



KUDZ ZE KAYAH PROJECT

SITE CHARACTERIZATION PLAN

REV 04

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
August 19, 2020	Rev 00	For issue to agencies
December 9, 2020	Rev 01	Updated with commitments and Final Screening Report Recommendations; Appendix E replaced with updated 2019 version
July 18, 2022	Rev 02	Updated Section 7.1 with 2022 caribou census information; Updated with edits from BMC Final Review
April 11, 2024	Rev 03	Updated with responses to Interventions on the Type A Water Licence Application and responses to Information Requests on the QML Application (IR#1 and IR#5a from EMR dated April 11 & July 19, 2023, respectively)
June 1, 2026	Rev 04	Updated with additional baseline data collected since Rev 03 was compiled, and made administrative updates in response to EMR completeness check

SUMMARY OF REVISIONS

Information Request/Intervention	Document	Exhibit	Section	Revision
Site Characterization Plan Revision 03				
EMR Phase 1 IR 1 and YG Intervention Recommendation 1: Develop and submit a conceptual site model as described by Appendix A of the Guidelines for Mine Waste Management Facilities (Yukon, 2023) and in the Guidelines for Developing Water Quality Objectives and Effluent Quality Standards for Quartz Mining Project (Yukon, 2021). This should include, but is not limited to, the consideration of: a. Geology and geochemistry; b. Atmospheric environment; c. Hydrology; d. Hydrogeology; e. Aquatic ecosystem f. Climate change; and g. Terrestrial ecosystem and resources.	Site Characterization Plan	n/a	2	Added a Conceptual Site Model.
EMR Phase 1 IR 2 and YG Intervention Recommendation 2: Update climate modelling in accordance with updated guidance including the guidelines for mine waste management facilities (Yukon, 2023) and Guide on Climate Change Adaptation for the Mining Sector (MAC, 2021).	Site Characterization Plan	n/a	4, Appendix B Appendix C	Climate modelling has been conducted in accordance with applicable MAC and YG guidance documents.
EMR Phase 1 IR 3 and YG Intervention Recommendation 3: Prepare and submit a geotechnical report for the mine site that includes the details of previous investigations, including detailed borehole logs, laboratory test results, and instrumentation installation details.	Site Characterization Plan	n/a	Appendix O, Appendix P	Added a Site Characterization Report based upon data collected in all previous investigations. Added reports from all previous investigations, including detailed borehole logs, laboratory test results and instrumentation installation details.
EMR Phase 1 IR 4 and YG Intervention Recommendation 4: Provide a list of all geotechnical instrumentation on site (e.g., ground temperature cables, piezometers, inclinometers, etc.) including a plan showing their locations relative to the mine waste and overburden facilities.	Site Characterization Plan	n/a	Appendix N	Added a list and plan of all geotechnical instrumentation on site.
EMR Phase 1 IR 5 and YG Intervention Recommendation 5: IR1-5: Prepare and submit a site geological model in accordance with EGBC 2016 guidance, <i>Site Characterization for Dam Foundations in BC</i>, to a level of detail appropriate to see the extent of different	Site Characterization Plan	n/a	Appendix O	Developed a detailed site geological model using <i>Leapfrog</i> , with results presented in the Site Characterization Report, including details of geological, geotechnical, hydrogeological and seismotechnic conditions.

Information Request/Intervention	Document	Exhibit	Section	Revision
Site Characterization Plan Revision 03				
surficial geological, bedrock geological, geotechnical, hydrogeological and seismotechnic conditions within the foundations of the mine waste management facilities. This should include, at least, a soil stratigraphy plan and multiple sections for each mine waste management facility.				
EMR Phase 1 IR 6 and YG Intervention Recommendation 6: IR1-6: Prepare and submit a site-specific site characterization report for each mine waste facility in accordance with <i>EGBC 2016</i> guidance, <i>Site Characterization for Dam Foundations in BC</i> . This should also include instrumentation reports for all geotechnical instruments showing all data collected to date.	Site Characterization Plan	n/a	Appendix O	Added a site-specific Site Characterization Report for each mine waste facility in accordance with APEG BC 2016 guidance.
EMR Phase 5a IR IR5-1: Update the Site Characterization Plan to include baseline data collected in all discipline areas up to and including August 2022. Where practical, include data collected in 2023 as well.	Site Characterization Plan	n/a	4, Appendix A	Updated with hydrometeorological data collected through 2023.
	Site Characterization Plan	n/a	5, Appendix A, Appendix C, Appendix D	Updated with hydrology and water quality data collected through 2023.
	Site Characterization Plan	n/a	6, Appendix E	Updated with hydrogeology data collected through 2023.
	Site Characterization Plan	n/a	7, Appendix I	Updated with invasive plant species data collected through 2023.
	Site Characterization Plan	n/a	8, Appendix K	Updated with ungulate data collected through 2023.
	Site Characterization Plan	n/a	9	Updated with updated aquatic resources data collected through 2021.
	Site Characterization Plan	n/a	12	Updated with geochemical data collected through 2023.
EMR Phase 5a IR IR5-3: YG's WL Intervention recommendation 29 with respect to climate change modelling applies to our review of the Site	Site Characterization Plan	n/a	Appendix C	Updated climate change modelling.

Information Request/Intervention	Document	Exhibit	Section	Revision
Site Characterization Plan Revision 03				
Characterization Plan as well. The Site Characterization Plan is required to be updated to address the comments and observations raised in YG's Intervention.				
EMR Phase 5a IR 5 Update the Site Characterization Plan to incorporate the conceptual site models required in MRB's IR1-1 and YG's Intervention recommendation 18 and the numerical model in YG's Intervention recommendation 19.	Site Characterization Plan	n/a	2, Appendix F	Added a Conceptual Site Model and a Conceptual Groundwater Model.
EMR Phase 5a IR 6 Update the Site Characterization Plan to incorporate the climate modelling required in MRB's IR1-2.	Site Characterization Plan	n/a	4, Appendix B Appendix C	Climate modelling has been conducted in accordance with applicable MAC and YG guidance documents.
EMR Phase 5a IR 12 The geotechnical report required in MRB's IR1-3 is required to be incorporated into the updated Site Characterization Plan.	Site Characterization Plan	n/a	Appendix O, Appendix P	Added a Site Characterization Report based upon data collected in all previous investigations. Added reports from all previous investigations, including detailed borehole logs, laboratory test results and instrumentation installation details.
EMR Phase 5a IR 13 The geological model required in MRB's IR1-5 is required to be incorporated into the updated Site Characterization Plan.	Site Characterization Plan	n/a	Appendix O	Developed a detailed site geological model using Leapfrog, with results presented in the Site Characterization Report.
EMR Phase 5a IR 14 Site-specific site characterization reports required in MRB's IR1-6 for the waste rock and tailings management facilities are not required to be included in the updated Site Characterization Plan but could be appended for completeness.	Site Characterization Plan	n/a	Appendix O	Added a site-specific Site Characterization Report for each mine waste facility in accordance with APEG BC 2016 guidance.
EMR Phase 5a IR 15 Provide the Terrain Stability and Hazards Mapping Report and Related Field Reconnaissance (Core and Associates, 2017b) referred to in the Site Characterization Plan and Appendix J.	Site Characterization Plan	n/a	Appendix O, Appendix Q	Included the requested reports.
EMR Phase 5a IR 16 The Site Characterization Plan uses the 2015 National Building Code Seismic Hazard Calculation; Natural Resources Canada revised this guidance in 2020. Complete a seismic hazard assessment using the 2020 guidance and include it in an updated Site Characterization Plan.	Site Characterization Plan	n/a	Appendix S	Added an updated seismic hazard assessment using the 2020 guidance.

Information Request/Intervention	Document	Exhibit	Section	Revision
Site Characterization Plan Revision 03				
EMR Phase 5a IR 18 Upon completion of the wildlife baseline data collection required in accordance with Decision Document term 11b, the timing of which is described in the June 20, 2023 letter from Department of Environment, the relevant sections of the Site Characterization Plan are required to be updated.	Site Characterization Plan	n/a	8, Appendix K	Revised to include data collected through 2023, and the commitment to update the Site Characterization Plan with the additional caribou data (per condition 11b) once it has been collected.
EMR Phase 5a IR 19 The Site Characterization Plan does not include a discussion on the current extent of invasive plants species in the project area. Appendix F provides information from 2015-2016, though with continued exploration and use of the area this may have changed. Include an updated invasive plant species inventory in the updated Site Characterization Plan.	Site Characterization Plan	n/a	7.2, Appendix I	Updated to include invasive plants, and the most recent report from the Invasive Species Management Program.
YG Intervention Recommendation 18 (Exhibit 5.2): Develop a CSM and present it visually as a series of plans, contour maps, cross-sections and/or block diagrams with supporting text and data tables that describe and quantify the components and features of the CSM. The CSM should be based on existing hydrogeological data and hydrogeological data generated as discussed in Recommendations 16 and 17. The CSM could be described in a stand-alone Conceptual Model Report or in a specific section of a report detailing the revised numerical groundwater model (see Recommendation 19).	Site Characterization Plan	n/a	2, Appendix F	Added a Conceptual Site Model and a Conceptual Groundwater Model.
YG Intervention Information Request 22 (Exhibit 5.2): The applicant needs to provide any reports on the development of the synthetic precipitation record, and updates to the baseline watershed model as referenced in the Life of Mine Water Balance Model (LoMWBM).	Site Characterization Plan	n/a	Appendix C	Included the updated Baseline Watershed Model, including details of the development of the synthetic precipitation record.

Note: Exhibit numbers have not been provided in the Summary of Revisions, as the Site Characterization Plan was not provided as part of the Yukon Water Licence application QZ20-068.

TABLE OF CONCORDANCE

The *Plan Requirements Guidance for Quartz Mining Projects* requires a Table of Concordance that outlines all applicable proponent commitments made during the environmental assessment, the Decision Document terms and conditions and licence conditions. This Site Characterization Plan describes existing site conditions, and there are no applicable commitments, Decision Document terms and conditions or licence conditions. All commitments, Decision Document terms and conditions and licence conditions applicable to the Kudz Ze Kayah Project are addressed in the Table of Concordance in other Management Plans.

LIST OF ACRONYMS AND ABBREVIATIONS

AEG	Alexco Environmental Group
ARD	Acid Rock Drainage
ARD/ML	Acid Rock Drainage and Metal Leaching
BMC	BMC Minerals Ltd.
CCME	Canadian Council of Ministers of the Environment
CI	Confidence Interval
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSM	Conceptual Site Model
COP1	Constituents of Potential Interest
CSR	<i>Contaminated Sites Regulations</i>
DOC	Dissolved Organic Carbon
ENV	Yukon Department of Environment
FCH	Finlayson Caribou Herd
GSC	Geological Survey of Canada
HPM	High Precious Metals
HSU	Hydrostratigraphic Unit
IEE	Initial Environmental Evaluation
IPMP	Invasive Plant Management Plan
KZK	Kudz Ze Kayah
masl	Metres above sea level
ML	Metal Leaching
NP	Neutralization Potential
NRC	Natural Resources Canada
PAG	Potentially Acid Generating
PET	Potential Evapotranspiration
PGA	Peak Ground Acceleration
PSHA	Probabilistic Seismic Hazard Analysis
RRDC	Ross River Dena Council
SARA	Species at Risk Act
SCP	Site Characterization Plan
SEPA	Socio-Economic Participation Agreement
SWE	Snow Water Equivalent
TSS	Total Suspended Solids
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VMS	Volcanogenic Massive Sulphide
WSC	Water Survey of Canada, Department of Environment and Climate Change
WUL	Canada
YG	Water use Licence
YOY	Yukon Government
YWB	Young-of-Year
	Yukon Water Board

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.

Alluvial Deposits: Sand, silt, clay, gravel, or other matter deposited by flowing water, as in a riverbed, floodplain, delta, or alluvial fan.

Alpine (Bioclimate Zone): High elevation ecosystems occurring at greater than 1,550 masl and associated with mountain environments.

Artesian: Underground water that reaches the ground surface under the natural pressure of the aquifer.

Baseline: The existing condition of the biophysical system prior to Project development.

Boreal Subalpine (Bioclimate Zone): Sparsely forested areas of moderate to high elevation (1,300 - 1,550 masl) situated above the Boreal High and below the Alpine zone. The subalpine is a transitional zone from the forested boreal and higher elevation non-forested areas.

Decommission, Reclamation, and Closure Phase: Project phase that will last at minimum three years and occurs following Operations Phase once all mining and ore processing activities stop.

Ecozone: Ecozones are large and generalized ecological units characterized by interactive abiotic factors. Five ecozones are recognized in Yukon: Southern Arctic, Pacific Maritime, Taiga Plain, Boreal, and Taiga Cordillera.

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.

Glacial Till: Unsorted glacial sediment which is derived from the erosion and entrainment of material by the moving ice of a glacier.

Graminoid: Herbaceous plants with a grass-like morphology. Includes the families Poaceae (grasses), Cyperaceae (sedges), and Juncaceae (rushes). Graminoids are often dominant in open habitat comprising grasslands, marshes, and alpine meadows.

Hardness: The amount of dissolved calcium and magnesium in water (i.e., hard water has high dissolved calcium and magnesium).

Initial Environmental Evaluation: A previous body of work completed at Kudz Ze Kayah in the 1990s by Cominco, which included wildlife baseline surveys.

Kaska (i.e., Kaska First Nation): A transboundary Nation involving Kaska people from the Ross River Dena Council and Liard First Nation in southeastern Yukon, and Daylu Dena Council, Dease River First Nation and Kwadacha Nation in northern British Columbia.

Local Study Area: The area encompassing a 3 km buffer surrounding the proposed Project infrastructure and a 1.5 km buffer around the Tote Road.

Mean Annual Runoff: The average value of total annual runoff amounts usually estimated from the period of record or during a specified base period from a specified area.

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

Permafrost: Soil, rock or sediment that is frozen for at least two consecutive years. In areas not overlain by ice, it exists beneath a layer of soil, rock, or sediment, which freezes and thaws annually and is called the "active layer".

Potentially Acid Generating: Acid rock drainage occurs naturally in some environments as part of the rock weathering process but may be accelerated by large-scale earth disturbances in rocks containing an abundance of sulphide minerals. Rocks are assessed as to whether they may be potentially acid generating, if disturbed.

Project Area: Refers to the area occupied by all the Project infrastructure where all direct effects from Project construction and operation will occur (also called the Direct Disturbance Area). Includes some areas of natural ecosystems between the locations of infrastructure footprints.

Regional Study Area: The area encompassed by Game Management Subzone 10-07. This was the study area used for early and late winter ungulate surveys.

Snow Water Equivalent: The amount of water contained in the snowpack.

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1 INTRODUCTION

BMC Minerals Ltd. (BMC) is the owner of the Kudz Ze Kayah (KZK) Project (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 Social-Economic Assessment Board.

KZK is located in southeast Yukon and within Kaska Traditional Territory. The KZK Project is a proposed open pit and underground copper, lead, zinc, gold, and silver mine located approximately 115 km southeast of Ross River, Yukon. The Project location is shown in Figure 1-1.

The Site Characterization Plan (SCP) presents a summary of baseline environmental conditions in areas that may be directly impacted by the Project, including footprint areas and environmental components. It was developed considering guidance from the Yukon Government's (YG) Plan Requirement Guidance for Quartz Mining Projects (Yukon, 2013), Guidelines for Mine Waste Management Facilities (Yukon, 2023) and Guidelines for Developing Water Quality Objectives and Effluent Quality Standards for Quartz Mining Projects (Yukon, 2021), and other applicable guidance.

The SCP presents baseline data and analyses at the level of detail needed to support risk-informed decisions regarding ongoing data collection, Project development, operation and closure, with the ultimate objective of minimizing the environmental impacts of the Project. These data and analyses are summarized in the SCP, with extensive supporting information provided in appendices.

1.1 PROJECT OVERVIEW

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. The Project area lies approximately 24 km south of Finlayson Lake and 25 km west of the Wolverine Mine, in the upper portion of the Geona Creek valley. The Project area is located at approximately 1,400 metres above sea level (masl) elevation in a broad, gently sloping valley.

The Project is in the Traditional Territory of the Kaska Nation and is the subject of a Socio-economic Participation Agreement that was signed in 2004 between Ross River Dena Council (on behalf of Kaska Nation) and Teck and which was subsequently assigned to BMC when the Project was acquired.

The Project encompasses the ABM Deposit, of which there are two zones: the ABM Zone and the Krakatoa Zone. The ABM Deposit is a polymetallic volcanogenic massive sulphide (VMS) deposit containing economic concentrations of zinc, copper, lead, silver, and gold. Mining will be conducted via both open pit and underground mining methods, with ore processed into separate copper, high precious metal (HPM), and zinc concentrates via sequential flotation through a nominal 2 million tonnes per year 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 potential for acid generation and metal leaching. Strongly

acid generating material will be co-disposed with tailings or stored in mined out areas of the open pit and underground workings. Other waste rock will be placed on the surface in managed facilities.

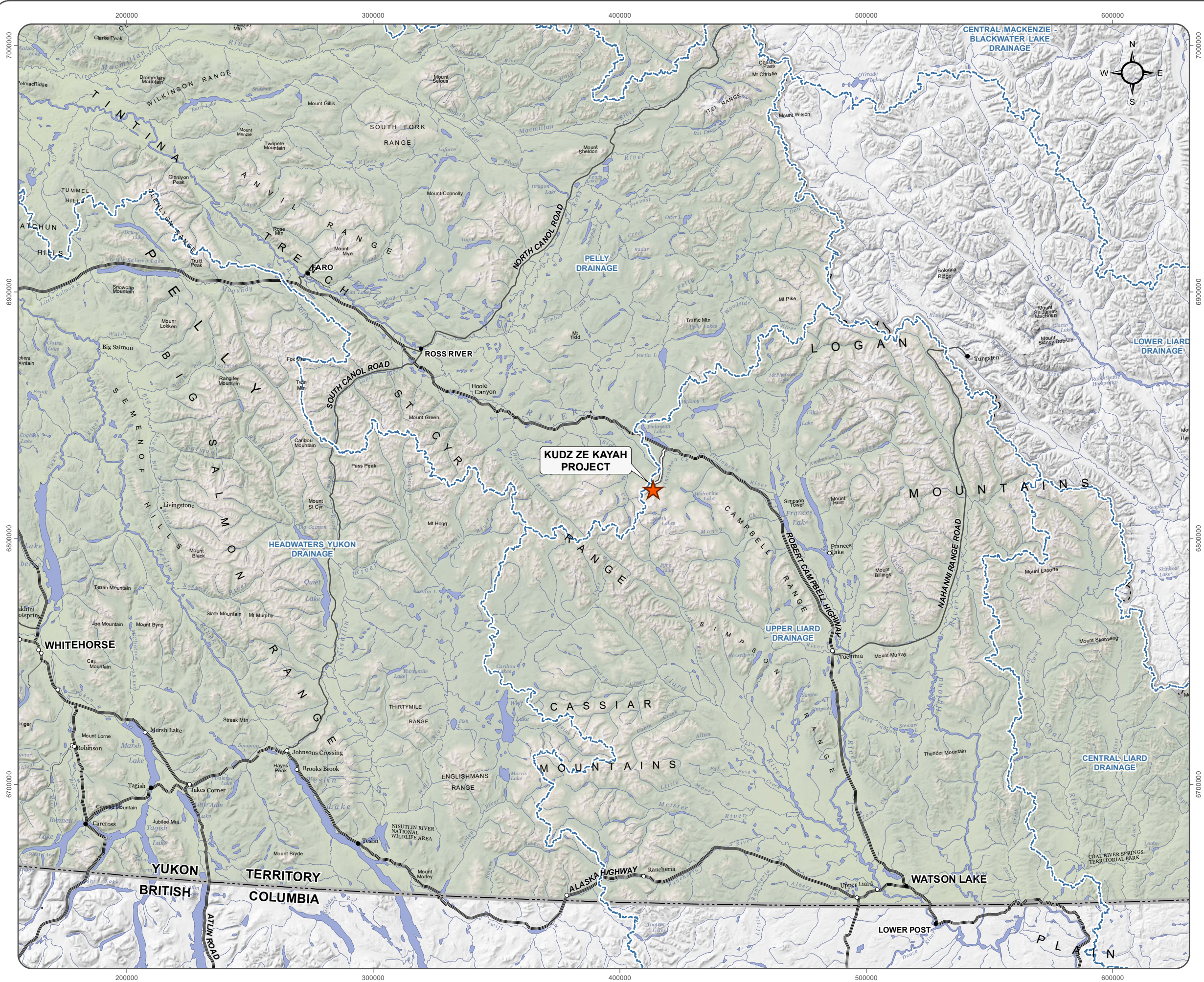
Site infrastructure includes a temporary Overburden Stockpile, two permanent waste rock storage facilities (Class B and Class C Storage Facilities), a permanent tailings and waste rock storage facility (Class A Storage Facility), water collection and water storage facilities, ore processing plant, water treatment plant, camp, laydown area, maintenance shops, and administration offices (Figure 1-2).

The Project is anticipated to operate for approximately ten years, producing approximately 205,000 tonnes (t) of zinc, 57,600 t of copper, and 49,000 t of HPM concentrates annually. Concentrate will be transported via Highway 4 (Robert Campbell Highway) to market locations.

1.2 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, prior to this Plan being finalized Dena Cho conducted a detailed independent review of the draft plan. 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.

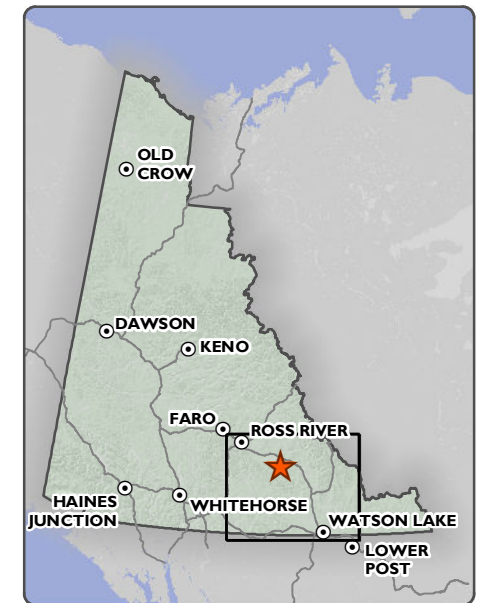
BMC and Ross River Dena Council (in its role as lead community for the Kaska Nations, including Liard First Nation) are parties to an existing Socio-Economic Participation Agreement (SEPA) for the KZK Project. In 2019, BMC and RRDC (on behalf of all Kaska Nations) signed a Letter of Intent committing 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, receiving and reviewing reports on implementation of those plans, reviewing monitoring plans/results, reviewing incident reports, and reporting back to Kaska members.



KUDZ ZE KAYAH PROJECT
SITE CHARACTERIZATION PLAN

FIGURE 1-1
PROJECT LOCATION

APRIL 2024



 KUDZ ZE KAYAH PROJECT



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.

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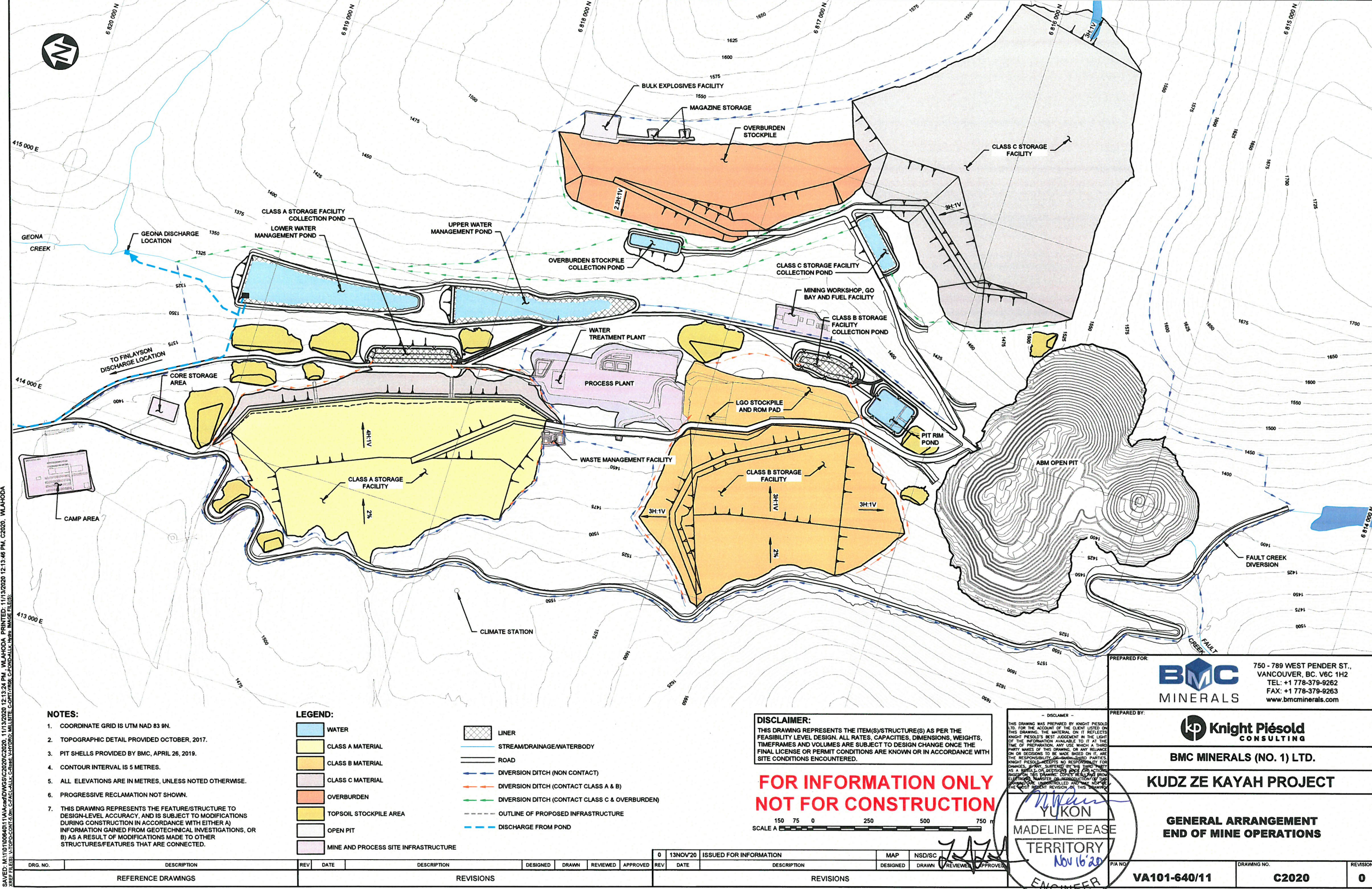
Datum: NAD 83; Projection UTM Zone 9N

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FIGURE 1-2: GENERAL ARRANGEMENT - END OF MINE OPERATIONS



2 CONCEPTUAL SITE MODEL

Conceptual site models (CSMs) for the Project have been developed to describe the predicted relationships between environmental components and potential stressors, including potential pathways for constituents of potential interest (COPIs), exposures and receptors. According to the BC Ministry of Environment and Climate Change (BC MECCS, 2018), a CSM is intended to act as a framework for:

- Determining whether all significant sources of COPIs from the Project have been considered and evaluated;
- Assessing major exposure pathways via which COPI can reach the receiving environment and potential receptors;
- Evaluating the receiving environment and using the CSM to identify receptors that may be adversely affected by COPI released from the Project; and
- Determining data collection requirements to validate and refine the CSM in relation to the completion of pathways from sources to receptors.

The Project CSMs have been developed based on information presented in the following guidance documents:

- Use of Conceptual Site Models to Support EMA Effluent Permit Applications (BC MECCS, 2018);
- Global Acid Rock Drainage Guide (INAP, 2018);
- Guidelines for Mine Waste Management Facilities, Appendix A (Yukon, 2023); and
- Guidelines for Developing Water Quality Objectives and Effluent Quality Standards for Quartz Mining Projects (Yukon, 2021).

The Project specific information used to develop the Project CSMs includes the documentation submitted during the Yukon Environmental and Socio-Economic assessment (YOR #2017-0083) and in Yukon Water use Licence (WUL) application QZ20-068, including information generated during the adequacy and public intervention phases of the Yukon Water Board (YWB) licensing process. Data sources used include baseline data, water balance model predictions, water quality model predictions, and Project engineering designs.

The CSM for Project construction, operation and closure is shown in Figure 2-1. The CSM for Project post-closure is shown in Figure 3-2. Key conclusions of these CSMs, with linkages to this Site Characterization Plan and other Project management plans, include:

- There are multiple potential sources of COPIs during all Project phases, starting during construction and extending into post-closure;
- Potential COPI receptors include land users, aquatic life and terrestrial animals and plants;

- There are multiple potential pathways from potential sources to potential receptors, via air, surface water and groundwater;
- Baseline conditions need to be characterized to understand the potential release and transport of COPIs to potential receptors as a result of the Project, including characterization of Project site geology (Chapter 3), climate and hydrology (Chapter 4), surface water (Chapter 5), groundwater (Chapter 6), vegetation (Chapter 7), wildlife (Chapter 8), aquatic resources (Chapter 9), soil and bedrock (Chapter 10), seismicity (Chapter 11) and geochemistry (Chapter 12);
- The Project has been designed and will be operated and closed to mitigate the risk of impacts to potential receptors, as detailed in the Project's management plans.
- Monitoring of potential sources, pathways and receptors is necessary to confirm that Project conditions are as expected, and to rapidly identify unexpected conditions, allowing appropriate mitigations to be developed and implemented. This process of monitoring and adaptive management is described in the Environmental Monitoring, Surveillance and Reporting Plan (BMC, 2026a) and the Adaptive Management Plan (BMC, 2026b).

This CSM should be validated and updated regularly as additional information becomes available, and will be used to support the process of environmental characterization and risk mitigation, ongoing throughout Project construction, operations and closure.

Figure 2-1: Conceptual Site Model – Project Construction, Operations and Closure

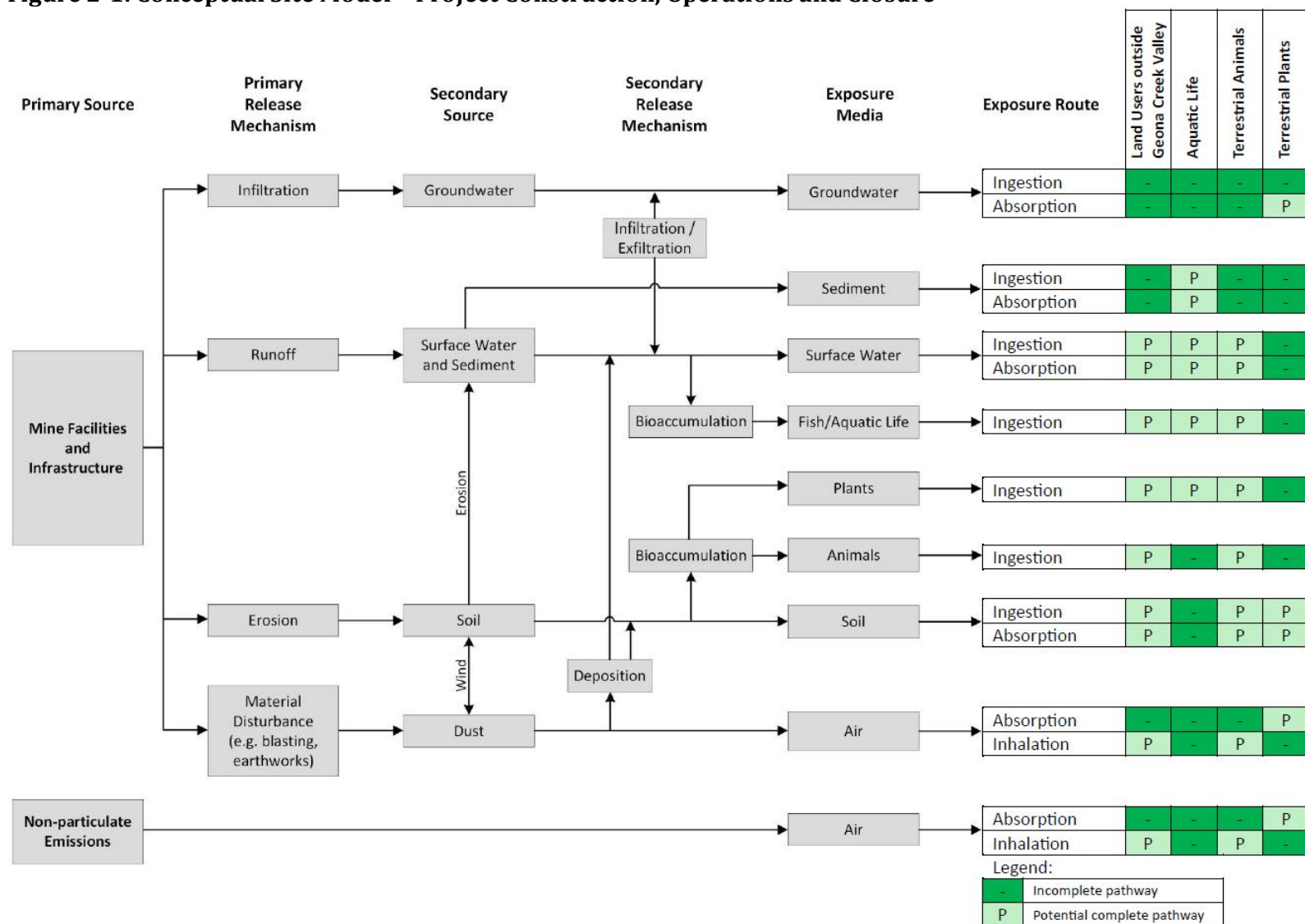
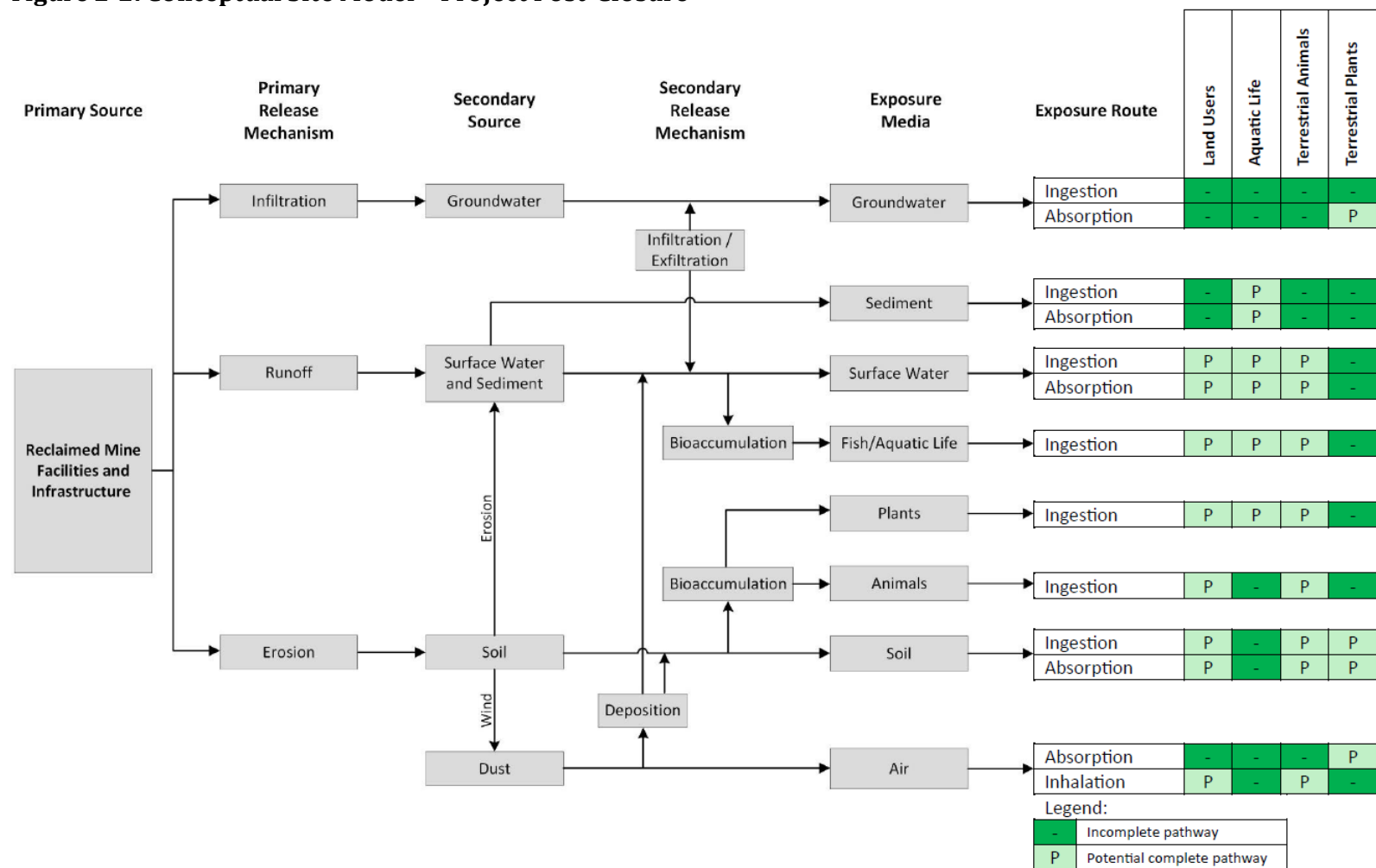


Figure 2-2: Conceptual Site Model – Project Post-Closure



3 GEOLOGY

3.1 REGIONAL GEOLOGY

The Project is located within the Finlayson Lake District, a crescent-shaped area approximately 300 km long and 50 km wide that extends from Ross River in the north to Watson Lake in the south. The Finlayson Lake District comprises Devonian to Lower Carboniferous (Mississippian) volcanic, intrusive, and sedimentary rocks assigned to the Yukon-Tanana and Slide Mountain terranes that are interpreted to be exotic terranes accreted eastward onto the ancient continental margin of North America. The combined Yukon-Tanana and Slide Mountain terranes are separated from the ancient continental strata to the northeast by the Inconnu Thrust. While more recent movement along the Tintina Fault has resulted in juxtaposition of the Finlayson Lake District against other Palaeozoic rocks with ancient North American continental margin affinities to the southwest. (Mortensen and Jilson, 1985; Plint and Gordon, 1996; Tempelman-Kluit, 1979). The Yukon-Tanana Terrane of the Finlayson Lake District is contiguous with the main part of the Yukon-Tanana Terrane, which underlies most of west central Yukon, after restoration of approximately 425 km of Late Cretaceous right-lateral, strike-slip movement along the Tintina Fault (e.g., Mortensen, 1992; Peter et al., 2007).

The Project area encompasses rocks of Devonian-Mississippian age within the Big Campbell thrust sheet, one of three thrust sheets underlying the Finlayson Lake District. The Big Campbell thrust sheet contains Pre-Late Devonian quartz-rich sedimentary rocks of the North River Formation; mafic and felsic volcanic, and carbonaceous clastic rocks of the Upper Devonian Grass Lakes Group; Late Devonian to Early Mississippian granitic rocks of the Grass Lakes plutonic suite; carbonaceous clastic and mafic and felsic volcanic rocks of the Lower Mississippian Wolverine Lake Group; and carbonaceous clastic rocks and chert of the Lower Permian Money Creek Formation (Murphy et al., 2006). The Grass Lakes Group is host to the ABM Deposit and underlies all of the claims that comprise the Kudz Ze Kayah Project.

The Grass Lakes Group comprises strongly foliated and lineated layered sedimentary and volcanic rocks positioned in a roof setting above and between bodies of Early Mississippian granitic orthogneiss and weakly foliated mid-Cretaceous granite (Murphy, 1997). The Grass Lakes Group has been subdivided into three formations which, from oldest to youngest, are the Fire Lake formation, Kudz Ze Kayah formation, and the Wind Lake formation (Peter et al., 2007). Each formation is described below:

- The Upper Devonian (circa 365 million years ago) Fire Lake formation is a mafic volcanic sequence comprising mainly chloritic phyllite with some carbonaceous phyllite and rare muscovite-quartz phyllite of probable felsic volcanic protolith. Intrusions and sills of mafic and serpentinized ultramafic plutonic rocks occur in the Fire Lake formation (Peter et al., 2007);
- Stratigraphically overlying the Fire Lake formation is the Late Devonian (circa 360 to 356 million years ago) Kudz Ze Kayah formation and dominated by what is interpreted as sequence of felsic volcanic and volcanoclastic and sedimentary rocks. It predominantly comprises feldspar-muscovite-quartz phyllite and augen phyllite of probable felsic volcanic

and volcanoclastic origin, and lesser fine-grained carbonaceous and siliciclastic sedimentary rocks (Peter et al., 2007); and

- The Wind Lake formation forms the uppermost unit of the Grass Lakes Group and comprises carbonaceous phyllite, quartzite, and chloritic phyllite of probable alkalic mafic volcanic and intrusive protolith (Peter et al., 2007).

Coeval with the Kudz Ze Kayah and Wind Lake formations are peraluminous plutonic granitoids of the Grass Lakes Suite which are interpreted as subvolcanic intrusive equivalents to the felsic volcanic host rocks of the ABM Deposit and are as old as 363 ± 3.3 million years ago (Mortensen, 1992). These rocks are deformed and were intruded by younger, late-kinematic plutonic rocks prior to deposition of the Wolverine Lake Group (Peter et al., 2007).

3.2 PROPERTY GEOLOGY

In the KZK Property, the stratigraphy trends easterly, dips moderately to the north and is interpreted as predominantly right way up except locally where it may be overturned in tight, mesoscale F2 folds. The rocks are generally overprinted by greenschist facies metamorphism and a penetrative deformation fabric. The property has been crosscut by north to northeast-trending brittle faults (e.g. Fault Creek and East Creek faults) which cut across all stratigraphic units.

The major components of Grass Lakes group stratigraphy on the KZK Property (Figure 3-1) include, from stratigraphic base to top:

1. Fire Lake formation: comprising mafic flows and ultramafic intrusions;
2. Kudz Ze Kayah formation: comprising;
 - a. A lower sedimentary component of the Kudz Ze Kayah formation; and
 - b. An upper felsic volcanic component, which is host to the volcanic hosted massive sulphide mineralization.
3. Wind Lake formation: equivalent to “*upper sedimentary and mafic volcanic sequence*” of MacRobbie and Holroyd (2000), and DMm and DMcp units of Murphy et al. (2001).

In the property, the lower sedimentary component of the Kudz Ze Kayah formation primarily comprises siltstone, phyllitic schist, light grey quartzite, and massive tuffaceous wacke, with minor mudstone, carbonaceous mudstone, and felsic tuff, all of which are interfingered with feldspar porphyry intrusions.

The felsic volcanic component of the upper Kudz Ze Kayah formation has, on the basis of relict primary textures, been broadly subdivided into units comprising felsic volcanoclastic rocks, coherent felsic flows and intrusive rocks, and aphanitic to feldspar-quartz porphyritic intrusive rocks. A relatively minor component of mafic intrusive rocks and mudstone is also present. Mafic intrusions are present in the Kudz Ze Kayah formation, the best example of which is a large mafic sill in the footwall of the ABM Deposit and comprising strongly foliated porphyroblastic amphibole-chlorite-biotite-calcite schist.

The base of the Wind Lake formation lies approximately 200 m stratigraphically above the ABM Deposit and the Wind Lake formation underlies the majority of the northern half of the KZK Property. The formation comprises carbonaceous and calcareous mudstone intercalated with mafic volcanic rocks along with minor quartzite, siltstone, chert, and felsic volcanic rocks.

Recent preliminary high-precision uranium-lead zircon dates (Manor et al., 2018) taken from the hangingwall of the ABM Deposit provide an upper limit to the age of mineralization and felsic volcanism in the Kudz Ze Kayah formation to circa 362.8 million years ago. The transition from felsic volcanism in the Kudz Ze Kayah formation to alkalic mafic volcanism in the Wind Lake formation is similarly constrained to circa 362.4 million years ago (Manor et al., 2018).

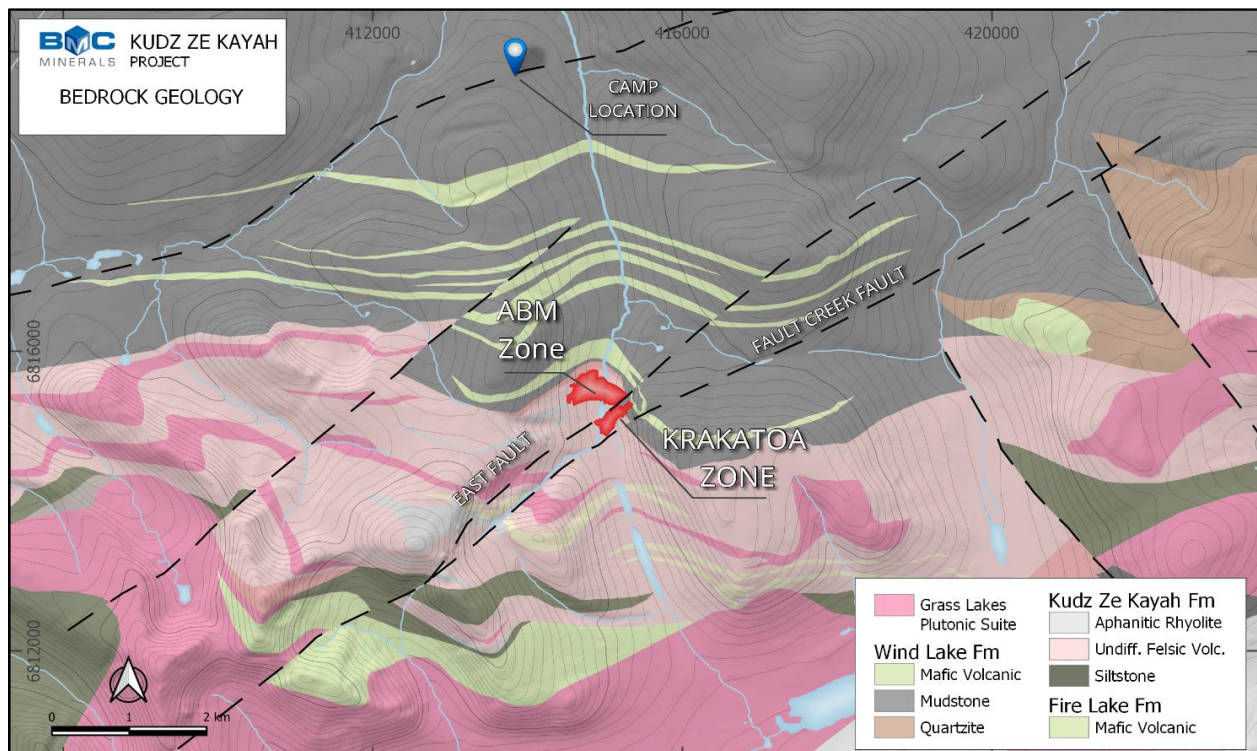


Figure 3-1: Property-scale Bedrock Geology Map

3.3 DEPOSIT GEOLOGY

All known massive sulphide mineralization on the KZK Property occurs in the Kudz Ze Kayah formation, albeit at what appear to be different stratigraphic levels.

The ABM Deposit (comprising the ABM Zone and Krakatoa Zone) consists predominantly of continuous, shallow-dipping massive sulphide mineralization hosted in a thick felsic package of volcanoclastic rocks and coherent sill/flow complex that locally make up the Kudz Ze Kayah formation (Figure 3-2).

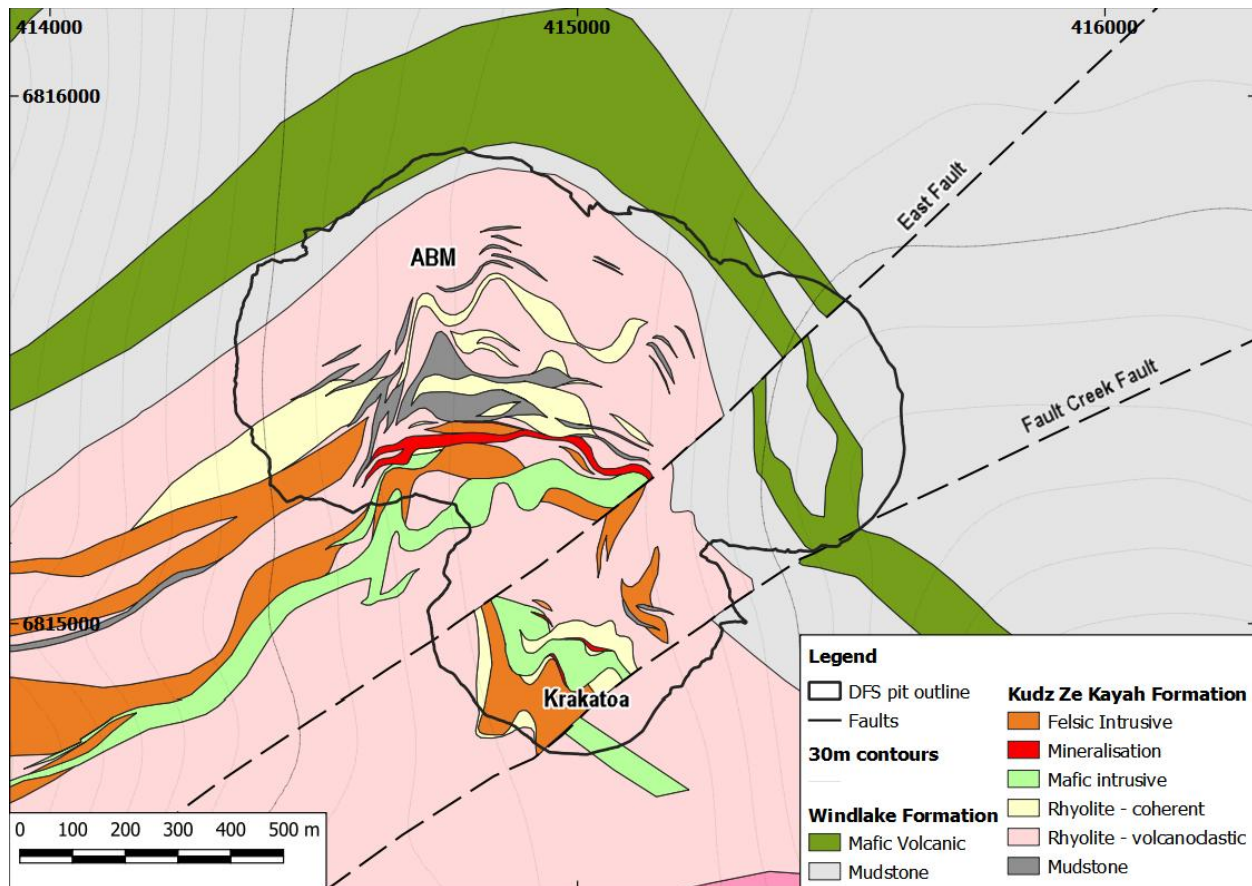


Figure 3-2: Detailed Geological Map of the Kudz Ze Kayah Deposit Area

Massive sulphide of the ABM Zone is hosted in a felsic rock package, whereas the Krakatoa Zone is predominantly hosted by a pre-mineralization mafic sill located in the felsic volcanic package. Mineralization at Krakatoa also occurs in the felsic hangingwall units stratigraphically overlying the mafic sill, in what is broadly interpreted to be the equivalent of the ABM mineralized position. Only scattered vein-style and disseminated mineralization occurs in the mafic sill lying stratigraphically below the ABM Zone.

The upper limits of the ABM and Krakatoa Zones are truncated near surface and overlain by glaciofluvial sediments. The massive sulphide mineralization at ABM occurs under approximately 2 to 20 m of glaciofluvial overburden and is up to approximately 39 m in true thickness, whereas the Krakatoa Zone occurs under approximately 30 m of glaciofluvial overburden and is up to approximately 22 m in true thickness.

A post-mineralization brittle fault zone (East Fault) offsets the ABM and Krakatoa zones, and angular clasts of sulphide are to be found in the fault zone breccias (Figure 3-3). The southeastern margin of Krakatoa is cut by another late brittle fault zone of the same generation (Fault Creek Fault).

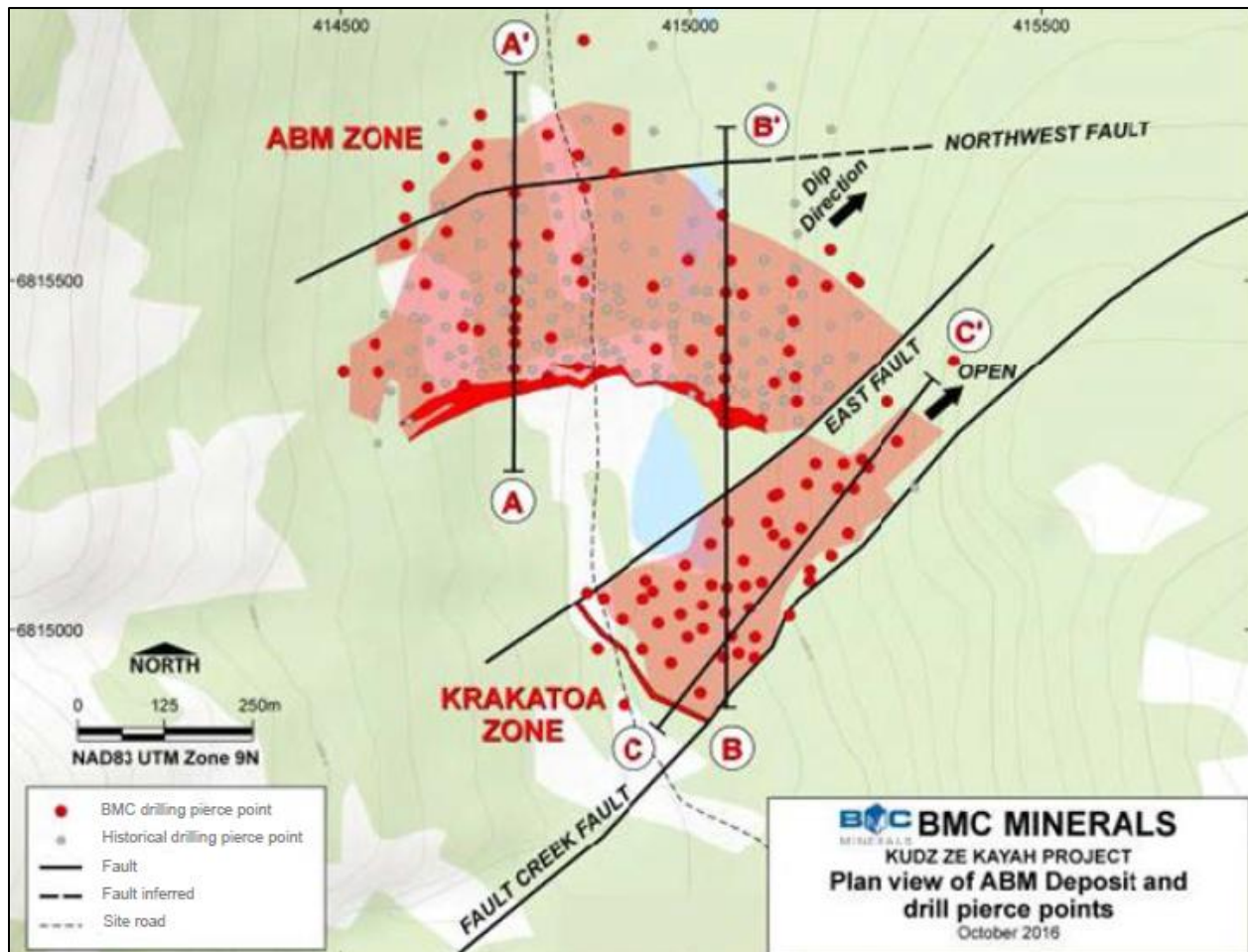


Figure 3-3: Plan View of ABM Deposit Showing Both ABM and Krakatoa Zones

3.4 MINERALIZATION

3.4.1 ABM Zone

Massive sulphide of the ABM Zone (Figure 3-4) is up to 39 m true thickness, extending approximately 700 m along strike and approximately 500 m down dip. It dips to the north-northeast at approximately 35° near surface, transitioning to a dip of approximately 15° at around 200 m depth below the valley floor. The up-dip extent of the deposit is truncated by erosion and covered by approximately 2 to 20 m of glaciofluvial overburden.

Mineralization of the ABM Zone occurs as several stacked massive sulphide lenses to the west, transitioning to a single massive horizon at around 415,025 m E and extending to approximately 415,250 m E where it is then truncated by the post-mineralization East Fault. Stockwork and disseminated mineralization occurs equally both in the hangingwall and footwall to massive sulphide, and to a lesser degree between massive sulphide lenses.

Sulphide mineralization is dominated by pyrite, sphalerite, pyrrhotite (+ marcasite), galena and chalcopyrite, with minor arsenopyrite and a range of sulphosalts predominantly comprising tennantite-tetrahedrite and freibergite. Both the up-dip part of ABM Zone and most of Krakatoa Zone have elevated sulphosalt content relative to the remainder of the ABM Deposit.

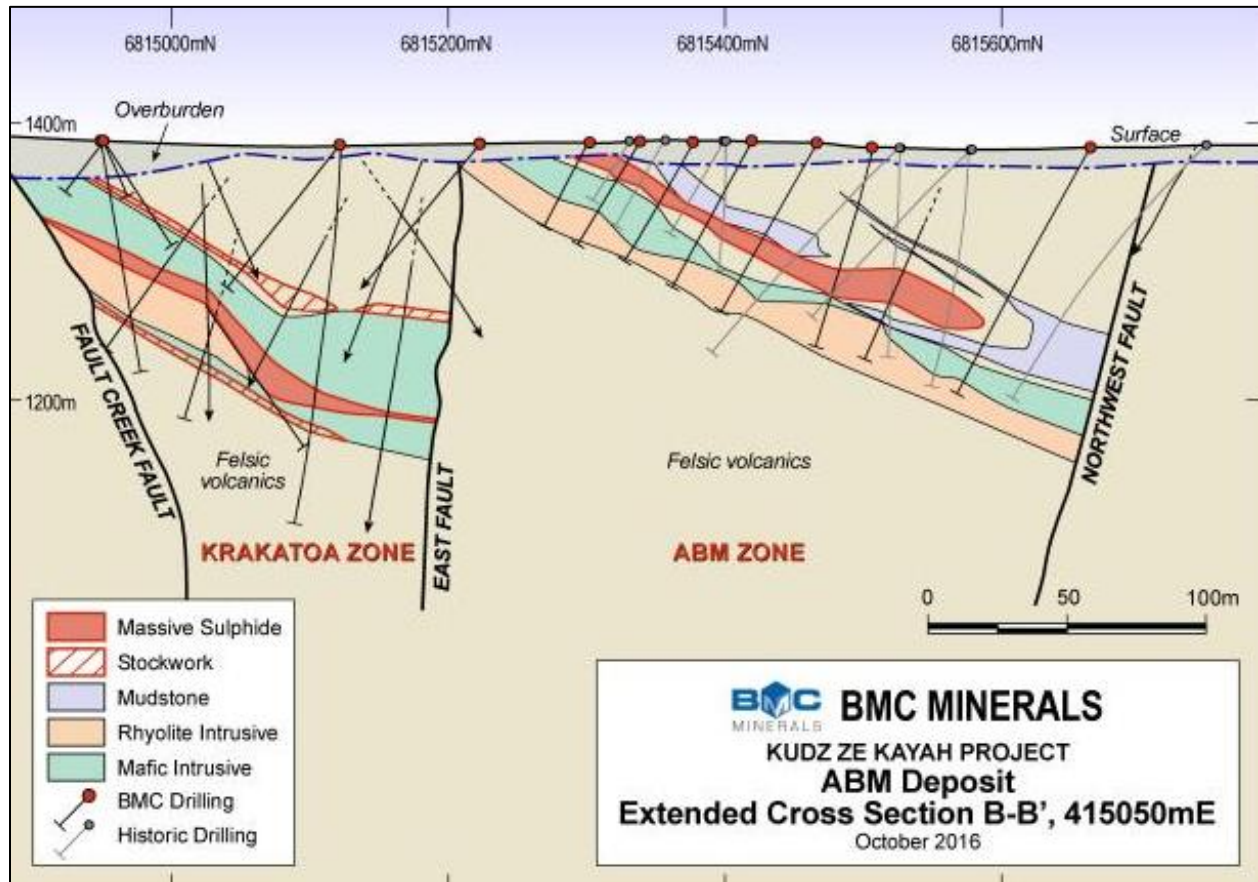


Figure 3-4: Schematic Cross-Section View Looking West Through Both the ABM and Krakatoa Zones Showing their Spatial Relationship

Note: refer to Figure 3-3 for section location

3.4.2 Krakatoa Zone

Krakatoa Zone mineralization, bound to the west by the East Fault and to the east by the Fault Creek Fault, is hosted in Kudz Ze Kayah formation that dips at 35° to the north-northeast. Although of lesser spatial extent, the distribution of mineralization in the Krakatoa Zone is more spatially complex than the ABM Zone due to the stacked mineralized lens system. Massive sulphide mineralization occurs in three principal mineralized horizons:

1. The “*Upper lens*”, broadly interpreted as the stratigraphic equivalent to the ABM lens;
2. The “*Main lens*”, the major component of Krakatoa Zone in terms of sulphide mineralization with a true thickness up to 22 m; and
3. A less pronounced and semi-continuous “*Lower lens*”.

Krakatoa Zone mineralization is broadly concordant with stratigraphic layering of the host rocks, extends over approximately 200 m of strike and at least 500 m down dip, and the up-dip extent is covered by glacial overburden of 20 to 30 m thickness.

Host rock types and alteration styles associated with Krakatoa Zone mineralization are for the most part similar to those encountered in the ABM Zone. The key difference is the degree of mineralization associated with the mafic sill, which below ABM Zone is only poorly mineralized. The Main lens comprises the bulk of mineralization at Krakatoa, with massive sulphide occurring both within the felsic volcanics immediately beneath the mafic sill, and within the mafic sill itself.

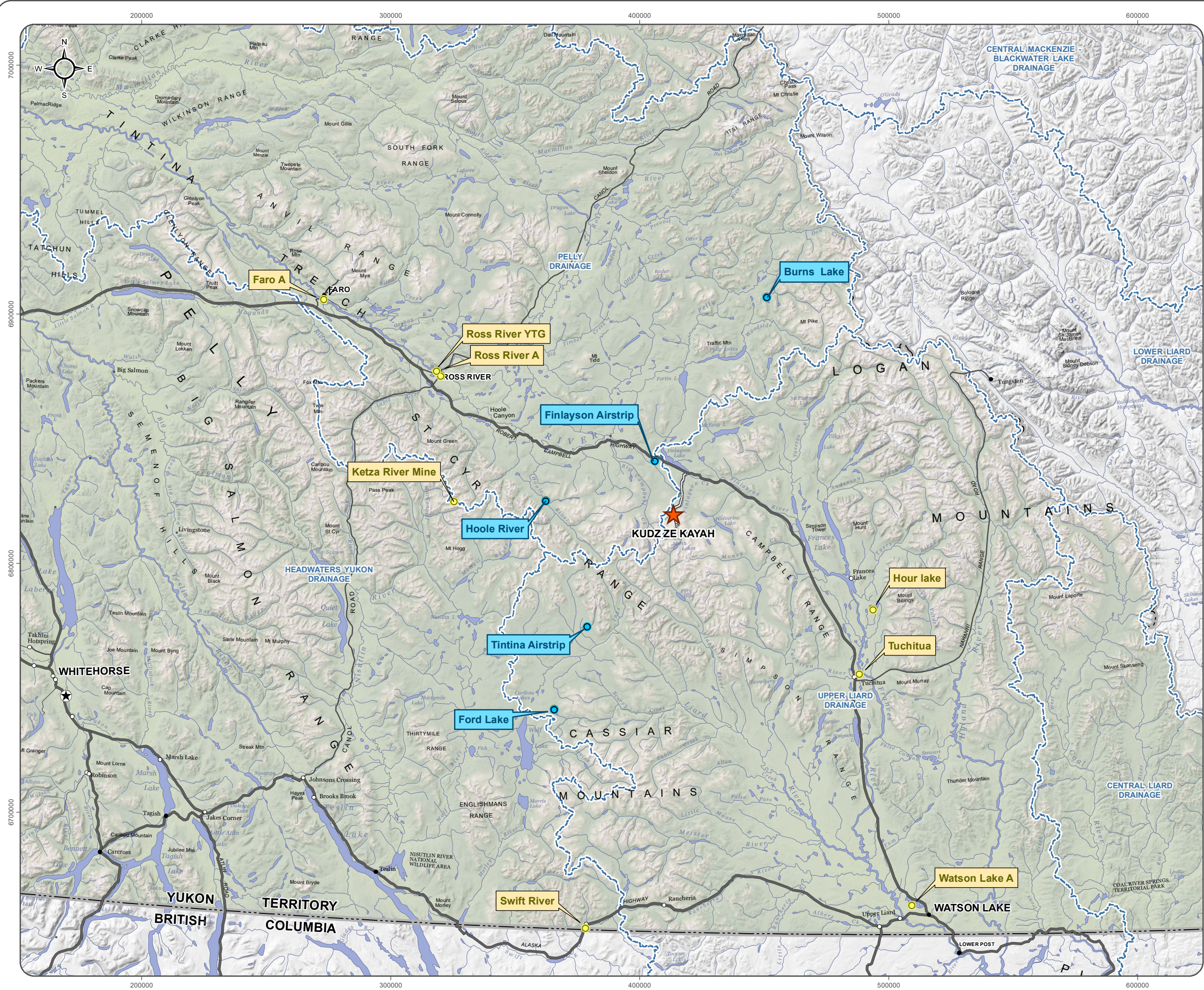
4 CLIMATE AND HYDROLOGY

The Project lies in the 26 km² Geona Creek watershed, a north flowing and north facing tributary to Finlayson Creek. Finlayson Creek meets the outflow of Finlayson Lake below the Robert Campbell Highway and flows east to eventually join the Frances River and ultimately the Mackenzie River. One of the highest elevation tributaries in the Geona Creek watershed, named Fault Creek, has a median elevation of 1,707 masl and an area of 2 km². Fault Creek is characterized by steep slopes and small trees and shrubs in the creek valley but otherwise is an alpine environment. Geona Creek has a median elevation of 1,482 masl and spans from the alpine environment to some sparsely forested areas at lower elevations. The Finlayson Creek catchment area is approximately 41 km² above the confluence with Geona Creek, increasing to 215 km² at the point where it flows under the Robert Campbell Highway to join the outflow of Finlayson Lake. The watershed divide of Geona Creek is characterized by several small lakes.

The hydrometeorological character of the Project is described using regional data available through Environment and Climate Change Canada and Environment Yukon (Figure 4-1) and data collected at the Project site in 1995 and from 2015 to April 2025 (Figure 4-2). Two meteorological stations were established at the Project site during 1995, one high and one low elevation station. A Campbell Scientific meteorological station was also installed and commissioned at the Project site on August 25, 2015, for the measurement of air temperature, relative humidity, wind speed and direction, barometric pressure, solar radiation, and total precipitation. An evaporation pan was also installed, and daily manual measurements were taken during the open water seasons of 2016 and 2017. In June 2018, the evaporation pan had an automation system installed. Manual snow surveys were conducted in 1995. Snow surveys were conducted on a monthly basis (January, February, March, and April) from 2016 to 2020, and on an annual basis (March) since 2021.

Hydrometric data were collected on site in 1995. Seven continuous monitoring stations were installed in May 2015 and discrete monthly discharge data were gathered to facilitate the development of a continuous record. The current monitoring network consists of 12 active stations (one station was discontinued in March 2017). Hydrometric stations were designed to conform with British Columbia standard criteria for the collection of Grade A data (or Grade B when channel conditions prevent Grade A) (RISC, 2018).

This section presents a summary of Project climate including temperature, rainfall, snowfall, snow accumulation, evaporation and other parameters required to support water balance modeling. Additional hydrometeorology details are presented in Appendix A, with analyses provided in Appendix B and Appendix C, including climate modelling and the resulting long-term synthetic climate string used to support Project design.

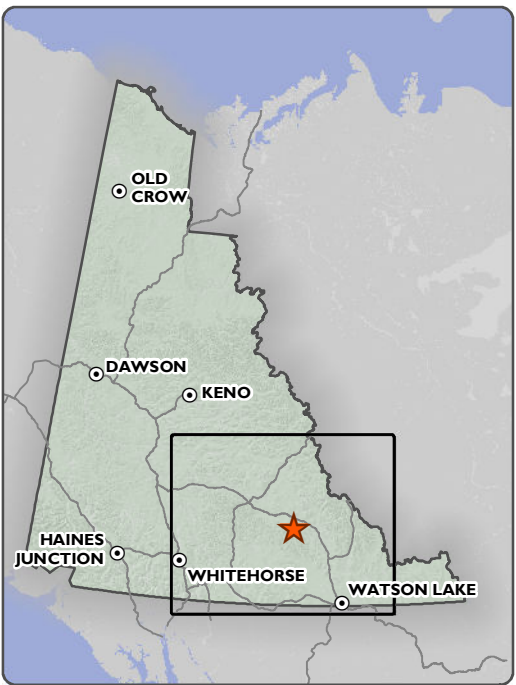


KUDZ ZE KAYAH PROJECT
SITE CHARACTERIZATION PLAN

FIGURE 4-1

REGIONAL METEOROLOGICAL AND
SNOW MONITORING STATIONS

APRIL 2024



- ★ Kudz Ze Kayah Project
- Meteorological and Snow Monitoring Station
- Snow Monitoring Station

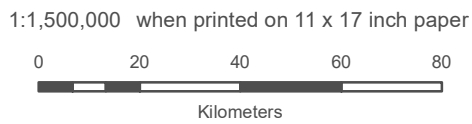


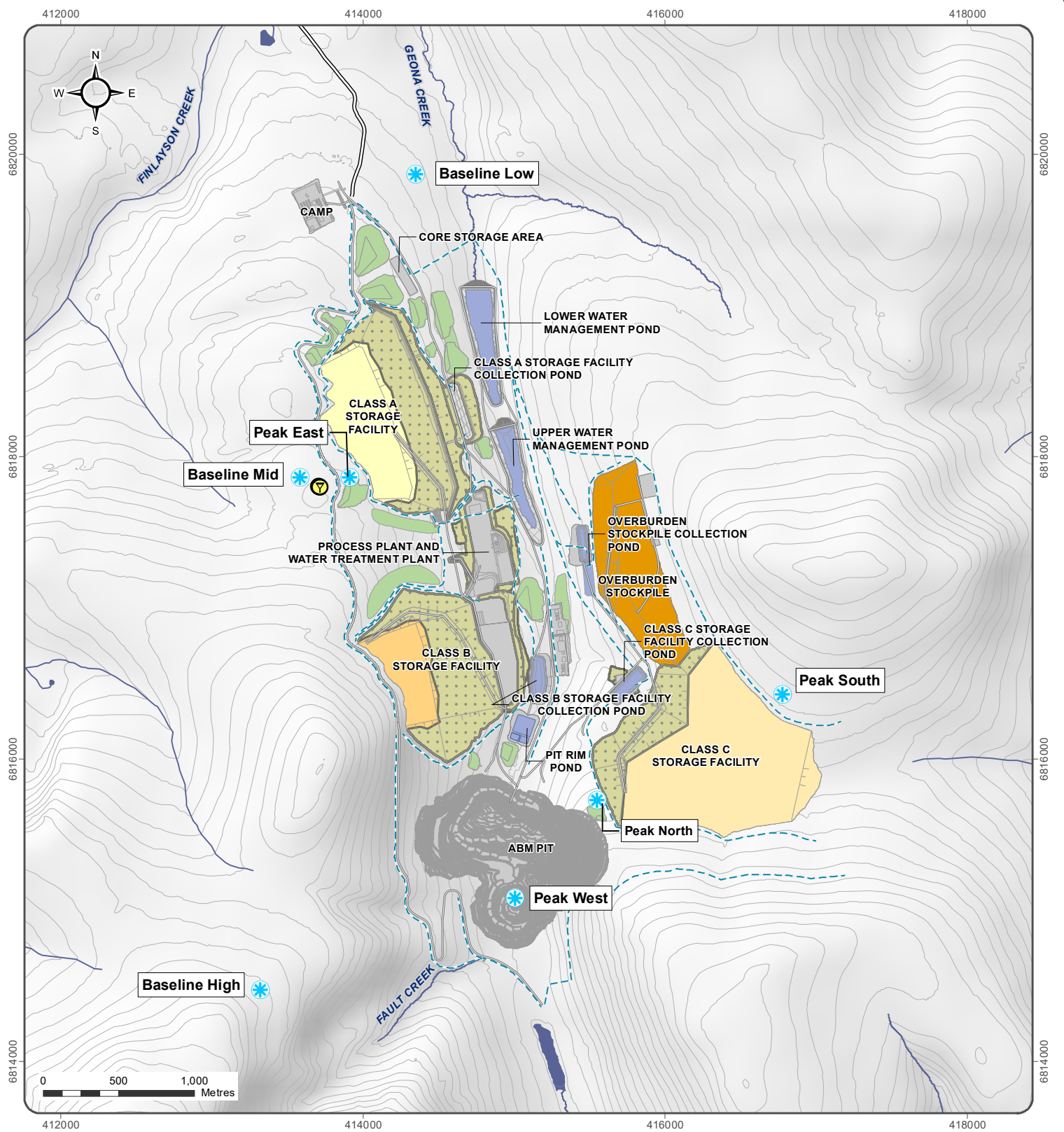
Digital elevation model created by the Yukon Department of the Environment interpolated from the digital 1:50,000 Canadian National Topographic Database (NTDB Edition 2) contour and watercourse layers. Obtained from Geomatics Yukon.

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Datum: NAD 83; Projection UTM Zone 9N

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- | | | |
|--------------------------------|--------------------------------|--------------------------------|
| Current Meteorological Station | Class A Storage Facility | Diversion Ditch |
| Snow Survey Station | Class B and C Storage Facility | Tote Road/Proposed Access Road |
| | Overburden Stockpile | Proposed Road |
| | Topsoil Stockpile | |
| | Progressive Reclamation | |
| | Pond/Water | |

KUDZE KAYAH PROJECT SITE CHARACTERIZATION PLAN

FIGURE 4-2

PROJECT SITE METEOROLOGICAL AND SNOW SURVEY STATIONS

APRIL 2024

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D:\Project\AllProjects\Kudze_Kayah\Map 6.01_Overview\03-Specific Topics\Monitoring\Snow_Monitoring\Snow_Survey_Weather_Location_20230311.mxd

4.1 TEMPERATURE

4.1.1 Regional Data

Regional climate stations proximate to the Project area are shown in Figure 4-1. Extreme and average air temperature minima and maxima, and monthly and annual mean temperatures were calculated for the entire period of record for each station. Mean annual temperatures range from -4.7°C at Ross River to -2.0°C at Faro, and extreme annual temperatures range from -59.4°C at Ross River in December to 35.4°C at Watson Lake in July.

4.1.2 Site Data

Monthly average minimum, maximum, mean and extreme temperatures were compiled from the hourly data collected at the Project's Campbell Scientific station since time of commissioning (September 2015). The mean annual temperature for 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023 and 2024 was -0.8°C, -2.6°C, -2.3°C, -1.5°C, -3.6°C, -3.4°C, -1.9°C, -1.3°C and -2.1°C, respectively.

4.2 PRECIPITATION

4.2.1 Regional Data

Mean annual precipitation at regional stations ranged from 210 mm at Ross River to 710 mm at Ketza River Mine. The proportion of total annual precipitation falling as rain ranged from 39% at Ketza River Mine to 70% at Ross River and Faro. The greatest amount of precipitation generally falls between June and September for all regional stations. Long-term records do not show clear changes in total precipitation over time; however, the proportion of total precipitation falling as rain shows an increasing trend at all stations, consistent with the rising trend observed in air temperature.

4.2.2 Site Data

Monthly total precipitation has been measured at the Project site since installation of the Project climate station in 2015. Based on interpolated regional and site data, mean annual precipitation at the Project site is estimated to be 520 mm (Appendix A).

4.2.3 Extreme Data

A detailed analysis of extreme precipitation estimates, including annual extremes, are presented in Appendix A. The analysis of extreme precipitation was used in part to support engineering design for water management infrastructure.

4.3 SNOW PACK

4.3.1 Regional Data

Environment Yukon conducts regular snow surveys across the territory, on or around March 1, April 1, and May 1 of each year (Appendix A). Overall, the regional station snow water equivalent (SWE) average is found to be higher than the average at the KZK site.

4.3.2 Site Data

The 2016 to 2025 Project snow surveys indicate that snowpack is highly variable across the site and between years as a result of variable climatic conditions and windblown accumulation. In March snow surveys between 2016 and 2025, SWE has ranged from 14 mm to 264 mm, with average at individual survey locations ranging from 58 mm to 147 mm and average across the site ranging from 49 mm to 159 mm.

4.4 WIND SPEED AND DIRECTION

Wind speed and direction are measured at a height of 10 m at the site meteorological station. Wind data collected from September 2015 to April 2025 show that prevailing winds are from the southwest to northeast direction and that the highest average wind speeds are from the southwest. From 2015 to 2020 the meteorological station was programmed with an ambiguous code which did not specify how wind data was recorded; as a result, hydrometeorological reports from this period misinterpreted the prevailing wind direction. In 2021 the coding was clarified, and prevailing wind direction from the south southwest was verified during a site visit. Average monthly windspeeds from 2015 to 2025 range from 4.3 m/s to 5.8 m/s, with maximum monthly windspeeds ranging from 20.0 m/s to 35.5 m/s.

4.5 RELATIVE HUMIDITY

Monthly minimum, maximum and mean relative humidity values have been compiled from hourly data collected at the site meteorological station since commissioning in 2015. The average annual relative humidity is 68.8%.

4.6 BAROMETRIC PRESSURE

Barometric pressure is corrected to sea-level equivalent within the site meteorological station datalogger program. Monthly averages were compiled from hourly data collected at the site meteorological station since commissioning. A seasonal pattern emerges with the lowest average values in late fall (November to December) and the highest in summer (July to August).

4.7 SOLAR RADIATION

Solar radiation measured at the low elevation station during the summer of 1995 was on average higher than the monthly averages measured over the same months from 2016 to 2025. The higher values in 1995 may be the result of a different instrumentation and/or a higher frequency of overcast skies from 2016 to 2025. The highest solar radiation values are measured in June, and the lowest in December which correlate to the Earth's rotation and tilt.

4.8 EVAPORATION AND EVAPOTRANSPIRATION

Regional and site evaporation data are summarized in Appendix A. Potential evapotranspiration (PET) is calculated from climate station data at the site. Climate normal values for Watson Lake A (1981 to 2010), as provided by Environment and Climate Change Canada (ECCC, 2016), indicate a mean annual lake evaporation of approximately 345 mm occurring from June to September. This value is similar to PET estimates for the Project from June to September, based on data collected in 1995 and from 2016 to 2024. Total PET in those months from 2016 to 2024 ranged from 293 mm to 478 mm.

Actual evapotranspiration is a fraction of PET and occurs predominantly between May and September, the growing season. Actual evapotranspiration has been estimated by applying a factor of 0.5 to the growing season PET values. Applying a factor of 0.5 to these PET values provides an actual evapotranspiration estimate at the Project site of approximately 250 mm per year.

5 SURFACE WATER

5.1 SURFACE WATER HYDROLOGY

5.1.1 Baseline Summary

A detailed summary of baseline surface water hydrology for the Project area is included in Appendix A. Additional analysis of baseline data is included in Appendix B and Appendix C, including the watershed analysis and resulting flow parameters used to support Project design.

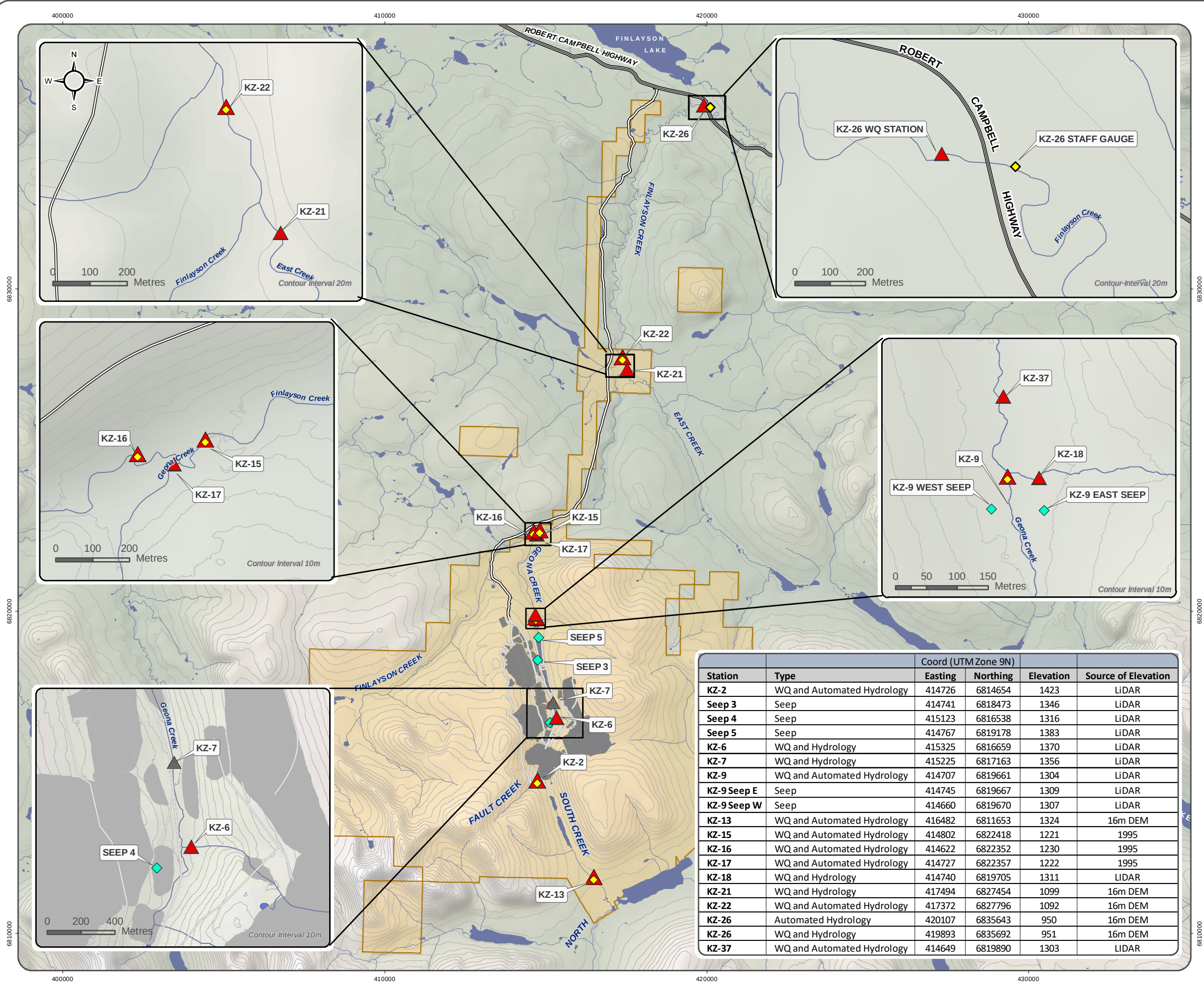
Data collected in 1996 and from 2015 to 2025 have been used to characterize the baseline hydrology of the Project area. The existing hydrometric monitoring network builds on the 1995 network in both spatial and temporal coverage. There are twelve hydrology stations that have been operating in the Project study area since 2015, including seven continuous stations and five discrete stations. Figure 5-1 shows the hydrometric monitoring locations.

Table 5-1 summarizes hydrological details for the seven continuous stations at South Creek (KZ-13), Fault Creek (KZ-2), Geona Creek below the Project infrastructure (KZ-9), Geona Creek below the confluence with the tributary below KZ-9 (KZ-37), Geona Creek above the confluence (KZ-17), Finlayson Creek below the confluence with Geona Creek (KZ-15), and Finlayson Creek at the Robert Campbell Highway (KZ-26).

Table 5-1: Summary of Hydrological Details for Continuous Monitoring Stations

Parameter	Monitoring Station						
	KZ-13	KZ-2	KZ-9	KZ-37	KZ-17	KZ-15	KZ-26
Catchment Area (km ²)	7.9	1.9	16.4	22.0	25.7	60.8	210.7
Mean annual runoff (mm)	297	517	265	261	253	254	179
Mean annual flow (m ³ /s)	0.08	0.04	0.14	0.19	0.20	0.49	1.20
Mean Monthly Flow – Annual Minimum (m ³ /s)	0.009	0.003	0.025	0.032	0.035	0.072	0.28
Mean Monthly Flow – Annual Maximum (m ³ /s)	0.18	0.17	0.45	0.57	0.63	1.34	3.23

Flow in Geona Creek and Finlayson Creek is typically characterized by high spring snowmelt-driven flows, mid to low summer flows sustained by groundwater inflows and periodic rainfall events, mid to high fall flows due to larger rainfall events, and very low winter flows due to freezing and the gradual depletion of groundwater storage.



Station	Type	Coord (UTM Zone 9N)		Elevation	Source of Elevation
		Easting	Northing		
KZ-2	WQ and Automated Hydrology	414726	6814654	1423	LiDAR
Seep 3	Seep	414741	6818473	1346	LiDAR
Seep 4	Seep	415123	6816538	1316	LiDAR
Seep 5	Seep	414767	6819178	1383	LiDAR
KZ-6	WQ and Hydrology	415325	6816659	1370	LiDAR
KZ-7	WQ and Hydrology	415225	6817163	1356	LiDAR
KZ-9	WQ and Automated Hydrology	414707	6819661	1304	LiDAR
KZ-9 Seep E	Seep	414745	6819667	1309	LiDAR
KZ-9 Seep W	Seep	414660	6819670	1307	LiDAR
KZ-13	WQ and Automated Hydrology	416482	6811653	1324	16m DEM
KZ-15	WQ and Automated Hydrology	414802	6822418	1221	1995
KZ-16	WQ and Automated Hydrology	414622	6822352	1230	1995
KZ-17	WQ and Automated Hydrology	414727	6822357	1222	1995
KZ-18	WQ and Hydrology	414740	6819705	1311	LiDAR
KZ-21	WQ and Hydrology	417494	6827454	1099	16m DEM
KZ-22	WQ and Automated Hydrology	417372	6827796	1092	16m DEM
KZ-26	Automated Hydrology	420107	6835643	950	16m DEM
KZ-26	WQ and Hydrology	419893	6835692	951	16m DEM
KZ-37	WQ and Automated Hydrology	414649	6819890	1303	LiDAR



KUDZ ZE KAYAH PROJECT
SITE CHARACTERIZATION PLAN

FIGURE 5-1

SURFACE WATER MONITORING
STATIONS

APRIL 2024

- Hydrometric Station
- Water Quality and Continuous Flow Measurement Station
- Water Quality Sampling Station
- Discontinued Water Quality Sampling Location
- Seep
- Tote Road/Proposed Access Road
- Proposed Road
- Contour (40 m interval)
- Watercourse
- Waterbody
- Location of Proposed Infrastructure
- BMC Minerals Ltd. Mineral Claim Areas



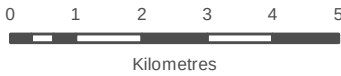
Digital elevation model created by the Yukon Department of the Environment interpolated from the digital 1:50,000 Canadian National Topographic Database (NTDB Edition 2) contour and watercourse layers. Obtained from Geomatics Yukon.

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Datum: NAD 83; Projection UTM Zone 9N

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5.1.2 Summary of Hydrology Analysis

Water Survey Canada (WSC) stations provide long-term datasets in the Project region and are an important data source for estimating longer term statistics for aspects such as high and low hydrological flows. The Initial Environmental Evaluation (Cominco, 1996) (IEE) included a regional analysis of 16 WSC stations and two Indigenous and Northern Affairs Canada (formerly Department of Indian Affairs and Northern Development) stations with seasonal records. For the purpose of assessment, it was determined that the regional stations would need to have at least 10 years of data to be included. Of the 16 WSC stations, 13 had the required 10 years of data to be used in the regional flood frequency analysis.

Project flood estimates were developed by preparing an envelope curve for estimating peak discharges for 2, 5, 10, 20, 50, and 100-year return period floods. To validate the regional model for the Project site, peak flows were calculated for recent, proximal WSC station data. The envelope curve, with an additional 15% climate change adjustment factor as recommended by Engineers and Geoscientists, British Columbia (EGBC, 2018), was used to develop design flood estimates for watersheds in the Project area larger than approximately 10 km². For smaller watersheds, rainfall-runoff modelling was used to predict peak flows. Detailed analysis of the hydrology data is included in Appendix B and Appendix C.

5.2 SURFACE WATER QUALITY

Baseline surface water quality data from the Project area are presented in Appendix D.

Baseline studies for surface water quality were undertaken in 1994 and 1995 by Cominco in support of the IEE. Subsequent biennial water quality monitoring was conducted as part of Water Licence QZ16-085-3 (formerly QZ97-026-01, expired September 2018) requirements and for baseline study purposes between 2002 and 2025. The site-wide surface water quality monitoring program was redesigned and recommenced in April 2015, comprising 12 stations sampled on a monthly basis (Table 5-2 and Figure 5-1). The stations are located on South Creek, Fault Creek, Geona Creek, Finlayson Creek, and East Creek. An additional higher frequency sampling program, comprising five samples over 30 days at the majority of monitoring stations during the periods May to June 2017, February to March 2018, May to June 2018, and May to June 2019 were undertaken to assess variance during both freshet and low flow winter conditions. Seeps were also sampled between June 2015 and October 2016 to evaluate their contribution to stream water quality (Table 5-2).

Surface water samples were analyzed for general chemical characteristics, total and dissolved metals, and nutrients in accordance with *Standard Methods for Examination of Water and Wastewater* (Rice et al., 2012).

Table 5-2: Surface Water Quality Monitoring Locations

Station	Description
KZ-26	Finlayson Creek at Robert Campbell Highway.
KZ-22	Finlayson Creek 100 m downstream of East Creek.
KZ-21	East Creek at mouth, 100 m upstream from confluence with Geona Creek.
KZ-16	Finlayson Creek immediately upstream of confluence with Geona Creek (reference station).
KZ-15	Finlayson Creek 100 m downstream of confluence with Geona Creek.
KZ-17	Geona Creek at mouth, 40 m above confluence with Finlayson Creek. A new sampling station was re-established as close as possible to the original KZ-17 station. The original station is currently flooded by a beaver dam constructed since 2008.
KZ-6	Tributary to Geona Creek where proposed Class C Storage Facility will be located.
KZ-7	Upper Geona Creek near ABM open pit.
KZ-9	Geona Creek downstream of Lower Water Management Pond discharge location.
KZ-18	East tributary to Geona Creek.
KZ-37	Geona Creek downstream of unnamed East tributary (KZ-18).
KZ-2	Fault Creek (reference station).
KZ-13	South Creek near mouth.
<i>Seeps</i>	
KZ-9 Seep East	Seep approximately 50 m east of Geona Creek at KZ-9.
KZ-9 Seep West	Seep approximately 50 m west of Geona Creek at KZ-9.
Seep 3	20 m wide seep located on west side of Geona Creek downstream of KZ-7.
Seep 4	Wide seep network located on west side of Geona Creek upstream of KZ-7.
Seep 5	Seep coming inside side channel of Geona Creek upstream of KZ-9.

5.2.1 General Chemistry

Creeks that drain the Project area were found to be circumneutral to alkaline (pH range 6.42 to 8.71; median 7.66) with hardness ranging from moderately hard (Fault Creek and South Creek), to hard (Geona Creek) and very hard (Finlayson Creek and East Creek). Water quality parameters which exceeded guideline values at over 5% of all samples at any surface water station were dissolved oxygen, fluoride, total arsenic, iron, and selenium, and dissolved cadmium, copper, and zinc.

Monitoring of seeps in the upper watershed indicated they may play a small role in slightly lowering the pH and raising the total iron content of waters in Geona Creek at KZ-9 due to inputs from the mildly acidic, ferruginous waters of Seep 5 and the KZ-9 East Seep.

East Creek displayed the highest median conductivity (448 $\mu\text{S}/\text{cm}$) in the Project area, and South Creek the lowest median conductivity (156 $\mu\text{S}/\text{cm}$). Similar to conductivity, hardness was lowest in South Creek (median 77 mg/L), and highest in East Creek (median 253 mg/L). Hardness in Finlayson

Creek increased progressively downstream, interpreted to be the result of contributions from the harder waters of Geona Creek, East Creek, and possibly other tributaries.

5.2.2 Nutrients and Anions

Dissolved organic carbon (DOC) concentrations ranged from <0.5 mg/L to 86 mg/L. Similar to hardness, DOC concentrations in Finlayson Creek increased downstream due to contributions from Geona and East Creek; the latter returning the highest median DOC level (4.6 mg/L) of all monitoring sites. DOC concentrations peaked during freshet as snowmelt rinsed surrounding organic soils and flushed organic carbon into the streams.

Nitrogen species (nitrate, nitrite, cyanide, ammonia) were typically below or marginally above the detection limit at all surface water stations, with the exception of nitrate-N which ranged from median concentrations of 0.02 mg/L in East Creek to 0.15 mg/L in Geona Creek. Nitrate concentrations were highest over winter likely due to limited primary productivity, which consumes nitrate, which would otherwise limit dissolved nitrate levels. Measured nitrate-N concentrations did not exceed the Canadian Council of Ministers of the Environment (CCME) threshold of 3 mg/L.

Measured fluoride values commonly exceeded the CCME guideline (0.12 mg/L) in East Creek, with a median concentration of 0.18 mg/L, suggesting that East Creek drains an area of fluorine-bearing rocks. Fluoride concentrations in Finlayson Creek increased downstream as a result of the input of high fluoride waters from East Creek. All seeps returned relatively low fluoride levels (0.031 mg/L to 0.17 mg/L) except for KZ-9 East Seep (0.86 mg/L to 1 mg/L), which returned higher fluoride concentrations than any of the creek monitoring stations.

Total phosphorus content exceeded the CCME eutrophic guideline of 0.035 mg/L in at least one sample at many of the stations. These peaks typically occurred during freshet and were accompanied by high concentrations of total suspended solids (TSS) and total iron. Due to the affinity of phosphorous for iron oxyhydroxides, it is likely that phosphorus was associated with iron particulates, with mobilization during freshet or precipitation events causing high TSS. Dissolved phosphorus was often below detection.

5.2.3 Metals

Water quality parameters which exceeded guideline values at over 5% of all samples at any surface water station were total arsenic, iron, and selenium, as well as dissolved cadmium, copper, and zinc. Concentrations of dissolved cadmium, copper, and zinc were highest in the headwaters of Geona Creek at station KZ- 7, and in Fault Creek (KZ-2) which flows into Geona Creek and are likely related to the mineralized nature of this area. Concentrations of these metals (linked to the local mineralization) were elevated in the upper watershed (primarily Geona Creek) relative to the lower watershed (Finlayson Creek).

Total selenium concentrations exceeded guidelines in the greatest number of samples at Fault Creek (KZ-2) and had a strong groundwater correlation as most of the exceedances occurred in the winter. Farther downstream, selenium concentrations remained consistently below the BC MECCS standard of 0.002 mg/L, with only a few sporadic exceedances at the remaining stations. Total selenium

concentrations were also notable in that although only four of the stations sampled exceeded the BC MECCS water quality guideline, 11 of the 13 surface water stations had total selenium concentrations within 50% of this guideline (i.e., between 0.001 and 0.002 mg/L).

Overall, substantially more water quality guideline exceedances were noted for total metal concentrations than their dissolved counterparts, suggesting that a significant portion of the metals were particulate-bound, especially during freshet and/or other periods (e.g., heavy rainfall events) characterized by high flow and associated elevated TSS levels.

5.2.4 Seasonal Variability

Most constituent concentrations peaked during spring as runoff during freshet increased the particulate content of the streams, leading to higher total metal concentrations. Conversely, concentrations of fluoride, total selenium, uranium, and hardness were lowest between freshet and summer. The levels of these constituents subsequently increased through the late fall and winter months, suggesting that groundwater may be an important contributor to surface water concentrations of these four constituents. This is supported by groundwater monitoring data from wells installed on the Project site in which fluoride (0.011 mg/L to 1.4 mg/L), selenium (less than 0.000062 mg/L to 0.0081 mg/L), uranium (0.00011 mg/L to 0.029 mg/L), and hardness (79 mg/L to 2,200 mg/L) concentrations in shallow groundwater either overlap or markedly exceed the range of concentrations observed in both Geona Creek and Fault Creek.

Nitrate-N concentrations also exhibit seasonality across the watershed, in that they display a clear maximum during the winter months. Primary producers are significant consumers of nitrate in aquatic systems, so lower primary productivity occurring during winter is likely responsible for higher nitrate-N levels observed in that period.

5.2.5 Long-term Variability

A comparison of the Cominco 1994 and 1995 water quality data with data collected during water quality monitoring conducted since 2015 indicates that most constituents shared a similar concentration range, indicating no substantive differences between the two datasets. Two exceptions were total selenium and total chromium. Total chromium concentrations were typically lower in the 2015 to 2025 dataset compared to the 1990s sampling, perhaps due to a preponderance of higher flow sampling events in the historical samples which may have resulted in higher particulate chromium concentrations. However, the CCME exceedances for total chromium were relatively marginal, with dissolved chromium concentrations exhibiting three-fold lower incidence of CCME exceedance. Conversely, total selenium concentrations were generally higher in the more recently collected samples than in the 1994 and 1995 program. Selenium concentrations appear to be sensitive to flow conditions, exhibiting minima during periods of high flow (i.e., dilution during freshet and following extended precipitation events) and elevated levels during baseflow winter conditions. The paucity of winter sampling in the 1994 and 1995 dataset allied with likely high precipitation events in the August 1995 samples, may have low-biased the historical dataset.

5.2.6 Five in 30 Results

A higher frequency sampling program, comprising the collection of five samples over periods of 30 days at the majority of monitoring stations, was carried out from May to June 2017, February to March 2018, and May to June 2018. The sampling program was designed to assess constituent variance during freshet and low flow winter conditions. Geona Creek (KZ-9, KZ-37, KZ-17) and upper Finlayson Creek (KZ-15, KZ-16, KZ-22) monitoring stations typically returned higher concentrations of constituents that typically associated with high TSS and water flow (i.e. particulate transported; aluminum, iron) earlier in May, and lower concentrations in June as water flows decreased. Peak concentrations in May 2017 at many stations were similar to peak concentrations observed in May 2015 at the majority of stations. Concentrations for several parameters peaked in the final June 2017 sample at stations further downstream in Finlayson Creek (KZ-26) and East Creek (KZ-21), most likely the result of a larger precipitation event that preceded the sampling. In Fault Creek (KZ-2), freshet appeared to arrive late in June 2017 and June 2018, likely due to its more isolated and high-altitude locale. Relatively limited variation was observed for the majority of parameters measured during February and March 2018, suggesting the previous monthly monitoring had adequately captured natural variation at the sampling stations during this time of year.

6 GROUNDWATER

This section summarizes groundwater conditions at the site, including elevations, flow directions, permeabilities, water quality and interactions with surface water. A detailed discussion of baseline groundwater flow and quality is provided in Appendix E.

6.1 GROUNDWATER MONITORING NETWORK

Groundwater monitoring at the site has been conducted in 1995 and from 2015 to 2025, and has included data collection at more than 60 monitoring wells. The original groundwater monitoring wells were installed in 1995, and additional wells were installed in 2015, 2016 and 2024 to expand the monitoring network and/or to replace existing wells. Monitoring in 2024 and 2025 was conducted at 45 monitoring wells locations, including multiples wells completed as nested installations (with a shallow piezometer completed in overburden and a deeper piezometer completed in bedrock). Table 6-1 summarizes the current monitoring well network with well completion details. Figure 6-1 shows the locations of the monitoring wells relative to the proposed Project infrastructure.

Figure 6-1 also shows the locations of 20 thermistors installed across the site. Monitoring of thermistors since 2016 has identified only one thermistor showing persistent sub-zero temperatures, indicating that the extent of permafrost across the site is limited. Thermistor results are provided in full in Appendix E.

Table 6-1: Groundwater Monitoring Network

Well ID	Easting (m)	Northing (m)	Year Drilled	Geological Unit	Well Depth	Screen Interval	
	UTM Nad83, Zone 9				m below ground surface (mbgs)	From	To
						mbgs	
Class A Storage Facility/Process Plant Area							
MW15-07D	414922	6817784	2015	Bedrock	33.0	26.3	32.1
MW15-09S	414709	6819177	2015	Overburden	42.0	11.4	17.3
MW16-14D2	414780	6818385	2024	Bedrock	12.2	10.4	11.9
MW16-17	414634	6817489	2016	Bedrock	31.1	20.3	27.7
BH95G-2	414341	6819836	1995	Bedrock	21.3	13.5	19.8
BH95G-15D	414576	6818976	1995	Bedrock	22.6	19	21.6
BH95G-15S2	414574	6818985	2024	Overburden	9.1	7.0	8.5
BH95G-33S2	415130	6816749	2024	Overburden	7.3	5.8	7.3
MW24-02D	415052	6817519	2024	Bedrock	28.0	10.1	11.6
MW24-02S	415055	6817520	2024	Overburden	2.1	0.5	2.0
MW24-03D	413738	6818155	2024	Bedrock	28.0	19.0	28.0

Well ID	Easting (m)	Northing (m)	Year Drilled	Geological Unit	Well Depth	Screen Interval	
	UTM Nad83, Zone 9				m below ground surface (mbgs)	From	To
						mbgs	
MW24-08S	414650	6819640	2024	Overburden	8.8	7.3	8.8
Class B Storage Facility Area							
MW15-01	414472	6816559	2015	Bedrock	20.0	10.0	18.8
MW15-02	414,808	6,816,270	2015	Bedrock	32.0	23.0	31.7
BH95G-32	415008	6816134	1995	Bedrock	16.2	12.2	15.2
BH95G-33D	415130	6816745	1995	Bedrock	13.1	9.1	12.1
MW24-01D	413934	6816857	2024	Bedrock	40.4	25.4	35.4
MW24-04S	415188	6817063	2024	Overburden	4.3	2.0	3.5
MW24-04D	415190	6817068	2024	Bedrock	12.8	9.5	12.5
Class C Storage Facility/Overburden Stockpile Area							
MW15-03S	416317	6816052	2015	Overburden	18.5	4.1	7.1
MW15-03D	416317	6816052	2015	Bedrock	18.5	10.1	16.0
MW15-04D	415786	6816156	2015	Bedrock	33.0	27.1	32.9
MW16-16D	415395	6817229	2016	Bedrock	40.3	31.5	38.8
MW15-05S	415852	6816872	2015	Overburden	30.0	4.6	7.6
MW15-05D	415852	6816872	2015	Bedrock	30.0	22.4	29.8
MW16-16S2	415418	6817234	2016	Overburden	5.8	1.2	2.1
MW24-05S	415845	6816480	2024	Overburden	6.8	4.5	6.0
MW24-05D	415847	6816482	2024	Bedrock	11.9	8.6	11.6
MW24-07D	416783	6816317	2024	Bedrock	15.9	9.5	15.5
MW24-06D	415986	6817326	2024	Bedrock	15.5	7.3	13.3
ABM Open Pit Area							
MW16-15S	414977	6814699	2016	Overburden	6.1	3.1	5.3
MW16-15D	414976	6814702	2016	Bedrock			
BH95G-21	414802	6815641	1995	Bedrock	10.1	6.1	9.1
BH95G-22	414928	6815729	1995	Bedrock	7.5	2.8	5.8
BH95G-25S	415073	6815522	1995	Overburden	22.3	8.5	11.5
BH95G-25D	415074	6815522	1995	Bedrock	22.3	17.8	20.8
BH95-129	414601	6815499	1995	Bedrock	160.0	154.5	160.0
BH95-131	415182	6815377	1995	Bedrock	128.0	123.5	128.0
BH95-146	414898	6815504	1995	Bedrock	139.9	134.1	138.7
K15-200-VWP	414749	6815599	2015	Bedrock	Vibrating Wire Piezometer		

Well ID	Easting (m)	Northing (m)	Year Drilled	Geological Unit	Well Depth	Screen Interval	
	UTM Nad83, Zone 9				m below ground surface (mbgs)	From	To
						mbgs	
K15-248-VWP	415203	6815282	2015	Bedrock	Vibrating Wire Piezometer		
BH95G-29S2	415195	6814540	2024	Overburden	7.3	5.8	7.3
BH95G-29D2	415198	6814536	2024	Bedrock	18.0	16.2	17.7

6.2 CONCEPTUAL GROUNDWATER MODEL

A conceptual groundwater model has been developed for the Project, and is presented in Appendix F.

6.2.1 Hydrostratigraphic Units

Overburden is present across most of the Project area except locally on hill slopes or hill tops where bedrock outcrops. Overburden is generally thinner at high elevations and thickest in the valley bottom. The primary overburden hydrostratigraphic units (HSUs) expected to control groundwater flow at the Project include alluvial and glaciofluvial channel deposits, alluvial overbank units, glaciofluvial kame, glacial till and glaciolacustrine units. Hydraulic conductivity of overburden varies widely dependant upon fines content.

Bedrock in the Project area is categorized into HSUs based on hydraulic conductivity, weathering and intactness, including shallow fractured bedrock, competent bedrock and fault zones. The upper 30 m to 50 m of bedrock across the Project area is generally fractured, with bulk hydraulic conductivity greater than that of the underlying competent bedrock. A number of fault zones have been identified in the Project area with the potential to act as marginally preferential flowpaths.

6.2.2 Groundwater Elevations and Flow

Water levels in bedrock and overburden wells exhibit the following seasonal trends:

- Rising water levels starting in late April/early May, presumably with the onset of freshet, through the summer months (approximately to September);
- Peak water levels reached between August and October, depending on the year;
- Falling water levels through the winter months (approximately October to April); and
- Lowest levels reached between April and June, prior to the onset of freshet, depending on the year.

In most monitoring wells, the maximum-minimum water level difference ranged between 2 m and 8 m; the maximum observed difference was 16.5 m.

Relief at the project site suggests that a local flow system dominates the groundwater system, with groundwater recharge occurring along the valley peaks and slopes of the Geona Creek catchment and flow and discharge toward the valley bottom. Groundwater levels are therefore generally expected to be a subdued reflection of the topography with groundwater levels at surface in the valley bottom and 10 m or more below ground surface along the valley slope.

Preferential groundwater flow paths in bedrock likely occur through secondary porosity, such as fractures, bedding planes, and open foliations. The enhanced hydraulic conductivity in shallow bedrock will concentrate groundwater flow subparallel to the slope near the surface. At greater depth in more competent, lower permeability bedrock, groundwater flow will be focused in fractures and along bedding planes or open foliations of the northeast dipping stratigraphy. Groundwater flow in

the direction perpendicular to the stratigraphy may be impeded, particularly across lower permeability units such as mudstone.

Where permafrost is present, the groundwater flow regime will include a shallow (supra-permafrost) flow system. The shallow flow system is inferred to be present in the active layer above permafrost during the warm summer months when the near surface soils thaw. The depth of the active layer (seasonal thaw) observed with onsite thermistor strings in drillholes is up to 5 m. The shallow supra-permafrost flow system is anticipated to have limited hydraulic connection with the year-round deeper (sub-permafrost) flow system. The shallow flow system is likely present where permafrost is mapped along the lower slopes east of Geona Creek. Given the relief along the hillslopes, the shallow and deep flow systems will follow the same path and discharge to surface water features and local topographic lows.

Geologic structures, such as faults, are expected to serve as potential conduits and barriers for groundwater flow. The network of faults in the deposit area is expected to result in some enhanced permeability, as observed based on the testing in the fault zones, as well as barrier to flows, which may contribute to artesian water levels encountered in several exploration drillholes in the hillslopes of the deposit area. Fault Creek Fault and East Fault are mapped to extend beyond the deposit area and beyond Geona Creek catchment and may allow for preferential groundwater flow along their length. Several other faults are inferred in the deposit area, however, their influence on groundwater flow may not extend much beyond the local deposit area.

6.2.3 Groundwater Recharge

Groundwater recharge in the Project area will predominantly occur along the topographic highs and slopes of the Geona Creek catchment. Groundwater recharge rates are expected to be lower in areas where the permeability of surficial material is lower (e.g., permafrost and glaciolacustrine or fine-grained glacial till deposits). Conversely, higher groundwater recharge rates are expected in areas where the permeability of surficial material is relatively high (e.g., coarse-grained glaciofluvial deposits). The distribution and ice content of permafrost is expected to locally control recharge to the water table where permafrost is present. Permafrost likely serves as a semi-confining unit restricting the upward flow of groundwater along the lower west-facing hillslopes in Geona Creek valley where permafrost is mapped. Groundwater recharge in this area will be limited to “windows” where permafrost is absent.

6.2.4 Groundwater Surface Water Interaction

Gaining streamflow conditions (groundwater discharge to the stream) are expected to dominate along most of upper Geona Creek given the well-defined valley and the shallow depths to the water table adjacent to the channel. Several seeps are present along Geona Creek between the ABM Deposit and hydrology station KZ-9. Artesian water levels additionally indicate areas of groundwater discharge exist in the valley bottom. Artesian sites are present surrounding the headwater lakes in the ABM Deposit and are generally present at all water level sites adjacent to Geona Creek to hydrology station KZ-9 approximately 4 km downstream. Water level records indicate artesian conditions persist throughout the year at these locations. Results of numerical groundwater modelling for the Project similarly indicate Geona Creek is a gaining stream (Appendix G).

Interaction between the surface drainage and groundwater systems (both gaining and losing conditions) is expected to be greatest where glaciofluvial and fluvial deposits are present in creek valleys due to the relatively high permeability of these deposits. Losing conditions along Geona Creek, if present, are expected to be very local scale, such as hyporheic flow, whereby surface water infiltrates the subsurface and returns to the channel again a relatively short distance downstream (i.e., a few meters to tens of meters). Fault Creek and other tributaries are expected to be losing when they flow over the alluvial fan at the base of slope prior to flowing into Geona Creek.

6.3 GROUNDWATER QUALITY

In general, the chemical composition of groundwater depends on the local and upgradient lithologies. As groundwater flows through the ground it assumes and continuously evolves a characteristic chemical composition due to interaction with the soil or rock. As such, a groundwater sample represents the local and upstream geological conditions, and its composition is a function of lithology, solution kinetics, groundwater residence time, mixing, and groundwater flow patterns.

Groundwater quality has been assessed at a total of more than 60 monitoring well locations in 1995 and from 2015 through 2025, with samples analyzed for general chemical parameters, total and dissolved metals, and nutrients. Groundwater results from the monitoring wells installed in 2024 are not discussed in this section, as additional monitoring is needed to fully understand the characteristics of groundwater at these newer wells.

Groundwater quality varies considerably across the Project area, which is interpreted to be due to the considerable extent of the Project area (over 5 km north to south), the various groundwater flow systems and recharge sources (east and west of Geona Creek) and the potential for differing chemistry in the vicinity of the ABM Deposit as compared to the wide range of bedrock lithologies with differing mineralogy and chemical compositions.

6.3.1 General Chemistry

Field pH values ranged from 5.47 to 9.42 and averaged a slightly alkaline 7.43 in both overburden and bedrock across the study area. Dissolved hardness concentrations are variable across the site, ranging from 78.9 to 2,180 mg/L. The maximum hardness value was reported in bedrock well MW15-10D located at the northern end of the study area and was over two times higher than the next highest value (in a bedrock well below the ABM Deposit). Average and maximum dissolved hardness values were typically higher in bedrock wells than overburden wells and appear to increase in value with depth in bedrock. Groundwater has an average conductivity of 593.4 $\mu\text{S}/\text{cm}$ across the study area with the highest conductivity (3,186 $\mu\text{S}/\text{cm}$) recorded in a bedrock well MW15-10D, located at the northern end of the study area.

Sulphate concentrations were generally much higher in the ABM open pit area, with a maximum concentration of 439 mg/L and an average concentration of 123 mg/L, relative to the rest of the Project area which averaged 39 mg/L. Higher sulphate concentrations in the vicinity of the ABM Deposit is likely due to oxidation of the sulphide minerals. Despite the increased concentrations in this area, none exceeded the Yukon *Contaminated Sites Regulations* (CSR) Standard for sulphate

(1,000 mg/L). Sulphate concentrations varied between overburden and bedrock wells across the Project area with deep wells tending to have slightly higher concentrations than shallow wells due to bedrock mineralization.

Ammonia was elevated in several wells across the Project area and, although not otherwise specific to any particular area, the observed concentrations were generally higher in the ABM Deposit area. Fluoride was elevated in many wells across the site and was one of the few parameters to reflect a difference between bedrock and overburden concentrations. Bedrock wells tended to have higher fluoride concentrations than overburden wells, likely reflecting the leaching of fluoride from host rock minerals such as mica. Fluoride concentrations across the site were the most consistent, with little fluctuation relative to the other general parameters and metals.

6.3.2 Dissolved Metals

Many of the parameters included in the groundwater baseline characterization program fluctuated significantly over the period of record. Concentrations of dissolved metals showed no clear trend based on host formation (i.e. bedrock wells and overburden wells).

Dissolved cadmium was elevated in a number of wells and exceeded its CSR Standard the most frequently. Overall, average concentrations of dissolved arsenic, zinc, cadmium, lead, and copper were highest in ABM Deposit wells compared to other areas. Wells in the area of the proposed Class A Storage Facility yielded the next highest average concentrations of dissolved arsenic, cadmium, and copper. This is inferred to be due to wells located in the bottom of the valley beside Geona Creek and downgradient of the ABM Deposit that could have groundwater influenced by mineralization. Several wells across the site had dissolved cadmium, lead, copper, and selenium below the DL indicating spatial variability of groundwater quality. The concentrations of zinc in the ABM Deposit area were elevated compared to the rest of the Project area, likely due to the presence of significant mineralization in this area. Elevated iron in the ABM Deposit area may be related to oxidation dissolution of iron sulphide minerals in and around the mineralized zone.

The high dissolved iron concentrations were measured in several bedrock wells across the site coinciding with lower or negative ORP values and indicating that reducing conditions are likely partly responsible for maintaining the elevated dissolved iron concentrations. Dissolved selenium concentrations exhibited higher concentrations in shallow wells relative to their bedrock counterparts. This water quality difference was not observed for other dissolved metal concentrations except in two wells (MW16-15 and MW16-12).

6.4 NUMERICAL GROUNDWATER MODEL

A numerical groundwater model was developed for the Project, and is presented in Appendix G. This model was developed considering the conceptual groundwater model and using available climate, geology and hydrology data to constrain model geometry and parameters, and to calibrate the model. The numerical model will be used as a tool to support predictions of how Project activities will interact with the local groundwater system, and to support Project engineering to ensure that groundwater will be managed appropriately to minimize potential environmental impacts.

7 VEGETATION

Since 1995, multiple vegetation surveys have been performed at the Project, including for rare plants, invasive species, timber stand density and volume, and wetlands. Tissue sampling and ground truthing to support terrestrial ecosystem mapping have also been conducted. The results of baseline vegetation surveys are presented in Appendix H, I, U, and V.

7.1 VEGETATION SUMMARY

The Project is located in the Boreal Cordillera Ecozone with proposed infrastructure primarily situated in the subalpine bioclimatic zone, from an elevation of 1,300 masl to approximately 1,550 masl, with the ABM open pit anticipated to extend to the lower range of the alpine zone. At higher elevations, dwarf shrubs, graminoids, and herbs dominate; boreal forests are more prevalent at lower elevations.

The most common species found within the Project area include scrub birch (*Betula glandulosa*), willow (*Salix* spp.), subalpine fir (*Abies lasiocarpa*), and open stands of white spruce (*Picea glauca*) at lower subalpine elevations. Along either side of the first 17 km of the Tote Road, a mixed forest of white and black spruce (*Picea mariana*) exists. The forests are composed of mainly mature trees (greater than 100 years); some of the white spruce encountered are older (greater than 160 years) and are likely survivors of historic fires.

The riparian systems within the Project area are of two basic types: slow flowing creek/fen complexes with associated wetlands, or faster flowing creeks confined to deep valleys with definitive floodplains, such as Finlayson Creek. The riparian systems associated with slow flowing creeks contain organic substrates derived from sphagnum mosses and graminoids. Acid tolerant plants such as Labrador tea (*Rhododendron groenlandicum*), bog blueberry (*Vaccinium uliginosum*), and cloudberry (*Rubus chamaemorus*) grow amongst the moss hummocks. The second type of riparian system has a rocky substrate; sediment is composed mostly of gravel, cobbles, and boulders. The vegetation associated with this system is tall willows, balsam poplar (*Populus balsamifera*), and white spruce on upper terraces.

7.2 RARE PLANTS

No rare plants were found during targeted transect surveys (2015), or during the focussed surveys around the margins of each wetland (2016), nor through incidental observations while performing other field work through 2025. Although it is possible that rare plants may exist, observations were neither made nor expected as the Project area does not have unique landscape features such as hot springs, limestone, or alkaline wetlands that are known to be associated with rare plants in the southeast Yukon.

7.3 INVASIVE PLANT SPECIES

Invasive plant surveys were first completed in July 2015 by Alexco Environmental Group (AEG) on behalf of BMC. The survey confirmed that invasive weed infestations had developed under the previous owner and BMC immediately implemented an Invasive Plant Management Plan (IPMP) for the Project. The IPMP contains protocols on identifying, preventing, and controlling the spread of invasive plants (AEG, 2015). The IPMP was implemented during the 2016 through 2020 field seasons. In 2021 and 2022 there was no exploration activity and thus no environmental monitors on site to implement the IPMP. Extensive IPMP programs were implemented in 2023, 2024 and 2025. The 2025 Invasive Species Management Report is included in Appendix I.

The 2023 invasive plant survey identified a notable increase in invasive plant populations since 2020, likely related to the lack of environmental monitors or IPMP activities in 2021 and 2022. The IPMP includes removing observed invasive plants by hand pulling, storing plants in garbage bags and incinerating them on site, and these measures may have contributed to the significant decrease in observations in the early 2025 survey; however, seasonality may have also contributed to these results.

7.4 METALS IN SOILS AND VEGETATION

Baseline metal concentrations in vegetation within the Project area were evaluated in 1997 in both riparian and uplands species. BMC also collected soil and vegetation tissue samples in 2015 and 2016 from 32 locations in the Project area, and in 2024 from 30 locations, as discussed in Appendix U. The plant species selected for tissue sampling were based on the dietary preferences of moose, caribou, birds, and anticipated First Nation harvest species. Criteria for plants to be selected for the sampling program included:

- Plants consumed by wildlife, which are hunted and consumed by humans (e.g. moose and caribou);
- Plants gathered by Kaska; and
- Plants well distributed over the district so they are easy to find within the selected study areas.

Metals concentrations in soil samples were compared to the CCME soil guidelines for metal concentrations at industrial sites. Since 2015, for the 19 metals with established guidelines, six have been observed to exceed the guidelines (arsenic, chromium, copper, nickel, selenium, and zinc). The arsenic guideline has been exceeded at 26 out of 62 sites. Chromium, copper, nickel, selenium and zinc exceeded the guidelines at one, three, two, two, and seven sites, respectively.

In 2015, a total of 40 vegetation samples were collected from six different vegetation types: willow (*Salix* spp.), grass (Graminoids), grass roots, horsetail (*Equisetum* spp.), lowbush cranberry (*Vaccinium vitis-idaea*), and bog blueberry (*Vaccinium uliginosum*). In 2016, a total of 33 vegetation samples were collected from four different vegetation types: willow, lichen (*Cladina stellaris*), horsetail, and bog blueberry. In 2024, a total of 30 vegetation samples were collected from four different vegetation types: willow, lichen, lowbush cranberry and bog blueberry.

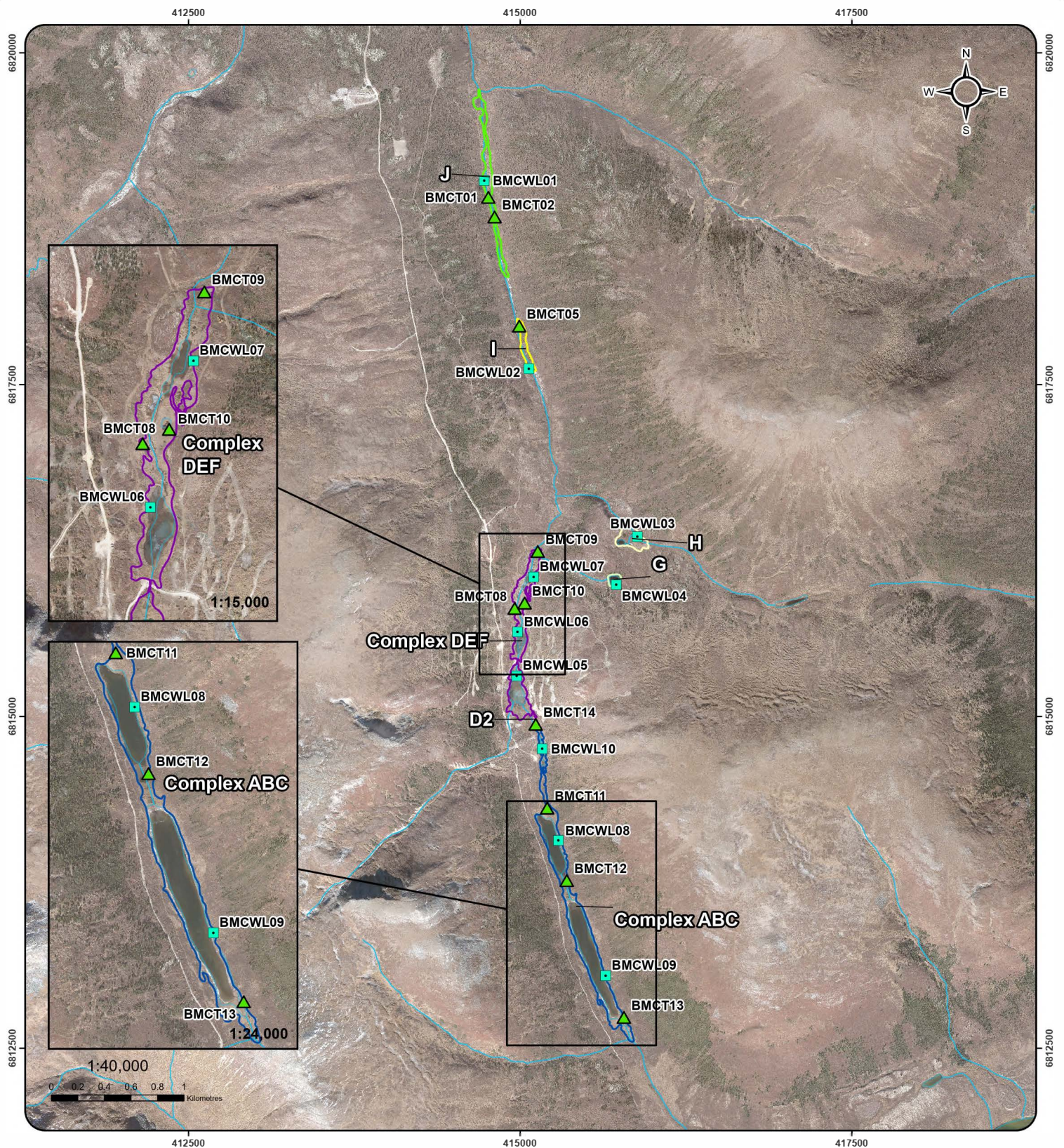
Different parts of the plant were sampled to determine where metals had accumulated within the plant, with selection depending also on what part of the plant is consumed. Berry samples were collected from the cranberry and blueberry plants, leaves and buds were collected from the willow, stems and roots were analyzed from grass species, leaves were collected from the lichen, and stalks were sampled from the horsetail plant. These species were chosen as representatives of groups of traditionally used plants. There are no guidelines for metal concentrations in plant tissues. However, the concentrations in the vegetation were used to support a Human Health Risk Assessment that was conducted during the Project's Screening Assessment, which no concluded no unacceptable risks (Appendix R2-N of BMC, 2017).

7.5 WETLANDS CHARACTERIZATION

Wetlands were surveyed and classified in 2016 (in part) to support the development of the Terrestrial Ecosystem Map for the Project. This information is included in Appendix A of the Baseline Vegetation Report (Appendix H). Surveying and classification of wetlands was updated in 2024 (Appendix V) using soil as the primary indicator to identify wetland boundaries. This approach delineated larger wetlands compared to the 2016 delineations. The 2024 survey identified wetlands A through J, with an ABC complex, a DEF complex, and wetland D2 separate from the DEF complex (Figure 7-1). Table 7-1 summarizes the characteristics of the wetlands identified in the local study area in 2024.

7.6 TIMBER VOLUMES

Timber volume and density estimates were made for forested polygons along the Tote Road. In general, the timber resources are of poor quality from a forestry perspective; the number of stems per hectare is very low (Appendix H).



- Wetland Sample Plot
- ▲ ELC Sample Plot
- Waterbody
- Watercourse

- Wetlands**
- Complex ABC
 - D2
 - Complex DEF

- G
- H
- I
- J

KUDZ ZE KAYAH PROJECT

WETLAND LOCATIONS

FIGURE 7-1

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Table 7-1: Wetland Characteristics

Wetland ID	Proportion of Wetland Class Zones	Area (ha)
A	55% Pond 25% Willow – Water Sedge Swamp 15% Giant Water Moss Shallow Water 5% Beaked Sedge – Water Sedge Marsh	13.8
B	45% Pond 35% Willow – Water Sedge Swamp 15% Shallow Water 5% Beaked Sedge – Water Sedge Marsh	7.7
C	50% Willow – Shrub Birch – Water Sedge Swamp 35% Giant Water Moss Shallow Water 15% Beaked Sedge – Water Sedge Marsh	1.34
D1	75% Giant Water Moss Shallow Water 15% Beaked Sedge – Water Sedge Marsh 10% Willow – Water Sedge Swamp	4.77
D2	75% Willow – Water Sedge Swamp 25% Shallow Water	0.02
E	65% Shallow Water 25% Shrub Birch – Willow – Net-veined Willow Swamp 10% Beaked Sedge – Water Sedge Marsh	2.32
F	45% Shrub Birch – Willow – Net-veined Willow Swamp 35% Beaked Sedge – Water Sedge Marsh 20% Giant Water Moss Shallow Water	4.84
G	95% Shallow Water 5% Beaked Sedge – Water Sedge Marsh	0.66
H	50% Willow – Shrub Birch – Water Sedge / Shrub Birch – Willow – Net-veined Willow Swamp 35% Shallow Water 15% Beaked Sedge – Water Sedge Marsh	2.96
I	65% Shrub Birch – Willow – Net-veined Willow Swamp 25% Shallow Water 10% Beaked Sedge – Water Sedge Marsh	1.86
J	80% Willow – Shrub Birch – Water Sedge Swamp 10% Shallow Water 10% Beaked Sedge – Water Sedge Marsh	5.30

8 WILDLIFE

Baseline wildlife studies at the Project were initially conducted in the 1990s in support of the IEE that was submitted for regulatory review in 1996 and contributed to a positive assessment and licensing outcome for Cominco Ltd., then-owners of the Project. Subsequent studies were completed between March 2015 and March 2025. The 2015 and 2016 baseline program focused on caribou, moose, grizzly bear, furbearers, collared pika, hoary marmot, beaver, small mammals, bats, breeding birds, waterfowl, and raptors. The 2017 baseline program focused on caribou, moose, common nighthawk and short eared owl surveys. Surveys between 2018 and 2025 have focussed on caribou and moose. In addition to these surveys, habitat suitability mapping was conducted for caribou (late winter, post calving and rut), moose (post-rut), grizzly bear (denning), collard pika and hoary marmot, little brown bat, olive sided flycatcher, horned grebe, rusty black bird, short eared owl, common nighthawk, waterfowl, and cliff nesting raptors. Models were also developed for grizzly bears to assess habitat effectiveness, security, and linkages zones.

Appendix J presents the results of the baseline surveys conducted between 2015 and 2019, all habitat suitability mapping, and a summary of existing information and historical wildlife studies previously completed for the Project. Appendix K (Ungulate Baseline Report) focuses on the survey results of caribou and moose between 2015 and 2025.

8.1 FINLAYSON CARIBOU HERD

8.1.1 Summary of Caribou Studies

The Finlayson Caribou Herd is of ecological, economic, and cultural importance to the Kaska First Nations (Kaska). This herd has been the focus of the longest continuous monitoring and management effort of any Yukon caribou herd. The Yukon Government, sometimes in partnerships with industry (e.g., Yukon Zinc, BMC), conducted fall rut composition surveys annually from 1982 to 2015, the Finlayson Lake Predator Control Study from 1983 to 1989, as well as seven population censuses between 1986 and 2022, a management history spanning over 40 years.

The following aerial wildlife surveys have been conducted by BMC with Kaska support every year since 2015:

1. Post calving (caribou) (July);
2. Rut (caribou) (October);
3. Early winter (caribou and moose) (November); and
4. Late winter (caribou and moose) (March).

In addition, to help assess the impacts of current and future climate regimes, a photogrammetric monitoring program was initiated in the summer of 2017 to record the condition of five snow patches located in the Regional Study Area around the Project. This survey is conducted annually during the post calving caribou survey. The results are included in the annual Ungulate Baseline Report (Appendix K).

In addition to the surveys described above, in 2023 Yukon Government approved the *Kudz Ze Kayah Project – Additional Caribou Baseline Studies Workplan*. This workplan was developed in collaboration with Yukon Government’s Department of Environment (ENV) and comments that ENV received from Kaska on the draft workplan. BMC provided the draft workplan to Kaska for discussion but has at the date of this report received no feedback. The purpose of this workplan is to fulfill YG’s requirements for BMC to undertake additional baseline data collection on caribou habitat, distribution, and movement for a period of 2 years as per Term 11(b) of the Project’s Decision Document. While the workplan was approved in 2023 the work was initiated in the fall of 2022 and was completed in 2024. The scope of the additional data collection included:

1. Intensive Aerial Surveys (Spring Range and Early Winter)
2. Wildlife Trail Mapping (desk and field based)
3. Caribou Seasonal Movements (Camera Program)
4. Regional Long Term Trends in Snow Patch Distribution and Abundance (desk based)
5. Late Winter Caribou Distribution (desk based)

BMC has conducted 45 seasonal ungulate surveys through March 2025, including 11 late winter, two intensive spring range (consisting of four weekly surveys), 10 post calving, 10 fall rut, and 12 early winter surveys (10 single annual surveys and 2 years of intensive surveys consisting of four weekly surveys annually) over 10 years.

BMC provides RRDC and LFN with a memo summarizing all the annual caribou data collected by BMC since 2015. This information has been provided to Kaska annually for several years.

8.1.2 Summary of Results

The Finlayson Caribou Herd (FCH) is part of the Northern Mountain caribou population (*Rangifer tarandus caribou*), assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as a species of Special Concern, and listed as such under the *Species at Risk Act* in 2005. The FCH uses the uplands around the Project area in the spring, summer, and fall for calving and rutting, and the lowlands of the Pelly River for overwintering. As part of the baseline study, caribou-focused surveys were conducted annually during four seasons (post calving, rut, early winter, and late winter), between March 2015 and March 2025, to assess the spatial and temporal distribution of FCH throughout the year in the Project area.

8.1.2.1 Post calving Survey

Results from the post calving surveys conducted for the Project from 2015 to 2024 are summarized in Table 8-1. Except for the 2015, 2019 and 2023 surveys, the relative abundance of caribou was consistent across surveys ranging from 17.5 to 23.6 caribou per 100 km of survey. Most post calving surveys were conducted during warm, sunny or partly sunny days and calm to light wind conditions. This produced ideal survey conditions where most caribou detected during the surveys were on or near high elevation snow patches or easily detected on windswept mountain ridges. During post calving, caribou congregate in higher elevations and extensively rely on snow patches to avoid heat stress and insect harassment. Most moderate to high use areas are localized to the highest elevation

terrain and are well dispersed throughout mountain blocks north of the Hoole and Black rivers (Figure 8-1).

Table 8-1: Summary of Caribou Observations During Post Calving Caribou Surveys (2015 to 2024)

Year	Cows	Calves	Bulls	Unclassified	Total	Number of Groups	Average Group Size	Caribou per 100 km of Flight Path
2015	61	12	20	0	93	27	3.4	9.6
2016	103	18	21	4	145	53	2.7	19.2
2017	147	43	41	2	233	60	3.9	20.7
2018	30	35	20	112	197	45	4.4	21.6
2019	97	35	26	0	158	78	2.0	12.3
2020	192	34	94	10	329	78	4.2	23.6
2021	81	81	78	138	378	72	5.3	23.3
2022	64	59	35	145	303	63	4.8	19.2
2023	14	14	18	39	85	42	2.0	5.3
2024	57	57	24	181	320	100	3.2	17.5

KUDZ ZE KAYAH PROJECT
UNGULATE BASELINE REPORT

FIGURE 8-1

POST CALVING SURVEY CARIBOU
OBSERVATIONS 2015 TO 2024

MAY 2025

- Location of Proposed Infrastructure
- BMC Minerals Ltd. Claim Areas
- Caribou Post Calving Survey Blocks
- Tote Road / Proposed Access Road
- Highway
- Watercourse
- Waterbody

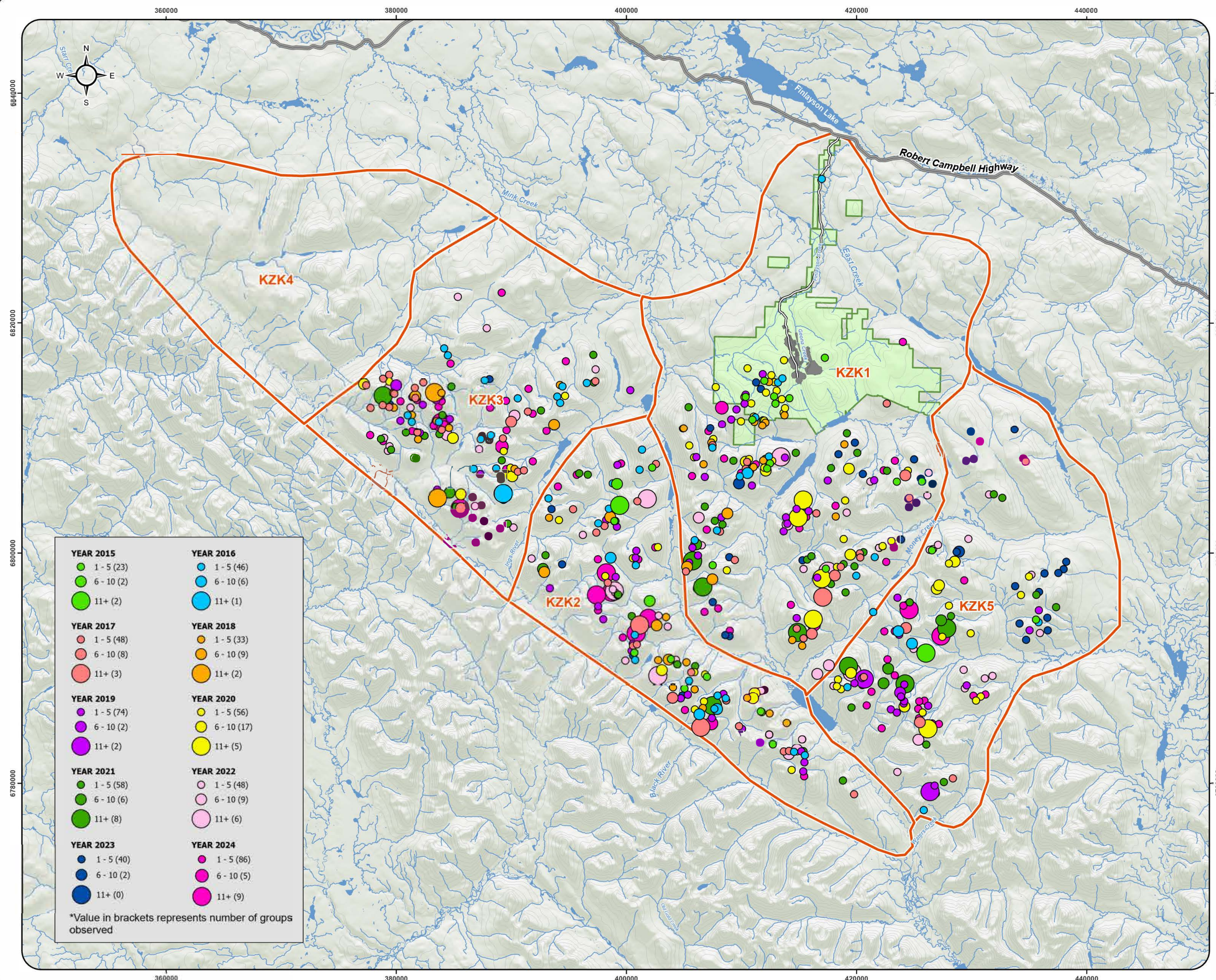
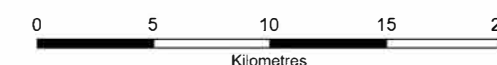


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8.1.2.2 *Fall Rut Survey*

Results from the rut surveys conducted for the Project from 2015 to 2024 are summarized in Table 8-2. Minimum fall recruitment rates of 20 to 25 calves per 100 cows are required for stable population growth rates and a minimum sex ratio of 30 bulls per 100 cows is required to make sure reproduction is maximized and herd size is sustained (Environment Yukon, 2016). Because atypical numbers of immature and mature bulls were observed in 2018, it is presumed that some cows were incorrectly classified as immature bulls. Therefore, the recruitment rate and sex ratio were not calculated for that year. Recruitment rates have ranged from 20 to 37 and averaged 27.2 calves per 100 cows since Project surveys began in 2015. This is indicative of a stable or possibly slowly increasing population growth trend.

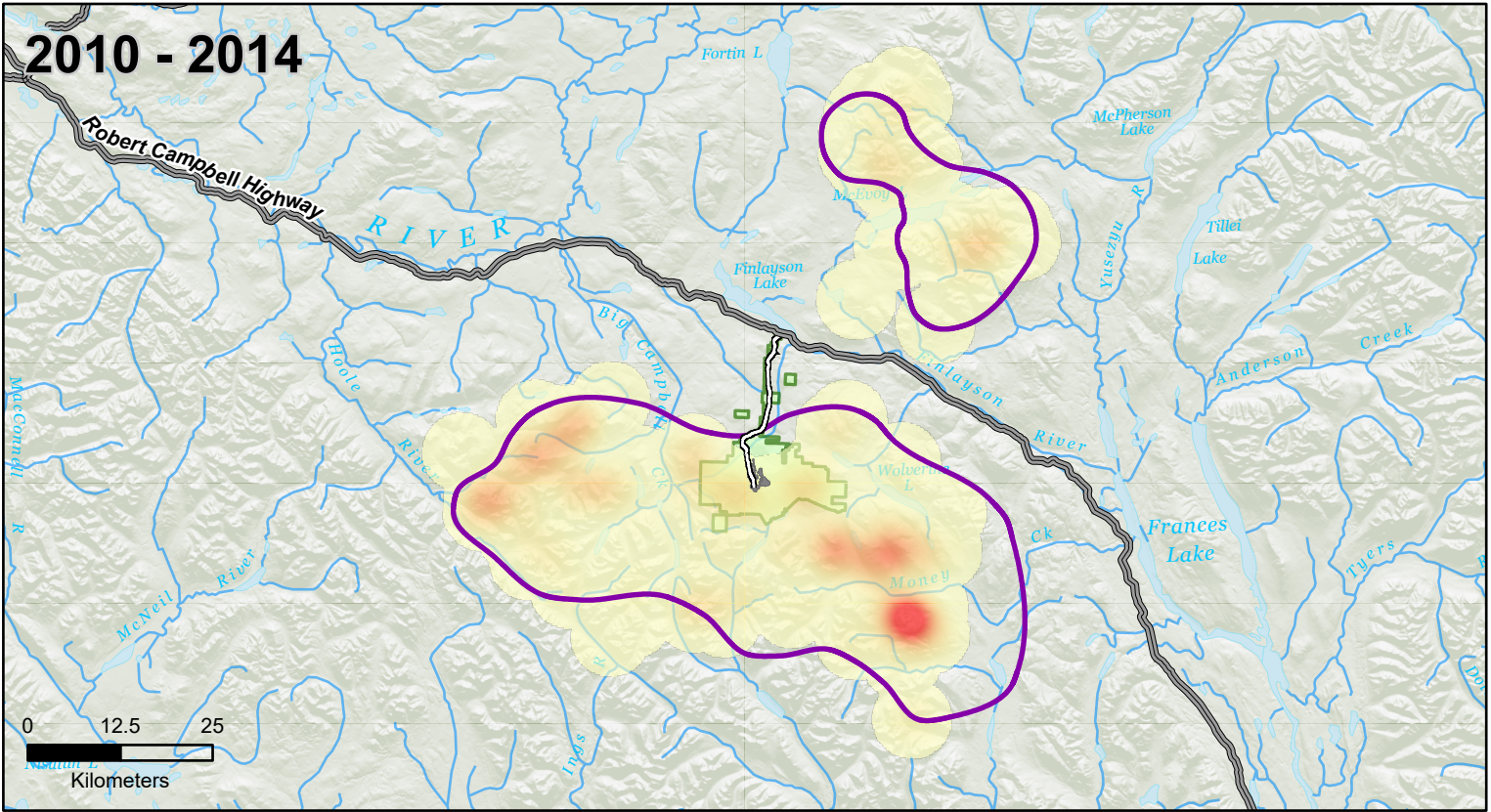
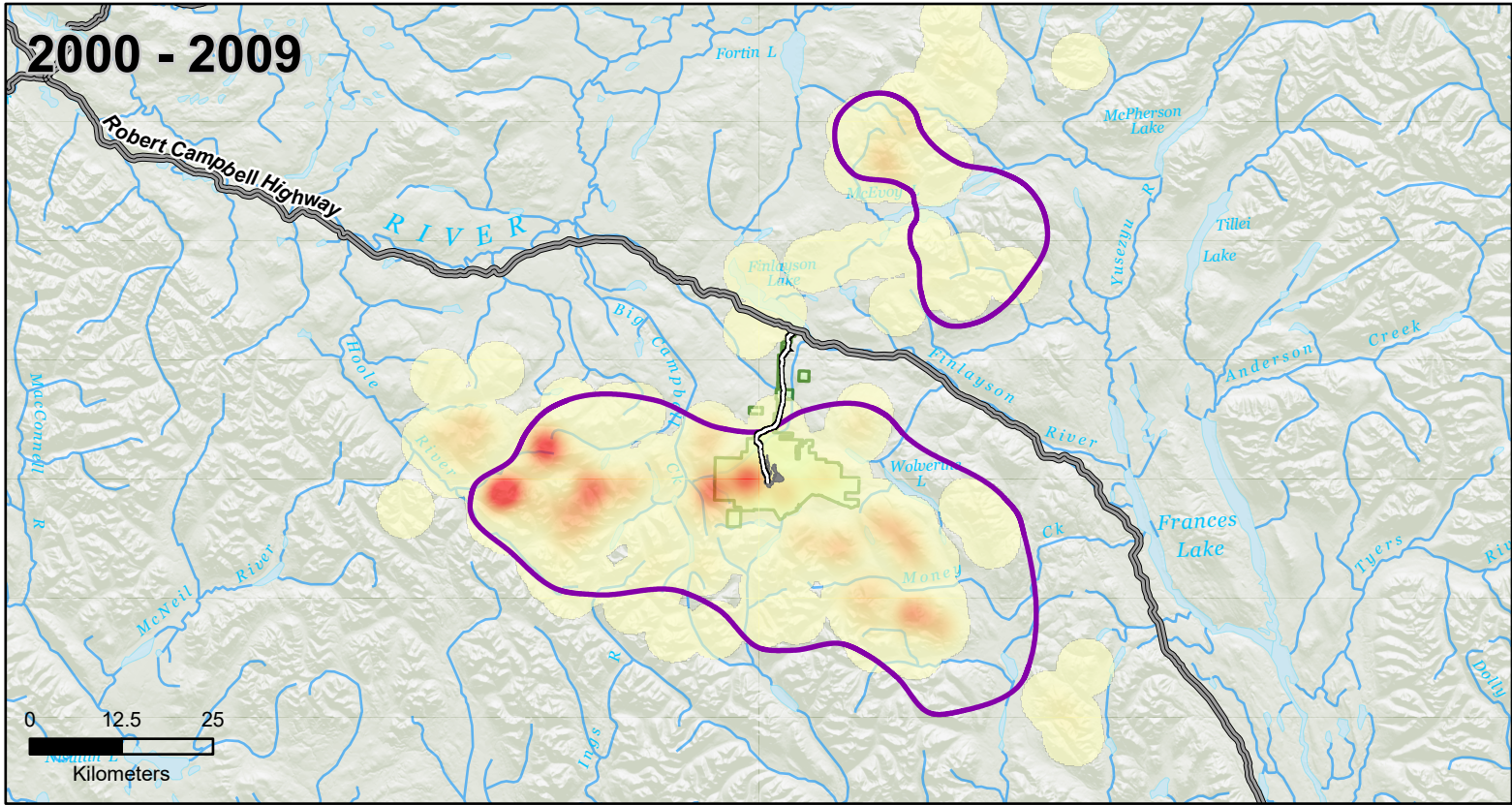
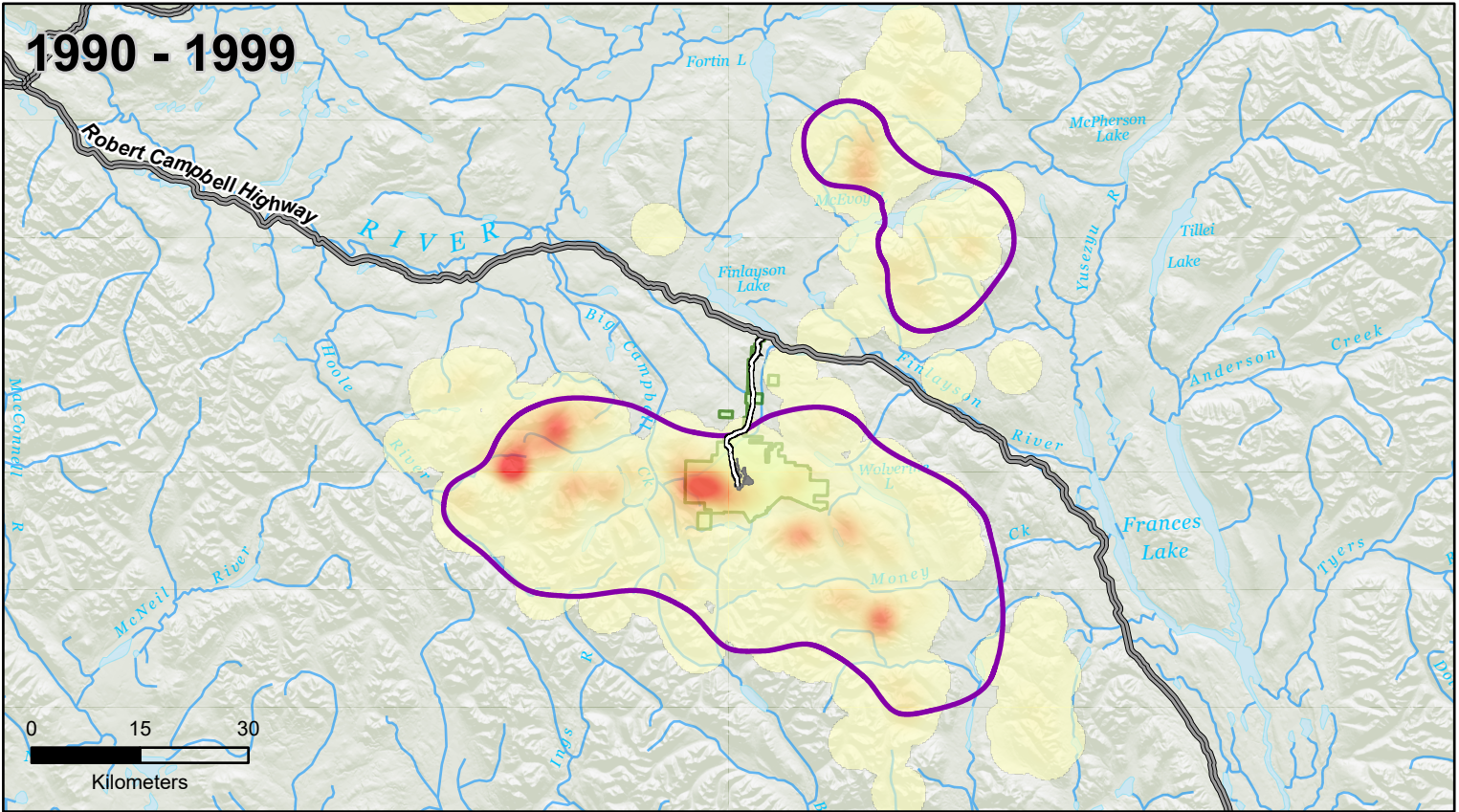
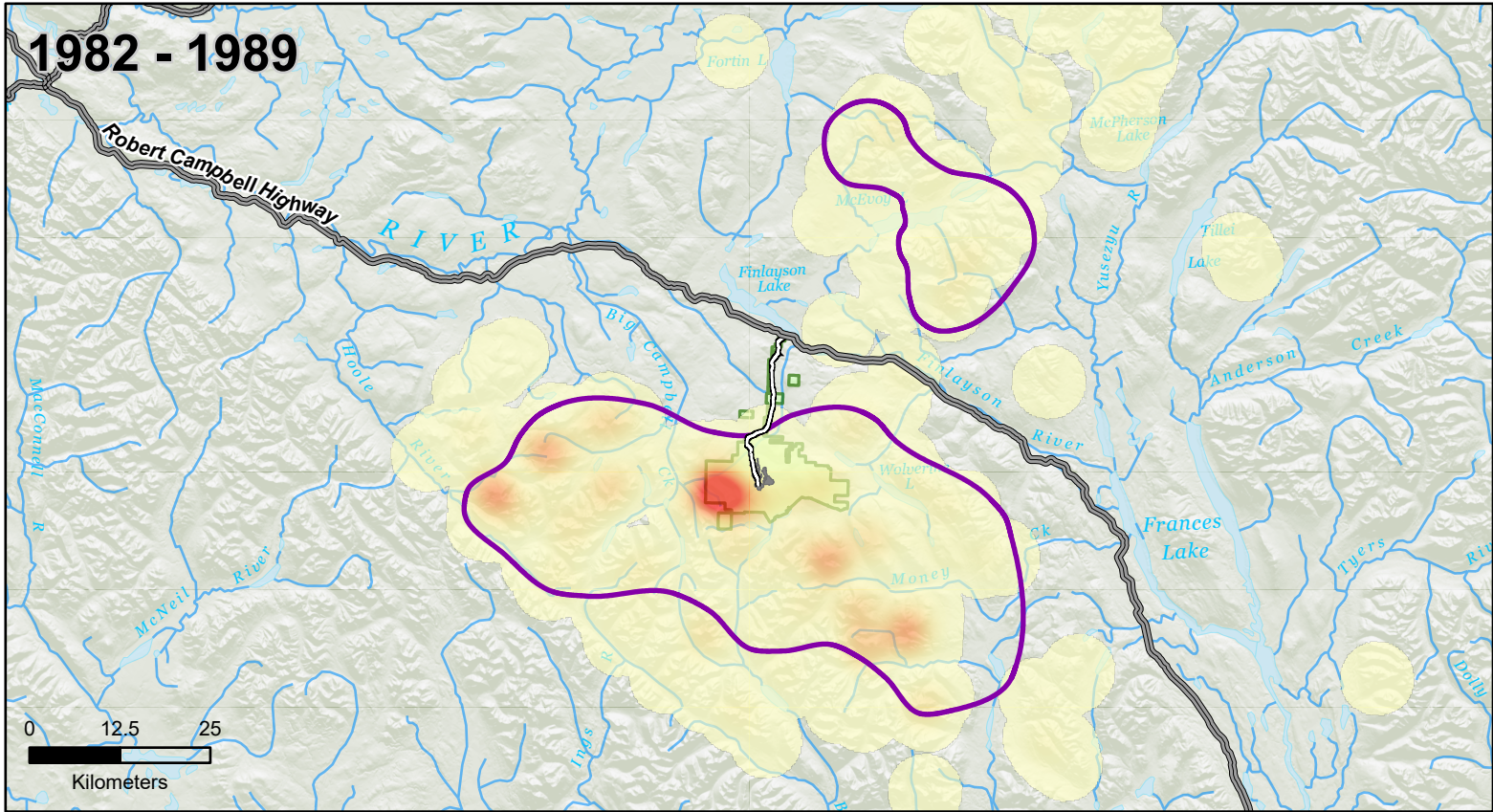
Although there was some variability in range use between years, it was mostly consistent across years. High use areas during the fall rut are generally broader than during post calving and at slightly lower elevations. The full extent of the FCH's rutting range has remained consistent since fall rut surveys began in 1982; however moderate to high use areas have shifted incrementally from year to year (Figure 8-2 and Figure 8-3). The one constant is that they are generally broad in extent and overlap clusters of subalpine plateaus and wide ridges rather than rugged mountains. Although moderate use of the mountain block south of Money Creek has been consistent since the early 1990s, high use of the area appears to be a characteristic of the past decade. The distribution of moderate to high use areas from 2015 to 2024 is nearly identical to caribou distribution observed during Environment Yukon surveys from 2010 to 2014. Although use of the plateaus immediately southwest of the Project footprint remain moderate, high use of the area appears to have progressively diminished from the 1980s to 2010s.

At the request of Environment Yukon, the locations of rutting caribou observations from 2015 to 2024 are not presented in this Site Characterization Plan.

Table 8-2: Summary of Caribou Observations During Fall Rut Caribou Surveys (2015 to 2024)

Year	Cows	Calves	Immature Bulls	Mature Bulls	Not classified	Total	Number of Groups	Average Group Size	Caribou per 100 km of Flight Path	Recruitment Rate (calves/100 cows)	Sex Ratio (bulls/100 cows)
2015	449	123	62	78	-	712	53	13.4	49.7	27	31
2016	398	107	73	82	-	660	60	11.0	65.0	27	39
2017	260	95	56	52	-	463	47	9.9	46.0	37	42
2018 ¹	298 ¹	96	153	91	12	650	59	11.0	60.2	n/a	n/a
2019	541	128	133	187	-	989	76	13.0	101.3	24	59
2020	346	69	136	98	13	662	42	15.8	48.4	20	68
2021	422	86	101	95	-	704	72	9.8	48.3	20	46
2022	240	57	34	82	-	413	57	7.2	37.1	24	48
2023	378	138	47	126	-	689	109	6.3	33.6	37	46
2024	432	124	90	136	-	782	103	7.6	40.0	29	32

¹During the 2018 survey, it is assumed that some cows were incorrectly classified as immature bulls since the number of immature bulls is inconsistent with typical survey results. For this reason, recruitment rate and sex ratio cannot be accurately calculated.



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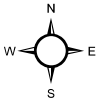
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- High Presence
- Moderate Presence
- Low Presence
- Location of Proposed Infrastructure
- BMC Minerals Ltd. Claim Areas
- Caribou Rut Survey Areas
- Tote Road / Proposed Access Road
- Highway
- Watercourse
- Waterbody

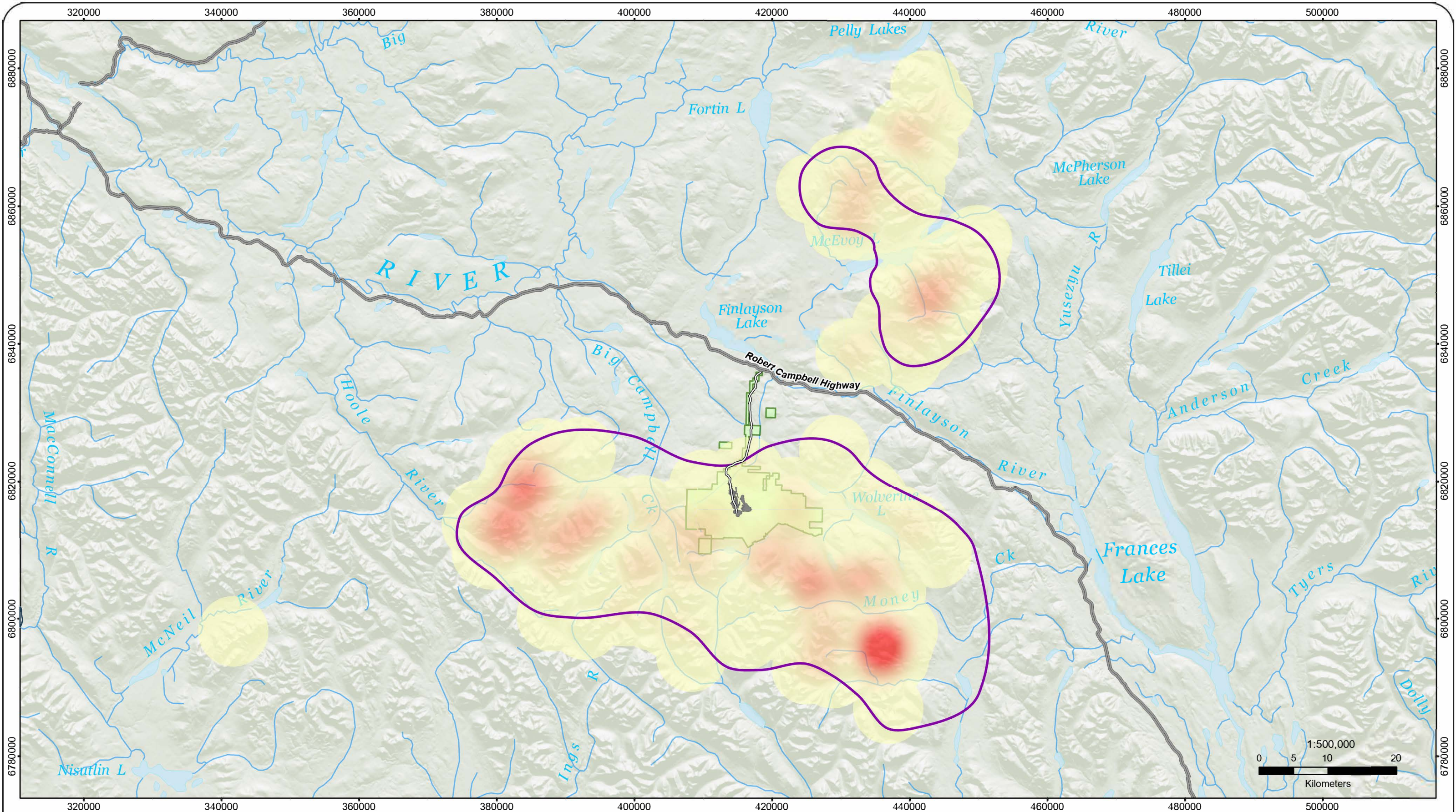


KUDZ ZE KAYAH PROJECT
SITE CHARACTERIZATION PLAN

FIGURE 8-2

FINLAYSON CARIBOU HERD FALL RUT
DISTRIBUTION FROM YUKON GOVERNMENT SURVEYS

APRIL 2023



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	High Density		BMC Minerals Ltd. Claim Areas		Watercourse
	Moderate Density		Caribou Rut Survey Areas		Waterbody
	Low Density		Tote Road / Proposed Access Road		
	Location of Proposed Infrastructure		Highway		



KUDZ ZE KAYAH PROJECT
UNGULATE BASELINE REPORT

FIGURE 8-3

FALL RUT CARIBOU DISTRIBUTION FROM BMC
SURVEYS 2015 TO 2024

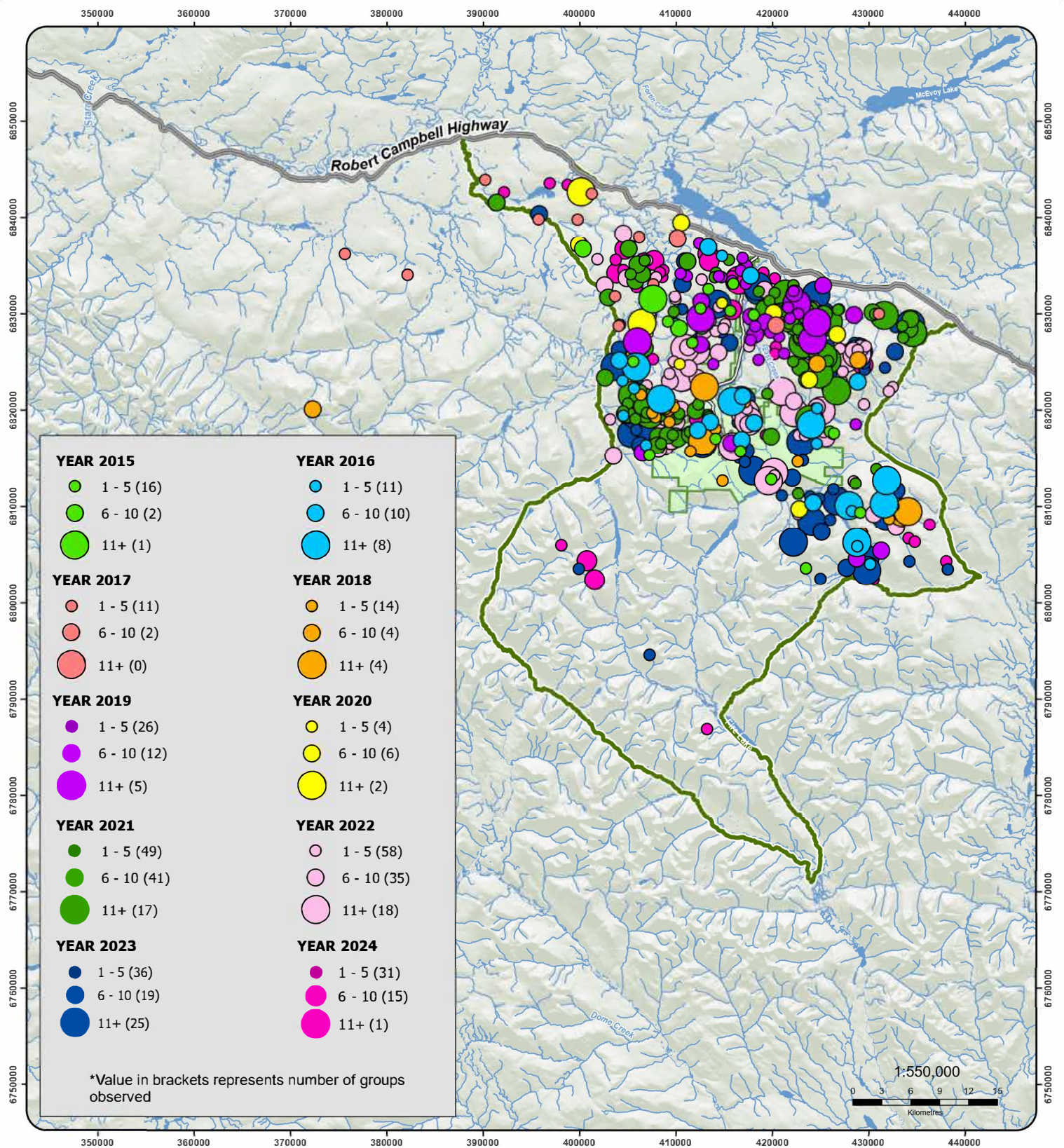
MAY 2025

8.1.2.3 Caribou Early Winter Survey

Caribou results from the early winter surveys conducted for the Project from 2015 to 2024 are summarized in Table 8-3 and the locations of observations are presented in Figure 8-4. Early winter survey results since 2015 demonstrate variability in the relative abundance and distribution of caribou in the Regional Study Area between years, suggesting annual variations in the timing of post rut movements towards their winter range. The timing of the FCH migration is likely influenced by variability in the onset of winter weather and snow conditions such as snow depth. Moderate to high use areas appear associated with lowland drainages, especially small headwater streams and bogs, and suggest the presence of movement corridors in these shallow valley systems. High use areas include the open shrublands west of the Project footprint in the headwaters of Finlayson Creek and a broad subdrainage of East Creek east of the Tote Road (Figure 8-4).

Table 8-3: Summary of Caribou Observations During Early Winter Ungulate Surveys (2015 to 2024)

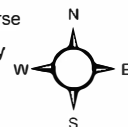
Year	Cows	Calves	Bulls	Unclassified	Total	Number of Groups	Average Group Size	Caribou per 100 km of Flight Path
2015	–	–	–	116	116	31	3.7	4.3
2016	–	–	–	318	318	29	11.0	26.7
2017	–	–	–	44	44	13	3.4	3.6
2018	–	–	–	185	185	21	8.8	15.3
2019	14	6	7	214	241	43	5.6	14.9
2020	–	2	–	90	92	12	7.7	7.1
2021	51	59	148	441	699	107	6.5	26.4
2022	106	56	99	403	664	109	6.1	36.1
2023	82	82	73	448	685	81	8.5	29.8
2024	28	27	29	139	223	47	4.7	11.7



Location of Proposed Infrastructure
BMC Minerals Ltd. Claim Areas

Regional Study Area (Game Management Subzone 10-07)
Tote Road / Proposed Access Road

Highway
Watercourse
Waterbody



KUDZ ZE KAYAH PROJECT UNGULATE BASELINE REPORT

FIGURE 8-4
EARLY WINTER SURVEY
CARIBOU OBSERVATIONS 2015 TO 2024

MAY 2025

National Topographic Database (NTDB) compiled by Natural Resources Canada. Reproduced under license from Her Majesty the Queen, as represented by the Minister of Natural Resources Canada. All rights reserved.

Datum: NAD 1983 UTM Zone 9N

EDI EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

BMC
MINERALS

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last edited by: O. Leblanc | EDI; Date: 2025-06-04

8.1.2.4 Caribou Late Winter Survey

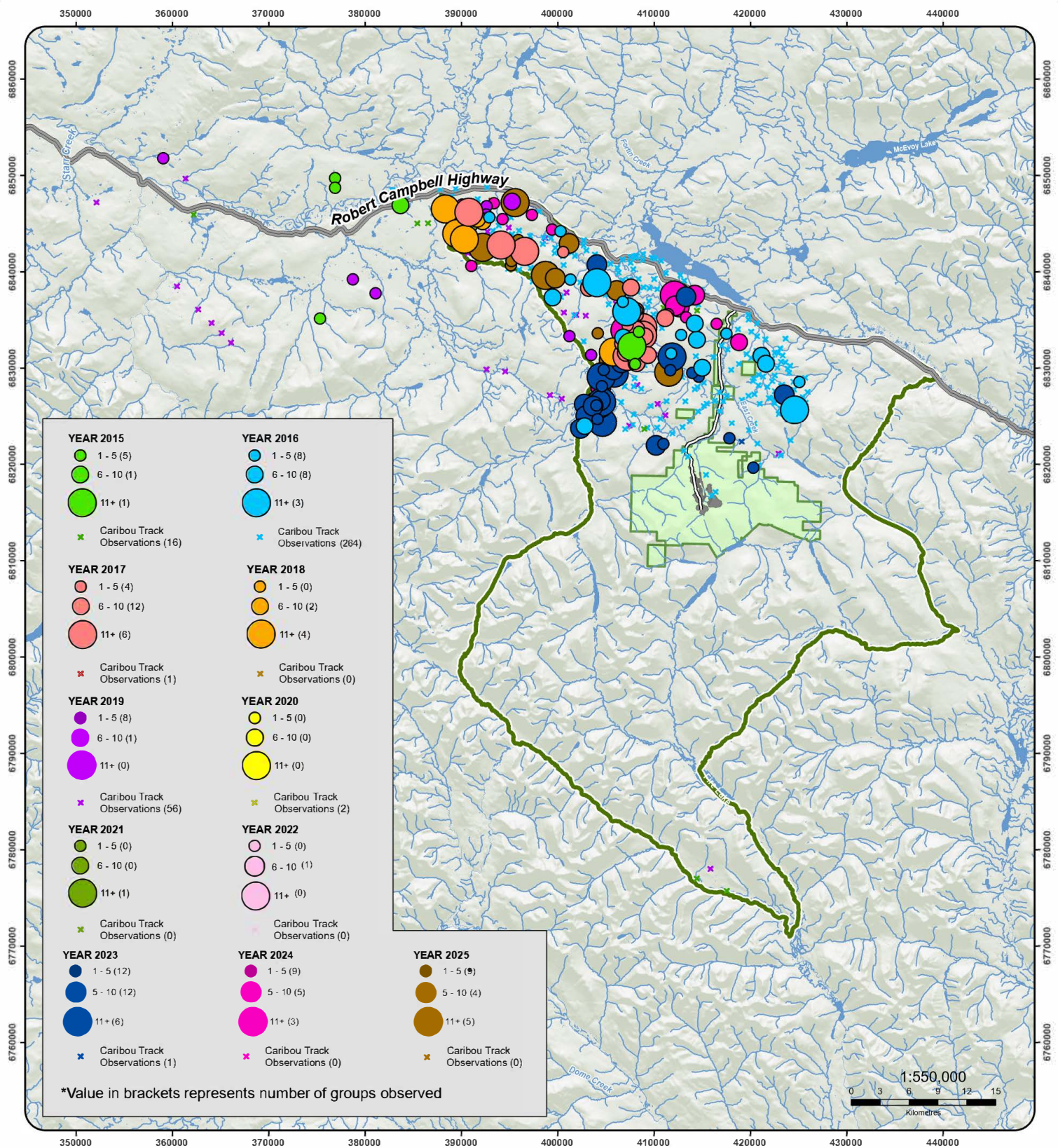
Caribou results from the late winter surveys conducted for the Project from 2015 to 2025 are summarized in Table 8-4 and the locations of observations are presented in Figure 8-5.

Late winter core areas used by the FCH vary annually across their winter range but generally coincide with the Pelly River lowlands and the Caribou Lakes region, west of the Project (Figure 8-5). They infrequently occur in the Regional Study Area, but in years when they are present, they occupy lowland habitats at the north end of the Regional Study Area.

The relative abundance of caribou during the late winter surveys varied from low in years when the core winter range was further west in the Pelly River lowlands (2015, 2019 to 2022; 0 to 2.9 caribou per 100 km of the survey) to moderate in years when core winter range use was more extensive in the Finlayson Lake region (2016 to 2018 and 2023 to 2025; 4.6 to 13.8 caribou per 100 km of survey). Late winter use of the Regional Study Area by the FCH may be related to winter snow depth. Moderate to high use areas appear associated with lowland drainages and bogs. High use areas include the headwaters of Campbell Creek south of Finlayson Creek and the northwest corner of the Regional Study Area adjacent to Big Campbell Creek.

Table 8-4: Summary of Caribou Observations During Late Winter Ungulate Surveys (2015 to 2025)

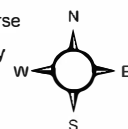
Year	Cows	Calves	Bulls	Unclassified	Total	Number of Groups	Average Group Size	Caribou per 100 km of Flight Path
2015	–	–	–	–	19	7	2.7	0.8
2016	109	11	16	7	143	21	6.8	6.1
2017	–	23	–	175	198	22	9.0	13.8
2018	0	5	0	56	61	6	10.2	4.6
2019	3	3	3	13	22	9	2.4	1.9
2020	0	0	0	0	0	0	0	0
2021	–	2	–	41	43	1	43.0	2.9
2022	–	–	–	8	8	1	8.0	0.4
2023	9	9	1	244	263	30	8.8	11.8
2024	5	5	2	95	107	17	6.3	6.3
2025	11	7	1	111	144	19	7.6	6.7



Location of Proposed Infrastructure
BMC Minerals Ltd. Claim Areas

Regional Study Area (Game Management Subzone 10-07)
Tote Road / Proposed Access Road

Highway
Watercourse
Waterbody



KUDZ ZE KAYAH PROJECT UNGULATE BASELINE REPORT

FIGURE 8-5
**LATE WINTER SURVEY CARIBOU
OBSERVATIONS 2015 TO 2025**

APRIL 2025

National Topographic Database (NTDB) compiled by Natural Resources Canada. Reproduced under license from Her Majesty the Queen, as represented by the Minister of Natural Resources Canada. All rights reserved.

Datum: NAD 1983 UTM Zone 9N

EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.



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last edited by: O. Leblanc | EDI; Date: 2025-09-11

8.1.2.5 Caribou Census Surveys

In addition to the caribou surveys conducted specifically for the Project, ENV has been studying the FCH since 1982. Due to declining herd size at the time, a caribou recovery program was implemented between 1983 and 1989, which included: culling 451 wolves from the FCH's range; reducing licensed harvest; and voluntary harvest restrictions for First Nations residents of Ross River and Watson Lake. Between 1982 and 2022, eight population census surveys have been completed for the FCH during the late winter period. The population was highest in 1990 at 5,950, which was at the end of the wolf control program. The population peak in 1990 was purely the result of a predator-prey dynamic which substantially limited predation on the FCH. Therefore, it is not representative of the herd's population under natural predator-prey dynamics. ENV has conducted a thorough assessment of the FCH's population trends and concluded that the herd may be stabilizing (Russell and Heynen, 2021). Indeed, population estimates from the 2007, 2017, and 2022 census are 3,077 (95% Confidence Interval (CI): 2,905 to 3,249), 2,712 (95% CI: 2,454 to 2,970), and 3,359 (95% CI: 3,085 to 3,634), respectively (Russel, 2022). In fact, the 2022 population estimate is statistically different from the 2017 estimate and corresponds to a 24% increase from the 2017 population. In combination with recent calf survival estimates, this indicates that the FCH is likely stable or increasing (Russel, 2022).

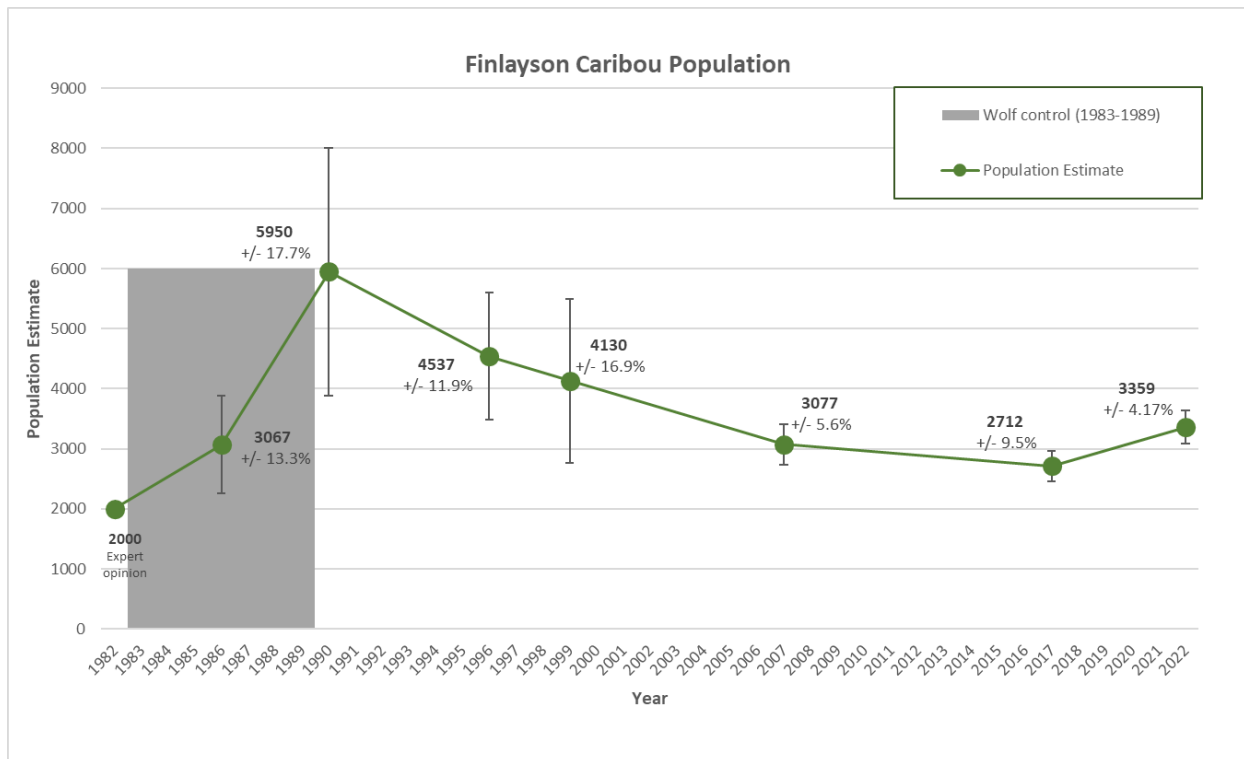


Figure 8-6: Estimated Population of the Finlayson Caribou Herd from Late Winter Census 1982 to 2022

8.2 OTHER CARIBOU HERDS

While the focus of the baseline studies for the Project focused on the FCH, the proposed concentrate transportation route goes through the range of the Little Rancheria and Horseranch caribou herds in southeast Yukon and northern British Columbia near Watson Lake, Alaska Highway, and the north end of the Stewart-Cassiar Highway.

The Little Rancheria Herd has a population of approximately 1,200 and the Horseranch Herd has a population of approximately 600 as of the last surveys, which were conducted in 1999 (BC MECCS 2021). Current and historic long-term trends of these herds are unknown (BC MECCS, 2021).

8.3 MOOSE

Moose (*Alces alces*) are also an important wildlife resource to the Kaska, resident, and guided hunters alike. Two different periods (late winter and early winter) were surveyed each year between 2015 and 2025 to assess moose distribution patterns and abundance in the Regional Study Area (Appendix K).

Moose results from early winter surveys conducted for the Project from 2015 to 2024 are summarized in Table 8-5. The relative abundance of moose was generally consistent across surveys ranging from 4.2 to 16.4 and averaging 11.6 moose per 100 km of survey. Moose distribution and habitat use was also similar between survey years. Moose were predominantly found in a broad east to west band through the central portions of the Regional Study Area, which overlaps with the Project.

Table 8-5: Summary of Moose Observation During the Early Winter Ungulate Surveys (2015 - 2024)

Year	Cows	Calves	Bulls	Unclassified	Total	Number of Groups	Average Group Size	Moose per 100 km of Flight Path
2015	45	15	40	13	113	51	2.2	4.2
2016 ¹	100	23	31	–	154	49	3.1	13.0
2017	92	25	49	–	166	60	2.8	13.8
2018	106	29	63	–	198	72	2.8	16.4
2019	67	23	46	–	136	66	2.1	8.4
2020	110	17	58	–	185	67	2.8	14.2
2021	134	34	84	8	260	108	2.4	9.8
2022	108	43	67	10	228	94	2.4	12.4
2023	66	31	59	36	192	76	2.5	8.3
2024	142	38	97	20	297	128	2.3	15.5

¹ A large proportion of bulls had cast their antlers by early December and may have been recorded as cows likely skewing the composition data.

Moose results from the late winter surveys conducted for the Project from 2015 to 2025 are summarized in Table 8-6. The relative abundance of moose in the RSA was broadly consistent between years, ranging from 1.3 to 7.7 and averaging 4.3 moose per 100 km of survey. The

distribution of moose observations was nearly uniform through the northern half of the Regional Study Area. However, few moose were observed in the southern half across all survey years.

Table 8-6: Summary of Moose Observations During Late Winter Ungulate Surveys (2015 to 2025)

Year	Cows	Calves	Bulls	Unclassified	Total	Number of Groups	Average Group Size	Moose per 100 km of Flight Path
2015	–	–	–	31	31	24	1.3	1.3
2016	37	16	60	2	115	69	1.7	4.9
2017	11	12	0	34	57	34	1.7	4.0
2018	12	7	7	10	36	21	1.7	2.7
2019	20	9	17	45	91	44	2.1	7.7
2020	29	12	19	2	62	39	1.6	4.4
2021	15	3	16	1	35	28	1.3	2.4
2022	9	9	4	72	94	52	1.8	4.5
2023	6	6	0	44	56	34	1.6	2.5
2024	12	12	0	82	107	69	1.6	6.3
2025	19	16	0	99	134	85	1.6	6.2

Data collected between March 2015 and March 2025 assisted BMC in quantifying use of the Project area by moose (Appendix K). Although moose are present in the Regional Study Area in all seasons, during summer moose are dispersed at low densities in low elevation shrub and forested habitats where they are difficult to detect during aerial surveys and where detections are biased towards open habitats. Consequently, little is known about moose seasonal distribution from spring through fall.

Historic and recent surveys, in combination with incidental observations, have shown that moose use habitats in the vicinity of the Project throughout the year; however, suitable habitats found in this region are extensively used by moose in early and late winter. Data collected for the Project in early to late winter surveys confirmed the overall habitat use and distribution patterns observed through historic regional Environment Yukon surveys.

Distribution, habitat use, and relative abundance by moose differed between early and late winter:

- As is typical of moose early winter habitat selection in the region, moose congregate in small to moderate sized groups in upland habitats rich with shrubs, particularly open subalpine shrubland plateaus, subalpine valleys, and open shrub/spruce/fir forests near or above the treeline. Surveys demonstrated that the area covered by the Local Study Area around the Project footprint, especially the open shrublands west of the Project footprint, are extensively used by moose during early winter. Moderate to high use areas appear associated with subalpine drainages, plateaus, upper mountain slopes, and post fire early succession forests. High use areas include the open shrublands west, southwest, and immediately east of the Project footprint.

- In late winter, moose were distributed in small groups of one to two individuals in lowland habitats found in association with abundant shrubs, generally riparian zones along creeks, willow flats in bogs, open conifer forests with a shrub understory, and small willow wetlands in mature conifer stands. Moderate to high use areas appear associated with lowland drainages, especially small headwater streams and bogs, and willow flats in Campbell Creek, Finlayson Creek, and East Creek headwaters. Likely because of the parallel alignment of the Tote Road and Finlayson Creek, the Tote Road Local Study Area intersects moderate to high use late winter habitats along the whole of its length.

Surveys confirm that moose occur at relatively high abundance within the Local Study Area in all seasons but that interactions between moose and the Project may be high from early to late winter.

8.4 THINHORN SHEEP

Environment Yukon identifies several Wildlife Key Areas within the Regional Study Area for thinhorn sheep as part of their Wildlife Key Area Inventory Program but none intersect the Local Study Area (Yukon Government, 2014). Sheep were documented incidentally in the Regional Study Area during the caribou and moose baseline studies for the Project from 2015 to 2025, but none were documented within the Local Study Area (BMC, unpublished data). The closest identified sheep range (anecdotal) is located south of the North Lakes, approximately 7 km southeast of the Project Local Study Area (Yukon Government, 2014).

8.5 GRIZZLY BEAR

Both grizzly and black bears occur in the Project Area. Grizzly bears are designated Special Concern under Schedule 1 of the Species at Risk Act (SARA) (Government of Canada, 2016) and are ecologically and culturally important.

To date, only two grizzly bear dens have been identified during Project baseline studies (Appendix J). Both dens were over 4 km from the proposed Project infrastructure and no dens were observed within the Project Local Study Area. In addition to denning surveys, grizzly sightings and tracks were recorded during other wildlife baseline studies and sightings were also recorded in the Project's Exploration Wildlife Logs (2015 to 2025). A denning habitat suitability model and habitat effectiveness, security, and linkages models were prepared for grizzly bear (Appendix J). Grizzly bear observations and dens were plotted on the suitability maps and aligned well with the predicted areas of suitable habitat.

8.6 FURBEARERS

Other predators in the Project area include black bear (*Ursus americanus*) and grey wolf (*Canis lupus*). Although no targeted surveys were conducted for these species other than the snow track surveys completed in March 2016 and 2017, multiple incidental observations have been recorded during other wildlife baseline studies and sightings were also recorded in the Project's Exploration Wildlife Logs (2015 to 2025). and reported Project's Exploration Wildlife Logs (2015 to 2025). To date, black bear observations have only been recorded at lower elevation sites along the Tote Road. Wolf

sightings and tracks have been reported during various surveys, as well as by BMC employees and contractors. Wolf observations have been made throughout the Regional Study Area from alpine ridges to the boreal forest. Following the wolf control program in the 1980s, wolf populations in the Finlayson Lake area had recovered by 1996 to regional pre-control numbers of approximately 240 (Farnell et al. 2008).

Other furbearer species, such as wolverine (*Gulo gulo*), American marten (*Martes americana*), red fox (*Vulpes vulpes*), and Canada lynx (*Lynx canadensis*) are present in the Project area. In addition to track observations made during the snow track surveys conducted in March 2016 and 2017, incidental observations have been recorded during other wildlife baseline studies and sightings were also recorded in the Project's Exploration Wildlife Logs.

Evidence of historic use of Geona Creek and Finlayson Creek by beaver (*Castor canadensis*) is confirmed by the presence of old dams and lodges. In 2015, a beaver survey was conducted along Geona Creek; however, no sign of recent beaver activity was observed. In 2016, a follow-up beaver survey was conducted in the upper reaches of Geona Creek, and again there was no sign of active beaver use. However, there was evidence of recent beaver activity approximately 2.5 km upstream from the confluence with Finlayson Creek in the form of freshly gnawed willow stems and beaver trails. In 2017, two beaver observations were reported at the headwaters of South Creek.

8.7 COLLARED PIKA AND HOARY MARMOT

Through targeted surveys, collared pika (*Ochotona collaris*) and hoary marmot (*Marmota caligata*) were observed on the mountains on the southern and western sides of the Geona Creek valley and most observations were outside of the Project Area. Pika were observed at high elevation sites that exhibited large, talus rock with crevices below that may provide cover. Sightings of Pika were also recorded in the Project's Exploration Wildlife Logs most years between 2015 and 2025. Given the frequency of observations is suspected that collared pika and hoary marmot are present throughout the Local Study Area at all high elevation sites with suitable habitat. Habitat suitability for collared pika was completed and is presented in the baseline report (Appendix J). Moderate and high suitability pika habitat is present in subalpine and alpine ecosystems in the Local Study Area, mainly southwest of the Project footprint.

8.8 BATS

There are three species of bat known to exist in Yukon, only one of which is expected to be found in the Project area, the little brown bat (*Myotis lucifugus*). A bat detector was installed at a wetland in the Geona Creek valley for one week in August of 2015; no recordings were identified, which confirmed expectations for the subalpine elevation. Two detectors were installed in 2016 at two different wetlands in boreal forest habitat along the Tote Road. Both detectors had some recordings of *Myotis spp.*, assumed to be *M. lucifugus*. Habitat suitability mapping was completed for the little brown bat as presented in the baseline report (Appendix J). Bats are not expected to interact with the Project infrastructure given the poor habitat suitability of high elevation ecosystems where the mine and associated infrastructure will be located. However, bats may interact with parts of the

Access Road at lower elevations where mature forest stands for roosting are located adjacent to riparian areas near ponds and streams for foraging

8.9 BIRDS

A total of 42 bird species were observed during surveys conducted in 2015, and 61 species were observed in 2016. The most frequently observed species were white-crowned sparrow (*Zonotrichia leucophrys*), American tree sparrow (*Spizella arborea*) and Wilson's warbler (*Cardellina pusilla*). A total of five habitat types were surveyed including riparian, wetland, alpine, mixed subalpine, and boreal forest. The greatest diversity of birds was observed in the wetland habitat.

A golden eagle (*Aquila chrysaetos*) nest has been identified in the Local Study area and has been intermittently active between 2015 and 2025, presumably by the same pair. However, nesting success at this site appears extremely low given that it is on a small rock outcrop and easily accessible by terrestrial predators. Another Golden Eagle nesting site is located southeast of the Local Study area and is likely an alternative nesting site of the same pair.

A northern harrier (*Circus cyaneus*) nest was also located in the Project footprint in the headwater wetlands of Geona Creek, near the water quality monitoring station KZ-6. Male and female adult harriers were spotted during the 2015 and 2016 passerine and raptor surveys. Other raptor species observed in the Project area include bald eagle (*Haliaeetus leucocephalus*) and gyrfalcon (*Falco rusticolus*). Ptarmigan (*Lagopus sp.*) were frequently observed throughout the Project area at all elevation levels. Spruce grouse (*Falcapennis canadensis*) were often seen along the Tote Road. Large sandhill crane (*Grus canadensis*) flocks fly over the Project area going north in April and south in August and September with very few landing. In addition, twilight surveys were completed in June 2017 resulting in no common nighthawk (*Chordeiles minor*) and one short-eared owl (*Asio flammeus*) observation. Habitat suitability maps for olive-sided flycatcher, horned grebe, rusty blackbird, short-eared owl, common nighthawk, waterfowl, and cliff-nesting raptors are included in the baseline report (Appendix J).

9 AQUATIC RESOURCES

Baseline assessments of fish and aquatic resources have been conducted in the vicinity of the Project (i.e., in Geona Creek, Finlayson Creek, South Creek, and the North Lakes system) since 1994 (Cominco, 1996, Cominco, 2000, Laberge and Can-Nic-A-Nick, 2003 to 2017, AEG, 2016, BMC, 2021 and Minnow, 2025). The most recent fish and aquatics report is included as Appendix L of this SCP.

9.1 SEDIMENTS

Stream sediments were characterized in 1994 and 1995 by Cominco as part of the baseline studies for the Project in support of the IEE (Cominco, 1996). After a Type A Water Use Licence (WUL QZ97-026) for the Project was issued in 1999, subsequent collection and characterization of stream sediments was conducted every two years from 2000 to 2016 to meet the compliance monitoring requirements of the Water Licence (Cominco, 2000; Laberge and Can-Nic-A-Nick, 2003 to 2017). Sediment sampling was also conducted in stream habitat in Finlayson Creek, Geona Creek, and Fault Creek in 2015 and 2016 to support the YESAB Project Proposal; in 2017 and 2018 to characterize lentic habitat in the vicinity of the Project and in 2024 in advance of implementation of the Project's EMSRP and Adaptive Management Plan (BMC, xx and xxxx). A summary of the sediment monitoring is presented in Table 9-1.

Table 9-1: Summary of Aquatic Sediments Baseline Sampling Programs, Stations, and Years

Station	Description	Year Sampled
KZ-2	Fault Creek	1994, 1995, 2015
KZ-7	Geona Creek	1994, 1995, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2015, 2016
KZ-9 / GEOR	Geona Creek near proposed Lower Water Management Pond discharge location	1995, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2015, 2016, 2024
KZ-13	South Creek near mouth	1995, 2015
KZ-15 / FINR-DS	Finlayson Creek 100 m downstream of confluence with Geona Creek	2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2015, 2016, 2024
KZ-16 / FINR-US	Finlayson Creek immediately upstream of confluence with Geona Creek	2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2015, 2016, 2024
KZ-17	Geona Creek at mouth	2015, 2016
KZ-18	Unnamed East tributary to Geona Creek	2016
KZ-21 / EASR	East Creek at mouth (above confluence with Finlayson Creek)	2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2015, 2016, 2024
KZ-22	Finlayson Creek 100 m downstream of East Creek	2015
KZ-26	Finlayson Creek at Robert Campbell Highway	2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2015, 2016
KZ-27	North River below upper North Lake	2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016
South Lake A	Lake located immediately south of the Geona ponds	2017, 2018
South Lake B1 (Shallow)	Lake located immediately south of South Lake A	2017, 2028
South Lake B2 (Deep)	Lake located immediately south of South Lake A	2017, 2018

Station	Description	Year Sampled
Geona Pond A	Small pond found at the headwaters of Geona Creek that overlaps with the proposed open pit	2017, 2018
McLaughlin Lake (Deep)	Reference Lake located approximately 7 km northeast of the Geona Valley	2018
McLaughlin Lake (Shallow)	Reference Lake located approximately 7 km northeast of the Geona Valley	2018

Note: Sediment samples collected in 1994 and 1995 were collected in July and September respectively, after which, sample collection to support WUL compliance monitoring from 2000 to 2014 was completed in mid to late August of each monitoring year. WUL compliance monitoring of sediments in 2016 was completed from September 30 to October 4 as high flows in August of 2016 delayed the collection of samples due to safety concerns. In 2015, stream sediment sampling to support the YESAB Project Proposal was completed from September 9 to 11.

Sediments over the monitoring period (i.e. from the 1990s through to 2024) have shown year to year variability and site to site variability. However, in general arsenic, cadmium, copper, and zinc are elevated to varying degrees in sediments throughout the study area, corresponding to the fact that these drainages lie in naturally mineralized zones.

9.2 FISH AND AQUATIC LIFE

9.2.1 Benthic Invertebrates

Benthic invertebrate communities were initially surveyed in stream and lentic habitat in Finlayson Creek, East Creek, Geona Creek (including Ponds A and B), South Creek (including South Lake A), and North River in September 1995 as part of the IEE for the Project (Cominco, 1996). Subsequent benthic invertebrate surveys were conducted biannually from 2000 to 2016 (mid to late August in all years except 2016 when sampling occurred from September 30 to October 4)¹ (Cominco, 2000, Laberge and Can-Nic-A-Nick, 2003 to 2017). To support the YESAB Project Proposal, additional baseline studies were completed in 2015 and 2016 to provide a more recent characterization of existing aquatic resources in Geona Creek, fill information gaps from previous baseline studies, and provide data to support post-construction effects assessments and the development of a Fisheries Offsetting Plan considering the Project included construction of mine infrastructure within the Geona Creek catchment. Subsequent baseline sampling in 2017 and 2018 targeted lentic habitat in the vicinity of the Project (BMC, 2021). Additional benthic invertebrate sampling occurred in 2024 (Appendix L) in advance of implementation of the Project's Environmental Monitoring, Surveillance and Reporting Plan (BMC, 2026a) and Adaptive Management Plan (BMC, 2026b). A summary of the benthic invertebrate monitoring is presented in Table 9-2.

Table 9-2: Summary of Benthic Invertebrate Baseline Sampling Program Stations and Years

Station	Description	Year Sampled
KZ-2	Fault Creek	2015
KZ-7	Geona Creek	2015

¹ High flows during August in 2016 prevented field crews from entering the water (due to safety concerns). The assessment was therefore delayed until September 30 after flows receded.

Station	Description	Year Sampled
KZ-9 / GEOR	Geona Creek near proposed Lower Water Management Pond discharge location	1995, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2024
KZ-13	South Creek near mouth	1995
KZ-15 / FINR-DS	Finlayson Creek 100 m downstream of confluence with Geona Creek	1995, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2024
KZ-16 / FINR-US	Finlayson Creek immediately upstream of confluence with Geona Creek	1995, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2024
KZ-17	Geona Creek at mouth	2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2015, 2016
KZ-18	Unnamed East tributary to Geona Creek	2016
KZ-21 / EASR	East Creek at mouth (above confluence with Finlayson Creek)	1995, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2024
KZ-26	Finlayson Creek at Robert Campbell Highway	2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016
KZ-27	North River below upper North Lake	1995, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016
South Lake A	Lake located immediately south of the Geona ponds	1995, 2017, 2018
South Lake B	Lake located immediately south of South Lake A	1995, 2017, 2018
Geona Pond A	Small pond found at the headwaters of Geona Creek that overlaps with the proposed open pit	1995, 2018
McLaughlin Lake	Reference Lake located approximately 7 km northeast of the Geona Valley	2018

Benthic invertebrate communities were generally assessed at the lowest practical level and, at minimum, characterized based on taxonomic richness (number of unique taxa), abundance (number of organisms), invertebrate density (number of organisms per m², and community composition (proportion of major taxa).

Results from 1995 through 2024 have shown fluctuations in both the density and community composition of benthic invertebrates at all sample locations. Benthic invertebrate densities at long-term sampling locations in Geona Creek have varied substantially over time, although some of this variability is likely due differences in sampling methods (e.g., different mesh sizes used for sieving samples) and targeting slightly different habitat across surveys.

The mean tissue metal concentrations documented during the 1995 through 2016 studies were well below the mean concentrations in the Yukon database (Laberge and Can-Nic-A-Nick, 2017), except in 2014 when metal concentrations were an order of magnitude higher than all other years. Elevated concentrations were not observed again in 2016. High metal concentrations observed in 2014 are believed to be from the laboratory testing the samples in error as plant tissue rather than benthic invertebrate tissue. Benthic invertebrates were not analysed for metals during the 2017, 2018 and 2024 field programs.

9.2.2 Fish and Fish Habitat

Baseline fish community and fish habitat assessments were initially completed in 1995 with the objective to determine fish distribution and habitat conditions in streams, lakes, and ponds in the vicinity of the Project, particularly Geona Creek and its headwater ponds, Finlayson Creek (including tributaries intersected by the Tote Road), East Creek, South Creek (including South Lake A and B), and the North Lakes systems. Fish community surveys in 1995 were conducted in spring, summer, and fall, and included the use of backpack electrofishing units, minnow traps, weir/fence traps, angling, aerial surveys, and diver surveys (Cominco, 1996). Captured fish were identified, enumerated, and measured for length and weight. A subsample of Arctic grayling and slimy sculpin captured were retained for more complete examination and analysis. This included the collection of otoliths and scales for aging, stomachs for stomach content analysis, and tissue samples for analysis of tissue metals concentrations. Fish habitat surveys were conducted in spring and included measurements of stream channel width, wetted width, water depth, substrate composition, in situ water quality, discharge rate, and the amount and types of in-stream cover available for fish (Cominco, 1996).

Following the issue of WUL QZ97-026 in 1999, fish community and tissue metals concentrations were assessed in Finlayson Creek (KZ-15, KZ-16, and KZ-26; Figure 4-1) in mid to late August from 2000 to 2014 and September 30 to October 4 in 2016 as part of biannual WUL compliance monitoring (Cominco, 2000; Laberge and Can-Nic-A-Nick, 2003 to 2017). Fish community monitoring was conducted via backpack electrofishing with a minimum of 500 seconds of electrofishing at each site and at least three minnow traps were also set at each site in pools, side-channels, and back eddies where woody debris was present. All captured fish were identified, enumerated, and measured, with at least five slimy sculpin retained at each site for analysis of tissue metals concentrations. Stream habitat surveys were also conducted at each site, and included measurements of stream channel width, wetted width, water depth, substrate composition, and available fish cover.

During development of the YESAB Project Proposal, additional fish community sampling by electrofishing and minnow trapping was carried out in Geona Creek in June, August, and October of 2015 and in June, July, and October of 2016 and on some survey dates also included sampling in Finlayson Creek, Fault Creek, East Creek, South Creek, and/or the North River. To characterize Arctic grayling spawning, visual spawning surveys were completed on the mainstem of Geona Creek on six occasions from May 17 to June 2, 2016. A fish habitat assessment was also carried out on Geona Creek in late August 2015 in addition to an assessment of overwintering habitat availability in February and March of 2016 that included measurements of in-situ water quality, flow (stream habitat only), and depth of water under ice (Ponds A, B, and C).

In 2017 and 2018, fish and fish habitat were assessed in Geona Ponds A, B, and C, South Lake A, South Lake B, and McLaughlin Lake. The lentic surveys used gill nets, minnow traps, and angling to evaluate composition, habitat use, and to estimate relative fish abundance within the waterbodies from June to September (sampling dates varied by waterbody). In addition to fish community surveys, BMC also installed a fish counting fence immediately upstream of the culverts in Finlayson Creek from May 28 to June 26, 2018, and September 21 to 30, 2018 to determine the absolute abundance of fish migrating up and down the system through the Robert Campbell Highway crossing (BMC, 2021).

Detailed surveys of fish habitat were conducted in Geona Creek and some tributaries, Finlayson Creek and South Creek during the high flow period in spring 2024, with fish community characterization in these creeks conducted in summer 2024 (Appendix L).

Arctic grayling is the only fish species that has been documented throughout Geona Creek during baseline fish community sampling conducted in 1995 and from 2015 to 2024. Slimy sculpin have been caught occasionally in upper Finlayson Creek (i.e. upstream the Robert Campbell Highway) and in Geona Creek near the confluence with Finlayson Creek, however none have been observed in Geona Creek above the pond near the confluence with Finlayson Creek. In 1995, fishing was conducted in lower, middle, and upper Geona Creek. In 2015 and 2016, fishing was conducted in the vicinity of sampling stations KZ-17, KZ-9, KZ-7, KZ-6, KZ-2, downstream of Geona Pond B, in the channel between Pond A and B, and upstream of Pond A. In 2017, fishing was conducted in Geona Ponds A, B, and C. In 2024, electrofishing was conducted at five stations in Geona Creek, five stations in Finlayson Creek and over multiple lengths of South Creek. Supplemental minnow trapping was also conducted in the vicinity of the headwater ponds of Geona Creek where most Arctic grayling have historically been captured, and gill netting was used in South Lake B. 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; Appendix L). Although all stages of arctic grayling life history (young-of-year (YOY), juvenile, and adults) have been recorded, the majority of arctic grayling caught in Geona Creek have been YOY and 1+, with 2+ and older individuals caught only occasionally.

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.

Condition (weight-at-length) of arctic grayling captured in Geona Creek could not be compared to other waterbodies in the vicinity of the Project due to either the small sample size of fish with both length and weight data available for a given area/year or because there was little to no overlap in the size range of fish caught. Similarly, there was little overlap in the size of arctic grayling caught during baseline fish community sampling in 1995 relative to later years.

A fish counting fence was installed on Finlayson Creek just upstream of the Robert Campbell Highway from May 28 to June 26, 2018 to determine the extent to which the culverts act as barrier to fish passage. Over the 25 day period, 19 arctic grayling were caught attempting to migrate upstream; of these, 11 were caught from June 21 to 22 during a low water event (BMC, 2021). The mean length of arctic grayling caught was 29.0 cm (range = 21.0 to 38.0 cm; BMC, 2021) suggesting that only larger adults may be able to navigate the culverts under low flow conditions.

Sample sizes for Arctic grayling tissue from Geona Creek and Finlayson Creek have generally been too small to make definitive conclusions regarding natural variability of metals concentrations over time. However, Arctic grayling dry weight muscle tissue collected in 2024 from Geona Creek was comparable to 1995 for most key parameters with available data except lead which was higher in 2024. In Finlayson Creek, mean dry weight concentrations of copper, mercury, and selenium in 2024

muscle tissue was comparable to 1995 whereas arsenic and zinc were higher and lead was lower than in 1995. Mean wet weight concentrations of most key parameters were comparable to or lower in 2024 than 2018 except arsenic, lead, and zinc which were higher in 2024.

The sample size for slimy sculpin from Finlayson Creek in 1995 was extremely small ($n = 3$), however mean whole body concentrations of most key parameters in 2024 were comparable to or lower than in 1995 except arsenic which was 6-fold higher in 2024. Mercury was below the detection limit in 1995 which was slightly higher than the mean concentration of mercury in 2024. Mean concentrations of key parameters in 2024 were within the range of or only slightly higher than mean concentrations from 2002 to 2016, except mean concentration of mercury in 2024 which was slightly lower than the range from 2002 to 2016.

9.2.3 Periphyton

In 2015, Periphyton sampling occurred in Finlayson Creek, Geona Creek and Fault Creek. Abundance and diversity of Periphyton was highest in Geona Creek and lowest in Fault Creek, which was generally consistent with the benthic invertebrate results. Bacillariophyta was the dominant phylum observed at all sites. Bacillariophyceae and Fragilariophyceae were the dominate orders in the phylum, representing an average of 41% to 56% of cells across all sites. All other phyla generally represented less than 1%, except for Cyanobacteria in Fault Creek (4.35%) and Chlorophyta in lower Finlayson Creek (1.6%). *Didymosphenia geminata*, an invasive species, was observed at four locations throughout the study area. In all cases *Didymosphenia* represented <1% of the total number of cells.

9.2.4 Chlorophyll *a*

Determining chlorophyll *a* concentrations provides a measure of algae biomass and therefore the primary productivity of a given location. In 2015 Chlorophyll-*a* samples were collected on Finlayson Creek, Geona Creek and Fault Creek. Chlorophyll-*a* in Geona Creek and Fault Creek in 2015 ranged from 0.59 and 1.86 µg/L with the lowest and highest concentrations at KZ-2 and KZ-17, respectively. The low concentrations in these creeks indicates they are low productivity systems.

10 SOIL AND BEDROCK

Soil and bedrock at the Project site have been characterized through geological mapping and modelling, and site investigations conducted in 1995, 1996, 2015, 2016, 2017 and 2024. This information is provided in:

- Appendix M, presenting a summary of geotechnical characteristics of the Project site;
- Appendix N, presenting a summary of all geotechnical instrumentation installed at the Project site;
- Appendix O, presenting a site characterization report for foundation conditions in the footprint of the proposed waste management facilities, in accordance with APEG BC (2016);
- Appendix P, presenting geotechnical reports for the Project including details of site investigations, detailed borehole and test pit logs, laboratory test results and instrumentation details;
- Appendix Q, presenting permafrost mapping; and
- Appendix R, presenting terrain stability and hazards mapping.

10.1 SOILS

Glacial, periglacial (ice related), and fluvial processes have been involved in the creation of landforms and surficial deposits in the Project area (Cominco, 1996). This was confirmed in work conducted by Knight Piésold in 2015 and 2016 (Knight Piésold, 2016). The main surficial deposits in the area are detailed in Appendix O and include:

- Organic soil, occurring in thin zones (less than 0.5 m thick) at surface in the vicinity of the ephemeral drainage line in the northwest part of the proposed Class C Storage Facility and locally at the floor of the Geona Creek Valley;
- Alluvium, deposited by ongoing fluvial processes along the Geona Creek drainage line and along the ephemeral drainage line at the proposed Class C Storage Facility, are generally observed to be up to 11 m thick. A thicker area of alluvium is present at the alluvial fan at the base of Fault Creek;
- Colluvium, comprising material that has moved down slope by mass wasting, located on the steeper lower Geona Creek valley slopes and on steeper slopes in the northeast part of the proposed Class C Storage Facility, observed to be up to 14 m thick;
- Glacial Till, resulting from direct glacial action, comprising silty sand and gravel deposit overlying much of the Project site, ranging in thickness from less than 1 m up to 10 m, typically decreasing in thickness with elevation;
- Glaciofluvial deposits, resulting from the melting of glaciers and ice sheets, comprising sands and gravels on the lower slopes of the Geona Creek Valley and on the valley floor at the

proposed Class C Storage Facility, observed to ranging in thickness from less than 2 m up to 5 m; and

- Glaciolacustrine units, deposited in glacial lakes during the McConnell Glaciation, comprising sandy and clayey silt to sand, occurring locally at the proposed Class C Storage Facility in zones up to 6 m thick.

The most common Soil Order (soil classification based on dominant physical, chemical, or biological properties) encountered during the ecosystem survey comprised Cryosols. Cryosols are soils that overlay shallow permafrost (less than 2 m below the surface) especially on the north aspects in Spruce/Feathermoss forests and in the valley bottoms where thick organic layers insulate mineral soils from solar radiation. The other orders of mineral soils encountered within the study area were Dystric Brunisols (displaying some horizontal development) found on south facing mountain slopes and old alluvial plains. Regosols are young soils with a poorly developed B horizon. Regosols are mainly located in the alpine where soils evolve slowly or in floodplain corridors where there is repeated disturbance by high water events.

10.1.1 Class A and B Storage Facilities

The proposed Class A and B Storage Facilities are located on the western slopes of the Geona Creek Valley. Encountered surficial deposits range in thickness from 0.3 to 14.3 m. The typical overburden profile consists of an organic silt layer ranging from 0 to 0.6 m thick, which generally overlies silty, gravelly sand and sandy silt deposits with varying amounts of gravel and cobbles. Boulders were also encountered in some drill holes and test pits. The deposits are described as compact glacial till with compaction increasing with depth.

10.1.2 Class C Storage Facility

The proposed Class C Storage Facility is located in a small valley offshoot along the east slopes of the Geona Creek Valley at the southern end. Encountered surficial deposits in the Class C Facility area range in thickness from 1.4 to 19.2 m. The typical overburden profile consists of an organic silt layer ranging from 0.3 to 0.4 m thick, overlying silty, gravelly sand deposits, which are described as compact to dense glacial till and colluvium. Isolated fine-grained glaciolacustrine silt and clay deposits were encountered overlying the bedrock.

10.1.3 Overburden Stockpile

The proposed Overburden Stockpile is located on the eastern slope of the Geona Creek Valley, north of the Class C Storage Facility. Encountered surficial deposits in the Overburden Stockpile area range in thickness from 2.4 to 9.0 m. The typical overburden profile consists of an organic silt layer ranging from 0.2 to 0.3 m thick, overlying gravelly silt and sand deposits that are described as loose to compact glacial till and colluvium.

10.1.4 ABM Open Pit

Surficial deposits observed in the proposed ABM Open Pit area range in thickness from 0.2 m to more than 18 m. The typical overburden profile consists of an organic silt layer 0.1 to 0.9 m thick, overlying alluvium, glaciolacustrine, glacial till, and colluvium deposits. The deepest deposits are encountered at lower elevations along the eastern side of the valley and are typically well graded silty, gravelly sand with cobbles. Alluvium deposits are located to the south and comprise coarse-grained sand and gravel. In the northwest the overburden is significantly shallower and comprises silty, gravelly, sand deposits of glacial till and colluvium. Fine grained glaciolacustrine deposits of sandy silt were encountered at the valley bottom near the existing lakes.

10.1.5 Upper and Lower Water Management Ponds

The proposed Upper and Lower Water Management Ponds are located on the Geona Creek Valley floor. Overburden in this area consists of interlayered glacial till, alluvial, and glaciolacustrine sediments ranging from 3.5 to 20.0 m thick on the west slopes, 17.5 to 21.0 m thick in the valley bottom, and 4 m to 16 m thick on the east slopes. The typical overburden profile comprises a 0.2 to 2.0 m thick organic silt layer, overlying inorganic deposits. Along the eastern and western valley slopes the deposits are described as silty sand and gravel. In the valley bottom both coarse grained alluvium deposits of sand and gravel along with fine grained glaciolacustrine deposits of clayey silt were encountered.

10.1.6 Process Plant

Surficial deposits encountered in the Process Plant area range in thickness from 2.2 to 7.4 m. Deposits typically consist of a 0.1 to 0.5 m thick layer of soft organic silt, which overlies silty, gravelly sand deposits that are described as compact to dense glacial till.

10.2 BEDROCK

Bedrock at the Project site is discussed in Chapter 3 and characterized in detail in Appendix O, and generally includes a thin layer of weathered bedrock overlying intact bedrock.

Weathered bedrock is present over much of the Project site, typically ranging from 1 m to 2 m thick. It is likely that some weathered bedrock material was eroded by the advancing ice sheet during the McConnell Glaciation.

Intact bedrock comprises inter-layered low-grade metasedimentary rocks and metavolcanics of the Wind Lake formation. The parent rock of the metasediments is predominantly mudstone and carbonaceous mudstone whereas the parent rock of the metavolcanics includes alkalic mafic volcanic rocks. Low-grade metasedimentary rocks are classed as the 'mudstone unit' and low-grade metavolcanics are classed collectively as the 'volcanics unit'. Both bedrock units show extensive quartz and calcite veins, which are up to 1 m thick. The calcite veins commonly exhibit dissolution vugs and the core logs identify open discontinuities with pervasive iron staining associated calcite veining.

10.3 PERMAFROST

The Project is located within an area of extensive discontinuous permafrost close to the boundary of an area of sporadic discontinuous permafrost (Heginbottom and Redburn, 1992). Permafrost mapping for the Project was undertaken in 2017 (Palmer and CoreGeo, 2017), and revised in October 2023 (Palmer, 2023). A copy of the 2023 mapping report is presented in Appendix Q.

The mapping identifies areas of confirmed permafrost at the northeast toe of the proposed Class A Storage Facility, the north part of the proposed Class C Storage Facility and the west part of the proposed Overburden Stockpile including the site of the proposed collection pond. Probable permafrost areas are mapped throughout approximately half the area of the proposed Class B Storage Facility and collection pond, at the south parts of the proposed Class A Storage Facility and collection pond, at the north and east parts of the proposed Class C Storage Facility and the northwest part in the vicinity of the drainage line and at the upslope area of the proposed Overburden Stockpile. The predominant mapped surficial geological materials in the areas of confirmed and probable permafrost are glacial till and colluvium. The permafrost mapping shows the lower valley slopes on the east side of the Geona Creek valley are the most likely to contain permafrost.

Data from thermistors, test pits and boreholes suggest that these maps may overestimate the extent of permafrost at the site. Ground temperature monitoring has been conducted since 2017 using 20 thermistors across the site (Appendix E). Most thermistors record above-freezing temperatures at most times of the year, while only one thermistor has recorded sub-zero temperatures persisting for more than a year. Ice has been observed in very few of the dozens of test pits and boreholes across the site (Appendix O and Appendix P).

11 SEISMICITY

A site-specific seismic hazard assessment has been performed for the Project, and is provided in Appendix S. The assessment included review of regional seismicity and seismic hazard analyses to provide seismic design parameters for Project infrastructure.

A review of historical earthquake records and regional tectonics indicates that the Project site is situated in a region of low seismicity. However, the region of the southwest Yukon and northwest coastal British Columbia is one of the most seismically active areas in Canada. The seismic hazard in the region is also influenced by the seismically active region of southeast Alaska, including the Alaska-Aleutian subduction zone. The high seismicity in the southwestern Yukon and adjacent regions of Alaska and British Columbia is associated with the Yakutat terrane collision that is creating the St. Elias Mountains. The Yakutat collision is occurring at a tectonic corner defined by the transition from strike-slip faulting on the Fairweather fault to tectonic plate subduction along the Alaska-Aleutian Megathrust subduction zone.

The coastal regions of the southwest Yukon, southeast Alaska, and northwest coastal British Columbia have experienced many large earthquakes, including events with magnitudes in the range of Magnitude 7 (M7) to M8. These earthquakes are typically associated with the Fairweather fault and the Denali fault systems. There is potential for earthquakes greater than M8 to occur on these fault systems. However, the amplitude of ground motions experienced at the Project site from large earthquakes along these faults will be relatively low due to attenuation over a large distance (approximately 370 km or more).

The Tintina strike-slip fault extends for approximately 1000 km from southeastern Yukon into eastern Alaska. Different studies have indicated that there has been between 400 and 1000 km of right-lateral displacement along the Tintina Trench since mid to late-Cretaceous time (about 65 million years ago) which translates to an average slip rate of about 8 mm/year. Other geologic evidence suggests that the present strain rate may be closer to 0.5 to 1 mm/year, suggesting that the fault no longer accommodates significant seismic deformation. The present fault is associated with low levels of seismicity up to about Magnitude 5 (M5) but with potential for M7+ earthquakes albeit at long return periods. This aligns with recent research that recognizes the potential risk of future earthquakes at the Tintina Fault (Finley et al., 2025).

Seismic ground motion parameters have been determined from a Probabilistic Seismic Hazard Analysis (PSHA) to develop a seismic hazard model for the region of western Canada and Alaska. A Deterministic Seismic Hazard Analysis was also carried out to predict maximum ground motions at the Project site from earthquakes located on the major fault systems in the regions of northwestern Canada and southeastern Alaska. Appropriate ground motion prediction models defining the relationship between earthquake magnitude, source to site distance and ground shaking, defined by Peak Ground Acceleration (PGA) and spectral acceleration values, have been used in the seismic hazard analyses. The seismic sources and source parameters defined in the model are consistent with those used by the Geological Survey of Canada (GSC) for defining the seismic hazard in western Canada. However, the GSC model does not include the Tintina fault. The Tintina fault may make a significant contribution to the seismic hazard at the Project site (particularly for long return periods)

due to its proximity (minimum distance of about 21 km). Consequently, the Tintina fault was added to the seismic hazard model developed for this study using the available information and recorded seismicity data.

The PSHA was used to predict PGA and spectral accelerations defining uniform hazard spectra, for return periods ranging from 100 to 10,000 years, corresponding to Annual Exceedance Probabilities ranging from 1/100 to 1/10,000. PGA and spectral accelerations were initially calculated for a Vs30 value of 450 m/sec (representing very dense soil or soft rock) for comparison with values provided by the seismic hazard database of Natural Resources Canada (NRC). Vs30 is used to characterize the site foundation conditions and represents the average shear wave velocity in the top 30 metres of the ground profile. The predicted PGA values for return periods of 475 years and 2,475 years are 0.05 g and 0.14 g respectively, indicating the seismic hazard at the Project site is relatively low. PGA values for return periods ranging from 100 years to 10,000 years are presented in Table 11-1.

Table 11-1: Seismic Annual Exceedance Probability, Return Period, and Peak Ground Acceleration

Return Period (Years)	Peak Ground Acceleration (gravity)	Probability of Exceedance in 28 Years
100	0.015	25%
475	0.050	6%
1,000	0.082	3%
2,475	0.14	1%
5,000	0.20	0.6%
10,000	0.27	0.3%

12 GEOCHEMISTRY

The acid rock drainage and metal leaching (ARD/ML) potential of the waste rock, tailings, mineralized rock and overburden to be produced by the Project has been evaluated using static and ongoing kinetic geochemical testing. Detailed information on the geochemistry methods and results can be found in Appendix T.

The ABM Deposit is a typical VMS deposit in that it comprises a zone of massive sulphide surrounded by an alteration halo that grades outwards from massive sulphide to disseminated sulphide and from Fe-carbonate to calcite. The carbonate and sulphide alteration cross-cuts stratigraphy. Geological units which post-date the mineralizing event, for example the Wind Lake formation, are unmineralized and unaltered. In general terms, the disseminated sulphide zone (predominantly pyrite +/- Fe-carbonate) will be acid producing, while the more distal calcite halo will be acid consuming. The transitional zone lying in between may be either acid producing or acid consuming depending on the relative quantities of sulphide and calcite.

Prior to BMC's sampling for the ARD/ML characterization program, ten geodomains were defined using a combination of primary lithology, texture, and alteration mineralogy. The geodomains were used to ensure that there was adequate sampling both in terms of the number of samples and spatial distribution. At the time this logging and sampling strategy was developed, it was contemplated that the ten geodomains would later be composited into fewer larger domains that reflected the proposed mining and waste management process. A total of 567 samples were selected for geochemical analysis.

Cominco completed an ARD/ML characterization in the 1990s in support of their project development at the time. Their waste rock acid base accounting static dataset ($n = 243$) was evaluated and deemed fit for use and was supplemented with acid base accounting analysis of waste rock sampled from exploration drill core collected in 2015 ($n = 324$) to expand the geographic range of the samples, resulting in an acid base accounting static dataset of 567 samples. Measurements of the acid generating potential and acid neutralizing potential (NP) indicated that the bulk of waste rock associated with the upper portion of the hanging wall and the footwall were not potentially acid generating (non-PAG). Samples of mudstone from the southeastern corner of the ABM Zone were also largely non-PAG. Samples located proximal to the orebody tended to have higher sulphide contents and were predominantly potentially acid generating (PAG). Although sulphide content was not particularly elevated in rhyolite samples from the Krakatoa Zone (median 0.76 wt.%), NP was generally low (median 17 kg CaCO_3/t) resulting in the majority of these samples also being classed as PAG. Shake flask extraction testing indicated that, where present, elevated soluble trace element concentrations were mainly associated with the samples from units containing significant disseminated sulphides located close to the massive sulphide mineralization.

Mineralized rock and tailings samples were all PAG. Their moderate to relatively high (median 70 and 96 kg CaCO_3/t , respectively) NP content will likely delay the onset of acidic leachate somewhat, however, humidity cell acid generating potential and NP depletion time calculations indicate that tailings material deposited at the start of mining will likely develop acid drainage during Project operations (i.e., <10 years). Mineralized rock samples had elevated concentrations of shake

flask extraction-soluble selenium, lead, and zinc. Tailings samples also returned high soluble concentrations of the same elements in addition to copper, thallium, and cadmium, with orders of magnitude higher trace element leaching rates observed in NP-depleted sulphidic waste rock and tailings humidity cell leachate. Overburden soil and rock samples collected across the Project site were non-PAG, with limited metal leaching potential.

Trickle leach column and field barrel kinetic testing suggests that metal leaching at circumneutral pH is a concern for selenium, antimony, uranium, cadmium, zinc, and arsenic. The majority of elevated concentrations were associated with PAG material, although elevated arsenic leaching was observed in the samples from field barrel and trickle leach columns that contained mafic volcanics rock and the trickle leach column that comprised feldspar-quartz porphyry intrusive rock. Overall, elevated concentrations of arsenic, antimony, cadmium, copper, lead, nickel, selenium, thallium, uranium, and zinc were observed in at least one kinetic test.

Waste rock classification criteria were developed based on the potential for acid generation and metal leaching. The details of the classification and material handling procedures are described in more detail in the Tailings Management Plan (BMC, 2026c) and the Waste Rock and Overburden Management Plan (BMC, 2026d).

Waste rock will be classified as either Class A, Class B or Class C, based on its acid drainage and metal leaching potential, then placed into a waste storage facility over short-term and long-term periods. The identification of the waste rock “Class” will be based on laboratory analysis for sulphur and calcite content to estimate the acid and neutralization potential. Separate facilities will be constructed to store each Class of waste rock.

Class A waste rock is defined as strongly PAG material with an associated high potential for metal leaching in the short term (i.e. during Project operations). This material will be contained in a storage facility with controlled drainage during operations and will be encapsulated and reclaimed after cessation of mining to minimize contact with oxygen and water.

Class B waste rock is defined as weakly PAG with a potential for metal leaching potential that is lower than Class A material over the longer term (after cessation of mining activities). Storage of this material will require controlled drainage during operations. Encapsulation will be required after cessation of mining as part of the reclamation plan.

Class C waste rock is defined as non-PAG and has low potential for metal leaching. Drainage of Class C material is expected to remain circumneutral and is not anticipated to require treatment. This material is suitable for construction purposes around the site as well as capping material required for reclamation during closure.

Major and trace constituent release rate data from circumneutral and acidic kinetic experiments will inform estimates of the drainage water quality from the three storage facilities throughout operations and closure and refine the preliminary waste rock management plan. These data will continue to be integrated with the Mine planning and scheduling in the engineering design of the Project.

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