Appendix 8.1A
Archaeology 2013 Baseline Report

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2013 Baseline Report
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newgold™

Blackwater Gold Project

September 2013 / AMEC VE52277

amec

Blackwater Gold Project

2013 Baseline Report
Archaeology

Prepared for:
New Gold Inc.
Suite 1800 – 555 Burrard Street
Vancouver, BC

Prepared by:
AMEC Environment & Infrastructure
a division of AMEC Americas Ltd.
Suite 600, 4445 Lougheed Hwy
Burnaby, BC V5C 5A9

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ACRONYMS

Abbreviations and Units of Measure	Definition
AD	anno domini
Agency	Canadian Environmental Assessment Agency
AIA	Archaeological Impact Assessment
AIR	Application Information Requirements
AMEC	AMEC Environment and Infrastructure
AOA	Archaeological Overview Assessment
Application (the)	Application for an Environmental Assessment Certificate
B.C.	Before Christ
BAFAun	Boreal Altai Fescue Alpine Undifferentiated subzone
BC	British Columbia
BC MFLNRO	British Columbia Ministry of Forests, Lands and Natural Resource Operations
BC MOF	British Columbia Ministry of Forests
BC *EAA*	British Columbia *Environmental Assessment Act*
BGC	biogeoclimatic
BP	Before Present, where Present is AD 1950
ca.	Circa
CEAA	*Canadian Environmental Assessment Act, 2012*
CMT	Culturally Modified Tree
dAIR	Draft Application Information Requirements
DBH	diameter at breast height; used in recording CMTs
°	degree
DBS	Depth Below Surface
ESSFmv1	Engelmann Spruce–Subalpine Fir Moist Very Cold Nechako variant
ESSFmvp	Engelmann Spruce–Subalpine Fir Moist Very Cold Nechako Parkland variant
FPPR	Forest Planning and Practices Regulation
FRPA	*Forest and Range Practices Act*
FSR	Forest Service Road
GIS	Geographic Information System
ha	hectare
HCA	*Heritage Conservation Act*
Hwy	Highway
km	kilometre
kV	kilovolt
LSA	Local Study Area
m	metre

Abbreviations and Units of Measure	Definition
m^2	square metres
masl	metres above sea level
MFLNRO	BC Ministry of Forests, Lands and Natural Resources Operations
Mm^3	million cubic metres
Mt/yr	million tonnes per year
MYAB	Multi-Year Area Base
NAU	Nazko Upland ecosection
NTS	National Topographic System
Proponent (the)	New Gold Inc.
Project (the)	Proposed Blackwater Gold Project
%	percent
RAAD	Remote Access to Archaeological Data
RCYBP	Radiocarbon Years Before Present, where Present is AD 1950
ROW	right-of-way
RSA	Regional Study Area
SBSdk	Sub-Boreal Spruce dry cool variant
SBSdw3	Sub-Boreal Spruce dry warm Stuart variant
SBSmc2	Sub-Boreal Spruce Moist Cold Babine variant
SBSmc3	Sub-Boreal Spruce Moist Cold Kluskus variant
TFL	Tree Farm License
TK/TLU	Traditional Knowledge/Traditional Land Use
TRIM	Terrain Resource Inventory Mapping
VC	Valued Component (environmental, economic, social, heritage, or health) considered important by the proponent, public, Aboriginal groups, scientists, and government agencies involved in the assessment process.
VFD	Vanderhoof Forest District

GLOSSARY

Term	Definition
Biozone	Intervals of geologic strata defined on the basis of their characteristic fossils
GSC	Geological Survey of Canada
Pleistocene	1.806 million years ago (Ma) to 0.018 Main geologic time, an early stage of the Quaternary
Project Area	Both Regional and Local Study Areas and lands immediately adjacent to them
Quaternary	2.588 Ma to present time, onset of North American glaciation
Stikine Terrane	Strata composed of island arc volcanism and associated sedimentation in central and east-central British Columbia

EXECUTIVE SUMMARY

Heritage

AMEC Environment and Infrastructure (AMEC) was retained by New Gold Inc. (New Gold) to conduct heritage baseline studies for the proposed Blackwater Gold Project (the Project) near Vanderhoof, BC, for the preparation for completing an environmental assessment under the British Columbia *Environmental Assessment Act* (2012). This report presents the results of the heritage baseline (background and field) studies 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 of archaeological and historical heritage sites for the heritage baseline studies completed. 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 the following valued components: archaeological sites and historical heritage sites.

Based on the *Mines Act* application process, reasonable expectations, and professional judgment, the following study area boundaries were established for the heritage baseline study:

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

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

1. proposed mine site;
2. proposed transmission line and two reroute options;
3. mine site access road;
4. proposed water pipeline;
5. proposed airstrip and access road; and
6. Kluskus Forest Service Road (re-alignment of road from 104+900 to 106-738 km).

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 within the LSA, prior to the Project

heritage study, a significant expansion of the research catchment area was required to acquire an adequate sample of comparative data. A larger geographic scope, or RSA, was utilized for the baseline research and is defined in the Application Information Requirements (AIR) as a 15-kilometre (km) buffer around the proposed mine site footprint and a 10-km wide buffer on the centreline of transmission line, access road and water supply pipeline line footprints. Beyond the mine development footprint, it is anticipated that the Project will not be affected by land alterations that could affect archaeological or other heritage sites.

Archaeological resources in British Columbia (BC) are Valued Components (VCs) by virtue of their protection under the *HCA*. Section 13 of the *Heritage Conservation Act* (*HCA*) specifies that an individual (or corporation) must not "damage, excavate, dig in, or alter or remove any heritage object" (Government of BC, 1996a) 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 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* (*LGA*) (Government of BC, 1996b).

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*. 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).

The *Forest Act* defines a cultural heritage resource as "an object, a site, or the location of a traditional societal practice that is of historic, cultural, or archaeological significance to BC, a community or an Aboriginal people." Section 10 of the Forest Planning and Practices Regulation (FPPR) further refines the definition of a cultural heritage resource under the *Forest and Range Practices Act* (FRPA). The FPPR states the following objective set by government: "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";* (Resources Practices Branch, 2013).

For this study, specific examples of cultural heritage resources include culturally modified trees (CMTs), trail blazes, traps, and traplines, which post-date 1846 AD and are not protected under the *HCA*.

An Archaeological Impact Assessment (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, water pipeline, airstrip and access road, and re-alignment of the Kluskus Forest Service Road between from 104+900 to 106+738 KM. The results of the AIA are presented below.

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 cultural heritage resource sites consisting of blazed trees and non-protected CMTs, that is, post-dating 1846 AD, were identified. 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.

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. The field assessment of the transmission line identified 18 locations with moderate or high archaeological potential, in which a total of 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 (FlSe-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 cultural heritage resources consisting of unprotected CMTs, blazes, and box traps were identified.

Proposed Transmission Line – Mills Ranch Reroute

The AIA identified one protected archaeological site within the Mills Ranch Reroute 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 Mills Ranch Reroute.

Proposed Transmission Line – Stellako Reroute

The AIA identified four archaeological sites within the Stellako Reroute 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 cultural heritage resource sites consisting of non-protected culturally modified trees were identified. The remnants of a cabin, previously identified historical heritage site, GaSf-10, were also identified.

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.

Proposed Water 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 water pipeline. A total of 24 subsurface tests were excavated. Currently, BCTS Forest Service Road 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.

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.

Kluskus Forest Service Road (re-alignment of road from 104+900 to 106+738 km)

The AIA identified no archaeological sites, historical heritage sites, or cultural heritage sites. with the realignment of the Kluskus Forest Service Road from 104+900 to 106+738 km corner. In addition, no areas of archaeological potential were identified or tested.

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; 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 cultural heritage resources 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 exception is in proximity to the Stellako Rivers 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 19th and 20th century mineral exploration and timber harvesting activities.

Palaeontology

This 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 Projects' Regional and Local Study Areas (RSAs 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 (the mine site, access road, and water 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. 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 Forest Service Road within the heritage RSA, but these sites are unlikely to be impacted by the Project's mining and associated operations.

The 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 associated with the Project. A majority of the fossils described from this area are fragmental and/or indeterminate in part due to their preservation in thinly bedded shale.

1.0 HERITAGE

1.1 Introduction

AMEC Environment and Infrastructure (AMEC) was retained by New Gold Inc. (New Gold) to conduct heritage baseline studies for the proposed Blackwater Gold Project (the proposed Project) near Vanderhoof, BC (**Figure 1.2-1**) in preparation for the environmental assessment under the British Columbia *Environmental Assessment Act* (2002). An environmental assessment (EA) must be submitted to the Environmental Assessment Office (EAO) in order to obtain an Environmental Assessment Certificate, as required prior to a *Mines Act* permit being issued. This report presents the results of the heritage baseline (background and field) studies completed in 2011 and 2012 as part of a multi-year heritage baseline study program.

The report provides an overview description of the Project and summarizes background information of archaeological and historical heritage sites for the heritage baseline studies completed. 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 the following valued components: archaeological sites and historical heritage sites.

1.2 Project Description

New Gold is proposing the development of an open pit gold mine south of Vanderhoof on Blackwater Mountain. Current concepts involve an open pit mine removing 22 million tonnes per year (Mt/yr), and ore processing facility producing gold and silver ore bars. The Project will also involve upgrading existing forestry access roads from Vanderhoof and constructing a power line to the site. The current mine plan calls for the development of a tailings storage facility (TSF). Potential locations for tailings management are being considered for storage of 300 million cubic metres (Mm^3) of tailings and potential acid generating waste rock. The location of the Project property boundaries is shown in **Figure 1.2-1**.

The Project will involve infrastructure and equipment required for mining, processing, and transporting the gold; water and earth will be managed at the site; and a reclamation plan will be prepared in consideration of the end land use objective(s) for the property after mining has ceased.

320000 360000 400000 440000

6000000 5960000 5920000 5880000

François Lake
Southbank
Cheslatta Carrier
Danskin
Skin Tyee
Endako
Stellako
Fraser Lake
Nadleh Whuten
Fort Fraser
Engen
Vanderhoof
Weneez
Sinkut River
Saik'uz
Nulki
Mapes
Nazko
Kluskus

Proposed Transmission Line (Stellako Re-route)
Proposed Transmission Line (Mills Ranch Re-route)
Proposed Airstrip
Kluskus-Ootsa FSR Upgrade
Proposed Fresh Water Pipeline
Kluskus FSR
Kluskus-Ootsa FSR
Kluskus-Blue FSR
Proposed Transmission Line

Endako
François Lake
Uncha Lake
Takysie Creek
Binta Lake
Nithi River
Smith Creek
Nechako River
Tahultzu Lake
Hallett Lake
Greer Creek
Targe Creek
Knapp Creek
Cheslatta River
Cheslatta Lake
Cheslatta
Bird Creek
Lucas Lake
Lucas Creek
Knewstubb Lake
Big Bend Creek
Natalkuz Lake (Nechako Reservoir)
Tetachuck River
Entiako River
Entiako Lake
Johnny Lake
Moose Lake
Laidman Lake
Fawnie Creek
Top Lake
Chedakuz Creek
Tatelkuz Lake
Kuyakuz Lake
Tsacha Lake
Kushya
Blackwater River
Finger Lake
Tatuk Lake
Chilako River
Taluk Creek
Batnuni Lake
Euchiniko River
Euchiniko Lakes
Euchiniko
Nataniko Creek
Baezaeko
Nazko
Engen
Nechako River
Stuart River
Tachick Lake
Stony
Nulki Lake
Sinkut River
Cluculz Lake
Cluculz Creek
Khai
Corkscrew

N

Legend

- Populated Place
- 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

Scale: 1:500,000
0 5 10 20
Kilometres

Reference
BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Heritage Resources Baseline Study Areas

DATE:	ANALYST:	Figure 1.2-1
April, 2014	PK	
JOB No: VE52277	QA/QC: GH	PDF FILE: 16-100-001_v8.pdf
GIS FILE: 16-100-001_v8.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

Y:\GIS\Projects\VE\VE52095_Richfield_Blackwater\Mapping\16_archaeology\Baseline\16-100-001_v8.mxd

The proposed mine site occupies a surface area of approximately 3,300 hectares (ha). It is located approximately 110 km southwest of Vanderhoof (straight-line distance) in central BC and approximately 160 km southwest of Prince George, in the Bulkley-Nechako Regional District. Coordinates at the approximate centre of the proposed mine site are centered at 53° 11' 22.872"N 124° 52' 0.437"W (5893000 N and 375400 E). The Project area is located on NTS map sheets (1:50,000) 93F107 and 93F02 or within BCGS (1:20,000) map sheets 093F026 (north) and 093F016 (south) and 93F27 and 93F017 to the east. The proposed mine site is situated along the northern flanks of Mt. Davidson in the Nechako Plateau. Elevation of the mine site ranges from 1,175 metres above sea level (masl) to 1,740 masl for the upper elevation of the mine footprint. The summit of Mount Davidson is 1,861 masl.

Power will be brought to the Project via a 133 km-long, 230 kilovolt (kV) transmission line. The transmission line is proposed to have a right-of-way (ROW) approximately 40 m wide and to occupy approximately 550 ha from the Glenannan substation, near Fraser Lake, to the mine site. Two variants of the transmission line are the Mills Ranch Reroute and the Stellako River Reroute. The transmission line alignment crosses National Topographic Series (NTS) map sheets (1:50,000) 93K02 and 93K03. Access will be via the Kluskus Forest Service Road (FSR) from Vanderhoof to the Project and crosses NTS map sheets (1:50,000) 93F02, 93F03, 93F07, 93F09, 93F10, and 93F16. A proposed 12.9 km water pipeline will be constructed from Tatelkuz Lake to the proposed mine site.

The Project falls within the BC Ministry of Forests, Lands and Natural Resources Operations (MFLNRO) Vanderhoof Forest District (VFD). The forestry designation for the project is within the Prince George Timber Supply Area (TSA), a part of the Northern Central Interior Region, administered by the VFD as well as the Prince George and the Fort. St. James Forest Districts. Active forestry operations adjacent to the Project belong to L&M Lumber who have developed a road system in the Davidson Creek drainage to access low site productivity pine stands.

1.3 Heritage Baseline Study Areas

Based on the *EA* application process, reasonable expectations and professional judgment, the following study area boundaries were established for the heritage baseline study:

- an LSA includes the Project area plus a buffer encompassing a zone of potential direct project-specific effects; and
- an RSA includes the Project and surrounding lands encompassing a zone for data collection only and for which there are no specific heritage effects expected.

1.3.1 Local Study Area

The Project development area encompasses an LSA that is larger than the development footprint but is comparable to the LSA adopted by other scientific disciplines for the Project.

As defined in the dAIR, an approximate 500-m buffer around the Project facilities defines de LSA. Six LSAs have been defined for the Project:

- proposed mine site;
- proposed transmission line and two options: the Mills Ranch Re-alignment and the Stellako Re-alignment;
- mine site access road;
- proposed water pipeline;
- proposed airstrip and access road; and
- re-alignment of one section of the Kluskus FSR (104+900 to 106+738 km (**Figure 1.2-1**).

Aside from a few key sources that are noted as appropriate, the archaeological and historical heritage information available for the LSA was uninformative as a tool for baseline research.

1.3.2 Regional Study Area

Given the paucity of archaeological and other heritage resource information within the LSA, a significant expansion of the research catchment area was required to acquire an adequate sample of comparative data. A larger geographic scope, or RSA, was utilized for the baseline research and is defined in the dAIR as a 15 km buffer around the proposed mine site footprint and for the transmission line, access road, and water supply pipeline line footprints, a 10 km-wide buffer on either side of the centerline of each of these Project components. Beyond the mine development footprint, it is anticipated that the Project will not affect archaeological or other heritage sites.

Reference to the general description of a study area in this document includes all LSAs and RSAs of the mine site, access roads, transmission line, airstrip, and water pipeline as of August 2013, and their facilities, roads, etc., associated with the Project (**Figure 1.2-1**).

1.4 Principles of Heritage Resource Management

The *Canadian Environmental Assessment Act* (*CEAA*) (Government of Canada, 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, 2012). It further outlines four categories of heritage resources: archaeology, historic sites, palaeontology, and traditional land use.

The British Columbia *Environmental Assessment Act* (BC *EAA*) requires the assessment of a proposed project's effects on cultural heritage resources, which include impacts to archaeological sites. For all reviewable projects, the BC Environmental Assessment Office

(BC EAO) requires an assessment of cultural heritage resources in accordance with the AIR Template (BC EAO 2013).

The assessment of the archaeological and historical heritage resources commenced with an Archaeological Overview Assessment (AOA) as described in the British Columbia Archaeological Impact Assessment Guidelines (Archaeology Branch, 1998). According to the guidelines, an AOA is used to identify archaeological concerns and assess archaeological resource potential within a proposed development area for archaeological resources, which are afforded protection under the provincial *HCA* (Government of BC, 1996a). Palaeontology is discussed later in this section while Traditional Knowledge and Traditional Land Use (TK/TLU) are discussed in other sections.

For the purposes of this assessment, archaeological sites 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)

Archaeological resources in BC are VCs by virtue of their protection under the *HCA*. Section 13 of the *HCA* specifies that an individual (or corporation) must not "damage, excavate, dig in or alter, or remove any heritage object" (Government of BC, 1996a) 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 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, 1996b).

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*.

1.4.1 Cultural Heritage Resources

For the purposes of this baseline a cultural heritage resource follows the definition provided in the *Forest Act* 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) further refines the definition of a cultural heritage resource under the *Forest and Range Practices Act* (FRPA). 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";* (Resource Practices Branch, 2013).

For this study, specific examples of cultural heritage resources include CMTs, trail blazes, traps, and traplines, which post-date 1846 AD and are not protected under the *HCA.*

1.5 Research Objectives

The baseline review described in this report commenced with an AOA as defined in the British Columbia Archaeological Impact Assessment Guidelines (Archaeology Branch, 1998). The objectives of this study are to:

- Review previous studies of archaeological and other heritage resources within the LSA and RSA defined for the Project, to obtain information about heritage resources in environmental settings comparable to that of the Project development areas;
- Identify lands that have potential to contain archaeological resources in the Project development areas as currently envisioned; and
- Identify archaeological and other heritage resources that potentially conflict with the Project.

1.6 Methods

The archaeological and heritage resource baseline research involved the following tasks:

- A desktop review of historical, ethnographic, and archaeological literature available for the Fraser Plateau region generally, and the Nechako–Blackwater areas specifically;
- A preliminary review of biophysical and topographic information relevant to the distribution of heritage resources in the study area;
- A review of the existing AOA report prepared by AMEC (AMEC, 2011), which documented the results of previous archaeological studies for the LSA as considered herein;

- A review of the forthcoming archaeological impact assessment (AIA) report under preparation by AMEC (AMEC, 2014 pending);
- A search for data on documented archaeological sites in the RSA in the BC Provincial Heritage Register, an electronic database maintained by the Archaeology Branch, accessed via the Remote Access to Archaeological Data (RAAD) on-line application;
- Identification of data gaps pertaining to archaeological and other heritage resources, including an evaluation of the extent of previous archaeological survey coverage within the LSA and the RSA; and
- An assessment of archaeological resource potential modelling within the LSA and RSA.

1.7 Results/Discussion

1.7.1 Study Area Resources

1.7.1.1 Biophysical Setting

Environmental conditions, both past and present, govern the availability of natural resources and "liveability" of the natural landscape for human habitation and sustenance. As such, environmental conditions are main factors to determine land use, settlement, and subsistence patterns of ancient inhabitants of this region. In this Section, background information on past and present resource characteristics that may have influenced human occupation and land use is presented in order to provide the framework for interpreting heritage resources.

1.7.1.2 Landscape and Terrain

The Project study area is situated within the VFD located in the approximate geographic centre of BC in the northern part of the Interior Plateau (**Figure 1.2-1**). The VFD is bordered by five drainages: the Stuart and Nechako Rivers in the north, and the Blackwater, Chilako, and Entiako Rivers in the south.

The Project is situated in mountainous terrain on the slopes of Mount Davidson within the Fawnie Range. Terrain consists of steep slopes, numerous narrow drainages, and some areas of relatively level ground. The Project falls within the Central Interior ecoprovince in the Fraser Plateau ecoregion. The mine site property and southern section of the transmission line are situated within the Nazko Upland (NAU) characterized hilly uplands consisting of several monadnocks and drained by many small streams that flow eastward through many medium and small lakes and wetlands (Demarchi 1996). The NAU comprises the greatest proportion of the RSA with increased precipitation in comparison to other ecosections in the Fraser River Plateau ecoregion (Demarchi, 1996). The northern portion of

the transmission line is within the Bulkley Basin ecosection, characterized by broad lowlands and broad valleys filled with many lakes ranging in size from large to small (Demarchi, 1996).

1.7.1.3 Geology

The Project is situated within the Nechako Uplift, a structurally raised block that juxtaposes older Jurassic rocks (Hazelton and Bowser Lake group) with younger Eocene extensional related rocks (Ootsa and Endako groups). These stratified rocks are locally intruded by late Cretaceous felsic plutons such as the Capoose batholith. The widespread Eocene Ootsa Lake and Endako groups overlie these older volcanic and intrusive rocks. The entire package is capped by basalts of the Chilcotin Group (New Gold, 2011a). Currently, the Mount Davidson locality does not have a known lithic raw material source used in the manufacture of prehistoric stone tools, and none of the identified geological formations at Mount Davidson contains rock types typically sought in pre-Contact times for stone-tool manufacture.

However, it should be noted that quarry sites for rock types appropriate for stone tools have been identified on the Fraser Plateau and throughout the Interior Plateau (Fladmark, 2009; Haley, 1996; Helmer, 1977a, 1977b; Helmer and Wilson, 1975; Jackman-Craig, 2002; McMurdo, 1979; Wilson and Helmer, 1974).

1.7.1.4 Hydrology

Numerous small, unnamed lakes and wetlands are located within the mine site LSA. Drainages flow primarily to the north and northeast, including Davidson Creek and Turtle Creek. The only named drainage on the south slopes of Mount Davidson is Mathews Creek, with Fawnie Creek to the west. The proposed transmission line crosses numerous drainages, including the Nechako and Stellako Rivers, Davidson Creek, Chedakuz Creek, Big Bend Creek, Greer Creek, Stony Creek, and Goldie Creek, as well as numerous smaller drainages. In addition, the transmission line is routed in proximity to major lakes including Tatelkuz Lake, Brewster Lake, and Tahultzu Lake.

Modern Vegetation

The Project is situated within the Sub-Boreal Spruce (SBS) biogeoclimatic (BGC) zone (Meidinger et al., 1991). The ecological conditions, vegetation, and wildlife habitats of each BGC zone are described in Meidinger and Pojar (1991). A BGC zone is divided into subzones based on climatic and biophysical attributes. The Sub-Boreal Pine–Spruce Moist Cold variant occupies the gently rolling landscaped of the Fraser Plateau and the lower elevations of the Project area. The lodgepole pine, white spruce, and trembling aspen are the dominant tree species for this variant.

The SBS BGC zone is characterized by spruce forest, with frequent stands of lodgepole pine, subalpine fir at higher elevations, and trembling aspen in river valleys and low-lying areas. The Engelmann Spruce—Subalpine Fir (ESSF) zone occupies the highest forested elevations in BC. It is characterized by the presence of Engelmann spruce and subalpine fir stands with Whitebark pine common in drier parts of the zone. The Boreal Altai Fescue Alpine vegetation consists primarily of dwarf willows, grasses, sedges, and lichens.

Within the Project area, six BGC variants are present that are geographically specific or elevation-dependant:

1. Sub-Boreal Pine—Spruce Moist Cold variant (SBPSmc) (Steen and Demarchi, 1991)
2. Sub-Boreal Spruce Moist Cold Babine variant (SBSmc2) (Meidinger et al., 1991);
3. Sub-Boreal Spruce Moist Cold Kluskus variant (SBSmc3) (Meidinger et al., 1991);
4. Engelmann Spruce—Subalpine Fir Moist Very Cold Nechako variant (ESSFmv1) (Coupé et al., 1991);
5. Engelmann Spruce—Subalpine Fir Moist Very Cold Nechako Parkland variant (ESSFwvp) (Coupé et al., 1991); and
6. Boreal Altai Fescue Alpine Undifferentiated (BAFAun) (Banner et al., 1993).

Wildlife and Fisheries Resources

Wildlife species typically found in the Project area include black bear, grizzly bear, moose, and black-tailed deer, with some historic evidence of caribou. The mine site area is adjacent to the eastern boundary of an identified ungulate winter range (L. Michalak pers. comm. 2011).

Many of the numerous creeks and lakes of the LSA and RSA are fish bearing. Rainbow trout are present and Kokanee seasonally use the lower reaches of the creeks within the RSA as spawning channels (B. Horne pers. comm., 2011).

Ancient Environments

Significant environmental changes have taken place on the north-central part of the Interior Plateau region in the 12,000 years since the end of the last glacial advance. Much of the characteristic landscape of the Interior Plateau is the result of Pleistocene glaciation, modified by Holocene warming and later neoglacial episodes (Clague et al., 1987; Holland, 1976; Ryder, 1978; Tipper, 1971). Climate warming occurred quickly, either just before or during deglaciation, about 10,000 years ago. Following deglaciation, a relatively warm, dry interval corresponding to the Hypsithermal occurred from approximately 8,000 to 6,000 BP, with the postglacial thermal maximum occurring at about 6,000 years ago (Hansen, 1955; Ryder, 1978; Tipper, 1971). Three relatively cooler, moister neoglacial episodes followed the Hypsithermal, at 5,800 to 4,900 BP, 3,300 to 2,300 BP, and 1,000 BP to the present.

Revegetation of newly exposed surfaces proceeded rapidly. Studies of postglacial vegetation sequences are incomplete for the VFD (Dyke, 2005; Hebda, 1995); however, where studies have been made, trees were the immediate postglacial flora, with no indication of an intervening tundra stage (Ryder, 1978). These climatic changes altered the availability of food and other resources, and likely played a critical role in the lives of the ancient inhabitants of the Mount Davidson area.

1.7.1.5 Cultural Setting

Ethnographic Background – Aboriginal Inhabitants of the Study Area

The Project RSA is situated on the Fraser Plateau, and within the traditional territory of the *Dakelh*, or Carrier people. Contemporary *Dakelh* communities are direct descendents of the people who lived throughout the Central Interior region prior to the arrival of European traders and settlers. The Carrier language is of the Athapaskan language family (Toby, 1981). The identities and affiliations of the individual Aboriginal groups associated with these First Nations are summarized in **Table 1.7-1**. The rationale for inclusion in **Table 1.7-2** is based on those First Nations groups identified as having an asserted traditional or consultative interest by the Provincial Government for Heritage Inspection Permit #2012-0295 issued by the Archaeology Branch and listed in the Section 11 Order Schedule B and C for the Project.

The Tsilhqot'in National Government represents five Tsilhqot'in (Chilcotin) First Nations based in the Chilcotin region, south of the Blackwater (West Road) drainage. The mine site and southern section of the transmission line are located with the Tsilhqot'in National Government's Engagement Zone A. The Tsilhqot'in are Athapaskan people that speak a distinct language that shares some areal features with that of the adjacent Carrier Indians (Lane, 1981).

Table 1.7-1: Aboriginal Groups near the Project

Aboriginal Groups	Tribal Association
Lhoosk'uz Dene Nation	Carrier Chilcotin Tribal Council
Nadleh Whut'en First Nation	Carrier Sekani Tribal Council
Nazko First Nation	Non-affiliated
Saik'uz (formerly Stoney Creek) First Nation	Carrier Sekani Tribal Council
Skin Tyee Nation	Office of the Wet'suwet'en
Stellat'en First Nation	Carrier Sekani Tribal Council
	Tsilhqot'in National Government
Ulkatcho First Nation	Carrier Chilcotin Tribal Council

Members of the Fraser Plateau communities listed in **Table 1.7-1** speak different dialects of *Dakelh*. Summaries of *Dakelh* ethnography and traditional life-ways are addressed in the

following sources: Cranny (1987); Duff (1951); Fiske (1987); Fiske and Patrick (2000); Furniss (1993); Hall (1992); Hudson (1972); Jenness (1943); Kobrinsky (1968); Morice (1890, 1895, 1978); and Tobey (1981). Tsilhqot'in ethnography and traditional life-ways can be found in Farrand (1900); Lane (1953, 1981); Matson and Magne (2007), Morice (1890, 1895, 1978), and Teit (1909), amongst others. Published ethnohistoric sources in the form of fur trade and explorers' journals, including Simon Fraser (Lamb, 1960), Daniel Harmon (Harmon, 1957), Alexander Mackenzie (1970), John McLean (1932), and George Mercer Dawson (1989) offer additional information about the people of the area.

Traditional Subsistence and Habitations

Mobile *Dakelh* family groups moved around their territory for much of the year, then congregated at winter residences along major rivers and lakes. The annual cycle of subsistence activities and settlement was dictated by the seasonal availability of food and resources. The northern dwelling was a conical lodge covered with spruce bark; in summer, animal hides were used to cover the frame. Evidence for semi-subterranean dwellings (pit houses) is also found within the region. Other constructed features used in the day-to-day life of *Dakelh* people included hearths, drying racks, tree-caches, and storage pits (Tobey, 1981).

Traditionally, the *Dakelh* were hunters, fishers, and gatherers who took advantage of the resources within their territory by shifting residency on a seasonal basis. Salmon was a particularly important resource, especially as it could be stored for winter use, and the availability of salmon greatly influenced the location of major Carrier and Tsilhqot'in settlements (Fladmark, 2009; Kobrinsky, 1968; Matson and Magne, 2007). A variety of other animal species were (and are) also extremely important, including moose, deer, caribou, bear, and fur-bearing mammals. Important plants include numerous types of berries, such as Saskatoon berries, huckleberries, cranberries, soapberries, and black currants (Morice 1978). Also important, especially in the springtime, was the cambium of lodgepole pine trees (Blackstock, 2001; Dawson, 1989; Hall, 1992; Marshall, 2002; Prince, 2001) and various medicinal plants (Kuhnlein and Turner, 1991; Turner, 1997, 1998).

Traditionally, several species of animals were hunted as part of the seasonal round. Large game predominately included moose, caribou, and deer, but bears and mountain goats were hunted where available and when encountered. Many smaller mammal species were taken, but most were likely more important as fur-bearers than food.

Contact Period

The first Europeans to journey through the Interior were accompanying Alexander Mackenzie and Simon Fraser on their voyages from the Peace River district in 1793 and 1806. Fort McLeod, Fort St. James, Fort George, and Fort Alexandria were established by the North West Company between 1805 and 1812 (Morice, 1978; Ormsby, 1958). The North West operations were taken over by the Hudson's Bay Company in 1819. Aside from fur

trapping, First Nations people were also employed in supplying the traders with preserved salmon from their traditional fisheries, as well as game.

The Cariboo gold rush of the 1860s resulted in prospecting expeditions throughout the Interior of BC, from the Thompson Plateau to the Omineca River valley. Significant discoveries were made in the latter area. However, few permanent settlements were founded in the Vanderhoof locality, except those in association with established fur trading posts and missions (e.g., Lejac) (Hancock, 1979; Morice, 1978; Ormsby, 1958). The region remained relatively undeveloped until the earlier years of the 20th century when land preemptions occurred in anticipation of railway construction between Prince George and Prince Rupert. Primary economic activities were associated with resource extraction, including trapping, forestry, and mineral exploration.

The construction of the Grand Trunk Pacific (not the Canadian National Railway) in the early 20th century created a major transportation corridor between Prince George in the east and Prince Rupert on the west coast. Opportunities for more intensive land use and economic development flourished throughout the area. The region saw further economic expansion with the completion of Highway 16, and the construction of the Alcan project and construction of the Kenny Dam and Kemano hydroelectric facilities associated with the creation of the Nechako Reservoir in the early 1950s (Hancock, 1979).

Today, Vanderhoof is a district municipality that lies near the geographic center of BC and has a population of approximately 4,500 residents. The town is almost entirely supported by the lumber industry, agriculture, and related industries.

1.7.1.6 Archaeological Background

Archaeological sites are locations with material remains produced by human activities in the past. In BC, archaeological sites are usually attributed to First Nations settlement and land use in pre-Contact times, but places with physical evidence (historic remains) of more recent activities pre-dating World War 2 are recorded as historical archaeological sites. Historical heritage sites will often have intact structural remains or “built heritage” (including residences, industrial structures, and farm outbuildings), but could also include roads and trails, single objects such as vehicles or machines, and featureless sites such as rubbish dumps.

Archaeological sites in BC are recorded in the Provincial Heritage Register, maintained by the Archaeology Branch (Site Inventory Section), the provincial government agency responsible for management of archaeological resources in accordance with the *HCA*.

Archaeological sites are numbered according to the Borden Site Designation Scheme (Borden, 1952a), which is used throughout Canada. This scheme is based on the maps of the National Topographic System and uses latitude and longitude to generally pinpoint a site’s location. The four alternating upper and lower case letters (e.g., FhSe) denote a

unique “Borden unit” measuring 10’ latitude x 10’ longitude. Sites are numbered sequentially within each Borden unit, based (usually) on their date of discovery (i.e., FhSe-57 is the 57th site recorded in the “FhSe” Borden unit).

Archaeological Site Types

Archaeological sites are defined according to the types of **archaeological remains** (i.e., artifacts and features) present, and according to the types of traditional activities suspected to have taken place at the site. A particular site can comprise one or more of these types of archaeological remains, and it is expected that larger sites will be more complex than smaller ones.

Typical archaeological remains found in the RSA include habitation features, subsistence features, artifact scatters, lithic procurement sites, rock art, burial places, culturally modified trees (CMT), trails, and historic remains, described as follows:

- **Habitation features** were used for semi-permanent or transitory residence. They are characterized by house depressions or platforms, caves and rockshelters, hearths, and refuse deposits consisting of fire-altered rocks, charcoal, ash, artifacts, and faunal remains;
- **Subsistence features** are usually present at locations used to harvest and process natural resources, but are often associated with habitation sites. Cache or storage pits are the most common type of subsistence feature, and appear as circular surface depressions between 1 metre (m) and 4 m in diameter, frequently in close-spaced clusters;
- **Artifact scatters** usually consist of stone artifacts (including formed tools and waste materials resulting from the production of such tools), and less-frequently, butchered animal bones, found on the ground or buried beneath the surface. Artifacts scatters will always be present around habitation sites, and most sites where subsistence features are present, but can also occur in sites by themselves, denoting transitory hunting or travel camps;
- **Lithic procurement/quarry sites** are locations where lithic (stone) raw material, suitable for making stone tools has been gathered and/or mined by Aboriginal people;
- **Rock art** consists of paintings (pictographs) or carvings/etchings (petroglyphs) and are typically found on bedrock outcrops or large boulders. Rock art is often found along steep shorelines and traditional trails, or at locations of strong spiritual significance to First Nations people (Alexander, 1997:104-105; Corner, 1968); no rock art has been reported for the LSA or RSA, but has been identified on the shorelines of major lakes in neighbouring Forest Districts;
- **Burial places** are locations where First Nations people interred their dead. Ancestral remains are commonly found near winter villages, but occur generally throughout the

landscape for individuals who died when away from their villages. No burials have been identified within the LSA or RSA;

- **CMTs** are trees that have been altered by Aboriginal people as part of their traditional use of the forest (Archaeology Branch, 2001; Resources Inventory Committee, 2001). Although Aboriginal people in the central-interior of BC traditionally used a variety of tree species for many purposes, bark-stripped lodgepole pine trees are the most common CMT type. Lodgepole pine CMTs are associated with the collection of cambium, which has been called "an almost universal food" of the Interior First Nations (Archaeology Branch, 2001:63). A bark-stripped CMT is a tree from which a section of bark has been removed, resulting in a lenticular bark scar. Once the bark was removed, the exposed cambium was scraped or peeled off with a knife or scraper. Lodgepole pine cambium is collected in late spring when it is sweet and palatable (Kuhnlein and Turner, 1991; Turner, 1997, 1998).

  George M. Dawson noted in his journal for June 12, 1876, "some Indians camped near us now engaged in preparing the cambium layer of the scrub-pine called *'stick a muck-a-muck"* (Dawson 1989:207). Dawson's journal editors, Cole and Lockner, note that in Chinook Jargon the expression means, roughly, "that one can eat the wood." The cambium provides a quick source of high-energy food. The primary attributes used for identifying Aboriginally bark-stripped trees include the shape and size of the bark strip scar, and the presence of tool marks on the bark-stripped face of the tree (Archaeology Branch 2001:62-70). Cambium was also gathered from other trees, including black cottonwood, balsam poplar, and hemlock, for food and medicinal purposes (Hall, 1992; Tobey, 1981). Recent research on CMTs, specifically tree art or carvings on trees (arborglyphs) has been produced by M. D. Blackstock in his book *Faces in the Forest: First Nations Art Created on Living Trees* (Blackstock, 2001). Blackstock has focused on the function and meaning of tree art and its role within First Nations' cosmology.

  CMTs not regulated under the *HCA* (i.e., postdate 1846 AD) are referred to as "Cultural Heritage Resources" for this study.

- **Trails** represent routes used by First Nations people, either for subsistence pursuits, long-distance trade (e.g., eulachon oil – "grease trails"), or communication with neighbouring Nations. Many trails became historically known routes during the fur trade period, and were used later for contemporary roads. The most famous trail in the Mount Davidson area is the Nuxalk Carrier Grease Trail used by Alexander MacKenzie (Blacklaws 1979; MacKenzie 1970). CMTs are commonly found within a short distance of pre-Contact and more recent trails.
- **Historic remains** denote artifacts, structures, and other features usually associated with Euro-Canadian settlement and land use, although they are also associated with First Nation historical occupation. In the Project area, they are most likely to be associated with late-19th and early-20th century homesteading, mining, and forestry.

Regional Cultural Chronology – Fraser Plateau

The study area is situated within the Western Subarctic Culture Area (Clark 1981, 1991). A sketchy record of prehistoric settlement and occupancy by First Nations people in this region has been described, based on the outcome of inventories of sites throughout the region, and from detailed excavations at a few sites within and slightly beyond the RSA. Fladmark (2009), Helmer (1977a), and Helmer et al. (1977) have prepared the most inclusive discussions of cultural history in this area.

Traces Archaeological Research and Consulting Ltd. (Traces, 1996c) have completed archaeological resource overviews for the VFD. These overviews provide comprehensive summaries of previous archaeological investigations in the study area. Generalized discussions of the archaeological sequence and background for BC that include areas within the VFD and the study area can be found in Clark (1981), Donahue (1975a, 1975b, 1977), Fladmark (1973), Helmer (1977a, 1977b), Richards and Rousseau (1987), and Stryd and Rousseau (1996).

Early archaeological investigations conducted within the study area were concentrated around the Blackwater River, south of Vanderhoof (**Annex 1**). A large number of sites have been recorded along the Blackwater drainage and many studies have been inventories along the Nuxalk-Carrier Grease Trail (Alexander Mackenzie Heritage Trail) and include Helmer (1976), Helmer and Wilson (1975), May (1978) I.R. Wilson Consultants (1983, 1985, 1986a, 1986b, 1989). Numerous archaeological investigations in the region have been conducted in relation to research projects (Borden 1951, 1952b; Cranny 1984, 1987, 1988; Donahue 1970, 1972, 1973, 1975a, 1975b, 1977; Fladmark 1973, 2009; Helmer 1977b; Helmer and Wilson 1975; Helmer et al. 1977; Lawhead 1979; Montgomery 1978; Skinner 1987). Since 1994, there has been a shift from survey near lakes and rivers to survey in upland areas, away from major watercourses, due to proposed forestry developments. In the VFD, forestry related resource management studies have been conducted by Traces Archaeological Research and Consulting Ltd. (Traces 1996a, 1997b, 1998, 1999, 2000, 2005, 2006, 2007). However, as a result of forest health management practices responding to mountain pine beetle infestation along major waterways, the trend has shifted back to survey of lakeshores and major river drainages (Arcas 1995a, 1995b; Traces 1996c).

A culture history sequence for the region has tentatively been developed, but is based on several projects that have involved significant excavations (Borden 1951, 1952b; Carlson 1998a; Donahue 1973, 1975a, 1975b, 1977; Fladmark 1973, 1976; Wilmeth 1969, 1971, 1975, 1977, 1978). In addition, archaeological research concerning both CMTs (Carlson 1998b) and cultural history (Carlson, 1998a; Traces, 1996c) has begun within the VFD. As a result of these surveys and excavations, archaeologists have documented more than 4,000 years of human history in the VFD.

Approximately 96% of the identified archaeological sites in the VFD are of Aboriginal origin (Traces, 1996c). A variety of sites have been documented:

- habitation sites;
- sites with subsistence-related features such as culturally modified trees and cache pits;
- burial sites;
- pictographs;
- spiritual sites; and
- sites consisting of surface and/or buried cultural materials comprised largely of stone artifacts (i.e., artifact scatters).

In addition to Aboriginal sites, a small number of historical Euro-Canadian sites have also been recorded:

- abandoned log cabins;
- farm and ranch buildings and features;
- historic refuse, such as can and bottle dumps;
- old sawmills;
- historic buildings in towns;
- the remains of mining activities; and
- in three cases, human burials.

In addition, a unique historic site, consisting of a tree with a message written in Carrier syllabics, has been dated to 1877 (Traces, 1996a: 11). These types of prehistoric and historical heritage sites represent the most likely types of archaeological sites to be identified in the study area.

Previous investigations in the Fraser Plateau region commenced with site inventory surveys that concentrated on major river drainages, shorelines, and adjoining terraces of significant lakes. These were at some distance from the RSA such as the Bulkley, Telkwa, Morice; and closer to the Project area, the Nechako Rivers and Morice Lake, and those lakes inundated by the Nechako Reservoir, northwards to Babine and Stuart—Trembleur Lakes. Inland settings and smaller drainages and lakes were not investigated in detail until the mid-1990s. Archaeological investigations have been conducted as components of research studies (e.g., Borden 1951; Cranny 1988; Cranny and Fitzpatrick 1984; Fladmark 1973, 1976; Keddie and Carl; Mohs 1974; 1975; Mohs and Mohs 1976; Rafferty 1975, 1976; Richards 1981; Wilmeth 1969, 1971, 1975, 1977, 1978) and for proposed development projects (e.g., Arcas 1997, 1998, 1999a, 1999b, 2000a, 2000b, 2001a, 2001b, 2003a, 2003b, 2004; Aresco 1982, Blacklaws 1984, French 1993, 1996; Marshall 2002; Simonsen 1984; Traces 1995a, 1995b, 1997a). To the west of the study area, the Cheslatta Carrier Nation undertook archaeological research endeavours near Cheslatta Lake on Reserves #5 and #7 (French 1993). Additional studies to the south and east of the study area have revealed

evidence for at least 4,000 years of human history in this region (Donahue 1970, 1972, 1975a, 1975b, 1977; Fladmark 2009; Helmer 1977a).

A detailed, recent prehistoric cultural sequence has not been developed for the Fraser Plateau. In the past, archaeologists have looked to the south for cultural comparisons with archaeological assemblages from this region. **Annex 2** provides a list of previous archaeological excavations for the greater region. Helmer (1977a) asserted that archaeological remains in the study area have greater similarities with artifact assemblages in northern BC and the southern Yukon. Other archaeologists have drawn the same conclusion (e.g., Clark 1981), but a tendency toward southern attributions persists among many authorities (*cf*., Archer, 2008b; Burford et al., 2008; Magne and Matson, 2008). Accordingly, the accompanying prehistoric cultural sequence (**Table 1.7-2**) is adapted from Helmer (1977: Table 1), with more recent data input from Magne and Matson (2008). FlRq-13, a site identified near Prince George, is the oldest dated site in the region, extending the chronology by 7,000 years (Archer, 2008b; Burford et al., 2008).

Table 1.7-2: Archaeological Cultural Sequence for the Fraser Plateau

Period	Time Span	Representative Sites
Protohistoric to Contact	1700 AD – 1860 AD	Chinlac; Natalkuz Lake; Punchaw Lake
Diagnostic artifacts: Euro-Canadian trade goods, small side-notched projectile points, polished stone adze blades, bone points		
Late Prehistoric	~ 1500 BC – 1700 AD (ca. 3500 BP to ca. 100 BP)	Natalkuz Lake; Punchaw Lake
Diagnostic artifacts: several varieties of small side-notched projectile points, small corner-notched points, flaked and ground stone adze blades, bone points		
Middle Prehistoric	~ 5000 BC – 1500 BC (ca. 7000 BP to ca. 3500 BP)	Natalkuz Lake, Punchaw Lake; Nechako Reservoir
Diagnostic artifacts: large corner-notched projectile points, large side-notched projectile points, bipolar cores, microblades/microcores		
Early Prehistoric	~ 9000 BC – 5000 BC (ca. 11,000 BP to ca. 7000 BP)	Simon Fraser Bridge (Prince George)
Diagnostic artifacts: leaf-shaped projectile points, large corner-notched projectile points, concave-based projectile points, stemmed projectile points, heavy unifaces, microblades/microcores		

Historic Development Activities in the Study Area

The first Europeans to journey through the Interior accompanied Alexander Mackenzie and Simon Fraser on their voyages from the Peace River in 1793 and 1806, respectively. The first European habitations were associated with the fur trade with the nearest posts established at Fort McLeod, Fort St. James, and Fort Alexandria by the North West Company between 1805 and 1812 (Morice, 1905; Ormsby, 1958). The North West Company operations were taken over by the Hudson's Bay Company in 1819.

Four local histories that provide particular insights about 20th century settlement and historic land use in the Nechako Reservoir area are Kendrick (1978), Mould (1976), Nechako Chronicle (1978), and the Southside Centennial Committee, Francois Lake (1958).

The Cariboo gold rush of the 1860s resulted in prospecting expeditions throughout the Interior of BC, from the Thompson Plateau to the Omineca River valley, with significant strikes being made in the latter location. However, few permanent settlements were founded, except in the Cariboo district. Permanent European settlement in the Ootsa Lake and Francois Lake areas commenced in the years after World War 1, following completion of the Canadian National Railway through the Bulkley Valley to the north. For many years, small-scale ranching and subsistence farming were the principal economic activities for scattered Euro-Canadian settlers, as well as First Nations people who had been confined to Indian Reserves by about 1880. With the arrival of railway construction parties between the 1910s and the 1920s, produce farming and ranching became viable and more intensive economic activities; and prospecting for lode and coalmines become common. Timber harvesting commenced during the interwar years, but most logging in this region has taken place since WW2. The homesteading era along Ootsa Lake ended with the construction of the Kenney Dam in 1951-1952, and subsequent flooding of the Nechako Reservoir.

Blackwater Mining Property

The Blackwater mining property was discovered in 1971 by Granges Inc., with work primarily done by ground and air survey with soil sampling. In the 1980s, additional ground and air surveys took place along with trenching. Drilling commenced in 1985 with approximately 64 holes drilled between 1985 and 1987. There was limited development activity in the 1990s with approximately 10 holes drilled. In 2005, Silver Quest Resources Ltd. acquired the Davidson property and drilled seven holes in 2005 and 2006 with a focus on historical drilling on high-grade vein gold targets as well as silver (New Gold, 2011b).

In 2009, Silver Quest optioned 75% of northern Davidson property to Richfield and Richfield optioned 100% of the southern Davidson property. Richfield conducted the initial drill program targeting bulk tonnage potential and eventually optioned the southern Jarritt property to consolidate the southern half of the Project.

In 2010, Richfield continued the drilling program on the Project and competed the preliminary metallurgical testing. The next year, Richfield announced the initial mineral resource estimate and formalized joint venture on 75% of the owned northern Davidson property with Silver Quest in June 2011 New Gold acquired Richfield. In the third quarter of 2011, New Gold acquired Silver Quest (New Gold, 2011b).

1.7.2 Baseline Assessment Review

1.7.2.1 Document Review

Archaeological and ethnographic sources for the Project area, as represented by the mine site LSA (Figure 2 in AMEC, 2011), were extremely limited for baseline research. Given the paucity of information available for the Project area, expansion of the research catchment area was required. This larger geographic scope, or RSA (Figure 3 in AMEC, 2011), is defined as those lands within 10 km of the LSA. The absence of any detailed archaeological studies for the RSA required the inclusion of the VFD area, the eastern portion of the Nadina Forest District, and the Blackwater River locality (within the Quesnel Forest District) for the heritage baseline study. This approach was not required for the transmission line LSA and RSA, given that a number of archaeological studies and identified archaeological sites are documented within the study corridor.

Many of the necessary documents required for this study were available in the AMEC library, supplemented as necessary by additional reports obtained from the electronic library of permit reports maintained by the Archaeology Branch, and from the personal libraries of AMEC staff archaeologists. This aspect of the research sought general information on pre-Contact archaeology, First Nations land use and settlement, and historic land-use patterns. The review of archaeological reports describing past research focused on the studies that were centered within the LSA as defined above, and with a more general synthesis obtained from the RSA as far as the Blackwater River and surrounding lands within the Vanderhoof and Quesnel Forest Districts.

As well as regional ethnographic sources (e.g., Cranny 1987; Duff 1964; Furniss 1993; Jenness 1943; Tobey 1981), more recent land use information was obtained from various overview studies (Alexander 1997; Traces 1996c), archaeological impact assessments (e.g. Arcas 1995b, 2000; Traces 1995a, 1995b, 1996a, 1996b, 1997a, 1997b, 1999, 2000, 2005, 2006, 2007), and an archaeological overview studies (Arcas 1995a, 1995b; Traces 1996c). To date no archaeological impact assessments have been conducted with the LSA, aside from the AMEC AIA conducted under Heritage Inspection Permit #2012-095 (AMEC 2013 pending).

Geo-referenced location data for documented archaeological sites near the Project was obtained from the Provincial Heritage Register, via RAAD. For the data-gap analysis, the search for documented archaeological sites was confined to those “Borden units” that encompassed the LSA and RSA.

Generalized topographic information was obtained from 1:50,000 scale NTS maps and 1:20,000 TRIM maps, as well as scalable orthophotos available from Google Earth™. Biophysical information pertinent to the Project was obtained from discussions with other Discipline Leads working on the environmental studies for the Project within AMEC.

1.7.2.2 Evaluation of Archaeological Resource Potential

For the purposes of this study, archaeological resource potential is defined as the capability of a landscape (or portion of a landscape) to have supported the type of past human activities that would have resulted in the formation and preservation of archaeological remains. Some types of activities (e.g., medicinal plant collection) did not usually result in the creation of physical remains and cannot normally be considered in the context of an assessment of archaeological resource potential. The same constraint also applies to places of cultural significance (e.g., spirited places), but where traditional knowledge/traditional use data is available. Both types of information can be used as landscape attributes to assess archaeological resource potential.

As considered here, potential evaluations are not synonymous with *probability*, which is a quantifiable measure of site occurrence, but simply rate the sensitivity of lands that should be examined by archaeologists in advance of land-altering developments.

The assessment of archaeological potential is based on a consideration of the locations of documented sites, ethnographic and historical land use information, and landscape characteristics that influence (favourably or negatively) the distribution of archaeological sites. Because archaeological site locations are often correlated with particular micro-environmental landscape attributes, the presence or absence of these variables can be used to identify lands with greater or lesser archaeological potential.

Criteria used to define polygons of moderate or high archaeological potential are separated into macrosite and microsite landscape attributes. Macrosite criteria apply to the determination of archaeological potential in a regional context. The macrosite criteria include known archaeological sites, travel/transportation corridors, bedrock geology, and ungulate range.

Microsite criteria refer to factors that refine the shape, location, and degree of individual “polygons” denoting particular classes of archaeological potential. These criteria include site-specific landform features such as solar aspect, terrace/fan, open shallow water, watercourse, relict watercourse, or confluence. These landscape attributes are not usually discernable at map scales larger than 1:5,000 or 1:10,000.

Lands are categorized as having “high,” “moderate,” or “low” archaeological resource potential. These varying classes affect the scope and level of effort recommended for future archaeological assessment studies. In general, the higher the potential class, the greater the level of effort expected by regulatory authorities. For the present study, the potential values are defined as follows:

- **High potential**: Lands exhibiting topographic and biophysical attributes highly supportive of past cultural activities that would have left archaeological evidence. These lands exhibit the highest archaeological sensitivity within a particular landscape;

- **Moderate potential**: Lands exhibiting fewer attributes that would have supported past cultural activities than the preceding category; and
- **Low potential**: Lands that exhibit few characteristics supportive of past cultural activities. Further archaeological investigations are not normally recommended for lands categorized as having low archaeological potential.

A GIS-based archaeological potential model was developed for the VFD (Traces, 1996c). The Archaeology Branch cautions users of all GIS-based archaeological potential models to use additional sources of information regarding project-specific study areas (e.g., detailed design plans, satellite imagery, etc.), and expressly warns users not to use the VFD model for operational planning. The GIS model explicitly does not cover lands within the mine footprint and only lower elevation areas within the LSA are covered by this model (Figure 2 in AMEC, 2011). In order to address this data-gap, AMEC developed a simple GIS model for mid to upper elevation lands within the mine site (AMEC, 2011).

Mine Site Local Study Area

Utilizing the VFD model for the mine site LSA (total area = 41,867 ha) yielded 1,067 ha of high potential lands (2.5% of the LSA) and 1,909 ha of moderate potential lands (4.6% of the LSA), at lower elevations. Within the mine site RSA (total area = 256,366 ha, includes lands within the LSA) approximately 10,814 ha of high potential lands (4.2% of the RSA) and 16,876 ha of moderate potential lands (6.6% of the RSA) have been established for lower elevations.

In order to address this data gap a simple archaeological potential model was developed in GIS for the mine site LSA and RSA. For the purposes of this baseline, lands for the middle and upper elevation LSA were not assigned “moderate” or “high” potential ratings, but rather represented as just “archaeological potential.” This approach was adopted due to the lack of comparative archaeological data for higher elevations in this region that would allow for further refinement of the model. **Table 1.7-3** identifies the buffers used for the archaeological potential modelling (the results of this model are presented in AMEC 2011, Figure 4).

Table 1.7-3: Archaeological Potential Model Buffers within the Mine LSA

Biogeoclimatic Subzones	Tarns (Alpine Lakes) (m)	Headwaters of Creeks & Creeks (m)	Ponds, Wetlands (m)	Creeks (m)	Lakes (m)
Sub-Boreal Pine, Spruce Moist Cold variant (SBPSmc)	-	-	150	150	150
Sub-Boreal Spruce Moist Cold Babine variant (SBSmc2)	-	-	100	100	100
Sub-Boreal Spruce Moist Cold Kluskus variant (SBSmc3)	-	-	100	100	100

Table continues...

Biogeoclimatic Subzones	Tarns (Alpine Lakes) (m)	Headwaters of Creeks & Creeks (m)	Ponds, Wetlands (m)	Creeks (m)	Lakes (m)
Engelmann Spruce – Sub-Alpine Fir Moist Very Cold Nechako variant (ESSFmv1)	-	-	50	25	50
Engelmann Spruce, Sub-Alpine Fir Moist Very Cold Nechako Parkland variant (ESSFmvp)	-	-	75	50	100
Boreal Altai Fescue Alpine Undifferentiated (BAFAun)[1]	100	100	-	-	-

Note: [1] Based on aerial inspection it was determined that all the upper alpine areas of Mount Davidson had moderate to high archaeological potential.

Transmission Line Local Study Area

For lands within the transmission line LSA and RSA, model outputs from the VFD Model were utilized (Figures 5-1, 5-2, 5-3, 5-4, and 5-5 in AMEC, 2011). Approximately 1,733 ha of high potential lands and 4,292 ha of moderate potential lands are modelled within the transmission line LSA. Output for the transmission line RSA resulted in 15,608 ha of high potential lands and 43,038 ha of moderate potential lands. The remaining lands are rated as having low archaeological potential.

Previous archaeological assessments of proposed forestry developments have been undertaken within both the mine site and transmission line LSA and RSA. In the mine site LSA, approximately 9,450 ha of land and approximately 16,876 ha of the RSA have been covered by archaeological assessments. Approximately 1,142 ha of the transmission line LSA and 11,500 ha of the transmission line RSA have been covered by archaeological assessments.

Low-potential ratings **do not** signify that archaeological resources are not present. Rather, it is assumed that such polygons denote very low site densities, based on specific landscape attributes that inhibit the formation and/or preservation of archaeological sites. In such settings, archaeological sites would be very difficult to find (e.g., isolated artifacts or single CMTs in forested, montane environments). Conversely, polygons modelled with high archaeological potential imply that such lands should exhibit higher site densities, with enhanced opportunities for encountering sites in the field.

In addition, as defined here, it is possible if not likely, that traditional cultural properties exist in the local and regional study areas. However, these are not recorded in the Provincial Heritage Register because conventional archaeological remains, such as cultural features and artifacts, are infrequently associated with these sites, and descendent communities usually regard information pertaining to these sites as confidential.

Preliminary Field Reconnaissance – Aerial Inspection

No archaeological sites were identified during aerial inspections in the fall of 2011 and 2012. However, it was observed that archaeological potential could be closely associated with specific BGC zones. The upper subalpine and alpine zones have moderate to high archaeological potential, especially near the tarns and/or headwaters and upper reaches of numerous drainages.

The mid-elevation zone has low archaeological potential (excluding level terrain or elevated features with well-drained sediments associated with wetlands, ponds, lakes, and substantial drainages). Archaeological potential increases as elevation decreases. Again, lands in association with wetlands, ponds, lakes, and drainages have moderate to high potential, especially in level terrain that is well drained. In addition, the presence of mature lodgepole pine stands suggests potential for CMTs wherever they occur.

Evaluation of Historical Resource Potential

The presence of historical industrial remains attributable to 20th century mineral exploration and logging operations in the mine site LSA was verified by the AOA field reconnaissance (AMEC, 2012) and AIA field survey (AMEC, 2013 pending). Additional historical remains should be expected in parts of the mine site LSA not covered by the AMEC crews, although it is expected these would be restricted to small sites or isolated occurrences of discarded or abandoned pieces of equipment.

The proposed transmission line, mine access road, and water pipeline have potential for a variety of industrial remains attributable to 20th century mineral exploration and logging operations. In addition, the proposed transmission line has potential for historical remains attributable to 20th century ranching and homesteading, particularly along its northern portion. These historical activities were verified by the AIA field survey (AMEC, 2013 pending) conducted by AMEC.

1.7.2.3 Archaeological Research in the Project Area

Mine Site Local Study Area

Previous Archaeological Studies

Previous archaeological research on lands within the LSA identified eight archaeological sites (**Annex 3**), but no historical heritage sites were identified within the LSA. The eight archaeological sites are situated at lower elevations in the LSA, away from the mine footprint. The other identified sites are situated in proximity to wetlands and pine stands southwest of the mine footprint. The eight archaeological sites consist of artifact scatters (n=5), CMTs (n=2), and one subsistence feature (cache pit) with associated artifact scatter.

Mine Footprint

The baseline research indicated that no archaeological sites or historical heritage sites were previously identified within the mine footprint. In addition, no evidence was found for any previous archaeological investigations within the mine footprint.

Mine Site Regional Study Area

The RSA consists of a 10 km buffer around the mine site LSA. There are 193 archaeological sites documented for the RSA. Summary information on archaeological sites within the RSA is presented in **Annex 5**. These sites are situated in low elevation settings in proximity to aquatic features, pine stands (for CMTs), larger waterbodies, and/or in association with the Blackwater River drainage.

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 along Davidson Creek and adjacent to other streams and waterbodies (**Figure 1.7-1** and **Figure 1.7-2**). The AIA identified three archaeological sites, one historical heritage resource, and 20 cultural heritage resources within the mine footprint. The field assessment identified 77 areas of high or moderate archaeological potential, in which 1,423 subsurface tests were excavated (**Photo 1.7-1**). Archaeological sites FhSe-73, FhSe-74, and FhSf-4 (**Table 1.7-4**, **Photo 1.7-2**, **Photo 1.7-3**, and **Photo 1.7-4**) were identified at three of these locations (**Figure 1.7-1**). All three sites were identified along level terraces on Davidson Creek. Twenty cultural heritage resource sites (**Table 1.7-5**, **Photo 1.7-5**, **Photo 1.7-6**) were identified, consisting of blazed trees and non-protected CMTs (i.e., post-dating 1846 AD). One historical heritage resource, the remnants of a cabin, was identified along Creek 146920, just south of the existing Blackwater camp (**Table 1.7-6**, **Photo 1.7-7**, **Figure 1.7-2**).

Table 1.7-4: Proposed Mine Footprint AIA Results – Archaeological Sites

Archaeological Site	Identified Features	Comment
FhSe-73	Isolated 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

Photo 1.7-1: View Northwest at Crew Excavating One of 77 Test Locations within the Mine Footprint

Photo 1.7-2: View North of Cultural Depression (cache pit) at FhSe-73

Photo 1.7-3: View West from FhSe-74 to Flagged Boundary

Photo 1.7-4: View North to Flagged Boundary of FhSf-4

Photo 1.7-5: View East to Cultural Heritage Resource 10, a Trail Marker Tree

Photo 1.7-6: Three of 71 Blazed Trees of CHR 28, Along Trail

Table 1.7-5: Proposed Mine Footprint AIA Results – Cultural Heritage Resources

Cultural Heritage Resource Site	Identified Features	Comment
CHR 1	21 trees with oval blazes	Approximate linear alignment suggests likely association with mineral exploration activities
CHR 2	19 trees with oval blazes	Approximate linear alignment suggests likely association with mineral exploration activities
CHR 3	5 trees with oval blazes	Approximate linear alignment suggests likely association with mineral exploration activities
CHR 4	4 trees with oval blazes	Approximate linear alignment suggests likely association with mineral exploration activities
CHR 5	8 trees with oval blazes	Approximate 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 (±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; may have marked boundary (Archaeology Branch 2001)
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, date of modification in 1936

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.

Table 1.7-6: Historic Heritage Resource

Historic Heritage Resource	Identified Features	Comment
Cabin	Remnant of cabin floor and kitchen debris	In flood plain on south bank of Creek 146920; associated ware introduced from 19th century to 1980s – most likely age of occupation from 1940 to 1980

Photo 1.7-7: Remnants of Cabin Identified on Creek 146920

368000 372000 376000 380000

5900000 5896000 5892000

FhSe-73 ST=20
FhSe-74 ST=41
FhSf-4 ST=52
ST=14 ST=8 ST=33 ST=6 ST=6 ST=6 ST=6 ST=131 ST=8 ST=8 ST=12 ST=6 ST=12 ST=37 ST=42 ST=42 ST=21 ST=20 ST=43 ST=25 ST=51 ST=14 ST=21 ST=21 ST=16 ST=8 ST=6 ST=13 ST=39 ST=6 ST=7 ST=6 ST=12 ST=12 ST=32 ST=58 ST=7 ST=9 ST=92 ST=6 ST=15 ST=21 ST=25 ST=14
ST=13 ST=6 ST=6 ST=10 ST=11 ST=6 ST=14
ST=21 ST=21 ST=12 ST=6 ST=6 ST=8 ST=7 ST=7 ST=6 ST=11 ST=9 ST=14 ST=6 ST=11 ST=23 ST=18 ST=6 ST=6 ST=16 ST=6 ST=11 ST=6 ST=8
Creek 428073
Creek 700
Creek 636713
Creek 688328
Creek 146920
Creek 543585
Creek 5036 89
Creek 661
Creek 704454
Davidson Creek
Snake Lake
Lake 01428UEUT
Lake 01538UEUT
Lake 01682LNRS
Creek 705
1387m
1231m
1151m
1666m
1444m
1611m
1668m

Legend

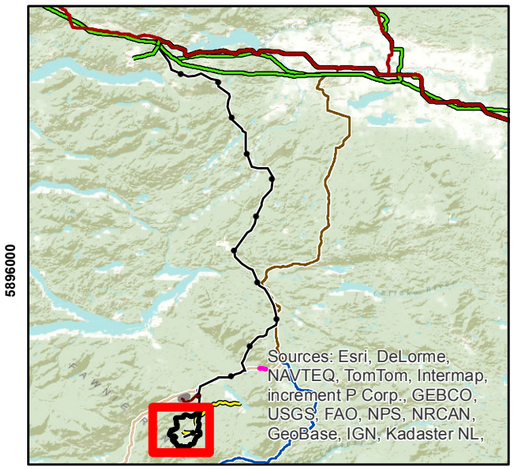
- Archaeological Site
- Subsurface Test Location
- Pedestrian Survey Coverage
- Existing Road
- Contour (20 m)
- Stream
- Waterbody
- Wetland

Project Components

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

Heritage Resources

- Local Study Area



Scale: 1:45,000

0 0.5 1 2

Kilometres

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Mine Site - Archaeological Survey Coverage, Archaeological Sites and Subsurface Test Locations

DATE:	ANALYST:	Figure 1.7-1
April, 2014	PK	
JOB No: VE52277	QA/QC: GH	PDF FILE: 16-100-065_SurveyCoverageMineSite&TestLocs.pdf
GIS FILE: 16-100-065_SurveyCoverageMineSite&TestLocs.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

Y:\GIS\Projects\VE\VE52095_Richfield_Blackwater\Mapping\16_archaeology\Baseline\16-100-065_SurveyCoverageMineSite&TestLocs.mxd

370000 375000 380000

5900000

5895000

CHR 28
CHR 27
CHR 26
CHR 16
CHR 11
CHR 13
CHR 5
CHR 25
CHR 6
CHR 1
CHR 10
CHR 3
CHR 15
CHR 23
CHR 2
CHR 24
CHR 20
CHR 4
CHR 22
CHR 21

1387m
1634m
1666m
1231m
1151m
1444m
1611m
1668m

Creek 700
Creek 428073
Davidson Creek
Creek 636713
Creek 6883 2.8
Creek 50565
Creek 146920
Creek 543585
Creek 661
Creek 705
Creek 704454

N

Legend

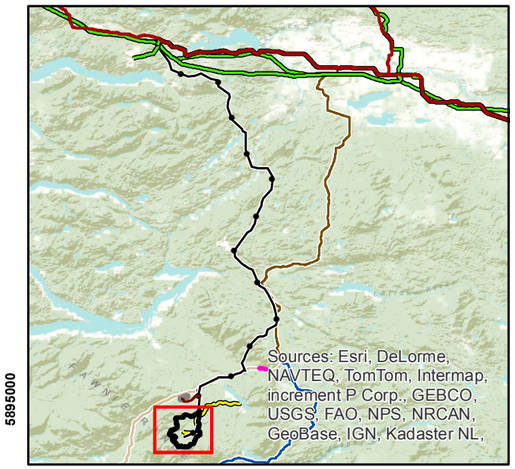
- Blaze
- CMT
- Historical Heritage Resources
- Existing Road
- Contour (20 m)
- Stream
- Waterbody
- Wetland

Project Components

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

Heritage Resources

- Local Study Area
- Pedestrian Survey Coverage



Scale: 1:45,000

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Kilometres

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Mine Site - Archaeological Survey Coverage and Cultural Heritage Resources

DATE:	ANALYST:	Figure 1.7-2
April, 2014	PK	
JOB No: VE52277	QA/QC: GH	PDF FILE: 16-100-065_SurveyCoverageMineSite&CHR_v2.pdf
GIS FILE: 16-100-065_SurveyCoverageMineSite&CHR_v2.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

Y:\GIS\Projects\VE\VE52095 Richfield Blackwater\Mapping\16 archaeology\Baseline\16-100-065 SurveyCoverageMineSite&CHR_V2.mxd

Proposed Transmission Line

Transmission Line Local Study Area

The transmission line LSA consists of a 1 km-wide (500 m each side of centerline) corridor for the transmission line and two options, the Mills Ranch Reroute and the Stellako Reroute. The AOA (AMEC, 2011) identified two archaeological sites on the centerline as currently proposed (GIS shapefile August 2012). The Messue Trail (FhSe-43) and the Cheslatta Trail are crossed by the proposed transmission line. Fifteen sites have been recorded within the transmission line LSA (**Annex 4**). These sites consist of artifact scatters (n=2), trails (n=2), CMTs (n=6), CMTs associated with a trail (n=1), subsistence features (cache pits, n=1), and subsistence features (cache pits) associated with an artifact scatter (n=3). Site GaSf-41, which consists of an isolated lithic artifact, was identified in 2012 under permit #2012-295, but falls 30-m outside the current ROW. General trends indicate that the sites are situated in lower elevation settings in proximity to water features and/or pine stands.

Photo 1.7-8: View Northeast at Crew Excavating Transmission Line Subsurface Test Location MF5

Photo 1.7-9: View West at Crew Excavating Transmission Line Subsurface Test Location NP3

Transmission Line Regional Study Area

The RSA is a 10 km-wide (5 km off each side of centerline) corridor for the preferred option. The AOA (AMEC, 2011) identified 132 sites within the transmission line RSA. Summary information is presented in **Annex 6**. In general, trends indicate that these sites are situated in low elevation settings in proximity to water features and/or pine stands (CMTs).

Documented sites within the transmission line RSA are variable in site types, extent, and site localities. In some localities within the RSA, site locations likely reflect regional disparities in archaeological site density and in others the extent and intensity of previous archaeological studies. However, the existing data are not clear if the occurrence of sites represents genuine high-use areas by Aboriginal groups, or simply reflects of the places where archaeologists have looked for sites.

Several previous archaeological studies have been conducted within the RSA and surrounding lands. Aside from localized areas of particular interest such as Tatelkuz Lake, Chedakuz Creek, Brewster Lakes, Finger Lake-Willington Lake locality, and the Stoney Creek-Nulki Lake-Tachick Lake locality, it cannot be said that prior to the heritage baseline study, archaeological resources in the study area have been thoroughly investigated. **Annex 6** includes a summary of the 26 archaeological studies conducted within the RSA between 1952 and 2011. These studies were identified from provincial permit numbers reported on archaeological site records downloaded from the Provincial Heritage Register, and cross-referenced to an electronic library of permit reports maintained by the Archaeology Branch.

Most of the documented sites in this region have been identified in the past 20 years by development-driven archaeological impact assessments. In the RSA assessments of linear developments have been conducted for highways (Archer, 2008a, 2011; Bernick and Clark, 1977; Mackie and Montgomery, 1977; Matrix, 2003; McMurdo, 1979; Pike, 1974; Points

West, 1990, 1993), and transmission line developments (e.g., Bates and Scott, 1975). Academic research has tended to focus on the lower Nechako River watershed. Parks Canada conducted investigations at the Fort St. James historic site (Harris, 1972, 1974).

The majority of archaeological studies in this region have been impact assessments for proposed forestry developments (e.g., Arcas, 2000; Norcan, 2007; Traces, 1996a, 1997b, 1999, 2000, 2005, 2006, 2007). These assessments were typically conducted under "blanket" Heritage Inspection Permits, which allow the permit holder to conduct assessments within a defined geographic or administrative area (most often the local Forest District), for an unspecified number of specific developments. Although the area covered by such a permit may be very large, the actual area of lands assessed under a single Permit will typically represent a small fraction of that area. The Ministry of Forests, Lands and Natural Resource Operations (and its predecessors) has collected geospatial data on the location of proposed forestry development areas assessed since approximately 1994. As described in the AOA Section 1.3.1 (AMEC, 2011), shapefiles of these archaeological studies were acquired from GeoBC. Polygons showing the extent of these studies are displayed on the AOA Figures 3-1, 3-2, 3-3, 3-4, and 3-5 (AMEC, 2011).

Annex 2 is a tabulated summary of archaeological investigations (excavations conducted by academic researchers or by archaeological consultants as part of the cultural resource management process for development projects). These studies are widely scattered across the landscape, and none of importance have so far taken place within the RSA defined for the baseline research. Small-scale map-units (e.g., 93 F, 93 G, 93 K) of the National Topographic System were used to search for appropriate projects.

Table 1.7-7 is broken down by specific type of archaeological site and does not combine identified site types, as two or more kinds of archaeological remains can be found at the same location. As noted above, no archaeological sites have been identified within the mine footprint, but eight have been identified in the mine site LSA with the majority (n=5) consisting of artifact scatters and one subsistence feature with associated artifact scatter. The mine site RSA is dominated by archaeological sites consisting of subsistence features (cache pits, n=114) followed by artifact scatters (n=92), with CMT sites (n=31) and trails and/or traplines (n=27).

The AOA (AMEC, 2011) established that the centreline of the transmission line conflicts with two sites: the Messue Trail and the Cheslatta Trail with associated CMTs. The majority of identified archaeological sites within the transmission line LSA consist of CMT sites (n=7) with a lesser number of artifact scatters and cultural depressions identified as cache pits (both types co-occur at three sites within the transmission line LSA). The dominant site type identified within the transmission line RSA are artifact scatters (n=61) with the next most common type consisting of subsistence features (cache pits, n=39) and CMTs (n=39).

Table 1.7-7: Summary of Archaeological Sites within the Project Study Areas Prior to the AIA

Site Type1	Project Study Areas					
	Mine Footprint	Mine LSA	Mine RSA	Transmission Line Footprint	Transmission Line LSA	Transmission Line RSA
Arborglyph	-	-	1	-	-	-
Artifact Scatter	-	6	92	-	4	61
Canoe	-	-	1	-	-	-
Culturally Modified Trees	-	2	31	1	7	38
Habitation Feature (housepit)	-	-	20	-	-	1
Habitation/Subsistence Feature (function unknown)	-	1	10	-	-	8
Subsistence Feature (hearth)	-	-	1	-	-	1
Historic Building or Structure	-	-	1	-	-	2
Petroform	-	-	1	-	-	-
Subsistence Feature (cache pit)	-	-	114	-	4	39
Subsistence Feature (roasting pit)	-	-	-	-	-	1
Subsistence Feature (fishing)	-	-	2	-	-	-
Trail or trapline	-	-	27	1	2	8*
Quarry (traditional tool stone)	-	-		-	-	1

Notes: [1] Many archaeological sites contain more than one type of evidence of past human activity; one recorded site may be represented here by multiple site types.
* Includes a post-Contact wagon trail.

A variety of site types including a CMT (arborglyph) site (n=1), a canoe (n=1), subsistence features (fishing n=2; hearth features n=2; a petroform n=1; roasting pit n=1), and a quarry (n=1) have been identified within the mine site RSA and transmission line RSA. In addition, two historical structures have been reported for the Project RSA. No burials or ancestral remains have been identified in any of the Project components.

Archaeological Impact Assessment 2012 and 2013

The AIA identified four archaeological sites and one historical heritage site within the transmission line footprint. The field assessment of the transmission line identified 18 locations with moderate or high archaeological potential (**Photo 1.7-8**, **Photo 1.7-9**), in

which a total of 311 subsurface tests six 50 cm x 50 cm evaluative test units were excavated (**Figure 1.7-3**).

Two previously identified protected heritage sites, the Messue Trail (FhSe-43; **Figure 1.7-4**) and the Cheslatta Trail (FlSe-2) were identified (**Table 1.7-8**). In addition, archaeological sites GaSf-47 (**Photo 1.7-10**) and GaSf-48 (**Photo 1.7-11**) were identified. Site GaSf-47 consists of 10 cache pits, and site GaSf-48 consists of one cache pit (**Figure 1.7-5**).

Table 1.7-8: Proposed Transmission Line AIA –Archaeological Sites

Archaeological Site	Identified Features	Comment
Messue Trail FhSe-43	Maintained road; no CMTs or blazes identified	One area of potential identified and subsurface tested in the vicinity of the trail on bank of tributary of Chedakuz Creek; all negative
Cheslatta Trail (FlSe-2) and Cheslatta Trail variant (FlSe-15)	Previously cleared road; no CMTs or blazes identified	Overgrown forestry road at area where trail meets proposed transmission line
GaSf-47	Cultural depressions: 10 cache pits	Site located on two terraces; 79 shovel tests and six 50x50 cm evaluative units excavated; all negative
GaSf-48	Cultural depression: 1 cache pit	Elevated terrain overlooking a dry gully. Aspen tree growing in cache pit dated to 84-years-old; site therefore older. Nine negative shovel tests placed inside and around the cache pit

Photo 1.7-10: View East to In-progress Excavation Units at Site GaSf-47 in Cultural Depression 6

Photo 1.7-11: View South-Southeast to Cultural Depression at Site GaSf-48

320000 360000 400000 440000

6000000 5960000 5920000 5880000

N

Endako
Stellako
Fraser Lake
Nadleh Whuten
Fort Fraser
Engen
Vanderhoof
Weneez
Sinkut River
Saik'uz
Nulki
Mapes
Nazko
Kluskus
Proposed Transmission Line (Stellako Re-route)
CHR 38
ST=35
ST=11
CHR 31
ST=7
CHR 41
ST=25
ST=25
ST=23
ST=37
ST=12
ST=15
ST=15
ST=23
Proposed Transmission Line
ST=9
ST=20
ST=6
ST=11
ST=9
ST=22
ST=20
ST=14
Proposed Transmission Line (Mills Ranch Re-route)
Proposed Airstrip
Kluskus-Ootsa FSR Upgrade
Kluskus-Ootsa FSR
Proposed Fresh Water Pipeline
Kluskus FSR
Kluskus-Blue FSR
François Lake
Southbank
Cheslatta Carrier
Danskin
Skin Tyee
Uncha Lake
Takysie Creek
Binta Lake
Nithi River
Cheslatta River
Cheslatta Lake
Knapp Creek
Cheslatta
Bird Creek
Hallett Lake
Targe Creek
Lucas Lake
Lucas Creek
Knewstubb Lake
Big Bend Creek
Natalkuz Lake (Nechako Reservoir)
Tetachuck River
Entiako River
Entiako Lake
Top Lake
Fawnie Creek
Laidman Lake
Johnny Lake
Moose Lake
Tsacha Lake
Kushya
Blackwater River
Chedakuz Creek
Tatelkuz Lake
Kuyakuz Lake
Smith Creek
Tachick Lake
Nechako River
Nulki Lake
Sinkut River
Stuart River
Cluculz Lake
Cluculz Creek
Khai
Corkscrew
Finger Lake
Tatuk Lake
Chilako River
Taluk Creek
Batnuni Lake
Euchiniko River
Nataniko Creek
Euchiniko
Euchiniko Lakes
Baezaeko
Nazko
Engen
Fraser Lake

16 35

Scale: 1:500,000
0 5 10 20
Kilometres

Legend

- Blaze
- Box trap
- CMT
- Historical Heritage Resource
- Subsurface Test Location
- Populated Place
- 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: newgold

PROJECT: Blackwater Gold Project

Transmission Line - Archaeological Survey Coverage, Subsurface Test Locations, and Cultural Heritage Resources

DATE: April, 2014	ANALYST: PK	**Figure** 1.7-3
JOB No: VE52277	QA/QC: GH	PDF FILE: 16-100-067_SurveyCoverageTL_v3.pdf
GIS FILE: 16-100-067_SurveyCoverageTL_v3.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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381000 384000 387000 390000

5913000 5910000 5907000

N

FhSe-43
Messue Trail

ST=8
ST=10
ST=12
ST=15
ST=23
ST=19
ST=16
ST=6
ST=19
CHR 30
CHR 29
ST=20
ST=6
ST=6
ST=6
ST=6
ST=6

Chedakuz Creek
Davidson Creek
Tatelkuz Lake
Turtle Creek

FhSe-43
Messue Trail

Legend

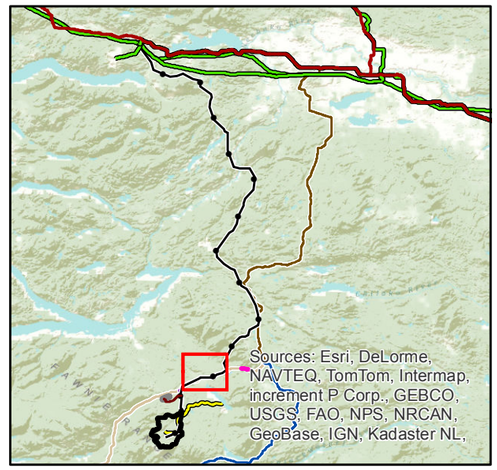
- Archaeological Site
- Blaze
- CMT
- Subsurface Test Location
- Pedestrian Survey Coverage
- Kluskus-Ootsa FSR
- Existing Road
- Contour (20 m)
- Stream
- Waterbody
- Wetland

Proposed Transmission Line

- Proposed Transmission Line
- Proposed Transmission Line (Mills Ranch Re-route)

Heritage Resources

- Local Study Area



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Meters

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

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

DATE: April, 2014	ANALYST: PK	**Figure** 1.7-4	
JOB No: VE52277	QA/QC: GH	PDF FILE: 16-100-082_SurveyCoverage_MillsRanch.pdf	
GIS FILE: 16-100-082_SurveyCoverage_MillsRanch.mxd			
PROJECTION: UTM Zone 10	DATUM: NAD83	amec	

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368000 370000 372000 374000

5992000 5990000 5988000

ST=10 CHR 32 CHR 33 ST=21 ST=6 ST=22 CHR 34 CHR 36 CHR 35 CHR 37 CHR 39 ST=12 GaSf-41 ST=7 GaSf-47 ST=85 GaSf-48 ST=9 CHR 44

ST=12 ST=8 ST=10 ST=14 CHR 40 ST=9 ST=40 ST=7 ST=11 CHR 45 GaSf-44 GaSf-45 ST=33 GaSf-43 GaSf-46 CHR 42 CHR 43

Endako Mine Road
Endako River
Alf Creek
Stellako River
Sweetnam Creek
François Lake Rd
16

STELLAKO RIVER
WILDLIFE MANAGEMENT AREA
STELLAQUO 1

N

Legend

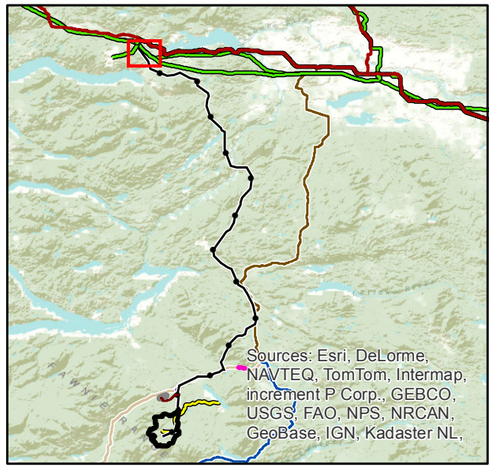
- Archaeological Site
- Subsurface Test Location
- Blaze
- Box trap
- CMT
- Historical Heritage Resource
- Pedestrian Survey Coverage
- Highway
- Collector Road
- Existing Road
- Existing Transmission Line
- Contour (25m)
- Wetland
- Indian Reserve
- Wildlife Management Area

Project Components

- Proposed Transmission Line
- Proposed Transmission Line (Stellako Re-route)

Heritage Resources

- Local Study Area



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Meters

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

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

DATE: April, 2014	ANALYST: PK	**Figure** 1.7-5
JOB No: VE52277	QA/QC: GH	PDF FILE: 16-100-083_SurveyCoverage_Stellako.pdf
GIS FILE: 16-100-083_SurveyCoverage_Stellako.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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The Messue Trail (FhSe-43) is a traditional trail, later used as a wagon trail, which proceeds 26 km southeast from Natalkuz Lake to Tatelkuz Lake. The trail proceeds along the east side of Tatelkuz Lake south and eventually joins the Alexander Mackenzie—Nuxalk-Carrier route along the Blackwater River. A variant of the Messue Trail proceeds via the west side of Tatelkuz Lake northeast to southwest to eventually join the Alexander Mackenzie—Nuxalk-Carrier Trail.

The Messue Trail is well maintained where it is crossed by the proposed transmission line, and is represented by a road that joins the Kluskus FSR. The area has been further cleared (**Photo 1.7-12**). No blazes or CMTs were identified at this location. One area of moderate archaeological potential was identified in proximity to the Messue Trail. Six subsurface tests were excavated on a small (8 m x 10 m) terrace overlooking an unnamed tributary of Chedakuz Creek. All tests were negative.

The Cheslatta Trail (FlSe-2 and variant FlSe-15) is a traditional trail that proceeds approximately 54 km north to south between Cheslatta and Fraser Lakes (**Figure 1.7-6**). The Cheslatta Trail has been previously impacted by forestry where it crosses the proposed transmission line, and is an overgrown and rutted service road (**Photo 1.7-13**). Maintained and flagged portions of the recreation trail were observed approximately 500 m north of the transmission line alignment. No evidence of the trail, such as exposed and compacted sediments, wagon ruts or a forest clearing indicating a pathway, was identified at the transmission line crossing.

Photo 1.7-12: View Southeast to Road and Cleared Area that Characterize the Messue Trail (FhSe-43) at the Transmission Line Junction

Photo 1.7-13: View Southwest to Cheslatta Trail (FlSe-2), an Overgrown Logging Road where it crosses the Proposed Transmission Line

382500 385000 387500

5982500 5980000 5977500

Nithi Mountain

Chowsunkut Lake

Chowsunkut Creek

Foster Creek

Holy Cross FSR

Nithi Rd

FISe-15
Cheslatta Trail Variant

FISe-2
Cheslatta Trail

Holy Cross FSR

Smith Creek

Smith Creek

N

Legend

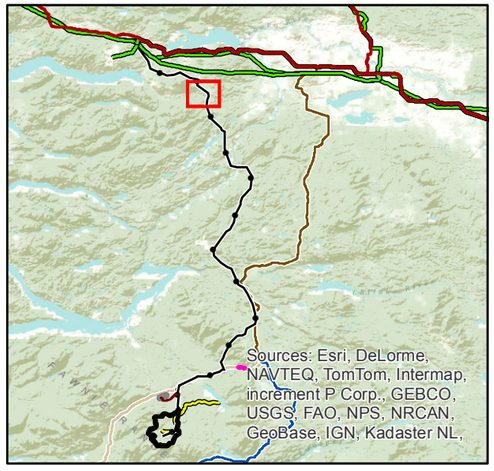
- Archaeological Site
- Pedestrian Survey Coverage
- Previously Identified Archaeological Site
- Collector Road
- Existing Road
- Contour (25m)
- Stream
- Waterbody
- Wetland

Project Components

- Proposed Transmission Line

Heritage Resources

- Local Study Area



Scale:1:25,000

0 250 500 1000 1500

Meters

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Transmission Line and Cheslatta Trail (FISe-2) – Archaeological Survey Coverage

DATE: April, 2014	ANALYST: PK	**Figure** 1.7-6
JOB No: VE52277	QA/QC: GH	PDF FILE: 16-100-084_SurveyCoverage_CheslattaTrail.pdf
GIS FILE: 16-100-084_SurveyCoverage_CheslattaTrail.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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In addition, 12 cultural heritage resource sites consisting of box traps, blazed trees and non-protected CMTs (post-dating 1846 AD) were identified during the survey of the proposed transmission line (**Table 1.7-9**, **Photo 1.7-14**, **Photo 1.7-15**, **Figure 1.7-4**, and **Figure 1.7-5**).

Table 1.7-9: Proposed Transmission Line AIA – Cultural Heritage Resource Sites

Cultural Heritage Resource Site	Identified Features	Comment
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 with MF5 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

Photo 1.7-14: Taking an Increment Core Sample from a Bark-Stripped Tree at CHR 31. The Modification was Dated to 1879

Photo 1.7-15: CHR 41, a Box Trap

In addition, one unprotected historic heritage resource, a wooden memorial marker, was identified during the transmission line survey (**Table 1.7-10**, **Photo 1.7-16**).

Table 1.7-10: Proposed Transmission Line AIA – Historic Heritage Resource Sites

Historic Heritage Resource	Identified Features	Comment
Memorial cross	Roadside memorial cross	Wooden memorial marker to "William Scott" in cleared ROW beside Francois Lake Road

Photo 1.7-16: Memorial Marker

Transmission Line – Mills Ranch Reroute

The Mills Ranch Reroute is an approximately 15.3 km transmission line option that crosses Chedakuz Creek approximately 3 km north of the line's current proposed alignment. The AOA indicated that one archaeological site has been identified within the Mills Ranch Reroute (**Table 1.7-11**), FhSe-43, the Messue Trail. No historical heritage sites have been identified within the alignment. In addition, no evidence that any previous archaeological investigations covered any part of the access ROW was identified. Two cultural heritage resources were identified during the AIA of the Mills Ranch Reroute.

Archaeological Impact Assessment 2012 and 2013

The AIA identified eight locations of moderate archaeological potential, and 109 subsurface tests were excavated at these locations with negative results (**Figure 1.7-4**). Previously identified archaeological site FhSe-43 (Messue Trail) was located at its crossing of the Mills Ranch Reroute ROW. At this point, the Messue Trail consists of a well-used and maintained road, likely used by all-terrain vehicles (**Photo 1.7-17**). Two cultural heritage resources were identified: one blaze and one CMT. No historic heritage resources were identified on the Mills Ranch Reroute option.

Table 1.7-11: Proposed Transmission Line AIA – Historic Heritage Resource Sites

Archaeological Site	Identified Features	Comment
Messue Trail FhSe-43	Cleared road; no blazes or CMTs identified	Saw-cut logs suggest trail is well-maintained, runs roughly WNW by ESE, and is between 2 m to 2.5 m wide, likely in use by an ATV or small pickup

Photo 1.7-17: Messue Trail (FhSe-43) Where it Crosses the Mills Ranch Reroute

Table 1.7-12: Cultural Heritage Resources

Cultural Heritage Resource	Identified Features	Comment
CHR 29	1 standing lodgepole pine with a rectangular bark-strip scar	On a trail that runs across a tested area of archaeological potential; all shovel tests negative. Modification dated to 1968
CHR 30	1 axe cut blazed standing lodgepole pine	Tree located on a worn trail

Proposed Stellako River Reroute

The proposed Stellako River Reroute is an 8-km corridor east of the transmission line's current alignment north and south of the Stellako River. The AOA identified no archaeological sites in the Stellako Reroute corridor. One historic heritage resource (GaSf-10) was previously identified within the Stellako alignment.

Archaeological Impact Assessment 2012 and 2013

The AIA identified 11 locations of moderate or high archaeological potential, and a total of 171 subsurface tests were excavated (**Figure 1.7-5**). Four archaeological sites were

identified (**Table 1.7-13**). Sites GaSf-43 (**Photo 1.7-18**), GaSf-44, GaSf-45 (**Photo 1.7-19**), and GaSf-46 each consist of a single cache pit on undifferentiated, sloped, or level terrain.

Table 1.7-13: Proposed Stellako River Reroute AIA – Archaeological Sites

Archaeological Site	Identified Features	Comment
GaSf-43	Cultural depression; 1 cache pit	Located on level terrain with a gentle slope and southern aspect
GaSf-44	Cultural depression; 1 cache pit	Located on undifferentiated terrain with a gentle slope and northeast aspect. Site falls 10 m east of ROW
GaSf-45	Cultural depression; 1 cache pit	Well-defined cache pit on a gentle slope
GaSf-46	Cultural depression; 1 cache pit	Ill-defined cache pit on undifferentiated terrain

Photo 1.7-18: Cultural Depression at Site GaSf-43

Photo 1.7-19: Cultural Depression at Site GaSf-45

Four cultural heritage resources consisting of unprotected CMTs were also identified during the AIA of the Stellako Reroute (**Table 1.7-14**).

Table 1.7-14: Stellako River Reroute AIA – Cultural Heritage Resources

Cultural Heritage Resource	Identified Features	Comment
CHR 42	1 shaped spruce	Increment core indicates tree modified 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: 1 tree exhibited columnar scarring; 1 had 2 lenticular scars; 4 trees had lenticular scars; 1 had a rectangular and a healed scar; 1 fallen tree had a rectangular scar; and 1 tree had an inverted triangular scar	Advanced state of decay precluded dating; trees cover an area 48 m N/S and 97 m NW by SE, on a moderate slope with a NW aspect
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; 1 sample failed, the other indicated it was modified in 1945

Previously identified historical heritage resource GaSf-10 was re-visited during the 2012 and 2013 AIA (**Table 1.7-15**, **Figure 1.7-5**). The unprotected, historic cabin was originally identified in 1982. The condition of the structure has since degraded, with just two corners of its wall remaining (**Photo 1.7-20**). The survey indicated GaSf-10 falls just outside the Reroute corridor.

Table 1.7-15: Stellako River Reroute AIA – Historical Heritage Resources

Historical Heritage Resource	Identified Features	Comment
GaSf-10	Historic cabin	15 m SSW of reroute; 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

Photo 1.7-20: View Southwest to Historic Heritage Resource GaSf-10

Proposed Mine Access Road

The proposed mine access road has a 40 m wide ROW and trends 14.5 km north downhill from the mine site to connect with the Kluskus-Ootsa FSR.

Previous Archaeological Studies

The AOA indicated that no archaeological sites or historical heritage sites were previously identified within the proposed mine access road ROW. In addition, no evidence was found that any previous archaeological investigations covered any part of the access ROW.

Archaeological Impact Assessment 2012 and 2013

Most of the mine access road was covered by pedestrian survey (8.3 km; 57%) where the road corridor proceeded through Greenfield settings or standing timber (**Figure 1.7-7**).

Visual assessment (4.2 km; 29%) was undertaken where the proposed road will upgrade existing FSRs or proceed through cut blocks adjacent to existing roads. Only 2.0 km (14%) of the proposed road was not inspected, where it ran through existing timber harvesting blocks assessed as low potential. The AIA identified no archaeological sites and no historical heritage sites. The field survey identified no areas of archaeological potential, and no subsurface tests were excavated.

Proposed Water Pipeline

The proposed water pipeline has a 40 m wide ROW and runs 12.9 km northeast from the mine to the western shore of Tatelkuz Lake.

Previous Archaeological Studies

The AOA indicated that one archaeological site (FhSe-43; the Messue Trail) has been identified within the proposed water pipeline ROW. No historical heritage sites have been identified within the water pipeline ROW. In addition, no evidence that any previous archaeological investigations had taken place within the water pipeline ROW was identified.

Archaeological Impact Assessment 2012 and 2013

The majority of the proposed water pipeline was subject to visual assessment (9.8 km; 77%), as the water pipeline ROW will be situated within existing forestry roads or forestry cut blocks adjacent to existing roads. Pedestrian survey was undertaken for those locations where the water pipeline corridor proceeded through Greenfield settings or standing timber (2.5 km; 20%). Only 0.5 km (3.0%) of the proposed water pipeline was not inspected where it traversed timber-harvesting blocks assessed as low potential. The field survey identified two areas of moderate archaeological potential on the lakeshore of Tatelkuz Lake (**Figure 1.7-8**). These areas are located at the intake for the water pipeline and 24 subsurface tests were excavated.

One protected heritage site, the Messue Trail (FhSe-43), was encountered during the AIA (**Figure 1.7-8**, **Figure 1.7-8**). Currently, BCTS Forestry Road 7655.38 crosses the Messue Trail. The Messue Trail was followed for 300 m along its northwest alignment and 400 m along it southwest alignment on either side of the FSR. The footpaths of the trail and wagon ruts are visible along the trail. Numerous blazes, CMTs (both cambium stripped lodgepole pine and shaped standing trees) and a wire snare were identified adjacent to the Messue Trail. Two of the blazed trees were dated; one tree dated to 1969 AD (north side) and 1984 AD (south side). The second dated tree also has two blazes, which dated to 1969 AD (north side) and 1946 AD (south side).

372500 375000 377500 380000

5907500

5905000

5902500

Turtle Creek

Creek 700

Creek 428073

Davidson Creek

Snake lake

N

Legend

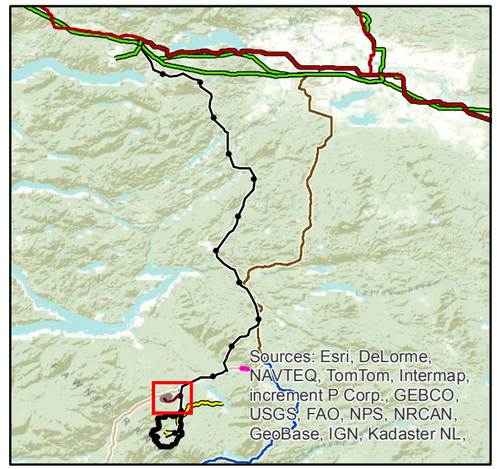
- Archaeological Site
- Pedestrian Survey Coverage
- Kluskus Ootsa FSR
- Existing Road
- Contour (20 m)
- Stream
- Waterbody
- Wetland

Project Components

- Proposed Transmission Line
- Proposed Mine Access Road
- Proposed Airstrip Access Road
- Proposed Airstrip
- Proposed Mine Site

Heritage Resources

- Local Study Area



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Meters

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Mine Access Road and Airstrip and Access Road - Archaeological Survey Coverage

DATE: April, 2014	ANALYST: PK	**Figure** 1.7-7
JOB No: VE52277	QA/QC: GH	PDF FILE: 16-100-066_SurveyCoverageAccessRdAirstrip.pdf
GIS FILE: 16-100-066_SurveyCoverageAccessRdAirstrip.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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380000 384000 388000

5904000 5900000

N

Tatelkuz Lake

Davidson Creek

Creek 226585

Creek 428073

Snake Lake

Creek 661

Creek 746920

Kluskus-Messue FSR

Cheedakuz Creek

FhSe-43 Messue Trail

ST=3

ST=21

Trapline - Numerous Blazed Trees and Well-Worn Footpath

Messue Trail - Numerous Blazed Trees and CMT's

Legend

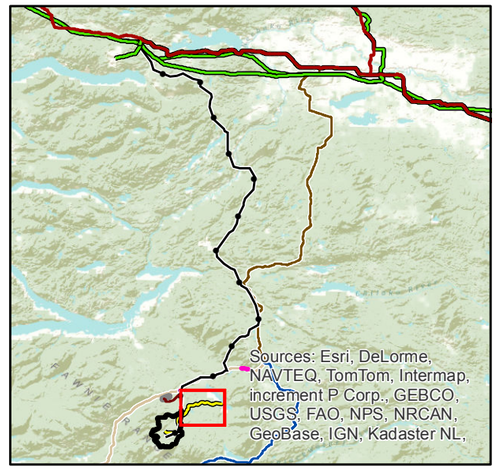
- Archaeological Site
- Subsurface Test Location
- Wire Trap
- Pedestrian Survey Coverage
- Previously Identified Archaeological Site
- Other FSRs
- Existing Road
- Contour (20 m)
- Stream
- Wetland
- Waterbody

Project Components

- Proposed Transmission Line
- Proposed Water Pipeline Route
- Pumpstation
- Proposed Mine Site

Heritage Resources

- Local Study Area



Scale:1:35,000

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Meters

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Water Pipeline and Messue Trail (FhSe-43) - Archaeological Survey Coverage

DATE: April, 2014	ANALYST: PK	**Figure** 1.7-8
JOB No: VE52277	QA/QC: GH	PDF FILE: 16-100-081_SurveyCoverage_WaterPipeline.pdf
GIS FILE: 16-100-081_SurveyCoverage_WaterPipeline.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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One trap line with associated blazes was identified between the Messue Trail and an unnamed creek west of the trail. The trap line, delineated by blazes and a worn footpath, is situated between 40 and 150 west of the Messue Trail and it relatively parallels the Messue Trail (**Photo 1.7-21**). Two of the blazes were dated to 1952 AD and 1970 AD.

Photo 1.7-21: View Northeast Along Messue Trail (FhSe-43) South of Proposed Water Pipeline

Proposed Airstrip and Access Road

The proposed airstrip footprint is 1.7 km long and 80 m wide, and is located approximately 4 km north of the mine site boundary. It lies on a plateau on the south side of Turtle Creek. The 5.7-km long access road is a west fork off the proposed mine access road, approximately 3.8 km north of the mine boundary.

Previous Archaeological Studies

The AOA indicated the general vicinity of the airstrip and access road had been subjected to previous assessment due to forestry (Traces, 2005), although it could not be determined if the proposed footprint itself had been assessed. No historical heritage, cultural heritage, or archaeological sites have been previously identified in the footprint of either the access road or airstrip. Three archaeological sites are in relative proximity: FhSf-1, a cache pit and

artifact scatter 1.8 km northeast, FhSe-57, a cache pit and roasting pit 2.4 km northeast, and FhSe-58, an artifact scatter 2.1 km northeast. All three sites are on the north bank of Turtle Creek.

Archaeological Impact Assessment 2013

The entire 1.7 km long, 80-m wide airstrip extent was subject to pedestrian survey due to its proximity to Turtle Creek (**Figure 1.7-8**). The survey confirmed that the entire airstrip extent is in previously harvested cutblocks. The majority of the approximately 5.7 km-long airport access road (91%) was subject to visual assessment, as it passes through existing forestry roads or forestry cutblocks adjacent to existing roads. One 150 m section and one 350 m section which pass through existing cutblocks were assessed as low potential and were not subject to survey.

The field assessment identified no areas of archaeological potential within the airstrip and access road footprints. No areas were subjected to subsurface testing, and no archaeological sites, cultural heritage resources, or historical heritage resources were identified.

Kluskus Forest Service Road (re-alignment of road from 104+900 to 106+738 km

The proposed Kluskus FSR re-alignment is an approximate 1.8-km long (104+900 to 106+973 km), 40-m wide corridor (8-m running surface) approximately 18 km northeast of the proposed mine footprint, between kilometre 104 and kilometre 106 on the Kluskus-Ootsa FSR. The AOA indicated no archaeological sites have been identified within the footprint of the proposed re-alignment. No historic heritage resources or cultural heritage resources have been identified.

Archaeological Impact Assessment 2013

All but approximately 50 m (2%) of the re-alignment was subjected to pedestrian survey (**Figure 1.7-9**). At this location, the alignment passes through a previously harvested cutblock. No areas of archaeological potential were identified or tested. No archaeological sites, cultural heritage resources or historic heritage resources were identified during the AIA.

393000 394000 395000 396000 397000

5913000 5912000 5911000 5910000

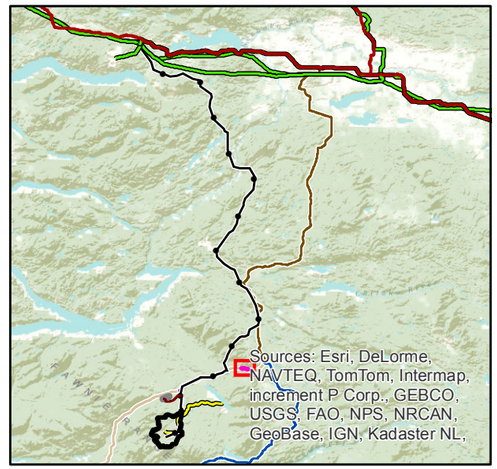
N

Legend

- Archaeological Site
- Pedestrian Survey Coverage
- Kluskus Ootsa FSR Upgrade
- Kluskus Ootsa FSR
- Existing Road
- Contour (20 m)
- Stream
- Wetland
- Waterbody

Heritage Resources

- Local Study Area



Scale: 1:15,000

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Meters

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Kluskus FSR Re-alignment - Archaeological Survey Coverage

DATE:	ANALYST:	**Figure** 1.7-9
April, 2014	PK	
JOB No: VE52277	QA/QC: GH	PDF FILE: 16-100-085_SurveyCoverage_KluskusOotsaUpgrade.pdf
GIS FILE: 16-100-085_SurveyCoverage_KluskusOotsaUpgrade.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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1.8 Conclusions

This baseline study concludes that lands within the Project development footprint exhibit low to moderate potential for protected archaeological resources. The exception is in proximity to the Stellako Rivers and on lower elevation level terraces bordering Davidson Creek where there is high potential for sites such as lithic scatters and cultural depressions (AMEC, 2014 pending). There is moderate to high potential for Cultural Heritage Sites, in particular, non-protected cambium-stripped trees, blazes, and trap-sets within the LSAs. Finally, there is low to moderate potential for encountering historical heritage remains left by 19th and 20th century mineral exploration and timber harvesting activities (AMEC, 2011, 2014 pending).

The majority of the information used in this baseline study was based on the expertise of archaeological professionals who have worked extensively in the Central Interior Plateau. In addition, the AMEC AIA (AMEC, 2014 pending) found some evidence of archaeological resources within the Project footprint. The AMEC AIA (2014 pending) did not include the RSA as a component of field studies.

The results of the AIA conducted by AMEC (2014 pending) determined that archaeological sites, historical heritage sites, and cultural heritage resources are present in the footprints of the mine site and transmission line options and an archaeological site is present in the water pipeline footprint LSA of the Project. Based on the current Project footprint, no additional archaeological work is recommended for the Project footprint that was assessed under the AIA.

2.0 PALAEONTOLOGY

2.1 Introduction

2.1.1 Objectives

The Land Tenures Branch of the British Columbia Ministry of Forests, Lands and Natural Resource Operations (BC MFLNRO) is in the process of developing a fossil management framework for the province, and has defined fossil and fossil sites as heritage resources. One of the goals of the fossil management framework will be the protection of significant fossil resources. The objective of this baseline study is to identify and describe the known significant fossil sites within the Project RSA and LSAs, and also to identify areas with a high probability of containing additional significant fossil resource that may be subject to disturbance by mining and associated activity. Protective measures can then be recommended to protect the fossil sites and their contents.

2.2 Methods

2.2.1 Sources of Data

In addition to the Palaeontological history of the Project area, this study also requires knowledge of the geologic history and current geologic setting of the Project area, especially with respect to the sedimentary rock record. To accomplish this, an extensive literature search was performed using online databases, including those of the British Columbia Ministry of Energy, Mines and Petroleum Resources, the Royal BC Museum, the Geological Survey of Canada (GSC), and the Canadian Society of Petroleum Geologists. An existing Blackwater geotechnical report was supplied by AMEC. Geospatial data valuable in locating known fossil sites was obtained through the BC Ministry of Energy, Mines and Petroleum Resources Open File 2007-10 (GSC Open File 5623). This Open File also provided an excellent synopsis of relevant geotechnical work completed within the Project area.

In addition, two visits were made to the GSC offices in Calgary to discuss the regional Palaeontology of the general area. The GSC generously shared their in-house Palaeontological database for use in this study.

2.2.2 Regional Geologic Setting

The Project is located within the Nechako Plateau, part of the eastern Stikine Terrane, in BC. Much of the Plateau is overlain by flat or gently dipping Tertiary lava flows, underlain by volcanic, sedimentary, and intrusive rocks. Glacial drift covers much of the bedrock. Ice moved across the Plateau during the Pleistocene, towards the northeast and east, and created surficial grooves and drumlin-like ridges. Glacial lakes, eskers, and meltwater channels were the result of retreating ice (Holland, 1994).

The oldest strata exposed within the Project area (**Table 2.2-1**) include fossiliferous Upper Triassic sediments. Fine-grained marine sediments of Carnian to Early Norian age yield the bivalve *Halobia* in the Fulton Lake map area (93L/16) (Diakow et al., 1997). Although Triassic exposures are rare in the Nechako River area, sediments from the Hazelton Group (Jurassic in age) vary from near-shore to distal marine, and could potentially hold bivalve fossils closely related to *Halobia*. Fossiliferous sedimentary beds of Jurassic age have been described for the area (Diakow et al., 1997), and any additional finds will be of relevance for improving the currently poorly defined biostratigraphy of the area.

In the uplifted horst of the Fawnie and Nechako ranges (which corresponds to the area of interest), the Hazelton Group is divided into the Entiako Formation and the younger Nagliko Formation, which include lower to middle Jurassic sediments. However, in other areas of the Stikine Terrane, the Hazelton Group is represented mainly by the Telkwa, Nilkitkwa, and Smithers Formations, ranging from Hettangian to Bathonian in age (Gagnon et al., 2012).

The Entiako Formation includes a marine sedimentary facies that has produced ammonite fossils. The distal marine subfacies include fossil taxa from ammonites such as *Dactylioceras kanense, Lioceratoides propiniquum*, *Lioceratoides angionus,* and *Tiltoniceras antiquum*, all

early Toarcian in age. Overlying argillite and lesser feldspathic siltstone layers also contain the pelecypod *Bositra*. The near-shore subfacies for the Entiako Formation includes feldspathic sandstone and volcanic-lithic granule conglomerates containing *Collina*, a late-middle Toarcian ammonite (Diakow et al., 1997). There are also several ammonite fossils currently unidentified in the upper near-shore facies of the Entiako Formation. In the lower layers of the Nagliko Formation, poorly preserved ammonites can be found, as well as gastropods and indeterminate bivalves (Diakow et al., 1997). Additionally, belemnites and bivalves are also found among an abundant fauna characteristic of intervolcanic sediments within the formation. A sonninid ammonite suggests a probable early Bajocian age for part of the Naglico Formation. The higher sections of this formation have been suggested as late Bajocian in age by the presence of specific thick-shelled bivalves and a few ammonites characteristic of that time (Diakow et al., 1997).

Additional exposures of the Hazelton Group have revealed the presence of ammonites, well-preserved silicified burrows, algal oncoids, and ooids in sediments of upper Sinemurian age. Sediments of the Smithers Formation also include fossil belemnites, gastropods, scleractinian corals, and a wide range of ornate bivalves, such as *Myophorella*. Ichnogenera of lower Bajocian to Bathonian age have also been found in sediments pertaining to the Smithers Formation. Common ichnogenera include: *Teichichnus*, *Planolites*, *Cylindrichnus*, *Rosselia*, *Ophiomorpha*, *Palaeophycus*, *Skolithos*, *Thalassinoides*, *Planolites*, and *Chondrites*. Sediments from the Quock Formation, which overlies the Smithers Formation for the majority of the Stikine Terrane (Gagnon et al., 2012), include fossils of belemnites and late Bathonian ammonites (including *Kepplerites* ssp.) (Gagnon et al., 2012).

The Bowser Lake Group is divided into the Ashman Formation and the overlying Nechako Volcanics. The Ashman Formation is fossiliferous and includes the early Callovian ammonite *Kepplerites*, and possibly *Iniskinites* (?), which would suggest the presence of upper Bathonian strata (Diakow et al., 1997). Additional fossils, such as the bivalve *Anditrigonia,* indicate a range of Callovian or early Oxfordian in age. At exposures between Knewstubb and Natalkuz lakes, there are abundant calcareous concretions within exposed mudstone containing the ammonite species *Lilloettia tipperi*. Further to the north, abundant fossils, including thick-shelled bivalves, belemnites, gastropods, worm burrows, and wood debris, suggest a shallow-marine, high-energy environment (Diakow et al., 1997).

Evenchick et al. (2010) have published a detailed faunal list of ammonite and bivalve assemblages for the upper Hazelton and lower Bowser Lake Groups, in areas north of the area of interest for the Project. This assemblage list will aid in the process of determining the biozones represented within the area of interest with increased accuracy.

A widespread and often thick mantle of glacial drift including till, glaciofluvial sediments, and glaciolacustrine sediments of Quaternary age, is also found in the area of study. Mammoth (*Mammuthus* ssp.) bone fragments and fossilized plants (*Picea* and *Abies* ssp.) have been recovered from the Babine Lake area, suggesting a Late Wisconsinian age for the last glaciation in the region (Levson and Giles, 1997). Additional information on Quaternary fossils from the region is sparse.

Table 2.2-1: Table of Geological Formations in Project Area (Diakow et al., 1997)

	Epoch	Stage	Stratigraphy		Map Unit	Lithology
NEOGENE	Pliocene		Chilcotin Group		MPc	Olivine basalt flows, vesicular texture, columnar jointed
	5					
	Miocene					
	23					***Disconformity***
	Oligocene					
	35		Endako Group		Ee	Andesite Flows, massive and amygdaloidal textures
	Eocene		Ootsa Lake Group		Eo	Quartz-phyric rhyolite flows and air-fall tuffs; some bladed feldspar and augite-phyric andesite flows; local basal boulder conglomerate
					Ech	CH pluton: Hornblende biotite granodiorite
	57					***Unconformity; block faulting***
CRETACEOUS	65	Maastrichtian	Unnamed volcanics		uKv	Hornblende Andesite tuff-breccia and flows
	L				LKt	Biotite-bearing felsites sills
					LKd	Quartz diorite stocks and plugs
		Cenomanian				
	97	Albian			lKs	Rare black mudstone
	E		Unnamed volcanics			***Unconformity; inception of the Nechako uplift; brittle deformation***
					EKc	Capoose batholith: hornblende biotite granodiorite and quartz monzonite
	146	Berriasian			lKv	Rare biotite-phyric dacite flows
JURASSIC		Tithonian				
	L	Kimmeridgian	Bowser Lake Group	Nechako volcanics	uJ_{BN}	Pyroxene-phyric basalt flows, rhyolitic tuffs
	157	Oxfordian				***Paraconformity/angular unconformity***
		Callovian		Ashman Fm.	muJ_{BA}	Black mudstone; chert-bearing conglomerate, sandstone and siltstone
		Bathonian				***Major unconformity; erosional interval***
	M	Bajocian	Hazelton Group	Naglico fm.	mJ_{HN}	Pyroxene-phyric basalt flows and tuffs; feldspathic sediments
	178	Aalenian		Entiako fm.	lmJ_{HE}	Near-shore and distal marine facies: volcanic sandstone and granule-pebble conglomerate; black laminated tuffaceous mudstone
		Toarcian				Subaerial facies: quartz-phyric rhyolite tuffs, lesser rhyolite flows; variegated maroon and green air-fall tuffs
	E					
	208					***Major unconformity***
TRIASSIC		Norian				
		Carnian	Unnamed Sediments		uTs	Marine black, laminated siltstone

2.3 Results/Discussion

The results of this baseline study will be presented by individual study area. The key issues are the presence or absence of sedimentary rocks within each study area and, if present, whether they contain significant fossil material. Each study area will be presented individually. Collectively, the study areas are shown overlain on the Geological Map of British Columbia, which is also annotated with known fossil sites. The components of the fossil sites are presented in **Table 2.3-1** and **Table 2.3-2**.

2.3.1 Mine Site RSA

Quaternary drift and colluvial deposits mask the bedrock within the mine site LSA (**Annex 7**, **Figure 1**). A 2009/2010 drill core program indicated that the mine site bedrock consists of Eocene and possibly Late Cretaceous volcanics (Simpson, 2012). There are no known fossil sites within the boundary of the mine site LSA.

However, there are five known fossil sites in the mine site RSA, with four of them located west of the mine site LSA along the Kluskus–Ootsa FSR (**Annex 7**, **Figure 1**). Nearly all of the fossil material consists of moulds and shell fragments of shelled marine invertebrates representing the phylum Mollusca (ammonites, snails, clams, oysters, scallops, etc.). Rare plant fragments have also been recorded (**Table 2.3-1**).

Table 2.3-1: RSA Fossil Sites

GSC LOC	Fossil Type	Classification (if identifiable)/Misc.	System/Age
C-143716[1]	bivalves	Trigoniinae (Family)	Mesozoic undifferentiable; Middle Jurassic (?)
C-143711[1]	gastropod	indeterminate	Middle Jurassic
C-143711	belemnite (?)	Cephalopoda (Class)	Middle Jurassic
C-143711	bivalves	*Vaugonia* ssp., *Pleuromya* ssp.	Middle Jurassic
C-143711	plants	bored wood	Middle Jurassic
C-143395[2]	gastropod	indeterminate	Middle Jurassic
C-143395	bivalves	*Grossouvria (?)* ssp., *Entolium* ssp., *Pleuromya* ssp., *Camptonectes (?)* ssp., *Thracia (?)* ssp. *Ostrea* ssp., *Corbula (?)* ssp., *Pinna* ssp., and indeterminate specimen	Middle Jurassic
C-143395	belemnite	Cephalopoda (Class)	Middle Jurassic
C-143395	plants	fragments	Middle Jurassic
C-203454[3]	belemnite	Cephalopoda (Class)	Middle Jurassic
C-203454	ammonoids	indeterminate	Middle Jurassic
C-203454	bivalves	*Myophorella* ssp. *Montanensis (?), Oxytoma* sp,.and indeterminate specimen	Middle Jurassic

Sources: Poulton, T.P., 1995 (J6)[1]
Poulton, T.P., 1995 (J7)[2]
Tipper, H.W., 1994[3]

2.3.2 Transmission Line LSA

The transmission line LSA is primarily underlain by Mesozoic and Eocene volcanics, as well as some Quaternary deposits (**Annex 7**, **Figure 2**). However, ten fossil sites are located along the study area where it deviates southwesterly at Brewster Road (**Figure 2.3-1**). Most of the fossil material consists of moulds and shell fragments of shelled marine invertebrates representing the phylum Mollusca. Lesser components are crinoids from the phylum Echinodermata, one specimen from the phylum Brachiopoda, possible fish scales, and rare plant fragments (**Table 2.3-2**).

Table 2.3-2: Transmission Line LSA Fossil Sites

GSC LOC	Fossil Type	Classification (if identifiable)/Misc	System/Age/Formation
C-056986[1]	belemnites	Cephalopoda (Class)	Jurassic-Cretaceous, pre-Albian?
C-056986	bivalves	*Propeamussium* ssp., *Entolium* ssp., *Pleuromya (?)* ssp., oyster fragments, indeterminate specimen	Jurassic-Cretaceous, pre-Albian
C-056987[1]	bivalves	*Entoliidae* (Family), pleuromyid, other indeterminate specimens	probably Jurassic-Early Cretaceous
C-177438[1]	ichthyoliths?	fish scale	Indeterminate
C-177438	gastropod	indeterminate	Indeterminate
C-177438	bivalve	Inoceramus (Family) (?)	possibly Late Early Cretaceous
C-177439[1]	scaphopod	Scaphopoda (Class)	Middle Jurassic, Bajacian?
C-177439	ammonoid	possible stephanoceratid (Family)	Middle Jurassic, Bajacian?
C-177439	belemnite	Cephalopoda (Class)	Middle Jurassic, Bajacian?
C-177439	bivalves	*Propeamussuim* ssp., and indeterminate specimen	Middle Jurassic, Bajacian?
C-177440[1]	bivalves	indeterminate	Middle to Upper Jurassic
C-177440	ammonoids	possible stephanoceratid (Family), and indeterminate specimen	Middle to Upper Jurassic
C-143722[1]	ammonoids	indeterminate	Early Jurassic?
C-143722	bivalves	*Propeamussuim* ssp., possible pholadomyid (?), possible inoceramid (?), others indeterminate	Early Jurassic?
C-143722	gastropods	indeterminate	Early Jurassic?
C-143722	ichnofossil	horizontal burrowing trace	Early Jurassic?
C-203465[2]	echinoderms	Crinoidea (Class), columnals	Middle Jurassic?
C-203466[3]	ichthyoliths	fish scales (could be crustacean)	Indeterminate, Middle Jurassic?
C-203466	brachiopods	Rhynchonellida (Order)?	Indeterminate, Middle Jurassic?
C-203466	bivalves	*(Camptonectes* ssp., *Isognomon* ssp., *Pinna* ssp., *Thracia* ssp.*)* (?) and indeterminate specimens	Indeterminate, Middle Jurassic?
C-203467[3]	bivalves	*Myophorella* ssp. (?) and inderminate specimen	Possibly Early to Late Jurassic
C-203467	plant	wood fragment	Possibly Early to Late Jurassic
C-143720[3]	bivalves	*Myophorella* ssp. and indeterminate specimen	Early-Late Jurassic

Sources: Haggart, J.W., 1995[1]
Poulton, T.P., 1995 (J7)[2]
Poulton, T.P., 1995 (J6)[3]

348000 360000 372000 384000 396000

5928000 5916000 5904000 5892000

Houlton Lake Yellow Moose Lake Natalkuz Lake (Nechako Reservoir) Entiako River Capoose Lake Capoose Creek Van Tine Creek Fawnie Creek Laidman Lake Moose Lake Williamson Lake Top Lake Chedakuz Creek Davidson Creek Tatelkuz Lake Kuyakuz Lake Euchiniko Lakes Blackwater River Mathews Creek East Erhorn Creek Erhorn Creek

Nechako Range Fawnie Range

Mount Swannel 1768m
Fawnie Nose 1926m
Fawnie Rose 1873m
Fawnie Dome 1726m
Mount Davidson 1856m
Tsacha Mountain 1781m
Tatelkuz Mountain 1611m
Kuyakuz Mountain 1734m
933m
1096m
1151m
1231m
1387m
1634m
1666m
1611m
1444m
1668m
1767m
1097m
960m

C-143388 C-143392 C-143391 C-143713 C-143712 C-143716 C-143721 C-203461 C-143719 C-056986 C-143722 C-177439 C-203465 C-177438 C-056987 C-177440 C-203466 C-143720 C-203467 C-177441 C-203472 C-203454 C-143384 C-143382 C-143383 C-143711 C-143395 C-203471 C-203470 C-143707 C-143705 C-143702 C-143704 C-143708

N

Legend

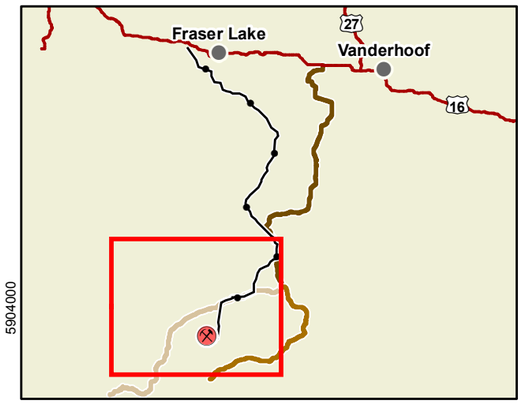
- Fossil Sites
- Populated Place
- Spotheights
- Kluskus FSR
- Kluskus Blue FSR
- Kluskus Ootsa FSR
- Stream
- Waterbody

Project Components

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

Heritage Resources

- Regional Study Area
- Local Study Area



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5 2.5 0 5

Kilometres

Reference

BC Government GeoBC Data Distribution
Nechako NATMAP Project: A suite of geoscience information for central British Columbia Struik, L.C., MacIntyre, D.G. and Williams, S.P.
GSC Open File 5623 - BCMEMPR Open File 2007-10
Paleontology Points: Minister of Energy and Mines

CLIENT: newgold

PROJECT: Blackwater Gold Project

Surficial Geology with Fossil Sites & Study Areas

DATE:	ANALYST:	Figure 2.3-1
April, 2014	WR	
JOB No: VE52095	QA/QC: MY	PDF FILE: 20-100-004_paloen_site_v2.pdf
GIS FILE: 20-100-004_paloen_site_v2.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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2.3.3 Mine Access Road LSA

The proposed mine site access road is primarily underlain by Quaternary overburden (**Annex 7**, **Figures 1** to **7**). There are two locations where bedrock was sampled for micropalaeontological data. The northernmost location, C-209070, sampled from unknown strata, was barren of palynomorphs, and the age of the sample was undeterminable. The second site, C-177441, located farther south along the access road, apparently sampled the Middle Jurassic Nechako Formation and was also barren.

2.3.4 Water Pipeline LSA

Bedrock underlying the water pipeline LSA is entirely masked by Quaternary cover (**Annex 7**, **Figure 1**). Two locations were sampled for microfossils, from what was possibly the Lower to Middle Jurassic age Nechako Formation, directly east of Tatelkuz Lake (within the RSA), and were deemed barren.

2.4 Conclusions

No significant fossil resources were identified within the access road LSA, the mine site LSA, or the water pipeline LSA, or much of the lands within the transmission line LSA. However, However, one area of concern within the transmission line LSA is in the southern portion, where 10 known fossil resource sites lie within or very near to the boundaries of the LSA (**Annex 7**, **Figure 1**).

3.0 PALAEONTOLOGICAL FIELD ASSESSMENT

3.1 Introduction

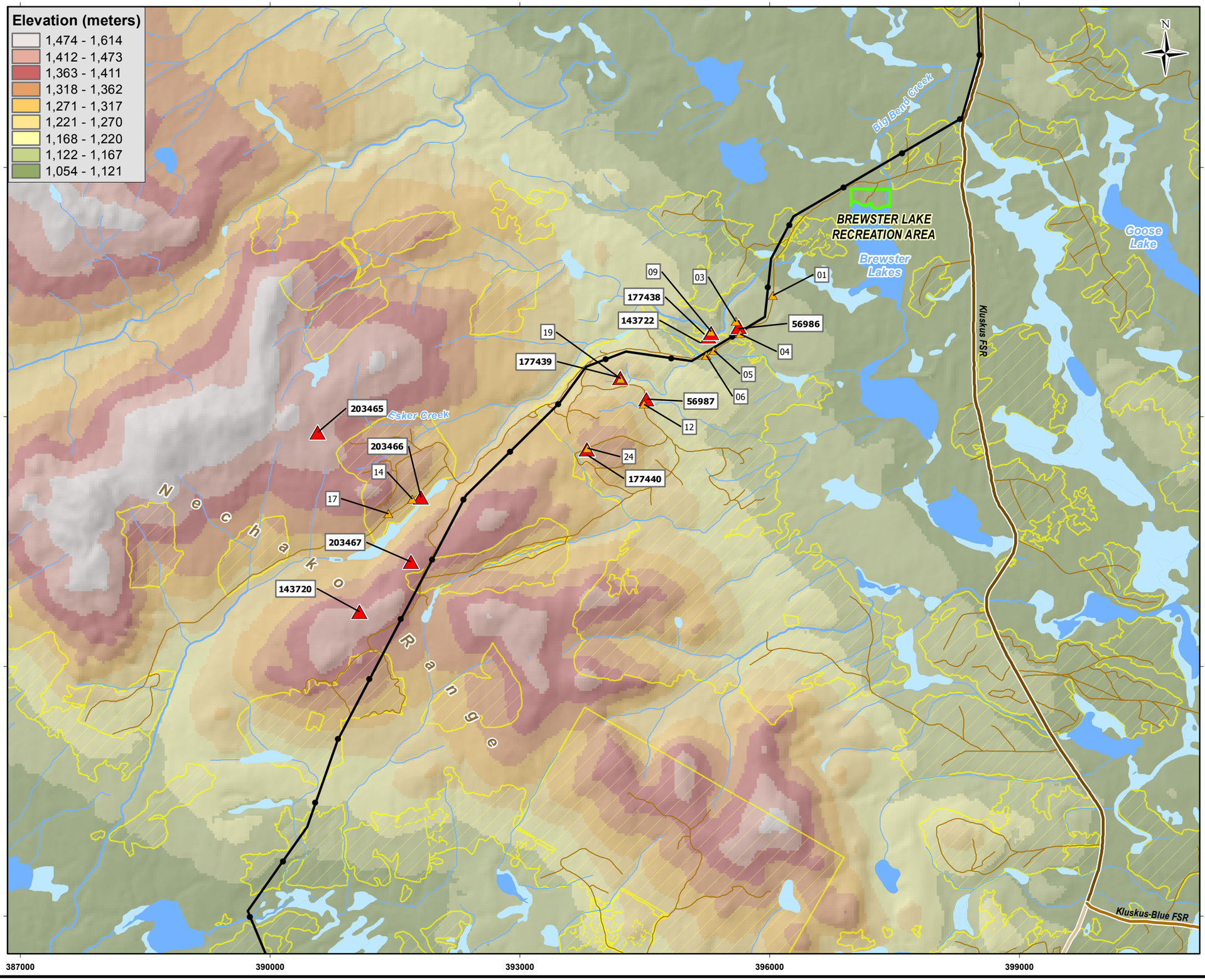
3.1.1 Objectives

The Project Palaeontological Baseline Study determined that the only area within the RSA and LSA where heritage resources (fossils) were at risk during Project construction was a portion of the proposed transmission line where it closely follows Brewster Road (**Figure 3.1-1**). It was subsequently recommended in the baseline study that a field assessment be conducted with the objective being to relocate and document the existing ten fossil sites and recommend proper measures to insure that the fossil sites are protected from disturbance during transmission line construction.

3.1.2 Methodology

In order to locate the ten known fossil sites, their approximate locations were uploaded to a Garmin Montana 650 GPS handheld unit. The field inspection was conducted on 4 and 5 June 2013 via vehicle and pedestrian reconnaissance and focused on road cuts, small quarries and small nearby stream cuts along and adjacent to the proposed transmission line

ROW. Three fossil sites (C-203465, C-203467, and C-143720) were inaccessible to due impassable road conditions such as large deadfall and major washouts. Field time limitation prevented access to these sites via pedestrian reconnaissance. The inspection track and key waypoints were recorded with the waypoints and the approximate fossil site locations being shown in **Figure 3.1-2** and **Figure 3.4-1.**



Legend

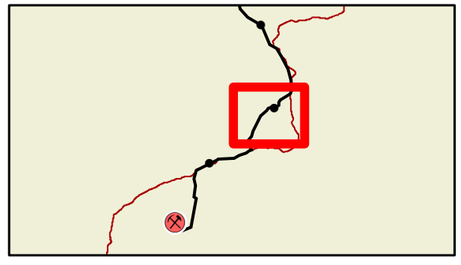
- Known Fossil Sites
- Waypoints
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Existing Road
- Stream
- Wetland
- Waterbody
- Recreation Area
- Forest Cut Block

Project Components

- Proposed Transmission Line

Elevation (meters)

- 1,474 - 1,614
- 1,412 - 1,473
- 1,363 - 1,411
- 1,318 - 1,362
- 1,271 - 1,317
- 1,221 - 1,270
- 1,168 - 1,220
- 1,122 - 1,167
- 1,054 - 1,121



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0 250 500 1000 1500

Meters

Reference

BC Government GeoBC Data Distribution
Nechako NATMAP Project: A suite of geoscience information for central British Columbia Struik, L.C., MacIntyre, D.G. and Williams, S.P. GSC Open File 5623 - BCMEMPR Open File 2007-10

CLIENT: newgold

PROJECT: Blackwater Gold Project

Approximate Location of Known Fossil Sites Situated Near the Proposed Transmission Line in the Nechako Range

DATE:	ANALYST:	**Figure** 3.1-1
April, 2014	WR	
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GIS FILE: 16-100-069_PaleoNechakoPTL_v4topography.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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392000 394000 396000 398000

5922000 5920000 5918000

N

Big Bend Creek

Brewser Lake Road

Brewster Lakes

Esker Creek

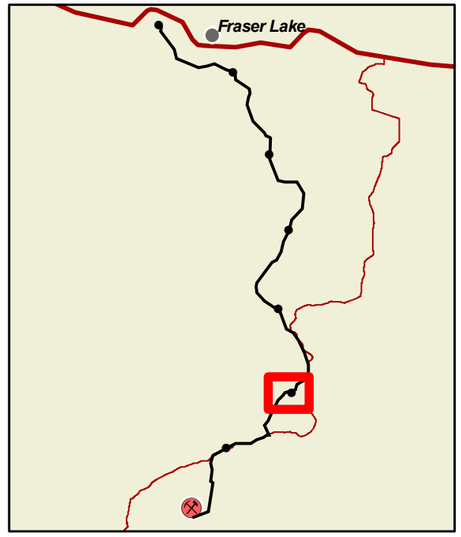
Kluskus FSR

Nechako Range

203465 203466 203467 143720

177438 143722 177439 56987 177440 56986

01 03 04 05 06 09 12 14 17 19 24



Scale: 1:26,000

0 250 500 1000

Meters

Legend

- Known Fossil Sites
- Waypoints
- Kluskus FSR
- Logging Road
- Contour (20 m)
- Stream
- Proposed Transmission Line

Reference

BC Government GeoBC Data Distribution
Google Earth

CLIENT: newgold

PROJECT: Blackwater Gold Project

Approximate Location of Known Fossil Sites and Assessment Waypoints near the Proposed Transmission Line

DATE:	ANALYST:	Figure 3.1-2
April, 2014	WR	
JOB No: VE52277	QA/QC: MY	PDF FILE: 16-100-069_PaleoNechakoPTL_OrthoNechako.pdf
GIS FILE: 16-100-069_PaleoNechakoPTL_OrthoNechako.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

Y:\GIS\Projects\VE\VE52095_Richfield_BlackwaterMapping\16_archaeology\EIA\16-100-069_PaleoNechakoPTL_OrthoNechako.mxd

3.2 Results

The Interior Plateau physiographic region in central BC is covered with a widespread and thick mantle of glacial drift including till, glacio-fluvial sediments and glacio-lacustrine sediments (Levson and Giles, 1997). However, the area assessed in this report is transected by a number of access (mainly logging) roads, cut blocks, small quarries and tributary water courses that have created bedrock exposures of varying degree and a number of these were assessed in this report. A northeast to southwest traverse was made along and adjacent to the proposed transmission line ROW and the sites assessed will be discussed in that order.

Gravels, likely of glacio-fluvial origin were observed at waypoint 1 which was the initial road cut assessed (**Annex 8**, **Plate 1**). The first indication of the presence of exposed bedrock were the medium to dark gray shale, siltstones and fine-grained sandstones noted at disturbed and possibly quarried road cuts at waypoints 4, 5 and 6 (**Annex 8**, **Plate 2**). A fragment of the bivalve *Pleuromya sp* (T. Poulton, personal communication, 22 July 2013) of Middle Jurassic (Bathonian to Callovian) age was collected from unconsolidated material likely weathered out of an adjacent road cut (**Annex 8**, **Plate 3**).

A traverse was then made to a stream (Esker Creek) cut observed at waypoint 9. Alternate lenses of medium to dark gray thin platy shale (**Annex 8**, **Plate 4**) overlie more massive siltstone and fine grained sandstone (**Annex 8**, **Plate 5**) at this location. Small, linear trace (or plant) fossils were observed in the thinner shale layers (**Annex 8**, **Plate 6**).

One of the more extensive areas in terms of bedrock exposure is situated at waypoint 19 along a road cut and adjacent steep valley wall of a Brewster Lake tributary. Present are thick intervals of bedded chert-pebble conglomeratic (**Annex 8**, **Plates 7** and **8**), sandstone, siltstone and medium to dark gray fissile shale. The only fossil material observed at this site were rare trace fossils occurring in the shale intervals (**Annex 8**, **Plate 9**). Disturbed shale and Quaternary gravels were observed at waypoint 12 at a road cut approximately 300 m southeast of waypoint 19 (**Annex 8**, **Plate 10**). A small exposure of medium to dark gray fissile shale was also noted in a reseeded cut block at waypoint 24 (**Annex 8**, **Plate 11**).

A quarried area was observed at waypoint 17 consisting of predominately medium to dark gray fissile shale with occasional thin dark gray siltstone and sandstone and conglomerate (**Annex 8**, **Plate 12 Figure A**). Two indeterminate fossils were found in a shale unit and are awaiting identification (**Annex 8**, **Plate 12 Figures A** and **B**). A disturbed interval of dark gray shale and siltstone and Quaternary gravels was observed at waypoint 14, approximately 200 m to the east of the quarried area.

3.3 Discussion

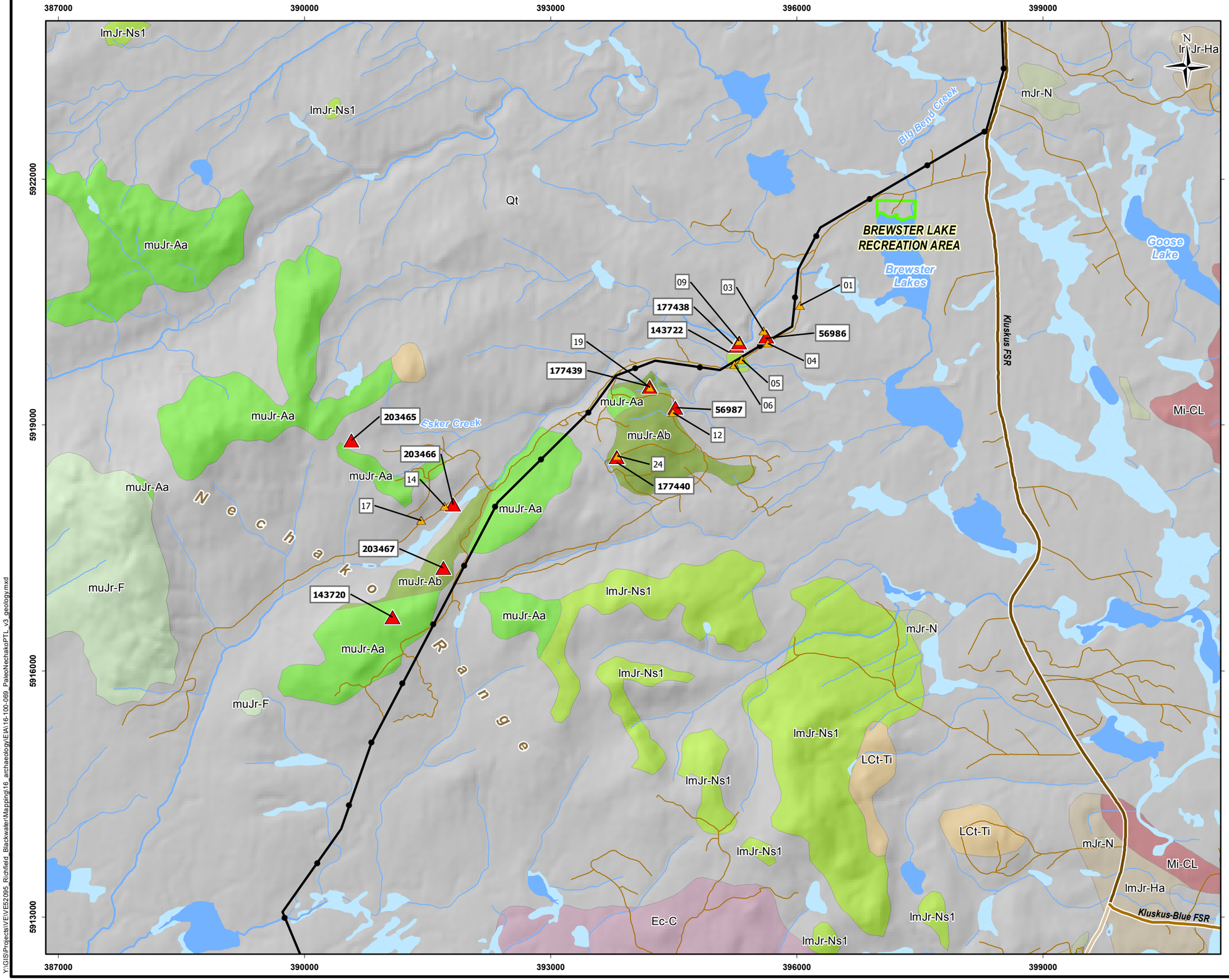
Although the original focus of the assessment was the relocation of known fossil sites within and immediately adjacent to the proposed transmission line ROW, it became apparent

during field assessment that the site locations were approximate at best as is often the case with pre-GPS location descriptions.

All sites examined in this baseline report contained in-situ or disturbed bedrock of the Middle to Upper Jurassic (Bathonian to Callovian) Ashman Formation except for waypoint 1, which solely contained Quaternary gravels, likely of glacio-fluvial origin. The Ashman Formation in this portion of the Project Area consists predominantly of thick intervals of bedded chert-pebble conglomerate with associated layers of sandstones, siltstones and shale. Relatively sparse fossil material was observed throughout the thin-bedded, often fissile shale. The geological observations are consistent with the Geological Map of British Columbia (Struik and McIntyre, 1997) except for those locations, such as at waypoints 14 and 17 that may not have been utilized or known prior to the maps' construction.

3.4 Conclusion

The results of this assessment in conjunction with work by prior researchers confirm the presence of Ashman Formation bedrock within and immediately adjacent to the proposed transmission line ROW associated with the Project. A majority of the fossils described from this area are fragmental and/or indeterminate in part due to their preservation in thinly bedded shale.



Legend

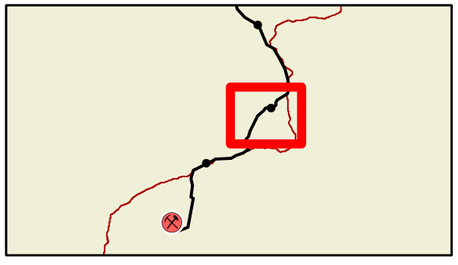
- Known Fossil Sites
- Waypoints
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Existing Road
- Stream
- Wetland
- Waterbody
- Recreation Area

Project Components

- Proposed Transmission Line

Surficial Geology Units

- Ec-C
- lmJr-Ha
- lmJr-Ns1
- LCt-Ti
- Mi-CL
- mJr-N
- muJr-Aa
- muJr-Ab
- muJr-F
- Qt
- uCt-K



Scale: 1:45,000

0 250 500 1000 1500

Meters

Reference

BC Government GeoBC Data Distribution
Nechako NATMAP Project: A suite of geoscience information for central British Columbia Struik, L.C., MacIntyre, D.G. and Williams, S.P. GSC Open File 5623 - BCMEMPR Open File 2007-10

CLIENT: newgold

PROJECT: Blackwater Gold Project

Approximate Location of Known Fossil Sites and Assessment Waypoints near the Proposed Transmission Line Overlain with the Geological Map of British Columbia

DATE:	ANALYST:	Figure 3.4-1
April, 2014	WR	
JOB No: VE52277	QA/QC: MY	PDF FILE: 16-100-069_PaleoNechakoPTL_v3_geology.pdf
GIS FILE: 16-100-069_PaleoNechakoPTL_v3_geology.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

Y:\GIS\Projects\VE\VE52095 Richfield_Blackwater\Mapping\16_archaeology\EA\16-100-069_PaleoNechakoPTL_v3_geology.mxd

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Annexes

Annex 1
Previous Archaeological Studies

Table 1-1: Summary Information about Previous Archaeological Studies Reported within the Study Region

Year	Investigator(s)	Affiliation	Project Title	Sites Recorded (Re-visited)	Developments	Permit #	Permit holder
1951-1952	Charles Borden	University of British Columbia	Preliminary Survey of the Nechako Reservoir, West Central BC	GaSd-2	Hydroelectric developments	non-permit	N/A
1971	Alan Carl, Grant Keddie	BC Provincial Museum	Provincial Museum Archaeological Survey of Parks and Recreation Reserves: Summer 1971	FlSa-2	Parks and Recreation Reserves	1971-30	Abbott
1974	James Pike	Archaeological Sites Advisory Board (ASAB)	Heritage Resource Investigations along Proposed BC Hydro and Power Authority transmission line Right-of-Ways - Summer 1974	GdSu-1	Hydro survey	1974-1	Simonsen
1975	Abbey Bates & Olivia Scott	ASAB	Heritage Resource Investigations of Proposed BC Hydro and Power Authority transmission lines in the Central Interior	FkRr-2, 3, 4	Transmission lines	1975-7	
1977	Kathryn Bernick, Carol Clark	ASAB	ASAB Interior Historic Survey Department of Highways Archaeological Survey - North	GaSd-8	Inventory of fur trading posts	1977-17	Simonsen
1977	Alexander Mackie, Kevin Montgomery	ASAB	Department of Highways Archaeological Survey - North	FlRv-4	Highway developments	1977-17	Simonsen
1978	John McMurdo	ASAB	Archaeological Investigations in the Omineca-Peace Resource Management Region	GaSa-10	Various land developments	1978-7	
1982	Susan Irvine	Heritage Conservation Branch	Skeena and Omineca-Peace Heritage Impact Assessment Survey	GbSk-4	Various land developments		
1982	Martin Magne	Aresco Ltd. (Aresco)	Heritage Resource Impact Assessment: Williston - Telkwa Second 500 kV transmission line	(FkRq-1, FkRr-4) GaSf-6, 8, 9, 10, 11 GcSl-2 GaSh-1	Transmission line	1982-30	Magne
1984	Michael Cranny, Kathleen Fitzpatrick	Heritage Conservation Branch	Nechako-Stuart Archaeological Survey	FlRv-7, 21, 22, 23	Provincial archaeological survey	1984-21	Cranny
1987	David Burley, Charles Bishop, Arthur Ray	Simon Fraser University	British Columbia Land Based Fur Trade Project	GaSd-3	Research	1986-16	Burley
1990	Jean Bussey, Arne Carlson	Points West Heritage Consulting (Points West)	Archaeological Inventory and Impact Assessment of Five Proposed Highways Projects in the Skeena, Lakes and Nechako Districts, BC	(GaSd-2, 10, 11)	Highway developments	1990-72	Carlson
1995	Arne Carlson, Lesley Mitchell	Traces Archaeological Research and Consulting Ltd. (Traces)	Results of an Archaeological Survey on the Nechako Plateau, Central Interior BC	GaSd-12	Site inventory in the Vanderhoof FD	1993-63	Carlson
1996	Arne Carlson	Traces	Archaeological Inventory Surveys of Several Localities in the Upper Nechako River Drainage, BC	GaSe-25	Site inventory in the Vanderhoof FD	1995-146	Carlson
1997	Arne Carlson	Traces	1996 Archaeological Impact Assessments of Forest Industry Developments in the Vanderhoof Forest District	GaSe-12	Forestry developments	1996-99	Carlson
1996	Arne Carlson	Traces	1996 Archaeological Inventory Surveys of Several Localities in the Vanderhoof Forest District	GaSe-13 and 14	Forestry developments	1996-175	Carlson
1997	Arne Carlson	Traces	Archaeological Inventories, Impact Assessments, and Reconnaissance Surveys of Woodlots in the Vanderhoof Forest District	FlRu-4, 5, GaSc-3, GaSd-19, GaSe-21, 22	Forestry developments	1997-159	Carlson
1999	Arne Carlson, Paul Prince	Traces	1997 Archaeological Inventory and Impact Assessments of Proposed Fraser Lake Sawmills Logging Operations in the Lakes And Vanderhoof Forest Districts	FlSe-6	Forestry developments	1997-198	Carlson
2000	Nicole Jackman	Arcas	Archaeological Inventory & Impact Assessments of Proposed Small Business Enterprise Program Logging Operations in the Vanderhoof Forest District	FlRw-11, 12 GaSe-27, 28, 29	Forestry developments	1999-175	Howe
2005	Frank Craig & Nicole Jackman	Traces	Archaeological Assessments of Proposed Forestry Developments in the Vanderhoof Forest District	FlRv-21, 22, 23, 29, 30, 31, 34, 35, 36, 37	Forestry developments	2004-87	Craig
2006	Frank Craig & Nicole Jackman	Traces	Archaeological Impact Assessments of Proposed Developments in the Nadina Forest District; Permit Report	GcSn-3 GcSm-13	Forestry developments	2005-95	Craig
2006	Frank Craig & Nicole Jackman	Traces	Final Report For AIAs of Proposed Forestry Developments In the Vanderhoof Forest District	FlRv-49-73	Forestry developments	2005-118	Craig
2007	Frank Craig, Nicole Jackman	Traces	Archaeological Assessments of Proposed Forestry Developments in the Vanderhoof Forest District - Volume 1	FlRv-75 – 83 FlRv-66, 71, 72 GcSd- 23 – 41	Forestry developments	2006-96	Craig
2007	Kelli Watson, Normand Canuel	Norcan	Archaeological Impact Assessments of Various Proposed Forestry Operations In the Vanderhoof Forest District - 2006	GaSe-12	Forestry developments	2006-100	Canuel
2008	Frank Craig, Nicole Jackman	Archer CRM Partnership (Archer)	Archaeological Assessments Of Proposed Ministry Of Transportation Developments Within Transportation Regions Northern (3), Fort George (9, 19), Nechako (23), Robson (20), Bulkley-Stikine (10) And Lakes (24).	GaSd-2 and 10	Highway developments	2006-209	Craig
2011	Nicole Jackman	Archer	Archaeological Assessments for the Ministry of Transportation and Infrastructure, Northern Region, Service Areas Nechako (23), Fort George (19), & Robson (20)	GaSe-25 and 35	Highway developments	2008-253	Jackman

Annex 2
Archaeological Excavations

Table 2-1: Archaeological Excavations in North Central BC (NTS Map Unit: 93 F. 93G, 93K)

Year	Investigator(s)	Affiliation	Project/Report Title	Results Summary	Permit #	Map Unit
1950	Charles Borden	University of British Columbia	Results of Archaeological Investigations in Central BC	Describes result of excavation of a house at the Chinlac (GaRv-1) site and the survey of adjacent area; Borden attributes Chinlac to Carrier occupation, and further concludes based in part on Natalkuz Lake (FiSi-19) site that Salish people once lived farther north than they did at beginning of historic period.	Non-permit	93 F; 93 G
1970 1971	Paul Donahue	University of Wisconsin	Excavations at Algatcho and Tezli on the Central Interior Plateau of BC	Test pits and trenches of varying sizes excavated. Algatcho (FfSk-1) is attributed to Carrier occupation post-1850, while five of 38 circular depressions at Tezli (FgSd-1) suggest ancestral Carrier, up to 2000 years in age.	1970-4	93 F
			Preliminary Report: Excavations at Tezli (FgSd-1), BC	Trench excavation; 68 m^2 excavated at FgSd-1, resulting in recovery of 1,030 artifacts and identification of 43 features. Concluded that Tezli was intermittently occupied over 2000 years in three separate occupations; two parallel rows of pithouses (A.D. 500), a second pithouse occupation (A.D. 1400), and a third small summer camp assigned to the late prehistoric	1971-1	
			4500 Years of Cultural Continuity on the Central Interior of BC	PhD dissertation provides an overview of research in the central interior and describes excavations at Tezli; similar lifestyle to Fraser and Columbia plateau people inferred.		
1973 1974	Knut Fladmark	Simon Fraser University (SFU)	Punchaw Village: A Preliminary Report on the Archaeology of a Prehistoric Settlement.	Excavations at FiRs-1, plus a survey of surrounding area which identified 40 sites. Forty-three house platforms and 57 storage pits identified in the site, visited by Alexander Mackenzie. One complete house platform excavated and one partial platform completely excavated; one or two 2 m x 2 m units placed in another three platforms and one storage pit. Earliest dated occupation 4000 years B.P. from a burial; latest major occupation between 1700 and 1800 A.D.	1973-8	93 G
	Pamela Wilson & James Helmer	SFU and University of Calgary	The Punchaw Lake Site (FiRs-1): A Progress Report on the 1974 Field Season	Full excavation of four house platforms in 2m x 2 m units planned, but due to funding less excavated. Fauna and lithics numbering 3,300 recovered. Compared artifact density and type between two house platform clusters, concluded much of the site's use was in the last 250 years and earlier dates are anomalous.	1974-20	
	Pamela Montgomery	SFU	Stone Artifacts from the Punchaw Lake Site (Area C)	Montgomery M.A. thesis		
1972	Douglas Hudson	New Caledonia College	Report of Excavations at Nadsilnich Lake (West Lake) BC in August 1972	Salvage excavation of a 1 m x 2 m unit and two 1 m x 1 m units at FkRr-1 yielded a small number of artifacts dated to before 1800 A.D. Storage and cooking pits present; site inferred to be a cooking or hunting camp.	1972-34	93 G
1971 1972	Don Harris	Parks Canada	The Archaeological Excavations at the Site of Fort St. James, BC	Excavations at the perimeter fence, boardwalks, men's house, trade store, and other features of the 1806 HBC Fort St. James site (GcSb-9).	1972-14	93 K
1978	Stephen Lawhead	HCB	Salvage Archaeology Project May-August 1978	GcSb-7 on Fir Island at headwaters of Stuart River excavated prior to housing construction. Eight of 341 cultural depressions tested and five 1m x 1m units placed in between depressions. Low artifact density; depressions assumed to be food storage pits; two occupations inferred.	1978-9	93 K
1987	Mark Skinner	SFU	Analysis of Human Skeletal Remains (6-I6) from the Nechako/Hautley River Confluence	Remains of a very aged adult male found near several cultural depressions at GaSd-3. Associated obsidian flake and basalt flakes not obvious grave goods, but the burnt fragments of a middle-aged adult male cranium likely area.	1987-2	93 K
1996	Arne Carlson	Traces Archaeological Research and Consulting	1996 Archaeological Investigations at Sites FjSf-30, 61, 102, 155 & FkSf-11 in the Nechako Canyon Vicinity.	Habitation sites FjSf-61, FjSf-155, multi-occupational 102, and two sites with buried cultural deposits are excavated. Study concludes it is a preliminary step towards understanding site variability in the Nechako Plateau.	1996-197	93 F
2006 2007	Aidan Burford, Ainslie Cogswell, Nicole Jackman	Archer CRM Partnership	Archaeological Investigations at Site FlRq-13 on the Fraser River in Prince George, BC An Early Cordilleran Assemblage from the Nechako-Fraser Basin	More than 31,000 artifacts recovered from 185.75 m^2 excavations in advance of highway redevelopment at FlRq-13. Two components identified, one as old as 8200 BP, another ~500 BP.	2006-416	93 G

Annex 3
Summary of Archaeological Sites within the Mine Site LSA

Table 3-1: Summary of Archaeological Sites within the Mine Site Local Study Area

Site No.	Environmental Setting	Type	Recorded Visits
FgSg-5	Undulating, undifferentiated terrain	CMTs	2000
FgSg-6	Along a wide shallow stream adjacent to a wetland	CMT	2000
FgSg-11	Low knoll at the edge of Matthew's Creek wetland	Artifact scatter	2004
FgSg-12	Knoll along Matthew's Creek, extending into a wetland	Cultural depression, artifact scatter	2004
FhSe-52	Between kettle and northern shores of Snake Lake	Artifact scatter	2002
FhSe-53	High bank on the northern shores of Snake Lake	Artifact scatter	2002
FhSe-54	Small bowl on the northern shores of Snake Lake	Artifact scatter	2002
FhSe-55	Esker on the northern shores of Snake Lake	Artifact scatter	2002

Annex 4
Summary of Archaeological Sites within the Transmission Line LSA

Table 4-1: Summary of Archaeological Sites within the Transmission Line Local Study Area

Site No.	Environmental Setting	Type	Recorded Visits
FhSe-35	Several esker features	CMTs	1999
FhSe-43	Parallel to the north shore of Tatelkuz Lake	CMTs, trail	2000, 2001
FhSe-59	Not reported	Cache pits	2002
FhSe-60	Not reported	Cache pit, artifact scatter	2002
FiSd-1	Low lakeshore bench	Cache pit, artifact scatter	1996, 2005
FiSd-13	Creek bank	CMTs	2005
FkSc-8	Bottom of a gentle slope	Trail	2003, 2010
FlSb-15	Undifferentiated, rolling terrain	CMTs	1997
FlSb-17	Undulating plateau	CMTs	1997
FlSb-35	Undulating terrain east of stream gully	CMTs	1997
FlSb-51	Terrace above unnamed creek	Artifact scatter	1998
FlSb-53	Undulating glacial groove and ridge terrain	CMTs	1997
FlSb-57	Bank above ephemeral stream.	Cache pit, artifact scatter	2004

Annex 5
Summary of Archaeological Sites within the Mine Site RSA

Table 5-1: Summary of Archaeological Sites within the Mine Site Regional Study Area

Site No.	Environmental Setting	Type	Recorded Visits
FgSd-13	Lodgepole pine forest west of wagon trail	Cultural depression	1979
FgSd-17	North shore of Upper Kluskus Lake, on and near wagon road	Cache pits, artifact scatter	1979
FgSd-18	On either side of the Messue Wagon Trail	CMTs	1999, 2000
FgSd-19	Nearly level south-facing glacial deposit	CMTs	2000
FgSd-20	Nearly level south-facing glacial deposit	CMTs	2000
FgSd-21	Rolling glacial deposits	CMTs	2000
FgSd-22	Slope extending towards lake shore	Artifact scatter	2000
FgSd-23	Glacial deposits in a small outwash area south of Kuyakus Lake	Cache pits, artifact scatter	2000
FgSd-24	Terrace like glacial deposits	Cache pits, artifact scatter	2000
FgSd-25	Glacial outwash in high terrain between Kuyakuz and Euchiniko lakes	Cache pit	2000
FgSd-26	Not reported	CMT	2000
FgSd-27	Bench on north side of Kuyakuz Lake	Cache pit	2000
FgSd-28	High bank on north side of Kuyakuz Lake	Cache pit, hearth, artifact scatter	2000
FgSd-29	Bank of an unnamed stream	Cache pit	2001
FgSd-31	Low bench along flood plain of unnamed stream	Artifact scatter	2001
FgSd-47	Esker	Cache pits	2003
FgSd-48	Lake terrace	Cache pit, artifact scatter	2003
FgSd-49	Low benches with northern aspect	Cache pit	2003
FgSd-50	Lake terrace with northern aspect	Cache pit, artifact scatter, CMT	2004
FgSd-51	Undifferentiated terrain across lake terraces	Cache pits, artifact scatter, CMT	2003
FgSd-53	Valley edge	Artifact scatter	2004
FgSd-69	North bank of Kluskus Creek, along north shore of Squirrel Lake, continuing west, along the south side of the Blackwater River	Alexander Mackenzie Heritage Trail/Nuxalk - Carrier Grease Trail: Squirrel Lake Section	N/A
FgSe-1	Low bank, overlooking a small wetland	Cabin	2000
FgSe-2	Southwest along the Kushya River, following terrain between Tsacha Lake and Twin Lakes, and south of the Blackwater River	Alexander Mackenzie Heritage Trail/Nuxalk - Carrier Grease Trail: Twin Lakes Section	N/A
FgSf-1	West end of Tsacha Lake	Housepits	1970
FgSf-2	West end of Tsacha Lake	Canoes	1970
FgSf-3	South shore of Tsacha Lake, near creek and overlooking a wetland	Cache pit, artifact scatter	1979, 1986
FgSf-6	Flood plain on north bank of Blackwater River	Cultural depression, artifact scatter	2000
FgSf-7	Shore terrace of Adrian Lake, with basalt outcrops along its length	Artifact scatter	2000
FgSf-8	Blackwater floodplain, west of Tsacha Lake, upslope to Tommy Lakes	Trail, artifact scatter	2000
FgSf-9	This portion of the trail follows the southeast shore of Tsacha Lake	Alexander Mackenzie Heritage Trail/Nuxalk - Carrier Grease Trail: Tsacha Lake Section	N/A
FgSg-1	Flat to undulating terrain along east end of lake	Artifact scatter, CMT	2000, 2004
FgSg-2	Small point of land that projects into lake	Cache pits, artifact scatter	2000, 2004
FgSg-3	Small, flat terrace on south side of a creek	Artifact scatter	2000
FgSg-4	Undifferentiated hummocky terrain	Cultural depression	2000
FgSg-5	Gradually undulating, undifferentiated terrain	CMTs	2000, 2006
FgSg-6	Undifferentiated terrain, along a shallow ephemeral stream	CMTs	2000
FgSg-8	Knoll and terrace surrounded by meadows	Cache pit, artifact scatter	2001

Site No.	Environmental Setting	Type	Recorded Visits
FgSg-9	Open flat rise on the west shore of Adrian Lake	Artifact scatter	2001
FgSg-10	Slight prominence along west edge of Matthew Creek wetlands and meadows	Artifact scatter	2004
FgSg-11	Low elongated knoll at edge of Matthew's Creek wetland	Artifact scatter	2004
FgSg-12	Elongated knoll along Matthew's Creek, extending into wetland	Cultural depression, artifact scatter	2004
FgSg-13	North bank of Matthew's Creek	Artifact scatter	2004
FgSg-14	Knoll overlooking Tommy Lakes	Cache pit	2004
FgSg-15	Esker feature overlooking Tommy Lake	Cache pit	2004
FgSg-16	Terrace edge overlooking Tommy Lake	Cache pit	2004
FgSg-17	Terrace edge overlooking Tommy Lake	Cache pit	2004
FgSg-18	Bench along lake shore	Cache pits, artifact scatter, trail, CMTs	2004
FgSg-19	Terrace overlooking Tommy Lake	Artifact scatter, trail	2004
FgSg-20	Bank and isolated knolls	Housepit, cache pit, artifact scatter, trail,	2004
FgSg-21	Small benches on a steep westerly aspect	Cache pits	2004
FgSg-22	Terrace overlooking Tommy Lake	Cache pit	2004
FgSg-23	Bank overlooking lake	Trail	2004
FgSg-24	Terrace an point overlooking a small lake	CMTs, artifact scatter	2010
FgSh-13	Upper bench along north margin of Williamson Lake	Cache pits, artifact scatter	2000, 2001
FgSh-14	Upper bench along north margin of Williamson Lake	Cache pit	2000, 2001
FgSh-35	Edge of a broad flat terrace	Artifact scatter, CMTs	2001
FgSh-36	Two high knolls overlooking a river channel	Cache pits, artifact scatter, CMTs	2001
FgSh-42	Point of forested land protruding into a large meadow north of Naglico Lake	Cache pit	2001
FgSh-45	Low wet rocky bench along north margin of Williamson Lake	Artifact scatter	2001
FgSh-46	High bedrock knoll jutting into a lake	Artifact scatter	2001
FgSh-47	North shore of Naglico Lake, extending into a large meadow	Cache pits, artifact scatter, CMTs	2001
FgSh-48	Northern bank of an unnamed creek	Artifact scatter, CMT	
FhSd-1	West bank of stream on north end of Kuyakuz Lake	Fishing weir, cultural depressions, Housepits, Artifact scatter, trail, petroform	1971, 2002
FhSd-2	Southern shore of Tatelkuz Lake	Cache pit	1978
FhSd-3	Dominant point which forms the southern border of the narrowest point of Tatelkuz Lake.	Artifact scatter	1978
FhSd-4	Tatelkuz Lake	Cache pit, artifact scatter	1978
FhSd-5	South side of Tatelkuz Lake	Housepits, cache pits, artifact scatter, CMTs, trail	1978, 2001
FhSd-6	Shore of Tatelkuz Lake	Cache pit	1978
FhSd-7	Shore of Tatelkuz Lake	Cache pits	1978, 2001
FhSd-8	High ridge of an esker system on shore of Tatelkuz Lake	Cache pit	1978
FhSd-9	Point along southern shore of Tatelkuz Lake, at its eastern end	Cache pit, artifact scatter	1978, 2001
FhSd-10	Northern side of point along shore of Tatelkuz lake	Cache pit	1978
FhSd-11	Shore of Tatelkuz Lake	Artifact scatter	1978
FhSd-12	Northern shore of Tatelkuz Lake	Artifact scatter	1978
FhSd-13	At narrows of eastern end of Tatelkuz Lake	Cache pits	1978
FhSd-14	Small promontory along north shore of Tatelkuz Lake	Cache pit	1978
FhSd-15	North shore of Tatelkuz Lake	Cache pits	1978
FhSd-16	North shore of Tatelkuz Lake	Cache pits	1978

Site No.	Environmental Setting	Type	Recorded Visits
FhSd-18	Sloping land at edge of glacial valley south towards Tatelkuz Lake	CMTs	1996
FhSd-19	West slope of Kuyakus Mountain	CMTs	1999
FhSd-20	High flat terrace south of Tatelkuz Lake	Housepit, cache pits, artifact scatter	2001
FhSd-21	South bank of Tatelkuz Lake	Housepit	2000
FhSd-22	High bank west of Tatelkuz Lake	Housepit, cache pit	2001
FhSd-23	Low esker west of Tatelkuz Lake and north of a small wetland	Cache pits, artifact scatter	2001, 2002
FhSd-24	Bank west of Tatelkuz Lake	Cache pits, artifact scatter	2000, 2002
FhSd-25	Across two high terraces facing Tatelkuz Lake	Cache pits, CMTs	2001
FhSd-27	High terrace southwest of Tatelkuz Lake	Cache pits, hearth, artifact scatter, CMTs	2001, 2002
FhSd-28	Upper terrace along the southwest margin of Tatelkuz Lake, adjacent to a low-lying boggy area	Housepits, cache pit	2001
FhSd-29	South bank of Tatelkuz Lake	Housepit	2001
FhSd-30	West of Tatelkuz Lake	Cache Pit	2001
FhSd-32	Southeast side hill of an east-west running esker	Cache pit	2001
FhSd-33	Bench looking east to Tatelkuz Lake	Cultural depression	2001
FhSd-34	Bench looking east to Tatelkuz Lake	Housepit	2001
FhSd-35	North-south trending esker	Cache pits	2001, 2002
FhSd-36	Flat, undifferentiated terrain	Cache pit	2001
FhSd-37	Bench looking east to Tatelkuz Lake	Cache pits	2001
FhSd-38	Low knoll	Cache pit	2001
FhSd-39	Terrace at the toe of slope on second bench of Tatelkuz Lake	Cache pit	2001
FhSd-40	Short esker on second bench inland from Tatelkuz Lake	Housepit, cache pit, artifact scatter	2001, 2002
FhSd-41	Low bank of a shallow east-tending draw	Housepit	2001
FhSd-42	West of an ephemeral stream near Tatelkuz Lake	Cache pit	2001
FhSd-43	East of an ephemeral stream on southern shore of Tatelkuz Lake	Housepits, cache pit, artifact scatter, CMTs (Messue trail)	2001
FhSd-44	Tatelkuz Lake	Cache pits, artifact scatter	2001
FhSd-45	Tatelkuz Lake	Artifact scatter, CMT (Messue trail)	2001
FhSd-46	Tatelkuz Lake	Housepits, cache pits, artifact scatter, CMTs (Messue trail)	2001
FhSd-47	Tatelkuz Lake	Cache pits, CMTs (Messue trail)	N/A
FhSd-48	Tatelkuz Lake	Housepits, cache pits, artifact scatter (Messue trail)	2001
FhSd-49	Tatelkuz Lake	Housepits, cache pits, artifact scatter (Messue trail)	2001
FhSd-50	Tatelkuz Lake	Artifact scatter	N/A
FhSd-51	Tatelkuz Lake and Chedakuz Creek	Cache pit, CMT (Messue Trail; arbourglyph)	2002
FhSd-57	Tatelkuz Lake	CMTs	2002
FhSd-58	Chedakuz Creek Tatelkuz Lake	Cache pits, artifact scatter	2002
FhSd-59	Tatelkuz Lake	Cache pit, artifact scatter	2002
FhSd-60	Tatelkuz Lake	Artifact scatter	2002
FhSd-61	Tatelkuz Lake	Housepit	2002
FhSd-62	Tatelkuz Lake	Cache pits	2002
FhSe-1	End of a ridge on Tatelkuz Lake	Cache pits	1978
FhSe-2	Southwest shore of Tatelkuz Lake	Cache pit, cultural depression	1978
FhSe-3	Ridge on the south shore of Tatelkuz Lake	Cultural depression	1978
FhSe-4	Esker formation on southern shore of Tatelkuz Lake	Cache pit	1978

Site No.	Environmental Setting	Type	Recorded Visits
FhSe-5	Esker formation on southern shore of Tatelkuz Lake	Cache pit	1978
FhSe-6	Southern shore of Tatekuz Lake	Artifact scatter	1978
FhSe-7	Southern shore of Tatelkuz Lake	Cache pits	1978
FhSe-8	Promontory on southern shore of Tatelkus Lake	Cache pit, artifact scatter	1978
FhSe-9	Southern shore of Tatelkuz Lake	Cultural depressions	1978
FhSe-10	Promontory bordering stream on southern shore of Tatelkuz Lake	Cache pits	1978
FhSe-11	Southern shore of Tatelkuz Lake	Cache pit	1978
FhSe-12	Inland some from west end of Tatelkuz Lake	Artifact scatter	1978
FhSe-13	Inland from northwest end of Tatelkuz Lake	Cache pit	1978
FhSe-14	Small promontory on northern shore of Tatelkuz Lake	Cache pit	1978
FhSe-15	North shore of Tatelkuz Lake	Cache pit	1978
FhSe-16	North shore of Tatelkuz Lake	Cache pit	1978
FhSe-17	Promontory on northern shore of Tatelkuz Lake	Cache pits	1978
FhSe-18	Small rise of land on north shore of Tatelkuz Lake	Cache pits, artifact scatter, CMTs	1978, 2001
FhSe-19	West end of Tatelkuz Lake	Artifact scatter	1978
FhSe-20	At mouth of Chedakuz Creek on west end of Tatelkuz Lake	Fishing weir	1978
FhSe-21	West end of Tatelkus Lake	Artifact scatter	1978
FhSe-22	Edge of esker system along south shore of Tatelkuz Lake	Cache pits, artifact scatter	1978
FhSe-23	Inland from west end of Tatelkuz Lake	Cache pit	1978
FhSe-24	North shore of Tatelkuz Lake	Cache pits, artifact scatter	1978
FhSe-25	Edge of a terrace along north shore of Tatelkuz Lake	Cache pit	1978
FhSe-26	North shore of Tatelkuz Lake	Artifact scatter	1978, 2000
FhSe-27	North shore of Tatelkuz Lake	Cache pits	1978
FhSe-28	North Tatelkuz Lake	Artifact scatter	1978
FhSe-29	North shore of Tatelkuz Lake	Cache pits	1978
FhSe-30	Northern shore of Tatelkuz Lake	Cache pit	1978
FhSe-31	Low hill over a wetland	Cache pit	1998
FhSe-32	Southern terrace of a moderately sized unnamed creek	Artifact scatter	1998
FhSe-33	East shore of Tatelkuz Lake	Cache pits, cultural depression, artifact scatter	1999, 2002
FhSe-34	Numerous esker features	CMTs	1999
FhSe-35	Numerous esker features	CMTs	1999
FhSe-36	Northeast bank of Tatelkuz Lake	Artifact scatter	2000
FhSe-37	Low knoll situated on northeast bank of Tatelkuz Lake	Cache pits	2000
FhSe-38	Northeast bank of Tatelkuz Lake, next to ephemeral stream	Cache pits	2000
FhSe-39	Northeast bank of Tatelkuz Lake	Artifact scatter	2000
FhSe-40	Northeast bank of Tatelkuz Lake	Cache pit, artifact scatter	2000
FhSe-41	Top of the hillside on north end of Tatelkuz Lake	Cache pit	2000
FhSe-42	High ridge overlooking Messue Trail	Cache pit, artifact scatter	2000
FhSe-43	Northeast shore of Tatelkuz Lake and northern escarpment of Chedakuz Creek	CMTs (Messue Trail)	2000, 2001
FhSe-44	East facing ridge	Cache pit	2001
FhSe-45	Tatelkuz Lake	Artifact scatter	2001
FhSe-46	Tatelkuz Lake	Artifact scatter	2001
FhSe-47	Tatelkuz Lake	Artifact scatter	2001
FhSe-48	Not reported	Cache pits, housepits, artifact scatter (Messue Trail)	2001
FhSe-49	Not reported	Cache pit	2002

Site No.	Environmental Setting	Type	Recorded Visits
FhSe-50	Bank between a creek and a wetland	Cache pits, artifact scatter	2001, 2002
FhSe-51	Northern banks of a subsidiary stream of Chedakuz Creek	Artifact scatter	2002
FhSe-52	Northern shores of Snake Lake	Artifact scatter	2002
FhSe-53	Northern shores of Snake Lake	Artifact scatter	2002
FhSe-54	Northern shores of a Snake Lake	Artifact scatter	2002
FhSe-55	Northern shores of Snake Lake	Artifact scatter	2002
FhSe-56	North bank of a stream flowing into Chedakus Creek	Cache pit, artifact scatter	2002
FhSe-57	Bench	Cache pits, roasting pit	2002
FhSe-58	Bank	Artifact scatter	2002
FhSe-59	Bank	Cache pits	2002
FhSe-60	Bank	Cache pit, artifact scatter	2002
FhSe-61	East of a stream	Cache pit	2002
FhSe-62	East of a stream	Cache pit, housepit	2002, 2003
FhSe-63	Not reported	Cache pit, housepit, artifact scatter	2002, 2003
FhSe-64	Tatelkuz Lake	Cache pit	2002
FhSe-65	Tatelkuz Lake	Cache pit	2002
FhSe-66	Tatelkuz Lake	Artifact scatter	2002
FhSe-67	North of an unnamed stream.	Artifact scatter	2003
FhSe-68	Bench on bowl edge with northern aspect	Cache pits	2003
FhSe-69	Narrow bench on steep slope	Cache pit	2003
FhSe-70	Discontinuous bench	Cache pit, artifact scatter	2003
FhSe-71	Knoll overlooking trail	Cache pits	2003
FhSe-72	Ridge in undulating terrain	Cache pit	2003
FhSf-1	Bank	Cache pits, artifact scatter	2002
FhSf-2	Terrace	Cache pits	2002
FhSf-3	Gently rolling lake terrace	Artifact scatter	2004
FhSh-1	Elevated landform in the narrows of the Van Tine Creek Valley	Artifact scatter	1998

Annex 6
Summary of Archaeological Sites within the Transmission Line RSA

Table 6-1: Summary of Archaeological Sites within the Transmission Line RSA

Site No.	Environmental Setting	Type	Recorded Visits
FhSe-12	Tatelkuz Lake	Artifact scatter	1978
FhSe-31	Low hill over a wetland	Cache pit	1998
FhSe-32	Edge of a high bench above a stream	Artifact scatter	1998
FhSe-34	Numerous esker features	CMTs	1999
FhSe-35	Numerous esker features	CMTs	1999
FhSe-43	Along northeast shore of Tatelkuz Lake and northern escarpment of Chedakuz Creek	CMTs (Messue Trail)	2000, 2001
FhSe-49	Not reported	Cache pit	2002
FhSe-50	Bank between a creek and wetland	Cache pits, artifact scatter	2001, 2002
FhSe-52	Northern shores of Snake Lake	Artifact scatter	2002
FhSe-53	Northern shores of Snake Lake	Artifact scatter	2002
FhSe-54	Small bowl near lake	Artifact scatter	2002
FhSe-55	Esker over lake	Artifact scatter	2002
FhSe-57	Bench	Cache pits, roasting pit	2002
FhSe-58	Bank	Artifact scatter	2002
FhSe-59	Bank	Cache pits	2002
FhSe-60	Bank	Cache pit, artifact scatter	2002
FhSf-1	Bank	Cache pits, artifact scatter	2002
FhSf-2	Terrace	Cache pits	2002
FiSc-66	Eskers and flat topped benches forming a bay in an unnamed lake	Cultural depression, artifact scatter	2004
FiSd-1	Low lake shore bench	Cache pit, artifact scatter	1996, 2005
FiSd-5	Gentle slope terminating at shore of Brewster Lake	CMTs	2000
FiSd-6	Glacial deposits on west of Brewster Lake	Cultural depression	2000
FiSd-7	Gentle slope terminating at eastern shore of Brewster Lake	CMTs	2000
FiSd-13	South-facing creek bank.	CMTs	2005
FiSd-14	Southwest-facing terrace and knoll overlooking a small lake	Artifact scatter	2009
FjSb-16	North shore of Finger Lake	Artifact scatter	1978
FjSb-17	On a stream which empties in Finger Lake	Artifact scatter	1978
FjSb-18	At confluence of stream and northern shore on western side of Finger Lake	Artifact scatter	1978
FjSb-22	Eastern end of island in Finger Lake	Cache pit	1978
FjSb-45	Glacial deposits north of Finger Lake	CMTs (Finger Lake Trail)	1998, 2003
FjSc-1	South shore of Finger Lake	Cache pit	1978
FjSc-2	South shore of Finger Lake	Cache pit	1978
FjSc-3	Southeast corner of small bay on Finger Lake	Cache pit	1978
FjSc-4	Southern shore of Finger Lake	Cache pit	1978
FjSc-5	Island-like landform at mouth of inlet stream at western end of Finger Lake	Cache pits	1978
FjSc-6	North shore of Finger Lake	Cache pits, artifact scatter	1978
FjSc-7	Old terrace of Finger Lake	Cache pits, cultural depressions	1978
FjSc-8	South side Of Finger Creek	Cache pit	1978
FjSc-12	On both sides of a stream at its outlet into Arthur Lake	Cultural depressions, artifact scatter	2001, 2006
FjSc-13	East of an outlet of Arthur Lake	Artifact scatter	2001

Site No.	Environmental Setting	Type	Recorded Visits
FjSc-15	Terrace above creek and wetlands	Cache pits, artifact scatter	2006, 2007
FjSc-16	Not reported	Cache pit, artifact scatter	2006
FjSc-17	Flat area above wetland	Artifact scatter	2006
FjSc-18	High bench	Cache pit, artifact scatter	2006
FjSc-19	Upper bench	Cache pit	2006
FjSc-20	Bench	Cache pits, artifact scatter	2006
FjSc-21	Sloping inconsistent bench	Hearth, artifact scatter, trail	2006
FjSc-22	Narrow northeast facing bench.	Cache Pit	2006
FjSc-23	Wetland, kettle feature	Cache pits	2006
FjSc-24	Not reported	Cache pit	2006
FjSc-27	Bench north of a wetland	Artifact scatter	2007
FjSc-28	Southwest facing bench above wetland at Finnie Lake	Artifact scatter	2007
FjSc-29	Level area beside wetland at Finnie Lake	Artifact scatter	2007
FjSc-30	Bench above Finnie Lake wetland	Artifact scatter	2007
FjSc-31	Bench overlooking Finnie Lake and wetland	Artifact scatter	2007
FjSc-32	Bench facing Finnie Lake	Artifact scatter	2007
FjSc-33	Small bench facing Finnie Lake	Artifact scatter	2007
FjSc-34	Small low bench facing Finnie Lake	Artifact scatter	2007
FjSc-35	Knoll overlooking Finnie Lake	Artifact scatter	2007
FjSc-36	Knoll northeast of Finnie Lake	Cache pits	2007
FjSc-37	Bench north of an unnamed creek	Cache pit	2007
FjSc-38	Bench	Cache pits	2007
FjSc-39	Ridge between Arthur Lake and Finger Creek	Cache pits	2007
FjSc-40	Bench west of Finger Creek	Cache pits	2007
FjSc-41	Ridge above Arthur Lake	Cache pit	2007
FjSc-42	Bench above wetland complex	Artifact scatter	2007
FjSc-43	Knoll above creek	Artifact scatter	2007
FjSc-44	Bench overlooking creek	Artifact scatter	2007
FjSc-45	Bench overlooking creek	Artifact scatter	2007
FjSd-3	Not reported	Artifact scatter	1997
FjSd-4	Not reported	CMT	1997
FjSd-5	Not reported	CMT	1997
FjSd-6	Not reported	Cultural depression	2000
FjSd-11	Bench beside wetland.	Artifact scatter	2007
FjSd-12	Bench beside wetland	Artifact scatter	2007
FkSb-2	Undulating undifferentiated terrain west of a high bench above a stream	CMTs	1998
FkSb-3	Terrace above a wetland	Artifact scatter	2006
FkSb-4	Terrace above a wetland	Artifact scatter	2009
FkSc-5	Not reported	Artifact scatter	1999
FkSc-6	Beside an unnamed stream	CMTs	2003
FkSc-7	On a large hill	CMTs	2004
FkSc-8	Bottom section of a gentle slope	Trail (CMTs)	2003, 2010
FlSb-2	Not reported	Cultural depression	Not reported
FlSb-3	Nulki Lake	Artifact scatter	Not reported

Site No.	Environmental Setting	Type	Recorded Visits
FlSb-4	Both sides of an intermediate drainage on the north side of Nulki Lake	Artifact scatter	1992
FlSb-6	Sloping ridge above a small creek and wetland	Cache pit, housepit, artifact scatter, quarry	1996
FlSb-7	Undulating terrain	CMTs	1996
FlSb-8	Gently undulating glacial ridged and grooved terrain	CMT	1996
FlSb-10	Gently undulating terrain	Cache pit	1996
FlSb-11	Gently undulating terrain	Trail, CMTs	1996
FlSb-12	A series of NE-SW running parallel glacial ridges and fulleys intersect area of the site	Cache pit	1996
FlSb-13	Area is dissected by a series of E-W running glacial ridges and gulleys	Trail|blazed, CMTs	1996
FlSb-14	1998: Unnamed creeks to northwest and southeast that drain into Nulki Lake 2006: an unnamed creek flows through center of site. Undulating glacial till plain oriented northeast to southwest	CMTs, trail, wagon road	1997, 2006
FlSb-15	Undifferentiated rolling terrain	CMTs	1997
FlSb-16	Flat, undulating terrain	CMTs	1997
FlSb-17	Undulating plateau	CMTs	1997
FlSb-18	Undulating plateau	CMTs	1997
FlSb-19	Hill above wetland	CMTs	1997
FlSb-20	North side of creek	CMTs	1997
FlSb-21	Gently sloping ridge above wetland	Artifact scatter	1997
FlSb-22	End of rounded hill above wetland	Artifact scatter	1997
FlSb-23	Rounded knoll above wetland	Artifact scatter	1997
FlSb-24	Rounded bench along lakeshore	Artifact scatter	1997
FlSb-25	Raised bench	Artifact scatter	1997
FlSb-26	Undulating bench	Cultural depression	1997
FlSb-27	Undulating knoll	Cultural depression	1997
FlSb-28	Raised bench above wetland	Artifact scatter	1997
FlSb-35	Undulating terrain east of stream gully	CMTs	1997
FlSb-38	Upper ridge of stream gully	Artifact scatter	1997
FlSb-39	Upper edge of gully	Artifact scatter	1997
FlSb-40	Upper edge of gully	Cache pit	1997
FlSb-41	Edge of stream gully	Artifact scatter	1997
FlSb-42	Bench on north side of Stoney Creek	Cache pit	1997
FlSb-43	Poorly defined bench on southeast side of Stoney Creek	CMTs	1997
FlSb-44	Undulating terrain	CMTs	1997
FlSb-45	Undulating terrain	CMTs	1997
FlSb-46	Flat terrain between two drainages	CMTs	1997
FlSb-47	Not reported	CMTs	1997
FlSb-48	Level terrace above Stoney Creek	Cache pit, artifact scatter	1997
FlSb-49	Hills north and undulating terrain in the south	CMTs	1997
FlSb-50	Fluvial terrace of an unnamed stream	Artifact scatter	1997
FlSb-51	Terrace above unnamed creek	Artifact scatter	1997
FlSb-52	Gully terrace	CMTs	1997
FlSb-53	Undulating glacial groove and ridge terrain	CMTs	1997

Site No.	Environmental Setting	Type	Recorded Visits
FlSb-54	Not reported	CMTs	1999
FlSb-55	Not reported	Artifact scatter	1999
FlSb-56	Not reported	Habitation structure, CMT	1999
FlSb-57	Bank above ephemeral stream	Cache pit, artifact scatter	2004
FlSc-1	Not reported	CMTs	1997
FlSc-2	Not reported	CMTs	1997
GaSb-4	Not reported	Cabin	1982
GaSc-3	Low hilly terrain	CMT	1997

Table 6-2: Summary of Archaeological Sites within the Transmission Line RSA

Site No.	Environmental Setting	Type	Recorded Visits
FhSe-12	Tatelkuz Lake	Artifact scatter	1978
FhSe-31	Low hill over a wetland	Cache pit	1998
FhSe-32	Edge of a high bench above a stream	Artifact scatter	1998
FhSe-34	Numerous esker features	CMTs	1999
FhSe-35	Numerous esker features	CMTs	1999
FhSe-43	Along northeast shore of Tatelkuz Lake and northern escarpment of Chedakuz Creek	CMTs (Messue Trail)	2000, 2001
FhSe-49	Not reported	Cache pit	2002
FhSe-50	Bank between a creek and wetland	Cache pits, artifact scatter	2001, 2002
FhSe-52	Northern shores of Snake Lake	Artifact scatter	2002
FhSe-53	Northern shores of Snake Lake	Artifact scatter	2002
FhSe-54	Small bowl near lake	Artifact scatter	2002
FhSe-55	Esker over lake	Artifact scatter	2002
FhSe-57	Bench	Cache pits, roasting pit	2002
FhSe-58	Bank	Artifact scatter	2002
FhSe-59	Bank	Cache pits	2002
FhSe-60	Bank	Cache pit, artifact scatter	2002
FhSf-1	Bank	Cache pits, artifact scatter	2002
FhSf-2	Terrace	Cache pits	2002
FiSc-66	Eskers and flat topped benches forming a bay in an unnamed lake	Cultural depression, artifact scatter	2004
FiSd-1	Low lake shore bench	Cache pit, artifact scatter	1996, 2005
FiSd-5	Gentle slope terminating at shore of Brewster Lake	CMTs	2000
FiSd-6	Glacial deposits on west of Brewster Lake	Cultural depression	2000
FiSd-7	Gentle slope terminating at eastern shore of Brewster Lake	CMTs	2000
FiSd-13	South-facing creek bank.	CMTs	2005
FiSd-14	Southwest-facing terrace and knoll overlooking a small lake	Artifact scatter	2009
FjSb-16	North shore of Finger Lake	Artifact scatter	1978
FjSb-17	On a stream which empties in Finger Lake	Artifact scatter	1978
FjSb-18	At confluence of stream and northern shore on western side of Finger Lake	Artifact scatter	1978
FjSb-22	Eastern end of island in Finger Lake	Cache pit	1978
FjSb-45	Glacial deposits north of Finger Lake	CMTs (Finger Lake Trail)	1998, 2003
FjSc-1	South shore of Finger Lake	Cache pit	1978
FjSc-2	South shore of Finger Lake	Cache pit	1978
FjSc-3	Southeast corner of small bay on Finger Lake	Cache pit	1978
FjSc-4	Southern shore of Finger Lake	Cache pit	1978
FjSc-5	Island-like landform at mouth of inlet stream at western end of Finger Lake	Cache pits	1978
FjSc-6	North shore of Finger Lake	Cache pits, artifact scatter	1978
FjSc-7	Old terrace of Finger Lake	Cache pits, cultural depressions	1978
FjSc-8	South side Of Finger Creek	Cache pit	1978
FjSc-12	On both sides of a stream at its outlet into Arthur Lake	Cultural depressions, artifact scatter	2001, 2006
FjSc-13	East of an outlet of Arthur Lake	Artifact scatter	2001
FjSc-15	Terrace above creek and wetlands	Cache pits, artifact scatter	2006, 2007
FjSc-16	Not reported	Cache pit, artifact scatter	2006
FjSc-17	Flat area above wetland	Artifact scatter	2006
FjSc-18	High bench	Cache pit, artifact scatter	2006

Site No.	Environmental Setting	Type	Recorded Visits
FjSc-19	Upper bench	Cache pit	2006
FjSc-20	Bench	Cache pits, artifact scatter	2006
FjSc-21	Sloping inconsistent bench	Hearth, artifact scatter, trail	2006
FjSc-22	Narrow northeast facing bench.	Cache Pit	2006
FjSc-23	Wetland, kettle feature	Cache pits	2006
FjSc-24	Not reported	Cache pit	2006
FjSc-27	Bench north of a wetland	Artifact scatter	2007
FjSc-28	Southwest facing bench above wetland at Finnie Lake	Artifact scatter	2007
FjSc-29	Level area beside wetland at Finnie Lake	Artifact scatter	2007
FjSc-30	Bench above Finnie Lake wetland	Artifact scatter	2007
FjSc-31	Bench overlooking Finnie Lake and wetland	Artifact scatter	2007
FjSc-32	Bench facing Finnie Lake	Artifact scatter	2007
FjSc-33	Small bench facing Finnie Lake	Artifact scatter	2007
FjSc-34	Small low bench facing Finnie Lake	Artifact scatter	2007
FjSc-35	Knoll overlooking Finnie Lake	Artifact scatter	2007
FjSc-36	Knoll northeast of Finnie Lake	Cache pits	2007
FjSc-37	Bench north of an unnamed creek	Cache pit	2007
FjSc-38	Bench	Cache pits	2007
FjSc-39	Ridge between Arthur Lake and Finger Creek	Cache pits	2007
FjSc-40	Bench west of Finger Creek	Cache pits	2007
FjSc-41	Ridge above Arthur Lake	Cache pit	2007
FjSc-42	Bench above wetland complex	Artifact scatter	2007
FjSc-43	Knoll above creek	Artifact scatter	2007
FjSc-44	Bench overlooking creek	Artifact scatter	2007
FjSc-45	Bench overlooking creek	Artifact scatter	2007
FjSd-3	Not reported	Artifact scatter	1997
FjSd-4	Not reported	CMT	1997
FjSd-5	Not reported	CMT	1997
FjSd-6	Not reported	Cultural depression	2000
FjSd-11	Bench beside wetland.	Artifact scatter	2007
FjSd-12	Bench beside wetland	Artifact scatter	2007
FkSb-2	Undulating undifferentiated terrain west of a high bench above a stream	CMTs	1998
FkSb-3	Terrace above a wetland	Artifact scatter	2006
FkSb-4	Terrace above a wetland	Artifact scatter	2009
FkSc-5	Not reported	Artifact scatter	1999
FkSc-6	Beside an unnamed stream	CMTs	2003
FkSc-7	On a large hill	CMTs	2004
FkSc-8	Bottom section of a gentle slope	Trail (CMTs)	2003, 2010
FlSb-2	Not reported	Cultural depression	Not reported
FlSb-3	Nulki Lake	Artifact scatter	Not reported
FlSb-4	Both sides of an intermediate drainage on the north side of Nulki Lake	Artifact scatter	1992
FlSb-6	Sloping ridge above a small creek and wetland	Cache pit, housepit, artifact scatter, quarry	1996
FlSb-7	Undulating terrain	CMTs	1996
FlSb-8	Gently undulating glacial ridged and grooved terrain	CMT	1996
FlSb-10	Gently undulating terrain	Cache pit	1996
FlSb-11	Gently undulating terrain	Trail, CMTs	1996
FlSb-12	A series of NE-SW running parallel glacial ridges and fulleys intersect area of the site.	Cache pit	1996

Site No.	Environmental Setting	Type	Recorded Visits
FlSb-13	Area is dissected by a series of E-W running glacial ridges and gulleys.	Trail|blazed, CMTs	1996
FlSb-14	1998: Unnamed creeks to northwest and southeast that drain into Nulki Lake 2006: an unnamed creek flows through center of site. Undulating glacial till plain oriented northeast to southwest	CMTs, trail, wagon road	1997, 2006
FlSb-15	Undifferentiated rolling terrain	CMTs	1997
FlSb-16	Flat, undulating terrain	CMTs	1997
FlSb-17	Undulating plateau	CMTs	1997
FlSb-18	Undulating plateau	CMTs	1997
FlSb-19	Hill above wetland	CMTs	1997
FlSb-20	North side of creek	CMTs	1997
FlSb-21	Gently sloping ridge above wetland	Artifact scatter	1997
FlSb-22	End of rounded hill above wetland	Artifact scatter	1997
FlSb-23	Rounded knoll above wetland	Artifact scatter	1997
FlSb-24	Rounded bench along lakeshore	Artifact scatter	1997
FlSb-25	Raised bench	Artifact scatter	1997
FlSb-26	Undulating bench	Cultural depression	1997
FlSb-27	Undulating knoll	Cultural depression	1997
FlSb-28	Raised bench above wetland	Artifact scatter	1997
FlSb-35	Undulating terrain east of stream gully	CMTs	1997
FlSb-38	Upper ridge of stream gully	Artifact scatter	1997
FlSb-39	Upper edge of gully	Artifact scatter	1997
FlSb-40	Upper edge of gully	Cache pit	1997
FlSb-41	Edge of stream gully	Artifact scatter	1997
FlSb-42	Bench on north side of Stoney Creek	Cache pit	1997
FlSb-43	Poorly defined bench on southeast side of Stoney Creek	CMTs	1997
FlSb-44	Undulating terrain	CMTs	1997
FlSb-45	Undulating terrain	CMTs	1997
FlSb-46	Flat terrain between two drainages	CMTs	1997
FlSb-47	Not reported	CMTs	1997
FlSb-48	Level terrace above Stoney Creek	Cache pit, artifact scatter	1997
FlSb-49	Hills north and undulating terrain in the south	CMTs	1997
FlSb-50	Fluvial terrace of an unnamed stream	Artifact scatter	1997
FlSb-51	Terrace above unnamed creek	Artifact scatter	1997
FlSb-52	Gully terrace	CMTs	1997
FlSb-53	Undulating glacial groove and ridge terrain	CMTs	1997
FlSb-54	Not reported	CMTs	1999
FlSb-55	Not reported	Artifact scatter	1999
FlSb-56	Not reported	Habitation structure, CMT	1999
FlSb-57	Bank above ephemeral stream	Cache pit, artifact scatter	2004
FlSc-1	Not reported	CMTs	1997
FlSc-2	Not reported	CMTs	1997
GaSb-4	Not reported	Cabin	1982
GaSc-3	Low hilly terrain	CMT	1997

Annex 7
Project Study Areas with known Fossil Sites: Shown on Geological Map of British Columbia

348000 360000 372000 384000 396000

5928000 5916000 5904000 5892000

Hoult Lake
Yellow Moose Lake
Natalkuz Lake (Nechako Reservoir)
Entiako River
Capoose Lake
Capoose Creek
Fawnie Creek
Fawnie Range
Van Tine Creek
Top Lake
Laidman Lake
Moose Lake
Williamson Lake
Mathews Creek
East Erhorn Creek
Nechako Range
Erhorn Creek
Chedakuz Creek
Davidson Creek
Tatelkuz Lake
Kuyakuz Lake
Euchiniko Lakes
Blackwater River

Mount Swannel 1768m
Fawnie Rose 1873m
Fawnie Nose 1926m
Fawnie Dome 1726m
Mount Davidson 1856m
Tsacha Mountain 1781m
Tatelkuz Mountain 1611m
933m
1096m
1151m
1231m
1387m
1634m
1097m
1666m
1611m
1444m
1668m
1767m
960m

C-143388 C-143392 C-143391 C-143713 C-143712 C-143716 C-143721 C-203461 C-143719 C-056986 C-143722 C-177439 C-203465 C-177438 C-056987 C-177440 C-203466 C-143720 C-203467 C-177441 C-203472 C-203454 C-143384 C-143383 C-143382 C-143711 C-143395 C-203471 C-203470 C-143707 C-143705 C-143702 C-143704 C-143708

Legend

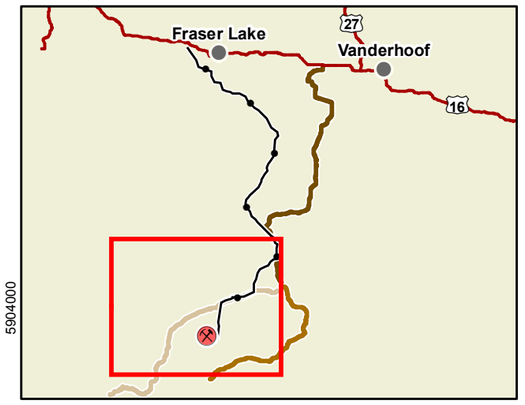
- Palaeontology Point
- Populated Place
- Spotheights
- Kluskus FSR
- Kluskus Blue FSR
- Kluskus Ootsa FSR
- Stream
- Waterbody

Project Components

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

Heritage Resources

- Regional Study Area
- Local Study Area



Scale: 1:180,000

5 2.5 0 5

Kilometres

Reference

BC Government GeoBC Data Distribution
Nechako NATMAP Project: A suite of geoscience information for central British Columbia Struik, L.C., MacIntyre, D.G. and Williams, S.P.
GSC Open File 5623 - BCMEMPR Open File 2007-10
Paleontology Points: Minister of Energy and Mines

CLIENT: newgold

PROJECT: Blackwater Gold Project

Surficial Geology with Palaeontology Sites & Study Areas

DATE:	ANALYST:	Figure 3.2-1
April, 2014	WR	
JOB No: VE52095	QA/QC: MY	PDF FILE: 20-100-004_paloen_site_v2.pdf
GIS FILE: 20-100-004_paloen_site_v2.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

Y:\GIS\Projects\VE\VE52095_Richfield_Blackwater\Mapping\20_paleontology\20-100-004_paloen_site_v2.mxd

Annex 8
Plates

PLATE 1

WP 1: GLACIO-FLUVIAL GRAVELS ALONG ROAD CUT. NO BEDROCK WAS OBSERVED.

PLATE 2

WP 5: DISTURBED DARK GRAY SHALE AND SILTSTONE ALONG ROAD CUT.

WP 7: FRAGMENT TO THE BIVALVE GENUS *PLUEROMYA* FOUND IN ROAD CUT SCREE PILE.

WP 9: FISSILE SHALE AT TERRACED SLOPE BREAK ALONG SOUTH VALLEY WALL OF ESKER CREEK.


PLATE 5
WP 9: MASSIVE SILTSTONE AND FINE GRAINED SANDSTONE UNDERLYING INTERVAL SHOWN IN PLATE 4.

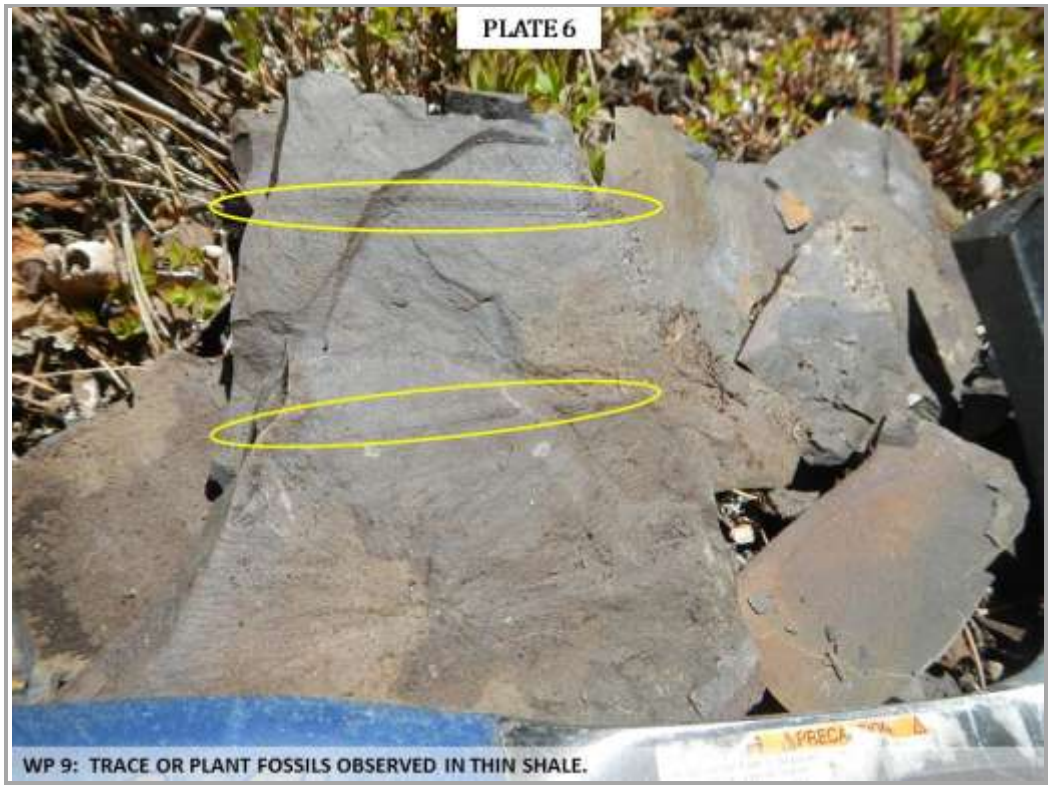


PLATE 6
WP 9: TRACE OR PLANT FOSSILS OBSERVED IN THIN SHALE.


PLATE 7
WP 19: INTERVAL OF BEDDED CHERT PEBBLE CONGLOMERATE.


PLATE 8
WP 19: CHERT PEBBLE CONGLOMERATE LINING SOUTH VALLEY WALL OF BREWSTER LAKE TRIBUTARY.

PLATE 9

WP 19: INDETERMINENT TRACE FOSSIL FROM FISSILE SHALE UNIT.

PLATE 10

WP 12: DISTURBED BEDROCK DEBRIS AND QUATERNARY GRAVEL ALONG ROADCUT.

PLATE 11

WP 24: DISTURBED DARK GRAY FISSILE SHALE IN RESEEDED CUT BLOCK.

PLATE 12

WP 17: PANORAMIC VIEW OF ABANDONED QUARRY.

WP 17: INDETERMINENT FOSSIL MATERIAL FROM SHALE FOUND IN SCREE PILES (RAINDROP = SCALE IN FIG A).