PROPOSED ARCTOS ANTHRACITE PROJECT

Project Description

FINAL

Pursuant to:
British Columbia *Environmental Assessment Act* and the *Canadian Environmental Assessment Act*

Prepared for:
Arctos Anthracite Joint Venture
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Stantec Project No.:
1232-10182

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List of Abbreviations

AAJV ..... Arctos Anthracite Joint Venture
ABA ..... acid-base accounting
AIA ..... Archaeological Impact Assessment
AIR ..... Application Information Requirements
ANFO ..... ammonium nitrate/fuel Oil
AOA ..... Archaeological Overview Assessment
BC ..... British Columbia
BCEAA ..... British Columbia *Environmental Assessment Act*
BCRC ..... British Columbia Railway Corporation
CEA Agency ..... Canadian Environmental Assessment Agency
CEAA ..... *Canadian Environmental Assessment Act*
CNR ..... Canadian National Railway
COSEWIC ..... Committee on the Status of Endangered Wildlife in Canada
CSR ..... *Contaminated Sites Regulation*
dAIR ..... draft Application Information Requirements
dEIS ..... draft Environmental Impact Statement Guidelines
DFO ..... Fisheries and Oceans Canada
dTOR ..... draft Terms of Reference
EA ..... Environmental Assessment
EAC ..... Environmental Assessment Certificate
EAO ..... Environmental Assessment Office
EIS ..... Environmental Impact Statement
GSC ..... Geological Survey of Canada
LRMP ..... Land Resource Management Plan
MEM ..... Ministry of Energy, Mines and Natural Gas
MFLNRO ..... Ministry of Forests, Lands and Natural Resource Operations
ML/ARD ..... metal leaching/acid rock drainage
MOE ..... Ministry of Environment
MOU ..... Memorandum of Understanding
NPR ..... neutralization potential ratio
OGC ..... Oil and Gas Commission
PAG ..... potentially acid generating

PAH ..... polycyclic aromatic hydrocarbon
PCI ..... pulverized coal injection
PM ..... particulate matter
POI ..... Point of Interconnection
POSCAN ..... POSCO Canada Ltd.
Project ..... Arctos Anthracite Project
RMZ ..... resource management zone
ROM ..... run-of-mine
ROW ..... right-of-way
SARA ..... *Species at Risk Act*
SFC ..... Skeena Fisheries Commission
TCC ..... Tahltan Central Council
TEM ..... terrestrial ecosystem mapping
THREAT ..... Tahltan Heritage Resource and Environmental Assessment Team
TK ..... traditional knowledge
TLU ..... traditional land use
TSP ..... total suspended particulate

1 INTRODUCTION

The Arctos Anthracite Project (the Project) is a proposed anthracite coal mine in northwestern British Columbia. The proposed mine is within the Cassiar-Iskut-Stikine Land Resource Management Plan (LRMP) and Liard Mining Division. The site of the proposed mine is about 90 kilometres southeast of Iskut, 160 kilometres northeast of Stewart and 240 kilometres north of Hazelton, as shown in Figure 1-1.

The Project is owned by the Arctos Anthracite Joint Venture (AAJV) as an unincorporated joint venture of Fortune Coal Limited and POSCO Klappan Coal Limited. The AAJV has 61 contiguous coal licences located on Crown land on and around the north side of Mount Klappan. On behalf of the AAJV, Stantec Consulting Ltd. (Stantec) has prepared this Project Description to introduce the development plans to Aboriginal groups, agencies, tenure holders, and the general public.

The proposed mine is anticipated to produce 3 million tonnes per year of clean anthracite coal over a mine life of approximately 25 years. The final (end-of-mine) areal extent of the open pit mine and other mine infrastructure disturbances is expected to be about 4,000 hectares. The proposed mine plan includes backfilling portions of the open pit with mined rock concurrently with on-going operations and to engage in progressive reclamation as sites become available.

As part of the Project AAJV also proposes to finish 147 km of partially built rail line between the proposed mine and Minaret siding, where the existing CN rail line terminates. The partially built rail line lies within the Fort St. James LRMP and Omineca Mining Division. Completion of this rail line will enable the Project to tie into the existing CN rail line for transport of coal to Ridley Terminals Inc., Prince Rupert, BC, as well as to supply the mine with equipment and other necessary materials.

Both Project components, the proposed mine and completion of the 147 km rail line, require review under the British Columbia *Environmental Assessment Act* (BCEAA) and *Canadian Environmental Assessment Act* (CEAA). Because the two Project components are interdependent and cannot proceed without each other a single environmental assessment under both the CEAA and BCEAA is being conducted.

This Project Description presents a detailed overview of the Project and provides a preliminary assessment of potential effects to be reviewed by:

- Regulatory agencies
- Aboriginal groups
- Other tenure holders
- Members of the public

Legend

- Proposed Rail Route on Existing Railbed
- Existing Railway
- Existing Access Road
- City or Town
- Waterbody
- River or Stream

Project Location

Sources: Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012). Project Data:Arctos Feasibilty Study, Golder Associates (2012).

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PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: 1-1

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In preparing this report, the guidelines prepared by the British Columbia Environmental Assessment Office (EAO) and by the Canadian Environmental Assessment Agency (CEA Agency) have been followed, specifically:

- *Guidelines for Preparing a Project Description for an Environmental Assessment in British Columbia*, 2008 (EAO)
- *Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act*, 2012 (July 2012) *Guide to Preparing a Project Description for a Major Resource Project* (CEA Agency December 2008)

As this report has been prepared in accordance with environmental assessment (EA) guidance materials prepared by the provincial and federal governments, Concordance Tables for these respective processes are provided in Appendices A and B.

2 PROPONENT INFORMATION

2.1 Proponent Identification

2.1.1 Arctos Anthracite Joint Venture

The Project is owned by the AAJV, comprised of Fortune Coal Limited (80 percent) and POSCO Klappan Coal Limited (20 percent). The unincorporated joint venture was formed on July 13, 2011 for the purpose of developing the proposed coal mine. It was originally named the Klappan Coal Joint Venture, and was renamed the AAJV on August 21, 2012.

2.1.2 Fortune Coal Limited

Fortune Coal Limited is a 100 percent subsidiary of Fortune Minerals Limited, a public company based in London, Ontario with interests in two advanced mining projects in Canada. Fortune Minerals Limited trades on the Toronto Stock Exchange (TSX) under the symbol FT. Within the AAJV, Fortune Coal Limited is the project manager and will be the mine operators.

2.1.3 POSCO Klappan Coal Ltd.

POSCO Klappan Coal Ltd. is 100 percent owned by POSCO Canada Ltd. (POSCAN) which is, in turn, 100 percent owned by POSCO, a public company located in the Republic of Korea. POSCO is the world's third largest steel manufacturer with annual sales revenue exceeding $60 billion. It is listed on several of the world's major stock exchanges, including the New York Stock Exchange where it trades under the symbol PKX.

2.2 Company Contacts

The AAJV can be contacted as follows:

Robin Goad, President and CEO
Arctos Anthracite Joint Venture
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3 BACKGROUND INFORMATION

3.1 Project Background

In 1901, V.H. Dupont reported a coal outcrop near Mount Klappan in a Canadian government railway survey report. The Geological Survey of Canada (GSC) issued reports on the area in 1912 and 1914, based on work conducted in 1911 and 1912 by G.S. Malloch. Malloch's work was subsequently followed by GSC Reports by Buckham and Latour (1950) and Richards and Gilchrist (1979). The GSC's C.A. Evenchick, G.M. Green and others have performed numerous studies and mapping of the Bowser Basin from 1985 to the present.

In 1978, Esso Resources Ltd. and Petrofina Ltd. acquired the first coal licences at the current project location but allowed the licences to lapse in 1980. Based on Esso's report from a summer geological mapping program, Gulf acquired its licences between 1981 and 1987 covering an area much greater than the current AAJV licences.

Between 1981 and 1988, Gulf conducted annual exploration programs to refine its knowledge of the regional geology, seam occurrences and physical characteristics, and quality attributes of the anthracite resources. These programs were comprehensive and included rotary and core drilling, adits, trenching and outcrop sampling, and quality testing.

In 1985 and 1986, Gulf developed a trial cargo pit on top of Lost Ridge and constructed a pilot processing plant near the railway bed access road for bulk testing and to produce sample shipments for potential customers. Anthracite mined from the trial cargo pit was hauled to the pilot plant where it was processed in a heavy media bath and water-only cyclones to separate coal from the rock. The clean coal products were then trucked to the Port of Stewart and shipped via ocean vessels to potential overseas customers.

In February 1992, Gulf surrendered several coal licences north (in the Little Klappan Valley), south (in the Skeena/Spatsizi Valley) and west (in the Nass/Klappan Valley) of the current licence block. In 1994, Gulf performed its last major technical study, which was an analysis of producing a single anthracite product for use in steelmaking.

In July 2001, Conoco acquired Gulf's remaining coal licences through acquisition of the company. In 2002, Fortune Coal Limited acquired these coal licences and Gulf's comprehensive technical database from Conoco Canada Ltd.

The history of the previous environmental assessment for this project is described in Section 6.1.

3.2 Project Description

The AAJV is proposing to develop an open pit coal mine which would produce run of mine (ROM) coal. At full production, the mine is anticipated to produce 5.4 million tonnes of ROM coal annually which will be processed into 3 million tonnes of clean coal. The mine will produce anthracite coal, which is the highest quality metallurgical coal available; metallurgical coal along with iron ore are the principal raw material used to make steel. China is currently the world's largest producer of anthracite coal and was once a major exporter, but stopped exporting anthracite in 2004. The emergence of China as a net importer coupled with the increased demand for new sources of

anthracite from steel manufacturing countries without adequate domestic supplies, such as Korea and Japan, allows for the development of a new Canadian source of supply to service the global steel and metal producing industry.

- Excavate raw coal and waste rock from four open pits within the property boundary using conventional open pit mining methods and equipment
- Haul the coal to a coal preparation/wash plant then store in two clean coal storage silos
- Transport and haul clean coal rejects to the mine rock storage facilities for co-disposal with mine rock from the open pits
- Dispose coal rejects off-site or comingle within the mine rock storage piles
- Store the waste rock in engineered rock storage facilities on the mine site
- Remove overburden material and store in mine rock storage facilities adjacent to the open pit
- Conduct primary mine rock stripping and load onto trucks haulage to the mine rock storage facilities or in-pit placement
- Stockpile and use salvaged soil for growth media in interim, progressive and final reclamation of the mine site
- Load coal into rail cars for transport by railway from the mine site to Ridley Terminal in Prince Rupert
    - A new rail extension will require construction and/or maintenance to link the 147 km section between the mine site and the existing CNR siding at Minaret. The majority of the 147 km section is already on existing rail bed, only 23 km of this section will require the construction of a new rail bed in addition to the construction of the new rail.
- Construct rail load out facilities
- Decommission and reclaim the Project site on completion of the mining operation

3.2.1 Summary from the 2012 Feasibility Study

Golder-Marston Canada Ltd. (and its predecessor company Marston & Marston Inc.) has prepared NI 43-101 compliant technical studies and updates on the Project in 2005, 2008, 2010 and 2012. In 2012, Golder-Marston updated the geological model, coal resources and reserves and economics for the Lost-Fox deposit. The updated study is based on an open pit mine and wash plant producing 3 million tonnes per year of washed coal, consisting of a premium 10 percent ash ultra-low volatile PCI product used to manufacture steel, and on railway transportation of coal to Ridley Terminals at the Port of Prince Rupert for export to the overseas steel industry.

Golder-Marston prepared an updated digital block model of the geology and coal seams and estimated in-pit coal resources, and run-of-mine (ROM) and 10 percent ash product coal reserves for the Lost-Fox deposit. The results are summarized below in millions of tonnes.

Table 3-1 Estimated Coal Reserves in the Lost-Fox Deposit

In-Pit Coal Resources (Mt)			Run of Mine Reserves (Mt)			10% Ash Product Reserves (Mt)		
Measured	Indicated	Total	Proven	Probable	Total	Proven	Probable	Total
172.4	20.4	192.8	115.0	9.9	124.9	64.4	4.8	69.2

NOTE:
Mt = millions of tonnes

The updated 10 percent ash product coal reserves for the Lost-Fox deposit area will support production of 3 millions of tonnes per year over a minimum mine life of 25 years. The life of mine average in-pit strip ratio is 6.2 bank cubic metres of mine rock per tonne of in-situ coal and the washed coal strip ratio is 11.2 bank cubic metres of mine rock per tonne. The total mine rock produced from mining was calculated to be 781 million bank cubic metres.

3.3 Project Location and Access

3.3.1 Location of Proposed Mine Site

The proposed mine and existing access road lie within the Cassiar-Iskut-Stikine LRMP and Liard Mining Division, and most of the proposed completion of the rail from the mine site to Minaret lies within the Fort St. James LRMP and Omineca Mining Division. The proposed mine site is about 90 kilometres southeast of Iskut, 160 kilometres northeast of Stewart and 240 kilometres north of Hazelton (centered at approximately 57° 15’ N latitude and 128° 53’ W longitude, NTS Map Reference 104H, Northing 6344710, Easting 507750, UTM Zone 9, NAD 1983 datum), as depicted on Figure 1-1.

3.3.1.1 Mine Site Access

The site is accessed by a 112 km gravel road from Highway 37. The road begins on the Ealue Lake Road approximately 12 kilometres south of Iskut and travels eastward approximately 25 kilometres to a bridge over the Klappan River which connects to existing rail bed that was built as part of the Dease Lake Extension Project. This stretch of rail bed does not support rail tracks, but it has been in use by the public along with the Ealue Lake Road, for over 30 years to access the Klappan area. It is the only road access to the Spatsizi Plateau Wilderness Provincial Park.

3.3.2 Location of Proposed Rail Line

The rail line travels south from a rail load-out located between the Little Klappan and Spatsizi Rivers (at approximately 57° 17’ N, 128° 51’ W, NTS Map Reference 104H, Northing 6348490, Easting 508670, UTM Zone 9, NAD 1983 datum), along the Spatsizi and Skeena River valley until it reaches the existing tracked terminus at Minaret siding near the confluence of the Sustut and Skeena Rivers (at approximately 56°20’ N, 127°16’ W, NTS Reference Map 94D06, Northing 6545440, Easting 606380, UTM Zone 9, NAD 1983 datum). Some new rail and rail bed will need to be constructed and some sections will require maintenance. The sections that will require new rail tracks and those that

will require both rail bed and track construction will be along an established corridor linked to the Dease Lake Line on which construction was started 30 years ago.

The Dease Lake Extension Project was led by the Government of British Columbia and involved construction of a rail line that connected Fort St. James and Dease Lake. Construction of the line was stopped in April, 1977 at which time the line had been fully completed to Minaret and a further 58 km of rail and wooden ties had been laid as far north as the Chipmunk River (see Figure 1-1). These ties have since been salvaged to avoid perceived environmental and safety associated with their deterioration. Beyond Chipmunk the grade and bridge structures were left in varying stages of design and construction.

The existing Dease Lake line from Minaret southeast is currently operated by Canadian National Railways (CNR or CN) under a long term lease with the owner, British Columbia Railway Company (BCRC) through the 2004 BCR Revitalization Agreement. The title for the portion of the rail line north of Minaret siding has not yet been designated and raised for railway ROW. BCRC holds a map reserve on Crown land for the line north of Minaret. Therefore, the proposed railway extension for this project would be a new ROW.

The AAJV has a Special Use Permit (S24493 issued by the BC Ministry of Forests, Lands and Natural Resource Operations [MFLNRO], August 26, 2005) for the access road and will perform required road maintenance prior to mine construction to support environmental assessment work. The AAJV understands that the access road may require some engineered upgrades in select locations, environmental permits and approvals will be sought as required.

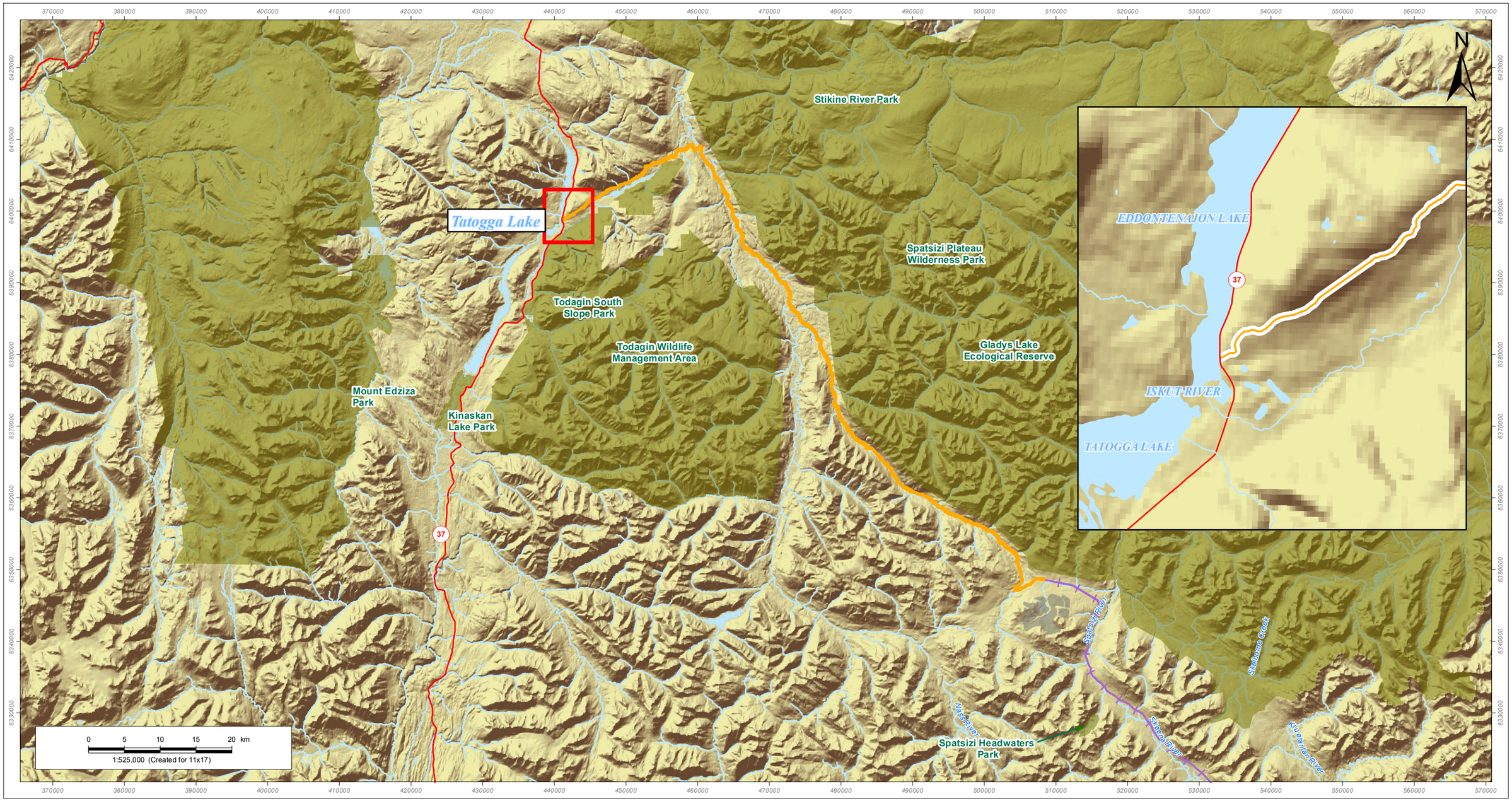
An existing gravel air strip, approximately 1,000 metres long and located within the coal licences on a widened section of the railway bed adjacent to the Little Klappan River, provides access for fixed wing aircraft to the site.

3.3.3 Location of Proposed Transmission Line

The preferred source of electrical power consists of eight 1,500 kilowatt diesel generators. An alternate source of power is a transmission line. Given the construction of BC Hydro's Northwest Transmission Line (NTL) from Skeena Substation (near Terrace) north to Bob Quinn Lake, there is now the potential for the mine to interconnect and purchase power from BC Hydro. Given an anticipated mine load of about 20 MW, and the expected distances to reach the BC Hydro system, the operating voltage of a proposed power transmission line will likely be 287 or 138 kilovolts. The proposed transmission line could potentially interconnect at Bob Quinn Lake, Hazelton, or Tatogga Lake, however the closest and most logical point of interconnection (POI) to NTL is at Tatogga, BC.

From a POI at Tatogga, the transmission line would follow the Ealue Lake service road until it intersects the existing rail bed, and then follow the rail bed to the project site; the total distance is approximately 112 km. The exact width of the required clearing for the transmission line will depend on many factors: terrain (slope), tree height, existing cleared width (for roads/railway), among others. The corridor proposed will be considerably wider than the final routing; initial tower locations, geohazards evaluation, and considerations of environmental impacts presented will be approximated until further detailed design is available.

Note the interconnection at Tatogga Lake is only possible if the Northwest Transmission Line is extended for other Projects, and thus is not included in this scope of this assessment. The selection of a preferred POI will be carried out prior to the submission of the AIR, along with the selection of a preferred route.



Legend

- Proposed Rail Route on Existing Railbed
- Conceptual Transmission Line Location
- Conceptual Transmission Line 50m Right of Way
- Parks and Ecological Reserves
- River or Stream

Conceptual Location of Transmission Line from Tatogga Lake to Project Site along Ealue Lake Access Road

Sources: Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012).
Project Data:Arctos Feasibilty Study, Golder Associates (2012).

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FIGURE NO: **3-1**

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3.4 Purpose and Rationale

The proposed Project would produce anthracite coal which is the highest quality metallurgical coal (highest carbon content) available, and represents just one percent of world coal reserves. Metallurgical coal together with iron ore are the principal raw materials needed to make steel. Anthracite is the most versatile coal, suitable for use in a broad range of metallurgical, thermal, water purification and composite material products. The high carbon and very low volatile (gas) content of anthracite makes it ideal for use as a premium ultra-low volatile pulverized coal injection (PCI) product that is injected into the blast furnace to reduce the amount of coke used in crude steel production. High carbon and low volatiles also allows anthracite to be used as a direct coke replacement and as a blend coal with hard coking coal to make metallurgical coke. Anthracite is also the coal that can be used as sinter feed. Anthracite reductants are used in electric arc and direct reduction steel manufacturing and for the processing of ferroalloys and other metals. Carbon filters for water purification are made with anthracite coal as well as some carbon composite materials. The high carbon content of anthracite makes it the preferred coal for gasification and liquefaction technologies to make urea fertilizers, plastics and high quality synthetic fuels, particularly in Asia where natural gas supplies are scarce.

The global shortage of high quality metallurgical coal is driving innovation in the steel industry as producers are driven to develop new technologies to be globally competitive, reduce greenhouse gas emissions, and diversify their sources of key raw materials. Many of these new technologies use even greater amounts of anthracite.

The world's reserves of high quality metallurgical coal are in decline, while consumption and demand of anthracite is increasing in metallurgy. China is the world's largest producer of anthracite coal and was once a major exporter. In 2004, China stopped exporting anthracite and production is currently used domestically mainly for steel production. The emergence of China as a net importer coupled with depletion of supplies from other historical producers allows for the development of a new Canadian source of supply to service the global steel and metal processing industry.

A growing shortage of export ready, high-grade anthracite is of great concern to steel manufacturers in countries without significant domestic supplies, such as Korea and Japan. Analysts predict that Asian demand for seaborne anthracite will greatly exceed available supply. As a result, it is anticipated that anthracite prices will escalate significantly and new sources of anthracite coal will be in high demand.

3.5 Project Capital Costs and Estimated Benefits

The estimated capital cost of the proposed Project is summarized in Table 3-2, based on the *2012 Update to the Arctos Anthracite Project Mine Feasibility Study*, (Golder-Marston 2012). No federal funds are required for this project.

Table 3-2 Estimated Capital Costs

Description	Initial Capital ($ millions)	Sustaining Capital ($ millions)	Total Capital ($ millions)
Mine	192	589	781
Off-site Transportation	330	0	330
On-site Infrastructure	260	4	264
Other	7	40	47
Total	789	633	1,422

Project construction is anticipated to require 1,500 to 1,600 person years of labour and once built, the proposed mine would create approximately 500 to 550 direct jobs and indirectly over 1,000 jobs in supporting activities.

Based on the 2012 feasibility study update (Golder-Marston 2012), the average annual sales revenue is estimated to exceed $530 million, resulting in total sales revenues of over $12 billion over the life of the Project, generating approximately $360 million in federal taxes and $240 million in provincial taxes.

4 PROJECT OVERVIEW

4.1 Project Components

The mine will operate from four component pits within an overall single pit area and have an associated mine infrastructure and rock storage facilities, as shown on Figure 4-1.

The mine will be serviced by a rail line that is to be built along the existing partially constructed railway bed between the mine site and Minaret siding, the current terminus of the Dease Lake Line 147 kilometres to the southeast. The extension will permit the transportation of clean anthracite coal to Ridley Terminals Inc. in Prince Rupert and the supplying of the mine with equipment and other necessary materials. A 23 kilometres section of this extension will require the construction of a new rail bed through a previously cleared route Figure 4-2. The railway extension is considered to be new ROW.

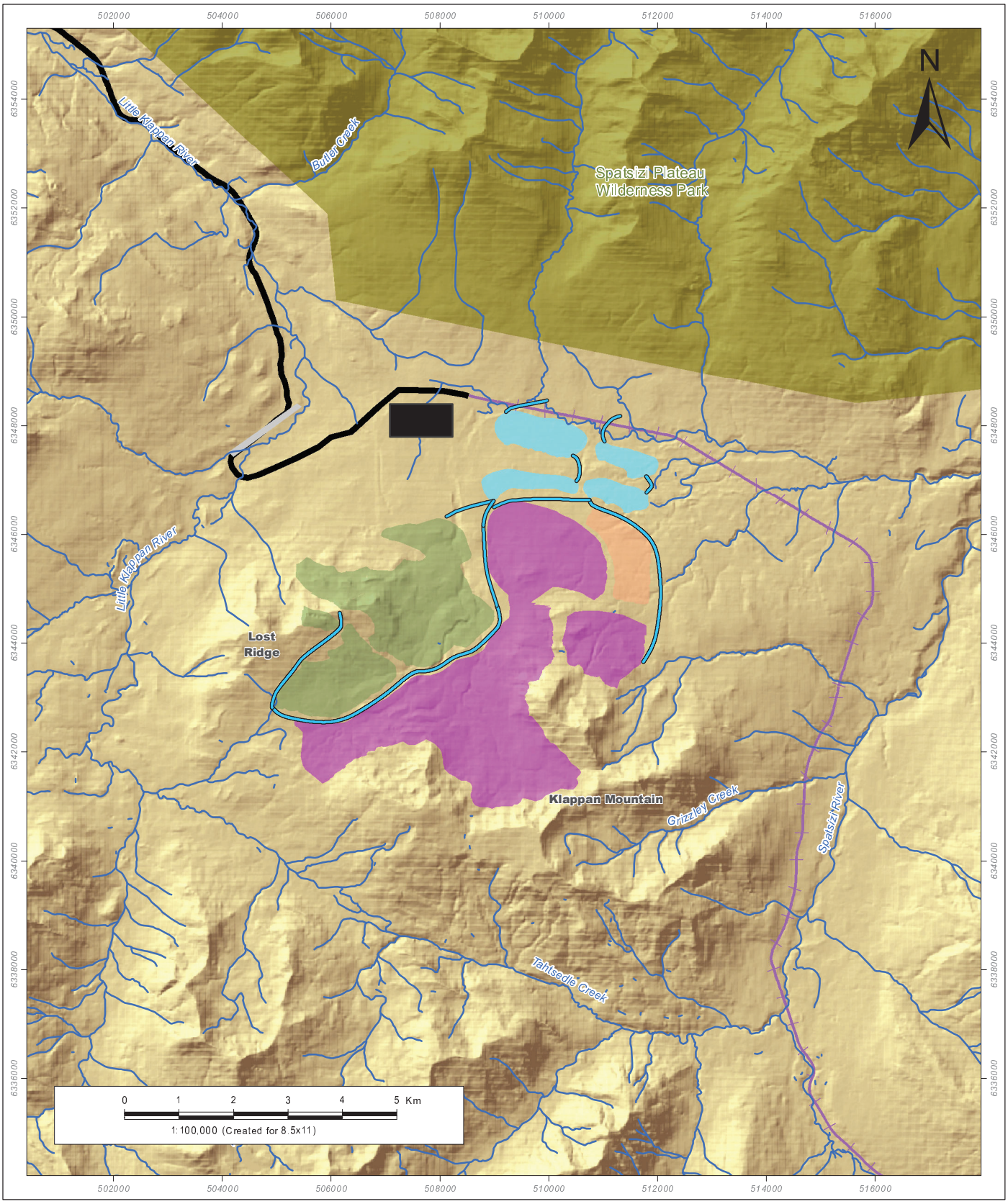
The scope of the Project consists of the following primary components:

Mine Components

- Open pit mine and coal wash plant capable of processing approximately 3 million tonnes per year of coal
- Upgraded surface of the airfield
- Mine haul roads within the mineral property
- Clean coal storage silos and coal rejects bin
- Mine rock, coal rejects, and soil storage facilities
- Borrow pits
- Erosion, sediment control and water management structures
- Reagent handling and storage facilities
- Process water management
- Diesel powered electrical generation
- Mine dry, camp, security, warehouse, maintenance shop, and administration buildings
- Infrastructure facilities and services, including a fuel tank farm, laboratories, potable water supply, sewage treatment and possible waste disposal facilities, and communication, safety and fire protection systems
- Explosives storage facilities
- BC MFLNRO (Special Use Permit S24493) upgraded access road (using the Ealue Lake road and BC Rail right-of-way) to the mine site Figure 4-2.

Rail Extension Component

- Rail load-out facility
- New track (approximately 124 km) from the mine site to Minaret Figure 4-2.
- New rail grade and bed (23 km) and improved rail grade in some sections of this line, including water crossings



Legend

- Proposed Rail Route on Existing Railbed
- Existing Access Road
- Surface Water Collection Ditches
- Camp and Processing Facilities
- Proposed Sediment Ponds
- Mine Rock Storage Facility
- Ultimate Pit Extents
- Coal Rejects Storage Facility
- Existing Air Strip
- Parks and Ecological Reserves

Conceptual Mine Development

Sources: Base Data: Land Resource Data Warehouse, Government of British Columbia (2012); Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012). Project Data: Arctos Feasibilty Study, Golder Associates (2012).

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FIGURE NO: **4-1**

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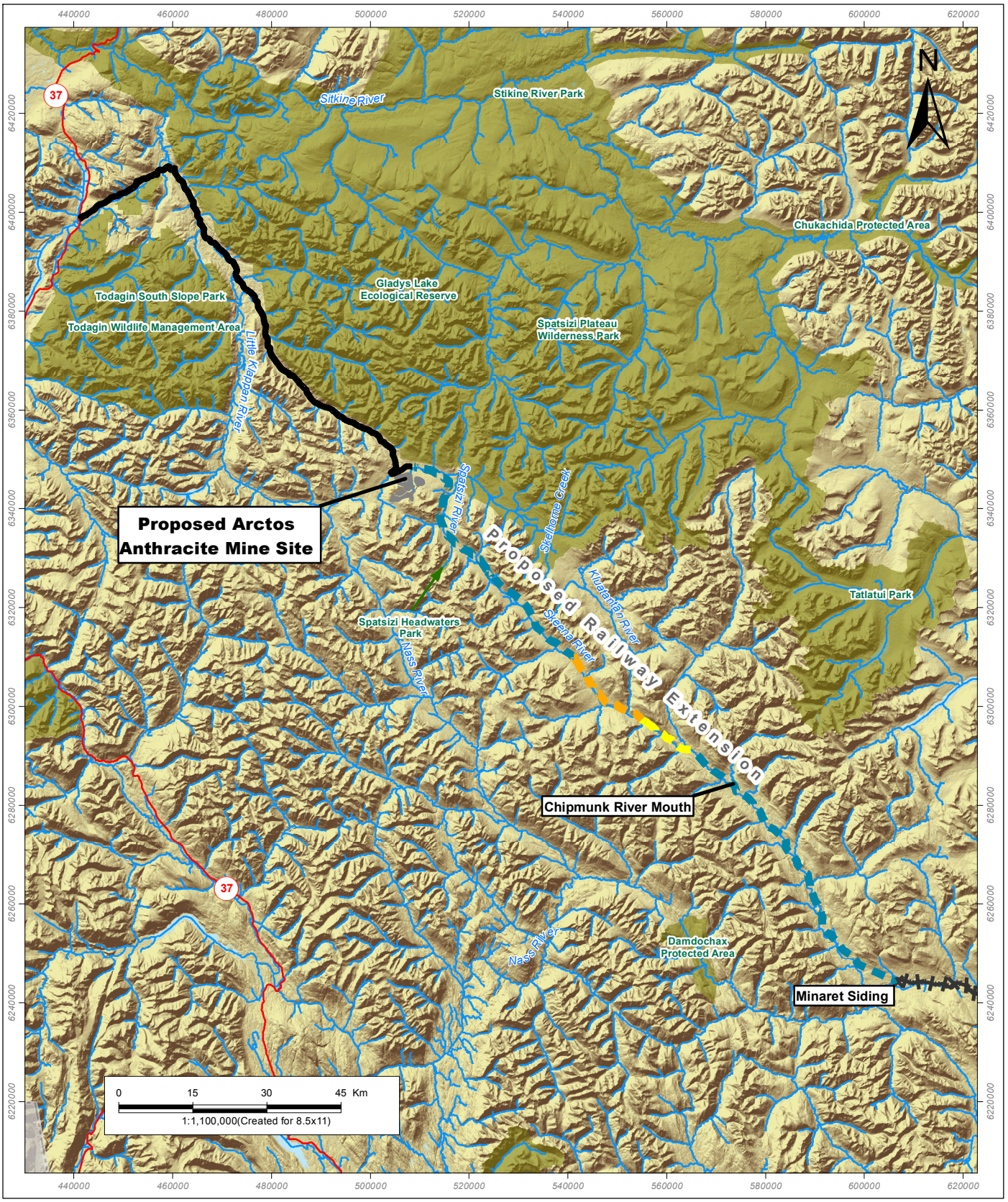

Legend

- Existing Railway
- Existing Rail Bed
- Partially Completed Rail Bed
- Rail Bed Required
- Existing Access Road
- Parks and Ecological Reserves

Railway and Access Road

Sources: Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012). Project Data:Arctos Feasibilty Study, Golder Associates (2012).

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PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE JOINT VENTURE

FIGURE NO: **4-2**

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4.2 Mine Plan

4.2.1 Planned Project Activities

Golder-Marston has prepared several technical studies and updates on the Project (2005, 2008, 2010 and 2012). The relevant and most current information from these studies has been incorporated into this project description and is summarized in this section.

4.2.1.1 Mine Site Construction

Mine construction is planned to begin with site preparation of the office, shop and wash plant areas which will likely take place simultaneously. Runoff from these areas will be routed through sedimentation ponds which will be constructed as a part of the site preparation. Earthwork on sediment control and water impoundments will occur during the spring and summer months.

It is proposed that development of the mine will begin during the spring or summer once the facilities development is underway. Soil removal, diversion ditches and water storage pond construction will occur during the spring and summer where possible.

During construction of the mine and its infrastructure, some temporary personnel facilities will be needed. A temporary construction camp will be built using modular units which may later be converted to housing for the permanent labour force. During construction, electrical power will be supplied by diesel generators and heat will be derived from the generators, or from electrical, fuel oil or propane powered heaters. The water supply will be from a river source, and sewage will be treated in a sewage treatment plant.

4.2.1.2 Rail Extension Construction

In order to provide an efficient system for transporting the coal by rail to Ridley Terminals Inc. at Prince Rupert the AAJV needs to access and determine the costs and issues to construct a new load out facility at the mine site to service a 147 km rail extension. The extension will complete the existing partially constructed rail line and bed between the proposed mine and the connection to the existing CNR rail line at Minaret. Once completed it is intended that CNR will operate and maintain the line.

The Dease Lake Extension was a project by the Government of British Columbia to construct a rail line to connect Fort St. James and Dease Lake. The line was fully completed up to Minaret beyond that 58 km (north as far as Chipmunk creek) of rail bed and wooden ties laid before construction stopped in April of 1977. Beyond Chipmunk the grade and bridge structures were left in varying stages of design and construction.

Although the right-of way (corridor) was designed for railway use, the line north of Minaret has never had any active rail service and has remained untouched since construction was discontinued in 1977. In about 2006, to address their environmental concerns, BCR elected to salvage the track material that had been laid down and to clean up the right-of-way between Minaret and Chipmunk.

The rail line was designed to the standards and practices that were in place in the 1970’s and over time the work has deteriorated. The rail line will therefore need to be evaluated, redesigned and

engineered as required to be in full compliance with all current government and industry operating, environmental and safety standards and regulations.

A rail engineering scoping study will be conducted and will aim to determine the most cost effective method to complete the rail line to today's standards and to design and recommend an appropriate load-out layout at the mine. To reduce costs, the intent is to use as much as possible of the alignment, right of way and track structure from the 1970's project.

The scoping study will review, access and where necessary update the 1970's work with a view to establishing its current condition and appropriateness to meet today's regulatory standards and to then incorporate it into a detailed cost estimate. The study will consider suitable options and recommend the most cost effective solution to constructing a railway infrastructure that will provide for a modern unit train operation.

The engineering scoping study will not involve any construction but will involve detailed site inspections and audits of the proposed line north of Minaret. Activities will include:

- Surveying of the route alignment and right of way
- Soil sampling of the subgrade and sub ballast levels
- Culvert and retaining wall inspections
- An approximately 23 km long section of the rail line was only roughed in when the line was constructed in the 1970s; drilling and blasting activities were performed, but the rail bed and sub-base were not constructed. Activities in this section will therefore require more effort in terms of geotechnical evaluation, culvert development at water crossings, and rail base/bed construction using coarse rock aggregates taken from existing borrow pits built in the 1970s
- Bridge inspections, including determining the current condition of steel, abutments and piers
- Establishing appropriate locations (borrowing pits) to source materials that will be required to finalize the track structure

4.2.1.3 Access and Haul Roads

The existing mine access road that runs from Highway 37 near Iskut (Ealue Lake Road) south to the proposed mine site will be upgraded. The road will be used as the main access road to the mine during construction, and later during operations as the primary access for work crews that are transported by bus from Dease Lake and other communities. Improvements and repairs may be required to the existing mine access road under BC MFLNRO Special Use Permit S24493. Any maintenance is anticipated to be accomplished in a single construction season.

Materials and supplies will be brought in via Highways 16 and 37 during the construction phase from centres including Prince George, Smithers, and Terrace. It is anticipated that the access road may require some upgrades and repairs along its length to accommodate mine traffic; any work will be conducted under AAJV's current Special Use Permit S24493. Any road maintenance that is required to access the site for environmental assessment work will be performed before the construction and operational phases."

If deemed acceptable (e.g., non-acid generating), mine rock from the initial pits may be used to construct road bases for internal mine roads and haul roads. Access, mine and haul roads will be designed and constructed in accordance with BC Ministry of Energy, Mines and Natural Gas (MEM) guidelines for the anticipated traffic. Culverts will be installed as required to maintain positive drainage in the roadside ditches. Culverts will be designed and constructed to meet regulatory requirements using accepted engineering principles and due consideration of unimpeded fish passage and for the protection of aquatic environments.

4.2.1.4 Mine Site Preparation

Soil Removal and Storage

Soils, including identifiable topsoil, will be removed from areas affected by mining activities prior to disturbance. The salvaged soil will be stockpiled for use as growth media in interim, progressive and final reclamation of the mine site. Vegetation cleared for mine development will be incorporated into the salvaged soil to provide organic content. Growth media soil storage facilities will be located in areas protected from traffic and from wind and water erosion by mulching and promoting vegetative growth. Runoff from these storage facilities will be directed to sediment ponds. Soil from roads and perimeter ditches may be stockpiled in windrows adjacent to the road or ditch protected from traffic and further disturbance as appropriate.

Overburden Removal and Storage

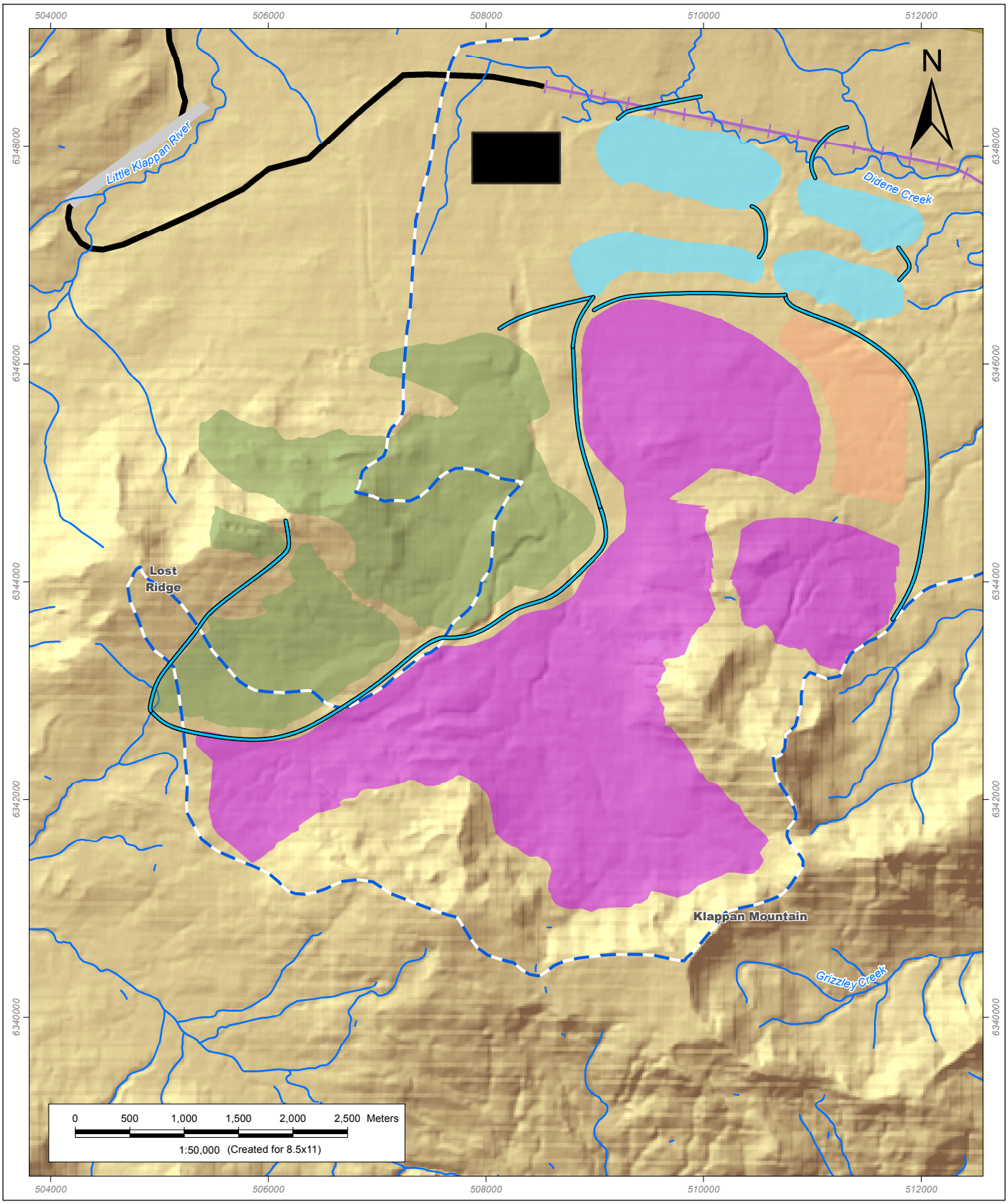
Overburden material (primarily rock overlying coal seams) will be removed during the initiation of mining and placed in mine rock storage facilities adjacent to the open pit. The areas outside the pit affected by the overburden storage and disposal will be prepared by clearing and soil removal. Sediment control for disturbed areas will be established where necessary.

Mine Rock Storage Facilities

The mine rock storage facilities have been conceptually designed to minimize mine site haulage distances, associated costs and increase the stability. This will be accomplished by utilizing the existing topography and backfilling within the mined out pits, where practical. More detailed geotechnical engineering will inform the detailed design. To minimize overall impacts from mine infrastructure, the mine rock storage facilities will be located entirely within one watershed—the Didene Creek watershed. The AAJV, working closely with the MEM and the MOE, will develop engineering and mitigations plans for the diversion of Didene Creek.

Pit Development and Phasing

Open pit mining will produce run of mine (ROM) coal from four separate pits within a single overall pit area. The smaller pits result from modelling of the deposit based on assumed economics that are quite conservative. As a result, these pits may coalesce as the mining progresses resulting in combined overall pit(s). The ultimate design pit is shown on Figure 4-3. A sequence of mining phases, shown on Figure 4-4, has been developed to minimize the cost of haulage and total material movement and deferring high strip ratio coal to the later stages of the mine life. This includes utilizing space created in the pits for mine rock backfill, as shown on Figure 4-4, which helps minimize the ultimate size of the external mine rock storage facilities.



Legend

- Proposed Rail Route on Existing Railbed
- Existing Access Road
- Camp and Processing Facilities
- Surface Water Collection Ditches
- Didene Creek Watershed
- Proposed Sediment Ponds
- Mine Rock Storage Facility
- Ultimate Pit Extents
- Coal Rejects Storage Facility
- Existing Air Strip
- Parks and Ecological Reserves

Ultimate Pit Design

Sources: Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012).
Project Data: Arctos Feasibilty Study, Golder Associates (2012).

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

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FIGURE ID: 123210182-082	DATUM: NAD 83
DRAWN BY: M.WOOD	CHECKED BY: J. MUCKLOW

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **4-3**

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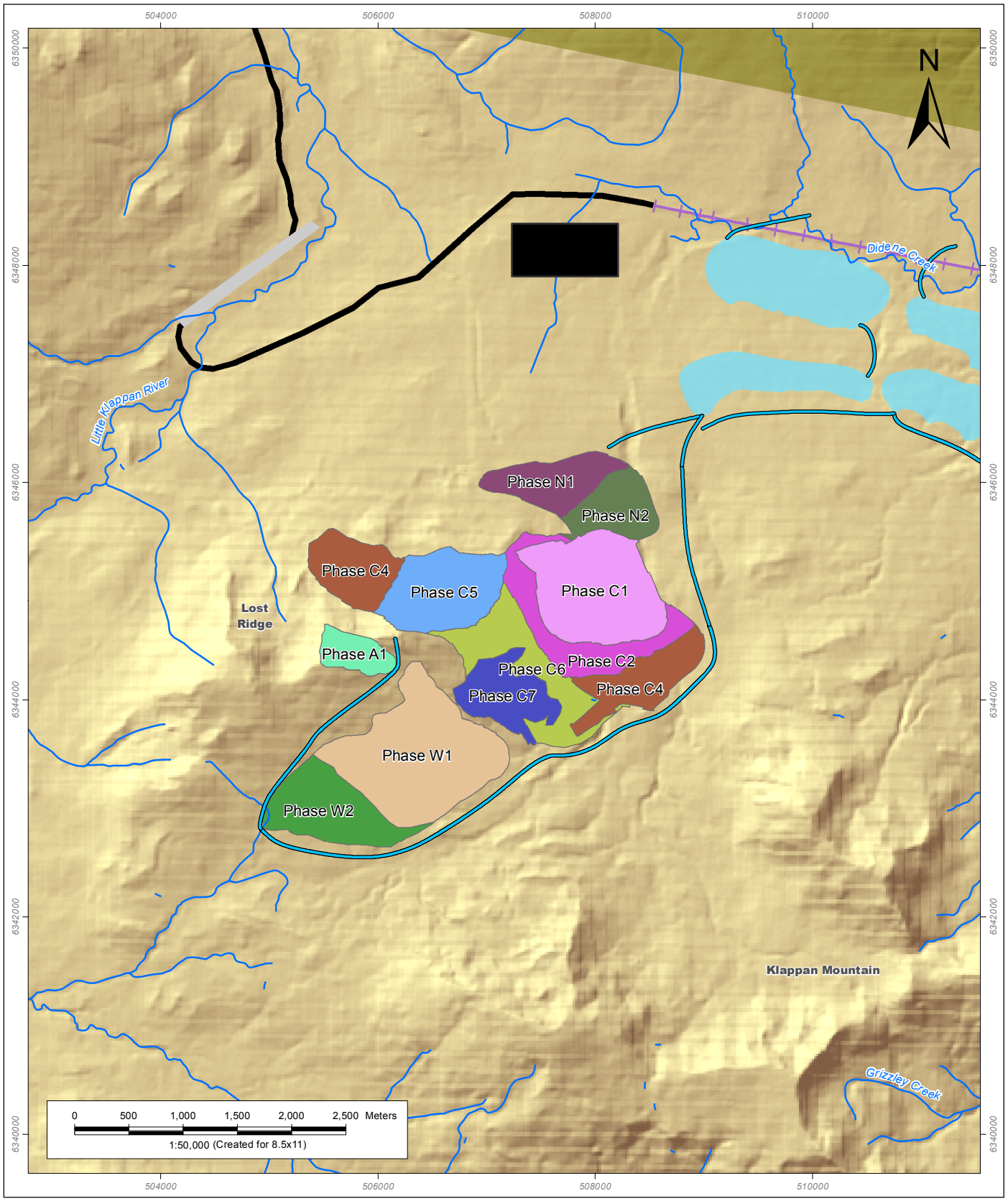

Legend

- Proposed Rail Route on Existing Railbed
- Existing Access Road
- Surface Water Collection Ditches
- Proposed Sediment Ponds
- Camp and Processing Facilities
- Existing Air Strip
- Parks and Ecological Reserves

3 Mt/y Phased Mine Developement Plan

Sources: Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012). Project Data: Arctos Feasibilty Study, Golder Associates (2012).

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DATE: 30-JAN-13	PROJECTION: UTM - ZONE 9
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Supplying the world. Protecting our environment.

FIGURE NO: **4-4**

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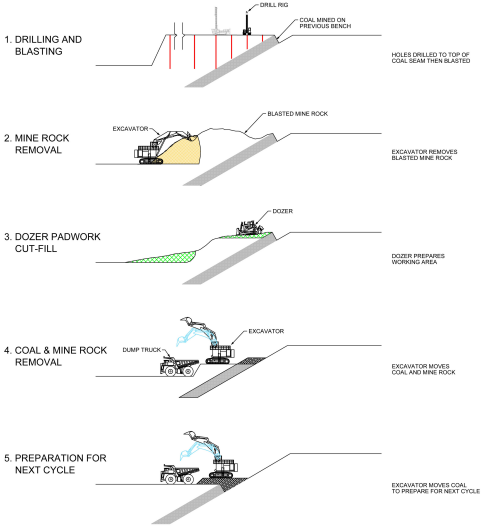
4.2.1.5 Mining Operations

Primary mine rock stripping will be conducted with hydraulic shovels loading trucks for haulage to the mine rock storage facilities or in-pit placement. Backhoe excavators will remove top wedge rock material, coal and rock partings (Figure 4-5). Blasting operations will be limited to mine rock; the coal seams themselves will not be blasted.

At full production, the mine will produce approximately 5.4 million tonnes of ROM coal annually which will be processed into 3 million tonnes of clean coal. The average stripping ratio over the mine life is estimated to be 11.3 bank cubic metres of mine rock per tonne of clean coal produced. The total stripping volume for the life of the mine is estimated to be 782 million bank cubic metres of mine rock.

The ultimate areal extent of the open pits will be approximately 730 hectares and the total areal footprint of the external mine rock storage facilities will be approximately 1,350 hectares. Collectively, the total ultimate areal extent of the disturbance area including the open pits, mine rock storage facilities, mine infrastructure and railway load-out, but not including the rail line, is estimated to be less than 4,000 hectares.



LEGEND

- MINE ROCK MATERIAL
- COAL SEAM
- COAL REMOVAL
- DOZER PUSH

Mining Cycle

Sources: 2012 Update of the Arctos Anthracite Project Mine Feasability Study, Golder Associates (2012)

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FIGURE NO: **4-5**

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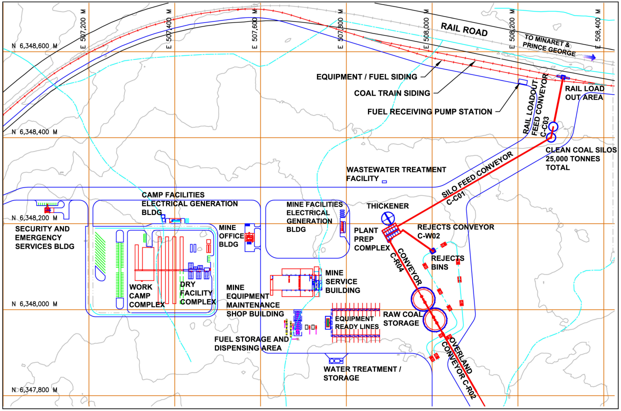
4.2.2 Explosives Use and Storage

Mine rock will be drilled and blasted using rotary and percussive blasthole drills and ammonium nitrate/fuel oil (ANFO) based explosives. Bulk emulsion explosives may also be used in wet areas as required. Certified blasters or a certified blasting contractor will perform blasting operations. Related blasting materials, including detonators, detonating cord, boosters, ANFO and raw materials such as ammonium nitrate prill will be stored on site in a licensed magazine location using approved magazine facilities for finished explosives and approved storage containers for raw materials. The magazines will be established in compliance with regulations. The location of the facilities will consider natural barricades and will have limited access in a gated, secure location. Magazine sites will be strategically located to avoid transporting explosives through congested areas.

Explosives storage and inventory monitoring will be conducted in compliance with Natural Resources Canada and other applicable regulations. The quantity of blasting material stored on site will be limited to that necessary to accommodate uninterrupted operation of the mining operation with consideration given to seasonal access and delivery limitations associated with the remote location of the mine.

4.2.3 Mine Site Infrastructure

Locations of buildings and other mine facilities have been selected to minimize disturbance to the land by keeping them relatively close to each other, and to the open pits and rock storage facilities, as well as to the rail load-out facility. Mine site infrastructure is currently anticipated to include a camp, mine administration/engineering office, first aid/security/gatehouse building, washhouse (mine dry), shop, warehouse, and storage yard. Gravel surfaced parking areas will be provided at the facilities. The gatehouse building will be staffed by security personnel who will manage access to the active mining area. The infrastructure is depicted on Figure 4-6.



Camp and Processing Facilities

Sources: 2012 Update of the Arctos Anthracite Project Mine Feasability Study, Golder Associates (2012) and CDG Engineers (2012).

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PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **4-6**

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4.2.3.1 Mining Camp and Dry

A camp will be constructed to accommodate the work force of approximately 470 employees (580 at peak), primarily from nearby communities. The camp will include lodging and catering facilities for the mine, the mine's security and emergency services building and the mine dry. These will be situated together near the mine entrance to use the same set of power supply, water supply, sewage treatment and fire-protection services. The mine dry will contain miners' clean-up facilities including lockers, showers and toilets, and will be located where incoming workers are dispatched to their respective work locations and transport vehicles and where off shift workers leave to return to camp.

It is anticipated that the mining, processing, and coal transportation operations will be scheduled with rotating crews. Maintenance personnel crew shifts will also be staggered with operations personnel crew shifts. As a result, approximately 325 people will rotate in and out of the Arctos site every two weeks. Two pick-up points for employees and/or contractors are envisioned along Hwy 37 - one each to the north and south of the access road to site. Three buses will operate each week transporting personnel. The bus routes will follow numbered provincial highways. The use of highways to transport raw materials and supplies will be predominantly in the construction phases. During operation it is anticipated that the proposed rail will be relied on for the majority of transportation needs. A general layout of the proposed personnel facilities is shown on Figure 4-7.

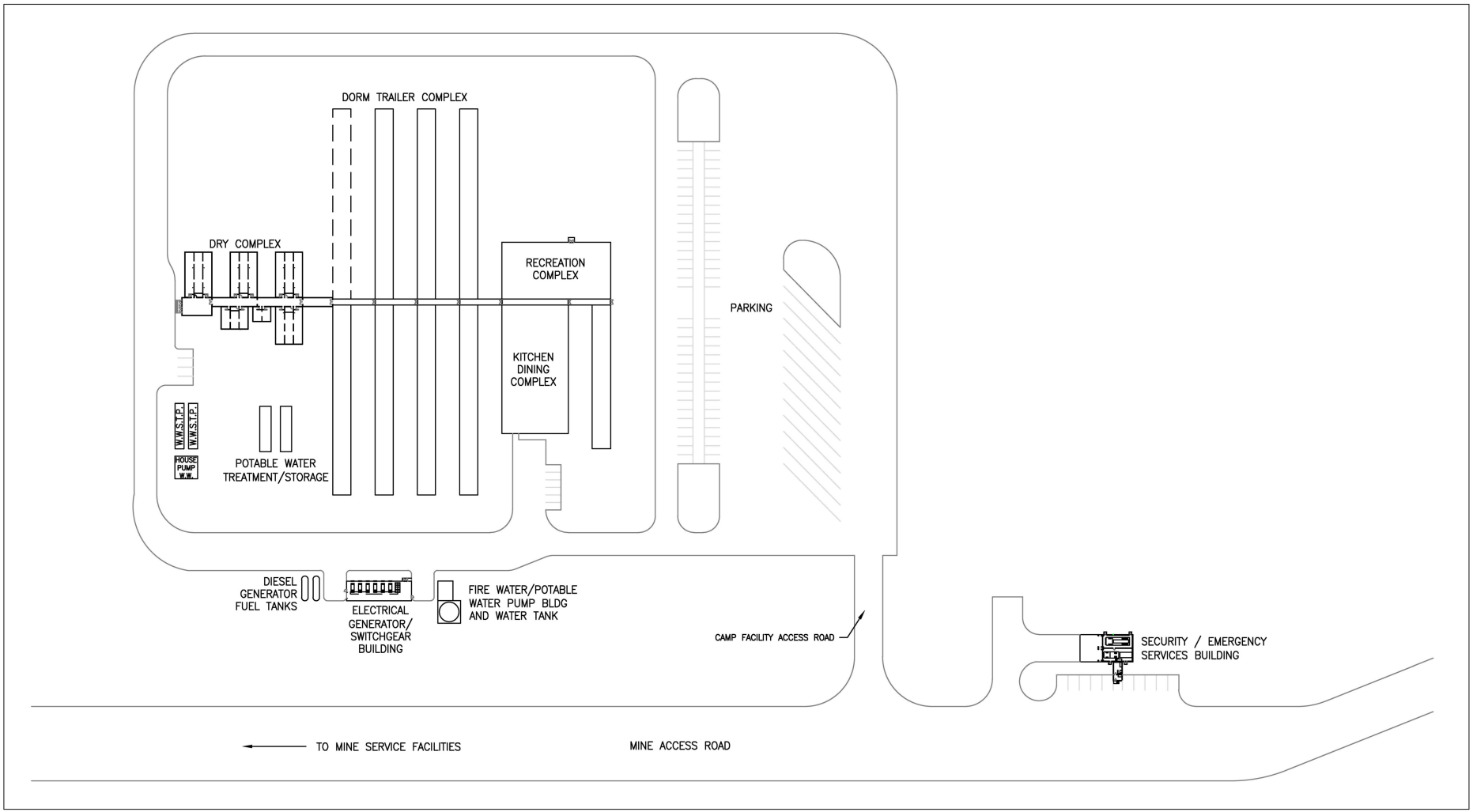
4.2.3.2 Security and Emergency Services Facility

A security and emergency services facility will be located near the camp on the primary access road to the mine. The emergency services area will house an ambulance and a fire truck and will be equipped with appropriate fire-fighting tools.

4.2.3.3 Power Supply

The electrical power requirements for mine facilities including work camp, coal handling, mine facilities/buildings and infrastructure is estimated to have a design load of 8,250 kilowatts with an average demand estimated to be approximately 6,270 kilowatts. Expansion in the future may lead to a peak electrical load of 20 megawatts (20,000 kilowatts).

Based on preliminary designs, the proposed mine electrical generation facilities will consist of eight 1,500 kilowatt diesel generators. The electrical generation system for peak load conditions will require six 1,500 kilowatt generators. The additional two generators will be standby units. The use of natural gas generators (using railway supplied compressed natural gas) will be considered in lieu of diesel generators.



Mine Camp and Dry

Sources: 2012 Update of the Arctos Anthracite Project Mine Feasability Study, Golder Associates (2012) and CDG Engineers (2012).

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FIGURE NO: 4-7

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An alternate source of electrical power will be considered that would require construction of a power transmission line. To facilitate the peak load of the mine, and to limit the electrical losses during transmission, the operating voltage for the transmission line is expected to be either 287 or 138 kilovolts. Options for the Point of Interconnection (POI) to the BC Hydro system include the BC Hydro 287 kilovolts substation at Bob Quinn (under construction), the 287 kilovolts substation at Tatogga Lake (proposed), and the 230 kilovolts substation at Hazelton (existing). The selection of the preferred POI, along with an associated route corridor, will be carried out prior to the submission of the AIR. The preferred option will consider the technical feasibility and commercial viability of both the transmission line and interconnection, as well as expected environmental effects.

During the construction of the mine and rail extension, it is anticipated that fuel would be delivered to the on-site fuel storage tanks via a commercial tanker truck operated by a regional fuel supplier. Once the railway has been commissioned, the AAJV envisions using fuel tanker rail cars to bring fuel to the mine site from Prince George.

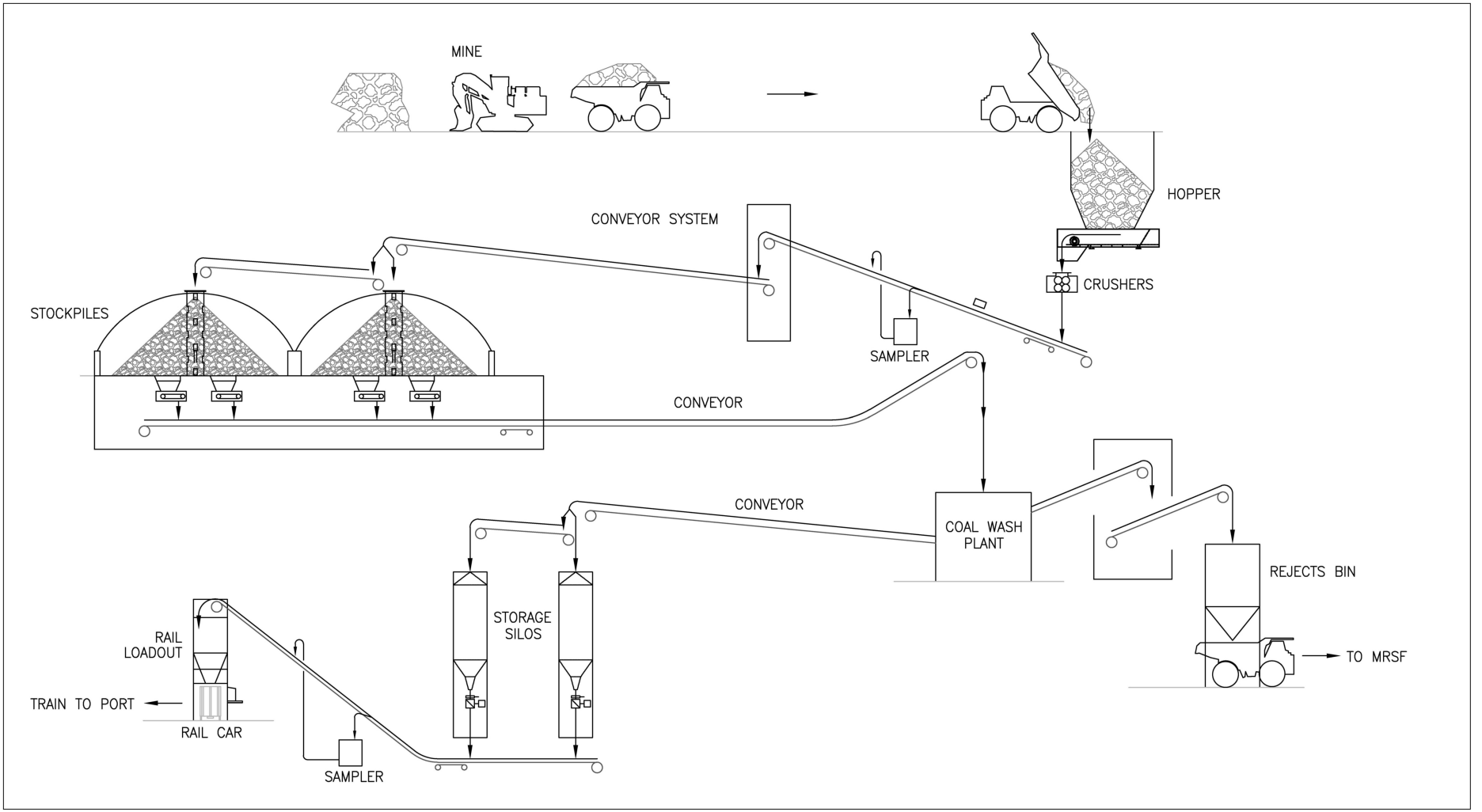
4.2.4 Coal Processing

4.2.4.1 Coal Wash Plant

The coal preparation plant was designed by Taggart Global to be built in a single season. It is a typical coal wash plant design using multiple levels and gravity flow to distribute coal through the process. The coal wash plant will be built in a single stage and will accommodate 3 million tonnes per year of clean coal production. The coal handling system is shown on Figure 4-8.

The coal wash plant will use water and a series of vibratory and stationary sizing screens, heavy media baths and heavy media cyclones, reflux classifiers and dewatering sieves, for the recovery, cleaning and sizing of coarse (greater than 6 millimetres), intermediate (6 to 0.5 millimetres) and fine (0.5 millimetres to 150 microns) coal. Flotation cells will be used for the recovery of ultrafine coal (45 to 150 microns) which is anticipated to represent approximately 5 percent of the coal being cleaned. The coal wash plant will be designed to produce a 10 percent ash anthracite coal product optimally suited for use in PCI processes utilized in many modern steel manufacturing plants. A simplified flow sheet for the coal washing operation is shown on Figure 4-9. The plant may be configured to produce other premium anthracite products in the future, including charge carbon for electric arc steel manufacturing, coke replacement and ferroalloys processing as well as carbon filters for water purification and sinter.

The initial source of the coal wash plant water required to “charge” the system is anticipated to be drawn from surface waters collected from around the mine site, from pit water, and pit dewatering wells. Supplemental, or “make-up” water, is also anticipated to come from these sources.



Coal Handling System

Sources: 2012 Update of the Arctos Anthracite Project Mine Feasability Study, Golder Associates (2012) and CDG Engineers (2012).

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FIGURE NO: **4-8**

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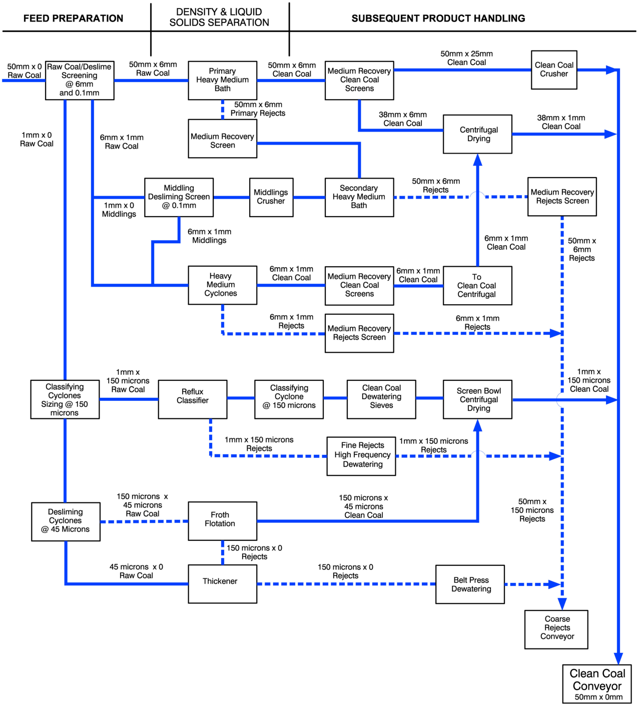


PREPARED BY: Stantec

Simplified Flow Sheet

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

Sources: 2012 Update of the Arctos Anthracite Project Mine Feasability Study, Golder Associates (2012)

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

FIGURE NO: **4-9**

DATE: 30-JAN-13

DRAWN BY: M.WOOD

CHECKED BY: J. MUCKLOW

Approximately 5.4 million tonnes per year of ROM coal will be delivered to the coal wash plant and this will be processed to produce approximately 3 million tonnes per year of clean coal resulting in approximately 2.4 million tonnes per year of coal wash plant rejects comprised of mine rock and unrecoverable coal. In order to recycle as much water as possible, the clean coal and coal rejects will be dewatered using screens, centrifuges and thickeners. Wherever possible, coal wash plant water will be recycled within the process itself.

After dewatering, the clean coal rejects have the consistency of wetted solids and these will be transported by conveyor belt and haul truck to the mine rock storage facilities for co-disposal with mine rock from the open pits. The coal wash plant is not anticipated to produce slurry tailings, nor will the mine require a tailings management facility. Coal rejects will be placed in a separate storage facility as depicted on Figure 4-3. Coal rejects will ultimately be disposed of off-site or comingled within the mine rock storage piles pending geochemical analysis to determine metal leaching or acid generating potential. Coal rejects will be segregated and handled in accordance with the approved metal leaching/acid rock drainage (ML/ARD) management plan.

4.2.4.2 Magnetite Control Circuit

Fine-grained magnetite (an iron oxide mineral) is mixed with water to increase the density of the water which is necessary to separate the coal from mine rock. The magnetite is kept in suspension by agitation in the heavy media baths and heavy media cyclones. Magnetite is later separated from the clean coal product using magnetic separators and the magnetite is reused in the process. Commercial grade magnetite may contain trace amounts (less than 4 percent) of impurities such as fine particles of rock or sand and other non-magnetic material.

4.2.4.3 Ultrafine Coal Circuit (Froth Flotation)

Conventional flotation cells will be used to recover the ultrafine coal. Flotation uses a frothing agent mixed in water that causes the ultrafine coal particles to float, thereby enabling the skimming of coal from the flotation cells. Coal wash plant rejects containing fine particles of rock and coal will report to a thickener for concentration which uses additions of small quantities of anionic and cationic polymers to promote rapid settling of the fine particles to about 25 percent solids by weight. The thickened rejects will then be mechanically dewatered and transported to the rock storage facilities for co-disposal with mine rock from the open pits.

4.2.4.4 Clean Coal Storage Facilities

Clean coal will be kept in two 12,500-tonne silos in order to protect the coal from wind loss, rain and snow. The silos will be instrumented and monitored for pile height, heat/fire detection and fire suppression.

4.2.4.5 Rejects Disposal

The Project will not require a conventional tailings storage facility. Instead, the rejects from the coal wash plant will be dewatered to the consistency of wet sand, then co-mingled within the rock storage piles or stored separately pending geochemical analysis to determine metal leaching or acid generating potential.

4.2.5 Mine Site Water Management

A diversion ditch is currently proposed into the side of Didene Creek to potentially allow for the pumping of water during the spring freshet to a slip (backwater pool) outside of the creek channel. The diversion ditch would be constructed when the creek is at low water to avoid or minimize sediment entering the creek. The AAJV will work with the DFO to develop and implement an approved design to avoid sediment from entering the river during construction and operation.

Inside the slip, a perforated caisson would be fitted with electric pumps for drawing water. The pumps would be removed and stored during the winter season. An above-ground water line would connect the pump station to a reservoir located outside the creek, as shown on Figure 4-10.

Water from the reservoir is planned to supply storage tanks at the camp area and the shop/preparation plant area for use as:

- Process water make-up
- Fire water pumping and distribution
- Service water pumping and distribution
- Potable water treatment facilities, storage, pumping and distribution

The mine's water requirements are estimated in the following table and depicted in Figure 4-11.

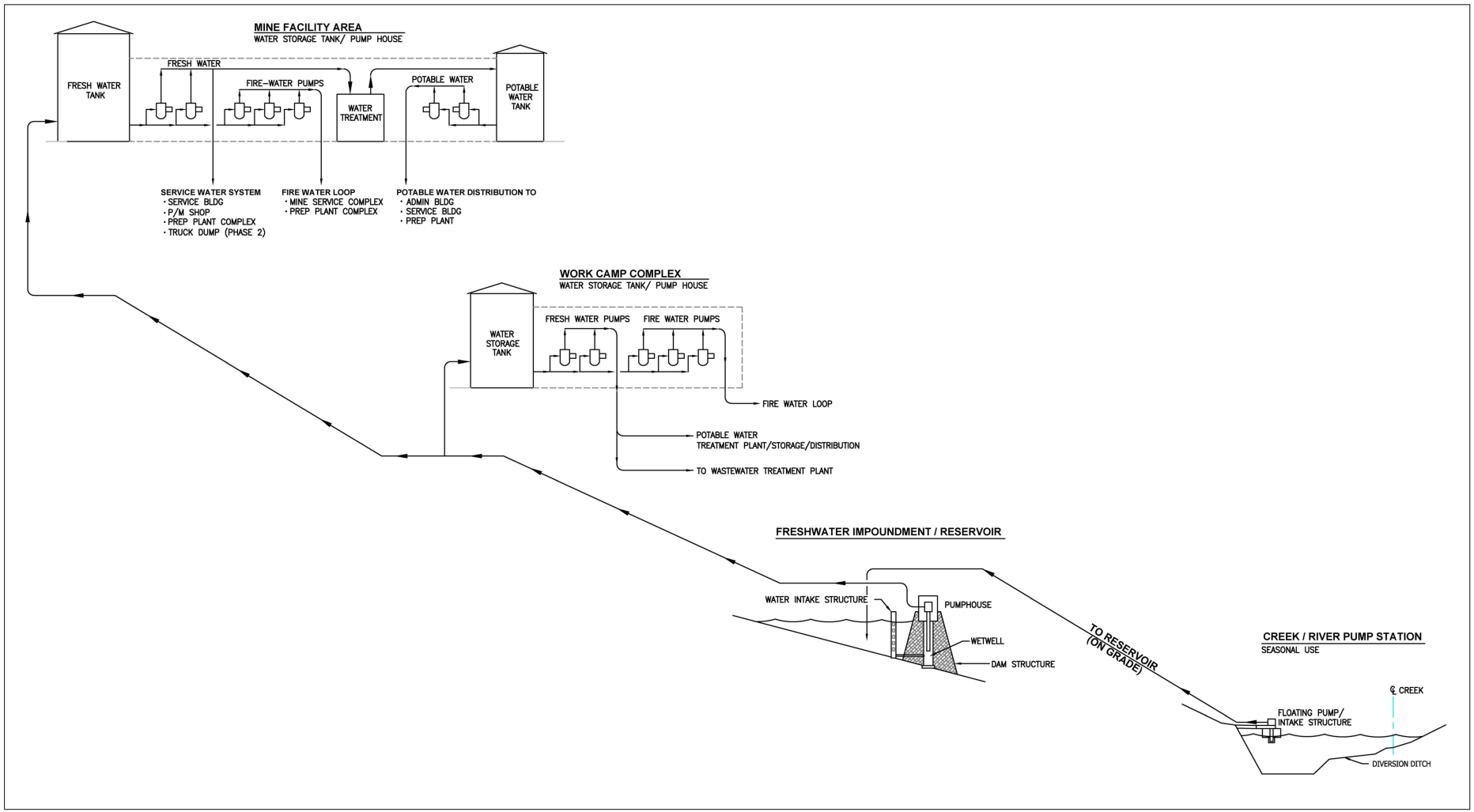
Table 4-1 Mine Water Requirements

Uses	Volume (m^3/y)
Coal Preparation Plant	428,400
Dust Suppression	228,917
Shop, Camp, Mine Dry	47,145
Evaporation	331
Total Uses	704,793
Sources	**Volume (m^3/y)**
Surface Runoff from Mine Area	263,707
Pit Dewatering [a]	198,940
Water Treatment Plan	23,573
Creek Makeup	218,573
Total Sources	704,793

NOTE:
[a] These estimates are very conservative. Much higher volumes are anticipated, thereby reducing the demand from Didene Creek.

SOURCE:
Golder Associates Inc. 2012

The plant is expected to be able to recycle approximately 95 percent of the water used in the process. In equivalent terms of annual water requirements, this equates to approximately 8,568,010 cubic metres per year not taken from the environment.



Water Supply and Distribution

Sources: 2012 Update of the Arctos Anthracite Project Mine Feasability Study, Golder Associates (2012) and CDG Engineers (2012).

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FIGURE NO: **4-10**

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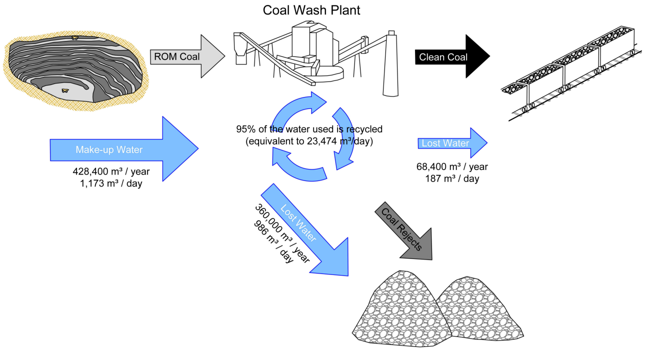

Approximately 95% of the water is recycled in the coal wash plant

Some water leaves the plant with the clean coal and the coal rejects

Make-up water is required to replace the water that leaves the plant

Water Flow

Sources: 2012 Update of the Arctos Anthracite Project Mine Feasability Study, Golder Associates (2012) and CDG Engineers (2012).

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FIGURE ID: 123210182-93	DATUM: NAD 83	CHECKED BY: J. MUKLOW

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **4-11**

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4.2.5.1 Water Storage Reservoir

The fresh water impoundment, to be located near the source of make-up water, and is anticipated to be designed to contain approximately 700,000 cubic metres of water. When the impoundment is full this volume represents one full year of the mine's make-up water demand, as well as the volume imposed by 2 metres of ice frozen on the reservoir surface. The reservoir would be kept at optimum level during summer months.

The reservoir would be fitted with a reinforced concrete wet well pump structure and a pump enclosure building designed for year-round operations. Discharge from the reservoir pumps will be piped to the camp water storage tank and to the shop/preparation plant water storage tank.

4.2.5.2 Camp Water System

The camp water storage tank would be a 600,000 litre vertical steel tank measuring approximately 8 metres in diameter by 12 metres high, installed on a reinforced concrete foundation. This tank volume provides water storage capacity for approximately three days of potable water, and approximately two hours of pumping for fire water at a rate greater than of 2,000 litres per minute.

A potable water filtration and chemical treatment facility would be provided to produce potable water at the rate of 136,000 litres per day, with storage tanks to handle the peak demands of the camp. Water pumps and equipment would be enclosed in a pre-engineered steel building located adjacent to the water storage tank.

4.2.5.3 Shop/Preparation Plant Water System

The shop/preparation plant storage tank would be an approximately 1,350-cubic metre vertical steel tank installed on a reinforced concrete foundation. This tank volume will provide storage capacity for uses such as: potable water, shop service water, coal wash plant make-up water, and some fire pumping capacity.

Water pumps and equipment would be enclosed in a pre-engineered steel building located adjacent to the water storage tanks. A water distribution network would be provided for the service water, potable water and fire water system. The fire water loop would encompass the shop area, the coal handling area and the preparation plant.

4.2.5.4 Runoff, Erosion and Sediment Control Plans

The key objectives of erosion and sediment control plans are to manage runoff effectively, provide erosion protection where required, prevent the transport of sediment from within the mine site footprint (disturbed areas) and maintain the water quality in the existing streams that flow through and near the area of the mine site during construction, operations and closure activities.

Runoff and snow melt from areas affected by the mining operation will be directed to sedimentation ponds for use in the wash plant where feasible. Excess water may be discharged to the receiving stream, assuming water quality meets licence requirements. Collector ditches will be constructed around mining areas, rock storage facilities, the coal reject storage facility (if required), soil storage facilities, infrastructure areas and roads to direct the water to the sedimentation ponds. In order to minimize impacts from the rock storage facilities, major infrastructure, such as the storage facilities,

will be contained entirely within the Didene Creek watershed. This configuration will avoid impacts on more sensitive watersheds such as the Little Klappan River and Spatsizi River watersheds (fish-bearing) and will simplify the design and construction of diversion and collection ditches as well as treatment storage ponds. The surface water management installations are shown on Figure 4-10, which depicts the ultimate pit design.

Sedimentation ponds have been preliminarily designed to treat the runoff from a 10-year/24-hour rainfall event and to safely pass the 200-year rainfall event. Sediment control will be provided by constructing cells close to the affected areas that will discharge into internal ditches that flow to the final settling ponds. These cells will serve to attenuate peak flows from downstream structures and will provide sediment accumulation closer to the source. In addition, these cells will be constructed to facilitate sediment cleanout during the mine life.

Runoff and snowmelt upstream from the affected areas will be diverted around the mining disturbance by perimeter diversion ditches, where possible. These diversion ditches will be temporary structures that will be removed as a part of final reclamation. A more detailed plan will be developed for permitting utilizing site and activity specific practices to prevent erosion and sediment generation and to manage runoff.

4.2.6 Mine Site Waste Management

4.2.6.1 Mine Rock Management

Pending geochemical data will be used to systematically identify potentially acid generating (PAG) rock that may be excavated from the mine. The mine rock will also be characterized for potential metal leaching issues (e.g., selenium) that would need to be addressed. A comprehensive management plan will be developed that will address potential ML/ARD issues in order to implement an effective strategy for avoiding, reducing or mitigating ML/ARD during the mine development, operations and closure. Comprehensive monitoring plans will also be established. The Mine Rock Management Plan will be based on to the *Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia* (BC MEM 1998).

Coal rejects from the coal washing operations will be either be comingled within the mine rock storage piles or placed in a separate storage facility as required. This will include both coarse coal rejects and fine flotation rejects. Fine rejects and dewatered sludge from water and waste water treatment will also be placed with the mine rock.

4.2.6.2 General Waste Management

Management of wastes on site will be guided by human health and safety, and environmental responsibility, standards and regulations. Waste management plans will meet the requirements of legislation and guidelines of British Columbia in the context of the operating licences and permits.

The governing objectives of the plans will be to minimize the potential for adverse effects to the environment, including land, water, air, vegetation, wildlife and habitats. The plans will be designed with consideration of social factors such as visual impacts, current and future land usage and the public interest.

Management plans will be developed to address various sources of waste or potential wastes and emissions, including wastes resulting from the operation of the mine, coal wash plant and living quarters, as well hazardous materials handling and disposal. Consideration will be given to various disposal options including removal of waste to an off-site disposal facility or possibly approved on-site management (e.g., incinerator). The guiding principles will be to reduce, reuse, recycle and recover, and the underlying objective will be to reduce the quantity of unusable waste materials that must be disposed.

The waste management plans will aim to comply with regulations and guidelines associated with the Ministry of Health in the *Health Act*, the Ministry of Environment in the *Environmental Management Act*, and other relevant regulations. Wastes and emissions typically expected at a coal mine with associated coal processing and transport facilities are described below, along with possible mitigation measures.

Air Emissions

Air emissions will be generated primarily as dust and combustion gases. Sources of combustion emissions may include train operations, diesel-electric (possibly natural gas) generators, mobile equipment at mine site and commuting to/from mine site. Low sulphur diesel will be used to minimize issues with combustion gases. Dust emissions will most likely be generated from mobile equipment movement and mining operations such as digging and truck loading, drilling operations, truck-dumping and crusher operations, which can be managed by water spraying. Blasting in the pit will generate instantaneous gas and dust emissions which dissipate. Venting from laboratories and maintenance activities such as welding, the paint shop and sandblasting equipment for health and safety reasons will generate small quantities of air emissions. Emissions from the camp, mainly from cooking vented outside, should also be minimal.

Water Management

Surface runoff (rain/snowmelt) from mine areas and water from pit dewatering operations will be routed to sedimentation storage ponds for use in the coal washing plant. Excess water would be released to the environment when water quality meets discharge criteria, following testing and treatment. The specifics of the potential treatment have not yet been determined and will be based on the hydrochemical testing of these sources of water. Should and pit water may contain trace residues of oils, fuels and grease and dissolved explosives ingredients (ammonium nitrate) which would require treatment prior to release.

The coal wash plant recycles most of the water. Primary losses from the recycling circuit include moisture on the clean coal shipped by train to market and on the coal rejects comingled with the mine rock. Fine coal rejects that pass through the coal flotation recovery process will contain residues of the flotation reagents.

Sewage and grey water from the camp/dry and maintenance buildings will be routed to the camp sewage treatment plant.. This water is anticipated to be used in the coal washing plant but may be treated and released to the environment when excess water conditions exist. Potential water quality issues associated with the sewage water will be evaluated. The option of directing sewage into holding tanks to be transported to off-site treatment facilities will also be assessed.

Water from shop activities/equipment washing operations will be routed to the mine facility wastewater treatment plant. Once treated, this water will be added to the coal washing circuit. During periods of excess water, the treated wastewater may be released to the environment.

Chemical Management

Used liquid solvents, degreasers, lubricants and oil will be stored for shipment off-site disposal of in accordance with BC MOE regulations. This material is anticipated to be shipped to a receiver that recycles such liquids.

Other Waste Management

Food wastes will be collected and either incinerated by a licensed incinerator or removed from site by train or truck to an approved disposal facility. Recyclable wastes, such as paper, cardboard, plastics, metal, etc. will be sorted and shipped out for recycling to the extent possible. Some combustible wastes such as soiled paper and cardboard may also be incinerated.. Plans will be developed to address other solid wastes that may be generated at the mine site, such as wood, concrete, etc. Options such as on-site or off-site disposal and incineration are being considered.

We anticipate the production of small quantities of potentially hazardous wastes. Protocols will be developed for handling hazardous wastes, and applicable guidelines will be followed.

4.2.7 Operations Schedule

The pit and mine rock storage facility phases referenced in the following sections refer to those areas shown on Figure 4-12.

Pre-production stripping will be accomplished in Year 1 and development for Phases A1, N1, and C1 will begin. The mine rock from the pre-stripping operation will be transported to the nearest rock storage facility with mine rock from the Phases A1, N1 and C1 going to the South, Northwest and East rock storage facilities, respectively. Years 10 through 15 will finish the mining of Phases C4, W1 and C2. This will allow for in-pit mine rock placement into the mined-out Phase W1 beginning in Year 12, thereby contributing to reduced haulage distances and reclamation costs. Mine rock will be hauled primarily to the Northwest and South rock storage facilities. Figure 4-16 depicts the expected mine status at the end of Year 15.

Years 15 through 20 will finish the mining of Phases C5, W2 and the majority of Phase C3 in that order, while development of Phase C6 will begin in Year 15. Development of Phase C7 will commence in Year 17. Figure 4-17 depicts the expected mine status at the end of Year 20.

Years 20 through 25 will finish the mining of Phases C3, C6 and C7. The completion of Phase C3 in Year 21 will allow in-pit fill with mine rock being transported from Phases C6 and C7. Mine rock will be transported to the in-pit backfill rock storage areas as well as the Northeast and Northwest rock storage facilities. Figure 4-18 depicts the expected mine status at the end of Year 25.

Table 4-2 summarizes the production quantities for mine rock and clean coal tonnes produced for each production year.

Figure 4-12 depicts the mine status at the end of Year 1.

Year 3 will finish mining in Phase A1. Phase A1 and C1 provide low ratio coal in Years 1, 2 and 3, while the development of Phase N2 and C4 will begin in Year 3. Mine rock from Phase A1 and C1 will be hauled to the South and Northwest rock storage facilities, respectively, while mine rock from Phases N1 and N2 will be transported to the East rock storage facility. Figure 4-13 depicts the expected mine status at the end of Year 3.

Years 4 and 5 will continue the development of Phases N1 and N2. Phase C1 will contribute the majority of the coal during this period. The development of Phases C2, W1 and C4 will commence in Year 5. Mine rock will be transported from Phases N1 and N2 to the East rock storage facility, while mine rock from Phase C1 will be hauled to the Northwest rock storage facility. Figure 4-14 depicts the expected mine status at the end of Year 5.

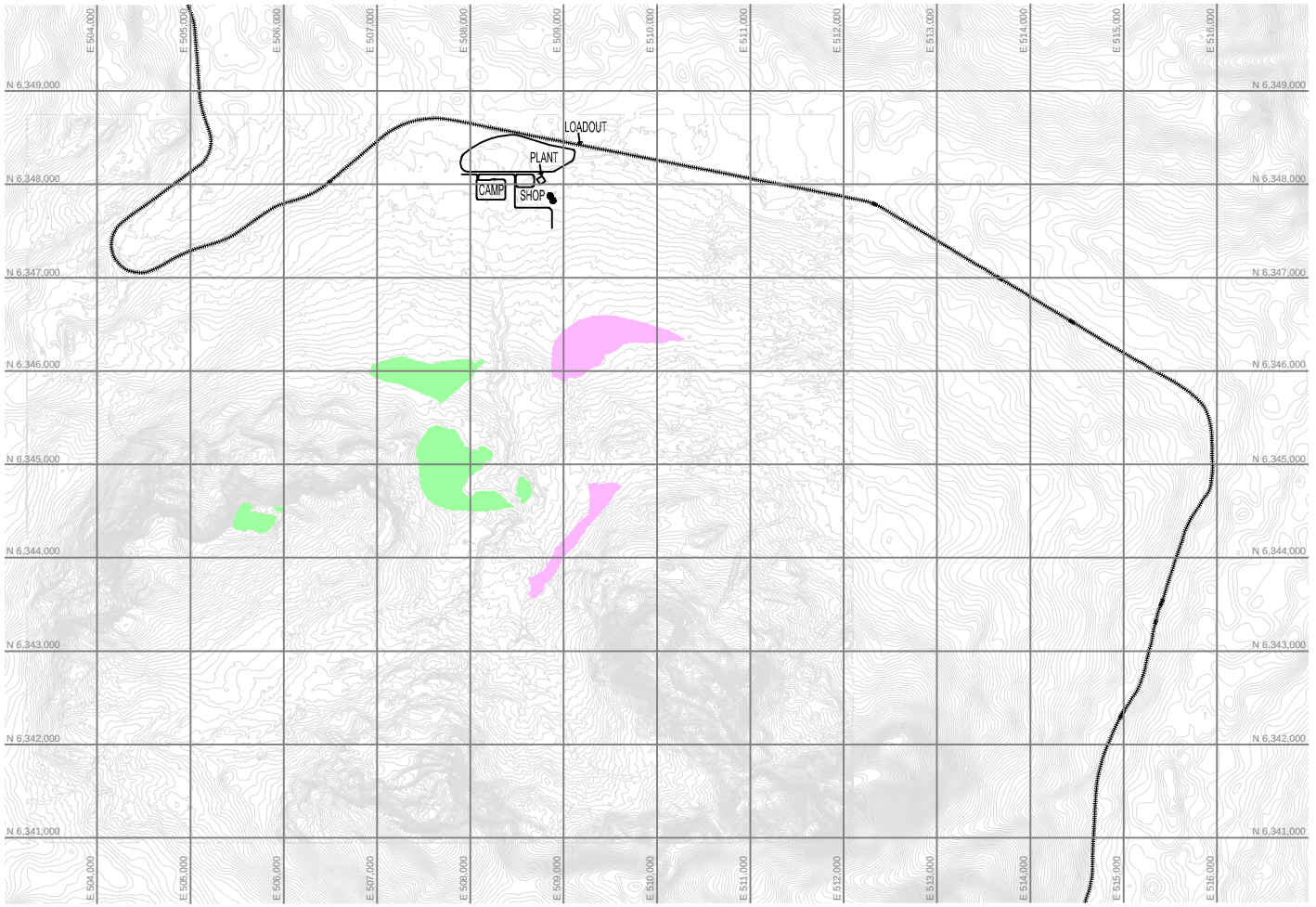
Years 5 through 10 will finish the mining of Phases N1, C1, N2 and C4 in that order with development of the upper benches of Phases C5 and C3. Mine rock will be hauled to the Southeast, Northeast, and Northwest rock storage facilities. Figure 4-15 depicts the expected mine status at the end of Year 10.

Years 10 through 15 will finish the mining of Phases C4, W1 and C2. This will allow for in-pit mine rock placement into the mined-out Phase W1 beginning in Year 12, thereby contributing to reduced haulage distances and reclamation costs. Mine rock will be hauled primarily to the Northwest and South rock storage facilities. Figure 4-16 depicts the expected mine status at the end of Year 15.

Years 15 through 20 will finish the mining of Phases C5, W2 and the majority of Phase C3 in that order, while development of Phase C6 will begin in Year 15. Development of Phase C7 will commence in Year 17. Figure 4-17 depicts the expected mine status at the end of Year 20.

Years 20 through 25 will finish the mining of Phases C3, C6 and C7. The completion of Phase C3 in Year 21 will allow in-pit fill with mine rock being transported from Phases C6 and C7. Mine rock will be transported to the in-pit backfill rock storage areas as well as the Northeast and Northwest rock storage facilities. Figure 4-18 depicts the expected mine status at the end of Year 25.

Table 4-2 summarizes the production quantities for mine rock and clean coal tonnes produced for each production year.



Legend

- Topography Contour (m)
- Proposed Plant and Facilities
- Surface Water Collection Ditch
- Pit Extents
- Mine Rock Storage Facility
- Coal Reject Storage Facility
- Revised Sediment Pond Extents

Scale in Meters

0 1,000 2,000 3,000 4,000 5,000

1:75,000

Pit Status End of Year 1

Sources: *Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012).*
Project Data: Arctos Feasibilty Study, Golder Associates (2012).

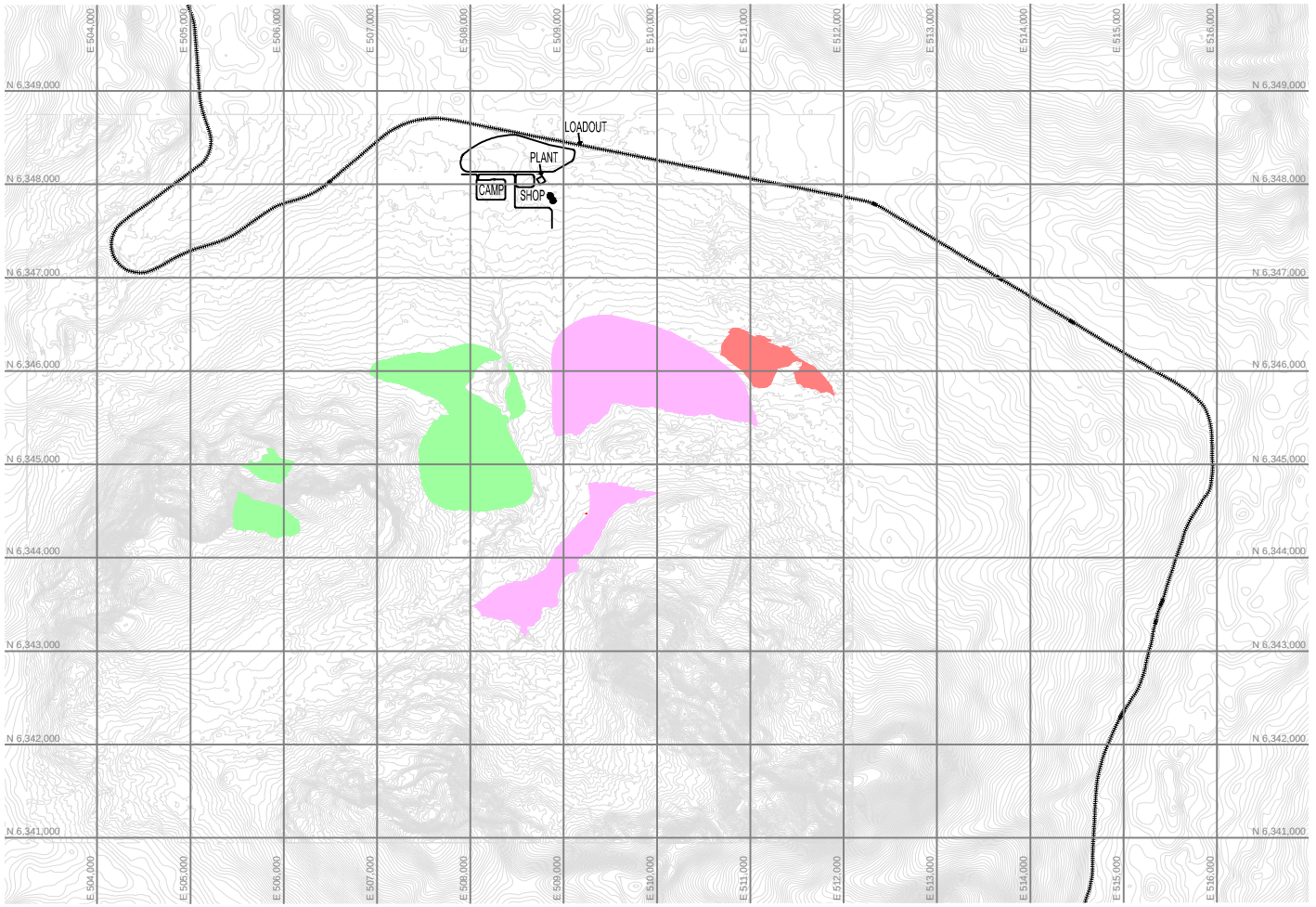
Although there is no reason to believe that there are any errors associated with the data used to generate the product or in the product itself, useres of these data are advised that errrs in the data may be present.

DATE: 30-JAN-13	PROJECTION: UTM - ZONE 09	DRAWN BY: G. HUYNH
FIGURE ID: 123210182-107	DATUM: NAD 83	CHECKED BY: M. WOOD

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **4-12**



Legend

- Topography Contour (m)
- Proposed Plant and Facilities
- Surface Water Collection Ditch
- Pit Extents
- Mine Rock Storage Facility
- Coal Reject Storage Facility
- Revised Sediment Pond Extents

Scale in Meters

1,000 2,000 3,000 4,000 5,000

1:75,000

Pit Status End of Year 3

Sources: *Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012).*
Project Data: Arctos Feasibilty Study, Golder Associates (2012).

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FIGURE ID: 123210182-107	DATUM: NAD 83	CHECKED BY: M. WOOD

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **4-13**

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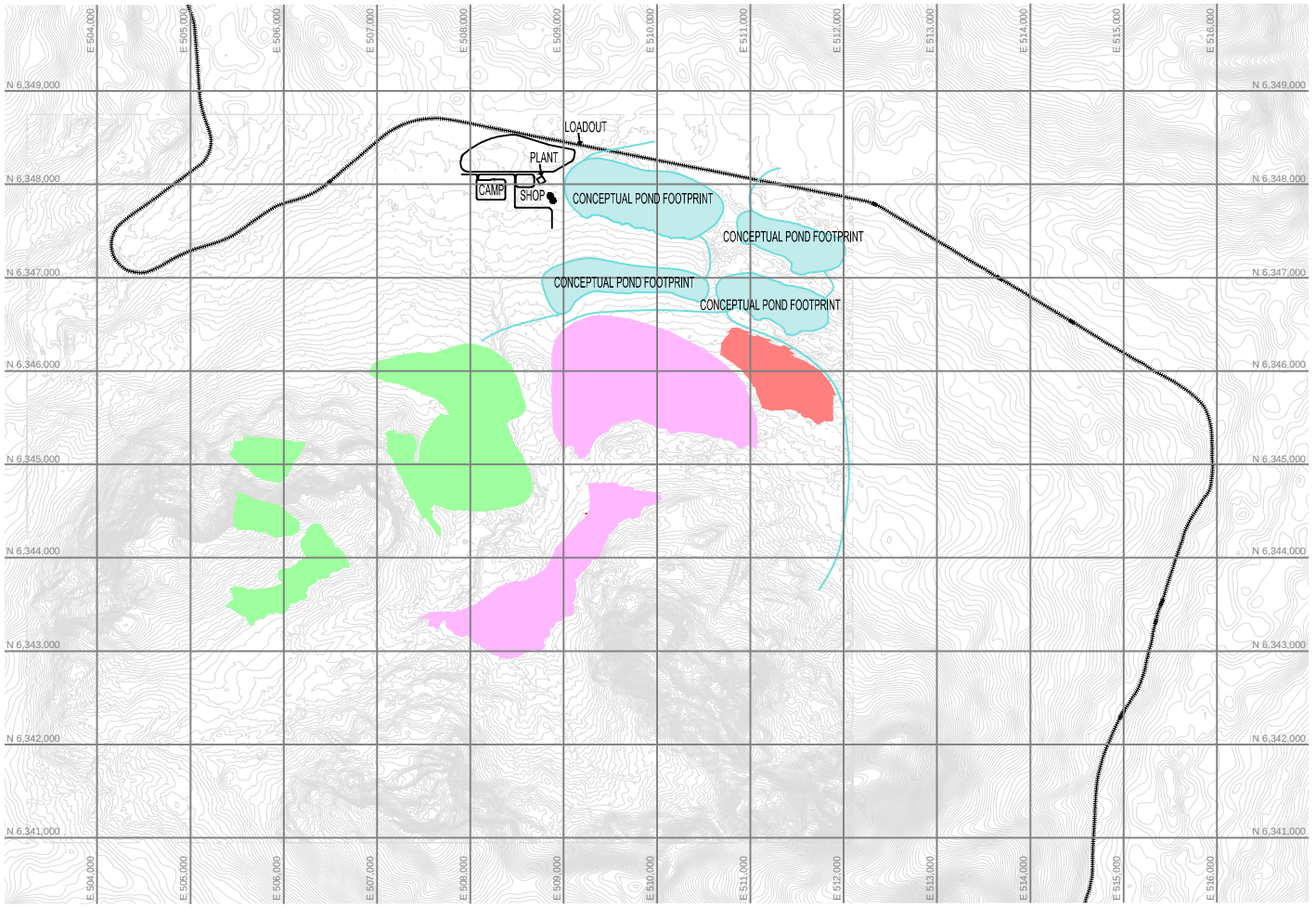

Legend

- Topography Contour (m)
- Proposed Plant and Facilities
- Surface Water Collection Ditch
- Pit Extents
- Mine Rock Storage Facility
- Coal Reject Storage Facility
- Revised Sediment Pond Extents

Scale in Meters

1,000 2,000 3,000 4,000 5,000

1:75,000

Pit Status End of Year 5

Sources: *Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012).*
Project Data: Arctos Feasibilty Study, Golder Associates (2012).

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FIGURE ID: 123210182-107	DATUM: NAD 83	CHECKED BY: M. WOOD

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **4-14**

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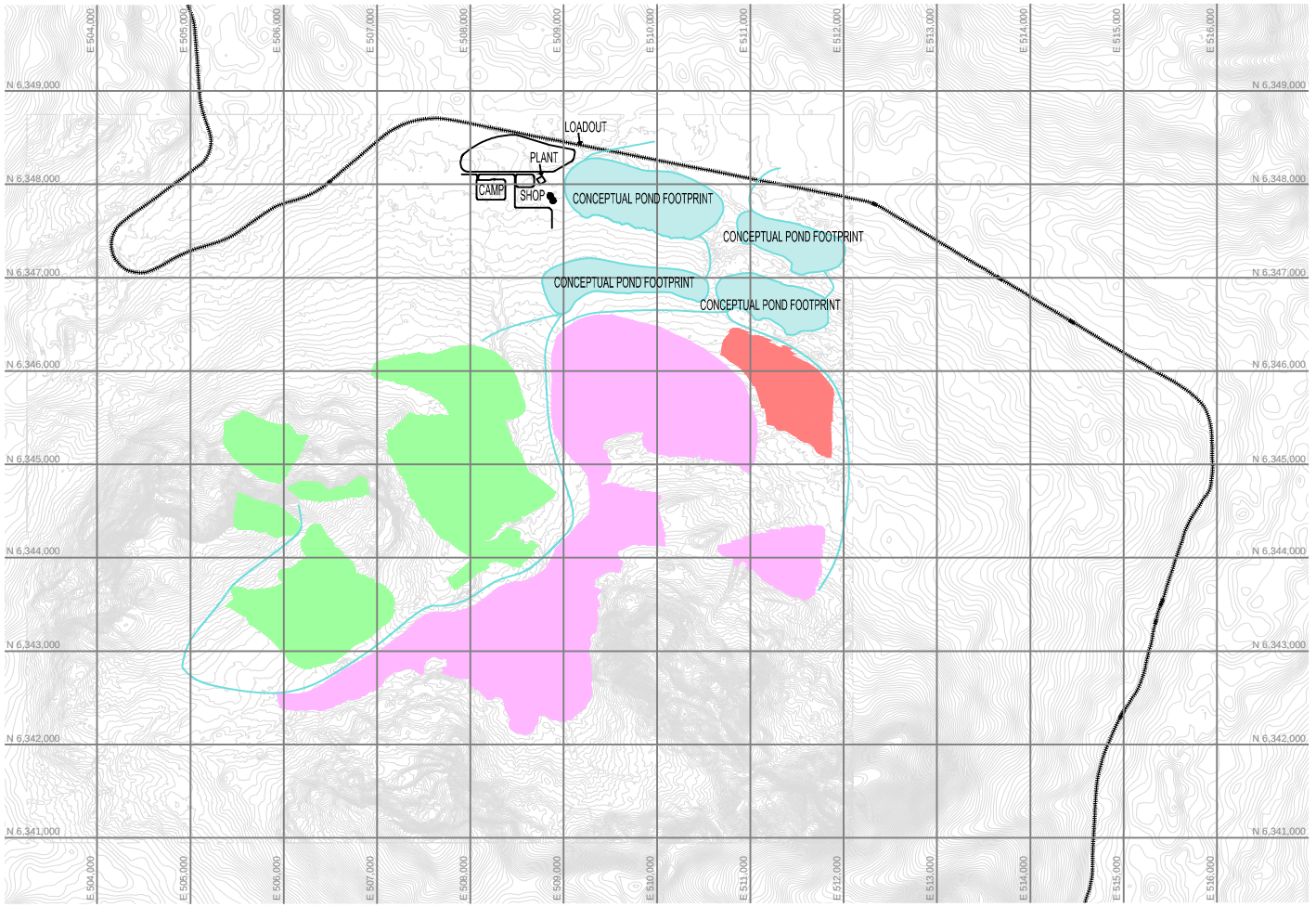

Legend

- Topography Contour (m)
- Proposed Plant and Facilities
- Surface Water Collection Ditch
- Pit Extents
- Mine Rock Storage Facility
- Coal Reject Storage Facility
- Revised Sediment Pond Extents

Scale in Meters

1,000 2,000 3,000 4,000 5,000

1:75,000

Pit Status End of Year 10

Sources: *Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012).*
Project Data: Arctos Feasibilty Study, Golder Associates (2012).

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FIGURE ID: 123210182-107	DATUM: NAD 83	CHECKED BY: M. WOOD

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **4-15**

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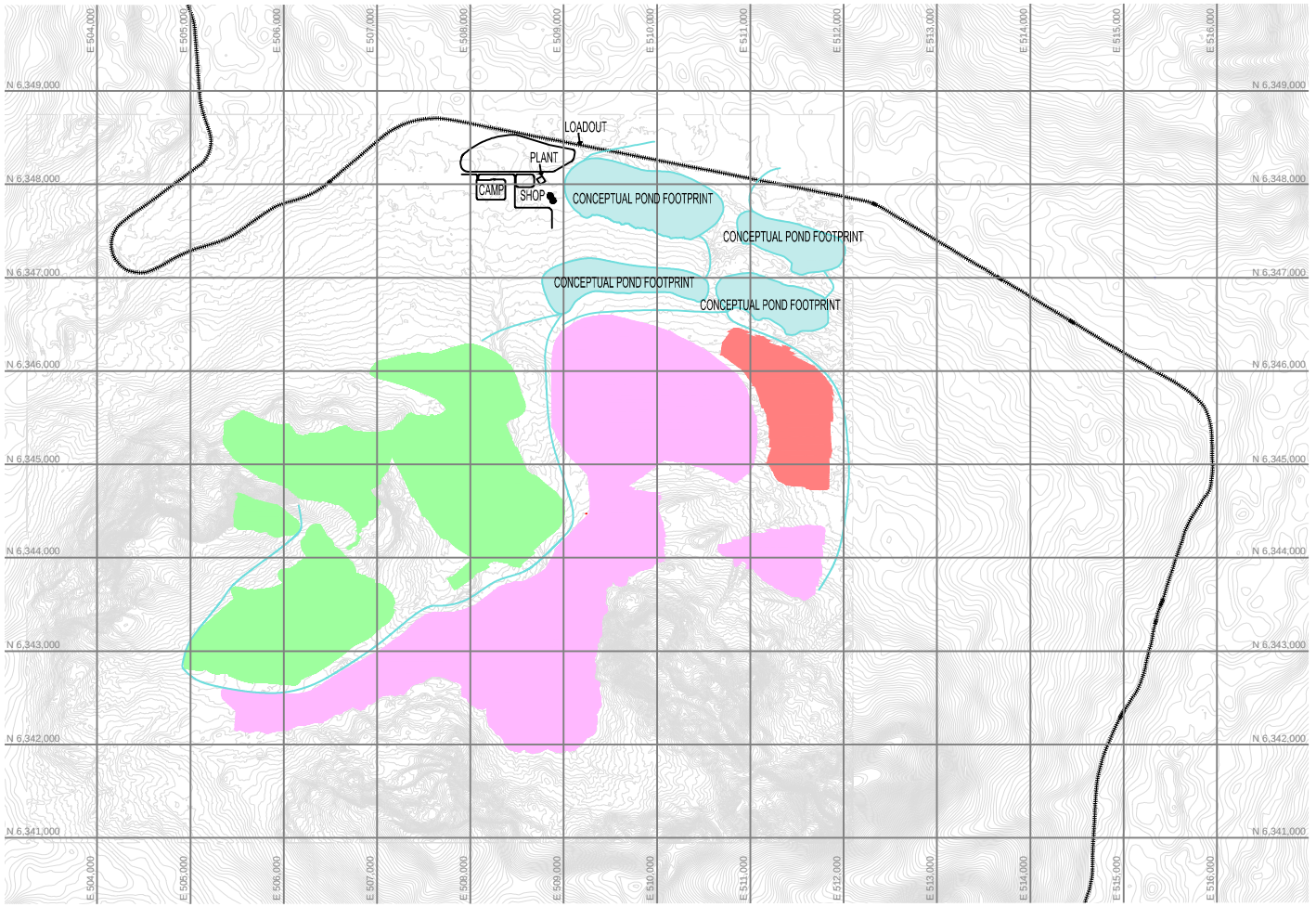

Legend

- Topography Contour (m)
- Proposed Plant and Facilities
- Surface Water Collection Ditch
- Pit Extents
- Mine Rock Storage Facility
- Coal Reject Storage Facility
- Revised Sediment Pond Extents

Scale in Meters

1,000 2,000 3,000 4,000 5,000

1:75,000

Pit Status End of Year 15

Sources: *Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012).*
Project Data: Arctos Feasibilty Study, Golder Associates (2012).

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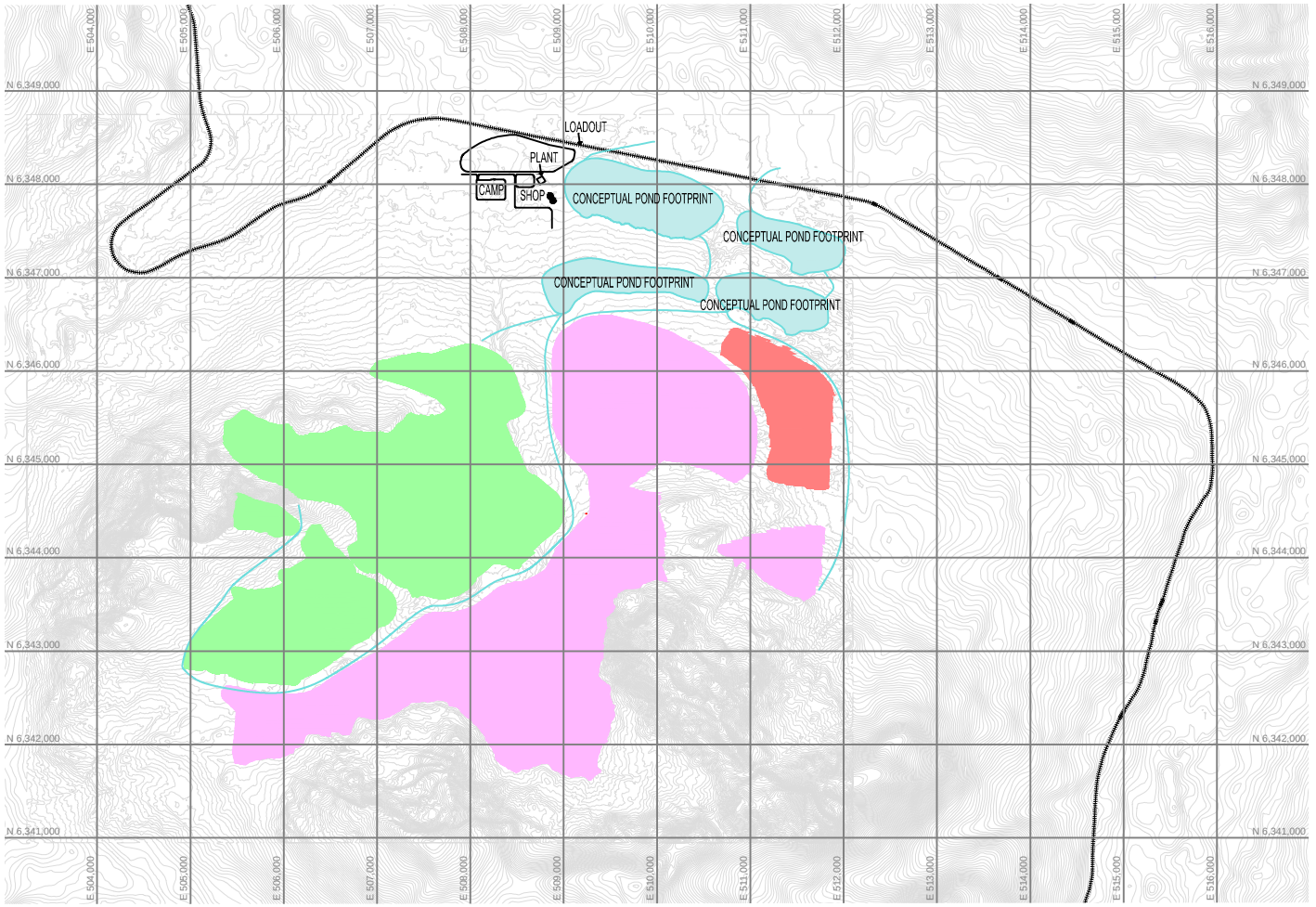
FIGURE ID: 123210182-107	DATUM: NAD 83	CHECKED BY: M. WOOD

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **4-16**



Legend

- Topography Contour (m)
- Proposed Plant and Facilities
- Surface Water Collection Ditch
- Pit Extents
- Mine Rock Storage Facility
- Coal Reject Storage Facility
- Revised Sediment Pond Extents

Scale in Meters

1,000 2,000 3,000 4,000 5,000

1:75,000

Pit Status End of Year 20

Sources: *Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012).*
Project Data: Arctos Feasibilty Study, Golder Associates (2012).

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FIGURE ID: 123210182-107	DATUM: NAD 83	CHECKED BY: M. WOOD

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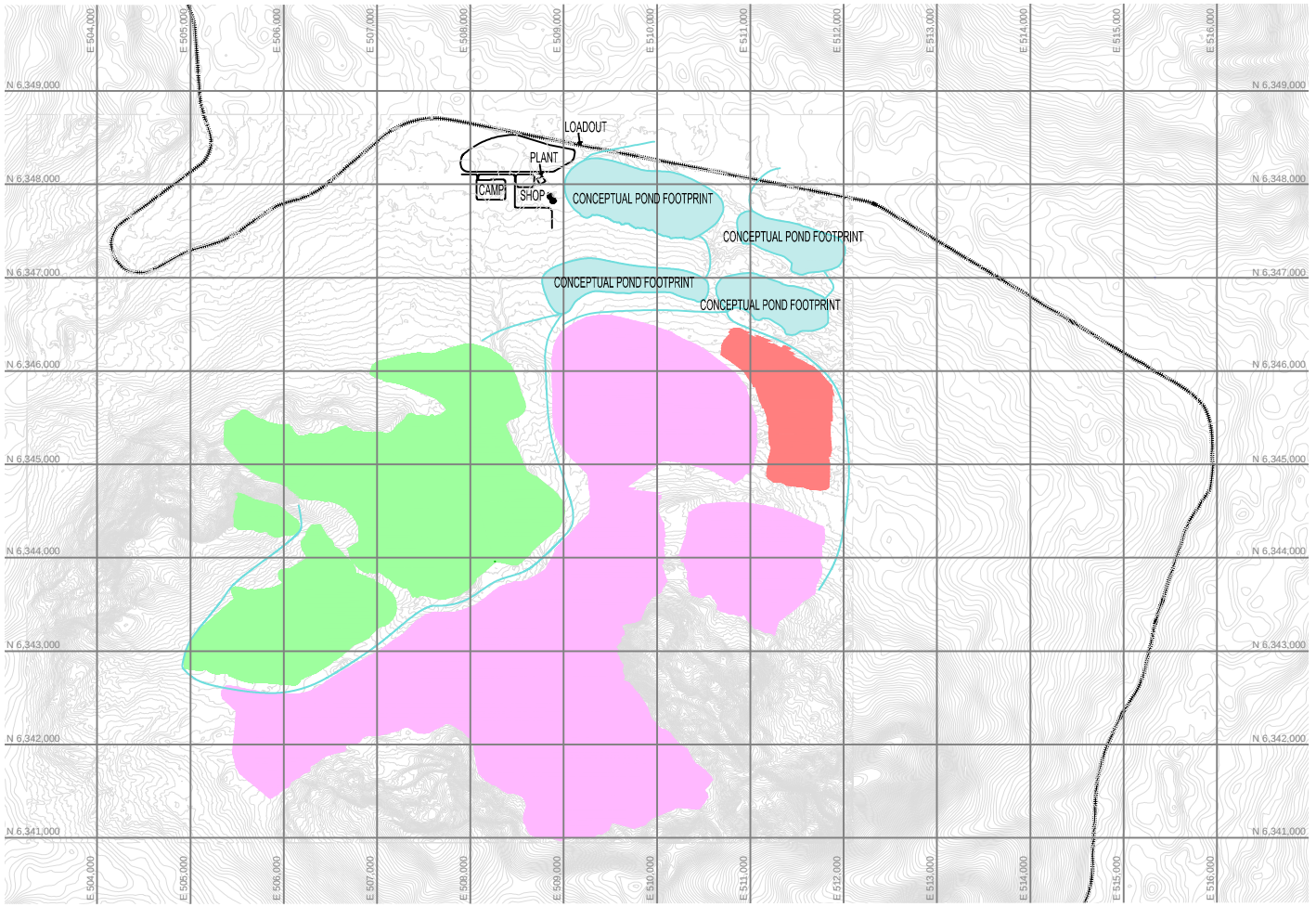
PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **4-17**



Legend

- Topography Contour (m)
- Proposed Plant and Facilities
- Surface Water Collection Ditch
- Pit Extents
- Mine Rock Storage Facility
- Coal Reject Storage Facility
- Revised Sediment Pond Extents

Scale in Meters

1,000 2,000 3,000 4,000 5,000

1:75,000

Pit Status End of Year 25

Sources: *Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012).*
Project Data: Arctos Feasibilty Study, Golder Associates (2012).

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FIGURE ID: 123210182-107	DATUM: NAD 83	CHECKED BY: M. WOOD

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **4-18**

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Table 4-2 Summary of 25 year Mine Plan Production Statistics—3 Mt/y Case

		YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	YR 7	YR 8	YR 9	YR 10	YR 11	YR 12	YR 13
PRODUCTION STATISTICS														
Total Stripping Volume (000s bcm)		**12,401,527**	**27,329,459**	**29,524,513**	**33,743,883**	**31,066,435**	**32,829,931**	**32,490,793**	**34,832,794**	**33,644,833**	**34,843,882**	**35,226,913**	**35,019,089**	**34,981,294**
ROM Coal Production (000s tonnes)		763,040	3,895,374	4,803,173	4,731,806	4,564,499	5,096,853	4,929,459	5,712,084	5,917,629	5,922,897	5,915,370	5,397,474	5,206,462
ROM Stripping Ratio (bcm/ROM tonne)		16.3	7.0	6.1	7.1	6.8	6.4	6.6	6.1	5.7	5.9	6.0	6.5	6.7
Product Coal Tonnage (000s tonnes)		**441,577**	**2,338,302**	**3,003,712**	**3,009,160**	**3,013,007**	**3,008,122**	**3,020,164**	**3,002,690**	**3,031,035**	**2,931,461**	**2,981,424**	**3,009,744**	**3,003,027**
Product Stripping Ratio (bcm/product tonne)		28.1	11.7	9.8	11.2	10.3	10.9	10.8	11.6	11.1	11.9	11.8	11.6	11.6
Preparation Plant Yield (%)		**58%**	**60.0%**	**62.5%**	**63.6%**	**66.0%**	**59.0%**	**61.3%**	**52.6%**	**51.2%**	**49.5%**	**50.4%**	**55.8%**	**57.7%**
CLEAN COAL by SEAM														
Total	**(000s tonnes)**	**441,577**	**2,338,302**	**3,003,712**	**3,009,160**	**3,013,007**	**3,008,122**	**3,020,164**	**3,002,690**	**3,031,035**	**2,931,461**	**2,981,424**	**3,009,744**	**3,003,027**
INFERRED COAL (1)	(000s tonnes)	**80.7**	**28.5**	**58.8**	**294.6**	**170.2**	**127.4**	**14.8**	**30.1**	**80.9**	**139.6**	**109.9**	**79.6**	**204.7**

YR 14	YR 15	YR 16	YR 17	YR 18	YR 19	YR 20	YR 21	YR 22	YR 23	YR 24	YR 25	TOTAL
34,576,802	**35,004,677**	**35,051,854**	**35,428,234**	**35,095,984**	**35,017,753**	**35,174,848**	**34,170,573**	**32,245,937**	**30,596,903**	**27,011,676**	**3,554,636**	**780,865,224**
5,778,959	5,148,076	5,333,941	5,705,019	5,832,168	5,724,590	5,562,183	5,580,308	5,898,177	5,470,045	5,190,658	983,998	125,064,240
6.0	*6.8*	*6.6*	*6.2*	*6.0*	*6.1*	*6.3*	*6.1*	*5.5*	*5.6*	*5.2*	*3.6*	*6.5*
3,007,156	**3,011,114**	**3,000,461**	**2,942,293**	**2,875,442**	**3,047,786**	**2,958,706**	**3,005,693**	**3,065,371**	**3,029,373**	**3,007,652**	**504,964**	**69,242,348**
11.5	*11.6*	*11.7*	*12.0*	*12.2*	*11.5*	*11.9*	*11.4*	*10.5*	*10.1*	*9.0*	*7.0*	*11.7*
52.0%	**58.5%**	**56.3%**	**51.6%**	**49.3%**	**53.2%**	**53.2%**	**53.9%**	**52.0%**	**55.4%**	**57.9%**	**51.3%**	*56%*
3,007,156	**3,011,114**	**3,000,461**	**2,942,293**	**2,875,442**	**3,047,786**	**2,958,706**	**3,005,693**	**3,065,371**	**3,029,373**	**3,007,652**	**504,964**	**69,242,348**
72.8	**0.9**	**2.1**	**103.8**	**153.5**	**17.6**	**4.6**	**7.6**	**33.3**	**38.1**	**206.0**	**11.0**	**2,071**

NOTES:
1 Inferred coal modeled as waste. The Inferred tonnage shown represents the potential clean coal recovered if all Inferred coal can be upgraded to Measured or Indicated by additional drilling.
2 Pre-Production Year (Year -1) stripping volume was included in table Year 1 Production Statistics

4.2.8 Mine Reclamation and Closure

Closure of the proposed mine will be based on several objectives developed to provide assurance to regulators and land users that the site will be left in a condition that will minimize future environmental impacts and liability. Decommissioning of the site will include the reclamation of disturbed surfaces, the removal of buildings and other infrastructure, and the maintenance of infrastructure requiring post-closure such as water management facilities. Structures will be removed and the foundations will be broken and buried.

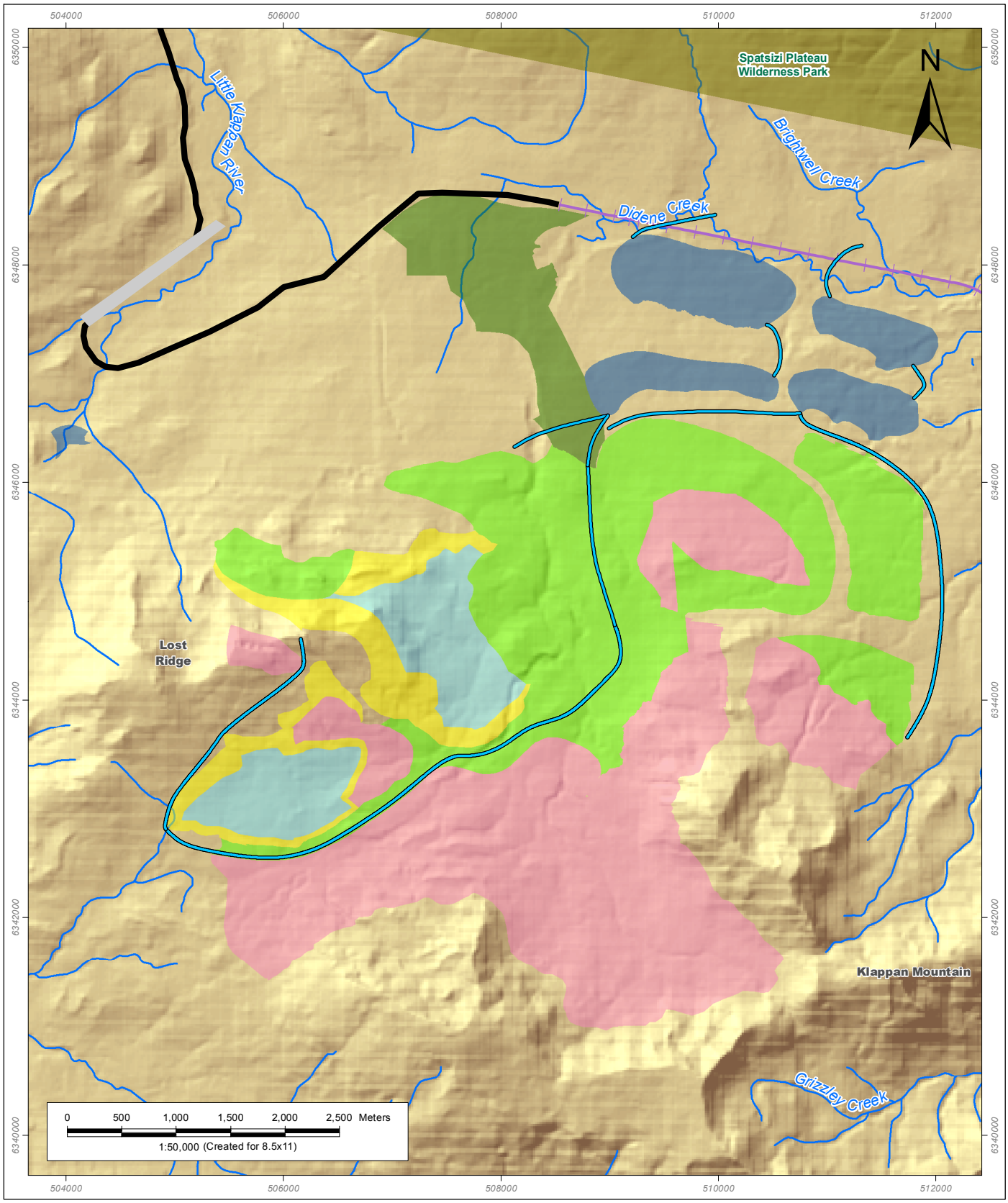
Progressive reclamation of mine area features will be conducted as features (or portions thereof) become inactive in the operations phase of the mine. Growth media placement and re-vegetation will take place in these areas where reclamation will be permanent. These progressively reclaimed areas will serve as advance monitoring for reclamation techniques and success.

The primary objective for site reclamation will be to achieve long-term stability of reclaimed areas capable of supporting productive revegetation. Reclamation plans will promote the growth and development of self-sustaining ecosystems including contouring of mine rock facilities as necessary, placement of growth media, scarification, tree and shrub plantings, placement of wildlife habitat features (e.g., rock piles, coarse woody debris, as appropriate), and maintenance and monitoring of the reclaimed site. Native plants, specifically traditional use plants, will be part of re-vegetation activities.

The site closure objectives will be designed to comply with appropriate land use plans, legislations and guidelines in effect at the time. These proposed objectives include continued use of the area outside the project area by Aboriginal groups and other land users, as well as the provision of upland and wetland wildlife habitat.

This reclamation plan will be a short-form description of the conceptual reclamation plan and written in plain non-technical language.

The reclamation objectives will be met through a combination of protecting ecosystems from disturbance, where possible, reshaping the landscape to be consistent with the surrounding area, and by planting species suitable for the reclaimed landscape. The draft end land use objectives will govern reclamation practices to maintain or reclaim distinct landforms or ecosystems that provide critical habitat or human use attributes. The conceptual end land use objectives proposed are summarized below, and shown in Figure 4-19.



Legend

- Alpine Landscape
- Mountain-Side Shrub-Herb Landscape
- Valley Bottom Open Forest Landscape
- Pit (May fill with water)
- Pit Wall
- Pond
- Proposed Rail Route on Existing Railbed
- Existing Access Road
- Existing Air Strip
- Surface Water Collection Ditches

Conceptual End Land Use

Sources: Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012). Project Data: Arctos Feasibilty Study, Golder Associates (2012).

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

DATE: 01-FEB-13	PROJECTION: UTM - ZONE 9
FIGURE ID: 123210182-114	DATUM: NAD 83
DRAWN BY: K. POLL	CHECKED BY: B. FULLER

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

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FIGURE NO: **4-19**

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4.2.8.1 Conceptual End Land Use Objectives

The proposed end land use objectives are conceptual and will evolve to incorporate input from several sources including input from Aboriginal groups, constraints due to the long-term mine design, and data derived from soil, vegetation and wildlife studies. Based on current mine design and ecology of the area the following end land uses will be proposed.

- Alpine Landscape
- Mountain Side Shrub Herb Landscape
- Valley Bottom Open Forest Landscape
- Ponds

Alpine Landscape

Mine rock storage facilities and slopes above the treeline (approximately 1,600 metres elevation) will be reclaimed to allow for alpine grass, herb and dwarf shrub species to develop as spring and summer feeding habitat for grizzly bear, caribou, hoary marmot and mountain goat. Other potential opportunities such as berry-picking and medicine-gathering will also be available to Aboriginal groups.

Reclaimed mine rock storage facility platforms above 1,800 metres elevation will be reclaimed to provide windswept ridges that may be used by caribou and mountain goats for summer and winter feeding. These high elevation habitats also provide food for marmots and ptarmigan that feed on the grasses, forbs and berries.

Mountain Side Shrub-Herb Landscape

Lower elevation mine rock storage facilities (below 1,600 metres elevation) will be reclaimed to provide upland subalpine-fir and shrub forest habitat. These areas will be designed to provide opportunities for continued plant gathering, particularly fir and berries. In the late summer or fall, berries such as soopolallie, blueberry, huckleberry and crowberry may be used as a food source for bears prior to hibernation. These forests can also provide suitable foraging habitat for caribou that forage on lichens in forest patches.

The surfaces of northern sides of re-contoured slopes of the rock storage facilities will be completed to provide mammal denning habitat (e.g., grizzly bears, marmots and wolverine), as similar as possible to the current existing deep till lobes. Retention or placement of suitable vegetation cover during reclamation will provide grizzly bear and wolverine with areas having stable soil conditions suitable for denning. In addition, these conditions will allow for snow to accumulate, which provides insulation for these species.

Valley Bottom Open Forest Landscape

The camp and coal processing facilities area will be reclaimed to provide open forest used by caribou for calving in the spring and summer. These patchy tree and shrub habitats will also provide foraging opportunities for caribou and moose.

The mosaic of wetland and forest habitats located between the railway, camp and coal processing facilities and mine rock storage facilities will be maintained as possible caribou and moose calving and feeding habitat, food and medicine gathering areas, and corridors through which people and wildlife can move across the landscape.

Ponds

Sediment ponds and water reservoirs will be reclaimed to provide potential toad spawning and rearing habitat. This expected end land use is based on observations of the current use of existing man-made ponds for breeding.

4.2.8.2 Mine Pit and Rock Storage Facility Reclamation

The main features of the mine site that will remain are the open pits and the mine rock storage facilities. Pit areas will be backfilled when technically practical and feasible with mine rock as mining progresses, but a portion of the open pit areas are expected to remain unfilled at the time of mine closure as these will have been the last areas to be mined prior to closure. At mine closure the pits are expected to gradually fill with seepage of ground water through the pit walls and surface water accumulation and runoff into the pits. Eventually the water in the pit would reach a level of hydrostatic equilibrium. These pit water levels will be predicted through modelling. Given the significant difference in elevation from the uphill side of the pits to the downhill side of the pits, water flow from the filled pits should be anticipated and will be predicted through modelling. A contingency plan for a spillway will be required and an assessment of the potential effect of water flow from the pits when the water level reaches the point of spilling from the pits, based on predicted water chemistry will be completed along with development of mitigation measures, if required.

Pit walls in bedrock remaining above water will not be reclaimed, as they are exempt under Part 10.7 of the Reclamation Code (BC MEMPR 2008). The steep rock cliffs remaining can provide suitable mountain goat escape terrain and habitat for nesting golden eagles. Where the pit will impound water, use and productivity objectives will be achieved.

Pit walls in soil or non-competent bedrock will be sloped and reclaimed similar to the mine rock storage facilities.

At final closure, the mine rock storage facilities will have a slope configuration that meets MEM guidelines. Slopes may be as shallow as 14° with no slope greater than 26° (2:1) unless specified in the reclamation plan for purposes of habitat diversity. Slopes will be covered with soil and revegetated. The contouring will be designed to be consistent with the natural surrounding topography in accordance with proper closure principles and local/aboriginal recommendations.

4.2.8.3 Roads, Ditches and Facilities Reclamation

Structures will be decommissioned, demolished and salvaged to recover recyclable materials. Non-hazardous building materials that cannot be recycled (e.g., concrete) will either be removed for off-site disposal or buried on site. Foundations left in place will be breached to prevent ponding of water,

and buried. Some buildings may be reusable at another site or in nearby communities and this will be a consideration in the final disposition of these structures.

Mine roads, ditches and facility areas will be reclaimed by scarifying them and grading the areas to blend with the surrounding topography prior to re-vegetating.

Some ditches will remain as permanent structures where they are required for water management. Perimeter ditches used during the mining operation to direct runoff from unaffected areas around the mining disturbance may be removed and re-established to natural drainage.

4.2.8.4 Access Reclamation

Access for the mine currently consists of an existing rail bed (used as a roadway) and air strip. The rail bed roadway and air strip will not be reclaimed as these represent public infrastructure.

4.2.8.5 Revegetation, Maintenance and Monitoring

Re-vegetation will consist of seeding and/or planting the areas with appropriate vegetation following growth media placement. Species to be used in re-vegetation will be preferentially selected from the native species found in the local area during ecosystem mapping, and will be those that are suitable for the projected post-closure environmental conditions and designated land use. Re-vegetation species will also be selected, to the extent possible, based on their importance to the wildlife native to the area and to local Aboriginal groups. On-site test plots will be established early in the mine life. Local Aboriginal groups will be invited to participate in the reclamation and re-vegetation work.

Maintenance activities will typically include ongoing monitoring, repairing erosion, infill planting areas with low survival of planted vegetation, repairing drainage structures and other maintenance required to fulfill the final reclamation objectives.

4.3 Coal Transportation System

The coal is proposed to be transported by railway from the mine site to Ridley Terminals in Prince Rupert as shown Figure 4-6. Rail is considered the most energy efficient and cost effective method of transport available for the Project. The AAJV understands that Ridley Terminals will not require upgrades to service this Project.

As currently conceived, 100 percent of the full costs of this new railway construction is assumed to be the responsibility of the Project.

Coal will be loaded onto trains at the mine site using a rail siding system and rail car hopper loader that will be designed to load a full train in less than six hours. Subject to more detailed analysis, coal cars will either be fitted with canopies to prevent dust losses, or an ecologically compatible dust suppression material will be applied to the coal in the cars as is currently practiced by several other western Canadian coal mines transporting coal by rail.

Current engineering studies show that the railway is being planned to be rated to support up to a 268,000 pound gross weight on rail standard. In order to ship 3 million tonnes of clean coal annually on a line built to this standard, the mine would require six unit trains, each consisting of 127, 95-

tonne rail cars. Locomotives will be provided by CN, and the AAJV would lease the rail cars. The leased cars would fully meet the operating requirements of the rail operator, as well as the off-loading requirements at Ridley Terminals. The cycle time from the mine to Ridley Terminals at the Port of Prince Rupert would be an average of 6.2 days per train which equates to two loaded trains leaving site every three days.

5 PROJECT PLANNING AND SCHEDULING

5.1 Project Schedule

A summary breakdown of the proposed schedule is provided in Table 5-1. The proposed schedule is intended to comply with the BC EAA and CEAA policies and legislation.

Table 5-1 Summary of Major Milestone Activities

Phase			Anticipated Timing
EA Process	**EAO**	**CEA Agency**	
	Draft Project Description Report	Draft Project Description Report	January 2013
	Final Project Description Report	Final Project Description Report	March April 2013
	Section 10 Order Issued		March April 2013
	Draft AIR submitted and project working group meeting	Draft EIS Guideline info provided (if required)	April to May 2013
	Section 11 Order issued		April to May 2013
	Public comment period on dAIR and open houses	Public comment period on draft EIS guidelines	June to August 2013
	AIR Approved	EIS guidelines issued	September - October 2013
	Finish Baseline Studies/Reports (write EAC application concurrently)	Finish Baseline Studies/Reports (write EIS concurrently)	December 2013
	Submission of EAC Application for completeness evaluation	Submission of EIS application for completeness evaluation	February 2014
	EAC application review including working group meeting and public comment period	EIS review including public comment period on EIS summary, and the draft EA report	July 2014 to January 2015
	Decision on issuance of EAC	Decision on EA approval	April 2015
Permitting			
	Authorizations (See Table 10-1)		January-July 2015

Table 5-2 Summary of Major Milestone Activities by Project Component

Project Component	Description of Activities	Date
Environmental Baseline Studies	Studies necessary to assess potential project impacts on the biological or social environment	2012 to 2013
Environmental Assessment Process	Steps as outlined by the EAO and CEA Agency	2013 to 2015
Permitting and EMPs	As per provincial and federal legislation	2013 to 2015
Construction	Receive authorization to construct, begin construction; site clearing and preparation, construction of camp and ancillary facilities, pre-stripping and initiate coal transportation system	Q3 2015 to 2016
Operation	Receive authorization to operate; initial mining/full production	Q4 2016
Decommissioning/ Closure	Reclamation and Decommissioning Reclamation and Decommissioning (progressive reclamation initiated early in mine life with most activity in 2042. Decommissioning is expected to take approximately 2 years; reclamation may take 3-5 years)	2042 (based on current mine plan)

5.2 Project Activities

5.2.1 Construction Phase

Upon receipt of the required regulatory approvals and permits, the construction phase of the Project will include the following main steps:

Mine Site

- Upgrade access road for delivery of construction-related materials and equipment
- Safety and environmental procedures implemented, including finalization of the Environmental Management Plans (EMPs)
- Site clearing, grading, and grubbing
- Construction of sediment control and water management facilities
- Construction of transmission line for construction power and later operations
- Set up of mine infrastructure (camp, power, water supply, office, equipment repair)
- Transportation of construction workers, equipment and supplies to the mine site by rail and/or transport truck
- Set up of explosives facility
- Development of haul road network and pit preparation/stripping
- Construction of coal washing plant

Coal Transportation System

- Construction of rail extension from mine site to Minaret siding
- Construction of rail load-out facilities

Development and Construction Schedule

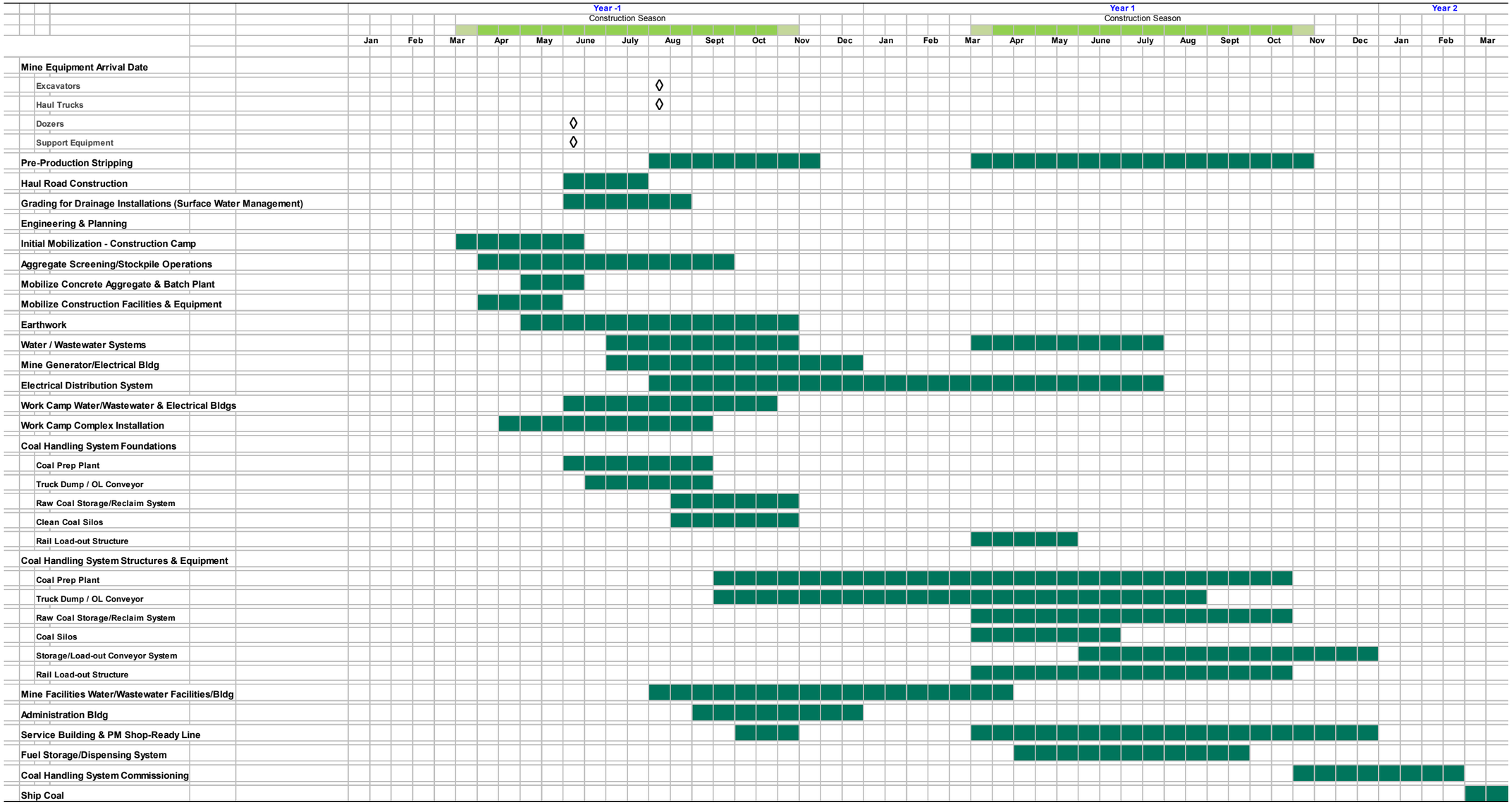
The schedule reflected in Table 5-3 focuses on infrastructure during the mine construction and the initial production period. Final Project design and engineering is projected to begin early and proceed to the stage that contracts can be negotiated and advance purchase of long-lead materials, particularly the processing plant and the mining camp facilities can be completed. At the onset of the initial construction season following issuance of the mining permit, project set-up and site development works will begin simultaneously at the mine site. Work will proceed on a fast track, with the intention of accelerated completion of critical path items such as the coal processing plant.

During the pre-production year (Year -1), earthwork and foundation work will be completed to the extent that the remaining infrastructure work can be completed within Year 1. The main focus for the coal processing plant will be to finish initial placement of machinery and the enclosure, so that the plant can then be completed under roof during the winter season of Year 1. In addition, work will include the construction of key access roads, mine maintenance facilities, and the pre-stripping of

key low ratio pits. A total of 3.02 million bank cubic metres of pre-stripping will be performed and 54,900 tonnes of coal will be exposed and remain in-pit until the start-up of the coal preparation plant.

Construction of other infrastructure components will proceed concurrently with the process plant and they are anticipated to be under roof or substantially finished before weather prohibits outdoor work in the winter of Year 1. The mine construction should be completed to a stage that initial coal production can begin and continue in Year 1. Full production at 3 million tonnes per year will begin thereafter in Year 2 or on a schedule approved by Arctos.

Table 5-43 Construction and Mine Operations Schedule



NOTES:

1 Lead times for equipment procurement must be anticipated and accounted for; allow up to 24 months for large excavators and trucks and up to 12 months for any support equipment.

2 Engineering and Planning must begin in the year prior to mobilization and construction.

3 Engineering and Planning includes: Preliminary Engineering & Planning, Topographic Survey for Facilities Design, Geotech Investigations, Engineering Design Development, Detailed Engineering, Major Equipment/Systems Procurement, Construction Contracting.

5.2.2 Operation Phase

During operation of the Project, the following key activities will occur:

Mine Site

- Transportation of construction workers, equipment and supplies to the mine site by rail or transport truck.
- Mining, handling and processing of coal
- Deposition of mine rock in rock storage facilities and in-pit placement
- Comingling of coal rejects within the mine rock storage piles or in a separate storage facility
- Operation of sediment control and water management facilities
- Ongoing reclamation of disturbed areas
- Environmental monitoring, supervision and surveillance
- Maintenance and vegetation management along transmission lines and access roads

Coal Transportation System

- Loading of coal into rail cars (including implementation of dust control measures)
- Transport of coal by rail from the mine site to Ridley Terminals by the rail operator

The operations schedule is presented in Section 4.2.7.

5.2.3 Reclamation and Decommissioning Phase

The life of the Project is expected to be approximately 25 years based on the proposed production rates. Conceptual plans for the reclamation, decommissioning and closure of the mine will be presented in the Application together with proposed end use objectives and site reclamation test program. Detailed plans will be submitted during the permitting phase of development. Reclamation will be progressive over the life of the mine. At the end of the Project, the decommissioning plan will be implemented. Reclamation and decommissioning activities will be conducted in accordance with applicable regulations and informed by input and participation by Aboriginal groups.

6 PROJECT SETTING

6.1 Project Geology

The area has been the subject of numerous geological studies, including coal, oil and gas exploration, as well as British Columbia and Canadian Geological Survey studies (Bowser and Sustut Basins, State of Knowledge and New Initiatives, Evenchick 2003) and university degree theses. The regional geology is well understood and well described by Innis et al. (1988).

Regionally, the anthracite deposits occur within a large area of sedimentary rocks, called the Bowser Basin, that formed and filled with sediments eroded from surrounding high land during the late Jurassic to early Cretaceous periods. The Bowser Basin extends from the north near Iskut to the south near Terrace and Smithers, and from the west near Stewart to the east near Takla Lake, as shown on Figure 6-1.

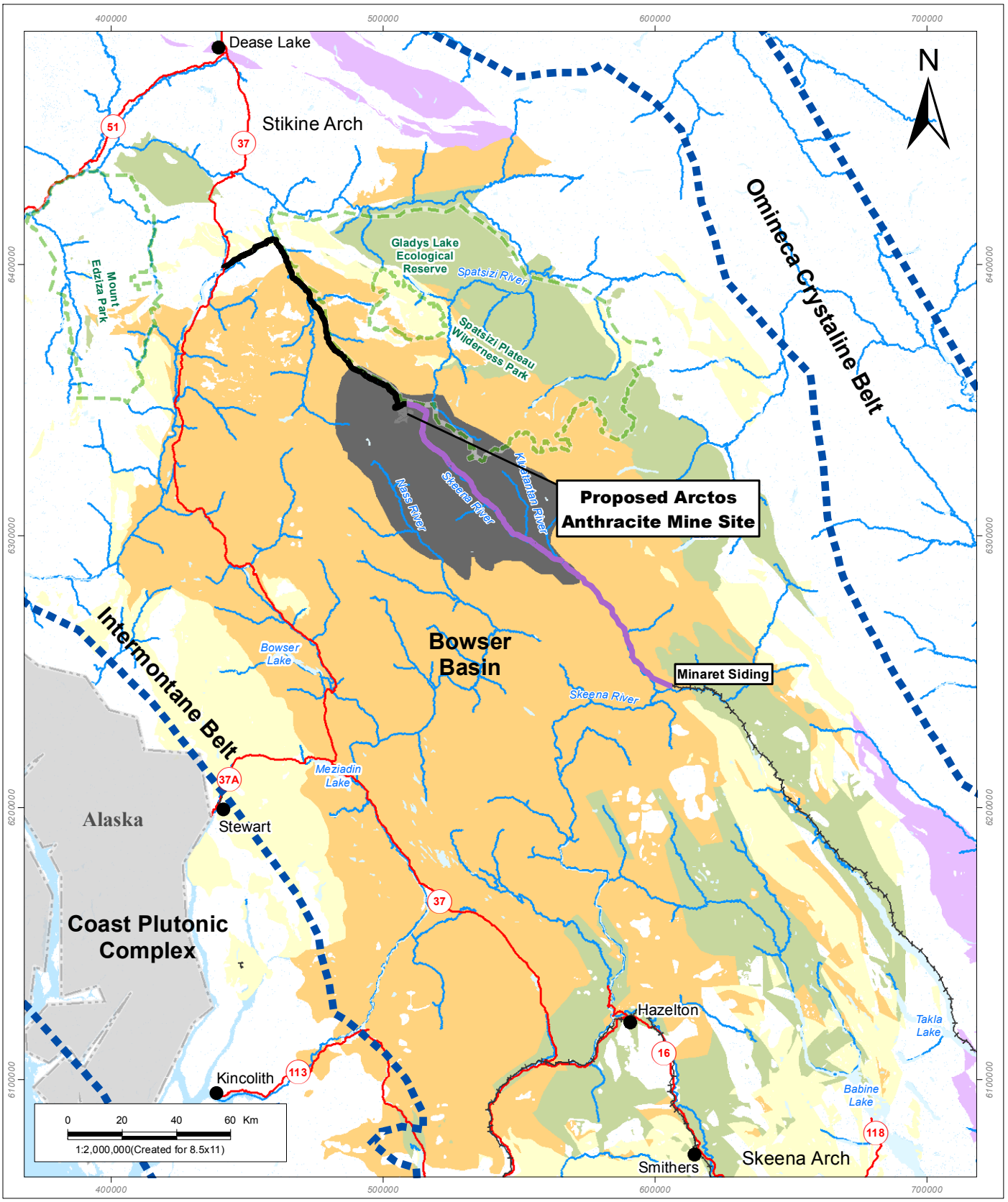
Two distinct areas containing coal have been identified in the northern portion of the basin: the Klappan Coalfield in the northwest (Koo 1986) where the Project is located, and the Groundhog Coalfield about 50 kilometres to its southeast, west of the Skeena River (Malloch 1912; Innis et al. 1988).

The Klappan Coalfield is described below based on Gulf's field work, a Gulf 1988 report, and Marston Engineering's 2005 Feasibility Study.

The Arctos Anthracite resources are contained in a sedimentary rock layer called the Klappan Formation, which is composed of mudstone, siltstone, sandstone and conglomerate. This formation has 33 anthracite seams that are interpreted to have been deposited in a shoreline delta environment that experienced rising and falling sea levels causing repeating layers of organic matter to be deposited that ultimately became the coal seams. The Klappan Formation is part of the Bowser Lake Group of sedimentary rocks being underlain by the Spatsizi Formation and overlain by the Malloch Formation, both of which contain sedimentary rocks similar to the Klappan Formation.

The Klappan Formation is approximately 1,100 metres thick, and the anthracite seams occur in the central 600 metres of the formation. A stratigraphic column of the coal bearing section of the Klappan Formation and the location and thickness of the coal seams and Klappan Formation within rock sequence of the Bowser Basin is shown in Figure 6-2.

A generalized geological map of the local area, shown on Figure 6-3, shows that the Klappan Formation is exposed at surface between the Spatsizi Formation to the north and the Malloch Formation to the south in the vicinity of Mount Klappan.



Legend

- Belt Boundaries
- Existing Access Road
- Proposed Rail Route on Existing Railbed
- Parks and Ecological Reserves
- Exisiting Railway
- Coal Measures
- Bowser Lake Group
- Cache Creek Complex
- Hazelton Group
- Skeena Group; Sustut Group

Regional Geology

Sources: Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012); BC Geology, BC Ministry of Energy, Mines and Natural Gas, Government of British Columbia (2009). Project Data:Arctos Feasibilty Study, Golder Associates (2012).

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DATE: 27-MAR-13	PROJECTION: UTM - ZONE 9
FIGURE ID: 123210182-071	DATUM: NAD 83
DRAWN BY: M.WOOD	CHECKED BY: J. MUCKLOW

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **6-1**

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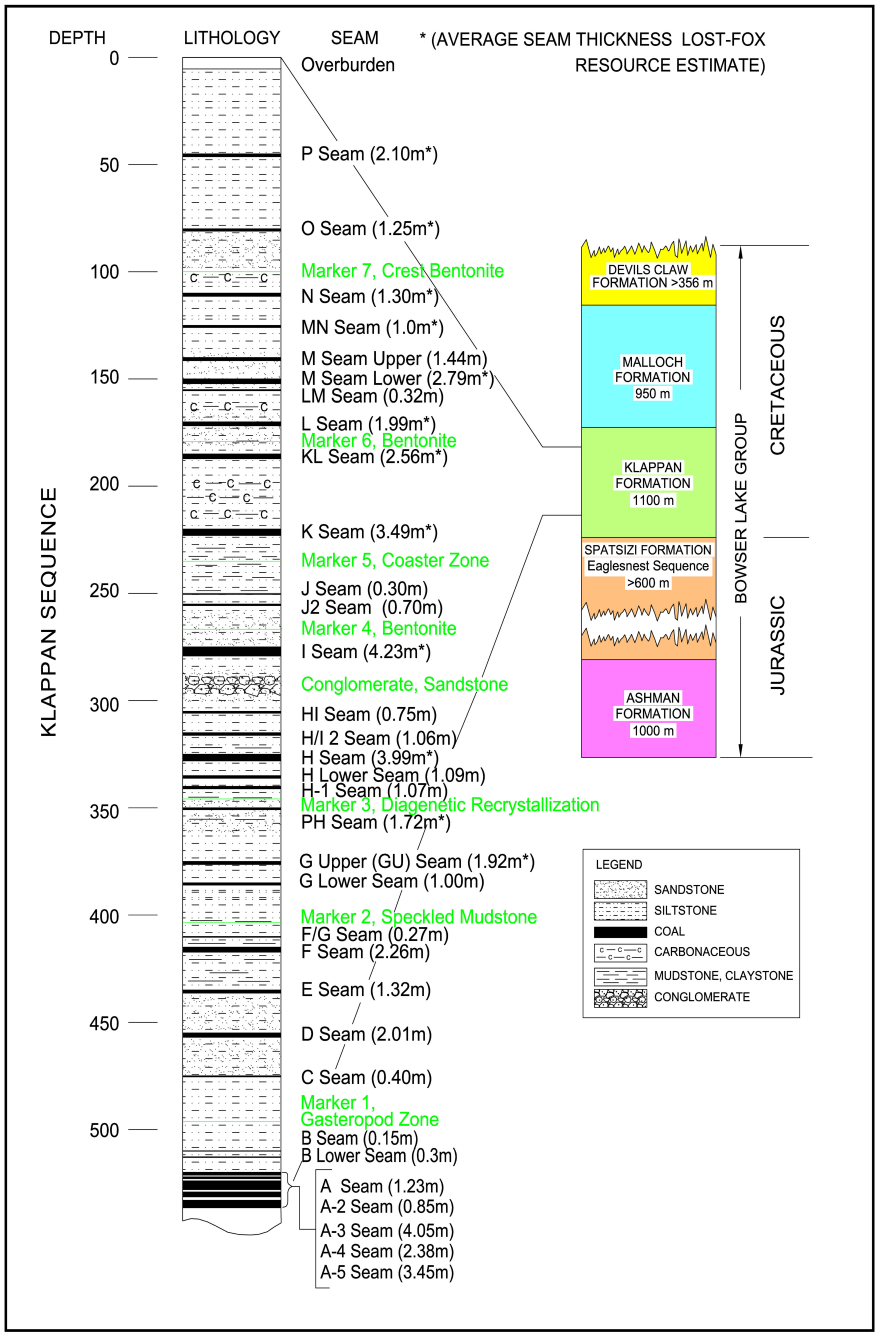

Generalized Strategraphic Column

Sources: 2012 Update of the Arctos Anthracite Project Mine Feasability Study, Golder Associates (2012)

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FIGURE NO: 6-2

DATE: 21-NOV-12

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CHECKED BY: J. MUCKLOW

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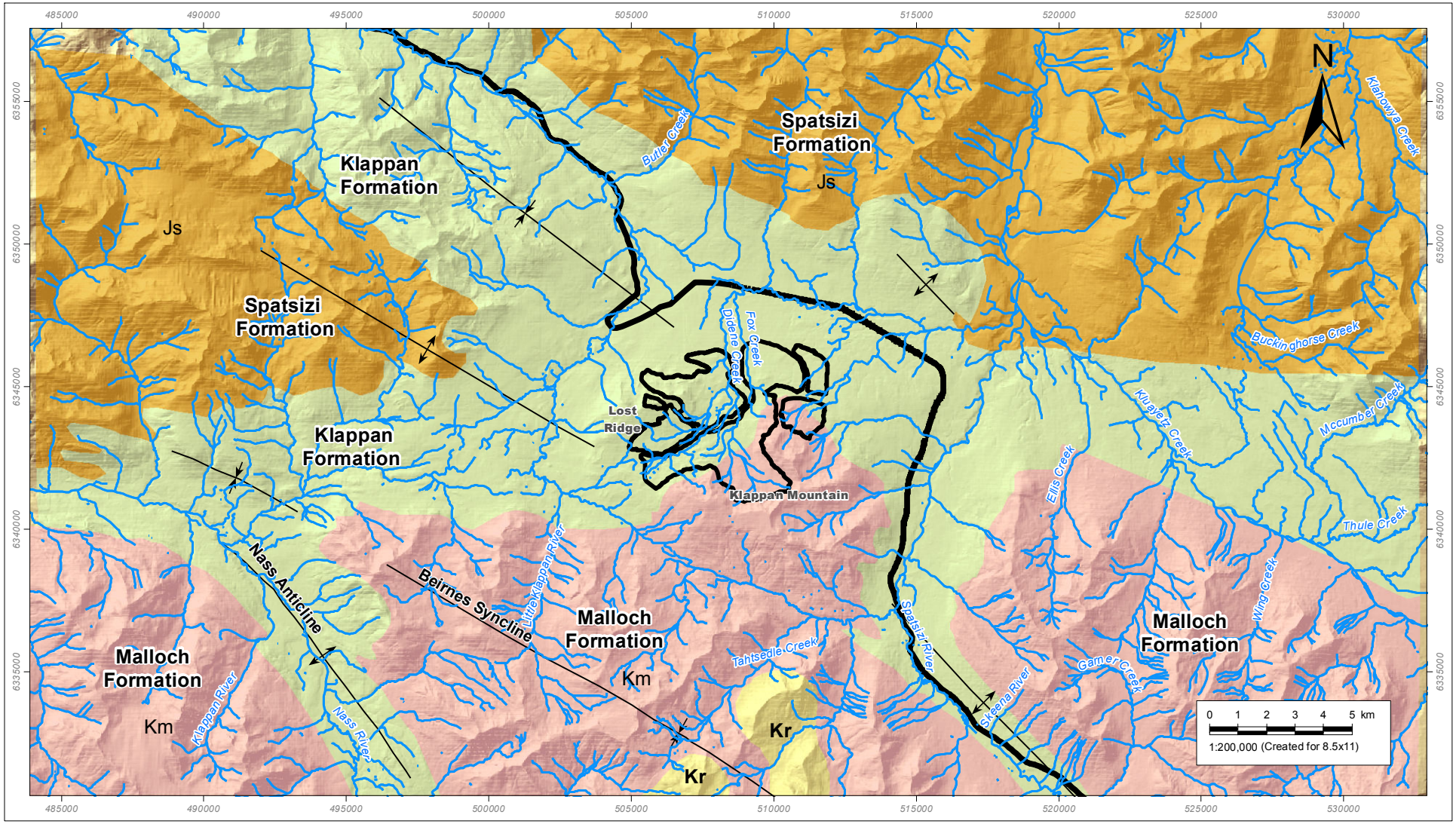

Legend

- Existing Road on Rail bed
- Overall Project Footprint
- Anticline
- Syncline
- Klappan Formation (JKk)
- Malloch Formation (Km)
- Rhondda Formation (Kr)
- Spatsizi Formation (Js)

Local Geology

Sources: Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012).Gulf Canada Resources Inc. (1998) in Golder Associates (2012). Project Data:Arctos Feasibilty Study, Golder Associates (2012).

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DATE: 27-MAR-13	PROJECTION: UTM - ZONE 9	DRAWN BY: M.WOOD
FIGURE ID: 123210182-76	DATUM: NAD 83	CHECKED BY: J. MUCKLOW

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **6-3**

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Coal seams have been identified in the central part of the licence area over most of its east-west extent. The areas of interest that have been identified are named the Lost-Fox (including the Lost-Fox extension), Hobbit-Broatch and the Summit areas. This Project is focused on the Lost-Fox area.

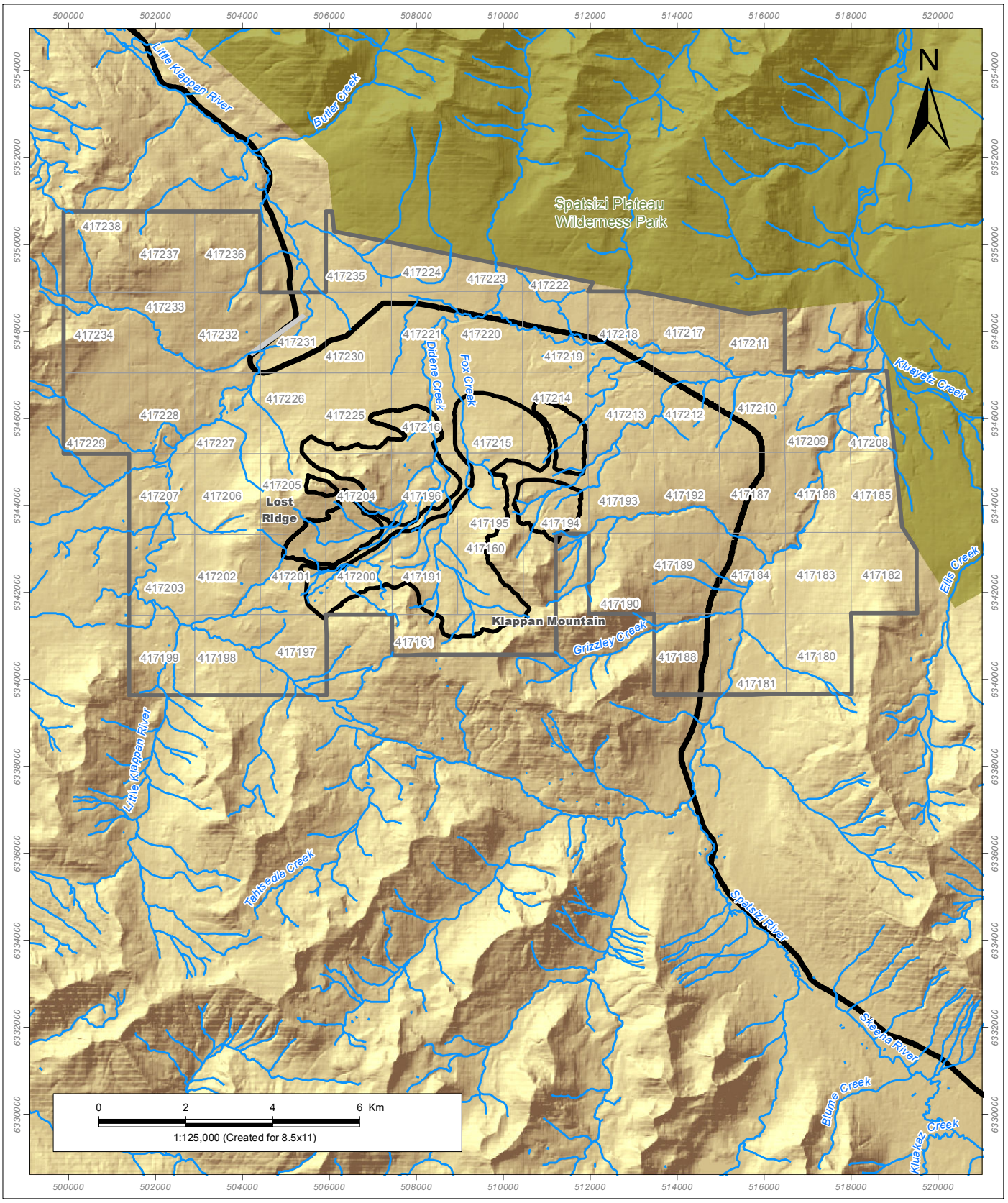
6.2 Mineral Rights

The AAJV mineral rights comprise 61 contiguous coal licences on Crown land, listed in Table 6-1, with a combined area of 16,411 hectares located on and around the north side of Mount Klappan as shown on Figure 6-4.

Table 6-1 AAJV Coal Licences

Licence No	Mapsheet	Area (ha)	Licence No	Mapsheet	Area (ha)
417160	104H026	281	417209	104H027	280
417161	104H026	491	417210	104H027	280
417180	104H017	281	417211	104H027	211
417181	104H017	281	417212	104H027	280
417182	104H027	276	417213	104H026	280
417183	104H027	281	417214	104H026	280
417184	104H027	281	417215	104H026	280
417185	104H027	205	417216	104H026	280
417186	104H027	280	417217	104H027	247
417187	104H027	280	417218	104H026	279
417188	104H017	281	417219	104H026	280
417189	104H027	281	417220	104H026	280
417190	104H026	281	417221	104H026	280
417191	104H026	281	417222	104H026	58
417192	104H027	280	417223	104H026	104
417193	104H026	280	417224	104H026	149
417194	104H026	280	417225	104H026	280
417195	104H026	280	417226	104H026	280
417196	104H026	280	417227	104H026	280
417197	104H016	281	417228	104H026	280
417198	104H016	281	417229	104H025	280
417199	104H016	281	417230	104H026	280
417200	104H026	281	417231	104H026	280
417201	104H026	281	417232	104H026	280
417202	104H026	281	417233	104H026	280
417203	104H026	281	417234	104H025	280
417204	104H026	280	417235	104H026	202
417205	104H026	280	417236	104H026	280
417206	104H026	280	417237	104H026	280
417207	104H026	280	417238	104H025	280
417208	104H027	173			

NOTE:
Mapsheet References are to BC Geographic Survey



Legend

- Existing Road on Rail Bed
- Overall Project Footprint
- Coal Licence Block
- Coal Licences
- Existing Air Strip
- Parks and Ecological Reserves

Location of Coal Licences

Sources: Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012).
Project Data: Arctos Feasibilty Study, Golder Associates (2012).

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

DATE: 27-MAR-13	PROJECTION: UTM - ZONE 9
FIGURE ID: 123210182-040	DATUM: NAD 83
DRAWN BY: M.WOOD	CHECKED BY: J. MUCKLOW

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE PROJECT

FIGURE NO: **6-4**

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7 ENVIRONMENTAL SETTING

The proposed mine is located in the northern part of the Skeena Mountains, a high rugged mountain range situated between the coastal mountains in the west and the sub-boreal interior plateau to the east in northwestern British Columbia. The proposed mine area lies in a transition zone between a wet coastal region and a drier interior region in the upper drainage basins of the Stikine River (Spatsizi River and Little Klappan River sub-basins).

The region around the coal licence area has valley elevations of less than 1,100 metres above sea level rising to mountaintops over 2,000 metres above sea level, with treeline typically near 1,500 metres above sea level. The proposed mine lies between 1,300 and 1,840 metres above sea level, with the tree line at approximately 1,600 metres above sea level. The higher elevation vegetation is generally alpine tundra. Scattered coniferous forest, grass, shrubs, meadows and bogs prevail at lower elevations.

Environmental Assessments and regionally based studies other than those done by Gulf Canada and Fortune Minerals have been conducted in the area. The proposed mine site and a large portion of the rail bed to the south of it fall within the Cassair-Iskut-Stikine LRMP and the Fort St. James LRMP, respectively. Socio-economic and biophysical studies were undertaken within these LRMPs. In addition, the Tahltan Central Council and the BC Integrated Land Management Bureau collaborated on an information and analysis package to provide groundwork for potential future land use planning for the Klappan area and to help inform referrals and decisions related to development activities in the area (Tahltan-ILMB Joint Planning Information Package for the Tlebāne/Klappan 2008).

7.1 Climate

There are several years of site-specific and regional meteorology and/or climate data available to describe the conditions at the proposed mine site. In addition to the ongoing monitoring, historical baseline data is available from three baseline reports characterizing atmospheric conditions in the project area between 1979 and 1986. In addition to meteorology measurements collected at the site, historical data from three Environment Canada meteorological stations within a 100-kilometre radius are available for this purpose: Bob Quinn, Iskut Ranch and Todagin Ranch. These stations have more than 10 years of data on record, but they were decommissioned in the early 1990s. In addition, data from other stations somewhat farther afield are available, including Fort St. James and Germansen Landing.

Data from the Didene Creek meteorology station at the proposed mine site, indicates the monthly average temperatures ranges from about -13.5°C in January to 10.5°C in July. The lowest temperature measured in the project area is -45°C in February 1986. The total precipitation measured at the site during 2005, 2007 and 2008 was 650, 625 and 630 millimetres, respectively. Three months of precipitation data were missing for 2006 and data between November 2009 and September 2011 were missing due to a dead battery (RTEC 2012), a period in which site activities had been suspended.

Wind speeds averaged 2.1 metres per second mainly from the west to west north-west and the east to south-east.

The highest monthly average incoming solar radiation in May 2008 was 286 watts per square metre. The highest daily average incoming solar radiation was 420 watts per square metre on August 5, 2008. The highest hourly incoming solar radiation was 1,088 watts per square metre on August 3, 2008 at 13:00 hours.

During the very high snow season of 2007, snow remained on the ground from mid-October to early June and the snow pack was up to 181 centimetres deep (the peak was reached in early April 2007).

One of the considerations in the project planning will be an analysis of the potential effects of climate change on the project infrastructure and future reclamation programs. These potential climatic effects will be addressed in the environmental assessment.

The rail route between the proposed mine and Minaret siding covers a variety of vegetation zones, as described below, which provide indications as to the general climate of the rail route. In the first 60 kilometres south of the proposed mine, the following general characteristics of the climate are anticipated:

- Relatively cold, moist, and snowy continental climate with growing seasons that are cool and short while winters are long and cold.
- Mean annual temperatures range from -2 to +2°C. Mean monthly temperatures are below 0°C for 5 to 7 months and above 10°C for 2 months.
- Mean annual precipitation is highly variable. Relatively dry portions of the zone may receive 400 to 500 millimetres of precipitation while wetter areas may receive higher amounts (up to 2,200 millimetres). Most of the precipitation (50 to 70 percent) falls as snow and the maximum snowpack range from about 1 metre in lower elevations to more than 2 metres for higher elevations.
- Soils are commonly frozen in winter, especially in areas with relatively light snowfall where freezing occurs before there is significant snow cover.
- Over the next 90 kilometres to Minaret siding, average temperatures increase slightly but remain cool while precipitation is similar.
- Mean annual temperature ranges from 1.7 to 5°C. Average temperature is below 0°C for 4 to 5 months of the year, and above 10°C for 2 to 5 months.
- Mean annual precipitation ranges from 440 to 900 millimetres but can be higher at higher elevations—up to 1,650 millimetres of which 25 to 50 percent is snow.

7.2 Soils

Soils in the area of the proposed mine site, road and rail bed corridor are derived from glacial processes. Periglacial processes and wetlands have also influenced soil development.

The proposed mine site is dominated by thin mantles of silt and clay morainal deposits. These deposits occupy approximately 3,400 hectares of the coal licence area, with areas of colluvial (gravity moved) material at higher elevations, and organic and silty sand and gravel fluvial materials in valley bottoms. Rock outcrops of mudstone, conglomerate, and other sedimentary rocks occur in the area including isolated areas in valley bottoms. Most of the proposed mine area (approximately 98 percent) is flat (0 to 5 percent grade) to gently sloping (6 to 26 percent grade). The remaining area is moderately sloping (27 to 49 percent grade).

Dominant soil orders in the project areas include brunisols which have limited soil development due to the cold climate, gleysols along stream banks and wet forest sites formed where the water table is within 2 metres of the surface, and regosols (poorly developed soils) in the weathered bedrock of the higher ridges (RTEC 2008). Till derived soils contain silt and clay, and fluvial and glacio-fluvial soils range from silt loams to sand.

Geochemical properties of soil samples from the coal licence area were compared to British Columbia Reg. 375/96 *Contaminated Sites Regulation* (CSR) criteria for soils—parkland land use. Based on these criteria, natural concentrations of nickel, copper, barium and selenium exceed parkland criterion at many locations.

Key issues to be addressed for project planning are maintaining soil quality and quantity. These issues are measured by soil erosion, soil compaction, soil moisture, soil fertility, and effects from dusting. The soil assessment will provide information to assist in the development of mitigation strategies for the sediment and erosion control plans and the soil salvage, storage and replacement plans for reclamation.

7.3 Topography and Surface Drainage Features

The coal licence area is within the upper drainage basins of the Little Klappan and Spatsizi rivers. The proposed mine site lies primarily within the Fox/Didene Creek catchment, which flows into the Spatsizi River. The westernmost portion of the proposed mine site is within the Little Klappan River catchment. The proposed rail line generally follows the east side of the Skeena River valley although the northernmost portion, near the proposed mine site, follows the upper Spatsizi River valley. The route crosses several tributaries of the two rivers, in particular, the Kluatantan and Duti rivers. The access road from the north follows the east side of the Klappan and Little Klappan river valleys.

The topography in the proposed mine area is generally a broad rolling alpine valley with gentle slopes, with low round-topped mountains. The proposed mine generally located on the south slopes of Lost Ridge, which forms the northern ridge of Mount Klappan, and part of the alpine valley between the two. Lost Ridge is predominantly gently sloping on the south slope, with steep cliffs up to 30 metres high on the north side.

Soil creep and slumps in areas of surface seepage are common in the proposed mine area and surrounding mountainous terrain, even on gentle slopes. More rapid mass movements along drainages or avalanche tracks are evident on the deeply incised sides of some major river tributaries.

The key topographic issue to be addressed in the project planning will be evaluation of terrain stability in mine areas, and mitigating the potential of landslide debris and sediment entering streams along the many crossings of fast-flowing rivers along the access road and rail corridor.

7.4 Water Quality

Water samples were collected from numerous locations in the streams around proposed mine area over a period of three years, including each season. In addition, Gulf Canada collected water quality data in the mid-1980s which is available to compare with current data.

Overall, the waters of the proposed mine site are considered generally unaffected by non-natural influences, with natural seasonal fluctuations reflecting base flow winter conditions, spring freshet flows and the transition between the two that are typical for most water bodies in western Canada.

The seasonality of water flows, in particular the very low flow winter and very high flow freshet results in seasonality of water quality. High spring freshet flows, consisting largely of snow melt, tend to have lower concentrations of dissolved constituents. In contrast, winter base flow conditions, containing a high proportion of ground water recharge water, have higher concentrations of dissolved constituents. The seasonal flow also affects total (dissolved plus particulate) concentrations, in particular metals and most particularly the common rock forming metals (such as aluminum and iron). Although the dissolved levels are low during the freshet flows due to snow melt water dilution, the increased flow causes sediments to become disturbed increasing particulate levels in the water and, as a result, raising total metals levels. This is most pronounced near the beginning of the freshet when the fine sediments that accumulated during the relatively quiet winter flows are first disturbed.

Water quality along the proposed rail route between the proposed mine site and Minaret has not been characterized, but is expected to display similar seasonal characteristics to that in the proposed mine area. Detailed information about water quality is considered important to evaluate baseline aquatic conditions (including fisheries and aquatic life) along the transportation routes, although the potential effects will be mainly during the construction phase when it can be managed. Fish habitat and water quality assessments will include baseline turbidity conditions. Water chemistry will be documented at key locations along the transportation routes, and mitigation strategies will be developed to protect water quality.

Project work will include collection of additional data related to baseline levels of metals, such as selenium and mercury, in tissues of periphtyon and benthic invertebrates, and of metals and polycyclic aromatic hydrocarbons (PAHs) in fish tissue to evaluate potential bioaccumulation and to support the ecological risk assessment. To accomplish this, supporting environmental data are required for water quality, sediment, periphyton and benthic invertebrates at selected sites within the proposed mine area. In addition, baseline water chemistry, including dissolved and total metals, will be characterized along the transportation routes (existing road and proposed railway).

7.5 Geochemistry

Based on work conducted to date on rock samples, an acid rock drainage problem is not anticipated. Potential acid-producing material was identified in some seam-edge samples associated with various coal seams. The amount of the potential acid-producing material was a small percentage of the total material mined and, if mixed, should be neutralized by the alkalinity in the surrounding rock material.

The potential for ML/ARD was assessed using 141 core analyses from the Gulf studies of the 1980s and 174 core and existing coal waste samples from recent investigations.

The salient conclusions and observations presented with regard to ML/ARD potential can be summarized as follows:

- The overall neutralization potential ratio (NPR) for the entire mine rock volume is considered net acid neutralizing as per British Columbia criteria. This calculation is considered conservative and effectively incorporates a margin of safety relative to the overweighting of PAG material.
- Five of the 174 recent samples had an acidic paste pH (pH less than 6). Of these, four represented “weathered” core that had been generated in the 1980s, the fifth result was considered “possibly erroneous”.
- Although half of the 16 humidity cell tests were predicted to generate acidic conditions based on acid-base accounting (ABA) results, none did so over the 65-week testing program. Extrapolations of reaction rates indicated that between 1 and 10 years would be required before acidic conditions would develop in the test cells.
- No visible staining suggestive of ARD was observed on site and the hydrochemical evidence (on-site water quality sample testing) do not suggest ARD, despite the presence of potential net acid generating mine wastes that have been exposed for over two decades. The water quality results indicated no change in water quality that could be unequivocally attributed to sulphide oxidation from upgradient to downgradient of the coal-wash rejects (which the ABA results suggest could be net acid generating)
- The humidity cell test results indicated that metal leaching was generally low; however, cobalt, manganese, molybdenum, nickel, selenium and zinc were identified as metals that might leach under neutral pH conditions. The on-site water quality sampling also suggests that the leachability of the material in the coal-wash rejects is limited.

These results suggest that the overall ARD potential of the mine rock at the mine site is low to very low. The paste pH, humidity cell, on-site water quality and visual evidence suggests lag times of at least two decades or more with the humidity cell tests suggesting lag times would be in the order of 10 to 100 years for the small percentage of the total material to be mined. Volume estimates of PAG material to actually be mined will be determined.

Given the general lack of reactivity, acid generation occurring after these lag times would be expected to occur as a gradual process rather than a dramatic and sudden onset of acidic conditions, if acid conditions did develop in the long term. This gradual nature of the acid generation

implies that neutralization reactions would likely have enough opportunity to neutralize localized acid generation. In addition, reduction of seepage quantities through use of standard engineering practices such as use of covers and other forms of water management aimed at minimizing infiltration into mine rock would further enhance the interaction between neutralizing minerals and localized acidic solutions. The occurrence of localized acid generation cannot be ruled out based on the current evidence, but if this happens, it is anticipated that the available neutralization potential is enough to counteract it.

A site specific ML/ARD management plan will be developed based on geochemical modeling of leaching characteristics of the mine rock storage facilities, pit walls and other disturbed material. The management plan will be in accordance with common practices that have been presented by the MEM specifically as outlined in *Guidelines For Metal Leaching and Acid Rock Drainage at Minesites in British Columbia* (Price and Errington 1998) and *Policy for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia* (MEM 1998). Potential ML/ARD mitigation strategies that may be employed for the Project include: 1) blending of PAG and acid-neutralizing materials if the PAG material is in very low concentrations/volumes, and 2) segregation of PAG material from non-PAG material within a facility whereby drainage waters can be managed.

In response to the uncertainty of test results relative to actual field performance, further field testing will be undertaken of controlled cells exposed to ambient field conditions (rain, snow, temperatures). The cells comprise mine rock from historical mining and collection of meteoric water that collects at the bottom of the cells. Mine rock samples will be obtained by correlating the geologic block model (indicating which waste rock formations will actually be mined) with existing rock samples and samples yet to be collected from those projected mined formations. The water is also tested for evidence of acidity and metal leaching.

7.6 Atmospheric Resources

The atmospheric resources at the proposed mine site and along the transportation route are considered very good due to the lack of industrial activity in the area and the remoteness of the site. There are existing emissions from a well-used public access gravel road and many multiyear established camps, but these are considered minor. Occasional forest fires in the region temporarily degrade air quality during the fires. In the vicinity of Minaret siding, forestry operations have occurred in the past with clear cuts, roads, some bridge and log storage yards. At the time of writing, these operations had not operated for several years, but could be restarted in the future. A couple of seasonal fishing lodges are located about 10 kilometres southeast of Minaret but are not considered to have a significant effect on air quality.

Air quality can be described in terms of its gaseous components and the amount of particulate matter (PM), or dust, that it contains. The gaseous compounds in the ambient air at the mine site are in the ranges that are typical for a remote area that is generally not influenced by human activities.

Mining generates dust as a result of blasting, moving of materials, rock crushing and movement of equipment; therefore, the baseline environmental studies have included monitoring of dust deposition. Three dustfall stations were established in 2005, one at the proposed mine site and two

along the existing access road. In 2006, another five stations were added, three along Highway 37, one in the Klappan River-Nass Lake area and one in the Bell-Irving River valley. Dustfall data had also been collected in and around the proposed mine site between 1984 and 1986. In addition, total suspended particulate (TSP) concentrations were measured weekly during the summer of 1984.

The key atmospheric resources issue to be addressed during project planning will be to estimate the air emissions from the various activities and transportation route and their effect on potential human and ecological receptors. Pending discussions with regulatory agencies and other groups, an air dispersion model may be considered to estimate the dispersion of the air emissions.

Potential mitigation measures may include storage of coal product in silos, point source control measures (e.g., bag houses), wetting of haulage routes, and use of a thin polymer film on coal cars.

7.7 Noise

Although baseline noise studies have not been conducted, given the remote location of the project site, the acoustic environment is assumed to be consistent with that of quiet rural areas described in the British Columbia Oil and Gas Commission (OGC) *Noise Control Guideline* (OGC 2009); that is, areas with low dwelling density and away from heavily travelled roadways. The ambient sound levels will generally be affected by animal and insect activity as well as atmospheric and ground conditions along with recreational human activities associated with the public access road, camps, etc. Sound levels will have seasonal variability.

In regard to the noise impact assessment, the key issues that will be addressed during the planning stage will involve the identification of the key noise sensitive receptors and performing sound level predictions for these receptors for different project phases or activities such as construction, mine operations and railway traffic. The noise emissions from different activities will be quantified and the resulting receptor sound levels calculated using appropriate environmental noise prediction methods. The results from noise predictions will be used to assess the effects on human and wildlife receptors. The receptors will be identified in consultation with Aboriginal groups, agencies, area residents and other resource users and will comprise both human receptors such as permanent and temporary dwellings, hunting and trapping cabins, fishing lodges as well as wildlife receptors such as sensitive or important habitat areas. Attention will also be paid to potential effects of noise on Spatsizi Plateau Wilderness Provincial Park.

7.8 Fisheries and Aquatic Resources

Baseline conditions for aquatic resources assessed in 2005 and 2006 for watercourses in the vicinity of the proposed mine, included studies of sediment quality, periphyton, benthic invertebrates, fish habitat, and the fish community.

In sediment samples from streams in the vicinity of the proposed mine, no concentrations exceeded the Probable Effects Levels for the protection of freshwater aquatic life (RTEC 2008g). However, concentrations of chromium and copper were generally elevated above the interim sediment quality guidelines, while nickel was above Severe Effects Levels (RTEC 2008g).

Periphyton generally had the highest biomass, richness, and diversity at sites in the Spatsizi River watershed, compared to other streams in the proposed mine area. At most of the sites sampled, the blue-green alga *Homoeothrix* was the predominant organism. Benthic invertebrate communities contained predominantly dipterans (*Chironomidae*) and mayflies (*Ephemeroptera*). Density was highest at a site located in the Nass River watershed, while richness and diversity were greatest at sites in the Didene Creek watershed.

Fish habitat, according to the *Fisheries Act*¸ is defined as spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes. These are aquatic environments that directly or indirectly support fish populations that sustain, or have the potential to sustain, subsistence, commercial or recreational fishing activities. Fish are defined as shellfish, crustaceans, marine animals, the eggs, sperm, spat and juvenile stages of fish, shellfish, crustaceans, and marine animals.

Fish habitat in the vicinity of the proposed mine is predominantly riffle and cascade, with cobbles and boulders the dominant substrates. Boulders and overhanging cover provided the majority of instream cover, while riparian cover was almost exclusively restricted to the banks rather than the canopy. Fish presence was assessed at 30 sites in the proposed mine area, and 8 species were captured at 13 of these sites, 2 of which are blue-listed in British Columbia.

There are no *Species at Risk Act* (SARA)-listed fish species within the area of the proposed mine; therefore, none of the captured fish species are SARA-listed species. The most common species captured was mountain whitefish, followed by rainbow trout, bull trout (blue-listed), burbot, Arctic grayling, Dolly Varden, cutthroat trout (blue-listed) and longnose sucker. Both Dolly Varden and bull trout were captured in the Little Klappan and Spatsizi rivers. No fish were captured upstream of the Didene Creek waterfall located one kilometre upstream of its confluence with the Spatsizi River. Fox Creek and the majority of Didene Creek are, therefore, considered non-fish-bearing. Although no SARA-listed species have been identified within the area of the proposed mine the AAJV has initiated and will continue more detailed field studies to determine if any SARA-listed species are present within the study area. Appropriate Best Management Practices will be implemented to minimize risk to any critical habitat if identified.

The proposed rail route crosses numerous tributaries ranging in size from small, high-gradient non-fish-bearing streams to rivers, such as the Kluatantan with high quality fish habitat and populations. Approximately 250 stream crossings have been identified for the rail line. Since most of the proposed railway will be constructed on existing rail bed, most of these streams have already been crossed. In these areas the focus of study will be on the potential for these existing crossings to act as fish migration barriers and on potential for mitigation strategies. In the 23-kilometre section where the rail bed has not been constructed, the focus will be on assessing the streams for fish habitat. Some information about habitat quality and fish presence in these watercourses is available in government databases, historical surveys and the Skeena Fisheries Commission database.

The key issues to be addressed in project planning are characterization of fish habitat and fish presence at crossings along the proposed rail transport route, and defining mitigation measures to protect fish and fish habitat from runoff, spills and other construction or mine operation activities. This

site-specific information will be used as input to route selection, mitigations and habitat compensation plans, as well as the effects assessment. An Environmental Management Plan will be developed to identify locations in the proposed mine area and situations where mitigation measures are required to protect fish and fish habitat. The plan will include details on erosion and sediment control, construction monitoring, water quality monitoring, and actions to take if there are spills, elevated turbidity levels or other issues. The plans will cover the construction, operation and decommissioning phases of the Project. Another issue affecting fish in Didene Creek may be a proposed earthen diversion ditch that is proposed to be constructed from the creek connecting to a back-water pool (slip) outside the creek that would provide water to the site on an as-needed basis when Didene Creek is ice-free.

7.9 Vegetation

The proposed mine site and existing road access route are located in the Boreal Mountains and Plateaus Ecoregion which is a complex of rugged mountains and intervening lowlands, and rolling, high plateaus. More specifically, the mine site is located in the Southern Boreal Plateau Ecosection of this ecoregion. Within this ecosection, the boreal white and black spruce forests grow in the large wide valley bottoms, black spruce grows commonly around wetlands and muskeg, and white spruce grows on the deeper alluvial soils. The lower to mid-slopes of the mountains are dominated by scrubby spruce-willow-birch forests. Extensive boreal altai fescue alpine vegetation occurs on the upper slopes and mountain-tops, but at higher elevations barren rock is abundant. Alpine vegetation is extensive and dominated by grass above the tree line, but at higher elevations barren rock fields are the most common (MOE 2012). Southwest of the proposed mine site, the regional study area extends into the Skeena Mountains Ecoregion.

Southward from the proposed mine site, the proposed railway crosses from the Boreal Mountains & Plateaus Ecosection into the Omineca Mountains Ecoregion (MOE 2012) which consists of several dominantly rounded, isolated mountain ranges that build in height from the south to north with wide valleys often separating these ranges. More specifically, the ecosystem subdivision into which the railway passes from the north is the Eastern Skeena Mountains Ecoregion which has a wide valley in the centre that is surrounded by high isolated and often rugged mountain ranges. Sub-boreal spruce forests dominate the valley bottoms and lower mountain slopes while Engelmann spruce-subalpine fir forests occur in the mid-slopes. Boreal altai fescue alpine vegetation occurs on the upper slopes and ridges, while at high elevations barren rock is abundant. The current pine beetle epidemic has hit most the lodgepole pine stands within this ecosection.

The regional study area lies within ten biogeoclimatic units. The boreal alpine altai fescue undifferentiated/parkland subzones (BAFAun/unp) cover the largest extent of the regional study area, while the next largest subzone is the lower elevation boreal white and black spruce dry cool subzone–Stikine variant (BWBSdk1). Within the terrestrial ecosystem mapping (TEM) area of the local landscape, the spruce willow birch moist cool scrub subzone (SWBmks) covers the largest area.

Two small blue-listed ecological communities were identified; one near the sources of the Nass and Klappan Rivers and one near the proposed mine (RTEC 2008). The BC CDC currently identifies 62 blue- or red-listed ecological communities that have the possibility of occurring in the Cassiar portion of the Skeena-Stikine Forest District. Of this total, 26 blue- or red-listed ecological communities are associated with the biogeoclimatic units found in the project regional study area.

The BC CDC tracks 147 vascular and non-vascular plants in the Cassiar portion of the Skeena-Stikine Forest District. Previous baseline studies identified nine rare plant species at 23 locations. Some species were confirmed by the CDC as "listed species" or "likely listed species." The blue-listed species, Arctic rush (*Juncus arcticus* ssp. *alaskanus*), was identified at 13 locations, while blue-listed species, Arctic wood-rush (*Luzula nivalis*), umbellate starwort (*Stellaria umbellata*), western Jacob's-ladder (*Polemonium occidentale* ssp. *occidentale*), and elegant cinquefoil (*Potentilla elegans*) were identified at single locations. Gentian Botanical Research (2005) identified four species within the study area for a different project. Blue-listed species alpine draba (*Draba alpina*) and Hudson Bay sedge (*Carex heleonastes*) were each identified at single locations, while the red-listed spoon-shaped moonwort (*Botrychium spathulatum*) and blue-listed Enander's sedge (*Carex lenticularis* var. *dolia*) were each identified at two locations. No plants tracked by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) were identified (RTEC 2008).

7.10 Wildlife

Although winter use of the study area may be limited for many species of wildlife due to deep snow and harsh conditions, a broad range of species are known or expected to use habitat in the area. Comprehensive wildlife surveys in the study area between 2005 and 2008 form the basis for the descriptions below characterizing the wildlife of the proposed mine area.

The railway corridor runs along river valleys in mountainous terrain, characterized by coniferous forests with some areas of mixed wood and deciduous forest. The watercourses it crosses and wetlands it passes by are expected to provide high quality habitat for many species of wildlife.

Four potential project effects on wildlife have been identified:

- Change in habitat as a result of loss or alteration
- Change in movement as a result of habitat fragmentation, barriers, and sensory effects
- Change in mortality risk due to vehicle collisions, vegetation clearing and site development, or increased area access for hunters
- Change in animal health as a result of changes to air, water, or food sources

A comprehensive Wildlife Management Plan will be developed and implemented addressing mitigation measures for wildlife that could be effected by the mine or rail line.

7.10.1 Ungulates

Woodland caribou (northern mountain ecotype; *Rangifer tarandus*), mountain goat (*Oreamnos americanus*), Stone's sheep (*Ovis dalli stonei*) and moose (*Alces alces*) have been observed within

or near the proposed mine and existing road access area (Rescan 2008a, 2009). Mule deer (*Odocoileus hemionus*) may also occur in suitable habitat (i.e., abundant shrubby browse) in the area as three individuals were observed adjacent to Ealue Lake road during winter aerial surveys (Rescan 2008a). Similar species are anticipated along the proposed railway corridor. Of these ungulates, caribou are of conservation concern at both the federal (special concern on SARA Schedule 1; SRPR 2012) and provincial (blue-listed; MOE 2012) levels. The caribou belong to the Spatsizi herd, which has a population of approximately 3000 (Environment Canada 2012). Based on collared caribou studies conducted 30 years ago (Hatler 1986), caribou in the Spatsizi herd tend to concentrate in early winter in the north of Spatsizi Plateau Wilderness Provincial Park (north of Eaglenest Range and Gladys Lake Ecological Reserve, which is greater than 30 kilometres from the project area). Extreme snow depths are expected to limit use of the project area for ungulates during the winter. Although widely dispersed, caribou calving areas are likely to occur in the project area (Hatler 1986). In this study, calving areas were identified in drainages of the Nass, Skeena, and Spatsizi Rivers, as well as the west side of the Klappan River.

Woodland caribou (Special Concern on SARA Schedule 1; SRPR 2012; blue-listed; MOE 2012) is the one federally or provincially listed ungulate species that occurs at in the general vicinity of the Project.

7.10.2 Large Carnivores

Several large carnivores are known to occur within or close to the study area, including grizzly bear (*Ursus arctos*), black bear (*Ursus americanus*), grey wolf (*Canis lupus*) and red fox (*Canis vulpes*) (Rescan 2007, 2008a). The project area intersects two grizzly bear population units, the Spatsizi and Finlay-Ospika. Grizzly bears are listed as special concern by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (SRPR 2012) and are blue-listed in British Columbia (MOE 2012). Cougar (*Puma concolor*) and Canada lynx (*Lynx candensis*) and possibly coyote (*Canis latrans*) are expected to occur at low densities (E-Fauna BC 2012). Predators are expected to den in the study area as well as forage and raise their young.

7.10.3 Small Mammals

The occurrence of mustelids, or weasels, in the study area was been studied in the previous work in the proposed mine site area. One wolverine (*Gulo gulo*; blue-listed in BC (MOE 2012)) was recorded incidentally during ungulate surveys (Rescan 2008a). The following mustelids are also expected to occur in suitable habitat within the study area: American marten (*Martes americana*), fisher (*Martes pennant*—blue-listed in BC), ermine (*Mustela erminea*), least weasel (*Mustela nivalis*), American mink (*Neovision vision*) and river otter (*Lontra canadensis*) (Eder and Pattie 2001; E-Fauna BC 2012).

Groundhogs, including hoary marmot (*Marmota caligata*) and arctic ground squirrel (*Spermophilus parryii*) have been identified by the Tahltan as a valued resource as a traditional food source. Both have been subject of study in the proposed mine area (Rescan 2010). A number of other small mammals, such as muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), porcupine (*Erethizon dorsatum*), snowshoe hare (*Lepus americanus*), red squirrel (*Tamiascurius hudsonicus*), nearctic

brown lemming (*Lemmus trimucronatus)* and a variety of mice, voles and shrews are also expected to occur. No identified species of small mammals have been identified as being of conservation concern.

Public inventory information for bats is lacking within northwestern British Columbia. Surveys at lower elevations along the Bell-Irving River (Rescan 2008c) resulted in the capture of two bats, likely western long-eared myotis (*Myotis eyotis*), and the detection of another two species, likely little brown myotis (*Myotis lucifugus;* endangered by COSEWIC; SRPR 2012)) and silver-haired bat (*Lasionycteris notivagans*). It is also possible that the red-listed Keen's Long-eared myotis (*Myotis keenii;* also special concern on SARA Schedule 3), big brown bat (*Eptesicus fuscus*) and the long-legged bat (*Myotis volans*) occur in the area. The probability of bats occurring in areas of high elevation in the proposed mine area is low, but bats may occur during spring, summer and fall in areas with mature or old-growth forest with adjacent suitable foraging areas. Long-eared myotis, little brown myotis, long-legged bat and silver-haired bat are expected to occur in appropriate habitats along the railway corridor (Nagorsen and Brigham 1993; Eder and Pattie 2001). Keen's Long-eared Myotis is possible, but unlikely to occur along the railway corridor (Nagorsen and Brigham 1993; COSEWIC 2003).

7.10.4 Birds

A wide range of birds, both year-round residents and migratory species, including waterfowl, raptors and songbirds, occur in the project area. Two regulations are applicable to the protection of birds and their nests and eggs; the federal *Migratory Birds Convention Act* and the BC *Wildlife Act*. Birds covered under the *Migratory Birds Convention Act* with the possibility of occurring in the project area include:

- Waterfowl (e.g., ducks, geese and swans)
- Herons, cranes, rails and coots
- Shorebirds (e.g., plovers and sandpipers)
- Nighthawks, swallows and swifts
- Woodpeckers and hummingbirds
- Most songbirds (e.g., warblers, sparrows, flycatchers, and thrushes)

Birds not covered under the *Migratory Birds Convention Act Migratory Birds Convention Act* but covered under the BC *Wildlife Act* include grouse, quail, pheasants, ptarmigan, hawks, owls, eagles, falcons, cormorants, pelicans, kingfishers, crows, jays and blackbirds. Most of the species not covered under the *Migratory Birds Convention Act* are, however, covered under the BC *Wildlife Act*. Species not covered under either *Act*, and possibly occurring in the project area, include: common raven, American crow, black-billed magpie, European starling, house sparrow, rock pigeon, and brown-headed cowbird.

Site clearing is the primary effect mechanism in the loss of migratory bird habitat, as the direct result of vegetation removal and site disturbance. The effect begins at construction but will be evident in

the Project. Construction, operations and project-related traffic are also expected to affect habitat availability to some extent, but indirectly as the result of sensory disturbance (primarily noise). The indirect effects during operations are likely to be more pronounced than those during other phases given the larger scale and more prolonged time frame.

Mitigation measures to reduce mortality risk from site clearing include:

- Managing the incremental clearing of vegetation so that this activity occurs outside of the critical timing window for migratory birds (May 1 to July 31; BC MFLNRO 2011)
- If vegetation clearing during the critical timing window is unavoidable, a risk management strategy will be implemented to address the effects on migratory birds that may be nesting in the area.

Wetlands along the existing access road and proposed railway corridor are expected to support breeding and migratory waterfowl and other water bird species, The proposed mine site itself supports little habitat for waterfowl, although dabbling ducks and harlequin duck were observed in 2005 (RTEC 2007).

Spring migration surveys identified 14 species of waterfowl in the region (RTEC 2007), including species of conservation concern along the existing access road and proposed mine site:

- Surf scoter (*Melanitta perspicillata*)—blue-listed (MOE 2012)
- American bittern (*Botaurus lentiginosus*)—blue-listed (MOE 2012)
- Harlequin duck (*Histrionicus histrionicus*)—Conservation Framework rank 1 (MOE 2012)
- Barrow's goldeneye (*Bucephala islandica*)—Conservation Framework rank 1 (MOE 2012)

Several raptor species are likely to occur within suitable habitat along the access route, railway corridor and proposed mine site. Species of conservation concern (MOE 2012) include:

- Peregrine falcon (*Falco peregrinus*)—Pealei subspecies Special Concern on Schedule 1 of SARA and blue-listed and Anatum subspecies Threatened on Schedule 1 of SARA and red-listed
- Rough-legged hawk (*Buteo lagopus*)—blue-listed
- Gyrfalcon (*Falco rusticolus*)—blue-listed
- Short-eared owl (*Asio flammeus*)—Special Concern on Schedule 1 of SARA and blue-listed
- Swainson's hawk (*Buteo swainsoni*)—red-listed

Migratory species occur in the project area, particularly those that use high elevation habitats and coniferous forests. Breeding bird surveys conducted in 2005 and 2006 (RTEC 2007) identified 42 species in the SWBmk subzone and 20 species in the BAFA zone. Species of conservation concern expected to occur along the access road, railway corridor or mine site include:

- Olive-sided flycatcher (*Contopus cooperi*)—Threatened on Schedule 1 of SARA and blue-listed
- Common nighthawk (*Chordeiles minor*)—Threatened on Schedule 1 of SARA and blue-listed
- Barn swallow (*Hirundo rustica*)—Threatened (designated by COSEWIC) and blue-listed
- Rusty blackbird (*Euphagus carolinus*)—Special Concern on Schedule 1 of SARA and blue-listed

Based on breeding bird surveys in 2005 and 2006, the most common species in the SWBmk subzone were golden-crowned sparrow (*Zonotrichia atricapilla*), American tree sparrow (*Spizella arborea*), savannah sparrow (*Passerculus sandwichensis*) and Wilson's warbler (*Cardellina pusilla*). Olive-sided flycatcher was observed in SWB. The most common species in the BAFA region included American pipit (*Anthus rubescens*), horned lark (*Eremophila alpestris*), savannah sparrow, semipalmated plover (*Charadrius semipalmatus*) and Wilson's warbler. Rusty blackbird may occur in suitable wetlands in the lower elevations, such as along the access route or railway corridor. Common nighthawk may occur in areas of open habitat (COSEWIC 2007).

Other species of interest to hunters that likely occur in the project area are dusky grouse (*Dendragapus obscurus*), ruffed grouse (*Bonasa umbellus*), spruce grouse (*Falcipennis canadensis*), rock ptarmigan (*Lagopus muta*), white-tailed ptarmigan (*Lagopus leucura*) and willow ptarmigan (*Lagopus lagopus)* (MOE 2012). Dusky grouse, ruffed grouse, and rock ptarmigan and willow ptarmigan were observed during surveys in 2005 and 2006 (RTEC 2007).

7.10.5 Amphibians and Reptiles

Several species of amphibians and reptiles (known collectively as herptiles) could occur within suitable wetland and pond habitats in the project area, including wood frog (*Lithobates sylvaticus*), Columbia spotted frog (*Rana luteiventris*), western toad (*Anaxyrus boreas*), long-toed salamander (*Ambystoma macrodactylum*) and common garter snake (*Thamnophis sirtalis*). Western toad is designated as Special Concern on Schedule 1 of SARA and blue-listed (MOE 2012).

7.10.6 Butterflies

In response to a concern expressed by a member of the public with knowledge of butterflies, a study was undertaken in the vicinity of the proposed mine and existing road access for a blue listed subspecies of the Western Meadow Fritillary (*Clossiana epithore sigridae*) (RTEC 2008b). Overall, butterflies were not abundant in the areas surveyed; however, *C.e. sigridae* made up almost half of the butterflies sighted and a second blue listed subspecies of the Margined White (*Pieris marginalis guppyi*) made up most of the rest. These butterflies were generally observed in wet areas of bunch grass, sphagnum, and a characteristic group of food/indicator plant species including violet (*Viola* sp.), monkshood (*Aconitum* sp.) and mountain dandelion (*Agoseris aurantiaca*). These and similar areas were identified as good habitat for *C.e. sigridae,* and occur in valley bottoms in the area, particularly in areas of disturbance, such as adjacent to the rail bed. Low abundance of butterflies may be a feature of the area, perhaps due to unsuitable habitat including overall climate conditions. The abundance of butterflies can also be affected by annual or seasonal weather variations.

8 HUMAN ENVIRONMENT SETTING

The Project is located in an area that is largely wilderness and that has experienced little prior resource development. Land and resource use studies are required because of the potential for project-related interactions with other existing or proposed land and resource uses and tenure holders within or near the project mine site footprint or coal transportation corridor.

Potential issues with respect to the land tenure, land and resource use could include, but are not limited to:

- Effects on access to resources that are important to other tenure holders or land users
- Effects on resources that are important to other tenure holders or land users
- Changing the quality of a resource or land use activity that is important to other tenures

Previously identified Aboriginal and non-aboriginal land use activities within the project area include: hunting, trapping, guide outfitting, guided angling, wilderness-based tourism and recreation, and mineral and placer exploration. No commercial forestry or ranching and agriculture are located in the vicinity of the proposed mine, nor are there industrial facilities or commercial development. Several residents of Iskut have camps in the Klappan valley and a traditional camp for teaching Tahltan ways is located near the confluence of the Klappan and Little Klappan Rivers. One camp is located within the mine licence boundaries, while a cabin is located less than one kilometre north, along the Little Klappan River valley (Rescan 2008). Two cabins associated with registered trapline TR616T011 are located in the area, one located 16 kilometres southeast of the mine near the confluence of the Skeena River and Garner Creek, and the other located 32 kilometres southeast of the mine site near the confluence of the Skeena River and Otsi Creek (Rescan 2008). The Steelhead Valhalla Lodge is located on the north bank of the Sustut River about one kilometre south of Minaret.

The existing access road, which uses the British Columbia railway bed constructed in the 1970s, is the primary access route for the Spatsizi Plateau Wilderness Provincial Park, which is located north of the licence area.

The existing access road and the proposed mine area are within the Klappan Zone of the Cassiar-Iskut-Stikine LRMP. This zone is recognized as being ecologically sensitive, of high cultural significance to the Tahltan people, and containing high timber and coal values. The Cassiar-Iskut LRMP identifies the following values and activities within the Klappan Zone:

- Functional habitat for multiple species of the Spatsizi predator-prey system
- Tahltan cultural heritage values
- Visual quality from the rail grade, the Klappan River and other important viewpoints
- River recreation, including rafting
- Mineral and coal exploration and development
- Timber harvesting (not allowed in Little Klappan drainage and deferred from 2000 to 2015 in the greater Klappan drainage

The Cassiar-Iskut-Stikine LRMP supports mineral exploration and development within the Klappan Zone, subject to standard regulatory approval process and consistent with the general management direction for management direction for mineral and energy resources.

The proposed partially completed coal haul route a railway north from Minaret siding was originally intended to haul minerals from northwest British Columbia, and facilitated logging development in the Skeena-Sustut River valley. Aboriginal groups also use land around the rail line for harvesting activities. Activities by stakeholders in the area include wilderness recreation and mineral exploration.

Most of the rail corridor between the mine site and Minaret is located within the Fort St. James LRMP. Within this LRMP, the corridor passes through or is adjacent to four resource management zones (RMZs), which are, from north to south, Groundhog, Skeena, Sustut, and Lower Sustut RMZs. The Groundhog and Skeena RMZs are remote areas, which are managed generally for a wide variety of resource values. Access for resource extraction is to be coordinated to maintain integrity of fish, wildlife, water quality, remote recreation, local community interests, and tourism. Management objectives within the Sustut and Lower Sustut RMZs emphasize their significant fish tourism and recreation values, in particular the Sustut River, recognized for its world class steelhead fishing, but the significance of these RMZs as resource transportation corridors is also recognized.

There are no federal lands near or potentially affected by the Project. The nearest federal land to the proposed mine site is Iskut IR #6, located at Iskut, approximately 90 kilometres north-northwest of the proposed mine site. The nearest federal land to the proposed railway is Bear River IR# 3, approximately 20 kilometres east of Minaret along the existing, operating BCR/CNR railway.

Stakeholders will be identified to provide information and perspective with respect to potential project effects and mitigation measures. Collection of information will involve interviews with forest tenure holders, discussions with tourism and recreational operators regarding potential effects on operations and revenue, interviews with oil and gas licence holders (there is currently a moratorium placed on Coal-Bed Methane development in the region) regarding access and cost implications, and interviews with trappers and guide-outfitters regarding potential project effects. Both structured and unstructured interviews will be conducted to understand the nature and extent of land use within the study area. Interviews may also be conducted opportunistically with individuals encountered during the visual quality assessment. The intent of these interviews would be to identify potential land and resource use issues as associated with the Project from the perspective of non-traditional use. This work is not intended to replace a traditional use study, and would be undertaken in coordination with public consultation efforts for the Project.

8.1 Traditional Knowledge and Traditional Land Use

8.1.1 Previous Studies

Rescan (2008) conducted a preliminary traditional knowledge study with several elders from Iskut regarding the mine site that focused on wildlife. Further traditional knowledge research is considered to be required to reach more Tahltan people and include other aspects, such as important sites. In

addition, at the time of the research, the Project did not include the proposed rail transportation route.

A Tahltan Use Study, undertaken by the Heritage Department of the TCC in 2007, funded under agreement with Fortune, identified land use values in the Klappan Valley area. This study will also require further investigation.

Project-specific Gitxsan traditional ecological knowledge and land use information has not yet been obtained for the Upper Skeena and Sustut territories along the proposed rail line.

8.1.2 Proposed Studies

The AAJV recognizes the importance of collecting and incorporating information regarding the potential effects of the Project on the traditional territories and the ecological, cultural and spiritual health of Aboriginal groups in the area. For this reason, the AAJV will either undertake or support TK and traditional land use (TLU) studies for the affected Aboriginal groups.

The AAJV understands that the Tahltan Nation would prefer to undertake its own studies, supported by funding from the AAJV. The 2008 Rescan report referenced above would be made available to the researchers for their use and verification.

The AAJV will also support TK/TLU studies with the Gitxsan Nation in the manner sensitive to (or consistent with) how they would prefer them conducted. This work will include a review of existing information held by these groups, interviews to collect project specific information relevant to the environmental assessment processes and verification of information provided.

The proposed reclamation plan and the end land use objectives developed for the site will be described in terms consistent with traditional knowledge of animal movement and use patterns, and the connectivity of the landscape.

8.2 Socio-Cultural and Economic Setting

There are communities and groups that could potentially experience socio-cultural or economic effects associated with the Project based on their proximity to it and their role in project development and operations. This is related to three considerations:

- Some Aboriginal groups with interests in the Project are members of the communities
- Residents' activities or well-being is dependent on the quality of the biophysical environment in the vicinity of the project components
- The communities are likely to provide labour or goods and services for the Project

Socio-cultural and economic assessment is used to identify and evaluate the potential socio-cultural and economic effects of the proposed project on the lives and circumstances of people, their families, communities, businesses, and/or governments. Mitigation measures to avoid or reduce adverse impacts and enhance positive effects will be developed through consultation with those groups which may be potentially affected. Measures will also be established to manage and monitor the effects and the effectiveness of mitigation measures over time.

8.2.1 Aboriginal Communities

The Aboriginal or largely Aboriginal communities that may potentially experience socio-cultural or economic effect s associated with the mine or rail components of the project include the:

- Tahltan communities of:
  - Iskut (Łuwechōn)
  - Telegraph Creek (Tlēgōhīn)
  - Dease Lake (Tahl'ah)
- Gitxsan communities of:
  - Gitanmaax (Old Hazelton)
  - Kispiox (Anspa'yaxw)
  - Sik-e-dahk (Glen Vowell)
  - Gitwangak (Kitwanga)
  - Gitsegukla (Kitsequecla)
  - Gitanyow (formerly Kitwancool)

The locations of these communities are shown on Figures 11-1 and 11-2. A brief description of each of these communities is provided in the following sections. Many Gitxsan people also live in the largely non-aboriginal communities of Hazelton and New Hazelton. Many Tahltan and Gitxsan people also live outside their traditional territories, in the largely non-aboriginal communities of Stewart, Smithers, Terrace and Prince Rupert and in more distant communities like Vancouver, Prince George and Whitehorse. Additional information on the communities, including refinement of demographic information will be an important part of the environmental assessment.

8.2.1.1 Iskut

Iskut, home to the Iskut First Nation, is a small community of approximately 650 residents (http://www.tahltan.org/nation/territory/communities), mostly members of the Tahltan Nation, located at the 407 kilometre mark on Highway 37, approximately a six- to seven-hour drive north of Terrace and Smithers. Iskut is about 140 kilometres from the proposed mine site via road from Highway 37 and along the Ealue Lake forest service road and the BC Rail railway bed. Schooling is available in Iskut from kindergarten to grade 10. The community has a gas station (with affiliated grocery store and post office), health centre, and volunteer fire hall.

8.2.1.2 Telegraph Creek

Telegraph Creek is another small community in northwestern British Columbia. Approximately 400 people live in Telegraph Creek, of which approximately 350 are of Tahltan ancestry (http://www.tahltan.org/nation/territory/communities). The community of Telegraph Creek is located on the Stikine River, near the end of a 150 kilometre gravel road that connects to Highway 37 at Dease Lake. Although the direct distance to the proposed mine from Telegraph Creek is

approximately 155 kilometres, by road the distance is about 370 kilometres. Schooling is available from kindergarten to grade 10. The community has a gas station (with affiliated grocery store and post office), health centre, and volunteer fire hall. It does not have a police station.

8.2.1.3 Dease Lake

The community of Dease Lake is located about 80 kilometres north of Iskut and approximately 210 kilometres from the proposed mine site by road. The community includes the Dease Lake I.R. 9, which is located 4 kilometres north of the main townsite.

Dease Lake is a government service and supply centre for the northwest region. Schooling is available from kindergarten to grade 12, as well as community college (Northern Lights College). The community has a gas station, grocery store, post office, health centre, police station and fire hall.

Statistics Canada data reports that Dease Lake has a population of 303 people (2011), down from 384 in 2006. However, previous estimates (2006) put the on-and-off reserve population at approximately 450 to 600 people. According the Tahltan Central Council web site, approximately, 475 people live in Dease Lake, of which approximately 45 percent are Tahltan (http://www.tahltan.org/ nation/territory/communities). A local population estimate by the Chief of Tahltan Band in 2007 estimated the on-reserve population at approximately 140 people.

8.2.1.4 Gitanmaax

Gitanmaax consists of approximately 250 housing units situated at the confluence of the Skeena and Bulkley Rivers, approximately 265 kilometres from the coast of British Columbia. It is located between the municipalities of Hazelton and New Hazelton. Schooling is available at the John Field Elementary School and the Gitanmaax School of Northwest Coast Indian Art. Healthcare services are provided through the Gitxsan Health Society.

8.2.1.5 Kispiox

Kispiox is located approximately 32 kilometres north of Gitanmaax at the confluence of the Kispiox and Skeena Rivers. Schooling is available at the Kispiox Elementary School which serves children from nursery school to grade 7. Social development programs are available through the Kispiox Social Development Program (governed by the Gitxsan Social Development Policy of 1996). Wilps Majagalee (house of flowers) Kispiox Drop-In Centre provides recreational programs and traditional and cultural activities for children and youth. Healthcare services are provided through the Gitxsan Health Society. The local economy is primarily driven by Anspayaxw Developments Ltd. which operates a range of economic opportunities including the local gas bar, government contracts related to logging, tree planting, GPS surveys, infrastructure-related projects, and acts on the lead proponent for Forest Renewal BC work such as watershed restoration projects. Skeena Eco-Expeditions, a tourism company staffed by Gitxsan, offers adventure trips to tourists.

8.2.1.6 Sik-e-dahk (Glen Vowell)

Sik-e-dahk is a small community located between Kispiox and Gitanmaax on the Skeena River. Schooling is available to community members off site. There is a fire hall located on site and a police detachment located off site. Healthcare services are provided through the Gitxsan Health Society.

8.2.1.7 Gitsegukla (Kitsequecla)

Gitsegukla is located along the Skeena River Valley at the confluence of the Gitsegukla and Skeena Rivers, approximately 40 kilometres southwest of Hazelton. There is an elementary school in the community. Health services are provided at the Gitsegukla Health Center. The community has a fire hall.

8.2.1.8 Gitwangak (Kitwanga)

Gitwangak or Kitwanga is the southwestern-most Gitxsan village on the Skeena River, approximately 241 kilometres from the British Columbia coast. The village itself lies on the northern bank of the Skeena River about 3 kilometres from the National Historic Site of Taawdzep or Gitwangak Battle Hill (formerly Kitwanga Fort). The Gitwangak Education Society provides a number of services including running a Wilp school and daycare, post-secondary support, youth program and teaching life skills. Health services are provided by the Gitwangak Health Station. The community is served by a volunteer fire department.

8.2.1.9 Gitanyow (formerly Kitwancool)

Gitanyow is located just off of the Highway 37, about 20 kilometres north Gitwangak. The Gitanyow Fisheries Authority is the technical arm of the Gitanyow Hereditary Chiefs, and provides fisheries, wildlife and overall environmental expertise and services. The local economy is reliant on fisheries and forestry products. Gitanyow Human Services, a branch of the Gitanyow Band Council, delivers community health programs. Gitanyow Human Services is governed by a health board which consists of a representative from each of the four traditional Gitanyow Clans: Wolf, Frog, Grouse and Eagle. The community is served by the Gitanyow Fire Department located in Kitwanga.

8.2.2 Non-Aboriginal Communities

The communities of the Hazeltons, Stewart, Smithers, Terrace and Prince Rupert have been initially identified as secondary study communities for their role as service centres and as potential sources of employment, goods and services for the Project. These communities are considered non-aboriginal communities, although many members of Aboriginal people do live in these communities.

8.2.2.1 The Hazeltons

The Hazeltons are small communities consisting of the Village of Hazelton, District of New Hazelton and South Hazelton. Although the Hazeltons are non-aboriginal communities, geographically they reside within Gitxsan Territory. Approximately 1,100 people live in the Hazeltons. Some members of the Gitxsan Nation live in the Hazeltons in addition to the surrounding Aboriginal communities.

The Hazeltons are located on Highway 16 about 240 kilometres straight line distance from the proposed mine and approximately 60 kilometres northwest of Smithers. The CN Rail main line railway passes through New Hazelton carrying coal from mines in the northeast and southeast of British Columbia to Ridley Terminals near Prince Rupert. Coal from Arctos Anthracite would also follow this route to the terminal.

New Hazelton and Hazelton are the service and commerce centres for the Kispiox Valley north of the communities. They are home to most of the shopping, restaurants and accommodations in the area. Education is available in the communities at the elementary, secondary and community college (Northwest Community College) levels.

8.2.2.2 Stewart

Stewart is a small community located on the northwest coast of British Columbia at the eastern end of the Portland Canal and western end of Highway 37A. Established in 1898, Stewart was settled by gold miners and prospectors and remained a major centre for gold and silver mining until the 1980s. Stewart is home to the northernmost ice-free deep-water port in British Columbia and remains a shipping/sea port town. Stewart is located about 160 kilometres straight-line distance southwest of the proposed mine.

Approximately 500 people live in Stewart. Forestry, shipping, and tourism are the major economic drivers in the town of Stewart. Services in the community include an elementary and secondary school, a health clinic and ambulance detachment, paved runway and helicopter landing pad, arena, RCMP detachment and fire service.

8.2.2.3 Smithers

Smithers is a small town situated in central-western British Columbia on Highway 16 midway between Prince George and Prince Rupert. Smithers is situated on the CN Rail main line described above with respect to the Hazeltons. The straight-line distance between Smithers and the proposed mine is approximately 300 kilometres.

Approximately 5,400 people live in Smithers. The mining and the forest industry are vital to the economy of Smithers and it serves as a regional government services centre. Education is available in the community at the elementary, secondary and community college (Northwest Community College) levels. Smithers has an arena, ski hill, government services, hospital and medical clinic, veterinary clinic, taxi service, parks, fire department and commercial airport.

8.2.2.4 Terrace

Terrace is a small city located on the Skeena River in central-western British Columbia on Highway 16. Terrace is situated on the existing CN Rail main line described above. The straight-line distance between Terrace and the proposed mine is approximately 310 kilometres.

Approximately 11,500 people live in Terrace. Forestry is the mainstay of the area's economy. Terrace is the main hub of northwestern British Columbia describing itself as the "Gateway to the North". Education is available in the community at the elementary, secondary and community college

(Northwest Community College) levels. The community has a commercial airport, newspaper, radio, television station, hospital and other services normally associated with a city its size.

8.2.2.5 Prince Rupert

Prince Rupert is a small city located on the Pacific coast of central British Columbia at the western end of Highway 16. Prince Rupert is the terminus of the CNR main line described above. The straight-line distance between the Prince Rupert and the proposed mine site is approximately 350 kilometres.

Approximately 16,000 people live in Prince Rupert. Its economy is based on the natural deep-water harbour and transshipping terminal (Ridley Terminals), which handles large volumes of freight including grain, lumber, pulp, mineral ore, sulphur and coal destined for international markets. Education is available in the community at the elementary, secondary and community college (Northwest Community College) levels. The community has a commercial airport, international seaport, library, civic centre, aquatic centre, golf course, museum, parks, public transportation and sea ferry.

8.3 Archaeology

Although it was a remote wilderness until the unfinished BCR rail grade opened up the region for vehicle access in the 1970s, the Klappan River valley and its surrounding peaks have long been used for hunting and trapping, and the Klappan-Skeena valley has been an important travel corridor historically used by Aboriginal people.

Aresco Ltd. (1986) conducted an archaeological assessment of the much larger former Gulf Canada coal licence area identifying 17 archaeological sites in that original study area. These sites included historic cabins and prehistoric camp sites, as well as cultural depressions, burial sites, blazed trees and lithic scatters. Of the 17 sites located in Aresco's original study area, 5 of these are located in the proposed mine development area and are described as prehistoric obsidian lithic scatters and artifacts.

During the initial Archaeological Impact Assessment (AIA) for Fortune Minerals during the 2005 to 2006 field seasons by Baseline Consulting, an additional 27 archaeology sites were identified within the proposed mine area. These sites comprised surface and subsurface obsidian lithic scatters, artifacts and debitage. Baseline Consulting recommended further AIA-level work required for the mine site that would include surveys of areas not yet covered, as well as additional shovel and evaluative unit testing at some identified archeological sites. These areas include proposed mine rock storage area, coal processing facilities, and potential areas within the footprint of the proposed open pit mine.

Archaeological surveys (1979 to 1983) in the lower Klappan River valley identified 25 archaeological sites and several large trails. In 2008, Rescan completed an Archaeological Overview Assessment (AOA) and an AIA for Shell Canada's proposed coal bed methane project along the existing road access from Ealue Lake in the north to Beirnes Creek at the Skeena River in the south where the northern section of completed rail bed ends. Several areas of archaeological potential were identified

along the railway bed where AIAs should be carried out if further land disturbance is anticipated. Two new sites were recorded during this 2008 survey and several trails were also observed within the study area as well as 46 historic and recent land use locations along the Klappan River.

The archaeological potential for the 23 kilometre section of the proposed railway where rail bed has not been constructed (from Beirnes Creek south to the Kluatantan River) requires evaluation. The archaeological potential for the transportation corridor areas not surveyed in Rescan's study for Shell will also require evaluation. Particular attention will be required in areas of significant water crossings, such as at the Kluatantan River. Areas of potential impact include the approaches to bridges and stream crossings, and areas where new railbed construction is proposed and other land-altering activities associated within the railway corridor are proposed to take place. The location of the proposed rail load-out below the proposed mine will also need to be studied.

These archaeological studies should involve the participation of local Aboriginal groups.

9 REGULATORY FRAMEWORK

9.1 Environmental Assessment History

Stage I (June 1985) and Stage II (April 1987) environmental assessment reports were submitted by Gulf Canada Resources Limited for review under the former Guidelines for Coal Development. By the mid-1990s, Gulf had completed several iterations of preliminary assessments, pre-feasibility and feasibility studies. Studies included a surface open pit mine, coal processing plant, site infrastructure, a new haul road to Bell 2 on Highway 37 and an upgraded port facility at Stewart. The studies were based on producing four to five coal products for space heating in Europe and Korea and for specialty metallurgical processes.

In 2002, Fortune Coal Limited purchased the coal licences and in September 2004, submitted a Project Description to the EAO that described its plans to produce 1.5 million tonnes per year of anthracite coal and truck it to the Port of Stewart. The Project was called the Mount Klappan Coal Project at that time. The EAO determined that the proposed Project was reviewable under the BCEAA because it would have a production capacity equivalent to or exceeding 250,000 tonnes per year and, in October 2004, issued a Section 10 Order requiring that the proponent receive an environmental assessment certificate (EAC) before proceeding with the Project. A Section 11 Order was issued in October 2006 describing the scope of the environmental assessment and the procedures and methods for conducting the assessment.

Draft Terms of Reference (dTOR) for an EAC under the BCEAA were submitted to the EAO in November 2006. Public comments on the dTOR were received into early 2007. The Project was also subject to the CEAA, but the federal review process was not formally initiated.

Environmental assessment activities were temporarily suspended by Fortune Coal Limited in 2008 when the company decided to modify its mining plans in order to develop more cost-effective and efficient mine and transportation operations. In the ensuing period, Fortune made several key

changes to the Project and created a joint venture with POSCO Klappan Coal Ltd., the AAJV, to develop the Project under the name of the Arctos Anthracite Project. The key changes include increased production rate and railway transportation to the Port of Prince Rupert as opposed to road transportation to the Port of Stewart.

With this Project Description, the AAJV is making a new application to the EAO for an EAC and the CEA Agency for a decision statement on the Project.

9.1.1 Provincial Environmental Assessment Requirements

The proposed mine is anticipated to produce 3 million tonnes per year of anthracite coal, therefore it is assumed the Project will be subject to the BCEAA since this exceeds the BCEAA *Reviewable Projects Regulations* threshold listed in Section (9) Table 6:

- "Coal Mines— (1) A new mine facility that, during operation, will have a production capacity of ≥250,000 tonnes/year of clean coal or raw coal or a combination of both clean coal and raw coal."

9.1.2 Federal Environmental Assessment Requirements

It is anticipated that an environmental assessment pursuant to CEAA will be required as the proposed Project exceeds the thresholds identified in the following Sections of the *Regulations Designating Physical Activities* Section:

- Section 15(d): "The construction, operation, decommissioning and abandonment of a coal mine with a coal production capacity of 3,000 tonnes per day or more."
- Section 28(a): "A railway line more than 32 kilometres in length on a new right of way (ROW)".

Under CEAA (Section 5), the federal environmental assessment process focuses on potential adverse environmental effects that are within federal jurisdiction. Those relevant to the proposed Project include:

- Fish and fish habitat, as defined in the *Fisheries Act* (Section 2 and Subsection 34(1) respectively)
- Aquatic species, as defined in the *Species at Risk Act* (Subsection 2(1))
- Migratory birds, as defined in the *Migratory Birds Convention Act* 1994 (Subsection 2(1))
- Effects that impact on Aboriginal peoples, such as their use of lands and resources for traditional purposes; including effects on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes, or structures, site or thing that is of historical, archaeological, paleontological or architectural significance.
- Changes to the environment that are directly linked to or necessarily incidental to federal decisions about a project

No federal financial support is being requested to allow the project to proceed in whole or in part and no federal lands will be used in carrying out the Project. The closest federal lands to the Project are reserves.

The southern half of the proposed rail extension is located in the asserted traditional territory of the Gitxsan Nation. The reserve closest to the project area associated with the Gitxsan Nation and affiliated with the Kispiox Band is Kuldoe No. 1, is approximately 63 kilometres southwest of Minaret siding and 160 kilometres south-southeast of the proposed mine. Kisgegas Reserve, affiliated with the Gitanmaax Band Council, is about 70 kilometres south of Minaret siding. Both of these reserves are generally not inhabited. The closest populated reserve associated with the Gitxsan Nation is Kispiox No. 1, located approximately 110 kilometres south-southwest of Minaret siding.

Although the proposed mine site is located in the Stikine River headwaters area and the Stikine River ultimately flows across an international boundary (Alaska), no effects assessment under the International Rivers Improvement Act will be undertaken, as the distance from the mine site to the Alaskan border (over 500 kilometres along the river system) precludes any measurable impact to Alaskan waters from the mine.

Section 10 of this document lists possible permits, approvals, or authorizations that will be required for this project, for both federal and provincial agencies.

It is anticipated that under the CEAA 2012 that the Agency will be the lead for the federal environmental assessment process. AAJV has expressed an interest in the EAO formally requesting substitution as per section 32 of CEAA 2012.

9.1.3 Aboriginal Interests

As noted in section 8.2.1, the environmental assessment will include the consideration of potential adverse effects of the proposed mine and new rail line on the interests of potentially affected Aboriginal groups, including the Tahltan Nation, and the Gitxsan Nation, and ways to avoid, mitigate or accommodate such adverse effects.

After the review of this Project Description, it is anticipated that Aboriginal groups will identify their expectations for the assessment of potential environmental, economic, social, heritage, health effects, and perhaps other issues associated with the proposed Project. The Project Description and ongoing engagement will assist Aboriginal groups to identify potential effects of the proposed Project.

The AAJV is aware of the existence of environmental assessment and other standards prepared by the Tahltan Nation and will consider incorporation of those requirements into the overall environmental assessment of the Project, once these requirements are provided to AAJV.

Gitxsan Simgiigyet of the Upper Skeena and Sustut watersheds have recommended to the AAJV some issues that they would like to see addressed and the approach that should be taken to the assessment. The AAJV anticipates that additional issues may be identified based on a review of this Project Description.

Other requirements, as they are expressed, will be addressed and considered in the assessment as well. This Project Description is intended to provide the information that these Aboriginal groups need to further identify potential issues and concerns associated with the Project including the potential to affect their Aboriginal rights or interests.

10 REQUIRED PERMITS

Once the Project has received overall approval in the form of an EAC and a federal decision under the BC EAA and CEAA, respectively, the AAJV will apply for the regulatory authorizations necessary for the construction and operation of the Project. A preliminary list of potential authorizations is presented in Table 10-1

Table 10-1 Authorizations Potentially Required for the Arctos Anthracite Mine Project

Authorization	Legislation	Regulator	Purpose	Approval Period	EA Prep.	Post-EAC	Con.	Ops.
Land Act Permits								
Investigative Use Permit	*Land Act*	MFLNRO	Authorization to carry out feasibility level investigations of the proposed rail corridor		X			
Archaeology Permits								
Heritage Inspection Permit	*Heritage Conservation Act*	MFLNRO – Archaeology Branch	Conduct a field study to assess the archaeological significance of land or other property	45 days	X			
Heritage Investigation Permit	*Heritage Conservation Act*	MFLNRO – Archaeology Branch	Conduct a systematic data recovery (excavation) to recover information which might otherwise be lost as a result of site alteration or destruction	45 days	X	X		
Site Alteration Permit	*Heritage Conservation Act*	MFLNRO – Archaeology Branch	Authorizes the removal of residual archaeological deposits once the inspection and investigation are completed	45 days		X	X	
Fish and Fish Habitat Permits								
Permit for Scientific Licence	*Fisheries Act*	Fisheries and Oceans Canada	Fish salvage for data collection	~ 10 days	X		X	
Fish Collection Permit	*Wildlife Act*	MFLNRO	Fish salvage for data collection	~ 21 days	X		X	X
Authorization for Works or Undertakings Affecting Fish Habitat	*Fisheries Act*	Fisheries and Oceans Canada	Harmful alteration, disruption or destruction (HADD) for fish habitat	~ 60 days			X	X
Various Operational Statements	*Fisheries Act*	Fisheries and Oceans Canada	Operational statements for installing clear-span bridges, temporary stream crossings, bridge and culvert maintenance, overhead line construction, and riparian maintenance	~ 10 days			X	X
Waste Management Permits								
Waste Discharge Permit	*Environmental Management Act*	Ministry of Environment	Authorization to discharge waste under the *Environmental Management Act* for mining effluent (sediment, tailings and sewage, discharge from filter plant, air emissions (crushers, concentrator) refuse, and incinerator	6 – 12 months *			X	X
Special Waste Generator Permit (Waste Oil)	*Environmental Management Act*	Ministry of Environment	*Authorization to store, handle and dispose of waste oil generated by mining activities*	varies			X	X
Open Burning Permit	*Environmental Management Act*	Ministry of Environment	Open Burning Permit for land clearing activities	varies			X	
Water Management Permits								
Authorization	*Navigable Waters Protection Act*	Transport Canada	Authorizes the construction, placement, repairing or modification of work which will substantially interfere with navigation in, over, under, through or across listed navigable waterway	3 – 6 months*			If needed	
Notifications	*Water Act*	MFLNRO	Notifications are typically used for works that do not involve diversion of water, may be completed within a short period of time and will have minimal impact on the environment or third parties	45 Days			X	

Authorization	Legislation	Regulator	Purpose	Approval Period	EA Prep.	Post-EAC	Con.	Ops.
Approvals	*Water Act*	MFLNRO	An Approval is a written authorization for changes in and about a stream that are of a complex nature	140 Days			X	
Short Term Water Use Approval	*Water Act*	MFLNRO	Short Term Water Use	140 Days	If needed		If needed	
Water Use Licence	*Water Act*	MFLNRO	Authority to divert and use surface water	140 Days	If needed		If needed	X
Wildlife Permits								
Permit to Possess, Take or Destroy Bird Nest and/or Egg	*Wildlife Act*	MFLNRO	For possessing, taking or destroying a bird / nest	2 – 4 weeks				If needed
Beaver Dam Removal	*Wildlife Act*	MFLNRO	Destroying beaver dams or muskrat dens	2 – 4 weeks			X	
Wildlife Salvage Permit	*Wildlife Act*	MFLNRO	For amphibian / small mammal capture and release	2 – 4 weeks	If needed	If needed	If needed	If needed
Construction and Mine / Exploration Permits								
Notice of Work	*Mine Act*	Ministry of Energy and Mines	Coal exploration permits	varies	X	X	X	
Mine Plan and Reclamation Program Permit	*Mines Act*	Ministry of Energy and Mines	Approval of mining projects with respect to the *Mines Act* R.S.B.C. 1996, c. 293 (*Mines Act*) and its accompanying Health, Safety and Reclamation Code for Mines in British Columbia (Code)	varies			X	
Sand / Gravel Quarry Permit	*Mines Act*	Ministry of Energy and Mines	For the extraction of sand and gravel and/or quarry materials	<45 days			If needed	If needed
Occupant Licence to Cut	*Forest Act*	MFLNRO	The right to harvest timber on Crown Land (including transmission line ROWs and Road Corridors)	varies			X	
Special Use Permit	*Forest Act*	MFLNRO	Access road construction and maintenance	varies			X	X
Road Use Permit	*Forest Act*	MFLNRO	For use of existing roads	varies			X	X
Forest Service Road	*Forest Act*	MFLNRO	For use of existing roads	varies			X	X
Highway Access Permit	*Highway Act*	Ministry of Transportation	Highway access permits are required for accesses	varies			If needed	
Licence of Occupation	*Land Act*	Ministry of Energy and Mines	For Borrow and Gravel Pits; Staging Areas	varies			X	X
Surface Lease	*Land Act*	Ministry of Energy and Mines	Surface leases with property owners	varies			X	X
Crown Land Tenure	*Land Act*	MFLNRO	Authorization to conduct work on Crown Land	varies				
Right of Way	*Land Act*	MFLNRO	For transmission line construction and operations	varies			X	X

Authorization	Legislation	Regulator	Purpose	Approval Period	EA Prep.	Post-EAC	Con.	Ops.
Pipeline Permit	*Pipeline Act*	BC Oil and Gas Commission	For pipeline construction to transfer fuel from rail cars to storage tanks	varies			If needed	If needed
Radio Licences	*Radio Communication Act*	Industry Canada	Licence for radio frequencies for the Project	varies			If needed	
Explosives Permits								
Explosives Magazine Storage and Use Permit	*Explosives Act; Health, Safety, and Reclamation Code for Mines in British Columbia*	Ministry of Energy and Mines	For explosive use and storage during construction	varies			X	X
Explosives User Magazine Licence	*Explosives Act*	Natural Resource Canada	Storage of blasting explosives and other types of industrial explosives (required permits and/or licences to be obtained by explosives vendor)	varies			X	X
Factory Licence	*Explosives Act*	Natural Resource Canada	Explosives Manufacture (required permits and/or licences to be obtained by explosives vendor)	varies				X
Approval	*Canada Transportation Act*	Transport Canada	To store ammonium nitrate and ammonium nitrate mixed fertilizers	varies			If needed	If needed
Construction Camp Permits								
Approval	*Health Act*	Ministry of Health	Regional health permits for food handling and drinking water	varies			If needed	If needed
Camp Operation Permit	*Health Act*	Ministry of Health	For drinking water, sewage disposal, sanitation and food	varies			If needed	If needed

11 CONSULTATION AND ENGAGEMENT

11.1 Aboriginal Groups

The mine project components of the Project are, in varying amounts, within the asserted traditional territories of the Tahltan Nation and Gitxsan Nation, as described below. The following sections provide some preliminary information on the Aboriginal groups that are expected to be affected by the proposed mine and rail extension. The Project Description and ongoing engagement will assist Aboriginal groups to identify potential effects of the proposed Project and allow the AAJV, in conjunction with the Aboriginal Groups, to develop mitigation measures.

11.1.1 Tahltan Nation

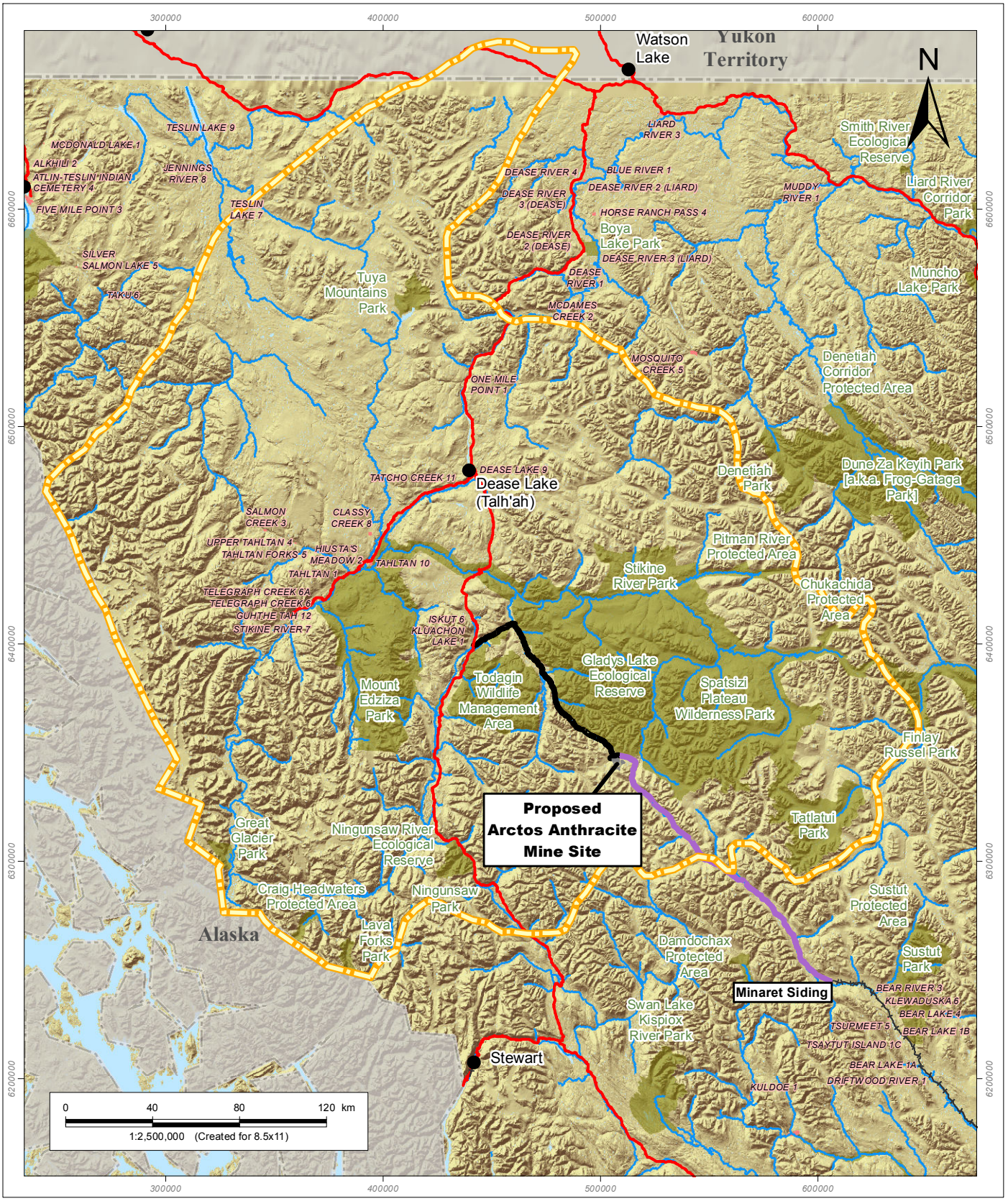
Tahltan traditional territory, as asserted by the Tahltan Nation and shown on Figure 11-1, is located mainly in northwestern British Columbia and encompasses about 97,000 square kilometres (www.tahltan.org/nation/territory). The territory includes the Stikine River basin and extents southward into the upper Nass River and upper Skeena River basins.

The proposed mine and the northern, approximate, half of the proposed new railway extension are located within the asserted traditional territory of the Tahltan Nation. This section of proposed railway is from the proposed mine site, south, to approximately the mouth of the Kluatantan River at the Skeena River.

The Tahltan Nation is presumed to have over 5,000 members, of which approximately 75 percent live outside of the core Tahltan communities of Dease Lake, Iskut and Telegraph Creek. Members of the Tahltan Nation live in British Columbia and Alberta, and particularly in the communities of Smithers, Terrace, Stewart, Prince George, Whitehorse and Vancouver (RTEC 2008h).

Tahltan people represent more than half of the residents living in Tahltan territory, dispersed between three main communities: Telegraph Creek, Dease Lake and Iskut. Tahltan communities were historically located where the Tahltan and Stikine Rivers meet, although Tahltan seasonal hunting grounds including a much larger area (RTEC 2008h).

Tahltan people, especially those living in Iskut, use the Klappan valley area for year-round activities including hunting, trapping, fishing, berry gathering and plant harvesting, as well as traditional activities. Moose, caribou, porcupines, groundhogs, mountain goats, gophers and mountain sheep are hunted or trapped, particularly during the summer and early fall. The Amalgamated Iskut Trapline, located in the project area, combines the traplines of 45 members and is managed by the Iskut First Nation (RTEC 2008a).



Legend

- Exisiting Rail
- Proposed Rail Route on Existing Railbed
- Existing Access Road
- Tahltan Traditional Territory
- Indian Reserve
- Park or Ecological Reserve

Tahltan Territory

Sources: Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012). Tahltan Territory "Out of Respect", Report of the Tahltan Mining Symposium, (2003). The boundary shown is for illustrative purposes only and is not determinative of ownership or jurisdiction.

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

DATE: 27-MAR-13	PROJECTION: UTM - ZONE 9
FIGURE ID: 123210182-080	DATUM: NAD 83
DRAWN BY: M.WOOD	CHECKED BY: J. MUCKLOW

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE JOINT VENTURE

FIGURE NO: **11-1**

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At least 13 plant species are known to be locally harvested by the Tahltan people for medicinal and food use, including caribou weed, balsam bark and blueberries (Rescan 2008). The Klappan valley area is also culturally and spiritually significant for the Tahltan and there are several burial and sacred sites that are visited and/or used by members of the community. Tahltan members regularly camp in the Klappan valley area as temporary residences and as places for education, training and the transfer of cultural and traditional land use knowledge to younger members. One traditional camp, called *Kawdi Cho*, is located approximately 45 kilometres north of the proposed mine site adjacent to the existing access road near the confluence of the Little Klappan and Klappan Rivers.

The Tahltan people refer to a vast area in the upper Klappan, Spatsizi, Stikine, Nass and Skeena River basins as Tl'ab'ne (Klabona), or the Klappan, an area much larger than the Klappan River basin itself. Outside the territory, this area has been called the Sacred Headwaters.

11.1.2 Gitxsan Nation

The Gitxsan traditional territories, as asserted by the Gitxsan Nation and shown on Figure 11-2, occupy an area of 33,000 square kilometres in northwest British Columbia, south of Tahltan territory (www.gitxsan.com/territory/maps.html). Much of this territory is located in the Skeena River basin, including much of the Babine and Bulkley River basins, and the upper Nass River basin.

The southern, approximate, half of the proposed railway extension, is located in the asserted traditional territory of the Gitxsan Nation. This is the section of proposed railway from Minaret siding, north, to approximately the mouth of the Kluatantan River at the Skeena River.

The Gitxsan Nation is understood to have approximately 10,000 members, although, similar to the Tahltan Nation, many of the Gitxsan people live outside the territories. The Gitxsan member bands and communities are within a 40 kilometre radius of Hazelton and close to the Skeena, Bulkley and Kispiox Rivers. Within the territory, most Gitxsan members live in one of five villages: Gitwangak, Gitsegukla, Gitanmaax, Sik-e-dakh (Glen Vowell) and Kispiox; as well as the municipalities of Hazelton and New Hazelton. Many also live in nearby municipalities such as Smithers, Terrace, Prince Rupert, Prince George and Vancouver.

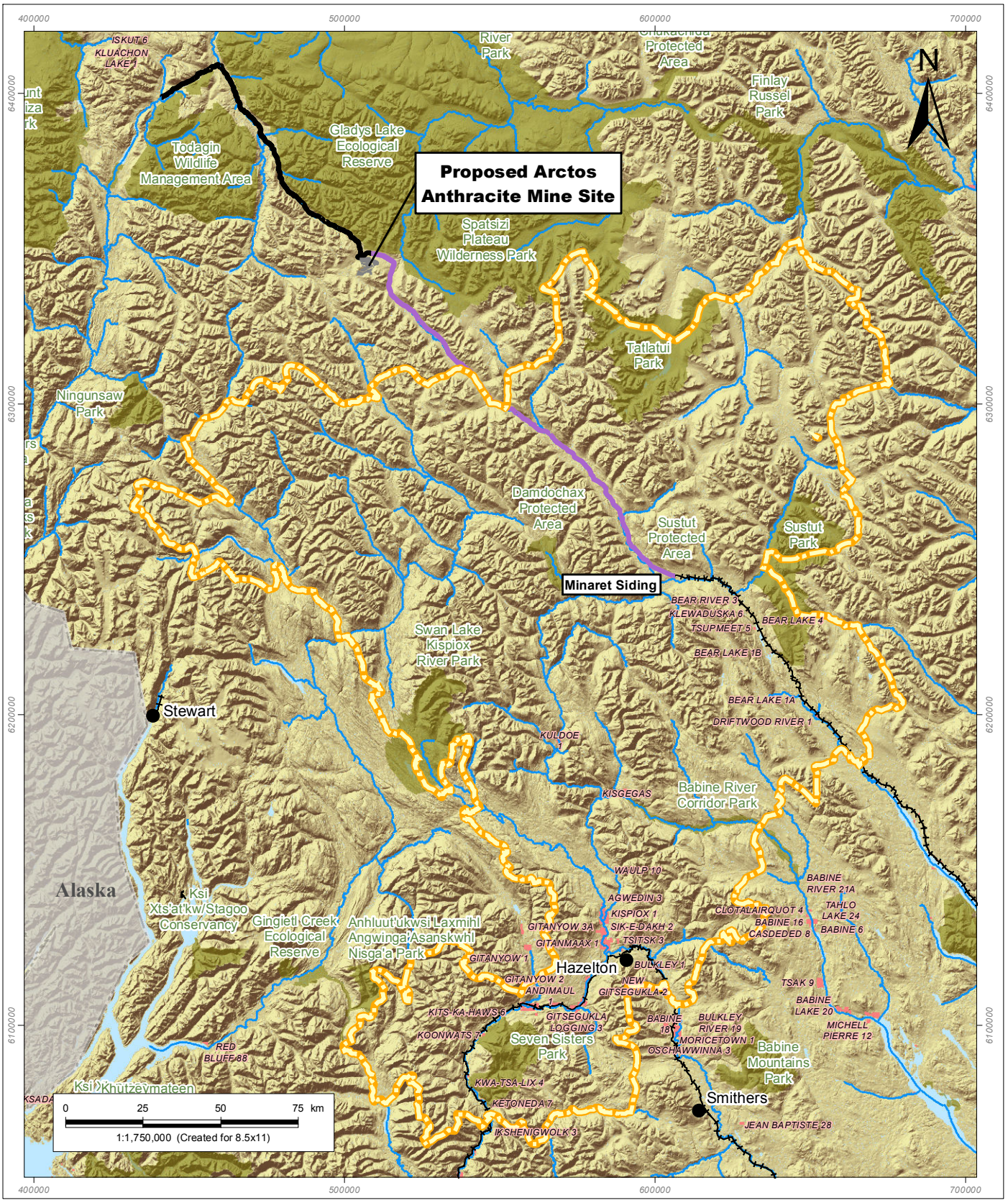
At the core of Gitxsan society is the Wilp or House, each of which is a group of extended families. Each Wilp is represented by a Simogyat, or Hereditary Chief, and has approximately 20 to more than 200 members, whom are related through matrilineal lines. Wing Chiefs and Wilp members support the Hereditary Chiefs' responsibilities. Wilps belong to one of four clans: Wolf (Lax Gibuu), Frog (Lax Seel or Lax Ganeda), Fireweed (Gisgaast) and Eagle (Lax Skiik).

Gitxsan communities were historically located in the Skeena, Nass and Bulkley River valleys and their traditional territory is divided into lax yip, or house territories, which individual Wilps have a responsibility to manage.

The Gitxsan have historically used the area of the proposed railway route along the Skeena River for hunting, trapping, plant harvesting, fishing, etc. Salmon is the primary food source for the Gitxsan, and Lax Yips are organized by access to this valuable resource. The Babine, Bulkley, Kispiox and Skeena Rivers and their tributaries are important salmon and steelhead fishing areas for the Gitxsan. Marten and other small animals are trapped for fur and mountain goat, deer and moose are used for

food and materials. Berries are also an important food source, and several species of huckleberry and blueberry are consumed, among others. In the past Gitxsan people burned areas to encourage berry growth.

The Skeena Fisheries Commission (SFC) is the organization that focuses on fisheries management, science and conservation in the Skeena River basin on behalf of the Aboriginal nations with traditional territory in the Skeena drainage and the adjacent north coast of British Columbia including the Gitxsan, Gitanyow, Wet'suwet'en, Tsimshian and Lake Babine Nations. The Commission, as directed by the signatories, responds to management and access priorities relating to the broad Aboriginal interest in the fisheries resource. Under an agreement between the AAJV and the SFC, the SFC has been and is anticipated to continue to be involved with the collection and evaluation of fisheries data as part of the EA process.



Legend

- Exisiting Rail
- Proposed Rail Route on Existing Railbed
- Existing Access Road
- Gitxsan Traditional Territory
- Indian Reserve
- Park or Ecological Reserve

Gitxsan Territory

Sources: Base Data: Land Resource Data Warehouse, Government of British Columbia (2012);Terrain Resource Information Management (TRIM) topographic database, Government of British Columbia (2012); National Topographic Database (NTDB), Canvec v.10, Government of Canada (2012). Gitxsan Territory (www.gitxsan.com/territory/maps.html). The boundary shown is for illustrative purposes only and is not determinative of ownership or jurisdiction.

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DATE: 27-MAR-13	PROJECTION: UTM - ZONE 9
FIGURE ID: 123210182-079	DATUM: NAD 83
DRAWN BY: M.WOOD	CHECKED BY: J. MUCKLOW

PREPARED BY: Stantec

PREPARED FOR: ARCTOS ANTHRACITE JOINT VENTURE

FIGURE NO:

10.1-2

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11.1.3 Métis

Métis people may use areas near the proposed mine or transportation routes when they exercise their claimed Aboriginal rights to harvest and use the land. The following Métis associations have been identified in the general vicinity of the project areas:

- New Caledonia Métis Association (head office located in Fort St. James)
- Tri-Rivers Métis Association (head office located in Smithers)
- Northwest BC Métis Association (head office located in Terrace)
- Prince Rupert United Métis Community Association (head office located in Prince Rupert).

11.2 Aboriginal Consultation and Engagement

11.2.1 Previous Engagement

From 2005 to 2011, Fortune, and from July 2011 onward, the AAJV have actively engaged Aboriginal groups to discuss and obtain input on the proposed Project and associated environmental studies, as well as the environmental assessment process, and to better understand the people themselves. The early and most active focus of the engagements has been with the Tahltan Nation because the proposed mine is within its traditional territory. In addition, the Project as originally planned had the proposed road haul route largely within the Tahltan Nation's traditional territory. Some engagement was also undertaken with the Gitxsan Nation, the Skii km Lax Ha and the Nisga'a Nation during the original environmental assessment process since part of the road haul route intersected their asserted traditional territories or, in the case of the Nisga'a Nation, the Nass Area (as defined in the Nisga'a Final Agreement) and the Portland Canal with regard to ships accessing the Port of Stewart. The Project, as currently proposed, does not involve a road haul route and does not appear to affect Nisga'a territorial interests.

The following sections briefly outline the engagement activities that have occurred with Aboriginal groups including the Tahltan Nation, Gitxsan Nation and Skii km Lax Ha. The engagement activities undertaken on the original project and environmental assessment (prior to the formation of the AAJV) were part of a formal consultation process directed by the EAO. A high level summary of engagement by the AAJV and the reconfiguration of the Project is provided in Appendix C.

11.2.1.1 Tahltan Nation

Fortune's previous engagement with the Tahltan Nation (including the Tahltan Central Council [TCC], Tahltan Heritage Resource and Environmental Assessment Team [THREAT], band councils and individuals) involved a combination of meetings, presentations, funding and cooperation agreements and the review of comments regarding the dTOR for the environmental assessment regarding potential physical, social, cultural, economic effects and components of the proposed Project. The discussions and information exchange provided Fortune with some insight into the concerns of the Tahltan Nation.

Previous Negotiated Agreements

Fortune Coal Limited and the TCC have negotiated and signed the following agreements:

- *Tahltan Knowledge Agreement*. Signed between the TCC and Fortune Coal Limited on June 7, 2007, this agreement outlines how Tahltan knowledge will be shared between the two parties and the conditions under which the knowledge will be shared. This agreement led to the production of a Tahltan Use Report by the Heritage Department of the TCC.
- *Confidentiality Agreement on Predictive Ecosystem Mapping (PEM) Data Sharing*. Signed between the TCC and Fortune Coal Limited and Fortune Minerals Limited, April 7, 2008, this enabled Fortune to provide the PEM data to the TCC for its use.
- *Environmental Assessment Process Funding Agreement.* Signed between the TCC and Fortune Coal Limited in January 2009, this agreement outlines how Fortune would help fund the participation of the Tahltan Nation in the Environmental Assessment process.

Recent Engagement

In July 2011, with the formation of the AAJV, discussions were reinitiated with the Tahltan Nation beginning with an introduction of the joint venture partners and a presentation regarding the redesigned proposed Project. The AAJV is committed to the development of a relationship based on mutual respect and trust. The AAJV understands the Tahltan's need to have full involvement from the beginning to the end of the study. Recent engagement activities have been carried out from this perspective. The objective of the recent engagement was to allow the AAJV to explain the changes to the proposed Project and to hear Tahltan Nation concerns.

Two meetings have been held with the leadership of the TCC and its advisors, and in September 2011 a large meeting was held in Dease Lake with the combined leadership of the Tahltan (TCC, Tahltan Nation and Iskut First Nation) as well as councillors and several elders. The Dease Lake meeting included a site tour offered to anyone who wished to go, to facilitate the discussion of site specific issues associated with the proposed mine site.

The AAJV has provided to the TCC and THREAT copies of the applications for study permits as well as a draft work plan for the environmental studies for their review and comment. A draft copy of this Project Description was also provided to the TCC and THREAT for their review and comment prior to its finalization with the EAO and CEA Agency. A dAIR, the Environmental Impact Statement Guidelines, and eventually the draft EAC and EIS will also be provided for review and comment prior to finalization. The AAJV has invited the Tahltan people through its leadership and advisors to become active participants, in the capacity they prefer, in the evaluation of this Project.

Proposed consultation activities are summarized in Section 11.2.2 below. In addition, traditional ecological knowledge and traditional land use studies will be undertaken as described in Section 8.1.

Ongoing Engagement and Consultation

During a July 2011 meeting, TCC leadership indicated the AAJV should commit to communication protocols and procedures in accordance with a plan of communications established by the TCC to adequately inform the Tahltan Nation of the Project and its implications and to facilitate informed discussions within the Nation. At the time this Project Description was being prepared, the final scope of the protocols was still being discussed. The AAJV committed to adopting the plan of communications proposed by the TCC.

The plan of communications involves providing information in various forms to the Tahltan Nation as a whole, as well as to smaller groups based on communities, demographics and interests, including community members, key influencers and decision-makers within the Tahltan Nation core communities (Dease Lake, Iskut and Telegraph Creek) as well as members of the Tahltan Nation living elsewhere. The TCC has established a network of liaison people in several of these communities to facilitate dissemination of information.

11.2.1.2 Gitxsan Nation

Previous Engagement

Fortune's previous engagement with the Gitxsan Nation, prior to the formation of the AAJV, involved meetings and discussions with the Gitxsan. Before 2007, some meetings between Fortune's consultant, Rescan, and members of the Gitxsan Nation took place to discuss the Project and particularly a proposed haul road to Bell 2 (which is no longer part of the Project). Between January 2007 and April 2008, several discussions between Fortune and various members of the Gitxsan Nation focused on the concept of a slurry pipeline to transport coal to Stewart, an idea that was eventually abandoned and is also not part of this Project.

Comments were provided by Suu Dii (a hereditary chief in the house of Gwinin Nitxw, of the Wolf Clan) regarding the 2006 dTOR for the original project. These comments related to the scope of the Project, Aboriginal rights, cumulative effects, effects of slides (debris) from the rail grade on the river, and potential health impacts of the then proposed Project.

Recent Engagement

Since mid-2010, Fortune and the AAJV have engaged the Gitxsan Nation in various ways (including public presentations at the 2010, 2011, and 2012 Gitxsan Summits, regular meetings with Simgiigyet [hereditary chiefs] of the Upper Skeena and Sustut watersheds, and open houses) to introduce the Project, its history and future direction, as well as the joint venture itself. The AAJV has also introduced its consulting team to the Simgiigyet and had them participate in recent meetings to make sure that they also develop a relationship and understanding of each other. Most importantly, the discussions provided the opportunity for the AAJV to listen to Gitxsan concerns and how they would like to be involved in the environmental assessment process and the Project. The AAJV has hired a member of the Gitxsan Nation as an employee to assist with liaison and ongoing dialogue within the Gitxsan Nation.

In addition to sharing information about the Project, the discussions provided the opportunity for the consulting team to learn about Gitxsan culture, protocols, expectations, access requirements and expertise from the Simgiigyet and other house representatives. Discussions also focused on proposed field work (including formats for access agreements for each chief's territory) and traditional knowledge studies, future engagement, and a draft Memorandum of Understanding (MOU).

The AAJV has provided to the Simgiigyet copies of the applications for study permits as well as a draft work plan for the environmental studies for their review and comment. A draft copy of this Project Description was also provided for review and comment prior to finalization with the EAO and CEA Agency. A draft version of the AIR and EIS Guidelines and eventually the draft Application for the EAC and EIS will also be provided for review and comment prior to finalization. The AAJV has invited the Gitxsan people through the Simgiigyet to become active participants, in the capacity they prefer, in the evaluation of this Project.

The AAJV and its consultants have met with representatives of the Gitxsan Watershed Authority and SFC to discuss the scopes of investigation and opportunities to work cooperatively on these studies. The SFC is playing a significant leading role in the fishery and surface water studies.

In the fall of 2011, AAJV's Gitxsan liaison staff interviewed the Simgiigyet of northeastern Wilps (territories) of the Upper Skeena and Sustut watersheds adjacent to the proposed new rail line. The interviews recorded the Simgiigyet's initial comments and concerns regarding environmental and socio-economic impacts in their territory.

Proposed consultation activities are summarized in Section 11.4.2 below. In addition, traditional ecological knowledge and traditional land use studies will be undertaken as described in Section 8.1.

Ongoing Engagement and Consultation

At the request of the Simgiigyet, the AAJV obtained signed letters of permission to access the territories along the proposed new rail line for the purpose of environmental studies. In addition, at the time of writing, negotiations between the Simgiigyet of the Upper Skeena and Sustut watersheds and AAJV were nearing completion for a MOU which outlines how the two parties intend to communicate and cooperate with regard to the environmental studies. The MOU is another step in developing a relationship based on respect, trust and cooperation between the Simgiigyet and the AAJV. It is focused on a positive working relationship (e.g., regular meetings, working together to resolve issues/concerns), information sharing and confidentiality issues, and contemplates the negotiation of future agreements (such as a participation agreement) between the parties, but without prejudice to a decision to support the Project. Through the negotiation process a generally cooperative relationship has developed with respect to the proposed environmental assessment studies.

11.2.1.3 Skii km Lax Ha

Previous Engagement

Fortune's previous engagement with the Skii km Lax Ha, prior to the formation of the AAJV, included several meetings and communications focused on legislative requirements for consultation and the Skii km Lax Ha's asserted traditional territorial claims in the area of the previously proposed access road to Bell 2 and the mine site.

Recent Engagement

Beginning in the fall of 2011, the AAJV has met with representatives of the Skii km Lax Ha to discuss the current project and the recent formation of the joint venture. Subsequent meetings have been held introducing the consulting team, discussing the process for environmental studies, traditional knowledge (TK) studies and issues of concern. The AAJV has committed to undertake a TK study. In April 2012, the TK team lead with Stantec, consultants to the AAJV, met with the Skii km Lax Ha to discuss the proposed TK study in detail.

The AAJV has provided to the Skii km Lax Ha copies of the applications for study permits as well as a draft work plan for the environmental studies for their review and comment. A draft copy of this Project Description was also provided in draft for review and comment prior to finalization with the EAO and CEA Agency. A draft version of AIR and EIS Guidelines and eventually the draft Application for the EAC and EIS will also be provided for review and comment prior to finalization. The AAJV has involved the Skii km Lax Ha as active participants in aspects of the evaluation of this Project.

Proposed consultation activities are summarized in Section 11.4.2 below. In addition, traditional ecological knowledge and traditional land use studies will be undertaken as described in Section 8.1.

11.2.1.4 Other Aboriginal Groups

For the previous project, Fortune met with representatives of the Nisga'a Nation to discuss the then proposed Project. As noted in Section 11.2.1, the current and anticipated potential impacts of the Project do not appear to affect Nisga'a territorial interests as described in the Nisga'a Final Agreement.

At the time of writing, Métis groups had not yet been contacted to assess their interests in the Project.

11.2.2 Planned Consultation and Engagement

The AAJV understands that while the ultimate responsibility for ensuring that the duty to consult is satisfied lies with the Crown, certain aspects of consultation will be delegated to the AAJV to fulfill. In addition, as the AAJV recognizes that consultation is an important component of the EA process. Consistent with the EAO requirements, the AAJV will seek advice from the Aboriginal groups on the appropriate means of consultation and will develop and submit an Aboriginal Engagement Plan for

approval by the EAO. Prior to the submission of the plan, the AAJV will provide the draft plan to Aboriginal groups for review and comment.

Specific consultation activities and approaches will depend on the particular Aboriginal group engaged with. The goals of the Aboriginal engagement plan are to:

- Build and maintain positive long-term relationships with Aboriginal groups potentially affected by the Project
- Gather, understand and integrate aboriginal input into project design and execution, as appropriate
- Address concerns and issues related to Aboriginal groups as appropriate

A variety of engagement techniques will be used as appropriate during engagement activities in both the pre-application and application review stages of the environmental assessment process. Individual Aboriginal groups will have preferences as to which will be most effective, both generally and for their individual and collective needs of the range of audiences within and across Aboriginal groups.

Engagement tools and techniques may include (but are not limited to):

- Meetings with local organizations
- Meetings with individuals (i.e., elders, youth, women's groups, family representatives, special interest organizations and others, as directed by leadership)
- Workshops—to address specific issues/topic areas as requested or as appropriate
- Site visits
- Community liaison staff
- FAQs/fact sheets or brochures
- Newsletters (electronic, paper)
- Community radio/TV
- Information kiosks (e.g., at access road, in communities)
- 3-D model/site plan
- Project website
- Video
- Development of e-mail distribution lists for project information (e.g., for newsletters, fact sheets, events)
- Social media

Many Aboriginal groups have citizens living outside the traditional territories, for example in Prince Rupert, Prince George, Smithers, Terrace, Stewart, Vancouver and Whitehorse. Consequently, engagement activities may need to extend into these areas to allow full access to opportunities to participate, in consultation with Aboriginal leadership. The AAJV will consult with a cross section of

the respective Aboriginal groups which whom it engages based on directions provided by their leadership.

The Aboriginal groups identified for engagement in the environmental assessment process, as well as those to be invited to participate on the EAO's project advisory working group along with agency representatives, will be specified by the EAO and CEA Agency. The AAJV's Aboriginal engagement process will be conducted in a manner that respects the approaches preferred by the Aboriginal groups, and which as well as satisfies the engagement requirements of both the EAO and the CEA Agency. The Aboriginal groups considered potentially affected by the proposed Project are identified below in Table 11-1 with respect to the three principle components of the proposed Project:

Table 11-1 Aboriginal Groups Potentially Affected by the Project

Project Component	Tahltan Nation	Gitxsan Nation	Metis
Proposed Mine Area	●		?
Existing Road Access	●		?
Proposed New Railway	●	●	?

11.2.3 Contact Information

The contact information of Aboriginal Groups that the Proponent understands to have interests in the Project and that will be involved in the environmental assessment are listed in Table 11-2.

Table 11-2 Contact Information for Aboriginal Groups Potentially Affected by the Project

Aboriginal Group	Contact Information
Tahltan Central Council	Anita McPhee, President Tahltan Central Council Box 69, Dease Lake, BC V0C 1L0 (250) 771-3274 (phone) (250) 771-3020 (fax)
Gitxsan Simgiigyet of the Upper Skeena and Sustut Watersheds	Simgiigyet of the Upper Skeena and Sustut Watersheds c/o 4546 13th Avenue New Hazelton, BC V0J 2J0

11.2.4 Key Issues

Comments were provided by Aboriginal groups during the review of the dTOR in 2007 (based on the previously proposed truck haul transportation) and during recent engagement activities. The comments associated with the 2007 review are summarized below.

- Environment:
  - Impact on land used for traditional purposes
  - Potential for increased access to the wilderness resulting in increased hunting affecting moose populations
  - Need for the Project to be consistent with Aboriginal land use policies and plans
  - Impact on fish populations
- Consultation:
  - Needs to be comprehensive and intensive
- Economic:
  - Compensation and participation
- Socio-Cultural:
  - Cumulative effects of multiple mining projects on health and social conditions in Aboriginal communities
  - Imposition of non-Aboriginal values in Aboriginal communities
  - Increased pressure on existing health and social services
  - Impact on spiritually and culturally significant areas

During recent discussions, additional comments have also been raised on the current project. These are noted below and are broken out by Aboriginal group. Ongoing engagement is expected to result in the identification of additional issues.

Recent Issues Raised (relative to the current Project)

- Tahltan Nation
  - Adoption of Tahltan communication protocols
  - The spiritual and cultural importance and ongoing traditional usage of the area
  - Plans for field study programs
  - Consultation process to be used for the rail route
  - Potential business opportunities associated with the rail route
  - Importance of Tahltan knowledge and community involvement in the Project
  - The process for involving the TCC and THREAT
  - Heritage resources
  - Cumulative effects

- Gitxsan Nation
  - Potential impacts on fish and fish habitat, water quality, wildlife and wildlife habitat, and the land
  - Employment opportunities during studies and operations
  - Railway Issues (safety, rail bed stability, accidents, potential for increased access to the area, water crossings, train size and frequency, construction procedures)
  - Safety of railway lines (rail bed stability, accidents)
  - Sustainability of trap lines
  - Preservation of cultural features
  - Protocols for encountering human remains
  - Sharing of information

11.3 Agency Engagement

11.3.1 Previous Agency Engagement

During the pre-application stage of the review process for the original project described in the 2006 dTOR, Fortune consulted individually and as a member of the advisory working group with provincial and federal agencies in developing the baseline data collection program and the dTOR for the environmental assessment application and the anticipated requirements of the CEAA. Provincial agencies that were consulted included the Ministry of Sustainable Resource Management, MEM, Ministry of Water, Land and Air Protection, Ministry of Small Business and Economic Development, and Treaty Negotiations Office. Federal agencies included the Department of Fisheries and Oceans, Transport Canada, Natural Resources Canada, and Environment Canada. Local government agencies consulted included the Regional District of Kitimat-Stikine and the Dease Lake Advisory Planning Commission.

Agency comments on the dTOR, provided during the public comment period held December 1, 2006 to January 8, 2007, were posted on the EAO's electronic project information centre website. These comments have been taken into consideration in the development of this Project Description.

11.3.2 Ongoing and Planned Agency Engagement

The AAJV will continue to consult with federal, provincial and local government agencies both individually and as members of the environmental assessment working group with respect to issues and concerns with the Project. In addition to issues identified during the previous consultation, the AAJV will be seeking input regarding potential issues and comments that are relevant to the assessment of the Project.

In 2012, the AAJV and their consultants provided informational presentations regarding the Project to several British Columbia Government Ministries and Departments including MEM, Ministry of Aboriginal Relations and Reconciliation, Ministry of Transportation, Ministry of Jobs, Tourism and

Skills Training and the Major Investments Office. More recently, presentations specific to the Project Description Report have been made to the MEM and to representatives of the EAO and CEAA.

The AAJV and its consultants will work closely with the environmental assessment agencies to prepare the required documentation required for both the BCEAA and CEAA. A collaborative and iterative process will be established to develop and finalise the documents especially the Application/ EIS.

11.3.3 Key Issues Raised to Date

Issues identified during engagement to date with agencies and local government representatives include potential effects of the current project on:

- Water quality and flow regimes
- Air quality
- Noise
- Vegetation
- Wildlife and wildlife habitat
- Terrain
- Soils
- Fish and fish habitat
- Heritage and cultural resources
- Land and resource use

It is anticipated that the engagement stage may result in the identification of additional issues related to both the proposed mine site and the railway.

11.4 Public and Stakeholder Engagement

11.4.1 Previous Engagement with the Public and Stakeholders

The 2006 dTOR for the original project generated comments from 10 individuals and 8 organizations. The organizations that provided comments included:

- Mining Watch Canada
- OutYonder Productions
- BC Nature/Federation of BC Naturalists
- Driftwood Foundation
- Cassiar Watch
- Transboundary Watershed Alliance
- Friends of the Stikine Society
- Canadian Parks and Wilderness Society—BC Chapter

Comments on the dTOR provided during the public comment period can be found on the EAO's project information centre and are briefly summarized in Section 11.2.4.

11.4.2 Ongoing and Planned Engagement with the Public and Stakeholders

The public and stakeholders (e.g., other tenure holders, including forestry, mining, energy, guide-outfitting, trapping; environmental organizations) will be consulted in a variety of ways during the two stages (pre-application stage and application review stage) of the environmental assessment of the Project as summarized below. Appendix C provides a high level summary of engagement from July 2011 to date, including open houses, presentations, site tours, job fairs, interviews, meetings, and requests for comment and input on draft reports.

11.4.2.1 Environmental Assessment Process Required Consultation

Consultation with the public and stakeholders will be carried out by AAJV as directed (or required) by EAO and CEA Agency. Engagement opportunities during the pre-application stage are expected to include the following:

- ***Posting of Project Description:*** the Project Description will provide an opportunity for the public and stakeholders to become familiar with the Project proposal on the EAO's project information centre (e-PIC)and CEA Agency's registry, and provide an opportunity for input to the CEAA process.
- ***Review of Draft Application Information Requirements (dAIR) / Draft Environmental Impact Statement (dEIS) Guideline***: the dAIR/dEIS Guideline will be made available on the EAO's e-PIC and CEAA registry for public comment and potentially supported with one or more open houses.

Following the acceptance of the Application/ EIS for review by the EAO and CEA Agency, the public and stakeholders will be provided with an opportunity to review and comment on the Application and EIS during a formal public comment period specified by the two agencies. The public will be notified of the public comment period and the location and dates of the open houses (and/any other relevant forms of engagement). The CEA Agency will also post its draft Assessment Report for public comment. There are four public comment periods for a typical EA under CEAA.

11.4.3 Key Issues Raised to Date

Issues raised to date by stakeholder groups and individuals can be classified under the following themes:

- Environment:
  - Potential for impact on fish stocks
  - Global warming issues related to the use of coal for power generation
  - Proximity to Spatsizi Plateau Wilderness Provincial Park—home of Spatsizi caribou herd
  - The potential for long term impact to flora and fauna in the mine area

- Environmental costs versus economic benefits

- Project:
  - An evaluation of alternatives (e.g., power generation, coal port facility, limiting landscape disturbance, avoiding new access road, examining environmental issues for each alternative)
  - Aboriginal land claims in the region have not been settled
  - Need for informed consent
- Socio-Cultural:
  - Spiritual significance of the Klappan area to Tahltan people in the region

It is anticipated that further engagement will result in the identification of additional issues related to both the mine site and the railway in the context of the current project.

12 POTENTIAL PROJECT EFFECTS

The information collected to date has been used to identify potential project effects and issues that will be considered in the environmental assessment. Additional information collected during ongoing baseline studies and through consultation with Aboriginal groups, agencies and stakeholders will be used to further refine this list.

It is anticipated that the scope of the environmental assessment for the Project will include consideration of the potential environmental, social, cultural, economic, health and heritage effects and potential effects on Aboriginal interests. The assessment will also identify and evaluate practical means of avoiding or mitigating potential adverse effects, while maximizing the benefits of the Project to the extent practical.

12.1 Proposed Mine Site—Potential Key Issues

A preliminary list of potential issues or effects is presented in Table 12-1. Potential impacts are linked to Construction/Development (D), Mine Operations (O) and/or Closure (C).

Table 12-1 Preliminary List of Potential Issues or Effects

EA Component	Phase	Issue/Potential Effect
Socio-cultural	D O C	Potential effects on traditional activities and culture, including: ▪ Fishing ▪ Gathering plants and medicines ▪ Hunting and trapping (caribou, goats, moose, marmot) ▪ Other cultural activities (e.g., student camps on the land, language preservation and revitalization) ▪ Spiritual importance of the potentially impacted lands
Socio-community	D O C	Potential effects on community services and quality of life, including: ▪ Area access ▪ Aesthetics/visual and noise effects of the construction and operation of the mine ▪ Housing and transportation ▪ Public safety ▪ Community health (including substance abuse)
Socio-economic	D O C	Potential effects on region/communities as a result of increased population including: ▪ Employment, education/training ▪ Contracting and procurement ▪ Regional economic effects ▪ Effects on other tenure holders (e.g. guides / outfitters, trappers)
Heritage and Archaeological	D	Potential effects on Aboriginal and other archaeological resources ▪ Effects on heritage or archaeological resources
Atmospheric Resources	D O	Potential effects on local air quality from mine emissions ▪ Air quality including effects from fugitive greenhouse gas emissions, and dust
Climate	C	Potential effects on long term reclamation and land use ▪ Local climate change and how that effects long-term reclamation
Terrestrial Ecosystems	D O	Potential effects on local and regional bio-physical characteristics including: ▪ Change in vegetation and soil ▪ Change in soil quantity, and vegetation community structure ▪ Effects from fugitive dust on soils, plants ▪ Terrain stability/landslides ▪ Wetlands ▪
Wildlife Populations and Habitat	D O	Potential effects on wildlife and wildlife habitat ▪ Change in habitat quality

EA Component	Phase	Issue/Potential Effect
Surface Water Quality	D O	Potential effects on water quality due to mining and associated activities, including; ▪ Potential acid rock drainage and metal leaching and surface run off
Surface Water Quantity	D O	Potential effects on surface water flow
Fisheries Habitat	D O	Potential effects on fish and fish habitat including: ▪ Change in habitat ▪ Change in Fish populations ▪ Change in Aquatic biota
Groundwater	D O C	Potential effects on long term local ground water regime including: ▪ Change in groundwater quality and quantity ▪ Change in in groundwater flow quantity or pattern and resulting effects on surface water flows

Potential impacts linked to Construction/Development (D), Mine Operations (O), and/or Mine Closure (C).

12.2 Coal Transportation System—Potential Key Issues

A preliminary list of potential issues or effects is presented in Table 12-2.

Table 12-2 Preliminary List of Potential Issues or Effects

EA Component	Phase	Issue/Potential Effect
Socio-cultural	D O C	Potential effects (due to effect of new rail line or changes in access) on traditional activities and culture, including: ▪ Hunting, fishing, trapping ▪ Gathering plants and medicines ▪ Other cultural activities
Socio-community	D O C	Potential effects on community services and quality of life, including: ▪ Infrastructure and services ▪ Community health ▪ Public safety ▪ Aesthetics/visual and noise effects of the construction and operation of the new rail line ▪ Non-traditional land use
Socio-economic	D O C	Potential effects on region/communities as a result of increased population including: ▪ Employment effects (positive and negative) ▪ Contracting and procurement

EA Component	Phase	Issue/Potential Effect
		▪ Regional economic effects ▪ Effects on other tenure holders (e.g. guides / outfitters, trappers)
Heritage and Archaeological	D	Potential effects on Aboriginal and other archaeological resources ▪ Effects on heritage or archaeological resources
Atmospheric Resources	D O	Potential effects on local air quality from mine emissions ▪ Air quality including effects from fugitive greenhouse gas emissions
Terrestrial Ecosystems	D O	Potential effects on local and regional bio-physical characteristics including: ▪ Change in vegetation and soil ▪ Change in soil quality and vegetation community structure ▪ Terrain stability ▪ Pesticide use on rail line
Wildlife Populations and Habitat	D O	Potential effects on wildlife communities ▪ Change in habitat and or reduction in habitat quality (e.g. habitat fragmentation) ▪ Potential for increased hunting due to improved access on wildlife populations ▪ Impact of railway traffic on wildlife populations
Surface Water Quality	D O	Effects on water quality and water flow ▪ Change in water quality due to erosion and sedimentation ▪ Change in rail car spills ▪ Stream alterations
Fisheries Habitat	D O	Potential effects on fish and fish habitat including: ▪ Change in habitat ▪ Increased fishing due to improved access ▪ Change from water crossings ▪ Effects from rail car spills

Potential impacts linked to Construction/Development (D), Mine Operations (O), and/or Mine Closure (C).

12.3 Potential Cumulative Effects

The cumulative effects assessment will include consideration of the extent to which past or proposed activities in the region may combine spatially with the proposed Project to contribute to significant adverse environmental, economic, social, heritage and health effects. The potential key issues and effects identified in Table 12-1 and 12-2 and selected regional projects listed in Table 12-3 will be considered for the cumulative effects assessment pursuant to the *Application Information Requirements Template With Respect to an Environmental Assessment Certificate* (BC Environmental Assessment Office, October 2010).

Table 12-3 Other Projects in the Area

Timing	Project Name	Proponent	Type of Project
Past			
	Golden Bear	North American Metals Corp.	Gold / Silver Mine and Road
	Eskay Creek	Barrick Gold Corporation	Gold / Silver mine
Present			
	Northwest Transmission Line	BC Hydro	Electrical Transmission Line
	Forrest Kerr	Coast Mountain Hydro / AltaGas	Hydro-electric power
	Kemess	AuRico Gold Inc.	Copper / Gold mine
	McLymont Creek	AltaGas Ltd.	Hydro-electric power
	Red Chris	Imperial Metals	Copper / Gold mine
Reasonably Foreseeable Future			
	Galore Creek	Teck/Nova Gold Resources Inc.	Copper / Gold / Silver mine
	Schaft Creek	Copper Fox Metals	Gold / Molybdenum / Silver
	Volcano Creek	AltaGas Ltd.	Hydro-electric power
	Kinskuch River	Syntaris Power	Hydro-electric power
	Kitsault Mine	Avanti Mining, Inc.	Molybdenum
Possible Future			
	Groundhog Project	Atrum Coal	Coal
	KSM (Kerr-Sulphurets-Mitchell)	Seabridge Gold Inc.	Gold / Copper

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APPENDIX A

Table of Concordance: Proposed Project Description Cross Reference to Provincial "Guidelines for Preparing a Project Description for an Environmental Assessment in British Columbia"

ARCTOS
ANTHRACITE PROJECT

APPENDIX A Table of Concordance: EAO Project Description Guidelines

Item	Clause	Requirement	PD Section
General Information			
1	N/A	The proponent's name and the representative managing the project	2.1, 2.2
2	N/A	Contact information, including a mailing address, phone and fax numbers, and email addresses	2.2
3	N/A	Corporate information, including a website address, particulars of company incorporation, and partners' names (if applicable)	2.2
General Background Information			
4	N/A	The type and size of the project, with specific reference to the thresholds set out in the Reviewable Projects Regulation	9.1.1
5	N/A	Project purpose and rationale	3.1
6	N/A	Estimated capital cost	3.5
7	N/A	Number of construction jobs (in person years) and operating jobs (actual number)	3.5
8	N/A	Location (latitude and longitude)	3.3.1, 3.3.2
Project Overview			
9	N/A	A brief description of the major on-site and off-site project components, including options if the final site selections are not yet available	4.1
10	N/A	A conceptual site plan and map(s) at sufficient scale to allow for clear location of all major components of the project (proponents may wish to include photographs if these would be helpful to understanding the nature and location of the proposed project)	Figures 4-1, 4-2, 4.2.5
11	N/A	The project's duration, including decommissioning if appropriate	1, 3, 4.2.7, 5.2, Table 5-1, Table 5-2
12	N/A	The project's potential environmental, economic, social, heritage, and health effects (in general terms)	8, 8.1, 8.2, 7, Table 12.1-1, Table 12.2-1
Land Use Setting			
13	N/A	A general description of existing land use in the vicinity of the project site	8
14	N/A	Whether the project and its components are situated on private or Crown land	1.0, 3.3, 6.2, 11.1, 8
15	N/A	Information about First Nations interests where asserted claims to rights or title are known	11.1
Consultation Activities			
16	N/A	A summary of consultation activities that have been carried out with First Nations, the public and local governments	11.2, 11.3, 11.4
Consultation Activities			

Item	Clause	Requirement	PD Section
17	N/A	A tentative schedule for submitting an application for an environmental assessment certificate and developing the project (should a certificate be issued)	Table 5-1
Consultation Activities			
18	N/A	A list of required permits, if known	Table 10-1

APPENDIX B

Table of Concordance: Proposed Project Description Cross Reference to Federal "Guide to Preparing a Description of a Designated Project under the *Canadian Environmental Assessment Act, 2012*"

Appendix B Table of Concordance: CEAA Project Description Guidelines

Item	Clause	Requirement	PD Section	Notes
8.0 Executive Summary				
1	8.0	Summary of information provided in Sections 1 through 7 above in both French and English	Executive Summary	
2.0 General Information				
2	1.1	The nature of the project	1	
3	1.1	The proposed location of the project	1, 3.3	
4	1.1	The name of the project	1	
5	1.2.2 1.2.3	The name and address of the proponent	2.2	
6	1.2.4	The name and contact information for the proponent CEO or equivalent	2.2	
7	1.2.5	The name and contact information for the principal contact person for the purposes of the project description	2.2	
8	1.3	A list of the jurisdictions (federal authorities, provincial or municipal governments, etc.) consulted during the preparation of the project description	9, 11.3.2	
9	1.3	A list of the other parties (Aboriginal groups, the public, etc.) consulted during the preparation of the project description	9.1.3, 11.2	
10	1.4.1	Information on other jurisdictional environmental assessment regimes and/or regulatory requirements to which the project has been or could be subjected (i.e., provincial, territorial, land claim environmental assessment processes, etc.)	9, 3.4, 11.3	
11	1.4.2	Information regarding whether the project area is located in a region that is/has been involved in a regional environmental study	9.1, 8	
3.0 Project Information				
12	2.1	General description of the project (context and objectives)	3.1	
13	2.2	Activities that describe the project in whole or in part that concur with the provisions identified in the *Regulations Designating Physical Activities*	9.1.2	
14	2.3.1	A description of the physical works associated with the project including all structures and associated infrastructure. Include a description of their purpose, approximate dimensions and capacity where appropriate; and any related activities required to support the project	4.1, 4.2, 4.3	
15	2.3.2	Production capacity and the size (e.g., length of road, acreage used) of the main components of the project, including a description of the processes, infrastructure and any permanent or temporary structures	4.2.1, 4.2.3, 4.2.6, 4.3	
16	2.3.3	The percent increase in size or capacity if project is an expansion of an existing project	n/a	

Item	Clause	Requirement	PD Section	Notes
17	2.3.4	A description of all activities associated with the project	4.2, 4.3	
18	2.4	The nature of any solid, liquid or gaseous wastes likely to be generated by the project, and of plans to manage these wastes	4.2.6	
19	2.4.1	Sources and location of atmospheric contaminant emissions (greenhouse gases (GHGs), etc.)	4.2.6.2	
20	2.4.2	Sources and location of liquid discharges	4.2.5, 4.2.6.2	
21	2.4.3	Types of by-products to be generated by the project and plans for proper disposal procedures as applicable	4.2.4, 4.2.6	
22	2.5	The construction, operation and decommissioning phases, and the timing and scheduling of each phase	4.2.1, 4.2.7, 5.1, Table 5-1, 5.2, Table 5-3	
23	2.5.1	Schedule – time of year, duration and staging (site preparation, construction, operation, decommissioning, abandonment)	4.2.7, 5.2, Table 5-1, Table 5-3	
24	2.5.2	Main activities associated with each phase of the project (e.g. site preparation – land clearing, excavations, grading, etc.)	4.2.1, 4.2.5, 4.2.7, 4.2.8, 5.2	
3.0 Project Location				
25	3.1.1	The geographical location of the project – provide coordinates for the centre of a facility, or the start/end points of a linear facility	3.3.1, 3.3.2	
26	3.1.2	A site map indicating the location of the project at an appropriate scale	Figure 1-1, Figure 4-2	
27	3.1.3	Map(s) indicating the locations of the project components/activities in relation to existing features, including names where applicable (e.g., watercourses, transportation infrastructure, land use factors, Aboriginal settlement and/or claim lands, ESAs, etc.)	Figures 4-1, 4-2, 4-6, 4-7, 10.1-1, 10-1,	
28	3.1.4	Photographs of work locations	n/a	
29	3.1.5	Legal land description for property(ies) associated with the project (title, deed/document, authorization relating to a water lot)	8 (but no legal description)	
30	3.1.6	Proximity of the project to: permanent, seasonal or temporary residences; Aboriginal lands associated with traditional territories, settlement and resources; and federal lands	9.1.3, 3.3, 11.1, 8	
31	3.2.1 3.2.2	Describe the ownership and zoning of land and water affected by the project, including zoning designations and current land ownership (including sub-surface rights)	1, 3.3	Crown land, Aboriginal land
32	3.2.3	Identify land use, water use, resource management or conservation plans in proximity to the project	9.1, 8	Spatsizi Plateau Wilderness Provincial Park in the Cassiar Iskut-Stikine LRMP

Item	Clause	Requirement	PD Section	Notes
33	3.2.4	Identify if the lands are or have been used as a marine terminal, or designated within a land use plan that has undergone public consultation	1, 3.3, 8	Cassiar Iskut-Stikine LRMP (mine), Fort St. James LRMP (rail)
34	3.2.5	If applicable, provide land status and zoning under the Port Land Use Plan if lands are within waters/lands under the jurisdiction of a Canada Port Authority under the Canada Marine Act	n/a	
35	3.2.6	Identify whether project activities will impact in any way (i.e., access, occupation, exploration, development, etc.) lands and resources currently used by Aboriginal peoples for traditional purposes	9.1.3, 11.1, 11.2.4, 8.1, 8.2, Table 12.1-1, Table 12.2-1	
4.0 Federal Involvement – Financial Support, Lands and Legislative Requirements				
36	4.1	Information identifying any federal government department or agency that is, or may be, providing financial support to the project	3.5	
37	4.2	Identify any federal lands associated with the project area, including information related to granting of interest in federal land (easement, ROW, transfer of ownership)	9.1.2, 3.3.2, 4.1, 8	
38	4.3	Information relating to federal legislative or regulatory requirements, permits, licences and authorizations that the proponent believes are required for the project	9.1.2, 11.3, 10, Table 10-1	
5.0 Environmental Effects				
39	5.1	A summary of the physical and biological components in the area likely to be affected by the project, including known habitat areas:	Tables 12.1-1 and 12.2-1 (all categories)	
40	5.1	▪ Terrain	7.2, 7.3	
41	5.1	▪ Water	7.4	
42	5.1	▪ Air	7.6	
43	5.1	▪ Vegetation	7.9	
44	5.1	▪ Fish	7.8	
45	5.1	▪ Wildlife	7.10	
46	5.1	▪ Migratory Birds	7.10.4	
47	5.2	A summary of potential impacts of the project to:	Tables 12.1-1 and 12.2-1 (all categories)	
48	5.2	▪ Fish and fish habitat (*Fisheries Act*)	7.8	
49	5.2	▪ Aquatic species (*Species at Risk Act*)	7.8, 7.10	
50	5.2	▪ Migratory birds (*Migratory Birds Convention Act*, 1994)	7.10.4	
51	5.3	Description of potential environmental impacts of the project to federal, provincial lands (outside	11.3	International Rivers

Item	Clause	Requirement	PD Section	Notes
		the province the project is located in) or international lands		Improvement Act
52	5.4	Description of the effects on Aboriginal peoples resulting from changes to the environment caused by the project:	Tables 12.1-1 and 12.2-1	
53	5.4	▪ Health and socio-economic conditions	11.2.4, 8.2, 12.1, 12.2	
54	5.4	▪ Physical and cultural heritage	11.2.4, Table 12.1-1, Table 12.2-1	
55	5.4	▪ Current use of lands and resources for traditional purposes	11.2.4, Table 12.1-1, Table 12.2-1	
56	5.4	▪ Structure, site or thing of historical, archaeological, paleontological or architectural significance	11.2.4, 8.3, Table 12.1-1, Table 12.2-1	
6.0 Proponent Engagement and Consultation with Aboriginal Groups				
In order to determine the scope of Aboriginal interests related to the project, the proponent should provide background information on Aboriginal groups' potential or established Aboriginal or treaty rights, and identify the overlap area of the project describing any potential impacts to uses and lands associated with these rights.				
57	6.1	List of Aboriginal groups potentially interested in or affected by the project, including detailed contact information	9.1.3, 11.1, 11.2.3, Table 11-1, 8.2.1	
58	6.2	Description of engagement and consultation activities with Aboriginal groups undertaken to date with regards to the project (including names, date(s) that engagement/consultation activities occurred, and means of engagement/consultation – meetings, correspondence, communications)	11.2.1, 11.2.2, Appendix C	
59	6.3	Summary of comments and concerns expressed by Aboriginal groups, and responses provided to date with regards to the project	10.2.1, 11.2.4	
60	6.4	Summary of current land and resource use by Aboriginal groups/peoples for traditional purposes	11.1, 8, 8.1	
61	6.5	Overview of a consultation plan identifying ongoing and proposed Aboriginal engagement and consultation activities, schedule and type of information that will be collected (or reasons why engagement and consultation is not required)	11.2.2, 8.1.2	
7.0 Consultation with the Public and Other Parties				
62	7.1	List of stakeholders potentially interested in or affected by the project, including detailed contact information and a description of engagement and consultation activities to date (names, date(s) that engagement/consultation activities occurred, and means of engagement/consultation – meetings, correspondence, communications)	11.4, Appendix C	
63	7.2	Summary of comments and concerns expressed by stakeholders, and responses provided to date with regards to the project	11.4.1	

Item	Clause	Requirement	PD Section	Notes
64	7.3	Summary of ongoing and proposed stakeholder consultation activities	11.4.3	
65	7.4	Summary of consultations with other authorities that have environmental assessment or regulatory decision-making jurisdiction with respect to the project	11.3	EAO

APPENDIX C

Summary of Engagement Activity

ARCTOS
ANTHRACITE PROJECT

Appendix C: Summary of Engagement to Date

The following table outlines key engagement activities for the proposed Arctos project for the period July 2011 to December 2012. The table is not inclusive of all activities. A number of other communications, e.g., unofficial discussions (in person, by telephone or e-mail), or attendance at conferences, have also occurred but are not documented here. Section 4.2.4 provides a high-level overview of key issues that have been identified during engagement.

#	Date	Aboriginal Group	Summary of Engagement Activity
	July 25, 2011	Tahltan Centre Council and Advisors	▪ Meeting in Vancouver to discuss the formation of the joint venture between Fortune and POSCO and to discuss how to engage with the Tahltan people
	August 8, 2011	Gitxsan Simgiigyet of the Upper Skeena and Sustut Watersheds	▪ Meeting in New Hazelton to discuss project updates from Fortune Minerals Limited., and announcement of POSCO Canada joint venture
	September 8, 2011	Tahltan Leadership – Tahltan Central Council, Tahltan Band Council, Iskut Band Council and Tahltan elders	▪ Presentation and project overview of the proposed project to the Tahltan Leadership in Dease Lake
	September 9, 2011	Tahltan Central Council, Tahltan Band Council, Iskut Band Council and Tahltan Elders	▪ Aerial tour of Project area
	September 23, 2011	Gitxsan Simgiigyet of the Upper Skeena and Sustut Watersheds	▪ Attempted aerial tour of the project area, cancelled due to bad weather in Smithers
	October 19, 2011	Skii km Lax Ha	▪ Meeting in New Hazelton with Skii km Lax Ha to discuss the new joint venture and how to engage with them as the project progresses
	October 20, 2011	Gitxsan Hereditary Chiefs, Gitxsan Summit	▪ Presentation in Kitwanga at the Gitxsan Summit outlining the joint venture, project history, and the project's future direction
	November 6, 2011	Gitxsan Simgiigyet	▪ Meeting in Vancouver with two Gitxsan Simgiigyet based in Vancouver to outline the joint venture, project history, and the project's future and direction
	November 24, 2011	Gitxsan Simgiigyet of the Upper Skeena and Sustut watersheds	▪ Meeting in New Hazelton to discuss the proposed project, potential effects, Gitxsan questions and concerns
	November 2011	Gitxsan Simgiigyet of the Upper Skeena and Sustut watersheds	▪ Interviews with the Simgiigyet in their homes to listed to their questions, concerns and interests with respect to the proposed project
	January 12, 2012	Gitxsan Simgiigyet of the Upper Skeena and Sustut watersheds	▪ Meeting in New Hazelton to share information on Gitxsan culture, values, protocols and approach; Discussion of proposed project, questions, opportunities and participation.
	January 23-24, 2012	Skii km Lax Ha	▪ Meetings in Vancouver to discuss timelines for the EA process and project ; traditional knowledge (TK) study; involvement in field work; mine reclamation process
	March 8, 2012	Gitxsan Simgiigyet of the Upper Skeena and Sustut watersheds	▪ Meeting in Kitwanga with two Gitxsan Simgiigyet

#	Date	Aboriginal Group	Summary of Engagement Activity
	April 4, 2012	Tahltan Central Council	▪ Letter with work plan and permit application for proposed winter aerial survey along transportation route
	April 10, 2012	Gitxsan Simgiigyet of the Upper Skeena and Sustut Watersheds	▪ Meeting in New Hazelton to discuss proposed field work, TK studies, and future engagement
	April 10, 2012	Gitxsan Simogyat	▪ Meeting with a Gitxsan Simogyat; in New Hazelton
	April 11, 2012	Skii km Lax Ha	▪ Meeting in Gitanmaax to discuss Traditional Knowledge and Traditional Land Use Studies
	April 26, 2012	Gitxsan Simogyat	▪ Meeting with a Gitxsan Simogyat in Vancouver
	May 1, 2012	Skeena Fisheries Commission / Gitksan Watershed Authorities	▪ Meeting in Hazelton to discuss organizational mandate, geographic extent of interests, capacity, interests in the project area (particularly along the rail line)
	May 27, 2012	Gitxsan Simgiigyet of the Upper Skeena and Sustut Watersheds	▪ Meeting with Simgiigyet in New Hazelton to discuss field studies/permit applications (copies provided), Traditional Knowledge, archaeology, fisheries, and access to Gitxsan territory
	May 28, 2012	Gitxsan Simgiigyet of the Upper Skeena and Sustut Watersheds	▪ Three individual meetings with Simgiigyet and representatives in Gitanmaax (2 meetings) and Hazelton (1 meeting) to discuss the project and field studies/permit applications.
	May 28/ June 4 , 2012	Tahltan Central Council and Tahltan Heritage Resources Environmental Assessment Team (THREAT)	▪ Letter sent to Tahltan Central Council and THREAT with draft Work Plans and permit applications (e-mail/hard copy)
	June 1, 2012	Gitxsan	▪ Gitxsan Job Fair in Gitsegukla
	June 4, 2012	Skii km Lax Ha	▪ Letter sent to Skii km Lax Ha with draft Work Plans and permit applications
	June 18, 2012	Gitxsan Simgiigyet	▪ Meeting in Vancouver with two Simgiigyet
	July 6, 2012	Gitxsan	▪ Meeting in Vancouver with representative of a Gitxsan Simogyat
	August 1, 2012	Gitxsan Simogyat	▪ Meeting in Vancouver with a Gitxsan Simogyat and others to review the project and proposed environmental field work
	August 2, 2012	Gitxsan Simgiigyet of the Upper Skeena and Sustut Watersheds	▪ Regular meeting in New Hazelton to discuss ongoing field work
	September 18, 2012	Gitxsan Simgiigyet of the Upper Skeena and Sustut Watersheds	▪ Aerial site tour of the railway route
	September 19, 2012	Gitxsan - Kispiox Community	▪ Community Open House in Kispiox to present the proposed Arctos Anthracite Joint Venture (AAJV) project with a focus on general project background, Traditional Knowledge, social and economic effects, and the environment

#	Date	Aboriginal Group	Summary of Engagement Activity
	September 20, 2012	Gitxsan - Gitsegukla Community	▪ Community Open House in Gitsegukla to present the proposed AAJV project with a focus on general project background, Traditional Knowledge, social and economic effects, and the environment
	September 21, 2012	Gitxsan - Kitwanga Community	▪ Community Open House in Kitwanga to present the proposed AAJV project with a focus on general project background, Traditional Knowledge, social and economic effects, and the environment ▪ A Tahltan/Iskut delegation also attended
	September 22, 2012	Gitxsan - New Hazelton Community - non-Aboriginal people from New Hazelton and surrounding area(s) also attended	▪ Community Open House in New Hazelton to present the proposed AAJV project with a focus on general project background, Traditional Knowledge, social and economic effects, and the environment. ▪ A Tahltan/Iskut delegation also attended
	October 18, 2012	Gitxsan Hereditary Chiefs, Gitxsan Summit	▪ Presentation by FML to the Gitxsan Summit in Gitanmaax
	November 7, 2012	Tahltan Central Council	▪ Letter sent to the Tahltan Central Council seeking comment on Draft Project Description Report (copies provided)
	November 12, 2012	Skii km Lax Ha	▪ Letter sent to Skii km Lax Ha seeking comment on Draft Project Description Report (copy provided)
	November 28, 2012	Meeting with the Gitxsan Simgiigyet of the Upper Skeena and Sustut Watersheds	▪ Meeting in New Hazelton to summarize FML's work completed to date and to present the Draft Project Description (copies provided)
	November 29, 2012	Gitxsan Treaty Society (Gitxsan Hereditary Chiefs Office)	▪ Meeting at Hazelton offices to provide update on the project and respond to specific questions/concerns
	November 29, 2012	Skeena Fisheries Commission	▪ Meeting in Gitanmaax to collaborate on field work/studies
	November 29, 2012	Skeena Watershed Conservation Coalition	▪ Meeting in Hazelton to provide an overview of the proposed project and a copy of the draft Project Description Report
	December 14, 2012	Gitxsan Simogyat	▪ Meeting with Vancouver based Simogyat to discuss Draft Project Description and other issues