

# 1. Introduction and Project Overview

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This chapter provides an overview of the Proponent, including contact information, name of the legal entity that would develop, manage, and operate the Project, and corporate and management structures. The chapter also specifies the mechanism used to ensure corporate policies will be implemented, summarizes the key elements of the Proponent's environment, health and safety management system, and discusses how the system will be integrated into the Project.

## 1.1 PROPONENT DESCRIPTION

### 1.1.1 Proponent

Pretium Resources Inc. (Pretivm, or the Proponent) is a publicly traded company, with common shares trading on the Toronto (TSX: PVG) and New York (NYSE: PVG) stock exchanges with an office in Vancouver, BC. Pretivm was incorporated under the *Businesses Corporations Act* on September 17, 2010.

Pretivm acquired the Brucejack Gold Mine Project (the Project) and mineral tenures and the adjacent Snowfield Property mineral tenures from Silver Standard Resources Inc. (Silver Standard) in 2010. The gold and silver resources of the Project and the adjacent Snowfield Property are Pretivm's core assets. Pretivm is focusing its resources on advancing the Brucejack Gold Mine Project. The Snowfield Property is a longer-term opportunity. All tenures are in good standing till 2025.

Pretivm intends to develop, manage, and operate the Brucejack Gold Mine Project, including obtaining the authorizations to construct, operate, close, and reclaim the Project.

### 1.1.2 Corporate Governance and Management Structures

Pretivm's corporate governance practices are consistent with applicable current Canadian regulatory policies and standards (Pretivm 2013a). Pretivm is classified as a foreign private issuer in connection with their listing on the New York Stock Exchange (the NYSE); Pretivm's corporate governance practices also incorporate best practices derived from NYSE's corporate governance practices. There are no significant differences between the company's corporate governance practices and the NYSE Rules (Pretivm 2013a).

Pretivm's Board of Directors is mandated to ensure that the company is responsibly managed, including financial (i.e., including insurance and liability management), environmental, and social responsibilities. The Board is responsible for the annual review and adoption of the strategic business plan proposed by Pretivm management.

Pretivm is managed under the direction of:

- Robert A. Quartermain, B.Sc. (Hons), M.Sc., D.Sc., P.Geo., President and Chief Executive Officer, Director.
- Joseph J. Ovsenek, B.A.Sc., P.Eng., LLB, Executive Vice President and Chief Development Officer.

Other members of Pretivm's management team include:

- James A. Currie, B.Sc., P.Eng., Chief Operating Officer;
- Kenneth C. McNaughton, M.A.Sc., P.Eng., Chief Exploration Officer;

- Ian I. Chang, M.A.Sc., P.Eng., Vice President, Project Development;
- Michelle Romero, B.A., MLS, Vice President, Corporate Relations;
- Warwick Board, Ph.D., P.Geo, MAusIMM, Pr.Sci.Nat, Chief Geologist;
- Kevin Torpy, B.Sc., Director, Operations;
- Max Holtby, B.Sc., P.Geo., Director, Permitting; and
- Peter de Visser, B.Comm., C.A., Chief Financial Officer.

Communications regarding this Application/EIS should be directed to:

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### 1.1.3 Environment, Health, and Safety Management System

Health, Safety, and Environment (HSE) will be incorporated into the design, constructability, and operability of the Project. HSE programs and initiatives will be essential to the Project's success.

The development of HSE practices will require a high level of communication, motivation, and involvement, including alignment with site contractors on topics such as safety training, occupational health and hygiene, hazard and risk awareness, safe systems of work, and job safety analysis. Tools will be implemented for performance tracking and accountability, including procedures for incident management.

As the Project progresses into the Construction and Operation phases, Pretivm will expand the environmental management system resources, including employing an Environmental Manager (see Chapter 28, Environmental Management System for more detail). Current Pretivm policy states that the Environmental Manager and Chief Development Officer will consult with the President on the management of environmental matters (Pretivm 2013b). Key objectives of the Environmental Manager's role will include communicating the environmental policy to all company employees; assisting appropriate operational project and regional managers in developing procedures to ensure compliance with the corporate environmental policy; informing and briefing appropriate personnel on statutory requirements and proposed changes to statutes; developing decommissioning and reclamation procedures and obtaining relevant regulatory approvals; and ensuring due diligence environmental audits on potential company acquisitions are carried out (Pretivm 2013b). The Chief Development Officer will also play an important role in the company's environmental management strategy by ensuring an effective environmental protection management system is developed and monitored; assigning responsibilities associated with senior positions within the structure; ensuring effective and efficient reporting procedures are in place; and reviewing non-compliance incidents and participating in remedial actions required (Pretivm 2013b).

## 1.2 GUIDING PRINCIPLES

The Proponent is committed to using the environmental assessment (EA) process as a planning tool used to ensure that Project decisions (and related physical activities and components) are considered in a careful and precautionary manner in order to avoid or mitigate the possible adverse effects. Key principles that will guide the development of the Project are described below.

### 1.2.1 Precautionary Principle

The Government of Canada document *A Framework for the Application of Precaution in Science-based Decision Making About Risk* (2003) sets out guiding principles for the application of precaution to science-based decision making in areas of federal regulatory activity for the protection of health and safety and the environment and the conservation of natural resources. This framework states that:

*The application of “precaution”, “the precautionary principle” or “the precautionary approach” recognizes that the absence of full scientific certainty shall not be used as reason for postponing decisions where there is a risk of serious or irreversible harm.*

The Proponent will use technically and economically feasible mitigation measures to avoid and mitigate adverse effects that may arise from the Project. The lack of full scientific certainty regarding whether significant adverse effects are probable or likely to occur will not be used as a reason to postpone the implementation of required mitigation measures. The Proponent is committed to applying the precautionary principle as a strategy in all phases of Project planning and design.

The Project Application Information Requirements (AIR) and EIS Guidelines require that Pretivm demonstrate that all aspects of the Project have been examined and planned in a careful and precautionary manner in order to ensure that they would not cause irreversible damage to the environment, especially with respect to environmental functions and integrity, system tolerance and resilience, and/or the human health of current and future generations. This is demonstrated by Pretivm’s utilization of prescribed standard methodology recommended in provincial and federal guidelines and legislation for assessing significant adverse effects. Reference documents included the Canadian Environmental Assessment Agency’s (CEA Agency) Operational Policy Statement: *Assessing Cumulative Environmental Effects under the CEAA, 2012* (CEA Agency 2013) and *Cumulative Effects Assessment Practitioners’ Guide* (CEA Agency 1999). An effects assessment is the process of identifying and quantifying the effects of a proposed project (i.e., its components and related physical activities) on environmental, social, economic, heritage, and health conditions.

### 1.2.2 Community Knowledge and Aboriginal Traditional Knowledge

Subsection 19(3) of the *Canadian Environmental Assessment Act, 2012* (2012) states that “the environmental assessment of a designated project may take into account community knowledge and Aboriginal traditional knowledge”. Community knowledge and Aboriginal knowledge refers to knowledge acquired and accumulated by a community or an Aboriginal community, through generations of living in close contact with a particular area or territory.

The integration of community and Aboriginal traditional knowledge is an important consideration during the EA planning process. Communication and cooperation with local communities and Aboriginal peoples, including Treaty Nations, First Nations, and the Métis, is required to ensure Project impacts on potential or established Aboriginal and treaty rights, and related interests in the Project area, are minimized to the extent possible.

### 1.2.3 Public Consultation

One of the principles identified in the *Canadian Environmental Assessment Act, 2012* (2012) and the *BC Environmental Assessment Act* (2002b) is to ensure there are opportunities for meaningful participation during an EA. Both Acts require that the public have an opportunity to participate in an EA and an opportunity to comment on documents produced during the EA. The overall objective of meaningful public participation is best achieved when all parties have a clear understanding of the proposed Project as early as possible in the EA process. Proponents are required to provide current information about their project to the public and, in particular, to the communities likely to be most affected by their project.

The Proponent recognizes the importance of public participation and is committed to considering and, where possible, addressing the issues and/or concerns raised by the public throughout all phases of the EA. Chapter 3, Information Distribution and Consultation, of the Application/EIS describes the information distribution and consultation activities undertaken prior to submitting the Application/EIS and the activities planned during the Application/EIS review stage.

### 1.2.4 Aboriginal Consultation

The Proponent has engaged with Aboriginal peoples and groups potentially affected by the Project, or that have potential or established Aboriginal and treaty rights and related interests in the Project area. Engagement with Aboriginal groups was initiated prior to or shortly after submitting the Project Description to the CEA Agency and the BC Environmental Assessment Office (BC EAO).

## 1.3 PURPOSE OF THE PROJECT

The purpose of the Project is to undertake sustainable mineral exploration extraction activities in alignment with the objectives of responsible resource development, as outlined in the Government of Canada's *Economic Action Plan 2012* (Government of Canada 2012), and to foster economic growth and prosperity in BC as outlined in *British Columbia's Mineral Exploration and Mining Strategy* (BC MEM 2012) and in the *BC Jobs Plan* (Government of British Columbia 2012).

The Brucejack Gold Mine Project involves the economic extraction of the gold and silver resources from the Valley of Kings Zone (VOK) and West Zone (WZ) deposits on the Brucejack Property. The life-of-mine (LOM) is expected to be a minimum of 22 years, which will include an initial Construction phase projected to last two years. The mine will produce approximately 16 million tonnes (Mt) of mineralized material at a rate of up to 2,700 tonnes per day (tpd), and would generate positive economic impacts for both the company and BC, including employment, business opportunities, and tax payments. The Project is comprised of high-grade, gold-rich veins within a larger bulk-tonnage gold-silver envelope, which has one of the largest undeveloped high-grade gold resources held by an exploration company in the world, offering Pretivm a catalyst for achieving near-term production.

Based on mineral resource estimates compiled to date, it is expected that the underground mine would be developed to support more than 500 jobs during a two-year construction period and more than 300 jobs over a minimum 22-year mine life, and will provide important economic opportunities for communities in northwest British Columbia.

With respect to the demand for gold, the consumer market for gold is dominated by India and China, which together account for 60% of the global jewelry sector and as much as 50% of the total bar and coin demand. As gold prices fell from 2012 to 2013, lower prices generated a surge in the demand from consumers for jewelry but at the same time the year-on-year overall investment demand declined. Overall, the demand for gold is highly volatile and depends on gold prices and the state of the

economy, that is, at lower prices the demand is higher. However, in some cases the negative economic conditions can overwhelm the positive impacts of lower prices and still reduce the demand (as it happened in the European market in the first and second quarter of 2013). Therefore, although the demand for jewelry and gold coin and bars increased from 2012 to 2013, the total demand decreased. Moreover, as a result of lower prices in 2013, the global gold supply shrunk by 6% as compared to the past year; the reason for that was a marked contraction in gold recycling (World Gold Council 2013). Historical demand for gold is presented in Figure 1.3-1.

The total demand for silver slightly fell from 2010 to 2012; however, it was still higher as compared to the demand recorded prior to 2010. The dip was mostly observed in the demand for industrial applications of silver as a result of the challenging economic environment in the industrialized countries. Jewelry and silverware fabrication remained virtually unchanged over the last decade, with significantly lower demand for silver in photography as a result of a shift to digital cameras (The Silver Institute 2013a). Historical demand for silver is presented in Figure 1.3-2.

Most of gold and silver production in the province of BC is exported to other countries. In 2008, the top destination countries for the export of gold, in its primary stage<sup>1</sup>, included Japan (57%), South Korea (21%), and China (20%). The top destination countries for BC silver (in primary stage) included Japan (64%), South Korea (20%), and China (14%). The United States import BC gold and silver in a more refined stage that includes pure mineral, semi-finished or/and finished products (BC MEM Statistics 2013e).

It is expected, therefore, that the Project will support industrial development needs, help to meet the overall global gold and silver demand, as well as contribute to the provincial total exports.

## 1.4 PROJECT LOCATION, ACCESS, AND HISTORY

### 1.4.1 Location

The Brucejack Property is located at 56° 28' 20" N latitude by 130° 11' 31" W longitude (Universal Transverse Mercator [UTM] 426,967E 6,258,719N North American Datum [NAD] 83 Zone 9), which is approximately 950 kilometres (km) northwest of Vancouver, 65 km north-northwest of Stewart, and 21 km south-southeast of the closed Eskay Creek Mine (Figure 1.4-1). The Project is located within the Regional District of Kitimat-Stikine and Electoral Area A of the Regional District of Bulkley Nechako.

### 1.4.2 Project Location in Relation to Aboriginal Traditional Territories and Lands Defined under the *Nisga'a Final Agreement*

The Project is located within the traditional territories claimed by the Skii km Lax Ha and Tahltan First Nation, and the Nass Area of Nisga'a Nation as defined in the Nisga'a Final Agreement (NFA; Government of Canada, Government of BC, and Nisga'a Nation 2000). The Métis Nation also has interests in the general region of the Project.

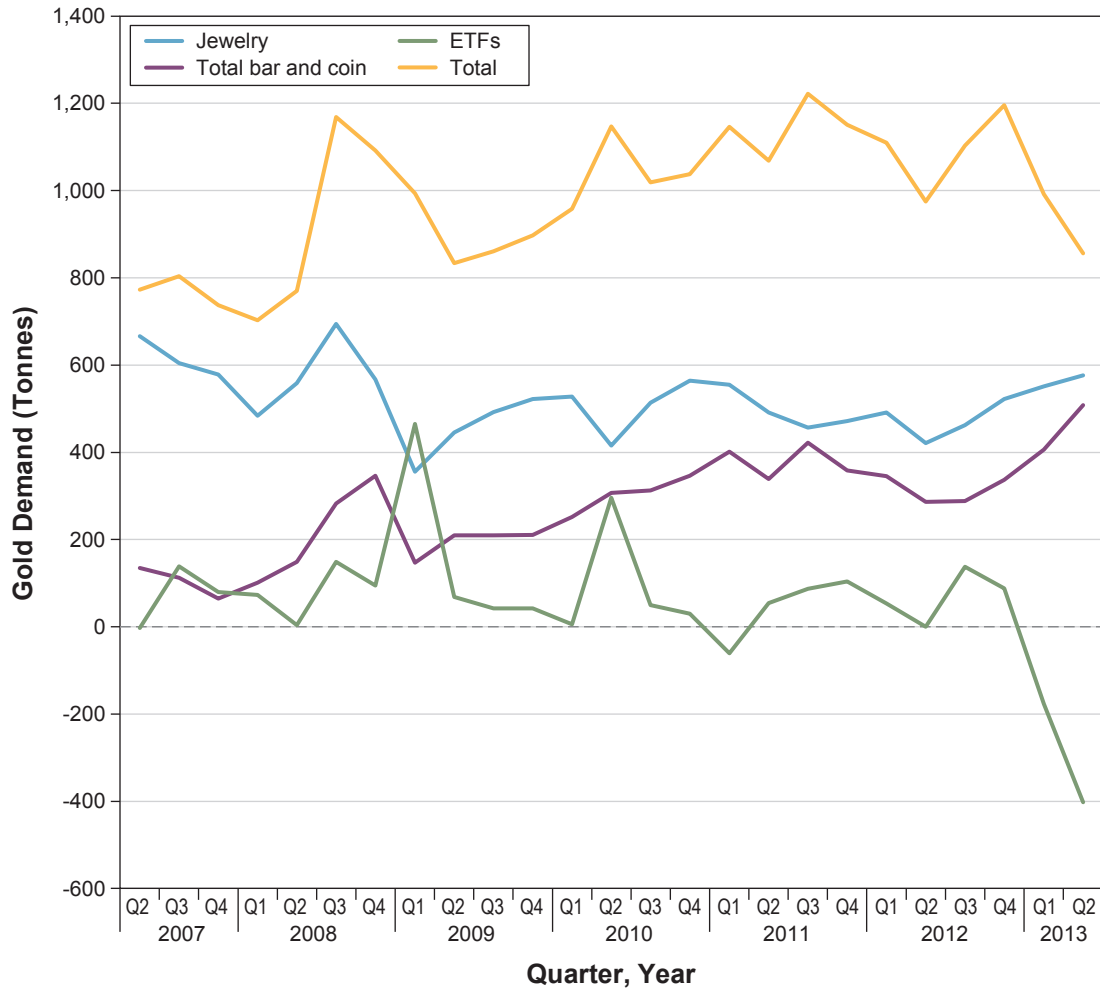
#### Skii km Lax Ha

Skii km Lax Ha traditional territory extends from the north side of the Cranberry River to Ningunsaw Pass, along the Nass and Bell-Irving rivers, and overlaps with the location of proposed Project infrastructure (Figure 1.4-2).

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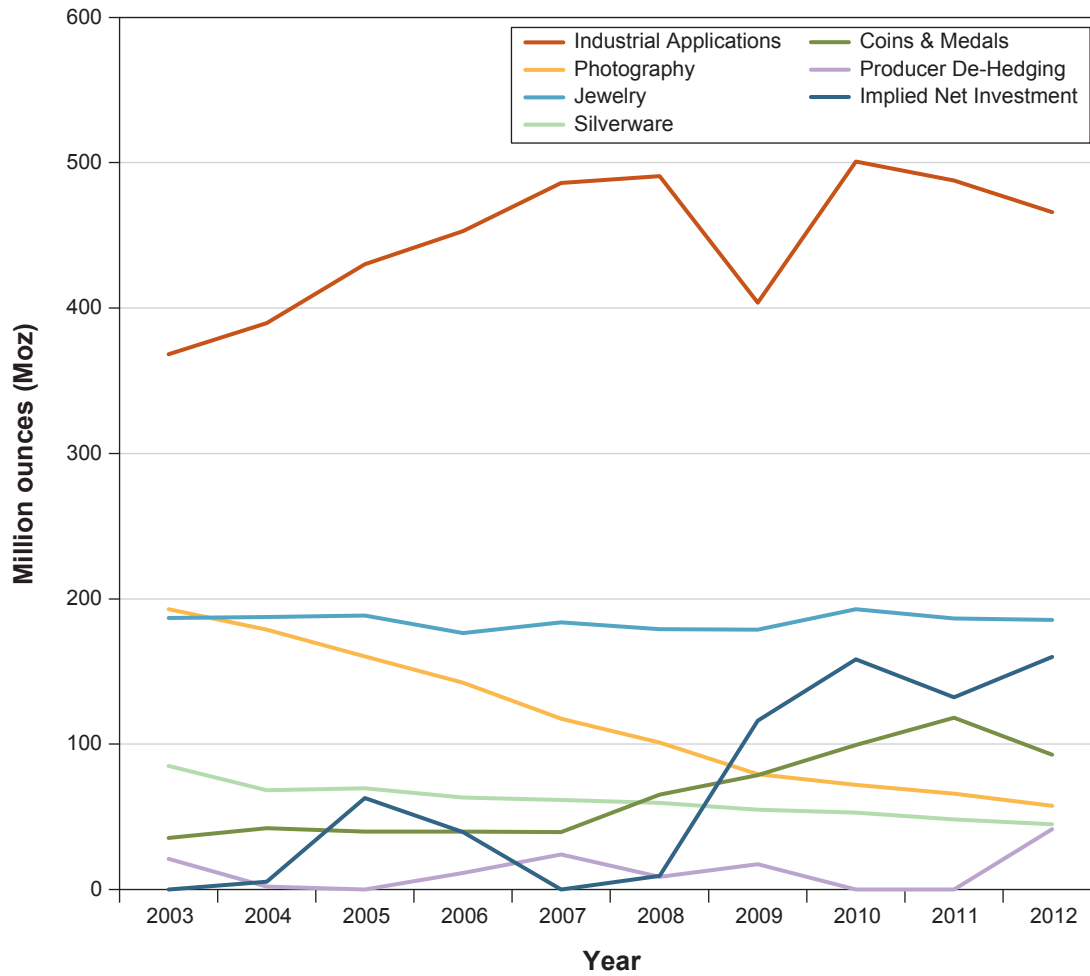
<sup>1</sup> Primary stage (I) involves the discovery of ore, ore extraction, and processing to the concentrate stage. Scrap material, ash, and tailings have been placed in this category.

**Figure 1.3-1**  
**Historical World Demand for Gold**



Source: World Gold Council, 2013.

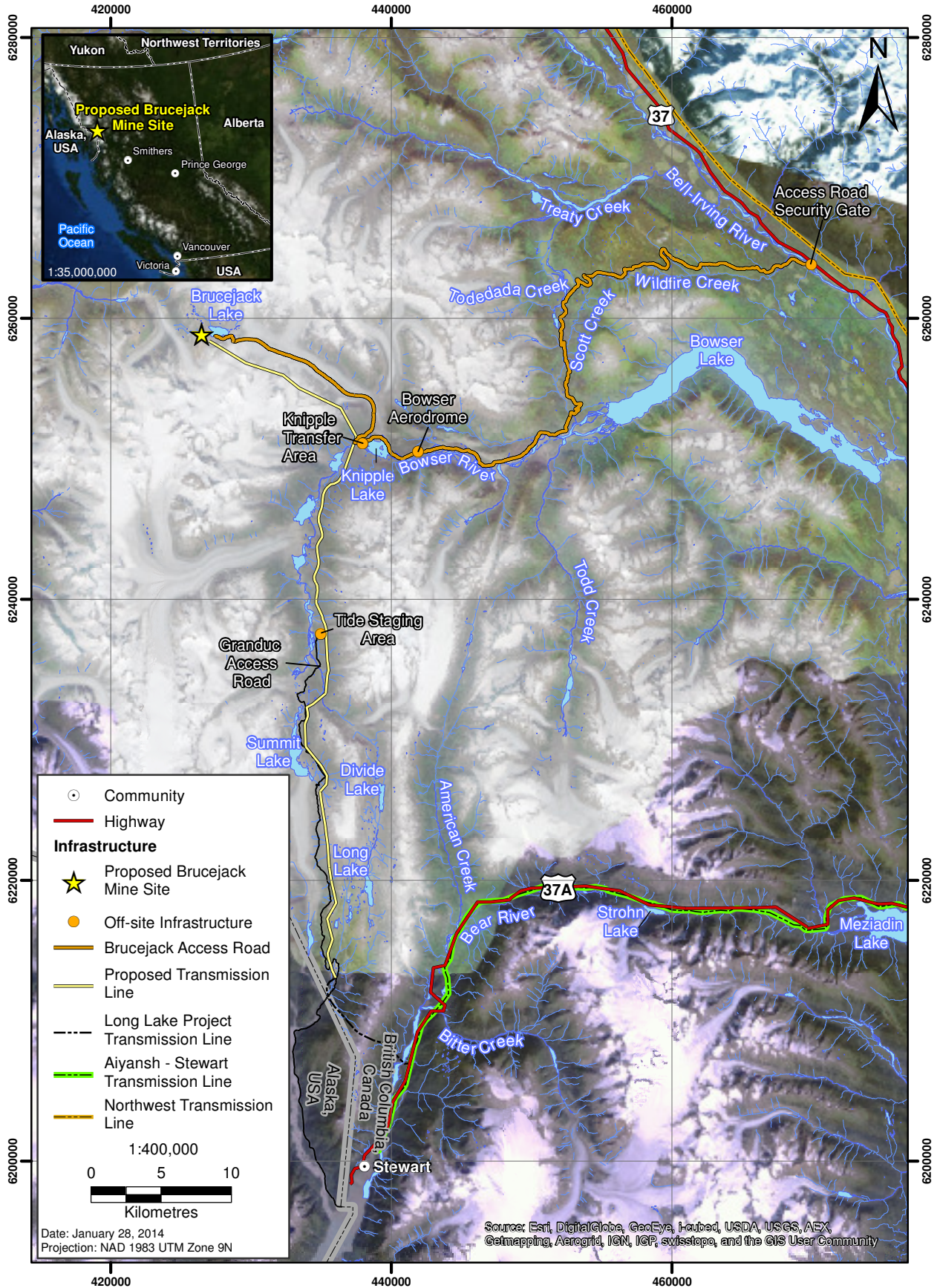
**Figure 1.3-2**  
**Historical World Demand for Silver**



Source: The Silver Institute, 2013a.

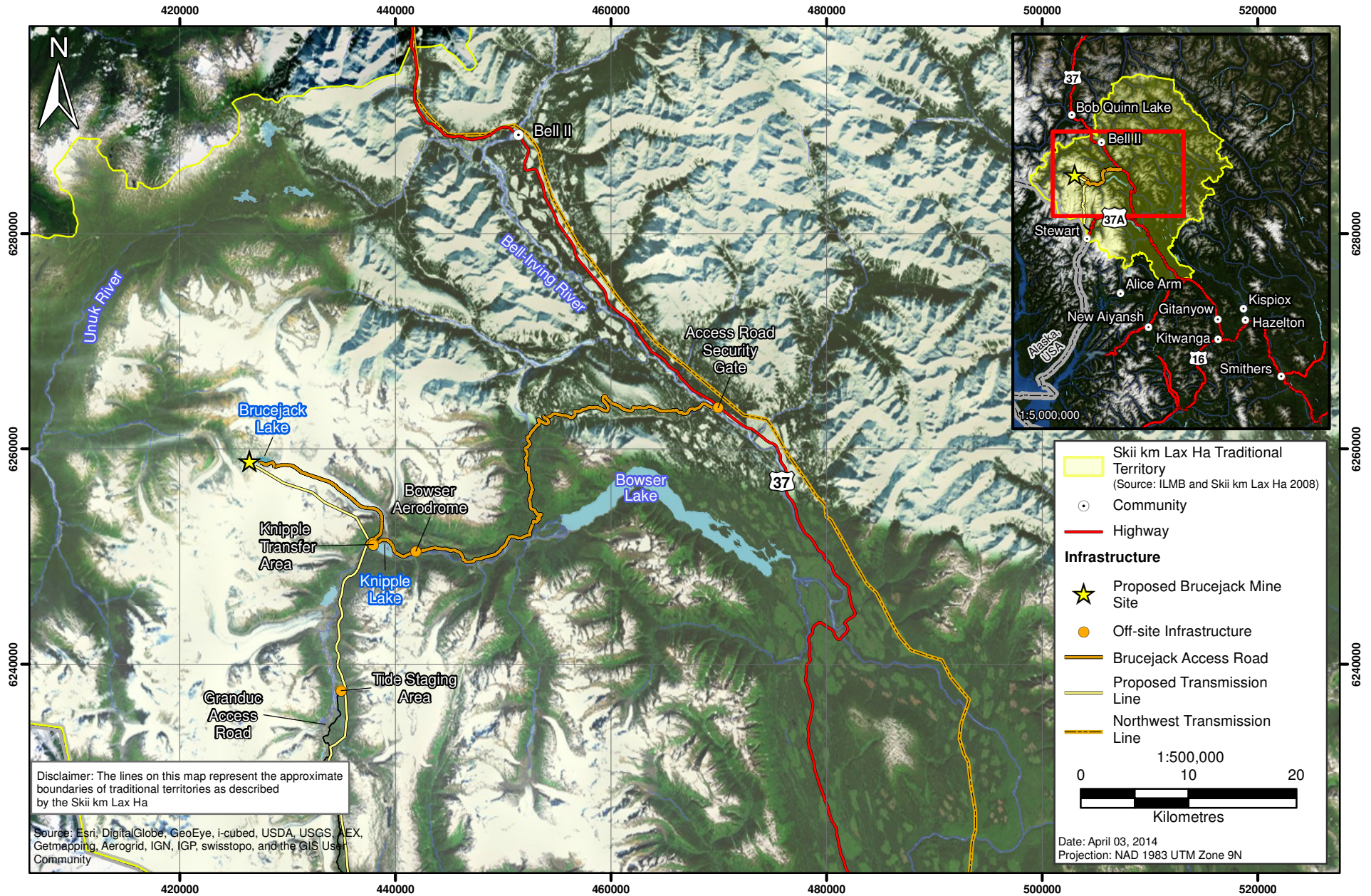
Figure 1.4-1

Location of Brucejack Gold Mine Project





**Figure 1.4-2**  
**Skii km Lax Ha Traditional Territory**



### Nisga'a Nation

Proposed Project infrastructure is located within the Nass Area as defined in the *Nisga'a Final Agreement* (NFA; Figure 1.4-3). The Nisga'a Nation is a treaty nation with a constitutionally recognized government and specific rights and interests set out in the NFA, which came into effect in May 2000 (Government of Canada, Government of BC, and Nisga'a Nation 2000). The NFA provided for the transfer of 1,992 km<sup>2</sup> of Crown land to the Nisga'a Nation (now known as Nisga'a Lands).

### Tahltan Nation

The traditional territory of the Tahltan Nation lies to the north of the Project (Figure 1.4-4) and encompasses 93,500 km<sup>2</sup>. The territory includes the areas surrounding the Stikine River drainage basin in the Coast and Cassiar mountains. The southern boundary of the territory follows the Unuk River drainage from the BC/Alaska border and a portion of Treaty Creek and the Nass River. The closest Tahltan community to the Project is the Iskut First Nation located in the village of Iskut found along Highway 37 to the north of Bob Quinn.

### Métis

There are two Métis chartered communities existing south of the Project: the Northwest BC Métis Association in Terrace and the Tri-River Métis Association in Smithers (Métis Nation British Columbia n.d.).

#### **1.4.3 Access**

The Property is accessed via a 73-km road that extends from Highway 37 to the current exploration camp at Brucejack Lake. The road section, with the exception of the Knipple Glacier section, will require upgrading to: improve safety; allow for a speed limit of up to 40 km/h; and handle the higher traffic loadings and volumes from both Construction and Operation activities. Road upgrading will include minor re-alignments of the sharper curves, reductions of the steeper grades, and additional surfacing of some sections. The access road will be referenced as the Brucejack Access Road throughout the Application/EIS, except in reference to past and present use to support exploration activities.

#### **1.4.4 History**

Exploration of the Brucejack Property and the surrounding region dates back to the 1880s, when placer gold was discovered at Sulphurets and Mitchell creeks. Placer mining was intermittently undertaken throughout the early 1900s and remained the main focus of prospecting until the mid-1930s (Wardrop 2011).

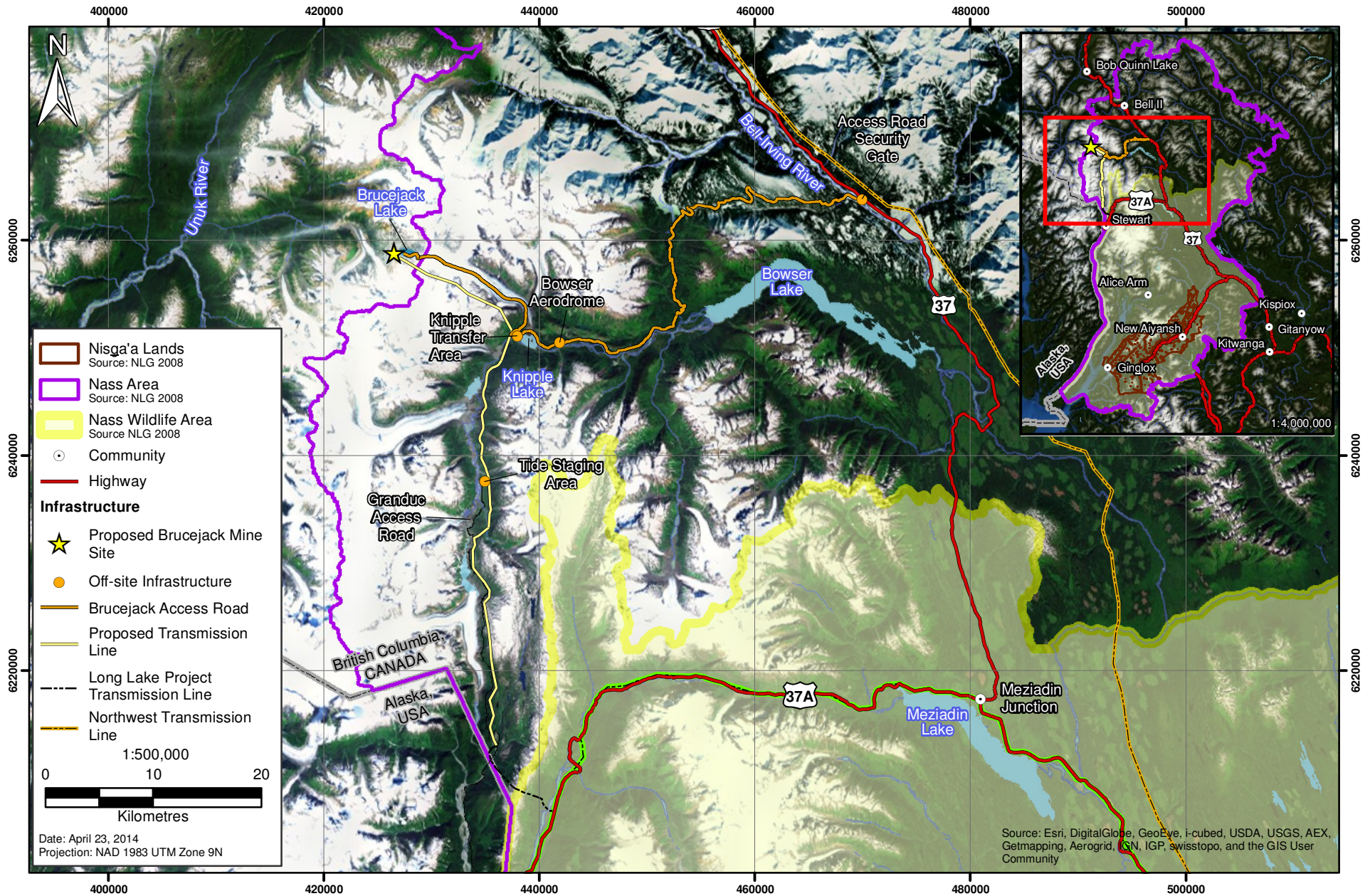
In 1935, prospectors discovered copper-molybdenum mineralization on the Sulphurets Property in the vicinity of the main copper zone, approximately 6 km northwest of Brucejack Lake; however, claims were not staked until 1960. From 1935 to 1959, the area was relatively inactive with respect to prospecting. However, it was intermittently evaluated by a number of different parties and several small copper and gold-silver occurrences were discovered in the area of Sulphurets and Mitchell creeks (Wardrop 2011).

In 1960, prospectors staked the main claim group covering the known copper and gold-silver occurrences, which collectively became known as the Sulphurets Property. The Sulphurets Property was a larger claim group that included what is now the Brucejack Property.

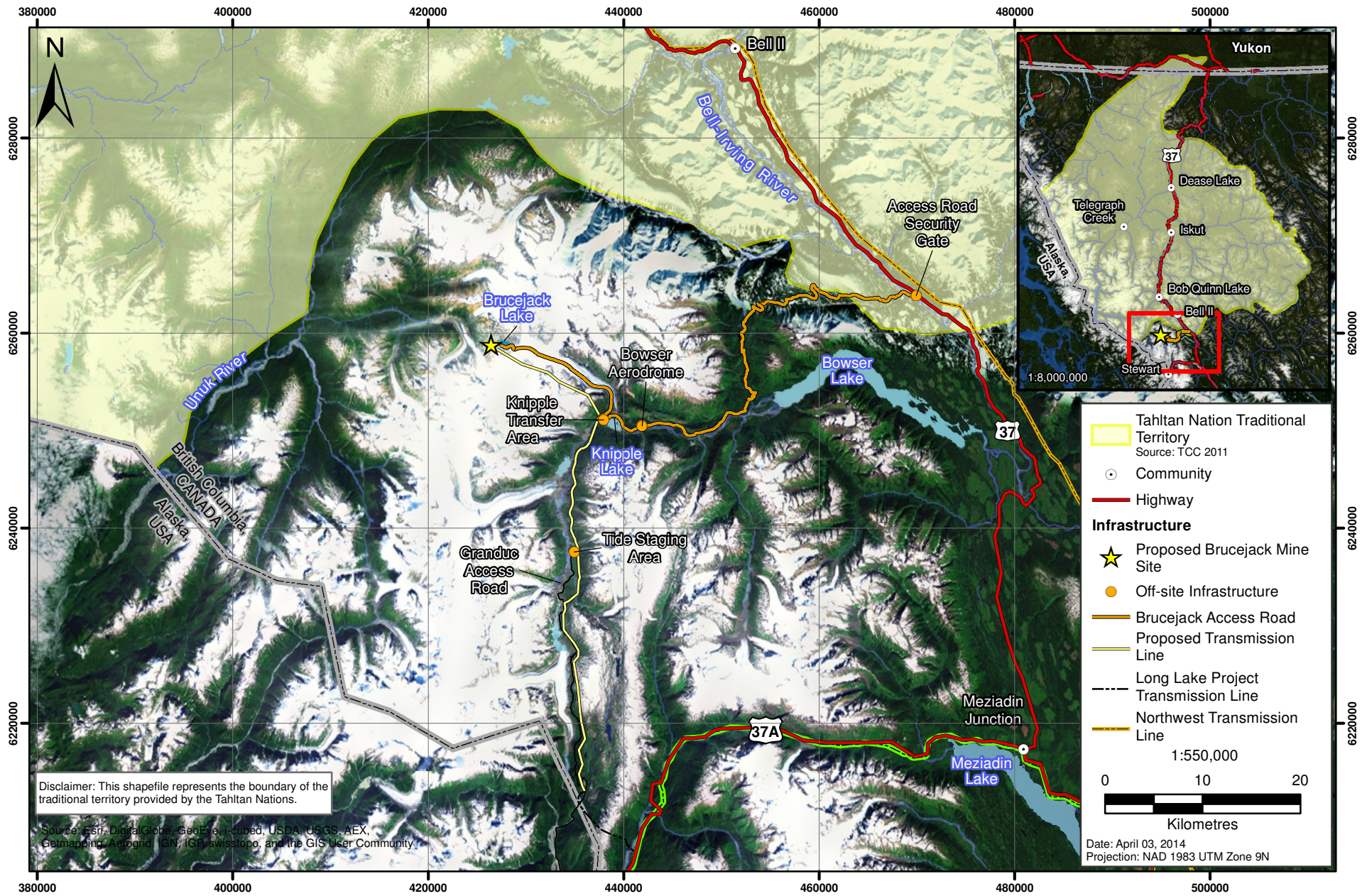
Between 1986 and 1991, the Newcana Joint Venture spent approximately \$21 million developing the West Zone (WZ) and other smaller precious metal veins on what would later become the Brucejack Property. The historic adit near Brucejack Lake dates from this time. Waste rock and ore from this advanced exploration activity was deposited into Brucejack Lake. Newcana was a joint venture between Newhawk Gold Mines Ltd. (Newhawk) and Lacana Mining Corp.; however, work completed by the joint venture was managed by Newhawk.

Figure 1.4-3

Nass Area, Nass Wildlife Area and Nisga'a Lands as defined in the Nisga'a Final Agreement



**Figure 1.4-4**  
**Tahltan Nation Traditional Territory**



During the late 1980s a small underground mining operation was developed by Catear Resources at the Goldwedge Property northwest of Brucejack Lake. The mine operated briefly, beginning in 1988, and included a 50 tpd mill and ancillary structures, some of which are still standing. Pretivm has conducted some voluntary cleanup of the Catear Goldwedge Property site.

From 1991 to 1992 Newhawk conducted exploration on the Brucejack Property. In 1999, Silver Standard acquired its initial interest in the property and conducted exploration activities in 2009 and 2010 until its sale to Pretivm.

## 1.5 PROJECT TENURE

The Brucejack Property is located on provincial Crown land and consists of eleven mineral claims that cover the target mineral resource, totaling 3,199.28 hectares (ha) in area. All claims are in good standing until January 31, 2025 (Table 1.5-1). These claims are part of a larger block of mineral claims held by Pretivm that includes the Snowfield and Bowser Properties (Figure 1.5-1). The larger block of mineral claims totals 260 mineral claims totalling approximately 104,136 ha in and around the Brucejack Property (Table 1.5-2). The claims extend from the proposed mine site area east to Highway 37, including parts of the Bowser River, Scott Creek, and Wildfire Creek watersheds, and along parts of the transmission line right-of-way. The Project is situated within the Sulphurets District, Skeena Mining Division.

**Table 1.5-1. Mineral Claims for Brucejack Property**

Tenure No.	Tenure Type	Map No.	Owner	Pretivm Interest	Status	In Good Standing to:	Area (ha)
509223	Mineral	104B	Pretium Exploration Inc.	100%	Good	31-Jan-25	428.62
509397	Mineral	104B	Pretium Exploration Inc.	100%	Good	31-Jan-25	375.15
509400	Mineral	104B	Pretium Exploration Inc.	100%	Good	31-Jan-25	178.63
1027396	Mineral	104B	Pretium Exploration Inc.	100%	Good	31-Jan-25	125.09
1027397	Mineral	104B	Pretium Exploration Inc.	100%	Good	31-Jan-25	53.63
1027398	Mineral	104B	Pretium Exploration Inc.	100%	Good	31-Jan-25	160.92
1027399	Mineral	104B	Pretium Exploration Inc.	100%	Good	31-Jan-25	983.61
1027400	Mineral	104B	Pretium Exploration Inc.	100%	Good	31-Jan-25	500.39
1027429	Mineral	104B	Pretium Exploration Inc.	100%	Good	31-Jan-25	196.61
1027431	Mineral	104B	Pretium Exploration Inc.	100%	Good	31-Jan-25	53.63
1027433	Mineral	104B	Pretium Exploration Inc.	100%	Good	31-Jan-25	143.00
Total (ha)	-	-	-	-	-	-	3,199.28

### Placer Claims

Placer claims apply to metal or natural substances which can be mined but are found in loose earth, rock, gravel, and sand (BC MEMPR 2011). Figure 1.5-2 shows placer claims in the general area around the Brucejack Property, there are two main placer claims holders: Pretivm and Seabridge Gold Inc. (Government of British Columbia 2013a).

Figure 1.5-1

Outline of Mineral Tenures held by Pretivm in the Brucejack Project Area, as of May 2014

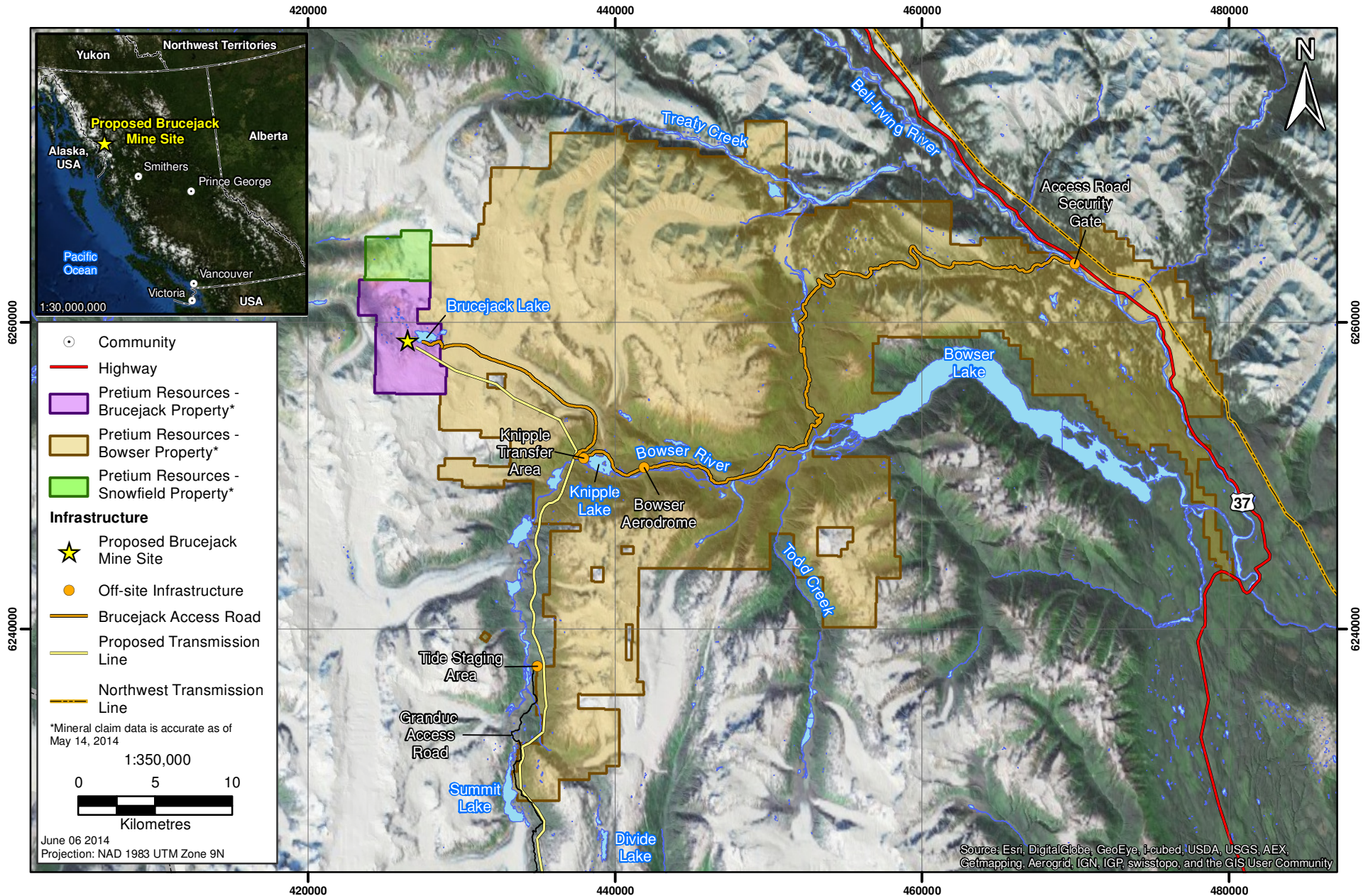
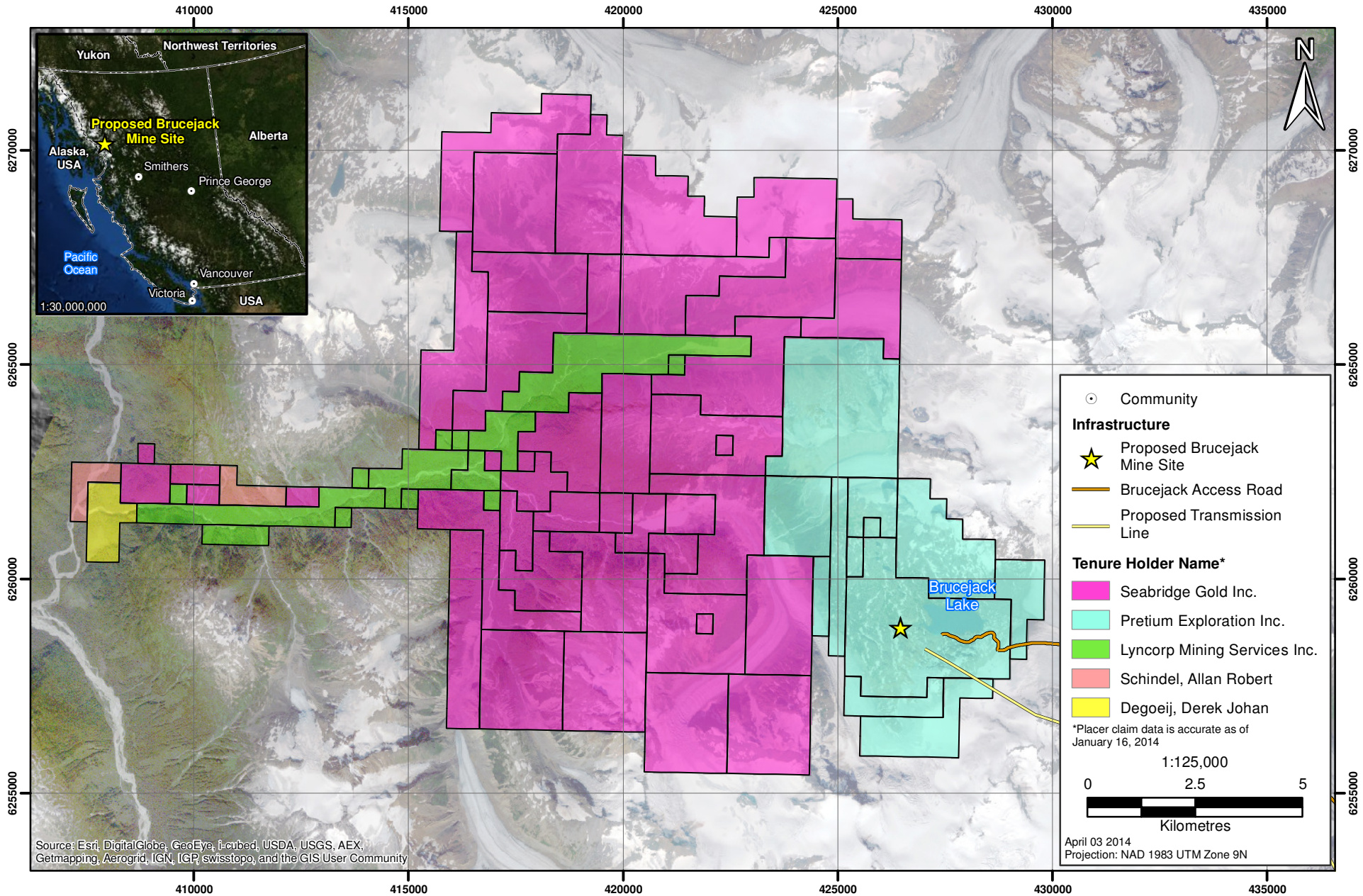


Figure 1.5-2

Outline of Placer Claims in the Brucejack Mine Project Area as of January 2014



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Table 1.5-2. Mineral Claims for the Bowser Property as of May 2014

Tenure No.	Tenure Type	Map No.	Owner	Pretivm Interest	Status	In Good Standing to:	Area (ha)
255168	Mineral	104B030	248421	100%	Good	2015/jan/31	25
509216	Mineral	104B	248421	100%	Good	2025/jan/31	1,267.425
509223	Mineral	104B	248421	100%	Good	2025/jan/31	428.623
509397	Mineral	104B	248421	100%	Good	2025/jan/31	375.147
509400	Mineral	104B	248421	100%	Good	2025/jan/31	178.632
553594	Mineral	104A	248421	100%	Good	2025/jan/31	447.4264
553595	Mineral	104A	248421	100%	Good	2025/jan/31	447.426
553598	Mineral	104A	248421	100%	Good	2025/jan/31	447.4255
553599	Mineral	104A	248421	100%	Good	2025/jan/31	429.5045
553601	Mineral	104A	248421	100%	Good	2025/jan/31	447.1852
553602	Mineral	104A	248421	100%	Good	2025/jan/31	447.1836
553603	Mineral	104A	248421	100%	Good	2025/jan/31	447.1816
553604	Mineral	104A	248421	100%	Good	2025/jan/31	429.2217
553605	Mineral	104A	248421	100%	Good	2025/jan/31	357.5722
553607	Mineral	104A	248421	100%	Good	2025/jan/31	446.9392
553609	Mineral	104A	248421	100%	Good	2025/jan/31	446.9369
553610	Mineral	104A	248421	100%	Good	2025/jan/31	428.9391
553612	Mineral	104A	248421	100%	Good	2025/jan/31	428.8994
553613	Mineral	104A	248421	100%	Good	2025/jan/31	446.6947
553614	Mineral	104A	248421	100%	Good	2025/jan/31	446.6918
553615	Mineral	104A	248421	100%	Good	2025/jan/31	428.6611
553616	Mineral	104A	248421	100%	Good	2025/jan/31	446.654
553617	Mineral	104A	248421	100%	Good	2025/jan/31	428.6493
553619	Mineral	104A	248421	100%	Good	2025/jan/31	446.5916
553621	Mineral	104A	248421	100%	Good	2025/jan/31	428.6179
553623	Mineral	104A	248421	100%	Good	2025/jan/31	446.4106
553624	Mineral	104A	248421	100%	Good	2025/jan/31	428.575
553625	Mineral	104A	248421	100%	Good	2025/jan/31	428.514
553626	Mineral	104A	248421	100%	Good	2025/jan/31	428.3881
553628	Mineral	104A	248421	100%	Good	2025/jan/31	428.4356
553629	Mineral	104A	248421	100%	Good	2025/jan/31	428.3738
553630	Mineral	104A	248421	100%	Good	2025/jan/31	428.3909
553631	Mineral	104A	248421	100%	Good	2025/jan/31	428.3242
553632	Mineral	104A	248421	100%	Good	2025/jan/31	392.6073
553704	Mineral	104A	248421	100%	Good	2025/jan/31	428.1858
553707	Mineral	104B	248421	100%	Good	2025/jan/31	428.1826
553708	Mineral	104B	248421	100%	Good	2025/jan/31	446.0081
553711	Mineral	104B	248421	100%	Good	2025/jan/31	445.7883
553713	Mineral	104B	248421	100%	Good	2025/jan/31	427.9709

(continued)



Table 1.5-2. Mineral Claims for the Bowser Property as of May 2014 (continued)

Tenure No.	Tenure Type	Map No.	Owner	Pretivm Interest	Status	In Good Standing to:	Area (ha)
553716	Mineral	104B	248421	100%	Good	2025/jan/31	427.9716
553718	Mineral	104A	248421	100%	Good	2025/jan/31	445.9791
553719	Mineral	104B	248421	100%	Good	2025/jan/31	427.9726
553720	Mineral	104A	248421	100%	Good	2025/jan/31	427.9767
553721	Mineral	104A	248421	100%	Good	2025/jan/31	445.9783
553722	Mineral	104B	248421	100%	Good	2025/jan/31	445.528
553723	Mineral	104A	248421	100%	Good	2025/jan/31	445.9746
553725	Mineral	104A	248421	100%	Good	2025/jan/31	445.9747
553726	Mineral	104A	248421	100%	Good	2025/jan/31	445.9706
553727	Mineral	104A	248421	100%	Good	2025/jan/31	428.1063
553728	Mineral	104A	248421	100%	Good	2025/jan/31	427.9293
553729	Mineral	104A	248421	100%	Good	2025/jan/31	427.9279
553730	Mineral	104A	248421	100%	Good	2025/jan/31	427.9266
553731	Mineral	104A	248421	100%	Good	2025/jan/31	445.757
553732	Mineral	104A	248421	100%	Good	2025/jan/31	445.5298
553733	Mineral	104A	248421	100%	Good	2025/jan/31	445.6742
553734	Mineral	104A	248421	100%	Good	2025/jan/31	427.7113
553735	Mineral	104A	248421	100%	Good	2025/jan/31	427.7501
553736	Mineral	104A	248421	100%	Good	2025/jan/31	445.603
553737	Mineral	104A	248421	100%	Good	2025/jan/31	249.4603
553738	Mineral	104A	248421	100%	Good	2025/jan/31	445.4029
569182	Mineral	104B	248421	100%	Good	2025/jan/31	874.782
569185	Mineral	104B	248421	100%	Good	2025/jan/31	875.196
569195	Mineral	104B	248421	100%	Good	2025/jan/31	1,215.674
570464	Mineral	104B	248421	100%	Good	2025/jan/31	893.6421
587884	Mineral	104A	248421	100%	Good	2025/jan/31	35.8079
587907	Mineral	104B	248421	100%	Good	2025/jan/31	17.9051
588361	Mineral	104A	248421	100%	Good	2025/jan/31	447.7938
588362	Mineral	104A	248421	100%	Good	2025/jan/31	412.0636
588364	Mineral	104A	248421	100%	Good	2025/jan/31	447.3831
588365	Mineral	104A	248421	100%	Good	2025/jan/31	447.3955
592320	Mineral	104A	248421	100%	Good	2025/jan/31	429.5278
592321	Mineral	104A	248421	100%	Good	2025/jan/31	429.3846
592322	Mineral	104A	248421	100%	Good	2025/jan/31	429.2431
592324	Mineral	104A	248421	100%	Good	2025/jan/31	429.1018
592325	Mineral	104A	248421	100%	Good	2025/jan/31	428.9603
592326	Mineral	104A	248421	100%	Good	2025/jan/31	428.8189
592327	Mineral	104A	248421	100%	Good	2025/jan/31	428.6771
592328	Mineral	104A	248421	100%	Good	2025/jan/31	428.5577

(continued)

Table 1.5-2. Mineral Claims for the Bowser Property as of May 2014 (continued)

Tenure No.	Tenure Type	Map No.	Owner	Pretivm Interest	Status	In Good Standing to:	Area (ha)
592329	Mineral	104A	248421	100%	Good	2025/jan/31	428.4168
592330	Mineral	104A	248421	100%	Good	2025/jan/31	428.2762
592331	Mineral	104A	248421	100%	Good	2025/jan/31	445.98
592332	Mineral	104A	248421	100%	Good	2025/jan/31	428.3458
592333	Mineral	104A	248421	100%	Good	2025/jan/31	446.4559
592334	Mineral	104A	248421	100%	Good	2025/jan/31	447.2651
592335	Mineral	104A	248421	100%	Good	2025/jan/31	446.3521
592336	Mineral	104A	248421	100%	Good	2025/jan/31	446.3558
592337	Mineral	104A	248421	100%	Good	2025/jan/31	428.583
592338	Mineral	104A	248421	100%	Good	2025/jan/31	446.4954
592339	Mineral	104A	248421	100%	Good	2025/jan/31	428.4731
592341	Mineral	104A	248421	100%	Good	2025/jan/31	446.7647
592342	Mineral	104A	248421	100%	Good	2025/jan/31	429.2256
592343	Mineral	104A	248421	100%	Good	2025/jan/31	447.4478
592344	Mineral	104A	248421	100%	Good	2025/jan/31	447.7652
592345	Mineral	104A	248421	100%	Good	2025/jan/31	376.5821
592439	Mineral	104A	248421	100%	Good	2025/jan/31	446.6029
592440	Mineral	104A	248421	100%	Good	2025/jan/31	446.3235
592441	Mineral	104A	248421	100%	Good	2025/jan/31	446.3527
592442	Mineral	104A	248421	100%	Good	2025/jan/31	446.2163
592443	Mineral	104A	248421	100%	Good	2025/jan/31	446.2019
592444	Mineral	104A	248421	100%	Good	2025/jan/31	178.4666
593446	Mineral	104A	248421	100%	Good	2025/jan/31	17.9316
593447	Mineral	104A	248421	100%	Good	2025/jan/31	430.155
593449	Mineral	104A	248421	100%	Good	2025/jan/31	447.895
593450	Mineral	104A	248421	100%	Good	2025/jan/31	448.2607
593455	Mineral	104A	248421	100%	Good	2025/jan/31	376.4286
593501	Mineral	104A	248421	100%	Good	2025/jan/31	447.7849
593505	Mineral	104A	248421	100%	Good	2025/jan/31	448.0254
593507	Mineral	104A	248421	100%	Good	2025/jan/31	447.896
593508	Mineral	104A	248421	100%	Good	2025/jan/31	448.1529
593509	Mineral	104A	248421	100%	Good	2025/jan/31	286.8121
593510	Mineral	104A	248421	100%	Good	2025/jan/31	447.5908
593511	Mineral	104A	248421	100%	Good	2025/jan/31	429.7263
593512	Mineral	104A	248421	100%	Good	2025/jan/31	429.7856
593513	Mineral	104A	248421	100%	Good	2025/jan/31	447.712
593514	Mineral	104A	248421	100%	Good	2025/jan/31	179.076
593515	Mineral	104A	248421	100%	Good	2025/jan/31	71.611
594138	Mineral	104A	248421	100%	Good	2025/jan/31	215.1985

(continued)

Table 1.5-2. Mineral Claims for the Bowser Property as of May 2014 (continued)

Tenure No.	Tenure Type	Map No.	Owner	Pretivm Interest	Status	In Good Standing to:	Area (ha)
594139	Mineral	104A	248421	100%	Good	2025/jan/31	125.5322
594140	Mineral	104A	248421	100%	Good	2025/jan/31	143.4682
594640	Mineral	104A	248421	100%	Good	2025/jan/31	142.7989
594641	Mineral	104A	248421	100%	Good	2025/jan/31	142.9176
594650	Mineral	104A	248421	100%	Good	2025/jan/31	107.4081
598759	Mineral	104A	248421	100%	Good	2025/jan/31	447.8164
598760	Mineral	104A	248421	100%	Good	2025/jan/31	447.8919
598761	Mineral	104A	248421	100%	Good	2025/jan/31	71.6536
598764	Mineral	104A	248421	100%	Good	2025/jan/31	447.0738
598765	Mineral	104A	248421	100%	Good	2025/jan/31	142.9886
598766	Mineral	104A	248421	100%	Good	2025/jan/31	447.1307
598771	Mineral	104A	248421	100%	Good	2025/jan/31	232.8145
604733	Mineral	104A	248421	100%	Good	2025/jan/31	446.1295
604734	Mineral	104A	248421	100%	Good	2025/jan/31	410.8676
604735	Mineral	104A	248421	100%	Good	2025/jan/31	268.3631
604737	Mineral	104A	248421	100%	Good	2025/jan/31	357.6116
604738	Mineral	104B	248421	100%	Good	2025/jan/31	429.4632
604739	Mineral	104B	248421	100%	Good	2025/jan/31	375.9609
604740	Mineral	104B	248421	100%	Good	2025/jan/31	322.1308
604741	Mineral	104A	248421	100%	Good	2025/jan/31	429.0866
604742	Mineral	104A	248421	100%	Good	2025/jan/31	411.1215
604743	Mineral	104B	248421	100%	Good	2025/jan/31	428.9454
604744	Mineral	104B	248421	100%	Good	2025/jan/31	446.7038
604784	Mineral	104A	248421	100%	Good	2025/jan/31	268.118
604785	Mineral	104A	248421	100%	Good	2025/jan/31	89.4636
604787	Mineral	104B	248421	100%	Good	2025/jan/31	429.2699
607645	Mineral	104A	248421	100%	Good	2025/jan/31	125.3425
608123	Mineral	104A	248421	100%	Good	2025/jan/31	358.0662
608125	Mineral	104A	248421	100%	Good	2025/jan/31	17.895
637223	Mineral	104A	248421	100%	Good	2025/jan/31	446.6494
637243	Mineral	104A	248421	100%	Good	2025/jan/31	446.4151
637244	Mineral	104A	248421	100%	Good	2025/jan/31	446.2254
637263	Mineral	104B	248421	100%	Good	2025/jan/31	428.6416
637264	Mineral	104B	248421	100%	Good	2025/jan/31	446.2683
637283	Mineral	104B	248421	100%	Good	2025/jan/31	410.7792
637286	Mineral	104B	248421	100%	Good	2025/jan/31	446.571
637287	Mineral	104B	248421	100%	Good	2025/jan/31	428.4405
637288	Mineral	104B	248421	100%	Good	2025/jan/31	357.0278
637289	Mineral	104B	248421	100%	Good	2025/jan/31	447.0176

(continued)

Table 1.5-2. Mineral Claims for the Bowser Property as of May 2014 (continued)

Tenure No.	Tenure Type	Map No.	Owner	Pretivm Interest	Status	In Good Standing to:	Area (ha)
637303	Mineral	104B	248421	100%	Good	2025/jan/31	125.1242
637304	Mineral	104A	248421	100%	Good	2025/jan/31	268.1372
685663	Mineral	104B	248421	100%	Good	2025/jan/31	17.9031
685664	Mineral	104B	248421	100%	Good	2025/jan/31	429.5086
685666	Mineral	104B	248421	100%	Good	2025/jan/31	35.7826
835571	Mineral	104A	248421	100%	Good	2025/jan/31	410.4214
835572	Mineral	104A	248421	100%	Good	2025/jan/31	446.0387
835573	Mineral	104A	248421	100%	Good	2025/jan/31	446.0485
835574	Mineral	104A	248421	100%	Good	2025/jan/31	445.8996
835576	Mineral	104A	248421	100%	Good	2025/jan/31	249.7178
835640	Mineral	104A	248421	100%	Good	2025/jan/31	375.1591
835642	Mineral	104A	248421	100%	Good	2025/jan/31	375.0618
835644	Mineral	104A	248421	100%	Good	2025/jan/31	375.1031
835647	Mineral	104A	248421	100%	Good	2025/jan/31	428.7919
835649	Mineral	104A	248421	100%	Good	2025/jan/31	446.6245
835651	Mineral	104A	248421	100%	Good	2025/jan/31	357.3712
835652	Mineral	104A	248421	100%	Good	2025/jan/31	214.427
835786	Mineral	104A	248421	100%	Good	2025/jan/31	411.2684
835787	Mineral	104A	248421	100%	Good	2025/jan/31	447.0274
835788	Mineral	104A	248421	100%	Good	2025/jan/31	303.716
835789	Mineral	104A	248421	100%	Good	2025/jan/31	160.6684
835790	Mineral	104A	248421	100%	Good	2025/jan/31	393.2918
841449	Mineral	104B	248421	100%	Good	2025/jan/31	429.5568
841454	Mineral	104B	248421	100%	Good	2025/jan/31	178.9243
842943	Mineral	104B	248421	100%	Good	2025/jan/31	196.8636
842991	Mineral	104A	248421	100%	Good	2025/jan/31	449.7072
842995	Mineral	104B	248421	100%	Good	2025/jan/31	448.2409
842998	Mineral	104B	248421	100%	Good	2025/jan/31	376.742
843000	Mineral	104B	248421	100%	Good	2025/jan/31	179.4669
843001	Mineral	104B	248421	100%	Good	2025/jan/31	215.6648
843002	Mineral	104B	248421	100%	Good	2025/jan/31	215.7574
843011	Mineral	104B	248421	100%	Good	2025/jan/31	143.2331
843013	Mineral	104B	248421	100%	Good	2025/jan/31	250.6587
843858	Mineral	104A	248421	100%	Good	2025/jan/31	446.4919
843861	Mineral	104A	248421	100%	Good	2025/jan/31	446.7192
843862	Mineral	104A	248421	100%	Good	2025/jan/31	446.7542
843863	Mineral	104A	248421	100%	Good	2025/jan/31	446.9126
843864	Mineral	104A	248421	100%	Good	2025/jan/31	428.9109
843865	Mineral	104A	248421	100%	Good	2025/jan/31	447.1535

(continued)

Table 1.5-2. Mineral Claims for the Bowser Property as of May 2014 (continued)

Tenure No.	Tenure Type	Map No.	Owner	Pretivm Interest	Status	In Good Standing to:	Area (ha)
843866	Mineral	104A	248421	100%	Good	2025/jan/31	446.8747
843868	Mineral	104A	248421	100%	Good	2025/jan/31	447.3074
843869	Mineral	104A	248421	100%	Good	2025/jan/31	428.9727
843870	Mineral	104A	248421	100%	Good	2025/jan/31	429.2691
843871	Mineral	104A	248421	100%	Good	2025/jan/31	393.7415
843872	Mineral	104A	248421	100%	Good	2025/jan/31	446.9456
843873	Mineral	104A	248421	100%	Good	2025/jan/31	393.2292
845852	Mineral	104A	248421	100%	Good	2025/jan/31	71.9543
845853	Mineral	104A	248421	100%	Good	2025/jan/31	53.9626
846560	Mineral	104A	248421	100%	Good	2025/jan/31	17.9143
854579	Mineral	104B	248421	100%	Good	2025/jan/31	449.0462
854600	Mineral	104B	248421	100%	Good	2025/jan/31	35.9168
854602	Mineral	104B	248421	100%	Good	2025/jan/31	179.5546
855187	Mineral	104A	248421	100%	Good	2025/jan/31	394.9706
855235	Mineral	104A	248421	100%	Good	2025/jan/31	287.7226
855245	Mineral	104A	248421	100%	Good	2025/jan/31	431.1298
856060	Mineral	104A	248421	100%	Good	2025/jan/31	377.4963
859467	Mineral	104B	248421	100%	Good	2025/jan/31	71.6403
866138	Mineral	104A	248421	100%	Good	2025/jan/31	143.8557
866139	Mineral	104A	248421	100%	Good	2025/jan/31	214.5674
866152	Mineral	104A	248421	100%	Good	2025/jan/31	17.9531
866617	Mineral	104A	248421	100%	Good	2025/jan/31	17.9896
866690	Mineral	104A	248421	100%	Good	2025/jan/31	17.9512
890120	Mineral	104B	248421	100%	Good	2025/jan/31	17.8834
999202	Mineral	104A	248421	100%	Good	2025/jan/31	285.6941
999203	Mineral	104A	248421	100%	Good	2025/jan/31	285.81
999222	Mineral	104A	248421	100%	Good	2025/jan/31	393.4624
1000537	Mineral	104B	248421	100%	Good	2025/jan/31	160.9454
1002762	Mineral	104A	248421	100%	Good	2025/jan/31	429.058
1011275	Mineral	104A	248421	100%	Good	2025/jan/31	411.5223
1013031	Mineral	104A	248421	100%	Good	2025/jan/31	1,471.9983
1013056	Mineral	104A	248421	100%	Good	2025/jan/31	430.4259
1013907	Mineral	104A	248421	100%	Good	2025/jan/31	1,713.7619
1013908	Mineral	104A	248421	100%	Good	2025/jan/31	1,751.8513
1014736	Mineral	104B	248421	100%	Good	2025/jan/31	89.5552
1015852	Mineral	104B	248421	100%	Good	2025/jan/31	555.2179
1016112	Mineral	104A	248421	100%	Good	2025/jan/31	17.8912
1019398	Mineral	104A	248421	100%	Good	2025/jan/31	89.6724
1019575	Mineral	104B	248421	100%	Good	2025/jan/31	53.9015

(continued)

Table 1.5-2. Mineral Claims for the Bowser Property as of May 2014 (completed)

Tenure No.	Tenure Type	Map No.	Owner	Pretivm Interest	Status	In Good Standing to:	Area (ha)
1019576	Mineral	104B	248421	100%	Good	2025/jan/31	17.9614
1019577	Mineral	104B	248421	100%	Good	2025/jan/31	89.8144
1019578	Mineral	104B	248421	100%	Good	2025/jan/31	53.8937
1019923	Mineral	104A	248421	100%	Good	2025/jan/31	89.8233
1019924	Mineral	104A	248421	100%	Good	2025/jan/31	143.6641
1019925	Mineral	104A	248421	100%	Good	2025/jan/31	143.5424
1020303	Mineral	104A	248421	100%	Good	2025/jan/31	107.6683
1020618	Mineral	104A	248421	100%	Good	2025/jan/31	215.3362
1022893	Mineral	104B	248421	100%	Good	2014/oct/09	35.9952
1023941	Mineral	104A	248421	100%	Good	2014/nov/22	71.8702
1024394	Mineral	104A	248421	100%	Good	2014/dec/14	71.7401
1026972	Mineral	104B	248421	100%	Good	2025/jan/31	661.8809
1026973	Mineral	104B	248421	100%	Good	2025/jan/31	1,061.5016
1026975	Mineral	104B	248421	100%	Good	2025/jan/31	431.4337
1026976	Mineral	104B	248421	100%	Good	2025/jan/31	1,254.0539
1027080	Mineral	104A	248421	100%	Good	2025/jan/31	1,290.6816
1027081	Mineral	104A	248421	100%	Good	2025/jan/31	1,218.5286
1027393	Mineral	104A	248421	100%	Good	2025/jan/31	4,786.3009
1027396	Mineral	104B	248421	100%	Good	2025/jan/31	125.0919
1027397	Mineral	104B	248421	100%	Good	2025/jan/31	53.6255
1027398	Mineral	104B	248421	100%	Good	2025/jan/31	160.9196
1027399	Mineral	104B	248421	100%	Good	2025/jan/31	983.6067
1027400	Mineral	104B	248421	100%	Good	2025/jan/31	500.3945
1027429	Mineral	104B	248421	100%	Good	2025/jan/31	196.6047
1027431	Mineral	104B	248421	100%	Good	2025/jan/31	53.6275
1027433	Mineral	104B	248421	100%	Good	2025/jan/31	143.0047
Total (ha)							104,136.50

## 1.6 REGIONAL AREA

The Project is located on provincial Crown land in a sparsely populated area of the Province. Sections of the Brucejack Transmission Line, Brucejack Access Road, Knipple Transfer Area, and the Bowser Aerodrome are located within the Nass Area.

The NFA establishes a variety of rights in regards to use and management of natural resources in the Nass Wildlife Area (NWA) and Nass Area (Government of Canada, Government of BC, and Nisga'a Nation 2000). These rights are protected under the *Constitution Act* (1982) and specifically include harvesting of fish, aquatic plants and wildlife. The NFA also affords Nisga'a citizens the right to reasonable access to and onto Crown lands that lie outside Nisga'a Lands, including streams and highways, for the exercise of Nisga'a rights and interests.

### Environmental Setting

The Property is located in the Boundary Range of the Coast Mountain physiographic belt along the western margin of the Intermontane tectonic belt. The climate is typical of northwestern BC, with cool, wet summers and relatively moderate but wet winters. The widely varying terrain hosts a broad range of ecosystems. There are five species of Pacific salmon (*Oncorhynchus* spp.), rainbow/steelhead trout (*O. mykiss*) and Dolly Varden (*Salvelinus malma*) char in the region although Brucejack and immediate downstream waterbodies are not fish-bearing. Wildlife such as, black bear (*Ursus americanus*), grizzly bear (*Ursus arctos*), moose (*Alces alces*) and migratory birds can be found in the region. Mountain goats (*Oreamnos americanus*) are present in the alpine areas. The tree line is at approximately 1,200 metres above sea level (masl). The Project is centred on the Valley of the Kings deposit, which is located southwest of Brucejack Lake at 1,400 masl.

### Provincial Land and Resource Use Plans

The Project is located in the Cassiar Iskut-Stikine Land and Resource Management Plan (CIS LRMP; BC ILMB 2000), and the Nass South Sustainable Resource Management Plan (Nass South SRMP; BC MFLNRO 2012) (Figure 1.6-1). The CIS LRMP is a sub-regional integrated plan that establishes a framework for land use and management objectives, and aims to satisfy the wide range of overlapping demands on natural resources and cultural heritage within the defined area (approximately 5.2 million ha of northwestern BC). The CIS LRMP provides policy direction on the management of land and resources in the LRMP area.

The Nass South SRMP focuses on similar issues and values as regional plans or LRMPs but at a more detailed level. For example, SRMPs are used to identify Old Growth Management Areas, a key element of biodiversity planning (BC Ministry of Sustainable Resource Management 2004). It encompasses about 662,500 ha and provides landscape-level direction for resource management within the plan area.

These management plans are discussed in further detail in Chapter 24, Assessment of Potential Commercial and Non-commercial Land Use Effects, which describes the land use regimes in the area in more detail, and [Appendix 24-A](#), Brucejack Gold Mine Project: Non-traditional Land Use Baseline.

### Permanent Communities and Temporary Residences

There is a commercial lodge and gas bar located at Bell 2, approximately 40 km to the northeast of the Project.

Pretivm is aware of four trapper cabins located within 60 km of the Brucejack Mine Site; the closest of these is located approximately 19 km from the proposed Brucejack Mine Site.

### Private Land, Crown-Granted Tenures, and Provincially-Designated Areas

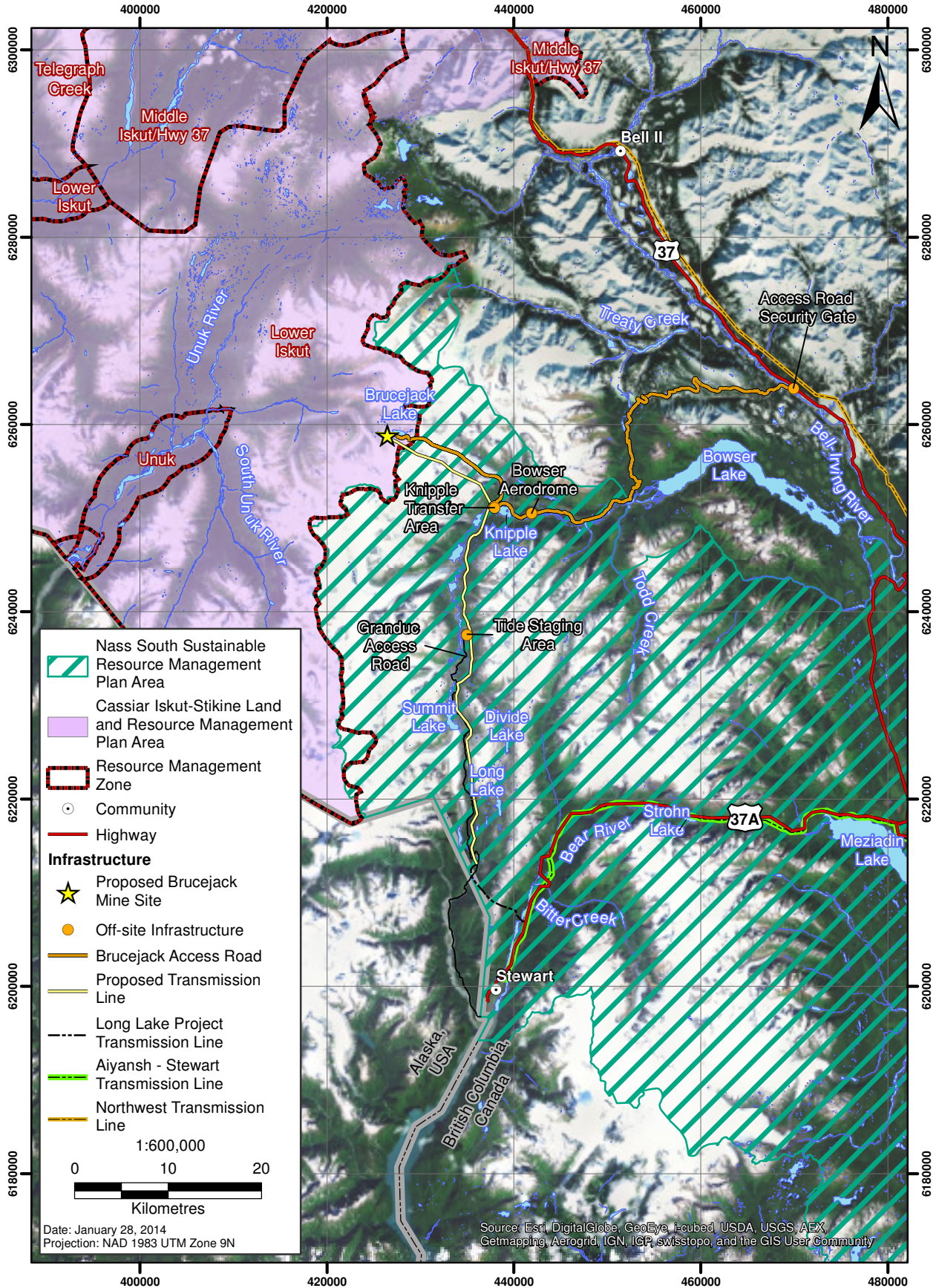
The Project is located on provincial Crown land within the Regional District of Kitimat-Stikine. All surface Project activities occur on Crown land and sub-surface rights in the Project area are held by Pretivm.

There are four blocks of private land within the regional area near Granduc including one that is linked to the Granduc airstrip. The Crown-granted tenures in the vicinity of the Project and overlapping the Project footprint include: water licences, guide outfitting licences, registered traplines, commercial recreation tenures, forestry licences and mineral tenures (Table 1.6-1). There is also an airstrip at Bob Quinn Lake.

No provincial parks, protected areas, or ecological reserves are located near proposed Project infrastructure. Border Lake Provincial Park is located to the west of the general region and Meziadin Lake Park is located 19.5 km from the Project site on the western shore of Meziadin Lake.

Figure 1.6-1

Land and Resource Management Plans  
in the Brucejack Gold Mine Project Area





**Table 1.6-1. Crown-granted Tenures, Land Uses within the Vicinity of the Project and Overlapping the Project Footprint**

Types of Land Use	Statute	Description of Land Uses In The Vicinity of the Project and Overlapping the Project Footprint
Provincial Parks, Ecological Reserves and Protected Areas	<i>Park Act (1996h)</i> <i>Protected Areas of British Columbia Act (2000)</i>	Border Lake Provincial Park is located west of Unuk River. No ecological reserves or Protected Areas.
Water	<i>Water Act (1996k)</i> <i>Water Protection Act (1996l)</i>	Five water licences.
Hunting	<i>Wildlife Act (1996m)</i>	Four Wildlife Management Units (WMU) where various species are hunted.
Guide Outfitting	<i>Land Act (1996c)</i>	Three registered guide outfitting licences.
Trapping	<i>Land Act (1996c)</i>	Six trapping licences.
Commercial Recreation	<i>Land Act (1996c)</i>	Eight commercial recreation licences (heli-skiing, fishing, lodging, guided mountaineering, guided freshwater recreation, and multiple use).
Public Recreation	<i>Land Act (1996c)</i>	Potential recreational activities include hiking, camping, snowmobiling, and riding ATVs.
Forestry	<i>Forest Act (1996a)</i> <i>Forest Practices Code of BC Act (1996b)</i>	Cassiar Timber Supply Area (TSA) and Nass TSA. Seven forest licences.
Agriculture	<i>Land Title Act (1996d)</i> <i>Agricultural Land Commission Act (2002a)</i>	None.
Oil and Gas	<i>Oil and Gas Activities Act (2008)</i>	None.
Transportation and Utilities	<i>Land Title Act (1996d)</i> <i>Utilities Commission Act (1996j)</i> <i>Transportation Act (2004)</i>	Highways and Roads: Highways 37 and 37A. A small number of forest service roads are located near Highway 37. The Granduc Access Road. Airports/airstrips: two airstrips. Electrical Transmission Lines: The Northwest Transmission Line; Long Lake Hydro Transmission Line; and the Aiyansh-Stewart Transmission Line. Telecommunications Sites: None.
Mining and Mineral Exploration	<i>Mineral Tenure Act (1996e)</i> <i>Mines Act (1996g)</i>	There are 17 entities with mineral claims as of January 2014. There are 2 placer claims held by 2 entities as of January 2013.

The area immediately around the Brucejack Mine Site is situated within Wildlife Management Unit (WMU) 6-21 (Stikine) and the majority of the regional area is located within WMU 6-16 (North Coast).

Chapter 24, Assessment of Potential Commercial and Non-commercial Land Use Effects, and [Appendix 24-A](#), Brucejack Gold Mine Project: Non-traditional Land Use Baseline, of the Application/EIS describe land ownership and the regional land use regime, including tenures, licences, permits and other authorizations in the vicinity of the Project and overlapping the Project footprint in more detail.

#### Regional Studies

The BC Ministry of Forests Lands and Natural Resources Operations (BC MFLRNO) completed the Northwest Cumulative Effects Assessment Pilot Project in the Skeena Region between April 2012 and

March 2013, which focused on the Cassiar and Nass Timber Supply Areas (TSA; BC MFLNRO 2011a, 2011b). The Project area overlaps both of these TSAs.

A Northwest Wildlife and Environmental Management Advisory Group has been established in the region in part to consider cumulative effects from new incremental industrial traffic along the Highway 37 and Highway 37A corridors. While a study has not yet been initiated, planning for this work is ongoing. The advisory group is co-chaired by the BC EAO and the BC MFLNRO with representatives from several municipal, regional, provincial, federal, and Nisga’a Lisims government agencies, regional Aboriginal and First Nations groups, and industry. Pretivm is a committed participant of the advisory group.

There are currently no other regional environmental studies being conducted in the region of the Project as defined under Section 74 of the *Canadian Environmental Assessment Act* (2012).

Environmental monitoring data have been gathered in the regional area to support the EA process for mining and other resource development projects (Figure 1.6-2). Table 1.6-2 provides a summary of past, existing, and reasonably foreseeable future projects that occur in the northwest region of the province that have been, are, or may be, subject to the EA process. Some aspects of these projects may have a spatial and temporal linkage with the Project. This potential linkage is discussed in more detail in Chapter 6, Assessment Methodology, Section 6.9, Cumulative Effects Assessment, of the Application/EIS.

**Table 1.6-2. Past, Current, and Reasonably Foreseeable Projects**

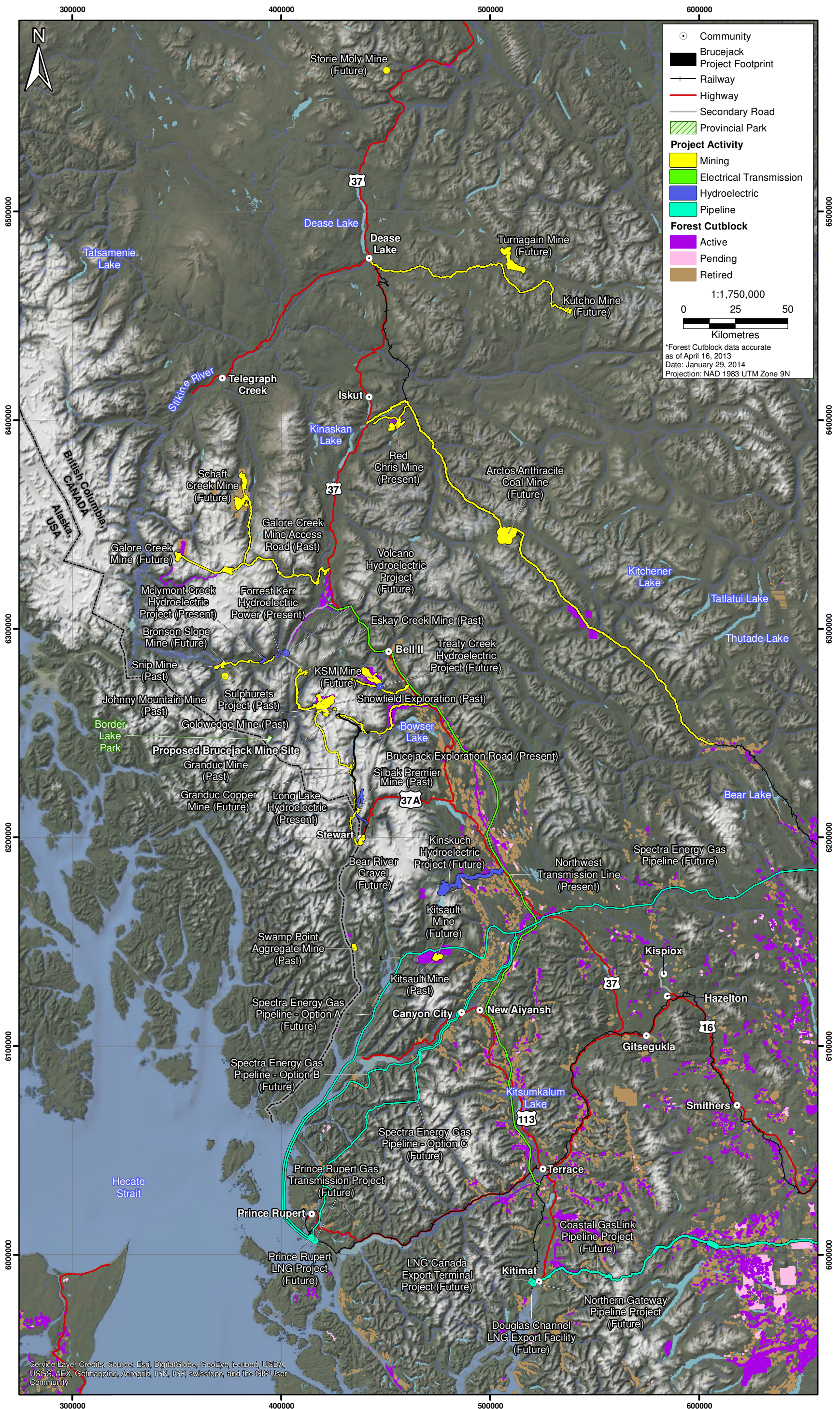
Past Projects	Existing Projects	Reasonably Foreseeable Projects
<ul style="list-style-type: none"> <li>• Eskay Creek Copper-Gold Mine</li> <li>• Goldwedge Gold Mine</li> <li>• Granduc Copper-Gold Mine</li> <li>• Johnny Mountain Gold Mine</li> <li>• Kitsault Molybdenum Mine</li> <li>• Silbak Premier Gold-Silver Mine Snip Gold Mine</li> <li>• Snowfield Exploration Project</li> <li>• Sulphurets Advanced Exploration Project</li> <li>• Swamp Point Aggregate Mine</li> </ul>	<ul style="list-style-type: none"> <li>• Brucejack Exploration Program</li> <li>• Forrest Kerr Hydroelectric (under construction)</li> <li>• Long Lake Hydroelectric (commenced operations Dec, 2013)</li> <li>• McLymont Creek Hydroelectric (under construction)</li> <li>• Northwest Transmission Line (under construction)</li> <li>• Red Chris Mine (under construction)</li> </ul>	<ul style="list-style-type: none"> <li>• Arctos Anthracite Coal Project</li> <li>• Bear River Gravel Project</li> <li>• Bronson Slope Project</li> <li>• Coastal GasLink Pipeline Project</li> <li>• Galore Creek Copper-Gold Project</li> <li>• Granduc Copper-Gold Project</li> <li>• KSM Copper-Gold Project</li> <li>• Kinskuch Hydroelectric Project</li> <li>• Kitsault Molybdenum Project</li> <li>• Kutcho Copper-Gold-Zinc Project</li> <li>• LNG Canada Export Terminal Project</li> <li>• Northern Gateway Pipeline Project</li> <li>• Prince Rupert Gas Transmission Project</li> <li>• Prince Rupert LNG Project</li> <li>• Schaft Creek Copper-Gold Project</li> <li>• Spectra Energy and BG Group Natural Gas Transportation System</li> <li>• Storie Moly Project</li> <li>• Treaty Creek Hydroelectric Project</li> <li>• Turnagain Nickel Project</li> <li>• Volcano Creek Hydroelectric Project</li> </ul>

Federal Lands

There are no federal lands in the vicinity of the Project. The nearest federal lands to the Project are the port at Prince Rupert (240 km), Gwaii Haanas National Park Reserve and Haida Heritage Site (416 km), the Kuldoe Indian Reserve (156 km - Gitxsan), and the Andimaul Indian Reserve (206 km - Gitxsan).

Figure 1.6-2

Brucejack Gold Mine Project: Past, Present and Reasonably Foreseeable Projects within the Region



## 1.7 PROJECT SCOPE

### 1.7.1 Provincial Scope of the Project

Pursuant to the Section 11 Order issued by the BC EAO (2013) on July 4, 2013, the provincial scope of the Project includes the following on-site and off-site components:

- underground mine and ancillary components and activities;
- mineral processing facility and ancillary components and activities;
- waste management and ancillary components and activities, including waste rock and tailings;
- water management and ancillary components and activities; and
- other infrastructure and ancillary components and activities, modification or expansion of the existing exploration road from Highway 37 to the Brucejack Mine Site, transportation from Highway 37 to the Brucejack Mine Site, transmission line and power supply, transfer station, aerodrome, camps and offices, truck shop, fuel storage, explosives, and concentrate storage.

### 1.7.2 Federal Scope of the Project

Based on information received in the project description from the Proponent, the Agency defines the scope of the Project to be assessed as the construction, operation, and decommissioning of the following project components:

- mine portal;
- ventilation shafts;
- waste rock transfer pad;
- run-of-mine ore stockpile;
- ore conveyor;
- surface and underground crushers;
- mill/concentrator;
- backfill paste plant;
- tailings pipeline;
- subaqueous disposal of waste rock and tailings;
- backfill of waste rock and tailings underground;
- diversion channels;
- back-up power plant;
- transmission line and ancillary components;
- warehouse;
- truck shop;
- helicopter pad;
- sewage treatment plant and related activities (e.g., sludge disposal);
- water treatment plant;

- incinerator;
- electric induction furnace;
- landfill;
- mine site haul roads and activities related to transportation along access roads up to Highway 37;
- aerodrome;
- transfer station;
- fuel storage tanks;
- surface and underground explosives storage;
- up to a 550-person modular camp; and
- administration offices.

## 1.8 PROJECT SCHEDULE

The Project will have a two-year Construction phase and 22-year mine life (Figure 1.8-1). The Closure phase will be one to two years, followed by a minimum of three years of Post-closure monitoring to ensure that Closure facilities and structures are functioning as predicted.

### 1.8.1 Construction Phase

An early priority for Construction will be the upgrading of the existing 73-km access road to the Project site.

The Knipple Transfer Area located along the access road approximately 5 km west of the Bowser Aerodrome will be used as a staging area for mine construction and transferring loads from highway trucks to vehicles equipped for glacier travel. The site will be cleared and levelled and a camp, fuel storage area, and transfer station building will be constructed.

The aerodrome will be constructed at the site of the historic gravel airstrip, which will be improved and expanded to provide a safe facility for the chartered air traffic proposed for crew transfers.

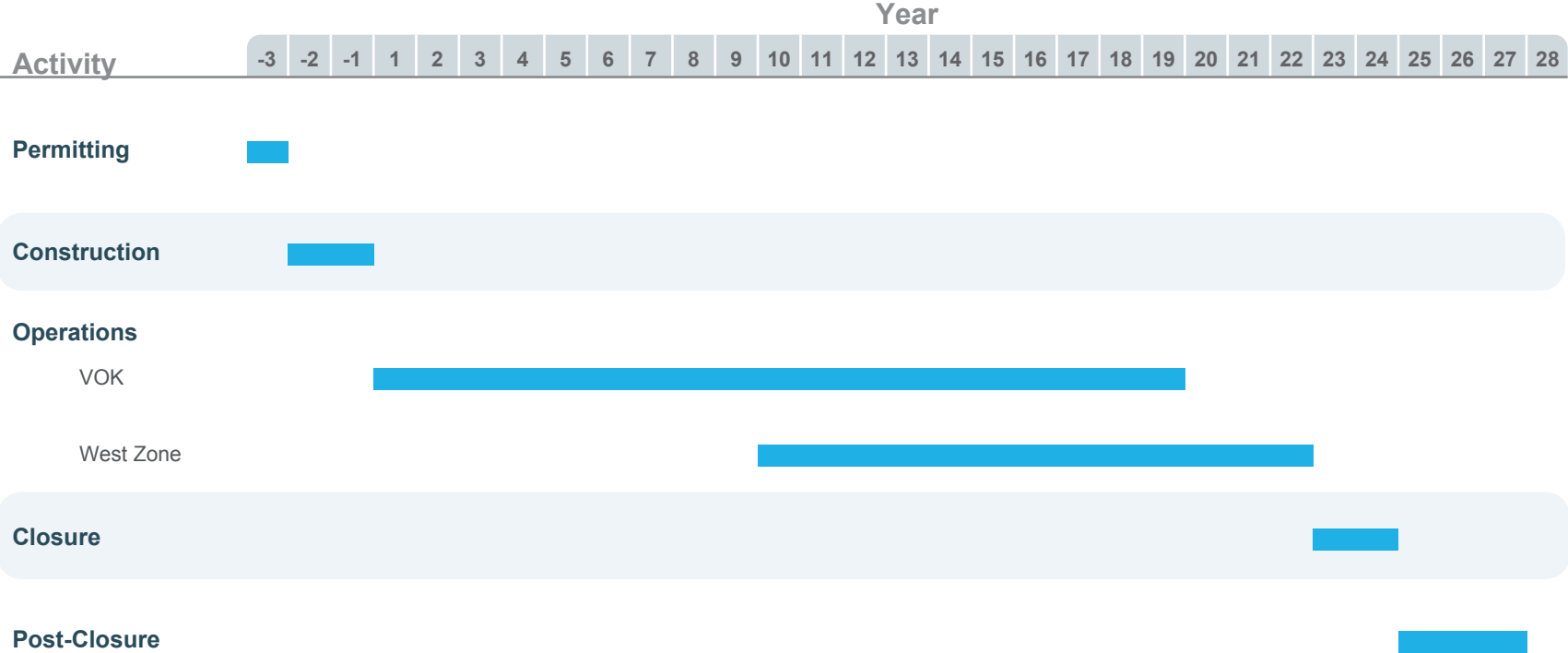
The Tide Staging Area, including a temporary camp for up to 90 persons, will be developed near the old Granduc mill site to support the clearing of the transmission line alignment, erection of transmission towers, and stringing of the transmission line.

A significant amount of underground development will be required prior to the start of production, including the declines, ventilation raises, 1,330 Level workshop area (maintenance workshops, magazine, fuel bay, and other ancillary installations), and crusher, as well as the development of stopes to mine the Valley of the Kings (VOK) orebody. Initial access to the underground will be through the existing exploration portal. Waste rock from this work will be deposited in Brucejack Lake. Development ore will be stockpiled for later processing in the mill.

A new water treatment plant will be constructed near the existing exploration portal to treat water pumped from the underground workings during the development stages and water that comes in contact with surface disturbances.

Explosives storage facilities will be provided for both surface and underground development activities.

**Figure 1.8-1**  
**Brucejack Gold Mine**  
**Project Development Schedule**



Rock will be excavated to create the pads for site roads, the haul road, the mill/portal/truck shop/camp area, substation, etc. Excavation will be done using excavators and/or bulldozers with rippers, and conventional drill and blast techniques. Benching will be used for the deeper cuts. Some of the rock from these excavations will be used to construct the laydown area near the shore of Brucejack Lake. A quarry will be developed east of the Brucejack Mine Site as a source of not-potentially acid-generating rock for use as fill. Diversion and collection ditches will be constructed to direct clean water away from disturbed areas and to collect contact water for treatment.

A new construction camp will be assembled on the mill pad. It will be renovated during the latter part of the Construction phase for use as the Brucejack Operations camp. A new sewage treatment plant for the mine area will be installed to support the construction camp and will be retained for the Operation phase.

Underground development workings will culminate in the creation of production stopes in the VOK and all necessary facilities for mining, crushing, and conveying ore to the surface.

The latter part of the Construction phase will also see the construction of the mill building and installation of the process plant machinery. The water treatment plant will be moved to the mill building. Water management facilities, such as diversion and contact water collection ditches, a contact water collection pond, and related pumping and piping will be expanded. The paste plant will be commissioned and the tailings pipeline installed from the mill building to Brucejack Lake. The surface truck shop will be constructed and equipped to handle both surface and underground mobile machinery.

The substation will be constructed and connected to the transmission line and site power distribution as soon as possible. The diesel generators installed for the Construction phase will be retained for emergency power.

### **1.8.2 Operation Phase**

The mill will be commissioned at the end of the Construction phase and will begin processing ore from the underground as well as stockpiled ore from the development stage. Stockpiled ore will be crushed at the stockpile and transported to the mill by truck.

Production levels will build to the projected 2,700 t/d by the second year as underground development in the VOK proceeds. By Year 10 minor production will have commenced from the WZ, which will increase to Year 19 when production from the VOK will have ceased. Overall production volumes will begin to taper off around Year 18, finally ceasing in Year 22.

Initially waste rock and tailings will be deposited primarily to Brucejack Lake, but as stope voids become available more material will be deposited underground as backfill. Tailings will be incorporated in the paste backfill. Tailings not used as backfill will be transported to the deeper levels of the lake by pipeline. The discharge point in the lake will be raised as required to offset the backpressure of overlying tailings.

Concentrate from the mill will be transported down the Knipple Glacier on specially equipped vehicles and then transferred to highway trucks at the Knipple Transfer Area. Fuel and other supplies will be backhauled to the mine using the same fleet of vehicles.

### 1.8.3 Closure Phase

Upon the completion of Construction, disturbed areas such as the Tide Staging Area that are not required for Operation will be re-contoured and reclaimed. Where appropriate reclamation work will continue throughout the Operation period to minimize reclamation obligations at closure.

Upon the completion of mining, the facilities not required for Post-closure management and monitoring of the site will be dismantled and removed. These facilities will include the underground mining equipment, portal structures and conveyor, truck shop, most of the Brucejack Camp, explosives magazines, fuel storage, and batch plant. The mine portals will be sealed. The water treatment plant and a building will be retained to treat mine drainage during the Closure and Post-closure phases, as required. Where practical surface disturbances will be re-contoured and returned to a natural appearance. Soil that was salvaged and stockpiled during the initial Construction will be re-applied to reclaimed areas.

Most of the Knipple Transfer Area will be re-contoured and reclaimed. The transfer station and camp will be removed, but some parts of the facility may be retained to service traffic travelling over the glacier.

The initial Closure process is expected to take one or two years. The water treatment plant will likely be required for several additional years Post-closure until discharge water quality meets relevant guidelines. The transmission line will be retained as long as electric power is required, as will the access road.

### 1.8.4 Post-closure

Following Closure, monitoring of water quality will continue until discharge water consistently meets guidelines, assumed to be about three years. In addition, reclaimed areas will be monitored to assess the effectiveness of the reclamation for controlling erosion and sedimentation, and where appropriate for re-vegetation success. Mitigation will be initiated where monitoring indicates that objectives are not being met.

Once Post-closure monitoring demonstrates that objectives have been met and discharges meet guidelines, there will be further decommissioning of the water treatment plant and associated site infrastructure, transmission line, Knipple Transfer Area, and access road.

## 1.9 PROJECT BENEFITS

### 1.9.1 Regulatory and Policy Framework

The proposed Project is subject to federal income tax levied on a mining operation's taxable income (generally being net of operating expenses, depreciation on capital assets and the deduction of exploration and pre-production development costs), provincial income tax, BC *Mineral Tax Act* (1996e) and the BC *Taxation (Rural Area) Act* (1996i).

The proposed Project is also influenced by federal and provincial economic development policies, including the Government of Canada's *Economic Action Plan 2012* (Government of Canada 2012) and the *British Columbia's Mineral Exploration and Mining Strategy* (BC MEM 2012) and the *BC Jobs Plan* (Government of British Columbia 2012).

### 1.9.2 Natural Resource Industry Overview

The natural resource sector in Canada is an important element of national, provincial, and territorial economies, contributing to high living standards for Canadians through the creation of economic development opportunities in that sector. In 2012, natural resources in Canada accounted for 13% of



GDP and 50% of national export. The sector also contributes over \$30 billion a year in revenue to the federal, provincial, and territorial governments - money that supports social programs such as health, education, and public pensions (Government of Canada 2013a). In BC, the mining industry in 2012 made total payments of \$504 million to government and government agencies while pre-tax net earnings in the mining industry totaled \$1.8 billion (MABC 2013).

The sector contributes to growth in other sectors such as construction, machinery, professional services, and transportation through the purchase of goods and services. Approximately 950,000 Canadians work in the natural resource sector; however, another 850,000 are employed in industries serving those sectors. In total, about 10% of all employment in Canada depends on natural resources (Government of Canada 2013a).

In 2012, both the provincial and federal governments underscored their support for and commitment to grow the mining sector, in key action plans. In the *Economic Action Plan 2013* (Government of Canada 2013b), the Government of Canada noted the importance of natural resources to the development of the national economy while contributing to local community and regional growth (Government of Canada 2013a). The plan commits the federal government to invest in Canada's natural resources, support responsible resource development, as well as expand trade and open new markets for Canadian businesses. Similarly, *British Columbia's Mineral Exploration and Mining Strategy* states that the provincial government is "moving forward to increase investment, expand job creation, develop new economic opportunities, protect the environment and build a better quality of life for future generations" through natural resource development (BC MEM 2012).

In line with federal and provincial government priorities, developments such as the Brucejack Gold Mine Project will support economic development opportunities while contributing to local, provincial, and national economies, as well as creating long-term employment opportunities locally, regionally, and beyond. The following subsections address the potential benefits of the proposed Project as they relate to the economic feasibility of the Project, Project revenue, and employment. The analysis is broken down on a national, provincial, and regional level as direct, indirect, and induced Project impacts will be felt not only regionally but also in the province of BC and Canada as a whole.

### 1.9.3 Project Economic Feasibility

#### 1.9.3.1 Production and Market Prices

Gold mining is a global industry with over 90 countries producing the precious metal. In 2012, the total world production reached 95.2 million ounces (Moz) of gold with China being the leading producer at 14.2 Moz, comprising 15% of the total global production. Australia was the second largest producer at 8.8 Moz; the United States produced 8.1 Moz, and Russia 7.2 Moz. Canada was the seventh largest producer, after Russia, South Africa, and Peru, with the total gold production of 3.6 Moz in 2012, comprising about 3.8% of the world production. The remaining three countries included in the Top 10 gold-producing countries were: Indonesia, Uzbekistan, and Ghana (Gold Investing News 2013). However, as of June 2013, countries and organizations having the highest gold holdings were the United States, Germany, International Monetary Fund (IMF), Italy, France, China, and Switzerland (World Gold Council 2013).

Silver is produced as a by-product, mined alongside other commodities like gold, copper, lead, and zinc, rather than coming from primary silver production (only 20% of silver production comes from direct silver mining). In 2012, the global production of silver reached 787 Moz with Mexico leading the production at 162.2 Moz, China at 117 Moz, and Peru at 111.3 Moz. Other major producers included Australia, Russia, Poland, Bolivia, Chile, United States, and Argentina. Canada was the eleventh largest producer at 21.3 Moz in 2012 (Silver Investing News 2013; The Silver Institute 2013b).

In Canada, the 2012 total gold and silver production was at 3.6 and 21.3 Moz respectively. The largest gold-producing provinces were Ontario (46%) and Quebec (28%), with BC being the fifth largest producer in Canada comprising 4.4% of gold production in the country. Silver production was mainly in Ontario (22%), Yukon (21%), and New Brunswick (20%), with BC being the fifth largest producer at 12.2% of total production in Canada (Natural Resources Canada 2013).

In the province of British Columbia, gold production has been on a decline since 2000 when the production reached a high of 0.9 Moz at a value of C\$334.3 million (Figure 1.9-1). Preliminary estimates for 2012 indicated that gold production was at approximately 0.2 Moz in the province having the value of C\$242.9 million. Silver production is also declining (Figure 1.9-2). In 2003, the production of silver was as much as 23.9 Moz at a value of C\$142.4 million, but this fell to approximately 2.9 Moz in 2012 at an estimated value of C\$81.3 million (BC MEM Statistics 2012). As of August 2013, there were 19 mines operating in BC, out of which five included gold production and three silver production (BC MEM Statistics 2013a).

The expectation is therefore that the proposed Project will increase the declining production of gold and silver in the province; the initial estimates indicate that the underground mine, over the 22-year mine life, will produce 7.3 Moz of gold and 35.3 Moz of silver. This indicates that the mine will contribute to the annual production of gold and silver in the province approximately 0.4 Moz and 0.3 Moz respectively in the first 10 years of Operation. Moreover, future exploration is planned that could potentially result in further additions to the resources.

Average gold prices trended upward from US\$280 per ounce (US\$/oz) in 2000 to US\$1,667/oz in 2012 with some volatility in 2009 when the prices declined due to the economic crisis and in 2011 when prices increased, falling again in 2013. In 2013, gold prices were recorded at approximately US\$1,347/oz; historical gold prices are presented in Figure 1.9-3 (BC MEM Statistics, 2013c; BC MEM Statistics 2013d). In June of 2014, the price of gold was approximately US\$1,252/oz (Gold Price 2014).

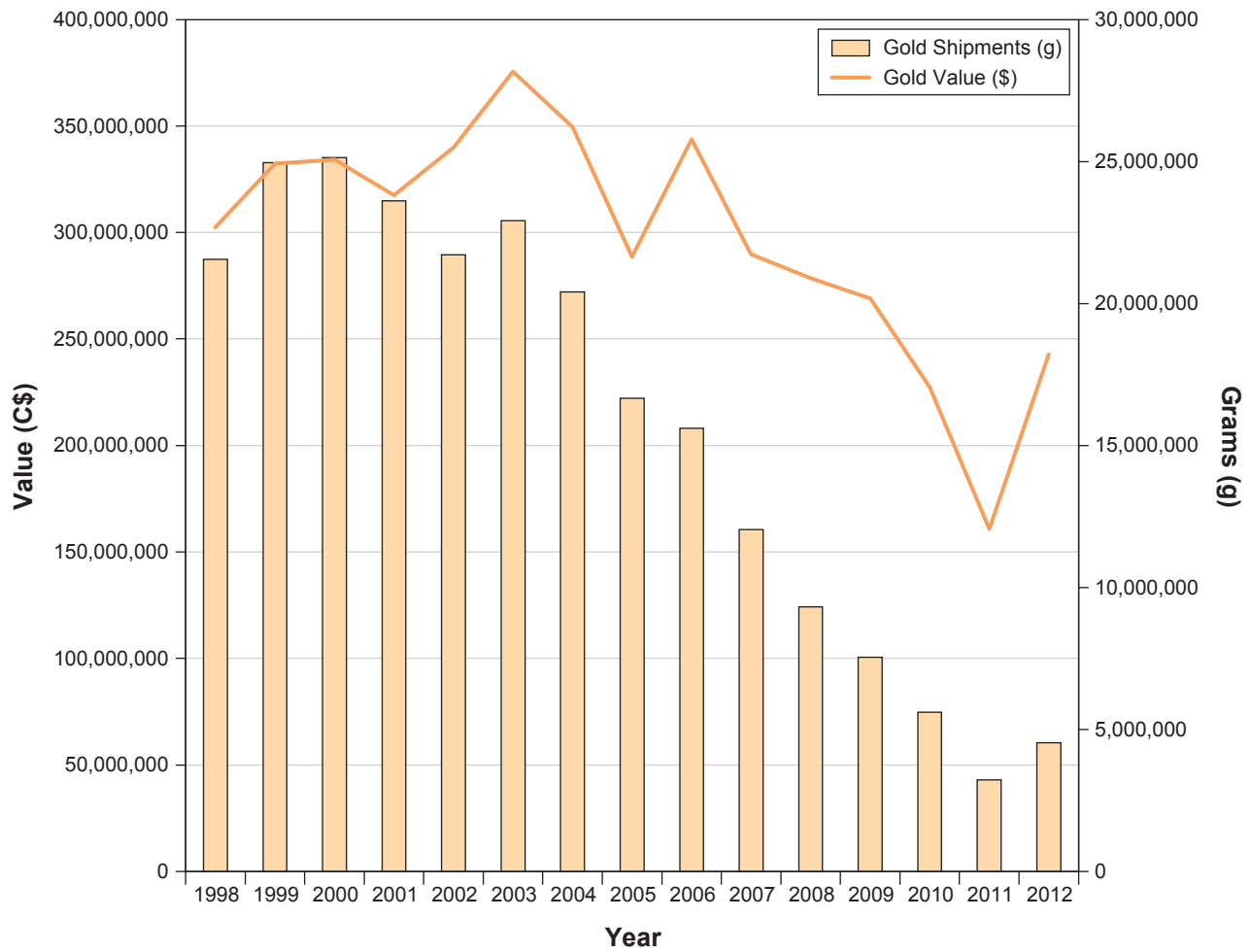
The average price of silver rose steadily from a low of US\$5/oz in 2000 to US\$35/oz in 2011. Similarly, the prices showed some significant volatility in 2009 when the prices sharply decreased and in 2011 with a sharp price increase. In 2013, the average price of silver was at approximately US\$22/oz; historical silver prices are presented in Figure 1.9-3 (BC MEM Statistics, 2013c; BC MEM Statistics 2013d). In June of 2014, the price of silver was at approximately US\$19/oz (Silver Price 2014).

The price volatility in the market for gold and silver makes it hard to approximate the potential revenues from the Project. However, recent trends and consumer expectations indicate that the prices are expected to either remain high or increase supporting the profitability of the Project and contributing to the provincial and federal revenue from mineral, corporate, personal income, and sales taxes. For potential economic returns, see Table 1.9-6 (Section 1.9.2.3).

#### 1.9.3.2 *Project Mineral Production*

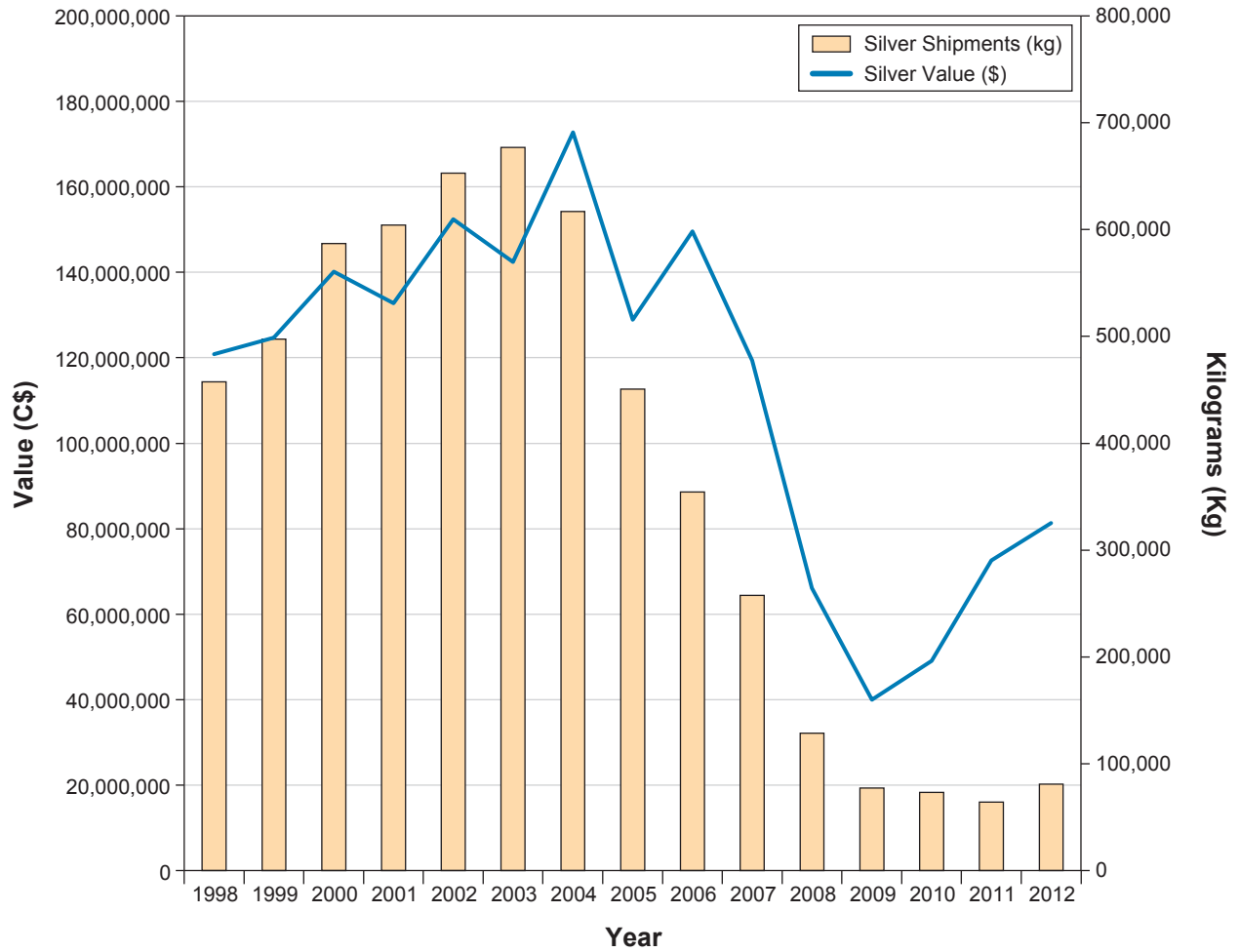
Mineral resource estimates identified at the Project (November 2012, December 2013) are presented in Tables 1.9-1 and 1.9-2. These estimates were provided as part of the Feasibility Study for the Project and include Measured, Indicated, and Inferred Reserves (Tetra Tech 2013b; Snowden 2014). Tables 1.9-3 and 1.9-4 present Mineral Reserve estimates by zone and reserve category (reserves developed from the resource model); these reserves focus on Proven and Probable Mineral Reserve estimates and they come from the first underground holes drilled as part of the VOK bulk sample program completed in May and June of 2013 (SEDAR 2013).

**Figure 1.9-1**  
**British Columbia**  
**Gold Production**



Source: British Columbia Ministry of Energy and Mines (MEM) Statistics, 2012.

**Figure 1.9-2**  
**British Columbia**  
**Silver Production**



Source: British Columbia Ministry of Energy and Mines (MEM) Statistics, 2012.

**Figure 1.9-3**  
**Monthly Gold and Silver Prices,**  
**US\$/oz (Average)**



Source: British Columbia Ministry of Energy and Mines (MEM) Statistics, 2013b.

**Table 1.9-1. Valley of the Kings Mineral Resource**

Category	Tonnes (Millions)	Gold (g/t)	Silver (g/t)	Gold (Moz)	Silver (Moz)
Measured	2.0	19.3	14.4	1.2	0.9
Indicated	13.4	17.4	14.3	7.5	6.1
Measured and Indicated	15.3	17.6	14.3	8.7	7.0
Inferred	5.9	25.6	20.6	4.9	3.9

Notes:

Estimate based on cut-off grade of 5g/t AuEq (December 2013)

Source: Snowden (2014).

**Table 1.9-2. West Zone Mineral Resource**

Category	Tonnes (Millions)	Gold (g/t)	Silver (g/t)	Gold (Moz)	Silver (Moz)
Measured	2.4	5.85	347	0.5	26.8
Indicated	2.5	5.86	190	0.5	15.1
Measured and Indicated	4.9	5.85	267	0.9	41.9
Inferred	4.0	6.44	82	0.8	10.6

Notes:

Estimate based on cut-off grade of 5g/t (November 2012).

Source: Tetra Tech (2013a).

**Table 1.9-3. Valley of the Kings Mineral Reserve**

Category	Tonnes (millions)	Gold (g/t)	Silver (g/t)	Gold (Moz)	Silver (Moz)
Probable	15.1	13.6	11.0	6.6	5.3

Notes:

Estimate (May 2013).

Source: SEDAR (2013).

**Table 1.9-4. West Zone Mineral Reserve**

Category	Tonnes (millions)	Gold (g/t)	Silver (g/t)	Gold (Moz)	Silver (Moz)
Proven	2.0	5.7	309	0.4	19.9
Probable	1.8	5.8	172	0.3	10.1
Total	3.8	5.8	243	0.7	30.0

Notes:

Estimate (May 2013).

Source: SEDAR (2013).

An updated Mineral Resource estimate has been prepared for VOK Zone at Pretium's Brucejack Property (Snowden 2014) and it includes the Measured, Indicated and Inferred Mineral Resource estimates, effective December 2013.

In the Valley of the Kings (VOK), Probable Mineral Reserves are 6.6 Moz of gold (15.1 million tonnes grading 13.6 grams of gold per tonne) and West Zone (WZ) Proven and Probable Mineral Reserves are 700,000 oz of gold (3.8 million tonnes grading 5.8 grams of gold per tonne); silver reserves are estimated at 5.3 and 30.0 Moz respectively. The estimated production for the first 10 years of mine Operation is 425,700 oz of gold per year (the value of \$575 million per year at \$1,350/oz of gold); the average gold production for the 22-year life-of-mine is 321,500 oz of gold per year.

A total of 7.3 Moz of gold and 35.3 Moz of silver are estimated to be produced over the life of the Project; metallurgical recoveries for the VOK are 96.7% for gold and 84.8% for silver, for the WZ they are respectively 94.7% and 90.4% (SEDAR 2013). Table 1.9-5 presents the projected production and processing levels for the Project. The first 10 years of Operation will take place in the VOK, while the remaining life of the mine will be focused in the WZ.

**Table 1.9-5. Project's Projected Production and Processing**

Year	Tonnage (t)	Gold Grade (g/t)	Silver Grade, (g/t)	Gold Production ('000)	Silver Production ('000)
Year 1	811,000	15.4	12.2	388	271
Year 2	937,000	13.8	11.1	403	284
Year 3	979,000	13.1	11.0	400	294
Year 4	981,000	15.8	11.7	483	314
Year 5	983,000	17.1	13.5	523	364
Year 6	986,000	12.7	8.8	389	235
Year 7	985,000	15.5	11.4	474	306
Year 8	985,000	14.0	9.9	427	265
Year 9	980,000	14.0	11.3	427	303
Year 10	991,000	11.2	17.8	343	490
Years 1-10	9,618,000	14.2	11.9	4,257	3,126
Years 11-22	9,368,000	9.7	142.7	2,816	28,515
Life of Mine (Years 1-22)	18,986,000	12.0	57.9	7,073	31,641

Source: SEDAR (2013); Tetra Tech (2013a).

### 1.9.3.3 Economic Returns

The following economic data are taken from the *Feasibility Study and Technical Report on The Brucejack Gold Mine Project* completed in June of 2013 (Tetra Tech 2013b). Economic evaluation of the Project was performed to estimate the potential revenue from the Project. Three price scenarios were assumed: base case, lower price, and spot price (as of June 6, 2013).<sup>2</sup> Based on the assumed exchange rates, gold and silver prices, the model estimated the annual net cash flows (NCFs), net present value (NPV), project interest rate of return (IRR) and the payback time (Table 1.9-6). The base case scenario indicates that, at the price of gold at \$1,350/oz and the price of silver at \$20/oz (US\$/C\$ exchange rate of 1), the Project would secure the NPV of \$2.7 billion (at 5% discount) with the Project IRR of 42.9% (SEDAR 2013).

### 1.9.3.4 Mine Construction Expenditures

Construction of the Project is expected to take two years with the start of production scheduled for H2 2016. The total initial capital construction cost, including contingencies, is estimated at \$663.5 million, with the majority of costs incurred in the last year of Construction (64%). Out of the total of \$663.5 million, total direct costs of the Project are estimated at \$451.8 million; these represent expenditures on mining equipment, process equipment, mills, and permanent buildings.

Indirect costs are costs not directly attributable to the completion of the Construction of the Project; these costs are estimated at \$125.0 million and they include field administration, direct supervision, capital tools,

<sup>2</sup> The base case consideration assumes the price of gold at US\$1,350/oz and the price of silver at US\$20/oz. The exchange rate of US\$/C\$ is assumed at 1, therefore, US\$ and C\$ currency specifications are dropped for simplicity.

start-up cost, contractor's fees, insurance, and taxes. Owner's costs are estimated at \$22.3 million and they comprise costs assumed by the owner to support and execute the Construction of the Project.

**Table 1.9-6. Summary of Pre-tax and Post-tax Economic Returns**

Economic Returns Unit	Base Case	Lower Price	Spot Price
Exchange Rate (US\$/C\$)	1	1	0.98
Gold Price (\$/oz)	\$1,350.0	\$800.0	\$1,415.7
Silver Price (\$/oz)	\$20.0	\$15.0	\$22.7
<b>Pre-Tax</b>			
NCF (US\$) million	\$5,278	\$1,408	\$5,898
NPV (at 5% discount rate) (US\$) millions	\$2,687	\$602	\$3,014
Project IRR (%)	42.9	16.6	47.0
Payback Years	2.1	4.7	1.9
<b>Post-Tax</b>			
NCF (US\$) million	\$3,499	\$964	\$3,913
NPV (at 5% discount rate) (US\$) millions	\$1,763	\$384	\$1,984
Project IRR (%)	35.7	13.7	39.2
Payback Years	2.2	4.8	2

Source: SEDAR (2013).

The mean labour cost is estimated at \$134.0 million, with 870 person-years of employment, comprising 20% of the total construction costs; this is what is expected to be spent on wages paid to workers directly employed on the Construction of the Project. Finally, the total allowance contingency for the Project is estimated at 14.3% of the direct costs (Tetra Tech 2013b).

Major expenditure categories are presented in Table 1.9-7. To arrive at the estimated construction cost excluding labour, it was necessary to extract the wage component of these expenditures from the total expenditures in each category. This was done under the assumption that wages accounted for the same share of total spending in each category.

**Table 1.9-7. Construction Costs by Expenditure Category**

Expenditure Category	Estimated Cost including Labour (\$M)	Estimated Cost excluding Labour (\$M)
Mine Site	32.7	25.4
Mine Underground	174.5	135.5
Mine Site Process	80.1	62.2
Mine Site Utilities	23.7	18.4
Mine Site Facilities	43.7	33.9
Mine Site Tailings (Brucejack Lake)	3.5	2.7
Mine Site Temporary Facilities	10.2	7.9
Mine Site (Surface) Mobile Equipment	14.3	11.1
Off Site Infrastructure	69.1	53.6
Indirect costs	125.5	97.1
Owners Costs	22.3	71.3
Cost of Labour	Included above	134.0
<b>Total Capital Expenditures</b>	<b>599.1</b>	<b>599.1</b>
Contingency	64.4	64.4
<b>Total Capital Expenditures (Contingency Included)</b>	<b>663.5</b>	<b>663.5</b>

Source: Tetra Tech (2013b); BC Stats (2013a).



### Local Facilities

Project Construction is expected to require some local infrastructure and local facilities such as power and public roads. The Project will be powered by electricity from the BC Hydro System (2012). Power will be provided via a high-voltage, 138-kV power line serviced from Stewart, BC. This will be a power supply line from the substation at Long Lake Hydro Project (Invest in Northwest 2013) to the Brucejack site substation. The line has been identified to have sufficient capacity to provide power to the Project.

Transportation and communication in the region is limited; the region is intersected by Highway 37 north to south and Highway 16 east to west. The Project will mostly use Highway 37 that provides access to the Brucejack Access Road. Highway 37 is well below capacity thresholds and experiences mild traffic.

#### 1.9.3.5 Mine Operation Expenditures

The Project is expected to remain in operation for 22 years at 2,700 tonnes per day of extracted ore with an operating cost of \$156.5 per tonne milled (providing a minimum \$22.3/t operating margin of ore mined). Over the 22-year life-of-mine, the total mining expenditures are estimated at \$711.7 million, processing expenditures are estimated at \$1,067.1 million and the total general and administrative (G&A)/surface services are \$619.9 million. Operating expenditures include costs related to mining, processing, material re-handling, general and administration, surface services, backfill, and water treatment; and exclude sustaining capital costs, off-site costs, taxes, permitting costs, and other government permitting costs.

Table 1.9-8 shows the total distribution of operating expenditures by category, including and excluding labour, as well as the estimated sustaining mining capital estimated for the production period; the figures are based on the total estimated costs for the life of the mine. Labour cost associated with direct Project employment was estimated at \$1,469.0 million.<sup>3</sup> Sustaining capital costs are incorporated on a year-by-year basis over the Construction and life-of-mine; the costs are estimated at \$328.5 million and they include expenditures for mining and milling additions and replacement of equipment.

**Table 1.9-8. Operating Costs by Expenditure Category (Life of Mine)**

Expenditure Category	Total Spending	Materials and Services	Labour
Mining expenditure	\$1,717.9	\$711.7	\$1,006.2
Processing expenditure	\$1,264.4	\$1,067.1	\$197.3
G&A/Surface Services Expenditures	\$885.4	\$619.9	\$265.5
<b>Total - Mining, Processing, G&amp;A and Surface Services</b>	<b>\$3,867.7</b>	<b>\$2,398.7</b>	<b>\$1,469.0</b>
Sustaining Capital	\$328.5		

Source: Tetra Tech (2013b).

Table 1.9-9 displays the annual distribution of operating costs for the life of the mine, years 1 to 22. As shown, operating costs, as related to mining, processing and G&A/surface services, will be relatively stable during the Operation of the mine. Mining expenditures will average \$37.2 million per year for the first 10 years of Operation, reach a peak in year 5 at \$39.4 million, and significantly drop from \$18.2 to \$5.9 million over the last four years of Operation. Processing expenditures will average \$52.0 million over the first 10 years of Operation, reach a peak of \$60.3 million in year 5, and drop by year 22 to

<sup>3</sup> Costs are calculated in Canadian Dollars, however, as the US\$/C\$ exchange rate is assumed at 1, the currency specification is omitted. The operating costs for the Project were estimated within an accuracy range of +/-15%.

\$14.4 million. G&A/surface services will be relatively stable at approximately \$29.1 million per year over the 22-year life-of-mine, dropping to \$24.3 million per annum in the last year of Operation.

**Table 1.9-9. Annual Operating Expenditures (Life of Mine)**

Annual Expenditures	Mining (\$M)	Processing (\$M)	General and Administrative, Surface Services (\$M)
Year 1	\$27.5	\$45.1	\$28.8
Year 2	\$38.1	\$46.4	\$29.0
Year 3	\$39.0	\$50.5	\$29.1
Year 4	\$39.0	\$57.5	\$29.1
Year 5	\$39.4	\$60.3	\$29.1
Year 6	\$38.6	\$51.6	\$29.1
Year 7	\$37.4	\$55.6	\$29.1
Year 8	\$37.7	\$52.7	\$29.1
Year 9	\$37.3	\$52.2	\$29.1
Year 10	\$38.6	\$48.4	\$29.1
Year 11	\$35.8	\$51.5	\$29.1
Year 12	\$37.1	\$55.2	\$29.1
Year 13	\$37.4	\$53.5	\$29.1
Year 14	\$38.4	\$50.6	\$29.1
Year 15	\$34.9	\$52.2	\$28.7
Year 16	\$33.1	\$53.8	\$28.7
Year 17	\$34.3	\$52.9	\$26.8
Year 18	\$31.2	\$60.6	\$26.7
Year 19	\$18.2	\$36.5	\$26.1
Year 20	\$18.6	\$37.3	\$26.1
Year 21	\$14.4	\$28.6	\$25.9
Year 22	\$5.9	\$14.4	\$24.3
<b>Total</b>	<b>\$711.7</b>	<b>\$1,067.1</b>	<b>\$619.9</b>

Source: Tetra Tech (2013b).

#### 1.9.3.6 Mine Closure Expenditures

Table 1.9-10 shows the distribution of expected expenses to be incurred during mine Closure. The Closure costs estimates are based on the Closure activities proposed for each type of facility, as described. The cost is estimated at \$9.1 million including:

- Brucejack Mine Site;
- Brucejack Transmission Line;
- Brucejack Access Road;
- Bowser Aerodrome; and
- Knipple Transfer Area.

**Table 1.9-10. Mine Closure Costs**

Closure	\$M
Labour and equipment costs for closure of infrastructure	\$9.1
Site preparation, reclamation, and material costs	\$1.6
<b>Total Cost</b>	<b>\$10.7</b>

Source: Chapter 30, Closure and Reclamation, Section 30.10, Closure Costing.

The site preparation, reclamation and material costs for the areas that are associated with the Project are estimated at \$1.6 million. The costs include the cost of site preparation, soil placement, and re-vegetation. The material costs for the concrete seals for the portals and ventilation shafts are also included.

The total cost for closing the Project facilities and the reclamation for the components of the Project including the Brucejack Mine Site, the Brucejack Transmission Line, the Brucejack Access Road, the Bowser Aerodrome, and the Knipple Transfer Area has been estimated at \$10.7 million. Estimates do not include the cost of off-site disposal.

#### 1.9.4 Revenues

The Project is predicted to result in substantial benefits to the region and the province, as well as Canada as a whole. Benefits will be realized through employment (see Section 1.9.4) and business opportunities to supply goods and services directly and indirectly to the Project, as well as other spin-off economic benefits associated with workers spending their incomes within their communities and elsewhere. In addition, the Project will contribute tax revenues to local, provincial, and federal governments.

The communities in the economic effects assessment area (Chapter 19, Assessment of Potential Economic Effects) include incorporated municipalities and unincorporated towns, Treaty Nation villages, and Indian Reserves (IRs). Over the next years the mining industry is expected to represent an increasingly important source of investment and employment in local communities where extractive industries and related energy projects will form the basis of the regional economy.

The effects of the Project on community development are expected to be modest and mostly be comprised of mine-related economic activities. The Project is expected to create employment opportunities for local workers directly at the Brucejack Mine Site. Moreover, direct project spending on local goods and services will support businesses enhancing the economic development in the communities. The additional spending will drive job creation by local businesses leading to a higher level of general employment and, consequently, higher personal income.

##### 1.9.4.1 Economic Impact Analysis

###### BC Input-Output Model

An economic impact model, the BC Input-Output Model (BCIOM), was used to estimate the direct, indirect, and induced economic benefits of the Project. Direct Project impacts relate to Project activities such as direct Project spending and direct Project employment. Direct supplier impacts measure the impacts of the Project on BC industries supplying goods and services directly to the Project; indirect impacts measure the impacts on BC industries further back in the supply chain; and, induced impacts measure the impacts that spending by workers (employed by the Project or by direct/indirect suppliers) will have on the economy.

The BCIOM provides the total extent to which the BC economy will benefit from Project Construction and Operation. Four indicators are used to assess the economic impacts associated with the Project; these are:

- Gross Domestic Product (GDP);
- labour income;
- employment; and
- government tax revenue (from personal income tax, corporate profit tax, and sales tax).

GDP measures the value added to the BC economy by Project activities. This includes household income (wages, salaries, and benefits) as well as profits and incomes earned by corporations.<sup>4</sup> The wage component of the labour cost estimate is assumed to include pre-tax wages, salaries, and supplementary income (employer's share of CPP and EI). However, wage estimation does not take into account circumstances in which the wage could be higher or lower, possibly determined by local labour market characteristics (such as limited supply of labour) or risk premium associated with doing the work. Moreover, wage impacts not directly associated with work at the construction site are expected to be significantly lower as compared to the average supplier wages.

Employment estimates are based on labour requirements for the Construction and Operation phases. Employment represents hours spent on the job by a typical worker in an industry and it is given in person-years; this does not represent full-time equivalent (FTE) measures. Person-years represents one year of work in the given industry by one person. One year of work usually comprises 2,080 hours, and in most mining industries this implies 12-hour days with 2 weeks on the job and 2 weeks off the job.

Person-years is used, rather than the number of potential positions, as there is a large number of various shifts, different job requirements, and different positions that would be hard to categorize and consequently evaluate the impact of the Project on employment. Person-years, consequently, standardizes this approach.

Government tax revenue is a composite of income and commodity taxes generated by the Project. Income taxes include personal and corporate income taxes. Commodity taxes include PST, GST, gas taxes, air transportation taxes, duties, excise taxes, and other. Property taxes are not included in the economic impact modelling. Tax revenue impacts were calculated based on the current tax structure, 7% PST, applied to items subject to the tax (for BC only). The analysis is done at the provincial level with all effects assessed for the province of BC exclusively.

There are several limitations associated with the BCIOM, which include: the linear nature of the model as the model does not take into account the amount of time required for changes to happen; it is assumed that there are no capacity constraints and that an increase in the demand for labour will result in employment (rather than re-deployment); additionally, it is assumed that consumers spend an average of 80% of their personal income on goods and services and the remaining 20% is consumed by taxes and savings.

The BCIOM provides the analysis of the full extent of impacts in the province of BC as well as for two census divisions of BC: Regional District of Kitimat-Stikine (RDKS), as well as the Regional District of Bulkley-Nechako (RDBN). It is expected that the regional impacts in RDKS would occur to a larger extent than regional impacts in RDBN (these are expected mostly for the Town of Smithers); however,

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<sup>4</sup> For the purpose of the project it was assumed that 80% of worker's earnings would be used to purchase goods and services in the province (induced effects in the province), and 20% goes to taxes, other payroll deductions and savings.

the modelling approach does not make a similar distinction. Consequently the whole RDBN is included. The results of the economic impact modelling are presented throughout the following sections.

### Provincial Input-Output Multipliers

As the BCIOM provides Project impacts only in consideration of the BC economy, national impacts were assessed by ERM Rescan based on provincial and national input-output multipliers provided by Statistics Canada (Statistics Canada 2013). The input-output multipliers are derived from input-output tables and are used to assess the impacts on the economy of an exogenous change in final demand for the output of a given industry. The multipliers provide a measure of the interdependence between an industry and the rest of the economy.

As in the case of the BCIOM, the multipliers show the direct, indirect, and induced impacts on components of GDP, labour income, and jobs. Direct impacts relate to the impacts of the Project within BC, indirect and induced impacts are calculated for all other provinces. In order to avoid double counting, direct impacts were not calculated as the BCIOM assumes that all direct impacts would take place in BC exclusively. Similarly, indirect and induced multipliers were adjusted accordingly.

Two types of multipliers were utilized to assess Project impacts during Construction and Operation;<sup>5</sup> they are presented in Table 1.9-11.

**Table 1.9-11. Provincial Input-Output Multipliers**

	Multipliers <sup>1</sup>			
	Construction		Operation	
	Indirect	Induced	Indirect	Induced
GDP	0.14	0.24	0.09	0.15
Income	0.08	0.13	0.05	0.08
Employment	1.23	2.19	0.85	1.48

Notes:

<sup>1</sup> Indirect and induced multipliers for the Construction and Operation are for all Canadian provinces excluding BC.

The multipliers were used to determine the impact of Project capital expenditures on GDP, income and employment.

Source: Statistics Canada (2013).

### Additional Economic Data

Supporting information is based on the analysis completed in the *Feasibility Study and Technical Report on The Brucejack Gold Mine Project, Stewart, BC* (2013a), as well as the OPEX and CAPEX estimates prepared by Tetra Tech in July of 2013 (2013b).

#### 1.9.4.2 Mine Construction Impacts

### Canada

Project Construction is expected to provide direct, indirect, and induced benefits at the national, provincial, and regional level. Table 1.9-12 summarizes total GDP and income impacts of Project Construction. These impacts represent direct impacts as related to the Project's spending, and direct,

<sup>5</sup> The multipliers are derived from tables: Output Multipliers Provincial L97 2009 provided by Statistics Canada. For the Construction phase, multipliers for *Other Engineering Construction* (BS212220) were used. For the Operation phase, multipliers for *Gold and Silver Ore Mining* (BS23C500) were incorporated.

indirect, and induced impacts as related to the activities in the supplier industries; the highlighted impacts are for the province of BC and for Canada in general.

**Table 1.9-12. Total Impacts of Construction Activities in Canada**

Total Impacts in Canada <sup>1</sup>	Direct Impacts	Indirect Impacts	Induced Impacts	Total Impacts
<b>GDP Basic Price (\$M)</b>				
BC				
Construction	\$134.0	0.0	0.0	\$134.0
Supplier	\$129.0	\$60.2	\$71.6	\$260.8
Canada (less BC)	0.0	\$92.5	\$156.4	\$248.9
Total	\$263.0	\$152.7	\$228.1	\$643.8
<b>Labour Income (\$M)<sup>1</sup></b>				
BC				
Construction	\$134.0	0.0	0.0	\$134.0
Supplier	\$92.0	\$40.6	\$41.0	\$173.7
Canada (less BC)	0.0	\$52.6	\$85.4	\$137.9
Total	\$226.0	\$93.2	\$126.4	\$445.6

Notes:

<sup>1</sup> Provincial estimates are from BCIOM, estimates for Canada (less BC) are based on provincial input-output multipliers provided by Statistics Canada.

Source: BC Stats (2013a); Statistics Canada (2013).

Preliminary analysis indicates that Project Construction is expected to contribute a total of \$643.8 million to GDP in Canada. Of this total, direct construction spending is expected to contribute \$263.0 million, with \$134.0 million generated from the Construction of the Project (labour income) and \$129.0 million from supplier activities directly related to the Project. This effect is expected to be mostly felt within BC. Total indirect and induced impacts as related to the Construction of the Project will further contribute \$380.8 million to Canadian GDP (Table 1.9-12).

In terms of labour income within Canada, Project Construction is expected to contribute \$445.6 million. Labour income generated from direct spending at the Construction of the mine and from direct suppliers will comprise 50.7% of the total income effect, with the remaining income coming from Project's indirect and induced activities (including impacts at the national, provincial, and regional level; Table 1.9-12).

### British Columbia

Project Construction is expected to benefit the provincial economy through direct, indirect, and induced activities. In addition to GDP impacts, the Project will affect the level of household income and government tax revenue. Based on estimated capital expenditures of \$599.1 million during Construction (Table 1.9-7), the GDP impact associated with Project Construction (Project expenditures) is estimated at \$134.0 million, this is also equal to the wage bill. However, in this case, the GDP impact is possibly underestimated as the data included no information on the operating surplus<sup>6</sup>.

<sup>6</sup> An operating surplus is a component of GDP and relates to gross profit income realized in an economy. The term can apply to both the Project's Construction and Operation phases.

An additional \$260.8 million in GDP impacts will come from supplier activities related to direct, indirect, and induced Construction activities. The estimated GDP impacts in supplier industries include all components of GDP such as wages, salaries, operating surplus, mixed income, and taxes on production net of subsidies (Table 1.9-13). Comparatively, the provincial income-based GDP was estimated at approximately \$219,994 million in 2012 (BC Stats 2013b).

**Table 1.9-13. Total Economic Impacts**

	Direct	Other Suppliers	Total Indirect <sup>1</sup>	Induced <sup>2</sup>	Total Impact
<b>Total Expenditures, Construction (\$M)</b>					<b>1,126.3</b>
Project expenditures	599.1	0.0	0.0	0.0	599.1
Supplier industry and induced impacts	279.7	133.3	412.4	114.8	527.2
<b>GDP at Basic Prices (\$M)</b>					<b>394.8</b>
Construction <sup>3</sup>	134.0	0.0	0.0	0.0	134.0
Supplier industry and induced impacts	129.0	60.2	189.2	71.7	260.8
<b>Household Income (\$M)</b>					<b>307.7</b>
Construction	134.0	0.0	0.0	0.0	134.0
Supplier industry and induced impacts	92.0	40.6	132.6	41.0	173.7
<b>Tax Revenue (\$M)</b>					<b>64.3</b>
Construction	26.7	0.0	0.0	0.0	26.7
Supplier industry and induced impacts	19.0	9.2	28.2	9.4	37.6

*Notes:*

<sup>1</sup> The total indirect impact is the sum of the effect on direct suppliers and other supplier industries.

<sup>2</sup> Assumes a social safety net is in place. Includes effects generated by Project spending and activities of supplier industries.

<sup>3</sup> Project expenditure data provided by clients may not include all components of GDP (e.g., operating surplus).

Source: BC Stats (2013a).

As previously mentioned, the Construction of the Project will contribute \$134.0 million in household income as a result of employment created at the Brucejack Mine Site. An additional \$173.7 million in household income will come from supplier-related activities (direct, indirect, or induced; Table 1.9-13).

The Project will also support provincial and federal governments as it will contribute to the provincial and federal tax revenue. Direct tax revenue impacts associated with the Project are estimated at \$26.7 million and this represents primary personal income taxes paid on workers' wages (Table 1.9-13). Out of this, \$18.0 million will be paid to the federal government and \$8.7 million to the provincial government (Table 1.9-14). Corporate taxes for the Construction phase are not included.

In the supplier industries, tax revenues are estimated at \$37.6 million, \$19.0 million coming from direct supplier activities and \$9.2 million from indirect supplier activities; also, \$9.4 million is expected to be generated in industries that benefit from worker spending (Table 1.9-13). Overall, direct, indirect, and induced supplier activities will contribute \$17.9 million to the federal tax revenue, \$14.4 million to the provincial tax revenue and \$5.3 million to the local tax revenue (Table 1.9-15).

**Table 1.9-14. Tax Revenue Derived from Direct Project Expenditures**

	Tax Revenue			
	Federal	Provincial	Local	Total
<b>Total, All Sources</b>	<b>18.0</b>	<b>8.7</b>	<b>0.0</b>	<b>26.7</b>
Taxes on products (\$M) <sup>1</sup>	0.2	0.5	0.0	0.7
Taxes on factors of production (\$M)	0.0	0.0	0.0	0.0
Personal income taxes (\$M) <sup>2</sup>	17.8	8.2	0.0	26.0
Corporate income taxes (\$M) <sup>3</sup>	0.0	0.0	0.0	0.0

**Notes:**

<sup>1</sup> Small differences between figures and the value for taxes on products net of subsidies reported in the allocation of Project expenditure are due to rounding and/or the inclusion of net taxes paid on some goods purchased by subcontractors which are not reflected in the indirect and induced impacts given in the following table.

<sup>2</sup> Income taxes paid on worker's wages and returns to capital reported in Project expenditures.

<sup>3</sup> Corporate taxes are excluded.

Source: BC Stats (2013a).

**Table 1.9-15. Tax Revenue Derived from Indirect and Induced Project Expenditures**

	Direct Suppliers	Other Suppliers	Total Indirect Impact (all suppliers)	Induced Impact <sup>2</sup>	Total Indirect and Induced Impacts
<b>Total Tax Revenue (\$M)</b>	<b>19.0</b>	<b>9.2</b>	<b>28.2</b>	<b>9.4</b>	<b>37.6</b>
Federal (\$M)	10.4	4.5	14.9	3.0	17.9
Personal income tax <sup>1</sup>	7.8	3.2	11.0	2.3	13.3
Corporation income tax	2.8	1.3	4.1	1.2	5.3
Net taxes on products	-0.2	0.0	-0.2	-0.5	-0.7
Provincial (\$M)	7.4	3.4	10.8	3.6	14.4
Personal income tax	3.0	1.2	4.2	0.9	5.1
Corporation income tax	1.2	0.6	1.8	0.6	2.4
Net taxes on products	3.2	1.6	4.8	2.2	7.0
Local (\$M)	1.3	1.2	2.5	2.8	5.3

**Notes:**

<sup>1</sup> Includes wages, benefits, unincorporated business income, operating surplus and net taxes on factors of production.

<sup>2</sup> Assumes a social safety net is in place. Includes effects generated by Project spending and activities of supplier industries.

Source: BC Stats (2013a).

Project Construction is expected to generate profits for suppliers providing direct services to the mine, as well as suppliers benefiting from indirect and induced Construction activities. Project Construction will contribute to provincial GDP; the largest GDP impacts will be felt in businesses involved in professional, scientific and technical services, manufacturing and construction (direct suppliers), as well as in businesses providing services in finance, insurance, real estate, and rental and leasing (induced impact). Direct supplier activities are expected to contribute \$129.0 million to the province's GDP. In supplier industries GDP impacts resulting from indirect and induced activities are estimated at \$60.2 and \$71.6 million respectively (Table 1.9-16).



**Table 1.9-16. GDP Impacts of the Construction Phase in Top Five Supplier Industries**

	GDP (\$M)
<b>Direct Suppliers</b>	<b>129.0</b>
Professional, scientific and technical services	34.0
Manufacturing	27.9
Construction	19.8
Mining and oil and gas extraction	13.5
Wholesale trade	12.5
<i>Top five industries as a % of total direct supplier impact</i>	<i>83.5</i>
<b>Other Suppliers</b>	<b>60.2</b>
Professional, scientific and technical services	12.0
Finance, insurance, real estate and rental and leasing	10.2
Manufacturing	9.0
Wholesale trade	5.7
Transportation and warehousing	4.5
<i>Top five industries as a % of total impact in other supplier industries</i>	<i>68.9</i>
<b>Induced Impact</b>	<b>71.6</b>
Finance, insurance, real estate and rental and leasing	31.6
Retail trade	8.5
Information and cultural industries	3.2
Accommodation and food services	3.1
Non-profit institutions serving households	3.0
<i>Top five industries as a % of total induced impact</i>	<i>68.8</i>
<b>Total, Indirect and Induced</b>	<b>260.8</b>
Finance, insurance, real estate and rental and leasing	49.6
Professional, scientific and technical services	47.9
Manufacturing	38.7
Construction	21.7
Wholesale trade	20.7
<i>Top five industries as a % of total indirect and induced impact</i>	<i>68.5</i>

Source: BC Stats (2013a).

### Regional Area

Project Construction is expected to generate important economic impacts within the Regional District of Kitimat-Stikine (RDKS), with effects also extending to the Town of Smithers (located within the Electoral Area A of the RDBN), the Regional Economic Study Area for the Project (see Section 19.3, Baseline Characterization). However, the RDBN in general is not expected to experience substantial impacts during Construction as effects are anticipated to remain localized within the Town of Smithers.

Preliminary estimates of regional impacts in supplier industries indicate that activities related to the Construction of the Project will contribute approximately \$56.4 million to provincial GDP in RDKS and \$0.9 million in RDBN. Similarly, supplier industries will see an increase in household income by \$37.5 million in RDKS and \$0.6 million in RDBN (Table 1.9-17).

**Table 1.9-17. Regional Supplier Impacts Estimates**

	Direct Suppliers	Other Suppliers	Total Indirect Impact (all suppliers)	Induced	Total Indirect and Induced
<b>GDP (M\$)</b>					
RDKS	45.3	5.4	50.7	5.7	56.4
RDBN	0.3	0.3	0.6	0.3	0.9
Rest of BC	83.4	54.5	137.9	65.6	203.5
Total	129.0	60.2	189.2	71.6	260.8
<b>Household Income (\$M)</b>					
RDKS	30.9	2.7	33.6	3.9	37.5
RDBN	0.0	0.3	0.3	0.3	0.6
Rest of BC	61.1	37.6	98.7	36.8	135.6
Total	92.0	40.6	132.6	41.0	173.7

Source: BC Stats (2013a).

#### 1.9.4.3 Mine Operation Impacts

##### Canada

Table 1.9-18 summarizes total GDP and income impacts of Project Operation. These impacts include both direct impacts as related to the Project's spending, as well as direct, indirect, and induced impacts as related to activities in supplier industries. The impacts are for the province of BC and for Canada in general.

**Table 1.9-18. Total Impacts of Operation Activities in Canada**

Total Impacts in Canada <sup>1</sup>	Direct Impacts	Indirect Impacts	Induced Impacts	Total Impacts
<b>GDP Basic Price (\$M)</b>				
BC				
Operation	\$1,553.8	0.0	0.0	\$1,553.8
Supplier	\$587.6	\$276.7	\$495.6	\$1,360.0
Canada (less BC)	0.0	\$377.3	\$644.0	\$1,021.3
Total	\$2,141.5	\$654.0	\$1,139.6	\$3,935.2
<b>Labour Income (\$M)</b>				
BC				
Operation	\$1,475.4	0.0	0.0	\$1,475.4
Supplier	\$393.2	\$179.0	\$283.9	\$856.1
Canada (less BC)	0.0	\$218.7	\$356.7	\$575.4
Total	\$1,868.6	\$397.7	\$640.5	\$2,906.9

Notes:

<sup>1</sup> Provincial estimates are from BCIOM, estimates for Canada (less BC) are based on provincial input-output multipliers provided by Statistics Canada.

Source: BC Stats (2013a); Statistics Canada (2013).

During the life of the mine, the Project is expected to contribute a total to \$3,935.2 million to Canadian GDP. Direct Operation spending is expected to contribute \$2,141.5 million of this total, with

\$1,553.8 million generated from the Operation of the mine (this mostly includes labour income) and \$587.6 million from supplier activities directly related to the Project. This effect is expected to be mostly felt in BC. Total indirect and induced Operation impacts will contribute a further \$1,793.6 million to Canadian GDP (Table 1.9-18).

Labour income during mine Operation is expected to contribute \$2,906.9 million. Labour income generated from direct spending at the mine and from suppliers directly serving the mine will comprise 64.3% of the total income effect, with remaining income derived from Project's indirect and induced activities (including impacts at the national, provincial, and regional level; Table 1.9-18).

### British Columbia

The Project is expected to benefit the provincial economy through direct, indirect, and induced activities. In addition to GDP impacts, the Project will have an impact on household income and tax revenue. GDP impacts associated with the life of the mine (Project expenditures) are estimated at \$1,553.8 million; these impacts represent the wage bill (\$1,475.4 million) and overhead items such as taxes on factors of production included in G&A/surface services. However, as with Construction phase data, GDP impact is possibly underestimated as the data did not include information on the operating surplus.

The estimated GDP impact in supplier industries is \$1,360.0 million resulting from direct, indirect, and induced activities. Out of the total impact, \$587.8 million in GDP is expected to be generated in direct supplier industries, \$276.7 million from indirect activities, and \$495.6 million generated from worker spending. Therefore, total GDP impact over the 22-year life-of-mine in the province of BC is estimated at \$2.9 billion with an approximate annual contribution of \$132.1 million (Table 1.9-19).

**Table 1.9-19. Total Economic Impacts**

	Direct	Other Suppliers	Total Indirect <sup>1</sup>	Induced <sup>2</sup>	Total Impact
<b>Total Expenditures (\$M)</b>					<b>6,858.5</b>
Project expenditures	4,222.0	0.0	0.0	0.0	4,222.0
Supplier industry and induced impacts	1,250.4	591.6	1,841.1	794.5	2,636.5
<b>GDP at Basic Prices (\$M)</b>					<b>2,913.8</b>
Operating costs <sup>3</sup>	1,553.8	0.0	0.0	0.0	1,553.8
Supplier industry and induced impacts	587.6	276.7	864.4	495.6	1,360.0
<b>Household Income (\$M)</b>					<b>2,331.5</b>
Operating costs	1,475.4	0.0	0.0	0.0	1,475.4
Supplier industry and induced impacts	393.2	179.0	572.2	283.9	856.1
<b>Tax Revenue (\$M)</b>					<b>526.9</b>
Operating costs	320.2	0.0	0.0	0.0	320.2
Supplier industry and induced impacts	96.2	45.3	141.5	65.2	206.7

**Notes:**

<sup>1</sup> The total indirect impact is the sum of the effect on direct suppliers and other supplier industries.

<sup>2</sup> Assumes a social safety net is in place. Includes effects generated by Project spending and activities of supplier industries.

<sup>3</sup> Project expenditure data provided by clients may not include all components of GDP (e.g., operating surplus).

Source: BC Stats (2013a).

In addition to the \$1,475.4 million in household income resulting from the Project employment at the Brucejack Mine Site, a further \$856.1 million in household income will come from supplier-related activities (direct, indirect, or induced; Table 1.9-19).

Mine Operation will also contribute to the provincial and federal tax revenue. Tax revenue impacts associated with the Project's expenditures are estimated at \$320.2 million, representing primary personal income taxes paid on workers' wages. This includes \$170.8 million in federal, \$98.2 million in provincial, and \$51.2 million in local taxes (Table 1.9-20).

**Table 1.9-20. Tax Revenue Derived from Project Expenditures**

	Tax Revenue			
	Federal	Provincial	Local	Total
<b>Total, all sources</b>	<b>170.8</b>	<b>98.2</b>	<b>51.2</b>	<b>320.2</b>
Taxes on products (\$M) <sup>1</sup>	7.7	4.8	0.0	12.5
Taxes on factors of production (\$M)	0.6	26.7	51.2	78.5
Personal income taxes (\$M) <sup>2</sup>	162.5	66.7	0.0	229.3
Corporate income taxes (\$M) <sup>3</sup>	0.0	0.0	0.0	0.0

*Notes:*

<sup>1</sup>Small differences between figures and the value for taxes on products net of subsidies reported in the allocation of Project expenditure are due to rounding and/or the inclusion of net taxes paid on some goods purchased by subcontractors which are not reflected in the indirect and induced impacts given in the following table.

<sup>2</sup>Income taxes paid on worker's wages and returns to capital reported in Project expenditures.

<sup>3</sup>Corporate taxes are excluded.

Source: BC Stats (2013a).

A tax model for the post-tax economic evaluation of the Project, with the inclusion of the applicable income and mining taxes, was provided in the feasibility study prepared by Tetra Tech. Based on the long-term metal prices, the study estimated total taxes payable on Project profits to be \$1,778.3 million over 22 years, with \$671.9 million incurred in federal corporate taxes, \$457.2 million in provincial corporate taxes, and \$649.1 million in provincial resource taxes (Tetra Tech, 2013a).<sup>7</sup> Further, rural property taxes were estimated at approximately \$1.8 million to \$2.5 million per year.<sup>8</sup>

In the supplier industries, tax revenues are estimated at \$206.7 million, with \$96.2 million coming from direct supplier activities and \$45.3 million from indirect supplier activities. The remaining \$65.2 million is expected to be generated in industries that benefit from worker spending, such as finance, insurance, real estate, rental and leasing, and retail. (Tables 1.9-19 and 1.9-22). Overall, direct, indirect, and induced supplier activities will contribute \$86.3 million to federal tax revenue, \$82.7 million to provincial tax revenue and \$37.7 million to local tax revenue<sup>9</sup> (Table 1.9-21).

Operation of the Project is also expected to generate benefits for suppliers providing direct services to the mine, as well as suppliers profiting from indirect and induced mining activities. The largest GDP impacts in supplier industries will be felt in businesses involved in transportation and warehousing (direct suppliers); as well as in businesses providing services in finance, insurance, real estate, and

<sup>7</sup> Federal income tax rate was assumed at 15.0% and provincial (BC) income tax rate was set at 10.0%; for the provincial mining tax system, 2% was used for the net current proceeds tax and 13% for the net revenue tax.

<sup>8</sup> Rural property tax estimates are based on the 2013 BC Rural Property Tax rates for the Electoral Area D (Telegraph Creek, Iskut, Bob Quinn) in RDKS. In that region, the rural property tax rate varies from 3.342 for businesses to 4.6379 for light/major industries. Therefore, the provided estimate is an approximation based on the capital Project expenditures and not the actual property assessment. Consequently, the estimated tax revenue may not reflect the actual tax as it does not take into consideration location of the property, size, land surface, shape, use, age, condition and similar. Further assumptions based on this estimate should be considered with caution.

<sup>9</sup> Local tax revenue represents the municipal tax revenue that mostly relates to accommodation taxes.

rental and leasing (induced impact). Direct supplier activities are expected to contribute \$587.6 million to the province’s GDP. GDP impacts in supplier industries resulting from indirect and induced activities are estimated at \$276.7 and \$495.6 million respectively (Table 1.9-22).

**Table 1.9-21. Tax Revenue Derived from Indirect and Induced Project Expenditures**

	Direct Suppliers	Other Suppliers	Total Indirect Impact (all suppliers)	Induced Impact <sup>2</sup>	Total Indirect and Induced Impacts
Total Tax Revenue (\$M)	96.2	45.3	141.5	65.2	206.7
Federal (\$M)	44.1	21.3	65.4	21.0	86.3
<i>Personal income tax<sup>1</sup></i>	28.2	13.8	42.0	15.8	57.8
<i>Corporation income tax</i>	15.8	7.0	22.8	8.5	31.3
<i>Net taxes on products</i>	0.1	0.5	0.6	-3.4	-2.7
Provincial (\$M)	40.0	17.7	57.7	25.0	82.7
<i>Personal income tax</i>	10.7	5.2	16.0	6.1	22.0
<i>Corporation income tax</i>	7.0	3.2	10.2	3.8	14.1
<i>Net taxes on products</i>	22.2	9.3	31.5	15.1	46.6
Local (\$M)	12.1	6.3	18.4	19.3	37.7

Notes:

<sup>1</sup> Includes wages, benefits, unincorporated business income, operating surplus and net taxes on factors of production.

<sup>2</sup> Assumes a social safety net is in place. Includes effects generated by Project spending and activities of supplier industries.  
Source: BC Stats (2013a).

**Table 1.9-22. GDP Impacts of Mine Operation in Top Five Supplier Industries (Life of Mine)**

	GDP (\$M)
<b>Direct Suppliers</b>	<b>587.6</b>
Transportation and warehousing	126.7
Accommodation and food services	76.0
Wholesale trade	75.6
Mining and oil and gas extraction	71.9
Manufacturing	67.4
<i>Top five industries as a % of total direct supplier impact</i>	<i>71.0</i>
<b>Other Suppliers</b>	<b>276.7</b>
Finance, insurance, real estate and rental and leasing	62.2
Transportation and warehousing	49.5
Wholesale trade	24.5
Professional, scientific and technical services	21.1
Manufacturing	16.9
<i>Top five industries as a % of total impact in other supplier industries</i>	<i>62.9</i>
<b>Induced Impact</b>	<b>495.6</b>
Finance, insurance, real estate and rental and leasing	218.5
Retail trade	58.5
Information and cultural industries	22.0

(continued)

**Table 1.9-22. GDP Impacts of Mine Operation in Top Five Supplier Industries (Life of Mine) (completed)**

	GDP (\$M)
Accommodation and food services	21.4
Non-profit institutions serving households	20.6
<i>Top five industries as a % of total induced impact</i>	<i>68.8</i>
<b>Total, Indirect and Induced</b>	<b>1,360.0</b>
Finance, insurance, real estate and rental and leasing	311.7
Transportation and warehousing	191.1
Wholesale trade	116.8
Accommodation and food services	102.9
Manufacturing	97.0
<i>Top five industries as a % of total indirect and induced impact</i>	<i>60.3</i>

Source: BC Stats (2013a).

### Regional Area

As noted in Section 1.9.3.2, it is anticipated that the regional impacts in RDKS would occur to a larger extent than regional impacts in RDBN (as impacts are primarily anticipated to be limited to the Town of Smithers); however, the modelling approach does not make a similar distinction. Consequently, the whole RDBN is included in the economic analysis.

Preliminary estimates of regional impacts in supplier industries indicate that activities related to the Operation will contribute approximately \$101.2 million to GDP in RDKS and \$114.4 million in RDBN. Similarly, supplier industries will see an increase in household income by \$66.0 million in RDKS and \$74.8 million in RDBN (Table 1.9-23).

**Table 1.9-23. Regional Supplier Impact Estimates**

	Direct Suppliers	Other Suppliers	Total Indirect Impact (all suppliers)	Induced	Total Indirect and Induced
<b>GDP (\$M)</b>					
RDKS	70.4	15.4	85.8	17.6	101.2
RDBN	77.0	15.4	92.4	19.8	114.4
Rest of BC	440.2	245.9	686.2	458.2	1,144.4
Total	587.6	276.7	864.4	495.6	1,360.0
<b>Household Income (\$M)</b>					
RDKS	48.4	6.6	55.0	13.2	66.0
RDBN	52.8	6.6	59.4	13.2	74.8
Rest of BC	292.0	165.8	457.8	257.5	715.3
Total	393.2	179.0	572.2	283.9	856.1

Source: BC Stats (2013a).

#### 1.9.4.4 Mine Closure Impacts

The Closure of the Project will provide limited business opportunities; however, specific estimates are not yet available as Closure is in the distant future.

#### 1.9.4.5 *Local Procurement and Community Development*

The Project will encourage the involvement of local and regional businesses interested in the opportunities to directly and indirectly supply the Project to maximize the benefits within the region. Suppliers will be selected based on location, quality, price, delivery, and support services with the standards for purchasing determined during the initial stages of the Project. The Procurement Strategy to be developed by the Proponent is expected to encourage the procurement of goods and services from both local and Aboriginal-owned suppliers, where such goods and services are competitive in quality and price.

Some of the companies that are expected to benefit include long-haul and heavy-haul trucking companies, scheduled and chartered cargo service located in nearby communities such as Terrace, Smithers and Dease Lake, or barge service that is available from the Port Metro Vancouver, Prince Rupert Port or the Port of Stewart. Rail is being considered for shipping from Terrace to Eastern Canada. Other local companies could include businesses in safety services, catering, janitorial, electrical, mechanical, and similar.

#### 1.9.5 **Employment**

The Project will provide direct, indirect, and induced employment opportunities. Employment created at the Project site will contribute to the number of employed not only provincially but also in Canada overall. Moreover, the Project is expected to provide benefits to local and regional communities, including Aboriginal peoples, through direct training, skills development, and employment opportunities. Indirect and induced employment opportunities, related to goods and services contract providers to the mining industry, will also increase creating positive spin-off effects in the local, regional, and provincial economies.

In 2012, BC employment in metal mining was at approximately 3,945 jobs. This represented a steady increase over the last decade, from a low of 2,294 jobs in 2002 that comprised 28% of the total employment in that sector. However, it is still substantially lower as compared to 1981 when approximately 9,558 individuals were employed in metal mining, comprising 43% of the total employment in the mining sector (BC MEM Statistics 2013b). Figure 1.9.4 represents the historical employment in the metal mining sector from 1980 to 2012.

The region is populated by a number of small First Nations and Nisga'a communities and several larger centres (Table 1.9-24), which rely on resource industries such as mining and forestry. Some of the key communities that might experience benefits of the Project are listed in Table 1.9-24; the table also provides population estimates for 2011 and 2006. As evident, population in most of the smaller communities mostly decreased from 2006 to 2011. Moreover, in 2006, the unemployment rate in majority of communities was relatively high,<sup>10</sup> from 5.1% to 33.3%, as compared to the national unemployment rate of 6.6% (Statistics Canada 2011).

The high unemployment rate might indicate an unavailability of employment/career opportunities in the region that causes the decline in local population. The Project is expected to provide employment locally and regionally, and therefore, it could help stabilize and, in some communities, potentially reverse the outward migration trend of people. Moreover, employment opportunities provided by the Project, as well as resulting indirect and induced employment in supplier industries, will have a beneficial impact on the availability of employment opportunities and therefore the economic well-being of communities in the region.

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<sup>10</sup> The 2006 unemployment in Dease Lake was 33.3%, Hazelton 5.1%, New Aiyansh 26.2%, Smithers 8.5%, Stewart 8.2% and Terrace 10.6% (Statistics Canada 2011).

Figure 1.9-4

British Columbia Annual Employment  
in Metal Mines, 1980 to 2012



Source: British Columbia Ministry of Energy and Mines (MEM) Statistics, 2013a.



**Table 1.9-24. Population in the Project's Regional and Local Economic Study Area**

	Population 2011	Population 2006
Dease Lake (UNP)	303	384
<u>Tahltan Nations (Indian Reserve)</u>		
Dease Lake 9	58	68
Telegraph Creek <sup>1</sup>	209	251
Iskut 6	207	335
<u>Nisga'a Villages</u>		
Gitlaxt'aamiks (New Aiyansh)	758	806
Gitwinksihlkw (Canyon City)	184	201
Laxgalts'ap (Greenville)	378	474
Gingolx (Kincolith)	408	341
<u>The Hazeltons</u>		
Hazelton	270	293
New Hazelton (DM)	666	627
Skii km Lax Ha	N/A	N/A
<u>The Gitxsan Nation Communities (Indian Reserves)</u>		
Gitanmaax	627	723
Kispiox	536	617
Glen Vowell	222	225
Gitsegukla	448	721
Gitwangak	500	465
Town of Smithers	5,404	5,217
The City of Terrace	11,486	11,320
District of Stewart	494	496
RDKS	37,361	38,476
RDBN	39,208	38,243

**Note:**

The Project's Economic Regional and Local Study areas are described in detail in Chapter 19, Assessment of Potential Economic Effects.

<sup>1</sup> Telegraph Creek is comprised of three IRs: Telegraph Creek 6, Telegraph Creek 6A, and Guhthe Tah 12.

N/A = not available.

Source: Statistics Canada (2013).

### 1.9.5.1 Mine Construction Employment

#### Canada

Project Construction will take approximately two years and create approximately 6,185 person-years of employment, out of which 870 person-years of employment is expected to be created at the Construction of the mine, 3,042 person-years of employment is estimated in supplier industries in BC and the remaining 2,273 person-years of employment is to be created in other Canadian provinces (Table 1.9-25).

**Table 1.9-25. Employment Impact of Project Construction (Person-years)**

Total Impacts in Canada <sup>1</sup>	Direct Impacts	Indirect Impacts	Induced Impacts	Total Impacts
<b>BC</b>				
Construction	870	0.0	0.0	870
Supplier	1,510	722	809	3,042
Canada (less BC)	0.0	818	1,455	2,273
<b>Total</b>	<b>2,380</b>	<b>1,540</b>	<b>2,264</b>	<b>6,185</b>

Notes:

<sup>1</sup> Provincial estimates are from BCIOM, estimates for Canada (less BC) are based on provincial input-output multipliers provided by Statistics Canada.

Source: BC Stats (2013a); Statistics Canada (2013).

### British Columbia

The Construction phase will create approximately 870 person-years of employment directly related to the Project (Table 1.9-25). Most of the newly created job opportunities will take place in the first year of the Construction where jobs related to mining and engineering/technical positions will comprise over 50% of the total employment (Table 1.9-26).

**Table 1.9-26. Employment by Job Category during Project Construction (Person-years)**

Employment Category	Total	Year -2	Year -1
Engineers/Technicians	118	70	48
Miners	350	164	186
Machine Operators	23	20	3
Haul Truck Drivers	53	43	10
Flagmen	8	6	2
Concreter	11	4	7
Carpenter	18	5	13
Steel Fixer	13	4	9
Steel Erector	37	11	26
Millworker	16	7	9
Mechanics/Millwright	55	11	44
Pipe fitter	21	5	16
Electricians/Other	83	57	26
Helper	33	12	21
Crane Operators	31	11	20
<b>Total</b>	<b>870</b>	<b>430</b>	<b>440</b>

Source: Tetra Tech (2013b).

Total employment in supplier industries is estimated at 3,042 person-years, this includes 1,510 person-years of employment in direct supplier industries, and the remaining employment will result from direct and induced activities. Total annual wage bill, per employee, is estimated at \$154,028 at the Project Construction; the average wage bill in supplier industries is estimated at approximately \$57,090 (per employee; Table 1.9-27).

**Table 1.9-27. Total Employment Impact in BC during Construction (Person-years)**

	Direct	Other Suppliers	Total Indirect	Induced	Total Impact
<b>Employment (#)<sup>1</sup></b>					
Construction (Estimated by Client)	870	0.0	0.0	0.0	870
Supplier industry and induced impacts	1,510	722	2,232	809	3,042
<b>Average Annual Wage (\$ per employee)</b>					
Construction (Estimated by Client)	154,028	0.0	0.0	0.0	154,028
Supplier industry and induced impacts	60,920	56,275	59,420	50,675	57,090

Notes:

<sup>1</sup> Employment estimates are based on average annual wages in 2011. Includes total employment over the life of the Project. Source: BC Stats (2013a).

With respect to the employment impacts in supplier industries, the Project is expected to have major impacts on employment in person-years for professional, scientific, and technical services (455), accommodation and food services (307), manufacturing (253), wholesale trade (152) and construction (134). Indirect employment impacts would be primarily felt in professional, scientific and technical services (170); whereas, induced employment impacts would be mostly in retail and trade (192) and accommodation and food services (110; Table 1.9-28).

**Table 1.9-28. Employment Impacts in Top Five Supplier Industries**

	Person-years (#)
<b>Direct Suppliers</b>	<b>1,510</b>
Professional, scientific and technical	455
Accommodation and food services	307
Manufacturing	253
Wholesale trade	152
Construction	134
<i>Top five industries as a % of total direct supplier impact</i>	<i>86.2</i>
<b>Other Suppliers</b>	<b>722</b>
Professional, scientific and technical	170
Manufacturing	82
Wholesale trade	69
Retail trade	65
Finance, insurance, real estate and	64
<i>Top five industries as a % of total impact in other supplier industries</i>	<i>62.6</i>
<b>Induced Impact</b>	<b>810</b>
Retail trade	192
Accommodation and food services	111
Non-profit institutions serving housing	67
Other services (except public administration)	65

(continued)

**Table 1.9-28. Employment Impacts in Top Five Supplier Industries (completed)**

	Person-years (#)
Finance, insurance, real estate and	62
<i>Top five industries as a % of total induced impact</i>	<i>61.4</i>
<b>Total, Indirect and Induced</b>	<b>3,042</b>
Professional, scientific and technical	655
Accommodation and food services	447
Manufacturing	357
Retail trade	284
Wholesale trade	251
<i>Top five industries as a % of total indirect and induced impact</i>	<i>65.5</i>

Source: BC Stats (2013a).

### Regional Area

The BCIOM assumes that the majority of the Construction workforce will be BC-based; however, this is unlikely. Construction associated with mine projects typically requires a relatively large number of trained and skilled workers over a short period of time that are predominantly brought in from outside of the region. Most Construction work would likely be undertaken by contractors and businesses located outside the local region, due to the specialized construction experience and expertise. However, it is expected that those contractors hired from outside the region would, in turn, hire local people as labourers and equipment operators to undertake non-skilled construction. However, the specific origin of the Construction workforce is not yet known but it is likely that they will come from a variety of communities in the region, from the province, and beyond.

Although it is beyond BCIOM to estimate the composition of the direct Project workforce, the model provided estimations for regional employment in supplier industries. Based on the model, it is expected that direct supplier industries in the RDKS will create an average of 570 person-years of employment, with another 210 people working further back in the supply chain; a total of 780 person-years of employment in the Project area. In the RDBN, the Construction of the Project is not expected to create additional employment in supplier industries (Table 1.9-29).

**Table 1.9-29. Regional Employment Impacts in Supplier Industries (Person-years)**

	Direct Suppliers	Other Suppliers	Total Indirect Impact (all suppliers)	Induced	Total Indirect and Induced
RDKS	570	60	630	150	780
RDBN	0	0	0	0	0
Rest of BC	940	662	1,602	659	2,292
Total	1,510	722	2,232	809	3,042

Source: BC Stats (2013a).

1.9.5.2 Mine Operation Employment

Canada

During Operation, the Project will create approximately 38,786 person-years of employment in Canada, out of which 12,353 person-years of employment is expected to be created at the mine, 16,603 person-years of employment is estimated in supplier industries in BC and the remaining 9,830 person-years of employment is to be created in other Canadian provinces (Table 1.9-30).

**Table 1.9-30. Employment Impact of Mine Operation (Person-years)**

Impacts <sup>1</sup>	Direct Impacts	Indirect Impacts	Induced Impacts	Total Impacts
<b>BC</b>				
Operation	12,353	0.0	0.0	12,353
Supplier	7,669	3,332	5,602	16,603
Canada (less BC)	0.0	3,579	6,251	9,830
Total	20,022	6,912	11,852	38,786

Notes:

<sup>1</sup> Provincial estimates are from BCIOM, estimates for Canada (less BC) are based on provincial input-output multipliers provided by Statistics Canada.

Source: BC Stats (2013a); Statistics Canada (2013).

British Columbia

As estimated in the 2013 *Feasibility Study* (Tetra Tech 2013b), a total of 542 personnel are projected to be required for the Project, including an average 316 personnel for mining operations, 95 for process, 43 for G&A, 78 for surface services, and 10 for the backfill plant and water treatment plant. During Operation, the Project is expected to create approximately 12,353 person-years of employment in BC; approximately 56% of that employment will be related to mining activities, and about 28% to G&A/surface services, the remaining employment will be in processing (Table 1.9-31).

**Table 1.9-31. Employment during the Operation of the Mine (Person-years)**

	Mining	Processing	G&A/Surface Services	Total
Year 1	267	103	170	540
Year 2	349	95	175	619
Year 3	349	95	175	619
Year 4	349	95	175	619
Year 5	349	95	175	619
Year 6	349	95	175	619
Year 7	349	95	175	619
Year 8	349	95	175	619
Year 9	349	95	175	619
Year 10	328	95	173	596
Year 11	328	95	173	596
Year 12	328	95	173	596
Year 13	328	95	173	596
Year 14	288	95	170	553

(continued)

**Table 1.9-31. Employment during the Operation of the Mine (Person-years; completed)**

	Mining	Processing	G&A/Surface Services	Total
Year 15	288	95	170	553
Year 16	288	95	170	553
Year 17	283	95	169	547
Year 18	283	95	169	547
Year 19	174	95	162	431
Year 20	174	95	162	431
Year 21	174	95	162	431
Year 22	174	95	162	431
Total	6,497	2,098	3,758	12,353

Source: Tetra Tech (2013b).

Another 7,669 person-years of employment is expected to be created in direct supplier industries. Supplier industries benefiting from indirect activities will have an estimated 3,332 person-years of employment, whereas, supplier activities resulting from induced activities will contribute another 5,602 person-years of employment. The average annual wage bill is estimated at \$119,436 for activities taking place at the Brucejack Mine Site; for supplier-related activities the average annual wage bill is \$51,560 (Table 1.9-32).

**Table 1.9-32. Total Employment Impact during the Operation of the Mine (Person-years)**

	Direct	Other Suppliers	Total Indirect	Induced	Total Impact
<b>Employment (#)<sup>1</sup></b>					
Operating costs (Estimated by Client)	12,353	0.0	0.0	0.0	12,353
Supplier industry and induced impacts	7,669	3,332	11,001	5,602	16,603
<b>Average Annual Wage (\$ per employee)</b>					
Operating costs (Estimated by Client)	119,436	0.0	0.0	0.0	119,436
Supplier industry and induced impacts	51,275	53,710	52,015	50,675	51,560

Notes:

<sup>1</sup> Employment estimates are based on average annual wages in 2011. Includes total employment over the life of the Project.  
Source: BC Stats (2013a).

With respect to the employment impacts in supplier industries, the Project is expected to have major impacts on employment in accommodation and food services (2,049), transportation and warehousing (1,875), wholesale trade (919), and manufacturing (554) with a total of 7,669 person-years of employment. Indirect employment impacts would be most felt in transportation and warehousing (649); whereas, induced employment impacts would be mostly in retail trade (1,328; Table 1.9-33).

### Regional Area

The origins of the Project workforce for Operation are not yet known, although it is likely that a notably larger proportion of workers will come from the RDKS and RDBN than during Construction, with some workers also located elsewhere in the province and outside of BC.

**Table 1.9-33. Employment Impacts in Top Five Supplier Industries**

	Person-years (#)
<b>Direct Suppliers</b>	<b>7,669</b>
Accommodation and food services	2,049
Transportation and warehousing	1,875
Wholesale trade	919
Manufacturing	554
Other services (except public administration)	530
<i>Top five industries as a % of total direct supplier impact</i>	<i>77.3</i>
<b>Other Suppliers</b>	<b>3,332</b>
Transportation and warehousing	649
Finance, insurance, real estate and	435
Administrative and other support services	335
Retail trade	328
Professional, scientific and technical	321
<i>Top five industries as a % of total impact in other supplier industries</i>	<i>62.1</i>
<b>Induced Impact</b>	<b>5,602</b>
Retail trade	1,328
Accommodation and food services	765
Non-profit institutions serving housing	467
Other services (except public administration)	451
Finance, insurance, real estate and	429
<i>Top five industries as a % of total induced impact</i>	<i>61.4</i>
<b>Total, Indirect and Induced</b>	<b>16,603</b>
Accommodation and food services	2,987
Transportation and warehousing	2,718
Retail trade	1,777
Wholesale trade	1,419
Other services (except public administration)	1,176
<i>Top five industries as a % of total indirect and induced impact</i>	<i>60.7</i>

Source: BC Stats (2013a).

Based on the BCIOM, employment in supplier industries in RDKS and RDBN is estimated at approximately 3,520 person-years of employment, including 2,240 person-years of employment in direct supplier industries and another 1,100 person-years further back in the supply chain (Table 1.9-34).

**Table 1.9-34. Regional Employment Impacts in Supplier Industries (Person-years)**

	Direct Suppliers	Other Suppliers	Total Indirect Impact (all suppliers)	Induced	Total Indirect and Induced
RDKS	1,100	220	1,320	440	1,760
RDBN	1,320	0	1,320	440	1,760
Rest of BC	5,249	3,112	8,361	4,722	13,083
Total	7,669	3,332	11,001	5,602	16,603

Source: BC Stats (2013a).

### 1.9.5.3 *Mine Closure Employment*

The Project's Closure phase will provide limited employment opportunities; however, specific estimates are not yet available as Closure is in the distant future.

### 1.9.5.4 *Proponent's Employment Policies*

Pretium will aim to maximize employment benefits within local communities (including Aboriginal communities), the region, and the province as a whole. Activities to achieve this goal will include communication of the Project development schedule, including timing of major activities and key milestones, workforce requirements and the hiring schedule, including types of experience and qualifications required to work at the Project, in particular once it enters the Operation phase. Further, first opportunity for employment will be provided to residents of the LSA, followed by the RSA, and the province, subject to availability of appropriately skilled persons. Hiring practices will follow BC and federal legislation and regulations with a focus on hiring LSA and RSA residents, where possible, in consultation with local Aboriginal groups and LSA communities. Additionally, training and skill development, including on-the-job training, will be offered to Project employees across departments in order to support ongoing enhancement of worker skillsets and internal job advancement.

### 1.9.6 **Summary**

The benefits of the Project were evaluated according to two phases of the Project, Construction and Operation. Each phase is expected to provide direct, indirect, and induced benefits at the regional, provincial, and national level. Direct impacts of the Construction of the Project are expected to be felt to a large extent in BC, whereas regional impacts will be mostly felt in RDKS, and to a lesser extent within RDBN.

Direct Construction expenditures in BC were estimated at approximately \$663.5 million with \$134.0 million in direct household income (this is also the direct GDP impact); GDP and labour income, as a result of indirect and induced Project activities, will total to approximately \$260.8 million and \$173.7 million respectively. GDP and labour income in the rest of Canada are estimated at an additional \$248.9 million and \$137.9 million. In RDKS, GDP impact will be approximately \$56.4 million whereas household income will increase by approximately \$37.5 million; Project Construction impacts in RDBN will not be substantial.

Further, Project Construction is anticipated to create 870 person-years of direct employment or as much as 440 full-time jobs. Supplier-related employment in BC is estimated at 3,042 person-years, with an additional 2,273 person-years of employment in the rest of Canada. RDKS will benefit in approximately 780 person-years of employment, whereas no employment impacts are predicted for RDBN during Construction.

Tax revenue for direct, indirect, and induced Project activities during the Construction phase is expected to total approximately \$64.3 million in BC, with \$35.9 million in federal, \$23.1 million in provincial, and \$5.3 million in local tax revenue.

The Project is also expected to contribute to the growth and prosperity in other sectors such as construction, machinery, professional services, and transportation through the purchase of goods and services. Some of the top industries in the province, as identified by economic modelling, that will benefit from the Construction of the Project include finance, insurance, real estate, rental and leasing; professional, scientific, and technical services; and manufacturing and construction.



During the life of the mine direct mine operating expenditures in the province were estimated at approximately \$2,398.7 million, with the average cost of \$32.4 million per year for expenses related to mining, \$48.2 million per year for processing expenses, and approximately \$28.2 million for G&A/surface services. Direct, indirect, and induced Project spending will contribute \$3,953.2 million to the Canadian GDP, out of which \$2,913.8 million will be generated in BC. Labour income was estimated at \$1,469.0 million as related to the employment at the mine; \$856.1 million will be generated in labour income in supplier industries in BC with an additional \$575.4 million in household income to workers outside of BC. GDP impact in RDKS and RDBN is estimated at \$101.2 million and \$114.4 million, respectively. Similarly, labour income in RDKS and RDBN will total to \$134.8 million.

During the Operation of the mine the Project will create approximately 12,535 person-years of direct employment with an additional 16,603 person-years in supplier industries in BC and an additional 9,830 person-years of employment in the rest of Canada. In RDKS, 1,760 person-years of employment will be created with an additional 1,760 person-years of employment in RDBN.

The Operation of the mine will also substantially contribute to the tax revenue of approximately \$526.9 million, with \$257.1 million in federal, \$180.9 million in provincial and \$37.7 million in local tax revenue.

And finally, the top industries that will benefit from direct, indirect, and induced mine activities will be finance, insurance, real estate, and rental and leasing; transportation and warehousing; wholesale trade, accommodation, and food services; and manufacturing.

Mine Closure costs were estimated at approximately \$25.7 million; however, direct, indirect, and induced impacts of mine-related spending and employment were not estimated as that would require far-reaching assumptions to achieve at least relatively realistic estimates.

As presented in this report, the potential benefits of the Brucejack Gold Mine Project include:

- contribution to the provincial, national, and international supply of gold and silver;
- increase in the provincial and national exports of gold and silver;
- training and skills development opportunities for local communities, including Aboriginal peoples, to increase the skilled-labour base;
- creation of well-paying jobs at the Project's site, as well as in supplier industries;
- support of local and regional businesses through the purchase of goods and services;
- contribution to provincial and Canadian GDP; and
- additional federal, provincial, and local government revenue through the collection of taxes from direct, indirect, and induced Project activities.

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