Red Chris Block Cave Project - Production Phase

Application for an Amendment to Environmental Assessment Certificate #M05-02

Chapter 1.0 Project Overview

Submitted by:

Newcrest Red Chris Mining Limited

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SLR Consulting (Canada) Ltd.

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Revision Record

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Acronyms and Abbreviations

ABM	American Bullion Minerals Limited
Amendment Application	Application for an Amendment to Environmental Assessment Certificate #M05-02
AOA	Archaeological Overview Assessment
Baseline Background Conditions	The period for which detailed records of environmental and social conditions are available and are specific to the Red Chris Porphyry Copper-Gold Mine, specifically from 1994-2005.
BC	British Columbia
BEV	battery-electric vehicles
Block Cave Project	Transition from open pit mining to underground mining using the Block Cave method, developed using a phased approach.
CO_2 eq/year	Carbon Dioxide Equivalent/Year
DMT	dry metric tonne
EA	Environmental Assessment
EAO	Environmental Assessment Office
FTE	Full Time Equivalent
GHG	greenhouse gas
ha	hectare
Highway 37	Stewart-Cassiar Provincial Highway
kg	kilogram
km	kilometre
km^2	square kilometres
koz	thousand ounces
kt	thousand tonnes

kV	kilovolt
L	litre
LHD	load-haul-dump
LOM	Life of Mine
m	metre
m^3	cubic metre
MAA	Multiple Account Analysis
masl	metres above sea level
mbgs	metres below ground surface
MHS	Material Handling System
Mine/the Mine (also Red Chris)	Red Chris Porphyry Copper-Gold Mine
Mm^3	million cubic metres
Mm^3/y	million cubic metres per year
MT	million tonnes
Mtpa	million tonnes per annum
MW	megawatt
NAG	non-acid generating
NERD	North East Reclaim Dam
Newcrest	Newcrest Mining Limited
Newmont	Newmont Corporation
NOC	National Occupational Classification
NRCML	Newcrest Red Chris Mining Limited
NRD	North Reclaim Dam

NV	North Valley
Original Application	Red Chris Copper-Gold Porphyry Project Environmental Assessment Certificate Application
PAG	potentially acid generating
PFS	Pre-feasibility Study
PMA	Permitted Mine Area
Project	Production Phase of the Block Cave Project
PWTP	Potable Water Treatment Plant
RCDC	Red Chris Development Company Ltd.
RDKS	Regional District of Kitimat-Stikine
Red Chris (also Mine/the Mine)	Red Chris Porphyry Copper-Gold Mine
ROM	Run of Mine
RSA	Rock Storage Area
SAG	semi-autogenous grinding
SAOC	Site Asset Operations Centre
SCLUP	Social Closure and Land Use Plan
SIS	seepage interception system
SLR	SLR Consulting (Canada) Ltd.
SRD	South Reclaim Dam
STP	Sewage Treatment Plant
SV	South Valley
t	tonne
Tahltan	Tahltan Nation

Tahltan Territory	Area within which the Tahltan People assert Rights and Title, covering 93,500 square kilometres of northern British Columbia.
TCG	Tahltan Central Government
Terminal	Stewart Bulk Terminal
THREAT	Tahltan Heritage, Resources and Environmental Assessment Team
TIA	Tailings Impoundment Area
tpd	tonnes per day
USA	United States of America
VC	Valued Component
VR	vent raise

1.0 Project Overview

Newcrest Red Chris Mining Limited (NRCML), a wholly owned subsidiary of Newmont Corporation (Newmont), is the operator of the Red Chris Porphyry Copper-Gold Mine (Red Chris/the Mine), an open pit mine producing a mineral flotation concentrate of copper and gold. Red Chris is situated on the Todagin Plateau in northwest British Columbia (BC), entirely within the territory of the Tahltan Nation (Tahltan). In the fiscal year ending June 30, 2023, Red Chris produced approximately 18 thousand tonnes (kt) of copper, 39 thousand ounces (koz) of gold, and 94 koz of silver as a mineral concentrate product (Newcrest Mining Limited 2023).

NRCML proposes to change the mining method at Red Chris to an underground mining technique known as block cave mining. The change in mining method will allow NRCML to access higher grade ore known to exist below the permitted Open Pit shell. As described in this document, the Production Phase of the Block Cave Project (Project) will support continued operation of the Mine for approximately 12 years, by which time the existing Tailings Impoundment Area (TIA) will reach its currently permitted capacity.

Red Chris has operated under the conditions in Environmental Assessment Certificate (EAC) #M05-02 and other environmental permits and approvals since 2015. This document presents NRCML's Application for an Amendment to Environmental Assessment Certificate #M05-02 (Amendment Application), facilitating the development of the Project. This Amendment Application will follow the process as defined in the Amendment Procedures (August 09, 2024) for the proposed Project, issued by the Environmental Assessment Office (EAO). The procedures set out the process that incorporated the EAO policy and the *Declaration Act* Consent Decision-Making Agreement for Red Chris Porphyry Copper-Gold Mine Project between the Tahltan Central Government (TCG) and the province of British Columbia, entered into agreement on November 1, 2023 (TCG, BC Gov. 2023), which outlines that consent-based decision making will occur for the review of any substantial changes proposed for Red Chris. The Project's Environmental Assessment (EA) within this Amendment Application will be subject to the requirements of the Tahltan Impact Assessment Policy and the EAO's decision will be subject to the consent of the TCG.

In addition to the Amendment Application process, the Project will require amendments to the *Mines Act* Permit M-240 and *Environmental Management Act* Permit 105017, which will be the subject of a separate application.

1.1 Overview of the Certificate Holder

NRCML is the operator of Red Chris and holds EAC #M05-02. Red Chris is owned 70% by NRCML and 30% by the Red Chris Development Company Ltd. (RCDC) through an unincorporated joint venture. NRCML is wholly owned by Newmont, headquartered in Denver, Colorado, United States of America (USA), while RCDC is owned by Imperial Metals Corporation of Vancouver.

The business and affairs of Newmont are managed by officers under the direction of the Board of Directors. Newmont's board provides a broad range of qualifications and interests, ensuring a diversity of viewpoints and expertise.

1.1.1 Contact Information

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1.1.2 Primary Proponent Contact

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1.1.3 Amendment Application Authors

Development of this Amendment Application has been led by SLR Consulting (Canada) Ltd. (SLR). Appendix 19.3 Authorship, identifies key personnel responsible for preparing the respective chapters and sections of this application, including their employers, qualifications, and the sections for which they were contributors. Technical supporting documents have been completed by consultants with expertise or specialty within a given field. Table 1-1 identifies these consultants and their respective areas of technical supporting expertise.

Table 1-1: Technical Study Consultants and their Respective Areas of Expertise

Company Name	Area of Expertise
BGC Engineering, Inc.	Groundwater Flow Modelling
EDI Consulting	Terrain and Landscape
Jacobs Consultancy Canada, Inc.	Traffic Reporting
Lorax	Water Balance and Water Quality Modelling
SLR Consulting (Canada) Ltd.	Noise and Vibration and Socio-Economic Baseline Report
SRK Consulting	Environmental Geochemistry
Stantec Consulting Limited	Greenhouse Gas Emissions
	Economic Modelling
Swiftwater Consulting Limited	Climate Change and Hydrology
WSP	Air Quality, Surface Water Quality

1.2 Red Chris Location

The Mine is located in northwest BC, entirely within the area within which the Tahltan People assert Rights and Title, which covers 93,500 square kilometres (km^2) of northern BC (Tahltan Territory). The Mine is approximately 275 kilometres (km) from the Yukon border, 427 km from the Northwest Territories border, 580 km from the Alberta border, and 167 km from the Alaska, USA, border.

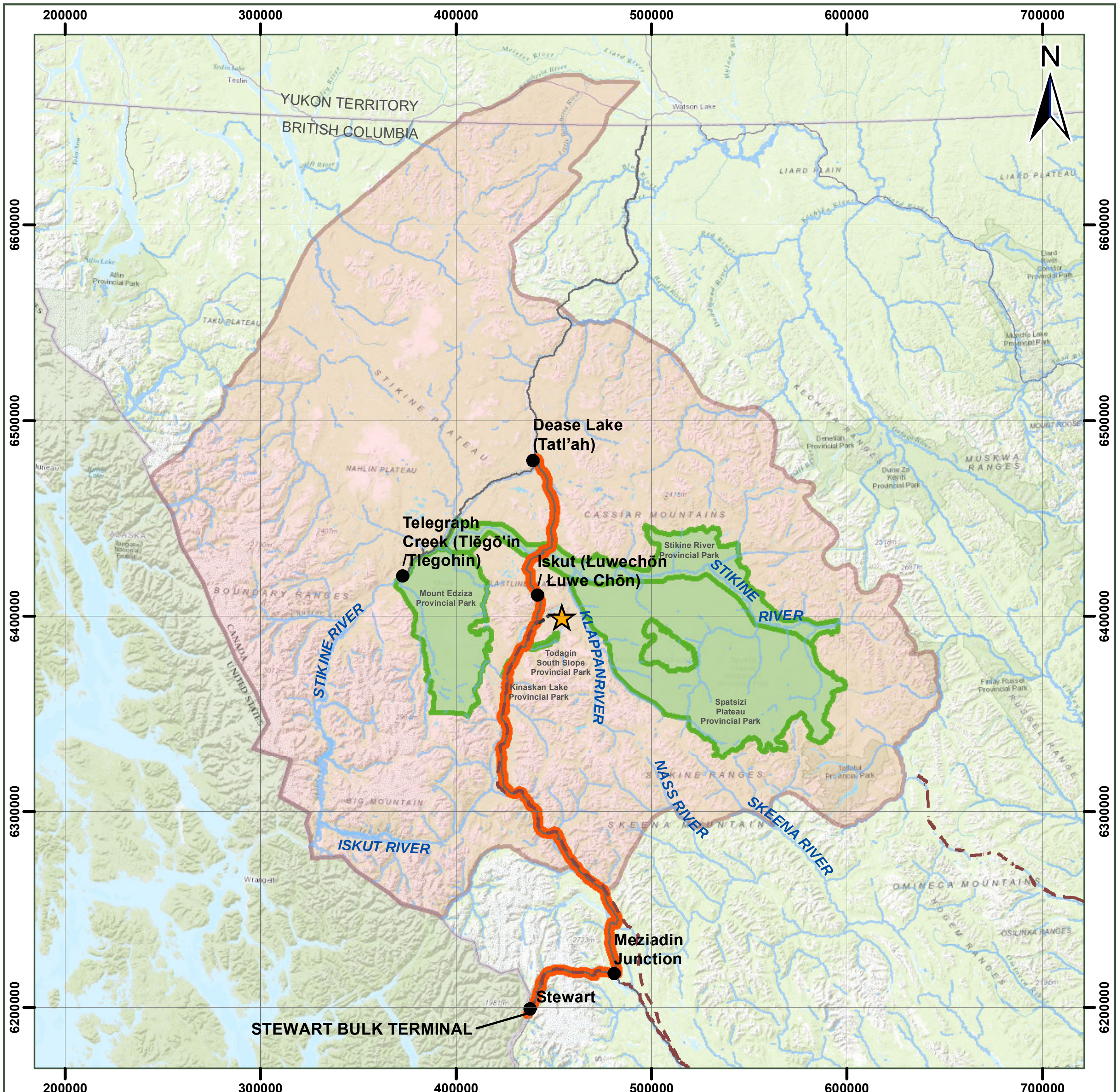
Red Chris is on the Todagin Plateau, within the Klappan Range of the Skeena Mountains, and approximately 1,500 metres above sea level (masl). The Todagin Plateau is on the boundary of the Klappan and Iskut regional watersheds (Greenwood 2022). The region is geographically isolated and sparsely populated, with the nearest regional communities located south of Red Chris being Smithers (450 km), Terrace (368 km), and Stewart (200 km). Communities north of Red Chris include the village of Iskut, Dease Lake, and Telegraph Creek. Red Chris is located approximately 5 km north of the Todagin South Slope Provincial Park, 20 km west of the Spatsizi Plateau Wilderness Park, 15 km south of the Stikine River Provincial Park, 32 km west of Mount Edziza Provincial Park, and 36 km northeast of Kinaskan Lake Provincial Park. Ecologically and biologically sensitive areas, wildlife habitat areas, old growth management areas, ungulate winter ranges, wetlands, estuaries, habitats of Federally or Provincially listed species at risk, and other identified sensitive areas surrounding the Project are discussed within the individual effects assessment sections in Chapter 11.

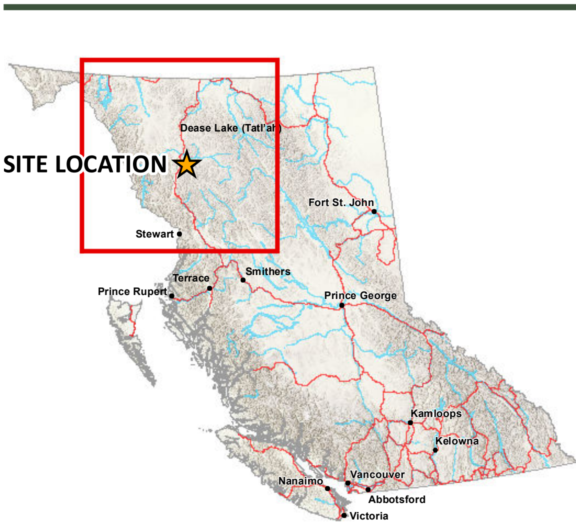
The Stewart-Cassiar Provincial Highway (Highway 37), Highway 37A, and Highway 16 provide road access to the Mine. The primary transportation corridor in the region is Highway 37, which is approximately 12 km west of Red Chris and connects the Mine to the Provincial transportation network via the Mine access road. Highway 37 is a two-lane paved road connecting Highway 16 at Kitwanga to the Yukon Territory and Alaska. Highway 16 crosses central BC from the Alberta border through Prince George to Prince Rupert, connecting several northern BC communities to service centres.

The Stewart-Cassiar Provincial Highway (Highway 37), Highway 37A, and Highway 16 pass through the territories of the;

- Nisga'a Nation
- Gitanyow Nation
- Tsetsaut Skii km Lax Ha Nation

The Mine's approximate centre coordinate is Latitude 57° 43' 57.8" North, and Longitude 129° 46' 3.5" West. The regional and local contexts for Red Chris are presented in Figure 1-1 and Figure 1-2, respectively.





LEGEND:

- LOCATION OF RED CHRIS
- TOWN/COMMUNITY
- HIGHWAY
- REGIONAL POWER SUPPLY
- MINE ACCESS ROAD
- PROVINCIAL PARK / ECOLOGICAL RESERVE
- TAHLTAN TERRITORIAL BOUNDARY
- TRANSPORTATION CORRIDOR
- WATERBODY OR WATERCOURSE

NOTES AND SOURCES:

1. THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY AND SHOULD NOT BE USED FOR NAVIGATION
2. BACKGROUND DATA FROM BC DATA CATALOGUE HTTPS://CATALOGUE.DATA.GOV.BC.CA/ ACCESSED SEPTEMBER 2023. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
3. TOPOGRAPHICAL BASE LAYER: ESRI
4. PROJECT NTS MAP SHEET: 104H116
5. COORDINATES: -129.758121W, 57.727226N
6. PREPARED BY SLR

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SCALE 1:3,000,000

DATA: NAD 1983 UTM Zone 9N

GRID: NAD1983 UTM ZONE 9N

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REPORT TITLE

RED CHRIS BLOCK CAVE PROJECT - PRODUCTION PHASE APPLICATION FOR AN AMENDMENT TO EAC #M05-02

FIGURE TITLE:

REGIONAL LOCATION OF RED CHRIS

FIGURE NO: **1-1**

DATE: November 29, 2024 PROJECT NO: 233.30000.00007

REV.	BY	CHK	DATE (M/DD/YYYY)	COMMENTS
0	AL	RA/JD	11/29/2024	FINAL ISSUE

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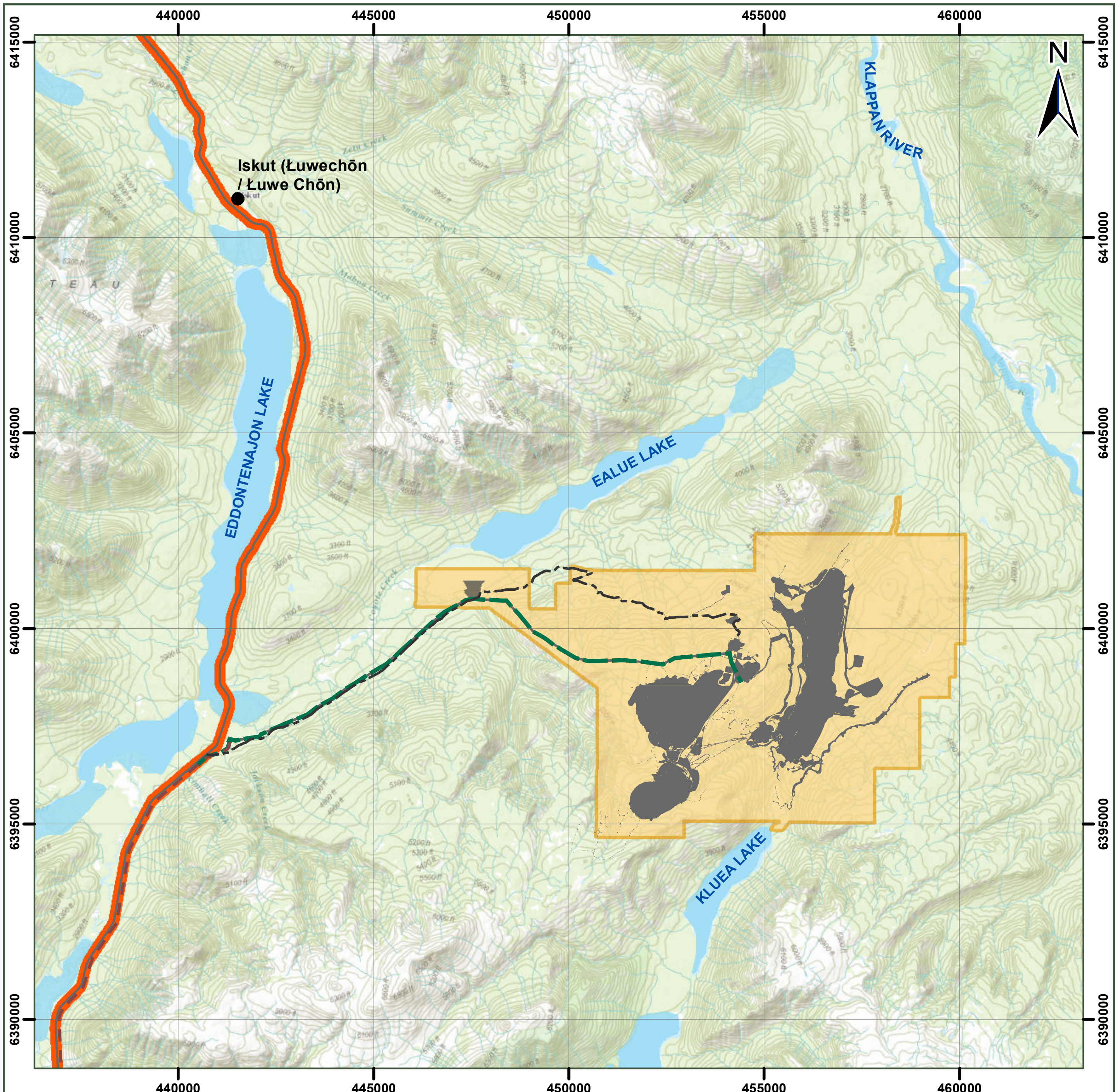

LEGEND:

- TOWN/COMMUNITY
- HIGHWAY
- REGIONAL POWER SUPPLY
- MINE ACCESS ROAD
- 287kV TRANSMISSION LINE
- PERMITTED MINE AREA
- EXISTING MINE
- TRANSPORTATION CORRIDOR
- WATERBODY OR WATERCOURSE

NOTES AND SOURCES:

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2. BACKGROUND DATA FROM BC DATA CATALOGUE HTTPS://CATALOGUE.DATA.GOV.BC.CA/ ACCESSED SEPTEMBER 2023. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
3. PROJECT NTS MAP SHEET: 104H116
4. COORDINATES: -129.758121W, 57.727226N
5. PREPARED BY SLR

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SCALE 1:150,000

DATA: NAD 1983 UTM Zone 9N

GRID: NAD1983 UTM ZONE 9N

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REPORT TITLE

RED CHRIS BLOCK CAVE PROJECT - PRODUCTION PHASE APPLICATION FOR AN AMENDMENT TO EAC #M05-02

FIGURE TITLE:

LOCAL AREA OF RED CHRIS

FIGURE NO: **1-2**

DATE: November 29, 2024

PROJECT NO: 233.30000.00007

REV.	BY	CHK	DATE (M/DD/YYYY)	COMMENTS
0	AL	RA/JD	11/29/2024	FINAL ISSUE

GIS PATH: G:_Projects\233\233_30000_RCBC\1_Maps\RPT\202402_ProjectOverview\233_30000_PO_01-02_LocalArea_RevB.mxd

1.3 Red Chris Site Context and Tahltan Continuum

Tahltan Territory is an area in northwest BC which covers 93,500 square kilometres, or roughly 11% of the province's land mass. Tahltan Territory stretches from its northwestern border paralleling the USA/Canadian border into a portion of the Yukon Territory, to the southeastern border that reaches the upper Nass tributaries and the western edge of the Stikine Plateau, including the sacred headwaters of the Stikine, Nass, and Skeena rivers (Figure 1-1). According to Tahltan oral history, this is where the Earth was first created and Tahltan culture began (TCG 2021e).

The Tahltan have three main communities: Telegraph Creek, Iskut and Dease Lake (Figure 1-1). Culturally important sites are located throughout Tahltan Territory, including at Tahltan Village, a historic site and traditional summer dwelling place for Tahltan located at the junction of the Tahltan and Stikine Rivers.

The Tahltan Continuum is defined as the Tahltan's ancient, historic, current, ongoing, and future exercise of Tahltan's Rights and Title for all time, founded on Tahltan's historic use and occupation of Tahltan Territory since time immemorial (BC Gov TCG 2023). The interconnection between the people, resources, creatures, way of life, and land is clear within Tahltan culture. The Tahltan identity is heavily intertwined and centered around the land and all that live on it.

The ancient and historic information provided below is intended to provide temporal context for the Mine, using timescales longer than typically presented within an EA. Additionally, Tahltan Perspective and ancient and historic conditions will be presented within Chapter 4.0 Tahltan Risk Assessment.

1.3.1 Ancient and Historic Context

The sections that follow have been included in this Amendment Application to provide the ancient and historic context of the Red Chris area, from a regional, and Tahltan territorial perspective. Tahltan ancient and historic context is understood within the relationships and principles of Tahltan stewardship, which are discussed in Section 4.1.1 Laws and Stewardship Principles.

1.3.1.1 Tahltan Ancient Context

Prior to the first European contact, the Tahltan were primarily a hunting, trapping, and land-based people who held a significant position in inter-tribal trade of northern BC. European contact with the Tahltan occurred later than it did with coastal Indigenous communities and groups in what is now BC. For example, as noted in Albright (1984), the Tahltan were middlemen traders of commodities, such as highly valued obsidian that they had mined. Albright (1984) also noted that the Tahltan traded the furs of the Kaska Nation (to the east of the Tahltan Territory) with the coastal Tlingit groups, who had already established trade contact with Europeans in the late 1700s.

The Tahltan- moved seasonally across the landscape primarily on foot, spending time in camps located across Tahltan Territory to take advantage of the corresponding seasonality of hunting and trapping (Emmons 1911). Hunting base camps were typically used in the autumn and winter months and, when the first salmon runs occurred in the summer, the Tahltan would occupy fishing villages along the salmon-bearing rivers of the Tahltan Territory, namely the Tahltan, Tuya, Taku, Iskut, Stikine, Nahlin, and Sheslay rivers, as well as locations in the upper Nass and Skeena watersheds (Emmons 1911; Albright 1984).

The Tahltan prepared winter clothing and the necessities required for autumn and winter hunting at the conclusion of the fishing season in the fall, once wildlife were fattened from summer and had their winter coats, and the salmon had been prepared, dried, and cached for storage. Groups of families would return to clan territories to hunt. These hunting territories were not owned by individual families but were stewarded and held in common by a matrilineal clan (Albright 1984).

Families would head to upland areas around late August to snare and trap marmots and ground squirrels, which were then dried. In early fall, sheep, goats, and bear were hunted at higher elevations. Caribou were also a winter resource, used for food as well as tools, clothing, and for other materials.

Large quantities of foods were preserved and cached in times when wildlife species were in abundance and were then used in periods of scarcity or seasons with less reliable access and availability to food. This required strategic movement across the Tahltan Territory to areas and elevations where desired resources were known to be abundant; for example, semi-permanent Tahltan fishing villages have been documented along the Tahltan and Stikine Rivers, at strategic locations where secondary streams and creeks enter these more major waterways (Albright 1984). Smokehouses were established at these key fishing villages to preserve the catch and enable large quantities for winter storage.

1.3.1.1.1 Regional Areas of Importance

The matrilineal organization of the Tahltan by the Crow and Wolf clans is associated with their connection to particular parts of the Tahltan Territory and associated stewardship responsibilities, titles/names, and stories. Important evidence of use and occupation is spread across the entire Tahltan Territory, which includes trail systems, evidence of camps, permanent villages, seasonal settlements, caches, lithic scatters, obsidian flakes and tools, maintained resource sites (i.e., berry patches), mechanisms of wayfinding, and oral histories recounting important, place--based events.

Interviews with Tahltan Elders were undertaken as part of the Archaeological Overview Assessment (AOA) conducted for the Cassiar-Iskut-Stikine Land and Resource Management Plan. Elders asserted in these interviews that all archaeological, traditional, and contemporary use sites represent the same level of cultural significance and use, and Elders also indicated “that the entire Tahltan Territory [is to] be represented as an aboriginal use site where many activities took place and continue to take place” (Millenia 1998, p. 122).

The following areas of the Tahltan Territory are highlighted in this Amendment Application, as presented below, because of their cultural importance to the Tahltan, their proximity to the Project, and the ways in which these areas connect other parts of the Tahltan Territory to each other.

1.3.1.1.1.1 Spatsizi Plateau

The Sacred Headwaters is a geographically expansive region of Tahltan Territory, and is the headwaters of the Stikine, Skeena and Nass Rivers, with the Klappan and Spatsizi Rivers joining the Skeena River in this area as well.

The Spatsizi (meaning 'red goat' in Tāłtān) Plateau plays a central role in the history of the Tahltan and contemporarily remains a place of importance and stewardship responsibility. The area is now protected as a Provincial park and contains Hok'ats Łuwe Menh/Cold Fish Lake, numerous trails, camp areas, and resources. Spatsizi Plateau Wilderness Provincial Park was established in 1975 and protects nearly 700,000 hectares (ha) of the Spatsizi Plateau and the Skeena Mountains. The Tahltan steward this part of their Territory to protect habitat for species of importance, including grizzly and black bears, moose, wolverines, woodland caribou, beavers, hoary marmot, and Arctic ground squirrels (TCG and BC 2017).

The Stikine River Provincial Park borders the northern edge of the Spatsizi Plateau Wilderness Provincial Park and provides protected corridors between Mount Edziza Provincial Park and the Spatsizi Plateau Wilderness Provincial Park. As it sits now, 60% of the Stikine-Iskut watershed is protected and under conservation.

1.3.1.1.1.2 Mount Edziza Area

Mount Edziza, to the west of the Mine site, is the primary source of obsidian in Tahltan Territory, providing the materials for the tools and trade goods produced by the Tahltan. The mountain is a composite volcano, with oral traditions describing eruptions that caused people to have to quickly move their camps from the volcano's proximity. Obsidian from Tahltan quarries on Mount Edziza has been found throughout BC, in southern Yukon, Alaska, and as far east as Alberta (Kristensen et al. 2021). Fladmark (1985) identified 112 heritage sites across this mountain landscape, and the mountain remains an important cultural location.

Adjacent to Mount Edziza is Tenh Dẕetle Conservancy, formerly referred to as the Ice Mountain Lands, established in 2021 through a collaboration with the Province of British Columbia (Province), the TCG, the Nature Conservancy of Canada, BC Parks, and Skeena Resources (BC Gov 2021f). Government-to-government discussions with the Tahltan recommended the area be designated as a conservancy, in response to Tahltan concerns about balancing mineral development with conservation interests, but also because conservancies explicitly recognize Indigenous Groups social, ceremonial, and cultural uses.

1.3.1.1.1.3 Red Chris Area

The area around where Red Chris is now situated is often referred to as "groundhog country." The Mine itself is situated on the Todagin Plateau near the Klappan River. As noted above, the seasonal rounds of Tahltan subsistence activities involved frequent moves between fall, winter, and spring camps. Ealue Lake, Black Lake, Todagin Lake, and Kluea Lake (which are located below the Plateau) were all important fishing sites in the spring, just as the Todagin Plateau provided a fall hunting range for Stone Sheep and mountain goat. Harvesting of plants and berries will have occurred in this area as well.

Use of the area is also tied to the larger pattern of seasonal activities (and relationships) that ranged from Tahltan Village on the Stikine River (near present-day Telegraph Creek) to the grassy plateau of the Sacred Headwaters. The Todagin Plateau, together with the surrounding lakes, are part of the "breadbasket" of the Tahltan, and the community of Iskut more specifically. A network of campsites and trails is present across the Plateau and surrounding valleys that reflects this use and connection to other areas of the Territory.

Ehahcezetle Mountain, located north-west of the Todagin Plateau, was identified as a traditional use and archaeology site (Simonsen and Diaz 2005) in supplemental materials from the 2004 EA. This hunting and trapping area is also the source of a number of streams and creeks that feed Ealue Lake, the shores of which are considered to have high archaeological potential (Simonsen and Diaz 2004).

1.3.1.1.1.4 Telegraph Creek/Sheslay Area

The Sheslay Area, about 50 km north of Telegraph Creek was a former meeting place for trade between Tahltan and coastal groups, and some village and burial sites remain on the land. The Sheslay River was also a seasonal fishing waterway, with sockeye salmon ascending as far up the river as Tatsamenie Lake, and several large fishing villages have been recorded on the Sheslay River tributaries (Albright 1984). Sheslay Mountain is also said to be one of two peaks in Tahltan Territory that remained uncovered during a great flood (Millenia 1998).

This confluence of the Tahltan and Stikine Rivers was the tribal headquarters of the Tahltan in historic times, with most Tahltan families visiting the location annually to fish or trade (Albright 1984). A traditional trail headed north from Telegraph Creek to Atlin eventually became a major transportation route to the Yukon (Albright 1984). The trading camps where Tlingit traders met with the Tahltan were located along the Stikine River between Telegraph Creek and the confluence of the Tahltan River.

1.3.1.2 Tahltan Historical Context

1.3.1.2.1 Significant Historical Events - Pre-European Contact

Many coastal and interior Indigenous Groups share accounts that tell of a significant destructive flood. The Tahltan have a similar story, with only two peaks in their Territory remaining above the flood waters (Emmons 1911). Some ethnographers have noted that large segments of Tahltan Territory had been covered in glaciers for thousands of years, and that the glaciers helped form much of the landscape (Fladmark 1985).

While first contact between Europeans and the Tahltan is believed to have occurred through explorer and fur trader Samuel Black in 1824 (Thompson 2007), other accounts tell of Hudson's Bay Company trader Robert Campbell being the first European to have contact with the Tahltan in 1838 (Tahltan Band, n.d.). Regardless of the veracity of both those accounts, smallpox reached the Tahltan via trade with other coastal Indigenous Groups prior to direct European contact. Albright (1984) records a smallpox epidemic that drastically reduced the population of the Tahltan, during which the Tahltan were unable to complete their preservation and caching of salmon, and subsequently, many of those that were not taken by the disease died of starvation the following winter.

1.3.1.2.2 Significant Historical Events - Post-European Contact

There was an increase in the non-Indigenous population in the Tahltan Territory between 1824 and 1838, which is the start of the post-European contact period for the Tahltan. While the Tahltan and other Indigenous Groups contacting the Tahltan had accessed parts of the Territory using the extensive trail network and the river system, settlers, also seeking access to the resources of the Territory, contributed to the construction of wagon roads and other avenues of access. The Tahltan and the International Institute of Sustainable Development produced a document in 2003 that captures significant post-contact events since 1861 that have influenced the Tahltan and/or their lands. Key events are presented in Table 1-2 below.

Table 1-2: Key Events Affecting the Tahltan, 1861–1995

Date	Event/Comment
1861–1862	Stikine River Gold Rush, for placer gold; first major influx of non-Tahltan people into Tahltan Territory.
1862	River boat service initiated from Wrangell to Telegraph Creek.
1863	Governor James Douglas claims all land north to the 60th parallel as part of BC. The effect is to open up “Tahltan Country” to outsiders. Tahltan role as principal trader falls quickly.
1865–1866	Abortive attempt by Perry McDonough Collins to establish a transcontinental telegraph connection between North America and Russia. Telegraph Creek used as a staging area.
1871	BC joins Confederation.
1874–1876	Cassiar Gold Rush, for placer gold. Placer mining continues within the Tahltan Territory to modern day with activity levels that fluctuate with gold prices.
1874	Hudson’s Bay Company sets up a trading post/store at Glenora.
Around 1875	First horses introduced as a transport mode; Tahltan people quickly become adept handlers.
1876	Consolidation of a number of existing pieces of colonial legislation into the first iteration of the Federal *Indian Act.*
1880s	Residential schools are established across Canada.
1898–1903	Klondike Gold Rush in the Yukon. Between 1897-1898, between 3,000 and 3,500 individuals were said to have camped at Glenora.
1897	The Telegraph Trail north from Telegraph Creek to Atlin is cleared and used as a major transportation route to the Yukon.
1901	Yukon Telegraph Line completed to Dawson City using the same route as the 1865–66 Collins initiative.
1910	1910 Tahltan Declaration of the Tahltan Tribe asks for resolution of land and rights issue through the development of a treaty among the Tahltan, the Government of Canada, and the Government of BC.
1928	The pack trail from Telegraph Creek to Dease Lake is upgraded to a road. The Stikine River, Telegraph Creek, and Dease Lake become essential transportation links between southern BC and the northern interior.

Date	Event/Comment
1930s	Bush planes provide a new means of access to remote areas, including to missionaries.
1936	Establishment of a mission school at Iskut
1941–1942	Stikine River used to transport heavy equipment and supplies for construction of the Alaska Highway.
1951	Federal *Indian Act* amended to allow ceremonial activities, including the potlatch.
1952	Production at the Cassiar asbestos mine begins; continues until 1992. Establishment of a new permanent village site opposite the town of Telegraph Creek on the south side of the Stikine River.
1950s and 1960s	A number of Tahltan members work in mineral exploration industry. Exploration of the Red Chris area is started.
1960s	Increasingly common use of fixed wing aircraft and the helicopter (which started in the 1950s) leads to the reduction in the use of Telegraph Creek as a staging point for exploration in Tahltan Territory in favour of Smithers. Tahltan involvement in exploration activities declines as a result.
1970s	Population increases in the Iskut-Stikine area with homesteaders coming in from southern BC and the USA; focus is on subsistence living.
1972	Highway 37 completed; easy (modern) access to Tahltan Territory established. River boats stop running on the Stikine River.
1972–1977	Road bed for the northern extension of BC Rail completed from Fort St. John to Dease Lake through Tahltan Territory. Project abandoned in 1977 with the extension of the rail line never completed.
1975	Electricity comes to the Tahltan villages/communities.
1982	Canadian constitution repatriated from England; aboriginal rights re-affirmed.
1985	Formation of the Tahltan Nation Development Corporation.
1987	Tahltan Resource Development Policy published.
1990	Production at the Golden Bear Mine begins. It operates until 1994 and then again from 1997–2001 (becoming the first heap leach operation permitted in British Columbia in 1997).
1990s	Tahltan members became more directly involved with mining operations in their Traditional Territory by providing services such as road construction and maintenance and camp catering; interaction with mining companies increases.
1995	Production at Eskay Creek Mine begins.
Source: Tahltan First Nation and International Institute for Sustainable Mining 2003.	

The Eskay Creek Mine subsequently closed on 2008, although attempts have been made to revitalize production. In more recent times, other developments projects (e.g., hydroelectric and mineral exploration) have also continued. For a description specific to the development of Red Chris, please refer to Section 1.3.2.

1.3.1.3 Resource Extraction and Development

Tahltan have a long and proud history of obsidian mining and trade, particularly from the Mount Edziza area. Resource extraction is visible across Tahltan Territory; evidence of obsidian mining has been documented across Tahltan Territory (Fladmark 1985). For more details, refer to Section 11.14 Archaeological and Heritage Resources.

The arrival of Europeans on the west coast of British Columbia in the 1700s marked a new chapter of interaction and trade. Seeking opportunities in the fur trade, they reached the mouth of the Stikine River. Tahltan traded with the Kaska Nation to the northeast and the Tlingit to the southwest, maintaining control of their trade economy by keeping the Hudson's Bay Company out of their lands until 1837. In that period, the Hudson's Bay Company established a trading post at what is now Dease Lake. Despite this, the fur trade intensified traditional trapping activities without disrupting the subsistence and settlement patterns of the Tahltan. As Albright (1984:16) notes, "the trapping of fur-bearing animals continued to be an activity which all members of the extended family could engage in." Over time, the Hudson's Bay Company established additional posts in Tahltan Territory, including locations near Telegraph Creek (Glenora) and McDame Creek (Archives of Manitoba n.d.).

The discovery of gold in the region brought further changes. In 1861, gold was found along the Stikine River, sparking interest that led to the formal definition of the Stikine Territory. A more significant event occurred in 1874 with the Cassiar Gold Rush, following the discovery of gold on Thibert Creek, northwest of present-day Dease Lake. This rush resulted in an influx of outsiders and the establishment of the Hudson's Bay Company fort at Glenora (Albright 1984). The Klondike Gold Rush of 1897 brought more miners passing through Tahltan Territory on their way to Alaska. These gold rushes and the fur trade introduced additional commerce to the area, lessening the reliance on hunting and gathering for food. Many Tahltan began participating in the wage economy, though they continued their traditional practices of hunting, trapping, and gathering (Thompson 2007, p. 36).

By the 1980s, mining activity near Dease Lake, Telegraph Creek, and Iskut was observed to have a lasting presence, with expectations of continued prospecting and exploration in the region. However, this activity brought minimal opportunities for local Indigenous populations, with most hiring focused on non-Indigenous workers (Sheppard 1983; Albright 1984).

1.3.1.3.1 Access and Transportation

Tahltan Territory remains a relatively rural and sparsely populated area, with minimal formal transportation infrastructure. Maintenance of transportation infrastructure can be challenging at times, as population centres are few and far apart. Tahltan use and occupancy of their Territory has left an extensive trail system that allows access to family and clan resource areas, hunting and trapping territories, ceremonial sites, and also facilitates the movement of wildlife. The Tahltan travelled extensively on foot across their Territory, traditionally relying on spruce bark canoes and rafts to cross waterbodies, when necessary (Albright 1984), and made extensive use of snowshoes and their dogs to support long treks on foot.

The region's history of resource extraction, and the associated boom and bust cycles, has left a network of forest service roads, incomplete rail beds, and airplane landing strips behind. While many of these pieces of infrastructure have deteriorated over time, some have been maintained or refurbished and serve multiple uses now. Many trails, telegraph lines, and rail beds built throughout Tahltan Territory ended up being used by the Provincial police, and the Royal Canadian Mounted Police, for both search and rescue and law enforcement purposes. The Telegraph Creek to Dease Lake road was the only link to other communities until Highway 37 was completed in the 1960s. Prior to the completion of Highway 37, Telegraph Creek had existed as a government centre for the area. At this point the governmental centre of the area transitioned to Tatl'ah/Dease Lake. The road between Dease Lake and Telegraph Creek is now considered Highway 51. Continued resource extraction and industrial development have also necessitated the use of helicopters and float planes to access many of the more remote and isolated locations across Tahltan Territory.

McIlwraith (2007) suggests that horses were introduced to the Tahltan in the 1860s, connected to the development of the telegraph line at Telegraph Creek. McIlwraith goes on to mention the use of horses by Tahltan at the turn of the century and explains that the Tahltan were not historically (pre-European contact) horse people, as they preferred to use dogs to support hunting and trapping trips.

To support gold rushes in the Tahltan Territory and into the Yukon, sternwheelers (a type of boat) were brought to the Stikine River, as well as to Dease Lake, in the late 1860s (Harvey 1999) as a means of connecting small settlement areas or facilitating the transportation of people and goods to the gold rushes. A route from Wrangell, Alaska, to Telegraph Creek was operational during the summer until 1916.

When the colony of BC joined Canadian confederation in 1871, a number of business ventures attempted to build railway lines in the northwest, but were unsuccessful, given the rough terrain of the area. Ottawa funded a trail from Telegraph Creek to Atlin in 1898, and a telegraph line (The Yukon Telegraphy Line) was installed alongside this trail that connected with Quesnel in the south. It became operational in 1901, and completion of this piece of the telegraph line between Telegraph Creek and Atlin resulted in a completed communication line spanning over 3,000 km that connected Dawson City with Ashcroft (Harvey 1999).

Construction was initiated on the Alaska Highway, or the northern most part of Highway 97, in 1942 in support of USA defense efforts connected to the threat of a Japanese sea blockage between the continental USA and Alaska. While the route does not pass through Tahltan Territory in BC, it crosses the part of the Territory in the Yukon. Approximately 27,000 individuals worked on the construction of this route. The road's construction prompted economic development, primarily centred around resource extraction. The influx of newcomers to the northern part of BC from this development displaced many Indigenous people, altered their access to the land base, and disrupted the movement of wildlife on which they depended (Castillo et al. 2020).

Highway 37, running north from its junction with Highway 16 at Kitwanga, was completed in 1964, originally as an offshoot of the Alaska Highway (McIlwraith 2007). Highway 37 was intended to connect Cassiar, an asbestos mining centre, with an overseas shipping point within BC. Stewart, BC, was chosen, and material was shipped from the Cassiar mine, with supplies for the mine shipped from Stewart. Both ends of this road were connected to the provincial highway system—to the Alaska Highway in the north, and to the Yellowhead Highway in the south (Harvey 2007).

1.3.2 History of Red Chris (1968–1994)

In 1968, The Great Plains Development Company of Canada, Ltd. began staking claims, marking more targeted exploration of the Mine area. Texasgulf Canada Ltd. acquired 60% of the Silver Standard and Great Plains Development Company of Canada, Ltd. claims in 1974, which were known as the Red and Chris claims. After a series of trades, takeovers, and acquisitions, American Bullion Minerals Ltd. (ABM) held an 80% interest of Red Chris in 1994, with the remaining 20% interest held by Teck Corporation (AMEC 2004).

1.3.2.1 Background (Pre-Red Chris Mine 1994–2005)

For the purposes of this Amendment Application, the period for which detailed records of environmental and social conditions are available and are specific to the Red Chris Porphyry Copper-Gold Mine, specifically from 1994-2005 Background Conditions) is presented as a summary of the information prior to the development of the Mine that is provided in the Red Chris Copper-Gold Porphyry Project Environmental Assessment Certificate Application (Original Application) (AMEC 2004). The Background Conditions presented below will summarize information from 1994–2004, for which detailed records of environmental and social conditions are available and specific to the Red Chris site, drawing on the information as presented in the Original Application (AMEC 2004) and the associated 2004 addendum.

ABM initiated environmental baseline studies in support of eventual Mine permitting as early as 1994. RCDC (a subsidiary of bcMetals) purchased a majority of ABM’s shares in the Red Chris property in October 2002. In the early 2000s, RCDC carried out infill drilling targeting the east and main zones where open pit mining was expected to take place and commissioned a feasibility study that was published in 2005. RCDC undertook EA work and, in 2004, applied for an EAC to include open pit mining and onsite concentrate production for gold and copper (AMEC 2004). RCDC received EAC #M05-02 on August 24, 2005, to “construct and operate an open pit copper/gold mine with mill processing 27,500 tonnes [t] of ore per day”. RCDC received Federal environmental approval from the Canadian Environmental Assessment Agency in 2006.

For the purposes of this document, reference to the Original Application indicates the EAC Application that was completed by AMEC in 2004 and reviewed provincially and federally, under a cooperative assessment agreement in 2005. The Original Application is based on the information collected between 1994 through to the September 2004 submission.

RCDC submitted an addendum to the Original Application on November 2, 2004, including the provision of these additional technical studies:

- **Fall 2003:** Baseline environmental monitoring – fish data collection.
- **2003:** Geotechnical investigations for Open Pit, waste dump, plant site, and tailings storage facility.
- **2004:** AOA of the Red Chris property located near the Iskut Community in Northwestern BC.
- **Spring 2004:** Baseline environmental monitoring – fish data collection.
- **Fall 2004:** Results of a fall survey of Stone's Sheep and Mountain Goats in the Todagin Area, Northwestern BC.
- **2004:** Red Chris access review.

1.3.2.2 Development of Red Chris (2005–2023)

In 2007, Imperial Metals Corporation acquired bcMetals Corporation, including RCDC and the Red Chris property. In 2008, Imperial initiated construction on access roads to the Red Chris area to facilitate exploration efforts.

In July 2010, RCDC received an extension to EAC #M05-02 and applied for a joint *Mines Act* and an *Environmental Management Act* Permit, with a mine life of 25 years, with a maximum ore production rate of 11 million tonnes per annum (Mtpa) or 30,000 tonnes per day (tpd) (RCDC 2010). Imperial was granted a *Mines Act* Permit (M-240) in May 2012 and construction of the Mine commenced. The *Mines Act* Permit outlines the boundary of the Red Chris Permitted Mine Area (PMA), as presented on Figure 1-3. Construction was substantially complete by the fall of 2014 and mining operations started in February 2015. RCDC received authorization to operate the process plant in mid-June 2015.

In August 2019, Newcrest Mining Limited (Newcrest) acquired 70% of Red Chris from RCDC, became the operator of Red Chris, and formed the NRCML joint venture. Newcrest subsequently initiated studies to evaluate and support a proposed transition from open pit mining to block caving, including exploration and planning studies, the development of the Naghā Exploration Decline, additional underground development (Section 1.4.7) and an expansion to the accommodations camp (Section 1.4.6).

Newmont assumed operational control of Red Chris through its corporate acquisition of Newcrest in November 2023, and permitted development activities continued to advance for the transition from open pit mining to underground mining using the Block Cave method, developed using a phased approach (Block Cave Project).

The evolution timeline of Red Chris, between 2005 and 2023, as relevant to the Project, is presented in Figure 1-3.

Figure 1-3: Evolution of Red Chris (2005–2023)

1.4 Existing and Permitted Components and Activities

Surface disturbance at Red Chris totalled approximately 1,453 ha as of December 31, 2023, all within the PMA (Figure 1-2) (NRCML 2024). The main components of Red Chris, including existing and permitted facilities, are listed below and shown on Figure 1-5.

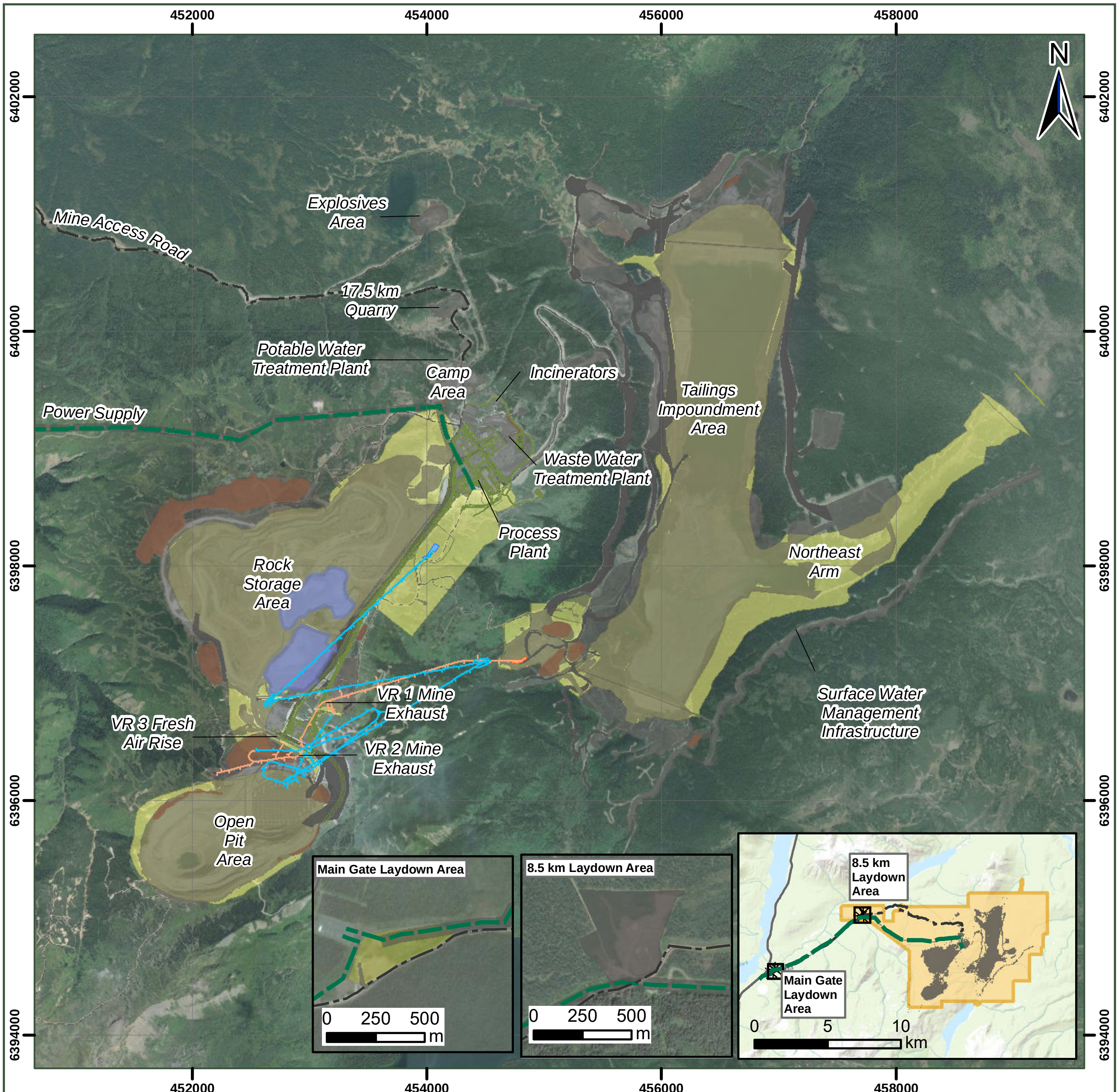
- **Open Pit Area:** Conventional drill-blast-shovel-truck techniques are used to produce 10 to 11 Mtpa of ore fed to the process plant, in addition to low-grade ore and waste rock.
- **Rock Storage Area (RSA):** Location where low-grade ore and waste rock are stockpiled.
- **Process plant:** Includes ore processing components such as primary crushing, coarse ore stockpile, milling comminution, froth flotation, and concentrate filtering, storage, and loading.
- **Tailings and water management:** Includes the TIA, where flotation tailings are deposited and stored permanently. Surface water management infrastructure diverts run-on ("non-contact") water around Mine facilities and to collect and manage "contact" water in accordance with regulatory requirements and applicable management plans (included within the footprint of the "Existing Mine" illustrated on Figure 1-4).
- **Power supply:** Includes a powerline running adjacent to the Mine access road from the Highway 37 junction (Tatogga Substation) to the Red Chris substation located near the process plant. This power line provides electrical power from the regional grid to the Mine.
- **Supporting infrastructure and activities:** Includes the camp area and supporting facilities for worker accommodations, sewage treatment plant, potable water treatment plant, incinerator, and waste management facilities. The Mine access road is a is a 23 km road connecting Red Chris to Highway 37, with haul and service roads facilitating the movement of light vehicles on a road network within the Mine footprint. Additional supporting infrastructure includes, but is not limited to, an explosives facility, quarries, construction laydown areas, batch plant, warehouses, Mine dry, fuel stations, and offices.
- **Underground infrastructure:** Includes the conveyor box cut and decline, the Naghā Box Cut and decline, and various underground components including three ventilation raises and lateral connections, underground support development, underground dewatering system, and underground electrical substations.

The Open Pit Area, RSA, Process Plant, and TIA are presented in Figure 1-4.

Figure 1-4: Existing Red Chris Components

Regional infrastructure (Figure 1-1) used by the Mine, not within the PMA, and do not require additional permitting, includes:

- **Highways 37 and 37A**: Used to transport materials to and from the Mine.
- **Provincial power grid:** Supplies power to the Tatogga substation (BC Hydro 2023).
- **Stewart Bulk Terminal (Terminal):** A port facility in the Port of Stewart, independently owned and operated by Stewart Bulk Terminals Ltd.



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LEGEND:

EXISTING COMPONENTS

- MINE ACCESS ROAD
- 287kV TRANSMISSION LINE
- EXISTING INFRASTRUCTURE
- EXISTING MINE
- CONVEYOR DECLINE
- NAGHĀ DECLINE
- CONVEYOR PORTAL
- NAGHĀ PORTAL
- EXISTING SERVICE ROADS
- SOIL STOCKPILE
- ORE STOCKPILE

AS PERMITTED COMPONENTS

- AS PERMITTED COMPONENTS

0 300 600 1,200 1,800 m

SCALE 1:50,000

DATA: NAD 1983 UTM Zone 9N

GRID: NAD1983 UTM ZONE 9N

Newmont

REPORT TITLE

RED CHRIS BLOCK CAVE PROJECT - PRODUCTION PHASE APPLICATION FOR AN AMENDMENT TO EAC #M05-02

FIGURE TITLE:

EXISTING AND PERMITTED RED CHRIS COMPONENTS

FIGURE NO: **1-5**

DATE: November 29, 2024 PROJECT NO: 233.30000.00007

REV.	BY	CHK	DATE (M/DD/YYYY)	COMMENTS
0	AL	RA/JD	11/29/2024	FINAL ISSUE

NOTES AND SOURCES:

1. THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY AND SHOULD NOT BE USED FOR NAVIGATION
2. BACKGROUND DATA FROM BC DATA CATALOGUE HTTPS://CATALOGUE.DATA.GOV.BC.CA/ ACCESSED SEPTEMBER 2023. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
3. BACKGROUND IMAGERY - MAXAR 2023
4. COORDINATES: -129.758121W, 57.727226N
5. PROJECT NTS MAP SHEET: 104H116 COMPONENT DATA SUPPLIED BY NEWMONT, 05/2024
6. VR - VENTILATION RAISE
7. PREPARED BY SLR

GIS PATH: G:_Projects\233\233_30000_RCBC\1_Maps\RPT\202402_ProjectOverview\233_30000_PO_01-05_ExistingComponents.mxd

1.4.1 Open Pit Area

Red Chris has been operating as an open pit mine since 2015, using conventional drill-blast-shovel-truck techniques. The initial open pit design included two pits: an eastern pit with a pit floor at an approximate elevation of 1,230 masl and a western pit with an expected pit floor at 1,150 masl (IM 2010). The two pits have since been merged into a single excavation, located in the southwestern portion of the site.

The open pit mining process involves the following key steps:

- Drilling
- Blasting
- Loading
- Hauling.

Mobile equipment in the Open Pit Area includes diesel haul trucks, diesel and electric mining shovels, and excavators. A haul road connects the Open Pit Area to the RSA, where waste rock and low-grade ore are stored. Run of Mine (ROM) ore is hauled to the primary crusher located at the northeast pit rim for processing. Water that accumulates in the Open Pit from rain, snowmelt, and groundwater inflow is collected in a sump and pumped to the process plant and used in ore processing. Photo 1-1 presents a visual of the Open Pit Area at Red Chris.

Photo 1-1: Open Pit Aerial View (facing north)

1.4.2 Rock Storage Area

The RSA includes stockpiles of non-acid generating (NAG) waste rock, potentially acid generating (PAG) waste rock, and low-grade ore. The RSA was originally designed and permitted to store 302 million tonnes (MT) of waste rock (Imperial Metals 2010). At the end of 2020, the RSA covered 168.5 ha of the expected final 237 ha, per the Five Year Mine Plan (NRCML 2021). At the end of 2023, the RSA was reported to contain 160 MT of PAG waste rock, 13 MT of NAG waste rock, and 24 MT of low-grade ore and mineralized waste in storage (Newmont 2024a). There are also three topsoil stockpiles around and adjacent to the RSA.

The RSA is located on the west side of the property, with NAG and PAG waste rock stockpiled in separate designated areas. Equipment used in the RSA includes diesel excavators and shovels. Contact water from the RSA is collected at sumps and pumped for use in the process plant. Portions of contact water that bypass the existing sump network are managed adaptively, as informed by the Mine's surface water and groundwater monitoring program and RSA seepage surveys.

1.4.3 Process Plant

The Red Chris process plant uses conventional technologies and methods including crushing, grinding, and froth flotation to produce a mineral concentrate containing payable quantities of copper, gold, and silver for shipment to world markets. Process plant ore throughput is approximately 13.9 Mtpa, with tailings piped to permanent storage in the TIA. The main ore processing steps include the following:

- Primary crushing and conveyance;
- Grinding circuit;
- Flotation circuit; and
- Concentrate storage and loading.

In the flotation process, the ground ore slurry is conditioned using chemical surfactants and is then transferred to flotation cells where the payable minerals are separated into a concentrate product. The gangue (non-payable) minerals, known as flotation tailings, are discharged in slurry form to the TIA for permanent storage.

The concentrate storage and loading area was originally designed for 166,000 dry metric tonnes (DMT) of concentrate storage with 12 trucks loading per day (SLR 2023). Currently, the concentrate storage and loading area handles approximately 145,000 DMT of concentrate, averaging 9 to 10 trucks loading per day (SLR 2023).

1.4.4 Tailings and Water Management

The TIA is located at the eastern edge of Red Chris in a north/south-trending valley. The Life of Mine (LOM) design of the TIA incorporates the North, South, and Northeast dams, which are permitted to a final embankment crest elevation of 1,180 masl (NRCML 2024). The North and South dams are operational and raised as needed, while the Northeast dam is permitted but not yet constructed.

The flotation tailings are separated in the process plant into two streams that are managed separately in the TIA:

- NAG tailings are generated from the rougher flotation circuit and constitute approximately 80% by weight of the tailings solids produced.
- PAG tailings are generated from the cleaner flotation circuit and contain pyrite scavenger concentrate during periods of high pyrite mill feed and constitute about 20% of the tailings.

PAG tailings are maintained in a water-saturated area of the TIA. NAG tailings can either be deposited into the impoundment or cycloned with the coarse fraction used for TIA embankment construction.

At the end of 2023, the TIA contained approximately 75.7 MT of flotation tailings in permanent storage, including 65.5 MT of rougher (NAG) and 10.2 MT of cleaner (PAG) tailings (SRK 2024). Under the permitted LOM plan, the TIA will contain approximately 300 MT of tailings once the facility reaches capacity.

The TIA forms a central component of the site contact water management infrastructure. Much of the contact water managed onsite circulates through the TIA via tailings deposition and recirculation to the process plant. Additional sources of contact water entering the TIA include seepage from the RSA via Thurston's Trickle and the West Diversion Ditch, reclaim from the North Reclaim Dam (NRD) and South Reclaim Dam (SRD) ponds, and the North Valley (NV) and South Valley (SV) seepage interception systems (SIS).

The TIA's water balance is dominated by water inflow associated with flotation tailings and the water recycled to the process plant. The main losses of water from the system are evaporation from ponded water and wet beaches in the TIA, water taken up into permanent storage in the pores of the tailings in storage, and uncaptured seepage from the TIA. The process plant sources makeup water from up to 13 groundwater production wells in the "deep aquifer" in the vicinity of the TIA—up to 9 in the NV Wellfield and up to 4 in the SV Wellfield. The process plant also receives water from the Open Pit, RSA, and the underground workings. Though permitted, water extraction from the Klappan River does not currently occur.

- **NV SIS:** Commenced in 2022 and is currently operational. The system is located downstream of the NRD and captures seepage that is entering the shallow aquifer groundwater and surface water. Seepage is pumped back to the NRD pond and then into the TIA for reuse by the mill.
- **SV SIS:** Will capture seepage entering the shallow aquifer in the SV and is anticipated to be commissioned in 2024.
- **Tailings thickener:** The thickener, which is anticipated to be operable in 2025, will recycle process water from the NAG tailings stream directly to the process plant, reducing the total inflow of water to the TIA. The thickener will improve site water management by reducing water losses and optimizing make-up water requirements, resulting in lower groundwater pumping requirements.

1.4.5 Power Supply

A dedicated power line connects Red Chris with a substation at Tatogga, near the junction of the Mine access road and Highway 37, approximately 23 km from the Mine. The line supplies power to a substation near the process plant, which steps the voltage down to 25 kilovolts (kV). Electrical power consumption at Red Chris averages approximately 48 megawatts (MW). The largest power consumers on site are the crushing and grinding circuits, which account for approximately half of the site demand.

Emergency power requirements for critical systems are provided by two 4 MW diesel generators for the operations areas and camp area and two 1.2 MW diesel generators at the Naghā portal.

1.4.6 Supporting Infrastructure and Activities

Administration area: The existing administrative complex includes offices, meeting rooms, document storage, medical facilities (staffed clinic with trauma and observation areas), emergency vehicle (ambulance and fire truck) parking bays, Mine rescue facility, tool storage, lube-oil storage, wash bay, and machine shop.

Camp area: The accommodations camp has an occupancy of 920 employees and contractors and is permitted for an occupancy of 1,200 people. The camp complex includes a potable water treatment plant (PWTP) treating groundwater pumped from wells in the shallow aquifer near the camp, a sewage treatment plant (STP) and leach field, and an incinerator. As the camp grows, the PWTP and STP are to be expanded, with treated effluent being directed to the TIA via the process plant, and an additional incinerator will be installed.

Explosives magazine: An explosives facility is located on the north end of Red Chris. The Original Application estimated the storage facility to accommodate up to 20,000 kilograms (kg) of emulsion. The facility holds explosives required for ongoing mining operations.

Mine access road: Red Chris is connected to Highway 37 by an all-weather access road that is approximately 23 km long.

Haul and service roads: Roads on the Mine site include a road from the camp and administrative area to the TIA, service roads around the TIA, a haul road between the Open Pit and the RSA, service roads within and around the RSA and process plant, and an access road from the Naghā Box Cut to the Open Pit Area. All onsite service roads, access roads, and haul roads are gravel based and allow two-way traffic.

Quarries: The 17.5 km Quarry is located 17.5 km north of the camp and administration areas and near to Beaver Creek. The 17.5 km quarry provides NAG building materials needed for the construction of the camp and ancillary services. Additional, already permitted quarries are used for operational maintenance. A visual of the camp area and other supporting infrastructure at Red Chris is shown in Photo 1-2.

Photo 1-2: Camp and Administration Area (facing south)

1.4.7 Underground Infrastructure

The block cave mining method accesses ore from below the ore body, often at great depth. As a result, block cave mines require several years of underground development before ore production begins. Accordingly, NRCML has followed a phased approach for the development of the Block Cave Project (Figure 1-6).

Figure 1-6: Block Cave Phased Development Approach

The various phases of the Block Cave Project that are already permitted are summarized below.

- Exploration Phase (completed April 2023) (Figure 1-5):
    - **Naghā Box Cut and portal area**: Includes an area of approximately 40 ha and encompasses the Naghā Box Cut and supporting infrastructure, including light and heavy vehicle roads, batch plant, Mine dry, warehouse, workshop, truck maintenance facility, office and construction trailers, fuel station with 60,000 L fuel storage, back-up electricity, and area for soil stockpile.
    - **Naghā decline:** Extends approximately 2.8 km underground to provide access for advanced exploration activities below the Open Pit shell, including core drilling. Supporting underground development includes an underground dewatering system, electrical substations, and drill platforms.
- Pre-Production Phase (in progress):
    - **Access decline:** The access decline is a continuation of the Naghā decline towards the block cave footprint. It provides access for personnel, equipment, and materials/consumables, and once complete will extend approximately 3.5 km from the Naghā decline reaching a depth of approximately 1,000 metres below ground surface (mbgs).
    - **Conveyor box cut and laydown:** The conveyor box cut area has been developed and is located close to the process plant to allow for eventual direct feed of ore from the underground to the coarse ore stockpile that supplies the mill. The permitted Pre-Production Permit Area includes an area of 60.4 ha with a maximum construction area of approximately 30.4 ha to accommodate the conveyor box cut, access roads, surface water management, new ancillary facilities, and infrastructure such as construction laydown areas, ROM pad, workshop, offices, Mine dry, and propane and lube storage required to support the conveyor box cut.

- **Conveyor decline:** The conveyor decline system includes three sections ("legs") to support material handling (conveyors) and provide secondary egress (Figure 1-5). The lower two conveyor decline sections are being developed from the Naghā decline, while the upper section is being developed from the surface box cut. The conveyor decline will extend approximately 5.7 km underground, reaching a depth of approximately 1,000 mbgs.
- **Ventilation raises and lateral connections:** Underground workings will be ventilated through three ventilation raises to surface, the Naghā decline, and the conveyor decline. The ventilation raises and lateral connections are designed to provide clean air, heat, and a healthy work environment for underground personnel. Approximately 1,300 metres (m) of vertical (raise) development is necessary to support the access and conveyor decline development. Construction of vent raise (VR) 1 is complete, with VR2 and VR3 currently permitted (Figure 1-5).
- **Underground support development:** Remuck bay, sumps, refuge chamber bays, passing bays, electrical bay, and lateral ventilation connections are required for both declines and between both declines.
- **Underground dewatering system:** The access and conveyor declines are dewatered using submersible pumps capable of accommodating volumetric flowrates from the advancing faces to intermediate sumps. Water is transferred from these sumps to high-lift booster stations, which in turn transfer water to the surface and then to the TIA via a surface pipeline.
- **Underground electrical substations:** Electrical substations are installed in the declines at a spacing of between 300 m and 500 m to power underground drilling, pumps, fans, lighting, and other equipment.

1.4.8 Reclamation and Closure

Red Chris currently has an approved Five-Year Mine Plan and a Reclamation and Closure Plan (NRCML 2021) for closure of the existing facilities at the site. Under the BC *Environmental Management Act* (BC Gov 2003) and the *Mines Act* (BC Gov 1996), maintenance of a five-year Mine Plan and a Reclamation and Closure Plan are required for all major mines operating in BC. For Red Chris, both plans must be updated with the Mine Review Committee every five years as a condition of the M-240 permit. The next scheduled update is December 2026.

1.4.8.1 Existing Conceptual Closure Plan

The overall approach to the Reclamation and Closure Plan is to use pre-mining ecosystems, natural landforms, and an ecosystem-based approach as a guide to closure and reclamation that meets Newmont's commitments. The Reclamation and Closure Plan is intended to be adaptable over time as mine plans change, technologies evolve, and stakeholders provide guidance.

Key aspects of the existing approved closure plan as described in the approved Reclamation and Closure Plan include:

- **Open Pit:** Pit closure will include access control, decommissioning, and the formation of a pit lake. After a long period of pit flooding, the pit lake water level will be maintained at a level below the natural spill elevation (<1435 masl) to keep the lake as a local sink for groundwater inflows. Discharge of pit lake water will be via active pumping to a water treatment facility, which will then discharge treated water into the TIA to maintain saturation of PAG tailings in the TIA. Pit access control will be developed to provide a physical barrier to prevent inadvertent access.
- **RSA:** RSA closure involves re-sloping the waste rock pile to an average slope of 3.5 H:1V (ratio of height to vertical distance) as well as the placement of a high-performance barrier cover over the RSA including a self-sustaining vegetative cover. It is worthwhile to note that the current approved plan is an improvement to the 'store and release' cover system that was included in the Original Application.
- **TIA:** At closure, both the North Dam and the South Dam will be separated from the pond area by a long beach of non-PAG tailings upstream of the dams, such that they will not be water retaining. The Northeast Dam may be water retaining in perpetuity, and a permanent, armoured, open channel spillway will be constructed to allow passage of a 24-hour probable maximum flood precipitation event. PAG tailings will be kept in a permanently saturated state at all times to prevent oxidation. Diversion ditches will be decommissioned at closure to allow runoff to enter the TIA and facilitate maintenance of the wet cover.
- **Water Management and Water Treatment:** A collection system will be used to collect RSA contact water and direct it to the pit lake. Once the pit lake has been flooded to its target level, water will be actively pumped in perpetuity to a water treatment facility prior to discharge to the TIA. Seepage interceptions systems downstream of the TIA would be maintained from the start of closure in perpetuity to intercept seepage from the TIA for active treatment and discharge back into the TIA.
- **Openings to underground mine:** The Pre-Production M-240 Amendment (Issued December 8, 2022) closure plan for openings to the underground mine include the following prescriptions:
  - Ventilation infrastructure will be removed from raises.
  - A hydrostatic plug will be constructed in the Naghā decline to prevent contact water from exiting the mine.
  - The conveyor decline will be closed with a waste rock plug and secured to prevent inadvertent access. Requirements for stabilization works around the portals and box cut will be incorporated into the design.
  - Three ventilation raises will be secured with concrete caps anchored to bedrock.
  - Service boreholes will be grouted.

- **Underground infrastructure:** Box cuts and underground support facilities and infrastructure will be decommissioned and removed, and underground dewatering will cease.
- **Processing Facility:** At closure, stockpiles of ore (if any) and low grade ore will be milled. The process plant will be decommissioned, and potentially hazardous material removed.
- **Site infrastructure:** Heavy equipment maintenance shop, warehouse, and office building will be removed. Site power distribution system will be dismantled and removed, including the power line from Tatogga to the mine property, unless required for water treatment. On-site access roads required for post-closure maintenance and monitoring activities will be maintained into the post-closure period. Roads that are no longer required will be permanently decommissioned.

1.4.8.2 Social Closure Planning

NRCML acknowledges that Indigenous communities have complex and nuanced connections to land, have jurisdiction over land management in their territory, and understand the importance of the inclusion of Indigenous voices in closure planning and decision-making to implementation of social transition during mine closure.

To promote successful social closure, NRCML will be developing an End Land Use and Social Closure Plan (ELUSCP) in collaboration with the Tahltan to address a permit requirement under *Mines Act* Permit M-240. Development of the ELUSCP will be guided by a Working Group that consists of representatives from the company, Tahltan Heritage, Resources and Environmental Assessment Team (THREAT), and the TCG. The Tahltan Land Doctrine and the TCG's guiding principles related to land use and expectations of managing the legacy after mining will be central to the development of the ELUSCP. In this regard, the objective of the ELUSCP will be to achieve an agreed-upon vision for the post-closure period that supports social transition for affected local communities as the Mine moves from operations to closure, and to conform with the end land use planning, social closure, and end of mine life engagement requirements outlined in M-240 *Mines Act* Permit.

The ELUSCP is also anticipated to identify employment opportunities and social land uses after mining for the Tahltan and considers social and cultural heritage aspects of Mine closure.
Key aspects of the ELUSCP will include how end land use objectives are accounted for and provides an understanding of the possibilities and limitations in returning the land to a pre-mining state, and other end land use opportunities.

1.4.8.3 Post-Mining End Land Use and Capability Objectives/Metrics

End land use capability objectives and metrics remain consistent with the Five-Year Mine Plan and Reclamation and Closure Plan and are based on an ecosystem approach. One of the objectives of the reclamation plan will be to return, where practicable, areas disturbed by mining operations to locally common land use and capability similar to that of the immediate surrounding area. There will be a focus on the restoration of wildlife habitat.

End land use objectives may exist beyond ecological conditions and are influenced by regulators, NRCML, Tahltan representatives, and local communities (e.g., Dease Lake, Telegraph Creek, and Iskut). NRCML is currently engaging with the Tahltan to refine end land uses for post-closure (see Section 1.4.8.1). The company is committed to defining these end land uses and the end land use objectives with the Tahltan in a manner that respects the Tahltan's relationship to the land and considers cultural, environmental stewardship, economic, health, and wellbeing aspects.

End land use objectives may also be adapted over time but once a landform is constructed, the end land uses will be limited. Post-closure, as wildlife usage increases and public access to parts of the site is re-established, the BC Ministry of Water, Lands, and Resource Stewardship will have the opportunity to sanction the end land uses of hunting, guide outfitting, and trapping. Other forms of recreation, including sport fishing, will be supported by maintaining appropriate water quality and aquatic habitats in receiving environment water bodies.

1.4.8.4 Reclamation Monitoring

The objective of reclamation monitoring is to track progress towards achieving the company's closure criteria, which are sub-components of the Mine's closure vision, which is to "establish a sustainable, diverse, functional landscape that, on a property average basis, is equal to the capability that existed prior to mining."

In general, monitoring during reclamation closure will align closely with operational monitoring until the removal of monitoring parameters or stations is supported by collected data. As the Project progresses through its lifecycle, and operational monitoring and modelling information is updated, the monitoring schedule may reflect these changes.

Structures that are no longer required for post-closure operations of the Open Pit at Red Chris will be decommissioned and will not require ongoing monitoring and maintenance. If infrastructure is required to support post closure activities (e.g., pipelines and pumps or water treatment facilities), specific monitoring and maintenance protocols will be defined.

Post-closure maintenance requirements will be refined as the Mine progresses towards closure and are largely conceptual at this stage.

1.4.9 Regional Infrastructure

NRCML uses regional infrastructure for electrical power supply and for the transportation of people, supplies, and concentrate product to and from the Mine.

- **Power supply:** Electrical power to Red Chris is provided by BC Hydro via the Northwest Transmission Line (BC Hydro 2022), a single, 287 kV overhead high voltage power line that supplies power to Red Chris and other power users in northwest BC. The line runs from the Skeena Substation, south of Terrace, and supplies power to a substation at Tatogga, near the junction of the Mine access road and Highway 37.

- **Transport of personnel:** Workers and contractors not based in local communities are transported by aircraft from regional centres to Dease Lake Airport, approximately 95 km north of the junction between the Mine access road and Highway 37. During the winter months, adverse conditions may require the use of the airport in Smithers, BC, which is a nine-hour journey by bus. The Mine site currently transports a workforce of approximately 700-800 personnel on a two-weeks on/two-weeks off rotation pattern. Approximately 85% of Red Chris workers fly in to the Mine via the Dease Lake airstrip, where they are then transported by bus to the site (Jacobs 2024a). Bus traffic consists of 2 to 5 buses per day, 3 days per week, equating to approximately an average of 42 buses per month completing a return trip (Jacobs 2024a).
- **Transport of concentrate:** Filtered concentrate from the process plant is transported by truck via Highways 37 and 37A to the Terminal on the west side of the Portland Canal, approximately 4 km south of the Town of Stewart. The Original Application provided an estimate of 12 truckloads of concentrate per day, based on an average annual concentrate production of 166,000 DMT during the first five years of an 18-year LOM. Red Chris produced 143,492 DMT of concentrate in 2022. Jacobs (2024a) reports that, between 2018 and 2022, monthly concentrate haul truck traffic fluctuated between approximately 6 and 10 trips per day (return trips).
- **Shipping of Concentrate:** NRCML has had a Terminal Services Agreement in place with Stewart Bulk Terminals Ltd. since 2013, for the LOM. The Terminal is a privately-owned facility not subject to underlying lease agreements with the government port authorities and is the most commercially and logistically suitable port for Red Chris concentrates.

Red Chris concentrate is transferred at the Terminal into a warehouse for storage, handling, and loading via conveyor and spout into ocean-going vessels. The concentrate is shipped from the Terminal on handysize vessels (Jacobs 2024b), which are bulk cargo carriers described as a vessel between 24,000 and 35,000 deadweight tonnage (i.e., DWT) (130–150 m length and 10 m draft). Currently, Red Chris concentrate is shipped via 1 to 2 cargo vessels per month (12 to 24 trips annually). The frequency of vessel traffic related to the current operation of Red Chris is correlated with the efficiency of hold utilization on board the carriers (i.e., concentrate from Red Chris may not always comprise the entire cargo of a vessel).

1.5 Description of the Project

This section provides an overview of the purpose and rationale of the Project; an overview of the Project stages; and a description of Project components and activities. A description of how the Project will make use of existing and permitted Red Chris infrastructure is also provided.

The existing Mine plan is premised on a total LOM ore production of approximately 300 million tonnes (MT). With the Project, approximately 40% of this will be mined from the Open Pit, including the ore mined from 2015 to date. The remaining 60% is proposed to be produced underground using the block cave mining method (Table 1-3). Underground ore production at 15 Mtpa will be approximately twelve years.

Table 1-3: Red Chris Production Metrics for Life of Mine

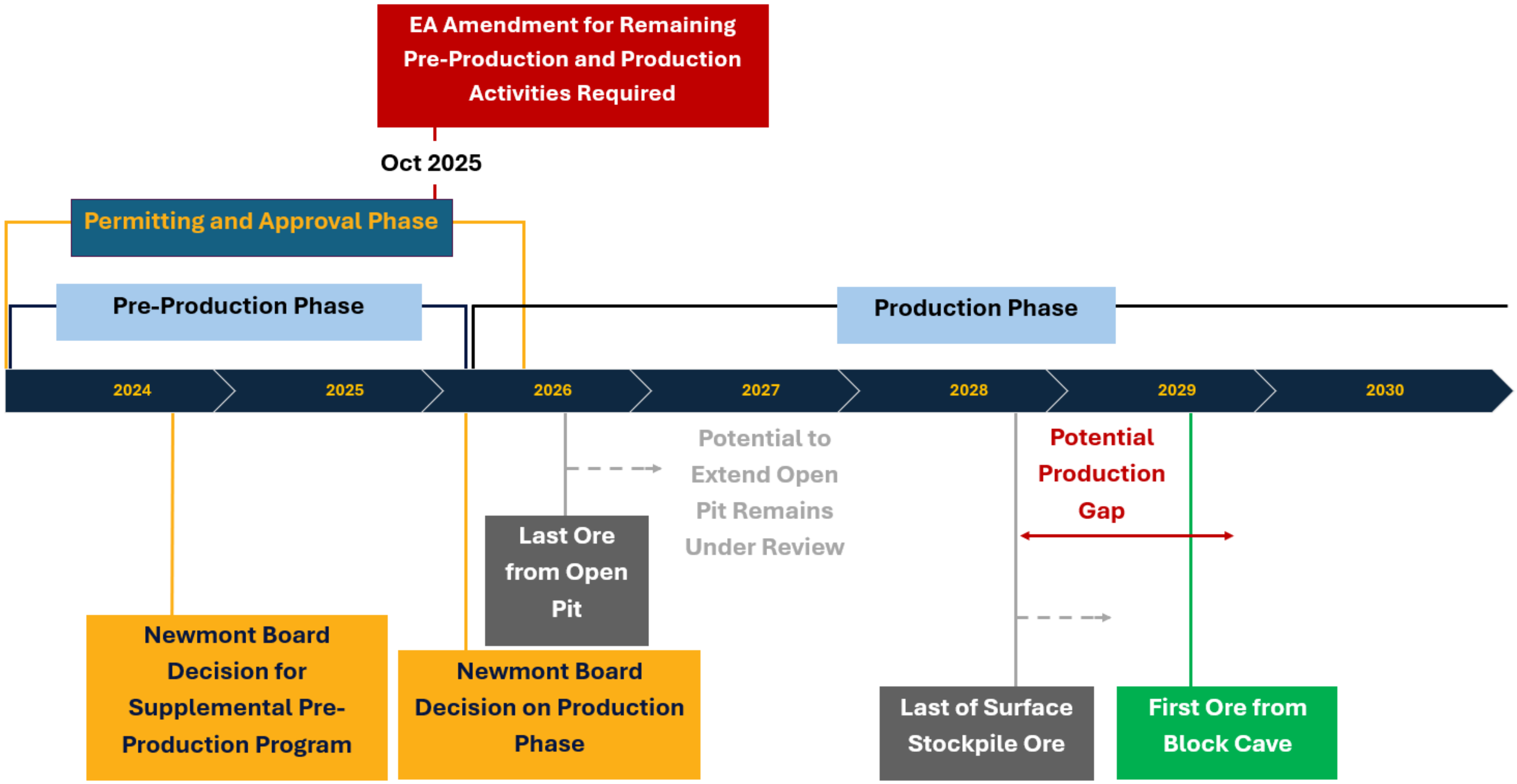
Red Chris Mine	Ore Tonnage
Open Pit LOM Production	
Open Pit and Stockpiles	120 MT
Underground Mining (development and block cave production)	
Block Cave Production Phase	180 MT
LOM Total	**300 MT**

1.5.1 Purpose and Rationale of the Project

NRCML mines a large, disseminated grade deposit at Red Chris that requires processing of a high volume of ore to be economically viable. NRCML proposes to transition the Mine from an open pit mining method to an underground block cave mining method that will enable access to additional and higher-grade ore at depths below the existing Open Pit shell. Studies conducted by NRCML have concluded that continuing to mine the deposit using the open pit mining method would not be economically sustainable at forecasted economic conditions.

When considering the forecasted economic conditions, the last ore extraction from the Open Pit at Red Chris is anticipated to be in 2026 (Year 12 of the currently permitted LOM). The potential to extend the open pit mining method remaining under review. While the Mine can continue to process ore from surface stockpiles, those are anticipated to be depleted in 2028. The projected timelines of the existing Open Pit production and the potential first production ore resulting from a change in mining method (block cave mining technique) is presented in Figure 1-7.

Figure 1-7: Project Permitting and Approval Timeline



Block cave mining was chosen as the method to extract the resource beneath the existing East Pit as it involves lower operating costs when compared to other mining methods. The proposed change in mining method will allow the additional ore beneath the pit to be economically mined. This will result in a longer operational life than currently forecasted for the Open Pit, providing employment, revenue, and other opportunities to the Tahltan, BC, and Canada.

The primary rationale for the Project includes:

- Maximized extraction of the current ore body while utilizing existing infrastructure and workforce where practical.
- Continued and increased production of copper, a critical mineral, to address global industrial demand needed to support the global energy transition to low-carbon societies. A block cave mine at Red Chris would be the largest of its kind in Canada and is estimated to increase Canada's annual copper production by over 15% annually.
- Continued and increased production of gold to meet global demand for industrial uses, financial investments, and jewellery.
- Continuation of economic contributions to local communities, the Tahltan, BC, and Canada through employment, commercial opportunities, discretionary social investment, Impact Benefit and Co-Management Agreement royalties, and government tax revenues.

Anticipated environmental benefits from the change in mining method include:

- Reducing the volume of waste rock to be stored at Red Chris and decreasing the amount of PAG rock produced that needs to be managed as part of the closure plan.
- Reduction in the area disturbed by mining when comparing the block cave subsidence zone to the equivalent size of Open Pit and related permitting and legacy closure considerations.
- Reduction of surface activities and equipment along with the related consumption, including diesel usage, greenhouse gas (GHG) emissions, and explosive use, as well as dust generation.

As operator, NRCML is committed to the principles of economic sustainability and environmental stewardship, and to operating Red Chris in a cooperative and respectful way with the Tahltan, on whose traditional territory Red Chris is located.

1.5.2 Revisions to the Project Description

The revisions that have been made to the Project Description since submission of the December 7, 2023, version to the EAO are outlined in Table 1-4.

Table 1-4: Summary of Revisions to the Project Description between December 2023 and the Project Overview, as written

Project Component	Design Change and Rationale
Project Timeline and Life Cycle	Project timeline updated with new dates for completion of permitting and obtaining approvals required for Project Execution. Updated timeline also shows potential production gap between processing last ore from surface and first ore from block cave being available. Project duration adjusted to approximately 15 years considering 3 years of Construction and 12 years of Operations. 60 to 70 years from the end of mining for the water level within the block cave Mine/Open Pit to reach equilibrium, instead of 70 years.
Project Components	Project general arrangement updated showing revised locations for Ventilation Raise #4 and Pre-Conditioning Drill Pad Area. Also, general arrangement presents updated locations and land requirements for Process Plant expansion and Project ancillary facilities including laydown areas, Site Asset Operations Centre (SAOC), Mine dry, service roads, potable water and waste water treatment plants, incinerator #3, 17.5 km quarry expansion, and “workshop to service the underground fleet” (see Figure 1-9). Surface disturbance updated to approximately 1,453 ha within the PMA as of December 31, 2023, rather than 1,920 ha following a review of the data sources.
LOM Production	Red Chris Production Metrics for LOM updated to reflect a more advanced mine plan, as follows: • 120 MT of ore from open pit and stockpiles; instead of 132 MT; and • 180 MT of ore from underground mining; instead of 170 MT. The updated values reflect that processing higher grade ore from underground mining is preferable to processing lower grade ore from surface; however, the low-grade stockpile will be fully consumed during the Project Construction Stage.
Mining Method	Advanced mining using conventional underground mining methods no longer considered as a proposed activity during the Construction Stage.
Process Plant	Expansion of rougher flotation circuit no longer tied to a specific manufacturer to allow for flexibility and cost efficiencies.
Water Balance	Values applicable to the Process Plant Water Demand and Supply table have been revised. The water model flow schematic has been updated.
Pre-Conditioning	A single pre-conditioning drill pad located north of the Open Pit is considered sufficient to achieve Project objectives. Updated location of the pre-conditioning drill pad is presented in Figure 1-11. Updated estimates of water requirements for pre-conditioning included indicating that “approximately 50,000 cubic metres (m^3)” would be required instead of “less than 100,000 m^3.”

Project Component	Design Change and Rationale
Extraction Level and Undercut	Concrete roadways will be constructed in high-traffic extraction drives only instead of in all extraction level developments.
Power Supply	Electricity consumption estimates updated from 135 MW to 140 MW to include a potential eventual upgrade to electric mine air heating.
Concentrate Shipping	Estimates of concentrate shipping of one to two cargo ships per month added. Not mentioned in the 2023 Project Description.
Workforce	Estimates of workforce requirements were added indicating that the Project will not decrease the number of employees during operations.

1.5.3 Project Components and Activities

Block caving is an efficient means of extracting ore at depth. The method involves undercutting the rock mass, creating an artificial void within an undercut level (Figure 1-8). The undercutting of rock mass to generate the void is completed via drilling and blasting. The same technique is then used to break the rock, causing it to drop into and fill the undercut level (Figure 1-9. The broken rock mass is directed in a controlled manner into a series of funnel-shaped drawbells created in the rock, transferring the material form the undercut level to the extraction level (Figure 1-8). The rock is then removed by mobile mining equipment from the draw points to a centralized underground crusher, where the extracted rock is reduced in size before being transferred to surface (Figure 1-10).
The efficiency of the method comes from the use of gravity and ground stresses rather than chemical and mechanical means to fragment the ore, and the use of gravity rather than equipment to move and collect ore.

As the broken rock is removed from the extraction level, the rock mass above the void cannot support itself and falls into the open space or cave (Figure 1-11). As the fracturing and fragmenting of the rock in the void progresses upward through the rock mass, it eventually breaks through to the surface causing a subsidence crater, which in this case will be directly underneath the existing East Pit. The active ground movement at surface caused by the subsidence is known as the Subsidence Zone. The area outside of the subsidence zone, the Stable Zone, is not anticipated to be affected by the subsidence formation.

The cave induced subsidence is typically comprised of four zones, as depicted in Figure 1-12. These consists of the following:

- **Mobilized Zone Limit:** Corresponds to the outer boundary of the broken crater material where area or volume of broken ore moving or flowing inside the ore column. On the surface (post breakthrough), mobilize zone creates a crater zone.
- **Fracture Limit or Fracture Zone:** Large-scale surface cracking (fractured) zone consists of an area around the cave crater where the ground surface is broken and has open tension cracks, benches, and rotational blocks. The outer limit of this zone is delineated as the fracture limit.

- **Continuous Subsidence Limit:** Lies beyond the fracture limit and is where the ground surface movements occur without associated visible fracturing. The outer boundary of this zone, corresponding to zero subsidence, is not as well defined as the fracture limit because delineation in practice is a function of the precision of the monitoring system used.
- **Stable Zone:** Lies beyond continuous subsidence limit and is not impacted by caving activities.

Figure 1-8: Block Cave Mining Schematic

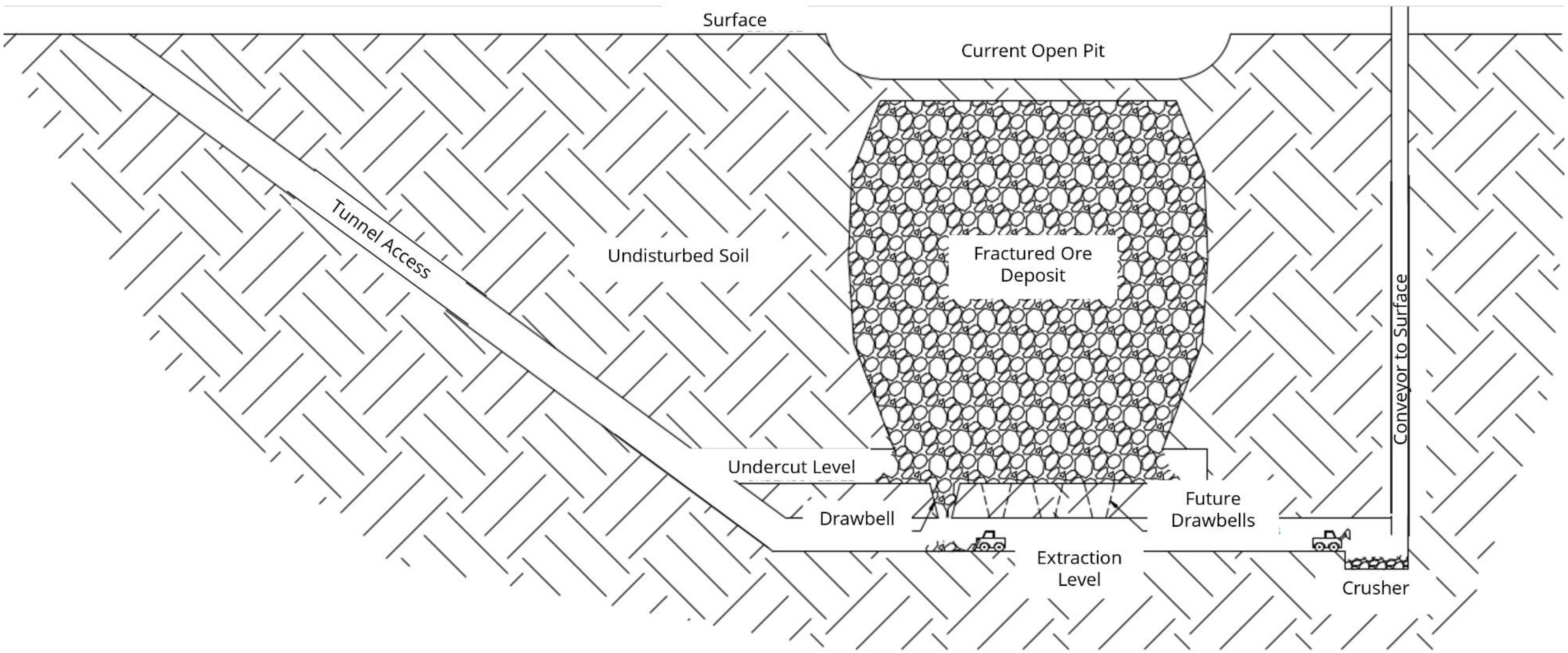
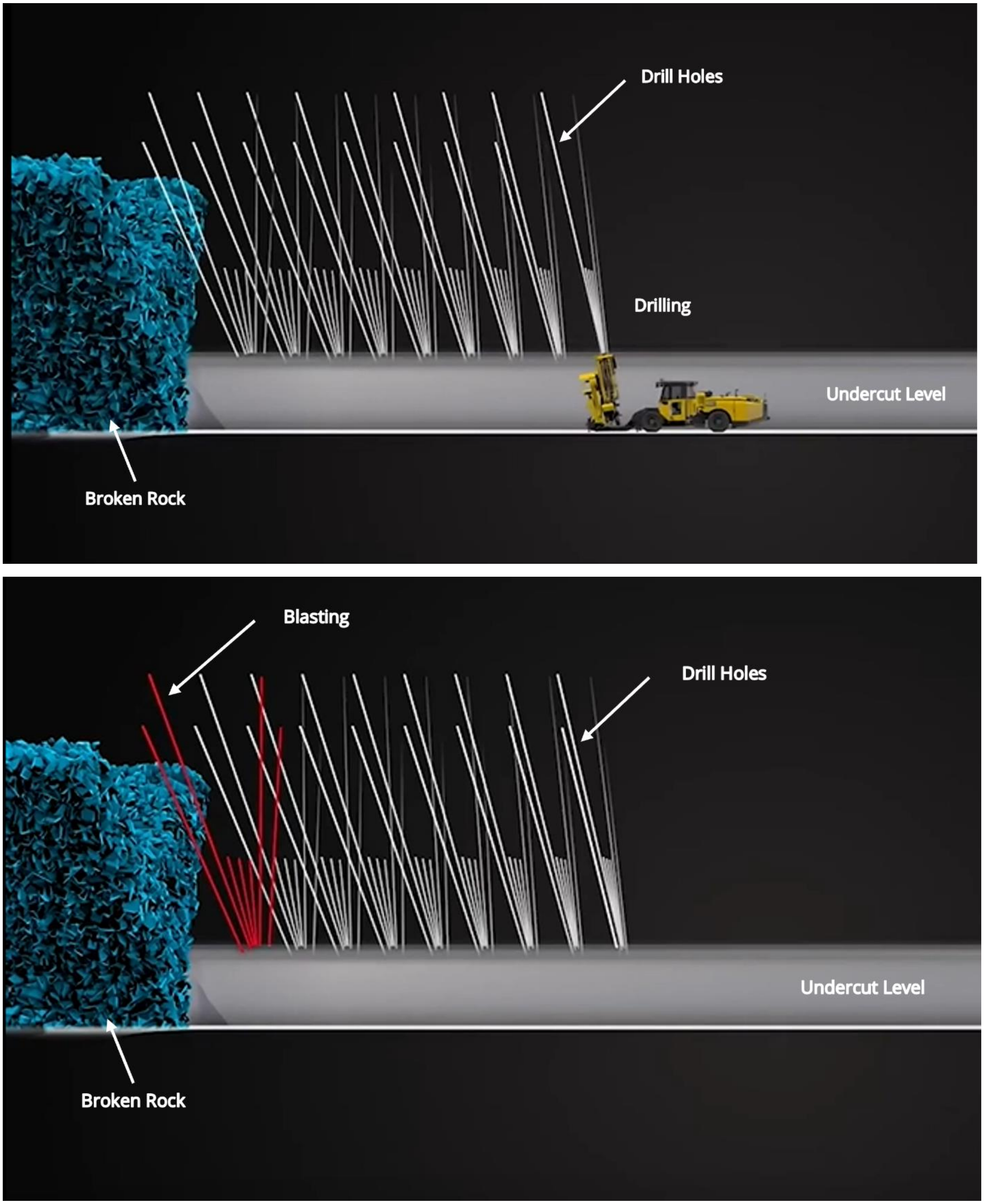
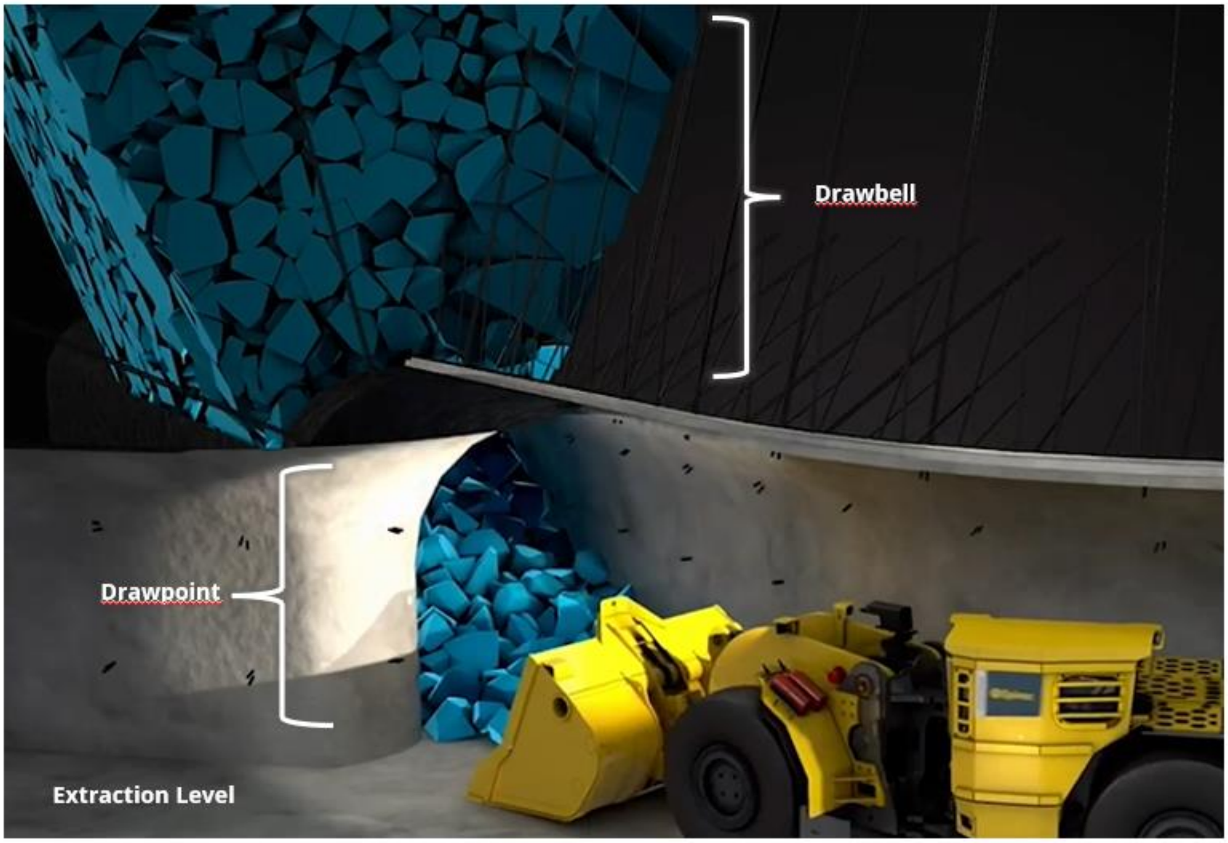


Figure 1-9: Filling the Undercut Level



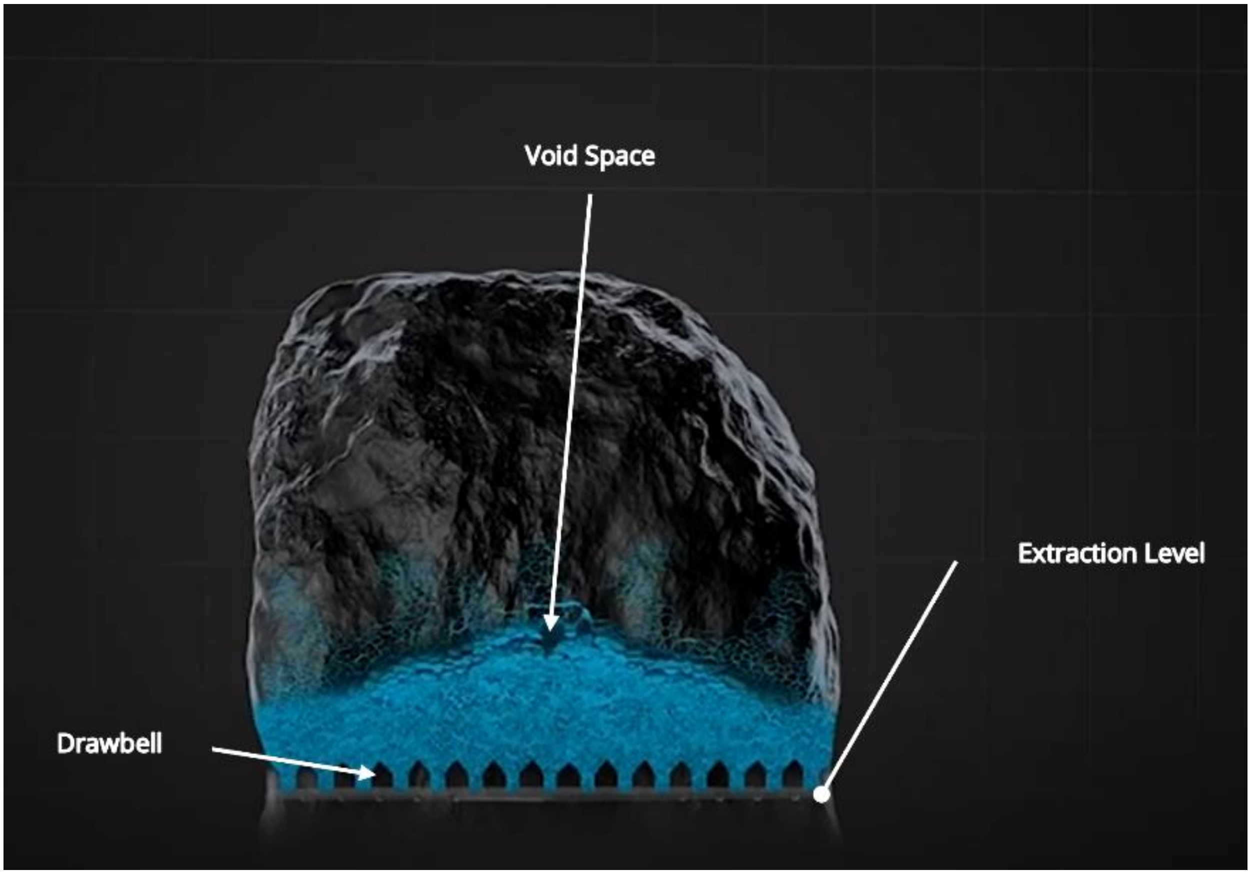
Source: Epiroc. n.d.-b.

Figure 1-10: Removing the Broken Rock from a Drawpoint in the Extraction Level



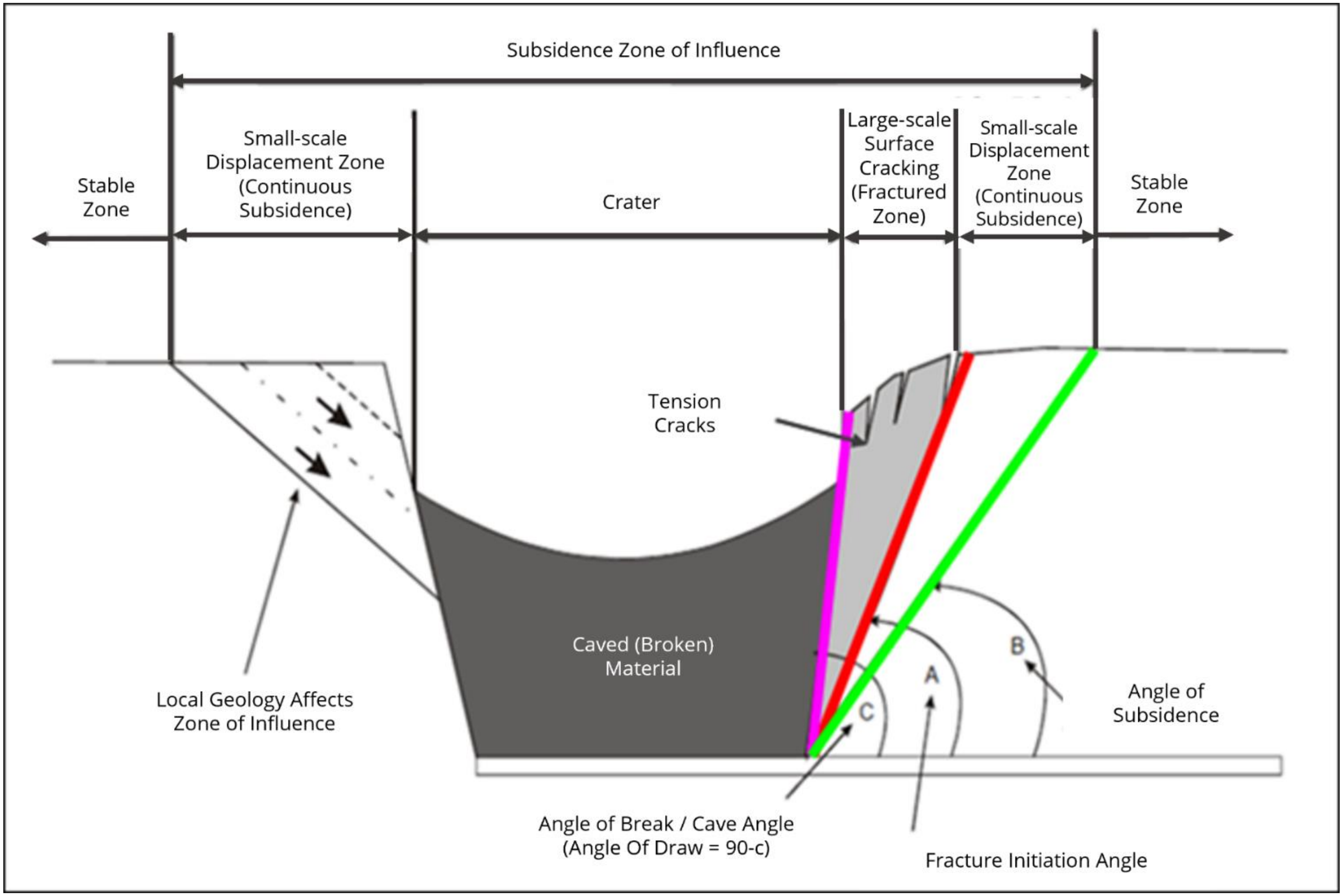
Source: Epiroc. n.d.-b.

Figure 1-11: Formation of the Void Beneath the Rock Mass



Source: Epiroc. n.d.-b.

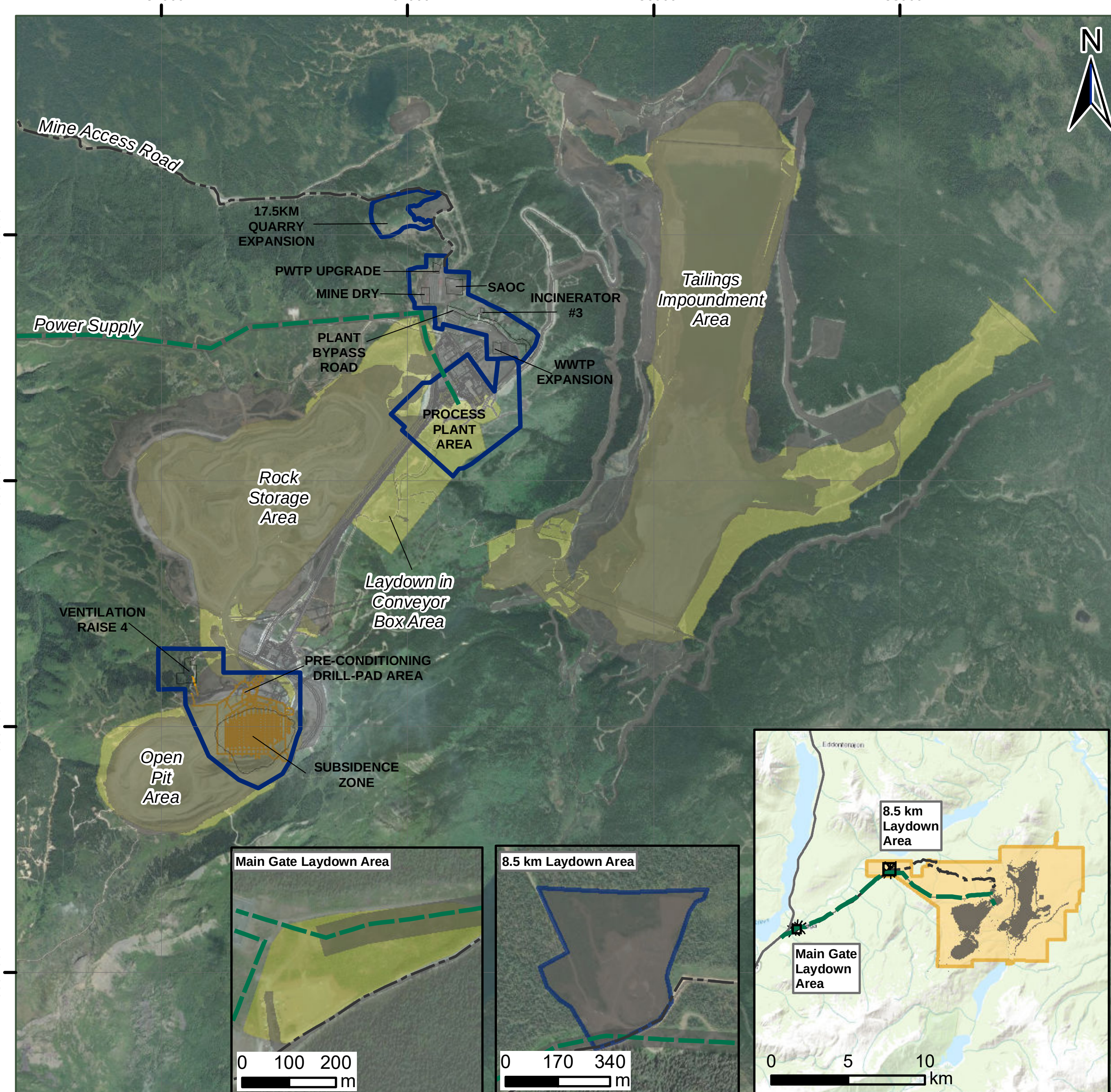
Figure 1-12: Definition of Caving-Induced Subsidence Zone



The Project will entail additional underground development, a transition from surface to underground mining, and an expansion of the process plant. New and modified surface components and activities include:

- Process plant expansion, building upgrades and laydowns, to a throughput capacity of up to 15 Mtpa.
- Upgraded and expanded camp and administrative area to support the increased workforce through Project construction, including additional freshwater wells and expanded potable water and sewage treatment.
- New ancillary infrastructure and upgrades to existing infrastructure, including a new Mine dry facility accommodating 500 people, modification to existing roads, a new road bypassing the process plant, expansion of the 17.5 km Quarry, fuel storage and distribution upgrades, electrical substation upgrades, and construction facilities, including laydown areas.
- Development of pre-conditioning drill pads and VR 4 in the vicinity of the Open Pit Area.

Figure 1-13 shows the production components of Project surface features, with existing Mine components illustrated in grey. The potential surface disturbance and the associated Project footprint areas are conceptually represented on Figure 1-14 and Figure 1-15. Extraction of water from the Klappan River has not occurred since the operation of the Mine began and will not occur in future.



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LEGEND:

EXISTING COMPONENTS

- MINE ACCESS ROAD
- 287kV TRANSMISSION LINE
- EXISTING MINE

AS PERMITTED COMPONENTS

- PERMITTED MINE AREA
- AS PERMITTED COMPONENTS

PRODUCTION COMPONENTS

- UNDERGROUND WORKS
- PROJECT FOOTPRINT

NOTES AND SOURCES:

1. THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY AND SHOULD NOT BE USED FOR NAVIGATION
2. BACKGROUND DATA FROM BC DATA CATALOGUE HTTPS://CATALOGUE.DATA.GOV.BC.CA/ ACCESSED SEPTEMBER 2023. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
3. BACKGROUND IMAGERY - MAXAR 2023
4. COORDINATES: -129.758121W, 57.727226N
5. PROJECT NTS MAP SHEET: 104H116
6. FOOTPRINT DATA SUPPLIED BY NEWMONT 05/2024
7. PWTP - POTABLE WATER TREATMENT PLANT
8. WWTP - WASTE WATER TREATMENT PLANT
9. SAOC - SITE ASSET OPERATIONS CENTRE
10. PREPARED BY SLR

0 300 600 1,200 1,800 m

SCALE 1:50,000

DATA: NAD 1983 UTM Zone 9N

GRID: NAD1983 UTM ZONE 9N

Newmont

REPORT TITLE

RED CHRIS BLOCK CAVE PROJECT - PRODUCTION PHASE APPLICATION FOR AN AMENDMENT TO EAC #M05-02

FIGURE TITLE:

BLOCK CAVE PRODUCTION COMPONENTS

FIGURE NO: **1-13**

DATE: November 29, 2024

PROJECT NO: 233.30000.00007

REV.	BY	CHK	DATE (M/DD/YYYY)	COMMENTS
0	AL	RA/JD	11/29/2024	FINAL ISSUE

GIS PATH: G:_Projects\233\233_30000_RCBC\1_Maps\RPT\202402_ProjectOverview\233_30000_PO_01-13_BlockCaveComponents.mxd

Figure 1-14: Conceptual Representation of Supporting Project Components and Associated Project Footprint

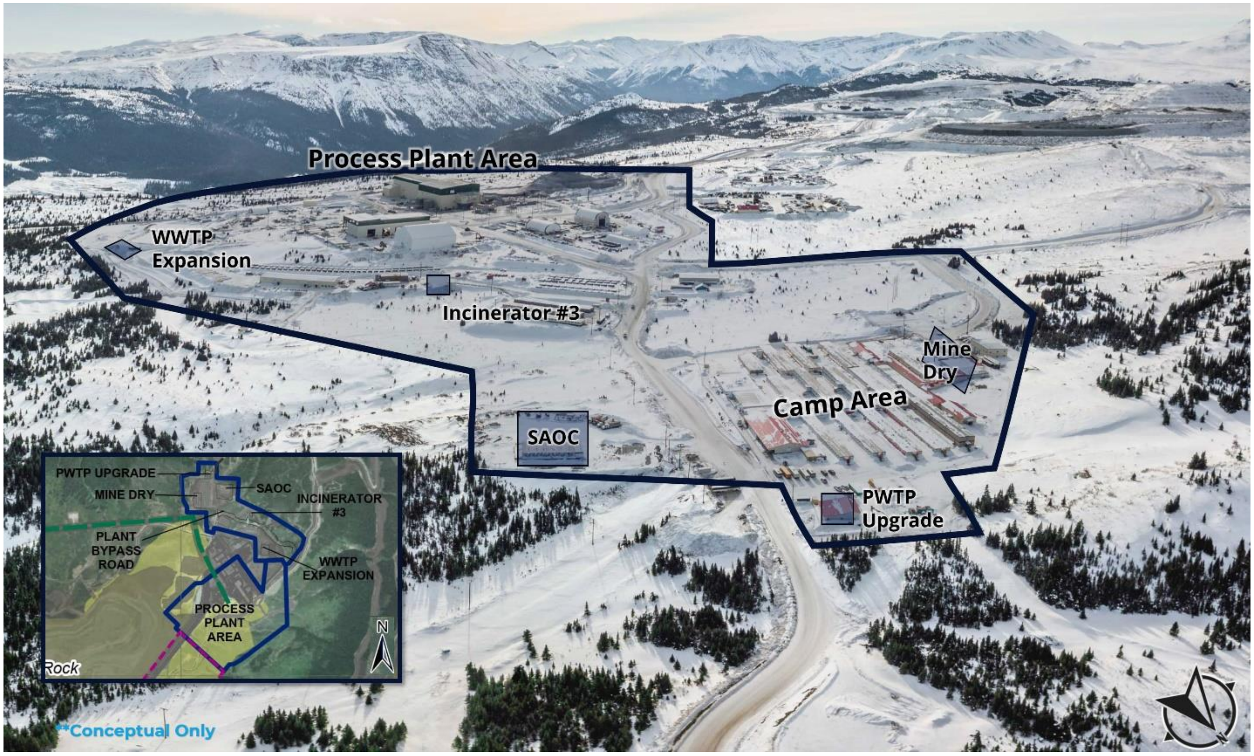
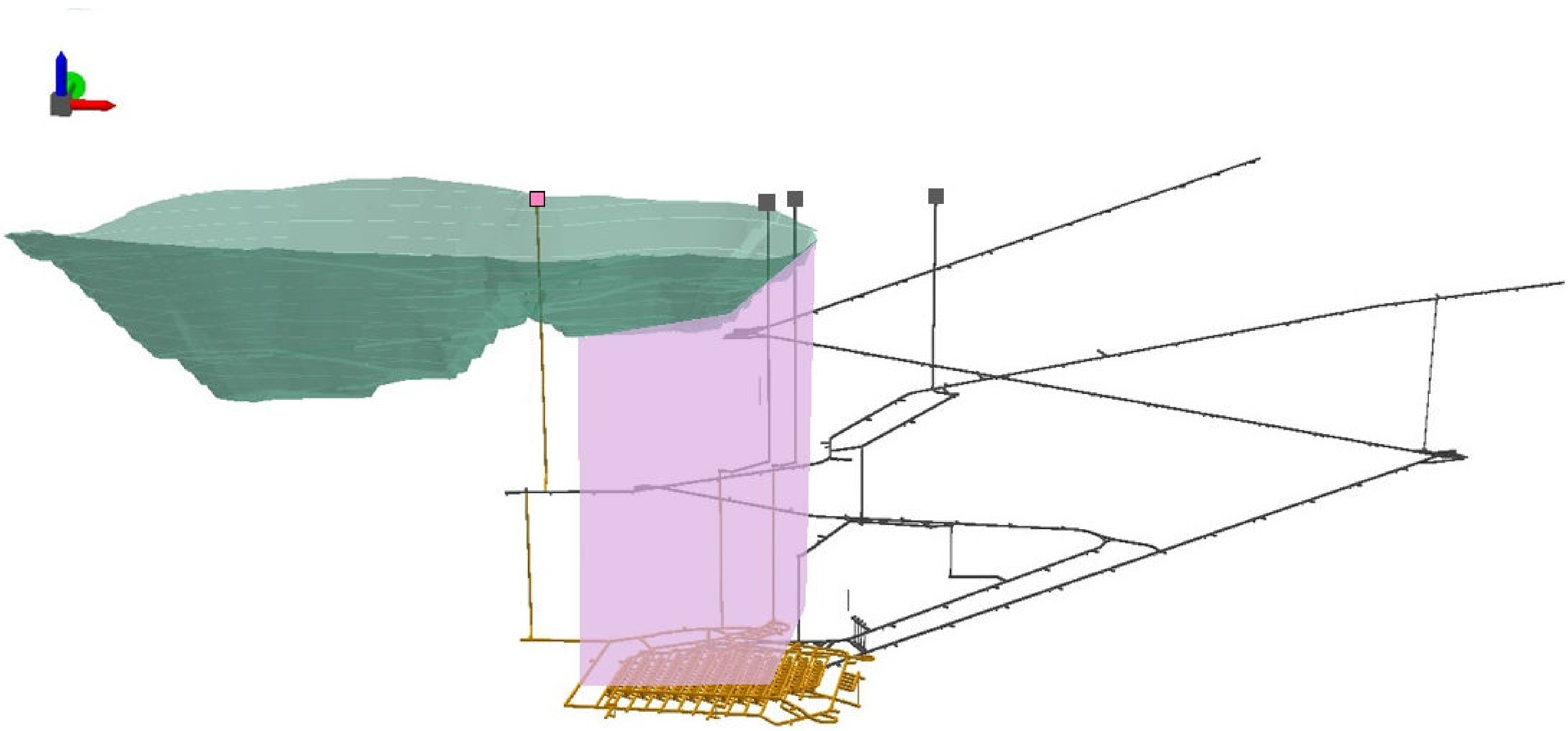


Figure 1-15: Conceptual Representation of Block Cave Components and Associated Project Footprint

Figure 1-16 shows an isometric view of the Project, which displays the existing and currently permitted Mine components in grey. Underground components and activities include:

- Development of the undercut and extraction levels below the block cave ore zone, accessed via the Naghā decline.
- The Material Handling System (MHS), which receives ore from load-haul-dumps (LHD) and consists of a coarse ore bin, crusher, fine ore bin, and feeder. The MHS is used to transfer the crushed ore to an approximately six kilometre long, three-leg conveyor to bring the ore to the process plant.
- An expanded ventilation system, which includes an additional vent raise (VR4) and additional vertical development to allow air to circulate through the Mine workings.
- An underground Mine dewatering system, where a combination of positive displacement pumps will be used to move Mine water to the surface.
- An expanded electrical distribution network, including electrical sub-stations installed in service cuddies in the extraction level.

- Fuel station, to be located on the eastern side of the extraction level, consisting of multiple bays and a maintenance access. The fuel station is also designed to accommodate potential future requirements of electric charging stations.
- Explosives magazine designed to accommodate detonators, primers, detonation cord, packaged products, and bulk explosives separated over multiple bays.
- A workshop to service the underground fleet.
- Underground roadways for general purposes suitable for heavy and light vehicle traffic.



LEGEND:

- VENTILATION RAISE 4
- UNDERGROUND WORKS
- APPROVED UNDERGROUND INFRASTRUCTURE
- OPEN PIT AREA

NOTES AND SOURCES:

1. THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY AND SHOULD NOT BE USED FOR NAVIGATION
2. ALL DATA PROVIDED BY NEWMONT
3. PREPARED BY SLR

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REPORT TITLE

RED CHRIS BLOCK CAVE PROJECT - PRODUCTION PHASE APPLICATION FOR AN AMENDMENT TO EAC #M05-02

FIGURE TITLE:

ISOMETRIC OF PROJECT UNDERGROUND MINE DESIGN

FIGURE NO: **1-16**

DATE: November 29, 2024

PROJECT NO: 233.30000.00007

REV.	BY	CHK	DATE (M/DD/YYYY)	COMMENTS
0	AL	RA/JD	11/29/2024	FINAL ISSUE

GIS PATH: G:_Projects\233\233_30000_RCBC\1_Maps\RPT\202402_ProjectOverview\233_30000_PO_01-16_Isometric.mxd

1.5.4 Project Stages for Assessment

The Project will build upon the Exploration and Pre-Production phases of block caving, as described in Section 1.4.7 and is divided into four stages:

- **Construction:** Includes underground development (large chambers, ventilation raise #4, extraction and undercut layers), the installation of the MHS and other underground infrastructure, expansion of the process plant to raise throughput to a nominal 15 Mtpa, expansion of the electrical substation and accommodations camp, and pre-conditioning of the ore zone. Waste rock generated during the development of the underground will be placed in the RSA. Late stages of underground development will generate ore that will be stockpiled for processing.
- **Operations:** The time period during which the mill will process ore at an approximate increased rate of 15 Mtpa; which will be supplied by ore from underground mining. Operations at this throughput will continue until the TIA embankment crest elevation reaches its permitted limit of 1,180 masl. The Project does not propose expansion of the TIA or the RSA beyond what is currently permitted.
- **Closure:** Consists of active Mine closure activities, including the dismantling and removal of block cave surface and underground infrastructure and reclamation of disturbed areas to promote long-term chemical and physical stability.
- **Post-Closure:** Post-closure will continue indefinitely following completion of the active closure measures and will consist mainly of water management (including, potentially, active water treatment) and environmental monitoring activities.

The four stages of the Project are described in the following sections.

1.5.5 Construction Stage

During Project construction, the process plant will be fed by either a combination of or a sole source of ore produced by surface (i.e., open pit and/or stockpiles) and underground activity. Permitted activities including water and tailings management will continue. Project construction will involve the following main components/activities:

- Pre-conditioning of the ore zone;
- Development of underground infrastructure to support block cave mining;
- Process plant expansion - building upgrades and laydowns; and
- Supporting infrastructure upgrades.
- There is a risk of a production gap at Red Chris occurring during the construction stage due to the anticipated timelines associated with:
    - Obtaining regulatory authorizations required to initiate the construction stage,
    - The timeline to construct and ramp up ore production from the underground, and
    - Current anticipated timeline to exhaust ore production from current surface Mine plan.

The potential production gap would materialize if there is not sufficient surface development ore to feed the process plant until underground ore is available, and would coincide with a reduction of operational activities at Red Chris.

1.5.5.1 Laydown Areas

Construction staging and laydown areas will be required to facilitate the movement and storage of the equipment required for construction, as illustrated on Figure 1-13. Two permitted laydown areas will be utilized, one in the conveyor box cut area and the other at the 8.5 km laydown located along the north side of the Mine access road. One new laydown area will additionally be required and is proposed near the main gate where the Mine access road meets Highway 37 (Figure 1-13).
The underground construction equipment and materials will be generally transported via Naghā decline between surface and underground.

1.5.5.2 Pre-Conditioning

Pre-conditioning for the Project refers to a process of pumping water at high pressure from surface through predeveloped drill holes to a targeted volume of rock, which weakens the rock mass by fracturing it. Additives including silica sand, friction reducers, and guar gum may be added to water used in the pre-conditioning process. The water is pressurized and isolated at a specific location along the drill hole by hydraulic or mechanical packers. Once initiated, fractures propagate radially in the direction of the maximum principal stress and grow at a rate proportional to the rate of water pumped at constant pressure.

NRCML has identified several potential pre-conditioning pad locations, located around the north end of the periphery of the Open Pit. The current planning basis is that several pads will be required for pre-conditioning the ore zone. The pre-conditioning drill pad area, shown on Figure 1-13, includes the areas in which the drill pads and associated laydown areas for equipment and materials will be located.

The water for pre-conditioning is anticipated to be sourced from existing extraction wells in the SV that provide makeup water for the process plant. Approximately 50,000 m^3 of water will be required.

Most of the residual water will be absorbed by the newly created rock surfaces and rock fines via surface tension and capillary forces, post pre-conditioning. This water, held in the pre-conditioning zone, will ultimately be removed to the process plant through mining of the block cave. Any water that is not transported with the ore will gravity drain and be captured by the underground dewatering system and pumped out of the underground mine.

NRCML plans to pre-condition the rock mass upon receipt of approvals. Pre-conditioning will take approximately four months to complete. Additional pre-conditioning is also planned during underground construction using drill and blast or alternative methods.

1.5.5.3 Open Pit Area

Open pit mining may continue during the construction stage. Once the Open Pit operations cease, the surface primary crusher will be placed into care and maintenance. Dewatering of the Open Pit will continue until the underground cave surfaces during the operations stage. This will be done to reduce the risk of uncontrolled water flow into the underground workings (Chapter 13.0 Accidents and Malfunctions).

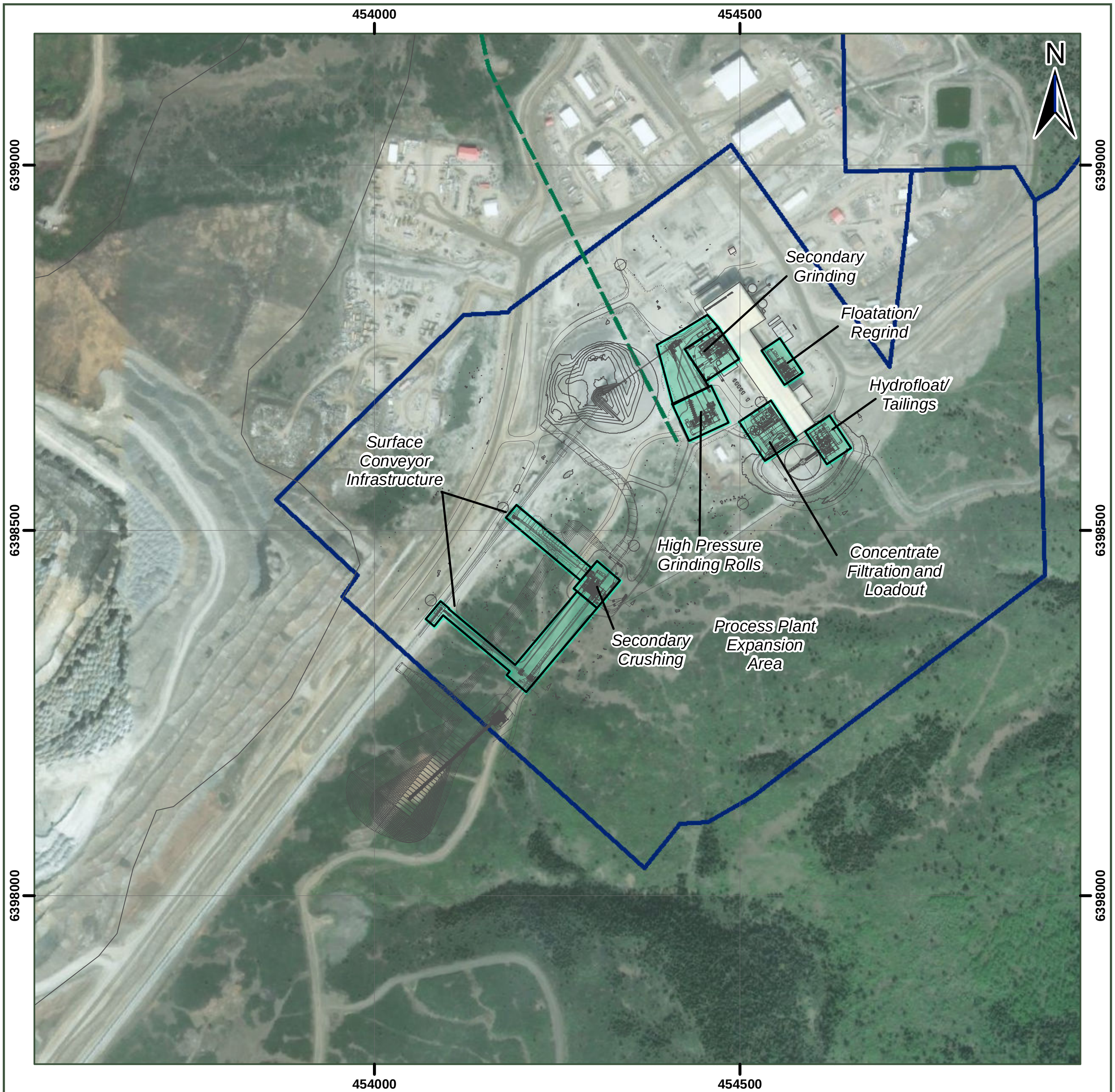
1.5.5.4 Rock Storage Area

The areal extent of the RSA will remain unchanged, given that most of the surface development has already taken place, but its final height will be lower. Ore encountered during underground development will be placed and stored in the RSA for processing at a later date.

During the Project construction stage, and once mining from the Open Pit ceases, it is anticipated that low grade ore currently stockpiled within the footprint of the RSA will be processed through the process plant. It is currently expected that the existing low-grade stockpile will be fully consumed during the Project construction stage.

1.5.5.5 Process Plant

The process plant will be upgraded to process the harder ore from the block cave and to achieve the Mine plan throughput of 15 Mtpa. These modifications will require an approximate 12 ha of previously undisturbed lands for the process plant expansion (building upgrades and laydowns), the new conveyor area, and some construction lay-down areas (Figure 1-17).



LEGEND:

- PROCESS PLAN EXPANSION PLAN
- 287kV TRANSMISSION LINE
- PROJECT FOOTPRINT
- PLANNED PROCESS PLANT COMPONENTS

0 50 100 200 300 m

SCALE 1:8,000

DATA: NAD 1983 UTM Zone 9N

GRID: NAD1983 UTM ZONE 9N

Newmont™

REPORT TITLE

RED CHRIS BLOCK CAVE PROJECT - PRODUCTION PHASE APPLICATION FOR AN AMENDMENT TO EAC #M05-02

FIGURE TITLE:

PROCESS PLANT EXPANSION AREA

FIGURE NO: **1-17**

DATE: December 13, 2024

PROJECT NO: 233.30000.00007

REV.	BY	CHK	DATE (M/DD/YYYY)	COMMENTS
0	AL	RA/JD	11/29/2024	FINAL ISSUE
1	AL	RA/JD	12/13/2024	PROJECT FOOTPRINT CORRECTED AROUND THE PROCESS PLANT AREA

NOTES AND SOURCES:

1. THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY AND SHOULD NOT BE USED FOR NAVIGATION
2. BACKGROUND DATA FROM BC DATA CATALOGUE HTTPS://CATALOGUE.DATA.GOV.BC.CA/ ACCESSED SEPTEMBER 2023. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
3. BACKGROUND IMAGERY - MAXAR 2023
4. COORDINATES: -129.758121W, 57.727226N
5. PROJECT NTS MAP SHEET: 104H116
6. EXPANSION DATA SUPPLIED BY NEWMONT, 09/2024
7. PREPARED BY SLR

Expansion and upgrades to the existing comminution circuit include:

- Addition of secondary crushing;
- Addition of high-pressure grinding rolls;
- Additional ball mill; and
- Additional regrinding capacity achieved using vertical stirred mill technology.

Modifications to the flotation circuit include:

- Expanded rougher flotation circuit;
- Expanded cleaner circuit;
- Coarse particle flotation technology will be used to mitigate effects of course grind; and
- Addition of a cleaner Jameson Cell.

Concentrate dewatering capacity will be increased through the addition of a new concentrate thickener and filtration equipment.

1.5.5.6 Tailings and Water Management

The TIA and water management systems will continue to operate through the construction stage of the Project. The transition from open pit mining to underground mining may include a period of low activity during a potential production gap but will not necessitate any changes to the current tailings management system. The process plant expansion and the construction of the tailings thickener (already permitted, see Section 1.4.4) will necessitate limited changes to the tailings distribution and management system. As the processing throughput increases to 15 Mtpa, volumetric flows in the tailings circuit will increase, which in turn will increase slurry velocities in pipelines and require turn up of various pumps such as tailings cyclone feed and tailings thickener underflow. The number of operating cyclones will also increase in the primary and secondary tailings cyclone stages as throughput increases to the full design rate.

1.5.5.7 Power Supply

Project development will not necessitate modifications to the Tatogga substation and the dedicated power line to site. To accommodate the project's power requirements, the 287 kV main substation (adjacent to the process plant) will be expanded, the existing 25 kV site power distribution network will be modified, and emergency generation capacity will be upgraded. NRCML is working with BC Hydro on the upstream supply of service to the Mine.

1.5.5.8 Supporting Infrastructure and Activities

Activities on site will facilitate development of supporting infrastructure required to support the Project through construction. These activities and infrastructure installations and upgrades include:

- Installation of communication infrastructure underground.
- A road bypassing the process plant.
- Substation upgrade to increase electrical power consumption capabilities.

- Additional diesel generators for underground emergency power.
- Construction of an underground fuel station and explosive storage.
- Increasing camp occupancy from 1,200 to 1,500 people.
- Addition of an incinerator.
- STP changes and PWTP upgrades.
- Construction of a new Mine dry facility to accommodate 500 people.
- Addition of a Site Asset Operations Centre (SAOC).
- Expansion of the 17.5 km Quarry.
- Use of laydown areas in existing permitted areas.
- Installation of a temporary batch plant near the conveyor portal / process plant.

1.5.5.9 Underground Infrastructure

Development of additional underground infrastructure will be required during the construction stage to facilitate underground Mine operation, including:

- Mass excavations;
- Crusher and tie-in to MHS;
- Underground water pump station;
- Workshop;
- Extraction and undercut levels; and
- Underground ventilation system.

1.5.5.9.1 Mass Excavations

Three mass excavations totaling approximately 300,000 t of rock movement will be required for the installation of the following Project components:

- **Crusher:** This forms part of the MHS. The crusher will be located adjacent to the block cave footprint with a total excavation volume of approximately 55,000 m^3 or 155,000 t of rock movement including accesses.
- **Workshop:** This accommodates equipment servicing, tire change, washdown, meal room, washrooms, storage, and electrical support facilities at a depth of 475 masl with a total excavation volume of approximately 25,000 m^3 or 70,000 t of rock movement including accesses.
- **Pump Station:** This will house the permanent and primary pumping facilities to facilitate pumping of mine water to surface. Anticipated location at a depth of 435 masl with a total excavation volume of approximately 29,000 m^3 or 80,000 t of rock movement including accesses.

1.5.5.9.2 Extraction and Undercut Levels

The Mine design is premised on the development of the extraction and undercut levels below the ore zone at approximately 500 masl and 525 masl, respectively. This is approximately 1,000 mbgs. These levels will be established via the standard mining practice of drilling and blasting.

The undercut level is the void into which ore and rock fall once the ore and rock above have been fractured. Once a sufficient ore body span is undercut, known as the critical hydraulic radius, the caving process initiates and the undercutting process continues, resulting in cave propagation across and upward into the ore body.

Below the undercut level, the extraction level is where infrastructure and production drawpoints will be housed. A drawpoint is an underground opening at the bottom of a cone-shaped void through which broken ore from the cave is extracted. The caved rock drops into the drawpoints to be hauled by LHD to the primary crusher. A perimeter drive will be developed around the outer region to provide ventilation and equipment access to working areas.

The undercut and extraction levels will be graded to allow water to collect in sumps away from LOM infrastructure and pumped to the surface via the pump station. Concrete roadways will be constructed in the high-traffic extraction drives on the production level to maintain efficient operating conditions and to reduce equipment wear and road maintenance.

The undercut and extraction levels will be developed in parallel and will take approximately three years to complete.

1.5.5.9.3 Underground Mobile Equipment

The mobile equipment used in the Open Pit is unsuitable for use in the underground Mine workings. The underground mobile equipment fleet for the construction and operations stages will include:

- LHD loaders
- Loader-mounted rock breakers
- Water cannons
- Secondary drills
- Graders
- Water trucks
- Drum rollers
- Service trucks
- Skid steer cleanups
- Integrated tool carriers.

1.5.5.9.4 Material Handling System

Construction activities related to the MHS include the installation of a central tipple with an ROM ore bin, an apron feeder, a single underground crusher, and a series of conveyors to transport crushed ore to the surface. The crusher will be located to the northeast of the footprint, and outside of the effects of mining-induced abutment stress. The conveyor system will occupy the conveyor decline (currently under construction). It will be approximately 6 km long and will include two transfer stations located at intermediate levels. It should be noted that some of the MHS that is to be constructed will be on the surface.

1.5.5.9.5 Underground Ventilation System

Primary ventilation consists of four raises to surface and lateral connections. Three raises and their associated lateral connections and surface expression were permitted during the exploration and pre-production phases. The fourth raise, VR4, is included and will be constructed as part of the Project. Ventilation transfer drifts and underground raise extensions will be required to distribute fresh air across the production area and support operations.

Perimeter ventilation distribution is required on both the extraction and undercut levels to provide primary ventilation distribution, placement of electrical infrastructure, refuge chambers as well as second means of egress for the development of the footprint production areas as well as production activities.

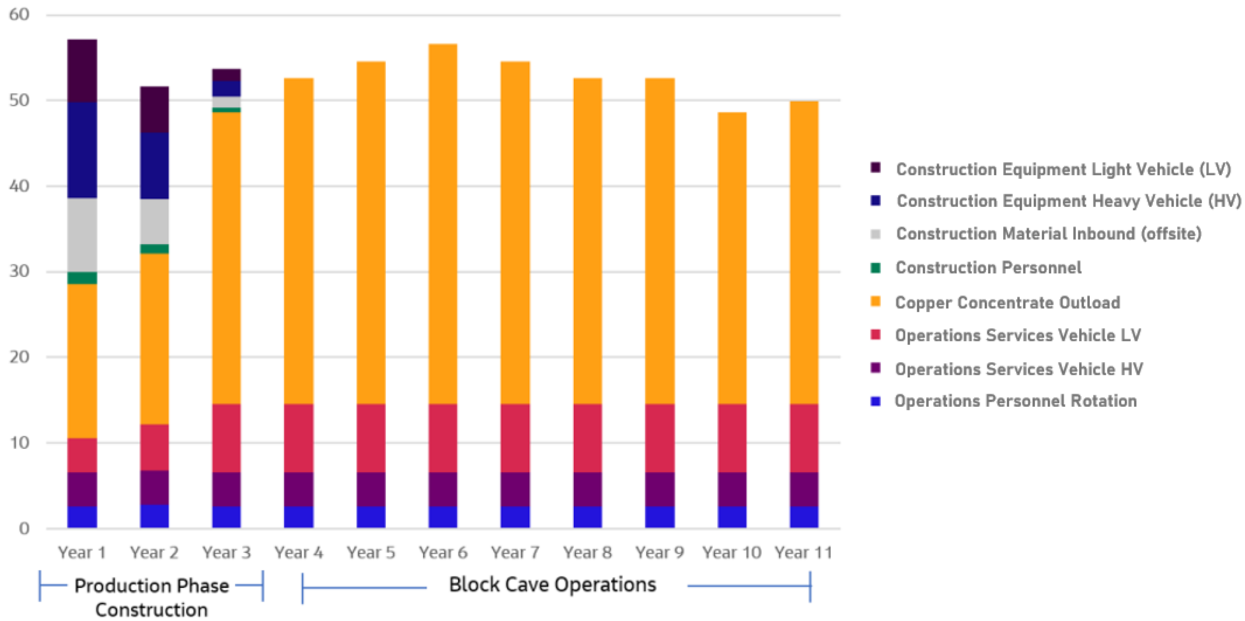
1.5.5.9.6 Underground Water Management

Construction of perimeter drive sumps and the main pump station will be completed to manage water flowing into the underground Mine and excess water from production activities. Mine water will be collected in perimeter drive sumps, as noted above, and pumped to the main pump station. This station is located near the conveyor transfer station below the extraction level. The main pump station will pump water to the process plant via a rising main.

1.5.5.10 Regional Infrastructure

During Project construction, road traffic will increase on Highway 37 between Red Chris and the Meziadin Junction due to the inflow of construction equipment and material, and between Red Chris and Dease Lake for employee rotation transport. Construction traffic is anticipated to peak in Year 1 and decline in Years 2 and 3 as construction activities wind down (Jacobs 2024a). Traffic on Highway 37 between Red Chris and Meziadin Junction is anticipated to increase from the current levels due to the inflow of construction equipment, while traffic on Highway 37 between Red Chris and Dease Lake is also anticipated to increase to accommodate transportation of the workforce (Jacobs 2024a). Traffic volumes (average month-return trips) for both the construction and operations stages are illustrated on Figure 1-18, and detailed in Appendix 1-A.

Figure 1-18: Forecasted Construction and Operations Traffic Volumes



Source: Jacobs 2024a

Notes: Traffic data presents off-site traffic (average month – return trips).

During construction, the number of flight days for transporting personnel to the region is anticipated be approximately five days per week with the potential to reach seven days per week on an as-needed basis. Flight schedules for Red Chris have ranged between three to five days per week depending upon operational needs and flight occupancy.

1.5.6 Operations Stage

The transition from open pit to underground mining will take several years during the construction and early operations stages. Once complete, the block cave operation will feed ore to the process plant at a nominal rate of 15 Mtpa. Operations will continue until the TIA reaches its permitted capacity, by which time approximately 300 MT of tailings will be in storage. The main activities during the operations stage are described in the following subsections.

1.5.6.1 Open Pit Area

As underground mining advances, a subsidence will develop over time at surface. The subsidence zone is anticipated to be entirely within the existing disturbed Mine footprint, and primarily within the Open Pit area (Figure 1-15). The area outside of the subsidence zone, the Stable Zone, is not anticipated to be affected by the cave formation.

1.5.6.2 Rock Storage Area

Waste rock production from the underground Mine will be reduced after the construction phase is completed. PAG rock from the underground will be placed in the RSA. The area used will be reduced as low-grade material stored in the RSA is depleted.

1.5.6.3 Process Plant

The process plant will be upgraded to enable a throughput of 15 Mtpa. Owing to the increased throughput and higher-grade ore from block cave mining, concentrate production will increase during the production stage. Annual concentrate production will peak at approximately 315,000 DMT and will average approximately 287,000 DMT over the period that the process plant will operate at 15 Mtpa.

The reagents utilized for the expansion are largely as per the existing process plant.

1.5.6.4 Tailings and Water Management

The change in mining method and the process plant modifications associated with Project development will not result in any fundamental changes to tailings and water management at Red Chris.

1.5.6.4.1 Tailings Impoundment Area Operation

The TIA will continue to operate as authorized, with the following potential changes in tailings management and deposition:

- The tailings deposition rate will increase in line with the proposed increase in process plant throughput from 13.9 Mtpa (as permitted under the *Mines Act* Permit) to approximately 15 Mtpa on an average basis.
- Tailings rheology may change as the process plant modifications will lead to a coarser grind, and the density (i.e., the ratio of solids to water) of the NAG tailings slurry will increase owing to the operation of the tailings thickener.

Tailings geochemistry will change as the deep ore to be mined by block caving is, on average, lower in pyrite (a key contributor to acid rock drainage and metal leaching potential) than the ore mined in the Open Pit. This implies that the mass ratio of NAG to PAG tailings, which are deposited separately in the TIA, will increase.

These changes will necessitate modifications to tailings deposition planning.

1.5.6.4.2 Site Water Balance and Water Management

Figure 1-19 shows a schematic of the site water balance during the operations stage. This schematic illustrates the structure of the water quality modelling that forms the basis for the effects assessment on the water-related Valued Components (VC) presented in Chapter 11.0 Valued Components Effects Assessment.

The water balance during the operations stage will differ from that described in Section 1.4.4 in relatively minor ways. For instance, water flows from the Mine will increase in time due to the depth of the underground development (the undercut and extraction levels will be developed at approximately 1,000 mbgs), exceeding the amount of water pumped from the Open Pit at present. Also, the addition of the tailings thickener (currently in construction) will reduce the volume of water discharged to the TIA with the NAG tailings stream as the thickener overflow will be recycled directly to the process plant.

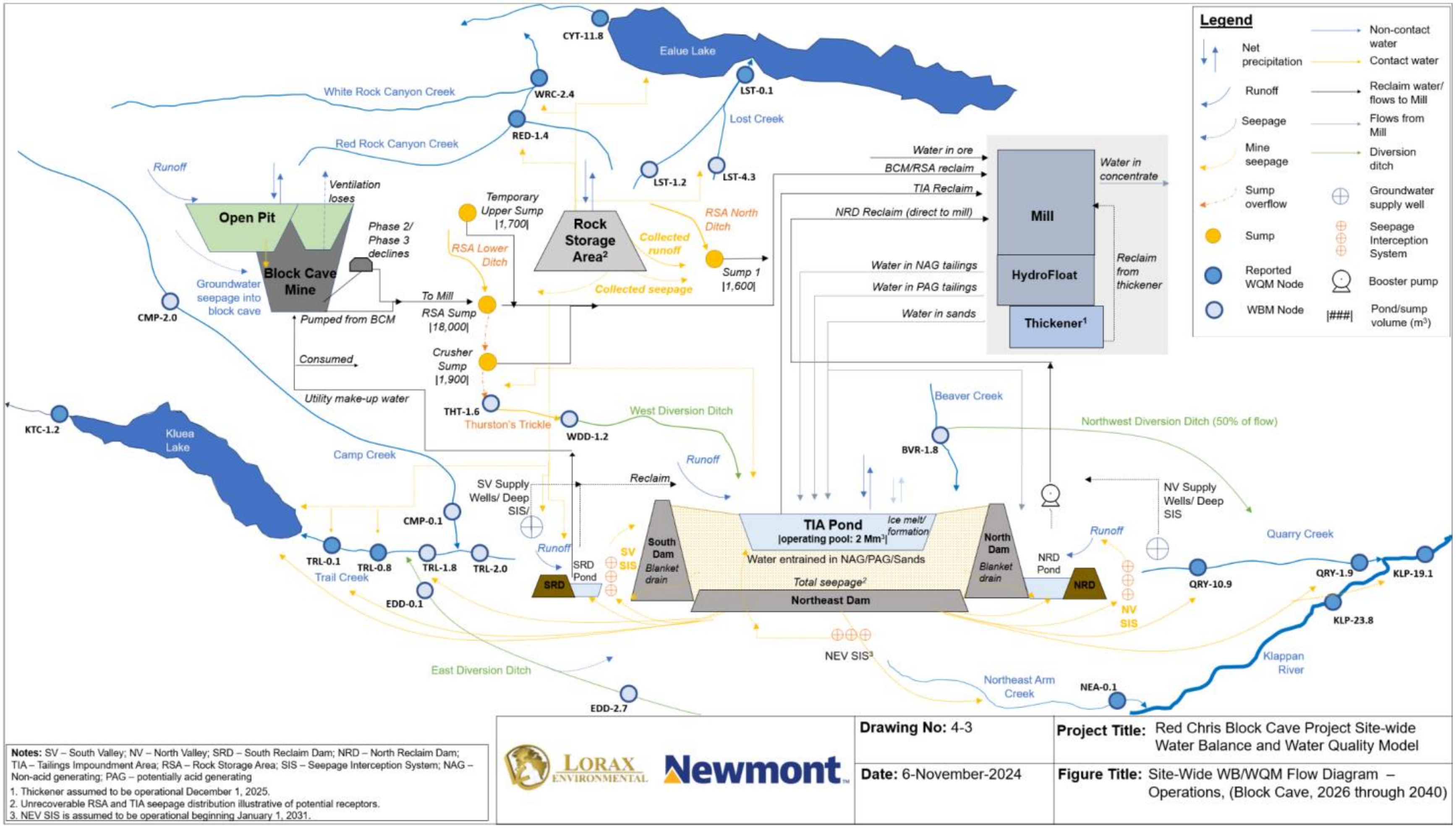
Process plant makeup water will continue to be sourced from the deep aquifer (Section 1.4.4). Table 1-5 lists the main sources of water for industrial use and average annual quantities to be supplied. Note that additional water use requirements to support the proposed increased mill throughput will be met principally through ongoing initiatives to improve water management in the TIA, including the tailings thickener. Considering ongoing water management initiatives, the *Block Cave Site Wide Water Balance and Water Quality Model* predicts that the yields from the deep aquifer well fields and the use of recycled water are sufficient for Block Cave operations at 15 Mtpa (Lorax 2024).

Table 1-5: Operations Stage Site Water Balance

Process Plant Water Demand and Supply	
Water Demand (including underground utility water)	54.9 Mm^3/y*
Water Supply	
Tailings thickener overflow recycled to process plant	31.0 Mm^3/y
Underground dewatering (including Open Pit and subsidence zone)	1.8 Mm^3/y
Water recycled from RSA	1.0 Mm^3/y
Water recycled from TIA	12.6 Mm^3/y
Water recycled from NRD pond	5.0 Mm^3/y
Groundwater pumped from production wells (make-up water)	3.4 Mm^3/y
Total	**54.9 Mm^3/y**

Source: Lorax (2024b).
Notes:
*Mm^3/y = Million cubic metres per year.

Figure 1-19: Water Balance and Water Quality Assessment Flow Diagram for Red Chris, 2026 through 2040



Source: Lorax 2024.

1.5.6.5 Power Supply

The consumption of electricity at Red Chris will increase during the operations stage, mainly due to increased demand from the expanded process plant, the operation of the crushed ore conveyor (which will transport ore a vertical distance of approximately 1,000 m), and the eventual upgrade to electric Mine air heating. NRCML estimates that the Mine load will increase from the current 48 MW to 118 MW and, with the implementation of electric Mine air heating, to 140 MW.

1.5.6.6 Supporting Infrastructure and Activities

Infrastructure upgrades implemented during construction will be utilized for operations, including the following:

- **Camp area**: The existing camp will be upgraded and expanded to support a maximum occupancy of 1,500 people. Camp accommodation upgrades will include the addition of a third incinerator and expansions to the sewage treatment and potable water treatment systems. Potable water is sourced from shallow aquifer wells in the vicinity of the accommodations camp on the plateau. The increase in camp occupancy from 1,200 to 1,500 people is anticipated to generate a proportional increase in potable water consumption in the camp. Changes to the existing medical facilities are not anticipated as they will be sufficient to support the Project's needs.
- **Communications systems upgrades:** Communications infrastructure will be installed underground to connect fixed equipment, people, mobile equipment, and monitoring devices.
- **SAOC:** An SAOC will be built, comprising managerial offices as well as an operational control center to manage daily and emergency operations. The SAOC will have the ability to support the planned utilization of remote underground mobile equipment operations, as well as potential future utilization of autonomous and semi-autonomous Mine loader operations.
- **Mine dry facility:** A new Mine dry to accommodate 500 people will be built near the existing accommodation camp. The facility will include a centrally located common area that will accommodate the changing and showering facilities, laundry and lamp room.
- **Fuel storage and distribution upgrades:** The existing diesel fuel and propane infrastructure will be maintained for contractor and ongoing surface fueling needs. Diesel will be transferred underground from the surface facility using fuel delivery trucks. Propane and electricity at surface will be used to heat the fresh air for the underground ventilation system.
- **Haul and service roads:** A new service road bypassing the process plant will be constructed. Existing roadways around the process plant will be upgraded and resurfaced to suit the new facilities. Minor widening and resurfacing of existing access and haul roads will also occur.

- **Quarry extension**: The 17.5 km Quarry is located north of the camp and administration areas and near Beaver Creek. The 17.5 km quarry is intended to provide NAG material for concrete and shotcrete sand, in addition to the aggregate needs for both the Block Cave Project and the longer-term underground precast concrete panel production for the underground drives. It will also provide material for ancillary services.
- **Topsoil stockpiles:** There are additional and expanded soil stockpiles being created/used due to civil works during construction. Approximately 0.02 ha soil will be added to existing topsoil stockpiles.
- **Preparation of shotcrete and concrete:** One temporary shotcrete/concrete batch plant will be required for the construction of surface facilities and underground civil works and will be located near the process plant. The batch plant will be decommissioned when construction is complete. The existing batch plant located near the Nagha Portal will remain in operation, with low use, during the production stage.

1.5.6.7 Underground Infrastructure and Mining

1.5.6.7.1 Ore Extraction

The extraction level of the underground network is the level where infrastructure and production drawpoints will be housed. A network of roads will be found on this level. LHDs will be used to extract ore from drawpoints and tram it to a central bin with five dump locations.

1.5.6.7.2 Materials Handling System

Ore will be stored in an ROM ore bin, from where it will be fed via an apron feeder into the crusher. The crushed ore will fall to a crushed ore bin and will be transferred by an apron feeder onto a collection conveyor, which discharges onto the first of three trunk conveyors that will transport ore to surface via the conveyor decline (currently in development). The conveyor will deliver crushed ore to the covered course ore stockpile adjacent to the process plant.

1.5.6.7.3 Underground Water Management

Underground water pumping requirements will increase from initial flows related to development of underground infrastructure to higher flows as the cave progresses. After breakthrough occurs between the Open Pit and the block cave, precipitation (rain and snowmelt) and groundwater infiltrating through the base of the Open Pit and fractured rock (natural fractures and those developed through pre-conditioning) will contribute to water collecting in the underground mining area, to be pumped to surface.

The underground water management system will be developed based on model estimates. The planned water management capacity will range from approximately 200 m^3/hour during initial development to approximately 1,500 m^3/hour during peak production. This maximum rate allows for a 24-hour peak surge of a 1-in-100-year precipitation event. On average, hydrogeologic and water balance modelling indicates that the block cave zone will generate approximately 2.5 Mm^3 of groundwater annually to be pumped from the underground mine.

Mine water will be collected in perimeter drive sumps and pumped to the main pump station located near the conveyor transfer station below the extraction level. The pump station will pump water to the process plant via a rising main.

1.5.6.8 Regional Infrastructure

Transport of personnel: Transportation of the workforce to site will be done in a similar manner, and at a similar volume as currently done and described in Section 1.4.8. The level of flight activity will be similar to the current operation. An approximate 1% change in traffic volume associated with the Project on Highway 37 to the north is anticipated.

Transport of concentrate: The current transport route will be used for the Project and follows Highway 37 south to Meziadin Junction and Highway 37A to Stewart. An approximate 10% increase in traffic volume along Highway 37 south of the Mine, and an approximate 4–8% increase of traffic volume is anticipated on Highway 37A (Jacobs 2024a). Jacobs (2024a) notes that concentrate haul trucks are forecasted to make up most Mine traffic traveling these sections of highway, and that the increases correlate to the higher number of haul trucks forecasted to be traveling to the Port of Stewart following the construction phase (Jacobs 2024a).

Shipping of concentrate: The increase in concentrate production associated with the Project would result in increased concentrate handling at the Terminal. The existing storage facilities at the Terminal will manage the anticipated increase in Red Chris concentrate production rates, associated with the Project, without modification. Similar to existing operations, the frequency of vessel traffic related to the current operation of Red Chris will be correlated with the efficiency of hold utilization on board the carriers.

1.5.7 Closure and Post-Closure

During the closure and post-closure stages, NRCML will undertake active closure measures, including demolition of infrastructure, as appropriate, in accordance with the permitted Five Year Mine Plan and Reclamation Plan (NRCML 2021), followed by an indefinite post-closure stage during which site activities will be limited primarily to water management and monitoring.

1.5.7.1 Reclamation and Closure Plan

1.5.7.1.1 Social Closure Planning

The Project will develop and maintain a stage-appropriate social closure plan that incorporates the socioeconomic and sociocultural aspects of the immediate pre-closure period, decommissioning, and post-closure monitoring, and maintenance strategies. As described in Section 1.4.8.1, NRCML in collaboration with the Tahltan is in the process of developing and End Land Use and Social Closure Plan (ELUSCP) for the mine in compliance with Red Chris' existing M-240 *Mines Act* permit. It is anticipated that eventual ELUSCP will be applicable to current permitted mine plans, as well as the Project.

Planning for reclamation and closure is a living process, not a static process. Social closure plan will be revisited as part of regular Mine Plan and Reclamation and Closure Plan updates.

1.5.7.1.2 Post-Mining End Land Use and Capability

The primary objective of the reclamation plan remains consistent with *Mines Act* Permit M-240, which is to return, where practicable, all areas disturbed by mining operations to their natural pre-mining land use and capability, focussing on the restoration of wildlife habitat.
Project development will necessitate limited changes to the current permitted plan. By restoring functional, locally common ecosystems to the reclaimed landscape, similar land uses will be available as were present prior to disturbance.

1.5.7.1.3 Reclamation Monitoring

In general, closure and post-closure monitoring will be similar (e.g., in terms of frequency, measured parameters, and analysis) to monitoring in existing plans, but will be refined as needed, as the Mine progresses towards closure. This approach will be implemented for the following:

- Surface and groundwater monitoring;
- Climate and precipitation monitoring;
- Reclamation monitoring;
- Wildlife monitoring;
- Metal uptake monitoring, and
- Aquatic resources monitoring.

1.5.7.2 Closure Stage

This section summarizes the planned active closure measures specific to Project components and activities. Closure measures for existing facilities like the TIA and RSA are not expected to change as a result of the Project and are therefore not described here.

1.5.7.2.1 Subsidence Zone and Open Pit Area

The subsidence zone is anticipated to be near final configuration during closure. The subsidence zone is anticipated to be contained inside the Open Pit Area when the Mine closes. During closure, the subsidence zone will begin to flood, forming a lake consistent with the existing Five Year Mine Plan and Reclamation Plan. As the water level rises, the remainder of the Open Pit Area will also be flooded with water. It is expected that it will take approximately 60-70 years from the end of mining for the water level within the Open Pit to reach equilibrium.

Consistent with the existing Five Year Mine Plan and Reclamation Plan, a barrier will be installed with a buffer of up to 200 m around the affected area to restrict access by wildlife and people. Suitable vegetation will be included to provide visual screening, which is unchanged from the current reclamation plan. At closure, the exclusion zone would be isolated from the remainder of the lease area by the fence and surrounded by suitable vegetation to provide visual screening.

In closure, and consistent with the existing Five Year Mine Plan and Reclamation Plan, water in the flooded Open Pit is predicted to require treatment prior to discharge to the environment due to interaction of water in the flooded Open Pit with oxidized pit walls and fractured rock associated with the underground mine. The current Mine water balance indicates that the Open Pit/block cave void will be flooded to reach the target managed elevation of 1,431.5 to 1,435 masl (approximately 60-70 years) (Lorax 2024). The block cave may influence the linkage between in-pit surface water and adjacent groundwater aquifers via fractures in the subsidence zone. Further, the fractures may allow for exposed PAG rock in the underground to influence the pit lake water quality in the long-term. Once the target elevation is reached, excess water volumes will be sent to the water treatment plant such that inflows and outflows into the pit lake are roughly in balance. Treated water will be discharged into the TIA to maintain a positive water balance. Lorax (2024) predicted that water would need to be pumped out of the Open Pit at an average rate of 5,000 m^3/day to prevent the flooded Open Pit overtopping and discharging to the environment.

1.5.7.2.2 Rock Storage Area

Construction of a high-performance barrier cover system on the RSA will be implemented as per the existing Five Year Mine Plan and Reclamation Plan.

1.5.7.2.3 Process Plant

Surface infrastructure will be decommissioned and removed from site as per the existing Five Year Mine Plan and Reclamation Plan. Process Plant expansion, building upgrades and laydowns, required for the Project, will result in an increase in the amount of material to be removed.

1.5.7.2.4 Tailings Impoundment Area

During the closure stage there will be maintenance on a 2 m wet cover on the PAG tailings stored in TIA, in alignment with the current Five Year Mine Plan and Reclamation Plan. Construction of the already permitted NRD, including ground disturbance, foundation, and materials placement.

1.5.7.2.5 Site Water Balance and Water Management

The dewatering activities will cease, and the underground workings will be allowed to fill with water. An already permitted, but not yet built, hydrostatic plug will also be installed in Naghā decline to prevent contact water from exiting the underground mine workings.

1.5.7.2.6 Power Supply

Power supply infrastructure will be decommissioned and removed from site as per the Five Year Mine Plan and Reclamation Plan.

1.5.7.2.7 Underground Infrastructure

During closure, recyclable and re-useable infrastructure and any hazardous materials will be removed from the underground. Equipment will be removed from the extraction level for possible re-use or disposed as appropriate. Following removals, dewatering activities will cease, and the underground workings will be allowed to fill with water.

1.5.7.2.7.1 Openings to Underground Mine

Following removal of ventilation infrastructure from the raises, the already permitted, but not yet built hydrostatic plug will be constructed in the Naghā decline to prevent contact water from exiting the underground Mine workings. As permitted, ventilation raises 1-3 will be secured with engineered caps. The conveyor decline will be closed with a waste rock plug and secured to prevent inadvertent access, as permitted. VR4 will similarly require an engineered cap for secure closure. Requirements for stabilization works around the portals and box cut will be incorporated into the design. Service boreholes will be grouted.

1.5.7.2.8 Supporting Infrastructure and Activities

Surface infrastructure will be decommissioned and removed from site as per the Five Year Mine Plan and Reclamation Plan.

1.5.7.3 Regional Infrastructure

The transport of personnel, concentrate, and shipping of concentrate will cease. Some transport of reduced workforce and recycled materials may occur.

1.5.7.4 Post-Closure Stage

The plans and activities for post-closure are fairly unchanged from the current Red Chris closure plan. The cave and subsidence zone will be allowed to begin to flood, forming a lake that will be contained within the Open Pit. It is expected that it will take approximately 60 -70 years from the end of mining for the water level within the Open Pit to reach equilibrium. The flooded Open Pit (including flooded underground) is anticipated reach a final managed elevation approximately 60-70 years after Mine dewatering ceases. The flooded Open Pit elevation is anticipated to reach an elevation of 1,431.5 masl.

Water that accumulates in the Open Pit is not anticipated to be suitable for direct discharge to the receiving environment and is planned to be conveyed for water treatment and subsequent release to the TIA (NRCML 2021). The long-term water balance predicts that the average annual quantity of water to be treated and released to the TIA will be 1.45 Mm^3/y.

1.6 Workforce Requirements

NRCML employs approximately 725 employees and 1350 contractors across operations, exploration, and the Project team as of May 2023. 125 of NRCML's 725 employees are Tahltan and Tahltan Associates, accounting for approximately 20% of the workforce. The Project will have comparable number of employees during operations to the current levels.

During construction, the Project is predicted to generate approximately 3,047 direct full-time equivalent (FTE) positions in the Regional District of Kitimat-Stikine (RDKS) and 989 indirect FTE positions. At the Provincial level, Project construction is estimated to generate 9,519 FTEs in BC. The total annual Project construction workforce would represent 0.7% of total construction workforce in BC in 2023. Over the 12-year Project operation period, the Project is estimated to generate 1,165 FTEs annually in the RDKS. Of the total annual Project related employment, 931 FTEs would be direct Project employment.

Project development and operations require a unique skill set when compared to other conventional mining methods. That said, NRCML recognizes the need to support the continuity of employment for Open Pit employees. NRCML preference will be to transition all existing Open Pit workforce to support the Project, although it is likely that not all employees will be interested in a transition.

Anticipated occupations required for the Project construction (development) and operations (production) are outlined in Table 1-6, and classified as per the National Occupational Classification (NOC) System, as appropriate. Additional roles through construction are anticipated to include construction management, procurement, and engineers. All roles are anticipated to be full time. The workforce will gradually decrease during closure and post-closure.

Table 1-6: Anticipated Occupations for Project Construction and Operation

Block Cave Construction	Block Cave Operation (Production)	Underground Technical Services / Engineering	Energy and Operational Technologies	Maintenance and Reliability
Heavy equipment operators (NOC 7521), Truck drivers (NOC 7511)	Heavy equipment operators (NOC 7521), Underground semi-autonomous equipment/ underground Mine technicians	Underground production geologists, underground production geology technicians	(Underground and surface) Energy and instrumentation technologists	(Underground and surface) Mechanical technicians
Underground development miners (NOC 8231) / Underground major projects	Underground production miners (NOC 8231) / Underground mine technicians, Secondary break	Underground production mining senior engineers for planning, ventilation, automation, mechanical / electrical	Underground electrical fixed plant technicians, Underground mobile electrical technicians	(Underground and surface) Maintenance and reliability planners and schedulers
Supervisors, mining and quarrying (NOC 8221)	Underground mining supervisors, superintendents, foremen	Underground geotechnical superintendent, Underground geology superintendent, Underground chief surveyor	(Underground and surface) Energy and instrumentation foremen, Energy and instrumentation lead hands	(Underground and surface) Mobile and Fixed Plant Foremen, Superintendents, Supervisors
Drillers (NOC 7372), Land surveyors (NOC 2154)	Underground mine technicians, drill and blast	Cave monitoring senior geotechnical engineer, Ground stability and support senior geotechnical engineer, Underground surveyors	(Underground and surface) Operational technologies specialists, technicians	(Underground and surface) Reliability engineers, specialists, technicians
Mining Engineers (NOC 2143), Infrastructure, Geologists (NOC 2113)	Underground mine engineers / Short-range planners	Underground geotechnical engineers, Underground geotechnical technicians	(Underground and surface) Process control engineers, Network radio technicians, Communications engineers	

As the Project progresses, there are anticipated changes to size and configuration of the workforce. Through the construction stage, the Project will rely on Project development and engineering teams. As the Project moves into operation, the workforce balance will shift towards roles involved in the day-to-day operation and maintenance of Red Chris.

1.6.1 Work Rotation and Accommodation Arrangements

The Project will require additional accommodation units to be constructed to reach a total occupancy of 1,500 people. Site staff and contractors, both construction and operational roles, are rotational and required to stay on site for the duration of the rotation. This is the current requirement, and it is not planned to change. The site currently operates using a two-week rotation, with very few exceptions, and it is anticipated that this rotation will continue for the operational stage of the Project. Construction personnel will work various rosters to suit Project needs.

Currently, personnel arrive on site by either personal vehicle, or by chartered flights and coaches. Personal vehicles are parked at the gates and are not permitted onsite.

1.6.2 Employment and Training Opportunities

As Red Chris is already an existing operational mine, NRCML has several training and development programs already in place, which will continue for the LOM. NRCML also offers opportunities for personal development for all employees and contractors, including financial literacy courses, on-the-job training and apprenticeship programs, process plant training, and management training.

In addition to these existing programs, NRCML plans to introduce skill development and training initiatives for the Project through a Workforce Transition Plan to help employees and contractors acquire the necessary skills and competencies as the Project transitions to underground operations. These initiatives include strategies for entry-level miner training, multi-skilled workforce development, and recognition of prior learning, utilizing a mix of methods including eLearning, virtual reality, and hands-on training. These initiatives also include specific training for the Tahltan workforce, aiming to develop portable skills and supporting long-term employment opportunities. A TCG-led cultural awareness training is also planned as part of these initiatives.

1.6.2.1 Tahltan Employment Initiatives

Specific engagement programs and activities designed for the discovery, advancement, and development of Tahltan employees include:

- Regular engagement with local communities to discuss training and development and to encourage academic success for students and ongoing implementation of Tahltan Engagement Strategy;
- Tahltan Feedback Mechanism to address and respond to any concerns raised by Tahltan members in a timely fashion; and
- Quarterly Sociocultural Committee meetings where concerns (including employment concerns) raised by Tahltan members are discussed, providing Tahltan with oversight for resolution of grievances, as requested.

In addition to engagement activities, NRCML continues to make annual financial contributions to TCG groups aimed at training, education, and development of Tahltan members, including:

- The TCG training and education department;
- The Tahltan Business Training Fund enhancing opportunities to build local business; and
- The TCG Bursary Fund to provide financial support Tahltan students pursuing post-secondary education.

NRCML is investing in training and upskilling the existing workforce with Project-specific training to equip workers with the skills necessary to optimize performance. Recognizing the value of a skilled and motivated workforce, incentive and retention programs will be put in place.

1.6.3 Employee and Workplace Policies

As an operating site, Red Chris has a number of policies and programs already in place to facilitate a safe and productive working environment. These programs are applicable for the LOM and will apply throughout the duration of the Project. Policies and programs include hiring and retention programs, onsite counselling services, cultural training, workplace behaviour standards, an employee assistance program, and a code of conduct.

1.7 Assessment of Alternatives

This section presents a two-fold assessment of alternatives as follows:

- **Alternatives to the Project;** which compares currently permitted surface mining alternatives with a combination surface mining and block cave mining (the Project) to achieve a total tonnage of processed ore of approximately 300 MT; which is the permitted storage capacity for the TIA.
- **Alternative Means of Carrying out the Project;** which discusses alternatives for selected project components and activities including production rate, underground waste rock disposal and diesel vs. electric mine fleet.

Components to be considered for an assessment of alternatives listed in the EAO Effects Assessment Policy (EAO 2020) are identified in Table 1-7, including the rationale for inclusion or exclusion in relation to the Project. The criteria excluding a component from the evaluation were:

- There is no material change required to existing infrastructure; or
- There is only one clear go-forward option.

Table 1-7: Rationale for Inclusion and Exclusion of Components for Assessment of Alternatives

Component	Rationale
Location of Red Chris	**Excluded:** No change required to existing infrastructure.
Access to Red Chris via Highway 37	**Excluded:** No change required to existing infrastructure.
Power Supply and Transmission Line Corridor	**Excluded:** No change required to existing infrastructure. Primary power supply will remain electric, supplied by BC Hydro grid.
Facility Design- Mining Area	**Included:** The transition to a new underground mining method (i.e. Block Caving) constitutes a material change to the Red Chris Mine and it is the focus of the assessment of alternatives to the Project (See Section 1.7.1). The main Project feature is the cave itself, which is located under the existing Mine, and will be contained within the final Open Pit footprint. The extraction level elevation was set at 500 masl to optimize access to the ore (see Section 1.7.1). The design of the cave was done to support a 15 Mtpa production rate. The production rate was a key part of the design bases evaluated to optimize the change in mining method (see Section 1.7.2.2). New equipment will be purchased for underground mining, surface transportation, and employee movements. The potential to convert from diesel- to battery-powered was evaluated for each type of equipment (see Section 1.7.2.4).
Facility Design - Process Plant Area	**Excluded:** Modifications will require an approximate 12 ha of previously undisturbed lands for the process plant expansion, building upgrades and laydowns. The ore processing method remains the same (i.e., flotation of sulphides to produce copper concentrate); at increased rate of up to 15 Mtpa for an additional 10 years for a total of 24 years, although additional equipment is required to support the increased throughput of 15 Mtpa.
Rock Storage Area (RSA)	**Included:** The final tonnage of waste rock to be stored on surface is expected to be smaller; however, the final footprint of the RSA doesn't change materially. Shifting to underground mining conceptually opens the opportunity to re-purpose the Open Pit as a waste storage facility. The potential storage of development rock, from the underground, within the Open Pit versus within the RSA was evaluated (see Section 1.7.2.3).
Camp and Administrative Areas	**Excluded:** An increase to onsite camp occupancy is required to accommodate a larger workforce. This is a clear go-forward option.
Mine Access Road	**Excluded:** No change required to existing infrastructure.

Component	Rationale
Supporting Infrastructure	**Excluded:** The Project will utilize existing permitted areas for laydown areas needed to support construction. An additional haul and service road is required in previously disturbed area is required.
Water and Wastewater Management	**Excluded:** Change to existing infrastructure are required to accommodate an increase to onsite camp occupancy. This is a clear go-forward option.
Terminal Transportation	**Excluded:** No Change required to existing infrastructure.
Water Management and Effluent Discharge	**Excluded:** No change required to existing or already permitted infrastructure.
Timing Options for Various Components	**Excluded:** Project is being timed to minimize potential temporary suspension of ore processing activities. Pre-Production activities are underway.
Closure Plan	**Excluded:** General approach for closure doesn't change and the Open Pit/cave will be flooded. It would take a shorter period of time for the Open Pit/cave to reach an elevation from where is then actively managed by pumping at an approximate steady state rate to a water treatment plant. Treated water is to be discharged to the TIA. The current permitted plan for closure of the TIA includes maintaining a wet cover over the potentially acid generating portion. This approach has not changed for the purposes of the Amendment Application. At a site-wide level, NRCML has identified the potential for shifting the closure plan to a dry cover alternative. If feasible, a dry cover would be preferred to a wet cover, as it reduces the long-term risk profile for the TIA, requires less on-going post closure management, and it better aligns with Tahltan sustainability requirements. An overview of the options that will be assessed is provided in Chapter 4, Tahltan Risk Assessment.
Tailings Impoundment Area (TIA)	**Excluded:** Though a change in mining method could conceptually open the opportunity to re-purpose the Open Pit as a tailings storage facility, the block cave's location under and connected to the East Pit at Red Chris prevents its use as a wet tailings storage facility due to safety reasons. Therefore, this option was not further evaluated. TIA final permitted configuration does not change. The alternatives presented only consider disposal of tailings up to the existing permitted TIA capacity.

1.7.1 Alternatives to the Project

The proposed Project itself constitutes an alternative to currently permitted open pit mining and this section compares the Project against surface mining options using environmental, social, technical and financial criteria.

1.7.1.1 Identification of Alternatives to the Project

The assessment of alternatives considers three different alternatives; two of which consider permitted mine plans applying surface mining only and a third scenario that combines surface mining and the Project. The three alternatives considered in this exercise include the following:

- **Alternative 1** (as Permitted): the Mine proceeds as permitted, expanding the Open Pit to a permitted Phase 6 configuration to continue feeding the mill and disposing tailings in the TIA to its full permitted capacity. The RSA expands as the site continues to stockpile low grade ore. This alternative includes a full-build-out of the TIA to support a larger than existing open pit operation for a total tonnage processed of 277 MT. Open pit mining will be followed by closure, as outlined in the Original Application and the permitted Mine plan.
- **Alternative 2** (shorter LOM): The Mine proceeds as consistent with current surface open pit operations, targeting a smaller ultimate open pit, compared to the original permit (from 2012) described in Alternative 1, identified as economically viable by Newcrest and permitted in 2021. TIA development stops as open pit mining method operations cease in alignment with a permitted Phase 8 open pit configuration, similar in size to existing, for a total tonnage of ore processed of 120 MT. Adding waste rock from active mining to the RSA ceases. Open pit mining would be followed by care and maintenance, as outlined in the current Mine plan. If market conditions do not support resumption of milling the low-grade ore, a decision will be made to move the site to closure, in a manner that is consistent with the Original Application and the permitted Mine plan.
- **Alternative 3** (Project): In this alternative, the Mine would proceed through a combination of surface and underground mining. Open pit mining is no longer economically viable; and it is replaced by underground mining; which provides higher grade ore to the mill as block cave mining is advanced to production. There is a low likelihood that potential delays in the development of underground infrastructure could affect the Mine's ability to feed the mill with ore; which could temporally reduce or suspend concentrate production. The total tonnage of ore processed from surface mining and underground block caving is 302 MT. In this alternative, the TIA would reach a fully permitted build-out scenario, followed by closure. Adding waste rock from active mining to the RSA ceases.

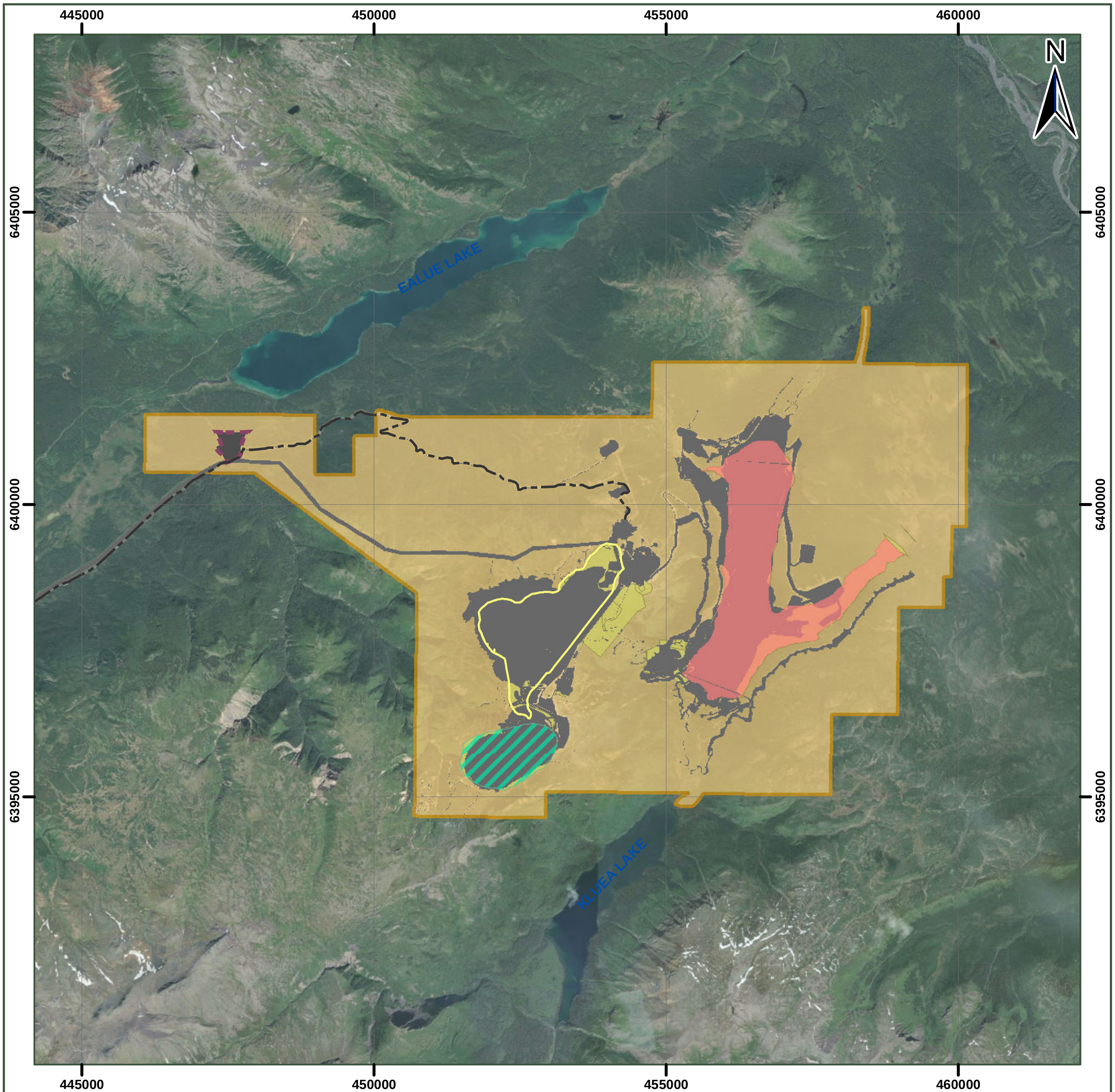
1.7.1.1.1 Alternative 1 – As Permitted

EAC #M05-02 was issued considering the Red Chris Feasibility Study - Mine Plan Optimization, communicated to the EAO in December 2004 (Campbell 2004), and included in Schedule A of EAC #M05-02. The Mine Plan Optimization considered a mine plan by open pit mining by conventional methods, as summarized in Section 1.4, Existing and Permitted Components.

An ore processing throughput of 30,000 tpd allowed for a LOM of approximately 25 years.
The original mine plan considered that open pit mining would be conducted for 17 years.
During first 17 years, the plant would receive ore directly from the open pit; while the plant would be fed with low grade ore stockpiled on surface during the final 8 years.

NRCML has conducted comprehensive reviews of the mine plans that supported surface mining and concluded that the “As Permitted” alternative is not economically viable; and thus, not technically feasible. This alternative is included in this assessment because it represents the configuration that has been authorized; and is a valid reference for comparison with Alternatives 2 and 3.

As shown in Figure 1-20, accessing deeper ore by open pit mining would increase the footprint of the Open Pit.



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LEGEND:

- MINE ACCESS ROAD
- ROCK STORAGE AREA
- PERMITTED MINE AREA
- EXISTING MINE
- OPEN PIT AREA - AS PERMITTED EXTENT
- TAILINGS IMPOUNDMENT AREA - AS PERMITTED EXTENT
- 8.5 KM LAYDOWN
- AS PERMITTED COMPONENTS

NOTES AND SOURCES:

1. THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY AND SHOULD NOT BE USED FOR NAVIGATION
2. BACKGROUND DATA FROM BC DATA CATALOGUE. HTTPS://CATALOGUE.DATA.GOV.BC.CA/ ACCESSED SEPTEMBER 2023. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA.
3. PROJECT NTS MAP SHEET: 104H116
4. COORDINATES: -129.758121W, 57.727226N
5. PREPARED BY SLR

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SCALE 1:100,000

DATA: NAD 1983 UTM Zone 9N

GRID: NAD1983 UTM ZONE 9N

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REPORT TITLE

RED CHRIS BLOCK CAVE PROJECT - PRODUCTION PHASE APPLICATION FOR AN AMENDMENT TO EAC #M05-02

FIGURE TITLE: **ALTERNATIVE 1 - AS PERMITTED**

FIGURE NO: **1-20**

DATE: November 29, 2024

PROJECT NO: 233.30000.00007

REV.	BY	CHK	DATE (M/DD/YYYY)	COMMENTS
0	AL	RA/JD	11/29/2024	FINAL ISSUE

1.7.1.1.2 Alternative 2 – Shorter LOM

Red Chris had mined and processed approximately 90 MT of ore as of December 2023. Current estimates are that it is economically viable at anticipated copper prices to mine an additional 30 MT of ore using conventional open pit techniques between 2024 and 2026; bringing the total tonnage of ore to be mined and processed from the Open Pit to 120 MT. This represents approximately 45% of the reserves contained in the Original Application in 2004.

The main reasons for the reduction in the tonnages of ore accessible by open pit mining include:

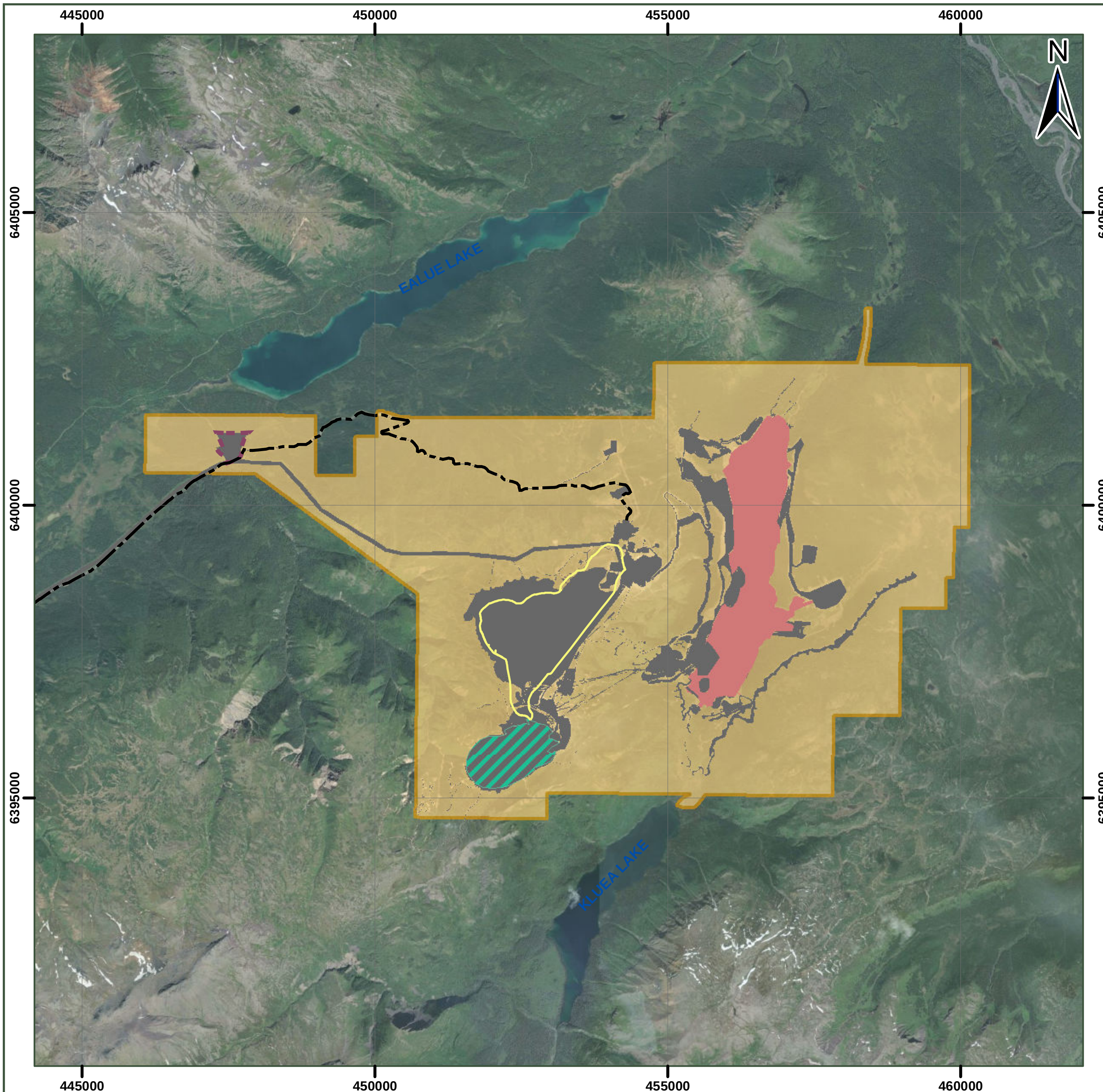
- Lower than expected ore grades in open pit ore;
- Higher than expected operating costs; and
- Less favourable geotechnical conditions than originally expected, which has increased the waste rock to ore ratio.

Exploration activities have allowed for better characterization of the orebody at the Mine. It is now understood that Mine operations are not likely to continue beyond 2025 without implementation of the Project. This would reduce the LOM from 25 years to 12 years; and initiation of closure activities in 2027.

The main pit or western portion of the Open Pit is active; under the current LOM plan, mining will be completed in mid-2026 when the pit will reach its maximum planned depth (1,160 masl) (NRCML 2024) (Figure 1-21). Continuing open pit mining to lower elevations would be uneconomic.

1.7.1.1.3 Alternative 3 – the Project

Alternative 3 – Block cave mining, which represents the subject of this Amendment Application. The Project has been described in Section 1.5, with Figure 1-22 presenting the anticipated new potential surface disturbance area required to execute the block cave mining method.



LEGEND:

- MINE ACCESS ROAD
- ROCK STORAGE AREA
- PERMITTED MINE AREA
- EXISTING MINE
- OPEN PIT AREA
- TAILINGS IMPOUNDMENT AREA
- 8.5 KM LAYDOWN

0 0.5 1 2 3 km

SCALE 1:100,000

DATA: NAD 1983 UTM Zone 9N

GRID: NAD1983 UTM ZONE 9N

REPORT TITLE

RED CHRIS BLOCK CAVE PROJECT - PRODUCTION PHASE APPLICATION FOR AN AMENDMENT TO EAC #M05-02

FIGURE TITLE:

ALTERNATIVE 2 - SHORTER LIFE OF MINE

FIGURE NO: **1-21**

DATE: November 29, 2024

PROJECT NO: 233.30000.00007

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5. PROJECT NTS MAP SHEET: 104H116
6. PREPARED BY SLR

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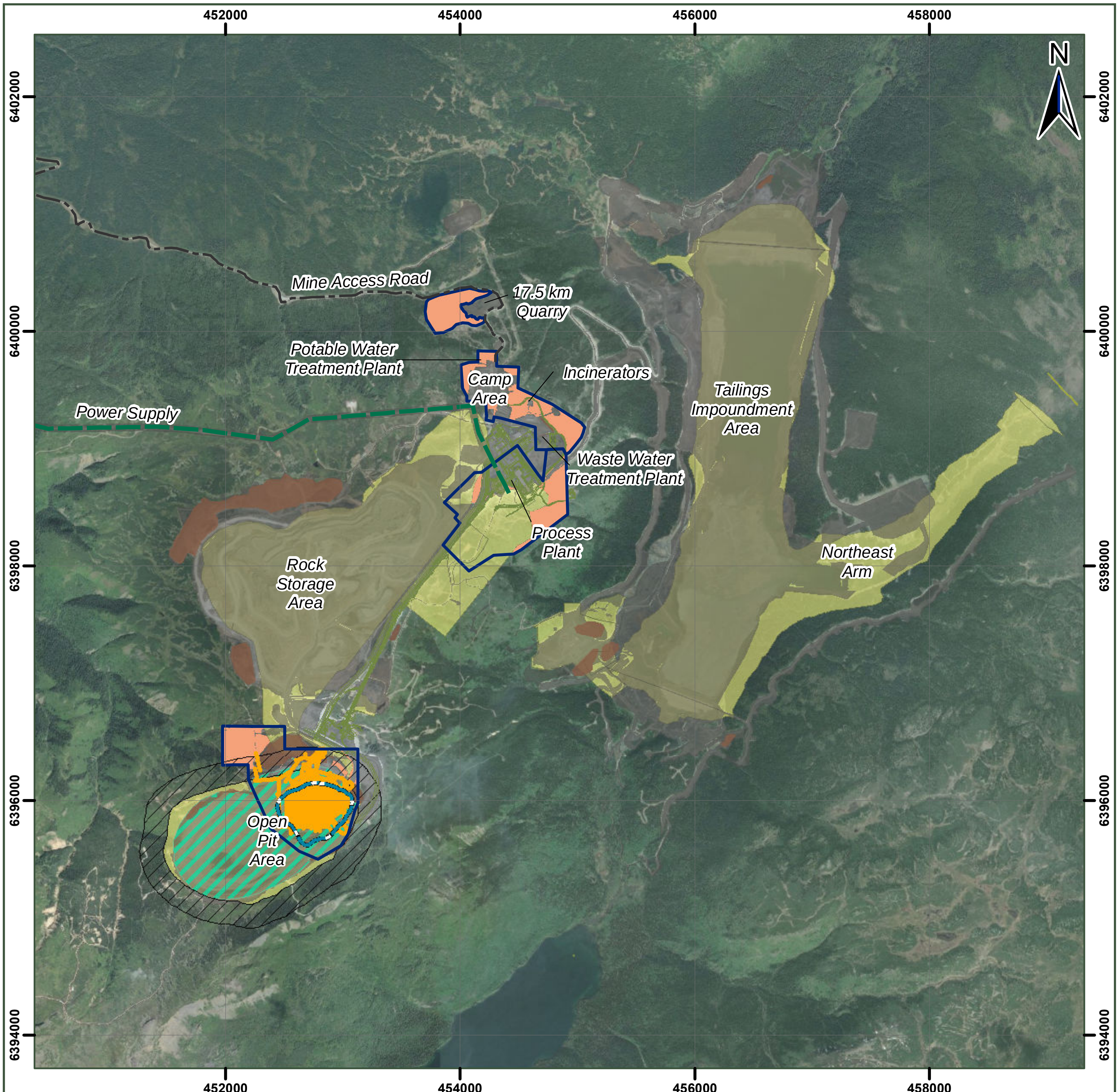

LEGEND:

EXISTING COMPONENTS

- MINE ACCESS ROAD
- 287KV TRANSMISSION LINE
- EXISTING INFRASTRUCTURE
- EXISTING MINE
- SOIL STOCKPILE
- OPEN PIT AREA

AS PERMITTED COMPONENTS

- AS PERMITTED COMPONENTS

PRODUCTION PHASE COMPONENTS

- UNDERGROUND WORKS
- PROJECT FOOTPRINT
- POTENTIAL NEW DISTURBANCE AREA

OPERATIONS/CLOSURE PHASE COMPONENTS

- SUBSIDENCE ZONE
- CLOSURE/POST CLOSURE EXCLUSION AREA

NOTES AND SOURCES:

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2. BACKGROUND DATA FROM BC DATA CATALOGUE HTTPS://CATALOGUE.DATA.GOV.BC.CA/ ACCESSED SEPTEMBER 2023. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
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6. COMPONENT DATA SUPPLIED BY NEWMONT, 05/2024
7. PREPARED BY SLR

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DATA: NAD 1983 UTM Zone 9N

GRID: NAD1983 UTM ZONE 9N

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REPORT TITLE

RED CHRIS BLOCK CAVE PROJECT - PRODUCTION PHASE APPLICATION FOR AN AMENDMENT TO EAC #M05-02

FIGURE TITLE: **ALTERNATIVE 3 – THE PROJECT**

FIGURE NO: **1-22**

DATE: November 29, 2024

PROJECT NO: 233.30000.00007

REV.	BY	CHK	DATE (M/DD/YYYY)	COMMENTS
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1.7.1.2 Method to Assess Alternatives to the Project

The method selected to compare alternatives is based on the Guidelines for the Assessment of Alternatives for Mine Waste Disposal (Government of Canada 2016a). This Multiple Account Analysis (MAA) considered all steps of the assessment of alternatives process, with exception of the Pre-Screening Assessment, which was not necessary given that the analysis was limited to two mining methods. The environmental, social, cost and technical sub-accounts, indicators, and units that were considered in the analysis are presented in Table 1-8.

Table 1-8: Accounts, Sub-Accounts, and Indicators Considered in the Analysis

Account	Sub-Account	Indicator	Unit
Environmental	Atmospheric Environment	GHG Emissions	carbon dioxide equivalent/year (CO_2 eq/year).
	Terrestrial Environment	Mine and TIA Footprint	ha
	Aquatic Environment	Fish Habitat	Qualitative
	Aquatic Environment	Groundwater Regime	Qualitative
Social	Employment and Economy	Workforce	FTE
	Human Health	Risk of Accidents	Qualitative
	Archaeology	Mine and TIA Footprint	ha
Financial	Project Financials	Capex	Dollars
		Opex	Dollars/tonne
		Net Present Value	Qualitative
Technical	Technological Reliability	Proven Technology	Qualitative
	Physical Stability	Risk of Failures	Qualitative

The sub-accounts and indicators proposed consider effects on Indigenous interests, particularly within the environmental and social accounts. There is also a link between the financial account and Indigenous interests because the financial sub-accounts are directly related to business and employment opportunities and the commitments in the Impact, Benefit, and Co-Management Agreement, *Amended and Restated Impact, Benefit and Co-Management Agreement dated as of August 15, 2019, between Newcrest Red Chris Mining Limited, Tahltan Central Government, Tahltan Band and Iskut Band* with the TCG.

1.7.1.3 Assessment of Alternatives to the Project

The alternatives were compared using the accounts, sub-accounts, and indicators as presented in Table 1-9. Scoring was completed using a scale from 1 to 5, with 1 representing the least favourable scenario and 5 representing the most favourable scenario for the proposed indicator. The outcome of the comparison, including rationale for the scoring of each indicator is presented in Table 1-9. See Appendix 1-B for further details.

Table 1-9: Indicator Scoring for Assessment of Alternatives

Indicator	Alternative 1 – As Permitted	Alternative 2 – Shorter LOM	Alternative 3 – The Project
GHG Emissions	The Mine currently generates an average 81,416 t carbon dioxide equivalent per year (CO_2 eq/year.)	The Mine currently generates an average 81,416 t CO_2 eq/year; but a shorter LOM implies that emissions would stop sooner.	The Project would generate an average of 21,953 tonnes CO_2 eq/year; which represents a reduction of approximately 75% compared with existing conditions.
	[Score 1]	**[Score 3]**	**[Score 5]**
Terrestrial Environment	Approximately 220 ha of additional land would be disturbed by an expanded Open Pit mine. TIA achieves fully permitted footprint. Approximately 1673 ha total required for the plan and permitted areas.	The existing footprint of the Mine would not substantively change. TIA doesn't achieve fully permitted footprint. Approximately 1453 ha total required.	An additional approximate 277 ha is required for the Project, outside of existing footprint, or an additional 57 ha outside of the existing disturbed and permitted areas. Surface subsidence within the open pit boundaries doesn't increase the existing footprint of the Mine. TIA achieves fully permitted footprint. Approximately 1730 ha total required.
	[Score 2]	**[Score 4]**	**[Score 1]**
Fish Habitat	Camp Creek will be affected by increased footprint of the Mine.	The existing footprint of the Mine would not substantively change, and thus Camp Creek would not be affected.	No effects on fish habitat because surface subsidence is contained within the Mine footprint.
	[Score 1]	**[Score 5]**	**[Score 5]**
Groundwater Regime	Groundwater inflows to the Open Pit will increase with the Open Pit expanded in footprint to reach deeper ore.	Groundwater inflows to the Open Pit remain as in existing conditions.	Groundwater inflows increase because block cave mining reaches ore at deeper levels.
	[Score 3]	**[Score 4]**	**[Score 3]**

Indicator	Alternative 1 – As Permitted	Alternative 2 – Shorter LOM	Alternative 3 – The Project
Workforce	Workforce is maintained at current levels.	Workforce is maintained at current levels.	Marginal increase in workforce during operations. Material increases in workforce during construction required to develop underground infrastructure.
	[Score 2]	**[Score 2]**	**[Score 5]**
Duration of Employment	Allows for a total of approximately 25 years of employment for the majority of the workforce.	Allows for a total of approximately 12 years of employment for the majority of the workforce.	Allows for a total of approximately 26 years of employment for the majority of the workforce.
	[Score 4]	**[Score 1]**	**[Score 5]**
Risk of Accidents	Risk of accidents is considered low given health and safety plan.	Risk of accidents is considered low given health and safety plan.	Risk of accidents is considered low, with updates required to existing health and safety plans.
	[Score 4]	**[Score 4]**	**[Score 4]**
Archaeology	220 ha increased in Mine footprint has the potential to affect archaeological sites; however, none have been identified at this time. TIA fully developed footprint.	No change in Mine footprint. TIA is not fully developed.	277 ha (an additional 57 ha outside of the existing disturbed and permitted areas) increase in Mine footprint has the potential to affect archaeological sites; however, none have been identified at this time. TIA fully developed footprint.
	[Score 2]	**[Score 4]**	**[Score 1]**
Capex	Capital expenditure is associated with additional surface mining equipment (i.e., trucks and shovels).	No capital expenditures associated with shorter LOM.	Capital expenditures are required to advance development of underground infrastructure during several years before ore can be extracted from underground workings.
	[Score 3]	**[Score 5]**	**[Score 1]**

Indicator	Alternative 1 – As Permitted	Alternative 2 – Shorter LOM	Alternative 3 – The Project
Opex	Higher operating costs driven by high waste and ore ratio.	High operating costs maintained.	Low operating costs driven by low waste and ore ratio and the use of gravity for the fragmentation and mobilization of ore down to extraction levels.
	[Score 1]	**[Score 2]**	**[Score 5]**
Proven Technology	Open pit mining is the most used mining method in large scale mining.	Open pit mining is the most used mining method in large scale mining.	Block caving is being executed in one mine in BC; however, it is a mining method applied in many other jurisdictions outside Canada, and the Certificate Holder has experience with this mining method.
	[Score 5]	**[Score 5]**	**[Score 4]**
Risk of Failures	There is an increased risk of failures associated with open pit mining in the Bowser Lake Group of sediments near the existing pit crest.	Risk of failures remain as per existing conditions.	The underground conditions beneath the Open Pit have been identified as very good for block cave mining.
	[Score 2]	**[Score 3]**	**[Score 4]**

Results of the MAA indicate that Alternative 3 – The Project is the preferred alternative, with a normalized account score of 75 when compared to alternatives that consider surface mining only. The Project Alternative scores the highest for the social and financial accounts given that it is the one that provides the longest duration of employment and the highest net present value. The Shorter LOM Alternative scores the highest in the environmental account, mainly because it is the one with the smallest footprint because of the TIA is not fully developed. Finally, the As Permitted Alternative is the one scoring the lowest, given it has the largest footprint combined with a much lower net present value.

1.7.1.4 Sensitivity Analysis

A sensitivity analysis is a step in the MAA method (Government of Canada 2016) that was performed on the outcome of the assessment to confirm the preferred alternative. By removing the financial and technical considerations, the sensitivity analysis places greater weight on environmental and social considerations as a means of measuring the outcomes of the equally weighted comparative assessment.

The sensitivity analysis confirmed that Alternative 3 - the Project, with a score of 73, remains the preferred alternative. Elimination of the financial and technical accounts and their associated indicators determined that Alternative 1- As Permitted scored 48, while Alternative 2 – Shorter LOM scored 68.

A summary of the MAA and sensitivity analysis results are presented in Table 1-10.

Table 1-10: Multiple Account Analysis Results

Scenario	Account	Weight	Alternative 1- As Permitted	Alternative 2- Shorter LOM	Alternative 3 - The Project
Normalized Account Score	Environmental	25%	9	20	18
	Social	25%	15	14	19
	Financial	25%	8	13	18
	Technical	25%	18	20	20
	Total Score		**50**	**67**	**75**
Sensitivity Analysis	Environmental	50%	18	40	35
	Social	50%	30	28	38
	Financial	0%	0	0	0
	Technical	0%	0	0	0
	Total Score		**48**	**68**	**73**

1.7.1.5 Risks and Uncertainties

The comparison of alternatives is based on currently available information and market conditions. Some of the information used is based on modelling, which carries some levels of uncertainty. The MAA is based on modelling outcomes that indicate ground subsidence associated with block cave mining will be contained within the Open Pit footprint. This understanding has informed the scoring outcomes related to the four of the sub-accounts considered by the MAA.

1.7.2 Alternative Means of Carrying out the Project

Alternative means are the different technically and economically feasible ways that would allow a project to be carried out (EAO 2020f). The evaluation of alternative means of carrying out the Project and the structured analysis of the relative positive and negative attributes of each option.

Table 1-11 identified the Project components that were considered as follows:

- Production Rate;
- Underground development waste rock storage; and
- Diesel vs Battery Powered Fleet.

1.7.2.1 Approach to Assessment

The approach used in the alternative means assessment is based on screening of the technical and economic feasibility of identified alternative means. Where there was more than one technically and economically feasible alternative mean, assessment of the potential environmental effects, including changes to the physical and human environment, were used to inform the selection of the preferred option. A summary table is provided at the end of each section which provides an overall performance rating based on a qualitative assessment of the merits of each option to define the 'preferred alternative.'

Table 1-11 provides a summary of the selected performance ratings applied in this assessment. The assessment was carried out at a level sufficient to distinguish the relative merits of the different alternatives for relevant to the development, operations, and closure of the Project. Engineering trade-off studies were utilized to inform the technical and economic feasibility of the various options.

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Table 1-11: Alternative Means Evaluation Criteria and Ratings

	Technical	Economic	Physical Environment	Human Environment (Social, Cultural, Health)
Criteria	• Reliability and effectiveness.	• Total costs. • Return on investment. • Net present value.	• Overall environmental risks and effects of the Project. • Ability to mitigate effects. • Amenability to reclamation.	• Overall socio-economic risks and effects of the Project. • Ability to mitigate effects and/or enhance benefits.
Considerations	• Flexibility with regard to technical, operational, and environmental uncertainties. • Proven technology used elsewhere (vs. new technology). • Technical risks. • Availability of construction material and volume requirements. • Post-closure risks and uncertainties.	• Capital, operational, decommissioning, and closure and post-closure costs. • Economic benefits and risks.	• Footprint size. • Potential effects to key valued components. • Potential for cumulative effects to key valued components. • Climate change adaptation. • Amenability to reclamation.	• Benefits and relative preferences of community members, Indigenous groups, local governments. • Preservation of archaeological/cultural sites. • Potential effects on health and well-being. • Potential for cumulative effects on health and well-being. • Overlapping land uses. • Safety considerations.
Preferred	• Proven effective with contingencies if the alternative does not perform as expected.	• Facilitates a competitive net present value.	• Reduces risk for an adverse effect on the environment with standard mitigation compared to less favourable alternatives.	• Reduces negative effects on the socio-economic environment with standard mitigation and provides positive benefits compared to less favourable alternatives.
Acceptable	• Appears effective based on modelling/theoretical results; contingencies are available if the alternative fails to perform as expected.	• Facilitates an acceptable net present value.	• Lowers magnitude of adverse effects on the environment with reasonable mitigation compared to less favourable alternatives.	• Lowers negative effects on the socio-economic environment with reasonable mitigation compared to less favourable alternatives.
Challenging	• Appears marginally effective based on modelling/theoretical results; contingencies may not be available if the alternative fails to perform as expected.	• Marginal: may or may not facilitate an acceptable net present value.	• May cause substantial or irreversible adverse effects on the environment that may be difficult to reasonably mitigate.	• May cause substantial negative effects on the socio-economic environment that may be difficult to reasonably mitigate.
Unacceptable	• Effectiveness appears dubious or relies on unproven technologies.	• Cannot be financially supported by the Project.	• Likely to cause substantial or irreversible adverse effects on the environment that cannot reasonably be mitigated.	• Likely to cause substantial negative socio-economic effects that cannot reasonably be mitigated.

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1.7.2.2 Production Rate

Currently, Red Chris is built based on a production capacity of 11 Mtpa. The proposed change in mining method presents the opportunity to re-evaluate the optimum production rate for the Mine. The analysis related to the comparison of retaining the existing production rate for the Project versus increasing the production rate to 15 Mtpa is summarized in Table 1-12.

From an economic perspective, every increment of increased production has positive net present value. From a technical perspective, the maximum production rate is ultimately limited by water intake availability and tailings storage capacity. Within the constraints of the existing water supply and permitted TIA capacity, a production rate of 15 Mtpa was identified as the upper bound. This production rate is a key design basis, which then informs sizing and selection of Designing the Project within the constraints of water supply and TIA capacity minimizes changes in surface disturbance and reclamation requirements. While the production rate would affect the duration of mining to extract the same resource, the differences between the effects to the physical environment and human environment are limited, and both are rated as acceptable. Overall, the preferred alternative is a Mine design based on 15 Mtpa production rate.

Table 1-12: Alternatives Evaluation Summary for Production Rate

	Existing Production Rate	15 Mtpa Production Rate
Technical	Achievable, but not optimized. Known limitations within existing mill.	Upper bound production rate with existing water intake, and by tailings storage capacity.
	Acceptable	Preferred
Economic	Not optimized for successful implementation.	Best net present value.
	Challenging	Preferred
Physical Environment	No material change in surface disturbance, or reclamation requirement. Longer duration to mine the same resource.	No material change in surface disturbance, or reclamation requirement.
	Acceptable	Acceptable
Human Environment	No material change in surface disturbance, or reclamation requirement. Longer duration to Mine; same resource - changes employment distribution (number, duration, roles).	No material change in surface disturbance, or reclamation requirement. Shorter duration to Mine resource - changes employment distribution (number, duration, roles).
	Acceptable	Acceptable
Overall Rating	**Challenging**	**Preferred**

1.7.2.3 Underground Development Waste Rock Storage

Shifting to underground mining conceptually opens the opportunity to re-purpose the open pit as a waste storage facility. The Project is expected to generate 2.5 Mt of waste rock from underground development. Options for storage of this material includes:

- Within the existing RSA; or
- Within the Open Pit.

Table 1-13 summarizes the technical, economic, physical, and human environment evaluations of these options.

The RSA was originally designed and permitted to store 302 MT of waste rock (RCDC 2010). At the end of 2023, the RSA was reported to contain 160 MT of PAG waste rock, 13 MT of NAG waste rock, and 24 MT of low-grade ore and mineralized waste in storage (Newmont 2024a). The Project waste rock represents 1.4% of the material already stored in the RSA. From a technical perspective, the existing RSA facility is already designed and permitted to accommodate this volume of material, to manage seepage and runoff from the facility, and to close the facility at the end of Mine life.
No material change is required to existing operational planning.

Table 1-13: Alternatives Evaluation Summary for Material Handling from Underground to Surface

	Development Rock in RSA	Development Rock in Open Pit
Technical	The 2.5 MT of waste rock can fit within the existing RSA with no new surface disturbance and no material change to existing operational planning.	New engineering design and permitting would be required. Haul distance into the Open Pit is 2.9 km longer.
	Preferred	Acceptable
Economic	Costs for hauling and managing materials within the existing RSA well known and constrained.	Longer haul route to the Open Pit would result in higher operating costs to move this material.
	Preferred	Challenging
Physical Environment	Storing the Project development rock in the RSA fits within the existing permitted water management and closure plan. The Project's small incremental contribution would not substantially change the required seepage and runoff management, nor the predicted closure outcomes already incurred at the RSA.	The waste rock would eventually be covered by water within the closure pit lake, which could achieve an acceptable closure end-point with appropriate design and planning, but it would not meaningfully improve the site-wide water quantity or quality that needs to be managed.
	Acceptable	Acceptable
Human Environment	Closure outcomes and future land use opportunities would be the same for both options.	Closure outcomes and future land use opportunities would be the same for both options.
	Acceptable	Acceptable
Overall Rating	**Preferred**	**Challenging**

1.7.2.4 Diesel vs. Battery Powered Fleet

1.7.2.4.1 Underground Mobile Equipment

NRCML has evaluated options for the underground mobile equipment fleet. For any option, the fleet make-up changes over time, and needs to meet the requirements of initial underground development, early production (prior to the conveyor system being in service), and production (with conveyor system in service). Mobile equipment fleet profiles for three options were developed:

- Diesel;
- Battery-electric vehicles (BEV); and
- Tethered electric load-dump-haul (LDH) plus BEV combination.

Table 1-14 summarizes the technical, economic, physical, and human environment evaluations of these options.

From a technical perspective, diesel LHDs and haul trucks are well established and available in large size classes (e.g., 20 t LHD, 60 t haul truck). BEV manufacturers do not currently produce models at this large of a size class.

While some BEV are available in the market, the number of BEVs manufactured and operating to date is low compared to diesel powered equipment. Managing battery usage (charging, replacement, disposal) is more complex than diesel. The durability, maintainability, and operating costs related to these units have not been proven through experience. Overall, from a technical perspective, BEV was rated as Challenging, compared to diesel. BEV is an emerging market, and it is expected that more and better BEV options (e.g., larger scoop payloads, longer operating hours) will become available over the next 5 to 10 years, which is the expected replacement lifespan of a diesel LHD unit. Therefore, the underground Mine infrastructure is being developed in a manner that would enable a future transition to an electric fleet once the technology is more established.

In addition, to the above, there are some technical challenges related to the tethered LHD and the current Mine layout (e.g., additional electrical infrastructure and limited tether length) that make the tethered LHD less attractive than BEV.

Diesel engines generate noise, heat, and contaminants that negatively affect the underground work environment. There would be improved underground environmental conditions by replacing part or all of the diesel mobile equipment fleet with electric equipment. This could reduce ventilation requirements and could result in a potential improvement in worker productivity and may also attract a more diverse workforce. From an economic perspective, the capital cost of battery-powered or tethered-electric mobile equipment is higher than the diesel unit of equivalent capacity. For the LHDs and haul trucks, the cost per unit for a BEV can be 40% to 50% higher than diesel, excluding the cost of the battery and battery charging infrastructure. When including equipment rebuilds and replacement costs and the cost of infrastructure to support an electric fleet, the LOM capital and sustaining capital cost for the electric fleet are up to 60% higher than the diesel fleet.

On the other hand, the operating costs, including equipment maintenance parts, fuel, or electrical power consumption costs (e.g., batteries and charging stations), lubricants, and maintenance labour, are lowest for the Tethered LDH plus BEV, and highest for diesel.

From a net present cost perspective, which takes into account the duration of the planned Mine life, diesel is the preferred option, followed by Tethered LDH plus BEV, and then BEV.

From an environmental perspective, the electric fleet options would result in lower GHG emissions (between 5,000 and 20,000 t CO_2 eq/year over the life of the Project) compared to the diesel fleet. LDH and haul truck units generate the most GHG emissions due to their high utilization. There would be limited GHG savings achieved by switching only the drilling equipment and other auxiliary vehicles (e.g., grader, backhoe, water truck) to electric.

All three options can be safely operated and would require a similar-sized workforce. The electric fleets would generate less noise, heat, and contaminants, which workers may prefer, and the different roles required for battery management (versus re-fueling) may be attractive in terms of hiring and retention. Overall, there are some environmental and social benefits related to utilizing an electric fleet; however, the capital costs are much higher, and these costs are not fully recovered through the lower operating costs. The diesel option is preferred, as it is well established, and can be safely implemented. The technology for electric fleets is still emerging. The underground Mine plan is being developed in a manner that would enable a future transition to an electric fleet once the technology is more established. NRCML will also continue to evaluate the potential to incorporate auxiliary electric units into the fleet to realize some of the GHG reduction and air quality benefits.

Table 1-14: Alternatives Evaluation Summary for Underground Mobile Equipment

	Diesel	Battery-Electric	Tethered Load Dump Haul + Battery-Electric Vehicles
Technical	Well established in mining industry. Noise, heat, and air contaminants influence ventilation requirements and work health/safety.	Multiple manufacturers provide BEV options. Less established than diesel. Durability, and maintainability have not been proven through experience.	Additional electrical infrastructure required, and placement is limited by tether length.
	Acceptable	Challenging	Challenging
Economic	Lowest capital cost. Highest operating cost. Best net present cost (NPC).	High capital cost (60% higher than diesel). Comparatively low operating cost. Highest NPC ($+49 million compared to diesel).	Highest capital cost. Lowest operating cost. High NPC ($+35 million compared to diesel).
	Preferred	Challenging	Challenging
Physical Environment	Highest GHG emission profile.	5,000 to 20,000 t CO_2 eq/year lower than diesel.	5,000 to 20,000 CO_2 eq/year lower than diesel.
	Challenging	Preferred	Preferred
Human Environment	Can be safely operated and would require a similar sized workforce.	Can be safely operated and would require a similar sized workforce.	Can be safely operated and would require a similar sized workforce.
	Acceptable	Acceptable	Acceptable
Overall Rating	**Preferred**	**Challenging**	**Challenging**

1.7.2.4.2 Bus and Truck

NRCML has evaluated options for a fleet of buses and light-duty (pickup) trucks to provide reliable and efficient onsite/offsite transportation support for the Project. Two options were evaluated:

- Diesel; and
- BEV.

Table 1-15 summarizes the technical, economic, physical, and human environment evaluations of these options.

Transportation requirements include shuttling personnel to/from the Dease Lake Airport at start and end of shift, and daily shuttling within the Mine-site. The size of the workforce considered range between 700 and 1240 over the life of the Project.

Concentrate haulage trucks and road coach buses (for personnel transport between the airport and camp) were not included in the evaluation due to low confidence that current BEV technology supports these applications, due to the longer distances and low temperatures during winter.

Table 1-15: Alternatives Evaluation Summary for Bus and Truck Fleet

	Diesel	Battery -Electric
Technical	Well established in mining industry. Less complex than BEV to operate.	Multiple manufacturers provide BEV options. Less established than diesel. Durability and maintainability have not been proven through experience. Managing battery usage (charging, replacement, disposal) is more complex. Customer support for the BEV system will be important to quickly address challenges that may be encountered.
	Preferred	Challenging
Economic	Low capital cost. High operating cost.	High capital cost, though some grants may be available. Low operating cost
	Acceptable	Acceptable
Physical Environment	Higher GHG emission profile than BEV.	240 tCO_{2eq}/year lower than diesel.
	Acceptable	Preferred
Human Environment	Can be safely operated and would require a similar-sized workforce.	Can be safely operated and would require a similar-sized workforce.
	Acceptable	Acceptable
Overall Rating	**Preferred**	**Challenging**

1.8 Future Potential Condition Context

As required in the Amendment Application Information Requirements context for the following future potential conditions associated with the Mine will be presented:

- Continuation of open pit mining, excluding the proposed Project;
- A future without the Project and the Red Chris Mine; and
- Additional Mine development following operations of the proposed Project.

1.8.1 Continuation of Open Pit Mining Without the Proposed Project

Without the proposed Project, the Mine could conceptually continue to operate, expanding the Open Pit to a permitted 'Phase 6' configuration (larger mine plan previously approved in 2012), feeding the mill and disposing tailings in the TIA to its full permitted capacity. The mine would continue to generate an average of 81,416 tCO_2 eq/year of GHG emissions, and approximately 220 ha of additional land would be disturbed by an expanded Open Pit mine. The RSA would grow within its existing footprint as the site continues to generate waste rock and stockpile low grade ore.

As described in Section 1.7.1, a total of 277 MT of ore would be processed, and approximately 1,673 ha of total disturbed footprint would result. Open pit mining would then be followed by closure, as described in Section 1.4.8.

However, continuation of mining in the current permitted configuration would be associated with high operating costs driven by high waste and ore ratio. If NRCML found a way to continue, it would likely be a marginal business that is strongly influenced by market fluctuations and continuously at risk of temporary or permanent closure. As described in Section 1.8.2, a shorter life of mine is the more likely outcome if the Proposed Project were not to proceed.

1.8.2 A Future Without the Project and the Red Chris Mine

If the Project were not to proceed, NRCML's current estimates are that it is economically viable at anticipated copper prices to mine an additional 30 MT of ore using conventional open pit techniques based on the permitted 'Phase 8' open pit configuration approved in 2021. A total of 120MT of ore would be processed. This would reduce the LOM to 12 years, compared to the original plan of 25 years.

The resultant footprint would be similar to what is on the ground today, and overall, a smaller RSA and smaller TIA than originally planned. It would result in significant reductions in jobs, contracts, and Tahltan revenue from the IBCA. Closure activities as described in Section 1.4.8 could initiate as soon as 2027. Substantial mineral resources would remain in the ground, and closure of the mill and TIA would significantly limit their future mining opportunity.

1.8.3 Additional Mine Development Following Operations of the Proposed Project

The ore body identified for block cave mining extends past the volume included in this Amendment Application; an estimated 300 MT of ore reserves will remain at depth at the end of the operations stage of the Project. Considering the significant mineral potential in the area, Newmont's objective would be to further assess the viability of additional development of the Red Chris property, should the Project as currently proposed, receive all necessary external and internal approvals and proceed to the construction and operations stages.

A pre-feasibility study (PFS) was completed by Newcrest (prior to Newmont ownership) in 2021. The 2021 PFS was conducted on the basis of accessing the known Red Chris ore body through progressive development of three macro-blocks, with each macro-block designed based on maximum volume of materials that can be managed through a single crusher and assumed continued use of existing Mine waste management process and infrastructure without substantive constraint.

During the transition from pre-feasibility and feasibility level planning and design, it was recognized that expanded or alternate tailings storage is a key constraint to potential development of the full project contemplated in the 2021 PFS. It is expected that several additional years of study and engagement with Tahltan and regulators would be required to identify additional, appropriate, and permittable tailings management.

As such, ongoing (since 2021) feasibility level planning and design has focused on development of a single macro-block, Macro-block 1. Macro-block 1 contains the highest grade of the known mineral resource in the immediate vicinity of the Open Pit, and mining of Macro-block 1 can be managed within the currently permitted capacities and extents of the TIA and RSA. Macro-block 1is estimated to contain approximately 180 MT of ore.

The feasibility level work that has been conducted has confirmed that development of Macro-block 1 has sufficient return on investment to support advancement of the project through Newmont's internal Board approval process to be developed as a stand-alone capital investment (i.e., not contingent upon to future expansion to support an investment decision).

Key factors to enable future development beyond the currently proposed Project include identification of feasible and socially acceptable waste management (including tailings), additional regulatory and Tahltan approvals including a subsequent complex amendment to Red Chris' EAC #M0502, additional detail planning and engineering design, and further economic analysis. It is anticipated that several (greater than five) years would be required to complete the studies and related work to understand the feasibility of any future developments. Should these factors be favorably addressed, there is the potential for decades of additional mining in and around Red Chris, along with associated economic benefits. Any future potential development is not possible without development of current Project.

Until key constraints, such as additional or alternative tailings management options are identified, the 2021 PFS outcomes do not represent a suitable level of detail for the development of Red Chris beyond Macro-block 1.

1.9 Summary

Block cave mining represents an opportunity to access ore beneath the permitted Open Pit shell that would be prohibitively expensive and environmentally disruptive to mine from the Open Pit. The proposed change in mining method will improve the economics of what is today a marginal operation, while entailing only a very small increase in current surface disturbance footprint and reducing GHG emissions when compared to the current open pit mining operation.

The information presented in Table 1-16 provides a summary of the existing and permitted components and activities and changes associated with the Project.

Table 1-16: Summary of Proposed Project Changes Compared to Existing and Permitted Components and Activities

Activity / Component	Existing and Permitted Components and Activities	Changes Associated with Project Construction	Changes Associated with Project Operations	Changes Associated with Project Closure and Post-Closure
General (Operations)				
Workforce	Originally estimated at 284 persons, with approximately half onsite at any given time (AMEC 2004). Estimated that 252 would be direct employees, with an additional 32 contract employees (AMEC 2004). There are currently approximately 725 employees at Red Chris.	During construction, the number of workers (i.e., employees and contractors) onsite will increase to a peak of approximately 1,500.	Approximately 800 workers are expected to be employed during the operations stage. It is expected that approximately 30% of surface mining positions will transition to underground mining positions.	A reduction in workforce due to closure.
Work Rotations	Mine will operate around the clock, 7 days per week, through a 14-days on/14-days off schedule of 12-hour shifts (AMEC 2004).	No change.	No change.	A reduction in workforce due to closure.
Mining Method	Conventional open pit shovel and truck operation. Exploration and Pre-Production activities and components that would support block cave mining have been permitted and constructed, as described in Section 1.4.6.	Transition from conventional open-pit mining method to the block cave mining method. The block cave mining method will initiate as underground infrastructure is completed.	The transition to block cave mining will increase production to full 15 Mtpa.	Not Applicable.
LOM Production Rate	13.9 Mtpa for 25 years.	Not Applicable	11 Mtpa for 14 years and up to 15 Mtpa for additional 10 years, for a total of 24 years.	Not Applicable.
Total Disturbed Area	986 ha was anticipated to be disturbed by Red Chris development activities in the Original Application (AMEC 2004). Total existing disturbance at the end of 2023 was approximately 1,453 ha. Permitted disturbance areas, including components not yet implemented, is 1009 ha.	Surface disturbance attributed to the Project is approximately 57 ha above existing permitted disturbance areas. Laydown areas required for construction will require approximately 6.4 ha.	Not Applicable.	Not Applicable.
Underground Infrastructure				
Underground Workshop: designed to accommodate service, tire change, washdown, crib-room, office washrooms, storage, and electrical support facilities at a depth.	Not Applicable.	Located at 475 masl, with a total excavation volume of approximately 25,000 m^3 or 70,000 t of rock movement including accesses.	Use and maintenance.	Equipment will be removed for re-use where possible or disposed of appropriately. The cave will fill with water once dewatering activities are ceased.
Pump Station: designed to house the permanent and primary pumping facilities to facilitate the safe and efficient pumping of mine water to surface.	Not Applicable.	Anticipated location at a depth of 435 masl with a total excavation volume of approximately 29,000 m^3 or 80,000 t of rock movement including accesses.	Use and maintenance.	Equipment will be removed for re-use where possible or disposed of appropriately. The cave will fill with water once dewatering activities are ceased.

Activity / Component	Existing and Permitted Components and Activities	Changes Associated with Project Construction	Changes Associated with Project Operations	Changes Associated with Project Closure and Post-Closure
Undercut and Extraction Level Area The Mine design is premised on the development of the extraction and undercut levels below the ore zone at approximately 500 masl and 525 masl, respectively. This is approximately 1,000 mbgs.	Not Applicable.	Drilling and blasting. Shotcrete will be used to reinforce underground tunnels.	Ore will be extracted from all draw bells developed during construction. The extraction level will be used to haul ore from the draw points to the MHS during the whole duration of operations.	The cave will flood once dewatering activities are ceased.
Crusher: The crusher will be located adjacent to the block cave footprint with a total excavation volume of approximately 55,000 m^3 or 155,000 t of rock movement including accesses.	Not Applicable.	Construction will include drilling and blasting. Shotcrete will be used to reinforce chambers.	Use and Maintenance.	Equipment will be removed for re-use where possible or disposed of appropriately. The cave will fill with water once dewatering activities are ceased.
Underground				
Underground Material Handling System	Not Applicable.	Construction activities related to the MHS include the installation of a central tipple with a ROM ore bin, an apron feeder, a single underground crusher, and a series of conveyors to transport crushed ore to the surface.	MHS will function during the whole duration of the operations stage.	Equipment will be removed for re-use where possible or disposed of appropriately. The cave will fill with water once dewatering activities are ceased.
Underground Ventilation System	Primary ventilation consists of raises to surface and lateral connections. Ventilation raises 1, 2 and 3 are permitted. Ventilation Raise 2 has been developed.	Electrical distribution systems Installation of propane tanks for heating systems. Installation of one additional ventilation shaft (VR4).	Air blowers associated with VR4 and propane heaters to heat the air, VR 1, 2, and 3 will be used.	Equipment will be removed for re-use where possible or disposed of appropriately. Surface openings will be secured with designed /permitted systems. The four ventilation raises will be secured with concrete caps anchored to bedrock.
Underground Water Management System	Precipitation (rain and snowmelt) and ground water flowing in to the Open Pit, as well as ground water accumulating into the existing underground workings plus process water, will collect in the underground mining area and will be pumped out of the Mine.	Expansion of the installation and operation of groundwater system to collect groundwater and pump it to the surface. Management underground (water collection & pumping system) Surface piping to convey water to the process plant for use.	Grading underground works will direct groundwater away from Block Cave infrastructure. The water system will pump all water from underground workings away from equipment and personnel and transfer to the process plant or reused underground.	The cave will fill with water once dewatering activities are ceased.
Mine Area				
Open Pit	East and Main zone pits projected to become one larger pit over the Mine life (AMEC 2004).	Advancement of the Open Pit and the activation of the first draw bell underground are not anticipated to overlap.	The Open Pit would develop to a smaller footprint that is presented in the Original Application. Pit dewatering will continue during the operations stage.	Not Applicable.

Activity / Component	Existing and Permitted Components and Activities	Changes Associated with Project Construction	Changes Associated with Project Operations	Changes Associated with Project Closure and Post-Closure
Subsidence Zone	The existing closure plan proposes installation of a barrier with a buffer up to 200 m around the affected area to restrict access by wildlife and humans.	Not Applicable.	The Project will result in subsidence associated with underground mining. The subsidence zone is anticipated to be located within the existing disturbed area. Subsidence zone will develop gradually during operations.	The subsidence cave will be near final configuration and will be contained inside the Open Pit when the block cave closes. The cave and subsidence zone will be allowed to flood, forming a lake that will be contained within the existing footprint of the Open Pit. It is expected that it will take approximately 60-70 years from the end of mining for the flooded cave to reach equilibrium. A barrier will be installed with a buffer up to 200 m around the affected area to restrict access by wildlife and humans.
Pit Lake	A pit lake will develop during post-closure to reach a maximum elevation in approximately 40 years after mining ends.	Not Applicable.	Not Applicable.	The filling of the Open Pit / Block Cave Mine with water will continue into the post-closure Stage and it is anticipated that the water elevation will reach 1,431.5 masl; the assumed final managed elevation. This elevation is anticipated to be reached approximately 60-70 years after mining ends.
Naghā Portal and Decline	Naghā decline extends approximately 2.8 km underground to provide access for advanced exploration activities and includes an underground dewatering system, electrical substations, and drill pads and platforms.	Not Applicable.	Primary access where people and equipment are transported to the extraction level via the Naghā decline.	Surface access will be secured to prevent entry. Installation of hydrostatic plug in Naghā decline to prevent contact water from exiting the Mine. The conveyor decline will be closed with a waste rock plug and secured to prevent inadvertent access.
Rock Storage Area – At Surface				
Placement and storage of waste rock from the underground into the RSA	Waste rock dump with provision for segregation and storage of low-grade ore. A total of 302 MT of waste and material will be placed in waste dumps and stockpiles.	Waste rock generated during the development of the underground workings will be placed in the RSA. No change in the permitted volume is planned.	Waste rock production from the underground mine will decrease, area used by in the Rock Storage Area will be less as low-grade material stored there is depleted.	Not Applicable.
Ore Stockpile Area	Ore generated during construction of the declines will be stored in the RSA, along with ore from ongoing open pit operations. Ore Stockpiles will continue to be used as a temporary storage prior to processing, Processing will prioritize any remaining lower grade ore and then will transition to higher grade ore from underground sources.	Processing of any remaining low-grade ore from stockpiles will continue per current plan.	Source of ore will transition to underground sources, as conveyed from underground. Limited amount of underground ore may be temporally stockpiled until it can be processed.	Not Applicable.

Activity / Component	Existing and Permitted Components and Activities	Changes Associated with Project Construction	Changes Associated with Project Operations	Changes Associated with Project Closure and Post-Closure
Process Plant Area – At Surface				
Process Plant	Process plant ore throughput averages between 10 and 11 Mtpa. The ore processing facility includes crushing, grinding, and floatation circuits.	Laydown area will be required for equipment and materials. Installation of additional crushing, grinding, flotation, and concentrate dewatering equipment will be required. Process plant modifications requiring construction include: • Expanded rougher flotation circuit. • Expanded cleaner circuit. • Addition of a cleaner Jameson Cell. • Installation of a coarse particle flotation technology. Changes in crushing and grinding technology to address harder ore and add capacity include: • Secondary crushing circuit. • High pressure grinding rolls . • Installation of a vertical stirred mill. • Upgrading of the current semi-autogenous grinding (SAG) and Ball mills • Installation of an additional Ball Mill.	There will be no fundamental changes to the operational aspects of the process plant associated with the expansion to a throughput of 15 Mtpa.	Not Applicable.
Tailings Impoundment Area				
Tailings Impoundment Facility	Formed by three dams: South Dam, North Dam, and Northeast Dam for a total capacity of 300 MT. Maintenance of Wet Cover (2 m) on TIA.	No change	No change	Not Applicable.
NRD, SRD, and North East Reclaim Dam (NERD)	The Northeast Dam will be constructed in a single stage to crest elevation 1075 m, giving it an approximate height of 10 m. The NRD and SRD are already in operation. Construction of the already permitted NERD, including ground disturbance, foundation and materials placement,	No change	No change	Not Applicable.

Activity / Component	Existing and Permitted Components and Activities	Changes Associated with Project Construction	Changes Associated with Project Operations	Changes Associated with Project Closure and Post-Closure
Tailings and Water Management at Surface	EAC was amended in 2016 to allow for the addition of a tailings thickener to optimize recycling of process water within the Ore Processing Area. Treat or otherwise manage the excess TIA water to be released to the receiving environment to meet applicable regulatory requirements. Groundwater is the main source of fresh water. NRCML has avoided the extraction and will not extract water from the Klappan River.	No change.	Tailings rheology may change as the process plant modifications will lead to a coarser grind, and the density (i.e., the ratio of solids to water) of the NAG tailings slurry will increase owing to the operation of the tailings thickener (once installed). The mass ratio of NAG to PAG tailings, which are deposited separately in the TIA, will increase.	Not Applicable.
Underground Water Management	Infrastructure to divert run-on ("non-contact") water around Mine facilities and to collect and manage "contact" water in accordance with regulatory requirements and applicable management plans.	Construction of underground dewatering system to support block caving operations.	Surface water management will continue as currently permitted. Underground water pumping requirements will increase from initial flows related to development of underground infrastructure.	Dewatering activities will cease, and the underground workings will be allowed to fill with water. Installation of the already permitted, but not yet built, hydrostatic plug in Naghā decline to prevent contact water from exiting the Mine.
Supporting Infrastructure				
Communications Systems Upgrades	Not Applicable.	Communications infrastructure will be installed underground to connect fixed equipment, people, mobile equipment, and monitoring devices.	Maintenance and use of underground communication system for general communication, safety and equipment.	Recyclable and re-useable infrastructure will be removed from underground, as will any hazardous materials.
Mine Access Road	23 km gravel topped access road connecting Red Chris with Highway 37	Not Applicable.	Not Applicable.	Not Applicable.
Onsite Haul and Service Roads	Various onsite haul and service roads between key Mine areas, including the use of mobile equipment at surface.	The Project will require construction of one additional road to allow light vehicle traffic to bypass the process plant.	Road use and maintenance.	Not Applicable.
Power Supply	138 kV (or 287 kV) power line from Highway 37 to Red Chris (Tatogga Lake) along the Mine access road. An onsite electrical power distribution system, consisting of substations, poles, and lines throughout the property.	Substation Upgrade - additional transformer 287 kv/25 kV with an Increase in electrical power consumption from 118 MW to 140 MW. New substation at Block Cave Area (VR2). Additional diesel generators for Underground emergency power. Additional diesel generators for Underground emergency power. Additional power lines for distribution of power onsite.	Reduction in diesel fuel consumption from mining equipment (haul trucks) once surface mining stops.	Not Applicable.

Activity / Component	Existing and Permitted Components and Activities	Changes Associated with Project Construction	Changes Associated with Project Operations	Changes Associated with Project Closure and Post-Closure
Camp and Accommodations	The EAC was amended multiple times to allow for 1,200 people. The most recent amendment application included the expansion of the facilities to add 510 of occupancy, a kitchen, boot room, dining facilities, offices, recreation centre, a PWTP, STP, expansion of the STP, backup power, ancillary facilities, and related infrastructure (November 2022).	Increasing camp occupancy from 1,200 to 1,500 people. Adding incinerator, STP changes, and wastewater treatment plant upgrades. No change to the camp footprint is required for the increase in occupancy at the camp.	Camp occupancy anticipated to be close to current levels.	Not Applicable.
Mine Dry	Existing Mine dry that will be decommissioned.	A new Mine dry to accommodate 500 miners will include a centrally located common area that will accommodate the changing and showering facilities and lamp room.	Use and maintenance of the facility during the operations stage.	Not Applicable.
Borrow Pits / Quarries	A series of till and gravel borrow pits, as documented in the Original Application.	Expansion of the 17.5 km Quarry. NAG Quarry intended to supply building materials needed for the construction of the camp and ancillary services.	Aggregate used to create concrete panels for drives in the underground.	Not Applicable.
Waste Material Management Wood Incineration / Other	Current incinerators and water and wood waste pile, current wastewater treatment plant.	Construction and installation of incinerator #3, and establishment of waste and wood waste piles.	Use and maintenance of the facilities during the operations stage.	Not Applicable.
Topsoil Stockpiles	Existing topsoil stockpiles.	Additional and expanded stockpiles will be created/used due to civil works during construction.	No change from existing management.	Not Applicable.
Preparation of Construction Laydown Areas	Existing laydown areas will be used to support the Project.	Additional laydown areas will be required.	Not Applicable.	Not Applicable.
Shotcrete Batch Plant	Not Applicable.	A temporary Batch Plant, and aggregate storage to be installed near conveyor portal / process plant.	Shotcrete will be used to reinforce and rehabilitate underground tunnels. Concrete for various minor civil works / repairs. Material will be sourced from current borrow pits and Quarries.	Equipment will be removed for re-use where possible or disposed of appropriately Surface openings will be secured with designed /permitted systems.

Activity / Component	Existing and Permitted Components and Activities	Changes Associated with Project Construction	Changes Associated with Project Operations	Changes Associated with Project Closure and Post-Closure
Use of Regional Infrastructure				
Concentrate Transport Route	Concentrate shipped by truck via Highways 37 and 37A to the Terminals for trans-shipment using existing concentrate storage and ship loading facilities.	No change.	No change.	Not Applicable.
Concentrate Transport Volume	Between 2018 and 2022, monthly concentrate haul truck traffic fluctuated between 6 and 10 per day.	A gradual increase in concentrate shipments during the construction phase; as the process plant mill ramp-up from 11 to 15 Mtpa. Additional 10 to 12 semi-trailers of construction equipment to site per day.	Anticipated +1% change in traffic during operations. Concentrate volumes on Highways 37 and 37A are anticipated to range between approximately 18 and 42 (average month – return trips) for Years 1 through 11 (Jacobs 2024a). Increased amount of concentrate transported to the Terminal the port for shipping.	Not Applicable.
Concentrate Shipping Volume	1-2 cargo ships per month (12-24 ships annually).	No change to marine vessel classification or frequency.	Shipping frequencies anticipated to range from no change to an additional 1 handysize bulk carrier call at the Port of Stewart per month.	Not Applicable.
Personnel and Equipment Transport	Employees will be flown to Dease Lake Airport and bused to the Mine site for the duration of the work rotation. Chartered bus service will make stops at select locations. Personal vehicles are not permitted onsite.	Equipment and materials will arrive by various commercial ports during construction, including the Port of Stewart. Highway 37: 10 to 12 semi-trailers of construction equipment will be transported to the Mine site per day via Highway 37 from offsite locations, including some from the Terminal. The frequency of workforce transport trips to/from the site are anticipated increase during the peak construction window (May through September) before returning to current levels.	No change to transportation modes or volume. An approximate 1% change in traffic volume heading North is associated with the Project on Highway 37.	Not Applicable.

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Appendix 1-A. Traffic Report – Block Cave Project (Jacobs 2024)

Red Chris Block Cave Project - Production Phase

Chapter 1.0 Project Overview

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December 13, 2024

Newmont™

Traffic Report – Block Cave Project

Final

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Newcrest Red Chris Mining Limited

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Appendices

Appendix A. Newcrest Traffic Data

Acronyms and Abbreviations

BC	British Columbia
ICBC	Insurance Corporation of British Columbia
km	kilometre(s)
LSA	Local Study Area
NRCML	Newcrest Red Chris Mining Ltd.
PDO	property damage only
Project	Red Chris Mine Block Cave Mine Project
RCM	Red Chris Mine
RSA	Regional Study Area
SADT	summer average daily traffic

1. Introduction

This report provides the following for the Red Chris Mine (RCM) Block Cave Mine Project (Project):

- An overview of current and projected traffic volumes and routes for the Project
- A description of baseline highway conditions, including the types and seasonality of traffic flows
- An overview of the Project's potential interaction with current traffic within the Regional Study Area

The purpose of this report is to inform Project planning and the Production Phase Environmental Assessment Certificate Amendment Application.

1.1 Methodology

This report uses publicly available desktop data sources to describe road networks and traffic flows in the region. No fieldwork or site visits were conducted in developing this report; however, interviews were conducted with local road users and relevant government agency representatives to confirm understanding of the current traffic baseline information and to identify potential changes in traffic flows as a result of the Project. All engagement was undertaken using pre-established lines of inquiry developed by Jacobs and approved by Newcrest Red Chris Mining Ltd. (NRCML).

As part of the Project development, NRCML advanced engagement activities to inform the planning of the Project. Engagement activities undertaken to date with local governments, provincial government agencies, guide outfitters and local tourism, and service businesses are summarised in Section 5.

The scope of the report focuses on the transportation corridor associated with the construction and operation of the Project, including the trucking of concentrate to the Port of Stewart for shipping to market. The transportation footprint for the Project is congruent with RCM's current operations.

The study areas include Highways 37, 37A, and 16 between the junction with Highway 37 (Kitwanga Junction) and the Village of Telkwa (Figure 1-1). The study areas also include Telegraph Creek Road that runs east to west between Dease Lake and Telegraph Creek. The study areas focus on the major transportation corridors that run through the province and the main routes between communities in the area, including the mine site.

The Local Study Area (LSA) includes most of Tahltan Territory, starting from the southern intersection of the Alaska/British Columbia (BC) border up to the BC/Yukon border, where it runs parallel along the northern boundary. The southeastern border includes the upper Nass tributaries and western half of the Stikine plateau, including the sacred headwaters of the Stikine, Nass, and Skeena rivers. The three primary communities within the LSA are Telegraph Creek, Dease Lake, and Iskut.

The Regional Study Area (RSA) follows the Stikine Regional District boundary starting at the Portland Canal northwest and then east, following the contour of the Alaska/BC border and BC/Yukon border. The eastern boundary runs south following the borders of the Regional District of the Kitimat-Stikine, the Stikine Region, and Tahltan Territory until south of Smithers, where it crosses south of Terrace until it reaches the southern Alaska/BC border at Portland Canal.

1.2 Information and Data Sources

The following information sources were reviewed in the preparation of this report:

- BC Traffic Data Program
- BC highway cameras

- Red Chris Project Environmental Assessment Certificate Application
- Insurance Corporation of BC (ICBC) collision data
- BC population estimates

N

- Airport / Aircraft Landing
- Regional Hospital
- Community / Locality
- Highway
- Railway
- Provincial / International Border
- Conservancy
- Park / Protected Area
- First Nation Reserve
- Municipality
- Red Chris Mine Site
- Local Study Area
- Regional Study Area
- Wildlife Management Area

NAD 1983 UTM Zone 9N.
Red Chris Mine Site: Newcrest 2022; LSA and RSA: Newcrest 2022; Airports: TERA Environmental Consultants 2008, derived from Canada Flight Supplement, 0901Z 10 April 2008 to 0901Z 5 June 2008; Health Care Facilities: BC Health Authority GIS Working Group 2019; Transportation: BC MFLNRO 2015, NRCan 2023; Geopolitical Boundaries: BC MFLNRO 2019, NRCan 2011; First Nations Reserves: Government of Canada 2021; Parks and Protected Areas: BC MFLNRO 2019, NRCan 2023; Wildlife Management Areas: BC MFLNRO 2019; Base Imagery: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community.

0 50 100 150 200
Kilometres

Figure 1-1
Regional Overview
Newcrest Red Chris Mining Ltd.

Jacobs

\\JACOBS.COM\COMMON\SHARES\CNR\GIS_PROJ3\CE812600_REDCHRIS\MAPFILES\REPORT2023\FIG1_1_REGIONAL_OVERVIEW.MXD DNICOLSON 1/24/2023 10:45:55 PM

2. Project Description

NRCML, a wholly owned subsidiary of Newmont Corporation, is the operator of the RCM. RCM is an unincorporated joint venture between NRCML (70%) and the Red Chris Development Company (30%). The mine has been in operation since 2015.

RCM is in northwest BC, entirely within Tahltan Territory, approximately 18 kilometres (km) southeast of the village of Iskut, 80 km south of Dease Lake, 450 km north of Smithers, and 12 km east of the Stewart-Cassiar Highway 37 (Figure 1-1). The site is in a geographically isolated and sparsely populated area. Regional hubs include Smithers, Terrace, and Stewart. The site is not located in or adjacent to any protected area. The Spatsizi Plateau Wilderness Provincial Park is to the east, Mount Edziza Provincial Park is to the west, and Todagin South Slope Provincial Park is to the south.

Operations at RCM include a conventional open pit mine which produces a mineral concentrate. Access to the mine site is via a 23-km mine access road that links to Highway 37 immediately south of Iskut. Concentrate produced by the mine is shipped south from the site via Highways 37 and 37A to the Port of Stewart for transport to international markets. There is also supporting infrastructure, including an accommodation camp, maintenance and warehouse facilities, and offices. The majority of staff are fly-in/fly-out and arrive via bus from the Dease Lake airport.

NRCML proposes to transition to an underground mining operation using the method known as block caving to access ore at depths directly below the existing open pit. The ore produced will feed the existing mill with the concentrate being transported along the same route to Stewart.

The Project entails the following main features:

- Development of underground infrastructure to support underground production mining
- Transitioning from open pit to underground mining
- Upgrades to surface infrastructure, including camp facilities, water treatment, effluent treatment, and electrical infrastructure
- Increased concentrate trucking from the mine to the port and loadout facility at Stewart
- Temporary increase in traffic associated with the transportation of construction personnel and construction equipment and materials

3. Baseline Conditions

3.1 Highway Descriptions

The Project is in northeastern BC with Highways 37, 37A, and 16 providing road access to the area. Highway 37 is a 725-km, north-south traversing, two-lane, paved road that connects southern BC with Yukon Territory and Alaska (Figure 3-1). The road starts in Kitwanga Junction and terminates at the Yukon/Alaska border where it joins the Alaska Highway. The highway is one of two main routes connecting southern BC with Yukon and Alaska in the north. Highway 37 also connects several communities, including Telegraph Creek (via Telegraph Creek Road), Dease Lake, and Iskut to major service centres to the south (such as Terrace and Smithers).

Points of interest along Highway 37 include Meziadin Lake Provincial Park, Boya Lake Provincial Park, and Kinaskan Lake Provincial Park. Mount Edziza Provincial Park and Spatsizi Plateau Provincial Park are located off Highway 37; however, they are mainly accessible by air or overland hiking routes.

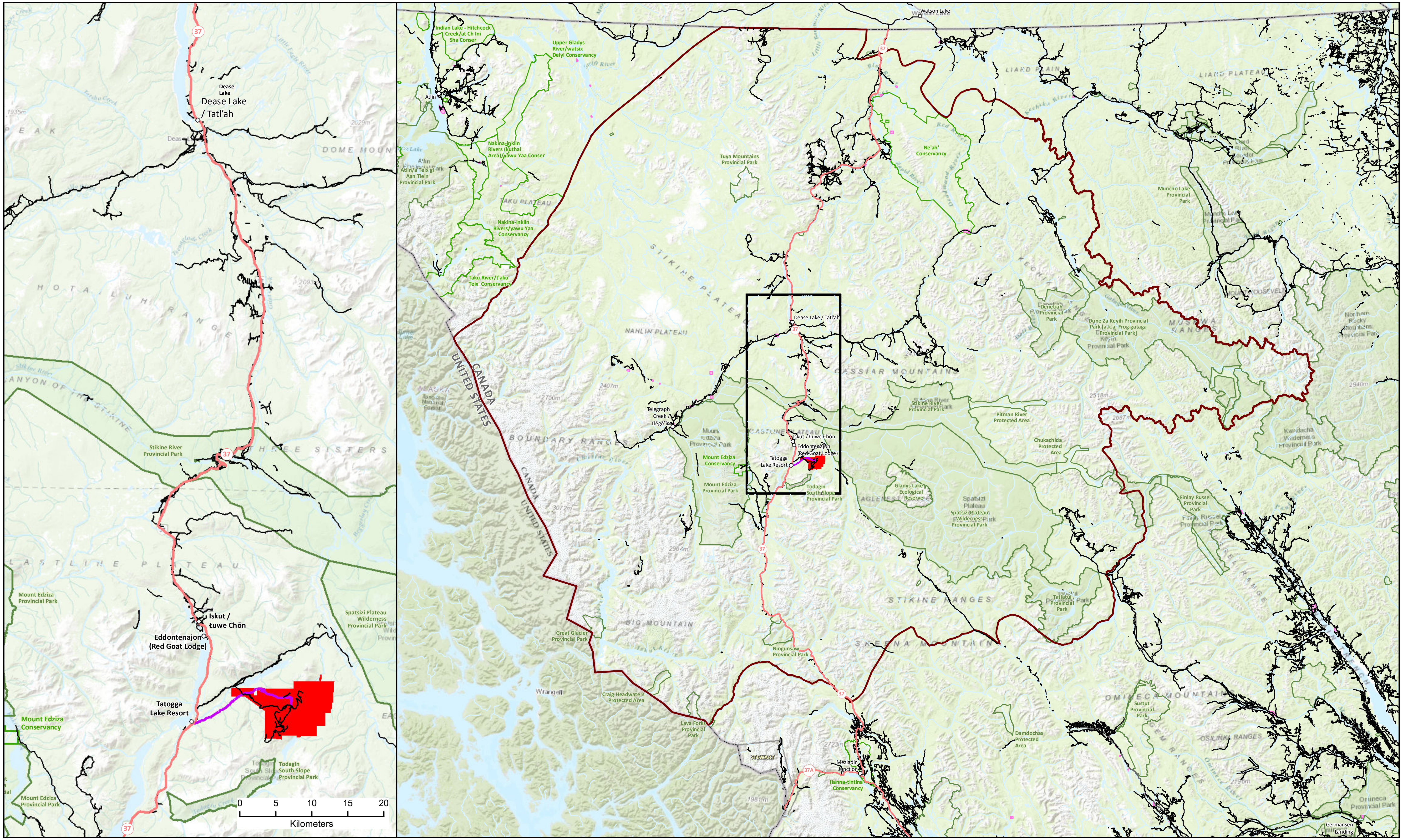
Highway 37A (also known as the Stewart Highway or Glacier Highway) is a 65-km, two-lane paved road that travels southwest from Meziadin Junction to the Canadian port town of Stewart at the Alaskan border. The road has dramatic scenery, including waterfalls, glaciers, and mountains, and provides access to Bear Glacier Provincial Park. The road is a popular scenic route north through the province and is also used by forestry and mining traffic (Government of BC 2023a).

Traffic associated with tourism is typically highest on all regional roads in summer, with tourists travelling Highway 37 and 37A to access outdoor recreation opportunities (such as hunting, fishing, and backcountry hiking) in northern BC, the Yukon, and Alaska and to take in the scenery of the area. There are three provincial parks and several other parks and protected areas that are accessed from Highway 37. Tourists also visit the area for historical buildings and museums (such as in Stewart) and historic sites (such as the Gitwangak Battle Hill National Historic Site) (Destination BC 2022).

The BC Government is currently undertaking a long-term transportation needs study of Highway 37 and Highway 37A (BC TRAN 2023). The objectives of the study are to assess current and future highway performance, identify opportunities to improve the operation, maintenance, and safety of these highways, and help identify and prioritize corridor improvements over the next 25 years. The study is anticipated to be complete in spring 2024, with a summary report issued later in the year. The Tahltan Highway Task Force is also undertaking a traffic study that is expected to include Highway 37 and 37A (Newcrest 2024).

Highway 16 is a 1,000-km highway running west from the Alberta border to the port city of Prince Rupert. Highway 16, also known as the Yellowhead Highway, connects several communities with northern BC service centres, including the cities of Prince Rupert and Terrace and the Town of Smithers. Highway 16 is a scenic corridor, providing access to several parks and protected areas, such as Babine Mountains Park and Seven Sisters Park.

At Kitwanga Junction, Highway 16 and Highway 37 share the same highway designation along a north-south route for 99 km before separating at Terrace, BC. Highway 16 continues west to Prince Rupert, generally running parallel to the Skeena River.



N

- Community/Locality
- Highway 37 / 37a
- Mine Access Road
- Other Road
- Railway
- Provincial / International Border
- Conservancy
- Park / Protected Area
- First Nation Reserve
- Municipality
- Red Chris Mine Area
- Local Study Area

NAD 1983 UTM Zone 9N.
Red Chris Mine Site: Newcrest 2022 ; LSA and RSA: Newcrest 2022; Transportation: BC MFLNRO 2015, NRCan 2023 and Jacobs 2021 (digitized from Imagery); Hydrography: NRCan 2019; Geopolitical Boundaries: BC MFLNRO 2019, NRCan 2011; First NationReserves: Government of Canada 2021; Parks and Protected Areas: BC MFLNRO 2019, NRCan 2023; Base Imagery: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community.

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Figure 3-1
Road Network
Newcrest Red Chris Mining Ltd.

Jacobs

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3.2 Services

There are several services available on Highway 16 between the junction with Highway 37 (Kitwanga Junction) and the Village of Telkwa, most notably the Town of Smithers, which provides access to gas, diesel, restaurants, and other commercial services. There are limited services along the Highway 37 route, with gas stations and food stores in small communities, such as Kitwanga, Iskut, and Dease Lake. There are no services between Meziadin Junction and the Town of Stewart. Table 3-1 provides an overview of service stations and amenities along Highway 37 between Kitwanga and Dease Lake.

Table 3-1. Available Services on Highway 37 from Kitwanga to Dease Lake

Location	Distance From Kitwanga (km)	Services
Kitwanga	0	Gas, diesel, repairs, restaurant
Meziadin Junction	160	Gas, diesel
Bell II	249	Gas, diesel, restaurant
Tatogga	392	Gas, diesel, restaurant
Iskut	405	Gas, diesel, groceries
Dease Lake	480	Gas, diesel, propane, repairs, groceries, restaurant

Source: Government of BC 2023a

3.3 Conditions

Highway 37 was first established as a forestry and mining road that was paved in the 1970s. Various additional upgrades have occurred as mining activity in the region has increased. An upgrade of the intersection of Highways 16 and 37 occurred in 2019 to accommodate increasing traffic volumes along both highway corridors. The Taft Creek Bridge was recently upgraded, and Bell-Irving Bridge is currently being upgraded to extend the life of each of the bridges (Government of BC 2022c).

Much of Highways 37 and 37A is single-lane hard surface (either pavement or sealcoat). Road conditions vary depending on the time of year. The following images were taken from the BC Highway Cams website in fall 2022. The images illustrate recent, snow-free conditions of Highway 37 and its junction with Highway 37A and Highway 37 at Dease Lake (Government of BC 2022a).

Meziadin Junction
Hwy 37 and Hwy 37A at Meziadin Junction, looking north. (elevation: 329 metres)

Dease Lake
Junction of Hwy 37 and Commercial Drive in Dease Lake, looking north on Hwy 37. (elevation: 808 metres)

The following image illustrates the state of Highway 37A between Stewart and Hyder in snow-free conditions as of fall 2022:

Stewart
Hwy 37a between Stewart,BC and Hyder, USA, looking north.
(elevation: 17 metres)

The RCM access road is located off of Highway 37. Based on a review of imagery (Google, n.d.), the area adjacent to the RCM access road has been cleared of trees and vegetation. When approaching from the south, the access road occurs along a straight stretch of road. From the north, the access road is located shortly after the Tatogga Lake Resort on the west side and a driveway for the highway maintenance contractor on the east side.

In 2013, a Traffic Effects Assessment of Highway 37 to support an Environmental Assessment for a project within this study area assessed the capacity of Highway 37. The assessment determined that Highway 37 had significant excess capacity available (Rescan 2013); however, traffic volumes have since increased according to Government of BC traffic counters (Tables 3-2 and 3-4).

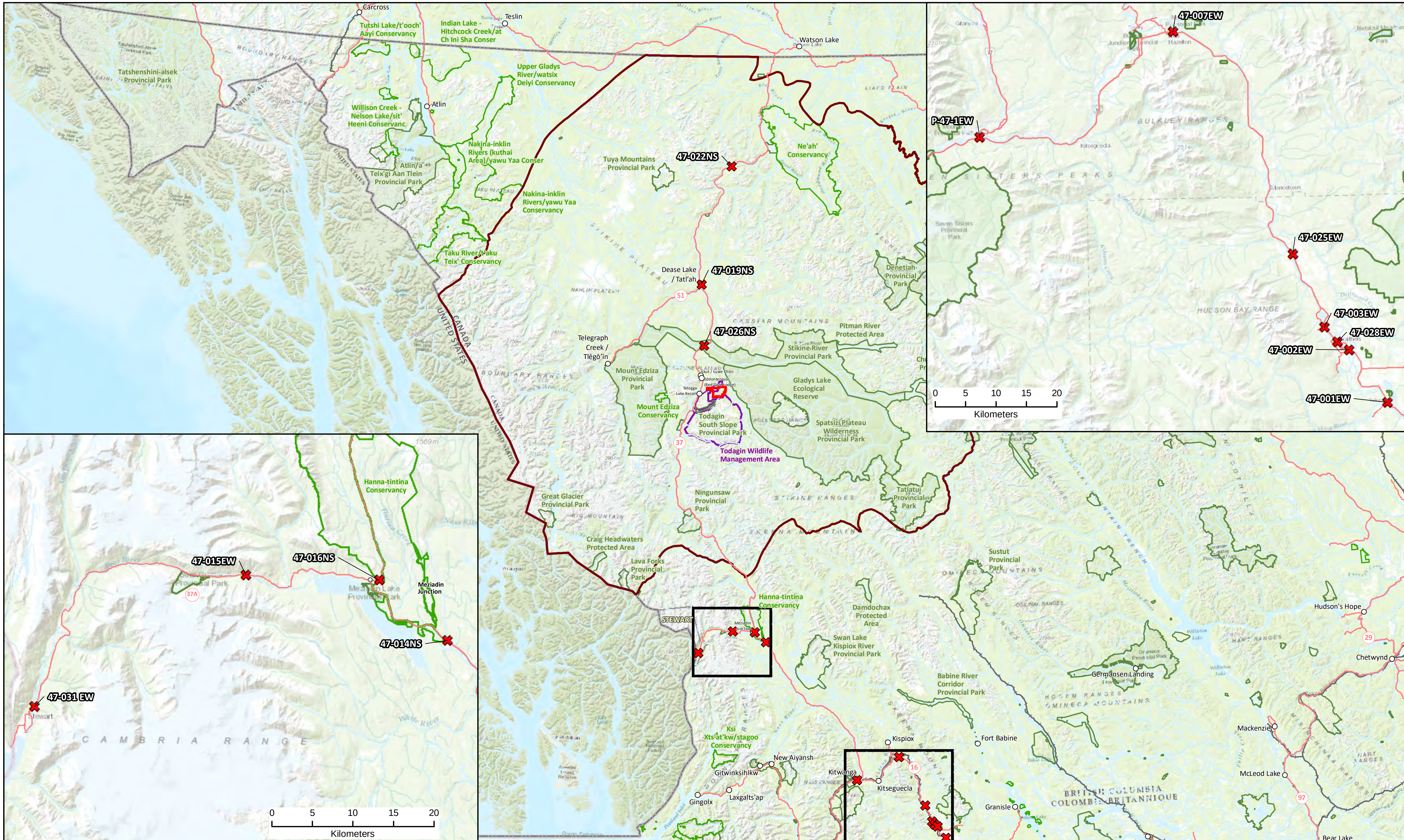
Highway 16 was fully completed in 1984. The condition of Highway 16 within the Project study area is similar to Highway 37, with the majority of the highway consisting of single-lane or double-lane hard surface (either pavement or sealcoat), and road conditions dependent on the time of year. The following images illustrate the state of Highway 16 within the Town of Smithers and Kitwanga as of January 2023 (Government of BC 2023b).

Smithers - N
Hwy 16 in Smithers at Main Street, looking north. (elevation: 497 metres)

Kitwanga - W
Junction of Hwy 16 and Hwy 37, near Kitwanga, looking west on Hwy 16. (elevation: 183 metres)

3.4 Traffic Volumes

Roads in the region were originally used by the mining and forestry industries to haul products to ports and markets in the south of BC. Today, the roads in the region are also used for tourism, recreation, and for residents travelling for various purposes. Traffic count data for the region are limited, and data collection has been inconsistent over the years. Available traffic data are sufficient for the purpose of providing a high-level description of the road usage and traffic flows. Figure 3-2 shows the traffic counter locations in relation to the Project.



N

- Traffic Counter
- Community/Locality
- Highway
- Railway
- Provincial / International Border
- Conservancy
- Park / Protected Area
- Municipality
- Red Chris Mine Area
- Local Study Area
- Wildlife Management Area

NAD 1983 UTM Zone 9N.
Traffic Counter Location sites: Digitized from Province of BC Traffic Data Program 2024; Wildlife Management Areas: BC MFLNRO 2023; Transportation: BC MFLNRO 2015; Hydrography: NRCan 2019; Geopolitical Boundaries: BC MFLNRO 2019, NRCan 2011; First Nations Reserves: Government of Canada 2021; Parks and Protected Areas: BC MFLNRO 2019; Base Imagery: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community.

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Figure 3-2
Traffic Volumes
Newcrest Red Chris Mining Ltd.

Jacobs

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Road usage in the region has seasonal variations. Although industrial traffic related to mining activity is year-round, tourist traffic is primarily concentrated in the summer and fall months when tourists use Highway 37 to travel north to Yukon and Alaska. Highway 16 experiences higher traffic volumes than Highway 37. The Highway 16 transportation corridor is more heavily populated, and the highway is a vital connection to major population centres in southern BC via Highway 5 and to Alberta as Highway 16 continues east.

Available daily traffic information from 2014 to 2023 is presented in Table 3-2 for Highway 37, and Table 3-4 for Highway 16. Summer average daily traffic (SADT) represents the average peak daily traffic volume for the months of July and August of a specified year. Summer traffic volume is typically higher than traffic the rest of the year because of tourism and recreational activities in addition to industrial traffic. From November 2020 to June 2021, the provincial government restricted recreational travel within BC to limit the spread of COVID-19. This reduced traffic volumes in 2020; however, in 2023 the traffic volumes increased to levels consistent with the volume recorded pre-pandemic.

Observations on Highways 37 and 37A traffic based on traffic data from 2014 to 2023 include the following:

- Highway 37 has the highest traffic volume occurring on the southern portions of the highway between Kitwanga Junction (where Highway 37 joins Highway 16) and Meziadin Lake Junction (where Highway 37 and Highway 37A connect). Traffic volume decreases as the highway continues north to Cassiar Junction.
- Traffic volumes increased significantly in 2023, with many locations recording the highest traffic volumes in 2023 when looking at the data from 2014 to 2023. The exception is Highway 37A, where the highest traffic volumes were recorded in 2017.
- Traffic count information indicates that SADT is generally higher than AADT (Government of BC 2023c).

Table 3-2. Available Daily Traffic Volumes

Traffic Counter Location	Average Daily Traffic Volumes	2014	2017	2020	2023	Average
Kitwanga Junction 47-01EW	AADT	--	1,438	1,414	1,686	1,513
	SADT	--	2,049	1,977	2,345	2,124
Nass River Bridge 47-014NS	AADT	675	746	430	--	617
	SADT	362	812	477	--	550
Meziadin Lake Junction 47-016NS	AADT	308	290	187	465	313
	SADT	266	516	311	716	452
Stikine River Bridge 47-026NS	AADT	242	213	147	270	218
	SADT	210	379	245	416	313
Dease Lake Junction 47-019NS	AADT	466	367	254	452	385
	SADT	320	515	369	606	453

Traffic Counter Location	Average Daily Traffic Volumes	2014	2017	2020	2023	Average
Cassiar Junction 47-022NS	AADT	196	169	109	226	175
	SADT	170	301	182	348	250
Windy Point Bridge (37A) 47-015EW	AADT	219	292	161	273	236
	SADT	189	520	268	421	350
Stewart (37A) 47-031 EW	AADT	287	376	219	342	306
	SADT	249	670	366	527	453

According to 2017 data gathered over an approximately 70-hour timespan (Table 3-3), truck traffic forms a significant volume of the overall traffic at locations along Highway 37 and 37A, ranging from 40% to 61% of all traffic depending on location. Truck traffic could be attributable to mines, forestry, or commercial transport of goods to northern communities.

Table 3-3. Count Class Distribution at Locations on Highways 37 and 37A (August 2017)

Traffic Counter Location	Trucks[a]	Total Vehicles	% of Traffic Trucks
Meziadin Lake Junction	805	1,318	61
Dease Lake Junction	645	1,593	40
Cassiar Junction	362	864	42
Stewart (37A)	1,031	1,677	61

Source: Government of BC 2023c

[a] Truck classification is done in accordance with BC Ministry of Transportation and Infrastructure *Traffic Reports User Documentation* (BC MoTI 2019). Trucks include buses; 2-axle, 6-tire, single-trailer trucks; single unit (3 to 6+ axles); and multi-trailer (5 to 7+ axles). These trucks typically weigh more than 11,795 kilograms, require the operator to have professional training and a specialized license, and are also referred to as heavy vehicles. This category does not include light vehicles that are in a lower weight category, such as pick-ups, sport-utility vehicles, and delivery vehicles.

The communities along Highway 37 are mostly small, with populations generally less than 1,000 residents (Government of BC 2022b). Traffic data in Table 3-3 show that the volume of residential traffic is low, with a high proportion of truck traffic.

The Town of Smithers is the largest community along highway 16 between Kitwanga Junction and the Village of Telkwa. Average daily traffic volumes for locations on Highway 16 between New Hazelton and the Village of Telkwa show a noticeable increase in traffic volume at the Smithers Traffic Counter location before dropping off again at locations east of the Town of Smithers. The average daily traffic volumes are all higher than along Highways 37 and 37A. Similar to Highways 37 and 37A, 2023 traffic volume is the highest traffic volume recorded during the period of 2014 to 2023.

Table 3-4. Average Daily Traffic Volumes at Locations on Highway 16 (2014 to 2023)

Traffic Counter Location	Average Daily Traffic Volumes	2014	2017	2020	2023	Average
New Hazelton 47-007EW	AADT	1,710	1,923	2,013	2,554	2,050
	SADT	1,173	2,703	2,921	3,424	2,555

Traffic Counter Location	Average Daily Traffic Volumes	2014	2017	2020	2023	Average
Smithers 47-025EW	AADT	11,094	10,136	10,703	--	10,644
	SADT	11,885	11,028	11,885	--	11,599
Bulkley River West 47-002EW	AADT	7,159	6,980	7,365	8,334	7,460
	SADT	9,592	9,808	10,687	11,174	10,315
Telkwa East 47-001EW	AADT	2,897	2,752	2,900	3,300	2,962
	SADT	1,981	3,867	4,208	4,465	3,630

Source: Government of BC 2023c

-- = No data available

The most recent Count Class Distribution data available for Highway 16 between Smithers and the junction between Highway 16 and at Kitwanga are from 2005. At that time, truck traffic accounted for 15 to 25% of the overall traffic. As this data is not recent, it would not account for both the increase in traffic (as demonstrated in the Government of BC Traffic Data in Table 3-2and Table 3-4) as well as the anticipated increase in truck traffic due to increasing industrial activity in the area.

Table 3-5. Count Class Distribution at Locations on Highway 16 (2005)

Traffic Counter Location	Trucks	Total Vehicles	% of Traffic Trucks
New Hazelton (March 2005)	1,371	5,388	25
New Hazelton (August 2005)	3,340	14,971	22
Smithers (March 2005)	5,401	36,865	15
Smithers (July 2005)	8,740	58,676	15

Source: Government of BC 2023c

3.5 Safety History

Collision history from ICBC for the period of 2018 to 2022 was reviewed and is summarised in Table 3-6. According to ICBC, a “casualty” is defined as an injury or a fatality, whereas “property damage only” (PDO) includes damages to vehicles or non-vehicles, such as structures. ICBC’s crash data are gathered from reports made to ICBC by insured registered vehicle owners, drivers, pedestrians, and cyclists. ICBC crash data were used instead of police crash data because the ICBC data set is generally larger in volume and because police do not attend all crashes, whereas insurance coverage is mandatory through ICBC. Although the police data set includes more information on contributing factors, this information is not always made available for the North Central Region. This may be excluded for confidentiality purposes given the small number of crashes in the region.

Because of the limitations of collision information, details on the types of vehicles involved and potential causes could not be characterized. A higher number of collisions on Highways 37 and 37a are associated with highway junctions or near more populated areas (such as Stewart and Dease Lake). Highway 16 collisions are highest near the Town of Smithers. This may correlate with the larger volume of traffic that uses this portion of the highway, as demonstrated by the BC Government Traffic data (Government of BC 2023c) in Table 3-4.

Table 3-6. ICBC Collision History for Highways 37 and 37A and 16 (2018 to 2022)

Year	Location							
	Kitwanga	Meziadin Junction	Highway 37A Through Stewart	Iskut	Highway 37 South of Dease Lake	Highway 37 at Dease Lake	Highway 16 at Moricetown	Highway 16 at Smithers
2018	0	2 PDO	0	0	0	1 PDO	0	16 casualties, 21 PDOs
2019	1 PDO	0	0	0	1 casualty	0	1 casualty	13 casualties, 25 PDOs
2020	0	1 PDO	0	0	0	0	2 casualties, 3 PDOs	12 casualties, 33 PDOs
2021	0	0	0	1 casualty	0	1 casualty	0	13 casualties, 16 PDOs
2022	0	1 PDO	0	0	0	0	0	0

Source: ICBC 2023

4. Project Traffic Analysis

4.1 Current Mine-related Traffic

Current mine-related traffic uses the regional network of roads, primarily Highway 37 and Highway 37A. Current mine-related traffic is made up of operations service vehicles, operations personnel (buses and personal vehicles), and concentrate haul trucks. The Dease Lake airport is the transit point for fly-in and fly-out staff. Approximately 85% of workers fly in, with the remainder driving themselves to the site. Employees that fly in arrive at the Dease Lake airstrip, where they are transported by bus to the mine site. Approximately 100 to 230 employees arrive by bus, and the frequency of bus traffic is approximately 2 to 5 buses per day, 3 days per week. This is approximately 42 buses per month, on average, completing a return trip.

Concentrate haul trucks start at the mine site and travel along Highway 37 and Highway 37A terminating in Stewart, BC. The trucks used in transportation include nine-axle trucks and eight-axle trucks. The current number of concentrate haul trucks per day varies based on mine production and inventory at the mine site. Monthly averages from 2018 to 2022 (Table 4-1) show that concentrate haul truck traffic averages between 200 and 300 trucks per month, return trips. There is some seasonal variation, with the minimum number of trucks typically occurring in the fall and winter months, and the average per month typically being higher in July and August than for the monthly average for the year (Table 4-1, Figure 4-1).

Table 4-1. Current Concentrate Haul Truck Traffic (Return Trips)

Year	Total Number of Trucks	Average Per Month (All)	Minimum Number (Minimum Month)	Maximum Number (Maximum Month)
2018	2,657	221	138 (May)	314 (January)
2019	3,295	275	212 (February)	391 (December)
2020	4,266	356	249 (November)	445 (June)
2021	3,157	263	204 (October)	324 (June)
2022	3,156	263	121 (December)	350 (August)
5 Year Average	3,306	276	--	--

Source: Newmont 2023

In 2020 and 2021, the provincial government implemented travel restrictions as a response to the COVID-19 pandemic.; however, mining was deemed an essential service, so there are no observed differences on concentrate haul traffic during this period. The truck traffic for 2020 was the highest or second highest in each of the quarters from 2018 to 2022, and the highest total truck numbers overall with a total of 4,266 trucks. Total numbers of trucks remained above 3,000 for 2021 and 2022 (the last year with complete data available).

4.2 Projected Traffic Volumes and Routes

The Project will contribute both construction traffic and operational traffic (once in production) to the regional network of highways, primarily Highways 37 and 37A, and to a lesser extent Highway 16. Changes in traffic volume will occur over several years, beginning in Year 1 (for this analysis Year 5 is considered the first year of production construction, excluding pre-production phase years 1 to 4), and ceasing in Year

11 (the forecasted date when the mine will cease operations in 2038). Traffic beyond Year 11 will be based on the mine closure plan and is difficult to forecast at this time.

4.2.1 Block Cave Construction Traffic

Construction traffic consists of buses used for employee rotation transportation and truck traffic for the transport of materials to the site (Appendix A). Construction of the Project during the production phase is anticipated to occur in stages over 3 years. Construction traffic is anticipated to peak in Year 1, and then decline in Years 2 and 3 as construction is completed. Traffic during the construction period is anticipated to increase the current levels on Highway 37 between the Project site and Dease Lake (for employee rotation transportation) and increase traffic levels on Highway 37 between the Project site and Meziadin Junction with the inflow of construction equipment and material from Alberta and Southern BC on Highway 16 and via the Port of Stewart on Highway 37a (Appendix A, Figure 4-1).

4.2.2 Block Cave Operations Traffic

Operations traffic consists of buses used for personnel rotation, operations services vehicles (both heavy vehicles and light vehicles) and concentrate haul trucks (Appendix A). Operations traffic will increase in Year 3 due to an increase in operations personnel rotation. Once the Project is in the production phase, it is forecasted that haul truck traffic from the mine site to Stewart along Highways 37 and 37A will continue to increase because of the transition to higher-grade underground ore, which increases the volume of copper concentrate production (Newmont 2023). Operations are expected to cease in 2038 (approximately Year 11 in this report). Traffic associated with operations personnel and operations service vehicles is forecasted to remain the same after construction is complete (Appendix A, Figure 4-1). Combining the estimated traffic volume associated with both the construction and operation of the Block Cave Mine provides an overall estimate of the change in mine-related traffic volume by year. Year 1 is forecasted to have the highest volume of traffic because of the overlap in increasing copper concentrate haul vehicles with a high volume of construction traffic. Once construction is complete, operations vehicles remain steady from Year 3 onwards. Copper concentrate haul truck volume increases to a peak in Year 6, before decreasing in volume to subsequent years.

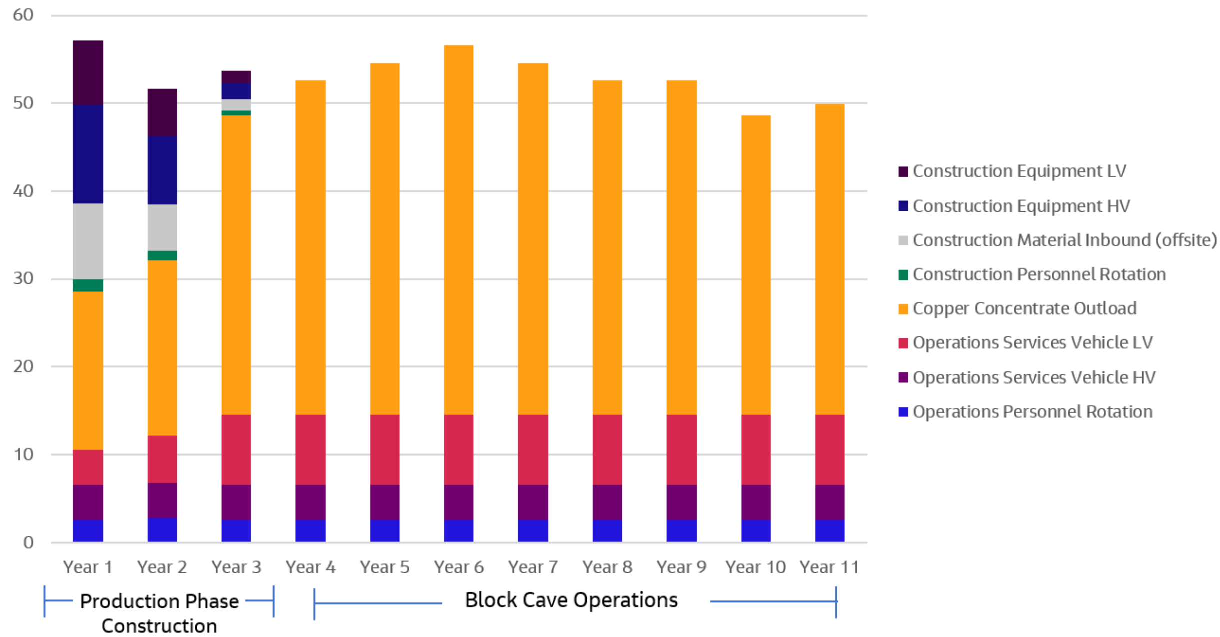

Figure 4-1. Forecasted Traffic Volumes during Block Cave Construction and Operations

4.3 Change in Traffic Volume by Route

Relative changes in traffic volume during construction and operations of the Project were assessed by highway route (Table 4-2). The change in traffic volume by highway route considers the current volume of traffic on a portion of highway (using a representative BC government traffic counter, and assuming an average SADT over the period of 2014 to 2023 to account for variation in traffic volume over this period due to COVID-19) and the type of mine-related traffic that will travel that portion of highway. Representative traffic counters were chosen based on completeness of traffic data and location to the relevant mine traffic destination (for example, the Stikine River traffic counter is the last traffic counter before the Dease Lake airport, which is the destination for the bus traffic).

A 2% annual increase in forecasted traffic volume was applied to the forecasted traffic volume to account for anticipated increase in traffic in the region over time due to increased industrial activity and population levels. Forecasted Project traffic is based on traffic data estimates provided by Newcrest (Appendix A). The Newcrest traffic data is based on potential daily traffic load from the Project and was standardized to a daily average single direction to align with the BC Government Traffic data. Year 1 refers to the first year of Production Phase Construction.

Table 4-2. Traffic Volume Analysis by Route

Route	Mine-related Traffic	Representative Traffic Counter Location
Highway 37, north of the mine site	Operations and construction personnel rotation (buses only)	Stikine River 47-026NS
Highway 37, south of the mine site	Operations service vehicles (HV and LV), construction material, construction equipment (HV and LV)	Meziadin Lake 47-016NS

Route	Mine-related Traffic	Representative Traffic Counter Location
Highway 37A	Concentrate haul trucks	Stewart 47-031EW
Highway 16	Construction material and construction equipment (HV and LV)	Smithers 47-028EW

HV = heavy vehicle
LV = light vehicle

4.3.1 Highway 37 (north of the mine)

Mine-related traffic travelling north of the mine is assumed to be mostly made up of operations and construction personnel travelling between the mine site and the Dease Lake airport via bus (Table 4-3, Figure 4-2). Approximately 15% of personnel currently travel to the mine by personal vehicle, but the estimated number of vehicles was not available and therefore has not been included in this assessment.

The change in traffic volume due to the transportation of personnel by bus during construction and operations of the mine represents an approximate 1% change in traffic volume and is therefore anticipated to be negligible.

Table 4-3. Daily Average of Forecasted Mine Traffic on Highway 37 (north of the Mine)

Year	Operations Personnel Rotation	Construction Personnel Rotation	Total Forecasted Mine Traffic	Traffic Counter (Stikine River)	Traffic Volumes Due to Mine Traffic (%)
Current	2	0	2	313	1%
Year 1	3	1	4	339	1%
Year 2	3	1	4	346	1%
Year 3	3	1	4	352	1%
Year 4	3	0	3	360	1%
Year 5	3	0	3	367	1%
Year 6	3	0	3	374	1%
Year 7	3	0	3	382	1%
Year 8	3	0	3	389	1%
Year 9	3	0	3	397	1%
Year 10	3	0	3	405	1%
Year 11	3	0	3	413	1%

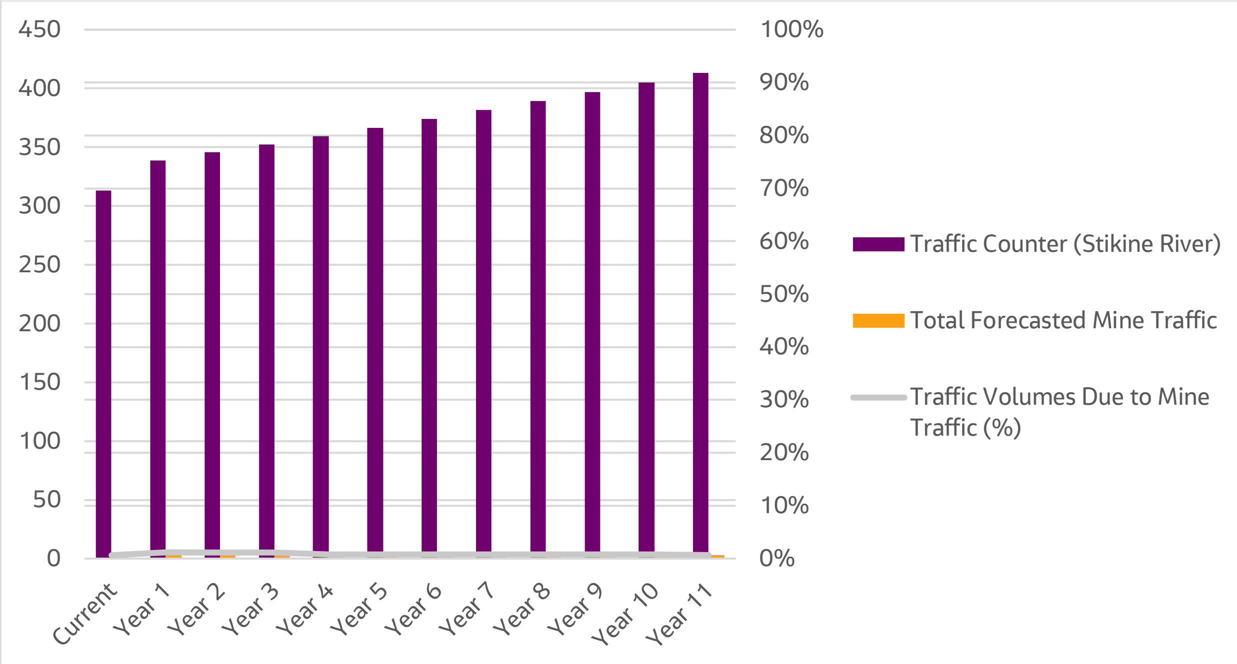

Figure 4-2. Change in Traffic Volume: Highway 37 (north of Mine)

4.3.2 Highway 37 (south of the mine)

Mine-related traffic on the portion of Highway 37 south of the mine is assumed to be made up of operations service vehicles (heavy and light), concentrate haul trucks, and construction equipment vehicles (heavy and light) (Table 4-4, Figure 4-3). Mine-related traffic on this portion of the highway is forecasted to increase the volume of traffic by approximately 10%. Once construction is complete in Year 4, concentrate haul trucks are forecasted to make up the majority of the total estimated mine traffic travelling on this section of highway.

Table 4-4. Daily Average of Forecasted Mine Traffic on Highway 37 (south of the mine)

Year	Operations Service Vehicle HV	Operations Service Vehicle LV	Concentrate Haul Trucks	Construction Material Inbound (offsite)	Construction Equipment HV	Construction Equipment LV	Total Forecasted Mine Traffic	Traffic Counter (Meziadin Lake)	Traffic Volume Due to Mine Traffic (%)
Current	0	0	18	0	0	0	18	452	4%
Year 1	4	4	18	9	11	7	53	489	11%
Year 2	4	5	20	5	8	5	47	499	9%
Year 3	4	8	34	1	2	1	50	509	10%
Year 4	4	8	38	0	0	0	50	519	10%
Year 5	4	8	40	0	0	0	52	529	10%
Year 6	4	8	42	0	0	0	54	540	10%
Year 7	4	8	40	0	0	0	52	551	9%
Year 8	4	8	38	0	0	0	50	562	9%

Year	Operations Service Vehicle HV	Operations Service Vehicle LV	Concentrate Haul Trucks	Construction Material Inbound (offsite)	Construction Equipment HV	Construction Equipment LV	Total Forecasted Mine Traffic	Traffic Counter (Meziadin Lake)	Traffic Volume Due to Mine Traffic (%)
Year 9	4	8	38	0	0	0	50	573	9%
Year 10	4	8	34	0	0	0	46	584	8%
Year 11	4	8	35	0	0	0	47	596	8%

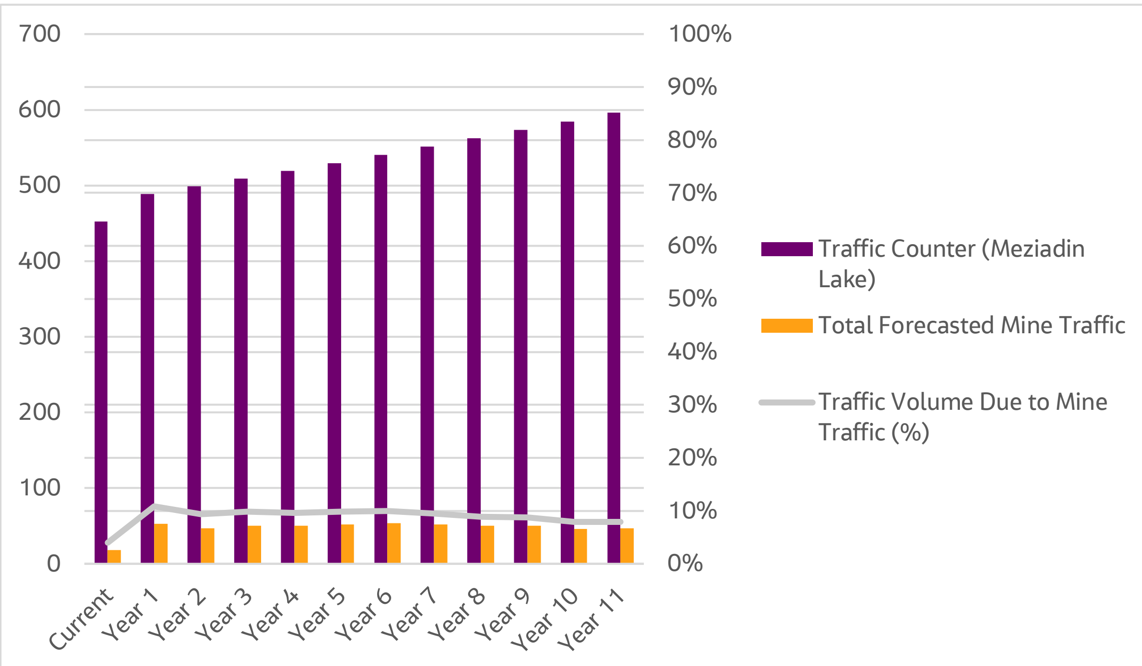

Figure 4-3. Change in Traffic Volume: Highway 37 (south of Mine)

4.3.3 Highway 37A

Mine-related traffic on Highway 37A is assumed to be concentrate haul truck traffic travelling between the Port of Stewart and the mine site (Table 4-5, Figure 4-4). Mine-related traffic is forecasted to increase traffic on this portion of Highway 37A from approximately 4% to a high of 8% in Year 6, before declining back to 6% in Year 11. This correlates to the higher number of concentrate haul trucks forecasted to be travelling to the Port of Stewart following the construction phase.

Table 4-5. Daily Average of Forecasted Mine Traffic on Highway 37A

Year	Concentrate Haul Trucks	Total Forecasted Mine Traffic	Traffic Counter (Stewart)	Traffic Volume Due to Mine Traffic (%)
Current	18	18	453	4%
Year 1	18	18	500	4%
Year 2	20	20	510	4%
Year 3	34	34	520	7%

Year	Concentrate Haul Trucks	Total Forecasted Mine Traffic	Traffic Counter (Stewart)	Traffic Volume Due to Mine Traffic (%)
Year 4	38	38	531	7%
Year 5	40	40	541	7%
Year 6	42	42	552	8%
Year 7	40	40	563	7%
Year 8	38	38	575	7%
Year 9	38	38	586	7%
Year 10	34	34	598	6%
Year 11	35	35	610	6%

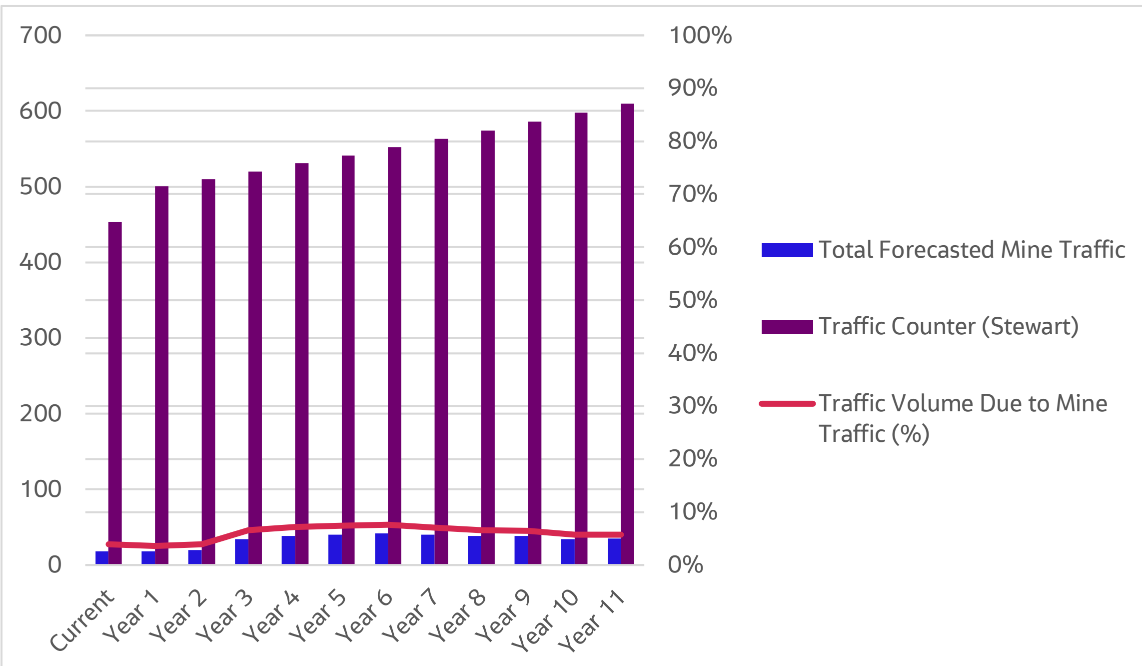

Figure 4-4. Change in Traffic Volume: Highway 37A

4.3.1 Highway 16

Mine-related traffic on the portion of Highway 16 within the Project study area is assumed to be made up of the transportation of construction material and construction equipment (heavy and light vehicles) to and from the mine site (Table 4-6, Figure 4-5). Because of the large volume of traffic on Highway 16, the change in traffic volume due to mine traffic is negligible. After Year 3, construction traffic is assumed to be zero and therefore has not been included in Table 4-6 and Figure 4-5.

Table 4-6. Daily Average of Forecasted Mine Traffic on Highway 16

Year	Traffic Category					
	Construction Material Inbound (offsite)	Construction Equipment HV	Construction Equipment LV	Total Forecasted Mine Traffic	Traffic Counter (Smithers)	Traffic Volume Change Due to Mine Traffic
Current	0	0	0	0	11,599	negligible
Year 1	9	11	7	27	12,806	negligible
Year 2	5	8	5	18	13,062	negligible
Year 3	1	2	1	4	13,324	negligible

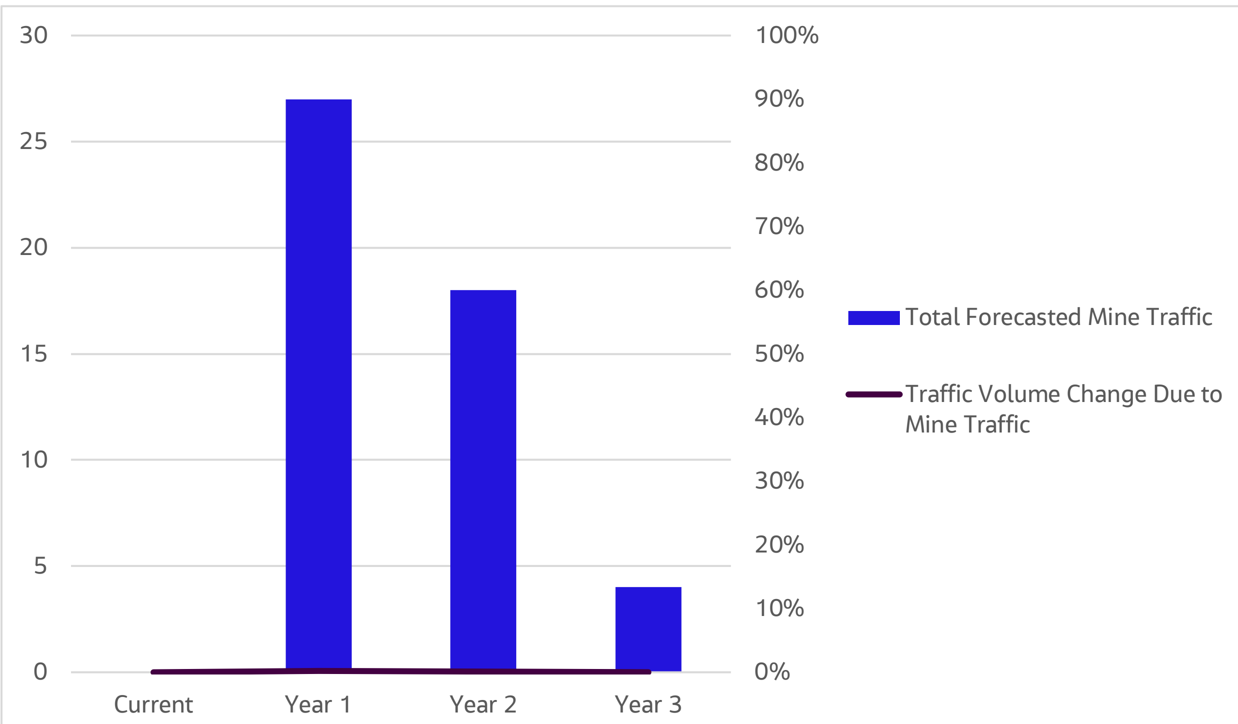

Figure 4-5. Change in Traffic Volume: Highway 16

5. Traffic Report Engagement Summary

In September and October 2022, engagement was conducted by Jacobs with key stakeholders to gain insight on existing road conditions, traffic patterns, key locations of concern, and potential interactions with road users. Stakeholder groups targeted for engagement included local governments, provincial agencies, local tourism organisations, and guide outfitters. In total, 19 organisations were contacted, and 6 interviews were held. All interviews provided context on existing traffic operations and concerns.

Table 5-1 summarises the key themes raised during engagement.

Table 5-1. Key Themes Raised During Engagement

Topic	Key Themes
Seasonality	▪ Traffic is the busiest between May and September, with peak season from August to September. ▪ There is very little traffic between October and April. During this time, it is mainly locals, industry, and travelers passing through. ▪ Traffic has slowed during the COVID-19 pandemic but has picked up recently.
Road Conditions and Safety	▪ Highway 37 is poorly maintained, especially in the winter. ▪ There are no shoulder markings, and the centreline is sometimes hard to see. ▪ Degradation to Highway 37 is often attributed to industrial use from mining and forestry. ▪ The south turnoff from the mine access road onto Highway 37 has the most potholes, and repairs do not seem to last. ▪ Local governments have limited capacity to continually repair roads and may be interested in collaborating on solutions. ▪ Local governments are mainly concerned with road conditions and public safety.
Key Locations	▪ Highway 37 is the busiest between Kitwanga and Meziadin Junction. ▪ Local commuters use the section of Highway 37 between Iskut and Dease Lake regularly for work and school. ▪ When the Alaska Highway has closures because of accidents, floods, or fires, it puts a large strain on Highway 37.
Interactions with Industry	▪ Current RCM operations are well-organised in terms of shuttle buses and flying workers in and out. ▪ There is a perceived safety risk associated with following mining trucks and buses because there is no passing lane. ▪ Respondents noted that following trucks and buses in the winter creates snow blowback, which reduces visibility. ▪ It was requested not to convoy multiple large vehicles in the winter, as this significantly reduces visibility for drivers who are following, and passing opportunities are limited. ▪ Respondents noted instances where industrial traffic has blocked access to certain areas along Highway 37A.

6. Identification of Potential Changes in Traffic

This section discusses potential changes in traffic volumes and flows.

6.1 Potential Traffic Changes

According to the estimated volume of current concentrate haul truck traffic, estimated construction traffic, and estimated operations traffic (Newmont 2023), there will be an increase in traffic, starting with an increase in construction traffic occurring during the construction period (Figure 4-1). Following construction, concentrate haul truck volume will continue to increase, reaching a maximum in Year 6 before declining slowly until the permitted capacity of the tailings impoundment area is reached in Year 11.

The impact of this increase in mine-related traffic is dependent on the portion of highway that will experience the traffic. When analyzing the change in traffic volume by highway route, Highway 37 south of the mine site may experience the most noticeable increase in mine-related traffic with an increase of an average of 10% traffic volume compared with pre-construction traffic volumes. Highway 37A traffic, which is made up of concentrate haul trucks travelling to the Port of Stewart, will experience an anticipated 4 to 8% increase in traffic due to the operation of the Block Cave Mine. Mine-related traffic on Highway 16 is forecasted to have a negligible impact on overall traffic volumes, due to the large volume of traffic that travels that highway.

7. Summary and Conclusions

This Traffic Report summarises current conditions, Project-related traffic, and anticipated changes to traffic volumes during construction and operation of the Block Cave Mine. Information on current and forecasted traffic volumes and current collision history was compiled and characterized. Engagement undertaken to date was used to inform the identification of potential interactions and key themes related to traffic associated with the Project.

Overall, the peak number of loads of construction and service vehicles will increase the volume of traffic on Highways 37, 37A. A negligible change is expected to Highway 16 traffic volume during construction. However, the forecasted change in traffic volume is dependent on the mine-related traffic travelling on each route and existing traffic volumes. Construction traffic and operations traffic will both increase as a result of the Project. For the construction traffic, this effect is forecasted to be short term in nature. The concentrate haul truck traffic makes up the bulk of the operations traffic. Concentrate haul truck traffic will continue to increase following construction before declining to current levels. Therefore, concentrate haul truck traffic will have a longer-term impact compared to construction traffic. There is not expected to be an enduring material impact associated with increased traffic.

8. References

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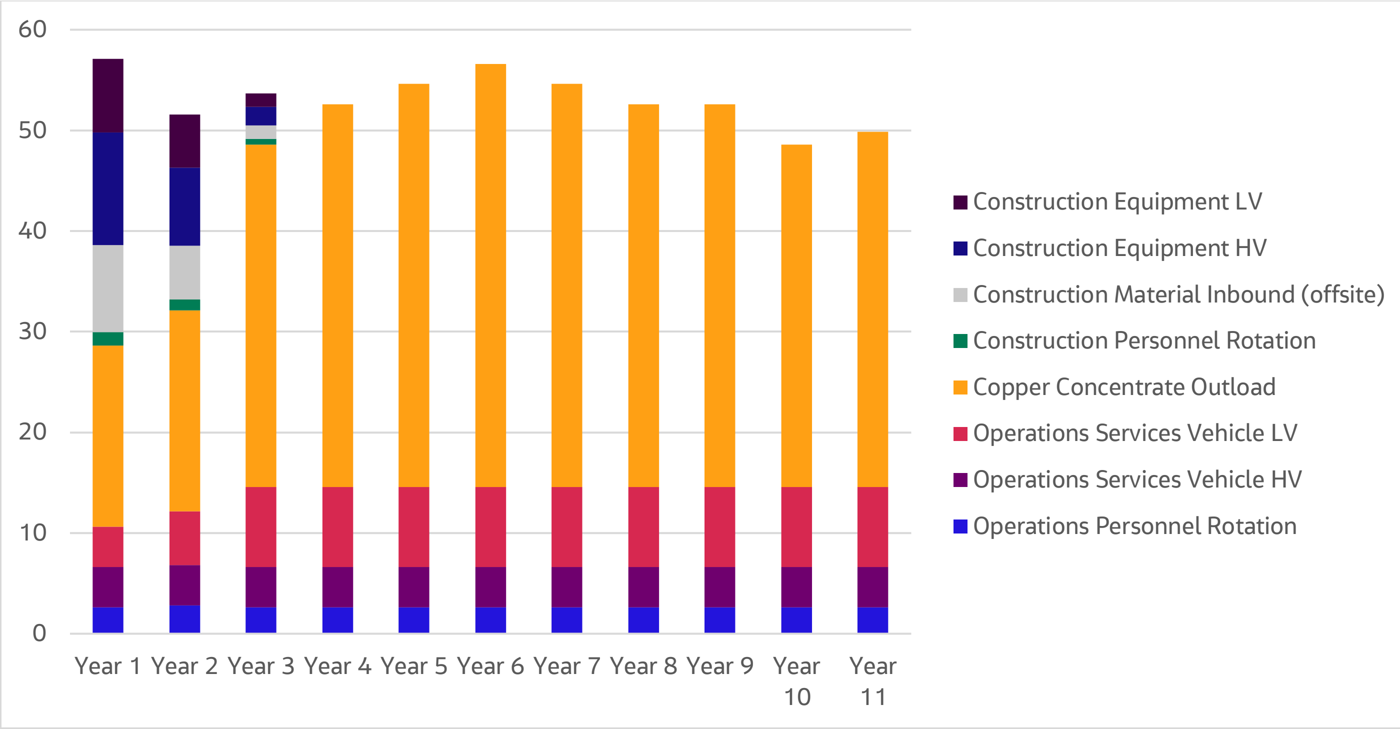
Appendix A
Newcrest Traffic Data

Newcrest Traffic Data

Offsite Traffic (average month - Return Trips)			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14
Operations Personnel Rotation		Bus	32	37	37	37	39	42	39	39	39	39	39	39	39	39
Operations Services Vehicle HV		HV	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Operations Services Vehicle LV		LV	60	60	60	60	60	80	120	120	120	120	120	120	120	120
Copper Concentrate Outload	Average Return Truck Journeys/Month	HV	292	395	400	228	253	299	487	555	604	611	594	573	552	517
	Average Return truck Journeys/Day		10	13	14	8	9	10	17	19	20	21	20	19	19	17
Construction Personnel Rotation		Bus	20	40	32	20	20	16	8	0	0	0	0	0	0	0
Construction Material Inbound (offsite)		HV	30	60	60	100	130	80	20	0	0	0	0	0	0	0
Construction Equipment HV		HV	20	40	40	96	168	116	28	0	0	0	0	0	0	0
Construction Equipment LV		LV	30	40	40	70	110	80	20	0	0	0	0	0	0	0


60
50
40
30
20
10
0
Year 1
Year 2
Year 3
Year 4
Year 5
Year 6
Year 7
Year 8
Year 9
Year 10
Year 11
Construction Equipment LV
Construction Equipment HV
Construction Material Inbound (offsite)
Construction Personnel Rotation
Copper Concentrate Outload
Operations Services Vehicle LV
Operations Services Vehicle HV
Operations Personnel Rotation

Appendix 1-B. Multiple Account Analysis

Red Chris Block Cave Project - Production Phase

Chapter 1.0 Project Overview

Document Number: 401-8311-EN-REP-0020-02

December 13, 2024

Newmont™

Account	Sub-account	Relative Weighting Factor	Indicator	Unit	Indicator			Unweighted Score (5 = Best performing Option 1 = Worst Performing Option)			Weighted Score (higher is better)			Maximum Unweighted Score	Maximum Weighted Score	Maximum Weighted Account Score	Direct Account Score			Normalized Account Score		
					Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	Option 1	Option 2	Option 3				Option 1	Option 2	Option 3	Option 1	Option 2	Option 3
Environmental	Atmospheric Environment	1	GHG Emissions	CO2 eq/year	200,000	200,000	50,000	1	3	5	1	3	5	5	5	20	7	16	14	9	20	18
	Terrestrial Environment	1	Mine and TIA Footprint	Hectares	1673	1453	1730	2	4	1	2	4	1	5	5							
	Aquatic Environment	1	Fish Habitat	Qualitative	Incremental Effect	Existing Conditions	Existing Conditions	1	5	5	1	5	5	5	5							
	Aquatic Environment	1	Groundwater Regime	Qualitative	Existing Conditions	Existing Conditions	Incremental Effect	3	4	3	3	4	3	5	5							
Social	Employment and Economy	1	Workforce	Qualitative	Existing Conditions	Existing Conditions	Increases	2	2	5	2	2	5	5	5	20	12	11	15	15	14	19
	Emploiyment and Economy	1	Duration of Employment	Years	25	12	26	4	1	5	4	1	5	5	5							
	Human Health	1	Risk of Accidents	Qualitative	Existing Conditions	Existing Conditions	Existing Conditions	4	4	4	4	4	4	5	5							
	Archaeology	1	Mine and TIA Footprint	Hectares	1673	1453	1730	2	4	1	2	4	1	5	5							
Financial	Capital	1	Capital Expenditure	Qualitative	Moderate	Low	High	3	5	1	3	5	1	5	5	15	5	8	11	8	13	18
	Operational	1	Operational Expenditures	Qualitative	Very High	High	Low	1	2	5	1	2	5	5	5							
	Financial Return	1	Net Present Value	Qualitative	Much Lower	Much Lower	Much Higher	1	1	5	1	1	5	5	5							
Technical	Technical Reliability	1	Proven Technology	Qualitative	High	High	High	5	5	4	5	5	4	5	5	10	7	8	8	18	20	20
	Physical Stability	1	Risk of Failures	Qualitative	Increases	Existing Conditions	Decreases	2	3	4	2	3	4	5	5							
																Total	31	43	48	**50**	**67**	**75**

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