

# 39 Conclusions

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## 39.1 Introduction

This Application for an Environmental Assessment Certificate / Environmental Impact Statement (Application/EIS) represents the application made by Seabridge Gold Inc. (Seabridge or the Proponent) under the British Columbia (BC) *Environmental Assessment Act* (2002) and the *Canadian Environmental Assessment Act* (CEAA; 1992) for approval to proceed to regulatory permitting for the proposed KSM Project (the Project).

The Proponent proposes to develop the Project, 65 km northwest of Stewart, and 35 km northeast of the BC–Alaska border. The Project is envisaged as a combined open pit and underground gold/copper/silver/molybdenum mine with an ore production rate of approximately 130,000 tpd. Ore will be mined from four mineral deposits: the Mitchell, Sulphurets, Kerr, and Iron Cap deposits. The Mine Site will be located in the Sulphurets and Mitchell Creek valleys, which are tributaries to the Unuk River system. Based on the findings of a detailed assessment of numerous tailing disposal alternatives, ore will be processed and tailing disposed of in a valley system approximately 23 km east of the Mine Site. The Processing and Tailing Management Area (PTMA) will be located in the Treaty and Teigen Creek drainages, which are tributaries to the Bell-Irving River. The Mine Site and the PTMA will be connected by twin 23-km tunnels (Mitchell-Treaty Twinned Tunnels [MTT]) and will be accessed by separate new resource roads. The construction and operation workforces will stay on-site in camp facilities, when on shift. Concentrate will be hauled by truck via Highway 37 to the Port of Stewart for overseas shipping. Project construction will take 5 years, and the mine life is estimated to be 51.5 years. Site reclamation will be undertaken during the closure phase (3 years), with follow-up site maintenance and ongoing water management during the Post-closure phase (250 years).

Chapter 4 provides a detailed description of Project infrastructure, facilities and activities at each Project phase, and Figure 4.1-3 illustrates the layout of the Project's various infrastructure components as of the end of the operation phase.

The PTMA is situated within the Nass Area, as defined by the *Nisga'a Final Agreement* (NFA; NLG, Province of BC, and Government of Canada 1998), but falls outside the Nass Wildlife Area and Nisga'a Lands owned by Nisga'a Nation under the terms of the NFA, which came into effect on May 11, 2000. The Tahltan 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 Gitksan Nation (as identified by the Gitksan 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, independent of the Gitksan, claim an area covering the Mine Site and the PTMA. Detailed information on Nisga'a Nation and First Nations interests and considerations are provided in Chapters 29 and 30 respectively.

In this Application / EIS, the Proponent has reported the findings of its assessments with respect to the potential effects of the Project on the Project's baseline environmental, economic, social, heritage and health setting. The assessments have been broadly scoped and are comprehensive, and have

followed the effects assessment methodology that is detailed in Chapter 5. The effects assessments reflect the extensive feedback provided during the pre-Application stage of the environmental assessment (EA) process by the review participants—Nisga'a Nation, potentially affected First Nations, government agencies, the public and stakeholder groups. The Proponent, in conducting these assessments, has been supported by a large team of technical specialists who have applied rigorous analytical procedures and expert professional judgement to the assessment analysis.

Throughout the pre-Application stage of the EA process, the Proponent has engaged in extensive exchanges with the review participants, at working group meetings, in direct one-on-one meetings, and in public open houses. Considerable efforts have been made to consult with Nisga'a Nation and potentially affected First Nations. The Proponent has made every effort to comply with Chapter 10 of the *Nisga'a Final Agreement* (NLG, Province of BC, and Government of Canada 1998) in consulting with Nisga'a Nation. To facilitate consultations with both Nisga'a Nation and First Nations, the Proponent has responded in detail to issues raised by them, either at working group sessions or directly, has held iterative discussions with them on issues such as baseline study design and alternatives assessments, has met with them in their communities, has provided capacity funding, and has carried out necessary studies.

The Proponent has embraced the EA process as a Project planning mechanism that has enabled it to refine Project layout and design so as to minimize the potential adverse effects of the Project and maximize the potential benefits. Through iterations with the various members of the working group, as well as other review participants, several important improvements to Project layout and design have been developed, as highlighted in Chapter 1 (see Table 1.7-1). Examples of such key improvements include re-routing of the proposed access road to the PTMA to reduce environmental effects in the Teigen drainage, elimination of the Sulphurets Rock Storage Facility (RSF), and incorporation of a lined carbon-in-leach (CIL) Centre Cell in the Tailing Management Facility (TMF) design to address seepage concerns.

Following the assessment methodology described in Chapter 5, the Proponent and its team have systematically identified issues of concern; scoped potential sources of effects and effects mechanisms; evaluated their potential to affect environmental, economic, social, heritage, and health valued components (VCs) of the Project setting; and assessed the capacity of various mitigation measures to prevent effects entirely or, where not possible, to reduce them to acceptable levels. With mitigation measures applied, the Proponent has then determined the residual effects, both positive and adverse, on the Project setting, and whether or not these residual effects are significant. Summaries of the effects assessments for a broad range of environmental, economic, social, heritage, and health VCs are provided in Chapters 6 through 25 of the Application/EIS.

For most potential effects, the Proponent has been successful in either avoiding adverse effects entirely or reducing them to insignificance. For many potential effects, no residual effects are predicted once proposed mitigation measures are implemented. For many other potential effects, although residual effects are predicted, these residual effects are rated **not significant (minor)**, as illustrated by the summary of assessment findings presented in Table 39.2-1. A small number of residual effects were rated as **significant (major)** issues, and a greater number determined to be **moderate, not significant** residual effects. Summaries of the assessment findings for these potential effects are presented in Sections 39.3 and 39.4, respectively.

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Greenhouse Gas Emissions (Climate Change; Chapter 6)</b>				
<b>Greenhouse gas (GHG) emissions:</b> change in atmospheric (GHG) levels	construction, operation (Mine Site, PTMA, MTT Hwys 37/37a)	Project design changes to minimize power/energy use, minimizing Project fuel use (e.g., by equipment, vehicles, and generators) through operational fuel efficiency measures; minimizing Project energy use (e.g., by facility and electrical equipment) through operational energy efficiency measures; and minimizing planned land-use change burning and maximizing replanting where possible; and maximize carbon sequestration. Implementation of: <ul style="list-style-type: none"> <li>Greenhouse Gas Management and Mitigation Plan</li> </ul>	<b>not significant (minor)</b>	n/a: cumulative effects assessment not possible due to due to global scale and complexity involved as per guidance documentation and usual EA practice
<b>Air Quality (Chapter 7)</b>				
<b>Ambient air quality:</b> 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: <ul style="list-style-type: none"> <li>Air Quality Management Plan</li> </ul>	<b>not significant (moderate; construction)</b> <b>not significant (minor; operation)</b>	<b>not significant (moderate; construction)</b> <b>not significant (minor; operation)</b>
<b>Ambient air quality:</b> overall	construction, operation (Mine Site, PTMA, MTT, Hwy 37)	see above	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Terrain, Surficial Geology and Soils (Chapter 8)</b>				
<b>Soil quantity:</b> permanent loss of soil from component footprint (land surface area loss)	construction, post-closure (Mine Site, PTMA, TCAC, CCAC, and MTT)	Minimize Project footprint; apply BMP for soil salvage and erosion control; reclaim disturbed areas as soon as possible Implementation of: <ul style="list-style-type: none"> <li>Soil Salvage and Handling Plan</li> <li>Erosion Control Plan</li> </ul>	<b>not significant (minor);</b> <b>not significant (moderate; TMF)</b>	<b>not significant (moderate)</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Terrain, Surficial Geology and Soils (Chapter 8)</b>				
<b>Soil quantity:</b> permanent loss of soil from mass movement or bulk erosion	construction (Mine Site, PTMA, TCAC, CCAC, and MTT)	Minimize Project footprint; apply BMP for soils salvage and erosion control; reclaim disturbed areas as soon as possible  Implementation of: <ul style="list-style-type: none"> <li>• Soil Salvage and Handling Plan</li> <li>• Terrain, Surficial Geology and Soil Management and Monitoring Plan</li> <li>• Erosion Control Plan</li> </ul>	<b>not significant (minor)</b>	<b>not significant (moderate)</b>
<b>Soil quantity:</b> overall	post-closure (all)	See above	<b>not significant (minor)</b>	<b>not significant (moderate)</b>
<b>Soil quality:</b> decreased soil fertility, compaction, or contamination in buffers surrounding components retained after closure	construction operation, post-closure (Mine Site, PTMA, TCAR, CCAC, and MTT)	Apply BMP for erosion/sediment control; establish soil monitoring program early; remediate and reclaim  Implementation of: <ul style="list-style-type: none"> <li>• Soil Contamination Prevention Plan</li> <li>• Soil Salvage and Handling Plan</li> <li>• Terrain, Surficial Geology and Soil Management and Monitoring Plan</li> <li>• Erosion Control Plan</li> </ul>	<b>not significant (minor)</b>	<b>not significant (minor)</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Geohazards (Chapter 9)</b>				
Risk assessment rather than effects assessment for Project effects on <b>terrain stability</b> where components interact with existing geohazards	all phases (Mine Site, PTMA and CCAR)	Reduce risk associated with BGC identified geohazard scenarios that will reduce geohazard: probability of occurring, magnitude, intensity, spatial probability of impact, temporal probability of impact, and vulnerability. (Chapter 34 and <a href="#">Appendices 9-A to 9-E</a> present mitigation for existing geohazards) Implementation of: <ul style="list-style-type: none"> <li>• Soil Salvage and Handling Plan</li> <li>• Erosion Control Plan</li> <li>• Terrain, Surficial Geology and Soil Management and Monitoring Plan</li> <li>• Vegetation Clearing Management Plan</li> </ul> Coulter Creek and Treaty Creek Access Road Construction Erosion and Sediment Control Plan	n/a	n/a
<b>Geochemistry (Chapter 10)</b>				
Cause-effect pathways to other VCs	n/a	n/a	n/a	n/a
<b>Groundwater Quantity (Chapter 11)</b>				
<b>Groundwater quantity:</b> Alteration of groundwater levels and flow patterns and directions due to mine dewatering and water level management	construction through post-closure (Mitchell Pit and Block Cave Mine, Sulphurets and Kerr Pits, subsequent pit lakes); operation (Iron Cap Block Cave Mine)	Cessation of dewatering Implementation of: <ul style="list-style-type: none"> <li>• TMF Management and Monitoring and Plan</li> </ul> Groundwater Monitoring Plan	<b>not significant (moderate); not significant (minor);</b> Iron Cap during operation)	<b>not significant (moderate)</b>
<b>Groundwater quantity:</b> Water level mounding in the Mitchell and McTagg RSFs	operation to post-closure (Mitchell and McTagg RSFs)	None	<b>not significant (minor)</b>	n/a: no interaction with other projects

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Groundwater Quantity (Chapter 11) (cont'd)</b>				
<b>Groundwater quantity:</b> Alteration of groundwater levels and flow patterns due to artificial reservoirs and implementation of associated seepage control curtains	construction through post-closure (Water Storage Facility; WSF); operation (TMF)	Implementation of: <ul style="list-style-type: none"> <li>• TMF Management and Monitoring Plan</li> <li>• Groundwater Monitoring Plan</li> </ul>	<b>not significant (moderate)</b>	n/a: no interaction with other projects
Overall	post-closure (all)	See above	<b>not significant (moderate)</b>	<b>not significant (moderate)</b>
<b>Groundwater Quality (Chapter 12)</b>				
<b>Groundwater quality:</b> 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: <ul style="list-style-type: none"> <li>• ML/ARD Management Plan</li> <li>• Water Storage Facility Management and Monitoring Plan</li> <li>• Groundwater Monitoring Plan</li> <li>• TMF Management and Monitoring Plan</li> </ul>	<b>not significant (moderate)</b>	<b>not significant (moderate)</b>
Overall	post-closure (all)	See above	<b>not significant (moderate)</b>	<b>not significant (moderate)</b>
<b>Surface Water Quantity (Chapter 13)</b>				
<b>Streamflows within the PTMA:</b> Changes in: annual flow volumes; monthly flow distribution; in peak flows; and in low flows	All phases (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: <ul style="list-style-type: none"> <li>• Water Management Plan</li> </ul>	<b>not significant (moderate)</b> for diversions and tunnels and TMF; <b>not significant (minor)</b> otherwise	n/a: effects confined to LSA; no interactions with other projects or activities
<b>Streamflows within the PTMA:</b> Overall effect on stream flows	post-closure (all)	see above	<b>not significant (moderate)</b>	n/a: see above

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Surface Water Quantity (Chapter 13) (cont'd)</b>				
<b>Streamflows within the Mine Site:</b> Changes in annual flow volumes	All phases (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: <ul style="list-style-type: none"> <li>Water Management Plan</li> </ul>	<b>not significant (moderate)</b> for diversions and tunnel, WSF, WTP, RSFs, pits, and block cave mines;  <b>not significant (minor)</b> otherwise	<b>n/a:</b> potential interaction with Brucejack Mine but there is no flow data for this project, no CEA not possible
<b>Streamflows within the Mine Site:</b> Changes in: monthly flow distribution; and 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: <ul style="list-style-type: none"> <li>Water Management Plan</li> </ul>	<b>not significant (moderate)</b> for diversions and tunnel, WSF, WTP;  <b>not significant (minor)</b> otherwise	<b>n/a:</b> potential interaction with Brucejack Mine but there is no flow data for this project, no CEA not possible
<b>Streamflows within the Mine Site:</b> Changes in low flows	All phases (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: <ul style="list-style-type: none"> <li>Water Management Plan</li> </ul>	<b>not significant (moderate)</b> for diversions and tunnel, WSF, WTP, RSFs, pits, and block cave mines;  <b>not significant (minor)</b> otherwise	<b>n/a:</b> potential interaction with Brucejack Mine but there is no flow data for this project, no CEA not possible
<b>Streamflows within the Mine Site:</b> Overall effect on stream flows	post-closure (all)	see above	<b>not significant (moderate)</b>	<b>n/a:</b> see above

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Surface Water Quantity (Chapter 13) (cont'd)</b>				
<b>Streamflows within the Bell-Irving River:</b> Changes in: annual flow volumes; monthly flow distribution; peak flows; and low flows	All phases (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: <ul style="list-style-type: none"> <li>Water Management Plan</li> </ul>	<b>not significant (minor)</b>	<b>n/a:</b> effects confined to LSA; no interactions with other projects or activities
<b>Stream flows within the Bell-Irving River (RSA):</b> Overall effect on streamflows	post-closure (all)	See above	<b>not significant (minor)</b>	<b>n/a:</b> see above
<b>Streamflows within the Unuk River:</b> Changes in annual flow volumes	All phases (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: <ul style="list-style-type: none"> <li>Water Management Plan</li> </ul>	<b>not significant (moderate)</b> for diversions and tunnels, WSF and WTP at closure;  <b>not significant (minor)</b> otherwise	<b>n/a:</b> effects confined to LSA; no interactions with other projects or activities
<b>Streamflows within the Mine Site:</b> Changes in: monthly flow distribution; and 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	<b>not significant (moderate)</b> for diversions and tunnel, WSF, WTP;  <b>not significant (minor)</b> otherwise	<b>n/a:</b> potential interaction with Brucejack Mine but there is no flow data for this project, no CEA not possible

(continued)



**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Surface Water Quantity (Chapter 13) (cont'd)</b>				
<b>Stream flows within the Unuk River:</b> Changes in monthly flow distribution	All phases (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: <ul style="list-style-type: none"> <li>Water Management Plan</li> </ul>	<b>not significant (minor)</b>	<b>n/a:</b> effects confined to LSA; no interactions with other projects or activities
<b>Stream flows within the Unuk River:</b> Changes in peak flows	All phases (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: <ul style="list-style-type: none"> <li>Water Management Plan</li> </ul>	<b>not significant (moderate)</b> for diversions and tunnels, WSF and WTP at closure; <b>not significant (minor)</b> otherwise	<b>n/a:</b> effects confined to LSA; no interactions with other projects or activities
<b>Stream flows within the Unuk River:</b> Changes in low flows	All phases (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: <ul style="list-style-type: none"> <li>Water Management Plan</li> </ul>	<b>not significant (moderate)</b> for diversions and tunnels, WSF and WTP at closure; <b>not significant (minor)</b> otherwise	<b>n/a:</b> effects confined to LSA; no interactions with other projects or activities
<b>Stream flows within the Unuk River (RSA):</b> Overall effect on streamflows	post-closure (all)	see above	<b>not significant (minor)</b>	<b>n/a:</b> see above

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Surface Water Quality (Chapter 14)</b>				
<b>Surface water quality:</b> Degradation of water quality due to sedimentation	construction, operation (all)	Implementation of: <ul style="list-style-type: none"> <li>• Terrain, Surficial Geology, and Soil Management and Monitoring Plan</li> </ul>	<b>not significant (minor)</b>	<b>n/a</b>
<b>Surface water quality:</b> Degradation of water quality due to TSS, ML/ARD, nitrogen loading	All phases (access corridors)	Implementation of: <ul style="list-style-type: none"> <li>• Terrain, Surficial Geology, and Soil Management and Monitoring Plan</li> <li>• ML/ARD Management Plan</li> <li>• Spill Prevention and Emergency Response</li> </ul>	<b>not significant (minor)</b>	<b>n/a</b>
<b>Surface water quality:</b> 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 WTP 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 WTP.  Implementation of: <ul style="list-style-type: none"> <li>• Water Management Plan</li> <li>• Fish and Aquatic Habitat Management Plan</li> <li>• ML/ARD Management Plan</li> </ul>	<b>not significant (moderate)</b>	<b>n/a</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Surface Water Quality (Chapter 14) (cont'd)</b>				
<b>Surface water quality:</b> 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 WTP 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 WTP.  Implementation of: <ul style="list-style-type: none"> <li>• Water Management Plan</li> <li>• Fish and Aquatic Habitat Management Plan</li> <li>• ML/ARD Management Plan</li> </ul>	<b>not significant (moderate)</b>	<b>n/a</b>
<b>Surface water quality:</b> Degradation of water quality in Treaty watershed (North Treaty and Treaty creeks) and 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: <ul style="list-style-type: none"> <li>• Water Management Plan</li> <li>• Fish and Aquatic Habitat Management Plan</li> <li>• ML/ARD Management Plan</li> </ul>	<b>not significant (minor)</b>	<b>n/a</b>
<b>Surface water quality: overall</b>	post-closure (all)	see above	<b>not significant (moderate)</b>	<b>n/a</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Fish and Aquatic Habitat (Chapter 15)</b>				
<b>Bull trout</b> (PTMA only), <b>Dolly Varden, rainbow trout/steelhead, and Pacific salmon</b> : direct mortality from blunt trauma and increased fishing pressures	construction, operation, closure (CCAC, TCAR, TMF)	Use of BMPs to minimize fish mortality with construction machinery; adhere to DFO's operational statements; adhere to appropriate construction operating window for instream work; site isolation; implementing no fishing policies for employees (construction and closure) Implementation of: <ul style="list-style-type: none"> <li>• Fish and Aquatic Management Plan</li> <li>• Fish Salvage Plan</li> </ul>	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Bull trout</b> (PTMA only), <b>Dolly Varden, rainbow trout/steelhead, and Pacific salmon</b> : Noise causing sub-lethal effects, decreased feeding efficiency and habitat avoidance	construction, operation (CCAC, TCAR, TMF)	Use of BMPs to minimize noise effects; adhere to DFO's operational statements; setback distances Implementation of: <ul style="list-style-type: none"> <li>• Fish and Aquatic Management Plan</li> </ul>	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Bull trout</b> (PTMA only), <b>Dolly Varden, rainbow trout/steelhead, Pacific salmon, and aquatic habitat</b> : 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 and 12, Treaty Marshalling Yard, Hwy 37)	Use of BMPs to minimize sediment entry to waterbodies; adhere to DFO's operational statements; site isolation; water quality maintenance; equipment maintenance Implementation of: <ul style="list-style-type: none"> <li>• Sediment and Erosion Control Plan</li> <li>• Terrain, Surficial Geology and Soil Management and Monitoring Plan</li> <li>• Fish and Aquatic Management Plan</li> <li>• Spill Prevention and Emergency Response Plan</li> </ul>	<b>not significant (minor)</b>	<b>not significant (minor)</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Fish and Aquatic Habitat (Chapter 15) (cont'd)</b>				
<b>Bull trout</b> (PTMA only), <b>Dolly Varden, rainbow trout/steelhead, Pacific salmon, and aquatic habitat</b> : 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)	All phases (TCAR, MTT, TMF, Treaty OPC, seepage collection ponds, concentrate storage and loadout)	Use of BMPs to minimize blast residue entry to waterbodies; water quality maintenance; use BMPs and industry water treatment standards to treat waste effluent and minimize residue entry to waterbodies  Implementation of: <ul style="list-style-type: none"> <li>• ML/ARD Management Plan</li> <li>• Fish and Aquatic Management Plan</li> <li>• Spill Prevention and Emergency Response Plan</li> <li>• Fish Salvage Plan</li> </ul>	<b>not significant (minor)</b>	<b>n/a</b>
<b>Dolly Varden, rainbow trout/steelhead, Pacific salmon, and aquatic habitat</b> : 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 and Energy Recovery Area, McTagg RSF, Mitchell RSF, Mitchell OPC, Mitchell Pit, Sludge Management Facilities, Sulphurets laydown area, Sulphurets-Mitchell Conveyor Tunnel, Sulphurets Pit, Kerr Pit)	Water and sediment quality maintenance Implementation of: <ul style="list-style-type: none"> <li>• ML/ARD Management Plan</li> <li>• Erosion Control Plan</li> <li>• Fish and Aquatic Habitat Management Plan</li> </ul>	<b>not significant (moderate)</b> for fish species, <b>not significant (minor)</b> for aquatic habitat	<b>n/a</b>
<b>Bull trout</b> (PTMA only), <b>Dolly Varden, rainbow trout/steelhead, Pacific salmon, and aquatic habitat</b> : 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 BMPs 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: <ul style="list-style-type: none"> <li>• Spill Containment and Emergency Response Plan</li> <li>• Erosion Control Plan</li> <li>• Fish and Aquatic Habitat Management Plan</li> </ul>	<b>not significant (minor)</b>	<b>n/a</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Fish and Aquatic Habitat (Chapter 15) (cont'd)</b>				
<b>Aquatic habitat:</b> 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 BMPs to minimize blast residue entry to waterbodies; compliance with the Municipal Wastewater Regulation and the Sewerage System Regulation; use of BMPs 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: <ul style="list-style-type: none"> <li>• Erosion Control Plan</li> <li>• Fish and Aquatic Habitat Management Plan</li> </ul>	<b>not significant (minor)</b>	<b>n/a</b>
<b>Aquatic habitat:</b> loss and degradation of instream and associated riparian habitat (habitat loss and alteration)	construction, operation, closure (all facilities)	Use of BMPs to minimize habitat loss; utilize DFO's operational statement for transmission lines Implementation of: <ul style="list-style-type: none"> <li>• Fish Habitat Compensation Plan</li> <li>• Fish and Aquatic Habitat Management Plan</li> </ul>	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Overall residual effect</b>	post-closure (all)	See above	<b>not significant (moderate)</b> for Dolly Varden, rainbow trout/steelhead, Pacific salmon;  <b>not significant (minor)</b> for bull trout and aquatic habitat	<b>not significant (moderate)</b> for Dolly Varden, rainbow trout/steelhead, Pacific salmon;  <b>not significant (minor)</b> for bull trout and aquatic habitat

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Wetlands (Chapter 16)</b>				
<b>Wetland extent:</b> loss of wetland extent	construction, operation (Camps 3 and 7, TCAR, Treaty OPC, TMF, Sulphurets Laydown Area, Kerr Pit, and CCAR)	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: <ul style="list-style-type: none"> <li>• Wetland Management Plan</li> <li>• Wetland Compensation Plan</li> </ul>	<b>not significant (moderate)</b> in the TMF; <b>not significant (minor)</b> otherwise	<b>not significant (minor)</b>
<b>Wetland function:</b> loss, alteration, or degradation of hydrological, ecological, habitat, and biochemical functions	construction, operation (Camps 3 and 7, TCAR, Treaty OPC, TMF, Sulphurets laydown area, Kerr Pit, and CCAR)	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: <ul style="list-style-type: none"> <li>• Wetland Management Plan</li> <li>• Wetland Compensation Plan</li> </ul>	<b>not significant (moderate)</b> in the TMF; <b>not significant (minor)</b> otherwise	<b>not significant (minor)</b>
<b>Overall residual effect</b>	post-closure	see above	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Terrestrial Ecosystems (Chapter 17)</b>				
<b>Potential pine mushroom habitat, avalanche track ecosystems, listed ecosystems, riparian and floodplain ecosystems, alpine and parkland ecosystems, old forests and other terrestrial ecosystems:</b> 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 /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: <ul style="list-style-type: none"> <li>• Terrestrial Ecosystems Management and Monitoring Plans</li> <li>• Vegetation Clearing Management Plan</li> </ul>	<b>not significant (moderate)</b> for avalanche track ecosystems and old forests; <b>not significant (minor)</b> otherwise	<b>not significant (minor)</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Terrestrial Ecosystems (Chapter 17) (cont'd)</b>				
<b>Potential pine mushroom habitat, avalanche track ecosystems, listed ecosystems, riparian and floodplain ecosystems, alpine and parkland ecosystems, old forests and other terrestrial ecosystems:</b> 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: <ul style="list-style-type: none"> <li>• Fugitive Dust Emissions Management Plan</li> <li>• Erosion and Control Plan</li> <li>• Fish and Aquatic Habitat Management Plan</li> <li>• Wildlife Management and Monitoring Plan</li> <li>• Terrestrial Ecosystems Management and Monitoring Plans</li> </ul>	<b>not significant (minor)</b>	<b>not significant (minor)</b>
Overall residual effects	post-closure	See above	<b>not significant (moderate)</b> for avalanche track and old forest ecosystems; <b>not significant (minor)</b> otherwise	<b>not significant (minor)</b>

(continued)



**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

Residual Effects	Project Phases and Components	Mitigation Measures	Significance of Residual Project Effects	Significance of Residual Cumulative Effects
<b>Wildlife and Wildlife Habitat (Chapter 18)</b>				
<b>moose, mountain goat, grizzly bear, black bear, American marten, hoary marmot, raptors, wetland birds, and forest and alpine birds:</b> habitat loss and alteration	construction (hoary marmot, mountain goat – Mine Site; others - all)	<p>Partial deactivation of some mine components and partial re-vegetation 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 British Columbia Ministry of Forests, Lands and Natural Resources Operations (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.</p> <p>Implementation of:</p> <ul style="list-style-type: none"> <li>• Wildlife Management and Monitoring Plan</li> </ul>	<p><b>not significant (moderate)</b> for mountain goat; <b>not significant (minor)</b> otherwise</p>	<p><b>not significant (moderate)</b> for moose and mountain goat; <b>not significant (minor)</b> otherwise</p>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Wildlife and Wildlife Habitat (Chapter 18) (cont'd)</b>				
<b>moose, mountain goat, grizzly bear and black bear:</b> disruption of movement due to Project infrastructure and activities	construction (moose: TMF, TCAR; mountain goats: Mine Site; others: all)	Partial re-vegetation 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: <ul style="list-style-type: none"> <li>Wildlife Management and Monitoring Plan</li> </ul>	<b>not significant (minor)</b>	<b>not significant (moderate)</b> for grizzly bears <b>not significant (minor)</b> otherwise
<b>moose, mountain goat, grizzly bear, black bear, American marten, hoary marmot, western toad:</b> 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: <ul style="list-style-type: none"> <li>Wildlife Management and Monitoring Plan</li> </ul>	<b>not significant (minor)</b>	<b>not significant (moderate)</b> for moose; <b>not significant (minor)</b> otherwise

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Wildlife and Wildlife Habitat (Chapter 18) (cont'd)</b>				
<b>black bear, grizzly bears:</b> 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 Project 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: <ul style="list-style-type: none"> <li>Wildlife Management and Monitoring Plan</li> </ul>	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>mountain goats:</b> “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: <ul style="list-style-type: none"> <li>Wildlife Management and Monitoring Plan</li> </ul>	<b>not significant (moderate)</b>	<b>not significant (moderate)</b>
<b>moose, black bear, grizzly bear, mountain goat:</b> 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: <ul style="list-style-type: none"> <li>Wildlife Management and Monitoring Plan</li> </ul>	<b>not significant (minor)</b>	<b>not significant (minor)</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Wildlife and Wildlife Habitat (Chapter 18) (cont'd)</b>				
<b>moose, mountain goats, bats and wetland birds:</b> 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: <ul style="list-style-type: none"> <li>• Wildlife Management and Monitoring Plan</li> <li>• Aquatic Effects Monitoring Plan</li> <li>• Fugitive Dust Emissions Management Plan</li> <li>• Water Management Plan</li> </ul>	<b>not significant (moderate)</b> for wetland birds; <b>not significant (minor)</b> otherwise	<b>not significant (minor)</b>
<b>moose, mountain goat, grizzly bear, black bear, American marten, hoary marmot, wetland birds:</b> overall	All phases (mountain goat, black bear, grizzly bear, moose, American marten, wetland birds: all; hoary marmot: Mine Site)	See above	<b>not significant (moderate)</b> for moose, mountain goat, grizzly bear; <b>not significant (minor)</b> otherwise	<b>not significant (moderate)</b> for moose under likely development scenario (less traffic); <b>significant (major)</b> for moose under unlikely development scenario (high traffic); <b>not significant (moderate)</b> for mountain goat and grizzly bear; <b>not significant (minor)</b> - otherwise

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Noise (Chapter 19)</b>				
<b>Noise:</b> 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: <ul style="list-style-type: none"> <li>Noise Management Plan</li> </ul>	<b>not significant (moderate)</b> for operation; <b>not significant (minor)</b> for construction	<b>not significant (moderate)</b> for operation; <b>not significant (minor)</b> for construction
<b>Noise:</b> 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: <ul style="list-style-type: none"> <li>Noise Management Plan</li> </ul>	<b>not significant (minor)</b>	no residual cumulative effects
<b>Noise:</b> 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: <ul style="list-style-type: none"> <li>Noise Management Plan</li> </ul>	<b>not significant (moderate)</b> for operation; <b>not significant (minor)</b> for construction	<b>not significant (moderate)</b> for operation; <b>not significant (minor)</b> for construction
<b>Noise:</b> Overall residual effect	all	See above	<b>not significant (moderate)</b>	<b>not significant (moderate)</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Economic (Chapter 20)</b>				
<b>Employment and income:</b> 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: <ul style="list-style-type: none"> <li>• Labour Recruitment and Retention Strategy</li> <li>• Procurement Strategy</li> <li>• Workforce Training Strategy</li> </ul>	<b>not significant (moderate) beneficial</b>	<b>significant (major)-beneficial</b>
<b>Employment and income:</b> 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: <ul style="list-style-type: none"> <li>• Labour Recruitment and Retention Strategy</li> <li>• Procurement Strategy</li> <li>• Workforce Training Strategy</li> </ul>	<b>not significant (moderate) beneficial</b>	<b>significant (major) beneficial</b>
<b>Employment and income:</b> 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	<b>not significant (moderate) beneficial</b>	<b>not significant (moderate) beneficial</b>
<b>Employment and income:</b> Overall	all	See above	<b>not significant (moderate) beneficial</b>	<b>significant (major) beneficial</b>
<b>Business opportunities and economic development:</b> 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: <ul style="list-style-type: none"> <li>• Procurement Strategy</li> </ul>	<b>not significant (moderate) - beneficial</b>	<b>not significant (moderate) - beneficial</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Economic (Chapter 20) (cont'd)</b>				
<b>Business opportunities and economic development:</b> 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: <ul style="list-style-type: none"> <li>• Procurement Strategy</li> </ul>	<b>not significant (moderate) - beneficial</b>	<b>not significant (moderate) - beneficial</b>
<b>Business opportunities and economic development:</b> 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: <ul style="list-style-type: none"> <li>• Labour Recruitment and Retention Strategy</li> <li>• Procurement Strategy</li> <li>• Workforce Training Strategy</li> </ul>	<b>not significant (moderate) - beneficial</b>	<b>not significant (moderate) - beneficial</b>
<b>Business opportunities and economic development:</b> Overall	all	See above	<b>not significant (moderate) - beneficial</b>	<b>not significant (moderate) - beneficial</b>
<b>Heritage (Chapter 21)</b>				
<b>Archaeological sites:</b> 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: <ul style="list-style-type: none"> <li>• Heritage Management and Monitoring Plan</li> <li>• Chance Find Procedure</li> </ul>	<b>not significant (minor)</b>	no residual cumulative effects
<b>Social (Chapter 22)</b>				
<b>Community demographics, infrastructure, and services:</b> Altering of community demographics due to population growth (beneficial and/or adverse, depending on personal opinion)	operation (employment; procurement of goods and services)	Project updates to local communities	<b>not significant (minor)</b>	<b>not significant (minor)</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Social (Chapter 22)</b>				
<b>Community demographics, infrastructure, and services:</b> 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)	Project updates to local communities	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Community demographics, infrastructure, and services:</b> Increase in government revenues to fund infrastructure and services due to Increased tax base (beneficial)	operation (employment; procurement of goods and services)	None	<b>not significant (minor) - beneficial</b>	<b>not significant (minor) - beneficial</b>
<b>Community demographics, infrastructure, and services:</b> Overall	operation (employment; procurement of goods and services)	See above.	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Education, skills, and training:</b> 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: <ul style="list-style-type: none"> <li>• Recruitment and Retention Strategy</li> <li>• Procurement Strategy</li> <li>• Workforce Training Strategy</li> </ul>	<b>not significant (minor) - beneficial</b>	<b>not significant (minor) - beneficial</b>
<b>Education, skills, and training:</b> 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: <ul style="list-style-type: none"> <li>• Recruitment and Retention Strategy</li> <li>• Procurement Strategy</li> <li>• Workforce Training Strategy</li> </ul>	<b>not significant (minor) - beneficial</b>	<b>not significant (minor) - beneficial</b>

(continued)



**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Social (Chapter 22) (cont'd)</b>				
<b>Education, skills, and training:</b> Improvement in the capacity of educational institutions due to population-fueled demand (beneficial)	operation (employment; procurement of goods and services)	Project updates to local communities • Implementation of: • Workforce Training Strategy	<b>not significant (minor) - beneficial</b>	<b>not significant (minor) - beneficial</b>
<b>Education, skills, and training:</b> Overall	construction, operation (employment; procurement of goods and services)	See above	<b>not significant (minor) - beneficial</b>	<b>not significant (minor) - beneficial</b>
<b>Community well-being:</b> 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	<b>not significant (minor) - beneficial</b>	<b>not significant (minor) - beneficial</b>
<b>Community well-being:</b> 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	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Community well-being:</b> 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.	<b>not significant (minor) - beneficial</b>	<b>not significant (minor) beneficial</b>
<b>Community well-being:</b> Increase in substance misuse due to increase in income (adverse)	operation (employment; procurement of goods and services)	Implementation of: • Employee Assistance Program	<b>not significant (minor)</b>	<b>not significant (minor)</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Social (Chapter 22) (cont'd)</b>				
<b>Community well-being:</b> Increased community pride due to reversal in population decline (beneficial)	operation (employment; procurement of goods and services)	Implementation of: • Recruitment and Retention Strategy	<b>not significant (minor)</b> - beneficial	<b>not significant (minor)</b> beneficial
<b>Community well-being:</b> 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)	Project updates to local communities Implementation of: • Employee Assistance Program	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Community well-being:</b> Increase in emissions (i.e., noise, exhaust) due to increased traffic volume in Stewart which would vary depending on development level	operation (Highway 37 and 37A)	Voluntary compliance with BC Clean Air Plan; Company Safety Management System Project updates to local communities Implementation of: • Traffic and Access Management Plan	<b>not significant (minor)</b>	<b>significant (major)</b> for unlikely development scenario; <b>not significant (moderate)</b> for likely development scenario
<b>Community well-being:</b> Increase in vehicle accidents due to increased traffic volume in Stewart (adverse) which would vary depending on development level	operation (Highway 37 and 37A)	Voluntary compliance with BC Clean Air Plan; Company Safety Management System Project updates to local communities Implementation of: • Traffic and Access Management Plan	<b>not significant (minor)</b>	<b>Not significant (moderate)</b> for unlikely development scenario; <b>not significant (minor)</b> for likely development scenario
<b>Community well-being:</b> Overall	operation (Highway 37 and 37A; employment; procurement of goods and services)	See above	<b>not significant (minor)</b>	<b>not significant (minor)</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Land Use (Chapter 23)</b>				
<b>Commercial recreation, guide outfitting, and trapping:</b> restricted access to tenures in Project area	construction, operation and closure (all); post-closure (PTMA)	Implementation of: <ul style="list-style-type: none"> <li>• Traffic and Access Management Plan</li> <li>• Monitoring and Adaptive Management</li> </ul>	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Commercial recreation, guide outfitting, and trapping:</b> noise, traffic and visibility 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: <ul style="list-style-type: none"> <li>• Traffic and Access Management Plan</li> <li>• Noise Management Plan</li> <li>• Visual Quality Management Plan</li> </ul>	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Commercial recreation, guide outfitting, and trapping:</b> wildlife resources diminished for guide outfitters and trappers due to habitat loss	construction, operation and closure (all)	Implementation of: <ul style="list-style-type: none"> <li>• Traffic and Access Management Plan</li> <li>• Noise Management Plan</li> <li>• Fish and Aquatic Habitat Management Plan</li> <li>• Terrestrial Ecosystems Management and Monitoring Plans</li> <li>• Wildlife Management and Monitoring Plan</li> </ul>	<b>not significant (moderate)</b>	<b>not significant (moderate)</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Land Use (Chapter 23) (cont'd)</b>				
<b>Recreational hunting and fishing:</b> wildlife resources diminished for resident hunters due to habitat loss	Construction, operation, closure (all)	Implementation of: <ul style="list-style-type: none"> <li>• Traffic Management Plan</li> <li>• Noise Management Plan</li> <li>• Fish and Aquatic Habitat Management Plan</li> <li>• Terrestrial Ecosystems Management and Monitoring Plans</li> <li>• Wildlife Management Plan</li> </ul>	<b>not significant (moderate)</b>	<b>not significant (moderate)</b>
<b>Subsistence:</b> restricted access to subsistence areas, including trapline 617T015 and 617T011	Construction and operation (all); closure (PTMA and TCAR); TMF and TCAR at post-closure	Implementation of: <ul style="list-style-type: none"> <li>• Access Management Plan</li> </ul>	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Subsistence:</b> wildlife resources diminished for subsistence harvesters due to habitat loss and other pressures	construction, operation, closure (all)	Implementation of: <ul style="list-style-type: none"> <li>• Traffic Management Plan</li> <li>• Noise Management Plan</li> <li>• Fish and Aquatic Habitat Management Plan</li> <li>• Terrestrial Ecosystems Management and Monitoring Plans</li> <li>• Wildlife Management and Monitoring Plan</li> </ul>	<b>not significant (moderate)</b> for construction and operation; <b>not significant (minor)</b> at closure	<b>not significant (moderate)</b>
<b>Navigable waters:</b> effects to navigational safety and access assessed in Chapter 31. See end of table.				
<b>Visual and Aesthetic Resources (Chapter 24)</b>				
Alteration of visual quality for river rafting tours, heli-skiers, guided backcountry expeditions, guided angling trips, visitors of Treaty Creek Site, and users of Highway 37	construction (CCAR, PTMA, pits, TCAR and transmission line, RSF, Hwy 37 construction camp)	Roads to mimic natural landscape as practical; leave tree buffers; re-vegetate roads at closure	<b>not significant (minor)</b>	<b>not significant (minor);</b> <b>n/a</b> for river rafting, visitors of Treaty Creek site, and Highway 37 users

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Visual and Aesthetic Resources (Chapter 24) (cont'd)</b>				
<b>Health effects from surface water:</b> 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	<b>not significant (minor)</b>	n/a
<b>Health effects from air quality:</b> health effects from emissions of NO <sub>2</sub> , SO <sub>2</sub> , CO, TSP, PM <sub>2.5</sub> , and PM <sub>10</sub> related to Project rising above background, but below guidelines	operation (mining machinery, equipment and traffic emissions, blasting [operation only])	Project design; emission control systems; vehicle and equipment maintenance; dust management; monitoring	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Health effects from air quality:</b> increase in hazard quotient for metal inhalation	operation (mining machinery, equipment and traffic emissions, blasting [operation only])	Project design; emission control systems; vehicle and equipment maintenance; dust management; monitoring	<b>not significant (minor)</b>	<b>not significant (minor)</b>
<b>Health effects from air quality:</b> increase in ILCR due to an increase in concentration of metals and PM <sub>2.5</sub> , and risk of excess mortality due in increase in concentrations of PM <sub>2.5</sub>	construction, operation (mining machinery and equipment emitting combustion PM <sub>2.5</sub> , especially near Mitchell and Treaty operating camps)	Project design; emission control systems; vehicle and equipment maintenance; dust management; monitoring	<b>not significant (minor)</b>	<b>not significant (moderate)</b>

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(continued)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Visual and Aesthetic Resources (Chapter 24) (cont'd)</b>				
<b>Health effects from the consumption of country foods:</b> 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	<b>not significant (minor)</b>	n/a
<b>Health effects from noise:</b> 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	<b>Not significant (minor)</b> during construction; <b>not significant (moderate)</b> during operation	<b>not significant (moderate)</b> for operation; <b>not significant (minor)</b> for construction
Overall residual effect on human health	all (post-closure)	See above	<b>not significant (minor)</b>	n/a

(continued)

**Table 39.2-1. Summary of Project Residual and Cumulative Effects and Mitigation Measures  
(completed)**

<b>Residual Effects</b>	<b>Project Phases and Components</b>	<b>Mitigation Measures</b>	<b>Significance of Residual Project Effects</b>	<b>Significance of Residual Cumulative Effects</b>
<b>Navigable Waters (Chapter 31)</b>				
<b>Navigable Waters:</b> effects on navigational safety and access	All phases (Mine Site, PTMA, TCAR and CCAR components)	Avoidance; putting up signage and other measures to warn of any navigational hazards, implement measures per CSA , Transport Canada standards, and DFO operational statements on navigable waters Implementation of: <ul style="list-style-type: none"> <li>• Construction Management Plan</li> <li>• Closure and Reclamation Plan</li> <li>• Fish and Aquatic Habitat Management Plan</li> <li>• Water Management Plan</li> </ul>	<b>not significant (minor)</b>	no residual cumulative effects

**Note:** n/a = not applicable BMP=best management practice, MTT=Mitchell-Treaty Twinned Tunnels, PTMA=Processing and Tailing Management Area, TMF= tailing management facility, LSA= Local Study Area, RSA=regional study area, OPCs=Mitchell Ore Preparation Complex and Treaty Ore Processing Complex , VC=valued component, HDS=high density sludge, DFO=Fisheries and Oceans Canada, COPC=Contaminants of Potential Concern

The identified **significant (major)** ratings (Section 39.3) are linked to residual cumulative effects for which the significance determination has been complicated by uncertainty over the number of other reasonably foreseeable projects that would proceed at the same time as the KSM Project. In particular, these significant residual cumulative effects are associated with the unlikely case where most or all potential future projects proceed as planned. When based on a more realistic projection of the future development, the significance of these residual effects is diminished.

### 39.2 Summary of All Residual Effects and Proposed Mitigation

The residual effects of the Project have been predicted based on the implementation of an extensive array of mitigation measures, many of which are incorporated into the Environmental Management Plans (EMPs) that are outlined in Chapter 26. These EMPs govern a wide range of Project-related activities, including construction, management of RSFs and the TMF, water storage and water management, materials and waste handling, emergency response planning, traffic, and the management of a variety of potential biophysical and socio-economic effects (e.g., for management of air quality and greenhouse gases, terrain and soils, metal leaching/acid rock drainage, groundwater, fish and aquatic habitat, wetlands, terrestrial ecosystems, wildlife, noise, heritage resources and community engagement). Many of these EMPs are identified in Table 39.2-1 for individual residual effects issues.

Many of the EMPs include monitoring provisions that will provide the basis for any necessary adaptive management to address effects that may require additional mitigation. In addition to these monitoring provisions, the Proponent has developed a Follow-up Program (see Chapter 38), as required under the CEAA (1992), to verify the predictions of environmental effects made during the EA of the Project and to confirm whether mitigation measures have achieved the desired outcomes. Follow-up programs are proposed for geohazards, groundwater quantity and quality, surface water quantity and quality, fish and aquatic habitat, wetlands, and wildlife.

Table 39.2-1 presents a summary of the Proponent's residual effects findings arising from the KSM Project EA. For each residual effect, the tables itemize the following information:

- the nature of the residual Project effect;
- the Project phase(s) and Project components with which the residual Project effect will be associated;
- mitigation measures proposed to reduce the residual Project effect;
- the predicted significance of the residual Project effects; and
- the predicted significance of any residual cumulative effects.

Potential effects for which no residual effects are predicted are not included in Table 39.2-1, but are described on a VC-by-VC basis in Chapters 6 through 25, and summarized in the "Potential Residual Effects" tables in those chapters.



### 39.3 Summary of Significant (Major) Residual Effects

Potential residual effects on the following VCs were assessed to be **significant (major)** under certain circumstances:

- *Moose VC* – potential for a significant adverse residual cumulative effect, depending on how many other future reasonably foreseeable projects proceed at the same time as the Project (Section 39.3.1);
- *Employment and income VCs* – potential for significant beneficial residual cumulative effects, depending on how many other future reasonably foreseeable projects proceed at the same time as the Project (Section 39.3.2); and
- *Community well-being VC* – potential for significant residual cumulative traffic effects in Stewart, depending on how many other future reasonably foreseeable projects proceed at the same time as the Project (Section 39.3.3).

#### 39.3.1 Moose (Wildlife)

Project effects on wildlife VCs have been assessed for the Project, with a potential significant cumulative residual effect identified for moose that is related to highway vehicle collisions in the Project area 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 that 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 together 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.

### 39.3.2 Employment and Income (Economic)

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 local study area (LSA) residents in Aboriginal and non-Aboriginal communities. During construction, a total of approximately 1,497 person-years of direct, indirect, and induced employment is predicted for residents in the region, and a total of approximately 31,094 person-years is predicted for BC residents. During operation, a total of approximately 21,810 person-years of employment is predicted for residents of the region, and a total of approximately 194,313 person-years is predicted for BC residents.

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. During construction, the average Project-related income (direct, indirect, and induced) is predicted to be approximately CAN\$99,132/year for residents in the region, and CAN\$79,115/year for BC residents. During operation, the average Project-related

income is predicted to be approximately CAN\$93,838/year for residents of the region and CAN\$66,716/year for BC residents. Regional and local businesses are also expected to benefit from the selling of goods and services to workers. The annual average contribution of the Project to GDP during construction is approximately CAN\$34 million/year within the region, \$626 million/year within BC, and CAN\$1.095 billion/year for all of Canada. The annual average contribution of the Project to GDP during operation is approximately CAN\$51 million/year within the region, CAN\$405 million/year within BC, and CAN\$809 million/year for all of Canada.

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. During construction, this consists of total tax revenue of approximately CAN\$183 million to the Government of BC and CAN\$732 million to the Government of Canada, with approximately CAN\$162 million combined going to the other provinces. During operation, this consists of total revenue of approximately CAN\$1.27 billion to the Government of BC and CAN\$5.37 billion to the Government of Canada, with approximately CAN\$1.38 billion combined going to the other provinces. The Proponent will also directly pay BC mineral tax revenues (averaging approximately CAN\$39.2 million/year for a total of approximately CAN\$2.35 billion over the life of the mine) and rural property taxes (averaging approximately CAN\$1.55 million/year for a total of approximately CAN\$85.0 million over the life of the mine).

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.

The Red Chris Mine is currently under construction and scheduled to enter production in the year 2014, with an approximate 28-year mine life. In operation, it is expected to directly employ approximately 250 workers. In addition, all identified future projects that temporally overlap with the KSM Project could, if they all proceed, provide additional employment within the regional study area (RSA) and LSA communities. These are estimated to amount to a total direct construction workforce of approximately 4,500, and a total operation workforce of approximately 2,600, distributed among the projects, and spread over a number of years. In addition, there will be ongoing employment associated with commercial land use activities, primarily fishing, guide outfitting, mineral and energy resource exploration, recreation and tourism, and timber harvesting.

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. As with other previously discussed economic effects, the nature of the changes will depend on a number of factors, including the overall condition of the economy at the time of closure and post-closure, the flexibility and adaptability of the economy, and the presence of other business opportunities. An increase in the base and diversity of the economy within the RSA and LSA communities is expected to lessen any adverse effect.

### 39.3.3 Community Well-being (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<sub>10</sub>] 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 (BC Reg. 296/97), a Community Engagement Plan, and a Traffic and Access Management Plan. 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.

### 39.4 Summary of Not Significant (Moderate Residual Effects)

Potential residual effects on the following VCs were found to have potential not significant (moderate) direct or cumulative residual effects:

- *Air quality* – potential localized effects on air quality (Section 39.4.1);
- *Soil loss* – potential for soil loss beneath the Project footprint (Section 39.4.2);
- *Soil degradation* – potential degradation of soil in the buffer zone around the permanent components of the Project infrastructure (Section 39.4.3);
- *Groundwater quantity*– potential for a significant adverse Project-specific residual effect (Section 39.4.4);
- *Groundwater quality* – (Section 39.4.5);
- *Surface water quantity* – potential to affect annual flow volumes, monthly flow distribution, peak flows, and low flows locally (Section 39.4.6);
- *Surface water quality* – potential for adverse residual cumulative effects (Section 39.4.7);
- *Fish and aquatic habitat* – potential for adverse effects on Fish VCs and aquatic habitat (Section 39.4.8);
- *Wetlands* – potential for adverse effects on wetlands linked to loss of both wetland area and wetland function (Section 39.4.9);
- *Avalanche track ecosystems* – potential loss of avalanche track ecosystems (Section 39.4.10);
- *Old forest ecosystems* – potential loss of old forest ecosystems (Section 39.4.11);
- *Mountain goats* – potential for functional habitat loss through sensory disturbances and direct habitat loss (Section 39.4.12);
- *Grizzly bears* – potential for direct Project and cumulative residual effects (Section 39.4.13);
- *Wetland birds* – potential for residual effects linked to bioaccumulation of chemicals in their systems (Section 39.4.14);
- *Noise* – potential residual effects with respect to sleep disturbance for workers and disturbance of wildlife habitat (Section 39.4.15);
- *Business opportunities and economic development* – potential beneficial residual business development effects (Section 39.4.16);

- *Land use* – potential residual effects on the amount of resources available to users of land and resources (Section 39.4.17);
- *Community well-being* – potential residual effects related to safety in the town of Stewart from increases in traffic, contingent on development level (Section 39.4.17);
- *Human health, noise* – potential for residual effects on human health associated with noise generation (Section 39.4.18); and
- *Human health, air emissions* – potential for residual cumulative increases in PM<sub>2.5</sub> particulates (Section 39.4.19).

### 39.4.1 Air Quality

Air quality has intrinsic value in terms of human health, wildlife, vegetation, odour, and visibility. As described in Chapter 7, mining activities such as blasting, material handling, and diesel combustion exhaust from generators and various mining equipment will affect ambient air quality throughout the life of the Project. During the construction phase, equipment will be used around the Mitchell-Treaty Saddle Area and the construction access adit area for the construction of the MTT. Due to the topography around these two areas, most instances of concentrations that are predicted to be above the BC and national ambient air quality objectives are expected to occur in these areas. Infrequent exceedances of one-hour NO<sub>2</sub> (0.05% in one year), and 24-hour total TSP (1.6% in one year), PM<sub>10</sub> (0.5% in one year), and PM<sub>2.5</sub> (2.5% in one year) are predicted for the construction phase. For example, exceedances of federal one-hour and annual NO<sub>2</sub> air quality objectives are predicted; however, this exceedance is predicted to only occur four hours per year.

Based on these infrequent increases in concentrations above ambient air quality objectives for these air contaminants, significance of the air quality residual direct and cumulative effects associated with the construction phase is rated **not significant (moderate)**.

Rare concentrations above the BC and national ambient air quality objectives are predicted for the operation phase for 24-hour TSP (0.8% in one year) and PM<sub>10</sub> (0.5% in one year). Since these instances are rare and they are largely attributed to fugitive dust, which has a lower health risk, the significance of air quality effects during the operation phase is rated **not significant (minor)**.

The Proponent's proposed Emissions Management Plan and Fugitive Dust Emissions Management Plan (Section 26.11) provide for various air quality mitigation measures to control contaminant concentrations. Air quality will be monitored during construction and operation to ensure the success of the proposed management strategies, and to identify additional mitigation, if necessary.

Due to the nature and frequency of instances where concentrations of criteria air contaminants are predicted to exceed air quality objectives, and because the effect on air quality is expected to be confined inside RSA, the overall significance on air quality is considered to be **not significant (minor)** for both Project and cumulative residual effects.

### 39.4.2 Soil Loss

As described in Chapter 8, the loss of ecologically functioning soil under the Project footprint will begin during construction and continue through operation. To reduce this loss, Project planning has attempted to minimize the area covered by the Project footprint, and to avoid environmentally sensitive or technically difficult areas, where possible. Where practicable, disturbed areas will be reclaimed and re-vegetated as soon as it is feasible to do so (progressive reclamation), but even so, after mine closure, the residual Project footprint (including those areas where Project infrastructure remains in place) will represent a residual loss of ecological soil function over approximately 2,554 ha of land.

Throughout most of the Project footprint, and especially in the Mine Site, the loss will have a relatively low impact on soils with high ecological values located in riparian zones, wetland complexes, alpine meadows, and river floodplains. More than 21% of permanently lost areas are currently overlain by non-soils, and another 5.7% are covered by bedrock or ice. The remaining portion is dominated by morainal and colluvial deposits, of which 43% are located on steep terrain (with greater than 50% slope grade) and/or are characterized by harsh climatic conditions. Given the low quality of soils and high natural incidence of soil disturbance in the terrain, surficial geology, and soil baseline study area, the significance of the overall direct Project effects associated with permanent soil loss in the retained portions of the Project infrastructure, other than the TMF (where it is anticipated to be **not significant (moderate)**), is predicted to be **not significant (minor)**. In addition, soil will be lost from mass movement or bulk erosion, which is similarly predicted to have **not significant (minor)** residual Project effects, and **not significant (moderate)** cumulative residual effects.

Some higher-value soils will be lost beneath the footprints of the TMF, as well as the Treaty Ore Preparation Complex (OPC), the Treaty Creek access road (TCAR), the Coulter Creek access road (CCAR), and the Treaty operating camp. Portions of these Project components will be located on the most fertile and sensitive soils in the LSA, which have developed in organic, morainal, and fluvial materials deposited in valleys. Approximately one third of the 124 ha of organic soils located in the LSA will be permanently lost. Taking into account that 1) fertile and sensitive soils comprise a comparatively small proportion of the area of lost soils and 2) a sizeable proportion of the total area of available fertile and sensitive soils will be lost, especially beneath the TMF footprint, the significance of the residual overall residual effects due to soil loss, from both land surface area lost and mass movement, is rated as **not significant (minor)** for the Project, and **not significant (moderate)** for cumulative residual effects.

Soil degradation, relating to soil compaction, fertility or contamination, is predicted to result in a lower magnitude of effects on soil quality of **not significant (minor)** for each residual effect, overall and cumulatively.

### 39.4.3 Groundwater Quantity

Project effects on groundwater quantity are assessed in Chapter 11. Excavation into the groundwater environment at both the Mine Site and the PTMA, together with Project water management systems and practices (such as mine dewatering, the creation of artificial reservoirs,

and implementation of seepage control curtains), will affect groundwater quantity locally throughout the life of the Project and beyond.

Based on groundwater flow modelling, water levels and flow patterns will diverge from baseline conditions within and near the open pits and underground block caves sites, both of the RSFs, the WSF, and the TMF. Residual effects are predicted in association with the dewatering of pits and block cave mines during operation, with pit lake water level management during post-closure, and with the development of artificial ponds with seepage control mechanisms (the TMF and the WSF). Groundwater management is planned into the long-term future for the Mitchell Pit and Mitchell Block Cave Mine, the backfilled Sulphurets Pit, the Kerr Pit, the WSF, and the TMF. Groundwater quantity effects resulting from mining activities will be permanent in the local catchments, with the imposition of water levels and flow patterns that diverge substantially from baseline conditions.

The general significance of the residual direct Project effects on groundwater quantity from components in the Mine Site and PTMA during construction through post-closure is rated **not significant (moderate)**. Iron Cap is a notable exception that is predicted to lead to **not significant (minor)** effects during operation. The extent of groundwater quantity effects is predicted to be local, 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 an open 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, so that effects will still be localized 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.

#### 39.4.4 Groundwater Quality

The Project will affect groundwater quality through the seepage of contact water. Groundwater modelling, detailed in Chapter 12, has predicted seepage of degraded water from mine facilities (the TMF, the Mitchell and McTagg RSFs, and the WSF). This seepage would occur for the duration of mine operation, and would continue long-term into post-closure. Elevated levels of certain metals are predicted to enter the groundwater environment, and this could result 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 Mine Site components of the Project. Mitigation measures, which have been incorporated into the Project design in these areas, will prevent or mitigate seepage of degraded water from entering the downstream off-site environment. 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)**.

### 39.4.5 Surface Water Quantity

As discussed in Chapter 13, the Project has the potential to affect annual flow volumes, monthly flow distribution, peak flows, and low flows at all surface water quantity VCs (i.e., stream flows within the PTMA and Mine Site) by altering the sub-catchment areas and flow pathways, changing the runoff coefficients, and regulating discharges from water storage components. Among the Project components, diversion channels and tunnels, the TMF, the WSF and the WTP, the RSFs, the open pits, and the block cave mines have the greatest potential to affect surface water quantity.

Extensive mitigation measures were included in the design for the proposed Project to avoid or reduce adverse effects on surface water quantity. Some of the key mitigation measures include diverting non-contact water around the Project to minimize storage and treatment capacities, increasing the WTP's capacity to make possible the staging of discharge to the natural hydrograph, staging discharge from the TMF so as to approximate the natural hydrograph of Treaty Creek, increasing the efficiency of diversion channels to reduce water losses, and re-aligning the diversion systems in the PTMA to protect high fisheries values in Teigen Creek.

For surface water quantity VCs within the LSA, although high magnitude effects are experienced at local scale, the extent of these effects do not extend beyond the boundaries of the LSA (which are located at Teigen Creek, Treaty Creek, and Sulphurets Creek) to downstream locations.

Based on the assessment, the significance of the residual direct Project effects on surface water quantity VCs is rated **not significant (moderate)**. For the surface water quantity RSA, the residual direct Project effects on surface water quantity VCs (i.e., stream flows within Bell-Irving and Unuk rivers) are rated **not significant (minor)**.

### 39.4.6 Surface Water Quality

Residual effects on surface water quality are assessed in Chapter 14, which are complicated by existing water chemistry in the area. Baseline concentrations of some metals found in surface water around the proposed Project footprint have been found to be elevated above freshwater aquatic life guidelines, particularly in the Sulphurets Creek drainage, but also throughout the surface water quality RSA. These elevated background levels pose management challenges for the Proponent, particularly at the Mine Site.

Project-related mining activity will increase 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 will be required to manage not only the mining contact water, but also the naturally poor-quality seeps in the Mine Site (with pH levels as low as 2.2).

At the Mine Site, selenium concentrations in effluent from the WTP are predicted to increase beyond the range of natural variability and above water quality guidelines for the protection of freshwater aquatic life (i.e., high magnitude effects). These elevated selenium levels were predicted for landscape geographical extent in Sulphurets Creek and 1.5 km downstream to monitoring station UR1 on the Unuk River. These elevated concentrations will affect water quality during the Project's operation, closure, and post-closure phases. At a regional scale, selenium concentrations at the BC-Alaska border, 35 km downstream of the Mine Site, are predicted to meet water quality guidelines, although they will be higher than baseline concentrations.

An extensive water management system is planned to divert non-contact water away from the Mine Site and to collect mine contact water in the WSF for storage, from which it will be pumped to the HDS lime WTP for treatment, prior to discharge into Mitchell Creek. The discharge schedule is staged to the natural hydrograph to minimize effects on water quality. This system will be complemented by other mitigation measures. For example, it is proposed that the Kerr Pit waste rock, which is predicted to be higher in selenium, will be backfilled into the Sulphurets Pit in lined benches. Drainage from the Sulphurets Pit will be treated at an ion-exchange Selenium Treatment Plant. Effluent monitoring and performance monitoring of waste rock, tailing, and pit walls will be undertaken as described in the Proponent's proposed Aquatic Effects Monitoring Plan (Section 26.18.2), the ML/ARD Management Plan (Section 26.14), and the Water Management Plan (Section 26.17).

Based on the assessment of increased selenium concentrations, the significance of water quality effects from Mine Site components in Sulphurets Creek and the Unuk River is rated **not significant (moderate)**. The significance of water quality residual effects in Teigen and Treaty creeks from PTMA components are rated **not significant (minor)**.

### 39.4.7 Fish and Aquatic Habitat

As discussed in Chapter 15, the Project is predicted to have residual effects on fish and aquatic habitat. At the Mine Site, extensive mitigation measures to improve water quality and minimize the potential for residual effects to fish and aquatic habitat are proposed, including the installation of the WTP on Mitchell Creek. The concentrations of most metals in surface waters will be reduced, following water treatment, but discharge from the Mine Site WTP has the potential to introduce metals into the aquatic environment that may cause toxicity to fish in downstream waterways. The area immediately downstream of the WTP discharge point is non-fish bearing, and fish are not present in Sulphurets Creek until below the cascades, approximately 9.5 km downstream (500 m upstream of its confluence with the Unuk River). Of the fish species VCs that were assessed, Dolly Varden was the only species found in Sulphurets Creek below the cascades during baseline studies. Dolly Varden, rainbow trout / steelhead, and Pacific salmon were all found in the Unuk River.

Water quality modelling predicted that the concentration of selenium in water at both the SC3 monitoring site (located in Sulphurets Creek below the cascades) and the UR1 monitoring site (in the Unuk River, just downstream of the confluence with Sulphurets Creek) will be greater than the BC water quality guideline for the protection of aquatic life (which is set at 2 µg/L) and will also exceed baseline water concentrations of selenium during the operation, closure, and post-closure phases. At the UR2 monitoring site (Unuk River, near the US border), the concentration of selenium in water is predicted to be below this water quality guideline during the operation, closure, and post-closure phases, but above baseline concentrations measured at this site.

Selenium is unique among metals in that the primary route of uptake is through the diet (i.e., through the food chain), rather than directly from the water (see Chapter 15). Increases in selenium concentrations in water relative to baseline conditions may lead to additional uptake of selenium by organisms at lower trophic levels, resulting in bioaccumulation of selenium in fish via the food chain. While selenium may accumulate in organisms of the lower trophic levels (such as periphyton or benthic invertebrates), these aquatic organisms are often more tolerant of selenium, and may be less likely to experience toxicity due to selenium bioaccumulation. In aquatic organisms at higher trophic levels, however, selenium has been associated with reproductive and developmental toxicity, particularly in egg-laying vertebrates such as fish.

Since selenium concentrations in surface water may climb above both water quality guidelines limits and background concentrations at the SC3 and UR1 monitoring sites, it is probable that fish tissue residues of selenium will also increase as a result of higher levels of selenium in the aquatic food chain. However, the probability that toxicity due to bioaccumulation of selenium may occur in fish species is less certain, since increased tissue residues do not necessarily mean increased toxicity until a threshold level is reached. There is uncertainty about whether this toxic threshold level will be reached in fish in lower Sulphurets Creek (below the cascades), or in the Unuk River, as a result of Project activities.

The uncertainty identified in this assessment will be addressed by the implementation of an Aquatic Effects Monitoring Plan (Section 26.18.2), which includes provision for additional adaptive management strategies, should monitoring reveal a selenium problem. The significance of the residual direct Project effects on fish VCs (Dolly Varden, rainbow trout/steelhead, and Pacific salmon) associated with an increase in selenium concentrations is rated as **not significant (moderate)** and **not significant (minor)** for aquatic habitat.

The significance of other residual surface water quality effects on fish VCs and aquatic habitat VCs at the Mine Site and elsewhere around the Project footprint is rated **not significant (minor)**, since these effects are considered unlikely to affect fish population viability or aquatic resources.

### 39.4.8 Wetlands

The loss of wetland function and wetland extent are closely related. The effects of the Project on wetlands is assessed for the Mine Site and PTMA in Chapter 16. Wetlands in the South Teigen and North Treaty creeks will be affected by development of the TMF. The Proponent has conducted baseline studies throughout the wetlands LSA, and has quantified the magnitude of the loss of wetland extent and wetland function. Project development will entail some wetlands

alteration (69.5 ha) or loss (59 ha), primarily in the PTMA, with a smaller amount of wetlands affected at or near the Mine Site. These effects will be reflected in changes in both wetland extent and function.

Mitigation measures largely rely on avoiding activities in wetland areas and ensuring that 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 near the Project footprint, where the losses will occur. The Wetland Compensation Plan will be implemented during the construction phase and will be complemented by a reclamation plan implemented at closure. 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 of the TMF at closure will result in 2.5 times as much wetland area in the region at closure as will be lost to the baseline wetlands setting.

Follow-up monitoring to confirm the effectiveness of the Wetland Compensation Plan in restoring wetland extent and function will assist in determining whether the wetland assessment conclusions are accurate. The follow-up program will focus on conducting vegetation surveys and biomass and photopoint monitoring at compensation sites.

The significance of direct Project effects on wetland VC's is rated **not significant (moderate)** for both the loss of wetland extent and the loss of wetland function associated with the development of the TMF. All other direct and cumulative residual effects on wetlands were assessed as **not significant (minor)**, or were completely mitigated through development and implementation of the Proponent's proposed Wetland Management Plan (Section 26.19) so that no residual effect is predicted.

### 39.4.9 Avalanche Track Ecosystems

Out of the seven terrestrial VCs assessed in Chapter 17, two resulted in **not significant (moderate)** ratings for some of their predicted residual effects—avalanche tracts and old forest ecosystems (30.4.10). Avalanche track ecosystems were assessed as part of Chapter 17, the Terrestrial Effects Assessment. Avalanches are very common in the Project area, due to the steep topography and abundant snowfall. Avalanche tracts develop in areas with frequent avalanches, and are dominated by a dense cover of deciduous shrubs or herb species. While typically linear, they can also occur over wider areas of sloping terrain. They typically initiate in the alpine or subalpine zones, where abundant snow accumulation and steeply sloping valley walls are present. As identified within the Culturally Important Plant Assessment ([Appendix 17-C](#)) and the ethnographic reports ([Appendices 30-A](#) through [30-D](#)), several plant species associated with avalanche track ecosystems have cultural importance to local Aboriginal groups (Chapters 29 and 30). They also represent important foraging areas for grizzly and black bears in the subalpine zones of BC ([Appendix 18-C](#)), and are implicitly assessed in the assessments of effects on bear habitat reported in Chapter 18.

Some Project infrastructure will result in the permanent removal of mapped avalanche track ecosystems within the terrestrial ecosystems LSA. The most affected watershed is Sulphurets Creek (with 27% lost within this watershed), for avalanche track ecosystems anticipated to be lost in their entirety. Loss estimates within the other affected watersheds are less than 5% of their respective baseline distributions. In total, within the terrestrial ecosystems LSA, an estimated 13% of the mapped avalanche track ecosystems will be lost. The losses will occur primarily as a result of the clearing of vegetation during the construction and operation phases.

Mitigation for the loss of avalanche track ecosystems is not feasible. Most losses occur directly beneath components of the proposed Project infrastructure, such as where pits will be developed. It is not practicable to create new avalanche track ecosystems, given the difficulties encountered and time required, to establish appropriate vegetation communities at alpine and subalpine elevations. Therefore the significance of residual direct Project effects on avalanche ecosystems is rated **not significant (moderate)**. As incremental loss is not expected within the Sulphurets Creek watershed, deemed most sensitive to cumulative effects given the medium magnitude effect estimated for the KSM Project, the residual cumulative effect is expected to be **not significant (minor)**. Losses in other watersheds are expected to be of low magnitude.

### 39.4.10 Old Forest Ecosystems

Old growth forests occur in sections of the Mine Site, PTMA, TCAR, and CCAR areas where they may experience loss or degradation effects as a result of the Project. Old forests are structurally complex stands typically containing large snags, coarse woody debris, large trees, and a diverse understory. As explained in Chapter 17, Section 17.1.6, old forests are important wildlife habitat, they store carbon and genetic resources, and they serve as recreational areas. Maintaining areas with the structure of old forests is a management objective within the *Nass South Sustainable Resource Management Plan* (BC MFLNRO 2012).

Approximately 345 ha (TEM data) of old forest could be lost as a result of the Project, representing approximately 17% of the mapped baseline distribution within the LSA. An estimated 34% of the baseline loss of old forests is anticipated to be from the Sulphurets Creek watershed, with approximately 25% and 18% loss of baseline old forests also estimated for the Treaty and Teigen creek watersheds respectively.

In general, loss of terrestrial systems is mitigated through measures like avoidance and progressive reclamation; however, even where reclamation objectives include the restoration of coniferous forest, their re-establishment could take hundreds of years. In addition, loss estimates with the VRI forest inventory program (rather than TEM data) suggests that the real extent of old forest ecosystems could be greater than that estimated through TEM. For these reasons, the significance of the residual direct Project effects on old forest ecosystems is rated **not significant (moderate)**. Cumulative effects relating to loss of old forest ecosystems (and all other terrestrial VCs) are anticipated to be **not significant (minor)**. Comparatively, direct Project and cumulative effects to old forest ecosystems (and all other terrestrial VCs) from degradation (e.g., from the introduction of invasive plants and dust) are anticipated to be **not significant (minor)**.

### 39.4.11 Mountain Goats

Various direct residual effects of the Project—habitat loss, disruption of movement, sensory disturbance, direct mortality, indirect mortality, and chemical hazards—may affect mountain goats. Of these, all are predicted (Chapter 18) to be **not significant (minor)** except for functional habitat loss through sensory disturbances and direct habitat loss to Project infrastructure in the Mine Site. Mountain goats are generally sensitive to noise and helicopter traffic. Activities such as blasting may cause mountain goats to leave otherwise suitable habitat surrounding the Project footprint. Approximately 1,150 ha of high-quality mountain goat winter habitat (about 2% of the winter habitat in the RSA), and 547 ha of Ungulate Winter Range (4% of that provincially designated UWR u-02-006) will be altered or removed as a result of Project construction.

Mitigation measures for sensory disturbance 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 their partial re-vegetation post-closure. Infrastructure such as bridges and roads will be designed to minimize movement obstruction. During construction and operation, traffic use of 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 contractors, and all vehicles will obey traffic signs so as to reduce vehicle-wildlife collisions.

The significance of the residual direct Project effects linked to loss and alteration of mountain goat habitat and sensory disturbance are rated **not significant (moderate)**, as are the residual cumulative effects. The significance of the overall direct effects of the Project on mountain goats is consequently (and conservatively) also rated **not significant (moderate)**, as are the overall residual cumulative effects.

### 39.4.12 Grizzly Bears

Anticipated residual Project effects on grizzly bears are associated with habitat loss and alteration, disruption of movement, direct mortality, indirect mortality, and attractants, as discussed in Chapter 18. Individually, the significance of each of these residual direct Project effects is rated **not significant (minor)**. In considering the potential for these individual direct Project effects to interact, creating additive or synergistic effects, several factors were considered:

- the amount of high-quality habitat in the wildlife RSA that is predicted to be lost or altered, which is relatively low;
- salmon food sources on the Unuk River, which are not predicted to be affected;
- the level of existing human disturbance and activity (e.g., forestry, road development and use, and hunting) in the area;
- the large home range size and habitat generalist preference of bears; and
- the mitigation that is proposed to prevent or minimize residual effects.

The overall potential direct Project-related residual effect on the local grizzly bear population may cause a shift from baseline conditions that may or may not be detectable, but which should not cross a significant threshold or otherwise adversely affect the viability of the local population. Although each of the direct residual effects to grizzly bears was individually rated as not significant (minor), when taken together, the significance of the overall residual direct Project effects on grizzly bears is rated as **not significant (moderate)**. In considering the combined effect of the KSM Project in conjunction with those of other present and potential future projects, the significance of the residual cumulative effects on grizzly bears for disruption of movement is also rated **not significant (moderate)**; although other cumulative effects on grizzly bears are predicted to individually be not significant (minor), the overall cumulative residual effect on grizzlies is also predicted to be **not significant (moderate)**.

### 39.4.13 Wetland Birds

Wetland birds were identified in Chapter 18 as potentially being affected by habitat loss and chemical hazards as a result of the Project. Residual and cumulative habitat loss is projected to be **not significant (minor)** for wetland birds. Chemical hazards could potentially result in a Project-related residual effect on migratory wetland birds because of the potential for wetland birds to bioaccumulate contaminants of potential concern (COPCs) when consuming vegetation and aquatic insects. Wetland birds could potentially be at risk when ingesting vegetation and aquatic insects in the Unuk River and North Treaty Creek, and post-closure, from the TMF and the WSF. Migratory wetland birds using the ponds in the WSF (during all Project phases) and the TMF (during operation and closure) for staging were also evaluated for direct exposure to a variety of COPCs (directly) in the water.

For the purposes of the assessment, it was assumed that wetland birds will forage for a substantial amount of time on insects and vegetation with elevated concentrations of COPCs. This is a “worst-case” assumption, since much of the breeding habitat for wetland birds occurs in areas where they will not be exposed to elevated COPCs. Wetland birds will likely forage for insects and vegetation in areas that are not affected by COPCs, as well as in those that are affected.

Wetland birds will be observed during monitoring using Project facilities where they may be exposed to COPCs, and adaptive management measures will be implemented to deter wetland birds from accessing these areas. With mitigation and monitoring, the significance of the residual direct Project effect on wetland birds linked to bioaccumulation of COPCs was rated as **not significant (moderate)**.

### 39.4.14 Noise

Potential Project noise effects were identified in Chapter 19 based on activities associated with Mine Site and PTMA components (i.e., access roads and utilities, mining pits, and the TMF), as well as different Project phases (primarily construction and operation). Potential residual direct Project effects on six noise VCs were considered—sleep disturbance, interference with speech communication, complaints, noise-induced hearing loss, noise induced rattling, and loss of wildlife habitat.

Noise during the operation phase can be broadly classified as steady, continuous noise typically associated with the continuous operation of stationary equipment (e.g., fans and generators). The character of the sound will be a low frequency droning type of sound that will vary with meteorological conditions, since the sound will propagate over large distances before it reaches receptors. Mobile equipment used during construction and operation will also sound fairly steady and continuous at the large setback distances that are being assessed. Non-continuous noise from blasting will cause short-term noise impulses that may be an annoyance to the closest human receptors, and sensory disturbance with potential effects on habitat for wildlife.

Short-term noise effects are unavoidable during major construction and mining projects, but will be minimized to the extent possible by adhering to best management practices, which will include a variety of mitigation measures. Distances from major noise sources to sleeping quarters will be maximized. Where possible, building facade insulation will be used, which has the necessary noise dampening efficiency to ensure that predicted indoor equivalent continuous noise levels (Leq levels) do not exceed 30 dBA. Other measures include avoiding the use of equipment that generates impulsive noise, minimizing the need for reversing alarms, avoiding dropping materials from a height, avoiding metal-to-metal contact on equipment, scheduling truck movements to avoid roads near mining camps, avoiding blasting configurations that could result in more than seven holes being detonated simultaneously, and ensuring that blast holes are stemmed to at least 6 m.

Of the six noise VCs assessed, sleep disturbance and noise leading to loss of wildlife habitat were both rated to have **not significant (moderate)** residual direct Project effects. Loss of wildlife habitat is discussed in more detail in Chapter 18, but briefly. Blasting activities and helicopter flights, especially during operation, may cause a startle response in animals, particularly mountain goats, causing the animals to migrate away from certain areas. These wildlife effects are described in more detail in Chapter 18. Blasting mitigation and control over flight paths and altitudes at which helicopters operate will reduce the overall degradation and loss of wildlife habitat. With regards to sleep disturbance, the only receptors that will be affected are workers sleeping in on-site camps, especially during operation. Mitigative measures, such as those listed for wildlife habitat, will reduce the impact of noise on the quality of workers' sleep. The assessment of cumulative effects as a result of the interaction of the Project with noise from the Snowfield and Brucejack projects also resulted in the determination of local **not significant (moderate)** cumulative effects for loss of wildlife habitat and sleep disturbance during construction and operation.

### 39.4.15 Business Opportunities and Economic Development

The Project is predicted to have beneficial effects on employment and income and business opportunities and economic development, as discussed in Chapter 20. During construction and operation, the Project is predicted to contribute to the economic growth, investments, and development of local businesses, such as opportunities for businesses and communities in the region to directly and indirectly supply the Project. The employment and income effects of the Project (Section 39.3.2) are expected to have beneficial effects on businesses selling goods and services to residents and businesses, which, in turn, are expected to contribute to the economic growth, diversification, and overall advancement of economic development in the Project region.



In addition to the mitigation identified for employment and income effects in Section 39.3.2, a Procurement Strategy will be developed for the procurement of goods and services for the Project. The overall objective of the Procurement Strategy will be to encourage the involvement of local and regional businesses in the Project to maximize benefits within the RSA. The goal is to enhance opportunities for both Aboriginal and non-Aboriginal businesses to benefit directly and indirectly from the Project.

With respect to cumulative effects, other reasonably foreseeable projects and activities—including the Red Chris Mine, a number of other future mine and hydroelectric projects (Chapter 20, Table 20.9-1), and commercial land use activities (i.e., fishing, guide outfitting, mineral and energy resource exploration, recreation and tourism, and timber harvesting)—have the potential to interact cumulatively with business opportunities and economic development. The Northwest Transmission Line Project is also expected to interact cumulatively, facilitating additional economic development. Overall, there are expected to be increased opportunities for businesses in the region and local communities. This, in turn, may result in growth in business productivity and competitiveness, further enhancing local business capabilities.

Because of the importance of ensuring that opportunities are available to local businesses, including Aboriginal-owned businesses, to benefit by becoming suppliers to the Project, procurement outcomes will be monitored. This will permit analysis and monitoring of accomplishments with respect to the benefits to local businesses.

Project potential effects on business opportunities and economic development have been assessed during construction and operation (comprising beneficial effects on businesses supplying the Project; economic growth and investments, and the development of local businesses; and LSA/RSA development and the broadening of the economic base). The result, as summarized in Table 39.2-1, is that all direct residual effects are each rated **not significant (moderate)**. The Project's effects on business opportunities and economic development, in conjunction with those of the Red Chris Mine and other potential future mine and hydro-electric power projects and land use activities, are predicted to result in residual cumulative effects that are also all rated **not significant (moderate)**.

### 39.4.16 Land Use

The effects of the Project on land use activities (commercial recreation, guide outfitting, and trapping; recreational hunting and fishing; and subsistence access and harvest) are assessed in Chapter 23. For these land use categories, the direct and cumulative effects have been assessed as **not significant (minor)**, except for those relating to harvesting of wildlife resources. It is anticipated that these harvesting resources may be diminished as a result of habitat loss and other pressures. Wildlife species of harvest interest are predicted to be affected by Project development within the land use LSA and RSA, including moose, black bears, grizzly bears, and mountain goats. Potential direct Project effects include habitat loss or degradation; loss of vegetative cover; disruption of movement and wildlife-vehicle collisions; as well as the opening up of resources to increased pressures associated with increased hunting, fishing, and trapping effort. The resulting change in the amount of resources is predicted to have a residual effect for commercial recreation, guide outfitting and trapping, resident hunters, as well as subsistence harvesters.

The significance of both the residual direct Project and cumulative effects on the three above (commercial, recreational and subsistence) groups of land users is predicted to be **not-significant (moderate)** during the construction and operation phases. This finding reflects not only the Project's potential effect on the amount of resources, but also the potential for the effect to occur throughout the RSA. In addition, the residual cumulative effect on the amount of available resources during closure is also assessed as **non-significant (moderate)**, given the number of other potential future projects and activities in the region.

### 39.4.17 Social – Well-being (Traffic Safety)

In general, the Project will result in not significant (minor) effects on well-being as shown in Table 39.2-1. An exception to this is relating to cumulative effects in the Town of Stewart. The Project will result in increases to traffic in the Project region, which may cumulatively interact with changes in traffic levels from other projects and activities in the region. There is uncertainty with respect to the predicted development levels that will occur in the region, which pertains to the potential effects on community well-being related to traffic effects on safety in the town of Stewart. This uncertainty is compounded because changes to safety effects such as collision rates are complex and difficult to predict; they can be affected by a number of other factors besides traffic volume, including driver behaviour, intersection configurations and treatments, road conditions, and weather, among others. Therefore, similar to the assessment for vehicle emissions (Section 39.3.3), two scenarios were considered for community well-being pertaining to traffic safety (e.g., accidents) in Stewart. For the likely development scenario (with less development and correspondingly less traffic), the residual cumulative effect is predicted to be **not significant (minor)**, raising to **not significant (moderate)** for the unlikely development scenario (where all projects proceed as planned resulting in more traffic).

### 39.4.18 Human Health – Noise

The construction and operation of the Project will introduce environmental noise to a remote area, largely originating from construction equipment, blasting activities, and vehicle and helicopter traffic. Noise-related effects on the health of noise-sensitive human receptors have been assessed in Chapter 25 accordance with the guideline published by Health Canada in April 2011, *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise* (Health Canada 2011). Hunters, trappers, and country food harvesters who are active near Project infrastructure, and off-shift Project workers residing in mining camps, were assessed as noise-sensitive human receptors.

Human health effects due to noise can include disturbance of rest and sleep, interference with speech communication, high annoyance resulting in complaints, noise-induced hearing loss, and psychological and physiological effects (e.g., stress). The noise levels associated with the construction and operation phases were modelled and assessed for potential adverse effects on human health. The assessment identified the possibility of sleep disturbance at night at three Project camps (Camps 5 and 6, to be used during the construction phase, and the Treaty operating camp to be used during the operation phase) as the only potential residual human health effects linked to noise.

Mitigation to reduce effects to human health from noise will rely on measures that reduce noise both where it originates and where it is experienced by human receptors. This will include maximizing the distance between major noise sources and sleeping quarters, and the application of appropriate levels of building insulation. Noise mitigation will be applied to vehicles and equipment throughout all phases of the Project. Noise will be monitored at various receptor locations. The selected noise monitoring locations will be suitable for confirming the noise modelling and effects assessment findings. Additional mitigation will be implemented, if necessary, to reduce the potential health impacts of noise at accommodation complexes and other sites where people require quiet conditions.

The significance of the residual direct Project effects on human health associated with noise generation is assessed as **not significant (moderate)** during the operation phase and **not significant (minor)** during construction. The significance of all other residual direct Project effects on human health is rated **not significant (minor)**, except for the residual cumulative effects of air emissions (Section 39.4.19).

### 39.4.19 Human Health – Air Emissions

The Project may have residual direct effects on human health associated with changes in air quality during the construction and operation phases, as detailed in Chapter 25. These effects have been assessed as **not significant (minor)** because BC air quality objectives and standards, which are protective of public health, were not exceeded. Human health effects were based on calculations that showed minor increases in non-threshold parameters and endpoints commonly used for air quality health assessments (excess mortality and incremental lifetime cancer risk [ILCR]).

Cumulative effects on human health due to degradation in air quality may result from the construction and operation of the Brucejack Mine at the same time as the KSM Project. The residual effect on air quality associated with the Brucejack Mine is expected to be much lower than that from the KSM Project. Thus, the probability of a cumulative effect actually occurring is low. However, given the importance attached to maintaining human health and since there is no threshold for health effects from small particulates, the potential for residual cumulative effects was assessed.

The minor cumulative increase in small particulate matter (PM<sub>2.5</sub>) may lead to a cumulative effect of medium magnitude for ILCR and excess death endpoints. Since emissions inventories have not yet been developed for these projects and dispersion and risk models have not been conducted for them, the adjusted confidence level for cumulative effects predictions is low. Bearing that in mind, the significance of the residual cumulative effect on ILCR and excess death due to potential cumulative increases in PM<sub>2.5</sub> is rated as **not significant (moderate)**.

Mitigation and monitoring for human health will rely on the mitigation and monitoring measures described in the Air Quality Management Plan (Section 26.11). Measures will include emissions and dust monitoring, and also best management practices for vehicle maintenance, road maintenance, incineration, emissions control equipment, and transport and storage of tailing and

concentrate. Any mitigation that results in an improvement in air quality will reduce potential effects on human health.

### **39.5 Table of Conditions**

Section 39.5 presents a Table of Conditions (formerly referred to as the summary of commitments; Table 39.5-1) made by the Proponent in the Application/EIS to avoid, reduce, or otherwise mitigate the potential adverse effects of the Project.

### **39.6 Nisga'a Nation Interests**

The Proponent recognizes that Nisga'a Nation have an important stake in the proposed KSM Project, since the PTMA component and the TCAR are located within the Nass Area established under the NFA. Project-related traffic along Highway 37 will travel through the Nass Area, and also through the Nass Wildlife Area. The Proponent has endeavoured to comply with Chapter 10 of the NFA, and to develop a respectful and productive working relationship with Nisga'a Nation in preparing this Application / EIS, and also in completing the Economic, Social and Cultural Impact Assessment (ESCIA) in compliance with Chapter 10, paragraph 8(f) of the NFA.

Consultations were initiated with NLG in February 2008, and since then, the Proponent has engaged Nisga'a on an ongoing basis through Working Group sessions, as well as a variety of other activities. Seabridge entered into an agreement with Nisga'a Lisims Government (NLG) to provide funding to facilitate Nisga'a participation and involvement in the EA process and also provided funding for various aspects of the ESCIA. Engagement has also included the provision of funds and training for Nisga'a citizens to work as field assistants in a range of studies undertaken for the Application/EIS, including baseline studies and the ESCIA. In September 2011, NLG participated in a helicopter visit to the Project site. NLG is a regular recipient of press releases distributed by Seabridge to provide exploration results and other updates on the Project. In June 2011, Seabridge and NLG hosted four community meetings in Nisga'a villages to provide information on the Project and answer questions.

As a result of the engagement process, various Nisga'a issues and concerns have been identified. These issues have led to improvements in Project layout and design. The assessments conducted for the Application/EIS have addressed these concerns, in addition to those of other parties. The potential effects of the Project on Nisga'a interests are addressed in detail in Chapter 29, as well as on a VC-by-VC basis in the various VC chapters (Chapters 6 through 25).

Social impacts of the Project will depend largely on the number of Nisga'a citizens who obtain mine employment and whether or not mine employment leads to a net increase in population in Nisga'a villages. There could be a modest boost in population in Nisga'a communities, which could strain housing resources. The social impacts of increased income and work schedules are likely to have both positive and negative outcomes. The Project is expected to contribute to an overall improvement in the education and skills profile of communities in the region, including Nisga'a villages.

**Table 39.5-1. Table of Conditions for the KSM Project**

Number	Condition	Timing	Responsible Authorities	Instrument
<i>Project Description</i>				
1	The EA Certificate holder must construct the Project as described and approved in the Certified Project Description. A Construction Management Plan must be developed and implemented prior to any land disturbance.	Pre-construction	<ul style="list-style-type: none"> <li>• British Columbia Environmental Assessment Office (BC EAO)</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> </ul>
<i>Environmental Management System</i>				
2	<p>The EA Certificate holder must prepare an Environmental Management System (EMS) which will outline a formal set of procedures and policies that define how the EA Certificate holder will manage potential effects of the Project on the biophysical and human environments.</p> <p>The EA Certificate holder must submit the final EMS to the British Columbia Environmental Assessment Office (BC EAO) for approval, and distribute to Nisga'a Lisims Government and potentially affected First Nations, one month before construction commences.</p>	Pre-construction	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• British Columbia Ministry of Energy, Mines and Natural Gas (BC MEMNG)</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• <i>Mines Act</i> Permit</li> </ul>
<i>Follow-up Programs</i>				
3	<p>In consultation with relevant government agencies, the EA Certificate holder must develop, implement and report on the Follow-up Programs as conceptualized in Chapter 38 and as further described in relevant EMPs. Follow-up programs are required for:</p> <ul style="list-style-type: none"> <li>• geohazards;</li> <li>• groundwater quantity and quality;</li> <li>• surface water quantity and quality;</li> <li>• fish and aquatic habitat;</li> <li>• wetlands; and</li> <li>• wildlife.</li> </ul>	Timing of development, implementation, and reporting of Follow-up Programs will be as directed by relevant government agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MEMNG</li> <li>• BC MFLNRO</li> <li>• BC MOE</li> <li>• Canadian Environmental Assessment Agency (CEA Agency)</li> <li>• DFO</li> <li>• Environment Canada-Canadian Wildlife Services</li> <li>• Natural Resources Canada</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• EA Decision Statement</li> <li>• Harmful alteration, disruption, and disturbance authorization</li> <li>• Metal Mining Effluent Regulations (SOR/2002-222) authorization</li> <li>• <i>Mines Act</i> Permit</li> <li>• <i>Environmental Management Act</i> (EMA; 2003) Effluent Permit</li> </ul>

(continued)

**Table 39.5-1. Table of Conditions for the KSM Project (continued)**

<b>Number</b>	<b>Condition</b>	<b>Timing</b>	<b>Responsible Authorities</b>	<b>Instrument</b>
<i>Notification</i>				
4	The EA Certificate holder will notify Nisga'a Nation and First Nations of spills affecting waterbodies along highways 37 and 37A.	Pre-construction until post-closure	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• CEA Agency</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• EA Decision Statement</li> </ul>
<i>Climate and Air Quality</i>				
5	<p>The Air Quality Management Plan (AQMP) and Greenhouse Gas Management Plan must be prepared and implemented in accordance with the Certified Project Description which must include the following:</p> <ul style="list-style-type: none"> <li>• use of emission control systems (e.g., baghouses) on stacks and relevant ventilation systems; and</li> <li>• monitoring and suppression of fugitive dust during construction, operation, and closure activities, and on access roads and Mine Site roads.</li> </ul>	Mitigation measures and the AQMP must be included in permit applications for the review and approval of relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MOE</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• EMA Air Permit</li> </ul>
<i>Geohazards</i>				
6	The EA Certificate holder must conduct inspections and maintenance of Project components in the Mine Site and PTMA, including the WSF, the TMF, TCAR, CCAR, and any other facilities and portion of roads, identified as having a moderate to high risk in Chapter 9 of the Application/EIS.	The plan must be included in permit applications for the review and approval of relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MEMNG</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• <i>Mines Act</i> Permit</li> </ul>
7	The Avalanche Management Plan will be implemented.			
8	A Geohazard Management Plan will be developed and implemented to minimize the potential for terrain instability associated with Project components, and will include a monitoring program to assess stability, effectiveness, and functionality during the construction, operation, and closure phases of the Project.			
9	Mitigation measures to reduce the risk associated with the Snowfield landslide will be identified and included in the Geohazard Management Plan.			

(continued)

**Table 39.5-1. Table of Conditions for the KSM Project (continued)**

<b>Number</b>	<b>Condition</b>	<b>Timing</b>	<b>Responsible Authorities</b>	<b>Instrument</b>
<i>Terrain, Surficial Geology, and Soils</i>				
10	Loss of soil as a result of erosion from surface runoff during mining activities must be minimized to the extent possible through the implementation of the: <ul style="list-style-type: none"> <li>• Terrain, Surficial Geology, and Soils Management and Monitoring Plan; and</li> <li>• Construction Management Plan</li> </ul>	The plan must be included in permit applications for the review and approval of relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MEMNG</li> <li>• BC MOE</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• <i>Mines Act</i> Permit</li> <li>• EMA Effluent Permit</li> </ul>
11	Contamination of soil from mining activities must be minimized to the extent possible through the implementation of the: <ul style="list-style-type: none"> <li>• Spill Prevention and Emergency Response Plan;</li> <li>• Dangerous Goods and Hazardous Materials Management Plan; and</li> <li>• Terrain, Surficial Geology, and Soils Management and Monitoring Plan</li> </ul>			
<i>Groundwater</i>				
12	Seepage control mechanisms as identified in the following EMPs and Certified Project Description must be implemented to minimize degradation of groundwater quality due to seepage of contact water from the WSF, TMF, and RSFs: <ul style="list-style-type: none"> <li>• Groundwater Management Plan;</li> <li>• Metal Leaching and Acid Rock Drainage Management Plan;</li> <li>• Rock Storage Facility Management and Monitoring Plan;</li> <li>• Tailing Management Facility Management and Monitoring Plan; and</li> <li>• Water Storage Facility Management and Monitoring Plan.</li> </ul>	Plans must be included in permit applications for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MEMNG</li> <li>• BC MOE</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• <i>Mines Act</i> Permit</li> <li>• EMA Effluent Permit</li> </ul>

(continued)

**Table 39.5-1. Table of Conditions for the KSM Project (continued)**

Number	Condition	Timing	Responsible Authorities	Instrument
<i>Surface Water</i>				
13	Mitigation and design measures as described in the Certified Project Description of the EA Certificate will be implemented to avoid or reduce adverse effects on surface water quantity. Some of the key mitigation measures include diverting non-contact water around the Project to minimize storage and treatment capacities, increasing the WTP's capacity to make possible the staging of discharge to the natural hydrograph, staging discharge from the TMF so as to approximate the natural hydrograph of Treaty Creek, increasing the efficiency of diversion channels to reduce water losses, and align the diversion systems in the PTMA to protect the high fisheries values situated in Teigen Creek.	Plans must be included in permit applications for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MEMNG</li> <li>• BC MOE</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> </ul>
14	The EA Certificate holder must meet receiving environment water quality standards as defined by the BC MOE. A water quality monitoring program must be implemented as described in the Water Management Plan.	Plans must be included in permit applications for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MOE</li> <li>• BC MEMNG</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Mines Act</i> Permit</li> <li>• EMA Effluent Permit</li> </ul>
15	The EA Certificate holder must develop and implement a Metal Leaching and Acid Rock Drainage Management Plan.	Plans must be included in permit applications for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MEMNG</li> <li>• BC MOE</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• <i>Mines Act</i> Permit</li> <li>• EMA Effluent Permit</li> </ul>
16	The EA Certificate holder must develop and implement a Glacier Monitoring Plan.	Plans must be included in permit applications for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> </ul>

(continued)



**Table 39.5-1. Table of Conditions for the KSM Project (continued)**

<b>Number</b>	<b>Condition</b>	<b>Timing</b>	<b>Responsible Authorities</b>	<b>Instrument</b>
<i>Surface Water (cont'd)</i>				
17	The EA Certificate holder must build and operate an HDS treatment plant to a maximum capacity of 7.5 m <sup>3</sup> /s and stage the discharge to mimic the natural hydrograph of Sulphurets Creek/Unuk River.	Plans must be included in permit applications for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MEMNG</li> <li>• BC MOE</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• <i>Mines Act</i> Permit</li> <li>• EMA Effluent Permit</li> </ul>
18	The EA Certificate holder must build and operate a selenium ion-exchange treatment plant to treat the contact water from the Kerr waste rock that is backfilled into the mined out Sulphurets Pit. A Follow-up Program must be developed and implemented to determine the effectiveness of the Selenium Treatment Plant in removing selenium from contact water.	Plans must be included in permit applications for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MEMNG</li> <li>• BC MOE</li> <li>• Environment Canada</li> <li>• CEA Agency</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• <i>Mines Act</i> Permit</li> <li>• EMA Effluent Permit</li> <li>• EA Decision Statement</li> </ul>
<i>Fish and Aquatic Habitat</i>				
19	The EA Certificate holder must develop and implement an Aquatic Effects Monitoring Plan in accordance with the Certified Project Description.	Plans must be included in permit applications and/or requests for regulatory amendments for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MEMNG</li> <li>• BC MOE</li> <li>• CEA Agency</li> <li>• Environment Canada</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• <i>Mines Act</i> Permit</li> <li>• EMA Effluent Permit</li> <li>• Metal Mining Effluent Regulations</li> <li>• EA Decision Statement</li> </ul>
20	The EA Certificate holder must develop and implement a Follow-Up Program for the protection of aquatic life for the Unuk River, Treaty Creek, and Teigen Creek.	Plans must be included in permit applications and/or requests for regulatory amendments for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• CEA Agency</li> <li>• Environment Canada</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• EA Decision Statement</li> </ul>

(continued)

**Table 39.5-1. Table of Conditions for the KSM Project (continued)**

Number	Condition	Timing	Responsible Authorities	Instrument
<i>Fish and Aquatic Habitat (cont'd)</i>				
21	The EA Certificate holder must develop a Fish Habitat Compensation Plan for the loss of fish habitat associated with the TMF before a <i>Fisheries Act</i> (1985) subsection 35(2) authorization is issued. A Follow-up Program must be developed to ensure fish habitat compensation works are effective.	Plans must be included in permit applications for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• DFO</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• <i>Fisheries Act</i> (1985)</li> </ul>
22	The EA Certificate holder must submit a Fish Habitat Compensation Plan for decision by Environment Canada before depositing a deleterious substance into the TMF should the waterbody be added to Schedule 2 of the Metal Mining Effluent Regulations (SOR/2002-222). The EA Certificate holder must implement a fish salvage program within the TMF and relocate salvaged fish to an approved location as per the Fish Salvage permit. A Follow-up Program must be developed to ensure fish habitat compensation works are effective.	Plans must be included in permit application for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• Environment Canada</li> <li>• DFO</li> <li>• CEA Agency</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• Schedule 2 Regulatory Amendment to the Metal Mining Effluent Regulations (SOR/2002-222)</li> <li>• EA Decision Statement</li> </ul>
<i>Wetlands</i>				
23	The EA Certificate holder must develop and implement a Wetland Compensation Plan to offset the loss of wetland extent and function associated with the construction and operation of the TMF.	Plans must be included in permit applications for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• Environment Canada</li> <li>• CEA Agency</li> </ul>	<ul style="list-style-type: none"> <li>• EA Decision Statement</li> <li>• EA Certificate</li> </ul>
24	The EA Certificate holder must develop and implement a Wetland Management Plan to reduce alteration of wetland habitat.			
<i>Terrestrial Ecosystems</i>				
25	The EA Certificate holder must conduct a rare plant survey prior to construction.	Pre-construction surveys	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MFLNRO</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> </ul>
<i>Terrestrial Ecosystems (cont'd)</i>				
26	The EA Certificate holder must develop and implement a Terrestrial Ecosystems Management and Monitoring Plan to assess the success of re-vegetation.	Plans must be included in permit application for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MFLNRO</li> <li>• BC <i>Mines Act</i> (1996c)</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> <li>• <i>Mines Act</i> Code Part 10</li> <li>• Reclamation Plan</li> </ul>

(continued)

**Table 39.5-1. Table of Conditions for the KSM Project (continued)**

<b>Number</b>	<b>Condition</b>	<b>Timing</b>	<b>Responsible Authorities</b>	<b>Instrument</b>
<i>Wildlife and Wildlife Habitat</i>				
27	The EA Certificate holder must develop and implement a Wildlife Management Plan to monitor the effects of the Project on wildlife (including habitat loss and alteration, attractants, sensory disturbance, disruption to movement, direct and indirect mortality).	Plans must be included in permit application for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MFLNRO</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> </ul>
28	The EA Certificate holder must develop and implement a Migratory Bird Protection Plan to ensure the Project minimizes effects on migratory birds.	Plans must be included in permit application for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• Environment Canada</li> <li>• CEA Agency</li> </ul>	<ul style="list-style-type: none"> <li>• EA Decision Statement</li> <li>• EA Certificate</li> </ul>
29	The EA Certificate holder must conduct a bat hibernacula survey in McTagg Creek prior to construction.	Pre-construction	<ul style="list-style-type: none"> <li>• BC MOE</li> <li>• BC EAO</li> <li>• CEA Agency</li> </ul>	<ul style="list-style-type: none"> <li>• EA Decision Statement</li> <li>• EA Certificate</li> </ul>
30	A wildlife Follow-up Program must be developed to verify the conclusions of the EA for moose, mountain goat, grizzly bear, and wetland birds.	Pre-construction	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• BC MFLNRO</li> <li>• CEA Agency</li> <li>• Environment Canada-Canadian Wildlife Services</li> </ul>	<ul style="list-style-type: none"> <li>• EA Decision Statement</li> <li>• EA Certificate</li> </ul>
<b>Socio-economic Effects</b>				
<i>Heritage and Archaeological Resources</i>				
31	The EA Certificate holder must prepare a Heritage Management and Monitoring Plan that describes protocols and procedures to be followed in the event that any archaeological or cultural heritage resources are found.  Any mitigation measures required must be carried out in accordance with the current BC Archaeology Branch Standard Operating Procedures.	Plans must be included in permit applications for the review and approval of the relevant agencies.	<ul style="list-style-type: none"> <li>• BC MFLNRO</li> <li>• BC EAO</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Heritage Conservation Act</i> (1996b)</li> <li>• EA Certificate</li> </ul>

(continued)

**Table 39.5-1. Table of Conditions for the KSM Project (completed)**

<b>Number</b>	<b>Condition</b>	<b>Timing</b>	<b>Responsible Authorities</b>	<b>Instrument</b>
<i>Social</i>				
32	The EA Certificate holder must implement speed restrictions on truck travel through Stewart to minimize noise disruption to residents in Stewart. A Traffic and Access Management Plan will be developed and implemented to address vehicle related noise and dust issues.	Pre-construction	<ul style="list-style-type: none"> <li>• BC EAO</li> <li>• British Columbia Ministry of Transportation and Infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> </ul>
<i>Land Use</i>				
33	The EA Certificate holder must enter into discussions with the holder of trapline [TR621T003] and the holder of trapline [TR617T015] to negotiate compensation for Project activities that overlap the trapping areas affected by the Mine Site and the PTMA.	Pre-construction	<ul style="list-style-type: none"> <li>• BC EAO</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> </ul>
<i>Economics</i>				
34	The EA Certificate holder must develop and implement a Labour Recruitment and Retention Strategy and Workforce Training Strategy.	Pre-construction	<ul style="list-style-type: none"> <li>• BC EAO</li> </ul>	<ul style="list-style-type: none"> <li>• EA Certificate</li> </ul>

Cultural effects related to shift work and increased income may be either positive or negative, and will depend on the number of Nisga'a workers who obtain mine employment, their ability to balance their current cultural activities and obligations, and the availability of family and community support. Effects of employment on Nisga'a diet, ceremony attendance, and opportunities to harvest will be mitigated sufficiently so as to accommodate the cultural needs of Nisga'a employees. Nisga'a access to traditional resources is not expected to be adversely effected to any significant degree. The Project footprint that overlaps Nisga'a rights and interests in the Nass Area is very small compared to the rest of the Nass Area and the Project area is not known to be intensively used by Nisga'a citizens.

Economic effects should be largely beneficial during construction and operation. The Project is predicted to have a long-term, positive effect on direct, indirect, and induced employment that will have a net economic benefit for Nisga'a citizens, businesses, and government. At closure, an adverse economic effect is anticipated as most Project-related income from jobs, contracts, and business opportunities will come to an end. The Project is projected to contribute to investment in, and growth of, Nisga'a businesses through the significant infusion of business revenue. The cumulative effects of other Projects will enhance business growth and development, and depending on the timing of the life-cycles of different projects, may off-set the adverse effects of closure of the KSM Project.

Heritage impacts are expected to be limited at most. Treaty Rock is located 27 km from the TMF and 19 km southeast of the TCAR, and is too distant from the Project footprint to be at risk. For Nisga'a people, the heritage / cultural value of the Nass Area where the PTMA is proposed may be impacted by a number of Project-related activities or components. Such effects are difficult to quantify, but relate largely to how the Project could affect Nisga'a experience while out on the land and / or their ability to pursue traditional / cultural practices and activities. Only minor effects are anticipated, given the Proponent's proposed mitigation measures, and the fact that the Project overlaps with a relatively small portion of the Nass Area that is relatively remote from the primary areas of Nisga'a traditional resource use and activity.

Few health effects are anticipated. The safety of country foods will be maintained through mitigation and monitoring of potential changes in soil, water and air toxicity. Health and safety policies have been established for the Project that comply with government regulations, including mitigation measures to minimize accidents related to handling and use of dangerous goods and hazardous materials. On-site employee support and counselling services will be available to assist workers who develop mental health problems linked to work stress.

Potential effects on Nisga'a use of lands and resources are expected to be effectively minimized by the Proponent's environmental protection and other resource mitigation measures. Potential effects on surface water and groundwater, fish and aquatic resources, and wetlands will be effectively managed by the mitigation and monitoring provisions in a range of EMPs, and are not expected to lead to significant off-site effects.

A low to moderate Project impact on moose populations in the Nass Wildlife Area is anticipated. Cumulative effects on moose could be greater, depending on the volume of other development that proceeds at the same time as the Project. Cumulative effects of concern include vehicle collision mortality along Highway 37. Any Project-related effects on mountain goats will be experienced outside areas with Nisga'a interests. Cumulative effects on the local grizzly bear population may

cause a shift from baseline conditions, but are not expected to adversely affect the viability of the local population.

Project-related residual effects are predicted for migratory wetland birds, associated with habitat loss and alteration, and also chemical hazards. Residual effects linked to habitat loss and alteration are predicted for migratory forest and alpine birds. Wetlands within the PTMA cover a very small portion of the total wetlands in the Nass Area, are relatively isolated and are not known to be wetland bird harvesting areas for Nisga’a citizens.

Approximately 4,361 ha of vegetation will be lost or degraded as a result of Project construction and operation in the Nass Area. A very small proportion of lost and degraded vegetation will be unavailable for traditional harvesting and subsistence activities, amounting to less than 0.2% of the Nass Area. The amount of forest and plant resources lost or degraded that could currently support culturally important plants is minimal, compared to the total suitable habitat available to Nisga’a harvesters.

The Proponent’s commitments to address the potential effects of the Project on Nisga’a Nation interests are briefly summarized in Table 39.6-1.

**Table 39.6-1. Summary of Commitments to Address Potential Effects on Nisga’a Rights and Interests**

<b>Discipline</b>	<b>Nisga’a Rights and Interests</b>	<b>Summary of Effects (D=direct; C=cumulative) [Project Phase<sup>1</sup>]</b>	<b>Commitment</b>
Social	Demographic change	Impact of in-migration on housing (D, C) [Cn, Op]	Management practices, monitoring, and adaptive management Project updates for local communities Employee Assistance Program.
Social	Education, skills development, and training	Overall improvement in education and skills levels (D, C) [Cn, Op]	Management practices, monitoring, and adaptive management Labour Recruitment and Retention Strategy Labour Relations Strategy Procurement Strategy Workforce Training Strategy
Social	Community well-being	Improvements due to jobs and higher incomes (D, C) [Cn, Op] Potential adverse effects related to higher incomes (e.g., substance abuse, domestic issues, stress, mental health issues) (D) [Cn, Op] Potential adverse effects due to loss of employment at closure (D, C) [CI]	Management practices, monitoring, and adaptive management Labour Recruitment and Retention Strategy includes financial management and general life skills development training programs to enhance the income benefits Workforce Training Strategy Workforce Transition Strategy

(continued)

**Table 39.6-1. Summary of Commitments to Address Potential Effects on Nisga’a Rights and Interests (continued)**

Discipline	Nisga’a Rights and Interests	Summary of Effects (D=direct; C=cumulative) [Project Phase <sup>1</sup> ]	Commitment
Cultural	Participation in traditional activities and practices	Increased access – depletion of traditional resources and/or heritage/cultural value of the land (D, C) [Cn, Op, CI] Restricted access (D) [Cn, Op] Noise and traffic (D, C) [Cn, Op] Mine-related shift work (D, C) [Cn, Op]	Traffic and Access Management Plan Noise Management Plan Wildlife Management and Monitoring Plan Aquatic Effects Monitoring Plan Fish and Aquatic Habitat Effects Protection and Mitigation Plan Wetland Management Plan Terrestrial Ecosystems Management Plan Access Management Plan
Economic	Employment and income	Jobs for Nisga’a citizens (D, C) [Cn, Op] Loss of jobs for Nisga’a (D, C) [CI]	Labour Recruitment and Retention Strategy Procurement Strategy Workforce Training Strategy Workforce Transition Program
Economic	Business opportunities and economic development	Nisga’a business development (D, C) [Cn, Op] Supply contracts (D, C) [Cn, Op]	Procurement Strategy: assist businesses in securing supplier contracts (direct and indirect); assist compliance with procurement requirements and expectations, includes specific focus on Aboriginal-owned businesses Heritage Management Plan
Heritage	Archaeological and heritage sites	Potential for disruption or damage to sites (D) [Cn, Op]	
Health	Individual and community health and wellbeing.	Mine traffic (D, C) [Cn, Op] Potential Project effects on the health of country foods, drinking water quality, and air quality (D, C) [Cn, Op] Project employment stress (D, C) [Cn, Op] Occupational and non-occupational hazards (D, C) [Cn, Op]	Air Quality Management Plan Noise Management Plan Traffic and Access Management Plan Access Management Plan Water Management Plan Dangerous Goods and Hazardous Materials Management Plan Emergency Response Plan Explosives Manufacture, Storage, handling, and Use Management Plan
Current Land and Resource Use	Fish and aquatic resources	Changes in groundwater quantity (TMF) (D) [Cn, Op, PC] Changes groundwater quality (TMF) (D) [Cn, Op] Changes in surface water quality (TMF) (D) [Cn, Op, C, PC] Changes in surface water quantity (TMF) (D) [Cn, Op, C, PC] Habitat loss and alteration (TMF) (D) [Cn] Loss of wetlands (TMF)(D) [Cn]	Fish Habitat Compensation Plans Wetlands Compensation Plan Aquatic Effects Monitoring Pplan Fish Salvage Plan Fish and Aquatic Habitat Effects Protection and Mitigation Plan ML/ARD Management Plan Groundwater Management Plan Water Management Plan

(continued)

**Table 39.6-1. Summary of Commitments to Address Potential Effects on Nisga’a Rights and Interests (completed)**

Discipline	Nisga’a Rights and Interests	Summary of Effects (D=direct; C=cumulative) [Project Phase <sup>1</sup> ]	Commitment
Current Land and Resource Use	Wildlife and migratory birds	Habitat loss and alteration (D) [Cn] Disruption of movement (D) [Cn, Op] Sensory disturbance [Cn, Ops, Cl] Direct mortality (D) [Cn, Ops] Indirect mortality [Cn, Ops] Attractants [Cn, Ops, C, PC] Chemical hazards [Cn, Ops, Cl, PC]	Wildlife Management Plan

**Notes:**

**1 Project Phases: Cn=construction, Op=operation, Cl=closure, PCI=post-closure**

The Proponent is committed to continuing with meaningful engagement with Nisga’a Nation throughout the Application/EIS review stage of the EA process and beyond, and believes that the opportunity exists for Nisga’a members to benefit significantly from the employment, income, and business opportunities offered by the Project. The Proponent will put forth best efforts to reach a Benefits Agreement with NLG that will provide a solid framework for Nisga’a participation in the Project.

**39.7 First Nations Interests**

The Proponent recognizes that the potentially affected First Nations have an important stake in the proposed KSM Project. The federal and provincial government have directed the Proponent to consult with the Tahltan First Nation, the Gitanyow First Nation (specifically wilp Wiiltsx-Txawokw) and the Gitxsan Nation (notably wilp Skii km Lax Ha, which is representing itself in the EA Process).

Consultations were initiated with these groups in February and March of 2008, and since then, the Proponent has engaged them on an ongoing basis through working group sessions, as well as a variety of other activities. Seabridge entered into agreements with First Nations to provide funding to facilitate their participation and involvement in the EA process, and has funded or offered to fund traditional knowledge research and various other studies. Engagement has also included the provision of funds and training for First Nations people to work as field assistants in a range of studies undertaken for the Application/EIS, including baseline studies. At various times, the Proponent has arranged site visits for First Nations representatives. These First Nations receive press releases distributed by Seabridge to provide exploration results and other updates on the Project. Seabridge has participated in various community meetings, as well as in one-on-one meetings with First Nation representatives.

As a result of the engagement process, various First Nation issues and concerns have been identified. These issues have led to improvements in Project layout and design. The assessments conducted for the Application/EIS have addressed these concerns, in addition to those of other parties.



The potential effects of the Project on First Nation interests are addressed in detail in Chapter 30, as well as on a VC-by-VC basis in the various VC chapters (Chapters 6 through 25).

Social impacts of the Project on First Nations will depend largely on the number of people from First Nations communities who obtain Project employment and the number of people who decide to move to (or back to) one of these communities. Most infrastructure and services in First Nations communities have the capacity to absorb the increase in demand from the relatively small influx of mine-related workers that is anticipated for any given community. Housing may be the one element of infrastructure that is in short supply in these communities.

The capacity of local and regional educational facilities to meet educational and training demands is expected to be adequate. The educational and skills profile of First Nations communities should gradually improve, in part due to education upgrading and skills training undertaken by Aboriginal peoples in order to pursue Project-related employment opportunities. The social impacts of increased income and work schedules are likely to have both positive and negative outcomes resulting from individual choices, the Proponent's policies and actions, and the level of response and support from community leaders.

Cultural effects are expected to be limited. Access to traditional resources is not expected to be adversely effected to any significant degree by the Project. The Project footprint overlaps only the Skii km Lax Ha and Tahltan Nation traditional territories, and the mine footprint is very small compared to the rest of these traditional territories. External harvesting pressure from outsiders enabled by Project access roads and rights-of-way is expected to be very limited during construction and operation, but could increase after mining ceases. Potential effects of the Project on moose could affect some First Nations cultural practices with respect to their harvest of moose.

Economic effects should be largely beneficial during construction and operation. The Project is predicted to have a long-term, positive effect on direct, indirect, and induced employment that will have a net economic benefit for First Nations communities and businesses. At closure, an adverse economic effect is anticipated as most Project-related income from jobs, contracts, and business opportunities will come to an end. The Project is projected to contribute to investment in, and growth of, First Nations businesses through the significant infusion of business revenue. The cumulative effects of other Projects will enhance business growth and development, and depending on the timing of the life-cycles of different projects, may off-set the adverse effects of closure of the KSM Project.

Heritage impacts are expected to be limited at most. Treaty Rock is located 27.3 km from the TMF and 19.2 km southeast of the TCAR, and is too distant from the Project footprint to be at risk. The heritage/cultural value of traditional territories may be impacted by a number of Project-related activities or components. Such effects are difficult to quantify, but are expected to be modest, given the proposed mitigation. Effects would relate largely to how the Project could affect the experience of Aboriginal people while out on the land and / or their ability to pursue traditional/cultural practices and activities. The Project footprint is relatively small in comparison to the extent of First Nations' traditional territories.

Few health effects are anticipated. The safety of country foods will be maintained through mitigation and monitoring of potential changes in soil, water, and air toxicity. Health and safety policies have been established for the Project that comply with government regulations, including mitigation measures to minimize accidents related to handling and use of dangerous goods and hazardous materials.

Potential effects on First Nations use of lands and resources are expected to be effectively minimized by the Proponent’s environmental protection and other resource mitigation measures. Potential effects on surface water and groundwater, fish and aquatic resources, and wetlands will be effectively managed by the mitigation and monitoring provisions in a range of EMPs, and are not expected to lead to significant off-site effects.

Traffic from the KSM Project alone is not predicted to cause the moose population to decline. However, when a range of other projects, their associated cumulative traffic and the resultant moose mortality were added to the modelled population, the current population size is predicted to decline under certain development and traffic scenarios. Potential direct and cumulative effects on grizzly bears, mountain goats, and wetland birds—depending on the species—could include habitat loss and alteration, disruption of movement, direct mortality, indirect mortality, sensory disturbance, attractants, and the bioaccumulation of COPCs, but all are predicted to be manageable. The amount of forest and plant resources lost or degraded that could currently support culturally important plants is minimal compared to the total suitable habitat available to First Nations harvesters.

The Proponent’s commitments to address the potential effects of the Project on Nisga’a Nation interests are briefly summarized in Table 39.7-1. Residual effects of the Project are anticipated to have a low impact on Aboriginal rights. The ability to continue practising traditional activities, i.e., fishing, hunting, and gathering, will not be affected for current and future generations.

**Table 39.7-1. Summary of Specific Commitments to Address Potential Effects to Aboriginal Customs, Practices, and Interests**

<b>Discipline</b>	<b>First Nations</b>	<b>Summary of Effects (D=direct; C=cumulative) [Project Phase<sup>1</sup>]</b>	<b>Mitigation Measures</b>
Social	Demographic change	Impact of in-migration on housing (D, C) [Cn, Op]	Management practices, monitoring and adaptive management Project updates to local communities Employee Assistance Program
Social	Education, skills development and training	Overall improvement in education and skills levels (D, C) [Cn, Op]	Management practices, monitoring and adaptive management Labour Recruitment and Retention Strategy Labour Relations Strategy Procurement Strategy Workforce Training Strategy

(continued)

**Table 39.7-1. Summary of Specific Commitments to Address Potential Effects to Aboriginal Customs, Practices, and Interests (continued)**

<b>Discipline</b>	<b>First Nations</b>	<b>Summary of Effects (D=direct; C=cumulative) [Project Phase<sup>1</sup>]</b>	<b>Mitigation Measures</b>
Social	Community well-being	Improvements due to jobs and higher incomes (D, C) [Cn, Op]  Potential adverse effects related to higher incomes (e.g., substance abuse, domestic issues, stress, mental health issues) (D) [Cn, Op]  Potential adverse effects due to loss of employment at closure (D, C) [CI]	Management practices, monitoring and adaptive management  Labour Recruitment and Retention Strategy Workforce Training Strategy Workforce Transition Strategy
Cultural	Participation in traditional activities and practices	Increased access – depletion of traditional resources and/or heritage/cultural value of the land (D, C) [Cn, Op, CI] Restricted access (D) [Cn, Op] Noise and traffic (D, C) [Cn, Op] Mine related shift work (D, C) [Cn, Op]	Traffic and Access Management Plan  Noise Management Plan Wildlife Management and Monitoring Plan Aquatic Effects Monitoring Plan Fish and Aquatic Habitat Effects Protection and Mitigation Plan Wetland Management Plan Terrestrial Ecosystems Management Plan Access Management Plan
Economic	Employment and income	Jobs for First Nations (D, C) [Cn, Op] Loss of jobs for First Nations (D, C) [CI]	Labour Recruitment and Retention Strategy Procurement Strategy Workforce Training Strategy Workforce Transition Program
Economic	Business opportunities and economic development	First Nations business development (D, C) [Cn, Op] Supply contracts (D, C) [Cn, Op]	Procurement Strategy
Heritage	Archaeological and heritage sites	Potential for disruption or damage to sites (D) [Cn, Op]	Heritage Management Plan

(continued)

**Table 39.7-1. Summary of Specific Commitments to Address Potential Effects to Aboriginal Customs, Practices, and Interests (completed)**

Discipline	First Nations	Summary of Effects (D=direct; C=cumulative) [Project Phase <sup>1</sup> ]	Mitigation Measures
Health	Individual and community health and well-being	Mine traffic (D, C) [Cn, Op] Potential Project effects on the health of country foods, drinking water quality, and air quality (D, C) [Cn, Op] Project employment stress (D, C) [Cn, Op] Occupational and non-occupational hazards (D, C) [Cn, Op]	Air Quality Management Plan Noise Management Plan Traffic and Access Management Plan Access Management Plan Water Management Plan Dangerous Goods and Hazardous Materials Management Plan Emergency Response Plan Explosives Manufacture, Storage, handling, and Use Management Plan
Current Land and Resource Use	Fish and aquatic resources	Changes in surface water quality (TMF) (D) [Cn, Op, C, PC] Changes in surface water quantity (TMF) (D) [Cn, Op, C, PC] Habitat loss and alteration (TMF) (D) [Cn] Loss of wetlands (TMF) (D) [Cn]	Fish Habitat Compensation plans Wetlands Compensation Plan Aquatic Effects Monitoring Plan Fish Salvage Plan Fish and Aquatic Habitat Effects Protection and Mitigation Plan ML/ARD Management Plan Water Management Plan

**Notes:**

**1 Project Phases: Cn=construction, Op=operation, Cl=closure, PCI=post-closure**

The Proponent is committed to continuing with meaningful engagement with the throughout the Application review stage of the EA process and beyond, and believes that the opportunity exists for Aboriginal people to benefit significantly from the employment, income, and business opportunities offered by the Project.

### 39.8 Moving Forward

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 as the result of adverse environmental, social, economic, cultural, heritage, and health effects and issues identified through this engagement and via professional and government regulatory consultation. The KSM Project Application/EIS provides comprehensive information on how the Project plan, as currently proposed, avoids,

minimizes, and/or compensates for identified potential adverse effects to environmental and human systems, while enhancing benefits. 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 minimize potential adverse effects.

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 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.

In summary, the intent of this Application/EIS is to demonstrate that mining of the KSM Project property will be economically beneficial and environmentally responsible. 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 in a manner that: 1) reasonably and effectively mitigates identified adverse local or regional environmental or economic effects to acceptable levels, and 2) does not undermine family or community well-being, public health, or the rights and interests of potentially affected Aboriginal peoples. 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.

As noted in Chapter 2, with the filing of this Application/EIS, the Proponent is also seeking concurrent permitting of several key regulatory permit applications. Under the BC *Environmental Assessment Act* (2002) Concurrent Approval Regulation (BC Reg. 371/2002), proponents may apply for provincial statutory authorizations required for their projects while the review of their Applications is being conducted. No such authorizations can be issued unless and until an EA Certificate has been issued. Where concurrent permit applications are filed, permitting agencies must issue a decision on those applications within 60 days after an EA Certificate is granted.

Seabridge is seeking permits under the Concurrent Approval Regulation (BC Reg. 371/2002) for various provincial authorizations. For the CCAR, TCAR, and Temporary Frank Mackie Glacier access route, Seabridge is seeking concurrent approval of *Forest Act* (1996a) licences to cut and special use permits, and also *Water Act* (1996d) permits. Seabridge is also seeking concurrent approval of various authorizations for the proposed construction camps.

### References

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1992. Canadian Environmental Assessment Act, SC. C. 37.
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- 1996b. Heritage Conservation Act, RSBC. C. 187.
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2003. Environmental Management Act, SBC. C. 53.
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