Executive Summary

Seabridge Gold Inc. (Seabridge or Proponent), is proposing to construct and operate the KSM Project (the Project), a combined open pit and underground gold/copper/silver/molybdenum mine with an ore extraction rate of approximately 130,000 tonnes per day. Ore will be mined from four zones of mineralization—the Mitchell, Sulphurets, Kerr, and Iron Cap deposits.

The proposed Project is located in the coastal mountains of northwestern British Columbia (BC), about 68 kilometres (km) northwest of Stewart, BC, and within 35 km of the BC–Alaska border (Figure 1). Currently, there is no direct all-weather road access to the Project area. Seabridge proposes to construct road access to the Processing and Tailing Management Area (PTMA) from Highway 37 following the valleys of Treaty and North Treaty creeks. Access to the Mine Site will be provided by construction of a new road from the existing Eskay Creek Mine road along Coulter Creek and Sulphurets Creek to the Mine Site.

The PTMA is situated within the Nass Area, as defined by the *Nisga'a Final Agreement* (NFA), but falls outside the Nisga'a Lands owned by Nisga'a Nation and the Nass Wildlife Area under the terms of the NFA, which came into effect on May 11, 2000. The Tahltan First Nation (as represented by the Tahltan Central Council) asserts a claim over part of the Project footprint. Both the Gitanyow First Nation (with specific emphasis on wilp Wiiltsx-Txawokw) and the Gitxsan Nation (as identified by the Gitxsan Hereditary Chiefs Office, with specific emphasis on wilp Skii km Lax Ha) have identified potentially affected interests within the broader region, notably downstream of the PTMA. The Skii km Lax Ha claim an area covering the Mine Site and the PTMA.

Seabridge is applying under Section 16 of the British Columbia *Environmental Assessment Act* (BC EAA; 2002) for an Environmental Assessment (EA) Certificate for the proposed Project (Application). The proposed Project is subject to both the BC EAA and the *Canadian Environmental Assessment Act* (CEAA 1992), and the Application is also deemed to be an Environmental Impact Statement (EIS) within the meaning of the CEAA 1992. The Application / EIS has been prepared to comply with the requirements of the British Columbia Environmental Assessment Office (BC EAO) and the Canadian Environmental Assessment Agency (CEA Agency), as well as with relevant provisions of the NFA.

Since officially entering the EA process in 2008, the Proponent has made use of the EA process as a planning tool to ensure that Project decisions (and related physical activities and components) are considered in a careful and precautionary manner to avoid or minimize the potential for adverse environmental, social, economic, heritage and health effects, and the potential for adverse effects on Aboriginal rights and treaty rights and interests. The Proponent has designed the Project to meet objectives of responsible resource development outlined in recent federal and provincial economic and natural resource development strategies. Through discussion and review of the proposed Project with all levels of government, Aboriginal groups, and the public, several key components of the KSM Project design have been relocated and / or redesigned in order to avoid or mitigate potential adverse effects. In addition to reductions in the potential for adverse effects, key benefits of the EA process for the Project have included technological innovations related to water treatment, increased socio-economic benefits, and advances in scientific knowledge.

Figure 1

Location of the Project

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The Proponent is committed to continuing to consider, and where possible, address issues or concerns raised by the public, Nisga'a Nation, Aboriginal groups, Canadian and US federal governments, and BC and Alaska State agencies throughout all phases of the EA. The Proponent views the integration of community and Aboriginal traditional knowledge as an important consideration during the EA planning process. Communication and cooperation with Aboriginal peoples, including Treaty Nations, First Nations, and the Métis, is required to ensure that Project effects on asserted or established Aboriginal rights and treaty rights, and related interests in the Project area, are minimized to the extent possible.

In its complete and submitted form, the Application / EIS represents Seabridge's mine development proposal for the KSM property. The intent of the Application / EIS is to demonstrate that mining of this property will be environmentally, socially and economically beneficial. The Project will promote economic prosperity in all regions of BC, especially northwestern BC. It will provide jobs, generate business opportunities, and produce local, provincial and federal tax revenues. Seabridge believes that the Project can be implemented without lasting adverse local or regional environmental or economic effects, and without undermining family or community well-being, public health or the rights and interests of potentially affected Aboriginal peoples. The Project will be implemented in accordance with responsible mining practices that comply with sustainable development standards.

Purpose of Application / Environmental Impact Statement

As previously noted, the Project is subject to EA procedures provided for under the BC EAA and CEAA 1992. With this document, Seabridge is making an application under Section 16 of the BC EAA for an EA Certificate for the proposed Project, and is also submitting an EIS under the CEAA 2002. This document, including its main text and appendices, collectively constitutes the Proponent's joint Application / EIS, and has been prepared in accordance with the requirements of the BC EAO and the CEA Agency.

The BC EAO and the CEA Agency are coordinating a joint cooperative EA review of the Project in accordance with the *Canada-British Columbia Agreement on Environmental Assessment Cooperation* (Government of Canada and Government of British Columbia 2004).

Organization of Application / Environmental Impact Statement

The Application / EIS has been prepared to comply with the January 31, 2011 Application Information Requirements (AIR) and the May 26, 2010 Comprehensive Study Scope of Assessment pursuant to Section 21 of CEAA 1992, and is organized into the following parts and chapters:

- *Front Matter* – includes this Executive Summary plus a Preface, Table of Concordance, Acknowledgements, and Table of Contents.
- *Part A – Introduction and Background* – Chapters 1 to 5 provide an overview of the Project, describe the assessment process, summarize the consultation process for the environmental assessment (EA) process, provide a detailed Project description, and explain the effects assessment methodology.

- *Part B – Assessment of Potential Environmental Effects* – Chapters 6 to 19 describe the effects assessment (baseline setting, potential impacts, proposed mitigation measures, predicted residual effects and their significance, and cumulative effects) for the following Valued Components (VCs) or groups of VCs: greenhouse gases (climate), air quality, terrain, geohazards, groundwater and surface water quantity and quality, geochemistry, fish and aquatic habitat, wetlands, terrestrial ecosystems, wildlife and wildlife habitat, and noise.
- *Part C - Assessment of Potential Economic Effects* – Chapter 20 describes the effects assessment for the economic VCs.
- *Part D - Assessment of Potential Social Effects* – Chapters 21 to 24 describe the effects assessment for the heritage, social, land use and visual / aesthetic VCs.
- *Part E - Assessment of Potential Health Effects* – Chapter 25 describes the effects assessment for health-related VCs.
- *Part F - Summary of Environmental Management Plans and Reporting* – Chapters 26 to 28 summarize proposed environmental management plans, the Closure and Reclamation Plan, and the framework for environmental reporting to be undertaken for the proposed Project.
- *Part G – Nisga'a Nation Interests* – In compliance with provisions of the *Nisga'a Final Agreement* (NFA), Chapter 29 describes Nisga'a Nation interests in the Project area, as identified through consultation, and the potential effects of the Project on those interests.
- *Part H – First Nations Interests* – Chapter 30 describes First Nations interests in the Project area, as identified through consultation, and describes the potential effects of the Project on those interests.
- *Part I – Federal Requirements* – Chapters 31 to 38 present the information required for a comprehensive study level of assessment pursuant to Section 16 of the CEAA (1992) with respect to the navigable waters VC, Project need and alternatives to the Project, alternative means of undertaking the Project, effects of the environment on the Project, the environmental effects of accidents and malfunctions, Project implications for the capacity of natural resources, the Project's cumulative environmental effects, and Seabridge's proposed follow-up program. Chapter 31, Navigable Waters, covers the federal requirements, including the requirement to complete an effects assessment of navigable waters as a valued health and socio-economic component. The assessment of potential effects of the Project on waterways that may affect navigation follows the effects assessment methods in Chapter 5.
- *Part J – Conclusions* – Chapter 39 summarizes the findings of the EA with respect to potential adverse and beneficial environmental, economic, social, heritage and health effects of the Project. A Table of Conditions identifying the proponents commitments to mitigation is also included. A glossary of technical terms and references are provided.
- *Appendices* – Various appendices provide background information on the biophysical and human environments potentially affected by the Project, as well on as other topics.

Project Background and Overview

The Proponent

Seabridge Gold Inc. is a publicly traded company with common shares trading on the TSX in Canada and on the New York Stock Exchange in the United States of America (USA). Seabridge has a market capitalization of approximately CAN$650 million as of April 13, 2013, and acquired the Kerr-Sulphurets-Mitchell (KSM) mineral claims in 2000.

Seabridge intends to design, and obtain authorizations for, a technically, socially, and economically feasible and environmentally responsible operation, to be sold to, or joint ventured with, another company to construct, operate, close and reclaim the Project, with responsibility for implementing and reclaiming the Project, implementing all required mitigation measures, and monitoring to manage potential adverse environmental, social, health, heritage and economic effects.

Communications regarding this Application / EIS should be directed to either of the following addresses:

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Seabridge Gold is managed under the direction of Rudi P. Fronk, Chairman and Chief Executive Officer, and Jay S. Layman, Director, President, and Chief Operating Officer. Company representatives specific to the Application / EIS are Brent Murphy, Vice President, Environmental Affairs, and Elizabeth Miller, Manager, Environmental Affairs.

The KSM Project

KSM Property History and Current Tenure Status

Prospectors first explored the regional area as far back as the 1800s, but the modern era of exploration dates from the 1960s, when in-depth geological and geochemical surveys commenced. Between the 1960s and 2000, several different mining companies explored the area, primarily for gold.

In 2000, Seabridge acquired a 100% interest in the Kerr and Sulphurets properties from Placer Dome Mining Corporation. Noranda Incorporated optioned the property in 2002, and carried out further exploration from 2003 to 2005 (as Noranda, then Falconbridge-Noranda). In 2006, the option was purchased by Seabridge, which continued exploration on the Mitchell, Sulphurets, Kerr and Iron Cap deposits. Seabridge has carried out significant drilling of the KSM property since 2006.

There are no records or evidence of past mineral production on the KSM property, but surrounding properties have been mined, including the recently closed Eskay Creek Mine, located approximately

18 km to the northwest, and the Granduc Mine, located approximately 30 km to the south. Small-scale placer gold mining has occurred in Sulphurets and Mitchell creeks, immediately west of the KSM property. From 1985 to 1991, Lacana Mining Corporation and Newhawk Gold Mines Ltd. invested more than $20 million in underground development of the Bruceside property, located east of the KSM property, currently owned by Pretium Resources Inc.

The KSM property is located entirely on Crown land. All surface and access rights are granted under provincial mineral tenures. Approximately 12.5 km of the route of the proposed Mitchell-Treaty Twinned Tunnels (MTT) which will connect the Mine Site with the Processing and Tailing Management Area (PTMA), passes through ground subject to mineral claims held by third parties. The Project comprises three discontinuous claim blocks, referred to as the KSM/BJ claim group, the Seabee / Tina claim block (covering the PTMA) and the KSM placer claim block. The KSM claim block and the Seabee / Tina claim block contain 117 mineral claims, and the KSM placer claim block, 22 placer claims, most of which overlie mineral claims. The total area of the three claim blocks is 52,133.26 hectares (ha). Figure 2 shows the location of the KSM property claim blocks.

The area surrounding the Project is heavily staked by third parties. All adjacent land is subject to mineral tenures, and sometimes also placer tenures (Figure 2). Adjacent mineral properties include the Snowfield Project and Brucejack Mine properties to the east of the KSM Project property, both currently owned by Pretium Resources Inc.

Tenures for seven registered traplines and three guide outfitters are recorded within the Project area. Six commercial recreation tenure holders are located within the land use local study area (LSA), engaged in eco-tourism, guided rafting, guided mountaineering and rock climbing, multiple use recreation and heli-skiing.

Summary of Project Description

The KSM Project is a proposed gold/copper/silver/molybdenum mine located in the coastal mountains of northwestern BC, approximately 950 km northwest of Vancouver, 65 km northwest of Stewart, and 35 km northeast of the BC-Alaska border, at 56.52 north latitude and 130.25 west longitude. The Proponent proposes an ore extraction rate of approximately 130,000 tonnes per day (tpd), and an average concentrate production rate of 800 to 1,000 tpd. Ore will be mined by a combination of open pit and underground mining methods from four mineral deposits – the Mitchell, Sulphurets, Kerr and Iron Cap deposits. Concentrate will be trucked to port facilities at Stewart for shipping to overseas markets.

The Project will be developed in two geographical areas: the Mine Site, and the PTMA (see Figure 3). At the Mine Site, the Kerr and Sulphurets deposits, and portions of the Mitchell deposits, will be mined using open pit mining methods. The Iron Cap deposit and the remainder of the Mitchell deposit will be mined using block cave underground mining methods. Waste rock from the open pit operation will be stored in rock storage facilities (RFSs) situated in the Mitchell and McTagg Creek valleys or placed as backfill in the mined-out Sulphurets Pit. Surface water that contacts disturbed areas in the Mine Site will be collected through a series of diversion tunnels and ditches and stored in the Water Storage Facility (WSF) for treatment at the Water Treatment Plant (WTP) to meet applicable water quality objectives before discharge to the receiving environment. Non-contact water will be diverted around disturbed areas for downstream discharge to the receiving environment.

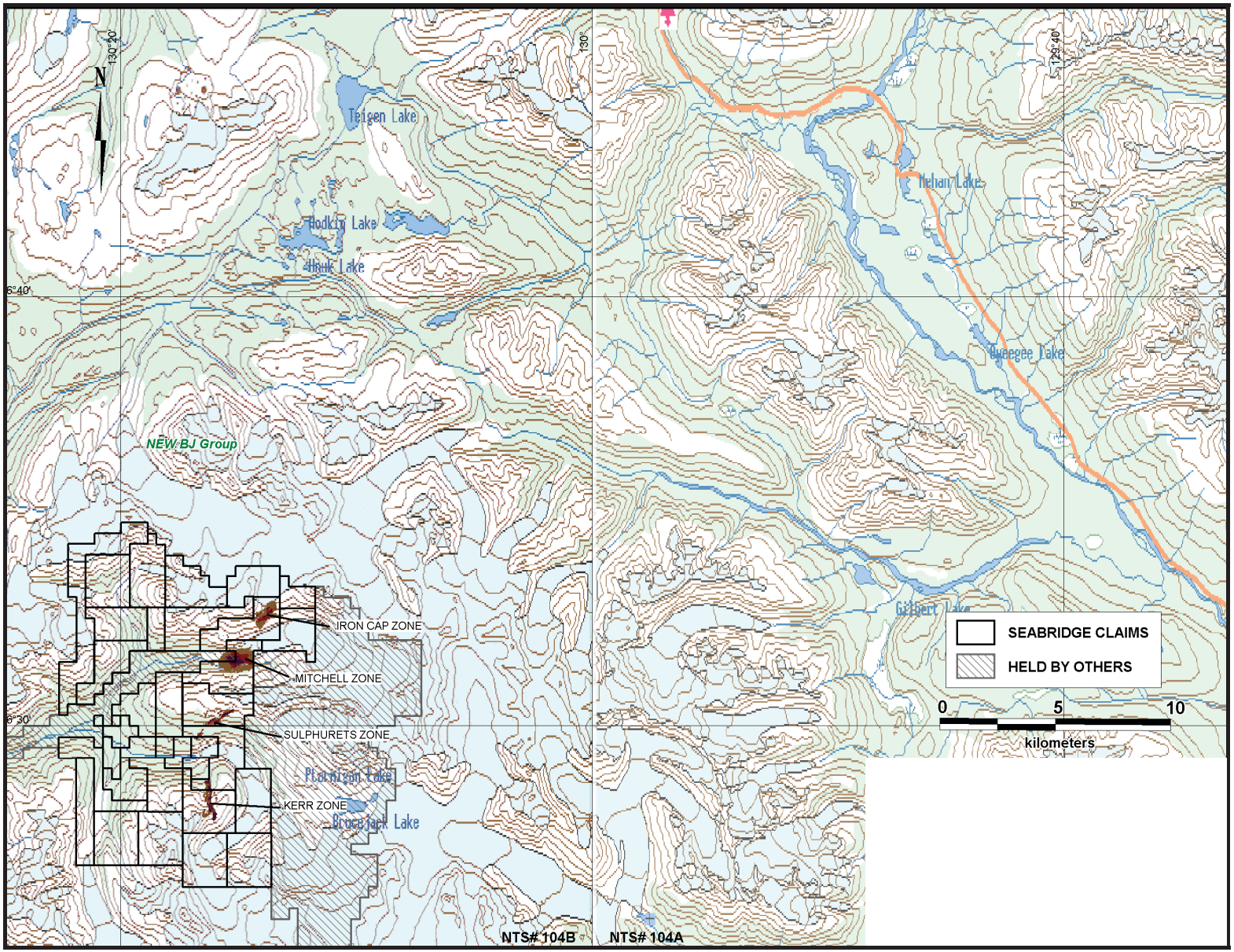

Figure 2

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Placer Claims in the KSM Project Area

Figure 2

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Ore from the mine will be crushed and conveyed through one of two parallel 23 km long tunnels, the MTT, to the PTMA for processing in the Treaty Ore Preparation Complex (OPC). This same tunnel will also be used to route electrical power transmission lines from the PTMA to the Mine Site. The second tunnel will be used to transport personnel and bulk materials between the PTMA and the Mine Site.

The PTMA is located near the upper tributaries of Teigen and Treaty creeks, in the Bell-Irving River watershed, and about 19 km southwest of Bell II. The Bell-Irving River discharges into the Nass River, approximately 70 km downstream of the confluence, which drains into the Pacific Ocean. Key components in the PTMA include the Treaty OPC, which consists of mill and crushing facilities, the Treaty Process Plant and Carbon-in-Leach (CIL) Plant, and the Tailing Management Facility (TMF). The Treaty Process Plant will process an average of 130,000 tonnes per day (tpd) of ore, to produce an average of 800 to 1,000 tpd in total of both gold-copper concentrate and molybdenum concentrate. Tailing from the Treaty Process Plant will be pumped to the TMF for storage. Gold-copper concentrate will be trucked from the PTMA for a distance of 185 km on highways 37 and 37A to the Port of Stewart for shipping to overseas markets.

Both the Mine Site and the PTMA are currently accessed by helicopter. The Project will require two new access roads to transport equipment, materials, and supplies:

- the Coulter Creek access road (CCAR), which will follow Coulter Creek and Sulphurets Creek to the Mine Site from km 70 along the existing Eskay Creek Mine road, which connects to Highway 37 at Bob Quinn Lake; and
- the Treaty Creek access road (TCAR), which will provide access to the PTMA from Highway 37, 19 km south of Bell II, via a 3-km segment of Forest Service Road off Highway 37, then paralleling Treaty Creek.

The Project requires an average of 149 megawatts (MW) with a peak demand of 171 million volt-amperes (MVA), which will be provided from the provincial electricity grid following completion of the construction of the 287-kV Northwest Transmission Line (NTL) from the Skeena Substation near Terrace to the Bob Quinn substation. Supply of electricity to the Project will require a switching station (constructed, owned, and operated by BC Hydro) on the NTL right-of-way near the junction of the proposed TCAR and Highway 37, and construction of a 287 kV, 28.5-km spur line along the Treaty Creek corridor to the Treaty Creek OPC. Additional hydroelectric power of over 5.5 MW will be generated on-site to augment the expected peak demand of 171 MVA, primarily through three small local hydro-electric power projects.

The Project will provide an estimated 1,800 direct and 2,510 indirect BC construction jobs, and 1,040 direct and 1,840 indirect BC operation jobs. The initial capital cost of this Project to bring it into commercial-scale production will be approximately CAD $5.3 billion dollars. The Project and related activities will be carried out over four distinct development phases:

- construction phase - 5 years;
- operation phase - 51.5 years;
- closure phase - 3 years; and
- post-closure phase - 250 years.

PROJECT # 868-022-48 GIS No. KSM-15-317_T January 31, 2013

407500 415000 422500 430000 437500 445000 452500 460000

6282500 6275000 6267500 6260000 6252500

Eskay Creek Mine Road
Eskay Creek Mine
Kerchum Creek
Eskay Creek
Tom MacKay Lake
Unuk Lake
Hodkin Lake
Teigen Creek
West Teigen Trib.
Kaypros Creek
Treaty OPC
Processing and Tailing Management Area
East Creek
Bell - Irving River
37
Tailing Management Facility
Tumbling Creek
CIL Lined Pond
Mitchell-Treaty Twinned Tunnels
Treaty Adit Road
Treaty Saddle Road
Treaty Creek
Gilbert Lake
Treaty Creek Access Road
Coulter Creek
Unuk River
Iron Cap Underground Works
Mine Site
Mitchell RSF
John Peaks
Tagg RSF
Coulter Creek Access Road
Mitchell Pit
Mitchell OPC
Sulphurets Pit
Sulphurets Creek
Mount Madge
Kerr Pit
Brucejack Lake
Knippie Glacier
Mount Knippie
South Unuk River
Unuk Finger

N

Fixed Avalanche Initiation Exploders
Incinerator
Highway
Access Road
Transmission Line
Underground Conveyor
Access Ramp
Tunnel
Rope Conveyor
Surface Conveyor
Diversion Ditch
Collection Ditch
Diversion Pipeline
Collection Pipeline
Diversion Tunnel
Collection Tunnel
Penstock
Spillway
Infrastructure
Ore Preparation Complex
Dam
Lined Pond
Pond
Gravel Beach Cover
Tailing Cell
Landfarm / Landfill
Ore Stockpile
Soil Storage
Till Stockpile
Surface Disturbance
Haul Road
Quarry
Waste Pile
Borrow Pit
Till Stockpile
Underground Footprint
Pit
Rock Storage Facility

1:150,000
0 2.5 5
Kilometres

KSM-15-317
Date: January 31, 2013
Projection: NAD 1983 UTM Zone 9N

Figure 3

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KSM Project Layout: End of Operation

Ten construction camps, with a lifespan of one to five years each, are required to support construction of the CCAR, TCAR, Mine Site and PTMA facilities. Temporary access to the Mitchell Valley will be via the Frank Mackie Glacier during the winter months to support initial construction activities. Camp capacity will be sized to accommodate from 40 to 800 people. During the operation phase, the Treaty operating camp (sized to accommodate 250 people), will be established in the PTMA, and the Mitchell operating camp (accommodating an estimated 350 people), at the Mine Site.

Reclamation will be an ongoing activity over the life of the mine, with the greater portion occurring during the closure phase. Facilities such as the WSF and WTP will continue to operate into the post-closure phase and beyond, until water quality is acceptable for discharge without treatment. Diversion structures, related hydroelectric plants and support infrastructure such as the TCAR, MTT, transmission line, and camps will be maintained as long as required.

Need for, and Purpose of, the Project

The need for, and purpose of, the Project are demonstrated by its capacity to further the natural resource development objectives of both Canada's 2012 *Economic Action Plan* and British Columbia's 2012 *Mineral Exploration and Mining Strategy* . The Project will develop one of the largest gold resources in the world, supplying gold and copper concentrate to overseas markets to support industrial development needs and growth in China, India, and other emerging markets. In a period of stagnant global economic growth, the revenues generated by the KSM Project will contribute to a slow economic recovery in Canada and create export opportunities consistent with strengthening international investment as outlined in Canada's *Economic Action Plan*. In addition to positive economic benefits, the Project will provide significant employment, education, and training opportunities to local and regional communities, including Aboriginal groups, where unemployment rates are currently above the provincial average.

Environmental Setting

Atmospheric Conditions

The meteorological conditions in the area are primarily influenced by the Pacific Ocean to the west and continental Arctic regions to the northeast. Hence, the Project is in a transition zone between wet coastal and dry/cold interior climate zones. The orographic influence of the mountain ranges on the Pacific and continental air masses results in precipitation and air temperatures that are widely variable across the Project region.

Strong winds generally occur in all seasons at high elevations above the mountains, with winds generally coming from the northeast, southeast, and southwest quadrants in the winters and from the southwest quadrant in the summers. Winds at low elevations are funneled through valleys with a light to moderate down-valley flow of Arctic air from the northeast in the winter and a light up-valley flow of warm Pacific air from the southwest in the summer.

The regional hydro-climate reflects the interactions between incoming weather systems and local topography that produce a degree of spatial variability in snowfall and rainfall. Orographic effects result when Pacific air streams confront the west-facing slopes of the Coast Mountains

and the moisture-laden air is forced up the slopes. As the air cools and rises, it is less capable of holding moisture and releases it as rain or snowfall. The mountains also slow down cyclonic storms, which can lead to prolonged and sometimes heavy rainfalls. Over the mountain summit, the air descends and warms, which disperses the cloud and potential rain through evaporation. The result is a dramatic reduction of precipitation in the rain-shadow. Within BC, the series of mountain ranges that parallel the coast produce a decrease in precipitation with increasing distance from the ocean as storms pass over the successive ranges.

The climate in the local region is typical of temperate rainforest with average monthly air temperature ranging between -12 and 14.7°C. Within the last four years (2008 to 2011), the highest daily maximum temperature ranged between 25.3 and 30.2°C, and the lowest daily minimum temperature ranged between -22.1 and -31.1°C. Within the same period, annual precipitation ranged from 689 mm at the Teigen Creek station to 1,914 mm at Eskay Creek station. The highest precipitation in the local region occurs in September and October. Subarctic conditions are present at high elevations (generally above 1,500 masl) where strong winds blowing in a westerly direction predominate in winter. At low elevations, winds are funneled through valleys—Arctic air from the northeast in the winter and warm Pacific air from the southwest in the summer.

The air quality in the area proposed for Project development and elsewhere in northwestern BC is predominantly unaffected by anthropogenic sources, reflecting the region's remoteness and the lack of, and localized nature of, sources of anthropogenic air emissions sources.

Geology and Geochemistry

Stikinia—a terrane of Triassic and Jurassic volcanic arcs, accreted onto Palaeozoic basement rocks of the western North American continental margin—forms the regional geological setting for the KSM property. Late Cretaceous folding and thrust faulting of the main stratigraphic groups in the region generated Stikinia's current structural features. Thrust faulting is common, and some strata are tightly folded. Remnants of Quaternary Era basaltic volcanic eruptions occur throughout the region. Early Jurassic sub-volcanic intrusive complexes are common. Several complexes host hydrothermal systems rich in precious and base metals, including the copper-gold porphyry deposits at the Galore Creek, Red Chris, Kemess, Mount Milligan and KSM properties, as well as related polymetallic deposits, including those at the Premier, Eskay Creek, Snip, Bruceside, and Granduc properties.

Local geology is dominated by variably deformed oceanic island arc complexes. Late Jurassic and Cretaceous back-arc basins to the east of the KSM property contain thick accumulations of fine black clastic sedimentary rocks, all folded and faulted to differing degrees during late Cretaceous compressional tectonics. Unloading linked to glacier retreat in the Mitchell Creek and Treaty Creek valleys has resulted in the formation of exfoliation stress relief fractures parallel to the valley flanks. Dikes, sills and plutonic plugs were intruded into these strata in early Jurassic times. Copper-gold mineralization is typically best developed at the margins of these intrusions. Extrusive and intrusive activity has led to rock alteration of various types around the KSM Project mineralized deposits.

The mineralized zones in the local area and more regionally, tend to be sulphide-rich. Where sulphide minerals such as pyrite are present, oxidation can create acid rock drainage (ARD), unless sufficient quantities of neutralizing minerals are available. In the event that acidic drainage is formed, low pH conditions can lead to higher rates of metal leaching (ML). Baseline surface water and groundwater quality in the vicinity of mineralized zones in the region exhibit relatively low pH and significant metal concentrations, reflecting the presence of sulphide minerals and the natural occurrence of ML / ARD processes.

Physiography

Today, the mountain topography is very rugged. Glaciers are common in high elevations. Most steep slopes are covered by bedrock and accumulations of rubbly colluvium. Gentler slopes have a thin mantle of morainal material (glacial till). Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes. Avalanches and slope failures are common features at high and intermediate elevations (above 1,500 masl).

Topography in the vicinity of the KSM mineral properties ranges from a low elevation of 240 metres above sea level (masl) (at the proposed Coulter Creek access road crossing of the Unuk River) to more than 2,300 masl at the highest peak. A large portion of the terrain is situated at, or above, the tree-line and in alpine areas. Glaciers and icefields dominate the terrain to the north, east, and south of the Project area. Glaciers in the area have been receding in the last several decades.

Geohazards

Locally and regionally, geohazards are linked primarily to landslides and snow avalanches. Landslide hazards are abundant throughout the region. They are attributed to several factors, including the presence of unstable surficial soils and weak bedrock, repeated geologically recent glaciations, resulting in over-steepened valley sidewalls, the loss of slope buttress support following glacial recession, abundance of veneers that are shallow to bedrock, and the high precipitation environment.

Thick glacial deposits are generally restricted to the margins of major valley floors and adjacent lower slopes. Much of the surficial cover in the Project area is unstable to potentially unstable, since all of the main valleys have been subject to glacial advance and retreat, and associated process such as erosion and deposition. Left behind are moderately steep upper slopes, steeper valley walls and gently sloping and wide valley floors.

Unstable lateral morainal till has been deposited on slopes at angles that exceed the angle of repose, resulting in rubbly colluvium accumulating along moderate steep slopes and valley bottoms. Post glacial processes have also contributed to terrain instability, as much of the recent deposits are loose and highly erodible. Periglacial processes are also in evidence, as several glaciers at the Project site are receding, leaving behind hanging valleys, over-steepened lateral moraines and glacio-fluvial outwash deposits in valley bottoms. The unloading of the valley walls following glacial retreat has led to pressure release cracks and associated local instability on over-steepened slopes resulting geohazards, such as rock fall, debris avalanches and slumping of surficial materials. These geohazard processes are endemic to the local area.

Snow avalanche hazards are abundant due to high elevation, substantial snow supply and generally steeper slope gradients, and tend to be associated with terrain that is open and steep. Since the region is located in a transition zone between maritime and continental climate zones, significant temperature and moisture fluctuations are experienced throughout an average winter. The avalanche season typically begins in early October at the higher elevations, and often extends until late June or early July. In valley bottoms, avalanches may be experienced from late October to late May.

Soil Development

Regional climate and geological history, in combination with local topography and vegetation, affect soil landscapes found in the local area. In high elevations solifluction, nivation, and cryoturbation disrupt, displace, and mix soil horizons, while the cold climate slows down mineral weathering and organic decomposition. Weathered volcanic rocks provide coarse-textured, acidic parent materials. As a result, soil development is often weak. The steep terrain results in unstable slopes where soil development is further hindered by mass movement of surficial materials.

Regosols (weakly developed, well-drained mineral soils in unconsolidated materials) and occasionally Cryosols (periodically frozen soils) occur in these areas. In lower elevations, soils are commonly subjected to seepage. Excess moisture and a high incidence of poorly drained soils are typical. Due to the steep terrain, most common parent materials consist of colluvial veneers. On lower slopes, soils often develop on morainal deposits. Dominant soils include Brunisols (well to imperfectly drained mineral soils with partial horizon development) and Ferro-Humic Podzols (characterized by low base saturation, low pH, high organic carbon, and a high concentration of iron and aluminum compounds).

Hydrology and Water Quality

Surface Water Quantity

Regional and local surface water quantity characteristics were determined from data collected from specially installed hydrometric stations, used in conjunction with a regional analysis prepared for long-term hydrometric data from Water Survey of Canada (WSC) hydrometric stations. Analysis reveals a clear difference in hydrologic patterns between the Teigen Creek / Treaty Creek drainages and the Unuk River / Sulphurets Creek drainages. With the exception of the mainstem of Treaty Creek, the amount of runoff from the Teigen Creek / Treaty Creek drainages is on average nearly 40% lower than from the Unuk River / Sulphurets Creek drainages. This difference reflects not only differences in local climate patterns between the two geographically distinct areas, but also the strong influence of glaciers on surface water volumes for the Sulphurets Creek drainages.

The monthly distribution of flow tends to be concentrated in the open water season (May to October), with less than 20% of the annual flow occurring from November to April at a majority of the regional stations. During the open water season, the distribution of flow depends on the timing of the freshet and the balance between the volumes of water released during the freshet and the volumes of water resulting from fall rains or glacial meltwater. Smaller regional watersheds with glaciers show a higher proportion of flow during July and August compared to

the larger regional watersheds with a smaller glacier percentage. This pattern is also evident in the Project area, especially for the Sulphurets Creek watersheds.

Groundwater Quantity

Groundwater conditions correspond with the mountainous, wet environment that comprises the Mine Site and the PTMA. Groundwater gradients are high, driven by heavy rainfall and recharge at higher elevations in the mountains. Valley bottoms are discharge zones, with groundwater levels near or above (artesian) ground surface. Discharge zones also exist along valley walls in the Mine Site, where seeps of acidic water have been observed (with pH readings as low as 2.5). Groundwater levels tend to be deeper at high elevations (i.e., from 6 m to 33 m below surface) and show more seasonal variation (from 1 m to about 15 m), whereas groundwater levels in the valley bottoms are generally shallow and show less seasonal variation. Bedrock aquifers are confined (i.e., groundwater is at pressures greater than atmospheric pressure). Unconfined aquifers are limited to the glacial deposits in the valley bottoms.

In the Mitchell Valley, poor quality water at the toe of the glacier is thought to be affected by groundwater that has contacted mineralized rock (i.e., it has a discharge quality similar to that in the springs / seeps). Groundwater elevations in wells installed in overburden (comprised of glacial till) in the Mitchell Valley bottom are similar to the creek bed elevation, and show little annual variation (< 1 m), suggesting a hydraulic connection between groundwater and surface water. Groundwater elevations in wells screened in bedrock are higher than wells screened in overburden, indicating upward hydraulic gradients.

Groundwater recharge is considered to be higher in the mountainous areas (reflecting the orographic effect). For modeling purposes, the recharge rate is estimated at 218 millimetres per annum (mm/a), or 13% of the mean annual precipitation of 1,650 mm where ground elevation is more than 1,300 masl, compared to 115 mm/a (or 7% of mean annual precipitation) where elevation is less than 400 masl. Beneath glaciers and snow pack, recharge is estimated at only 40 mm/a (2.4% of mean annual precipitation) because of frozen ground conditions.

Surface Water Quality

The hydrological regime is an important determinant of stream water quality in the Project region. Typical local streams experience a low-flow period between November and April, and higher flows between May and October associated with freshet, summer glacial melt, and fall heavy rain events. The hydrological regime affects water quality in two ways:

- increased flows during freshet, glacial melt, and heavy rainfall events dilutes concentrations of major ions and total dissolved solids; and
- increased sediment load and transport during high-flow periods leads to increased concentrations of total suspended solids (TSS) and particle-associated metals.

Streams near the Mine Site and PTMA have distinct surface water quality. Metal leaching due to naturally occurring ARD is associated with total and dissolved metal concentrations in Mitchell and Sulphurets creeks that are frequently higher than levels set in BC water quality guidelines for the protection of freshwater aquatic life. The high suspended sediment load, low concentrations

of bioavailable nutrients and high concentrations of total and dissolved metals identified in Mitchell and Sulphurets creeks and the Unuk River are likely contributing factors to the poor productive capacity of Mine Site streams. The lower suspended sediment load, increased concentrations of bioavailable nutrients, and lower concentrations of total and dissolved metals identified in the Snowbank, Teigen, Treaty and Bell-Irving watersheds are likely contributing factors to the greater productive capacity of PTMA streams relative to the Mine Site.

Groundwater Quality

Groundwater quality at the Mine Site is heavily influenced by the sulphide ore deposits. Groundwater is acidic near to, and within, the mineral deposits, with pH measurements as low as 2.5 in seeps along the valley walls of Mitchell Creek. Concentrations of certain metals are elevated in groundwater throughout the Mine Site, and are particularly high near and within the mineral deposits. Metals with elevated concentrations include iron, aluminum, copper, chromium, lead, manganese and zinc. Groundwater in the Mitchell Valley is not suitable for human consumption or the sustenance of fresh water aquatic life.

Dissolved metals concentrations are generally low in the PTMA. The water is fresh (low salinity) with neutral to slightly alkaline pH, ranging from 7.4 to 8.8.

Fisheries and Aquatic Habitat

Fisheries

The baseline fish and aquatic habitat study area encompasses two major watersheds that include the Unuk and Bell-Irving rivers. The north and west areas of the Project are situated within the Unuk River watershed, which crosses into Alaska and discharges into Burroughs Bay and eventually the Pacific Ocean. There are eight assessed sub-watersheds within the Unuk River watershed, in addition to the main stem of the Unuk River. The eastern area of the Project is situated within the Bell-Irving River watershed, which discharges into the Nass River. There are eight assessed sub-watersheds within the Bell-Irving River watershed, in addition to the main stem of the Bell-Irving River. There is one assessed sub-watershed within the Bowser River watershed (Scott Creek), in addition to the main stem of the Bowser River.

There is a 200 m-long cascade in Sulphurets Creek, approximately 500 m upstream of the confluence with the Unuk River. Dolly Varden are present in Sulphurets Creek below the cascade, but no fish species are present above the cascade, in areas around the Mine Site. No salmon species are present within Sulphurets Creek.

Dolly Varden is the only species present in North Treaty and South Teigen creeks within the footprint of the proposed TMF in the Bell-Irving watershed. Dolly Varden, bull trout, mountain whitefish, and rainbow trout are present in South Teigen Creek, downstream of a 2.5-metre-high falls and outside of the TMF footprint. Dolly Varden dominate the species composition (95%) downstream of the falls in the lower reach of South Teigen Creek. No salmon species have been observed in South Teigen, North Treaty, or Tumbling creeks.

Aquatic Habitat

Sediments in the area downstream of the Mine Site (in Mitchell Creek and Sulphurets Creek) are of poor quality. These sediments are often inhospitable, with low nutrient availability (total organic carbon, nitrogen, and phosphorus), relatively coarse sediment structure that limit the range of available habitat for benthic invertebrates, and metal concentrations that are frequently higher than sediment quality guidelines. Surveys of primary producer (periphyton) and benthic invertebrates in the creeks downstream of the Mine Site revealed low standing stocks (biomass and density) and low diversities (richness and Simpson's diversity) of the aquatic communities, which is consistent with both poor water quality and sediment quality.

Sediment quality in the PTMA is generally better than downstream of the Mine Site, but metal concentrations are often elevated above sediment quality guidelines. Some areas, particularly those downstream of the wetlands (e.g. South Teigen Creek), had relatively high organic carbon content and favorable particle size distributions that would provide a better range of suitable habitat to support more diverse benthic populations. There are some areas that support more abundant and diverse aquatic communities (e.g. Teigen Creek), while other areas have periphyton and benthic invertebrate communities that are less abundant and less diverse (e.g., Treaty Creek).

Terrestrial Ecosystems

General Regional Characterization

The Project is situated within the Skeena Mountains Ecoregion, the Boundary Ranges Ecoregion, and the Nass Ranges Ecoregion. Towards the coast, the Boundary Ranges consist of extensive ice fields, capping granitic intrusions remnant of the Coast Range Arc, and are dissected by several major river valleys, including the Nass River. Inland and east of the Boundary Ranges lies the Skeena Mountains Ecoregion, which consists of high rugged mountains and a moist, coast/interior transition climate, supporting many glaciers. The Nass Ranges Ecoregion, with a climate somewhat transitional between coastal and interior regimes, is a mountainous area situated west of the Kitimat Ranges (which are located south of the Project).

A wide range of topography and vegetation communities occur within the regional study area (RSA) and LSAs defined for the purposes of assessing terrestrial ecosystem effects. These include low elevation wetland and shrub-dominated riparian and floodplain ecosystems, low and intermediate-elevation forests, subalpine and alpine meadows and sparsely- to non-vegetated rocky and glaciated terrain. Many of these ecosystems provide valuable habitat for wildlife, as well as economically important forest and non-timber forest resources.

Locally and regionally, six Biogeoclimatic Ecosystem Classification (BEC) units are present, four of which are forested units, with the other two being undifferentiated alpine - parkland units. These BEC units include the Boreal Altai Fescue Alpine (BAFA) unit, which is most widespread in the RSA, as well as the Coastal Mountain-heather Alpine (CMA), Coastal Western Hemlock (CWH), Engelmann Spruce–Subalpine Fir (ESSF), Interior Cedar Hemlock (ICH) and Mountain Hemlock (MH) units. Nearly half (46%) of the RSA consists of non- and sparsely-vegetated ecosystems, while 26% consists of forested ecosystems, and 21%, of shrub-dominated ecosystems (including avalanche ecosystems). Glaciers and permanent snow / ice comprise

approximately 22% of the RSA. Of the forested area, 66% is mapped as mesic forest, followed by moist and wetter forests (12% and 11%, respectively).

Alpine Ecosystems

The terrain above treeline is often dominated by rugged and steep exposed bedrock and glaciers. Such alpine ecosystems provide escape terrain for mountain goats and support recreational opportunities such as backcountry hiking and heli-skiing. Parkland ecosystems occupy a narrow elevation band above dense coniferous forests and below the treeless alpine ecosystems. They are characterized by discontinuous tree islands growing on elevated sites that experience earlier snowmelt and allow for drainage of excessive moisture that prohibits forest establishment at higher elevations. Avalanche track ecosystems develop in the widespread areas with frequent avalanches. The herbaceous vegetation found in many of these tracks provides valuable forage for grizzly bears and black bears.

Forested Ecosystems

Below approximately 1,100 masl, forested ecosystems dominate the landscape. They are generally fairly continuous, but can be interrupted by natural disturbances such as avalanches and mass wasting, as well as fluvial disturbances such as flooding, channel aggradation and degradation, and debris flows. Many of the forests in the lower slopes and valley bottoms are very old, at least 500 years in some areas, due in part to the rarity of stand replacement disturbance events, such as wildfire and the lack of forest harvesting, except in the area immediately surrounding Highway 37. The diverse structures of these old growth forests provide a mosaic of habitats within close proximity to each other and retain an abundant biodiversity not associated with younger, less complex ecosystems, providing high value habitat for marten and fisher and a diversity of forest bird species. Higher elevation forests provide forage and cover to moose and mountain goats, as well as berries and herbaceous plants for bears. Early seral vegetation provides winter habitat for moose and spring forage to grizzly and black bears. During the summer and fall months, berries are an important food resource for bears.

Riparian Ecosystems

Ecosystems along watercourses, whether active or inactive, provide wildlife values, soil retention, and hydrological buffering. Forested ecosystems developing on aggraded fluvial deposits are very common in the RSA and the LSA, particularly along Treaty Creek and the Unuk River. These ecosystems develop on landforms that are no longer inundated by annual flood events, but experience extensive subterranean irrigation. Cottonwood trees, a preferred nesting tree for raptors, such as bald eagles, thrive in these conditions. The resulting forest is often composed of large mature cottonwood with an understory of either subalpine fir or hybrid white spruce. Active floodplain ecosystems are subject to regular disturbance, which promotes the longevity of pioneer species, such as willow and alder, as well as herbaceous species such as lady fern, which grows in response to the high nutrient load provided by flood events and decomposition of pioneer species leaf litter. This vegetation provides forage for wildlife species that use floodplain riparian ecosystems as movement corridors. The vigorous vegetation growth also helps to retain soils that would otherwise be transported by flood events. The complex channel morphology allows for the development of backwater channel swamp and fen

ecosystems. These are capable of storing large volumes of water, which mitigate flows during high water events, reducing the energy of floods downstream.

Listed Ecosystems

Twelve ecosystems (six terrestrial and six wetland types) that have been blue-listed or red-listed by the BC Conservation Data Centre (CDC) have been identified within the RSA and LSA. Of the 38 rare individual plant species that were observed within the LSA, most were found at high elevations in the Sulphurets Creek watershed. The 38 rare species include 27 lichens, nine vascular plants and two mosses.

Wildlife Species

Mature forests, wetlands, alpine areas, and riparian forests provide high-value habitat to a diverse wildlife community. Common species or groups that occur in the RSA include ungulates (e.g., moose and mountain goat), omnivores/carnivores (e.g., grizzly bear, black bear and wolves), furbearers (e.g., fisher, marten and wolverine), hoary marmots, bats, birds (forest birds, raptors and waterfowl), and amphibians (e.g., Columbia spotted frog and western toad). Forest harvesting within the RSA has been minimal compared to many other areas in BC, due to the remoteness of the area and the relatively poor productivity of the forests, so that the wildlife habitats found in the majority of the wildlife RSA are essentially undisturbed.

Moose

Moose are common throughout BC's forested areas with an estimated population size of 170,000 animals. Habitat suitability modeling and winter aerial surveys identified moose habitat in the wildlife RSA. Winter habitat has been identified as critical for maintaining moose populations and habitat modeling focused on this season. The majority of good quality winter habitat for moose occurs along river valleys within the interior survey area on the eastern side of the RSA, including the Bell-Irving River, Treaty Creek, Snowbank Creek and Teigen Creek, and also surrounding Bowser Lake. A smaller amount of moose habitat occurs in the western, coastal-influenced part of the RSA, along the Unuk River.

Baseline aerial moose surveys in the winter of 2009 revealed that the density and number of moose (adjusted for sightability) was higher in the eastern interior area of the RSA, near the PTMA, Treaty Creek, Bell Irving River, and Bowser Lake (0.59 moose/km^2; 198 moose) than in the western coastal area, near the Mine Site and Unuk River (0.27 moose/km^2; 33 moose). A lower male to female ratio was observed in the interior area, which is indicative of harvest pressure on males where access to high-quality moose habitat is available from Highway 37 along the Bell-Irving River and along forestry roads near Bowser Lake. The regional moose population is currently vulnerable.

Mountain Goats

In 2000, the total number of mountain goats in BC was estimated at approximately 50,000 individuals, of which between 16,000 and 35,000 occur within the Skeena Region. The most suitable year-round goat habitat in the RSA occurs in the eastern RSA along the Snowslide Range, and in the western RSA around John Peaks to the west of the Mine Site. Within the LSA, suitable habitat was identified in the Mine Site and southeast of the TMF. Summer surveys in

2008 observed 230 goats in 62 groups in the RSA. Winter 2009 survey observed 178 goats in 69 groups in the RSA. Goats were observed near the Mine Site during both the winter and summer surveys. In the PTMA, goats were observed on the Snowslide Range (i.e., the mountain range between the PTMA and the Bell-Irving River). In addition, a potential mineral lick was identified in the valley between the Sulphurets and Kerr pits. An additional mineral lick was observed during baseline surveys for the Brucejack Mine on the Snowslide Range, which encountered slightly higher numbers of goats and groupings.

Grizzly and Black Bears

Grizzly bears are found throughout BC, from sea level and river-valleys to alpine regions. BC contains more than 50% of the Canadian population of grizzly bears, with an estimated 13,800 grizzlies in the province. Grizzly bears are considered a species of special concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and are blue-listed in BC. Habitat suitability modeling revealed that overall, between 8% and 38% of habitat within the RSA was identified as Moderately High and High rated habitat for spring (27%), summer (38%), and fall. In addition, 5% of the LSA was identified as suitable denning habitat for grizzly bears, particularly in the PTMA. The area near the proposed TMF and TCAR has also been identified as a candidate grizzly bear Wildlife Habitat Area (WHA). Based on baseline studies in 2008 and 2009, the superpopulation (i.e. the total number of grizzly bears that used the RSA during the course of the studies) was estimated to include 31 females and 27 males, for a total of 58 bears.

Black bears are common and widespread in BC. The population estimate in 2001 was between 120,000 and 160,000 in the province, with highest densities along the coast, including within the wildlife RSA. During grizzly bear DNA baseline study, black bear hairs were collected incidentally. Black bears were detected throughout the RSA and LSA along all river drainages, particularly along the Unuk, Bell-Irving and Bowser rivers; and near Bowser Lake, and in the Treaty and Teigen creek valleys. In addition, black bears were the species most frequently observed incidentally in the LSA and RSA.

Furbearers

An evaluation of the BC Fur Harvest Database identified 14 furbearer species that were harvested in areas within and surrounding the RSA. The most commonly trapped species included American marten, American beaver, and red squirrel. Trapped species also include the provincially blue-listed fisher and the federally listed wolverine. American marten has historically been the most frequently harvested and most valuable component of the regional fur harvest. The majority of the forested habitat within the RSA was modeled as highly suitable winter habitat for marten. Within the RSA, continuous blocks of highly suitable habitat were distributed across low elevation within all major watersheds, particularly in mature forests along the Unuk River watershed. Over a quarter of the LSA was identified as highly suitable winter habitat for marten, including most of the forest habitat within the TMF and the low-elevation older forests along the Coulter Creek and Treaty Creek corridors. During wildlife baseline studies in 2008 and 2009, nine furbearer species or their sign were observed. The most frequently observed species and/or sign were black bears, red squirrel, and marten.

Small Mammals and Groundhogs

Small mammals are an important prey source for predatory birds and other mammals. Trapping surveys were conducted in the LSA in 2008 and 2009. Over the two-year baseline study, seven small mammal species were identified in the LSA, none of which are of conservation concern in BC. Species observed include Keen's mouse, Northern red-backed vole, meadow vole, meadow jumping mouse, Cinereus shrew, dusky shrew and Nearctic brown lemming. Productive habitats for small mammals were identified within low elevation riparian areas and adjacent coniferous forests.

Field studies of hoary marmots and Arctic ground squirrels conducted in 2008 and 2009 did not detect Arctic ground squirrels, but marmot colonies were distributed throughout the alpine in both the Mine Site and PTMA, with the highest densities observed in alpine areas (e.g., Snowslide Range) near the PTMA (average 0.62 colonies/km^2), surrounding the proposed TMF. The Mine Site is characterized by steep and rugged coastal mountain terrain, which is less suitable marmot habitat than occurs in the PTMA, which has larger areas of alpine meadow and gentler mountain topography.

Bats

Nine bat species potentially occur within the LSA, two of which were categorized as likely to occur—little brown myotis and Western long-eared myotis. The other seven species were categorized as possibly occurring—California myotis, Keen's long-eared myotis, northern long-eared myotis, long-legged myotis, Yuma myotis, silver-haired bat and big brown bat. Four of these nine species are of provincial or federal conservation concern—northern long-eared myotis, Keen's long-eared myotis, silver-haired bat and little brown myotis. Little brown myotis and western long-eared myotis were observed mainly within riparian habitat. The most important habitat features for bats are cave-based hibernacula, typically associated with karst (limestone) topography. The only area in the LSA with exposed limestone is located in McTagg Creek, extending south to Sulphurets Creek.

Birds

During 2008 and 2009 baseline studies, 93 bird species were detected—eight raptor species, 25 wetland bird species and 60 forest and alpine bird species. Raptors include hawks, falcons, owls and other birds of prey. Wetland birds include ducks, geese, shorebirds, and other bird families associated with water bodies. Forest and alpine birds include songbirds, hummingbirds, woodpeckers and game birds in terrestrial areas.

Eight raptor species were recorded in the RSA, including bald eagles, golden eagles, northern goshawks, ospreys, red-tailed hawks, merlins, rough-legged hawks and Swainson's hawk. In BC, the rough-legged hawk is blue-listed and the Swainson's hawk is red-listed. In addition, the northern goshawk *laingi* subspecies is red-listed in BC and designated as threatened under the Canada *Species at Risk Act* (SARA; 2002). It is unknown if the northern goshawks observed during baseline surveys are of the *laingi* subspecies. Two raptor nests were observed, both in riparian areas.

Twenty-five species of wetland bird were identified during the 2008 and 2009 baseline surveys. Three species identified in the RSA are of regional or provincial conservation concern - harlequin duck (provincially ranked as vulnerable during the non-breeding season), surf scoter,

which is blue-listed and provincially ranked as vulnerable during the breeding season, and trumpeter swan, which is . Harlequin ducks were observed on the Bell-Irving River and along Teigen Creek during the spring. A group of seven surf scoters was observed on Treaty Creek during fall 2008, and trumpeter swans were detected along Treaty Creek and on Border Lake. Areas with high species diversity during the breeding period were identified in wetland complexes associated with the confluence of Teigen Creek and Bell-Irving River, and along Treaty and Todedada creeks. In contrast, the habitat associated with the Mine Site and its drainages does not appear to provide good breeding habitat for most wetland species.

Sixty forest and alpine bird species were observed in the RSA in 2008 and 2009. The greatest richness of species, highest numbers of individual birds and highest diversity of birds were recorded within the proposed TMF, along the CCAR corridor adjacent to the Unuk River, and near Bowser Lake. The olive-sided flycatcher, which is federally listed as threatened (Schedule 1), was observed within the RSA adjacent to Unuk Lake. Nine nests belonging to five different species were observed during field surveys. Seven nests were located in the Mine Site, and two near Teigen Creek. The five species with confirmed nests were yellow warblers, dark-eyed juncos, Swainson's thrush, American three-toed woodpecker and red-breasted sapsucker.

Amphibians

The western toad is a federally listed species of special concern that is protected under Schedule 1 of the SARA. In British Columbia it is considered secure but it is afforded protection under the *Wildlife Act* . During 2009, three western toad breeding sites were observed, all of which were located outside of the LSA in ponds at low elevation, in shallow open water, with an open canopy, and warm water temperatures. Two toad breeding sites were found on West Teigen Lake, and a third at low elevation on the lower reaches of Teigen Creek, near the confluence with the Bell-Irving River. Other breeding sites likely occur in the RSA, though no high-quality potential sites were identified within the Project footprint or LSA, although moderately suitable habitat is present.

Two additional amphibian species were observed within the RSA near Teigen and Treaty Creeks - Columbia spotted frogs and wood frogs. Neither of these two species is of conservation concern.

Species at Risk

Forty listed species either occur or could potentially occur within the RSA and LSA, based on species distribution maps. Five species are listed in Schedule 1 of *SARA* that are confirmed present or are likely to occur. Western toad and olive-sided flycatcher were observed during baseline surveys, and rusty blackbird and common nighthawk likely occur. The northern goshawk *laingi* subspecies occurs in coastal BC, mainly on islands. Although northern goshawks were observed during baseline surveys, it is unknown whether they were the *laingi* subspecies, or the *atricapillus* subspecies, which is not at risk. However, for the assessment, northern goshawk *laingi* are considered to likely occur in the RSA or LSA.

Wildlife Habitat

Important wildlife habitats in the RSA include sensitive habitats (riparian wetlands and old growth forests) and high-quality habitats and features (WHAs, UWRs, salmon spawning areas, mineral licks, and movement corridors).

Sensitive Habitats

Wetlands, and riparian forest habitat supported by wetlands, provide highly valued habitat to a diverse wildlife community. Riparian forests also serve as important movement corridors for wildlife. For example, an objective of the Unuk River RMZ, designated under within the Cassiar Iskut-Stikine LRMP, is to apply best management practices to wetlands, floodplains and riparian habitats. The Unuk River Zone covers an area of 10,000 ha, and lies south of Sulphurets Creek along the Unuk River valley. Wetlands may also be used by rutting moose in the fall, and waterfowl may nest in tree cavities or in sedge / grass meadows around these areas.

Old forests are structurally diverse, supporting a wide variety of plant and animal species. Old growth forests provide important winter habitat function for some ungulates through provision of thermal and snow interception cover and winter forage (e.g., litter fall for goat); denning habitat for bears; nesting habitat for various waterfowl, raptor, and other bird species; and habitat for furbearers. Valley bottoms in the RSA support old growth forests, except in the Bowser Lake area, where logging has occurred with access from Highway 37. Approximately 10,970 ha of old forest greater than 250 years old occur within the terrestrial ecosystem's LSA. Old growth within the CWH and ICH BEC zones in the moist and nutrient rich areas is particularly important for wildlife. These areas have large trees, such as spruce and hemlock associated with old growth function and structure. Mature and old forested riparian habitat, particularly cottonwood, is also important as it supports black bear dens, fisher dens, and has value as nesting, roosting, and feeding habitat for various other species.

High Quality Habitats and Features

WHAs represent the essential habitat necessary to sustain wildlife species considered for management under BC's Identified Wildlife Management Strategy. There are currently no designated WHAs for grizzly bear or fisher in the Skeena Region, but candidate grizzly bear WHA polygons have been suggested along the Bell-Irving River, along Teigen Creek, overlapping the PTMA, and along the TCAR.

UWRs ensure environmental sustainability across a landscape by integrating habitats that provide a variety of functions. A designated mountain goat UWR (u-6-002) that was established in December 2008 for the Nass TSA overlaps the RSA and LSA. UWR u-6-002 includes polygons near Sulphurets, Gingras and McTagg creeks, near the PTMA, Mine Site, and the Unuk River, and throughout the RSA and LSA. Candidate UWRs for moose are proposed along the Bell-Irving River and Treaty Creek.

Salmon-bearing streams and salmon spawning areas are of particular importance to grizzly bears. Salmon presence was documented in the Unuk and Bell-Irving rivers and in Teigen, Treaty, and Coulter creeks. Other areas identified as important for salmon spawning include the lower Bowser River, and the large floodplain associated with the Bell-Irving River and Teigen Creek drainages.

Natural mineral licks are unique habitat features that are important for maintaining ungulate health. Mineral licks are important for mountain goats, which use them primarily during the summer to compensate for mineral deficiencies or imbalances in their diet. These areas are likely used annually and are important for a local mountain goat population. A potential, but unconfirmed, mineral lick has been identified in the LSA, while another mineral lick was observed during baseline surveys for the Brucejack Mine on the Snowslide Range in the RSA.

Wildlife migration routes connect habitats that are exploited during different times of the year, while movements within daily or seasonal ranges may also occur along specific routes. Corridors increase animal movement between habitat patches, which can facilitate healthy population sizes, enable gene flow, and maintain biodiversity. Moose and grizzly bears likely use the major drainages in the wildlife RSA and LSA, such as the Bell-Irving, Teigen, Treaty, Unuk, and Bowser drainages, when moving between their seasonal ranges.

Economic, Social, and Cultural Setting

Governance

There are five levels of governance in the area of northwestern BC where the KSM Project will be developed. Municipal, regional, provincial and federal bodies comprise the non-Aboriginal leadership, while Aboriginal communities have their own governing bodies (see Figure 4.)

The Project is situated in the Regional District of Kitimat-Stikine (RDKS), and Electoral Area A of the Bulkley Nechako Regional District. Local communities include municipalities, Nisga'a villages, Indian reserves, and unincorporated settlements. Municipal governance only exists for the District of Stewart, the City of Terrace, the Village of Hazelton, the District of New Hazelton and the Town of Smithers. The remaining communities that are not administered by Aboriginal bodies (Dease Lake, South Hazelton, Bell II, Meziadin Junction and Bob Quinn Lake) are unincorporated, and are governed by the regional district in which they are situated.

For Aboriginal communities, the base level of governance is the Nation or Band, and they may be further represented by a multi-party council. Nisga'a communities include the villages of Gitlaxt'aamiks (New Aiyansh), Gitwinksihlkw (Canyon City), Laxgalts'ap (Greenville), and Gingolx (Kincolith). Populated Indian reserves include: Gitanyow 1, five Tahltan communities (Telegraph Creek 6 and 6A, Guhthe Tah 12, Dease Lake 9 and Iskut 6) and five Gitxsan Nation communities (Gitwangak, Gitsegukla, Gitanmaax, Glen Vowell, and Kispiox). The Skii km Lax Ha reside in the Hazelton area.

Economic Setting

Economically, the Project region has been dependent upon timber and minerals for well over 100 years. The majority of non-Aboriginal communities in the region were initially established to serve natural resource activities such as the mine operation near Cassiar, Stewart, Smithers and Bob Quinn Lake. To date, the region's economic and social diversity has been constrained by limited access and infrastructure, lengthy distances, remote and small communities which provide limited labour or services, and long winters. Investment within the region has fluctuated based on the strength of the forestry and mining industries, global commodity prices and the value of the Canadian dollar.

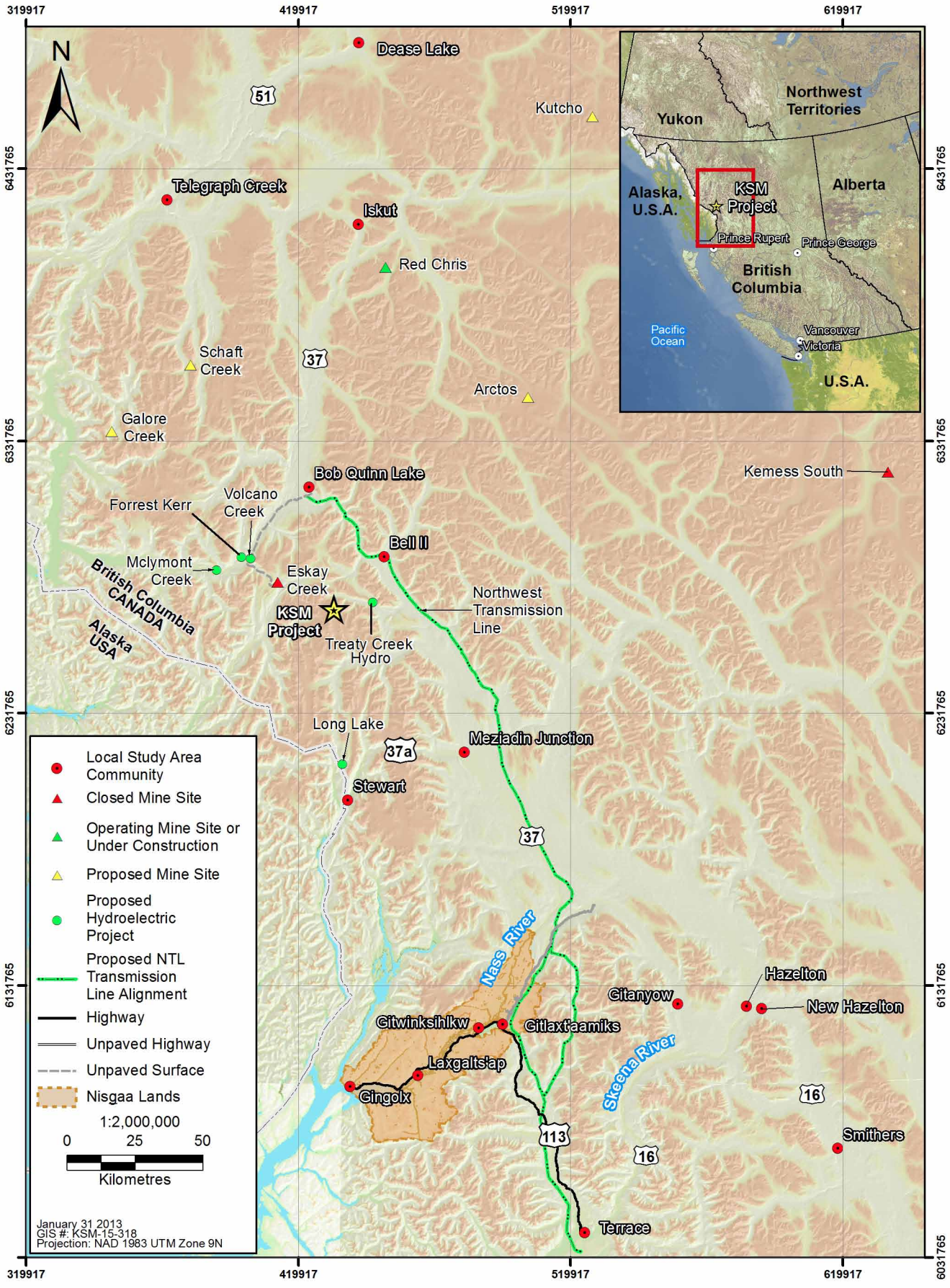

Figure 4

Social and Economic Local Study Area Communities

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Forestry, fishing, and coal mining were the key economic drivers of northwestern BC through the 1950s to the 1980s. The BC government pursued a policy of industrial resource development that historically saw rapid community growth. Within the region, this helped establish local economies and an experienced, if modest, labour force focused on natural resource extraction. Typically, the region's communities tend not to be economically diverse, so they are highly sensitivity to resource demand fluctuations. With the downturn in the forestry industry over the past 10 years, the majority of sawmills and pulp mills in the region are currently closed. Closures of mines in the area, such as Eskay Creek Mine and Golden Bear, have also affected the resource sector. Nonetheless, today, the economies of local communities continue to be largely resource-based, and continue to focus on supporting these sectors in the region.

Transportation challenges throughout northwestern BC are primarily due to the mountainous topography, which restricts development of transportation networks primarily to valley bottoms. The existing transportation network, including road, rail, and port facilities, supports an economy focused on exporting its natural resource to southern and international markets. Highway 16 and highways 37 and 37A act as the primary transportation corridors. Highway 37 is the only road between Gitwangak (Kitwanga, at the junction with Highway 16) and the Yukon Territory. All highways in the region are paved, except for small sections of Highway 37 north of Iskut and Highway 51 to Telegraph Creek. Terrace and Smithers have major airports capable of handling jets, while Stewart, Bob Quinn, Dease Lake, Iskut, and Telegraph Creek have smaller airstrips. The CNR Rail line connects the Port of Prince Rupert to the rest of North America via Prince George, running along the Highway 16 corridor through the communities of Terrace, Hazelton, New Hazelton and Smithers. Mobile cellular phone coverage is limited to the larger communities along Highway 16.

Overall, the economy in northwestern BC is gradually becoming more diversified. Newer industries that have become important to the region on recent years include energy production (including hydroelectric power generation) and tourism. In some communities, employment levels have increased in the public service, sales and service, tourism, transportation, and mineral exploration sectors. Employment sectors in local Aboriginal communities now include significant sales and service, mineral exploration, labour and government administration components. There are recent signs that the population decline may be reversing.

Today, the mining industry continues to provide an important source of employment in the region, supplying an estimated 30% of jobs for communities along Highway 37 in recent years. There is currently one operating mine in the region–the Huckleberry Mine–which produces copper, gold, silver and molybdenum, and which is expected to operate until 2021.

Social Setting

Recent economic changes have led to a general decline in the overall region's population over the past decade or more, largely due to the loss of jobs (e.g., mine closures), particularly among non-Aboriginal communities. This decline is especially evident in Stewart.

The considerable distances between communities exert a key influence on the social, economic and heritage environment of regional residents. It is common to travel two or more hours between

communities. Isolation may also be exacerbated by weather-related road closures. The larger centres of Smithers and Terrace, located in the south of the region, provide much of the region's goods and services. Transportation and communication options are limited, and long travel distances are often required to reach service centres. The sense of isolation in northern BC is further accentuated by the location of BC's major urban centres in the extreme south of the province.

Services vary considerably, depending on the size of the community, with smaller communities providing limited services and accommodations. Smithers, Terrace, and to a lesser extent Stewart, provide a broad range of services and supplies, including accommodation and support for mining and forestry activities. The number of recreation, health, social and educational services available within communities has dropped in parallel with the population. Regional hospitals are located in Terrace and Smithers, and there are well-equipped health clinics in both Dease Lake and Stewart, although existing services are contingent on stable populations. Primary and secondary education facilities exist in many communities, while educational facilities within certain Aboriginal communities do not extend beyond elementary school. Northwest Community College and Northern Lights College also offer facilities and programs for regional residents.

Aboriginal Groups

Several Aboriginal groups may be potentially affected by the Project. The PTMA is situated within the Nass Area, as defined by the NFA, but falls outside the Nass Wildlife Area (NWA), and also the Nisga'a Lands owned in fee simple by Nisga'a Nation under the terms of the NFA, which came into effect on May 11, 2000. The Tahltan First Nation (as represented by the Tahltan Central Council) asserts a claim over part of the Project footprint. Both the Gitanyow First Nation (notably wilp Wiiltsx-Txawokw) and the Gitxsan Nation (as identified by the Gitxsan Hereditary Chiefs Office), including wilp Skii km Lax Ha, which is representing itself separately in the EA process, have identified potentially affected interests within the broader region, notably downstream of the PTMA. The Skii km Lax Ha are claiming an area covering the Mine Site and PTMA.

Aboriginal people have a significant physical, cultural and historical presence within the Project region. In 2006, approximately 32% of the RDKS's population was reportedly Aboriginal. Furthermore, the populations of most of the region's smaller communities, notably those located along the north-south corridor of Highway 37 and the east-west corridor near Highway 16, are predominantly Aboriginal. The decline in the forestry and fishing industries since the 1980s has negatively impacted Aboriginal communities, as reflected by high unemployment rates. The current socio-economic setting of the region's Aboriginal communities is now in the process of evolving again due to opportunities provided by the mineral industry and tourism.

Land Use Setting

The KSM Project is located in an area of northwestern BC known as the "Golden Triangle", due to its high mineral potential and the occurrence of several gold projects in the region. For the past century, land and resource uses in the region have been largely driven by forestry, mining and mineral exploration, and this is still true today. A limited amount of commercial and non-commercial recreation also occurs in the region, including hunting, trapping, fishing, heli-skiing, hiking and camping. Key land uses and tenures in the region surrounding the Project footprint are summarized in Table 1.

Table 1. Designated Lands, Crown Tenures and Resource Uses within the Land Use Local and Regional Study Areas

Designated Lands, Crown Tenures and Resource Uses	Land and Resource Uses and Tenures
Communities, Official Community Plans, Bylaws	None.
Provincial Parks and Protected Areas	Ningunsaw Provincial Park, Ningunsaw River Ecological Reserve, Border Lake Provincial Park, and Lava Forks Provincial Park are located within or adjacent to the land use RSA.
Nass Area	The Project's PTMA and western portion of the land use RSA is located within the Nass Area. Nisga'a rights in the Nass Area are defined in the NFA.
First Nations Territories and communities	Tahltan Nation - Part of the land use RSA and LSA, including the Project's PTMA, fall within the southern portion of Tahltan traditional territory. The closest Tahltan community to the RSA is Iskut approximately 180 km to the north. Skii km Lax Ha – They claim an area that overlaps the LSA and RSA. Most members live in the Hazelton area, over 300 km southeast of the RSA. Gitxsan Nation – Traditional territory attributed to wilp Skii km Lax Ha falls within the eastern portion of the RSA and adjacent to the LSA. Most members live in the Hazelton area, approximately 230 km southeast of the RSA. Gitanyow First Nation - A small portion of its traditional territory falls within the southern edge of the RSA. The village of Gitanyow is located approximately 210 km south of the RSA.
Guide Outfitting	Three registered guide outfitting tenures partially overlap the RSA, one of which also overlaps the LSA.
Hunting	The RSA is located within three different WMUs, two of which overlap the LSA, where various species are hunted. Moose is the most desired species among resident hunters, ranging between 65 to 84 kills per year within the broader WMU areas.
Trapping	Seven trapping licences overlap the RSA, three of which also overlap the LSA. Two licence areas are owned by members of the Skii km Lax Ha. Three licence areas within the RSA have no reported trapping activity.
Commercial Recreation	Six commercial recreation licences intersect or lie within the RSA (heli-skiing, river rafting, fishing, lodging and backcountry expeditions). Five of these licences also intersect the LSA.
Forestry	The RSA falls within the Cassiar TSA and Nass TSA. Four forestry licences are located within the RSA, two of which are in the LSA and attributed or pending issuance to Seabridge Gold Inc.
Mineral	40 mineral claims and 5 placer claims are located within the LSA and RSA.
Water licences	Two water licences are located in the LSA. Eleven water licence applications are located within the RSA, including three in the LSA.
Recreation	Potential recreational activities exist within the LSA and RSA (hiking, camping, snowmobiling, and riding ATVs), although these occur on an informal and non-registered basis.
Agriculture Land Reserves	None.

(continued)

Table 1. Designated Lands, Crown Tenures and Resource Uses within the Land Use Local and Regional Study Areas (completed)

Designated Lands, Crown Tenures and Resource Uses	Land and Resource Uses and Tenures
Oil and Gas	None.
Transportation and Utilities	Highways and Roads - Highway 37 is on the eastern edge of the RSA. A small number of forest service roads are located within the RSA near Highway 37. Airports/airstrips - There are no airstrips within the RSA. Bob Quinn is the nearest airport. Electrical Transmission Lines - Once built, the Northwest Transmission Line will extend along the eastern border of the RSA. Telecommunications Sites - None.

Within the Project region, exploration projects were historically focused in areas between the mountainous Knipple Glacier and Eskay Creek areas. Placer claims are present in several areas, including in Mitchell and Sulphurets creeks. Two mineral developments have been active within the region since the 1990s, including the Eskay Creek Mine which operated between 1994 and 2008, primarily extracting silver and gold, and the Brucejack (Sulphurets) Lake underground development project, which ended in 1993. Developments associated with the former Eskay Creek Mine include an access road connecting Highway 37 to the Eskay Creek area, a mill site, and other support facilities and roads.

Limited timber harvesting has been carried out within the region, with former operation limited to areas in the Nass TSA along the Bell-Irving River and Highway 37. Timber harvesting contributed to the establishment of Meziadin Junction, with most of the harvesting activities occurring to the south of the Project area. Cut blocks within and immediately surrounding the region have been limited in scale and focused on pulpwood. Logs are transported to Stewart for shipping to overseas markets, or trucked to Terrace and Smithers.

Sections of the RSA are associated with the traditional hunting activities of local First Nations communities. Archaeological evidence suggests that pre-contact hunting activities have occurred in areas throughout the RSA. Sections along the Bell-Irving River have been used for traditional hunting and fishing, and cabins belonging to the Skii km La Ha are located within the RSA. Subsistence and resident hunting and fishing has continually occurred from the time of European contact in the region through to modern times. Resident hunting within the RSA has typically focused on moose within Wildlife Management Unit (WMU) 6-21, and on black bear and grizzly bear within WMU 6-16 and 6-17.

Trapping for fur-bearing animals has also historically influenced land use within the RSA, with both Aboriginal and non-Aboriginal trappers. Cabins associated with trapping activities are located along the Unuk and Bell-Irving River valleys, and are also used for hunting and fishing purposes. Registered traplines have records dating back to 1985, though the areas were potentially used before that time. Three traplines in the area are held by Aboriginal trappers. Areas near Treaty and Snowbank creeks have also been used for guide outfitting and angling operation.

Recreation, both commercial and private, such as guided mountaineering, guided river rafting and heli-skiing, has occurred in various areas within the RSA. Only a limited number of commercial operators have targeted the terrain within the RSA, due to its ruggedness and remoteness. Difficult access to these areas means that encounters with other individuals is infrequent, and the sense of isolation is an important part of the experience offered to clients. Areas near the Bell-Irving River (such as the Snowslide Range and Treaty Creek) see higher use because they are easier to access from Highway 37. Additionally, the Unuk River is used for commercial rafting adventures, and is accessible from the Eskay Creek Mine road or upstream from Alaska. Recreational activities, particularly fishing and heli-skiing, have contributed to the establishment of outdoor lodges, including Bell 2 and Spey / Boundary Lodge. Such activities, however, are seasonal and of short duration, so there are no formal recreational trails, roads or other infrastructure outside of the aforementioned lodges.

Land Use Planning Context

The Project area is subject to the provisions of two land use plans - the Cassiar Iskut-Stikine Land Resource Management Plan (LRMP) and the Nass South Sustainable Resource Management Plan (SRMP).

Land management within the Cassiar Iskut-Stikine LRMP includes objectives intended to preserve the physical, aesthetic, and cultural characteristics of the region. The LRMP created 14 protected areas for which resource conservation is emphasized, and three of which are located within or adjacent to the land use RSA. Notably, the LRMP acknowledges the mineral and energy resource potential within the Plan area. Under the Plan, exploration and development of mineral deposits, as well as construction of access roads, are allowable activities, excepting within Protected Areas. One Resource Management Zone (RMZ), the Unuk River RMZ, overlaps the LSA, including portions of the Coulter Creek access road. The management goals for the Unuk River RMZ are focused on preserving grizzly bear habitat and maintaining visual quality of the terrain from the Unuk River, while allowing for adjacent logging and mineral development.

Land management goals within the Nass South SRMP were developed in partnership with NLG, the Gitanyow First Nation, stakeholders, and government agencies, with the goal of guiding development and conserving environmental and cultural resources within the southern portion of the Nass TSA. The Nass South SRMP provides guidance on permitted land uses, and addresses sustainable management issues for land, water and resources, while aiming to facilitate economic opportunities. Mineral resource activity, timber harvesting, commercial recreation and tourism, guide outfitting, hunting, fishing, trapping and cultural land uses are all allowable activities.

Economic Benefits of the Project

The Project will benefit socio-economic well-being nationally and provincially, and especially in northwestern BC. The Project will contribute to increased economic and community stability by providing well-paying jobs and helping to reduce local unemployment levels. It offers stable and reliable job and income opportunities for people living in the region, including residents of various Aboriginal and non-Aboriginal communities.

Potential economic benefits of the Project are estimated based on the economic modeling that is reported in Chapter 20 of the main submission. Highlights of the socio-economic benefits associated with the Project include the following:

- *Project life* - The Project will generate approximately 57 years of economic activity, including an estimated 5 years of construction activity and 51.5 years of operation;
- *Capital cost* - The capital cost of construction is estimated at CAD$5.3 billion over the five-year construction period, with approximately 65 percent (%) of construction expenditures being made within BC, including an estimated $230 million within northwestern BC;
- *Construction phase employment* - The 5-year construction phase will create approximately 55,000 person-years (PYs) of direct, indirect and induced employment for Canadians at the mine, with 56% of jobs taken by BC residents, including approximately 1,500 PYs (272 per year) by regional residents;
- *Operation phase employment* - During the 51.5-year operation phase, the Project will create approximately 396,000 person-years (PYs) of direct, indirect and induced employment for Canadians at the mine, with approximately 49% of jobs taken by BC residents, including approximately 22,000 PYs (423 per year) by regional residents;
- *Annual GDP contribution* – The Project-related (direct, indirect and induced) contribution to the Gross Domestic Product (GDP) during operation will average approximately CAD$809 million annually across Canada, with CAD$405 million being generated in BC, including CAD $51 million within the region;
- *Federal tax revenues* – In constant dollars, the Project will generate about CAD$732 million in federal revenues during construction, and approximately CAD$5.4 billion during operation;
- *Provincial tax revenues* - In constant dollars, the Project will generate about CAD$183 million in tax revenues (direct, indirect, and induced) to the Province of BC during construction, and approximately CAD$1.3 billion during operation (mainly from income tax and sales tax), as well as an estimated additional average of CAD$39.2 million annually (for a total of approximately CAD$2.35 billion) in BC mineral tax, paid directly by the Proponent over the life of the mine; and
- *Local government tax revenues* - Regional taxes will amount to an average of approximately CAD$1.55 million per year (for a total of approximately CAD$85.0 million) paid directly by the Proponent over the life of the mine.

During construction and operation, skills training and on-the-job experience will provide important local and regional benefits, given that there is an anticipated regional shortage of the required skills for Project-related employment. The local and regional workforce skills profile is expected to increase as the Project proceeds, and this will provide an ongoing benefit after mining activity has ceased, helping local and regional workers to obtain other employment. In addition, workers employed directly by the Project during construction and operation can expect higher-than-average incomes.

The Environmental Assessment Process

The Project is subject to the BC *Environmental Assessment Act* , the *Canadian Environmental Assessment Act* , and Chapter 10 of the NFA. The Project entered the pre-Application stage of the BC EAA process in April 2008. It entered the CEAA process at the comprehensive study level of assessment in July 2009.

British Columbia Environmental Assessment Process

Under the BC EAA process and its regulations, certain categories of larger-scale projects must undergo an EA, and an EA Certificate must be obtained, before they can proceed. The scope, procedures and methods used for each assessment are tailored to the specific circumstances of a proposed project. The EA must assess a project's potential environmental, economic, social, heritage and health effects.

Under the BC EAA Reviewable Projects Regulation , the proponent of a new mineral mine facility with a production capacity of greater than 75,000 tonnes per annum (tpa) of mineral ore must obtain an EA Certificate. The KSM Project will have an annual mill throughput of 43,800,000 tpa, which substantially exceeds this threshold. The BC EAA review is being managed by the BC EAO.

The BC EAA process has two basic stages – the pre-Application and Application review stages. With the filing of this Application / EIS, the EA of the Project is approaching the end of the pre-Application stage.

Canadian Environmental Assessment Process

The CEAA, 1992 was significantly amended in 2003 and 2010, and was entirely repealed and replaced by the CEAA, 2012 on July 6, 2012. The CEAA, 2012 dispensed with comprehensive studies, but also provided that comprehensive studies begun under the relevant provisions of the CEAA, 1992, as amended from time to time, should be completed under those provisions. Under the 2010 amendments, the lead federal agency for the comprehensive study of the Project is the CEA Agency, which assumed the role from several CEAA responsible authorities (those federal agencies that may issue approvals for the Project under the Law List Regulations). The CEAA, 2012 provides for expedited timelines to conclude the EA process for those comprehensive studies that were underway before repeal of the CEAA, 1992. For the Project, six months of federal government review time remain.

The Project became subject to the CEAA, 1992 because it may require several statutory authorizations listed in the Law List Regulations, which are presented in Table 2.

The Project is subject to a comprehensive study level of assessment under the CEAA, 1992 because the proposed daily ore mill feed, 130,000 tonnes per day (tpd), exceeds two thresholds set out in the CEAA, 1992 Comprehensive Study List Regulations—specifically, the 4,000-tpd threshold for metal mills, and the 600-tpd production threshold for gold mines. Certain dam structures proposed for the Project also exceed the 10,000,000-cubic-metres-per-annum threshold for water diversions.

Table 2. CEAA, 1992 Law List Regulations Triggers

Federal Authorization – Law List Regulations Trigger	Enabling Legislation / Agency
Dam Licence – may be required for the Water Storage Facility located at the Mine Site.	*International River Improvements Act, section 4* Environment Canada
Authorization – may be needed for the harmful alteration, disruption or destruction of fish habitat.	*Fisheries Act*, section 35(2) Fisheries and Oceans Canada
Fish Habitat Compensation Agreement – may be negotiated between the Proponent and Fisheries and Oceans Canada.	*Fisheries Act* Fisheries and Oceans Canada
Amendment of Schedule 2 of the *Fisheries Act* Metal Mining Effluent Regulations (MMER) – may be needed to place the TMF in creeks that are presently occupied.	*Fisheries Act*, section 36(5) Federal Cabinet, on advice from Fisheries and Oceans Canada and Environment Canada
Licences – may be needed for a proposed Explosives Manufacturing Facility and proposed Explosives Magazines.	*Explosives Act*, section 7(1)(a) Natural Resources Canada
Stream Crossing Authorizations – may be needed for stream crossing approvals, where the crossings could affect stream navigability.	*Navigable Waters Protection Act*, section 5.3 Transport Canada

Nisga'a Final Agreement

The NFA is a treaty concluded between Nisga'a Nation, the Government of Canada, and the Government of BC in 1999. The NFA came into effect in May of 2000 under the federal *Constitution Act* and the BC *Nisga'a Final Agreement Act* , and sets out Nisga'a rights over approximately 27,000 km^2 of land in the Nass River system and surrounding drainages (see Figure 5).

The NFA establishes three categories of lands with different specified Nisga'a interests – the Nisga'a Lands (approximately 2,000 km^2), the Nass Wildlife Area (NWA, more than 16,000 km^2), and the Nass Area (approximately 27,000 km^2), the latter incorporating the Nisga'a Lands and the NWA within it. The NFA affords title to Nisga'a Nation within the Nisga'a Lands and defines the rights of Nisga'a Nation to self-government and law making authority in this area. The NFA also specifies Nisga'a Nation rights to access and make use of natural resources in the NWA and the Nass Area.

Seabridge proposes to develop some components of the Project footprint within the Nass Area, including the Process Plant, the TMF, and the northern portion of the MTT. No Project components will physically occupy any portion of Nisga'a Lands or the NWA, both of which are located south of the potentially affected portion of the Nass Area.

The NFA makes explicit provision for Nisga'a participation in federal or provincial EAs of projects sited anywhere within the outer Nass Area boundary. Seabridge has been directed by the federal and provincial governments to ensure that it conducts its EA responsibilities for the Project in compliance with all relevant Nisga'a treaty rights, including those dealing with economic, social, cultural, and environmental interests. Chapter 10 of the NFA ("Environmental Protection and Assessment"), paragraphs 6 to 10, provide for meaningful Nisga'a participation in the EA through effective coordination, timely notice, provisioning of information and studies to Nisga'a Nation, and a clear focus on assessment of potential adverse Project effects on residents of Nisga'a Lands, the Nisga'a Lands themselves, or more generally, on Nisga'a interests as set out in the NFA.

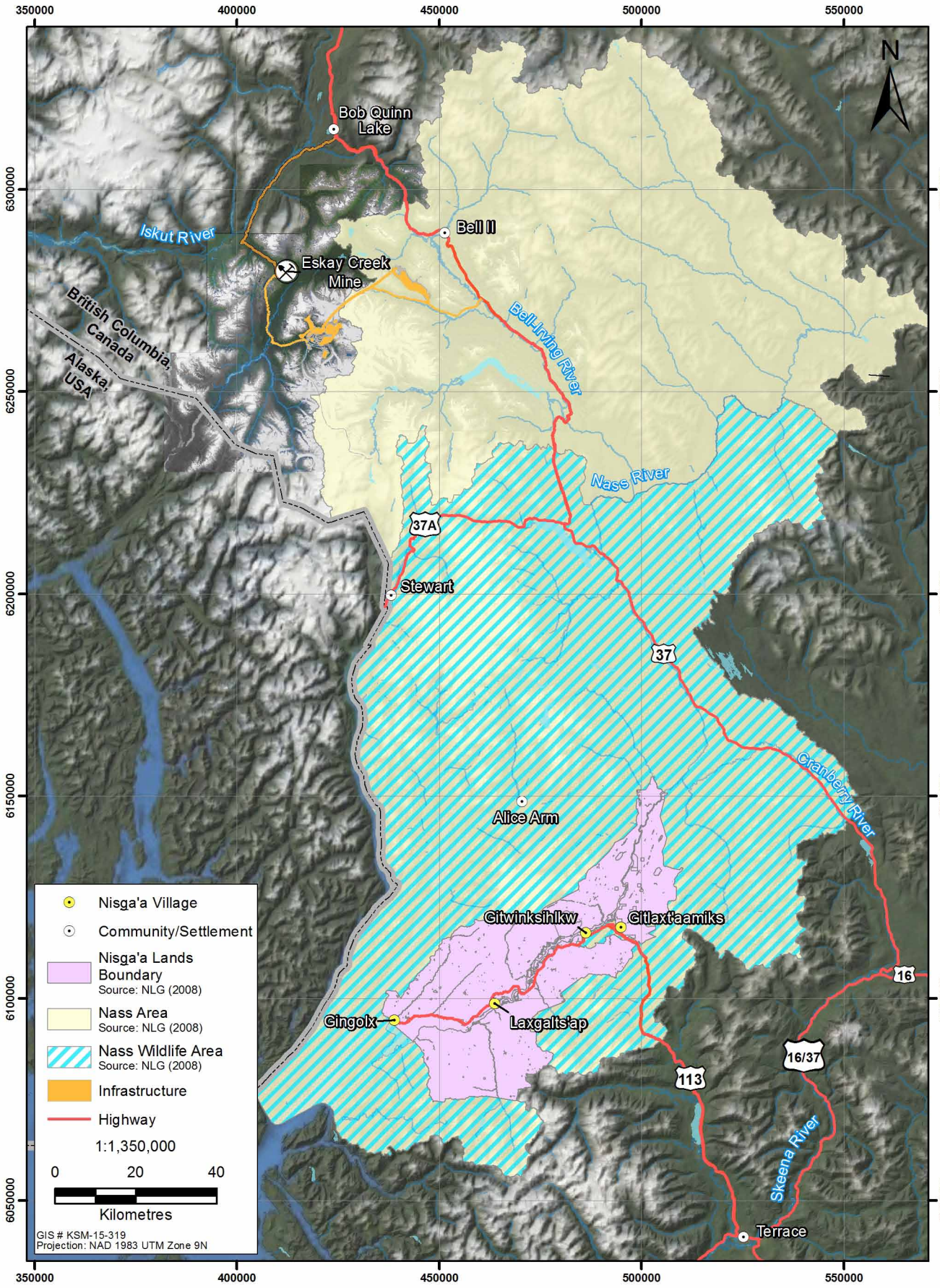

Figure 5

SEABRIDGE GOLD
KSM PROJECT

Proposed KSM Project in Relation to the Nass Area, Nass Wildlife Area, and Nisga'a Lands

Rescan
Engineers & Scientists

Cooperative Federal/Provincial EA Procedures

Canada and BC are conducting a joint EA of the Project under the March 2004 *Canada-British Columbia Agreement on Environmental Assessment Cooperation* (EA Cooperation Agreement). The EA Cooperation Agreement preserved the respective governmental roles and responsibilities, but provided for joint public comment periods, coordinated Aboriginal consultation, use of a common set of documents that meet the requirements of both governments, and establishment of joint working groups to facilitate the review process. Typically, BC is the lead party for the EA process, and its process staging is followed. Although the 2004 EA Cooperation Agreement has now expired, both governments are continuing to coordinate EA reviews in accordance with its principles.

Joint BCEAA / CEAA reviews provide opportunities for all interested parties, including Aboriginal people, the public, stakeholders and government agencies, to identify issues and provide input. Proponents must complete technical assessments of potential environmental, social, economic, heritage and health effects of their projects. Measures must be proposed to avoid, minimize, control or compensate for potential adverse project effects. Finally, the joint EA process must consider issues and comments raised by interested parties when evaluating the significance of likely adverse effects, and when making recommendations about whether projects should proceed.

EA Process to Date – The Pre-Application Stage

The BC EAA and CEAA reviews of the Project were launched in the spring of 2008. In June 2008, the BC EAO and the CEA Agency established a working group of Aboriginal groups and key provincial, federal, local and US federal and Alaska state agencies to review discuss issues and key documentation during the EA of the Project. The current membership of the working group for the Project is shown in Table 3. Working group members also have the option to sit on various sub-working-groups set up to focus on traffic, hydrology / hydrogeology, water quality, geochemistry, fisheries, wetlands and wildlife effects.

In May 2009, Seabridge submitted a first draft of the Application Information Requirements / Environmental Impact Statement Guidelines (AIR / Comprehensive Study Scope of Assessment), setting out proposed terms of reference for the EA of the Project. In June/July of 2010, the BC EAO held a public comment on the draft AIR. They were finalized in January 2011, after taking into account public comments and working group feedback on the draft document.

In July 2009, the CEA Agency posted a Notice of Commencement on its website, announcing that the CEAA review of the Project would be conducted at the comprehensive study level of assessment. The CEA Agency established a public comment period from June 1 to June 30, 2010 to obtain comments on the proposed scope of the EA, factors to be considered, scope of those factors, and the ability of the comprehensive study process to address issues related to the Project. In November 2009, the BC EAO issued an order under section 11 of the BC EAA, prescribing the scope, procedures and methods for the provincial EA. The BC EAO subsequently issued an order under section 13 of the BC EAA (in September 2011), amending both its original Section 11 Order and, with federal concurrence, the finalized AIR / EIS, in order to address concerns raised by the wilp Wiiltsx-Txawokw of the Gitanyow First Nation with respect to the proposed scope of the EA.

Table 3. Members of the EA Working Group for the KSM Project

British Columbia Agencies	Canada Agencies
• BC Environmental Assessment Office • BC Ministry of Advanced Education and Labour Market Development • BC Ministry of Energy, Mines and Natural Gas • BC Ministry of Environment • BC Ministry of Forests, Lands and Natural Resource Operation • BC Ministry of Transportation and Infrastructure	• Canadian Environmental Assessment Agency • Canadian Wildlife Service • Environment Canada • Fisheries and Oceans Canada • Health Canada • Major Projects Management Office • Natural Resources Canada
Local Government	**US Federal and State Agencies**
• Regional District of Kitimat-Stikine • District of Stewart	• US Department of the Interior • US Department of Natural Resources • US Environmental Protection Agency • US Forest Service • US National Oceanographic and Atmospheric Administration - Fisheries Service • Alaska Department of Fish and Game • Alaska Department of Natural Resources
Aboriginal Groups	
• Nisga'a Lisims Government • Gitxsan • Skii km Lax Ha • Tahltan Heritage Resources Environmental Assessment Team • Gitanyow First Nation	

Throughout the pre-Application stage, Seabridge has consulted with the various parties to the review. Nisga'a, potentially affected First Nations, the public and stakeholder groups, and relevant local, provincial and federal government agencies. These consultations are described further in Section 3.6.

Pre-application/Pre-Submission Stage Information Distribution and Consultation

During the pre-Application/pre-submission stage, the Proponent organized information distribution and various consultation activities, as well as participating in consultation activities organized by other parties. These activities were pursued with Nisga'a Nation, potentially affected First Nations, federal, provincial and local government agencies, and the public and stakeholder groups, as summarized in the following sections.

Nisga'a Nation

For the EA process, NLG has represented Nisga'a Nation in consultations related to the Project. Information distribution and consultation activities for Nisga'a Nation undertaken by, or involving, Seabridge during the pre-Application/pre-submission stage may be summarized as follows:

- Seabridge held meetings with NLG in February 2008 to introduce the Project and meet NLG representatives;

- Seabridge provided EA process participant funding to Nisga'a within the framework of an agreement reached in October 2012;
- Seabridge participated in all meetings of the working group of Aboriginal groups and government agencies set up by the BC EAO and the CEA Agency to oversee the EA, providing responses to NLG comments on proposed studies, potential Projects effects, proposed mitigation measures and various Project-related reports;
- Seabridge responded to comments from NLG with respect to the draft AIR in 2009 and 2010, before they were finalized in January 2011;
- Seabridge arranged for a "Mining 101: Mining for Non-miners" workshop for Nisga'a Nation in 2009, and made a financial contribution to the BC Aboriginal Mine Training Association, a portion of which was made available for Nisga'a related training initiatives focused on mining;
- Seabridge employed Nisga'a citizens in baseline field studies for the Project between 2008 and 2011;
- Seabridge arranged a helicopter site visit to the Project area in which Nisga'a representatives participated in September 2011;
- Seabridge and NLG hosted community meetings in all four Nisga'a villages in June 2011;
- Seabridge participated in the Nisga'a Prosperity Forum in March 2012 in Laxgalts'ap;
- Seabridge made donations to several Nisga'a cultural and business-oriented events;
- Per Chapter 10, paragraph 8(f) of the NFA, Seabridge completed a Nisga'a Economic, Social, Cultural Impact Assessment (ESCIA), based on November 2010 NLG Guidelines and a subsequent July 2011 work plan; and
- Seabridge completed a *Nisga'a Nation Consultation and Issues Summary Report* in January 2013, summarizing Seabridge's information distribution and consultation efforts during the pre-Application stage of the EA process.

In addition to formal consultation events and activities highlighted above, there has also been ongoing communication between NLG and the Proponent since 2008.

Potentially-affected First Nations

The EAO's Section 11 and Section 13 orders require Seabridge to consult with First Nations, defined as the Tahltan Central Council (on behalf of the Tahltan Nation), the Gitanyow wilp Wiiltsx-Txawokw, wilp Malii, wilp Gamlaxyeltxw, wilp Gwaas Hlaam and wilp Gwinnu, and the wilp of the Gitxsan Nation (as identified by the Gitxsan Hereditary Chiefs), including wilp Skii km Lax Ha. Information distribution and consultation activities for these First Nations undertaken by, or involving, Seabridge during the pre-Application/pre-submission stage may be summarized as follows:

- Seabridge held meetings with First Nations in February and March of 2008 to introduce the Project and meet representatives of each First Nation;

- Seabridge participated in all meetings of the working group of Aboriginal groups and government agencies set up by the BC EAO and the CEA Agency to oversee the EA, providing responses to First Nations comments on proposed studies, potential Projects effects, proposed mitigation measures and various Project-related reports;
- Seabridge responded to comments from First Nations with respect to the draft AIR in 2009 and 2010, before they were finalized in January 2011;
- Seabridge, in 2008, provided notice of opportunities for employment of First Nations members in baseline field studies for the Project, and several First Nations members were employed between 2008 and 2011;
- Seabridge concluded EA process participant funding agreements with Tahltan Central Council, Gitanyow Hereditary Chiefs' Office (GHCO), the Gitxsan Chiefs' Office (GCO), and the Skii km Lax Ha;
- Seabridge arranged for three sessions of a "Mining 101: Mining for Non-miners" workshop for First Nations in 2010, as well as an Occupational First Aid course for Gitxsan members in 2011, and made a financial contribution to the BC Aboriginal Mine Training Association, a portion of which was made available for First Nations training initiatives focused on mining;
- Seabridge arranged for helicopter site visits to the Project area that included First Nations at various times between 2008 and 2011; and
- Seabridge completed a *First Nations Consultation and Issues Summary Report* in January 2013, summarizing Seabridge's information distribution and consultation efforts during the pre-Application/pre-submission stage of the EA process.

Canadian Federal, Provincial, and Local Government and United States Federal and Alaska State Agencies

Information distribution and consultation activities for provincial, Canadian and US government agencies undertaken by, or involving, Seabridge during the pre-Application/pre-submission stage may be summarized as follows:

- Seabridge participated in all meetings of the working group of Aboriginal groups and government agencies set up by the BC EAO and the CEA Agency to oversee the EA, providing responses to agency comments on proposed studies, potential Projects effects, proposed mitigation measures and various Project-related reports;
- Seabridge arranged helicopter site visits to the Project area for working group members, including government agencies, at various times between 2008 and 2012, as well as tours of an operating mine and a closed mine near Kamloops in 2011;
- Seabridge responded to comments from government agencies with respect to the draft AIR in 2009 and 2010, before they were finalized in January 2011; and
- Seabridge completed a *Government Agency and Local Government Consultation and Issues Summary Report* in January 2013, summarizing Seabridge's information

distribution and consultation efforts during the pre-Application/pre-submission stage of the EA process.

The Public and Stakeholders

Information distribution and consultation activities for the public and stakeholder groups undertaken by, or involving, Seabridge during the pre-Application-stage may be summarized as follows:

- Seabridge participated in open houses held by the BC EAO in Terrace, Smithers, Stewart and Dease Lake in June and July of 2010, and hosted additional Project update open houses in Smithers, Terrace and Stewart in September and October of 2012;
- Seabridge hosted an open house on the Project in Ketchikan, Alaska in October 2011;
- Seabridge advertised open houses and the public comment period on the draft AIR in various local newspapers;
- Seabridge placed copies of the draft AIR in various local libraries, and the BC EAO provided opportunities for the public and stakeholders to review and comment on the draft AIR in 2009 and 2010, before they were finalized in January 2011;
- Seabridge sent letters to a number of tenure holders in the vicinity of the Project (for registered traplines, commercial recreation tenures, guide outfitter territories, forest licences and mineral tenure holders) in September 2008 to notify them of the proposed Project, followed up by letters sent in December 2012 to advise them of the Project review status;
- Seabridge held interviews with various tenure holders between 2008 and 2012 to obtain information about the nature of the tenures and potential impacts of the Project on their business interests;
- Seabridge participated in numerous conferences and panel discussions to provide information on the Project and respond to questions and concerns;
- Seabridge has conducted several radio interviews and placed numerous advertisements, advertorials, meeting notices and articles in newspapers to provide information on the Project;
- Seabridge has made several donations to local and provincial organizations and sponsored programs in local communities as part of its community outreach efforts;
- Seabridge established an email account (community@seabridgegold.net) prior to the 2010 BC EAO open houses so that it could receive and respond to feedback from the public;
- Seabridge opened an office in Smithers in 2011 so that the public can obtain information on the Project and meet with Seabridge personnel; and
- Seabridge completed a *Public and Stakeholders Consultation and Issues Summary Report* in January 2013, summarizing Seabridge's information distribution and consultation efforts during the pre-Application/pre-submission stage of the EA process.

Pre-Application/Pre-Submission Stage Issue Identification

During the pre-Application/pre-submission stage, Nisga'a Nation, potentially-affected First Nations, Canadian federal, provincial and local government and US federal and Alaska state agencies, and the public and stakeholder groups provided comments related to the EA review process and raised concerns about the Project. They also sought clarification on the scope of the Project, the nature of baseline studies, including the geochemical program, fisheries, water quality and wildlife field studies, as well as the scope of wetland and fish habitat compensation. The implications of a change in Project ownership was also raised. All parties were interested in the economic benefits of the Project including employment, contracting and business opportunities. Nisga'a and First Nations indicated an interest in training and capacity development in order to fully realize benefits from the Project.

Issues raised by Nisga'a Nation, potentially-affected First Nations, Canadian federal, provincial and local government and US federal and Alaska state agencies, and the public and stakeholder groups included concerns about potential effects on surface water quantity and quality, groundwater quantity and quality, wildlife and wildlife habitat, fish and aquatic habitat, and air quality as well as risks associated with avalanches. There was also interest in plans for reclaiming the Mine Site, PTMA and access roads.

Nisga'a and First Nations expressed concerns about the effects of Project traffic on moose as well as potential effects on salmon-bearing watercourses due to accidents and spills.

In response to concerns raised during the pre-Application/pre-submission stage, Seabridge has made a number of changes to the design of the Project. Most of the effects will be mitigated through the implementation of environmental management plans, adherence to standards and best practices, and commitment to monitoring.

EA Process Next Steps – The Application/EIS Review Stage

The next steps in the EA process entail filing the Application / EIS with the BC EAO and the CEA Agency. These agencies, in consultation with working group members, will screen the document to ensure that it satisfies the information requirements set out in the January 2011 AIR / May 2010 Comprehensive Study Scope of Assessment. Once the submission is judged complete, and is accepted for formal detailed review, the Application/EIS review stage of the BC EAA and CEAA processes will commence.

At that point, the BC EAO will set a 180-day period within which a formal review of the Application / EIS must be completed. The BC EAO and the CEA Agency will set a joint public comment period of up to 75 days for review of the Application / EIS. During the Application Review stage, the document will be reviewed by all interested parties, review comments provided, impact concerns discussed, any necessary revisions made to the Project by Seabridge to address outstanding concerns, and reports on EA findings prepared by the BC EAO and the CEA Agency.

Seabridge will participate in public open houses and/or meetings organized by the BC EAO and CEA Agency during the public comment period to present the findings of its EA studies, and to receive further feedback on the Project and its potential effects. Seabridge will respond to the comments received and issues raised, and the responses will be considered and discussed with the working group, which will meet on an as-needed basis during the 180-day review period.

As necessary throughout the 180-day review period, the BC EAO, the CEA Agency and Seabridge will engage in ongoing consultations with Nisga'a Nation and potentially affected First Nations, discussing and attempting to resolve outstanding Aboriginal concerns.

By the end of the 180-day review period, the BC EAO will document its EA findings and recommendations in an Assessment Report, and the CEA Agency will document its EA findings and recommendations in a Comprehensive Study Report (CSR). Working group members will be provided with an opportunity to review and comment on both reports in draft form.

The BC EAO will submit its Assessment Report and recommendations to the BC Minister of Environment and the BC Minister of Energy, Mines and Natural Gas for a decision on whether or not an EA Certificate should be granted to the Project. The two Ministers will make a decision on EA certification of the Project within 45 days of the referral of the BC EAO's Assessment Report. If the Project is considered acceptable, the Ministers will issue an EA Certificate containing conditions of approval with which Seabridge must comply.

The CEA Agency will hold a public comment period and consult with Aboriginal groups on its CSR. The federal Minister of the Environment will issue an EA decision statement within 12 weeks from the close of the CSR comment period, indicating whether or not, in his / her view, the Project is likely to cause significant adverse environmental effects. If the Minister concludes that the Project is not likely to do so, responsible authorities having duties with respect to the Project under other statutes, such as adjudicating permit applications, will be authorized to carry out those duties.

Application/EIS Review Stage – Proposed Consultations

For the Application/EIS review stage, Seabridge has developed consultation plans for Nisga'a Nation, potentially affected First Nations, federal, provincial and local government agencies, and the public and stakeholder groups, as summarized in the following sections.

Nisga'a Nation

Consultation planned with Nisga'a Nation during the Application/EIS review stage is intended to meet the requirements of the BC EAO Section 11 and Section 13 orders, as well as the CEAA, 1992. During the Application/EIS review stage, Seabridge will:

- distribute copies of the Application/EIS to Nisga'a Nation for information and consultation purposes (Section 19.1 of the Section 11 Order);
- provide electronic and/or hard copies of the Application/EIS to each Nisga'a Village Government office;

- write to Nisga'a Village governments and NLG to identify dates of the BC EAO/CEA Agency public comment period on the Application / EIS, and the dates, times and locations of BC EAO and CEA Agency open houses;
- within time limits set by the BC EAO, provide a written report to Nisga'a Nation and the BC EAO and CEA Agency on the results of consultation activities with Nisga'a Nation (Section 19.5 of the Section 11 Order);
- within any time limits set by the BC EAO, consider and respond to issues that are identified in comments submitted by Nisga'a Nation during the review of the Application / EIS (Section 23.1 of the Section 11 Order);
- where requested by, and within any time limits set by, the BC EAO, provide specified additional information in relation to, or to supplement, the information provided in the Application / EIS (Section 23.2 of the Section 11 Order);
- provide, to the BC EAO and the CEA Agency, a written summary report of any agreements reached with Nisga'a Nation or a Nisga'a Village within the meaning of paragraphs 8(i) and 10 of Chapter 10 of the NFA (Section 19.6 of the Section 11 Order);
- attend working group meetings organized by the BC EAO and the CEA Agency to provide information related to the Application / EIS, and respond to questions on the Application / EIS;
- prepare a table to track issues raised by Nisga'a Nation during the Application review stage and responses to those issues;
- consider and prepare written responses to key issues raised by Nisga'a Nation during the Application review stage;
- by mutual agreement, arrange consultation meetings with Nisga'a Nation to discuss issues related to the review of the Application / EIS and, the Project (section 19.3 of the Section 11 Order);
- use these meetings to present the results of Nisga'a ESCIA report; and
- undertake further consultations with Nisga'a Nation as directed by the BC EAO (per sections 16.3 and 19.7 of the Section 11 Order) and the CEA Agency.

Based on issues and concerns raised by NLG during the Application review stage, Seabridge will consider other measures to respond to issues and concerns raised by NLG.

Potentially-affected First Nations

The proposed plan for consultation with First Nations during the Application/EIS review stage is intended to meet the requirements of the BC EAO Section 11 and Section 13 orders, as well as the CEAA 2012. During the Application review stage, Seabridge will:

- distribute copies of the Application /EIS to First Nations for information and consultation purposes (per section 20.1 of the Section 11 Order);

- write to each First Nation to identify the dates of the public comment period on the Application / EIS, and the dates, times and locations of BC EAO/CEA Agency open houses;
- within time limits set by the BC EAO and CEA Agency, provide a written report to First Nations, the BC EAO and the CEA Agency on the results of consultation activities with First Nations (per Section 20.5 of the Section 11 Order);
- within any time limits set by the BC EAO, consider and respond to issues that are identified in comments submitted by First Nations during the review of the Application / EIS (per Section 23.1 of the Section 11 Order);
- where requested by, and within any time limits set by, the BC EAO, provide specified additional information in relation to, or to supplement, the information provided in the Application / EIS (per Section 23.2 of the Section 11 Order);
- attend working group meetings organized by the BC EAO and the CEA Agency to provide information related to the Application / EIS and respond to questions on the Application / EIS;
- prepare a table that tracks issues raised by First Nations on the Application / EIS and responses to those issues;
- consider and prepare written responses to key issues raised by First Nations on the Application/EIS;
- by mutual agreement, arrange consultation meetings with First Nations to identify:
  - any specific Aboriginal interests which may be potentially affected by the Project, as identified in Aboriginal interest and use studies, traditional use studies or other sources of information; and
  - measures to avoid or mitigate potential adverse effects and/or to otherwise address or mitigate First Nations' concerns (per Section 20.4 of the Section 11 Order);
- implement additional measures for First Nations consultations and accommodations as required by the BC EAO (per Section 20.6 of the Section 11 Order); and
- undertake further consultations with First Nations as directed by the BC EAO (per sections 17.3 and 20.6 of the Section 11 Order) and the CEA Agency.

Based on issues and concerns raised by First Nations during the Application review stage, Seabridge will consider other measures to respond to issues and concerns raised by First Nations.

Canadian Federal, Provincial, and Local Government, and United States Federal and Alaska State Agencies

The proposed consultation plan with government agencies and local governments during the Application review stage is intended to meet the requirements of the Section 11 Order and CEAA 1992 requirements. During the Application/EIS review stage, Seabridge will:

- distribute copies of the Application / EIS to federal, provincial and local government agencies for information and consultation purposes (per Section 22.1 of the Section 11 Order);

- write to local governments to identify the dates of the public comment period on the Application / EIS, and the dates, times and locations of BC EAO / CEA Agency Open Houses;
- within any time limits set by the BC EAO, respond to issues that are identified in comments submitted by federal, provincial, and local government agencies during the review of the Application / EIS (per Section 23.1 of the Section 11 Order);
- where requested by, and within any time limits set by, the BC EAO, provide specified additional information in relation to, or to supplement, the information provided in the Application / EIS (per Section 23.2 of the Section 11 Order);
- attend working group meetings organized by the BC EAO and the CEA Agency to provide information related to the Application / EIS and respond to questions on the Application / EIS; and
- prepare a table that tracks issues raised by government agencies and local government on the Application / EIS and responses to those issues.

Based on issues and concerns raised by government agencies and local government during the Application review stage, and based on advice from the BC EAO, Seabridge will consider other measures to respond to issues and concerns raised by government agencies and local government.

The Public and Stakeholders

The proposed consultation plan with the public and stakeholders during the Application/EIS review stage is intended to meet the requirements of the Section 11 and 13 orders and CEAA 1992. During the Application review stage, Seabridge will:

- advertise open houses and public comment periods a minimum of seven days in advance, using local media;
- within time limits set by the BC EAO, respond to issues that are identified in comments submitted by the public during the formal public comment period for review of the Application / EIS (per Section 13.3 of the Section 11 Order);
- hold open houses in Terrace, Smithers, Stewart and Gitlaxt'aamiks (per Section 18.2 of the Section 11 Order);
- prepare a table that tracks issues raised by the public and stakeholders during the Application review stage, and responses to those issues; and
- prepare a report for the BC EAO and the CEA Agency, summarizing consultation during the Application review stage, including the views, issues and concerns raised by the public (per Section 21.3 of the Section 11 Order).

Based on issues and concerns raised the public and stakeholders during the Application/EIS review stage, and based on advice from the BC EAO and the CEA Agency, Seabridge will consider other measures to respond to issues and concerns raised by the public and stakeholders.

Valued Components

For each assessment topic, Valued Components (VCs) were selected based on stipulations in the AIR / Comprehensive Study Scope of Assessment, issues identified during pre-Application/pre-submission stage stakeholder consultations, land use interviews, information gleaned from Aboriginal consultations and information sources, and the professional judgment of the discipline specialists who are members of the KSM technical team. Each VC selected for assessment meets the following three criteria:

- There is a spatial and temporal overlap between the KSM Project and the VC, making interactions between them possible.
- There is a suitable knowledge base for the VC and / or parameters are measurable for the VC, so that Project interactions can be meaningfully characterized, and can serve as the basis for assessing the potential effects of the KSM Project.
- There is a perceived, reasonable likelihood that the VC could be affected by the KSM Project.

The VCs selected for assessment in this Application / EIS, and the potential effects considered, are listed in Table 4.

Table 4. Valued Components Selected and Potential Effects Considered

Topic (and Part / Chapter # in Main Application / EIS)	Selected Valued Component	Potential Effects Considered
Greenhouse Gas Emissions (Climate Change) (Part B, Chapter 6)	Greenhouse gases	Change in atmospheric greenhouse gas levels (as a proxy for incremental climate change effects)
Air Quality (Part B, Chapter 7)	Ambient air quality	Change in ambient air quality measured by increases in criteria air contaminants (CACs, including SO_2, NO_2, CO, TSP, PM_{10}, and $PM_{2.5}$), dust, and acid deposition rates
Terrain, Surficial Geology, and Soils (Part B, Chapter 8)	Soil quantity	Loss of soil under component footprint Loss of soil due to erosion or mass movement
	Soil quality	Soil compaction Soil contamination Loss of soil fertility
Geohazards (Part B, Chapter 9)	Terrain stability	Decreased terrain stability and subsequent effects on geohazards
Geochemistry (Part B, Chapter 10)	none	none

(continued)

Table 4. Valued Components Selected and Potential Effects Considered (continued)

Topic (and Part / Chapter # in Main Application / EIS)	Selected Valued Component	Potential Effects Considered
Groundwater Quantity (Part B, Chapter 11)	Groundwater quantity	Alteration of groundwater levels, flow rates and directions due to changes in boundary condition Alteration of groundwater levels, flow rates and directions due to changes in permeability
Groundwater Quality (Part B, Chapter 12)	Groundwater quality	Degradation of groundwater quality due to seepage of contact water Degradation of groundwater quality due to releases of controlled substances (wastes, fuels, solvents, sewage, others)
Surface Water Quantity (Part B, Chapter 13)	Stream flows within the PTMA (LSA) Stream flows within the Mine Site (LSA) Stream flows within the Bell-Irving River (RSA) Stream flows within the Unuk River (RSA)	Changes in annual flow volumes Changes in monthly flow distribution Changes in peak flows Changes in low flows
Surface Water Quality (Part B, Chapter 14)	Surface water quality	Degradation of surface water quality
Fish and Aquatic Habitat (Part B, Chapter 15)	Bull trout Dolly Varden Rainbow trout/Steelhead Pacific salmon (Coho, sockeye, Chinook) Aquatic habitat	Direct mortality Noise Erosion and sedimentation Water quality degradation Habitat loss
Wetlands (Part B, Chapter 16)	Wetland extent Wetland function	Loss of wetland extent Loss of wetland function Alteration or degradation to wetland function
Terrestrial Ecosystems (Part B, Chapter 17)	Potential pine mushroom habitat Avalanche track ecosystems Listed ecosystems Riparian and floodplain ecosystems Alpine and parkland ecosystems Old forests Other terrestrial ecosystems	Vegetation loss Vegetation degradation

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Table 4. Valued Components Selected and Potential Effects Considered (continued)

Topic (and Part / Chapter # in Main Application / EIS)	Selected Valued Component	Potential Effects Considered
Wildlife and Wildlife Habitat (Part B, Chapter 18)	Moose Mountain goat Grizzly bear Black bear American marten Hoary marmot Bats Wetland birds Forest and alpine birds Raptors Western toad	Habitat loss and alteration Disruption of movement Sensory disturbance Direct mortality Indirect mortality Attractants Chemical hazards
Noise (Part B, Chapter 19)	Noise	Sleep disturbance Speech interference Complaints High annoyance Noise induced rattling Loss of wildlife habitat
Economic (Part C, Chapter 20)	Employment and income Business opportunities and economic development	Change in employment Change in income and value-added Change in business activity Change in the economy
Heritage (Part D, Chapter 21)	Archaeological sites	Disturbance of recorded archaeological sites Disturbance of unrecorded archaeological sites
Social (Part D, Chapter 22)	Community demographics and infrastructure Education, skills development, and training Community well-being	Change in employment Change in income Change in population Change in tax base Change in traffic
Land Use (Part D, Chapter 23)	Commercial recreation, guide outfitting, and trapping Recreational hunting and fishing Subsistence Traditional/heritage value of land Water Licenses Mining and mineral exploration	Restrictions on access to land and resources Change in sensory disturbances Change in the amount of resources

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Table 4. Valued Components Selected and Potential Effects Considered (completed)

Topic (and Part / Chapter # in Main Application / EIS)	Selected Valued Component	Potential Effects Considered
Land Use (Part D, Chapter 23; *cont'd*)	Navigable Waters	Potential effects on safe navigation and access restrictions
Visual and Aesthetic Resources (Part D, Chapter 24)	Visual quality for river rafting tours Visual quality for heli-skiing tours Visual quality for guided backcountry expeditions Visual quality for angling trips Visual quality for visitors to the Treaty Creek Site Visual quality for Highway 37 users	Alteration of visual quality
Human Health (Part D, Chapter 25)	Health effects from surface water quality Health effects from air quality Health effects from the consumption of country foods Health effects from noise	Health effects due to changes in surface water quality Health effects due to changes in ambient air quality Health effects from the consumption of country foods Health effects from noise

Key Potential Effects and Proposed Mitigation Measures

Key Project Changes

Advice and feedback received to date from various participants in the EA process, including Nisga'a Nation, First Nations, government agencies and the public, have provided key guidance in improving the Project proposal (Table 5).

Despite Project planning efforts to avoid adverse effects, several key issues emerged during the course of the Project EA, and these issues are briefly summarized below:

- assessment of TMF alternatives;
- terrain instability associated with the risks of geohazards to the Project;
- potential effects on groundwater quantity;
- potential effects on surface water quality;
- potential effects on fish and aquatic habitat;
- potential effects on wetlands;
- potential effects on mountain goats;
- potential effects on moose; and
- traffic management issues.

Alternatives Assessment for Tailing Management Facility

Where it is proposed that a fish-bearing water body be designated as a tailing impoundment area (TIA), as is the case for the KSM Project, a regulatory amendment to Schedule 2 of the *Metal Mining Effluent Regulation* is required. As outlined in the 2011 *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (the *Guidelines*), published by Environment Canada, an alternatives assessment is required to identify the best location for the TIA, which, for the Project, is referred to as the Tailing Management Facility (TMF). The guidelines prescribe the process to be followed for identifying, assessing, evaluating, ranking and selecting the best of the available options, following a Multiple Accounts Analysis approach.

To address potential environmental, technical, Aboriginal and other social concerns regarding TMF technologies and location, the Proponent was proactive in initiating a tailing management assessment two years prior to submitting this Application / EIS. Often, a TIA assessment is conducted only after EA approval has been granted. The intent of this early action from the Proponent was to ensure that the siting of the TMF was established in a timely manner, with appropriate consultation that would allow for the most optimal outcome, environmentally, technically and economically.

Table 5. Key Changes to the Project Design Resulting from the Environmental Assessment Planning Process

Re-designed Project Component	EA Benefits	Description
Adopting a different access road corridor from Highway 37 to the PTMA	Prevention or reduction of environmental effects Protection of treaty and non-treaty interests	During the EA process, Nisga'a and First Nations identified concerns related to wildlife, fish and fish habitat, and wetlands. Seabridge committed to minimizing environmental effects by ensuring that facilities were located in previously logged areas along Treaty Creek, and adopted a different access road corridor between Highway 37 and the PTMA, following the Treaty Creek Valley rather than the Teigen Creek Valley. Access options were examined in detail during the assessment of alternatives for the KSM Project TMF. Results showed a net environmental benefit by moving the access road corridor out of the Teigen Creek Valley and into the Treaty Creek Valley. <u>Fish Habitat</u> • Number of road crossings affecting fish-bearing streams a) Teigen Creek Valley - **24** crossings b) Treaty Creek Valley - **13** crossings <u>Fish</u> • Number of fish species affected a) Teigen Creek Valley – **8** species (Dolly Varden, Rainbow Trout, Coastal Cutthroat trout, bull trout, Chinook salmon, sockeye salmon, and whitefish) b) Treaty Creek Valley – **1** species (Dolly Varden) <u>Wildlife Habitat</u> • Area of affected mountain goat habitat a) Teigen Creek Valley - **279** ha b) Treaty Creek Valley - **97** ha <u>Western Toad Habitat</u> • Number of potential breeding ponds affected a) Teigen Creek Valley - > **30** b) Treaty Creek Valley – **7** <u>Wetlands</u> • Area of wetland affected a) Teigen – 42.6 ha b) Treaty – 22.6 ha <u>Heritage</u> Effects on 11 archaeological sites have been avoided by changing the access road to follow the Treaty Creek Valley

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Table 5. Key Changes to the Project Design Resulting from the Environmental Assessment Planning Process (continued)

Re-designed Project Component	EA Benefits	Description
Elimination of the Sulphurets Rock Storage Facility (RSF)	Prevention or reduction of environmental impacts Reduction in Project costs Protection of Aboriginal interests Protection of public health and safety	The temporary Sulphurets RSF was initially proposed as a short-term option to store 107 Mt of not PAG material from the Sulphurets Pit. Between Years 21 and 30 of the operation phase, the material was scheduled to be re-handled, and placed in the Mitchell RSF. Material was to be placed in the Sulphurets RSF in lifts, using the bottom-up construction method, and maintaining an overall slope angle of 26°. During working group discussions in 2012, Seabridge was informed by the Ministry of Energy, Mines and Natural Gas (MEMNG) that the Sulphurets RSF would be assessed as a long-term, low-grade ore stockpile by MEMNG. Low-grade ore stockpiles without drainage containment are considered a high liability risk to the Crown. As a result, reclamation bonding required by MEMNG to reduce the liability would be very high. The Project was redesigned to eliminate the temporary Sulphurets RSF, and it has been removed from the Project production schedule. From Years -2 to 6, 167 Mt of quarried not-PAG rock from the Sulphurets Pit will be used as construction material to build the haul road from the Sulphurets Pit to the Truck Shop, and to construct the WSD. Benefits of this redesign include: • Cost-savings of CAN$198.1 M in reduced re-handling costs during Years 21 – 30 • Reduced metals loading to Sulphurets Creek, achieved by removing a potential source of ARD from the Sulphurets RSF
Choice of mining method (open pit vs. underground)	Prevention or reduction of environmental effects Protection of treaty and non-treaty interests Incorporation technological innovations	<u>Mitchell Deposit</u> The Mitchell Pit mine plan was initially based entirely on open pit mining methods. Through the EA process, concerns were expressed regarding the height of the Mitchell Pit highwall and the amount of waste rock material that would be generated. The mine production schedule was amended to introduce underground block cave mining in the Mitchell deposit in Year 25. Environmental improvements achieved: • 30.5% reduction in height of Mitchell Pit highwall (decrease from 1,815 m to 1,260 m) • 21% reduction in Mitchell Pit waste rock volumes (decrease from 1,935 Mt to 1,519 M) <u>Iron Cap Deposit</u> The Iron Cap Deposit mine plan was initially based entirely on open pit mining methods. The design was modified to develop the Iron Cap Deposit underground. Environmental improvements that resulted are: • 99% reduction in waste rock (639 Mt)

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Table 5. Key Changes to the Project Design Resulting from the Environmental Assessment Planning Process (continued)

Re-designed Project Component	EA Benefits	Description
Cyanide disposal into the TMF	Incorporation technological innovations Prevention or reduction of environmental effects Protection of treaty and non-treaty interests	With an average ore production of 130,000 tpd through the Process Plant, 90% of rougher tailing (not-PAG) and 10% of pyritic PAG tailing are generated. Although the Treaty Process Plant has a cyanide recovery plant in the gold circuit, it was originally intended that a marginal amount of cyanide would be discharged to the North and South cells of the TMF. During the EA process, and on the advice of Seabridge's Independent Technical Review committee, the following design changes were made: • construction of a CIL central cell in the TMF to meet the International Cyanide Management Code and reduce leachate seepage
Backfill of Kerr Pit waste rock into mined-out Sulphurets pit	Prevention or reduction of environmental effects Technological innovations Protection of Aboriginal interests Increases in scientific knowledge	ML/ARD analyses and pit block modeling, combined with water quality modeling, identified Kerr waste rock as higher in selenium (Se) than other deposits. The crushing of the Kerr Pit waste rock (required to transport waste rock over the rope conveyor to the Sulphurets RSF), was predicted to increase Se concentrations in the WSF. The EA working group recommended that Kerr Pit waste rock be backfilled into the mined out Sulphurets Pit to reduce Se loading to the WSF. <u>Backfilled Sulphurets Pit</u> • liners will be installed on the top and on the benches of the backfilled Sulphurets pit to reduce infiltration of runoff • drainage from the Sulphurets Pit will be collected and directed to a selenium treatment plant
Selenium ion-exchange water treatment plant	Prevention or reduction of environmental effects Technological innovations Protection of Aboriginal interests Increased in scientific knowledge	Seabridge is committed to meeting receiving environment water quality guidelines in BC and Alaska. Naturally elevated concentrations of Se are higher than guideline values in the Sulphurets watershed, and initial predictive water quality modeling results showed that Se guidelines would be exceeded during Project operation, particularly between Years 35 and 45. The EA working group identified potential effects on water quality as a significant concern. The Project was re-designed to include a Se treatment plant to minimize Se loadings to the receiving environment from the Project.

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Table 5. Key Changes to the Project Design Resulting from the Environmental Assessment Planning Process (completed)

Re-designed Project Component	EA Benefits	Description
Saddle portal	Prevention or reduction of environmental impacts Protection of treaty and non-treaty interests	The 23 km long, MTT tunnels are planned with a Saddle portal at approximately km 16, at a point where the MTT passes close to the surface. The preliminary design for the Saddle portal included a 120 m cut-and-cover construction approach, entailing significant surface disturbance, a permanent stream diversion and potential barriers and/or long-term impacts to wildlife at the site. The EA working group identified effects on wildlife as a key concern. The Saddle portal cut-and-cover design (1.1 ha of surface disturbance) was converted to an entirely underground facility, with only the portal remaining at surface after construction. The MTT slope was altered slightly to maintain the tunnel completely underground at the Saddle portal, and the tunnel drive stations are planned as excavated caverns underground. The only surface expression after construction will be the seasonal access portal and vent raise.
Change to the TMF discharge location	Prevention or reduction of environmental impacts Protection of treaty and non-treaty interests	Based on input from Nisga'a and First Nations, the TMF was initially designed to discharge into South Teigen Creek to avoid fisheries values in the Treaty Creek watershed. During the collection of fish and fish habitat data from 2008 to 2012, Teigen Creek was confirmed as having high salmonid values. In consultation with Nisga'a and First Nations, Seabridge revised the design of the TMF in several ways: • non-contact diversion ditches on both valley walls were re-designed to flow north into the Teigen watershed to supplement flows that are altered as a result of the TMF footprint • TMF discharge is now designed to flow south, into Treaty Creek • a discharge schedule was developed to mimic the natural hydrograph of Treaty Creek, to avoid low flow periods and ensure that receiving environment water quality targets will be met
Change to transmission line route	Prevention or reduction of environmental impacts Protection of treaty and non-treaty interests	The Project requires a 28.5 km transmission line (287 kV) to connect to the NTL. It will have a 40 m right-of-way and an additional 15 m vegetation management zone on either side. Additional select hazard tree falling may be required along steep hillsides for protection of the transmission line. The EA working group suggested that the transmission line be co-located within the existing right-of-way for the TCAR to minimize environmental effects. The Project design was revised accordingly to adopt this suggestion.

To select the most appropriate TIA, the Proponent first conducted an initial screening of all potential tailing disposal sites within a 50-by-50-km area (2,500 km^2) surrounding the Mine Site. Threshold criteria used to exclude sites that were not feasible included basic topographic, accessibility / cost and technological limitations. This screening identified fourteen potential TMF candidate alternative sites for evaluation. Further use of a fatal-flaw technical analysis eliminated all but five of these sites. However, to achieve sufficient storage for life-of-mine tailing, these options were combined for a final four alternatives:

- the Upper Treaty TMF option;
- the Scott Creek Valley TMF option, combined with the West Teigen Lake TMF option;
- the Unuk Valley TMF option, combined with West Teigen Lake TMF option; and
- the Upper Treaty Creek Valley TMF option, combined with West Teigen Lake TMF option.

A wide range of environmental, technical, social and economic criteria were applied to each of the four shortlisted alternatives to allow the alternatives to be weighted and ranked against each other. Evaluation criteria included those identified as being important to Nisga'a and First Nations during working group meetings. These criteria included downstream fisheries, groundwater quality and quantity, surface water chemistry, terrestrial habitat loss, aquatic habitat loss, water management, foundation conditions, Aboriginal interests, employment and estimated costs. Multiple sensitivity analyses were also performed, to evaluate how bias would affect the final rankings.

The outcome of the analysis was that the Upper Teigen/Treaty TMF was identified as the preferred option. It consistently had the lowest potential environmental and social impacts, as well as being the most technically feasible and safest TMF to construct, operate, close and reclaim.

The Schedule 2 Amendment to the MMER would apply to the footprint of the Upper Teigen / Treaty TMF, inclusive of the main containment dams, as well as the area between the ultimate toes of the main tailing dams and the lower toe of their respective seepage collection dams.

Potential Effects on Surface Water Quality

Elevated background concentrations of metals in surface water above freshwater aquatic life guidelines, in particular in the Sulphurets Creek drainage but also observed throughout the regional area, pose considerable management challenges to the Proponent. KSM mining activity increases the potential for metal leaching and acid rock drainage (ML/ARD) at the Mine Site by exposing sulphide rich, unweathered rock to oxidizing conditions. Considerable effort is required to manage not only the mining contact water, but also the naturally poor quality seeps in the Mine Site area (with pH levels as low as 2.2) which serve to reduce the assimilative capacity of Sulphurets and Mitchell creeks which flow into the Unuk River. An extensive water management system is required to both divert non-contact water away from the Mine Site and to collect mining contact water for storage and treatment. Additional efforts to control the potential for mining induced ML/ARD include the elimination of the Sulphurets RSF and the backfilling of the Sulphurets Pit with lined benches of selenium-rich waste rock from the Kerr Deposit. Contact

water from the mined out Sulphurets Pit will drain to a selenium ion-exchange treatment plant for selenium removal. Contact water stored in the WSF will be treated at an HDS lime water treatment plant. Discharge of treated water from the Mine Site will be staged to mimic the natural hydrograph of the receiving environment to minimize effects on water quality. Tailing disposal (after processing through the cyanide destruction and gold recovery circuit) of pyritized material (approximately 10% of the tailing volume) will be disposed of into the central Carbon-In-Leach (CIL) cell of the Tailing Management Facility (TMF), which will be fully lined to reduce the potential for seepage from the TMF into the receiving environment. The CIL liner will meet the standards of the International Cyanide Management Code. Water will be discharged from the TMF between May and October to avoid low flow periods and minimize effects on water quality.

With the incorporation of the above adaptive Project design and implementation of mitigation measures, results of predictive water quality modelling undertaken for the KSM EA show that surface water quality concentrations meet receiving environment water quality standards at a regional scale, including at the BC/Alaska border, 35 km downstream of the Mine Site. Selenium is predicted to be above water quality guidelines immediately downstream of the Mine Site in Sulphurets Creek, and extending 1.5 km downstream to UR1, a monitoring site in the Unuk River. Selenium concentrations are predicted to be below aquatic life guidelines downstream of the PTMA. While Project-specific residual effects on water quality cannot be entirely eliminated through the proposed mitigation, the overall effect on water quality was determined to be not significant (moderate). A follow-up program will be established to confirm the predictions of the EA and to ensure water treatment mitigation measures are performing effectively. No cumulative residual effects on water quality were identified.

Potential Effects on Fish and Aquatic Habitat

Fish (bull trout, Dolly Varden, rainbow trout/steelhead, Pacific salmon) and aquatic habitat VCs were assessed for a number of potential Project-related residual effects. The assessment concluded that Project activities will cause minor, not significant residual effects to fish and aquatic habitat for direct mortality, noise, erosion and sedimentation, and habitat loss and alteration. Residual effects to all fish VCs and the aquatic habitat VC for most of the potential sources or pathways of water quality degradation (ML/ARD from non-point sources, discharge from the TMF, petroleum products, blasting residues, and sewage treatment plant effluent) were also determined to be minor and not significant.

It was determined that Dolly Varden, rainbow trout/steelhead, and Pacific salmon may be affected by the discharge from the Mine Site WTP. While these fish were not found in the area immediately downstream of the WTP discharge point (i.e., Mitchell Creek and most of Sulphurets Creek), they were located in Sulphurets Creek downstream of the cascade (Dolly Varden only) and in the Unuk River (all three fish VCs). Proposed mitigation measures will substantially decrease the potential for effects to downstream fish populations. However, residual effects were identified related to the potential for toxicity due to bioaccumulation of selenium in the fish VCs (Dolly Varden, rainbow trout/steelhead, and Pacific salmon), which was assessed as not significant (moderate). Residual effects from Mine Site WTP discharge to aquatic habitat, which was considered more resilient than fish and includes organisms that are less likely to experience toxicity due to selenium, was assessed as not significant (minor). A follow-up

program will be established to confirm assessment predictions, address uncertainties related to the significance determination, and ensure that mitigation measures perform as expected.

Most of the potential residual effects to fish and aquatic habitat will be mitigated through the implementation of management plans (e.g., Erosion Control Plan, ML/ARD Management Plan, Fish and Aquatic Habitat Management Plan), adherence to standards and best practices, and a commitment to implement an Aquatic Effects Monitoring Plan. Fish Habitat and MMER Compensation Plans will be developed to offset the loss of fish habitat and because of the deposit of a deleterious substance into a natural waterbody frequented by fish; these are required to support a regulatory amendment of Schedule 2 of the Metal Mining Effluent Regulations (MMER) to list the upper tributaries of South Teigen and North Treaty Creek as a TIA.

The HADD Fish Habitat Compensation Plan will be implemented to construct replacement habitat for 5.37 ha of fish habitat lost beneath the TMF and seepage pond dams, access road crossings and transmission line crossings, as well as associated water quantity reductions in North Treaty and South Teigen creeks downstream of the TMF dams. The MMER Fish Habitat Compensation Plan will be implemented to construct replacement habitat for 8.96 ha of fish habitat lost due to the deposit of deleterious substances into the proposed TMF and seepage collection ponds. A total of 36.6 ha of habitat will be created to offset the losses associated with construction of the Project. The compensation plan focuses on creating rearing and overwintering habitat through the creation of off-channel ponds and wetlands, as well as spawning habitat for Coho salmon and Dolly Varden.

Potential Effects on Groundwater Quantity

Groundwater flow modelling has demonstrated that the KSM Project will affect groundwater quantity. Residual effects will occur due to dewatering of pits and block cave mines during operation, pit lake water level management during post-closure, and the development of artificial ponds with seepage control mechanisms (TMF and WSF). Groundwater management is planned into the long term future in the Mitchell Pit and Mitchell Block Cave Mine, Sulphurets Pit, Kerr Pit, the WSF, and the TMF. Effects resulting from these components will be permanent, with the imposition of water levels and flow patterns that diverge substantially from baseline conditions.

The significance of the residual direct Project effects on groundwater quantity is rated **not significant (moderate).** These effects will be experienced only locally, and there will be no significant off-site effects on groundwater quantity in down-gradient parent catchment basins. Moreover, while flow patterns will change around tunnels, surface water levels are not predicted to be significantly affected, nor are the aquatic or riparian habitat and aquatic species that these streams support. The Proponent's proposed TMF Management and Monitoring Plan (Section 26.4) provides for discharge from the TMF cell ponds at some point in the post-closure phase, which would allow a return to near-baseline water levels around the TMF footprint.

The planned Snowfield Project includes a pit immediately adjacent to the Mitchell Pit. Dewatering of the two adjacent pits is expected to result in interacting drawdown cones, but the cumulative effect will not be of greater magnitude than the direct Project effect, and extents will remain local to the respective pit footprints. The significance of the residual cumulative effects on groundwater

quantity is rated **not significant (moderate).** No other cumulative effects due to other past, present, or reasonably foreseeable future projects or human activities are expected.

Potential Effects on Groundwater Quality

The KSM Project will affect groundwater quality. Seepage of degraded water from mine waste disposal sites (TMF, RSF) and the WSF has been predicted to occur based on the results of groundwater modelling. This seepage would occur for the duration of the mine life, and would continue for an uncertain amount of time following end of operation. The magnitude of degradation would be high, because elevated levels of certain metals would enter the groundwater environment, resulting in exceedances of guidelines for human consumption and the protection of freshwater aquatic life.

Degradation of groundwater quality will be confined to the immediately vicinity of the footprints of the TMF and Mitchell Valley Mine components up-stream of the WSF. Mitigation measures included in infrastructure designs in these areas will prevent seepage of degraded water into the downstream environment. No exceedances of accepted provincial water quality guidelines are predicted outside of the mine footprint. No exceedances of accepted provincial water quality guidelines have been forecast outside of the Project footprint. The significance of residual direct Project effects on groundwater quality is rated **not significant (moderate).**

Residual direct Project effects on groundwater quality, associated with seepage of contact water from upstream of the WSF at the Mine Site, could interact with those of the proposed Snowfield Project, but any additive effects on groundwater quality would be hydraulically contained within the Mitchell Creek Valley upstream of the WSF, and would not affect groundwater quality in downstream off-site locations. The significance of residual cumulative effects on groundwater quality is rated **not significant (moderate).**

Potential Effects on Wetlands

Mining activities will require the alteration (69.5 ha) or loss (59 ha) of wetlands primarily in the PTMA, with a smaller amount on or near the Mine Site, resulting in effects on wetland extent and function. The loss of wetland function is closely related to the loss of wetland extent. Mitigation measures largely rely on avoiding activities in wetland areas, and ensuring a riparian area buffer zone is created around wetlands during construction and operation activities. However, where impacts cannot be avoided, the Proponent has committed to meeting Environment Canada's 'no net loss' of wetland area policy, and has developed a Wetland Compensation Plan to offset the loss of wetland extent and function. Additionally, the Proponent is committed to developing a wetland along Highway 37 near Smithers to promote wetland research and education. Implementation of the Wetland Compensation Plan and reclamation in the TMF at closure will result in an increase of 2.5 times as much wetland area in the region over the life of the Project; residual effects on wetlands associated with TMF development are considered to be a moderate, not significant effect. A follow-up program is proposed to confirm the effectiveness of the Wetland Compensation Plan in restoring wetland extent and function. The follow-up program will focus on conducting vegetation surveys, biomass and photopoint monitoring at compensation sites.

Potential Effects on Moose

Project related activities have the potential to affect moose due to habitat loss, disruption of movement corridors, and increased access leading to higher hunting pressures and vehicle-wildlife collisions. The development of the Treaty Creek access road (TCAR) and the extension of the Coulter Creek access road (CCAR) into the Project area facilitates increased human access, and may result in an increase in unregulated hunting (particularly of cows) in the Project area. Increased Project traffic may increase moose mortality from vehicle-wildlife collisions. Other Project related effects habitat loss and disruption of movement.

The population of moose in the Project area has been declining in recent years, and is now being managed according to a conservation plan introduced by NLG. In 2007, NLG conducted an aerial survey of the moose population in the Nass Wildlife Area, and determined that it had declined by 50% since 2001 (i.e. down from 1,600+ to 800+). Hunting is typically believed to be the principal cause of the declining population.

In order to ameliorate the declining moose population, NLG and BC have reduced the moose harvest by issuing conservative moose allocations to both Nisga'a citizens and resident / non-resident hunters. NLG has introduced a five-year moose conservation plan to encourage the re-establishment of the population and mitigate the impacts of commercial development.

High Aboriginal concern has surrounded Project-related impacts to moose. In particular, the Project is expected to result in increased traffic along highways 37 and 37A, and concern surrounds potential increases in vehicle-wildlife collisions along these transportation corridors. To address and evaluate these concerns, the proponent completed a traffic effects study (for further discussion, see section 5.7).

Project-related measures to control effects on ungulates, including moose, during construction and operation will include restricting access to Project access roads and only permitting traffic that is required for the Project. At closure, all non-essential roads will be deactivated, and traffic will be significantly reduced. Mitigation measures for habitat loss and disruption of movement include the partial deactivation of some mine components and partial re-vegetation during closure and post-closure. As well, infrastructure such as bridges and roads will be designed to minimize the obstruction of wildlife movement. A no-hunting prohibition will be implemented for Project staff, and all vehicles will be required to obey traffic signs so as to reduce vehicle-wildlife collisions.

While Project-specific residual effects to moose cannot be entirely eliminated through proposed mitigation, they are not expected to be significant.

The cumulative moose effects assessment was faced with uncertainty about how many other projects and activities might proceed at the same time as the KSM Project. A "Likely Development / Moderate Traffic" scenario and an "Unlikely Development / High Traffic" scenario were assessed.

For the "Likely Development Scenario," where only a few of the potential reasonably foreseeable future projects proceed, leading to only moderate increases in traffic on highways 37 and 37A, the significance of the residual effect on moose was rated not significant (moderate).

For the "Unlikely Development Scenario", where most or all reasonably foreseeable future projects proceed at the same time as the KSM Project resulting in higher traffic levels, the overall cumulative effect on moose is assessed as significant (major) for the following reasons: (1) moose numbers have already declined below their natural population level in the NWA due to hunting and / or other factors, and (2) the traffic modelling report indicates that the cumulative effect of all projects (regardless of whether or not the KSM Project proceeds) will depress survival below the population's current surplus mortality (although the KSM Project alone would not cause the moose population to decline).

This cumulative effects assessment has relatively low certainty because the likelihood that all other proposed projects would occur simultaneously is difficult to estimate, and the model structure is posited to cause it to be overly sensitive to small reductions in survival.

Potential Effects on Mountain Goats

The primary Project effects for mountain goat surround functional habitat loss through sensory disturbances and direct habitat loss through Project infrastructure. Mountain goats are generally sensitive to noise, and helicopter traffic. Mine activities such as blasting may cause them to leave otherwise suitable habitat surrounding the Project. Approximately 1150 ha of high-quality mountain goat winter habitat and 550 ha of UWR will be permanently removed or altered through Project construction.

Mitigation measures for sensory disturbance will include implementing helicopter flight plans to avoid critical mountain goat winter habitat, maintaining noise controls on vehicles including the installation and regular maintenance of mufflers, and the continued monitoring of noise. Mitigation measures for habitat loss and disruption of movement include the partial deactivation of some mine components and partial re-vegetation post-closure. Infrastructure such as bridges and roads will be designed to minimized movement obstruction. During construction and operation, access to Project access roads will be restricted to only that traffic that is required for the Project. At closure all non-essential roads will be deactivated and traffic will be greatly reduced. A no-hunting prohibition will be implemented for Project staff, and all vehicles will obey traffic signs so as to reduce vehicle-wildlife collisions.

While residual effects to mountain goat cannot be entirely eliminated through proposed mitigation, they are not expected to be significant.

Traffic Issues

Traffic-related issues and concerns have been raised in discussions on the Project since outset of the EA process and throughout the pre-Application stage. The issues that have been raised by Nisga'a Nation, First Nations, local governments and federal and provincial agency representatives include:

- concern about the potential increase in wildlife mortality levels on Highway 37 as a result of increased traffic;
- concern about potential effects on traditional medicine plants along the haul route;
- concern about emissions generated by trucking concentrate to Stewart, and by accidents and malfunctions;
- inclusion of transportation routes in the spatial boundary for the Project;
- requests to report Project-related traffic estimates;
- concern about mortality effects on crossbills and siskins due to collisions with vehicles; and
- concern about Project traffic cargo such as acid solvents, explosives and other dangerous materials/ hazardous cargo.

A Section 13 order was issued by the BC EAO under the BCEAA on September 29, 2011, amending its earlier Section 11 order. The Section 13 order requires the Proponent to assess the potential effects arising from the transport of people, goods and materials, including, but not limited to fuel, hazardous cargos and explosives along Project access roads and Highway 37 between the proposed Project site and Highway 37's junction with Highway 16 at Kitwanga.

A Highways 37 and 37A Traffic Effects Assessment report was prepared to address the potential effects of Project-related traffic travelling on highways 37 and 37A. The study encompasses approximately 300 km of Highway 37 from the Eskay Creek Mine road junction, southeast to its junction with Highway 16 in Kitwanga, and also includes approximately 65 km of Highway 37A from Meziadin Junction to the District of Stewart. Potential risks to potentially affected VCs are characterized by: (1) their likelihood, ranging from rare to certain; and (2) their severity, ranging from negligible to catastrophic. Ratings were assigned in the study assuming the implementation of proposed mitigation measures.

In general, the study found that the potential for Project-related traffic accidents is expected to be rare. Most potential social and environmental risks associated with traffic accidents are expected to be rare and unlikely occurrences. Traffic accident effects resulting in human injury or death are characterized as possible and catastrophic, while unlikely accidents with major / moderate severity are those that involve the potential release of hazardous cargo or deleterious substances into the environment. For example, wetland function could be compromised if a hazardous cargo spill extends beyond the road surface, resulting in the deposition of deleterious substances into a wetland.

Effects resulting from normal Project traffic activities, in the absence of accidents, range in likelihood from rare to certain, with a predominant expectation of minor severity. For example, all highway transportation activities are certain to affect ambient air quality because all vehicles will use fuel. The maximum amount of fuel use will occur during operation, but, even during that phase, the contribution of air emissions is predicted to be minor. With or without accidents, there is a risk of increased wildfire incidence. While wildfire could affect rare and sensitive ecosystems and old growth forests, the potential for such wildfires is predicted to be rare.

Concern for the risk of increased moose collision mortality was expressed by Nisga'a, First Nations and other review participants. Traffic volumes on highways 37 and 37A have declined since 2000, for example, by more than 60% by 2008 at Meziadin Junction. The Project will contribute at most an additional four vehicles per hour, keeping traffic volumes below those reported in 2000. Vehicle / moose collision risk, particularly along Highway 37 from Bell II to Bell I, will be high during the winter, given the high quality habitat (currently a UWR is proposed in this area), and along migration corridors near Van Dyke Island and Cranberry Junction, and near the calving area on the Bell Irving River below Bell II. This effect may be magnified by moose using the snow-cleared road as a movement corridor during the winter, thus increasing the chances of moose collision. Even with mitigation, it is possible that vehicle / moose collisions will occur, resulting in direct mortality due to increased traffic on the highways (particularly Highway 37). Given the current declining status of the moose population in the area, the high value habitat along Highway 37, the unreliability of the Wildlife Accident Reporting System (WARS) data and the current numbers of vehicle / moose interactions, the severity of the collision mortality risk is expected to be moderate.

The Proponent's proposed Environmental Management Plans (EMPs), including its Traffic and Access Management Plan, Dangerous Goods and Hazardous Materials Management Plan, Emergency Response Plan and Spill Prevention and Emergency Response Plan, have been developed to minimize Project-related traffic accidents, and to ensure that appropriate and timely measures are taken in the unlikely event that an accident occurs.

Potential Effects of Geohazards on the Project

The Project is situated in a highly geohazard-prone area where it could be affected by geohazards and could, in turn, affect them. A total of 2,352.5 ha in the vicinity of Project components are associated with terrain stability class (TSC) IV terrain, and 1,422.9 ha, with TSC V terrain. Potential geohazards originating in various areas within, and adjacent to, the Project footprint may affect, or be affected by, a wide range of Project components. Most Project components are associated with some degree of geohazard, including, but not limited to, the TMF, the CCAR, all of the open pits, the McTagg Diversion Tunnels (MTDT), the Mitchell Diversion Tunnels (MDT), the WSF, the Mitchell RSF, the TCAR, the Treaty Creek spur road, various camps, and the Mitchell-Treaty Saddle Area (MTSA). A risk assessment, rather than effects assessment, for potential Project effects on terrain stability was conducted for components that may interact with existing geohazards.

Proposed mitigation measures to reduce risks associated with geohazard scenarios included proactive design strategies (e.g. locating infrastructure to avoid geohazards, timing of activity, and the use of appropriate construction techniques), as well as detailed mitigation and construction planning prior to construction, and effective maintenance, once in place. These strategies will reduce the overall risk of triggering geohazards by reducing:

- the probability of the geohazard occurring;
- geohazard magnitude (e.g., volume, peak discharge);
- geohazard intensity (e.g. run-out distance, velocity or impact forces);

- the spatial probability of impact (the likelihood that the geohazard will reach or impact the Project component at risk);
- the temporal probability of impact (likelihood of workers being present in the zone subject to the hazard); and
- vulnerability to adverse effects (the potential degree of loss to a given element at risk within the area affected by a geohazard).

Given the high terrain instability in the Project area, combined with the potential for high consequences if a geohazard event occurs (e.g. human fatalities), the Proponent will continue to monitor and mitigate for geohazard risk in the Project area. The proposed risk reduction options for particular sites will vary according to operational requirements. For example, measures described for the Mitchell OPC take account of the need for uninterrupted operation, whereas strategies for access roads may tolerate temporary closures for active avalanche control. In other cases, strategies include mine planning adjustments, such as consideration of the Snowfield landslide in staging the excavation of the Mitchell Pit.

Other examples of component-specific design measures include the following:

- the Explosives Manufacturing Facility, once planned for a location in the vicinity of the Ted Morris landslide, was moved upstream of Mitchell Creek in order to avoid interactions with that geohazard;
- the WSD was relocated in order to avoid the effects of local avalanches;
- foundations of the Mitchell RSF will be strengthened through slope buttressing in the Mitchell Creek Valley;
- in that same area, the Snowfields landslide will be removed during years one through seven to ensure the safety of Project personnel and to eliminate the potential impact to operation;
- the efficiencies of the diversion ditches around the WSF have been lowered and the storage capacity of the WSF itself increased in order to mitigate for terrain instability on the west side of the McTagg Creek Valley; and
- the portal entrances for the MTDT and the MTT have been designed to avoid the effects of avalanches.

Implementation of standard Best Management Practices (BMPs) will be the primary strategy for achieving erosion and sediment control. Practices for grading, site contouring, and the maintenance of slope length and gradient parameters, based upon the universal soil loss equation (USLE) guidelines developed by the BC Ministry of Forests (BC MOF), will reduce wind and water erosion of stockpiled soil materials.

With these measures implemented, the risk associated with potential geohazard scenarios will be reduced to an acceptable level, and the Project itself is not expected to have residual effects on geohazards. A follow-up program for geohazards is proposed.

Significant Residual Effects

There are two identified **significant (major)** adverse residual effects that could potentially occur as a result of the Project. Both of these effects are associated with one of two scenarios developed for the significance determination to address uncertainty regarding future development in the Project region. The Project may have adverse residual effects on moose as a result that may be cumulatively significant, contingent on unlikely case where all planned projects proceed as planned (Table 6). The Project is also predicted to have adverse residual effects on community well-being relating to traffic emissions in Stewart, which may be cumulatively significant. The Project is also predicted to have a **beneficial significant (major)** residual employment and income effect (Table 7); this effect is also contingent on proposed projects in northwest BC proceeding to development.

Table 6. Significant Adverse Residual Project Effects

VC	Residual Effect	Project Components	Timing of Effect
Moose – for Unlikely Development Scenario with high traffic and associated wildlife collisions	Cumulative: overall residual effect - significant	Cumulative increases in traffic along highways in combination with other effects	Operation
Community Well-being– for Unlikely Development Scenario with high vehicle emissions	Cumulative: increase in emissions and vehicle accidents in Stewart - significant	Highway 37 and 37A (Stewart only)	Operation

Table 7. Significant Beneficial Residual Project Effects

VC	Residual Effect
Employment and Income	Cumulative: beneficial effects on direct, indirect, and induced employment, including employment of LSA residents in Aboriginal and non-Aboriginal communities – significant (major)
Employment and Income	Cumulative: beneficial effects on direct, indirect, and induced personal incomes, GDP and government tax revenues, including income to LSA residents in Aboriginal and non-Aboriginal communities – significant (major)

Moose

Project effects on wildlife VCs have been assessed for the Project, with a potential significant cumulative residual effect identified for moose related to highway vehicle collisions in the Project region, and associated mortality for the less likely of two development scenarios discussed in Chapter 18, and summarized below. The context of this potential effect on moose is that the Nass moose population has declined to between one quarter and one third of its size in

the last 12 years due to factors outside of the Project. Seabridge conducted a population viability analysis of the Nass moose population, which found that the moose population is sensitive to relatively minor changes in overall mortality, due to its current state/health. This sensitivity is partly due to the type of model used for the analysis.

Moose in the Project region are susceptible to vehicle collisions. The KSM Project traffic alone is not predicted to cause the population to decline. However, when a range of other projects, their associated cumulative traffic, and the resultant mortality were added to the modelled population, the current population size is predicted to decline under certain development and traffic scenarios. All other potential residual effects on moose associated with the KSM Project, either alone, or acting cumulatively with the effects of other projects, were generally deemed **not significant (minor),** with a couple of **not significant (moderate)** ratings, as summarized in Table 39.2-1.

The level of future industrial development along the Highway 37 corridor is uncertain. It is unlikely that all currently proposed and reasonably foreseeable future mine projects (listed in Chapter 37, Section 37.2) will be developed at the same time. To address the uncertainty, two possible future scenarios were evaluated for potential cumulative effects on moose, linked to increased mortality from traffic accidents—a "Likely Development Scenario", with one to three mining projects concurrently entering production which could lead to moderate traffic increases, and an "Unlikely Development Scenario", where most or all reasonably foreseeable future projects go ahead as planned which would lead to higher traffic and associated wildlife collisions.

When these scenarios are evaluated using the modelled population, under the Likely Development Scenario—with its associated moderate traffic effects on Highway 37—the cumulative effects on moose in the Cumulative Effects Assessment area (which includes the Nass Wildlife Area) are assessed as **not significant (moderate)**.

The Unlikely Development Scenario, in contrast, is characterized by high traffic on Highway 37 (as a result of most projects and activities proceeding as planned), and is therefore predicted to result in a **significant (major)** effect on the moose population due to increased mortality associated with vehicle collisions. This assessment has relatively low certainty because the likelihood of most or all proposed projects proceeding simultaneously is low, and the model structure is posited to cause it to be overly sensitive to small reductions in survival.

The Proponent has developed mitigation measures designed to minimize the Project's effect on moose, including restricting access to Project access roads and only permitting traffic that is required for the Project, de-activating roads once no longer required, partial deactivation of some mine components, and partial re-vegetation during the post-closure Phase. As well, infrastructure such as bridges and roads will be designed to minimize obstruction of wildlife movement. A no-hunting prohibition will be implemented for Project staff and contractors, and all vehicles will obey traffic signs so as to reduce the risk of vehicle-wildlife collisions. Monitoring relating to wildlife-vehicle interactions will also be conducted coupled with adaptive management.

The Proponent will consider participating in regional monitoring programs by contributing to regionally based monitoring initiatives where the initiatives replace proposed KSM Project-specific monitoring, and where the monitoring activities are approved by relevant provincial authorities and stakeholders.

Community Well-being Effects (Social)

As discussed in Chapter 22, the residual cumulative effects of increased traffic through the town of Stewart include the potential for an increase in emissions (e.g., noise, exhaust and dust [e.g., PM_{10}] levels) due to increased traffic volume through the town. Increased effects are predicted because several future projects propose to use the Port of Stewart for shipping product overseas. However, as outlined in Section 39.3.1, there is considerable uncertainty over the magnitude of this effect depending on what number of proposed, reasonably foreseeable projects (listed in Chapter 37, Section 37.2) will actually proceed as planned. Predictions are also uncertain, given that the design details and specific timing regarding traffic volumes through Stewart for all other future projects and activities are not well-defined.

In the unlikely development scenario where most or all of the proposed, reasonably foreseeable projects proceed at the same time as the KSM Project, the significance of the adverse residual cumulative vehicle emissions effects on community well-being in Stewart is predicted to be **significant (major).** In the likely development scenario, where one to three projects proceed as planned, the residual cumulative effect of vehicle emissions would be lessened and is anticipated to be **not significant (moderate)**.

To minimize the adverse residual effects on community well-being due to a change in traffic through Stewart, KSM Project mitigation includes compliance with WorkSafeBC's Operational Health and Safety Regulation, a Traffic and Access Management Plan and Project updates to local communities. In addition, the Greenhouse Gas Management Plan will serve to minimize vehicle emissions from the Project. Due to mitigation, anticipated residual effects on traffic safety are anticipated to be less for both scenarios than for emissions, as discussed in Section 39.4.18.

Employment and Income Effects

As discussed in Chapter 20, the Project is predicted to have a beneficial effect on direct and spin-off (indirect and induced) employment, personal income, GDP, and government tax revenues during both construction and operation. This is expected to include employment and income to LSA residents in Aboriginal and non-Aboriginal communities. Income effects of the Project, in particular, are predicted to be strongly positive, since mine-related employment yields substantially higher wages than current average earnings, both within the region and in local communities. Regional and local businesses are also expected to benefit from the selling of goods and services to workers. Predicted government tax revenue benefits consist of personal income tax, corporate profit tax (other than that of the Project), and sales tax as a result of the economic activity generated by the Project.

The significance of the residual direct Project effects on the employment and income VCs is predicted to be **not significant (moderate)** in the regional context, and in conjunction with other

present and future projects and activities—the Red Chris Mine, future mine and hydroelectric projects, and current and ongoing commercial land use activities; these employment and income benefits would be increased.

Together, these projects and activities could act cumulatively to increase employment and alter the current employment profiles in the socio-economic RSA and the LSA communities, as well as exerting a cumulative beneficial effect on direct, indirect, and induced personal incomes, GDP and government tax revenues, including income to LSA residents in Aboriginal and non-Aboriginal communities. This will, in turn, further alter the income profiles of the RSA and LSA communities by increasing wage incomes and changing the income source mix, reflecting an increase in the importance of direct mine employment and indirect supply and service business.

Significant (major) beneficial residual cumulative effects for employment and income (personal income, GDP, and government tax revenues) for the region are predicted, providing that most or all of the reasonably foreseeable projects and activities proceed at the same time as the KSM Project. The significance of the cumulative effects is driven mainly by the increase in magnitude and duration of the combined effects of all projects considered, so this outcome is uncertain. If only a few of those developments proceed simultaneously with the Project, the cumulative effect may not be significant.

Management practices, monitoring, and adaptive management will be implemented to enhance the potential beneficial Project effects on employment and income. Measures include a Labour Recruitment and Retention Strategy, a Workforce Training Strategy, and a Workforce Transition Program. The objective of the Proponent's Labour Recruitment and Retention Strategy is to maximize employment benefits within the LSA communities, the RSA, and the province as a whole. This will include a focus on the engagement of Aboriginal workers for direct employment by the Project. The objective of the Workforce Training Strategy is to maximize work experience, education, and skill levels of the regional workforce, to help meet the workforce needs of the Project. Based on the level of interest and demand indicated, the Proponent will engage Nisga'a Nation and First Nation communities in discussions on the potential development of programs specifically targeted towards the training of Aboriginal workers.

When mining operations cease, the loss of Project-related employment and income could lead to adverse economic and social effects, depending on the health of the regional economy at that time.

Follow-up Program

Under section 16(2)(c) of the CEAA, a follow-up program is required to be considered for a comprehensive study type of environmental assessment, which the KSM Project is being assessed as. The objectives of implementing a follow-up program are to:

- verify the accuracy of the conclusions of the EA of a designated project; and
- determine the effectiveness of any measures taken to mitigate the adverse effects of the Project.

A follow-up program is essential in identifying whether mitigation measures or monitoring methodologies need to be modified or adapted as the Project proceeds in order to continue to be effective and address previously unanticipated adverse environmental effects.

Follow-up programs are proposed for VCs where there is an enhanced risk of residual adverse effects. These VCS include geohazards, groundwater quantity and quality, surface water quantity, surface water quality, fish and aquatic habitat, wetlands and wildlife.

Nisga'a Nation Considerations

The Project is subject to Chapter 10 of the NFA, which requires the EA to assess whether the Project can reasonably be expected to have adverse environmental effects on residents of Nisga'a Lands, Nisga'a Lands, or Nisga'a interests set out in the NFA. Chapter 10 also requires an assessment of potential effects of the Project on the existing and future economic, social and cultural well-being of Nisga'a citizens.

Project components and activities that have the potential to impact Nisga'a treaty rights and interests include construction, operation, closure and post-closure activities related to facilities in the PTMA (TMF, Process Plant, TCAR, transmission line, eastern portal of the MTT and Saddle Area), temporary use of the Frank Mackie Glacier for winter road access, and Project traffic travelling through the Nass Area and NWA on Highway 37 and 37A.

Nisga'a treaty rights and interests potentially affected by the Project include Nisga'a treaty rights to harvest wildlife, migratory birds, and fish and aquatic plants. Under Chapter 9 the NFA (Wildlife and Migratory Birds), initial designated species include moose, grizzly bear and mountain goats. While the Project is located in the northern portion of the Nass Area, and well away from direct fish harvesting by Nisga'a citizens in the lower Nass, the TMF construction and operation has the potential to affect water quality and flows downstream of the Project.

For a detailed discussion of potential Project effects on Nisga'a treaty right and interests, see Chapter 29 of the Application / EIS (Nisga'a Interests).

During the pre-Application stage, NLG recommended options to keep all Project infrastructure in one valley outside of the Nass system. All TMF alternatives that were confined within the Sulphurets and Unuk drainages were eliminated through a fatal flaw analysis except for the Unuk Valley TMF option. However, the outcome of a follow-up multiple accounts analysis was that the Upper Teigen/Treaty TMF was preferred over the Unuk Valley/West Teigen TMF option.

NLG sought clarification on the long term risks associated with the TMF and the design of the RSFs, plans for sludge disposal during all Project phases, ML/ARD characterization, and the scope of wetland compensation. NLG raised several concerns related to water quality, including seepage from the TMF during operation, closure and post-closure, management of PAG material during access road and tunnel construction, TMF water quality, and the effects of sludge on water quality. Nisga'a expressed concerns about Project-traffic effects on moose, flocking bird species and public safety. Concerns related to wildlife included potential effects on grizzly bear, moose, migratory birds and mountain goats. With respect to fish and aquatic habitat, NLG raised concerns about the Project about the productive capacity of Teigen and North Treaty creeks.

Nisga'a potential social effects concerns included potential effects on Nisga'a village infrastructure and services if Nisga'a citizens were to return to the Nass to work in the mine. NLG expressed interest in employment and opportunities for Nisga'a businesses, as well as training and apprenticeships.

First Nations Considerations

The BC EAO's November 2009 Section 11 Order, issued pursuant to the BCEAA, specifies that the Seabridge must consult with the following First Nations groups:

- the Tahltan Central Council, (on behalf of the Tahltan Nation);
- the Gitanyow First Nation, specifically wilp Wii'litsxw–Txawokw (alternate spelling used in this report: wilp Wii'litsxw); and
- the huwilp of the Gitxsan Nation (as identified by the Gitxsan Hereditary Chiefs Office),
- the Skii km Lax Ha (considered a wilp of the Gitxsan)

A September 2011 Section 13 Order, issued by the BC EAO pursuant to the BCEAA, amended the Section 11 Order to address concerns raised by the wilp Wiiltsx-Txawokw of the Gitanyow First Nation with respect to the proposed scope of the EA.

The Tahltan Nation, Gitanyow First Nation and Gitxsan Nation regularly participated on the EA working group and have made suggestions, along with other working group members, which have resulted in changes to the Project. All of the First Nations provided comments related to the TMF alternatives assessment and expressed interest in employment, training and business opportunities. First Nations have raised a number of issues related to potential Project effects which are summarized in Chapter 30 of the Application / EIS, and briefly discussed below. A detailed discussion of potential effects on First Nations interests is provided in Chapter 30 of the Application / EIS.

Tahltan First Nation

The Project lies in the southern portion of the Tahltan traditional territory, the southern boundary of which cuts across Sulphurets and Mitchell Creeks parallel to the Unuk River and to the north of the Mine Site. The Tahltan territory then dips southwards encompassing the PTMA portion of the Project and sections of the TCAR. The main Tahltan communities of Telegraph Creek and Iskut are roughly equidistant from the Project, which lies approximately 140 km (straight line distance) to the south. Traveling north by road on Highway 37 from the turn off for the TCAR, it is approximately 181 km to Iskut, and a further 83 km to the unincorporated community of Dease Lake, where many Tahltan live, and neighboring Dease Lake IR 9. Telegraph Creek is another 108 km by road southwest from Dease Lake.

The Tahltan Nation raised concerns about potential effects of the Project on moose, mountain goats and groundhogs, as well as impacts on moose due to traffic. The Tahltan suggested that alternate access to the Project be considered, including tunnel access from the Granduc mine area. The Tahltan also suggested that Seabridge consider using a pipeline to transport concentrate to the Post of Stewart. The Tahltan raised several concerns related to ML/ARD, including effects on the Treaty and Teigen Creek drainages, effects due to access road and tunnel construction. The Tahltan sought details on water treatment facilities at the Mine Site and the PTMA.

Gitanyow First Nation

The Gitanyow First Nation traditional territory lies approximately 36 km south on Highway 37 from the turn off for the TCAR. The reserve community of Gitanyow lies to the south of the Project, along Highway 37, more than 210 km away from the entrance to the TCAR. The Gitanyow territory does not overlap with any Project components. Project traffic travelling along highways 37 and 37A passes through the Gitanyow territory.

The Gitanyow are concerned about the effects of Project traffic on moose due to vehicle collisions, on fish, aquatic habitat and wetlands due to accidents and spills, and on public safety. The Gitanyow were c concerned about the perceived unreliability of the wildlife collision mortality data stored in the BC MOTI wildlife collision data base (WARS). The Gitanyow also raised concerns related to the effects of the TMF on downstream water quality and Treaty and Teigen creek flows, and risks to water quality and fish values in Teigen and Treaty creeks, and the Bell-Irving and Nass rivers. They expressed concerns about the long-term risks associated with the TMF and effects on beavers, marmots and mountain goats. Areas identified by the Gitanyow as important for water quality habitat and fisheries values included Brown Bear Creek, Oweegee and Bowser Lakes, Bell-Irving River and Hanna Tintina watersheds.

Gitxsan Nation

Gitxsan traditional territory, for the most part, falls on the east side of the Bell-Irving River, and thus does not overlap with either the Mine Site or the PTMA. The Bell-Irving River flows through portions of the Gitxsan territory, including wilp Skii km Lax Ha, from the settlement of Bell II to its confluence with the Nass River. Gitxsan communities are about 230 km south of the entrance to the TCAR near to where Highway 37 intersects Highway 16, and clustered in the vicinity of Hazelton farther up the Skeena Valley along Highway 16.

The Gitxsan expressed concern about the proposed TMF location, and potential risks to water and fish values in Teigen and Treaty creeks, as well as the Bell-Irving and Nass rivers.

Skii km Lax Ha

The Ski km Lax Ha claim a traditional territory that encompasses the Mine Site, the CCAR, the PTMA and the TCAR, and portions of the Project's haul route along Highway 37/37A. The Skii km Lax Ha live mostly in the communities of Hazelton and New Hazelton, about 200 km (straight line distance) southeast of the PTMA and Mine Site.

The Skii km Lax Ha requested inclusion of Mehan Lake, Awiigi Lake, and Awiigi Creek in downstream, effects studies. Both Awiigii and Mehan lakes are located on the northern to eastern side of the Bell-Irving River system, and are therefore outside the direct downstream influence of the Project. The Skii km Lax ha have cabin sites located at Skowill and Spruce creeks. Skowill Creek is located to the east of the Bell-Irving River, and will not be affected by the Project. Use made of the Treaty Creek area by the Skii km Lax Ha is unknown. The Skii km Lax Ha questioned whether all Project infrastructure could be located in one valley. The Skii km Lax Ha raised concerns related to groundhogs.

Proponent's Conclusions

In its complete and submitted form, the Application / EIS represents the Proponent's mine development proposal for the KSM property. The intent of the Application / EIS is to demonstrate that mining of this property will be economically beneficial, environmentally sustainable, and will meet the Government of Canada's objectives of responsible resource development. The Project will promote economic prosperity in all regions of BC, especially northwestern BC. It will provide jobs, generate business opportunities, and produce local, provincial and federal tax revenues.

Since initiating the EA process in 2008, the Proponent has attempted to ensure—through ongoing and meaningful engagement of the working group and other EA participants—that decisions about Project layout and design have been considered in a careful and precautionary manner. The Project plan has changed to minimize potential environmental effects as a result of this engagement, and government regulatory consultation. As the EA process for the Project advances into the Application/EIS review, regulatory permitting, and construction stages, the Proponent will continue striving to maximize Project benefits and minimizing potential adverse effects. As outlined in each section of the Application / EIS, the Project will be implemented in accordance with applicable regulations, industry standards, and responsible mining practices that support sustainable development.

The Proponent will also continue to consider and, to the extent possible, address issues or concerns raised by the public, Nisga'a, First Nations, Canadian and US federal governments, and BC and Alaska State agencies throughout all phases of Project planning, review, and development. The Proponent views the integration of community and Aboriginal traditional knowledge as an important consideration during the EA planning process. Communication and cooperation with Aboriginal peoples, including Treaty Nations and First Nations, are essential in ensuring that Project effects on asserted or established Aboriginal and Treaty rights, and related interests in the Project area, are minimized to the extent possible.

The material conclusions of the Proponent's assessments of the Project-specific and cumulative residual effects of the KSM Project are summarized in Table 8. Potential effects for which no residual effects are predicted are not included in Table 8, but are described on a VC-by-VC basis in Chapters 6 through 25.

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Greenhouse Gas Emissions (Climate Change; Chapter 6)				
Greenhouse gas (GHG) emissions: change in atmospheric (GHG) levels	construction, operation (Mine Site, PTMA, MTT, Project roads, Hwy 37)	Fuel efficiency measures such as procuring newer and more fuel efficient vehicles and equipment, monitoring and audits, regular maintenance, driver and operator training; energy efficiency measures such as designing in energy saving hydro plants, building energy efficiency, monitoring through energy system audits, and installing energy management systems; minimizing land clearing and maximizing replanting activities to reduce net land use change carbon loss to atmosphere and maximize carbon sequestration. Implementation of: • Greenhouse Gas Management and Mitigation Plan	**not significant (minor)**	cumulative effects assessment not possible due to global scale, uncertainty, and complexity involved
Air Quality (Chapter 7)				
Ambient air quality: Change in ambient air quality	construction, operation (Mine Site, PTMA, MTT, Hwy 37)	Unpaved access roads will be watered; crushers and MTT will be equipped with baghouses and/or wet scrubbers; equipment will be regularly maintained; ore stockpiles will be covered and processed ore stockpiles will be enclosed Implementation of: • Air Quality Management Plan	**not significant (moderate)** for construction; **not significant (minor)** during operation	**not significant (moderate)** for construction; **not significant (minor)** during operation
Ambient air quality: overall	construction, operation (Mine Site, PTMA, MTT, Hwy 37)	see above	**not significant (minor)**	**not significant (minor)**
Terrain, Surficial Geology and Soils (Chapter 8)				
Soil quantity: permanent loss of soil under footprint, or due to mass movement or erosion	construction, operation (Mine Site, PTMA, TCAR, CCAC, and MTT)	Minimize Project footprint; reclaim disturbed areas as soon as possible Implementation of: • Soil and Overburden Management Plan • Soil Salvage and Handling Plan • Erosion Control Plan	**not significant (moderate)** for TMF; **not significant (minor)** otherwise	**not significant (moderate)**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Terrain, Surficial Geology and Soils (Chapter 8*; cont'd)*				
Soil quantity: overall	Project: construction, operation (All) cumulative: post-closure (all)	See above	**not significant (minor)**	**not significant (moderate)**
Soil quality: decreased soil fertility, compaction, or contamination in buffers surrounding components retained after closure	construction, operation (Mine Site, PTMA, TCAR, CCAC, and MTT)	control dust; restrict off-road traffic; remediate contaminated areas Implementation of: • Soil and Overburden Management Plan • Soil Salvage and Handling Plan • Soil Contamination Prevention Plan • Erosion Control Plan	**not significant (moderate)** for TMF; **not significant (minor)** otherwise	**not significant (minor)**
Soil quality: overall	Project: construction (all) cumulative: post-closure (all)	see above	**not significant (minor**)	**not significant (minor**)
Geohazards (Chapter 9)				
no residual effects for **terrain stability**	none	Implementation of: • Soil and Overburden Management Plan • Erosion Control Plan	none	none
Geochemistry (Chapter 10)				
cause-effect pathways to other VCs	none	none	none	none

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Groundwater Quantity (Chapter 11)				
Groundwater quantity: Alteration of groundwater levels and flow patterns and directions due to mine dewatering and water level management	construction (Mitchell Pit & Block-Cave Mine, Sulphurets and Kerr Pits, subsequent pit lakes); operation (Iron Cap Block-Cave Mine)	Cessation of dewatering; tunnel decommissioning; concrete liners on high-permeability sections of tunnel walls Implementation of: • TMF Monitoring and Management Plan	**not significant (moderate)** at construction; **not significant (minor)** during operation	**not significant (moderate)**
Groundwater quantity: Alteration of groundwater levels and flow patterns due to artificial reservoirs and implementation of associated seepage control curtains	construction (WSF); operation (TMF)	Tunnel decommissioning; concrete liners along high-permeability sections of tunnel Implementation of: • TMF Monitoring and Management Plan	**not significant (moderate)**	no residual cumulative effects
Overall	post-closure (All)	See above	**not significant (moderate)**	no residual cumulative effects
Groundwater Quality (Chapter 12)				
Groundwater quality: Degradation of groundwater quality due to seepage of contact water	construction (Mitchell and McTagg RSFs, WSF), operation (TMF), closure (Iron Cap Block-Cave Mine)	Low-permeability liners for TMF centre cell and select sections of tunnels; mine dewatering and water level management; seepage control mechanisms for TMF and WSF Implementation of: • ML/ARD Management Plan • Waste Storage Facility Management and Monitoring Plan • Groundwater Management Plan • TMF Monitoring and Management Plan	**not significant (moderate)**	**not significant (moderate)**
Overall	post-closure (All)	See above	**not significant (moderate)**	no cumulative residual effects

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Surface Water Quantity (Chapter 13)				
Stream flows within the PTMA (LSA): Potential increases/decreases in annual flow volumes	construction, operation, closure, post-closure (diversions and tunnels, TMF, Camps, Access Roads, Laydown Areas, OPCs, Concentrate Storage and Loadout)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions and tunnels Implementation of: • Water Management Plan	**not significant (moderate)** for diversions and tunnels and TMF; **not significant (minor)** otherwise	no cumulative residual effects
Stream flows within the PTMA (LSA): Potential sharpening/flattening of monthly flow distribution	construction, operation, closure, post-closure (diversions and tunnels, TMF, Camps, Access Roads and Laydown Areas, OPCs, Concentrate Storage and Loadout)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions and tunnels Implementation of: • Water Management Plan	**not significant (moderate)** for diversions and tunnels and TMF (construction, operation, closure); **not significant (minor)** otherwise	no cumulative residual effects
Stream flows within the PTMA (LSA): Potential increase/decrease in peak flows	construction, operation, closure, post-closure (diversions and tunnels, TMF, Camps, Access Roads, Laydown Areas, OPCs, Concentrate Storage and Loadout)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions and tunnels Implementation of: • Water Management Plan	**not significant (moderate)** for diversions and tunnels and TMF; **not significant (minor)** otherwise	no cumulative residual effects

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Surface Water Quantity (Chapter 13*; cont'd)*				
Stream flows within the PTMA (LSA): Potential increase/decrease in low flows	construction, operation, closure, post-closure (diversions and tunnels, TMF, Camps, Access Roads, Laydown Areas, OPCs, Concentrate Storage and Loadout)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions and tunnels Implementation of: • Water Management Plan	**not significant (moderate)** for diversions and tunnels and TMF; **not significant (minor)** otherwise	no cumulative residual effects
Stream flows within the PTMA (LSA): Overall effect on stream flows	post-closure (all)	see above	**not significant (moderate)**	no cumulative residual effects
Stream flows within the Mine Site (LSA): Potential increases/decreases in annual flow volumes	construction, operation, closure, post-closure (diversions and tunnels, WSF, WTP, RSFs, pits, block cave mine, camps, access roads and laydown area, Sludge Management Facilities, Mine Site avalanche control, Explosive Manufacturing Facility and Truck Shop)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions, tunnels, WSF, WTP, RSFs, pits, and block cave mines Implementation of: • Water Management Plan	**not significant (moderate)** for diversions and tunnel, WSF, WTP, RSFs, pits, and block cave mines; **not significant (minor)** otherwise	**n/a**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Surface Water Quantity (Chapter 13*; cont'd)*				
Stream flows within the Mine Site (LSA): Potential sharpening/flattening of monthly flow distribution	construction, operation, closure, post-closure (diversions and tunnels, WSF, WTP, RSFs, pits, block cave mine, camps, access roads and laydown area, Sludge Management Facilities, Mine Site avalanche Control, Explosive manufacturing Facility and Truck Shop)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions, tunnels, WSF, WTP, RSFs, pits, and block cave mines Implementation of: • Water Management Plan	**not significant (moderate)** for diversions and tunnel, WSF, WTP; **not significant (minor)** otherwise	**n/a**
Stream flows within the Mine Site (LSA): Potential increase/decrease in peak flows	construction, operation, closure, post-closure (diversions and tunnels, WSF, WTP, RSFs, pits, block cave mine, camps, access roads and laydown area, Sludge Management Facilities, Mine Site avalanche Control, Explosive manufacturing Facility and Truck Shop)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions, tunnels, WSF, WTP, RSFs, pits, and block cave mines Implementation of: • Water Management Plan	**not significant (moderate)** for diversions and tunnel, WSF, WTP, RSFs, pits, and block cave mines; **not significant (minor)** otherwise	**n/a**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Surface Water Quantity (Chapter 13*; cont'd)*				
Stream flows within the Mine Site (LSA): Potential increase/decrease in low flows	construction, operation, closure, post-closure (diversions and tunnels, WSF, WTP, RSFs, pits, block cave mine, camps, access roads and laydown area, Sludge Management Facilities, Mine Site avalanche Control, Explosive manufacturing Facility and Truck Shop)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions, tunnels, WSF, WTP, RSFs, pits, and block cave mines Implementation of: • Water Management Plan	**not significant (moderate)** for diversions and tunnel, WSF, WTP, RSFs, pits, and block cave mines; **not significant (minor)** otherwise	**n/a**
Stream flows within the Mine Site (LSA): Overall effect on stream flows	post-closure (all)	see above	**not significant (moderate)**	n/a
Stream flows within the Bell-Irving River (RSA): Potential increases/decreases in annual flow volumes	construction, operation, closure, post-closure (diversions and tunnels, TMF, Camps, Access Roads, Laydown Areas, OPCs, Concentrate Storage and Loadout)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions and tunnels Implementation of: • Water Management Plan	**not significant (minor)**	no cumulative residual effects

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Surface Water Quantity (Chapter 13*; cont'd)*				
Stream flows within the Bell-Irving River (RSA): Potential sharpening/flattening of monthly flow distribution	construction, operation, closure, post-closure (diversions and tunnels, TMF, Camps, Access Roads, Laydown Areas, OPCs, Concentrate Storage and Loadout)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions and tunnels Implementation of: • Water Management Plan	**not significant (minor)**	no cumulative residual effects
Stream flows within the Bell-Irving River (RSA): Potential increase/decrease in peak flows	construction, operation, closure, post-closure (diversions and tunnels, TMF, Camps, Access Roads, Laydown Areas, OPCs, Concentrate Storage and Loadout)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions and tunnels Implementation of: • Water Management Plan	**not significant (minor)**	no cumulative residual effects
Stream flows within the Bell-Irving River (RSA): Potential increase/decrease in low flows	construction, operation, closure, post-closure (diversions and tunnels, TMF, Camps, Access Roads, Laydown Areas, OPCs, Concentrate Storage and Loadout)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions and tunnels Implementation of: • Water Management Plan	**not significant (minor)**	no cumulative residual effects

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Surface Water Quantity (Chapter 13*; cont'd)*				
Stream flows within the Bell-Irving River (RSA): Overall effect on stream flows	post-closure (all)	See above	**not significant (minor)**	no cumulative residual effects
Stream flows within the Unuk River (RSA): Potential increases/decreases in annual flow volumes	construction, operation, closure, post-closure (diversions and tunnels, WSF, WTP, RSFs, pits, block cave mine, camps, access roads and laydown area, Sludge Management Facilities, Mine Site Avalanche Control, Explosive Manufacturing Facility and Truck Shop)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions, tunnels, WSF, WTP, RSFs, pits, and block cave mines Implementation of: • Water Management Plan	**not significant (moderate)** for diversions and tunnels, WSF and WTP at closure; **not significant (minor)** otherwise	no cumulative residual effects

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Surface Water Quantity (Chapter 13*; cont'd)*				
Stream flows within the Unuk River (RSA): Potential sharpening/flattening of monthly flow distribution	construction, operation, closure, post-closure (diversions and tunnels, WSF, WTP, RSFs, pits, block cave mine, camps, access roads and laydown area, Sludge Management Facilities, Mine Site Avalanche Control, Explosive Manufacturing Facility and Truck Shop)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions, tunnels, WSF, WTP, RSFs, pits, and block cave mines Implementation of: • Water Management Plan	**not significant (minor)**	no cumulative residual effects
Stream flows within the Unuk River (RSA): Potential increase/decrease in peak flows	construction, operation, closure, post-closure (diversions and tunnels, WSF, WTP, RSFs, pits, block cave mine, camps, access roads and laydown area, Sludge Management Facilities, Mine Site Avalanche Control, Explosive Manufacturing Facility and Truck Shop)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions, tunnels, WSF, WTP, RSFs, pits, and block cave mines Implementation of: • Water Management Plan	**not significant (moderate)** for diversions and tunnels, WSF and WTP at closure; **not significant (minor)** otherwise	no cumulative residual effects

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Surface Water Quantity (Chapter 13*; cont'd)*				
Stream flows within the Unuk River (RSA): Potential increase/decrease in low flows	construction, operation, closure, post-closure (diversions and tunnels, WSF, WTP, RSFs, pits, block cave mine, camps, access roads and laydown area, Sludge Management Facilities, Mine Site Avalanche Control, Explosive Manufacturing Facility and Truck Shop)	Management Practices: considering flow pathways and following natural hydrologic regime in design and operation of diversions, tunnels, WSF, WTP, RSFs, pits, and block cave mines Implementation of: • Water Management Plan	**not significant (moderate)** for diversions and tunnels, WSF and WTP at closure; **not significant (minor)** otherwise	no cumulative residual effects
Stream flows within the Unuk River (RSA): Overall effect on stream flows	post-closure (all)	see above	**not significant (minor)**	no cumulative residual effects
Surface Water Quality (Chapter 14)				
Surface water quality: Degradation of water quality due to sedimentation	construction, operation (All)	Implementation of: • Terrain, Surficial Geology, and Soil Management and Monitoring Plan	**not significant (minor)**	**n/a**
Surface water quality: Degradation of water quality due to TSS, ML/ARD, nitrogen loading	construction, operation, closure, post-closure (Access Corridors)	Implementation of: • Soil and Overburden Management Plan • ML/ARD Management Plan • Spill Prevention and Emergency Response	**not significant (minor)**	**n/a**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Surface Water Quality (Chapter 14*; cont'd)*				
Surface water quality: Degradation of water quality Sulphurets Creek due to elevated selenium.	operation, closure, post-closure (Mine site)	Effluent from the WSF will be treated at the WTF using the HDS process and discharge limits will be set during permitting. Drainage and run-off from the Sulphurets Pit Backfill will be treated at the Selenium Treatment Plant. Effluent discharge from the WSF will be staged to match the natural hydrograph. Seepage recovery ponds are designed to maximize capture of seepage through and below the WSD and recovered water will be pumped back to the WSF. Implementation of: • Water Management Plan • Fish and Aquatic Habitat Management Plan • ML/ARD Management Plan	**not significant (moderate)**	**n/a**
Surface water quality: Degradation of water quality in Unuk River at UR1 and UR2 due to elevated selenium.	operation, closure, post-closure (Mine site)	Effluent from the WSF will be treated at the WTF using the HDS process and discharge limits will be set during permitting. Drainage and run-off from the Sulphurets Pit Backfill will be treated at the Selenium Treatment Plant. Effluent discharge from the WSF will be staged to match the natural hydrograph. Seepage recovery ponds are designed to maximize capture of seepage through and below the WSD and recovered water will be pumped back to the WSF. Implementation of: • Water Management Plan • Fish and Aquatic Habitat Management Plan • ML/ARD Management Plan	**not significant (moderate)**	**n/a**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Surface Water Quality (Chapter 14*; cont'd)*				
Surface water quality: Degradation of water quality in Treaty watershed (North Treaty and Treaty creeks) due to nitrogen loading)	operation, closure, post-closure (TMF)	Seepage recovery ponds are designed to maximize capture of seepage through and below the North and South Dams and recovered water will be pumped back to the TMF Implementation of: • Water Management Plan • Fish and Aquatic Habitat Management Plan • ML/ARD Management Plan	**not significant (minor)**	**n/a**
Surface water quality: Degradation of water quality in Teigen watershed (South Teigen and Teigen creeks) due to nitrogen loading)	operation, closure, post-closure (TMF)	Seepage recovery ponds are designed to maximize capture of seepage through and below the North and South Dams and recovered water will be pumped back to the TMF Implementation of: • Water Management Plan • Fish and Aquatic Habitat Management Plans • ML/ARD Management Plan	**not significant (minor)**	**n/a**
Surface water quality: overall	post-closure (all)	see above	**not significant (moderate)**	**n/a**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Fish and Aquatic Habitat (Chapter 15)				
Bull trout, Dolly Varden, rainbow trout/steelhead, and Pacific salmon: direct mortality from blunt trauma and increased fishing pressures	construction, operation, closure (CCAC, TCAR, TMF)	Use of best management practices to minimize fish mortality with construction machinery; adhere to Fisheries and Oceans Canada's (DFO's) operational statements; adhere to appropriate construction operating window for instream work; site isolation; implementing no fishing policies for employees Implementation of: • Fish and Aquatic Management Plan • Fish Salvage Plan	**not significant (minor)**	**not significant (minor)**
Bull trout, Dolly Varden, rainbow trout/steelhead, and Pacific salmon: Noise causing sub-lethal effects, decreased feeding efficiency and habitat avoidance for	construction, operation (CCAC, TCAR, TMF)	Use of best management practices to minimize noise effects; adhere to DFO's operational statements; setback distances Implementation of: • Fish and Aquatic Management Plan	**not significant (minor)**	**not significant (minor)**
Bull trout, Dolly Varden, rainbow trout/steelhead, Pacific salmon, and aquatic habitat: Erosion and sedimentation causing smothering of eggs, decreased feeding efficiency, habitat avoidance, smothering of aquatic invertebrates and loss of productive habitat capacity	construction, operation, closure (CCAC, TCAR, TMF, East Catchment Diversion, Camps 11 & 12, Treaty Marshalling Yard, Hwy 37)	Adhere to DFO's operational statements; site isolation; water quality maintenance; equipment maintenance Implementation of: • Sediment and Erosion Control Plan • Fish and Aquatic Management Plan • Spill Prevention and Emergency Response Plan	**not significant (minor)**	**not significant (minor)**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Fish and Aquatic Habitat (Chapter 15*; cont'd)*				
Bull trout, Dolly Varden, rainbow trout/steelhead, Pacific salmon, and aquatic habitat: sublethal toxicity due to metal exposure from non-point sources throughout the KSM Project LSA or metals or process chemicals downstream of TMF (water quality degradation)	construction, operation, closure, post-closure (TCAR, MTT, TMF, Treaty OPC, seepage collection ponds, concentrate storage and loadout)	Use of best management practices to minimize blast residue entry to waterbodies; water quality maintenance; use of best management practices and industry water treatment standards to treat waste effluent and minimize residue entry to waterbodies Implementation of: • ML/ARD Management Plan • Fish and Aquatic Management Plan • Spill Prevention and Emergency Response Plan • Fish Salvage Plan	**not significant (minor)**	**n/a**
Dolly Varden, rainbow trout/steelhead, Pacific salmon, and aquatic habitat: toxicity due to metals or process chemical exposure downstream of the Mine Site WSF and WTP (water quality degradation)	operation, closure, post-closure (WSF, WSD, WTP, Water Treatment & Energy Recovery Area, McTagg RSF, Mitchell RSF, Mitchell OPC, Mitchell Pit, Sludge Management Facilities, Sulphurets Laydown Area, SMCT, Sulphurets Pit, Kerr Pit)	Water and sediment quality maintenance Implementation of: • ML/ARD Management Plan • Erosion Control Plan • Fish and Aquatic Habitat Management Plan	**not significant (moderate)** for fish species; **not significant (minor)** for aquatic habitat	**n/a**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Fish and Aquatic Habitat (Chapter 15*; cont'd)*				
Bull trout, Dolly Varden, rainbow trout/steelhead, Pacific salmon, and aquatic habitat: toxicity due to petroleum products or nitrogenous compounds (water quality degradation)	construction, operation, closure (Camps 3 through 12; Mine Site; PTMA; McTagg Energy Recovery Facility; TCAR; CCAC; Hwy 37; MTT; construction Access Adit)	Use of best management practices to minimize spill entry to waterbodies; adhere to DFO's operational statements; spill kits, equipment maintenance; stream setback distances; water quality maintenance; adhere to appropriate construction operating window for instream work Implementation of: • Spill Containment and Emergency Response Plan • Erosion Control Plan • Fish and Aquatic Habitat Management Plan	**not significant (minor)**	**n/a**
Aquatic habitat: eutrophication due to input of nitrogenous compounds and phosphorus (water quality degradation)	construction, operation, closure (Camps 3 through 12; Mine Site; PTMA; McTagg Energy Recovery Facility; TCAR; CCAC; Hwy 37; MTT; construction Access Adit)	Adhere to DFO's operational statements; Use of best management practices to minimize blast residue entry to waterbodies; compliance with the Municipal Wastewater Regulation and the Sewerage System Regulation; use of best management practices and industry wastewater treatment standards to treat effluent and minimize effluent entry to waterbodies; site isolation; seepage collection pond collecting run-off; water quality maintenance Implementation of: • Erosion Control Plan • Fish and Aquatic Habitat Management Plan	**not significant (minor)**	**n/a**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Fish and Aquatic Habitat (Chapter 15*; cont'd)*				
Aquatic habitat: loss and degradation of instream and associated riparian habitat (habitat loss and alteration)	construction, operation, closure (All facilities)	Use of best management practices to minimize habitat loss; utilize DFO's operational statement for transmission lines Implementation of: • Fish Habitat Compensation Plan • Fish and Aquatic Habitat Management Plan	**not significant (minor)**	**not significant (minor)**
Overall residual effect	post-closure (All)	See above	**not significant (moderate)** for Pacific salmon, rainbow trout/steelhead, Dolly Varden; **not significant (minor)** for bull trout and aquatic habitat	**not significant (moderate)** for Pacific salmon, rainbow trout/steelhead, Dolly Varden; **not significant (minor)** for bull trout and aquatic habitat
Wetlands (Chapter 16)				
Wetland extent: loss of wetland extent	construction, operation for Camp 3, Camp 7, TCAR, Treaty OPC, TMF, Sulphurets Laydown Area, Kerr Pit, and CCAC	Avoidance - Changes to Treaty OPC from 2010 Pre-feasibility study (PFS) to 2012 PFS to reduce affected wetland areas; new road alignment along Treaty Creek to reduce wetland areas crossed by access road Minimization - Establishment of riparian area buffers around all wetlands Implementation of: • Wetland Management Plan • Wetland Compensation Plan	**not significant (moderate**) for loss of wetland extent in the TMF; **not significant (minor)** otherwise	**not significant (minor)**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Wetlands (Chapter 16*; cont'd)*				
Wetland function: loss, alteration, or degradation of hydrological, ecological, habitat, and biochemical functions	construction, operation for Camp 3, Camp 7, TCAR, Treaty OPC, TMF, Sulphurets Laydown Area, Kerr Pit, and CCAC	Avoidance - Changes to Treaty OPC from 2010 PFS to 2012 PFS to reduce affected wetland areas; new road alignment along Treaty Creek to reduce wetland areas crossed by access road Minimization - Establishment of riparian area buffers around all wetlands; locate necessary construction on wetland margins to mitigate wetland fragmentation Implementation of: • Wetland Management Plan • Wetland Compensation Plan	**not significant (moderate)** for wetland function supported by the TMF; **not significant (minor)** otherwise	**not significant (minor)**
Overall residual effect	post-closure	see above		**not significant (minor)**
Terrestrial Ecosystems (Chapter 17)				
Potential pine mushroom habitat, avalanche track ecosystems, listed ecosystems, riparian and floodplain ecosystems, alpine and parkland ecosystems, old forests and other terrestrial ecosystems: vegetation loss	construction (All)	Minimize clearing to the dimensions required; preferentially retain mature and old trees; pre-construction review of mapped avalanche polygons, and mapped and known listed ecosystems, riparian ecosystems, and alpine and parkland ecosystems to assess options to minimize effects; use of low disturbance clearing methods, where feasible Implementation of: • Terrestrial Ecosystems Management and Monitoring Plans • Vegetation Clearing Management Plan	**not significant (moderate)** for avalanche track ecosystems and old forests; **not significant (minor)** otherwise	**not significant (minor)**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Terrestrial Ecosystems (Chapter 17*; cont'd)*				
Potential pine mushroom habitat, avalanche track ecosystems, listed ecosystems, riparian and floodplain ecosystems, alpine and parkland ecosystems, old forests and other terrestrial ecosystems: vegetation degradation	construction (All)	Monitor re-vegetated areas to assess success of re-vegetation and minimize related degradation; management and monitoring plans for windthrow and invasive plant species; adopt low disturbance methods within identified sensitive areas and minimize disturbance to non-target vegetation; re-vegetate short-term disturbances and clearings as soon as possible / feasible; ensure all vehicles and equipment restrict travel to designated roads and surfaces Implementation of: • Fugitive Dust Emissions Management Plan • Erosion and Control Plan • Fish and Aquatic Habitat Management Plan • Wildlife Management and Monitoring Plan • Terrestrial Ecosystems Management and Monitoring Plans	**not significant (moderate)** for avalanche track ecosystems; **not significant (minor)** otherwise	**not significant (minor)**
Overall residual effects	post-closure	See above	**not significant (moderate)** for avalanche track and old forest ecosystems; **not significant (minor)** otherwise	**not significant (moderate) for** old forest ecosystems

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Wildlife and Wildlife Habitat (Chapter 18)				
moose, mountain goat, grizzly bear, black bear, American marten, hoary marmot, raptors, wetland birds, and forest and alpine birds: habitat loss and alteration	construction (hoary marmot, mountain goat – Mine Site; others - All)	Partial deactivation of some mine components and partial revegetation post-closure; majority of TMF will be reclaimed - however, during the early years of closure phase wildlife may need to be prevented from accessing the TMF until monitoring programs indicate water quality and associated vegetation are safe; in the Mine Site, rock storage suitable for reclamation post-closure; partial reclamation of CCAR; conduct clearing outside raptor sensitive periods where active raptor nests are present and establish and adhere to buffer zones and working procedures established for working around identified active raptor nests during raptor sensitive periods; Pre-clearing surveys to identify active and non-active raptor nests. If an active nest cannot be avoided or work must be undertaken within buffer areas, a nest monitoring program would be initiated. Inactive raptor nests or nests found outside of the breeding season would be maintained or relocated, in consultation with BC MFLNRO, or the appropriate agency; avoid active wetland/forest and alpine bird nests by conducting clearing outside breeding periods or through pre-clearing surveys for bird nests in suitable habitat when clearing is required within the breeding period; if nests are found, a buffer area, free of noise and construction activity, would be established and implemented around wetland bird nests for the duration of the breeding period. Implementation of: • Wildlife Management and Monitoring Plan	**not significant (moderate)** for mountain goat; **not significant (minor)** otherwise	**not significant (moderate)** for mountain goat; **not significant (minor)** otherwise

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Wildlife and Wildlife Habitat (Chapter 18*; cont'd)*				
moose, mountain goat, grizzly bear and black bear: disruption of movement due to Project infrastructure and activities	construction (moose: TMF, TCAR; mountain goats: Mine Site; others: All)	Partial revegetation post-closure, including development of movement corridor across the valley on TMF dams; design bridges over Unuk river crossings to allow animals to move under; refuge areas along access roads will be ploughed along the road during winter; gaps in snow on roads will be created at best spacing to allow an escape for moose; partial decommissioning of roads and linear corridors; implement speed limits; road signs in areas where road traverses suitable wildlife habitats; monitor saddle area for moose movement; implement helicopter flight plan to minimize disturbance. Partial reclamation of CCAR during closure phase. Implementation of: • Wildlife Management and Monitoring Plan	**not significant (minor)**	**not significant (moderate)** for grizzly bears **not significant (minor)** otherwise

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Wildlife and Wildlife Habitat (Chapter 18*; cont'd)*				
moose, mountain goat, grizzly bear, black bear, American marten, hoary marmot, western toad: direct mortality	construction (mountain goat: controlled avalanche; western toad and American marten: PTMA, CCAR, TCAR; hoary marmot: Mine Site; moose, black bear, and grizzly bear: TCAR, CCAR)	Prevent the seeding or planting of attractive vegetation near roads; maintain ROW clearing; speed limits implemented and monitored; road signs warning of moose along road; additional precautions taken during wildlife high activity hours; monitoring and adaptive management of wildlife-vehicle interactions; partial reclamation of CCAR post-closure; an avalanche hazard plan will be produced in consultation with the BC MFLNRO, or the applicable government agency, to minimize the effects of avalanche control on mountain goat; clearing outside of the denning or breeding period/season or if this is not possible, pre-clearing surveys of habitat; Implementation of design features to reduce the risk of collisions and electrocutions with the transmission line, including increasing visibility of the line; prevent raptor nesting on posts; monitoring for effects and adaptive management where areas with a higher incidence of bird strikes are identified; during operation, appropriate protection for toads will be provided to minimize collisions with vehicles, which may include toad tunnels or other effective mitigation. Implementation of: • Wildlife Management and Monitoring Plan	**not significant (minor)**	**not significant (minor)**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Wildlife and Wildlife Habitat (Chapter 18*; cont'd)*				
black bear, grizzly bears: attraction to camps and processing facilities due to odours (black bear, grizzly bear) (attractants)	construction (camps, Project roads)	Minimize the use of roadside salts for winter road management; mitigation along KSM access roads will include creating breaks in snow banks along ploughed Project access roads; eliminate attractive odours by incinerating appropriate garbage items and properly storing items that cannot be incinerated; enforce proper waste disposal procedures for all employees and contractors. Implementation of: • Wildlife Management and Monitoring Plan	**not significant (minor)**	**not significant (minor)**
mountain goats: "functional habitat loss" from sensory disturbance, where noise and light sources would interrupt movements, habitat selection, and behaviour	construction (Mine Site)	Noise: Noise specifications will be considered when selecting equipment to purchase; vehicles will be maintained regularly; speed limits will be imposed; mufflers will be installed on vehicles and maintained; noise dampening measures will be applied where possible; helicopter flight paths will be followed to minimize disturbance; noise will be monitored periodically at various human and wildlife receptor locations; goat response to noise may be monitored if they occupy habitat near the Mine Site Lights: Use of directed/focused lighting rather than broad area lighting and by shielding lights to minimize stray light; lighting in non-essential areas will be regulated to permit use only when necessary Implementation of: • Wildlife Management and Monitoring Plan	**not significant (moderate)**	**not significant (moderate)**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Wildlife and Wildlife Habitat (Chapter 18*; cont'd)*				
moose, black bear, grizzly bear, mountain goat: indirect mortality from increased accessibility in inaccessible landscape increasing hunting pressure on moose population (moose, black bear, grizzly bear, mountain goat), and consequences of shifting home range (mountain goat)	construction (moose, black bear, grizzly bear: TCAR, CCAR) closure (mountain goat: project roads)	Controlled access (e.g., gated road); Project area designated as no hunting zone and no personal firearms permitted within project area; partial deactivation of CCAR post-closure Implementation of: • Wildlife Management and Monitoring Plan	**not significant (minor)**	**not significant (minor)**
moose, mountain goats, bats and wetland birds: chemical hazards	construction (mountain goat: Mine Site) operation (wetland birds: TMF, WSF, receiving waters of Unuk River and North Treaty Creek) closure (bats: TMF) post-closure (moose: TMF)	Water quality monitoring will be conducted in the TMF and WSF during all Project phases; wildlife will be prevented from accessing the TMF and the WSF until water meets water quality guidelines for all COPCs Implementation of: • Wildlife Management and Monitoring Plan • Aquatic Effects Monitoring Plan • Fugitive Dust Emissions Management Plan • Water Management Plan	**not significant (moderate)** for wetland birds; not significant (minor) otherwise	**not significant (minor)**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Wildlife and Wildlife Habitat (Chapter 18*; cont'd)*				
moose, mountain goat, grizzly bear, black bear, American marten, hoary marmot, wetland birds: overall	construction (mountain goat, black bear, grizzly bear, moose, American marten, wetland birds: All; hoary marmot: Mine Site)	See above	**not significant (moderate)** for moose, mountain goat, grizzly bear; **not significant (minor)** otherwise	**not significant (moderate)** - for moose under likely / Moderate Traffic scenario **significant** - for moose under unlikely / High Traffic scenario **not significant (moderate)** -for mountain goat and grizzly bear **not significant (minor)** - otherwise
Noise (Chapter 19)				
Noise: Sleep disturbance	construction, operation (Mining Camp)	Maximize distances from major noise sources to sleeping quarters; improve building insulation so that predicted indoor Leq are 30 dBA or less; avoid the use of equipment that generates impulsive noise; minimize the need for reversing alarms; avoid dropping materials from a height; avoid metal-to-metal contact on equipment; if possible, schedule truck movements to avoid roads near mining camps; avoid mobile plant clustering near residences and other sensitive receptors Implementation of: • Noise Management Plan	**not significant (moderate)** for operation; **not significant (minor)** for construction	**not significant (moderate)** for operation; **not significant (minor)** for construction

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Noise (Chapter 19*; cont'd)*				
Noise: Speech interference, complaints, high annoyance, noise induced rattling	construction, operation (Offsite Receivers)	Avoid the use of equipment that generates impulsive noise; minimize the need for reversing alarms; avoid dropping materials from a height; avoid metal-to-metal contact on equipment; if possible, schedule truck movements to avoid roads near mining camps; avoid mobile plant clustering near residences and other sensitive receptors. Implementation of: • Noise Management Plan	**not significant (minor)**	no residual cumulative effects
Noise: Loss of wildlife habitat	construction, operation (Local Wildlife Habitat)	Use blast mats to reduce noise levels; properly stagger delays for blast pattern to minimize the number of charges simultaneously being ignited; avoid the use of equipment that generates impulsive noise; minimize the need for reversing alarms; avoid dropping materials from a height; avoid metal-to-metal contact on equipment; if possible, schedule truck movements to avoid roads near mining camps; avoid mobile plant clustering near sensitive receptors. Implementation of: • Noise Management Plan	**not significant (moderate)** for operation; **not significant (minor)** for construction	**not significant (moderate)** for operation; **not significant (minor)** for construction
Noise: Overall residual effect	all	See above	**not significant (moderate)**	**not significant (moderate)** for operation; no residual cumulative effect for operation

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Economic (Chapter 20)				
Employment and income: The Project will have beneficial effects on direct, indirect and induced employment, including employment of LSA residents in Aboriginal and non-Aboriginal communities.	construction, operation (Employment; Procurement of Goods and Services)	Implementation of: • Labour Recruitment and Retention Strategy • Procurement Strategy • Workforce Training Strategy	**not significant (moderate) -** beneficial	**significant (major)** - beneficial
Employment and income: The Project will have beneficial effects on direct, indirect and induced personal incomes, GDP, and government tax revenues, including income to LSA residents in Aboriginal and non-Aboriginal communities	construction, operation (Employment; Procurement of Goods and Services)	Implementation of: • Labour Recruitment and Retention Strategy • Procurement Strategy • Workforce Training Strategy	**not significant (moderate) -** beneficial	**significant (major)** - beneficial
Employment and income: Change in business activity is expected to alter the employment and income profile of the RSA and LSA communities.	construction, operation (Employment; Procurement of Goods and Services)	None	**not significant (moderate) -** beneficial	**not significant (moderate) -** beneficial
Employment and income: Overall	All	See above	**not significant (moderate) -** beneficial	**significant (major)** - beneficial

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Economic (Chapter 20*; cont'd)*				
Business opportunities and economic development: The Project will have beneficial effects on businesses supplying the Project and selling goods and services to residents and businesses.	construction, operation (Employment; Procurement of Goods and Services)	Implementation of: • Procurement Strategy	**not significant (moderate) -** beneficial	**not significant (moderate) -** beneficial
Business opportunities and economic development: The Project is expected to contribute to economic growth, investments, and the development of local businesses.	construction, operation (Employment; Procurement of Goods and Services)	Implementation of: • Procurement Strategy	**not significant (moderate) -** beneficial	**not significant (moderate) -** beneficial
Business opportunities and economic development: The Project is expected to contribute to LSA and RSA development and broadening of the economic base.	construction, operation (Employment; Procurement of Goods and Services)	Implementation of: • Labour Recruitment and Retention Strategy • Procurement Strategy • Workforce Training Strategy	**not significant (moderate) -** beneficial	**not significant (moderate) -** beneficial
Business opportunities and economic development: Overall	All	See above	**not significant (moderate) -** beneficial	**not significant (moderate) -** beneficial

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Heritage (Chapter 21)				
Archaeological sites: Disturbance of both known and unknown archaeological Sites	construction, operation (all Project components)	Avoidance; mitigation measures to be determined in consultation with the Archaeology Branch Implementation of: • Heritage Management and Monitoring Plan • Chance Find Procedure	**not significant (minor)**	no residual cumulative effects
Social (Chapter 22)				
Community demographics, infrastructure, and services: Altering of community demographics due to population growth (beneficial and/or adverse, depending on personal opinion)	operation (Employment; Procurement of Goods and Services)	Implementation of: • Community Engagement Plan	**not significant (minor)**	**not significant (minor)**
Community demographics, infrastructure, and services: Demand on community infrastructure and services may outpace small LSA communities' capacity in the short-term due to population growth (adverse)	operation (Employment; Procurement of Goods and Services)	Implementation of: • Community Engagement Plan	**not significant (minor)**	**not significant (minor)**
Community demographics, infrastructure, and services: Increase in government revenues to fund infrastructure and services due to Increased tax base (beneficial)	operation (Employment; Procurement of Goods and Services)	None	**not significant (minor) -** beneficial	**not significant (minor) -** beneficial

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Social (Chapter 22*; cont'd)*				
Community demographics, infrastructure, and services: Overall	operation (Employment; Procurement of Goods and Services)	See above.	**not significant (minor)**	**not significant (minor)**
Education, skills, and training: Increase in the educational profile of the local, regional and provincial workforce due to employment-related training and work experience (beneficial)	construction, operation (Employment; Procurement of Goods and Services)	Implementation of: • Recruitment and Retention Strategy • Procurement Strategy • Workforce Training Strategy	**not significant (minor)** - beneficial	**not significant (minor) -** beneficial
Education, skills, and training: Improvement in the educational profile of LSA and RSA communities due to in-migration of skilled workers (beneficial)	operation (Employment; Procurement of Goods and Services)	Implementation of: • Recruitment and Retention Strategy • Procurement Strategy • Workforce Training Strategy	**not significant (minor)** - beneficial	**not significant (minor) -** beneficial
Education, skills, and training: Improvement in the capacity of educational institutions due to population-fueled demand (beneficial)	operation (Employment; Procurement of Goods and Services)	Implementation of: • Workforce Training Strategy • Community Engagement Plan	**not significant (minor)** - beneficial	**not significant (minor) -** beneficial
Education, skills, and training: Overall	construction, operation (Employment; Procurement of Goods and Services)	See above	**not significant (minor)** - beneficial	**not significant (minor) -** beneficial

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Social (Chapter 22*; cont'd)*				
Community well-being: Increase in individual esteem and community pride due to employment (beneficial)	construction, operation (Employment; Procurement of Goods and Services)	Implementation of: • Recruitment and Retention Strategy • Procurement Strategy • Workforce Training Strategy	**not significant (minor)** - beneficial	**not significant (minor) -** beneficial
Community well-being: Increase in stress on families due to employment rotation schedules (adverse), and increase in substance misuse due to employment-related stress (adverse)	operation (Employment; Procurement of Goods and Services)	Implementation or recruitment of: • Employee Assistance Plan	**not significant (minor)**	**not significant (minor)**
Community well-being: Increase in financial independence and access to goods and services due to increased income (beneficial)	operation (Employment; Procurement of Goods and Services)	Implementation of: • Financial management and general life skills development training program.	**not significant (minor)** - beneficial	**not significant (minor)** beneficial
Community well-being: Increase in substance misuse due to increase in income (adverse)	operation (Employment; Procurement of Goods and Services)	Implementation of: • Employee Assistance Program	**not significant (minor)**	**not significant (minor)**
Community well-being: Increased community pride due to reversal in population decline (beneficial)	operation (Employment; Procurement of Goods and Services)	Implementation of: • Recruitment and Retention Strategy	**not significant (minor)** - beneficial	**not significant (minor)** beneficial

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Social (Chapter 22*; cont'd)*				
Community well-being: Increase in social, mental health, and community safety issues in the short term as community support capacity is outpaced by population change (adverse)	operation (Employment; Procurement of Goods and Services)	Implementation of: • Employee Assistance Program; • Community Engagement Plan	**not significant (minor)**	**not significant (minor)**
Community well-being: Increase in emissions (noise, exhaust) due to increased traffic volume in Stewart	operation (Highway 37 and 37A)	Voluntary compliance with BC Clean Air Plan; Company Safety Management System Implementation of: • Community Engagement Plan • Traffic and Access Management Plan	**not significant (minor)**	**Significant (major)**
Community well-being: Increase in vehicle accidents due to increased traffic volume in Stewart (adverse)	operation (Highway 37 and 37A)	Voluntary compliance with BC Clean Air Plan; Company Safety Management System Implementation of: • Community Engagement Plan • Traffic and Access Management Plan	**not significant (minor)**	**Significant (major)**
Community well-being: Overall	operation (Highway 37 and 37A; Employment; Procurement of goods and services)	See above	**not significant (minor)**	**not significant (minor)**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Land Use (Chapter 23)				
Commercial Recreation, Guide Outfitting, and Trapping: Restricted access to tenures in Project area	construction, operation and closure (All); post-closure (PTMA)	Implementation of: • Traffic and Access Management Plan • Monitoring and Adaptive Management	**not significant (minor)**	**not significant (minor)**
Commercial Recreation, Guide Outfitting, and Trapping: Noise, traffic and observation of project-related infrastructure in the landscape could alter areas and/or reduce economic opportunities for commercial licence holders due to a perceived reduction in the quality of the land user experience.	construction, operation and closure (All); post-closure (TCAR)	Implementation of: • Traffic and Access Management Plan • Noise Management Plan • Visual Quality Management Plan	**not significant (minor)**	**not significant (minor)**
Commercial Recreation, Guide Outfitting, and Trapping: Wildlife resources diminished for guide outfitters and trappers due to habitat loss and increased strain on harvest resources.	All (All)	Implementation of: • Traffic and Access Management Plan • Noise Management Plan • Fish and Aquatic Habitat Management Plan • Terrestrial Ecosystems Management and Monitoring Plans • Wildlife Management and Monitoring Plan	**not significant (moderate)** for construction and operation**;** **not significant (minor)** at closure	**not significant (moderate)**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Land Use (Chapter 23*; cont'd)*				
Recreational hunting and fishing: Wildlife resources diminished for resident hunters due to habitat loss and increased strain on harvest resources.	All (All)	Implementation of: • Traffic Management Plan • Noise Management Plan • Fish and Aquatic Habitat Management Plan • Terrestrial Ecosystems Management and Monitoring Plans • Wildlife Management Plan	**not significant (moderate)** for construction and operation; **not significant (minor)** at closure	**not significant (moderate)**
Subsistence: Restricted access to subsistence areas, including trapline 617T015 and 617T011, restricted	All components during construction and operation; PTMA and TCAR at closure; TMF and TCAR at post-closure	Implementation of: • Access Management Plan	**not significant (minor)**	**not significant (minor)**
Subsistence: Wildlife resources diminished for subsistence harvesters due to habitat loss and increased strain on harvest resources.	construction, operation, closure (All)	Implementation of: • Traffic Management Plan • Noise Management Plan • Fish and Aquatic Habitat Management Plan • Terrestrial Ecosystems Management and Monitoring Plans • Wildlife Management and Monitoring Plan	**not significant (moderate)** for construction and operation; **not significant (minor)** at closure	**not significant (moderate)**
Navigable Waters: access restrictions due to Bridge crossings; Impairment of safe navigation	construction, operation, closure, post-closure	temporary access restrictions; engineering design; monitoring and adaptive management	**not significant (minor)** all phases	n/a

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Visual and Aesthetic Resources (Chapter 24)				
Alteration of visual quality for river rafting tours, heli-skiiers, guided backcountry expeditions, guided angling trips, visitors of Treaty Creek Site, and users of Highway 37	construction (CCAC, PTMA, Pits, TCAR and TL, RSF, Hwy 37 construction camp)	Roads to mimic natural landscape as practical; leave tree buffers; re-vegetate roads at closure	**not significant (minor)**	**not significant (minor)**
Human Health (Chapter 25)				
Health effects from surface water: human health effects due to ingestion of metals from untreated water from downstream of the TMF and the Mine site	operation, closure and post-closure (TMF, Mine site)	Project design; water treatment; water quality monitoring	**not significant (minor)**	n/a
Health effects from air quality: health effects from emissions of NO_2, SO_2, CO, TSP, $PM_{2.5}$, and PM_{10} related to Project rising above background, but below guidelines	construction, operation (mining machinery, equipment and traffic emissions, blasting (operation only))	Project design; emission control systems; vehicle and equipment maintenance; dust management; monitoring	**not significant (minor)**	**not significant (minor)**
Health effects from air quality: increase in HQ for metal inhalation	construction, operation (mining machinery, equipment and traffic emissions, blasting (operation only))	Project design; emission control systems; vehicle and equipment maintenance; dust management; monitoring	**not significant (minor)**	**not significant (minor)**

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (continued)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Human Health (Chapter 25*; cont'd)*				
Health effects from air quality: increase in ILCR due to an increase in concentration of metals and $PM_{2.5}$	construction, operation (mining machinery and equipment emitting combustion $PM_{2.5}$, especially near Mitchell and Treaty oOperating cCamps (operation only))	Project design; emission control systems; vehicle and equipment maintenance; dust management; monitoring	**not significant (minor)**	**not significant (moderate)**
Health effects from air quality: excess mortality due in increase in concentrations of $PM_{2.5}$	construction, operation (mining machinery, equipment and traffic emissions, blasting, incinerators)	Project design; emission control systems; vehicle and equipment maintenance; dust management; monitoring	**not significant (minor)**	**not significant (moderate)**
Health effects from the consumption of country foods: human health effects relating to metal toxicity from the ingestion of country foods	operation, closure, post-closure (Water and sediment quality in TMF and creeks immediately downstream of TMF; water quality downstream of Mine Site); closure and post-closure only(vegetation quality in TMF and creeks immediately downstream of TMF)	Project design; dust management; water treatment; water and air quality monitoring; adaptive management	**not significant (minor)**	n/a

(continued)

Table 8. Summary of Residual Project-related and Cumulative Effects and Mitigation Measures for the KSM Environmental Assessment (completed)

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
Human Health (Chapter 25*; cont'd)*				
Health effects from noise: human health effects from sleep disturbance on site due to noise	construction (Camp 5); operation (Camp 6 and Treaty operating camp)	monitoring; adaptive management; regular maintenance of vehicles and machinery; speed control	**not significant (minor)** during construction**; not significant (moderate)** during operation	n/a
Overall residual effect on human health	all (post-closure)	See above	**not significant (minor)**	n/a

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