelled Water
Iron, total	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger	Synthetic Feed Water Chemistry (BQE Water) or Class A Modelled Outflow Chemistry (Modelled Water)
Nickel, total	75% Modelled Water	85% Modelled Water	95% Modelled Water	Modelled Water
Nitrate-N	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water
Nitrite-N	75% Modelled Water	85% Modelled Water	95% Modelled Water	Modelled Water
Selenium, total	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water
Sulphate	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water
Thallium, total	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water
Uranium, total	75% Modelled Water	85% Modelled Water	95% Modelled Water	Modelled Water
Cadmium, dissolved	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water
Copper, dissolved	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water
Lead, dissolved	75% Modelled Water	85% Modelled Water	95% Modelled Water	Modelled Water
Manganese, dissolved	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water
Zinc, dissolved	75% BQE Water	85% BQE Water	95% BQE Water	BQE Water

[a.] *For field pH (unitless), the trigger will occur if the sample result is below the trigger value.*
[b] *Triggers based on BQE expectations of treatment, will be refined at next AMP update after commissioning of WTP.*
[c,] *Triggers will be developed at next AMP update after commissioning of WTP.*

Table 3-24: Water Treatment Plant Capacity Numerical Triggers for KZ-12A and KZ-12B

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger	Synthetic Feed Water Chemistry (BQE Water) or Class A Modelled Outflow Chemistry (Modelled Water)
pH [a]	2.8	2.7	2.6	2.5
TSS [b]	750	850	950	1000
Aluminum, total	12	14	15	16.3
Ammonia-N	0.92	1	1.2	1.23
Antimony, total	0.027	0.031	0.034	0.036
Arsenic, total	0.32	0.36	0.4	0.42
Cobalt, total	0.86	0.97	1.1	1.14
Cyanide, WAD [c]	-	-	-	-
Fluoride	6.4	7.2	8.1	8.5
Iron, total	657	745	832	876
Nickel, total	0.71	0.81	0.9	0.95
Nitrate-N	3.4	3.9	4.3	4.55
Nitrite-N	0.11	0.12	0.13	0.14
Selenium, total	1.4	1.6	1.8	1.86
Sulphate	3675	4165	4655	4900
Thallium, total	0.025	0.028	0.031	0.033
Uranium, total	0.04	0.045	0.05	0.053
Cadmium, dissolved	1.3	1.5	1.6	1.72
Copper, dissolved	104	118	132	139
Lead, dissolved	0.029	0.032	0.036	0.038
Manganese, dissolved	55	62	69	72.8
Zinc, dissolved	237	269	300	316

[a.] *For field pH (unitless), the trigger will occur if the sample result is below the trigger value.*
[b] *Triggers based on BQE expectations of treatment; will be refined at next AMP update after commissioning of WTP*
[c.] *Triggers will be developed at next AMP update after commissioning of WTP.*

3.6.5 Monitoring Requirements

Monitoring of WTP influent rates will be recorded for Stream 1 and Stream 2 using automated flow meters providing continuous flows that will be converted to daily and monthly averages. Flow meters will be calibrated manually as per manufacturer specifications.

Water quality monitoring for stations KZ-12A and KZ-12B is described in Table 3-25 as specified in the EMSRP (BMC, 2026a). This data will be used to compare to triggers and to update trend analysis for each constituent. The monitoring program requirements involve weekly sampling frequencies. Analytical requirements include in-situ field parameters, physical parameters, nutrients, cyanide, total and dissolved metals, and dissolved organic carbon. Aside from in-situ measurements, all analyses will be performed by an external accredited laboratory.

Supplemental water quality monitoring data may also be collected in response to trigger activation.

Table 3-25: Water Treatment Plant Capacity Monitoring Schedule

Station	Description	Frequency [a]	Parameters [b]
KZ-12A	Influent water (Stream 1) to WTP	Wd	A, N, DOC, CN
KZ-12B	Influent water (Stream 2) to WTP	Wd	A, N, DOC, CN

[a] *Wd: Weekly while discharging.*
[b] *A: Physical parameters, conductivity, TSS, TDS, hardness, alkalinity, sulphate, ICP-total metals, ICP-dissolved metals. N: Nutrients (Ammonia-N, Nitrate-N, Nitrite-N). DOC: Dissolved organic carbon. CN: Total and weak acid-dissociable cyanide.*

3.6.6 Evaluation of Monitoring Results

Automated evaluation of influent rates will occur continuously, with automated alerts set at the trigger levels. Manual evaluation of data will occur at least weekly.

Data review of water quality results will occur after each sampling event, within two weeks of when the analytical results are received from the laboratory. The typical laboratory turn-around time for standard water quality analysis is two weeks. The evaluation will include a comparison of the water quality data to the AMI numerical trigger values using EQWin environmental data management software, or similar.

If an action level trigger has been reached, verification of the monitoring data will begin within one week of when the analytical results are received from the laboratory. This will include review of the laboratory QA/QC data, field QA/QC data, field notes, and historical data associated with the result. Laboratory re-analysis may be warranted pending findings from the data review.

If the data are confirmed as reaching a trigger value, next steps will be taken as outlined in the MRP.

3.6.7 Development and Implementation of Management Response Plan

The staged development and implementation of an MRP is detailed in Table 3-26. Individual MRPs will be developed for each location, as required, and Yukon Government and First Nations will be consulted prior to implementation of an MRP as discussed in Chapter 5.

The following is a list of potential mitigation options that may be included in the MRP for this AMI:

- Revise WTP operation in relation to flow rates and water quality and implementation of improvements as required (e.g., adjust the reagent dosage rates, alter the volume of water being treated, etc.);
- Revise site-wide water management procedures to decrease the flow of water to the WTP (e.g., store water in open pit, decrease treatment of process water, etc.); and
- Implement upstream COPI treatment measures (e.g., deploy mobile WTP for Class A Storage Facility Collection Pond, Pit Rim Pond water etc; identify and mitigate other upstream sources of COPI).

The performance of the mitigation options will be measured by continuing the influent rate and water quality monitoring program and tracking indicators.

Table 3-26: Water Treatment Plant Capacity Staged Response to Trigger Activation

Action Level	Description of Management Plan Elements
Low	Assess and Define the Situation • Review water quality and flow data at existing monitoring stations to assess the potential impact of the trigger being reached. Add additional water quality monitoring station(s), as required; • Review existing data and water quality and water balance models to determine the possible cause of the flow or COPI concentration increases. Undertake detailed field investigation if additional data are required; • Prepare a preliminary MRP including re-evaluation of timelines and possible adjustment of low, moderate, and high action level triggers to ensure timely implementation of the MRP when required; • Identify personnel who will be responsible for key decisions related to the development/update and implementation of MRPs; and • Complete updates to the MRP following conclusion of any additional investigations.
Moderate	Design Preferred Mitigation Approach • Update the MRP to include a detailed evaluation of the mitigation options and selection of the preferred management response that will be implemented should the trend continue and high action level triggers be reached; • Design the preferred mitigation option in sufficient detail to allow for successful implementation should the high action level be reached, including any required assessment and permitting; • Provide recommendations for monitoring that would be implemented to assess the effectiveness of the proposed mitigation and update the AMP as necessary; and • Implement appropriate mitigations, if any, to reverse water flow or quality trends prior to reaching the high trigger.
High	Implement, Monitor, Evaluate, and Adjust • Implement the preferred mitigation approach; • Continue water quality and flow monitoring and update the MRP to include any revisions or adjustments based on more recent information; • Evaluate the effectiveness of the implementation of the management response; and • Adjust the MRP and AMP as needed.

3.6.8 Reporting Requirements

Reporting requirements are discussed in Chapter 4.

3.7 DISCHARGE WATER QUALITY

3.7.1 Description

Prior to construction of the LWMP, the Pit Rim Pond acts as a temporary settlement/holding pond for mine dewatering prior to discharge to the environment (i.e., Geona Creek). This water is not anticipated to require additional treatment at the WTP, based on baseline groundwater quality data and the Water Quality Model (Ensero, 2024a). Nevertheless, the quality of this water will be monitored to ensure that it does not significantly differ from expected water quality in a way that could negatively impact the receiving environment. Water quality during this early stage of Project construction will be monitored at the following monitoring stations:

- Station KZ-37, located on Geona Creek, downstream of the discharge point to Geona Creek before the confluence with Finlayson Creek; and

- Station KZ-32, located in the Pit Rim Pond.

The LWMP will be constructed during a later stage of Project construction, and will serve as the final holding pond for a portion of the site water prior to release to the environment (i.e., Geona Creek and/or Finlayson Creek). Water quality in the LWMP will be monitored at one discharge station and two in-pond stations:

- Station KZ-8A/B, LWMP discharge monitoring station, located on the effluent of the LWMP where water is directed to the receiving environments in Geona Creek (KZ-8A) and Finlayson Creek (KZ-8B);
- Station KZ-5, located at the surface of the LWMP; and
- Station KZ-5D, located in the LMWP water column, within 5 m of bottom.

Stations KZ-37, KZ-32, KZ-8A/B, KZ-5 and KZ-5D are shown on Figure 3-1. Monitoring the water quality in LWMP is intended to confirm that discharge water quality does not exceed EQS. It will also help to evaluate the effectiveness of water quality management activities across the site, and to identify unanticipated sources with the potential to impact water quality.

3.7.2 Narrative Response

Prior to construction of the LWMP:

- COPI concentrations in the Pit Rim Pond increase to levels that may negatively impact water quality in the receiving environment; and
- Discharge from the Pit Rim Pond causes acute lethality to fish and benthic organisms.

Following construction of the LWMP:

- COPI concentrations in the LWMP increase to levels that may negatively impact water quality in the receiving environment; and
- Discharge from the Pit Rim Pond causes acute lethality to fish and benthic organisms.

3.7.3 Indicators

During the early Construction phase when the LWMP is not yet constructed, water discharged from the Pit Rim Pond is assessed for trigger activation at KZ-37 and KZ-32 using the COPIs indicated in the consolidated WQO report (Ensero and Minnow, 2024). The indicators include:

- Anions and nutrients including ammonia-N, cyanide (WAD), fluoride, nitrate, nitrite, and sulphate;
- Total aluminum, antimony, arsenic, cobalt, iron, nickel, selenium, thallium, uranium, and radium-226 (KZ-32 only);
- Dissolved cadmium, copper, lead, manganese, and zinc; and

- Acute lethality (KZ-32 only).

Once the LWMP is constructed and operational, water released from the LWMP is monitored at KZ-8A/B, KZ-5, and KZ-5D for trigger activation using the EQS developed for the LWMP (Ensero, 2024b). EQS are based on the water quality model and developed to ensure that LWMP effluent will not result in WQO exceedances in the aquatic receiving environment. The water quality model incorporates the most recent water quality data, and will be regularly calibrated and updated. The indicators include:

- Physical parameters including pH and total suspended solids (TSS);
- Anions and nutrients including ammonia-N, cyanide (WAD), fluoride, nitrate, nitrite, and sulphate;
- Total aluminum, antimony, arsenic, cobalt, iron, nickel, selenium, thallium, uranium, and radium-226 (KZ-8A/B only);
- Dissolved cadmium, copper, lead, manganese, and zinc; and
- Acute lethality (KZ-8A/B only).

3.7.4 Triggers and Action Levels

3.7.4.1 Pit Rim Pond Water Quality

Prior to the construction of the LWMP, water from the Pit Rim Pond will be discharged to Geona Creek. The AMI for Pit Rim Pond discharge only applies during this time; once the LWMP is in operation, Pit Rim Pond water quality will not be assessed under this AMI as it is captured in the LWMP discharge water quality.

Pit Rim Pond water quality triggers are based on the WQO developed for Geona Creek receiving environment station KZ-37 as described in Section 3.8. The radium-226 trigger is based on the Metal and Diamond Mining Effluent Regulations (Government of Canada, 2023). Low, moderate, and high action level triggers are described in Table 3-27. Table 3-28 summarizes triggers applied for each COPI under each action level at each monitoring station. Table 3-29 provides the WQO-based numerical triggers for each action level. Trend analysis is to be conducted as described in Section 3.1.5.

Table 3-27: Water Quality Triggers and Action Levels for Pit Rim Pond Discharge to Geona Creek

Action Level	Triggers
Low	Three consecutive samples exceed the low trigger indicated in Table 3-29 for **both** KZ-32 and KZ-37; **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the numerical triggers indicated in Table 3-29 for **both** KZ-32 and KZ-37 within 3 years
Moderate	Two consecutive samples exceed the moderate trigger indicated in Table 3-29 for **both** KZ-32 and KZ-37; **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the numerical triggers indicated in Table 3-29 for **both** KZ-32 and KZ-37 within 2 years.
High	Two consecutive samples exceed the high trigger indicated in Table 3-29 for **both** KZ-32 and KZ-37 **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the numerical triggers indicated in Table 3-29 for **both** KZ-32 and KZ-37 within 1 year.

Table 3-28: Discharge Water Quality Trigger Description for Pit Rim Pond Discharge to Geona Creek (KZ-32) and Geona Creek Receiver (KZ-37)

Constituent (unit: mg/L)	Low Trigger [a]	Moderate Trigger [a]	High Trigger [a]	WQO of KZ-37
Un-ionized Ammonia-N	75% CCME	85% CCME	95% CCME	CCME
Aluminum, total	75% FWQG	85% FWQG	95% FWQG	FWQG
Antimony, total	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Arsenic, total [b]	75% SSWQO	85% SSWQO	95% SSWQO	SSWQO
Cobalt, total	75% FWQG	85% FWQG	95% FWQG	FWQG
Fluoride [b]	75% SSWQO	85% SSWQO	95% SSWQO	SSWQO
Iron, total	85th Percentile	90th Percentile	95th Percentile	SSWQO
Nickel, total	75% CCME	85% CCME	95% CCME	CCME
Nitrate-N	75% CCME	85% CCME	95% CCME	CCME
Nitrite-N	75% CCME	85% CCME	95% CCME	CCME
Selenium, total [C]	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO
Sulphate	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Thallium, total	75% CCME	85% CCME	95% CCME	CCME
Uranium, total	75% CCME	85% CCME	95% CCME	CCME
Radium-226, total [d]	75% MDMER	85% MDMER	95% MDMER	No WQO at KZ-37
Cadmium, dissolved [e]	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO
Copper, dissolved [f]	85th Percentile/75% FWQG	90th Percentile/85% FWQG	95th Percentile/95% FWQG	SSWQO/FWQG
Lead, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG
Manganese, dissolved	75% CCME	85% CCME	95% CCME	CCME
Zinc, dissolved	75% CCME	85% CCME	95% CCME	CCME

[a] *For low, moderate, and high triggers, 75%, 85%, or 95% of the generic guideline (i.e., CCME, BC ENV, or FWQG) or the 85th, 90th, or 95th percentile of the background dataset are used, respectively, whichever is higher (Ensero and Minnow, 2024). For radium-226, 75%, 85%, or 95% of the MDMER standard are used for low, moderate, and high triggers, respectively.*

[b] *Site specific WQO derived based on the most recent science and latest generic guidelines.*

[c] *BC ENV-based WQO is used when sulphate ≤ 60 mg/L, and site specific WQO equation is used when sulphate when >60 mg/L (Ensero and Minnow, 2024).*

[d] *Units in Bq/L*

[e] *For samples collected in May, site specific WQO is used by applying a multiplier of 2.9 to BC ENV guideline for dissolved cadmium. BC ENV based WQO is used for samples collected in all months except for May.*

[f] *If calculated FWQG for sample is less than 95th percentile of background dataset then 85th, 90th, or 95th percentile of the background dataset are used. Otherwise FEQG is used.*

Table 3-29: Discharge Water Quality Numerical Triggers for Pit Rim Pond Discharge to Geona Creek (KZ-32) and Geona Creek Receiver (KZ-37)

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger	WQO of KZ-37
Un-ionized Ammonia-N	0.012	0.014	0.015	0.016
Aluminum, total	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Antimony, total	0.056	0.063	0.070	0.074
Arsenic, total	0.0278	0.0315	0.035	0.037
Cobalt, total	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Fluoride	0.83	0.94	1.05	1.1
Iron, total	0.47	0.53	0.91	0.91
Nickel, total	75% CCME	85% CCME	95% CCME	CCME [a]
Nitrate-N	2.3	2.6	2.9	3
Nitrite-N	0.045	0.051	0.057	0.06
Selenium, total	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO [b]
Sulphate	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV [a]
Thallium, total	0.0006	0.00068	0.00076	0.0008
Uranium, total	0.011	0.013	0.014	0.015
Radium-226, total [c]	0.83	0.94	1.05	No WQO
Radium-226, total [d]	0.28	0.31	0.35	No WQO
Cadmium, dissolved	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO [a,e]
Copper, dissolved	0.00085/75% FWQG	0.0011/85% FWQG	0.0013/95% FWQG	0.0013/FWQG [a]
Lead, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Manganese, dissolved	75% CCME	85% CCME	95% CCME	CCME [a]
Zinc, dissolved	75% CCME	85% CCME	95% CCME	CCME [a]

[a] pH, hardness, and/or DOC dependent guideline where trigger will be calculated using concurrent pH, hardness, and DOC concentrations.
[b] BC ENV-based WQO is used when sulphate ≤ 60 mg/L, and site specific WQO equation is used when sulphate when >60 mg/L (Ensero and Minnow, 2024). Trigger will be determined using concurrent sulphate concentrations.
[c] Triggers based on MDMER grab sample standard and applies to grab samples (i.e., weekly samples).
[d] Triggers based on MDMER monthly mean applies to monthly mean of weekly data.
[e] BC ENV based WQO is used for samples collected in all months except for May. For samples collected in May, site specific WQO is used by applying a multiplier of 2.9 to BC ENV guideline for dissolved cadmium.

3.7.4.2 Pit Rim Pond Acute Lethality

Prior to the construction of the LWMP, water from the Pit Rim Pond will be discharged to Geona Creek. The AMI for Pit Rim Pond discharge only applies during this time at KZ-32; once the LWMP is in operation, toxicity testing of the Pit Rim Pond water will not be assessed under this AMI as it is captured in the LWMP discharge water quality.

Pit Rim Pond acute lethality triggers are based on the MDMER requirements for acute lethality testing (ALT) of rainbow trout and *Daphnia magna* - representative fish and invertebrate species for which standard test protocols have been developed (Environment and Climate Change Canada Reference

Method EPS1/RM/13 and EPS1/RM/14, respectively [ECCC, 2000a; ECCC, 2000b]). This initially includes the following monthly tests[1]:

- Rainbow trout: 96-Hr LC50 Pass/Fail; and
- Daphnia magna: 48-Hr LC50 Pass/Fail.

Table 3-30: Acute Toxicity Triggers and Action Levels

Action Level	Triggers
Low	Rainbow trout 96-Hr LC_{50}: mortality rate of ≥20% / survival rate of ≤80%[2] *Daphnia magna* 48-Hr LC_{50}: mortality rate of ≥13% / survival rate of ≤87%[3]
Moderate	Ranbow trout Hr LC_{50}: mortality rate of ≥30% / survival rate of ≤70%[2] *Daphnia magna* 48-Hr LC_{50}: mortality rate of ≥23% / survival rate of ≤77%[3]
High	Ranbow trout Hr LC_{50}: test failure (>50% mortality) *Daphnia magna* 48-Hr LC_{50}: test failure (>50% mortality)

3.7.4.3 LWMP Water Quality

For the LWMP, there are two sets of triggers:

- Trigger based on the proposed EQS which will apply for every sampling event (i.e., grab samples); and
- Trigger based on the MDMER for monthly means (Government of Canada, 2023), which will apply to the monthly mean for samples collected on a weekly basis.

These triggers apply for stations KZ-8A/B, KZ-5, and KZ-5D.

Action level triggers are described in Table 3-31 and Table 3-32. Table 3-33 and Table 3-34 summarize triggers applied for each COPI under each action level at each monitoring station. Table 3-35 and Table 3-36 provide the WQO-based numerical triggers for each action level. Trend analysis is to be conducted as described in Section 3.1.5.

[1] Under the MDMER, frequency of acute lethality testing can be reduced to once per calendar year if effluent is determined not to be acutely lethal by that acute lethality test in 12 consecutive months.

[2] These thresholds (20% mortality and 30% mortality) are similar to the 15% and 25% below EQS used as thresholds for effluent chemistry. Ten organisms are used in rainbow trout ALT and therefore only increments of 10% are possible. Because 10% mortality in the controls is deemed acceptable (ECCC 2000a), 20% and 30% were selected for the low and moderate triggers.

[3] These triggers (13% mortality and 23% mortality) are similar to the 15% and 25% below EQS used as triggers for effluent chemistry, but because 30 organisms are used in *D. magna* ALT, only increments of 3.33% are possible (and are rounded to the nearest %).

Table 3-31: Discharge Water Quality Triggers and Action Levels for Grab Sample at KZ-8A/B, KZ-5/5D

Action Level	Triggers [a]
Low	Three consecutive samples exceed the low trigger developed based on EQS (Table 3-35). **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in an indicator concentration that will exceed the high trigger (Table 3-35) within 3 years.
Moderate	Two consecutive samples exceed the moderate trigger developed based on EQS (Table 3-35). **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in an indicator concentration that will exceed the high trigger (Table 3-35) within 2 years.
High	Two consecutive samples exceed the high trigger developed based on EQS (Table 3-35) **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in an indicator concentration that will exceed the high trigger (Table 3-35) within 1 year.

[a] *for pH, the trigger will occur if the sample result is below the trigger value.*

Table 3-32: Discharge Water Quality Triggers and Action Levels for Monthly Average at KZ-8A/B, KZ-5/5D

Action Level	Triggers [a]
Low	For samples collected weekly, three consecutive monthly average COPI concentrations that exceed the low trigger (Table 3-36). If sample is collected monthly, then the monthly data will be used for comparison with the low threshold (i.e., three consecutive monthly samples exceed low trigger); **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI that will exceed the high trigger (Table 3-36) within 3 years.
Moderate	For samples collected weekly, two consecutive monthly average COPI concentrations that exceed the moderate trigger (Table 3-36). If sample is collected monthly, then the monthly data will be used for comparison with the moderate threshold (i.e., two consecutive monthly samples exceed low trigger); **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI that will exceed the high trigger (Table 3-36) within 2 years.
High	For samples collected weekly, two consecutive monthly average COPI concentrations that exceed the high trigger (Table 3-36). If sample is collected monthly, then the monthly data will be used for comparison with the high threshold (i.e., two consecutive monthly samples exceed low trigger); **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI that will exceed the high trigger (Table 3-36) within 1 year.

[a] *for pH, the trigger will occur if the sample result is below the trigger value.*

Table 3-33: Discharge Water Quality Trigger Description for Grab Sample at KZ-8A/B, KZ-5/5D

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger
pH	Lower EQS + 0.3; Upper EQS – 0.3	Lower EQS + 0.2; Upper EQS – 0.2	Lower EQS + 0.1; Upper EQS – 0.1
Total Suspended Solids	75% EQS	85% EQS	95% EQS
Un-ionized Ammonia-N	75% EQS	85% EQS	95% EQS
Aluminum, total	75% EQS	85% EQS	95% EQS
Antimony, total	75% EQS	85% EQS	95% EQS
Arsenic, total	75% EQS	85% EQS	95% EQS
Cobalt, total	75% EQS	85% EQS	95% EQS
Cyanide, WAD	75% EQS	85% EQS	95% EQS
Fluoride	75% EQS	85% EQS	95% EQS
Iron, total	75% EQS	85% EQS	95% EQS
Nickel, total	75% EQS	85% EQS	95% EQS
Nitrate-N	75% EQS	85% EQS	95% EQS
Nitrite-N	75% EQS	85% EQS	95% EQS
Selenium, total	75% EQS	85% EQS	95% EQS
Sulphate	75% EQS	85% EQS	95% EQS
Thallium, total	75% EQS	85% EQS	95% EQS
Uranium, total	75% EQS	85% EQS	95% EQS
Radium-226, total [a]	75% EQS	85% EQS	95% EQS
Cadmium, dissolved	75% EQS	85% EQS	95% EQS
Copper, dissolved	75% EQS	85% EQS	95% EQS
Lead, dissolved	75% EQS	85% EQS	95% EQS
Manganese, dissolved	75% EQS	85% EQS	95% EQS
Zinc, dissolved	75% EQS	85% EQS	95% EQS

[a] *Unit in Bq/L.*

Table 3-34: Discharge Water Quality Trigger Description for Monthly Average at KZ-8A/B, KZ-5/5D

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger
Total Suspended Solids	75% MDMER	85% MDMER	95% MDMER
Un-ionized Ammonia-N	75% MDMER	85% MDMER	95% MDMER
Arsenic, total	75% MDMER	85% MDMER	95% MDMER
Copper, total	75% MDMER	85% MDMER	95% MDMER
Cyanide, total	75% MDMER	85% MDMER	95% MDMER
Lead, total	75% MDMER	85% MDMER	95% MDMER
Nickel, total	75% MDMER	85% MDMER	95% MDMER
Zinc, total	75% MDMER	85% MDMER	95% MDMER
Radium-226, total [a]	75% MDMER	85% MDMER	95% MDMER

[a] *Unit in Bq/L.*

Table 3-35: Discharge Water Quality Numerical Triggers for Grab Sample at KZ-8A/B, KZ-5/5D

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger	EQS
pH	Lower: 6.3; Upper: 9.2	Lower: 6.2; Upper:9.3	Lower: 6.1; Upper: 9.4	Lower: 6; Upper: 9.5
Total Suspended Solids	22.5	25.5	28.5	30
Un-ionized Ammonia-N	0.75	0.85	0.95	1
Aluminum, total	0.21	0.24	0.27	0.28
Antimony, total	0.20	0.22	0.25	0.26
Arsenic, total	0.098	0.11	0.12	0.13
Cobalt, total	0.0025	0.0028	0.0031	0.0033
Cyanide, WAD	0.012	0.014	0.015	0.016
Fluoride	2.6	3.0	3.3	3.5
Iron, total	0.65	0.73	0.82	0.86
Nickel, total	0.23	0.26	0.29	0.3
Nitrate-N	3.8	4.3	4.8	5
Nitrite-N	0.062	0.070	0.078	0.082
Selenium, total	0.0023	0.0026	0.0029	0.003
Sulphate	774	877.2	980.4	1032
Thallium, total	0.0020	0.0023	0.0026	0.0027
Uranium, total	0.027	0.031	0.034	0.036
Radium-226, total [a]	0.83	0.94	1.05	1.11
Cadmium, dissolved	0.00045	0.00051	0.00057	0.0006
Copper, dissolved	0.0025	0.0028	0.0031	0.0033
Lead, dissolved	0.0021	0.0024	0.0027	0.0028
Manganese, dissolved	1.05	1.19	1.33	1.4

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger	EQS
Zinc, dissolved	0.028	0.031	0.035	0.037

[a] *Unit in Bq/L.*

Table 3-36: Discharge Water Quality Numerical Triggers for Monthly Average at KZ-8A/B, KZ-5/5D

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger	MDMER Monthly Mean
Total Suspended Solids	11.3	12.8	14.3	15
Un-ionized Ammonia-N	0.38	0.43	0.48	0.50
Arsenic, total	0.075	0.085	0.095	0.10
Copper, total	0.075	0.085	0.095	0.10
Cyanide, total	0.38	0.43	0.48	0.50
Lead, total	0.060	0.068	0.076	0.08
Nickel, total	0.19	0.21	0.24	0.25
Zinc, total	0.30	0.34	0.38	0.40
Radium-226, total [a]	0.28	0.31	0.35	0.37

[a] *Unit in Bq/L.*

3.7.4.4 LWMP Acute Lethality

LWMP acute lethality triggers apply at stations KZ8A/B and are based on the MDMER requirements for acute lethality testing (ALT) of rainbow trout and Daphnia magna - representative fish and invertebrate species for which standard test protocols have been developed (Environment and Climate Change Canada Reference Method EPS1/RM/13 and EPS1/RM/14, respectively [ECCC, 2000a; ECCC, 2000b]). This initially includes the following monthly tests:

- Rainbow trout: 96-Hr LC50 Pass/Fail; and
- Daphnia magna: 48-Hr LC50 Pass/Fail.

Table 3-37: Acute Toxicity Triggers and Action Levels

Action Level	Triggers
Low	Rainbow trout 96-Hr LC_{50}: mortality rate of ≥20% / survival rate of ≤80% Daphnia magna 48-Hr LC_{50}: mortality rate of ≥13% / survival rate of ≤87%
Moderate	Ranbow trout Hr LC_{50}: mortality rate of ≥30% / survival rate of ≤70% Daphnia magna 48-Hr LC_{50}: mortality rate of ≥23% / survival rate of ≤77%
High	Ranbow trout Hr LC_{50}: test failure (>50% mortality) Daphnia magna 48-Hr LC_{50}: test failure (>50% mortality)

3.7.5 Monitoring Requirements

The monitoring schedule for stations KZ-37, KZ-32, KZ-8A/B, KZ-5 and KZ-5D is described in Table 3-38 as specified in the EMSRP (BMC, 2026a). This data will be used to compare to triggers and to update trend analysis for each constituent. The water monitoring program requirements involve weekly and monthly measurement. Analytical requirements include in-situ field parameters, physical parameters, nutrients, cyanide, total and dissolved metals, and dissolved organic carbon. Aside from in-situ measurements, all analyses will be performed by an external accredited laboratory. Supplemental water quality monitoring data may be collected in response to trigger activation.

Table 3-38: Discharge Water Quality Monitoring Schedule

Station	Description	Frequency [a]	Parameters [b]
KZ-37	Geona Creek, downstream of the effluent discharge point to Geona Creek before the confluence with Finlayson.	M/Wd	A, N, DOC, CN
KZ-32	Located in the Pit Rim Pond, at outflow.	M/Wd (Wd-Qd for Ra-226 and acute toxicity testing) SA (sublethal testing))	A, N, DOC, CN, Ra-226,
KZ-8A/B	Lower Water Management Pond Discharge to Geona Creek (KZ-8A) and Finlayson Creek (KZ-8B)	Wd (Wd-Qd for Ra-226 and acute toxicity testing[d])	A, N, DOC, CN, Ra-226
KZ-5	Located in Lower Water Management Pond, surface water.	M/Wd	A, N, CN
KZ-5D [c]	Located in Lower Water Management Pond, water column within 5 m of bottom.	M/Wd	A, N, CN

[a] Wd: Weekly while discharging; M: Monthly. Wd-Qd: Weekly while discharging, reduced to quarterly while discharging if radium-226 concentration is less than 0.037 Bq/L for 10 consecutive weeks.
[b] A: Physical parameters, conductivity, TSS, TDS, hardness, alkalinity, sulphate, ICP-total metals, ICP-dissolved metals. N: Nutrients (Ammonia-N, Nitrate-N, Nitrite-N). DOC: Dissolved organic carbon. CN: Total and weak acid-dissociable cyanide. Ra-226: total radium-226.
[c] Sampling occurs only when the pond water is deeper than 10 m.
SA: two times each calendar year for the first three years and once per calendar year afterwards as per MDMER directive.
[d] Rainbow trout: 96-Hr LC50 Pass/Fail and Daphnia Magna: 48-Hr LC50 Pass/Fail.

3.7.6 Evaluation of Monitoring Results

Data review will occur after each sampling event, within two weeks of when the analytical results are received from the laboratory. The typical laboratory turn-around time for standard water quality analysis is two weeks. The evaluation will include a comparison of the water quality data to the AMI numerical trigger values using EQWin environmental data management software, or similar, and the trend analysis will be carried out using Microsoft Excel spreadsheet software, or similar.

If an action level trigger has been reached, verification of the monitoring data will begin within two weeks of when the analytical results are received from the laboratory. This will include review of the laboratory QA/QC data, field QA/QC data, field notes, and historical data associated with the result. Laboratory re-analysis may be warranted pending findings from the data review.

Upon verification of the data following confirmatory sampling the next steps will be taken as outlined in the MRP.

3.7.7 Development and Implementation of Management Response Plan

The staged development and implementation of an MRP is detailed in Table 3-39. Individual MRPs will be developed for each location, as required, and Yukon Government and First Nations will be consulted prior to implementation of an MRP as discussed in Chapter 5.

Table 3-39: Discharge Water Quality Staged Response to Trigger Activation

Action Level	Description of Management Plan Elements
Low	Assess and Define the Situation • Review water quality data at existing monitoring stations to assess the potential impact of the trigger being reached. Add additional water quality monitoring station(s) and/or increase monitoring frequency, as required; • Review existing data and water quality models to determine the possible cause of the COPI concentration increases. Undertake detailed field investigation if additional data are required; • Preparation of a preliminary MRP including re-evaluation of timelines and possible adjustment of low, moderate, and high action level triggers to ensure timely implementation of the MRP when required; • Identify personnel who will be responsible for key decisions related to the development/update and implementation of MRPs; and • Complete updates to the MRP following conclusion of any additional investigations.
Moderate	Design Preferred Mitigation Approach • Update the MRP to include a detailed evaluation of the mitigation options and selection of the preferred management response that will be implemented should high action level triggers be reached; • Design the preferred mitigation option in sufficient detail to allow for successful implementation should the high action level be reached, including any required assessment and permitting; and • Provide recommendations for monitoring that would be implemented to the effectiveness of the proposed mitigation and update the AMP as necessary; and • Implement appropriate mitigations, if any, to reverse water quality trends prior to reaching the high trigger.
High	Implement, Monitor, Evaluate, and Adjust • Implement the preferred mitigation approach; • Continue water quality monitoring and update the MRP to include any revisions or adjustments based on more recent information; • Evaluate the effectiveness of the implementation of the management response; and • Adjust the MRP and AMP as needed.

The following is a list of potential mitigation options that may be included in the MRP for this AMI:

- Identify and evaluate the sources of increasing indicator concentrations and minimize the loading from identified sources in the short term as appropriate (e.g., local lime addition, revised water management procedures);
- Improve existing water quality mitigation activities (e.g., upgrades to WTP, revised water management procedures, suspending or decreasing dewatering);
- Temporarily decrease effluent discharge to ensure that WQOs are not exceeded in the receiving environment;

- Utilizing a mobile WTP; and
- If acute lethality to either test organism (i.e. rainbow trout or Daphnia magna) were to occur, all actions required under the MDMER will be completed. Briefly, this includes increased frequency of ALT and concurrent effluent characterization until non-acutely lethal conditions are established in three consecutive tests (Government of Canada 2002).

The performance of the mitigation options will be measured by continuing the water quality monitoring program and tracking indicator concentrations. The MRP will be deemed successful once water quality is below triggers.

3.7.8 Reporting Requirements

Reporting requirements are discussed in Chapter 4.

3.8 SURFACE WATER QUALITY

3.8.1 Description

Three watercourses are identified as downstream receiving environments of the Project, namely Geona Creek, Finlayson Creek, and South Creek. Runoff and seepage from the Project area flows to these creeks, either flowing directly as surface or groundwater, or being pumped from the LWMP. Water quality and water balance modelling predict that specified WQOs will be met.

WQOs have been developed for four receiving environment monitoring stations (Ensero and Minnow, 2024) including:

- Station KZ-37, located on Geona Creek, downstream of the effluent discharge point to Geona Creek before the confluence with Finlayson Creek;
- Station KZ-15, located on Finlayson Creek, approximately 250 m downstream of the confluence with Geona Creek;
- Station KZ-26, located on lower Finlayson Creek, approximately 15 km downstream of the final effluent discharge point; and
- Station KZ-13, located on South Creek, south of the ABM open pit.

The location of these monitoring stations is shown in Figure 3-1.

3.8.2 Narrative Response

Concentrations of COPIs in the Project's receiving environment water bodies increase to levels that may impact aquatic species.

3.8.3 Indicators

Indicators are based on the COPIs identified in the consolidated WQO report for the Project (Ensero and Minnow, 2024), including:

- Anions and nutrients including ammonia-N, cyanide (WAD), fluoride, nitrate, nitrite, and sulphate;
- Total aluminum, antimony, arsenic, cobalt, iron, nickel, selenium, thallium, and uranium; and
- Dissolved cadmium, copper, lead, manganese, and zinc.

3.8.4 Triggers and Action Levels

Triggers and action levels are described in Table 3-40. Table 3-41 to Table 3-44 summarize how the WQOs and triggers will be applied for each COPI under each action level at each monitoring station. Table 3-45 to Table 3-48 provide the numerical WQOs and triggers used. These comprise site specific water quality objectives (SSWQOs) and generic long-term (i.e., chronic) Canadian Council of Ministers of the Environment (CCME), BC Ministry of Environment (BC ENV), and Federal water quality guidelines (FWQG) (Ensero and Minnow, 2024). CCME guidelines were the primary selection for generic water quality guidelines. BC ENV guidelines were used when there was no CCME guideline or when BC ENV guideline is based on more recent testing and research than the CCME guideline. FWQG follow the derivation methodology of CCME and so were selected over BC ENV where available (aluminum, cobalt, copper, and lead). If the existing 95th percentile background concentrations in the dataset exceeded the generic guidelines (i.e., P95 > CCME or BC ENV), SSWQOs were developed using the existing dataset for WQOs. For some cases where generic guidelines do not reflect recent advancements in derivation methodology or the general toxicological literature, alternative approaches to WQO or SSWQO development were employed (Ensero and Minnow, 2024). Trend analysis is to be conducted as described in Section 3.1.5.

Table 3-40: Surface Water Quality Triggers and Action Levels

Action Level	Triggers
Low	Concentration of a COPI exceeds the low trigger value in two consecutive sample events. If samples are collected weekly, the monthly average will be used for comparison with the AMP trigger value; **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the WQO within 3 years.
Moderate	Two consecutive samples exceed the moderate trigger value. If samples are collected weekly, the monthly average will be used for comparison with the AMP trigger value; **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the WQO within 2 years.
High	Two consecutive samples exceed the high trigger value. If samples are collected weekly, the monthly average will be used for comparison with the AMP trigger value; **or** Trend analysis (e.g., seasonal Mann-Kendall) using the past 5 years of data identifies a statistically significant (0.05) increasing trend in a COPI concentration that will exceed the WQO within 1 year.

Table 3-41: Surface Water Quality Trigger Description at KZ-13

Constituent (unit: mg/L)	Low Trigger [a]	Moderate Trigger [a]	High Trigger [a]	WQO at KZ-13
Un-ionized Ammonia-N	75% CCME	85% CCME	95% CCME	CCME
Aluminum, total	75% FWQG	85% FWQG	95% FWQG	FWQG
Antimony, total	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Arsenic, total [b]	75% SSWQO	85% SSWQO	95% SSWQO	SSWQO
Cobalt, total	75% FWQG	85% FWQG	95% FWQG	FWQG
Cyanide, Weak Acid Dissociable	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Fluoride [b]	75% SSWQO	85% SSWQO	95% SSWQO	SSWQO
Iron, total	85^{th} Percentile	90^{th} Percentile	95^{th} Percentile	SSWQO
Nickel, total	75% CCME	85% CCME	95% CCME	CCME
Nitrate-N	75% CCME	85% CCME	95% CCME	CCME
Nitrite-N	75% CCME	85% CCME	95% CCME	CCME
Selenium, total [C]	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO
Sulphate	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Thallium, total	75% CCME	85% CCME	95% CCME	CCME
Uranium, total	75% CCME	85% CCME	95% CCME	CCME
Cadmium, dissolved [d]	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO
Copper, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG
Lead, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG
Manganese, dissolved	75% CCME	85% CCME	95% CCME	CCME
Zinc, dissolved	75% CCME	85% CCME	95% CCME	CCME

[a] *For low, moderate, and high triggers, 75%, 85%, or 95% of the generic guideline (i.e., CCME, BC ENV, or FWQG) or the 85^{th}, 90^{th}, or 95^{th} percentile of the background dataset are used, respectively, whichever is higher (Ensero and Minnow, 2024).*

[b] *Site specific WQO derived based on the most recent science and latest generic guidelines.*

[c] *BC ENV-based WQO is used when sulphate ≤ 60 mg/L, and site specific WQO equation is used when sulphate when >60 mg/L (Ensero and Minnow, 2024).*

[d] *For samples collected in May, site specific WQO is used by applying a multiplier of 2.9 to BC ENV guideline for dissolved cadmium. BC ENV based WQO is used for samples collected in all months except for May.*

Table 3-42: Surface Water Quality Trigger Description at KZ-15

Constituent (unit: mg/L)	Low Trigger [a]	Moderate Trigger [a]	High Trigger [a]	WQO at KZ-15
Un-ionized Ammonia-N	75% CCME	85% CCME	95% CCME	CCME
Aluminum, total	75% FWQG	85% FWQG	95% FWQG	FWQG
Antimony, total	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Arsenic, total [b]	75% SSWQO	85% SSWQO	95% SSWQO	SSWQO
Cobalt, total	75% FWQG	85% FWQG	95% FWQG	FWQG
Cyanide, Weak Acid Dissociable	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Fluoride [b]	75% SSWQO	85% SSWQO	95% SSWQO	SSWQO
Iron, total	75% CCME	85% CCME	95% CCME	CCME
Nickel, total	75% CCME	85% CCME	95% CCME	CCME
Nitrate-N	75% CCME	85% CCME	95% CCME	CCME
Nitrite-N	75% CCME	85% CCME	95% CCME	CCME
Selenium, total [c]	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO
Sulphate	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Thallium, total	75% CCME	85% CCME	95% CCME	CCME
Uranium, total	75% CCME	85% CCME	95% CCME	CCME
Cadmium, dissolved [d]	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO
Copper, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG
Lead, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG
Manganese, dissolved	75% CCME	85% CCME	95% CCME	CCME
Zinc, dissolved	75% CCME	85% CCME	95% CCME	CCME

[a] *For low, moderate, and high triggers, 75%, 85%, or 95% of the generic guideline (i.e., CCME, BC ENV, or FWQG) or the 85th, 90th, or 95th percentile of the background dataset are used, respectively, whichever is higher (Ensero and Minnow, 2024).*
[b] *Site specific WQO derived based on the most recent science and latest generic guidelines.*
[c] *BC ENV-based WQO is used when sulphate ≤ 60 mg/L, and site specific WQO equation is used when sulphate when >60 mg/L (Ensero and Minnow, 2024).*
[d] *For samples collected in May, site specific WQO is used by applying a multiplier of 2.9 to BC ENV guideline for dissolved cadmium. BC ENV based WQO is used for samples collected in all months except for May.*

Table 3-43: Surface Water Quality Trigger Description at KZ-26

Constituent (unit: mg/L)	Low Trigger [a]	Moderate Trigger [a]	High Trigger [a]	WQO at KZ-26
Un-ionized Ammonia-N	75% CCME	85% CCME	95% CCME	CCME
Aluminum, total	75% FWQG	85% FWQG	95% FWQG	FWQG
Antimony, total	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Arsenic, total [b]	75% SSWQO	85% SSWQO	95% SSWQO	SSWQO
Cobalt, total	75% FWQG	85% FWQG	95% FWQG	FWQG
Cyanide, Weak Acid Dissociable	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Fluoride [b]	75% SSWQO	85% SSWQO	95% SSWQO	SSWQO
Iron, total	85th Percentile	90th Percentile	95th Percentile	SSWQO
Nickel, total	75% CCME	85% CCME	95% CCME	CCME
Nitrate-N	75% CCME	85% CCME	95% CCME	CCME
Nitrite-N	75% CCME	85% CCME	95% CCME	CCME
Selenium, total [C]	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO
Sulphate	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Thallium, total	75% CCME	85% CCME	95% CCME	CCME
Uranium, total	75% CCME	85% CCME	95% CCME	CCME
Cadmium, dissolved [d]	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO
Copper, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG
Lead, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG
Manganese, dissolved	75% CCME	85% CCME	95% CCME	CCME
Zinc, dissolved	75% CCME	85% CCME	95% CCME	CCME

[a] *For low, moderate, and high triggers, 75%, 85%, or 95% of the generic guideline (i.e., CCME, BC ENV, or FWQG) or the 85th, 90tth, or 95th percentile of the background dataset are used,* respectively, *whichever is higher (Ensero and Minnow, 2024).*
[b] *Site specific WQO derived based on the most recent science and latest generic guidelines.*
[c] *BC ENV-based WQO is used when sulphate ≤ 60 mg/L, and site specific WQO equation is used when sulphate when >60 mg/L (Ensero and Minnow, 2024).*
[d] *For samples collected in May, site specific WQO is used by applying a multiplier of 2.9 to BC ENV guideline for dissolved cadmium. BC ENV based WQO is used for samples collected in all months except for May.*

Table 3-44: Surface Water Quality Trigger Description at KZ-37

Constituent (unit: mg/L)	Low Trigger [a]	Moderate Trigger [a]	High Trigger [a]	WQO at KZ-37
Un-ionized Ammonia-N	75% CCME	85% CCME	95% CCME	CCME
Aluminum, total	75% FWQG	85% FWQG	95% FWQG	FWQG
Antimony, total	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Arsenic, total [b]	75% SSWQO	85% SSWQO	95% SSWQO	SSWQO
Cobalt, total	75% FWQG	85% FWQG	95% FWQG	FWQG
Cyanide, Weak Acid Dissociable	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Fluoride [b]	75% SSWQO	85% SSWQO	95% SSWQO	SSWQO
Iron, total	85th Percentile	90th Percentile	95th Percentile	SSWQO
Nickel, total	75% CCME	85% CCME	95% CCME	CCME
Nitrate-N	75% CCME	85% CCME	95% CCME	CCME
Nitrite-N	75% CCME	85% CCME	95% CCME	CCME
Selenium, total [C]	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO
Sulphate	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV
Thallium, total	75% CCME	85% CCME	95% CCME	CCME
Uranium, total	75% CCME	85% CCME	95% CCME	CCME
Cadmium, dissolved [d]	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO
Copper, dissolved [e]	85th Percentile/75% FWQG	90th Percentile/85% FWQG	95th Percentile/95% FWQG	SSWQO/FWQG
Lead, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG
Manganese, dissolved	75% CCME	85% CCME	95% CCME	CCME
Zinc, dissolved	75% CCME	85% CCME	95% CCME	CCME

[a] *For low, moderate, and high triggers, 75%, 85%, or 95% of the generic guideline (i.e., CCME, BC ENV, FWQG) or the 85th, 90th, or 95th percentile of the background dataset are used,* respectively, *whichever is higher (Ensero and Minnow, 2024).*

[b] *Site specific WQO derived based on the most recent science and latest generic guidelines.*

[c] *BC ENV-based WQO is used when sulphate ≤ 60 mg/L, and site specific WQO equation is used when sulphate when >60 mg/L (Ensero and Minnow, 2024).*

[d] *For samples collected in May, site specific WQO is used by applying a multiplier of 2.9 to BC ENV guideline for dissolved cadmium. BC ENV based WQO is used for samples collected in all months except for May.*

[f] *If calculated FWQG for sample is less than 95th percentile of background dataset then 85th, 90th, or 95th percentile of the background dataset are used. Otherwise FEQG is used.*

Table 3-45: Surface Water Quality Numerical Triggers at KZ-13

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger	WQO at KZ-13
Un-ionized Ammonia-N	0.012	0.014	0.015	0.016
Aluminum, total	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Antimony, total	0.056	0.063	0.070	0.074
Arsenic, total	0.0278	0.0315	0.035	0.037
Cobalt, total	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Cyanide, Weak Acid Dissociable	0.0038	0.0043	0.0048	0.005
Fluoride	0.83	0.94	1.05	1.1
Iron, total	0.22	0.25	0.36	0.36
Nickel, total	75% CCME	85% CCME	95% CCME	CCME [a]
Nitrate-N	2.3	2.6	2.9	3
Nitrite-N	0.045	0.051	0.057	0.06
Selenium, total	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO [b]
Sulphate	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV [a]
Thallium, total	0.0006	0.00068	0.00076	0.0008
Uranium, total	0.011	0.013	0.014	0.015
Cadmium, dissolved	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO [a,c]
Copper, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG [d]
Lead, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Manganese, dissolved	75% CCME	85% CCME	95% CCME	CCME [a]
Zinc, dissolved	75% CCME	85% CCME	95% CCME	CCME [a]

[a] pH, hardness, and/or DOC dependent guideline where trigger will be calculated using concurrent pH, hardness, and DOC concentrations.
[b] BC ENV-based WQO is used when sulphate ≤ 60 mg/L, and site specific WQO equation is used when sulphate when >60 mg/L (Ensero and Minnow, 2024). Trigger will be determined using concurrent sulphate concentrations.
[c] BC ENV based WQO is used for samples collected in all months except for May. For samples collected in May, site specific WQO is used by applying a multiplier of 2.9 to BC ENV guideline for dissolved cadmium.
[d] Guideline based on Biotic Ligand Model (ECCC, 2021), where trigger will be calculated using concurrent pH, temperature, hardness, and DOC concentrations.

Table 3-46: Surface Water Quality Numerical Triggers at KZ-15

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger	WQO at KZ-15
Un-ionized Ammonia-N	0.012	0.014	0.015	0.016
Aluminum, total	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Antimony, total	0.056	0.063	0.070	0.074
Arsenic, total	0.0278	0.0315	0.035	0.037
Cobalt, total	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Cyanide, Weak Acid Dissociable	0.0038	0.0043	0.0048	0.005
Fluoride	0.83	0.94	1.05	1.1
Iron, total	0.24	0.27	0.30	0.32
Nickel, total	75% CCME	85% CCME	95% CCME	CCME [a]
Nitrate-N	2.3	2.6	2.9	3
Nitrite-N	0.045	0.051	0.057	0.06
Selenium, total	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO [b]
Sulphate	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV [a]
Thallium, total	0.0006	0.00068	0.00076	0.0008
Uranium, total	0.011	0.013	0.014	0.015
Cadmium, dissolved	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO [a,c]
Copper, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG [d]
Lead, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Manganese, dissolved	75% CCME	85% CCME	95% CCME	CCME [a]
Zinc, dissolved	75% CCME	85% CCME	95% CCME	CCME [a]

[a] pH, hardness, and/or DOC dependent guideline where trigger will be calculated using concurrent pH, hardness, and DOC concentrations.
[b] BC ENV-based WQO is used when sulphate ≤ 60 mg/L, and site specific WQO equation is used when sulphate when >60 mg/L (Ensero and Minnow, 2024). Trigger will be determined using concurrent sulphate concentrations.
[c] BC ENV based WQO is used for samples collected in all months except for May. For samples collected in May, site specific WQO is used by applying a multiplier of 2.9 to BC ENV guideline for dissolved cadmium.
[d] Guideline based on Biotic Ligand Model (ECCC, 2021), where trigger will be calculated using concurrent pH, temperature, hardness, and DOC concentrations.

Table 3-47: Surface Water Quality Numerical Triggers at KZ-26

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger	WQO at KZ-26
Un-ionized Ammonia-N	0.012	0.014	0.015	0.016
Aluminum, total	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Antimony, total	0.056	0.063	0.070	0.074
Arsenic, total	0.0278	0.0315	0.035	0.037
Cobalt, total	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Cyanide, Weak Acid Dissociable	0.0038	0.0043	0.0048	0.005
Fluoride	0.83	0.94	1.05	1.1
Iron, total	0.37	0.57	0.81	0.81
Nickel, total	75% CCME	85% CCME	95% CCME	CCME [a]
Nitrate-N	2.3	2.6	2.9	3
Nitrite-N	0.045	0.051	0.057	0.06
Selenium, total	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO [b]
Sulphate	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV [a]
Thallium, total	0.0006	0.00068	0.00076	0.0008
Uranium, total	0.011	0.013	0.014	0.015
Cadmium, dissolved	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO [a,c]
Copper, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG [d]
Lead, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Manganese, dissolved	75% CCME	85% CCME	95% CCME	CCME [a]
Zinc, dissolved	75% CCME	85% CCME	95% CCME	CCME [a]

[a] pH, hardness, and/or DOC dependent guideline where trigger will be calculated using concurrent pH, hardness, and DOC concentrations.
[b] BC ENV-based WQO is used when sulphate ≤ 60 mg/L, and site specific WQO equation is used when sulphate when >60 mg/L (Ensero and Minnow, 2024). Trigger will be determined using concurrent sulphate concentrations.
[c] BC ENV based WQO is used for samples collected in all months except for May. For samples collected in May, site specific WQO is used by applying a multiplier of 2.9 to BC ENV guideline for dissolved cadmium.
[d] Guideline based on Biotic Ligand Model (ECCC, 2021), where trigger will be calculated using concurrent pH, temperature, hardness, and DOC concentrations.

Table 3-48: Surface Water Quality Numerical Triggers at KZ-37

Constituent (unit: mg/L)	Low Trigger	Moderate Trigger	High Trigger	WQO at KZ-37
Un-ionized Ammonia-N	0.012	0.014	0.015	0.016
Aluminum, total	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Antimony, total	0.056	0.063	0.070	0.074
Arsenic, total	0.0278	0.0315	0.035	0.037
Cobalt, total	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Cyanide, Weak Acid Dissociable	0.0038	0.0043	0.0048	0.005
Fluoride	0.83	0.94	1.05	1.1
Iron, total	0.47	0.53	0.91	0.91
Nickel, total	75% CCME	85% CCME	95% CCME	CCME [a]
Nitrate-N	2.3	2.6	2.9	3
Nitrite-N	0.045	0.051	0.057	0.06
Selenium, total	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO [b]
Sulphate	75% BC ENV	85% BC ENV	95% BC ENV	BC ENV [a]
Thallium, total	0.0006	0.00068	0.00076	0.0008
Uranium, total	0.011	0.013	0.014	0.015
Cadmium, dissolved	75% BC ENV/SSWQO	85% BC ENV/SSWQO	95% BC ENV/SSWQO	BC ENV/SSWQO [a,c]
Copper, dissolved	0.00085/75% FWQG	0.0011/85% FWQG	0.0013/95% FWQG	0.0013/FWQG [d]
Lead, dissolved	75% FWQG	85% FWQG	95% FWQG	FWQG [a]
Manganese, dissolved	75% CCME	85% CCME	95% CCME	CCME [a]
Zinc, dissolved	75% CCME	85% CCME	95% CCME	CCME [a]

[a] *pH, hardness, and/or DOC dependent guideline where trigger will be calculated using concurrent pH, hardness, and DOC concentrations.*
[b] *BC ENV-based WQO is used when sulphate ≤ 60 mg/L, and site specific WQO equation is used when sulphate when >60 mg/L (Ensero and Minnow, 2024). Trigger will be determined using concurrent sulphate concentrations.*
[c] *BC ENV based WQO is used for samples collected in all months except for May. For samples collected in May, site specific WQO is used by applying a multiplier of 2.9 to BC ENV guideline for dissolved cadmium.*
[d] *Guideline based on Biotic Ligand Model (ECCC, 2021), where trigger will be calculated using concurrent pH, temperature, hardness, and DOC concentrations.*

3.8.5 Monitoring Requirements

The monitoring schedule for stations KZ-13, KZ-15, KZ-26, and KZ-37 is described in Table 3-49 as specified in the ESMRP (BMC, 2026a). These data will be used to compare to the triggers and to update trend analysis for each parameter. The surface water quality monitoring program includes weekly and monthly sampling. Analytical requirements include in-situ field parameters, physical parameters, nutrients, cyanide, total and dissolved metals, and dissolved organic carbon. Aside from in-situ measurements, all analyses will be performed by an external accredited laboratory.

Supplemental water quality monitoring data may also be collected in response to trigger activation.

Table 3-49: Surface Water Quality Monitoring Schedule

Station	Description	Type [a]	Frequency [b]	Parameters [c]
KZ-13	South Creek near mouth, south of the ABM open pit	SW	M	A, N, DOC, CN
KZ-15	Finlayson Creek 250 m downstream of confluence with Geona Creek	SW	M/Wd	A, N, DOC, CN
KZ-26	Lower Finlayson Creek at Robert Campbell Highway, approximately 15 km downstream of the final effluent discharge point.	SW	M	A, N, DOC, CN
KZ-37	Geona Creek, downstream of the effluent discharge point to Geona Creek before the confluence with Finlayson.	SW	M/Wd	A, N, DOC, CN

a. SW = surface water.
b. Wd: Weekly while discharging; M: Monthly.
c. A: Physical parameters, conductivity, TSS, TDS, hardness, alkalinity, sulphate, ICP-total metals, ICP-dissolved metals. N: Nutrients (Ammonia-N, Nitrate-N, Nitrite-N). DOC: Dissolved organic carbon. CN: Total and weak acid-dissociable cyanide.

3.8.6 Evaluation of Monitoring Results

Data review will occur after each sampling event, within two weeks of when the analytical results are received from the laboratory. The typical laboratory turn-around time for standard water quality analysis is two weeks. The evaluation will include a comparison of the water quality data to the AMI numerical trigger values using EQWin environmental data management software, or equivalent, and the trend analysis will be carried out using Microsoft Excel spreadsheet software, or equivalent. The preliminary data review will be conducted by the database manager, with supervision from a suitably qualified person.

If a trigger is reached, verification of the monitoring data will begin within two weeks of when the analytical results are received from the laboratory. This will include review of the laboratory quality assurance / quality control (QA/QC) data, field QA/QC data, field notes, and historical data associated with the result. Laboratory re-analysis may be warranted pending findings from the data review.

If the data are confirmed as reaching a trigger, the station will be re-sampled within one month of receiving the analytical results from the laboratory, pending current site conditions (e.g., monitoring station may be frozen, dry, or inaccessible). Upon verification of the data following confirmatory sampling, next steps will be taken as outlined in the MRP.

3.8.7 Development and Implementation of Management Response Plan

The staged development and implementation of an MRP is detailed in Table 3-50. Individual MRPs will be developed for each location, as required, and Yukon Government and First Nations will be consulted prior to implementation of an MRP as discussed in Chapter 5.

Table 3-50: Surface Water Quality Staged Response to Trigger Activation

Action Level	Description of Management Plan Elements
Low	Assess and Define the Situation • Review water quality data at existing monitoring stations to assess the potential impact of the trigger being reached. Add additional water quality monitoring station(s) and/or increase monitoring frequency, as required; • Review existing data and water quality models to determine the possible cause of the increase in COPI concentration. Undertake detailed field investigation if additional data are required; • Prepare a preliminary MRP including re-evaluation of timelines and possible adjustment of low, moderate, and high action level triggers to ensure timely implementation of the MRP when required; • Identify personnel who will be responsible for key inputs related to the development/update and implementation of MRPs; and • Complete updates to the MRP following conclusion of any additional investigations.
Moderate	Design Preferred Mitigation Approach • Update the MRP to include a detailed evaluation of the mitigation options and selection of the preferred management response that will be implemented should high action level triggers be reached; • Design the preferred mitigation approach in sufficient detail to allow for successful implementation should the high action level be reached, including any required assessment and permitting; and • Provide recommendations for monitoring that would be implemented to assess the effectiveness of the proposed mitigation and update the AMP as necessary. • Implement appropriate mitigations, if any, to reverse water quality trends prior to reaching the high trigger.
High	Implement, Monitor, Evaluate, and Adjust • Implement the preferred mitigation approach; • Continue water quality monitoring and update the MRP to include any revisions or adjustments based on more recent information; • Evaluate the effectiveness of the implementation of the management response; and • Adjust the MRP and AMP as needed.

The following is a list of potential mitigation options that may be included in the MRP for this AMI:

- Revise existing mitigation measures (e.g., upgrades to WTP, water management measures, implementation of a mobile WTP, suspend dewatering operations);
- Minimize the metal loading from identified sources in the short term as appropriate (e.g., local lime addition, water management, cover); and
- Implement reclamation of previously unidentified metal loading sources.

The performance of the mitigation options will be measured by continuing the water quality monitoring program and tracking the COPI concentrations. The corrective action will be deemed successful once the objectives of the MRP are met.

3.8.8 Reporting Requirements

Reporting requirements are discussed in Chapter 4.

3.9 SOIL AND VEGETATION METALS CONTENT

3.9.1 Description

Metals occur naturally in soils and vegetation in the Project area, but mining activities have the potential to elevate their concentrations.

Vegetation health is a potential Project-related effect where trace metals uptake via fugitive dust or other Project emissions may affect the health of vegetation. Dust can affect the health of vegetation depending on the amount and frequency of dusting, the chemical properties of dust, and the receptor plant species. It can block plant respiration, transpiration, and photosynthesis (Walker and Everett, 1987). Although trace metals are elements that occur naturally in the environment, they may become toxic to living organisms when concentrations become excessive, especially in disturbed environments (Adriano, 2001). This could potentially pose a risk to humans and wildlife that consume affected plant material.

The objective of trace metals monitoring is to measure concentrations to ensure that the Project does not result in an increase in trace metal concentrations in soils and select vegetation species above identified triggers. Monitoring will also help evaluate the effectiveness of air quality mitigation measures and inform adaptive management measures (as required).

3.9.2 Narrative Response

COPIs reach levels in soil and vegetation requiring the implementation of management measures to prevent adverse impacts to vegetation, humans, wildlife, and other biota.

3.9.3 Indicators

The selection of indicators was based on several considerations, including:

- Site conditions, as determined using baseline metal concentrations in soil and vegetation. Several metals were not present at detectable levels in vegetation and soil samples and were therefore not selected as indicators; and
- The level of risk associated with each element. Several sources were consulted, including Canadian Environmental Quality Guidelines (provided by CCME), and relevant literature on the presence, effects and other aspects of metals in northern terrestrial biota (e.g. Gamberg, 2000; Gamberg, 2008; CACAR, 2003). In the study, "Contaminants in Arctic Moose and Caribou", cadmium, copper, lead, and zinc were identified as trace metals of potential concern in northern biota (Gamberg, 2008). Similarly, "Contaminants in Yukon Country Foods" identified arsenic and mercury as trace metals of potential concern (Gamberg, 2000).

Based on these factors, nine COPIs have seen selected as indicators, including:

- Arsenic;

- Cadmium;
- Chromium;
- Copper;
- Mercury;
- Lead;
- Selenium;
- Uranium; and
- Zinc.

This list may be revised based on the results of future trace metal data collection and analysis, and incorporation of results and analysis from surface and groundwater monitoring programs.

3.9.4 Triggers and Action Levels

Trigger levels for COPIs were determined based on a review of current guidelines and an assessment of baseline data variability, including a minimum of 10 samples collected from each of the low, medium and high TSP concentration zones. These monitoring zones were determined based on air modeling results and are described in Section 9.3 of the EMSRP (BMC, 2026a).

3.9.4.1 Soil

With the exception of arsenic and zinc, baseline trace metals concentrations are typically well below CCME industrial soil quality guidelines; therefore, these guidelines are the triggers for these COPIs (Table 3-51). For arsenic and zinc, triggers are derived from a statistical standpoint as a two Standard Deviation change from the geometric mean baseline concentrations (EDI, 2025).

Table 3-51: Soil Quality Triggers

COPI	Source	Trigger (low/moderate/high TSP zone) (mg/kg dry weight)
Arsenic	CCME Soil Quality Guidelines[1] and baseline data	26 / 14 / 52
Cadmium	CCME Soil Quality Guidelines[1]	22 / 22 / 22
Chromium	CCME Soil Quality Guidelines[1]	87 / 87 / 87
Copper	CCME Soil Quality Guidelines[1]	91 / 91 / 91
Lead	CCME Soil Quality Guidelines[1]	600 / 600 / 600
Mercury	CCME Soil Quality Guidelines[1]	50 / 50 / 50
Selenium	CCME Soil Quality Guidelines[1]	3 / 3 / 3
Uranium	CCME Soil Quality Guidelines[1]	300 / 300 / 300
Zinc	CCME Soil Quality Guidelines[1] and baseline data	410 / 410 / 494

[1]Triggers based on CCME Industrial Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME 1997, 1999a, 1999b, 1999c, 1999d, 1999e, 2007, 2009, 2018).

3.9.4.2 Vegetation

For vegetation, no regulatory standards or guidelines exist to assess vegetation health due to the accumulation of trace metal COPI. However, there is a need to identify triggers of trace metal concentrations in indicator plant species to determine changes from Project baseline conditions. In the absence of guidelines, a statistical approach is taken to develop triggers.

Triggers for vegetation are developed using the following steps: 1) review of baseline data to remove potential outliers (1.5-times above or below the interquartile range) (EDI, 2025); 2) calculation of standard deviations for every combination of COPI, plant tissue and TSP impact zone; 3) calculation of geometric means for every COPI-tissue-zone by logarithmically transforming metal concentrations, fitting a linear model, and exponentiating the log-scale mean estimates; and 4) calculation of a two standard deviation increase from geometric means as a concentration and the percentage change relative to the baseline mean.

COPI triggers for vegetation are provided in Table 3-52 to Table 3-54, for the high, moderate and low TSP zones, respectively.

Table 3-52: Vegetation Triggers for Sites within the High TSP Concentration Zone

COPI	Triggers (mg/kg dry weight)			
	Willow	Blueberry	Cranberry	Lichen
Arsenic	0.075	0.022	0.057	0.104
Cadmium	19.81	1.96	0.12	0.17
Chromium	0.18	0.11	0.10	0.16
Copper	8.4	7.3	9.4	1.1
Lead	0.21	0.04	0.05	0.25
Mercury	0.020	0.020	0.020	0.023
Selenium	7.33	0.76	0.05	1.07
Uranium	0.005	0.002	0.002	0.008
Zinc	405.1	77.6	43.2	20.3

Table 3-53: Vegetation Triggers for Sites within the Moderate TSP Concentration Zone

COPI	Triggers (mg/kg dry weight)			
	Willow	Blueberry	Cranberry	Lichen
Arsenic	0.027	0.020	0.020	0.053
Cadmium	9.31	2.46	0.20	0.12
Chromium	0.10	0.13	0.10	0.10
Copper	6.74	7.82	5.80	0.68
Lead	0.117	0.034	0.035	0.113
Mercury	0.020	0.020	0.020	0.020
Selenium	0.569	0.061	0.128	0.050
Uranium	0.002	0.002	0.002	0.003
Zinc	357.3	96.8	54.2	19.0

Table 3-54: Vegetation Triggers for Sites within the Low TSP Concentration Zone

COPI	Triggers (mg/kg dry weight)			
	Willow	Blueberry	Cranberry	Lichen
Arsenic	0.020	0.020	0.020	0.065
Cadmium	15.78	2.56	0.12	0.07
Chromium	0.10	0.10	0.10	0.13
Copper	7.58	7.20	4.47	0.91
Lead	0.110	0.037	0.031	0.128
Mercury	0.020	0.027	0.020	0.020
Selenium	0.250	0.288	0.050	0.050
Uranium	0.002	0.002	0.002	0.004
Zinc	410.7	103.2	45.4	18.9

3.9.5 Monitoring Requirements

The monitoring requirements are specified in the EMSRP (BMC, 2026a). The trace metal monitoring program requirements involve soil and vegetation trace metal collections at 10 selected sites within each TSP concentration zone. Trace metal collection will be completed once during the construction phase and every three years during operations, starting one year after the operation phase has been initiated. Pending results from ongoing analyses, monitoring requirements may change during operations as determined by changes in trace metal concentrations and in response to trigger activation.

3.9.6 Evaluation of Monitoring Results

Trace metal concentrations will be analyzed in soil and vegetation in relation to Project triggers. Should the analysis find that the trigger for a particular COPI has been exceeded within one or more TSP concentration zones, further investigation will be undertaken. This may include investigation into potential sources of the COPI, review of data from the air quality monitoring program, review of data from the groundwater monitoring program and/or additional sampling (including sampling at reference sites if deemed appropriate).

The initial work would include the verification of the monitoring data collected. This will include review of the laboratory QA/QC data, field QA/QC data, field notes, and historical data associated with the results. Laboratory re-analysis may be warranted pending findings from the data review. If the data are confirmed as reaching a trigger value, trace metal sampling will be repeated the following year. Next steps taken upon verification of the data are outlined in the MRP.

3.9.7 Development and Implementation of Management Response Plan

The potential source of the increased COPI concentrations in soils or vegetation will be assessed, and this assessment will determine whether an MRP should be developed for this AMI and/or for Air Quality or Groundwater Quality. Individual MRPs will be developed for each location, as required, and Yukon Government and First Nations will be consulted prior to implementation of an MRP as discussed in Chapter 5.

The performance of the developed response plan will be measured by continuing the soil and vegetation trace metal monitoring program and tracking COPI concentrations. This may include increasing the frequency of sampling to an annual sampling plan and/or increasing the number of sampling sites.

3.9.8 Reporting Requirements

Reporting requirements are discussed in Chapter 4.

3.10 FISH AND AQUATIC LIFE

3.10.1 Description

Changes to surface water conditions have the potential to affect aquatic life (e.g., fish and invertebrates) and habitat in the vicinity of the Project. Water management activities such as diversion of site runoff, water storage and discharge of effluent from LWMP, and redirection of Fault Creek flow to South Creek will alter the flow regime in Geona Creek, South Creek, and to a lesser extent, Finlayson Creek, and this can affect the quantity and quality of habitat available for aquatic life.

Surface water quality and quantity were included in an effects assessment as part of the YESAB Project Proposal (BMC, 2017). After the application of mitigation measures, residual effects were considered to not be significant (BMC, 2017) and this has been corroborated by more recent models of surface water quality and quantity. As there is uncertainty associated with model predictions, the surface water quality and quantity monitoring programs, and the fish and aquatic resources monitoring programs described in the EMSRP (BMC, 2026a), will be used to verify the water quality and quantity model predictions and to characterize potential changes to fish and aquatic resources in the vicinity of the Project.

This AMI has been developed to provide a framework for detecting and characterizing unexpected effects on fish and aquatic life in the vicinity of the Project so that appropriate management responses can be implemented to minimize or eliminate the effects.

3.10.2 Narrative Response

Statistically significant differences in benthic invertebrate community composition, productivity, tissue quality, and/or stream channel stability are detected relative to reference conditions, triggering an adaptive management response to mitigate adverse impacts on fish and aquatic life.

3.10.3 Indicators

The following key indicators have been selected for the Fish and Aquatic Life AMI:

- benthic invertebrate community biomass;
- benthic invertebrate community taxon richness;
- percent Ephemeroptera, Plecoptera, and Trichoptera (% EPT) taxa;
- benthic invertebrate tissue copper, lead, selenium, and zinc concentrations;[4] and
- channel width/depth ratio.

[4] *The list of COPI's assessed in benthic invertebrate tissue for the Fish and Aquatic Life AMI may be revised dependent on results of future monitoring studies.*

In selecting the key indicators, a goal was to identify those that are quantitative, reproducible, and sensitive to the potential changes that could be identified during monitoring, limit the total number of indicators, and avoid redundancy in the indicators. Considering too many indicators results in an increased likelihood of finding a statistically significant difference when testing multiple hypotheses (i.e., potential false positives, e.g., Somers et al., 2019) and can also result in redundancy (Rice and Rochet, 2005). Redundant indicators that are influenced by similar generating processes (e.g., effects on flow or effects on water chemistry) may overestimate impacts if used collectively (Sutherland et al., 2016). The rationale for the selection of each of the key indicators is provided in Table 3-55.

Table 3-55: Rationale for the Selection of Key Indicators for the Fish and Aquatic Life AMI

Monitoring Component	Monitoring Subcomponent	Indicator	Rationale for Monitoring	AMI Indicator Rationale
Benthic Invertebrates	Productivity	Biomass (dw/m^2)	Potential stimulation by nutrients/temperature; impairment by sedimentation	Highly quantitative and sensitive to potential stimulation and flow regime change
	Community	Taxon Richness (no. of taxa per station)	Potential impairment by nutrients/temperature, sedimentation, or toxicity	Highly quantitative and sensitive to potential stimulation, flow regime change, and toxicity
		% EPT (% of total organisms)	Metal sensitive taxa; potential decrease with elevated metals	Highly quantitative and sensitive to potential stimulation, flow regime change, and toxicity
	Tissue Quality	Tissue Metals (mg/kg dw)	Potential increase with aqueous metal concentrations	With a focus on the key water quality indicator metals copper, lead, selenium, and zinc. Highly quantitative indicator of biological uptake and exposure to consumers of benthic invertebrates
Physical Habitat	Channel Stability	Channel width/depth ratio	Potential increase with flow regime change	Highly quantitative and sensitive to flow regime change; shift to wider and shallower channel could reduce pool and glide depth and affect instream cover attributes for fish

Notes: "dw" = dry weight; "EPT" = Ephemeroptera, Plecoptera, Trichoptera.

The Fish and Aquatic Life AMI relies on benthic invertebrate and fish habitat attributes to gain greater certainty with respect to effects on fish. Indicators related to fish health (e.g., condition) and abundance have not been included based on the results of baseline studies and compliance monitoring completed since 1995 which suggest that densities of fish upstream of the Robert Campbell Highway are too low or too low at some affected areas to reliably catch enough fish to gain statistical certainty regarding negative effects based on metrics of fish health or abundance. A total of 156 Arctic grayling have been captured in Geona Creek across baseline studies conducted in 1995 and from 2015 to 2024 (Cominco, 1996; AEG, 2016; BMC, 2021; BMC, 2026c). During WUL compliance monitoring in Finlayson Creek upstream of the Robert Campbell Highway in August from 2000 to 2014 and October in 2016, only one Arctic grayling was captured at stations KZ-15 (100 m downstream of the confluence with Geona Creek) and KZ-16 (upstream of the confluence with Geona Creek) over the eight monitoring events. Slimy sculpin (*Cottus cognatus*) have been caught more frequently in Finlayson Creek but have not been caught in Geona Creek except in small numbers near the confluence with Finlayson Creek.

3.10.4 Triggers and Action Levels

The Fish and Aquatic Life AMI has a smaller base of data to draw upon in comparison to other AMIs. Accordingly, rather than rely on numerical performance thresholds, the Fish and Aquatic Life AMI relies on triggers of statistical significance – does an indicator differ significantly from baseline and from reference? This is a typical approach to the use and interpretation of biological data (e.g., Environment Canada, 2012; Kilgour et al., 2017; Somers et al., 2019).

Due to the availability of baseline data for matched “future-exposed” and reference areas, it is anticipated that a BACI approach can be used for data analysis and to specifically support the AMI triggers. Unlike the standard before-after or control-impact approach which asks the questions “does after differ from before (baseline)?”, and “does exposed differ from reference?” (respectively), the BACI asks a question that is more powerful in determining potential mine-related change: “if there is a change from baseline in an exposed area, is that change larger than observed at the reference area?”. Application of BACI controls for natural differences among areas and temporal variability to provide optimal resolution of potential mine-related effects.

The Fish and Aquatic Life AMI triggers include a statistically significant difference ($p = 0.10$) in any of the five key indicators with action levels developed based on the comparison of differences to the critical effect size (CES). The CES represents a difference (effect size) considered to be ecologically meaningful (Munkittrick et al.; 2009, Environment Canada 2012). For the key indicators, a CES of ± 2 reference area SD will be used, which is typical in aquatic environmental effects monitoring (Munkittrick et al., 2009; Environment Canada, 2012; Kilgour et al., 2017; Somers et al., 2019. Action level responses and associated rationale for the Fish and Aquatic Life AMI triggers are provided in Table 3-56.

Table 3-56: Fish and Aquatic Life Triggers and Action Levels

Action Level	Triggers	Rationale
Low	Statistically significant difference ($p = 0.10$) in any of the five indicators, but at a level that is below the CES of ± 2 reference area SD	Statistically significant differences below the CES may not be ecologically meaningful but could provide useful early warnings for a potential future exceedance
Moderate	Statistically significant difference ($p = 0.10$) in any of the five indicators, but at a level that is greater than the CES of ± 2 reference area SD	Statistically significant differences greater than the CES would be considered to be ecologically meaningful
High	Statistically significant difference ($p = 0.10$) in any of the five indicators at a level that is greater than the CES of ± 2 reference area SD in two monitoring events in a row	Statistically significant differences greater than the CES for two monitoring events in a row would be considered both confirmed and ecologically meaningful

3.10.5 Monitoring Requirements

The Fish and Aquatic Life Monitoring Program presented in the EMSRP (BMC, 2026a) includes data collection for a variety of measurable parameters representing fish habitat, fish health, community, and abundance, and benthic invertebrate productivity, community condition, and tissue quality.

Monitoring data specifically required for the Fish and Aquatic Life AMI includes biomass, taxonomic richness, % EPT taxa, and tissue quality for benthic invertebrates, as well as channel width/depth ratio.

The frequency of monitoring under the Fish and Aquatic Life Monitoring Program varies by project phase, as detailed in Table 3-57. Approximate monitoring locations are shown in Figure 3-2, and these will be modified in the field as appropriate to ensure the quality of monitoring results. During Operations, "base" monitoring (i.e., monitoring in the absence of AMI-related changes to frequency triggered by monitoring findings) will occur at an initial frequency of annually for the first three years, followed by every three years thereafter. The Fish and Aquatic Life AMI has linkages with the Surface Water Quality AMI, discussed in Section 3.8.

Table 3-57: Description of Monitoring Requirements for the Fish and Aquatic Life AMI

Future Exposed Areas	Reference Areas	Benthic Invertebrates		Fish Habitat		Frequency	Timing
		Method Summary	Indicators	Method Summary	Indicators		
Geona Creek (KZ-37)	East Creek (KZ-21)[1]	**Productivity and Community:** Hess Sampler with 500 µm mesh (3 sub-sample composite at n = 5 stations); taxonomy to lowest practical level **Tissue Quality**: kick-and sweep and by hand (overturning rocks), taxon composition proportional to biomass; n = 5 stations	**Productivity**: dry weight per m^2 **Community**: taxon richness, %EPT taxa **Tissue Quality:** metal concentrations	**Channel Stability**: bankfull width with a measuring tape; bankfull depth as wetted depth plus distance from the water surface to height of measuring tape at bankfull width with a meter stick; n = 5 stations in riffle habitat	**Channel Stability:** Channel width to depth ratio	**Baseline**: 1 year **Construction**: 1 year **Operations**: Annually for years 1-3, every 3 years starting year 6 **Transition and Active Closure:** Every 3 Years **Post Closure:** TBD	Late August or September
Finlayson Creek (KZ-15)	Finlayson Creek (KZ-16)						

[1] If a suitable reference location is not identified in East Creek (e.g., similar habitat as the future exposed area in Geona Creek near KZ-37) other tributaries to Finlayson Creek will be assessed during baseline data collection in late summer 2024 to locate an alternative suitable reference area.

3.10.6 Evaluation of Monitoring Results

Review of relevant monitoring data for the Fish and Aquatic Life AMI will be carried out in late winter to early spring of the year following each monitoring event (i.e., monitoring data collected in late summer will be assessed in late winter to early spring of the following year). This considers the time required for laboratory analysis of benthic invertebrate community samples, completion of a data quality review of laboratory data, and subsequent statistical analysis of the five key indicators at the future effluent-exposed areas relative to reference. Evaluation of the monitoring data will include comparison of statistical analysis results to the Action Level triggers for each indicator at each monitoring location.

The Fish and Aquatic Life AMI also has interactions with the Surface Water Quality AMI. Surface water quality data will be collected downstream of the Project as described in Section 3.8.

Upon verification that a trigger has been reached, next steps will be taken as detailed in the Management Response Plan.

3.10.7 Development and Implementation of Management Response Plan

The Fish and Aquatic Life AMI includes escalating responses by action level (Table 3-58). With a Low Trigger exceedance, responses are focused on examining the potential causes of the difference using the existing data and assuring that the Surface Water Quality AMI addresses any parameters that could potentially be responsible. If the apparent cause of the difference is a mine-related supporting variable (e.g., a decrease in taxon richness in association with an increase in aqueous selenium concentration), then the Surface Water Quality AMI responses for that variable are more fully supported and will be implemented as appropriate, if not already implemented. If the difference is related to a supporting variable that is not mine-related, some Fish and Aquatic Life Monitoring Program design adjustments may be recommended to control for that variable. Lastly, if no apparent relationships are evident, consideration will be given to whether additional supporting physical, chemical, or biological supporting measures should be included in the Fish and Aquatic Life Monitoring Program.

In the instance of a Moderate Trigger exceedance, all Low Trigger responses will be completed along with an increase in monitoring frequency in the area of interest during the following biological monitoring season. In addition, a more formal Investigation of Cause (IOC) study will be designed and completed to determine the cause of the difference. An IOC study seeks to address potential causes of observed differences in key indicators by identifying hypotheses of cause and adjusting study designs to specifically address the hypotheses (e.g., Hewitt et al., 2003; Environment Canada, 2012). Thus, the IOC typically provides additional data to address the potential cause of observed differences.

If the IOC successfully results in the identification of cause and that cause is a mine-related change in water quality or quantity, feedback actions may include:

- If the causative factors are key indicators under the Surface Water Quality AMI, then the Surface Water Quality MRP for a High Trigger will be initiated;
- If the causative factors are related to water quality but are not key indicators under the Surface Water Quality AMI, a water quality evaluation of the causative parameters will be undertaken with the objective of determining if the parameter should be added to the Surface Water Quality AMI as a key indicator; and
- If the causative factors are related to surface water quantity, water quantity data will be reviewed and operational water management procedures may be adjusted to mitigate this impact, considering natural flows and climate variability, and impacts on water quality.

With a High Trigger exceedance, all Moderate Trigger responses will be completed along with expansion of IOC to an Investigation of Cause, Extent, and Magnitude (IOCEM). The IOCEM will be designed and completed in the area of interest the following monitoring season. The IOCEM will seek to determine the spatial extent and magnitude of the difference as well as the cause. This will include expanding spatial coverage. For example, if the trigger is exceeded in Finlayson Creek at KZ-15, the IOCEM will include sampling at Finlayson Creek downstream of East Creek and Finlayson Creek at the Robert Campbell Highway. This will serve to define the spatial extent and magnitude of the confirmed differences and to provide a more robust basis for IOC. The same feedback actions to the Surface Water Quality AMI and Surface Water Quality data and management will be undertaken as following the IOC Moderate Trigger.

Individual MRPs will be developed for each location, as required, and Yukon Government and First Nations will be consulted prior to implementation of an MRP as discussed in Chapter 5.

Table 3-58: Fish and Aquatic Life Staged Response to Trigger Activation

Action Level	Description of Management Plan Elements
Low	• For all indicators (biomass, taxon richness, % EPT Taxa, benthic invertebrate tissue Cu, Pb, Se, and Zn, and channel width/depth ratio), examine the relationships between the indicator and supporting measures of habitat, flow and water quality; • If supporting variable results and biological results are suggestive[1] of a mine-related effect (e.g., a decrease in density in association with an increase in metal concentrations), implement the Surface Water Quality MRP for the variable if it is a key indicator[2]; • Prepare a preliminary MRP including re-evaluation of timelines and possible adjustment of low, moderate, and high action level triggers to ensure timely implementation of the MRP when required; • Identify personnel who will be responsible for key inputs related to the development/update and implementation of MRPs; and • Complete updates to the MRP following conclusion of any additional investigations.
Moderate	• All Low Action Level responses; • Design and complete an Investigation of Cause (IOC) study; • If monitoring occurs less than annually, commence annual monitoring; • If supporting variable results and biological results are suggestive[1] of an unexpected mine-related effect, implement the Surface Water Quality MRP if it is a Surface Water Quality AMI key indicator and if it is not, determine whether to add the variable to the Surface Water Quality AMI; • If the causative factors are related to surface water quantity, review flow data and operational water management procedures and adjust as appropriate to mitigate this impact, considering natural flows and climate variability, and impacts on water quality; and • Update the MRP to include a detailed evaluation of the mitigation options and selection of the preferred management response that will be implemented should high action level triggers be reached;
High	• All Moderate Action Level responses; • Design and implement an Investigation of Cause, Extent and Magnitude Study (IOCEM); • Evaluate the effectiveness of the implementation of the management response; and • Adjust the MRP and AMP as needed.

[1] Suggestive is defined to mean strong association as determined by correlation analysis supported by a credible mechanism of cause.
[2] If the variable is mine-related and is not included in the Surface Water Quality AMI, complete a trend analysis for the "new" variable per the Surface Water Quality AMI and an evaluation of whether management response for the new variable is warranted.

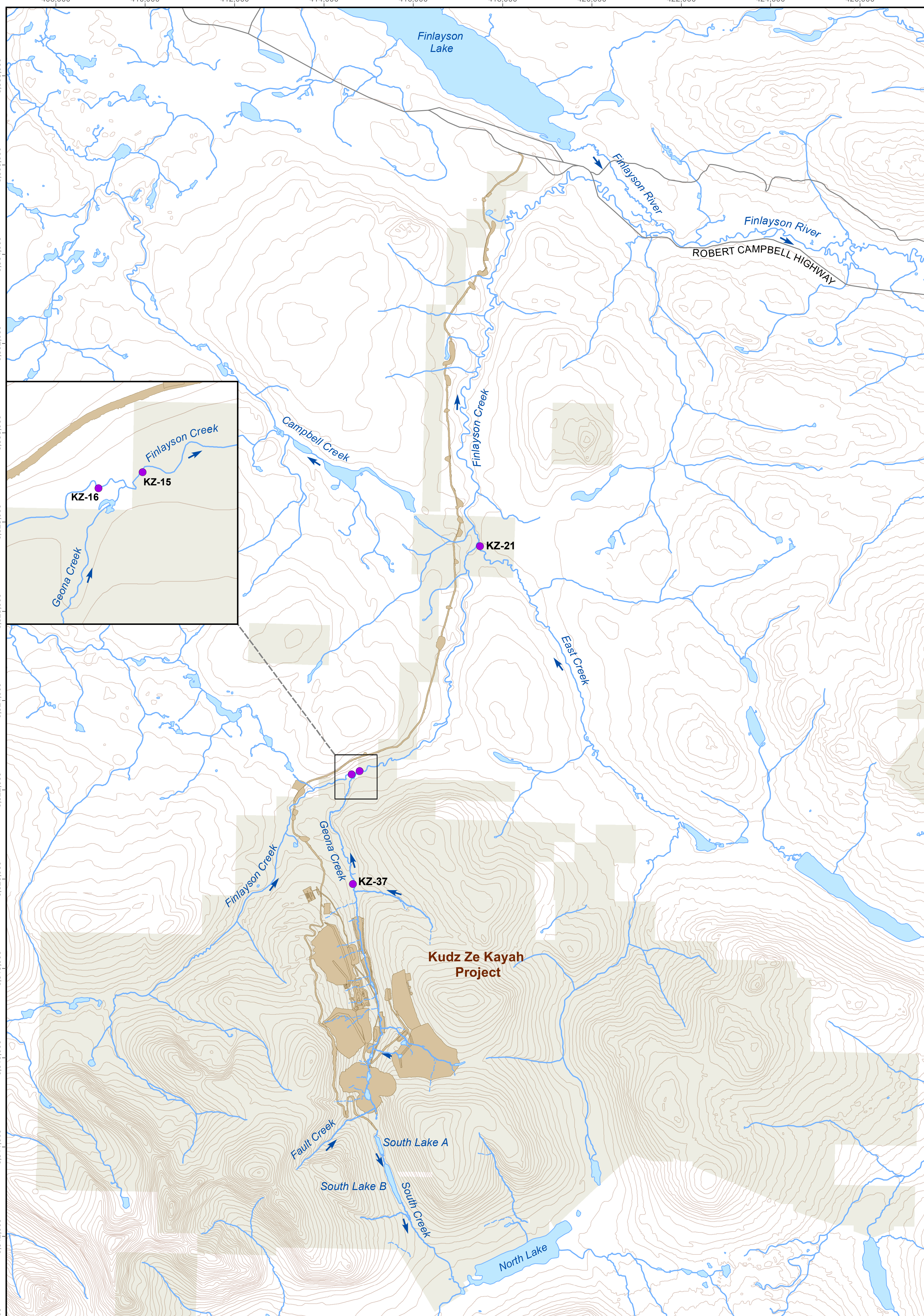
As outlined in Table 3-58, there are several points of interaction between the Fish and Aquatic Life AMI and the Surface Water Quality AMI. Any Surface Water Quality AMI High Trigger exceedance at Stations KZ-37 and KZ-15 will invoke responses that include engaging qualified personnel to determine recommendations for additional Fish and Aquatic Life monitoring. Similarly, the interpretation of Fish and Aquatic Life monitoring data will include consideration of associated surface water quality results. In addition:

- A Surface Water Quality AMI High Trigger will likely initiate an investigation of the source of increased COPI concentrations. The investigation will include consideration of multiple lines of evidence and the development of recommendations for mitigation. Depending on the findings of the investigation, an additional outcome may be the collection of additional data under the Fish and Aquatic Life Monitoring Program (to further support the investigation), which could include an increase in monitoring frequency, an increase in replication, additional monitoring components (e.g., toxicity testing), or an increase in spatial coverage; and

- A Fish and Aquatic Life AMI finding that a key aquatic life indicator is showing an unexpected change prompts an IOC (Moderate and High Triggers). If the IOC identifies a mine-related cause and the cause is not one of the key indicators identified in the Surface Water Quality AMI, an investigation of that cause will be completed for potential addition to the list of key indicators.

3.10.8 Reporting Requirements

Reporting requirements are discussed in Chapter 4.



LEGEND

- Benthic Invertebrate and Fish Habitat Sampling Location
- Road
- Watercourse
- Intermittent Watercourse
- Proposed Mine Infrastructure
- BMC Minerals Ltd. Claims

BMC MINERALS

Monitoring Locations for Fish and Aquatic Life AMI

0 1.25 2.5 5
Kilometers

N W E S

Map Projection: UTM Zone 9V NAD 1983
Data Source: Reproduced under licence from His Majesty the King in Right of Canada, Department of Natural Resources Canada. All rights reserved.

Date: May 2024
Project 237202.0107

minnow environmental inc.

Figure 3-2

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\BMC Minerals - 237202.0107 - Permitting Support\D - GIS\EMSRMP Update\23-107 Figure 3-2 Monitoring Locations for Fish and Aquatic Life AMI.mxd

3.11 AIR QUALITY

3.11.1 Description

Fugitive dust and emissions from mining activities at the Project have the potential to increase ambient concentrations of Total Suspended Particulate (TSP), coarse particulate matter (particulate matter less than 10 micrometres in diameter, PM_{10}) and/or fine particulate matter (particulate matter less than 2.5 micrometres in diameter, $PM_{2.5}$). These have the potential to adversely impact the health and well-being of humans, wildlife, vegetation, and other biota. Nitrogen dioxide (NO_2) emitted from equipment and vehicles also has the potential to adversely impact these receptors.

Potential adverse impacts of Project activities on air quality were evaluated through air dispersion modelling developed for the Project's environmental assessment (Chapter 6 of Project Proposal (BMC, 2017). When considering mitigation measures proposed by BMC, YESAB and the Decision Bodies residual effects were determined not to be significant. The ambient air quality monitoring program will serve to verify the results of the environmental assessment and evaluate the effectiveness of mitigation measures. Monitoring and evaluation of air quality will focus on criteria air contaminants (CACs), based on the 2025 Yukon Ambient Air Quality Standards (YAAQS) (Yukon, 2024).

3.11.2 Narrative Response

Concentrations of CACs reach levels requiring the implementation of management measures to prevent adverse impacts to humans, wildlife, vegetation, and other biota.

3.11.3 Indicators

The air quality indicators that will be monitored to assess whether a trigger has been activated are:

- 24-hour ambient concentrations of:
  - TSP;
  - PM_{10};
  - $PM_{2.5}$;
- Rolling annual arithmetic mean concentration of TSP;
- Rolling annual arithmetic mean concentration of $PM_{2.5}$; and
- Annual arithmetic mean of NO_2.

3.11.4 Triggers and Action Levels

The threshold for air quality are the YAAQS, and these were used to determine the action level triggers shown in Table 3-59. A single trigger level is applicable for air quality, corresponding to a concentration exceeding 80 percent of the applicable YAAQS for any parameter. This trigger has been established to allow for the effective implementation of responses before YAAQSs are reached. Staged triggers and action levels (i.e. low, medium, high) are not necessary for this AMI as the potential management responses are expected to rapidly reduce concentrations of CACs in the ambient air.

Table 3-59: Air Quality Triggers

Parameter	Measure	YAAQS (µg/m³)	Trigger (µg/m³)	Rationale
Total Suspended Particulate (TSP)	24-hour average	120	96	80% of YAAQS concentration
	Annual arithmetic mean	60	48*	
Fine Particulate Matter ($PM_{2.5}$)	24-hour average	27	22.4	
	Annual arithmetic mean	8.8	8*	
Coarse Particulate Matter (PM_{10})	24-hour average	50	40	
Nitrogen Dioxide (NO_2)	Annual arithmetic mean	23	18*	

**Rolling annual average evaluated monthly.*

3.11.5 Monitoring Requirements

The monitoring data required for this AMI is described in the Project's EMSRP (BMC, 2026a) and includes air quality concentration data collected from Stations AQ-01, AQ-02, AQ-03, AQ-04, and AQ-06, shown in Figure 3-3. Station AQ-05 is a control station for monitoring ambient air upwind of Project operations. Concentrations of dust (TSP, PM_{10} and $PM_{2.5}$) will be monitored continuously and NO_2 will be monitoring non-continuously (BMC, 2026a). The air quality monitoring schedule is shown in Table 3-60.

Table 3-60: Air Quality Monitoring Schedule

Station	Description	UTM Easting (m)	UTM Northing (m)	Monitoring Frequency
AQ-01	Approximately 4 km south of the open pit	416401	6811553	Monthly, Continuous
AQ-02	Near the open pit	404671	6815184	Monthly, Continuous
AQ-03	Near the process plant	414130	6817797	Monthly, Continuous
AQ-04	West of the camp area	413250	6819450	Monthly, Continuous
AQ-05	Control station, upwind of mine operations	417403	6827543	Monthly, Continuous
AQ-06	Near the access road	413343	6821596	Monthly, Continuous

3.11.6 Evaluation of Monitoring Results

The 24-hour average continuous monitoring results for TSP, PM_{10} and $PM_{2.5}$ will be evaluated daily. The monitoring equipment will include a datalogger capable of automatically sending an alert if a trigger value is exceeded for the 24-hour average. The monthly monitoring results for NO_2 will be evaluated upon receipt of the monthly laboratory results from analysis of the passive samples.

If results indicate that a trigger value has been exceeded, on-site personnel will implement next steps as outlined in the MRP.

3.11.7 Development and Implementation of Management Response Plan

If an air quality trigger value is exceeded, either for a 24-hour average or for the rolling annual arithmetic mean, the management responses below will be initiated. Some response components may be carried out concurrently or omitted, depending on the circumstances of the trigger and subsequent responses. Initial responses include:

- Identify the source, if possible, and confirm that the air quality sampler is functioning correctly and the measurement is valid;
- Investigate the cause as appropriate (e.g., visible dust transport observations, meteorological conditions, site activities, inspection records). Air quality triggers exceeded due to wildfire activity will be recorded, but will not be considered an AMP trigger, and will be noted as related to wildfires in the data record; and
- Conduct a trend analysis to determine if there is a trend towards the YAAQS or if this is an isolated event.

The potential implementation of additional management responses will depend on the results of the initial investigation and the source of the increased concentrations. Potential management responses and mitigation options will be appropriate for the identified source/cause and may include:

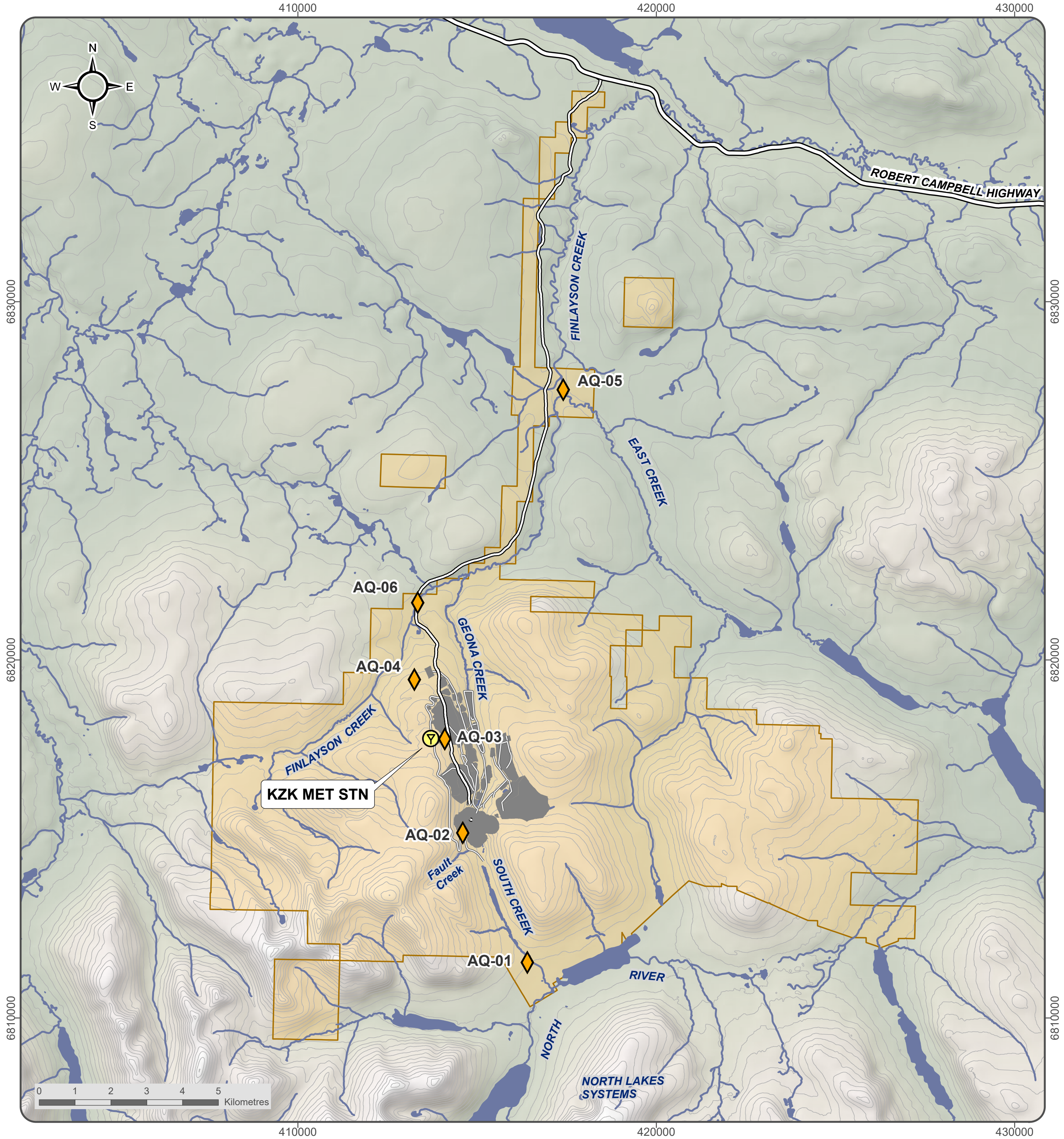
- Increased frequency or improved methodology of watering/dust suppressant application to road(s) and other exposed areas;
- Traffic management in areas where dust is generated;
- Early surface preparation and scheduling of re-vegetation activities for disturbed areas so that they may be seeded as early as practicable;
- Adjust timing of dust generating activities to reduce potential cumulative effects;
- For drilling water injection, collaring of holes and use of cyclones and other dust collection devices as required;
- Installation of design modifications and the use of technology-based solutions to rectify source defects where they are identified during Operations. These may include such areas as;
  - Modifications to transfer points on conveyors;
  - Installation of additional dust suppression capacity in the form of sprinklers/misters or the use of specialized dust suppression compounds in the dust suppression sprays in the processing plant; and
  - Design modifications to conveyor covers.
- Wind barrier (windrow) construction such as crushed rock, soil berms or fences upwind of roads and exposed areas to reduce wind exposure;
- Protocols around the use of ventilation; and

- Regular maintenance of mobile equipment, limiting idling time and cold starts and controlling the speed of mobile equipment to reduce NO_2 emissions.

Individual MRPs will be developed for each location, as required, and Yukon Government and First Nations will be consulted prior to implementation of an MRP as discussed in Chapter 5.

3.11.8 Reporting Requirements

Reporting requirements are discussed in Chapter 4.



Meteorological Station
Air Quality Station
Location of Proposed Infrastructure
Tote Road/Proposed Access Road
Proposed Road
Watercourse
Waterbody
BMC Minerals Ltd. Mineral Claim Areas

KUDZ ZE KAYAH PROJECT

FIGURE 3-3

AMBIENT AIR QUALITY MONITORING STATIONS

Datum: NAD 83; Projection: UTM Zone 9N

DECEMBER 2025

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4 ANNUAL REVIEW, REPORTING AND UPDATING

The AMP is a living document, subject to updates as new information and data become available through the implementation of the AMP and related Project monitoring programs. The concepts and effectiveness of the AMP will be reviewed annually as conditions at the Project evolve, including comprehensive review of data to identify any new or changing conditions that may warrant revising the AMP approach. This review will occur in the first quarter of each year.

Annual AMP reports will be submitted as part of the Water Licence and the Quartz Mining License reporting. These reports will include the results of annual AMP reviews, summaries of AMP trigger events and responses, AMP updates and engagement activities.

Reporting of all trigger activations will be provided within one month of confirming the trigger, via Waterline, and resulting consultation and engagement are discussed in Chapter 5.

5 CONSULTATION AND ENGAGEMENT PLAN

BMC has had extensive engagement with Ross River Dena Council (RRDC) including community meetings in Ross River, Elders Oversight Committee Meetings, meetings with Chief and Council and engagement with RRDC's wholly owned environmental consultancy, Dena Cho Environmental and Remediation Inc. (Dena Cho). As part of this ongoing engagement, Dean Cho conducted a detailed independent review of the draft Environmental Monitoring, Surveillance, Reporting and Adaptive Management Plan (BMC, 2022). Issues raised during the Dena Cho review were addressed collaboratively through a number of workshops and where appropriate this Plan was amended and additional commitments added.

BMC intends to continue consultation and engagement with affected First Nations through all stages of AMP implementation, including MRP development, annual AMP reviews and AMP updates, and will work to establish an AMP Technical Working Group to ensure the effectiveness of this consultation. Details of planned consultation and engagement activities are provided in Table 5-1, based on guidance in Yukon (2021), and will be further developed prior to Project construction.

Table 5-1: AMP Consultation and Engagement Activities

<table>
<tr><th>Phase</th><th>Action Level</th><th>Planned Consultation and Engagement Activities</th></tr>
<tr><td rowspan="3">AMP Implementation</td><td>Low</td><td>• Notice of trigger activation highlighted in monthly AMP report posted on Waterline; and
• Provide an opportunity for Yukon Government and First Nations to provide input on the preliminary MRP, including input on the selected potential mitigation options, and any mitigations to be implemented as part of the Low Trigger response.</td></tr>
<tr><td>Moderate</td><td>• Notice of trigger activation highlighted in monthly AMP report posted on Waterline and sent directly to Yukon Government and First Nations; and
• Provide an opportunity for Yukon Government and First Nations to provide input on:
  • the selection process for preferred mitigation options;
  • the design of the preferred mitigation options and any mitigations to be implemented as part of the Moderate Trigger response;
  • the updated MRP.</td></tr>
<tr><td>High</td><td>• Notice of trigger activation highlighted in monthly AMP report posted on Waterline and sent directly to Yukon Government and First Nations; and
• Provide an opportunity for Yukon Government and First Nations to provide input on:
  • review and input to any AMP updates;
  • review and input to monitoring the effectiveness of AMP implementation.</td></tr>
<tr><td>AMP Annual Report and Update</td><td>N/A</td><td>• Review the AMP Annual Report; and
• Provide an opportunity for Yukon Government and First Nations to provide input on recommendations stemming from the AMP Annual Report, and any updates to the AMP.</td></tr>
</table>

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APPENDIX A: TABLE OF CONCORDANCE

Reference No.	Proponent Commitment[1]	Where addressed
YESAB R118	Variable pWQOs (i.e. those that are hardness, sulphate, or chloride-dependent) will be calculated for each sample using actual dependency values and compared to the measured constituent concentration. Managers will have simple calculation tools developed to determine an immediate pWQO value upon receipt of analytical results. As part of the operational Adaptive Management Plan both short term (i.e., for each sampling event) and long-term (i.e., annual or longer) water quality thresholds will be established which will outline specific responses should receiving water quality values trend towards the exceedance of the pWQOs in the receiving environment.	AMP Section 3.7 and 3.8
YESAB R152	The preliminary water quality objectives report indicates the water quality parameters that will be evaluated at sites KZ-13, KZ-37, KZ-15, and KZ-26. These will be incorporated into a monitoring, surveillance, and Adaptive Management Plan to ensure environmental protection.	AMP Section 3.8
YESAB R155	In Geona Creek (KZ-37) and Finlayson Creek (KZ-15) where discharge from the mine will first enter the receiving environment, stilling wells with staff gauges will be used to collect continuous data where rating curves will be established and used to determine instantaneous discharge measurements. Weekly discharge and water quality samples will be collected at these locations when the Lower Water Management Pond is discharging. The water quality results for KZ-37 and KZ-15 will be compared to the Water Quality Objectives and their associated adaptive management thresholds.	AMP Section 3.8
YESAB R156	Effluent quality standards (EQS) will be established for the Lower Water Management Pond discharge (KZ-8) and will be the primary control for ensuring WQOs are met all the time. These EQS will be established during the water licencing process using updated versions of the water quality model and Water Quality Objectives.	AMP Section 3.7
YESAB R156	Daily onsite measurements of key parameters for KZ-8 such as pH, conductivity, and targeted metals, will be completed to ensure compliance in addition to the weekly external samples. Weekly water quality samples in Geona Creek (KZ-37) and Finlayson Creek (KZ-15) will be collected when the Lower Water Management Pond is discharging. The water quality results for KZ-37 and KZ-15 will be compared to the Water Quality Objectives and their associated adaptive management thresholds.	AMP Section 3.7 and 3.8
YESAB R3-24	If during the Project lifetime, concentrations in soils reach the adaptive management thresholds (that will be defined during permitting) the PQRA will be updated and additional management measures to reduce dust will be implemented as per the adaptive management plan (i.e. road watering and/or installing misters at certain key locations). In addition, based on comments received from YESAB and RRDC, during the Adequacy stage, BMC will be installing 5 air quality monitoring stations at the site in 2018. These stations will monitor TSP, PM10, PM2.5 and metals. The results of the 2018/2019 monitoring program will be used to confirm the assumed baseline concentrations of TSP, PM10 and PM2.5 that were presented in the Project Proposal. The stations will also be used in the monitoring program during construction, operations, and active closure.	AMP Section 3.11
YESAB R3-26	A vegetation and soil monitoring plan will be implemented to track the effects of dust deposition relating to the mine area and Access Road. The monitoring plan is scheduled to be conducted every three years starting in the construction phase and will track change in soil metal concentrations from baseline conditions. The company has committed to developing adaptive management thresholds during permitting. If soil metals in soil exceed guidelines or are consistently higher than baseline concentrations, then additional mitigations measures will be taken to reduce emissions (as per the adaptive management plan – to be developed during permitting). In addition, the PQRA would be updated.	AMP Section 3.9
YESAB R4-4	If during the Project lifetime, concentrations in soils reach the adaptive management thresholds (that will be defined during permitting) the PQRA will be updated and additional management measures to reduce dust will be implemented as per the adaptive management plan (i.e. road watering and/or installing misters at certain key locations).	AMP Section 3.9
YESAB R5-7	Specific adaptive management thresholds for air quality indicators will be developed as part of the Monitoring and Adaptive Management Plan. If a specific threshold is reached, either for a 24-hour average or for the annual mean, the following adaptive management responses will be undertaken: • Identify the source if possible and investigate the cause as appropriate (i.e., visible dust transport observations, meteorological conditions, site activities, inspection records, etc.); and	AMP Section 3.11

Reference No.	Proponent Commitment[1]	Where addressed
	• Conduct a trend analysis to determine if there is a statistically significant trend towards the 2020 Canadian Ambient Air Quality Standards or if this is an isolated event. The application of additional mitigation measures will be dependent on the results of the investigation (i.e., will be dependent on the source of the increased concentrations) and could include any of the contingency mitigation measures presented in the Air Quality Management Plan (Section 18.11 of the Project Proposal (BMC, 2017)) that are appropriate for the identified source(s)/cause(s), including (but may not be limited to): • Increased frequency of watering/dust suppressant application to road(s) and other exposed areas; • Traffic re-routing and work reduction in areas where dust is generated; • Early surface preparation and scheduling of revegetation activities for disturbed areas so that they may be seeded as early as practicable; • Adjust timing of dust generating activities to reduce cumulative effects; • For drilling water injection, collaring of holes and use of cyclones and other dust collection devices as required; • Installation of design modifications and the use of technology based solutions to rectify source defects where they are identified during Operations. These may include such areas as: ➢ modifications to transfer points on conveyors, installation of additional dust suppression capacity in the form of sprinklers/misters or the use of specialised dust suppression compounds in the dust suppression sprays within the processing plant; ➢ design modifications to conveyor covers, changes to conveyor speeds; ➢ changes to the way water is used in suppression of dust during blasting, excavation and hauling of rock from the mine to its final deposition point; • Wind barrier (windrow) construction such as crushed rock, soil berms or fences upwind of roads and exposed areas to reduce wind exposure; • Protocols around the use of ventilation; • Protocols and Rules in relation to the use of personal protective equipment where engineering solutions are not viable; and Review of dust control and the overall management plan as needed. Project.	
RRDC Adequacy Review R-2	Detailed monitoring and Adaptive Management Plans will be developed during permitting (i.e. during the Type A Water Licence and Quartz Mining Licence application processes). It is BMC's intention to work closely with RRDC and Dena Cho in the development of these detailed plans. The monitoring and management plans will not be submitted to the Yukon Water Board or EMR until they have been jointly reviewed by BMC and RRDC.	RRDC/Dena Cho reviewed and contributed to all management plans prior to them being finalized and submitted to EMR.
RRDC Adequacy Review R-9	The parameters for effluent quality standards will be primarily related to those COPI for which treatment is required to maintain concentrations in the receiving environment that are compatible with the water quality objectives and parameters listed in the Metal Mining Effluent Regulations, which will include but are not limited to pH, TSS, ammonia, cyanide, fluoride, arsenic, cadmium, copper, nickel, lead, selenium and zinc. These will be incorporated into a monitoring, surveillance, and Adaptive Management Plan to ensure environmental protection, which will be developed with RRDC.	AMP Section 3.7 Dena Cho reviewed and contributed to all draft management plans. Once BMC had amended the plans to address Dena Cho's comments, BMC sent them to RRDC Chief and Council for review prior to BMC finalizing and submitting them to EMR.
RRDC Adequacy Review R-55	The conceptual plans presented in the Project Proposal will be refined/developed during the subsequent permitting process and it is BMC's intention to work with RRDC and Dena Cho in the development of these detailed plans.	Dena Cho reviewed and contributed to all draft management plans. Once BMC had amended the plans to address Dena Cho's comments, BMC sent them to RRDC Chief and Council for review prior to BMC finalizing and submitting them to EMR.

Reference No.	Proponent Commitment[1]	Where addressed
RRDC Screening Review (ARD/ML)	Uranium will be included as monitoring parameter in the monitoring and adaptive management plan (AMP) that will be submitted as part of the permit applications. BMC will work with RRDC to establish appropriate thresholds and monitoring locations as part of the development of these documents. It is anticipated that the monitoring thresholds and locations will be selected such that they will provide an early warning before uranium concentrations exceed the preliminary water quality objectives (equivalent to the CCME uranium guideline) in the receiving environment. This will allow time for further characterization of any elevated uranium concentrations in waste streams and, where necessary, implementation of measures to ensure the receiving environment is not adversely affected.	AMP Section 3.1, 3.2, 3.3, 3.6, 3.7, 3.8 and 3.9 Dena Cho reviewed and contributed to all draft management plans. Once BMC had amended the plans to address Dena Cho's comments, BMC sent them to RRDC Chief and Council for review prior to BMC finalizing and submitting them to EMR.
RRDC Screening Review (ARD/ML)	BMC will work with RRDC to determine appropriate sampling frequency for Class C runoff and will establish associated criteria in the AMP along with contingency plans. The current thinking is that the monitoring would be monthly but this is likely to be more frequent during the early stages until our modelling is confirmed in the field.	AMP Section 3.1 Dena Cho reviewed and contributed to all draft management plans. Once BMC had amended the plans to address Dena Cho's comments, BMC sent them to RRDC Chief and Council for review prior to BMC finalizing and submitting them to EMR.
RRDC Screening Review (Groundwater)	BMC will be developing the adaptive management plans that will be submitted to the Waterboard and EMR as part of the Water Use Licence and Quartz Mining License Applications. This will include monitoring and management strategies for groundwater, including associated thresholds, triggers and contingency plans. BMC has committed to working with Dena Cho in the development of this and other management plans through the existing contractual agreements between the parties.	AMP Section 3.2 Dena Cho reviewed and contributed to all draft management plans. Once BMC had amended the plans to address Dena Cho's comments, BMC sent them to RRDC Chief and Council for review prior to BMC finalizing and submitting them to EMR.
RRDC Screening Review (Dust Deposition)	For vegetation and soils, the monitoring program and adaptive management and thresholds will be developed in consideration of baseline data as well as dust deposition model results, in conjunction with relevant standards (CCME soil quality guidelines). BMC has committed to working with Dena Cho in the development of the detailed soils and vegetation monitoring and adaptive management program and other management plans through the existing contractual agreements between the parties. This will likely include selection of culturally important vegetation for monitoring, based on feedback from the Elders.	AMP Section 3.9 Dena Cho reviewed and contributed to all draft management plans. Once BMC had amended the plans to address Dena Cho's comments, BMC sent them to RRDC Chief and Council for review prior to BMC finalizing and submitting them to EMR. draft . Once BMC had amended the plans to address Dena Cho's comments, BMC sent them to RRDC Chief and Council for review prior to BMC finalizing and submitting them
BMC Response to Public Comments on the DSR	BMC is in the process of developing the Adaptive Management Plan (AMP) for the Project to support both the Water Licence and Quartz Mining Licence applications. The Environmental Monitoring, Surveillance, Reporting and Adaptive Management Plan is a requirement based on Water Board guidance (Yukon Water Board, 2012) and guidance from Yukon Government's Department of Energy, Mines and Resources (Yukon Energy, Mines and Resources, 2013). The current draft licence applications for the Project include an AMP for COPI both beneath the Class A storage facility and downgradient of the facility. If the monitoring thresholds are triggered there are a number	AMP Section 3.2 and 3.3

Reference No.	Proponent Commitment[1]	Where addressed
	of adaptive management options that could be applied to contain the discharge (which are largely dependent on the Project phase) and could include (but are not limited to): • Depending on the COPI an aquatic ecological risk assessment could be conducted; • Addition of groundwater well network pumped to the water treatment plant while cover is repaired or replaced; • Installation of a trench and pump groundwater to the treatment plant while cover is repaired or replaced; • Installation of additional Constructed Wetland Treatment System; and • Installation of other viable passive treatment systems.	
BMC Response to Public Comments on the DSR	BMC is in the process of developing the Adaptive Management Plan for the Project to support both the Water Licence and Quartz Mining Licence applications. The Environmental Monitoring, Surveillance, Reporting and Adaptive Management Plan is a requirement based on Water Board guidance (Yukon Water Board, 2012) and guidance from Yukon Government's Department of Energy, Mines and Resources (Yukon Energy, Mines and Resources, 2013). The current draft Monitoring and Adaptive Management Plan (to support the licence applications) includes seepage monitoring and adaptive management measures for seepage from the Class A and B waste storage facilities.	AMP Section 3.3
BMC Response to LFN Comments on the DSR	We look forward to receiving from LFN the final KCIPR report and thence modifying the AMP with any new and applicable information that this may provide.	KCIPR documents provided to YESAB during the Assessment and to the Decision Bodies, post assessment, did not include detailed information related to the AMP. LFN reviewed the EMSRAMP as part of their review of the Type A Water Licence Application and provided an Intervention including multiple comments relating to the AMP. The majority of these comments were also included in EMR's Intervention and are reflected in the AMP, as detailed in the Table of Revisions.
BMC Response to LFN Comments on the DSR	BMC notes that RRDC is currently reviewing the proposed adaptive management plans to support permitting. BMC looks forward to receiving the LFN's final KCIPR report. BCM will carefully consider each issue raised by both parties when finalizing the adaptive management plans. Including the consideration of any culturally appropriate indicators of water quality and water management that LFN may identify.	Dena Cho reviewed and contributed to all draft management plans. Once BMC had amended the plans to address Dena Cho's comments, BMC sent them to RRDC Chief and Council for review prior to BMC finalizing and submitting them to EMR. draft . Once BMC had amended the plans to address Dena Cho's comments, BMC sent them to RRDC Chief and Council for review prior to BMC finalizing and submitting them
RRDC Review of Draft Management Plan	During construction this water will be monitored at the Pit Rim Pond which is designed to treat for sediment removal. If water quality requires additional treatment BMC will treat water before discharge.	AMP Section 3.7
RRDC Review of Draft	The annual report provided to EMR and WB will identify if there were any air quality exceedances during the monitoring period.	AMP Section 3.11

Reference No.	Proponent Commitment[1]	Where addressed
Management Plan		
RRDC Review of Draft Management Plan	Annual reports will be provided to Kaska.	AMP Chapter 4
Project Proposal Chapter 8 (BMC, 2017)	Water quality objectives have been established and will be incorporated into the adaptive management plan to mitigate potential effects to surface water quality.	AMP Section 3.8
Decision Document Condition #12	The Proponent shall ensure that LFN and RRDC have opportunities to participate in and influence the development of environmental and socioeconomic management plans and closure objectives developed for the Project to ensure that Kaska can collaboratively design, collect, report, manage and communicate the results of the monitoring programs and adaptive management plans to their community members. The Proponent will make participant funding available to Kaska to support the incorporation of Kaska perspectives on Kaska laws as well as support the inclusion of Kaska members, including Elders and land stewards, in the regulatory process, the monitoring of impacts, the implementation of adaptive management and the Proponent's commitments for the life of the Project (regulatory to reclamation).	AMP Section 1.3
Decision Document Condition #13	The Proponent shall ensure that LFN has the opportunity to be part of the Proponent–Kaska environmental, cultural and heritage management program.	AMP Section 1.3
Decision Document #32	The Proponent shall assess the effluent, as well as predicted concentrations in the receiving environment, for acute toxicity and chronic effects to fish and benthic organisms in the Project's receiving environment. This should be included in environmental monitoring, reporting and adaptive management plans and reflect the species and populations in the receiving environment.	AMP Sections 3.7, 3.8 and 3.10
Decision Document Term #33	The Proponent shall ensure the Adaptive Management Plan addresses potential leakage from tailings and waste rock facilities. The Adaptive Management Plan should outline monitoring, triggers and actions associated with these facilities that address leakage scenarios.	AMP Section 3.3
Decision Document Term #35	The Proponent shall develop an updated Water Quality Model and a comprehensive Adaptive Management Plan to be included in the licensing process. The Adaptive Management Plan shall address potential changes in water quality in Geona Creek downstream of the constructed wetland treatment system. The Adaptive Management Plan shall include early warning triggers and identify effective and timely mitigation measures to ensure protection of water quality.	AMP Section 3.8
Decision Document Term #36	As a part of regulatory applications, the Proponent shall develop and implement adaptive management measures based on monitoring for the onset of acidic conditions, that allows for early detection, management, and mitigation of acidic conditions and metal leaching developing on site during operations, closure and post-closure.	AMP Section 3.1
Decision Document Term #37	The Proponent shall develop an ambient air monitoring and adaptive management plan for all Criteria Air Contaminants (CACs), based on updated (2025) standards.	AMP Section 3.11

[1] *Many of the commitments are also applicable to the Environmental Monitoring, Surveillance and Reporting Plan and where applicable been included in that plan's Table of Concordance*