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Appendix 8.1A:	Archaeology 2013 Baseline Report (AMEC E&I)
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8 ASSESSMENT OF POTENTIAL HERITAGE EFFECTS

8.1 Heritage Baseline

8.1.1 Archaeological Sites and Historical Heritage Sites

The 2013 Archaeology Baseline Report is included in **Appendix 8.1A**. The Baseline Report presents the results of the heritage baseline (background and field) studies conducted between 2011 and 2013 as part of a multi-year heritage baseline study program.

The report provides an overview description of the Project, and summarizes background information on archaeological and historical heritage sites from the completed heritage baseline studies. It identifies the objectives of the heritage studies, and potential archaeological and historical heritage sites associated with the Project area, as well as general methodologies used for the assessments of these sites. The heritage baseline studies focused on three Valued Components (VCs): archaeological sites, historical heritage sites, and paleontological sites.

A key starting point for research is the baseline inventory, which draws on analysis of archaeological and historical records. The heritage baseline study methods include two key components, a baseline inventory of known heritage resources, and an Archaeological Impact Assessment (AIA). The baseline inventory consists of:

- A data-gap analysis and desktop review of available archaeological, historical heritage, and paleontological information relevant to the study area (within or adjacent to the proposed Project) – this is equivalent to an Archaeological Overview Assessment (AOA) as defined in the British Columbia (BC) AIA Guidelines (Government of BC, 1998);
- Determining the number and extent of previous archaeological studies within the study area, including those which encountered no heritage resources;
- Creating a model of archaeological site potential for the proposed Project locality which establishes three classes of lands with archaeological site potential (low, moderate, high); lands with moderate to high archaeological potential requires further (in-field) assessment; and
- Including the following sources:
 - Published and unpublished ethnographic, archaeological, and historical literature for the Nechako-Blackwater drainage areas;
 - Geo-spatial data for documented heritage (i.e., archaeological and historical sites) in the vicinity of the proposed Project area acquired from an electronic database (the Provincial Heritage Register) maintained by the Archaeology Branch;
 - The Vanderhoof District office of BC Ministry of Forests, Lands and Natural Resource Operations (BC MFLNRO) for information on lands covered in the past by archaeological assessments for forestry developments in their district;

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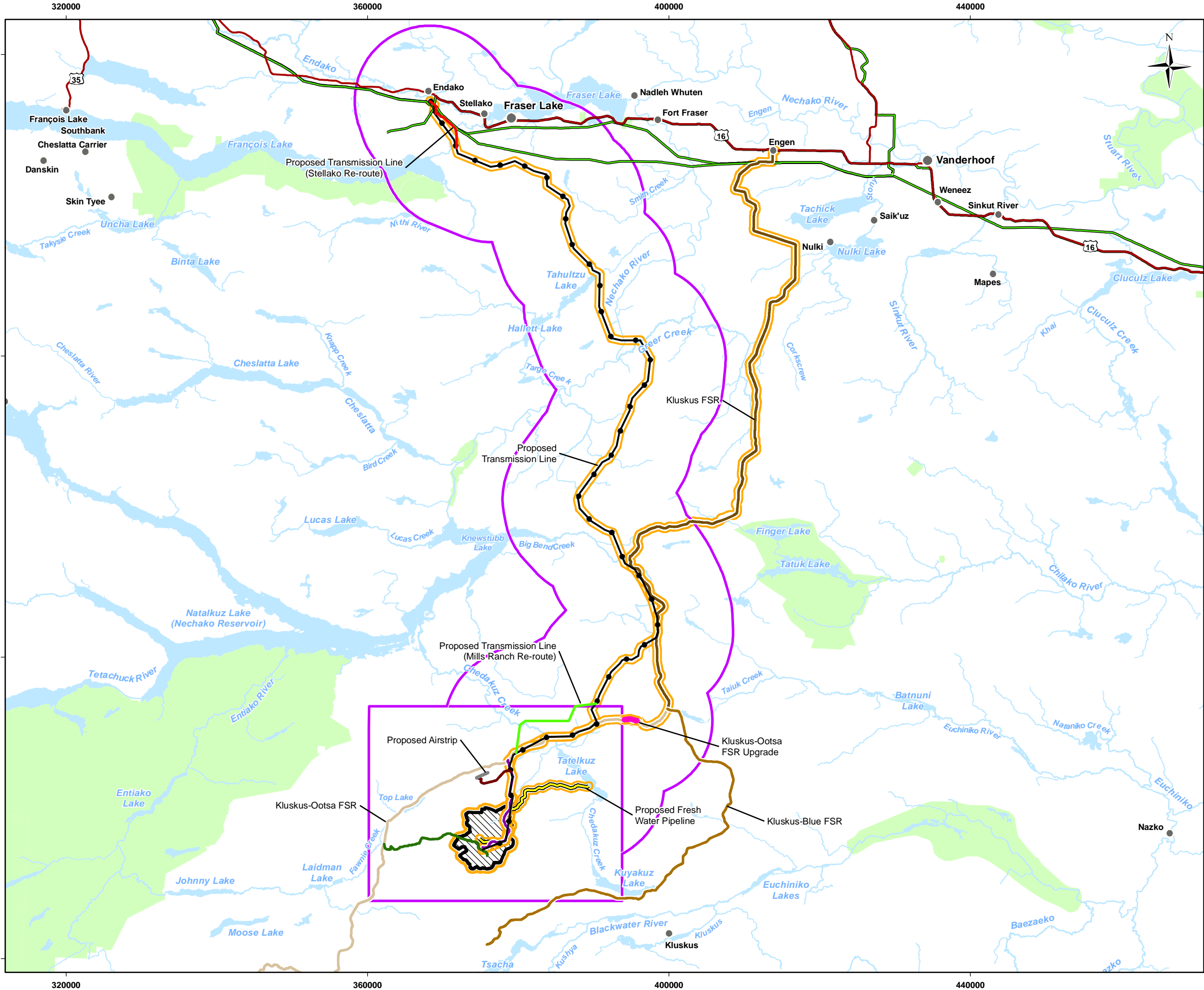
- Archaeology Branch for other kinds of archaeological assessments in this region, including any available archaeological potential models for this area that are not currently available via Remote Access to Archaeological Data;
- Mapped biophysical data for localized information pertinent to the assessment of archaeological potential values in this region, including bedrock geology, surface sediments and/or soil classification, and Biogeoclimatic (BGC) zonation; and
- The Land Tenure Branch, BC MFLNRO, and the Geological Survey of Canada contacted for information regarding paleontology for the proposed Project footprint.

Based on the British Columbia *Environmental Assessment Act* (BC EAA) (Government of BC, 2002a) and *Canadian Environmental Assessment Act, 2012* (CEAA, 2012) (Government of Canada, 2012) application process, reasonable expectations, and professional judgment, the following study area boundaries were established for the heritage baseline study (**Figure 8.1-1**):

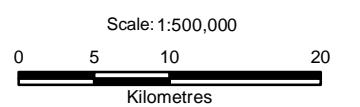
- A Local Study Area (LSA), which includes the Project area, plus a buffer encompassing a zone of potential, direct project-specific effects; and
- A Regional Study Area (RSA), which includes the Project and surrounding lands, encompassing a zone for data collection only, and for which there are no project effects on heritage sites.

The Project LSA is defined by an approximately 500-metre (m) buffer around the Project facilities, as defined in the Application Information Requirements (AIR). Six LSAs have been defined for the Project:

1. Proposed mine site;
2. Proposed transmission line and two re-route options;
3. Mine site access road;
4. Proposed freshwater supply pipeline;
5. Proposed airstrip and access road; and
6. Kluskus Forest Service Road (FSR) (realignment of road from 104+900 to 106+738 km).



- Legend**
- Populated Place
 - 16 Highway
 - Kluskus FSR
 - Kluskus-Blue FSR
 - Kluskus-Ootsa FSR
 - Existing Transmission Line
 - Stream
 - Waterbody
 - Parks & Protected Areas
- Project Components**
- Exploration Road
 - Proposed Mine Access Road
 - Kluskus-Ootsa FSR Upgrade
 - Proposed Transmission Line
 - Proposed Transmission Line (Mills Ranch Re-route)
 - Proposed Transmission Line (Stellako Re-route)
 - Proposed Fresh Water Pipeline
 - Proposed Airstrip Access Road
 - Proposed Airstrip
 - ▨ Proposed Mine Site
- Heritage Resources**
- Regional Study Area
 - Local Study Area



Reference
BC Government GeoBC Data Distribution

CLIENT:

PROJECT: Blackwater Gold Project

Heritage Resources Baseline Study Areas

DATE: September, 2014	ANALYST: PK	Figure 8.1-1
JOB No: VE52420	QA/QC: GH	PDF FILE: 16-100-001_v9.pdf
GIS FILE: 16-100-001_v9.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	

\\bby-fs2\by-ee\gis\Projects\VE\VE52095_Richfield_Blackwater\Mapping\16-100-001_v9.mxd

Aside from a few key sources, the archaeological and historical heritage information available for the LSA was uninformative as a tool for baseline research. Given the paucity of archaeological and other heritage resource information from within the LSA, prior to the Project heritage study, a significant expansion of the research catchment area was required for an adequate sample of comparative data. A larger geographic scope, the RSA, was used for the baseline research, and is defined in the AIR as a 33-kilometer (km) by 25 km rectangle around around the proposed mine site footprint, and a 500 m from centerline in either direction (1 km total) buffer on the centreline of the transmission line, access road, and freshwater supply pipeline footprints. Additional information pertaining to the transmission line study area including access roads are presented in **Section 2.2.4.4**. Beyond the mine development footprint, it is anticipated the Project will not affect archaeological or other heritage sites. There are no technical or administrative boundaries relevant to the heritage effects assessment.

The *CEAA, 2012* “Reference Guide on Physical and Cultural Heritage Resources” defines heritage resources as: “a human work or a place that gives evidence of human activity or has spiritual or cultural meaning and that has historic value” (Canadian Environmental Assessment Agency (the Agency, 2012). It further outlines four categories of heritage resources: paleontology, archaeology, historic sites, and traditional land use.

The BC *EAA* requires the assessment of a proposed project’s effects upon cultural heritage resources (CHRs), which includes impacts to archaeological sites. For all reviewable projects, the BC Environmental Assessment Office (BC EAO) requires an assessment of CHRs in accordance with the AIR Template (BC EAO, 2013).

Archaeological resources in BC are VCs by virtue of their protection under the *Heritage Conservation Act (HCA)* (Government of BC, 1996b). Section 13 of the *HCA* specifies that an individual (or corporation) must not “damage, excavate, dig in, or alter or remove any heritage object” from an archaeological site, except in accordance with a permit issued by the Minister. The *HCA* confers automatic protection on archaeological sites that predate 1846, or undated sites that could predate 1846. This protection is granted regardless of whether they are recorded in the Provincial Heritage Register, or whether they are located on Crown lands, or on private property. Post-1846 historical heritage sites that do not meet the criteria for automatic protection under section 13 can be protected by Ministerial Order or Designation by an Order-in-Council, or by municipal and regional governments under the *Local Government Act* (Government of BC, 1996c).

The types of archaeological resources automatically protected by section 13 of the *HCA* include:

- Archaeological sites occupied or used before 1846;
- Aboriginal rock art with historical or archaeological value;
- Burial places with historical or archaeological value;
- Heritage ship and aircraft wrecks; and
- Sites of unknown attribution that could have been occupied prior to 1846.

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Protected archaeological sites may not be altered or disturbed in any manner without a permit issued under sections 12 or 14 of the *HCA*. Further, heritage sites of Aboriginal origin not automatically protected by the *HCA* may be subject to legal interpretations of the Supreme Court of Canada decision in *Delgamuukw vs. British Columbia* (1997).

Historical heritage sites are locations which contain structures, things, or other forms of physical evidence that are of historical or architectural significance. Historical heritage sites and locations in this part of BC are primarily attributable to post-contact Euro-Canadian settlement and land use, but also include habitations and other evidence left by Aboriginal peoples in that time period.

For the purposes of this assessment, historical heritage sites and cultural resource sites follow the definition of archaeological sites, which:

“consist of the physical remains of past human activity. The scientific study of these remains, through the methods and techniques employed in the discipline of archaeology, is essential to the understanding and appreciation of prehistoric and historic cultural development in BC. These resources may be of regional, provincial, national, or international significance” (Archaeology Branch, 1998).

The historical heritage VC is those resources with an identified interaction with the Project. They were chosen based on regulatory requirements, as well as Aboriginal stakeholder interests, legislative protection, and sensitivity to potential project effects. Furthermore, the historical heritage VC has been identified as important in other mining Environmental Assessments (EAs), and there is sufficient information available to adequately assess Project effects on this VC.

Selection began with the preliminary heritage resources VCs listed in the Project AIR / Environmental Impact Statement Guidelines (EIS Guidelines), followed by a consideration of possible additional VCs through a detailed review of Agency and BC EAO requirements and standards; BC Archaeology Branch requirements, policies, guidelines, and bulletins; comments on the EIS Guidelines received from federal and provincial regulatory agencies, Aboriginal communities and organizations, and other groups; and an assessment of sensitivity to potential project effects based on experience and professional judgment.

For the purposes of the Heritage Baseline, a CHR follows the definition provided in the *Forest Act* (Government of BC, 1996a) and is “an object, a site, or the location of a traditional societal practice that is of historic, cultural, or archaeological significance to British Columbia, a community or an aboriginal people.” Section 10 of the *Forest Planning and Practices Regulation (FPPR)* (Government of BC, 2012) further refines the definition of a CHR under the *Forest and Range Practices Act* (Government of BC, 2002b). The *FPPR* states its objective as set by government is: “to conserve, or, if necessary, protect cultural heritage resources that are: (1) the focus of a traditional use, by an Aboriginal people, and that are of continuing importance to that people; and (2) not regulated under the *Heritage Conservation Act*” (Government of BC, 2012).

For this study, specific examples of CHRs include culturally modified trees (CMTs), trail blazes, traps, and traplines that postdate 1846 AD and are not protected under the *HCA*.

An AIA conducted under Heritage Inspection Permit #2012-0295, issued by the Archaeology Branch, was undertaken in fall 2012 and summer 2013 for the mine site footprint, transmission line, mine access road, freshwater supply pipeline, airstrip and access road, and the realignment of the Kluskus FSR between KM 104+900 and KM 106+738. The results of the AIA are presented below.

8.1.1.1 Proposed Mine Site Footprint

The AIA identified three archaeological sites and one historical heritage site within the mine footprint. The field assessment identified 77 areas of high or moderate archaeological potential, in which 1,423 subsurface tests were excavated. Twenty CHR sites were identified, consisting of blazed trees and non-protected CMTs postdating 1846. Archaeological site FhSe-73 consists of an isolated artifact and a cache pit; FhSe-74 consists of an artifact scatter; and FhSf-4 consists of a single stone tool. One historical heritage site, the remains of a cabin, was also identified.

8.1.1.2 Proposed Transmission Line

The AIA identified four archaeological sites. One historical heritage site, a roadside memorial cross, was identified within the primary reference alignment transmission line footprint. Field assessment of the transmission line identified 18 locations with moderate or high archaeological potential, in which 311 subsurface tests and six 50 x 50 cm evaluative units were excavated. Two protected heritage sites, the Messue Trail (FhSe-43), and the Cheslatta Trail (FISe-2) were identified. In addition, archaeological sites GaSf-47, which consists of 10 cache pits, and GaSf-48, which consists of one cache pit, were identified. Twelve CHRs were identified, consisting of unprotected CMTs, blazes, and box traps.

8.1.1.3 Proposed Transmission Line – Tatelkuz Lake Ranch Re-route

The AIA identified one protected archaeological site within the Tatelkuz Lake Ranch Re-route of the proposed transmission line, the previously identified Messue Trail (FhSe-43). Eight areas of moderate archaeological potential were identified, and 109 subsurface tests were excavated. No other archaeological sites and no historical heritage sites were identified. Two unprotected cultural resources—a blaze and a bark-stripped tree—were identified within the Tatelkuz Lake Ranch Re-route.

8.1.1.4 Proposed Transmission Line – Stellako Re-route

The AIA identified four archaeological sites within the Stellako Re-route of the proposed transmission line. GaSf-43, GaSf-44, GaSf-45, and GaSf-46 each consist of a single cache pit. Eleven areas of moderate or high archaeological potential were identified, and 171 subsurface tests were excavated. Four CHR sites were identified, consisting of non-protected CMTs. The remnants of a cabin, previously identified historical heritage site GaSf-10, were also identified.

8.1.1.5 Proposed Mine Access Road

The AIA identified no archaeological sites and no historical heritage sites. The field survey identified no locations of moderate archaeological potential, and no subsurface tests were excavated.

8.1.1.6 Proposed Freshwater Supply Pipeline

The AIA identified one archaeological site, the previously identified Messue Trail (FhSe-43). No other archaeological or historical heritage sites were identified. The field survey identified two areas of moderate archaeological potential on the shore of Tatelkuz Lake, near the intake for the freshwater supply pipeline. A total of 24 subsurface tests were excavated. Currently, BCTS FSR 7655.38 crosses the Messue Trail. One trapline with associated blazes was identified between the Messue Trail and an unnamed creek west of the trail.

8.1.1.7 Proposed Airstrip and Access Road

The AIA identified no archaeological sites, historical heritage sites, or cultural heritage sites. No areas of archaeological potential were identified, and no subsurface tests were excavated.

8.1.1.8 Kluskus Forest Service Road Realignment

The AIA identified no archaeological sites, historical heritage sites, or cultural heritage sites with the re-alignment of the Kluskus FSR from 104+900 to 106+738 km. In addition, no areas of archaeological potential were identified or tested.

8.1.2 Archaeology and Historic Heritage Baseline Summary

Prior to the 2012 AIA, no components of the Project had been covered by archaeological field studies, and a significant percentage of the land base remained unexamined for archaeological resources. In particular, there is a notable paucity of documented archaeological sites within mid-to upper-elevation localities throughout the region. The recent archaeological study has been completed for the Project within the LSA, resulting in 11 archaeological sites (three artifact scatters, six cultural depression sites, and two previously identified traditional trails) being identified within the Project development area as presently envisioned. Three historic heritage sites were identified: one roadside memorial cross, the remains of a cabin, and the remains of previously identified cabin GaSf-10. In addition, 39 CHRs were also recorded.

This baseline study concludes that the majority of lands within the Project development area exhibit low to moderate potential for protected archaeological resources. The exceptions are in proximity to the Stellako River, and on lower elevation level terraces bordering Davidson Creek, where there is high potential for sites such as lithic scatters and cultural depressions. There is moderate to high potential for Cultural Heritage Sites, in particular cambium-stripped trees, blazed trees, and box traps, within the LSAs. Finally, there is low to moderate potential for encountering historical heritage remains left by nineteenth- and twentieth- century mineral exploration and timber harvesting activities.

8.1.3 Palaeontological Resources

Baseline palaeontological resource study began in March 2013. An extensive literature search was undertaken in an effort to establish an understanding of the existence of key fossil resources¹ within the Project's RSA and LSAs. The study was restricted to the sedimentary rock component of those study areas, as the non-sedimentary rock components, such as volcanics, typically do not contain fossil resources.

Surficial and subsurface geologic mapping of the Project areas show limited areas of sedimentary rock exposures caused by occlusion by flat-lying or gently-dipping Tertiary lava flows, which are, in turn, often overlain by a widespread and often thick mantle of glacial drift, including till and glaciofluvial and lacustrine sediments. Three of the four LSAs assessed in this study—mine site, mine access road, and freshwater supply pipeline LSAs—are predominately overlain by glacial drift, and do not contain significant sedimentary bedrock exposures or known fossil sites. However, eight known fossil sites were identified within the transmission line LSA, and two are situated immediately adjacent to it. Four known fossil sites lie in an area northwest and west of the proposed mine site, bordering the Kluskus-Ootsa FSR within the heritage RSA, but these sites are outside of the Project's mining and associated operations footprint.

Results of the 2013 field assessment confirm the presence of Ashman Formation bedrock within and immediately adjacent to the proposed transmission line right-of-way (ROW) associated with the Project. Most of the fossils described from this area are fragmental and/or indeterminate, in part due to their preservation in thinly-bedded shale.

8.2 Heritage Effects Assessment

8.2.1 Identification and Selection of Valued Components

The approach of selecting VCs is consistent with the Guideline for the Selection of Valued Components and Assessment of Potential Effects (BC EAO, 9 September, 2013) and requirements under the final Environmental Impact Statement Guidelines (Agency, 2013) including the terminology and definitions for VCs and indicators. The purpose of this evaluation process is to select VCs that reflect the types of effects identified in the relevant legislation, revealed and identified through the issue scoping process, and to ensure effective, efficient, and focused analysis of potential effects from the proposed Blackwater Gold Project (the Project) (BC EAO, 2013).

Section 4.2 describes the methods used for determination of selected VCs. The process involves three steps:

- Identify Candidate VC;
- Evaluate Candidate VC; and
- Select Appropriate VCs.

¹ Includes both fossil plant (paleobotanical) and animal remains.

The first step is the identification of the candidate VCs, which involves issue scoping. Issue scoping is done by identifying the interaction of the Project components or activities with the five pillars (Environmental, Economic, Social, Heritage, and Health), through consultation with stakeholder groups and by applying professional judgement taking into account environmental assessments conducted in the past on similar projects. Baseline characterization results provide the information to identify relevant candidate VCs representative of the five pillars.

The BC EAO established a Working Group (WG) consisting of provincial and federal regulatory agencies, Aboriginal groups, and identified stakeholder groups likely to be involved in, or affected by the Project. The WG's involvement in the pre-Application stage has focused primarily on reviewing the draft Application Information Requirements (dAIR) that includes information on the candidate VCs for the project. The public also provided comments on the dAIR. The comments from the WG and public on the candidate VCs have been incorporated into the issues scoping process. In addition, the Project-specific issues are generally indicative of local and regional values held by the public, Aboriginal groups, and other stakeholders. Issues tracking tables that document issues and concerns raised during the preparation of the AIR and Application are presented in **Appendix 3.1.3A** and **Appendix 3.1.3B**. A summary of consultation is provided in **Appendix 3.1.3C**.

Table 8.2-1 includes the rationale for choosing each candidate VC as a result of the issue scoping, including details on the interactions between the candidate VC and Project activities.

The second step is the evaluation of the candidate VCs to selected VCs. The candidate VCs were examined to confirm if they would interact with Project components and activities, and if those interactions would result in an environmental effect. Key interactions were identified as those that had a greater potential to result in adverse effects of higher significance. The evaluation also used the VC attributes and key questions from the Guideline for the Selection of Valued Components and Assessment of Potential Effects, as presented in **Table 8.2-2**.

In the evaluation process, if all attributes and questions were confirmed and answered with "Yes," the candidate VC becomes a selected VC. If "No" was answered to one or more of the attributes or evaluation questions, the candidate VC was not considered as a selected VC, unless it was confirmed to be a component of concern. The outcome of the interactive process is a shorter list of VCs that appropriately reflects the concerns raised and the aspects of the broader environment that are of most value to society. This list allowed the assessment to focus on key issues for decision-makers and to address key concerns. **Section 4, Table 4.3-2** (Project Component and Activity Interaction Matrix) shows the potential key and moderate interactions between Project activities and components of the selected VCs.

The evaluation resulted in the following selected VCs for the Heritage subject area:

- Archaeological Sites;
- Historic Sites; and
- Paleontological Resources.

Indicators are identified as required to further focus the analysis of interactions between the Project and the selected VC. Indicators are aspects of the VC used to understand and evaluate the potential effect on the VC. They may comprise a species group, guild, or sub-population, or some other functional aspect, such as habitat, that is important to the integrity of the VC.

To be effective and useful, indicators must have the attributes from the Guideline for the Selection of Valued Components and Assessment of Potential Effects. The rationale for the indicators proposed for the selected Heritage Pillar VCs is shown in **Table 8.2-3**.

8.2.2 Archaeological Sites

8.2.2.1 Introduction

Archaeological sites are protected under provincial legislation, and are of concern to the Proponent, Aboriginal groups, regulators, archaeological groups, and members of the public at large. Potential impact to archaeological sites by Project land-altering activities in all phases of the Project is the key issue for the Archaeological Sites VC.

8.2.2.1.1 Relevant Legislation and Legal Framework

Regulatory requirements for archaeological heritage assessment studies are derived from the following legislation and guidance documents:

- *CEAA, 2012* (Government of Canada, 2012);
- *BC EAA* (Government of BC, 2002a); and
- *BC HCA* (Government of BC, 1996b).

The *CEAA, 2012* “Reference Guide on Physical and Cultural Heritage Resources” defines heritage resources as “a human work or a place that gives evidence of human activity or has spiritual or cultural meaning and that has historic value” (Agency, 2012). It further outlines four categories of heritage resources: palaeontology, archaeology, historical heritage sites, and traditional land use.

Table 8.2-1: Candidate Valued Component Rationale

Valued Component Candidates	Interaction with Project Activities	First Nations ⁽¹⁾	The Public and Other Stakeholders ⁽²⁾	EIS Guidelines
Archaeological sites	<ul style="list-style-type: none"> Known archaeological sites in the Project region (AMEC, 2011) Archaeological sites have the potential to be affected by Project activities such as land alteration and regrading of mine site area: construction, operations phases 	Ulkatcho First Nation; Lhoosk'uz Dene Nation	No comments noted to date	<ul style="list-style-type: none"> Section 9.1.2 Biophysical Environment – Human Environment 10.1.3 Effects of changes to the environment
Historic heritage sites	<ul style="list-style-type: none"> Known historic heritage sites in the Project region (AMEC, 2012) Historic heritage sites have the potential to be affected by Project activities such as land alteration and regrading of mine site area: construction, operations phases 	Lhoosk'uz Dene Nation	No comments noted to date	<ul style="list-style-type: none"> Section 9.1.2 Biophysical Environment – Human Environment 10.1.3 Effects of changes to the environment
Paleontological resources	<ul style="list-style-type: none"> Known paleontological sites in the Project region (AMEC, 2012) Paleontological heritage sites have the potential to be affected by Project activities such as land alteration and regrading of mine site area: construction, operations phases 	No comments noted to date	No comments noted to date	<ul style="list-style-type: none"> Section 9.1.2 Biophysical Environment – Human Environment 10.1.3 Effects of changes to the environment

Note: ⁽¹⁾ First Nation concerns are from comments in the tracking tables in reference to Version A through F of the dAIR.
⁽²⁾ “The Public and Other Stakeholders” comments do not include comments specific to study design, methods proposed for sampling.
 EIS = Environmental Impact Statement
 Refer to **Table 4.3-2** Project Component and Activity Interaction Matrix for Selected VCs.

Table 8.2-2: Evaluation of Candidate Valued Components

Subject Area	Candidate VC	Attributes					Evaluation Key Questions				
		Relevant ⁽¹⁾	Comprehensive ⁽²⁾	Representative ⁽³⁾	Responsive ⁽⁴⁾	Concise ⁽⁵⁾	Measurable ⁽⁶⁾	Grouping ⁽⁷⁾	Ultimate Receptor ⁽⁸⁾	Component of Concern ⁽⁹⁾	Selected VC (Included or Excluded)
Heritage	Archaeological sites	Y – Applicable to the Heritage Pillar	Y– VC needed to have full understanding of the Heritage Pillar and Heritage subject area	Y - VC is illustrative of the human environments to be possibly affected by the proposed project	Y – VC is responsive to the potential project effects	Y – Clear interaction with project activities and/or project component	Y – VC has measurable parameters	N - The potential effects of the candidate VC cannot be effectively represented by another VC	Y - VC is an end point in the effects pathway	Y – VC is raised as a concern though the issues scoping process	Y - Archaeological sites is a selected VC Included
	Historic heritage sites	Y – Applicable to the Heritage Pillar	Y– VC needed to have full understanding of the Heritage Pillar and Heritage subject area	Y - VC is illustrative of the human environments to be possibly affected by the proposed project	Y – VC is responsive to the potential project effects	Y – Clear interaction with project activities and/or project component	Y – VC has measurable parameters	N - The potential effects of the candidate VC cannot be effectively represented by another VC	Y - VC is an end point in the effects pathway	Y – VC is raised as a concern though the issues scoping process	Y - Historic heritage sites is a selected VC. Included
	Paleontological resources	Y – Applicable to the Heritage Pillar	Y– VC needed to have full understanding of the Heritage Pillar and Heritage subject area	Y - VC is illustrative of the human environments to be possibly affected by the proposed project	Y – VC is responsive to the potential project effects	Y – Clear interaction with project activities and/or project component	Y – VC has measurable parameters	N - The potential effects of the candidate VC cannot be effectively represented by another VC	Y - VC is an end point in the effects pathway	Y – VC is raised as a concern though the issues scoping process	Y – Paleontological resources is a selected VC. Included

Note: ⁽¹⁾ Relevant to one of the five pillars (environmental, economic, social, heritage and health) and clearly linked to the values reflected in the issues raised in respect to the project.
⁽²⁾ Comprehensive, taken together, the VCs selected for an assessment should enable a full understanding of the important potential effects of the project.
⁽³⁾ Representative of the important features of the natural and human environment likely to be affected by the project.
⁽⁴⁾ Responsive to the potential effects of the project.
⁽⁵⁾ Concise, so the nature of the project-VC interaction and the resulting effect pathway can be clearly articulated and understood, and overlapping or redundant analysis is avoided.
⁽⁶⁾ Measurable, the potential effects of the project on the VC can be measured and monitored.
⁽⁷⁾ Grouping, the potential effects of the candidate VC cannot be effectively represented by another VC.
⁽⁸⁾ Ultimate Receptor, the ultimate receptors are humans.
⁽⁹⁾ Component of Concern, includes issues and/or legislation raised by FNs, Federal or Provincial governments.
 VC = Valued Component; Y = Yes
 Refer to **Table 4.3-2** Project Component and Activity Interaction Matrix for Selected VCs.

Table 8.2-3: Selected Valued Components and Rationale of Indicators and/or Factor

Pillar	Valued Components	Indicators and/or Factors for Assessment	Rationale of Indicator and/or Factor ⁽¹⁾
Heritage	Archaeological sites	<ul style="list-style-type: none"> • Landmarks • Buildings • Religious features • Human remains • Culturally modified trees • Subsistence features 	Regulatory requirements for archaeological heritage assessment studies are derived from the following legislation and guidance documents: <ul style="list-style-type: none"> • <i>Canadian Environmental Assessment Act, 2012</i> (Government of Canada, 2012); • British Columbia <i>Environmental Assessment Act</i> (Government of BC, 2002); and • British Columbia <i>Heritage Conservation Act</i> (Government of BC, 1996). These measureable parameters are chosen because they capture potential effects of the project on Archaeological sites.
	Historic heritage sites	<ul style="list-style-type: none"> • Landmarks • Buildings • Religious features • Human remains • Culturally modified trees • Subsistence features 	Regulatory requirements for archaeological heritage assessment studies are derived from the following legislation and guidance documents: <ul style="list-style-type: none"> • <i>Canadian Environmental Assessment Act, 2012</i>; • British Columbia <i>Environmental Assessment Act</i>; and • British Columbia <i>Heritage Conservation Act</i>. These measureable parameters are chosen because they capture potential effects of the project on historic heritage sites.
	Paleontological resources	<ul style="list-style-type: none"> • Fossil sites 	Regulatory requirements for palaeontological heritage assessment studies are based on the following legislation and guidance documents: <ul style="list-style-type: none"> • <i>Canadian Environmental Assessment Act, 2012</i>; and • BC Fossil Management Framework (BC MFLNRO, 2005). These measureable parameters are chosen because they capture potential effects of the project on historic Paleontological resources.

Note: ⁽¹⁾Included indicators follow these attributes: *Relevant*: indicators must relate directly or indirectly to the integrity of the selected VC; *Practical*: there must be a practical way to evaluate the indicator, using existing or achievable data, predictive models, or the means; *Measurable*: the measurement of the selected indicator must generate useful data that inform our understanding of the potential effect on the VC; *Responsive* to the potential effects of the project; *Predictable* in terms of their response to the project. Refer to **Table 4.3-2** Project Component and Activity Interaction Matrix for Selected VCs.

In the absence of specific federal guidelines for the protection of cultural heritage, assessments of heritage resources required by the Agency generally need to meet the requirements of existing provincial legislation. In BC, this requirement is effected through the “Canada-British Columbia Agreement for Environmental Assessment Cooperation” (Government of Canada, 2004) that incorporates principles of the “Canada-wide Accord on Environmental Harmonization” (Canadian Council of Ministers of the Environment, 1998). Under the Canada-BC Agreement, such studies would be conducted according to the process established under existing provincial legislation.

The BC *EAA* requires the assessment of a proposed project’s effects on CHRs, which includes impacts to archaeological sites. For all reviewable projects, the BC EAO requires an assessment of CHRs in accordance with the AIR Template (BC EAO, 2013).

Archaeological resources in BC are VCs by virtue of their protection under the *HCA* (Government of BC, 1996b). Section 13 of the *HCA* specifies that an individual (or corporation) must not “damage, excavate, dig in or alter, or remove any heritage object” from an archaeological site, except in accordance with a permit issued by the Minister. The *HCA* confers automatic protection on archaeological sites that pre-date 1846, or undated sites that could pre-date 1846. This protection is granted regardless of whether they are recorded in the Provincial Heritage Register, or whether they are located on provincial Crown lands or on private property. Post-1846 historical heritage sites that do not meet the criteria for automatic protection under section 13 can be protected by Ministerial Order or Designation by an Order-in-Council, or by municipal and regional governments under the *Local Government Act* (Government of BC, 1996c).

The types of archaeological resources automatically protected by section 13 of the *HCA* include:

- Archaeological sites occupied or used before 1846;
- Aboriginal rock art with historical or archaeological value;
- Burial places with historical or archaeological value;
- Heritage ship and aircraft wrecks; and
- Sites of unknown attribution that could have been occupied prior to 1846.

Protected archaeological sites may not be altered or disturbed in any manner without a permit issued under sections 12 or 14 of the *HCA*.

For the purposes of this assessment, archaeological sites are defined as locations that:

“consist of the physical remains of past human activity. The scientific study of these remains, through the methods and techniques employed in the discipline of archaeology, is essential to the understanding and appreciation of prehistoric and historic cultural development in BC. These resources may be of regional, provincial, national, or international significance” (Archaeology Branch, 1998).

8.2.2.2 Valued Component Baseline

8.2.2.2.1 Information Sources and Methodology

The Archaeology Baseline Report provides a reference point for pre-Project conditions. Future conditions are predicted and compared to these baseline conditions (**Appendix 8.1A**). The Project Description (**Section 2.2**) provides dimensions and maximum footprints of proposed facilities and linear features. The assessment of archaeological resources commenced with an AOA as described in the BC AIA Guidelines (Archaeology Branch, 1998). According to the guidelines, an AOA is used to identify archaeological concerns and assess the archaeological resource potential within a proposed development area for archaeological resources, which are afforded protection under the *HCA* (Government of BC, 1996b). The AIA was conducted during fall 2012 and summer 2013 to inventory and assess archaeological sites.

8.2.2.2.2 Past, Present and Future Projects and Activities

The Archaeological Sites VC potentially interacts with other projects or activities in the RSA as a result of spatial or temporal overlap. **Section 4, Subsection 4.3.6, Table 4.3-11** shows the Summary Project Inclusion List developed for Cumulative Effects Assessment (CEA) (**Appendix 4C** contains the comprehensive Project Inclusion List). Any land altering activities associated with development projects have the potential to impact the archaeological sites, including:

- Timber harvesting for CMTs and CHR sites;
- Land altering activities such as clearing and grubbing;
- Forestry – logging;
- Road construction, including bridges;
- Development of ancillary facilities such as forestry camps and wildlife fighting support structure;
- Mineral exploration;
- Mining, including road and trail construction, drill lines, drill pads, and mining infrastructure and ancillary facilities;
- Transmission line construction and maintenance;
- Pipeline construction and maintenance;
- Recreational and residential development; and
- Agricultural activities.

8.2.2.2.3 Traditional Ecological or Community Knowledge

Protecting heritage resources is important for local residents and Aboriginal groups. Comments provided during the engagement and consultation process have offered insight into traditional, ecological, or community knowledge, which is defined as a body of knowledge built up by a group of people through generations of living in close contact with nature.

Aboriginal peoples noted that there are a number of sacred areas in the Project area. “Everywhere you go is special. Kuyakuz Mountain is sacred. The area to the east of Tatelkuz is where we used to burn our family members in the 1800s. It is a special spot, a sacred place. The only way to get there is by hiking or horseback” (Interview with Lhoosk’uz and Saik’uz First Nation Elders, 2013). “Tzelbeguz Lake is a place that holds a lot of meaning and is sacred to my family” (E-mail from Ulkatcho First Nation representative, 2012).

During interviews and communications with Ulkatcho First Nation, burial areas were identified (Letter from Ulkatcho First Nation representative, 2012).

The Alexander Mackenzie Heritage Trail and the Messue Wagon Trail are important heritage assets and represent aspects of the post-contact history of the area.

This information will be integrated into the Project design, execution, management, and monitoring in subsequent stages of the Project development including the Application review phase, the permitting phase, and the Project construction, operations, closure, and post-closure phases. A summary of issues and concerns received from all Aboriginal groups, the source of the input, and the Proponent’s response is included in **Appendix 3.1.3B. Section 7.2.7** provides an assessment of potential Project effects on current land and resource uses for traditional purposes. **Section 15** and **Section 16** address potential Project effects on Aboriginal rights and other Aboriginal interests respectively.

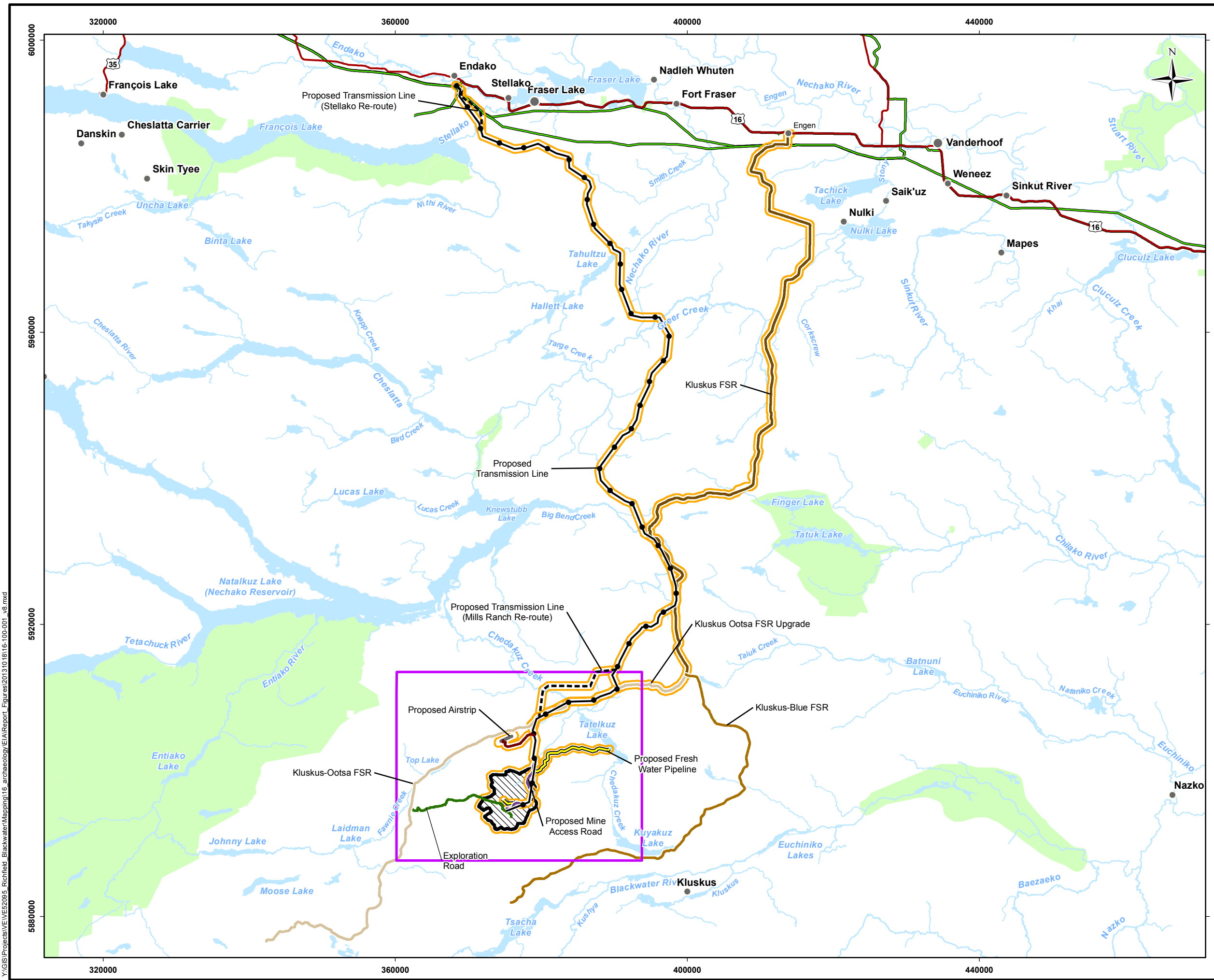
8.2.2.2.4 Archaeological Impact Assessment 2012 and 2013

The AIA, conducted under Heritage Inspection Permit #2012-0295, focused on areas identified as having archaeological potential in the AOA (AMEC, 2011), in particular those in proximity to aquatic features including the Stellako River, Davidson Creek, and adjacent to other streams and waterbodies (**Figure 8.2-1**). Summary information is provided in **Table 8.2-4**. The AIA identified 13 archaeological sites: three within the proposed mine site footprint (**Figure 8.2-2** and **Figure 8.2-3**), four within the transmission line (**Figure 8.2-4** and **Figure 8.2-5**), one archaeological site identified within the proposed Tatelkuz Lake Ranch re-route (**Figure 8.2-6**) four within the Stellako River re-route (**Figure 8.2-7**), and one within the freshwater supply system (**Figure 8.2-8**). No archaeological sites were identified within the proposed mine access road, proposed airstrip and access road, or proposed Kluskus FSR realignment Project components.

Table 8.2-4: Project AIA Results – Archaeological Sites

Project Facility	Archaeological Site	Identified Features	Comment
Mine Site Footprint	FhSe-73	Single artifact, cultural depression	Single chalcedony flake, cache pit on north bank of Davidson Creek
	FhSe-74	Artifact scatter	Two dacite flakes, one dacite shatter, and one obsidian shatter, whose macroscopic attributes suggest it is from the Ilgachuz obsidian source; south bank of Davidson Creek
	FhSf-4	Isolated artifact	Single chert scraping tool, on the north bank of Davidson Creek, at its junction with an unnamed tributary
Transmission Line	Messue Trail (FhSe-43)	Heritage trail	Maintained road; no CMTs or blazes identified
	Cheslatta Trail (FISe-2)	Heritage trail	Previously cleared road; no CMTs or blazes identified
	GaSf-47	Cultural depressions	10 cache pits
	GaSf-48	Cultural depression	1 cache pit
Transmission Line – Tatelkuz Lake Ranch Re-route	Messue Trail (FhSe-43)	Heritage trail	Cleared road; no blazes or CMTs identified; well maintained
Transmission Line – Stellako River Re-route	GaSf-43	Cultural depression	1 cache pit
	GaSf-44	Cultural depression	1 cache pit
	GaSf-45	Cultural depression	1 cache pit
	GaSf-46	Cultural depression	1 cache pit
Freshwater Supply System	Messue Trail (FhSe-43)	Heritage trail	Wagon ruts visible, blazes and CMTs observed

Note: CMT = Culturally Modified Tree



Legend

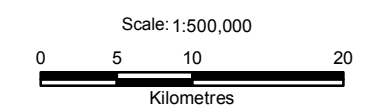
- Populated Place
- 16 Highway
- Kluskus FSR
- Kluskus Blue FSR
- Kluskus Ootsa FSR
- Existing Transmission Line
- Stream
- Waterbody
- Parks & Protected Areas

Project Components

- Exploration Road
- Proposed Transmission Line
- - - Proposed Transmission Line Re-routes
- Proposed Mine Access Road
- Proposed Fresh Water Pipeline
- Proposed Airstrip Access Road
- Proposed Airstrip
- Proposed Mine Site

Heritage Resources

- Regional Study Area
- Local Study Area



Reference
BC Government GeoBC Data Distribution

CLIENT: **newgold**

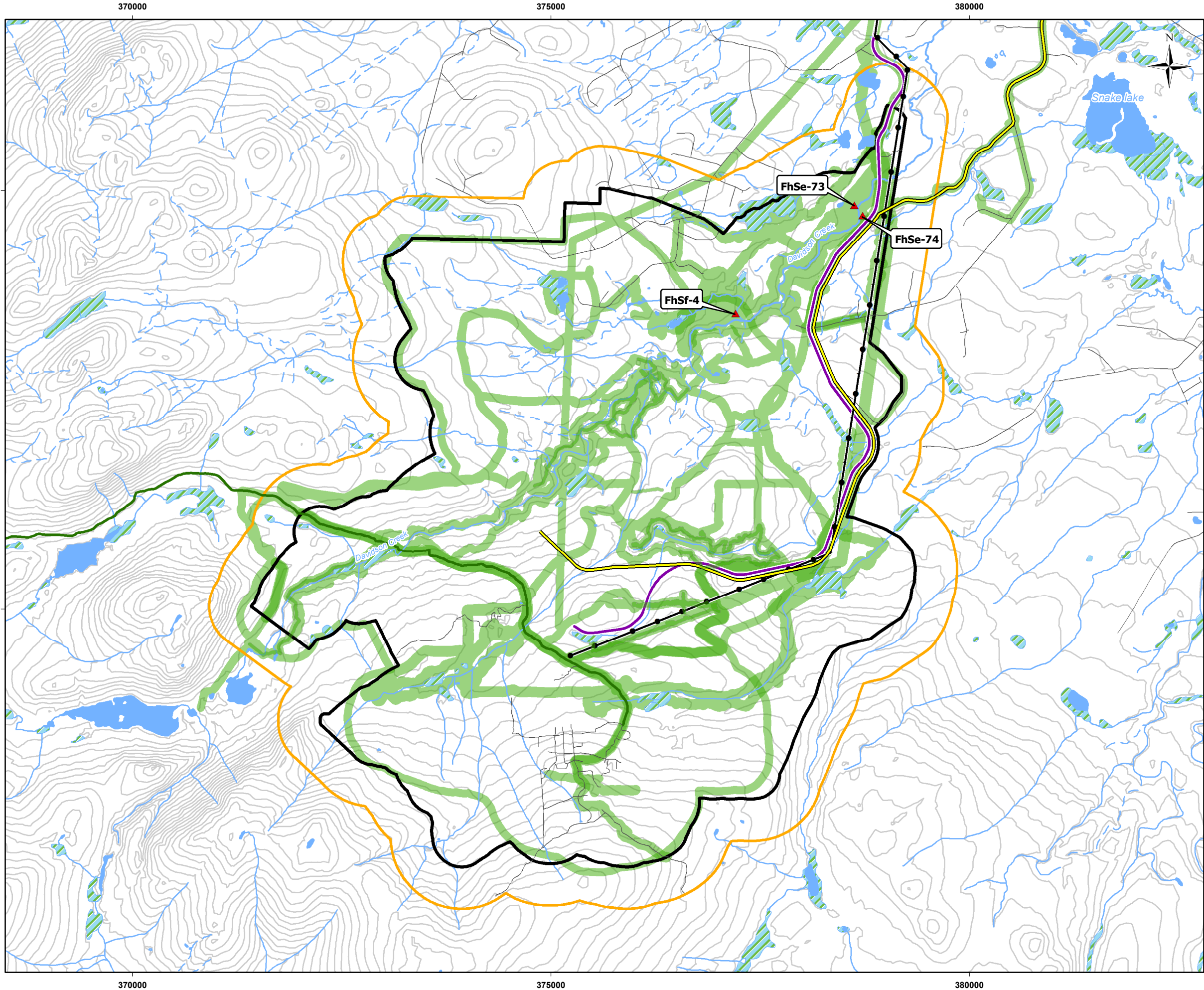
PROJECT: **Blackwater Gold Project**

Heritage Resources EA Study Area

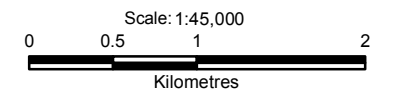
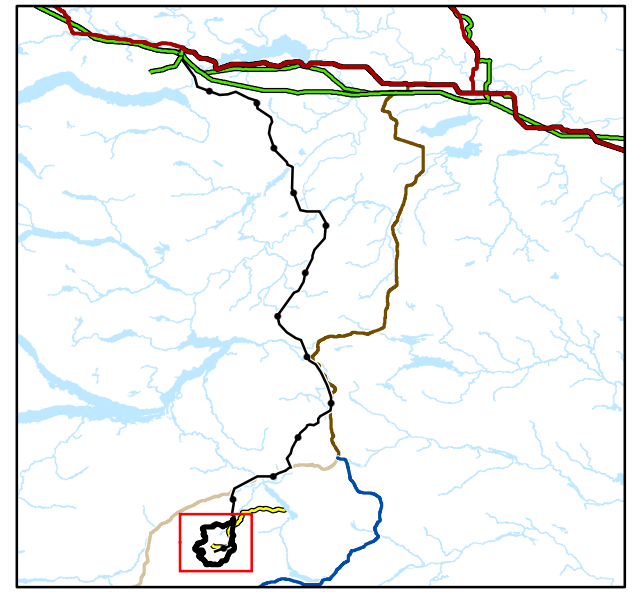
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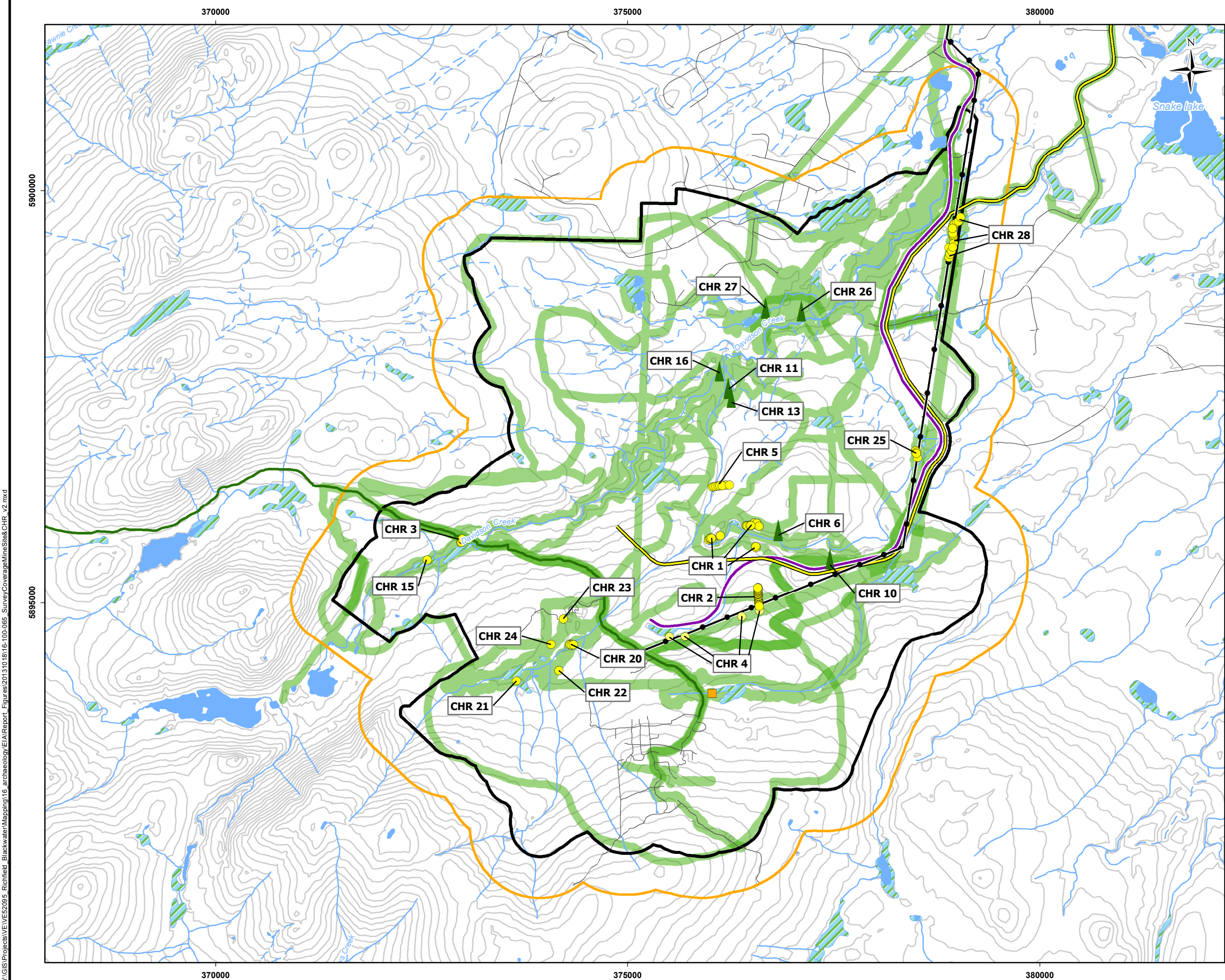


- Legend**
- ▲ Archaeological Site
 - Pedestrian Survey Coverage
 - Contour (20 m)
 - Existing Road
 - Stream
 - ▨ Wetland
 - Waterbody
- Project Components**
- Exploration Road
 - Proposed Transmission Line
 - Proposed Mine Access Road
 - Proposed Fresh Water Pipeline
 - ▭ Proposed Mine Site
- Heritage Resources**
- ▭ Local Study Area

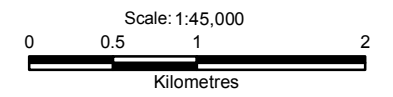
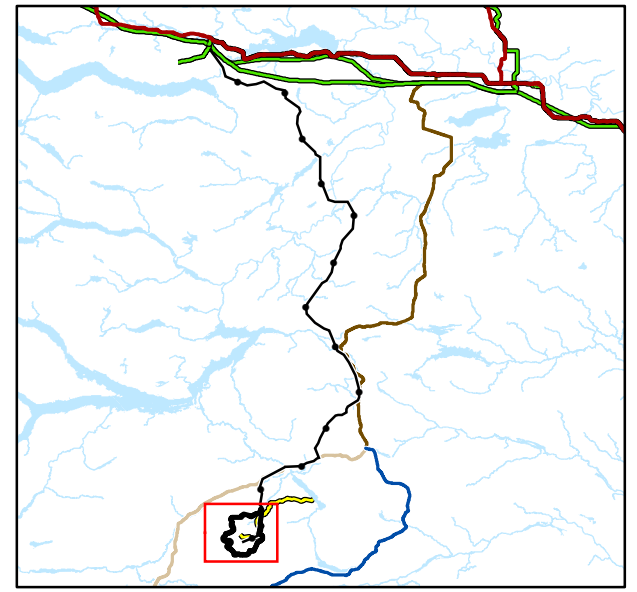


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Mine Site - Archaeological Survey Coverage and Archaeological Sites		
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- Legend**
- Blaze
 - ▲ CMT
 - Historical Heritage Resources
 - Pedestrian Survey Coverage
 - Contour (20 m)
 - Existing Road
 - Stream
 - ▨ Wetland
 - Waterbody
- Project Components**
- Exploration Road
 - Proposed Transmission Line
 - Proposed Mine Access Road
 - Proposed Fresh Water Pipeline
 - ▭ Proposed Mine Site
- Heritage Resources**
- ▭ Local Study Area



Reference
BC Government GeoBC Data Distribution

CLIENT: **newgold**

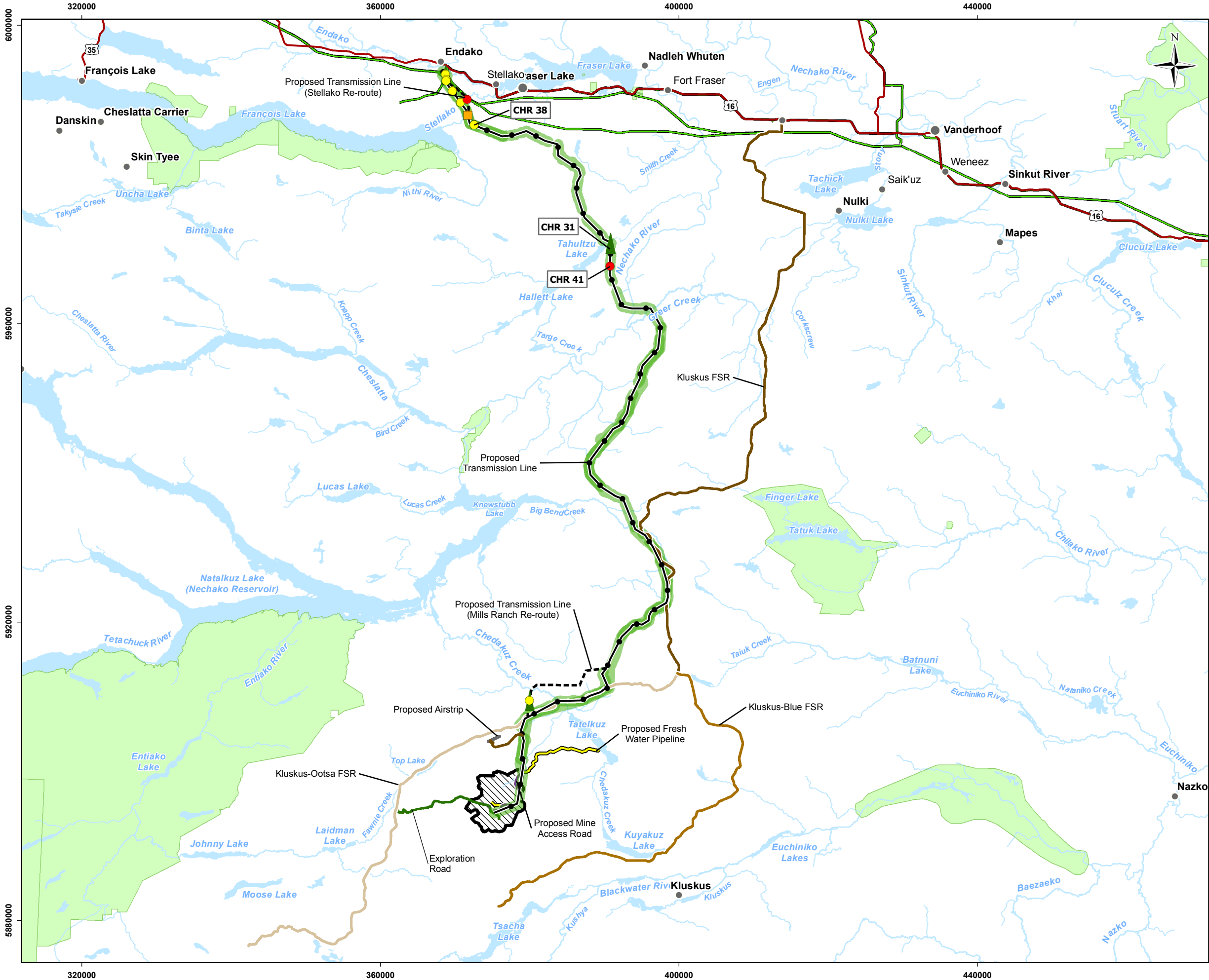
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Mine Site - Archaeological Survey Coverage and Cultural Heritage Resources

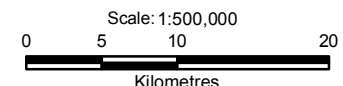
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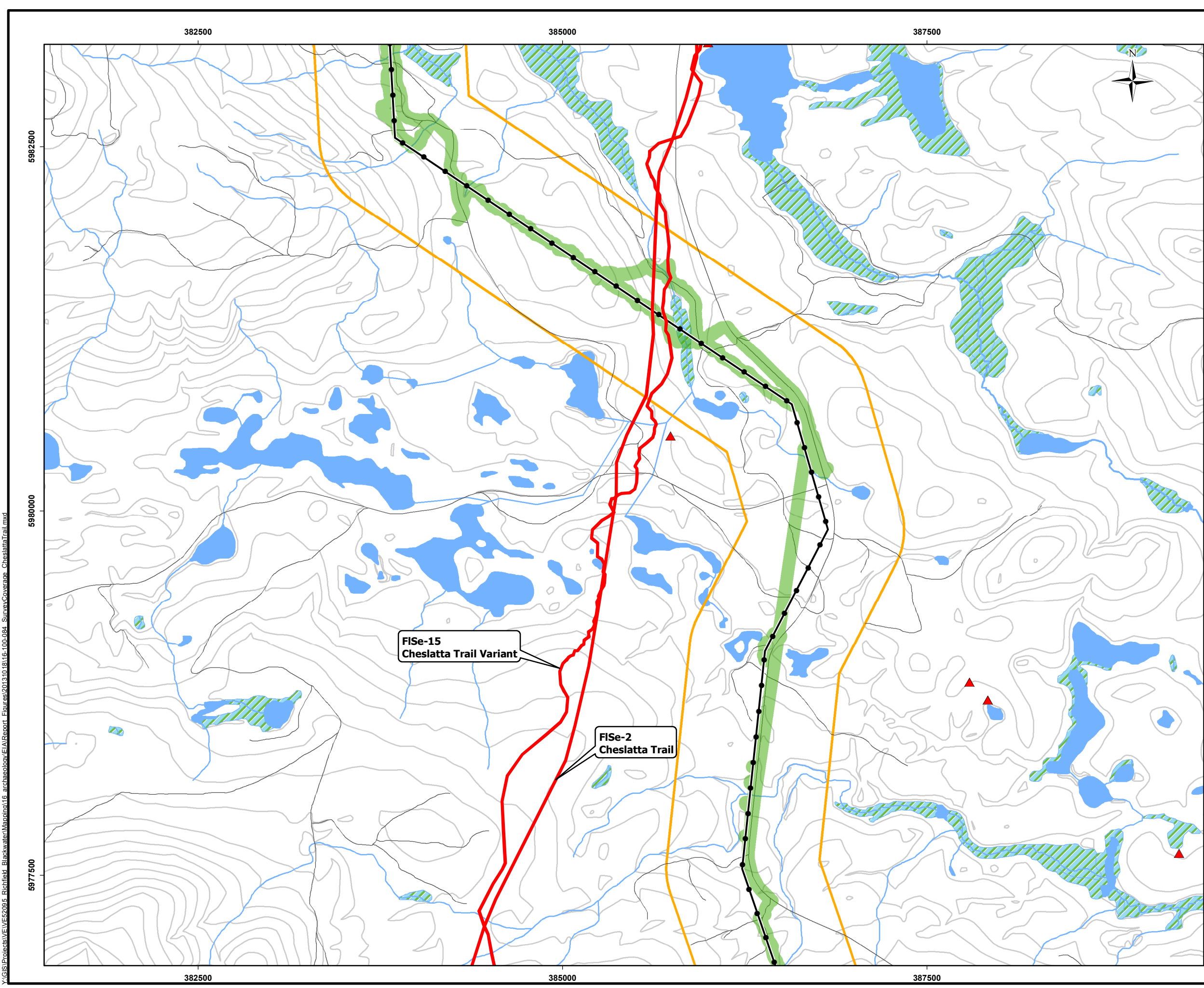
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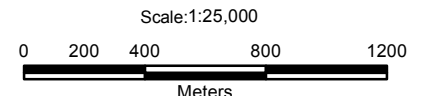
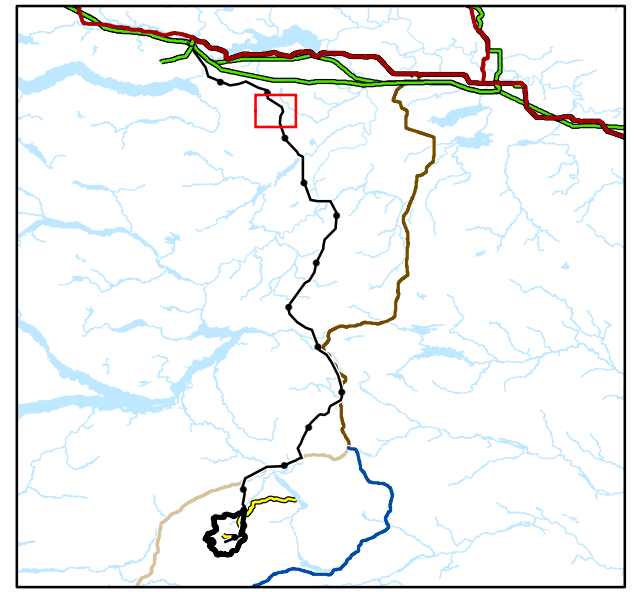
- Legend**
- Populated Place
 - Blaze
 - Box trap
 - ▲ CMT
 - Historical Heritage Resource
 - Kluskus FSR
 - Kluskus Blue FSR
 - Kluskus Ootsa FSR
 - Existing Transmission Line
 - Highway
 - Stream
 - Waterbody
 - Parks & Protected Areas
- Project Components**
- Exploration Road
 - Proposed Airstrip Access Road
 - Proposed Mine Access Road
 - Proposed Fresh Water Pipeline
 - Proposed Transmission Line
 - Proposed Transmission Line Re-routes
 - Proposed Airstrip
 - ▨ Proposed Mine Site



Reference		
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Transmission Line - Archaeological Survey Coverage and Cultural Heritage Locations		
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- Legend**
- ▲ Archaeological Site
 - Pedestrian Survey Coverage
 - Existing Road
 - Contour (20 m)
 - Stream
 - ▨ Wetland
 - Waterbody
 - Proposed Transmission Line
- Heritage Resources**
- ▭ Local Study Area



Reference
BC Government GeoBC Data Distribution

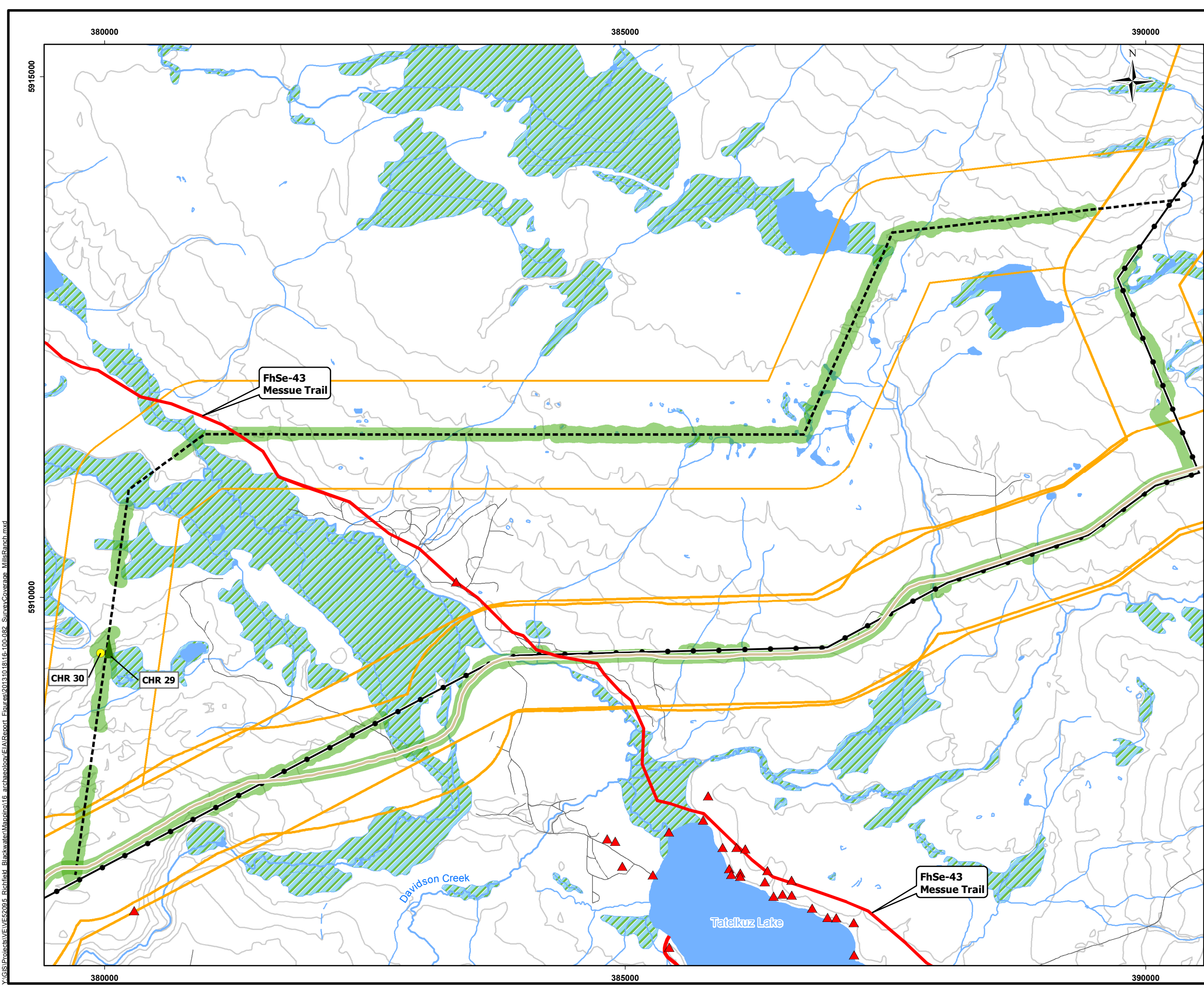
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PROJECT: **Blackwater Gold Project**

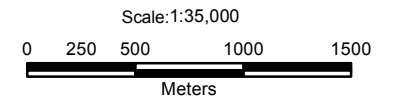
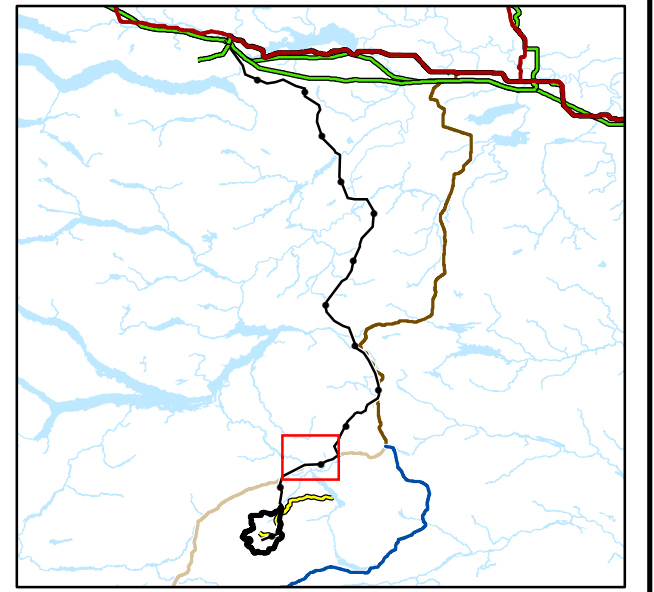
Transmission Line and Cheslatta Trail - Archaeological Survey Coverage

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- Legend**
- ▲ Archaeological Site
 - Blaze
 - ▲ CMT
 - Pedestrian Survey Coverage
 - Kluskus-Ootsa FSR
 - Existing Road
 - Stream
 - ▨ Wetland
 - Waterbody
- Project Components**
- Proposed Transmission Line
 - - - Proposed Transmission Line (Mills Ranch Re-route)
- Heritage Resources**
- ▭ Local Study Area



Reference
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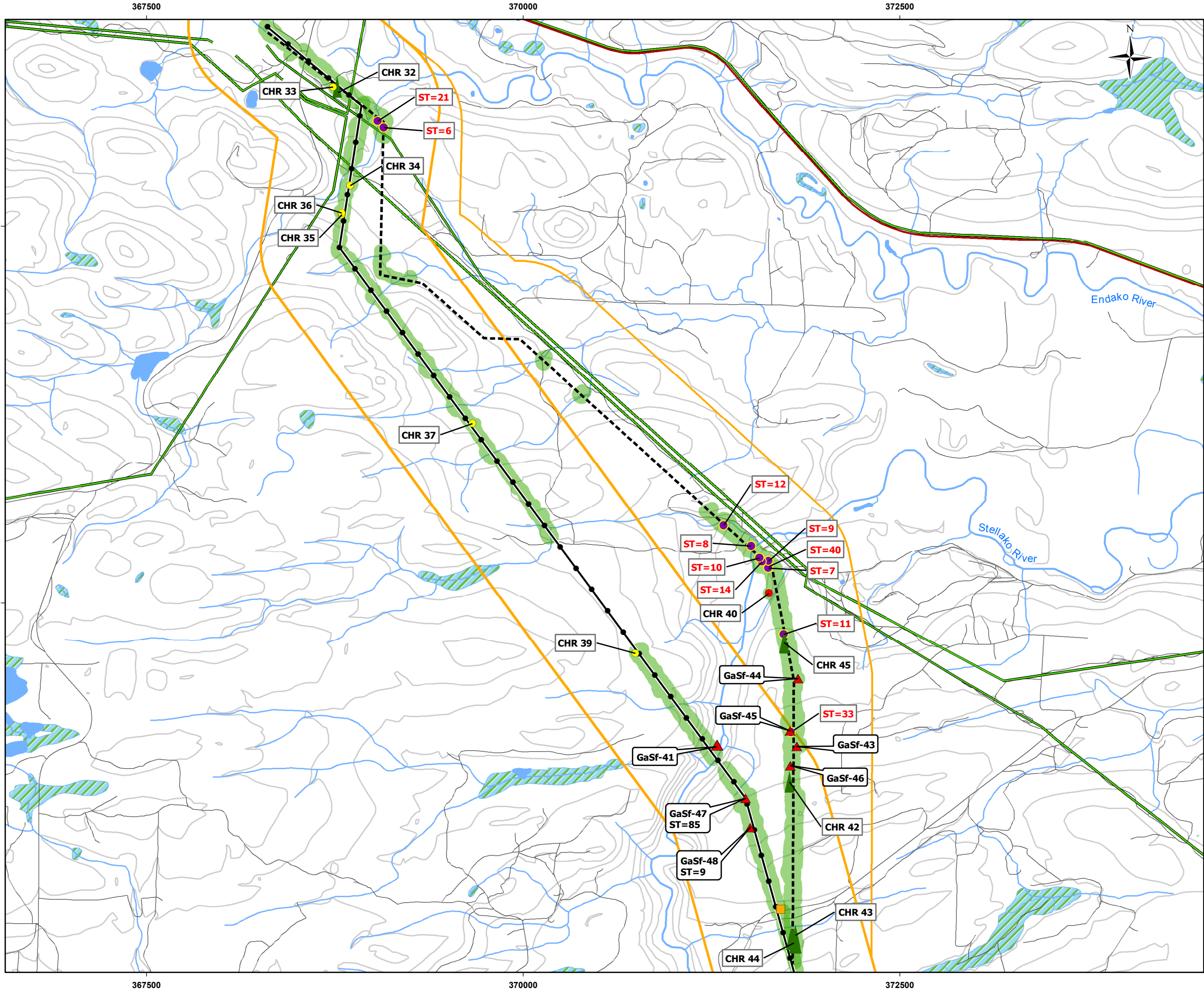
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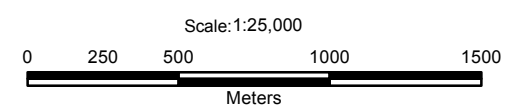
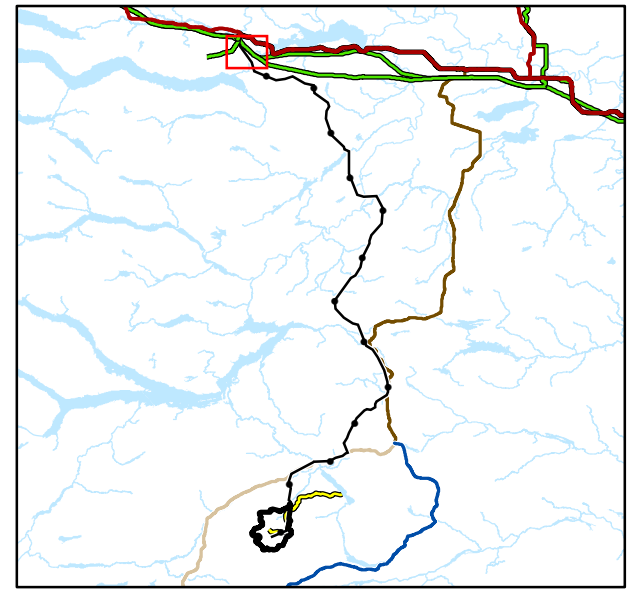
Transmission Line, Mills Ranch Reroute and Messue Trail - Archaeological Survey Coverage and Results

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- Legend**
- ▲ Archaeological Site
 - Blaze
 - Box trap
 - ▲ CMT
 - Historical Heritage Resource
 - Pedestrian Survey Coverage
 - Highway
 - Existing Road
 - Contour (20 m)
 - Stream
 - ▨ Wetland
 - Waterbody
- Project Components**
- Proposed Transmission Line
 - - - Proposed Transmission Line (Stellako Re-route)
- Heritage Resources**
- Local Study Area



Reference
BC Government GeoBC Data Distribution

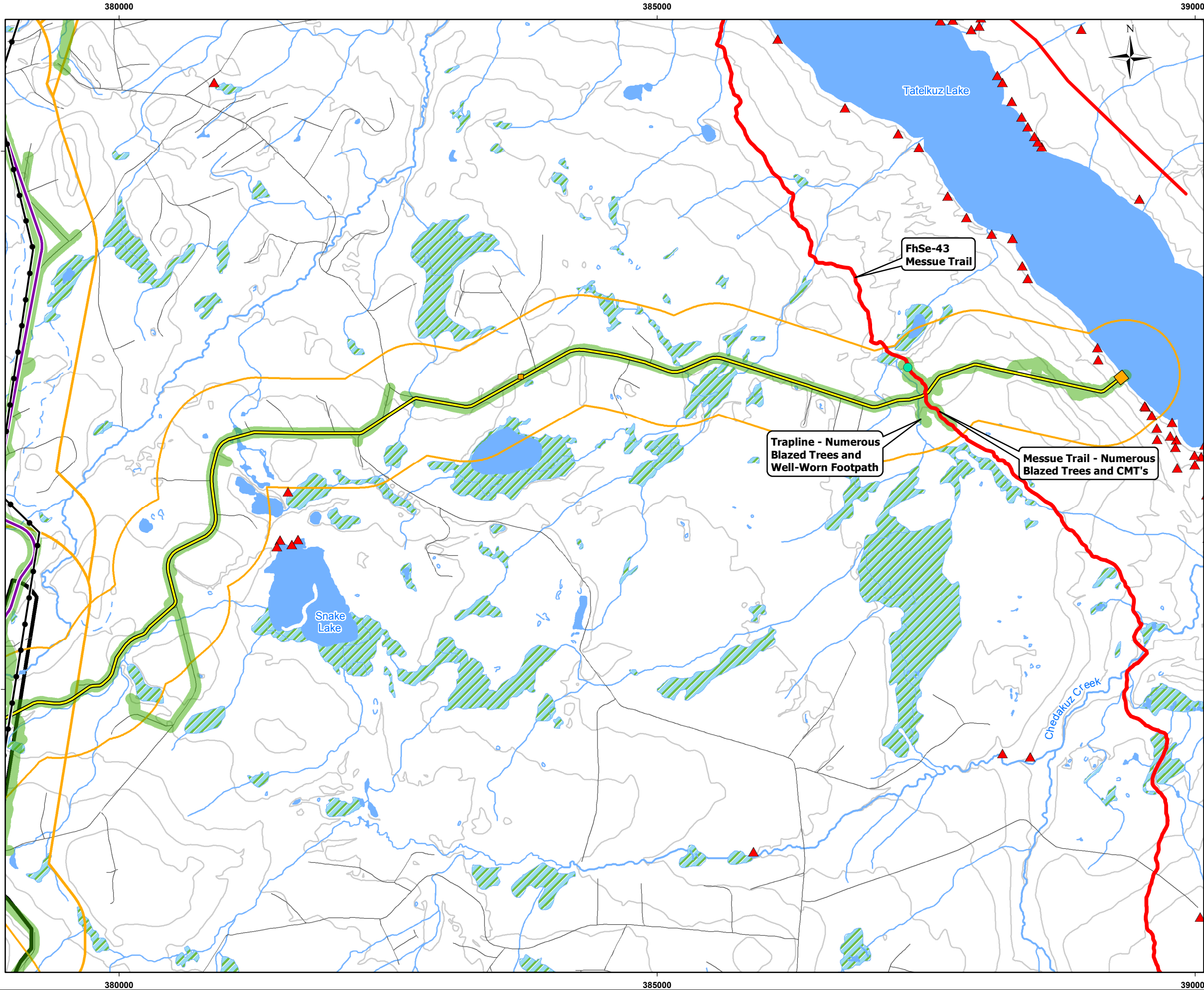
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newgold

PROJECT:
Blackwater Gold Project

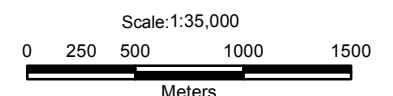
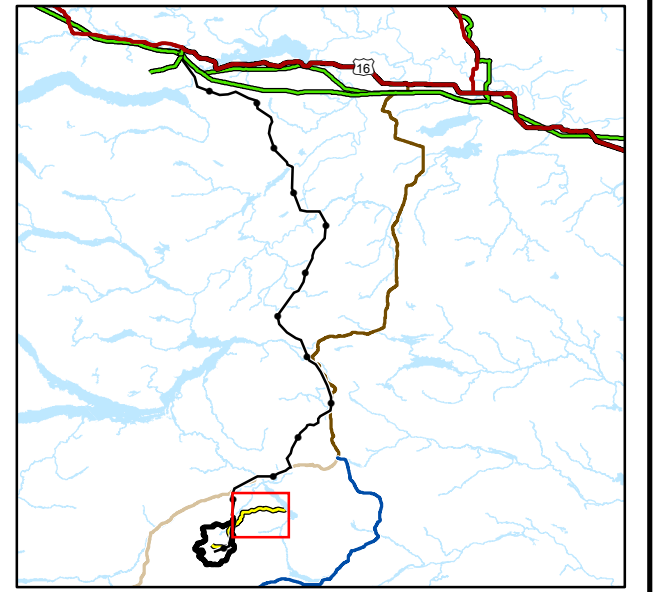
Transmission Line and Stellako River Reroute - Archaeological Survey Coverage and Results

DATE: March, 2014	ANALYST: PK	Figure 8.2-7
JOB No: VE52277	QA/QC: GH	PDF FILE: 16-100-083_SurveyCoverage_Stellako.pdf
GIS FILE: 16-100-083_SurveyCoverage_Stellako.mxd		amec
PROJECTION: UTM Zone 10	DATUM: NAD83	

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- Legend**
- ▲ Archaeological Site
 - Wire Trap
 - ▬ Pedestrian Survey Coverage
 - Contour (20 m)
 - Existing Road
 - Stream
 - ▨ Wetland
 - Waterbody
- Project Components**
- Exploration Road
 - Proposed Transmission Line
 - Proposed Mine Access Road
 - Proposed Water Pipeline Route
 - Pumpstation
 - Proposed Mine Site
- Heritage Resources**
- ▭ Local Study Area



Reference
BC Government GeoBC Data Distribution

CLIENT:
newgold

PROJECT:
Blackwater Gold Project

Fresh Water Supply System and Messue Trail (FhSe-43) - Archaeological Survey Coverage

DATE: March, 2014	ANALYST: PK	Figure 8.2-8
JOB No: VE52277	QA/QC: GH	
GIS FILE: 16-100-081_SurveyCoverage_WaterPipeline.mxd		PDF FILE: 16-100-081_SurveyCoverage_WaterPipeline.pdf
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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8.2.2.3 Potential Effects of the Proposed Project and Proposed Mitigation

This section discusses the potential effects of the Project and proposed mitigation on archaeological sites.

Interactions between project components and activities and the archaeological sites VC are presented in **Table 4.3-2** (Project Components and Activity Interaction Matrix for Selected VCs) in **Section 4**. There are key interactions between the mine site, the linear components (Kluskus-FSR, the transmission line, the airstrip and mine access road) and the VC during the construction phase of the Project due to ground disturbance and site clearing activities. There will also be key interactions between the mine site and the VC during the operations phase, because some mine facilities such as the waste rock dumps, the TSF and the open pit will expand and affect new ground. The linear components will not change in size during the operations phase and only maintenance activities will be undertaken, therefore the interactions with the VC are considered to be negligible and are not carried forward to the effects assessment. During the closure and post-closure phases there will be negligible interactions between the project components and the VC, because reclamation and re-vegetation activities will not disturb new ground.

The majority of the potential effects on archaeological sites will occur during the construction phase of the Project, with several potential effects occurring during the operations phase. The Project effect results from land-altering activities affecting archaeological sites. Project components in which direct effects on archaeological sites will occur are presented in **Table 8.2-5**.

8.2.2.3.1 Construction Phase

The majority of potential Project effects on archaeological sites will occur during the construction phase. All potential effects result from activities in which land-altering activities take place, including construction and re-alignment of roads, clearing, excavating and grading for the mine footprint, and development of mine infrastructure installations. Impacts may also occur during the creation, handling, and storage of soil and till, aggregate borrow pits for the concrete batch plant, and reject disposal areas. Other impacts may occur during the construction of the transmission line and freshwater supply system; however, not likely during the construction phase for the mine site access road, Kluskus FSR, and airstrip, given the absence of identified archaeological resources in those areas.

Table 8.2-5: Potential Project Effects on Archaeological Sites

Project Component	Project Phase	Potential Project Effect	Likelihood of Occurrence	Identified Archaeological Site
Mine Site	C, O	Land-altering activities impacting sites	Likely	FhSe-73, FhSe-74, FhSf-4
Mine Site Access Road	C	Land-altering activities impacting sites	Not likely	None
Transmission Line	C	Land-altering activities impacting sites	Likely	FhSe-73 (Messue Trail); FISE-2 (Cheslatta Trail), GaSf-47, GsSf-48
Transmission Line – Tatelkuz Lake Ranch Re-route	C	Land-altering activities impacting sites	Likely	FhSe-43 (Messue Trail)
Transmission Line – Stellako River Re-route	C	Land-altering activities impacting sites	Likely	GaSf-43, GaSf-44, GaSf-45, GaSf-46
Access Road (Kluskus FSR)	C	Land-altering activities impacting sites	Not likely	None
Airstrip	C	Land-altering activities impacting sites	Not likely	None
Freshwater Supply System	C	Land-altering activities impacting sites	Likely	FhSe-43 (Messue Trail)

Note: C = construction; O = operations;

8.2.2.3.2 Operations Phase

Potential Project effects will occur during the operations phase for the mine site. All potential effects result from land-altering activities associated with soil and till salvage, handling and storage, the reject pile disposal area construction and management, and operations of the concrete batch plant; however, potential effects are not likely during the operations phase for the mine site access road, transmission line, Kluskus FSR, airstrip, and freshwater supply system, given the lack of land-altering activities during the operations phase and absence of identified archaeological resources for those areas.

8.2.2.3.3 Closure Phase

No potential Project effects will occur during the closure phase. No component of the closure phase will affect any lands that have not already been affected during earlier Project phases.

8.2.2.3.4 Post-Closure Phase

No Project effects will occur during the post-closure phase. No component of the post-closure phase will affect any lands that have not already been affected during earlier Project phases.

8.2.2.3.5 Past, Present and Future Projects and Activities

Any land altering activities associated with development projects have the potential to impact the archaeological sites, including those listed in **Section 8.2.2.2. Table 8.2-6** presents an overview of potential adverse effects associated with past, present and future projects and activities that potentially interact with the Project.

Table 8.2-6: Potential Adverse Effects Resulting from Past, Present and Future Projects and Activities

Past, Present and Future Projects and Activities	Potential Adverse Effect	General High Level Mitigation
Timber harvesting for CMTs and CHR sites	Land-altering activities impacting sites	Implementation of guidelines such as the Forest Practices Code
Clearing and grubbing	Land-altering activities impacting sites	Implementation of guidelines such as the Forest Practices Code
Forestry - logging	Land-altering activities impacting sites	Implementation of guidelines such as the Forest Practices Code
Road construction, including bridges	Land-altering activities impacting sites	Implementation of BMPs and environmental management plans
Development of ancillary facilities such as forestry camps and wildlife fighting support structures	Land-altering activities impacting sites	Implementation of BMPs and environmental management plans
Mining	Land-altering activities impacting sites from road and trail construction, drill lines, drill pads, and mining infrastructure and ancillary facilities	Implementation of BMPs and environmental management plans
Transmission line construction and maintenance	Land-altering activities impacting sites	Implementation of BMPs
Agricultural activities	Land-altering activities impacting sites	Land and Resource Management Plans and Vanderhoof Crown Land Plan

8.2.2.3.6 Mitigation Measures

Effects on archaeological sites, specifically impacts to sites by land-altering activities associated with the Project, can be minimized and mitigated. **Table 8.2-7** summarizes mitigation measures for the Project by phases, which are discussed below.

Table 8.2-7: Mitigation Measures on Archaeological Sites

Project Component	Project Phase	Identified Archaeological Site	Mitigation Measures	Expected Efficiency of Mitigation Options
Mine Site	C, O	FhSe-73, FhSe-74, FhSf-4	Site Protection Systematic Data Recovery Surveillance Monitoring	High
Mine Site Access Road	C	None	None	N/A
Transmission Line	C	FhSe-73 (Messue Trail); FhSe-2 (Cheslatta Trail), GaSf-47, GsSf-48	Project Design Changes Site Protection Systematic Data Recovery Surveillance Monitoring	High
Transmission Line – Tatelkuz Lake Ranch Re-route	C	FhSe-43 (Messue Trail)	Site Protection Surveillance Monitoring	High
Transmission Line – Stellako River Re-route	C	GaSf-43, GaSf-44, GaSf-45, GaSf-46	Project Design Changes Site Protection Systematic Data Recovery Surveillance Monitoring	High
Project Access Road (Kluskus FSR)	C	None	None	None
Airstrip	C	None	None	None
Freshwater Supply System	C	FhSe-43 (Messue Trail)	Site Protection Surveillance Monitoring	High

Note: C = construction; FSR = Forest Service Road; O = operations;

Based on the archaeological background study and the AIA, 13 archaeological sites will be affected by the Project. These 13 archaeological sites require protection and/or mitigation and were identified within the Project footprint for additional areas assessed in the LSA. However, as-yet-undiscovered archaeological sites might be encountered during construction. If any sites are identified, they will be managed through the proposed Archaeology and Heritage Resources Management Plan (AHRMP) (**Section 12.2.1.18.4.7**). The AHRMP will include informing workers of sensitive cultural areas, a chance find procedure, and a process for reporting to applicable Aboriginal groups. The AHRMP will guide the identification, recording, assessment, consultation, and avoidance and/or data recovery mitigation options. The AHRMP will also define processes to record, analyze and mitigate physical remains of cultural sites, such as cabins, archaeological sites, CMTs, and trails. In addition to mitigating Project effects on archaeological sites, some

mitigation procedures provide excellent educational opportunities for members of Aboriginal groups.

Specific measures for mitigating impacts to heritage resources are identified in the BC AIA Guidelines (Archaeology Branch, 1998). Generally, site conservation by avoidance is the preferred strategy for sites or portions of sites threatened by proposed developments. Project redesign is the most commonly invoked version of this option, but in this instance is not feasible due to the extent and surroundings of the Project properties and/or rights-of-way (ROWs). Mitigation in the form of systematic data recovery (i.e., scientific excavations) is usually recommended for vulnerable, high-significance sites or portions of such sites that cannot be protected by other strategies. Archaeological surveillance and/or monitoring is another type of mitigation, often recommended for construction within less-significant sites or portions of sites, to ensure that emergency impact management measures are undertaken if unanticipated archaeological remains (e.g., ancestral burials) are encountered. Archaeological monitoring of construction activities is also done for sites where other types of archaeological investigations (e.g., data recovery) have been conducted in advance of construction.

Archaeological resources are non-renewable, and mitigative measures such as Project design changes and site protection are preferred where conflicts between proposed developments and archaeological sites have been identified. In situations where such measures are not practical (e.g., redesign options limited by environmental constraints or mining regulations), systematic data recovery is normally undertaken to salvage cultural materials from a threatened site or affected portions of a site.

8.2.2.3.6.1 Mine Site

Three archaeological sites (registration numbers FhSe-73, FhSe-74, and FhSf-4) are within the mine site footprint. Given that the Project cannot be redesigned to avoid sites FhSe-73, FhSe-4, and FhSf-4, then systematic data recovery, in the form of controlled archaeological excavation, is recommended prior to the commencement of the construction phase. These investigations must be undertaken by a qualified archaeologist under a Heritage Investigation Permit pursuant to section 14 or Site Alteration Permit pursuant to section 12 of the *HCA*. In addition, the Archaeology Branch will require that any ground-altering activity be monitored by archaeologists under a permit pursuant to section 12 of the *HCA*.

8.2.2.3.6.2 Transmission Line

Four archaeological sites (FhSe-73, FISE-2, GaSf-47, and GaSf-48) are within the transmission line footprint. Site FhSe-73 (the Messue Trail) is now a maintained road with no associated cultural features such as CMTs or blazes where the transmission line crosses the trail. Another site is the Cheslatta Trail (FISE-2), which is a cleared road with no associated CMTs or blazes. Given the nature of the two sites at the points where the transmission line crosses the trails, Project design changes and data recovery are not recommended prior to construction. Rather, it is recommended that the trails be protected during transmission line construction. The Archaeology Branch will require that

ground-altering activity is monitored by qualified archaeologists under a Site Alteration Permit during the construction phase.

Two prehistoric archaeological sites (GaSf-47 and GaSf-48) also are within the transmission line footprint. It is recommended that the transmission line be redesigned to avoid sites GaSf-47 and GaSf-48 (i.e., placement of poles, access roads). If this is not possible, then systematic data recovery, in the form of controlled excavation, is recommended prior to the construction phase. These investigations must be undertaken by qualified archaeologists under a Heritage Investigation Permit. In addition, the Archaeology Branch will require that ground-altering activities within these sites are monitored by qualified archaeologists under a Site Alteration Permit.

8.2.2.3.6.3 Transmission Line – Tatelkuz Lake Ranch Re-route

One archaeological site (FhSe-73, the Messue Trail) is now a cleared road with no associated cultural features such as CMTs or blazes where it is crossed by the transmission line. Given the present condition of the site where it is crossed by the transmission line, Project design changes and data recovery are not recommended prior to the construction phase. Rather, it is recommended that the trail be protected during transmission line construction. The Archaeology Branch will require ground altering activity be monitored by qualified archaeologists under a Site Alteration Permit.

8.2.2.3.6.4 Transmission Line – Stellako River Re-route

Four archaeological sites (GaSf-43, GaSf-44, GaSf-45, and GaSf-46) are within the transmission line Stellako River re-route. It is recommended that the transmission line be redesigned to avoid sites GaSf-43, GaSf-44, GaSf-45, and GaSf-46 (i.e., by hand-clearing vegetation from the ROW, placement of poles, access roads). If this is not possible, systematic data recovery, in the form of controlled archaeological excavation, is recommended prior to the construction phase. These investigations must be undertaken under a Heritage Investigation Permit. In addition, the Archaeology Branch will require any ground altering activity be monitored by archaeologists under a Site Alteration Permit.

8.2.2.3.6.5 Freshwater Supply System

One archaeological site (FhSe-73, the Messue Trail) consists of a visible wagon road with wagon ruts, associated with blazes and CMTs. Currently, the freshwater supply system is situated within the existing prism of BC Timber Sale FSR 7655.38. If the freshwater supply system remains within the existing road ROW (that portion already subject to previous ground disturbance), then no Project effects are anticipated. Given the nature of the landscape where the freshwater supply system crosses the Messue Trail, Project design changes and data recovery are not recommended. It is recommended that the trail be protected during the construction phase. The Archaeology Branch will require any ground-altering activity within site FhSe-73 be monitored by archaeologists under a Site Alteration Permit.

8.2.2.3.6.6 *Effectiveness of Mitigation*

Table 8.2-8 provides ratings for effectiveness of mitigation measures to avoid or reduce potential effects on archaeological sites during mine site development. The AHRMP will include informing workers of sensitive cultural areas, a chance find procedure, and a process for reporting to applicable Aboriginal groups. The AHRMP will also define processes to record, analyze and mitigate physical remains of cultural sites, such as cabins, archaeological sites, CMTs, and trails. Through bilateral discussion between the Proponent and affected Aboriginal groups, access to the mine site area by designated Aboriginal groups will be facilitated for cultural purposes, provided safe access can be accommodated. Mitigation measures will be based on site-specific information and construction engineering and are therefore preliminary at this stage.

Table 8.2-8: Mitigation Measures and Effectiveness of Mitigation to Avoid or Reduce Potential Effects on Archaeological Sites of the Land during Mine Site Development

Likely Project Effect	Project Phase	Mitigation/Enhancement Measure	Effectiveness of Mitigation Rating
Effects on Archaeological Sites:			
Mine Site: FhSe-73, FhSe-74, FhSf-4	Construction, Operations	Site protection	High
		Systematic data recovery	High
		Surveillance	High
		Monitoring	High
Transmission Line: FhSe-73 (Messue Trail); FISE-2 (Cheslatta Trail), GaSf-47, GsSf-48	Construction	Project design changes	High
		Site protection	High
		Systematic data recovery	High
		Surveillance	High
		Monitoring	High
Transmission Line – Tatelkuz Lake Ranch Re-Route: FhSe-43 (Messue Trail)	Construction	Site protection	High
		Surveillance	High
		Monitoring	High
Transmission Line – Stellako River Re-route: GaSf-43, GaSf-44, GaSf-45, GaSf-46	Construction	Project design changes	High
		Site protection	High
		Systematic data recovery	High
		Surveillance	High
		Monitoring	High
Freshwater Supply System: FhSe-43 (Messue Trail)	Construction	Site protection	High
		Surveillance	High
		Monitoring	High

In summary, low success rating means mitigation has not been proven successful, moderate success rating means mitigation has been proven successful elsewhere, and high success rating means mitigation has been proven effective. Effectiveness of mitigation measures is rated as high because these mitigation measures are standard regulatory actions as outlined in the AIA

Guidelines (1998). These mitigation measures have been proven to be effective for mining projects as well as hydroelectric, forestry, and infrastructure developments.

8.2.2.4 Residual Effects and Significance

The AIA indicated that there are 13 archaeological sites within the Project footprint. The potential for the Project to conflict with unidentified archaeological sites is low. With the implementation of proposed mitigation measures (i.e., site protection methods, systematic data recovery, and/or archaeological surveillance and monitoring) where expected Project effects cannot be avoided, information from archaeological sites regarding prehistoric Aboriginal use within the Project footprint will be identified and recorded.

Residual Project effects on archaeological sites are therefore considered negligible after mitigation is implemented. However, an overall increase in Project and general activity in the LSA may have adverse effects. As a mitigation strategy, the AHRMP (**Section 12.2.1.18.4.7**) will increase awareness and provide for management of any as-yet-unrecorded archaeological sites that may be encountered. **Table 8.2-9** summarizes the residual effects for archaeological sites. Residual effects simultaneously negative, in that additional archaeological sites may be discovered and disturbed, and positive, in that additional sites may be identified, recorded, and managed. Residual Project effects on archaeological sites are therefore considered to be negligible after mitigation.

Table 8.2-9: Summary of Residual Effects for Archaeological Sites

Project Phase	Residual Effect	Direction
C, O	Increased general activities in Vanderhoof Forest District	Negative – additional archaeological sites may be discovered and disturbed
		Positive – additional sites may be identified, recorded, and managed through the AHRMP

Note: AHRMP = Archaeology and Heritage Resource Management Plan; C = construction; O = operations;

8.2.2.4.1 Significance of Potential Residual Effects

Each potential residual effect was subjected to an effects assessment matrix to determine significance, and the criteria are described in **Section 4, Subsection 4.3.5.1**. Assessment of the residual effects for the four Project development phases for archaeological sites is presented in **Table 8.2-10**. Assessment for residual effect attributes includes context, magnitude, geographic extent, duration, frequency, reversibility, frequency, likelihood determination, statement of the level of confidence for likelihood, significance determination, and statement of the level of confidence for significance. The likelihood of occurrence of a particular residual effect is stated before significance has been determined. In **Table 8.2-10**, likelihood is shown as low, which means the residual effect is unlikely to occur or its occurrence could be considered very rare. The determination of significance of adverse residual effects is a key step in the assessment process. The residual effect for each stage of development is assessed as Not Significant (Negligible) with a high level of confidence. The level of confidence associated with the determinations of significance and likelihood are based on professional judgement and knowledge of the sources and nature of uncertainty as compounded through all the steps in the effects assessment. For the

proposed Project, confidence assessment is rated as high, following the criteria described in **Section 4, Table 4.3-10** (the VC is well understood, the Project-VC interaction is well understood, and mitigation has been proven effective).

The archaeological sites identified are very important resources within a regional context. While the archaeological site types are found in the region as a whole, their presence in the Project study area provides evidence for the utilization of the Project area and contributes to increasing our understanding of settlement patterns, landscape archaeology and regional prehistory. In addition, archaeological sites are finite in number, a non-renewable resource and static in their position in the landscape. As such the context is rated as high (**Table 8.2-10**) as the VC has low resilience to stress (physical alteration to the site). In addition, the Magnitude is rated as high given that the archaeological sites identified are relatively small in area and that the entire site could be lost.

Table 8.2-10: Residual Effects Assessment by Project Phase for Archaeological Sites

Categories for Significance Determination	Stage of Development / Rating			
	Construction	Operations	Closure	Post-Closure
Context	High	High	n/a	n/a
Magnitude	High	High	n/a	n/a
Geographic Extent	Point or Site-specific	Point or Site-specific	n/a	n/a
Duration	Chronic	Chronic	n/a	n/a
Reversibility	No	No	n/a	n/a
Frequency	Once	Once	n/a	n/a
Likelihood Determination	Low	Low	n/a	n/a
Statement of the Level of Confidence for Likelihood	High	High	n/a	n/a
Significance Determination	Not Significant (Negligible)	Not Significant (Negligible)	n/a	n/a
Statement of the Level of Confidence for Significance	High	High	n/a	n/a

Note: n/a =not applicable because there are no interactions between the Project and the VC during this phase.

8.2.2.5 Cumulative Effects

The archaeological assessment identified no Project effects on archaeological sites. Therefore, the residual effects of the Project on archaeological resources are Not Significant (Negligible), and an assessment of cumulative effects for the Project is not warranted.

8.2.2.6 Limitations

The effects assessment achieved comprehensive coverage of the proposed development. Information on archaeological sites in the LSA and Project footprint presented in the Baseline

Report is based on a search of the relevant literature, databases, and maps held by various repositories, an AIA, and consultation with knowledgeable authorities. Further information about archaeological resources in the Project area obtained from additional sources in the future may alter present interpretations or conclusions presented in the Baseline Report (**Appendix 8.1A; AHRMP Section 12.2.1.18.4.7**).

8.2.2.7 Conclusion

Thirteen archaeological sites will be affected by the Project. As-yet-unrecorded sites may be identified during any phase of the Project, but the greatest potential for such sites will occur during the construction and operations phases, although the probability of occurrence is rated as low or unknown. Land-altering activities are expected in each phase of the Project, but potential effects decrease substantially for those lands covered by previous archaeological assessments and lands previously affected by the Project during the construction and operations phases. The significance of effects after mitigation is rated as negligible. However, there is a small probability that land-altering activities (especially mining operations) may impact as-yet-unknown archaeological sites. Implementation of the AHRMP will mitigate such impacts.

8.2.3 Historic Sites

8.2.3.1 Introduction

Historic heritage sites are locations that contain structures, things, or other forms of physical evidence of historical or architectural significance. Historical heritage sites and locations in this region of BC are primarily attributable to post-contact Euro-Canadian settlement and land use, but also include habitations and other evidence left by Aboriginal peoples in that time period.

For the purposes of this assessment, historic sites and cultural resource sites follow the definition of archaeological sites, which are defined as locations which:

“consist of the physical remains of past human activity. The scientific study of these remains, through the methods and techniques employed in the discipline of archaeology, is essential to the understanding and appreciation of prehistoric and historic cultural development in BC. These resources may be of regional, provincial, national, or international significance” (Archaeology Branch, 1998).

The historical heritage VC are those resources with an identified interaction with the Project. They were chosen based on regulatory requirements, as well as Aboriginal stakeholder interests, legislative protection, and sensitivity to potential Project effects. The historic heritage VC has been identified as important in other mining EAs, and there is sufficient information available to adequately assess Project effects on this VC.

For the purposes of the Heritage Baseline, a CHR follows the definition provided in the *Forest Act* (Government of BC, 1996a) as “an object, a site, or the location of a traditional societal practice that is of historic, cultural, or archaeological significance to British Columbia, a community or an aboriginal people.” Section 10 of the *FPPR* further refines the definition of a CHR under the *Forest*

and Range Practices Act. The *FPPR* states its objective as set by government is “to conserve, or, if necessary, protect cultural heritage resources that are: (1) the focus of a traditional use, by an Aboriginal people, and that are of continuing importance to that people; and (2) not regulated under the *Heritage Conservation Act*” (BC MFLNRO, 2013).

Specific examples of CHRs include CMTs, trail blazes, traps, and traplines, which post-date 1846 AD and are not protected under the *HCA*.

8.2.3.1.1 Relevant Legislation and Legal Framework

Regulatory requirements for archaeological heritage assessment studies are derived from the following legislation and guidance documents:

- *CEAA, 2012* (Government of Canada, 2012);
- *BC EAA* (Government of BC, 2002a); and
- *BC HCA* (Government of BC, 1996b).

The *CEAA* “Reference Guide on Physical and Cultural Heritage Resources” defines heritage resources as “a human work or a place that gives evidence of human activity or has spiritual or cultural meaning and that has historic value” (Agency, 2012). It further outlines four categories of heritage resources: palaeontology, archaeology, historical heritage sites, and traditional land use.

In the absence of specific federal guidelines for the protection of cultural heritage, assessments of heritage resources required by the Agency generally need to meet the requirements of existing provincial legislation. In BC, this requirement is effected through the “Canada-British Columbia Agreement for Environmental Assessment Cooperation” (Government of Canada, 2004) that incorporates principles of the “Canada-wide Accord on Environmental Harmonization” (Canadian Council of Ministers of the Environment, 1998). Under the Canada-BC Agreement, such studies would be conducted according to the process established under existing provincial legislation.

The *BC EAA* requires the assessment of heritage sites. For all reviewable projects, the *BC EAO* requires an assessment of CHRs in accordance with the *AIR Template* (*BC EAO*, 2013).

The assessment of the historical and cultural heritage resources is included in the *AOA* (*AMEC*, 2011) as described in the *BC AIA Guidelines* (Archaeology Branch, 1998). The *AOA* identified potential historical and cultural heritage concerns and assessed their potential occurrence within a proposed development area.

8.2.3.2 Valued Component Baseline

8.2.3.2.1 Information Sources and Methodology

The *Archaeology 2013 Baseline Report* (**Appendix 8.1A**) provides a reference point of pre-Project conditions. Future conditions are predicted and compared to these baseline conditions. The *Project Description* (**Section 2.2**) provides dimensions and maximum footprints of proposed

facilities and linear features. The AIA conducted in 2012 and 2013 identified and assessed historical and cultural heritage resource sites.

8.2.3.2.2 Past, Present and Future Projects and Activities

The Archaeological Sites VC potentially interacts with other projects or activities in the RSA as a result of spatial or temporal overlap. **Section 4, Subsection 4.3.6.2, Table 4.3-11** shows the Summary Project Inclusion List developed for CEA (**Appendix 4C** contains the comprehensive Project Inclusion List). Any land altering activities associated with development projects have the potential to impact the archaeological sites, including:

- Timber harvesting for CMTs and CHR sites;
- Land altering activities such as clearing and grubbing;
- Forestry – logging;
- Road construction, including bridges;
- Development of ancillary facilities such as forestry camps and wildlife fighting support structure;
- Mineral exploration;
- Mining, including road and trail construction, drill lines, drill pads, and mining infrastructure and ancillary facilities;
- Transmission line construction and maintenance;
- Pipeline construction and maintenance;
- Recreational and residential development; and
- Agricultural activities.

8.2.3.2.3 Traditional Ecological or Community Knowledge

Protecting heritage resources is important for local residents and Aboriginal groups. Comments provided during the engagement and consultation process have offered insight into traditional, ecological, or community knowledge, which is defined as a body of knowledge built up by a group of people through generations of living in close contact with nature.

Aboriginal peoples noted that there are a number of sacred areas in the Project area. “Everywhere you go is special. Kuyakuz Mountain is sacred. The area to the east of Tatelkuz is where we used to burn our family members in the 1800s. It is a special spot, a sacred place. The only way to get there is by hiking or horseback” (Interview with Lhoosk’uz and Saik’uz First Nation Elders, 2013). “Tzelbeguz Lake is a place that holds a lot of meaning and is sacred to my family” (E-mail from Ulkatcho First Nation representative, 2012).

During interviews and communications with Ulkatcho First Nation, burial areas were identified (Letter from Ulkatcho First Nation representative, 2012).

The Alexander Mackenzie Heritage Trail and the Messue Wagon Trail are important heritage assets and represent aspects of the post-contact history of the area.

This information will be integrated into the Project design, execution, management, and monitoring in subsequent stages of the Project development including the Application review phase, the permitting phase, and the Project construction, operations, closure, and post-closure phases. A summary of issues and concerns received from all Aboriginal groups, the source of the input, and the Proponent’s response is included in **Appendix 3.1.3B. Section 7.2.7** provides an assessment of potential Project effects on current land and resource uses for traditional purposes. **Section 15** and **Section 16** address potential Project effects on Aboriginal rights and other Aboriginal interests respectively.

8.2.3.2.4 Archaeological Impact Assessment 2012 and 2013

The AIA, conducted under Heritage Inspection Permit #2012-0295, focused on areas identified as having archaeological potential for pre-contact sites (AMEC, 2011). However, the criteria that affect archaeological site distribution also favourably influenced the location of historical habitations and CMTs, in particular the proximity of aquatic features such as the Stellako River, Davidson Creek, and other streams and waterbodies (**Figure 8.2-1**). Although not protected under the *HCA* historic sites, additional CHR sites were identified, recorded, and assessed during the AIA. Summary information on the results of the field survey for historic sites is provided in **Table 8.2-11** and for cultural heritage features in **Table 8.2-12**.

Table 8.2-11: Proposed Project AIA Results – Historical Heritage Sites

Project Facility	Historic Site	Identified Features	Comment
Mine Site Footprint	Cabin	Remnant of cabin floor and kitchen debris	In flood plain of south bank of Creek 146920; associated ceramic wares introduced from 19th century to 1980s – most likely age of occupation from 1940 to 1980
Transmission Line	Roadside memorial	Memorial cross	Wooden memorial marker to “William Scott” in cleared ROW beside Francois Lake Road
Transmission Line – Stellako River Re-route	Cabin (GaSf-10)	Remnant of cabin floor and walls	15 m SSW of re-route; only small portions of north and south corners of cabin remain; fitted with saw and axe; round nails present on inner walls; measures 3.3 x 9 m

The AIA identified three historical heritage sites: one site consists of the remains of a cabin dated circa 1940 to 1980 within the mine footprint; one site is a roadside memorial cross in proximity to the transmission line, and the third site is the remains of a historic cabin dating approximately to the mid-20th century, adjacent to the Stellako River re-route (**Figure 8.2-2**, **Figure 8.2-3**, **Figure 8.2-4**, and **Figure 8.2-8**). No historic sites were identified within the proposed Tatelkuz Lake Ranch re-route, the mine access road, airstrip and access road, and proposed Kluskus FSR realignment.

Table 8.2-12: Project AIA Results – Cultural Heritage Resources

Project Facility	Cultural Heritage Site	Identified Features	Comment
Mine Site Footprint	CHR 1	21 trees with oval blazes	
	CHR 2	19 trees with oval blazes	Approximately linear alignment suggests likely association with mineral exploration activities
	CHR 3	5 trees with oval blazes	Approximately linear alignment suggests likely association with mineral exploration activities
	CHR 4	4 trees with oval blazes	Approximately linear alignment suggests likely association with mineral exploration activities
	CHR 5	8 trees with oval blazes	Approximately linear alignment suggests likely association with mineral exploration activities
	CHR 6	2 dead cambium- stripped lodgepole pine CMTs	Modification dates 105 and 115 years ago (\pm 10 years)
	CHR 10	1 shaped standing CMT	Tree dated to 60 years old; tree referred to as trail marker tree; may have marked boundary
	CHR 11	1 shaped standing CMT	Tree dated to 58 years old; tree referred to as trail marker tree; may have marked boundary
	CHR 13	1 shaped standing CMT	Tree not dated; assumed to be close in age to CHR 10 and CHR 11 based on DBH; referred to as trail marker tree; add may have marked "boundary" as illustrated in examples above
	CHR 15	1 dead cambium- stripped lodgepole pine CMT	Advanced state of decay precluded dating the tree
	CHR 16	1 dead cambium- stripped lodgepole pine CMT	Advanced state of decay precluded dating the tree
	CHR 20	4 trees with oval blazes	Approximate linear alignment suggests likely association with mineral exploration activities
	CHR 21	2 trees with oval blazes	Approximate linear alignment suggests likely association with mineral exploration activities
	CHR 22	3 trees with chainsaw cut blazes	Approximate linear alignment and chainsaw cuts suggest likely association with mineral exploration activities
	CHR 23	1 tree with oval blaze	Appears recent, located on a game trail
	CHR 24	6 trees with oval blazes	Approximate linear alignment suggests likely association with mineral exploration activities
CHR 25	11 trees with blazes	Approximate linear alignment suggests likely association with mineral exploration	
CHR 26	1 shaped standing CMT	Modified after 1935	
CHR 27	1 shaped standing CMT	Modified after 1993	
CHR 28	71 blazed trees	Trees along a well-worn trail; 1 tree tested, modification date of 1936	

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Project Facility	Cultural Heritage Site	Identified Features	Comment
Transmission Line	CHR 17	10 dead blazed lodgepole pine trees	Approximate linear alignment paralleling Stellako River suggests association with a trap line or modern industrial activity; one blaze dated to 1968
	CHR 31	9 bark-stripped lodgepole pines	Between Tahultzu Lake and a wetland; 7 trees previously recorded by Archer, 2 newly recorded, several more trees recorded by Archer outside the proposed transmission line. Seven samples within corridor dated; dates range from 1879-1971
	CHR 32	1 cambium-stripped standing lodgepole pine, with a rectangular scar and two oval blazes	Standing tree in a previously harvested forestry cutblock; blazes on east and west sides of tree
	CHR 33	1 standing lodgepole pine with two oval blazes	2 more blazed trees outside proposed transmission line; approximately linear alignment suggests association with forestry practice
	CHR 34	1 standing lodgepole pine with 2 oval and 1 irregular blazes	Faded orange spray paint suggests association with forestry development; axe cuts visible in irregular blaze
	CHR 35	1 standing lodgepole pine with 1 oval blaze	Cut stump in vicinity of blazed tree; located at end of an out-of-use logging spur road
	CHR 36	1 standing lodgepole pine with 1 oval blaze	Approximate linear alignment suggests association with forestry practice
	CHR 37	1 standing lodgepole pine with oval blaze	2 additional blazed trees to the east outside development; approximate linear alignment suggests association with forestry practice
	CHR 38	3 tapered bark- stripped lodgepole pine	Approximate linear alignment suggests association with forestry practice
	CHR 39	1 standing lodgepole pine with oval blazes	Blazed on east and west side of tree
	CHR 40	1 box trap	Recent trap, located on tree; lure (fish) still on wire inside trap
CHR 41	1 box trap	Located on ground at base of fir tree on moderately sloping terrain	
Transmission Line – Tatelkuz Lake Ranch Re-route	CHR 29	1 standing lodgepole pine with a rectangular bark-strip scar	On a trail that runs across a tested area of high archaeological potential; all shovel tests negative. Modification date of 1968
	CHR 30	1 axe-cut blazed standing lodgepole pine	Tree located on a worn trail

Project Facility	Cultural Heritage Site	Identified Features	Comment
Transmission Line – Stellako River Re-route	CHR 42	1 shaped spruce	Increment core indicates modification date after 1978
	CHR 43	1 lodgepole pine with lenticular bark-strip scarring	Located at base of a steep slope; advanced state of decay precluded dating
	CHR 44	8 standing and 1 fallen dead bark-stripped lodgepole pine	Advanced state of decay precluded dating
	CHR 45	2 spruce trees with triangular bark-strip scars	Two trees within 5 m of each other; 1 with 2 scar faces. Attempts were made to date both trees; one tree yielded a modification date of 1945
Freshwater System	Trap line	Footpath, blazes	Situated between 40m and 150m west of the Messue Trail, and it parallels the Messue Trail; two of the blazes had modification dates of 1952 AD and 1970 AD

Note: Cultural Heritage Resource (CHR) numbers are unique identifiers for the Project; not all resources identified through the life of the Project are relevant to the current baseline report and thus numbers are not inclusive or sequential.

The field survey identified 39 CHR sites. Twenty CHRs were identified within the mine site, including 12 CHRs consisting of a total of 147 blazes, three CHRs consisting of a total of four bark-stripped CMTs, and CHRs consisting of five shaped CMTs. Twelve CHRs were identified within the transmission line and consisted of seven CHRs with a total of 15 blazes, three CHRs consisting of three isolated CMTs, and two consisting of single box trap sets. Two CHRs were identified for the Tatelkuz Lake Ranch re-route: a single CMT and one blazed tree. Four CHRs were identified for the Stellako River re-route: one consisting of a shaped CMT, another consisting of a CMT, one consisting of nine CMTs, and the fourth consisting of two CMTs. One CHR, a trapline with associated footpath and blazes, was identified along the freshwater supply system. No CHR sites were identified within the mine access road, airstrip and access road, and proposed Kluskus FSR realignment. Summary information of the field survey for cultural heritage features is presented in **Table 8.2-12**.

8.2.3.3 Potential Effects of the Proposed Project and Proposed Mitigation

This section discusses the potential effects of the Project and proposed mitigation on historic sites.

Interactions between project components and activities and the historic sites VC are presented in **Table 4.3-2** (Project Components and Activity Interaction Matrix for Selected VCs) in **Section 4**. There are key interactions between the mine site, the linear components (Kluskus-FSR, the transmission line, the airstrip and mine access road) and the VC during the construction phase of the Project due to ground disturbance and site clearing activities. There will also be key interactions between the mine site and the VC during the operations phase, because some mine facilities such as the waste rock dumps, the TSF and the open pit will expand and affect new ground. The linear components will not change in size during the operations phase and only

maintenance activities will be undertaken, therefore the interactions with the VC are considered to be negligible and are not carried forward to the effects assessment. During the closure and post-closure phases there will be negligible interactions between the project components and the VC, because reclamation and re-vegetation activities will not disturb new ground.

The majority of potential effects on historical heritage sites and CHR sites will occur during the construction phase of the Project, with some potential effects occurring during the operations phase. The Project effect results from land-altering activities affecting historical heritage sites and CHR sites. Project components in which effects on these sites will occur are presented in **Table 8.2-13**.

Table 8.2-13: Potential Project Effects on Historical Heritage Sites

Project Component	Project Phase	Potential Direct Project Effect	Likelihood of Occurrence	Identified Historic Site and Cultural Heritage Resource Site
Mine Site	C, O	Land-altering activities impacting sites	Likely	Cabin, CHR 1 – 6, CHR 10, CHR 11, CHR 13, CHR 15, CHR 16, CHR 20 – 28
Mine Site Access Road	C	Land-altering activities impacting sites	Not likely	None
Transmission Line	C	Land-altering activities impacting sites	Likely	Roadside memorial, CHR 17, CHR 31 – 41
Transmission Line – Tatelkuz Lake Ranch Re-route	C	Land-altering activities impacting sites	Likely	CHR 29, CHR 30
Transmission Line – Stellako River Re-route	C	Land-altering activities impacting sites	Not likely	Cabin (GaSf-10), CHR 42 – 45
Access Road (Kluskus FSR)	C	Land-altering activities impacting sites	Not likely	None
Airstrip	C	Land-altering activities impacting sites	Not likely	None
Freshwater Supply System	C	Land-altering activities impacting sites	Not likely	Trap line

Note: C = construction; CHR = Cultural Heritage Resource; O = operations;

8.2.3.3.1 Construction Phase

The majority of potential Project effects on historical heritage sites and CHR sites will occur during the construction phase. All potential effects result from activities in which land-altering activities occur, including construction and upgrading of roads, clearing, excavating and grading for the mine footprint, and development of mine infrastructure. Impacts may also occur during the creation,

handling, and storage of soil and till, aggregate burrow pits for the concrete batch plant, and reject disposal areas. Other impacts may occur during the construction of the transmission line and freshwater supply system; however, not likely during the construction phase for the mine site access road, Kluskus FSR, and airstrip, given the absence of identified historical sites and CHR sites in those areas.

8.2.3.3.2 Operations Phase

Potential Project effects will occur during the operation phase for the mine site. All potential effects result from land-altering activities associated with soil and till salvage, handling and storage, the reject pile disposal area construction and management, and operation of the concrete batch plant; however, not likely during the operation phase for the mine site access road, transmission line, Kluskus FSR, airstrip, and freshwater supply system given the lack of land-altering activities during the operation phase and the absence of identified historical sites and CHR sites in those areas.

8.2.3.3.3 Closure Phase

No potential Project effects will occur during the closure phase. No component of the closure phase will affect any lands that have not already been affected during earlier Project phases.

8.2.3.3.4 Post-Closure Phase

No potential Project effects will occur during the post-closure phase. No component of the post-closure phase will affect any lands that have not already been affected during earlier Project phases.

In summary, Project construction will have the greatest impact on historical sites and CHR sites through land-altering activities associated with the Project development, while increased access to lands within the LSA is considered to be an indirect effect. However, any land-altering activity within LSA lands during the operations phase that were not subject to a previous AIA of the Project footprint could impact historical sites and CHR sites. Effects are simultaneously negative and positive, as these sites may be identified, recorded, and managed through the proposed AHRMP (**Section 12.2.1.18.4.7**).

8.2.3.3.5 Past, Present and Future Projects and Activities

Any land altering activities associated with development projects have the potential to impact the archaeological sites, including those listed in **Section 8.2.2.2.2**. **Table 8.2-14** presents an overview of potential adverse effects associated with past, present and future projects and activities that potentially interact with the Project.

Table 8.2-14: Potential Adverse Effects Resulting from Past, Present and Future Projects and Activities

Past, Present and Future Projects and Activities	Potential Adverse Effect	General High Level Mitigation
Timber harvesting for CMTs and CHR sites	Land-altering activities impacting sites	Implementation of guidelines such as the Forest Practices Code
Clearing and grubbing	Land-altering activities impacting sites	Implementation of guidelines such as the Forest Practices Code
Forestry - logging	Land-altering activities impacting sites	Implementation of guidelines such as the Forest Practices Code
Road construction, including bridges	Land-altering activities impacting sites	Implementation of BMPs and environmental management plans
Development of ancillary facilities such as forestry camps and wildlife fighting support structures	Land-altering activities impacting sites	Implementation of BMPs and environmental management plans
Mining	Land-altering activities impacting sites from road and trail construction, drill lines, drill pads, and mining infrastructure and ancillary facilities	Implementation of BMPs and environmental management plans
Transmission line construction and maintenance	Land-altering activities impacting sites	Implementation of BMPs
Agricultural activities	Land-altering activities impacting sites	Land and Resource Management Plans and Vanderhoof Crown Land Plan

8.2.3.3.6 Mitigation Measures

Effects on historical sites and CHR sites, specifically impacts to sites by land-altering activities associated with the Project can be minimized and mitigated. **Table 8.2-15** summarizes mitigation measures for the Project by phase, which are discussed below.

Table 8.2-15: Mitigation Measures for Historical Heritage and CHR Sites

Project Component	Project Phase	Identified Historical Heritage Site and CHR Site	Mitigation Measures	Expected Efficiency of Mitigation Options
Mine Site	C, O	Cabin, CHR 1 – 6, CHR 10, CHR 11, CHR 13, CHR 15, CHR 16, CHR 20 – 28	Systematic Data Recording Dendrochronological analysis (tree-ring dating)	High
Mine Site Access Road	C	None	None	N/A
Transmission Line	C	Roadside memorial, CHR 17, CHR 31 – 41	Project Design Changes Systematic Data Recording Dendrochronological analysis (tree-ring dating)	High
Transmission Line – Tatelkuz Lake Ranch Re-route	C	CHR 29, CHR 30	Systematic Data Recording Dendrochronological analysis (tree-ring dating)	High
Transmission Line – Stellako River Re-route	C	Cabin (GaSf-10), CHR 42 – CHR 45	Systematic Data Recording Dendrochronological analysis (tree-ring dating)	High
Project Access Road (Kluskus FSR)	C	None	None	None
Airstrip	C	None	None	None
Freshwater Supply System	C	Trap line	Systematic Data Recording Dendrochronological analysis (tree-ring dating)	High

Note: C = construction; CHR = Cultural Heritage Resource; O = operations.

Based upon the archaeological background study and the AIA, three historic sites and 39 CHRs will be affected by the Project. The historic sites and CHRs do not require protection and/or mitigation as they are not protected under the *HCA*. However, during the AIA, these sites were fully documented, subject to dendrochronological analysis (i.e., tree-ring dating) where applicable and practical, were assessed, and require no additional heritage investigations.

In addition, as-yet-unidentified historic sites and CHRs might be encountered during construction. If any sites are identified, they will be managed through the proposed AHRMP (**Section 12.2.1.18.4.7**). The AHRMP will include informing workers of sensitive cultural areas, a chance find procedure, and a process for reporting to applicable Aboriginal groups. The AHRMP will also define processes to record, analyze and mitigate physical remains of cultural sites, such as cabins, archaeological sites, CMTs, and trails. The AHRMP will guide the identification, recording, assessment, consultation, and avoidance and/or data recovery mitigation options. In

addition to mitigating Project effects on these sites, such procedures may provide excellent teaching opportunities for Aboriginal educational facilitators.

Although not protected under the *HCA*, general measures for mitigating impacts to heritage resources are identified in the BC AIA Guidelines (Archaeology Branch, 1998). Generally, site conservation by avoidance is the preferred strategy for sites or portions of sites threatened by proposed development. Project redesign is the most commonly invoked version of this option, but in this instance is infeasible due to the extent and surroundings of the Project properties and/or ROWs.

Historical heritage resources and CHRs are non-renewable, and mitigative measures such as Project design changes and site protection are preferred where conflicts between proposed developments and historical heritage resources and CHRs have been identified. In situations where such measures are not practical (e.g., redesign options limited by environmental constraints or mining regulations), recovery may be undertaken to salvage cultural data from a threatened site or affected portions of a site.

8.2.3.3.6.1 Mine Site

One historic site (i.e., a cabin) and 20 CHR sites are within the mine site footprint. The Project cannot be redesigned to avoid these sites and they are not protected under the *HCA*. However, all sites were fully documented, subject to dendrochronological analysis where possible, and they are considered to be fully mitigated, so no additional investigations or mitigation is required.

8.2.3.3.6.2 Transmission Line

Twelve CHR sites are within the transmission line footprint. Given that these sites are not protected under the *HCA* and that they were fully documented, assessed, and subject to dendrochronological analysis where possible, they do not require additional investigation or mitigation.

8.2.3.3.6.3 Transmission Line – Tatelkuz Lake Ranch Re-route

Two CHR sites are within the transmission line – Tatelkuz Lake Ranch re-route footprint. These sites are not protected under the *HCA* and they were fully documented, including dendrochronological analysis where applicable and practical, and they do not require additional investigation or mitigation.

8.2.3.3.6.4 Transmission Line – Stellako River Re-route

Four CHR sites are within the transmission line – Stellako re-route footprint. They are not protected under the *HCA* and they were fully documented, subject to dendrochronological analysis where possible, and they do not require additional investigation or mitigation.

8.2.3.3.6.5 *Freshwater Supply System*

One CHR site is within the freshwater supply system footprint. Given that this site is not protected under the HCA and current development plans will avoid the trapline, in addition to documentation of the trapline and subject to dendrochronological analysis, the site does not require additional investigation or mitigation.

8.2.3.3.6.6 *Effectiveness of Mitigation*

Table 8.2-16 provides ratings for effectiveness of mitigation measures to avoid or reduce potential effects on historic heritage sites during mine site development. The AHRMP will include informing workers of sensitive cultural areas, a chance find procedure, and a process for reporting to applicable Aboriginal groups. The AHRMP will also define processes to record, analyze and mitigate physical remains of cultural sites, such as cabins, archaeological sites, CMTs, and trails. Through bilateral discussion between the Proponent and affected Aboriginal groups, access to the mine site area by designated Aboriginal groups will be facilitated for cultural purposes, provided safe access can be accommodated. Mitigation measures will be based on site-specific information and construction engineering and are therefore preliminary at this stage.\

In summary, low success rating means mitigation has not been proven successful, moderate success rating means mitigation has been proven successful elsewhere, and high success rating means mitigation has been proven effective. Effectiveness of mitigation measures is rated as high because these mitigation measures are standard regulatory actions as outlined in the AIA Guidelines (1998). These mitigation measures have been proven to be effective for mining projects as well as hydroelectric, forestry, and infrastructure developments.

Table 8.2-16: Mitigation Measures and Effectiveness of Mitigation to Avoid or Reduce Potential Effects on Historic Heritage Sites during Mine Site Development

Likely Project Effect	Project Phase	Mitigation/Enhancement Measure	Effectiveness of Mitigation Rating
Mine Site: Cabin, CHR 1 – 6, CHR 10, CHR 11, CHR 13, CHR 15, CHR 16, CHR 20 – 28	Construction, Operations	Systematic Data Recording Dendrochronological analysis (tree-ring dating)	High
		Manage identified sites through the proposed AHRMP (Section 12.2.1.18.4.7)	High
		Avoidance of identified sites or portions of sites threatened by proposed development where possible	High
		Salvage cultural data from a threatened site or affected portions of a site when these sites cannot be avoided	High
Transmission Line: Roadside memorial, CHR 17, CHR 31 – 41	Construction	Project Design Changes Systematic Data Recording Dendrochronological analysis (tree-ring dating)	High
		Manage identified sites through the proposed AHRMP (Section 12.2.1.18.4.7)	High
		Avoidance of identified sites or portions of sites threatened by proposed development where possible	High
		Salvage cultural data from a threatened site or affected portions of a site when these sites cannot be avoided	High
Transmission Line – Tatelkuz Lake Ranch Re-route: CHR 29, CHR 30	Construction	Project Design Changes Systematic Data Recording Dendrochronological analysis (tree-ring dating)	High
		Manage identified sites through the proposed AHRMP (Section 12.2.1.18.4.7)	High
		Avoidance of identified sites or portions of sites threatened by proposed development where possible	High
		Salvage cultural data from a threatened site or affected portions of a site when these sites cannot be avoided	High
Transmission Line – Stellako River Re-Route: Cabin (GaSf-10), CHR 42 – CHR 45	Construction	Project Design Changes Systematic Data Recording Dendrochronological analysis (tree-ring dating)	High
		Manage identified sites through the proposed AHRMP (Section 12.2.1.18.4.7)	High
		Avoidance of identified sites or portions of sites threatened by proposed development where possible	High
		Salvage cultural data from a threatened site or affected portions of a site when these sites cannot be avoided	High
Freshwater Supply System: Trap line	Construction	Project Design Changes Systematic Data Recording Dendrochronological analysis (tree-ring dating)	High
		Manage identified sites through the proposed AHRMP (Section 12.2.1.18.4.7)	High
		Avoidance of identified sites or portions of sites threatened by proposed development where possible	High
		Salvage cultural data from a threatened site or affected portions of a site when these sites cannot be avoided	High

Note: AHRMP = Archaeology and Heritage Resources Management Plan

8.2.3.4 Residual Effects and Significance

Table 8.2-17 summarizes the residual Project effects on historical heritage sites and CHR sites. The AIA identified three historical heritage sites and 39 CHR sites within the Project footprint. The potential for the Project to conflict with unidentified historical sites and CHR sites is low. Having employed full documentation, including dendrochronological analysis, for the historical and CHR sites, additional heritage investigations or proposed mitigation measures is not required. Project effects cannot be avoided; information from historical and CHR sites regarding historical land use within the Project footprint has been identified and collected.

Table 8.2-17: Summary of Residual Effects for Historic Sites and CHR Sites

Project Phase	Residual Effect	Direction
C, O	Increased general activities in VFD	Negative – additional historic sites and CHR sites may be discovered and disturbed
		Positive – additional sites may be identified, recorded, and managed through the AHRMP

Note: C = construction; CHR = Cultural Heritage Resource; O = operation;

However, an overall increase in general activity in the LSA may have adverse effects. As a mitigation strategy, the AHRMP (**Section 12.2.1.18.4.7**) will increase awareness and provide for management of any as-yet-unrecorded historical heritage sites and CHR sites that may be encountered. The direction of the effect is negative, in that additional historical heritage sites and CHR sites may be discovered and disturbed, and positive, in that additional sites may be identified, recorded, and managed. Residual Project effects on historical heritage sites and CHR sites are therefore considered negligible after mitigation.

8.2.3.4.1 Significance of Potential Residual Effects

Each potential residual effect was rated in an effects assessment matrix to determine significance using the criteria described in **Section 4, Subsection 4.3.5.1**. Assessment of historical heritage residual effects for the four Project phases is presented in **Table 8.2-18**. Assessment for residual effect attributes includes context, magnitude, geographic extent, duration, frequency, reversibility, frequency, likelihood determination, statement of the level of confidence for likelihood, significance determination, and statement of the level of confidence for significance. The residual effect for the construction and operations phase is assessed as Not Significant (Negligible) with a high level of confidence. The likelihood of occurrence of a particular residual effect is stated before significance has been determined. In **Table 8.2-18**, likelihood is shown as low, which means the residual effect is unlikely to occur or its occurrence could be considered very rare. The level of confidence associated with the determinations of significance and likelihood are based on professional judgement and knowledge of the sources and nature of uncertainty as compounded through all the steps in the effects assessment. For the proposed Project, confidence assessment is rated as high, following the criteria described in **Section 4, Table 4.3-11** (the VC is well understood, the Project-VC interaction is well understood, and mitigation has been proven effective).

Table 8.2-18: Residual Effects Assessment by Project Phase for Historic Heritage Sites and CHR Sites

Categories for Significance Determination	Stage of Development/Rating			
	Construction	Operations	Closure	Post-Closure
Context	High	High	n/a	n/a
Magnitude	High	High	n/a	n/a
Geographic Extent	Point or Site Specific	Point or Site Specific	n/a	n/a
Duration	Chronic	Chronic	n/a	n/a
Reversibility	No	No	n/a	n/a
Frequency	Once	Once	n/a	n/a
Likelihood Determination	Low	Low	n/a	n/a
Statement of the Level of Confidence for Likelihood	High	High	n/a	n/a
Significance Determination	Not Significant (Negligible)	Not Significant (Negligible)	n/a	n/a
Statement of the Level of Confidence for Significance	High	High	n/a	n/a

Note: n/a =not applicable because there are no interactions between the Project and the VC during this phase.

The historical and cultural heritage resource sites identified are very important resources within a regional context. While the historical and cultural heritage resource site types are found in the region as a whole, their presence in the Project study area provides evidence for the historical utilization of the Project area and contributes to increasing our understanding of settlement patterns, landscape history and regional history. In addition, it must be stressed that historical and cultural heritage resource sites are finite in number, non-renewable resources and static in their position in the landscape. As such the context is rated as high (**Table 8.2-18**) as the VC has low resilience to stress (physical alteration to the site). In addition, magnitude is rated as high given that the historical and cultural heritage resource sites identified are relatively small in area and that the entire site could be lost.

8.2.3.5 Cumulative Effects

The historical heritage assessment identified no Project effects on historical heritage sites. Therefore, the residual effects of the Project on historical heritage resources are negligible, and an assessment of cumulative effects for the Project is not warranted.

8.2.3.6 Limitations

The impact assessment achieved comprehensive coverage of the proposed development. However, even the most thorough investigation may fail to reveal all historical heritage resources that may exist within a study area. In particular, isolated occurrences of trap-sets or blazed trees would be difficult to identify during a field survey and inspection of a development area may fail to reveal the presence of all historical resources. Therefore, consistent with the intent of the *HCA* and *CEAA*, the Proponent will follow the principles of the AHRMP (**Section 12.2.1.18.4.7**) and

contact the appropriate regulatory authorities should any historical materials, including but not limited to built structures, cabins, features, CMTs, or artifacts, are encountered prior to or during construction activities.

8.2.3.7 Conclusion

Three historical heritage sites and 39 CHR sites will be affected by the Project. As-yet-unrecorded sites may be identified during any phase of the Project, but the greatest potential for disturbing such sites will occur during the construction and operations phases. The potential for such sites within the Project area is rated as low or unknown. Land-altering activities are expected in each phase of the Project, but potential effects decrease substantially for those lands that have been covered by archaeological assessments and lands previously affected by the Project during the construction and operations phases. The significance of effects after mitigation is rated as negligible. However, there is a small probability that land-altering activities (especially mining operations) may impact as-yet-unknown historical heritage sites and CHR sites. Implementation of the AHRMP will mitigate such impacts.

8.2.4 Palaeontological Resources

8.2.4.1 Introduction

Palaeontological sites are locations where ancient organisms have been preserved in the geological record as fossils (Fossil Management Review Technical Working Group, 2004). Where present within the RSA, these typically occur as fossils in bedrock or as semi-fossilized bones of extinct animals in unconsolidated Quaternary (Ice Age) sediments. Resources have a wide appeal linked to scientific theories regarding the origins and development of life on Earth.

Palaeontological sites are particularly vulnerable to Project effects resulting from ground alterations, especially alterations to previously undisturbed ground. However, even where the ground has been previously disturbed, there is potential to add to any existing disturbance of the palaeontological site.

The VCs selected for heritage resources are those with an identified interaction with the Project. They were chosen based on regulatory requirements, *CEAA*, Strategic Land Policy and Legislation Branch (BC MFLNRO), individuals and heritage groups as well as Aboriginal interests, legislative protection, scientific concern, and sensitivity to potential Project effects. Furthermore, palaeontological resources have been identified as important in other mining EAs, and there is sufficient information available to adequately assess Project effects on this VC.

8.2.4.1.1 Relevant Legislation and Legal Framework

Regulatory requirements for palaeontological heritage assessment studies are based on the following legislation and guidance documents:

- *CEAA, 2012* (Government of Canada, 2012); and
- BC Fossil Management Framework (BC MFLNRO, 2005).

8.2.4.1.2 Canadian Environmental Assessment Act

The *CEAA* (Government of Canada, 2012) is administered by the Agency, and requires that proponents assess development project effects on heritage. The “Reference Guide for the *Canadian Environmental Assessment Act*. Assessing Environmental Effects on Physical and Cultural Heritage Resources” (Agency, 2012) recommends that heritage resources be assessed in relation to the mandates, objectives, and intents of existing legislation and policies on heritage found at various government levels (federal, provincial, municipal, or territorial). Palaeontological resources are one of the heritage resources listed in the Reference Guide.

8.2.4.1.3 BC Fossil Management Framework

The province of BC recognizes that palaeontological remains have heritage, scientific, and educational value as “fossils represent the historical record of the evolution and development of life on Earth” (Fossil Management Review Technical Working Group, 2004). As such, BC recognizes the need to protect important fossil finds and the interests of stakeholders. Undermining this recognition is the absence of administrative controls and legal instruments designed to protect and manage such resources. Currently, fossil collecting is largely unregulated and there is no clear policy for fossil management (Fossil Management Review Technical Working Group, 2004).

Regulatory protection for fossil sites was limited until 1997, when they were included under the *Mineral Tenure Act* (Government of BC, 1996d). In 2005, a new regulation took effect that identifies fossils as “not a mineral” under the *Mineral Tenure Act*, effectively preventing the rights to mine, extract, and sell fossils obtained through new mineral claims (BC MFLNRO, 2005).

Fossil sites are currently not protected by provincial legislation. However, the Lieutenant Governor in Council has the ability to protect specific palaeontological finds through designation as a Provincial Heritage Site or heritage object by issuing an Order-in-Council under section 9 of the *HCA* (Government of BC, 1996b). In addition, the Strategic Land Policy and Legislation Branch has established a set of guidelines for fossil management and are currently working with a Fossil Management Review Technical Working Group to establish operational and administrative

processes for fossil management in BC. Currently, the Land Tenures Branch (BC MFLNRO), responsible for fossil management in BC, states that:

- Fossils and fossil sites are important to BC as heritage resources;
- The order of priority for fossil management is science, natural heritage, education, and, where appropriate, commercial use;
- The order of priority for extraction or excavation of fossils is science, natural heritage, education, and, where appropriate, commercial use. Non-extractive commercial use has precedent over extractive commercial use; and
- A fossil management framework that recognizes the heritage value of fossils, the need to protect significant fossil sites, and the interests of stakeholders is necessary.

In the absence of clear legislative protection and resource management guidelines, ethical guidelines found in “West Coast Fossils: A Guide to the Ancient Life of Vancouver Island” (Ludvigsen and Beard, 1994) and the “Policy on Fossil Collecting and Regulation” (BC Palaeontological Alliance, 2012) have been adopted for this assessment.

8.2.4.2 Valued Component Baseline

The baseline palaeontological resource study was commenced in March 2013. An extensive literature search was undertaken in an effort to establish an understanding of the existence of key fossil resources within the Project RSA and LSA. The study was restricted to the sedimentary rock component of those study areas, as the non-sedimentary rock components, such as volcanics, typically do not contain fossil resources.

Surficial and subsurface geologic mapping of the Project areas show limited areas of sedimentary rock exposures caused by occlusion by flat-lying or gently-dipping tertiary lava flows, which are, in turn, often overlain by a widespread and often thick mantle of glacial drift, including till and glaciofluvial and lacustrine sediments. Three of the four LSAs (mine site, mine access road, and freshwater supply pipeline) are predominately overlain by glacial drift and do not contain significant sedimentary bedrock exposures or known fossil sites. However, eight known fossil sites were identified within the transmission line LSA, and two are situated immediately adjacent to it. It is possible that these fossil sites may be disturbed by transmission line construction. Four known fossil sites lie in an area northwest and west of the proposed mine site, bordering the Kluskus-Ootsa FSR within the RSA, but these sites are unlikely to be impacted by the Project.

The results of the 2013 field assessment confirm the presence of Ashman Formation bedrock within and immediately adjacent to the proposed transmission line ROW **Table 8.2-19**. A majority of the fossils from this area are fragmental and/or indeterminate, in part due to their preservation in thinly-bedded shale.

Table 8.2-19: Project Palaeontology Assessment Results – Fossil Sites

Project Facility	Fossil Site	Identified Fossil	Comment
Mine Site Footprint	None	None	None
Transmission Line	Fossiliferous Ashman Formation	A fragment of the bivalve <i>Pleuromya sp</i> of Middle Jurassic (Bathonian to Callovian) age	Within transmission line LSA but not within transmission line footprint
Transmission Line – Tatelkuz Lake Ranch Re-route	None	None	None
Transmission Line – Stellako River Re-route	None	None	None
Freshwater Supply Pipeline	None	None	None

Note: LSA = Local Study Area

8.2.4.2.1 Past, Present and Future Projects and Activities

The Archaeological Sites VC potentially interacts with other projects or activities in the RSA as a result of spatial or temporal overlap. **Section 4, Subsection 4.3.6.2, Table 4.3-11** shows the Summary Project Inclusion List developed for the CEA (**Appendix 4C** contains the comprehensive Project Inclusion List). Any land altering activities associated with development projects have the potential to impact the archaeological sites, including:

- Timber harvesting for CMTs and CHR sites;
- Land altering activities such as clearing and grubbing;
- Forestry – logging;
- Road construction, including bridges;
- Development of ancillary facilities such as forestry camps and wildlife fighting support structure;
- Mineral exploration;
- Mining, including road and trail construction, drill lines, drill pads, and mining infrastructure and ancillary facilities;
- Transmission line construction and maintenance;
- Pipeline construction and maintenance;
- Recreational and residential development; and
- Agricultural activities.

8.2.4.2.2 Traditional Ecological or Community Knowledge

Protecting heritage resources is important for local residents and Aboriginal groups. Comments provided during the engagement and consultation process have offered insight into traditional,

ecological, or community knowledge, which is defined as a body of knowledge built up by a group of people through generations of living in close contact with nature.

Aboriginal peoples noted that there are a number of sacred areas in the Project area. “Everywhere you go is special. Kuyakuz Mountain is sacred. The area to the east of Tatelkuz is where we used to burn our family members in the 1800s. It is a special spot, a sacred place. The only way to get there is by hiking or horseback” (Interview with Lhoosk’uz and Saik’uz First Nation Elders, 2013). “Tzelbeguz Lake is a place that holds a lot of meaning and is sacred to my family” (E-mail from Ulkatcho First Nation representative, 2012).

During interviews and communications with Ulkatcho First Nation, burial areas were identified (Letter from Ulkatcho First Nation representative, 2012).

The Alexander Mackenzie Heritage Trail and the Messue Wagon Trail are important heritage assets and represent aspects of the post-contact history of the area.

This information will be integrated into the Project design, execution, management, and monitoring in subsequent stages of the Project development including the Application review phase, the permitting phase, and the Project construction, operations, closure, and post-closure phases. A summary of issues and concerns received from all Aboriginal groups, the source of the input, and the Proponent’s response is included in **Appendix 3.1.3B. Section 7.2.7** provides an assessment of potential Project effects on current land and resource uses for traditional purposes. **Section 15** and **Section 16** address potential Project effects on Aboriginal rights and other Aboriginal interests respectively.

8.2.4.3 Potential Effects of the Proposed Project and Proposed Mitigation

This section discusses the potential effects of the Project and proposed mitigation on palaeontological sites.

Interactions between project components and activities and the palaeontological resources VC are presented in **Table 4.3-2** (Project Components and Activity Interaction Matrix for Selected VCs) in **Section 4**. There are key interactions between the mine site, the linear components (Kluskus-FSR, the transmission line, the airstrip and mine access road) and the VC during the construction phase of the Project due to ground disturbance and site clearing activities. There will also be key interactions between the mine site and the VC during the operations phase, because some mine facilities such as the waste rock dumps, the TSF and the open pit will expand and affect new ground. The linear components will not change in size during the operations phase and only maintenance activities will be undertaken, therefore the interactions with the VC are considered to be negligible and are not carried forward to the effects assessment. During the closure and post-closure phases there will be negligible interactions between the project components and the VC, because reclamation and re-vegetation activities will not disturb new ground.

The majority of the potential effects on palaeontological sites will occur during the construction phase of the Project, with several potential effects occurring during the operations phase. The Project effect results from land-altering activities impacting palaeontological sites. Project components in which direct effects on palaeontological sites will occur are presented in **Table 8.2-20**.

Table 8.2-20: Potential Project Effects on Palaeontological Sites

Project Component	Project Phase	Potential Project Effect	Likelihood of Occurrence	Identified Palaeontological Site
Mine Site	C, O	Land-altering activities impacting sites	Not likely	None
Mine Site Access Road	C	Land-altering activities impacting sites	Not likely	None
Transmission Line	C	Land-altering activities impacting sites	Not likely	Within Transmission Line LSA but not footprint
Transmission Line – Tatelkuz Lake Ranch Re-route	C	Land-altering activities impacting sites	Not likely	None
Transmission Line – Stellako River Re-route	C	Land-altering activities impacting sites	Not likely	None
Project Access Road (Kluskus FSR)	C	Land-altering activities impacting sites	Not likely	None
Airstrip	C	Land-altering activities impacting sites	Not likely	None
Freshwater Supply System	C	Land-altering activities impacting sites	Not likely	None

Note: C = construction; LSA = Local Study Area; O = operations;

8.2.4.3.1 Construction Phase

The majority of potential Project effects on palaeontological sites will occur during the construction phase. All potential effects result from activities in which land-altering activities will occur, including construction, upgrading of roads, and clearing, excavating, and grading for the transmission line footprint. However, such occurrences during the construction phase are not likely for the mine site, mine site access road, transmission line – Tatelkuz Lake Ranch re-route and transmission line – Stellako River re-route, Kluskus FSR, airstrip, and freshwater supply system, given the absence of identified palaeontology resources in those areas.

8.2.4.3.2 Operations Phase

Potential project effects may occur at the mine site due to land-altering activities. The linear components will not have potential Project effects on the VC during the operations phase. No component of the operations phase will affect any lands that have not already been affected during the construction phase.

8.2.4.3.3 Closure Phase

No potential Project effects will occur during the closure phase. No component of the closure phase will affect any lands that have not already been affected during earlier Project phases.

8.2.4.3.4 Post-Closure Phase

No potential Project effects will occur during the post-closure phase. No component of the post-closure phase will affect any lands that have not already been affected during earlier Project phases.

8.2.4.3.5 Past, Present and Future Projects and Activities

Any land altering activities associated with development projects have the potential to impact the archaeological sites, including those listed in **Section 8.2.2.2.2. Table 8.2-21** presents an overview of potential adverse effects associated with past, present and future projects and activities that potentially interact with the Project.

Table 8.2-21: Potential Adverse Effects Resulting from Past, Present and Future Projects and Activities

Past, Present and Future Projects and Activities	Potential Adverse Effect	General High Level Mitigation
Timber harvesting for CMTs and CHR sites	Land-altering activities impacting sites	Implementation of guidelines such as the Forest Practices Code
Clearing and grubbing	Land-altering activities impacting sites	Implementation of guidelines such as the Forest Practices Code
Forestry - logging	Land-altering activities impacting sites	Implementation of guidelines such as the Forest Practices Code
Road construction, including bridges	Land-altering activities impacting sites	Implementation of BMPs and environmental management plans
Development of ancillary facilities such as forestry camps and wildlife fighting support structures	Land-altering activities impacting sites	Implementation of BMPs and environmental management plans
Mining	Land-altering activities impacting sites from road and trail construction, drill lines, drill pads, and mining infrastructure and ancillary facilities	Implementation of BMPs and environmental management plans
Transmission line construction and maintenance	Land-altering activities impacting sites	Implementation of BMPs
Agricultural activities	Land-altering activities impacting sites	Land and Resource Management Plans and Vanderhoof Crown Land Plan

8.2.4.3.6 Mitigation Measures

As there are no known palaeontological sites, no mitigation measures are required for this VC. Considering the relatively short length of transmission line that is situated in the area where Project construction is likely to disturb Ashman Formation bedrock and the relatively sparse amount of fossil material that has been found there, there is insufficient evidence to warrant further protective measures during transmission line construction.

However, as-yet-unidentified palaeontological sites might be encountered during construction. If any sites are identified, they will be managed through the proposed AHRMP (**Section 12.2.1.18.4.7**). The AHRMP will guide the identification, recording, assessment, consultation, and avoidance and/or data recovery mitigation options. In addition to mitigating Project effects on palaeontological sites, some mitigation procedures may provide educational opportunities for Aboriginal communities.

Table 8.2-22 provides ratings for effectiveness of mitigation measures to avoid or reduce potential effects on palaeontological resources during mine site development. The AHRMP will include informing workers of sensitive cultural areas, a chance find procedure, and a process for reporting to applicable Aboriginal groups. The AHRMP will also define processes to record, analyze and mitigate physical remains of cultural sites, such as cabins, archaeological sites, CMTs, and trails. Through bilateral discussion between the Proponent and affected Aboriginal groups, access to the mine site area by designated Aboriginal groups will be facilitated for cultural purposes, provided safe access can be accommodated. Mitigation measures will be based on site-specific information and construction engineering and are therefore preliminary at this stage.

Table 8.2-22: Mitigation Measures and Effectiveness of Mitigation to Avoid or Reduce Potential Effects on Paleontological Resources during Mine Site Development

Likely Project Effect	Project Phase	Mitigation/Enhancement Measure	Effectiveness of Mitigation Rating
Encountered paleontological sites	Construction, Operation, Closure, Post-Closure	If any sites are identified, they will be managed through the proposed AHRMP (Section 12.2.1.18.4.7)	High

Note: AHRMP = Archaeology and Heritage Resources Management Plan

In summary, low success rating means mitigation has not been proven successful, moderate success rating means mitigation has been proven successful elsewhere, and high success rating means mitigation has been proven effective. Effectiveness of mitigation measures is rated as high because these mitigation measures are standard regulatory actions as outlined in the AIA Guidelines (1998). These mitigation measures have been proven to be effective for mining projects as well as hydroelectric, forestry, and infrastructure developments. Although paleontological sites are currently not protected under provincial or federal law, the potential effects on these sites can be mitigated by following the heritage inspection guidelines.

8.2.4.4 Residual Effects and Significance

If unidentified palaeontological sites are encountered during construction, residual Project effects on palaeontological sites will be not significant (negligible) after mitigation. **Table 8.2-23** presents the residual effects assessment by Project phase on palaeontological resources.

Table 8.2-23: Residual Effects Assessment by Project Phase on Palaeontological Resources

Categories for Significance Determination	Stage of Development/Rating			
	Construction	Operations	Closure	Post-Closure
Context	High	High	n/a	n/a
Magnitude	Moderate	Moderate	n/a	n/a
Geographic Extent	Point or Site Specific	Point or Site Specific	n/a	n/a
Duration	Chronic	Chronic	n/a	n/a
Reversibility	No	No	n/a	n/a
Frequency	Once	Once	n/a	n/a
Likelihood Determination	Low	Low	n/a	n/a
Statement of the Level of Confidence for Likelihood	High	High	n/a	n/a
Significance Determination	Not Significant (Negligible)	Not Significant (Negligible)	n/a	n/a
Statement of the Level of Confidence for Significance	High	High	n/a	n/a

Note: n/a =not applicable because there are no interactions between the Project and the VC during this phase.

Although no known palaeontological sites were identified they are very important resources within a regional context. In addition, it must be stressed that palaeontological sites are finite in number, non-renewable resources and static in their position in the landscape. As such the context is rated as high (**Table 8.2-18**) as the VC has low resilience to stress (physical alteration to the site). In addition, magnitude is rated as moderate given that the paleontological were not identified but where they have been identified in the region are relatively small in area and potentially a portion of the site could be lost.

8.2.4.5 Cumulative Effects

The palaeontological assessment identified no Project effects on fossil sites. Therefore, the residual effects of the Project on palaeontological resources are negligible, and an assessment of cumulative effects for the Project is not warranted.

8.2.4.6 Limitations

The effects assessment achieved comprehensive coverage of the proposed development. Information on palaeontological resources in the LSA presented in the Baseline Report (Appendix 8.1A) is based on a search of the relevant literature, databases, and maps held by various repositories, a field assessment, and consultation with knowledgeable authorities. While attempts have been made to identify all significant sources held by the repositories, palaeontological research can never claim to be complete. Further information about palaeontological resources in the Project area obtained from additional sources in the future may alter current interpretations or conclusions presented in the Baseline Report.

8.2.4.7 Conclusion

No known palaeontological sites will be affected by the Project. As-yet-unrecorded sites may be identified during any phase of the Project, but the greatest potential for adversely affecting such sites will occur only during the construction phase. However, the potential for such sites occurring in these lands is rated as low or unknown. Land-altering activities are expected in each phase of the Project, but potential effects decrease substantially for those lands covered by previous palaeontological assessments, and lands previously affected by the Project during the construction phase. As no palaeontological sites would be affected by the Project, the significance of effects is negligible. However, there is a small probability that land-altering activities, especially transmission line construction operations, may impact as-yet-unknown palaeontological sites. Implementation of the AHRMP (**Section 12.2.1.18.4.7**) will mitigate such impacts.

8.3 Summary of Assessment of Heritage Effects

Thirteen archaeological sites, three historical heritage sites and 39 Cultural Heritage Resource (CHR) sites, and no known palaeontological sites will be affected by the Project. As-yet-unrecorded sites may be identified during any phase of the Project, but the greatest potential for such sites will occur during the construction and operations phases. The potential for such sites within the Project area is rated as low or unknown. Land-altering activities are expected in each phase of the Project, but potential effects decrease substantially for those lands covered by previous archaeological assessments, and lands previously affected by the Project during the construction and operations phases. However, there is a small probability that land-altering activities (especially mining operations) may impact as-yet-unknown archaeological sites, historical heritage sites and CHR, and palaeontological sites.

Table 8.3-1 summarizes the potential effects, key mitigation measures, and the evaluation of significance of the assessment of the Heritage effects.

Table 8.3-1: Summary of Assessment of Potential Heritage Effects

Valued Components (Identify Phase of Project)⁽¹⁾	Potential Effects	Key Mitigation Measures	Evaluation of Significance of Residual Effects (Summary Statement)
Archaeological Sites (C, O)	Increased general activities in VFD	Project design changes Site protection Systematic data recovery Surveillance Monitoring	Residual Project effects on archaeological sites are considered to be Not Significant (negligible) after mitigation.
Historic Heritage Sites (C, O)	Increased general activities in VFD	Project design changes Systematic data recording Dendrochronological analysis (tree-ring dating)	Residual Project effects on historical heritage sites and CHR sites are considered to be Not Significant (negligible) after mitigation.
Palaeontological resources (C, O)	No paleontological sites identified, However, if sites are identified, the potential effect would be land-altering activities impacting sites	If sites are identified, they will be managed through the proposed AHRMP (Section 12.2.1.18.4.7).	Residual Project effects on paleontological sites are considered to be Not Significant (negligible) after mitigation.

Note: ⁽¹⁾ Project phase: C = construction; O = operations;
 VFD = Vanderhoof Forest District