KGHM AJAX Mining Inc.

January 11, 2012

Dear Interested Public,

The Ajax Project, our proposed Copper and Gold mine located on the southwest side of Kamloops, is progressing through the preliminary steps of the Environmental Assessment process. This process is administered jointly by the provincial Environmental Assessment Office, and the federal Canadian Environmental Assessment Agency.

Currently in the Environmental Assessment process, we are developing a document that will specify our requirements for the eventual studies and analyses to be submitted for evaluation. This document follows a template supplied to us by government, and is called the Application Information Requirements (AIR) in the provincial process, and the Environmental Impact Statement Guidelines (EIS Guidelines) in the federal process. As both levels of government have harmonized their review of the proposed Ajax Project, one single document is being developed that will satisfy both processes. The document is typically referred to by the acronym of its provincial process name – the AIR. As the document is under development, it remains in draft, and is therefore commonly referred to as the draft AIR, or simply the dAIR.

Further revision to this dAIR will incorporate input from government, First Nations, and the public. The provincial Environmental Assessment Office and federal Canadian Environmental Assessment Agency will approve a final AIR when they are satisfied that issues, concerns and regulatory requirements have been satisfactorily addressed.

We are pleased to provide the attached dAIR for your review and comment. We welcome your input to ensure we have captured the issues that must be studied as we progress through the Environmental Assessment. Please take advantage of the Public Comment Period from January 11 to March 12, 2012 to provide your written comments regarding the dAIR to the provincial Environmental Assessment Office or the federal Canadian Environmental Assessment Agency. Please note that there will be additional Public Comment Periods prior to the conclusion of the Environmental Assessment process, including opportunities to comment on the completed studies.

Note also that, in developing this most recent dAIR for public review, we met with and received input from numerous local government, First Nation, provincial, and federal specialists. These include representatives from:

- City of Kamloops
- Thompson Nicola Regional District
- Tk'emlups Indian Band
- Skeetchestn Indian Band
- Interior Health

330 Seymour Street, Kamloops, British Columbia V2C 2G2
Telephone: 250.374.5446 (KGHM) Facsimile: 250.374.5443

- Ministry of Forests, Lands and Natural Resource Operations
- Ministry of Environment
- Ministry of Energy and Mines
- Fisheries and Oceans Canada
- Health Canada
- Environment Canada
- Transport Canada
- Natural Resources Canada

Resulting from our consultation with these specialists, and from reviewing the public comments received during the first Public Comment Period (June 8 to July 11, 2011), we have modified the dAIR through numerous updates. The major enhancements to date include:

- Specific reference to City of Kamloops and TNRD plans, guidelines and bylaws
- More detailed description of the proposed Ajax Project was added
- Numerous clarifications to process and administration of the Ajax Project Environmental Assessment
- Update to the methodology for Cumulative Effects Assessment
- Addition of the section "Benefits to Canadians"
- Addition of the following as Valued Components to the existing list for inclusion in the Effects Assessment:
  - Geology, Landforms, and Soils
  - Pacific chorus frog and Columbia spotted frog
  - Sandhill crane
  - Ruffed grouse
  - Moose
  - Economic Diversification
  - Jacko Lake
  - Visual Impact / Aesthetic Features
  - Aboriginal Community Interest

We feel that we are now providing you with a comprehensive and considered document for your review. We look forward to hearing from you.

Sincerely,

KGHM Ajax Mining Inc.

Dianna Stoopnikoff
Environmental Manager

330 Seymour Street, Kamloops, British Columbia V2C 2G2
Telephone: 250.374.5446 (KGHM) Facsimile: 250.374.5443

ISO 9001, ISO 14001
OHSAS 18001

KGHM AJAX MINING INC.
AJAX PROJECT

DRAFT APPLICATION INFORMATION REQUIREMENTS / ENVIRONMENTAL IMPACT STATEMENT GUIDELINES

FOR THE KGHM AJAX MINING INC. APPLICATION FOR AN ENVIRONMENTAL ASSESSMENT / ENVIRONMENTAL IMPACT STATEMENT FOR COMPREHENSIVE STUDY

(REF. NO. VA101-246/8-2)

Rev	Description	Date	Approved
A	Issued in Draft	April 18, 2011	
B	EAO Preliminary Comments	June 15, 2011	
C	Public Comments Address	August 10, 2011	
D	Working Group Comments	January 6, 2012	

Knight Piésold Ltd.

Suite 1400
750 West Pender Street
Vancouver, British Columbia Canada V6C 2T8
Telephone: (604) 685-0543
Facsimile: (604) 685-0147
www.knightpiesold.com

Knight Piésold CONSULTING

PREFACE TO THE AIR

PURPOSE OF THE APPLICATION INFORMATION REQUIREMENTS

In British Columbia, proposed major projects are required to obtain an Environmental Assessment Certificate (Certificate) in accordance with British Columbia's *Environmental Assessment Act* (BCEAA). An Application for a Certificate must be made by the proposed project Proponent to the Environmental Assessment Office (EAO), and the Application must comply with all the information requirements set out in the Application Information Requirements (AIR) formally approved and issued by the EAO. The AIR specifies the information that will be needed to conduct a provincial environmental assessment (EA) and that will be provided by the KGHM Ajax Mining Inc. (KAM) in their Application for a Certificate.

Federal review under the *Canadian Environmental Assessment Act* (CEAA) is managed by the Canadian Environmental Assessment Agency (CEA Agency). The CEA Agency has determined that the Ajax Project is subject to federal review because it will request authorization or licence from Fisheries and Oceans Canada and Natural Resources Canada. The proposed project is subject to a comprehensive study EA under the Comprehensive Study List Regulations because it is a proposed metal mine, other than a gold mine, with an ore production capacity of 3 000 t/d or more as well as a proposed gold mine that exceeds the ore production capacity threshold of 600 tonnes of ore per day, and proposes construction of a metal mill that is anticipated to exceed the ore input capacity threshold of 4000 tonnes of ore per day. Proposed federal studies are outlined in an Environmental Impact Statement Guidelines (EIS Guidelines) document; information needed to complete the federal EA process is submitted to the CEA Agency for approval in an Environmental Impact Statement (EIS).

In line with the federal-provincial harmonization process (described below) the provincial AIR document and the Application for an Environmental Assessment Certificate will be used as the federal EIS Guidelines and the Environmental Impact Statement for a Comprehensive Study, respectively. For brevity, the terms AIR and Application will be used to refer to the EIS Guidelines and EIS, respectively, throughout this document.

PROJECT DESCRIPTION

KGHM Ajax Mining Inc. (KAM) proposes to develop the Ajax Project (the Project), an open pit copper-gold mine at the historic Afton Mining Camp, partially within the city of Kamloops, British Columbia (BC). The feasibility design of the Project is currently underway, and details of the design may be subject to change as work continues.

The Project is located in the South-Central Interior of British Columbia, southwest of the junction of the Trans-Canada Highway No. 1 and the Coquihalla Highway (No. 5) within the Thompson Nicola Regional District. The coordinates for the centre of the Project area are approximately 50°38' N latitude and 120°28' W longitude. Some components of the mine will be entirely or partially within Kamloops City limits, including the north and east waste rock management facilities; processing facility and truck shop; thickened tailings plant and emergency pond; process water intake and line; and tailings storage facility.

The proposed infrastructure will be located primarily on private land owned by KAM, with some utilisation of crown land.

The Project lies in the traditional territory of the Secwepemc Nation. Within the Secwepemc Nation, the Tk'emlúps te Secwepemc (Kamloops Indian Band) and the Skeetchestn Indian Band are the Aboriginal groups in closest proximity to the Project. Both bands are members of the Shuswap Nation Tribal Council. In a cooperative effort, the Tk'emlúps and Skeetchestn Bands have formed the Stk'emlupsemc te Secwepemc (STS), as a division of the greater Secwepemc Nation (also known as the Stk'emlupsemc of the Secwepemc Nation, or SSN). The Ashcroft Indian Band and Lower Nicola Indian Band, whose members are part of the Nlaka'pamux Nation, have also advised that the proposed Project lies within their asserted traditional territories.

The current mine plan for the proposed project predicts an operation based on a mill throughput of 60,000 tonnes of ore per day from the Ajax Pit over a 23 year mine life. Total material movement from the pit during the life of the mine is estimated at 1,701 Mt. Average annual production of the mine is estimated at 106 million pounds of copper and 99,400 ounces of gold in concentrate, based on a conceptual mine plan supplying 21.9 million tonnes of ore per year to the mill. Ore and waste zones will be mined on 12 m benches with nominal 13.5 m deep holes drilled in a single pass. Waste material will be blasted to produce a suitable particle size distribution for loading and transportation in 218 t class trucks. Mineralized material will be blasted to comply with fragmentation requirements and a specified particle distribution. Primary loading of waste and ore on the full 12 m benches will be accomplished by electric-hydraulic shovels with a 42 m^3 bucket.

The ore will be delivered from the mine utilizing a combined in-pit crushing and conveying system (IPCC) and out-pit gyratory primary crusher system. Ore will be crushed to the size which meets process requirements and will be transferred to the coarse ore stockpile by belt conveyors. Waste rock will be crushed so that it can be handled by the down-stream belt conveyors and stacking system. The conveyors will be constructed on the south and west side of the ultimate pit limit.

The processing facility will consist of stage-wise crushing and grinding, followed by a flotation process to recover and upgrade copper from the feed material. A gravity circuit will be included within the flotation circuit to enhance gold recovery. The flotation concentrate will be thickened and filtered and sent to the concentrate stockpile for subsequent shipping by truck to the Port of Vancouver.

The Tailings Storage Facility (TSF) will be located approximately 3.5 km west of the open pit in between Lac Le Jeune Road and Highway 5. The main elements of the TSF will include thickened tailings stack, TSF water collection system, collection ditches, TSF underdrain, and a TSF pond emergency spillway. The maximum elevation of the tailings would be at about 1,022 masl along the west side. A Thickened Tailings Plant (TTP) will produce a non-segregating tailings slurry. The plant will be located north of the TSF at 930 masl.

Two waste rock storage facilities (WRF) are planned: the North Waste Dump (NWD) and the East Waste Dump (EWD). The NWD will contain 728 Mt of waste and will have a final elevation of 1,084 masl. The EWD will have a top elevation of 1060 m and a tonnage capacity of 420 Mt. A total of 4.5 Mt of overburden and topsoil will be stored in the North Overburden Stockpile close to the NWD and another

3 Mt will be stored in the East Overburden Stockpile close to the EWD. The overburden tonnages in the two stockpiles are considered sufficient to cover the reclamation requirements for the NWD and EWD.

Project components to be assessed are expected to include the following:

- Ajax open pit
- Processing facility
- Thickened tailings plant
- Tailings storage facility
- Waste rock management facilities
- Water management facilities
- Road and bridge upgrades
- New access and haul roads
- Borrow sources
- Transmission line and transformer upgrades
- Explosives storage facility
- Process and potable water system, including the intake in Kamloops Lake
- Concentrate storage and shipping area, and
- Concentrate transport to Port of Vancouver.

PROVINCIAL SCOPE OF PROPOSED PROJECT

The BCEAA, administered by the BC Environmental Assessment Office (EAO), is the legal framework for the province's environmental assessment process. The BCEAA is supported by several regulations, including the *Reviewable Projects Regulation*, as well as a variety of policy, procedural, and technical guidelines. The proposed Project constitutes a reviewable project under Part 3 of the *Reviewable Projects Regulation* (BC Reg.370/02), since the production capacity of the proposed project will exceed 75,000 tonnes per year of mineral ore. As specified in the Section 10 Order issued by the EAO on February 25, 2011, KAM must complete the provincial EA process before proceeding with construction and operation of the Project.

In addition to the EA Certificate, KAM will require a number of provincial permits before construction of the Ajax Project can begin. KAM intends to apply for concurrent review of provincial permits in accordance with the Concurrent Approval Regulation (B.C. Reg. 371/2002) of the *BCEAA*. A decision on these approvals cannot be made until and unless the EA Certificate has been issued.

FEDERAL SCOPE OF PROPOSED PROJECT

The Project will require an Environmental Assessment under the CEAA, by virtue of it requiring federal permits and authorizations. This was confirmed in a letter from the CEA Agency to KAM on March 16, 2011.

It is anticipated that the Project will require Authorization from Fisheries and Oceans Canada (DFO) under the *Fisheries Act* Section 35(2), as well as a licence from Natural Resources Canada (NRCan) under Section 7(1) of the *Explosives Act*.

There are five types of federal EA: screening, class screening, comprehensive study, mediation, and review panel. The Project as proposed will follow a comprehensive study review track as defined in Section 16 of the *Comprehensive Study List Regulations* for a metal mine with an ore production capacity of greater than 3,000 tonnes per day.

The Major Projects Management Office (MPMO) has designated the Project as a major resource project subject to review in accordance with the procedures and practices developed under the *Cabinet Directive on Improving the Performance of the Regulatory System for Major Resource Projects*. The MPMO developed a Project Agreement on August 17, 2011 designed to track key milestones in the conduct of the federal environmental assessment.

FEDERAL – PROVINCIAL HARMONIZATION

Following the principles of the *Canada-BC Agreement for Environmental Assessment Cooperation (2004)*, a single joint harmonized environmental assessment process will be carried out for the Project. Under the harmonized process, the provincial AIR document and the Application for an Environmental Assessment Certificate will also be used as the federal EIS Guidelines and the Environmental Impact Statement for a Comprehensive Study, respectively, thereby reducing duplication. As previously described, the terms "Application Information Requirements" and "Environmental Impact Statement Guidelines" are used interchangeably throughout this document, as are "Application for an Environmental Assessment Certificate" and "Environmental Impact Statement". Other efficiencies between the two processes will be completed as feasible.

DEVELOPMENT OF THE AIR

The purpose of the AIR is to identify information that will be needed to conduct the environmental assessment and to provide this information in sufficient detail in the Application to allow evaluation of potential effects of the Project. Development of the AIR followed the "Application Information Requirements Template" (Environmental Assessment Office, 2010).

In developing the AIR, KAM consulted with local, provincial, and federal government representatives, as well as Aboriginal groups, stakeholders, and the public. The purpose of the early consultation was to identify issues and concerns to be addressed in the AIR and Application.

The following government agencies and community groups were consulted during development of the AIR:

- Environmental Assessment Office
- Canadian Environmental Assessment Agency
- Major Projects Management Office
- City of Kamloops
- Rotary Club

- Venture Kamloops
- MDRC
- Thompson Nicola Regional District
- Fish and Game Club
- Kamloops Fly Fishing Club
- Chamber of Commerce
- Stockmen's Group
- Naturalists Club
- Grasslands Conservation Council
- Tk'emlúps te Secwepemc
- Skeetchestn Indian Band
- Lower Nicola Indian Band
- Ashcroft Indian Band
- Health Canada
- Environment Canada
- Transport Canada
- Fisheries and Oceans Canada
- Natural Resources Canada
- Ministry of Environment
- Ministry of Energy and Mines, and
- Ministry of Forest, Lands and Natural Resource Operations.

Following submission of the first draft AIR (dAIR) to the EAO and the CEA Agency, the EAO circulated the document to the Working Group for review and comment. The Working Group is comprised of representatives from federal, provincial, and local governments, and Aboriginal groups.

The EAO will also sequester public input by posting the dAIR on the BC EAO Project Information Centre (e-PIC) website and specifying a period and process for written input. Per the Section 11 Order issued on XXXX, 2011, the public will have a 60 day period to provide comment. The EAO will also direct the proponent to hold one or more public open houses in one or more locations near the Project site during the pre-Application period.

All federal and provincial agency, Aboriginal groups, and public comments, along with responses from KAM, will be recorded in a Tracking Table and posted on the e-PIC website, and where relevant, will be addressed in the final AIR.

NEXT STEPS IN THE ENVIRONMENTAL ASSESSMENT OF THE PROJECT

Once the approved AIR is issued by the EAO and CEA Agency, KAM will develop and be eligible to submit to the EAO and CEA Agency an Application for screening, to ensure compliance with the AIR. In anticipation of an approved AIR in early 2011, KAM expects to submit a draft Application in 2012. If the Application successfully passes the screening, the EAO will initiate the 180-day environmental assessment review.

Once the review is completed, the EAO will prepare an assessment report for the Minister of the Environment and Minister of Energy and Mines with a recommendation on the issuance of an Environmental Assessment Certificate. Ministers have up to 45 days to render their final decision on whether or not to issue an Environmental Assessment Certificate. If the Proponent's request for concurrent permitting is granted by the EAO, the relevant provincial permitting agencies must render a decision within 60 days of a Ministerial decision to issue an EA certificate, pursuant to Section 8 of the *Concurrent Approval Regulation,* on any approvals for which the proponent has appropriately filed the necessary applications.

Similarly, the CEA Agency and Responsible Authorities will submit a Comprehensive Study Report, containing conclusions and recommendations, to the Federal Minister of the Environment for a decision pursuant to Section 23 of the CEAA. Once the EA decision is issued, the project will be referred to the applicable federal agencies for decision on the issuance of federal authorizations required for the Project. It is hoped that an EA Certificate will be issued in order for the proponent to initiate construction of the Project in 2013.

Knight Piésold CONSULTING

TABLE OF CONTENTS

PAGE

PREFACE TO THE AIR P1

TABLE OF CONTENTS i

PREFACE TO THE APPLICATION I

LIST OF ACRONYMS II

LIST OF UNITS IV

EXECUTIVE SUMMARY V

PART A - INTRODUCTION AND BACKGROUND 1

SECTION 1.0 - PURPOSE OF THE APPLICATION 1

SECTION 2.0 - PROJECT OVERVIEW 1

2.1 PROPONENT DESCRIPTION 1
2.1.1 Proponent 1
2.1.2 Consultants 2
2.2 PROJECT BACKGROUND 3
2.2.1 Provincial and Federal Triggers 3
2.2.2 Project Location 4
2.2.3 Project History 4
2.2.4 Proposed Project Schedule 5
2.2.5 Environmental Management System and Adaptive Management Approach 5
2.3 PROVINCIAL SCOPE OF THE PROPOSED PROJECT 7
2.4 FEDERAL SCOPE OF THE PROPOSED PROJECT 7
2.5 ALTERNATIVE MEANS OF UNDERTAKING THE PROPOSED PROJECT 7
2.6 PROJECT LAND USE 7
2.7 PROJECT BENEFITS 8
2.8 APPLICABLE PERMITS 9

SECTION 3.0 - DETAILED PROJECT DESCRIPTION 10

3.1 GEOLOGY 10
3.1.1 Regional Geology 10
3.1.2 Local Geology 10
3.1.3 Mineralization 11
3.2 MINERAL RESOURCES 12
3.3 SITE GEOCHEMISTRY 12

3.4 AJAX PIT DEVELOPMENT 13
3.4.1 Pioneering Work 13
3.4.2 Pit Development 13
3.4.3 Drilling and Blasting 14
3.4.4 Loading and Hauling 14
3.4.5 In-Pit crushing and conveying 14
3.5 MINE PRODUCTION SCHEDULE 15
3.6 PROCESS PLANT AND ORE PROCESSING 15
3.6.1 Primary Crushing 16
3.6.2 Coarse Ore Stockpile and Reclaim 16
3.6.3 Secondary Crushing 17
3.6.4 HPGR Feed Stockpile and Reclaim 17
3.6.5 HPGR Crushing 17
3.6.6 Grinding and Classification 18
3.6.7 Flotation and Regrind Circuits 19
3.6.8 Gravity Circuit 20
3.6.9 Concentrate Handling 21
3.6.10 Reagent Handling and Storage 21
3.6.11 Assay and Metallurgical Laboratory 22
3.7 TAILINGS MANAGEMENT 23
3.7.1 Tailings Storage Facility 23
3.7.2 Thickened Tailings Plant 23
3.8 WASTE ROCK STORAGE AND ORE STOCKPILES 25
3.8.1 Waste Rock Storage Facilities 25
3.8.2 Ore Stockpiles 26
3.9 OVERBURDEN AND TOPSOIL STOCKPILES 26
3.10 MINING EQUIPMENT 26
3.11 EXPLOSIVES MANUFACTURING AND STORAGE 26
3.12 SITE WATER MANAGEMENT 27
3.13 ANCILLARY INFRASTRUCTURE 28
3.14 WATER SUPPLY 29
3.14.1 Fresh water supply system 29
3.14.2 Process water supply system 30
3.15 POWER SUPPLY 30
3.16 ACCESS AND SITE ROADS 30
3.17 PROJECT ACCESS AND TRANSPORT CORRIDOR 31
3.18 CLOSURE AND RECLAMATION 31
3.18.1 Tailings Storage Facility Closure 32
3.18.2 Waste Rock Management Facilities Closure 32
3.18.3 Ajax Pit Closure 32
3.18.4 Processing Plant Closure 32
3.18.5 Access Road Closure 33

SECTION 4.0 - ASSESSMENT PROCESS 34

4.1 PROVINCIAL EA PROCESS 34
4.2 FEDERAL REVIEW 34
4.3 ABORIGINAL INFORMATION DISTRIBUTION AND CONSULTATION 34
4.4 PUBLIC AND AGENCY INFORMATION DISTRIBUTION AND CONSULTATION 34
4.4.1 Pre-Application Consultation 35
4.4.2 Consultation Planned During Application Review 35

PART B - ASSESSMENT OF POTENTIAL EFFECTS, MITIGATION MEASURES, AND SIGNIFICANCE OF RESIDUAL EFFECTS 36

SECTION 5.0 - EFFECTS ASSESSMENT 36

5.1 PROJECT EFFECTS ASSESSMENT METHODOLOGY 37
5.1.1 Valued Components 37
5.1.2 Spatial Boundaries 40
5.1.3 Temporal Boundaries 40
5.1.4 Potential Effects of the Proposed Project and Proposed Mitigation 40
5.1.5 Residual Effects and their Significance 41
5.1.6 Cumulative Effects Assessment 41

SECTION 6.0 - ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS 45

6.1 CLIMATE 45
6.1.1 Rationale 45
6.1.2 Background 45
6.1.3 Spatial and Temporal Boundaries 45
6.1.4 Potential Effects of the Proposed Project and Proposed Mitigation 46
6.1.5 Residual Effects and their Significance 46
6.1.6 Cumulative Effects Assessment 46
6.1.7 Conclusion 47
6.2 GEOLOGY, LANDFORMS AND SOILS 47
6.2.1 Rationale 47
6.2.2 Background 47
6.2.3 Spatial and Temporal Boundaries 48
6.2.4 Potential Effects of the Proposed Project and Proposed Mitigation 48
6.2.5 Residual Effects and their Significance 48
6.2.6 Cumulative Effects Assessment 48
6.2.7 Conclusion 49
6.3 SURFACE WATER QUALITY 49
6.3.1 Rationale 49
6.3.2 Background 49
6.3.3 Spatial and Temporal Boundaries 50
6.3.4 Potential Effects of the Proposed Project and Proposed Mitigation 50
6.3.5 Residual Effects and their Significance 53
6.3.6 Cumulative Effects Assessment 54
6.3.7 Conclusion 54

6.4 SURFACE WATER QUANTITY 54
6.4.1 Rationale 54
6.4.2 Background 55
6.4.3 Spatial and Temporal Boundaries 55
6.4.4 Potential Effects of the Proposed Project and Proposed Mitigation 55
6.4.5 Residual Effects and their Significance 56
6.4.6 Cumulative Effects Assessment 56
6.4.7 Conclusion 57
6.5 GROUNDWATER QUALITY 57
6.5.1 Rationale 57
6.5.2 Background 57
6.5.3 Spatial and Temporal Boundaries 58
6.5.4 Potential Effects of the Proposed Project and Proposed Mitigation 58
6.5.5 Residual Effects and their Significance 61
6.5.6 Cumulative Effects Assessment 61
6.5.7 Conclusion 61
6.6 GROUNDWATER QUANTITY 62
6.6.1 Rationale 62
6.6.2 Background 62
6.6.3 Spatial and Temporal Boundaries 63
6.6.4 Potential Effects of the Proposed Project and Proposed Mitigation 63
6.6.5 Residual Effects and their Significance 64
6.6.6 Cumulative Effects Assessment 64
6.6.7 Conclusion 65
6.7 FISH POPULATIONS AND FISH HABITAT 65
6.7.1 Rationale 65
6.7.2 Background 65
6.7.3 Spatial and Temporal Boundaries 66
6.7.4 Potential Effects of the Proposed Project and Proposed Mitigation 66
6.7.5 Residual Effects and their Significance 67
6.7.6 Cumulative Effects Assessment 68
6.7.7 Conclusion 68
6.8 RARE PLANTS 68
6.8.1 Rationale 68
6.8.2 Background 69
6.8.3 Spatial and Temporal Boundaries 69
6.8.4 Potential Effects of the Proposed Project and Proposed Mitigation 69
6.8.5 Residual Effects and their Significance 70
6.8.6 Cumulative Effects Assessment 70
6.8.7 Conclusion 70
6.9 RARE AND SENSITIVE ECOLOGICAL COMMUNITIES 71
6.9.1 Rationale 71
6.9.2 Background 71
6.9.3 Spatial and Temporal Boundaries 72
6.9.4 Potential Effects of the Proposed Project and Proposed Mitigation 72

6.9.5 Residual Effects and their Significance 72
6.9.6 Cumulative Effects Assessment 73
6.9.7 Conclusion 73
6.10 TERRESTRIAL INVERTEBRATE VC 73
6.10.1 Rationale 73
6.10.2 Background 74
6.10.3 Spatial and Temporal Boundaries 74
6.10.4 Potential Effects of the Proposed Project and Proposed Mitigation 74
6.10.5 Residual Effects and their Significance 75
6.10.6 Cumulative Effects Assessment 75
6.10.7 Conclusion 75
6.11 AMPHIBIAN VC 76
6.11.1 Rationale 76
6.11.2 Background 76
6.11.3 Spatial and Temporal Boundaries 77
6.11.4 Potential Effects of the Proposed Project and Proposed Mitigation 77
6.11.5 Residual Effects and their Significance 77
6.11.6 Cumulative Effects Assessment 78
6.11.7 Conclusion 78
6.12 REPTILE VC 78
6.12.1 Rationale 78
6.12.2 Background 79
6.12.3 Spatial and Temporal Boundaries 79
6.12.4 Potential Effects of the Proposed Project and Proposed Mitigation 79
6.12.5 Residual Effects and their Significance 80
6.12.6 Cumulative Effects Assessment 80
6.12.7 Conclusion 80
6.13 MIGRATORY BIRD VC 80
6.13.1 Rationale 80
6.13.2 Background 81
6.13.3 Spatial and Temporal Boundaries 81
6.13.4 Potential Effects of the Proposed Project and Proposed Mitigation 82
6.13.5 Residual Effects and their Significance 82
6.13.6 Cumulative Effects Assessment 83
6.13.7 Conclusion 83
6.14 RAPTOR VC 83
6.14.1 Rationale 83
6.14.2 Background 84
6.14.3 Spatial and Temporal Boundaries 84
6.14.4 Potential Effects of the Proposed Project and Proposed Mitigation 84
6.14.5 Residual Effects and their Significance 85
6.14.6 Cumulative Effects Assessment 85
6.14.7 Conclusion 85
6.15 NON-MIGRATORY GAMEBIRD VC 86
6.15.1 Rationale 86

6.15.2 Background 86
6.15.3 Spatial and Temporal Boundaries 86
6.15.4 Potential Effects of the Proposed Project and Proposed Mitigation 87
6.15.5 Residual Effects and their Significance 87
6.15.6 Cumulative Effects Assessment 87
6.15.7 Conclusion 88
6.16 BAT VC 88
6.16.1 Rationale 88
6.16.2 Background 88
6.16.3 Spatial and Temporal Boundaries 89
6.16.4 Potential Effects of the Proposed Project and Proposed Mitigation 89
6.16.5 Residual Effects and their Significance 89
6.16.6 Cumulative Effects Assessment 90
6.16.7 Conclusion 90
6.17 MAMMAL VC 90
6.17.1 Rationale 90
6.17.2 Background 91
6.17.3 Spatial and Temporal Boundaries 91
6.17.4 Potential Effects of the Proposed Project and Proposed Mitigation 92
6.17.5 Residual Effects and their Significance 92
6.17.6 Cumulative Effects Assessment 92
6.17.7 Conclusion 93
6.18 SUMMARY OF ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS 93

SECTION 7.0 - ASSESSMENT OF POTENTIAL ECONOMIC EFFECTS 94

7.1 LABOUR FORCE 94
7.1.1 Rationale 94
7.1.2 Background 94
7.1.3 Spatial and Temporal Boundaries 94
7.1.4 Potential Effects of the Proposed Project and Proposed Mitigation 94
7.1.5 Residual Effects and their Significance 94
7.1.6 Cumulative Effects Assessment 95
7.1.7 Conclusion 95
7.2 EDUCATION AND TRAINING 95
7.2.1 Rationale 95
7.2.2 Background 95
7.2.3 Spatial and Temporal Boundaries 96
7.2.4 Potential Effects of the Proposed Project and Proposed Mitigation 96
7.2.5 Residual Effects and their Significance 96
7.2.6 Cumulative Effects Assessment 97
7.2.7 Conclusion 97
7.3 INCOME 97
7.3.1 Rationale 97
7.3.2 Background 97

7.3.3 Spatial and Temporal Boundaries 98
7.3.4 Potential Effects of the Proposed Project and Proposed Mitigation 98
7.3.5 Residual Effects and their Significance 98
7.3.6 Cumulative Effects Assessment 98
7.3.7 Conclusion 99
7.4 EMPLOYMENT 99
7.4.1 Rationale 99
7.4.2 Background 99
7.4.3 Spatial and Temporal Boundaries 99
7.4.4 Potential Effects of the Proposed Project and Proposed Mitigation 99
7.4.5 Residual Effects and their Significance 100
7.4.6 Cumulative Effects Assessment 100
7.4.7 Conclusion 100
7.5 BUSINESS 100
7.5.1 Rationale 100
7.5.2 Background 101
7.5.3 Spatial and Temporal Boundaries 101
7.5.4 Potential Effects of the Proposed Project and Proposed Mitigation 101
7.5.5 Residual Effects and their Significance 101
7.5.6 Cumulative Effects Assessment 101
7.5.7 Conclusion 102
7.6 COST OF LIVING 102
7.6.1 Rationale 102
7.6.2 Background 102
7.6.3 Spatial and Temporal Boundaries 102
7.6.4 Potential Effects of the Proposed Project and Proposed Mitigation 102
7.6.5 Residual Effects and their Significance 103
7.6.6 Cumulative Effects Assessment 103
7.7 HOUSING 103
7.7.1 Rationale 103
7.7.2 Background 104
7.7.3 Spatial and Temporal Boundaries 104
7.7.4 Potential Effects of the Proposed Project and Proposed Mitigation 104
7.7.5 Residual Effects and their Significance 104
7.7.6 Cumulative Effects Assessment 104
7.7.7 Conclusion 105
7.8 INFRASTRUCTURE 105
7.8.1 Rationale 105
7.8.2 Background 105
7.8.3 Spatial and Temporal Boundaries 106
7.8.4 Potential Effects of the Proposed Project and Proposed Mitigation 106
7.8.5 Residual Effects and their Significance 106
7.8.6 Cumulative Effects Assessment 106
7.8.7 Conclusion 107
7.9 ECONOMIC DIVERSIFICATION 107

7.9.1 Rationale 107
7.9.2 Background 107
7.9.3 Spatial and Temporal Boundaries 107
7.9.4 Potential Effects of the Proposed Project and Proposed Mitigation 107
7.9.5 Residual Effects and their Significance 108
7.9.6 Cumulative Effects Assessment 108
7.9.7 Conclusion 108
7.10 SUMMARY OF ASSESSMENT OF POTENTIAL ECONOMIC EFFECTS 108

SECTION 8.0 - ASSESSMENT OF POTENTIAL SOCIAL EFFECTS 109

8.1 CULTURE 109
8.1.1 Rationale 109
8.1.2 Background 109
8.1.3 Spatial and Temporal Boundaries 109
8.1.4 Potential Effects of the Proposed Project and Proposed Mitigation 109
8.1.5 Residual Effects and their Significance 109
8.1.6 Cumulative Effects Assessment 110
8.1.7 Conclusion 110
8.2 COMMUNITY HEALTH AND WELL-BEING 110
8.2.1 Rationale 110
8.2.2 Background 110
8.2.3 Spatial and Temporal Boundaries 111
8.2.4 Potential Effects of the Proposed Project and Proposed Mitigation 111
8.2.5 Residual Effects and their Significance 111
8.2.6 Cumulative Effects Assessment 111
8.2.7 Conclusion 112
8.3 PUBLIC FACILITIES AND SERVICES, INCLUDING TRANSPORTATION 112
8.3.1 Rationale 112
8.3.2 Background 112
8.3.3 Spatial and Temporal Boundaries 112
8.3.4 Potential Effects of the Proposed Project and Proposed Mitigation 112
8.3.5 Residual Effects and their Significance 113
8.3.6 Cumulative Effects Assessment 113
8.3.7 Conclusion 113
8.4 DARK SKY/SHADING 113
8.4.1 Rationale 113
8.4.2 Background 114
8.4.3 Spatial and Temporal Boundaries 114
8.4.4 Potential Effects of the Proposed Project and Proposed Mitigation 114
8.4.5 Residual Effects and their Significance 114
8.4.6 Cumulative Effects Assessment 114
8.4.7 Conclusion 115
8.5 LAND AND RESOURCE USE 115
8.5.1 Rationale 115

8.5.2 Background 115
8.5.3 Spatial and Temporal Boundaries 116
8.5.4 Potential Effects of the Proposed Project and Proposed Mitigation 116
8.5.5 Residual Effects and their Significance 116
8.5.6 Cumulative Effects Assessment 116
8.5.7 Conclusion 117
8.6 JACKO LAKE 117
8.6.1 Rationale 117
8.6.2 Background 117
8.6.3 Spatial and Temporal Boundaries 117
8.6.4 Potential Effects of the Proposed Project and Proposed Mitigation 118
8.6.5 Residual Effects and their Significance 118
8.6.6 Cumulative Effects Assessment 118
8.6.7 Conclusion 118
8.7 VISUAL IMPACT 119
8.7.1 Rationale 119
8.7.2 Background 119
8.7.3 Spatial and Temporal Boundaries 119
8.7.4 Potential Effects of the Proposed Project and Proposed Mitigation 119
8.7.5 Residual Effects and their Significance 119
8.7.6 Cumulative Effects Assessment 119
8.7.7 Conclusion 120
8.8 ABORIGINAL COMMUNITY INTERESTS 120
8.8.1 Rationale 120
8.8.2 Background 120
8.8.3 Spatial and Temporal Boundaries 120
8.8.4 Potential Effects of the Proposed Project and Proposed Mitigation 120
8.8.5 Residual Effects and their Significance 120
8.8.6 Cumulative Effects Assessment 121
8.8.7 Conclusion 121
8.9 SUMMARY OF ASSESSMENT OF POTENTIAL SOCIAL EFFECTS 121

SECTION 9.0 - ASSESSMENT OF POTENTIAL HERITAGE EFFECTS 122

9.1 HERITAGE OBJECTS 122
9.1.1 Rationale 122
9.1.2 Background 122
9.1.3 Spatial and Temporal Boundaries 122
9.1.4 Potential Effects of the Proposed Project and Proposed Mitigation 123
9.1.5 Residual Effects and their Significance 123
9.1.6 Cumulative Effects Assessment 123
9.1.7 Conclusion 124
9.2 HERITAGE SITES 124
9.2.1 Rationale 124
9.2.2 Background 124

9.2.3 Spatial and Temporal Boundaries 125
9.2.4 Potential Effects of the Proposed Project and Proposed Mitigation 125
9.2.5 Residual Effects and their Significance 125
9.2.6 Cumulative Effects Assessment 126
9.2.7 Conclusion 126
9.3 SUMMARY OF ASSESSMENT OF POTENTIAL HERITAGE EFFECTS 126

SECTION 10.0 - ASSESSMENT OF POTENTIAL HEALTH EFFECTS 127

10.1 AIR QUALITY (DUSTFALL, PM_{10} AND $PM_{2.5}$) 127
10.1.1 Rationale 127
10.1.2 Background 127
10.1.3 Spatial and Temporal Boundaries 128
10.1.4 Potential Effects of the Proposed Project and Proposed Mitigation 128
10.1.5 Residual Effects and their Significance 129
10.1.6 Cumulative Effects Assessment 129
10.1.7 Conclusion 130
10.2 WATER QUALITY 130
10.2.1 Rationale 130
10.2.2 Background 131
10.2.3 Spatial and Temporal Boundaries 131
10.2.4 Potential Effects of the Proposed Project and Proposed Mitigation 131
10.2.5 Residual Effects and their Significance 131
10.2.6 Cumulative Effects Assessment 132
10.2.7 Conclusion 132
10.3 NOISE AND VIBRATION 133
10.3.1 Rationale 133
10.3.2 Background 133
10.3.3 Spatial and Temporal Boundaries 133
10.3.4 Potential Effects of the Proposed Project and Proposed Mitigation 133
10.3.5 Residual Effects and their Significance 134
10.3.6 Cumulative Effects Assessment 135
10.3.7 Conclusion 135
10.4 HEALTH EDUCATION 136
10.4.1 Rationale 136
10.4.2 Background 136
10.4.3 Spatial and Temporal Boundaries 136
10.4.4 Potential Effects of the Proposed Project and Proposed Mitigation 136
10.4.5 Residual Effects and their Significance 137
10.4.6 Cumulative Effects Assessment 137
10.4.7 Conclusion 137
10.5 HEALTHY LIVING 137
10.5.1 Rationale 137
10.5.2 Background 138
10.5.3 Spatial and Temporal Boundaries 138

10.5.4 Potential Effects of the Proposed Project and Proposed Mitigation 138
10.5.5 Residual Effects and their Significance 138
10.5.6 Cumulative Effects Assessment 139
10.5.7 Conclusion 139
10.6 SUMMARY OF ASSESSMENT OF POTENTIAL HEALTH EFFECTS 139

SECTION 11.0 - SUMMARY OF PROPOSED ENVIRONMENTAL AND OPERATIONAL MANAGEMENT PLANS 140

11.1 ENVIRONMENTAL MANAGEMENT SYSTEM 140
11.2 ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS 140
11.3 COMPLIANCE REPORTING 141

PART C – ABORIGINAL GROUPS INFORMATION REQUIREMENTS 142

SECTION 12.0 - BACKGROUND INFORMATION 142

SECTION 13.0 - ABORIGINAL RIGHTS 142

SECTION 14.0 - OTHER ABORIGINAL INTERESTS 142

SECTION 15.0 - ABORIGINAL CONSULTATION 142

SECTION 16.0 - SUMMARY 143

PART D – FEDERAL INFORMATION REQUIREMENTS 144

SECTION 17.0 - FEDERAL ENVIRONMENTAL ASSESSMENT REQUIREMENTS 144

17.1 ENVIRONMENTAL EFFECTS 144
17.2 FEDERAL COMPONENTS 144
17.3 NEED FOR, PURPOSE OF, AND ALTERNATIVES TO THE PROJECT 145
17.4 ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT 145
17.5 EFFECTS OF THE ENVIRONMENT ON THE PROJECT 146
17.6 ACCIDENTS OR MALFUNCTIONS 147
17.7 MITIGATION MEASURES 147
17.8 RESIDUAL ENVIRONMENTAL EFFECTS 148
17.9 SIGNIFICANCE ASSESSMENT/ANALYSIS 148
17.10 CUMULATIVE ENVIRONMENTAL EFFECTS 148
17.11 ABORIGINAL ENGAGEMENT AND CONSULTATION 149
17.12 FOLLOW-UP PROGRAMS 149
17.13 CAPACITY OF RENEWABLE RESOURCES 150
17.14 BENEFITS TO CANADIANS 150

PART E – CONCLUSIONS 152

SECTION 18.0 - SUMMARY OF RESIDUAL EFFECTS 152

SECTION 19.0 - SUMMARY OF COMMITMENTS 153

SECTION 20.0 - CONCLUSION 155

SECTION 21.0 - REFERENCES 156

APPENDICES 159

LIST OF TABLES

Table I.1 Rev 0	Example Table of Concordance
Table 5.1-1 Rev 0	Preliminary Valued Components for the Proposed Ajax Project
Table 6.18-1 Rev 0	Example Summary Table of Potential Environmental Effects
Table 7.10-1 Rev 0	Example Summary Table of Potential Economic Effects
Table 8.9-1 Rev 0	Example Summary Table of Potential Social Effects
Table 9.3-1 Rev 0	Example Summary Table of Potential Heritage Effects
Table 10.6-1 Rev 0	Example Summary Table of Potential Health Effects
Table 16.0-1 Rev 0	Summary of Potential Effects on Aboriginal Activities and Accommodation Measures
Table 18.0-1 Rev 0	Summary of Residual Effects
Table 19.0-1 Rev 0	Proponent's Table of Commitments

LIST OF FIGURES

Figure 2.2-1 Rev 0	Project Location
Figure 3.1-1 Rev 0	Regional Geology in the Project Area
Figure 3.1-2 Rev 0	Ajax Pit Geology
Figure 6.1-1 Rev 0	Climate Effects Study Area
Figure 6.3-1 Rev 0	Surface Water Quality Effects Study Area
Figure 6.4-1 Rev 0	Surface Hydrology Effects Study Area
Figure 6.5-1 Rev 0	Groundwater Effects Study Area
Figure 6.7-1 Rev 0	Aquatic Effects Study Area
Figure 6.8-1 Rev 0	Terrestrial Biophysical Effects Study Area
Figure 7.1-1 Rev 0	Economic and Social Effects Study Area
Figure 8.4-1 Rev 0	Quality of Darkness and Shading Effects Study Area
Figure 9.1-1 Rev 0	Heritage Effects Study Area
Figure 10.3-1 Rev 0	Noise and Vibration Effects Study Area

LIST OF PHOTOGRAPHS

A list of all photos referenced in the Application will be provided in this section.

APPENDICES

A list of all appendices referenced in the AIR and Application will be provided in this section.

Appendix 1 Rev 0	Water Quality Analytical Parameters

PREFACE TO THE APPLICATION

KAM commits to provide the following in the Application:

- That the proposed Project is subject to review under the *British Columbia Environmental Assessment Act* (BCEAA). The proposed project constitutes a reviewable project pursuant to Part 3 of the *Reviewable Projects Regulation* (B.C. Reg. 370/02), since the proposed Project is a new mining facility that will have a production capacity of 75,000 tonnes or more of mineral ore per year,
- That the proposed Project will be subject to review under the *Canadian Environmental Assessment Act* (CEAA). The Project has triggers under Section 5 of the CEAA since it is anticipated that it will require an Authorization from Fisheries and Oceans Canada (DFO) under Section 35(2) of the *Fisheries Act*, as well as a licence from Natural Resources Canada (NRCan) under Section 7(1) of the *Explosives Act*. The CEA Agency has determined that the proposed Project is listed in the *Comprehensive Study List Regulations* and therefore a comprehensive study will be required,
- Information on any other EA approval processes the proposed Project is undergoing (if applicable) especially if they interact/overlap with the CEAA,
- Statement that the Application has been developed pursuant to the AIR approved by the BC EAO and CEA Agency, and complies with relevant instructions provided in the Section 11 Order,
- Statement that the Application has been developed pursuant to federal information requirements that were communicated by the CEA Agency and/or federal Responsible Authorities (RAs), and
- Identification of the agencies, Aboriginal groups and other parties involved in the development of the Application.

KAM commits to providing a Table of Concordance in the Application presenting all requirements for content and methodological approaches in the approved AIR that are to be addressed in the Application, with volume, section, and page references. The Table of Concordance will use the format presented below.

Table I-1 Table of Concordance

AIR Section	Description of Relevant Section and Subsections	Application Volume and Section	Page Reference
Example 1…	Example 1…	Example 1…	
Example 2…	Example 2…	Example 2…	

LIST OF ACRONYMS

A list of all acronyms and abbreviations used in the Application will be presented in this section. A preliminary list of acronyms and abbreviations used in the AIR are indicated below.

AIA	Archaeological Impact Assessment
AIR	Application Information Requirements/Environmental Impact Statement Guidelines
AG	Acid generating
AN	Ammonium Nitrate
ANFO	Ammonium Nitrate Fuel Oil
AME	Abacus Mining and Exploration Corp.
AOA	Archaeological Overview Assessment
Application	Application for an Environmental Assessment Certificate/Environmental Impact Statement for a Comprehensive Study
ASILs	Acceptable Source Impact Levels
BC	British Columbia
BCEAA	British Columbia Environmental Assessment Act
BMP	Best Management Practice
CCME	Canadian Council of Ministers of the Environment
CEA	Cumulative Effects Assessment
CEA Agency	Canadian Environmental Assessment Agency
CEAA	Canadian Environmental Assessment Act
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
dAIR	Draft Application Information Requirements/Draft Environmental Impact Statement Guidelines
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EC	Environment Canada
EIS	Environmental Impact Statement for a Comprehensive Study
EMS	Environmental Management System
EWD	East Waste Dump
GHG	Greenhouse Gas
HC	Health Canada
HPGR	High Pressure Grinder Roll
ILMB	Integrated Land Management Bureau
INAC	Indian and Northern Affairs Canada
IWMS	Identified Wildlife Management Strategy
KAM	KGHM Ajax Mining Inc. (the Proponent)
KGHM	KGHM Polska Miedź S.A.
KPL	Knight Piésold Ltd.
LOM	Life of Mine
LRMP	Land and Resource Management Plan

LSA	Local Study Area
MAD	Mean Annual Discharge
MEM	Ministry of Energy and Mines
MIBC	Methyl Iso Butyl Carbonal
MFLNRO	Ministry of Forests, Lands, and Natural Resource Operations
ML/ARD	Metal Leaching/Acid Rock Drainage
MMER	Metal Mining Effluent Regulations
MOE	Ministry of Environment
MSDS	Material Safety Data Sheet
NAG	Non Acid Generating
NAPS	National Air Pollution Surveillance
New Gold	New Gold Inc.
NPRI	National Pollutant Release Inventory
NPV	Net Present Value
NRCan	Natural Resources Canada
NWD	North Waste Dump
NSR	Net Smelter Return
PAX	Potassium Amyl Xanthate
PAG	Potentially Acid Generating
PM	Particulate Matter
PMP	Probable Maximum Precipitation
Project	Ajax Project
Proponent	KGHM Ajax Mining Inc.
RA	Responsible Authority
RIC	Resources Inventory Committee (Now RISC)
RISC	Resources Information Standards Committee
ROM	Run-of-Mine
ROW	Right-of-Way
RSA	Regional Study Area
SARA	Species at Risk Act
SSN	Stk'emlupsemc of the Secwepemc Nation
STS	Stk'emlupsemc te Secwepemc
TC	Transport Canada
TEM	Terrestrial Ecosystem Mapping
TFL	Tree Farm License
TNRD	Thompson Nicola Regional District
TRIM	Terrain Resource Information Mapping
TSF	Tailings Storage Facility
TSS	Total Suspended Solids
TTP	Thickened Tailings Plant
VC	Valued Component
WCP	Wetland Compensation Plan
WHMIS	Workplace Hazardous Materials Information System
WSC	Water Survey of Canada
WRF	Waste Rock Storage Facilities

LIST OF UNITS

Annum (year)	a
Billion	B
Billion tonnes	Bt
Centimetre	cm
Cubic centimetre	cm^3
Cubic metre	m^3
Day	d
Degree	°
Degrees Celsius	°C
Dollar (American)	US$
Dollar (Canadian)	Cdn$
Grams per tonne	g/t
Kilo (thousand)	kg
Kilotonne	kt
Kilovolt-ampere	kVA
Kilowatt hours per tonne (metric ton)	kWh/t
Kilowatt hours per year	kWh/a
Litres per minute	L/m
Megawatt	MW
Metres above sea level	Masl
Metres per second	m/s
Metric ton (tonne)	T
Million	M
Million tonnes	Mt
Three Dimensional	3D
Tonne (1,000 kg)	T
Tonnes per day	t/d
Tonnes per hour	t/h
Tonnes per year	t/a
Volt	V
Wet metric ton	Wmt
Year (annum)	a

EXECUTIVE SUMMARY

KAM commits to provide the following in the Executive Summary of the Application:

- A brief description of the Project
- Summary of the consultations undertaken
- Summary of the issues and potential project impacts (both positive and adverse) identified
- Summary of the recommended mitigation measures
- Summary of potential residual effects
- Summary of the potential residual cumulative impacts
- Summary of the follow up programs proposed (if applicable), and
- Proponent conclusions from the EA.

PART A - INTRODUCTION AND BACKGROUND

Part A of the AIR and the Application will discuss the purpose of the Application and provide an overview of the Ajax Project (the proposed Project) and the Proponent.

SECTION 1.0 - PURPOSE OF THE APPLICATION

In this section, the Proponent will summarize the purpose of the Application, and indicate that the Application fulfils the federal and provincial requirements for an EA decision.

The Application will also state the following:

- The proposed Project is subject to review under the *British Columbia Environmental Assessment Act* (BCEAA). The proposed project constitutes a reviewable project pursuant to Part 3 of the Reviewable Projects Regulation (B.C. Reg. 370/02), since the proposed Project is a new mining facility that will have a production capacity of 75,000 tonnes or more of mineral ore per year.
- The proposed Project is also subject to review under the *Canadian Environmental Assessment Act* (CEAA), with a trigger under Section 5 of the CEAA due to the likely requirement for an authorization under the *Fisheries Act* related to potential impacts on fish and fish habitat, and a requirement for a licence under the *Explosives Act*. The CEA Agency has determined that the proposed Project is listed in the *Comprehensive Study List Regulations* and therefore a comprehensive study is required.
- For comprehensive studies, the Federal Minister of the Environment shall make a decision pursuant to Section 23 of the CEAA, including consideration of the comprehensive study report, public comments, and identified mitigation measures.
- The decision will also include a formal assessment of whether the proposed Project is likely to cause significant adverse environmental effects, taking into account proposed mitigation measures. Where significant adverse environmental effects are deemed likely the decision will also include an assessment of whether the proposed Project is justified in the circumstances.

SECTION 2.0 - PROJECT OVERVIEW

2.1 PROPONENT DESCRIPTION

2.1.1 Proponent

The information presented in this section of the dAIR will also be included in the Application.

KGHM Ajax Mining Inc. (KAM) is a joint venture company between KGHM Polska Miedź S.A. and Abacus Mining and Exploration Corp. (AME). KGHM Polska Miedź S.A. is a Polish copper mining and smelting company, the ninth largest copper producer in the world. It was created as a state-owned company in 1961, but in 1991 it was privatized, and since 1997 it has traded publically on the Warsaw Stock Exchange under the symbol “KGHM”. It currently employs over 18,000 people in three mines, two copper smelters, a wire rod plant, and various auxiliary business units. AME is a British Columbia-registered company, incorporated on October 17, 1983. It has engaged in mineral exploration in the province, with its primary focus being the deposits associated with the Ajax Project. It is registered company in British

Columbia and a Tier One issuer that trades on the TSX Venture Exchange under the symbol “AME”. The Ajax Project will largely be developed using expertise from AME.

KAM currently controls approximately 97 km^2 of land in the Project area. KGHM Ajax has ownership of 58 mineral claims and 31 Crown Granted mineral claims. Of these claims, 48 of the mineral claims and 28 of the Crown Grants are contiguous with the Ajax area. The remaining claims are near Ajax but are not contiguous.

The primary contact for the project is:

Mr. James Whittaker, Project Manager
KGHM Ajax Mining Inc.
6th Floor, 800 West Pender Street
Vancouver, BC. V6C 2V6
Canada

Phone: 604-682-0301
Toll Free: 866-834-0301
Fax: 604-682-0307
Email: info@amemining.com
Web: www.amemining.com

The Proponent can also be reached in Kamloops through:

Ms. Dianna Stoopnikoff, Environmental Manager
KGHM Ajax Mining Inc.
330 Seymour Street
Kamloops, BC. V2C 2G2

Phone: 250-374-5446
Fax: 250-374-5443
Email: info@ajaxmine
Web: www.ajaxmine.ca

2.1.2 Consultants

KAM has engaged Knight Piésold Ltd. (KPL) to conduct environmental assessment coordination. Contact information for Knight Piésold Ltd. is provided below.

Mr. Chris Brodie, R.P.Bio., Environmental Services Manager
Knight Piésold Ltd.
1400 – 750 W Pender Street
Vancouver, BC. V6C 2T8
Canada

Phone: 604-685-0543
Fax: 866-685-0417
Email: info@knightpiesold.com
Web: www.knightpiesold.com

The Application will include an identification and detailed summary of the following qualified professionals contributing to the AIR and Application:

- Knight Piésold Ltd. (Climatology/meteorology, hydrology, hydrogeology, surface water quality, fish and aquatic ecology)
- Keystone Wildlife Research Ltd. (wildlife and vegetation, reclamation and closure)
- Terra Archaeology (Archaeological Impact Assessment (AIA) and Archaeological Overview Assessment (AOA))
- InterGroup Consultants Ltd. (social and economic assessment)
- Interior Reforestation (soils and reclamation)
- Stantec (air quality and noise), and
- Arbutus Consultants (Aboriginal engagement).

2.2 PROJECT BACKGROUND

The following information will be included in the Application, and updated as necessary.

2.2.1 Provincial and Federal Triggers

Under the BCEAA a person cannot undertake or carry out any activity on a reviewable project without having an environmental assessment certificate. The Reviewable Projects Regulation of the BCEAA identifies the types of projects that are reviewable and therefore trigger an EA. The production capacity of the proposed project will exceed 75,000 tonnes per year of mineral ore, and therefore will trigger an EA under Part 3 of the Reviewable Projects Regulation.

The Project is subject to review under the CEAA. It is anticipated that the Project will require an Authorization from Fisheries and Oceans Canada (DFO) under Section 35(2) of the *Fisheries Act*, as well as a licence from Natural Resources Canada (NRCan) under Section 7(1) of the *Explosives Act*. The CEA Agency will act as the federal environmental assessment coordinator for the project under Section 12.4(1) of the CEAA. The federal environmental assessment coordinator will manage federal agency involvement throughout the environmental assessment process and ensure that federal authorities fulfil their obligations under the CEAA in a timely manner.

A comprehensive study is required when the project contains one or more components listed in the Comprehensive Study List Regulations. The Ajax Project contains components listed in paragraph 16 of the above regulation, as follows:

(a) a metal mine, other than a gold mine, with an ore production capacity of 3,000 t/d or more
(b) a metal mill with an ore input capacity of 4,000 t/d or more, and
(c) a gold mine, other than a placer mine, with an ore production capacity of 600 t/d or more.

The Major Projects Management Office (MPMO) has designated the Project to be a major resource project subject to review in accordance with the procedures and practices developed under the *Cabinet Directive on Improving the Performance of the Regulatory System for Major Resource Projects*. The MPMO has developed a Project Agreement and will track key milestones in the conduct of the federal EA.

2.2.2 Project Location

The Project is located in the South-Central Interior of British Columbia, partially within the city of Kamloops, within the Thompson Nicola Regional District (Figure 2.2-1). The coordinates for the centre of the Project area are approximately 50°38' N latitude and 120°28' W longitude. Some components of the mine will be entirely or partially within Kamloops City limits, including the north and east waste rock management facilities; ore and soil stockpiles; processing facility and truck shop; tailings storage facility; thickened tailings plant and emergency pond; and process water intake and line. The proposed infrastructure will be located primarily on private land owned by KAM, with some utilisation of Crown land.

Access to the proposed Project from Kamloops is via exit 366 off the Trans-Canada Highway (No. 1), east along Frontage Road, and then south along Lac Le Jeune Road to the old Afton Mine Haul Road near the Inks Lake Road Junction, a road distance of approximately 9 km.

2.2.3 Project History

Production in the Project area can be traced back over 100 years with exploration in the Project area beginning in the 1880s and continuing intermittently until the 1980s. Copper, gold, and iron mineralization was discovered at the Iron Mask Mine near Kamloops in 1896. Nearby properties, including the Wheal Tamar, Ajax, and Monte Carlo claims, were explored in the following years.

Claims in the Ajax Project area include Afton, Karen, Galaxy, Lucky Strike, Rainbow, Rogers, No. 7, Ajax, Gold Plate, Windsor, Buda, Lone Tree, Iron Mask, Iron Cap, Crescent, Winty, DM, Ned, Cliff, and Big Onion. Copper and gold are the main deposits of interest in the area.

In the Project area, underground exploration began on the Wheal Tamar claim in 1898 and development work was completed on the Monte Carlo claim as early as 1905 and on the Ajax claim in 1906. Exploration continued in the Wheal Tamar, Ajax, and Monte Carlo areas, becoming sporadic after 1914.

In 1928, the Consolidated Mining and Smelting Company of Canada Ltd. obtained options on claims in the Project area and completed surface drilling on the Ajax and Monte Carlo claims. In 1952, the Ajax property was optioned to Berens River Mines Ltd and later in 1954, CM&S and its successor, Consolidated Mining and Smelting Company of Canada Ltd., Cominco Limited (Cominco), entered into option agreements and explored the area until 1980.

More recently, the area has seen production through five open pit deposits: Afton, Ajax East, Ajax West, Crescent and Pothook. In the 1980s, Afton Operating Company (owned in majority by Teck Cominco) defined a mineral resource. Mining operations were initiated by Afton in 1989 on the Ajax East and Ajax West claims and subsequently suspended in 1991 due to depressed metal prices. A second period of

production began in 1994 and was again suspended in 1997. During these periods of production, it is estimated that 17 Mt of ore was mined and 13 Mt of ore was milled.

In 2002 and 2004, AME signed option agreements with Teck and Discovery Enterprises Corp. to earn a 100% interest in 52 mineral claims and 20 patented claims, which encompass the Crescent and Ajax pits. In 2004, AME fulfilled the terms of the agreement to hold a 100% interest in the Afton area claims, subject to a Teck Cominco back in right.

In June 2009, AME completed an NI 43-101 compliant positive Preliminary Assessment Technical Report on the Ajax property, after a series of successful drill programs from 2005 to 2008. The results of the Technical Report indicate the potential for a robust mining operation capable of processing 60,000 tonnes of ore per day.

KAM currently controls approximately 97 km^2 of land in the Project area, with ownership of 58 mineral claims and 31 Crown Granted mineral claims. Of these claims, 48 of the mineral claims and 28 of the Crown Grants are contiguous with the Ajax area. The remaining claims are near Ajax but are not contiguous.

The proposed Project is located on the footprint of the previous, now deactivated and decommissioned, Ajax open pit mine. The site is characterized by anthropogenic disturbance including the old open pits, access and haul roads, reclaimed waste rock piles, and other mining infrastructure. Ten kilometres west, on the west side of the Coquihalla Highway, is the Afton mine site, currently being operated by New Gold Inc. The Afton site is characterized by two open pits, as well as other mine infrastructure including access roads, retention ponds, reclaimed waste rock management facilities, tailings storage facility (TSF), and a decommissioned smelter site near Highway 1. The TSF used by both historical mine sites is located approximately 1.1 km southwest of the Afton pit.

2.2.4 Proposed Project Schedule

The overall project execution duration, from commencement to plant commissioning, is expected to be 36 months. The duration from commencement of field construction to substantial mechanical completion is 24 months, which includes access roads and early earthworks.

The anticipated operational phase of the Project is 23 years, which is contingent on material changes that could arise during the continued exploration work, process refinement or throughput modifications.

Closure and reclamation activities are expected to take approximately two years, followed by an additional three years of monitoring to ensure that all mitigation and closure facilities and structures are functioning properly.

2.2.5 Environmental Management System and Adaptive Management Approach

The Application will include a description of the Environmental Management System (EMS) and adaptive management approach that will be implemented during all phases of the proposed Project.

The EMS will ensure that all Project-related activities, from construction to decommissioning, are conducted in an environmentally responsible manner. The objectives of the EMS will be to:

- Ensure compliance with applicable legislation and regulations
- Promote conformance with applicable government policies and practices
- Ensure environmental conditions in authorizations, approvals, and licences are being met, and
- Ensure operations are consistent with good environmental practices and sustainable development objectives.

A company environmental policy is an integral part of an EMS. KAM has adopted a comprehensive Environmental, Health, and Safety Policy. KAM is committed to meeting or exceeding the requirements of the environmental and occupational health and safety legislation for each authority in which it operates. KAM is committed to protecting the health and safety of the public, its employees, and the natural environment. Where project activities may negatively affect people and/or the environment, KAM is committed to eliminating or mitigating the extent and magnitude of potential impacts. To achieve this, KAM is committed to:

- Implement, and continually improve upon, an effective health, safety, and environmental management system.
- Identify, assess, and manage risks to employees, contractors, communities, and the environment in which it operates.
- Provide and ensure understanding of the health, safety, and environmental risks through effective risk assessment and training to all its employees and contractors.
- Reduce, re-use and recycle waste in order to minimize waste and encourage the efficient use of resources.
- Use appropriate technologies to prevent and reduce waste and pollution.
- Ensure financial preparations are made throughout the life of the Project to ensure decommissioning is implemented appropriately.
- Meet, and where practical, exceed legal requirements for health, safety, and the environment.
- Maintain transparent relationships and consultation with all stakeholders and indigenous peoples.
- Support the fundamental human rights of all people potentially affected by a project, including employees, contractors, and communities.
- Respect the traditional rights of indigenous peoples, and
- Contribute to the long-term socioeconomic and institutional development of employees and the communities within which projects occur.

Other components of the EMS will include:

- Planning: KAM will identify legal requirements, consider how Project activities interact with the environment, and develop a plan to reduce any adverse effects operations may have on the environment.
- Implementation: The policy and plans to improve environmental performance will be documented, communicated to employees, assign responsibilities, and train employees to ensure that staff are aware of the plan and able to perform any required duties related to it.
- Checking and Correction: KAM will develop a process or processes to monitor and record how well it is doing with respect to the environmental plan and regulatory obligations. The EMS will outline the monitoring frequency, recording and correction procedures, and revision tracking processes.

An adaptive management approach will be implemented to revise and refine the EMS. The key features of the adaptive management program will include:

- Incorporating the results of environmental monitoring programs.
- Monitoring the performance or condition of mine infrastructure, including the water management system, containment structures, and the TSF.
- Planning of alternative methods using best available information regarding technological developments and changing environmental conditions.
- An iterative decision making process - design changes based on sound scientific principles.
- Identification of risk and uncertainty towards development of understanding and acknowledgement that predictions of effects have high uncertainty and are best assessed through an experimental approach to management.

2.3 PROVINCIAL SCOPE OF THE PROPOSED PROJECT

The following information will be presented in the Application:

- A description of the scope of the proposed Project to be assessed in the provincial EA (pursuant to the Section 11 Order).

2.4 FEDERAL SCOPE OF THE PROPOSED PROJECT

The Application will describe the scope of the proposed Project to be assessed as directed by the federal responsible authorities. The approved AIR, in accordance with the harmonized EA process, is considered to fulfil the requirements of the federal EIS Guidelines. This information will be updated in the Application.

2.5 ALTERNATIVE MEANS OF UNDERTAKING THE PROPOSED PROJECT

KAM will provide the following in the Application:

- Proposed alternatives for the following Project components:
  - Site access road
  - Pit size
  - Power supply and transmission line
  - Waste rock storage
  - Explosives factory and magazine
  - Tailings management and location of tailings storage facility
  - Transport corridor route, and
  - Analysis of different processing throughputs and rationale for current production configuration.
- Key issues in considering the alternative means of the proposed Project
- An analysis of the alternative means of carrying out the proposed Project that are technically and economically feasible, including closure implications of each option, and
- The rationale for selecting the preferred alternative.

2.6 PROJECT LAND USE

KAM commits to providing the following information in the Application

- A description of the land ownership and land use regime including tenures, licenses, permits or other authorizations that would be potentially affected by the proposed Project; and the status of consultations with holders of such tenures and permits, and private land owners including resolution of land tenure issues
- A description of the Kamloops Land and Resource Management Plan (LRMP), and its management objectives
- Existing and proposed management and monitoring programs or regional studies, including:
  - A description of the City of Kamloops Official Community Plan as it relates to the Project
  - A description of the City of Kamloops Sustainable Kamloops Plan and how it relates to the Project
  - A description of any Thompson Nicola Regional District (TNRD) Official Community Plans, guidelines, and bylaws as they relate to the Project
  - Description of the annual Sharp-Tailed Grouse population monitoring program conducted by regional Forests, Lands and Natural Resources Operations (FLNRO) biologists, and
  - Description of the regional Burrowing Owl re-introduction program.
- Identification of other developments that may result in overlapping impacts with the proposed Project, and
- Identification of future developments which are reasonably foreseeable and sufficiently certain to proceed.

2.7 PROJECT BENEFITS

KAM commits to provide information regarding project benefits in the Application, using the statistics available from provincial ministries. The Application will state all assumptions and will reference information sources for the reported information. Project benefits discussed in the Application will include:

- Initial capital construction cost estimates including:
  - Breakdown of costs for the land, buildings, and equipment associated with the proposed Project, and
  - Indication of the potential for use of local facilities and an indication of whether they are currently under-utilized.
- Estimated operating costs over the life of the proposed Project (for land, buildings and equipment) including:
  - Estimated annual operating costs (excluding labour)
  - Cost determination process and respective calculation methods
  - An indication of how the costs are measured in current dollar values or net present values, and
  - Costs for decommissioning/closure/abandonment/reclamation.
- Employment estimates including:
  - Direct employment (number of person years as defined by a single person employed fulltime for one year) to be created, by major job category (e.g., labour, management, business services) during construction and operation, distinguishing among full-time, part-time and seasonal workers
  - Wage levels, by major job category, for the construction and operating periods
  - Breakdown of the number of people that will be hired (locally, provincially, nationally or internationally)
  - Potential to use currently under-utilized local human resources
  - Indication of any relevant employment policies/practices including a local hiring strategy

  - Indirect employment for the construction and operation phases of the proposed Project
  - Employment estimates for supplies of goods and services used, and
  - Any assumptions relating to industry specific multipliers and other multipliers used.
- Contractor supply services estimates will include:
  - List of the major types of businesses/contractors (local, provincial, and national level) that will benefit from the overall proposed Project
  - Value of supply of service contracts expected for both the construction and operation phases of the proposed Project, and
  - Information about a local purchasing strategy.
- Estimated annual government revenues from the construction and operation phases of the proposed Project including:
  - Local/municipal (property taxes, other)
  - Regional District (taxes, other)
  - Provincial (income tax, lease, license and tenure, royalties, other), and
  - Federal (income tax, Harmonized Sales Tax (HST), payroll taxes, other).
- Proposed Project contributions to healthy living.
- Proposed Project contributions to community development.

2.8 APPLICABLE PERMITS

The following will be included in the Application:

- A list of all applicable federal, provincial, and local government licenses, permits and/or approvals required for the construction, operation and decommissioning of the proposed Project and the associated responsible regulatory agency, and
- A request for a concurrent permitting process under the BCEAA pursuant to the *Concurrent Approval Regulation* (BC Reg. 371/2002).

SECTION 3.0 - DETAILED PROJECT DESCRIPTION

This section of the Application will provide a detailed Project description, supported with maps and figures at appropriate scales to demonstrate proposed Project design and layout. The following information will be updated as design proceeds.

3.1 GEOLOGY

3.1.1 Regional Geology

The following information is from the Project Preliminary Assessment Technical Report (Wardrop, 2009), updated with information provided in the Feasibility Study Technical Report (Wardrop, 2011) and will be included in the Application.

The regional geology in the Project area is dominated by the approximately 5 km wide and 20 km long Upper Triassic Iron Mask batholith, which trends northwest through the region (Figure 3.1-1). The Iron Mask batholith intruded a sequence of Nicola Group flows and volcaniclastic rocks of mafic and intermediate composition. Near the contact with the Iron Mask batholith, the Nicola Group rocks are commonly basalt to andesite flows and flow breccias. Stratigraphically above the Nicola Group is a series of serpentinized picrite basalts, which are present within the batholith and are apparently localized along major structural corridors.

Multiple phases are recognized in the Iron Mask Batholith. The Pothook diorite is the oldest phase and consists of a medium to coarse-grained biotite pyroxene diorite. A hybrid unit is recognized where Nicola Group rocks have been incorporated into the Pothook. The Hybrid phase consists of up to 80% Nicola Group fragments within Pothook intrusive breccia.

The Cherry Creek phase dominates the north and east margins of the batholith and forms a pluton northwest of the batholith. The Cherry Creek postdates the Pothook and consists of a monzonite to monzodiorite. Ubiquitous K-feldspar generally gives the Cherry Creek a pinkish colour.

The Sugarloaf phase dominates the western margin of the batholith and also postdates the Pothook phase. The age relationship with Cherry Creek is uncertain. The Sugarloaf phase is commonly a fine-grained porphyritic hornblende diorite. Albite alteration is common near zones of mineralization. The Kamloops Group contains the youngest rocks in the region and consists dominantly of tuffaceous sandstone, siltstone, and shale with minor flows and agglomerates of basaltic and andesitic composition.

Copper-gold mineralization associated with the Iron Mask batholith is classified as alkaline porphyry copper-gold deposits and is associated with the Cherry Creek and Sugarloaf phases. Mineralization is generally localized along major fault zones and associated with albite and K-feldspar alteration.

3.1.2 Local Geology

The following information is from the Project Preliminary Assessment Technical Report (Wardrop, 2009), updated with information provided in the Feasibility Study Technical Report (Wardrop, 2011) and will be included in the Application.

As many as 22 rock types have been recognized in the Project area, but these can generally be combined into three main rock types: Iron Mask Hybrid, Sugarloaf Diorite, and Nicola Volcanics (Figure 3.1-2). Outcrops are generally abundant in the Project area. The contact between the Sugarloaf Diorite and the Iron Mask strikes southeasterly through the West Ajax area and changes to a northeasterly strike through the East Ajax area. The Sugarloaf-Iron Mask contact is truncated by a southeasterly striking fault at the north end of the East Project area. The contact between the Sugarloaf Diorite and Nicola Group generally strikes southeasterly through the Project area.

Sugarloaf Diorite is characteristically a fine to coarse-grained, light to medium gray porphyritic diorite containing euhedral hornblende phenocrysts. Unaltered Sugarloaf may contain up to 5% fine-grained magnetite. Locally, the Sugarloaf Diorite has assimilated rocks of the Nicola Group and is referred to as the Sugarloaf Hybrid. Albite and K-feldspar alteration is present in varying degrees. Strong albite alteration has commonly destroyed original textures locally. Sulphide mineralization is associated with albite alteration and consists predominantly of chalcopyrite and pyrite. Molybdenite, tetrahedrite, and bornite have been observed.

The Iron Mask Hybrid is considered to be an assimilation of the Nicola Group into the intruding Pothook Diorite. The Iron Mask is coarse-grained and dioritic to gabbroic in composition. Weak propylitic alteration is common with K-feldspar and albite alteration occurring locally. The Iron Mask Hybrid may contain up to 10% magnetite and locally chalcopyrite and pyrite are present. The Nicola Group consists of picrite and various fine-grained and pyroxene porphyritic mafic volcanic rocks. A variety of steeply dipping, unmineralized dykes up to 5 m wide intrude the main rock types. Dykes are composed of aplite, monzonite, latite, and fine-grained mafic rocks.

3.1.3 Mineralization

The following information is from the Project Preliminary Assessment Technical Report (Wardrop, 2009) and will be included in the Application with updates as available.

The Iron Mask Batholith is host to more than 20 known mineral deposits and occurrences and mineralization is commonly copper-gold. Chalcopyrite is the dominant sulphide mineral. The presence of accessory sulphide minerals is highly variable and can include tetrahedrite and molybdenite. Secondary copper oxides (bornite and chalcocite) and native copper have been observed locally. Mineralization is associated with regional fault zones that trend easterly or southeasterly through the area.

The mineralization in the Project area is associated with structural corridors of highly fractured sections of Sugarloaf and Sugarloaf Hybrid phases of the Iron Mask Batholith. Chalcopyrite is the dominant copper mineral and occurs as veins, veinlets, fracture fillings, disseminations, and isolated blebs in the host rock. Concentrations of chalcopyrite rarely exceed 5%. Accessory sulphide minerals include pyrite, magnetite, and molybdenite.

High-grade copper mineralization (>1.0% Cu) is confined to chalcopyrite vein systems. Copper grades decrease away from the chalcopyrite veins. High-grade mineralization can extend several metres from the vein structure. Low-grade copper mineralization (0.10% to 0.50% Cu) is generally associated with the

Sugarloaf-Iron Mask contact. Mineralization extends to depths exceeding 400 m and has a strike length exceeding 2,000 m.

It is common for gold concentrations to be directly correlated with copper concentrations. Gold mineralization increases slightly in areas where strong albite alteration occurs. The albite alteration is in part controlled by fault and vein structures. Minor palladium mineralization is associated with copper near the contacts of the Iron Mask Hybrid and Sugarloaf units.

3.2 MINERAL RESOURCES

The following information is from the Feasibility Study Technical Report (Wardrop, 2011) and will be included in the Application with updates as available.

The mineral resources of the Ajax deposit were classified in accordance with CIM definition standards and best practices referred to in NI 43-101 which have a reasonable expectation of economic extraction. The qualified person for the mineral resource estimate is Timothy O. Kuhl, SME Registered Member and an employee of AMEC. Mineral Resources are reported using a copper price of US $2.88/lb and a gold price of US$1,200/oz. The mineral resource estimate has an effective date of May 26, 2011.

The mineralization of the Project satisfies criteria to be classified into Measured, Indicated, and Inferred mineral resource categories. Mineral Resources are reported at a Base Case CuEq grade of 0.20%. The Measured and Indicated resource totals 512 Mt at an average grade of 0.31% Cu and 0.19 g/t Au, with an additional 73.7 Mt of Inferred at 0.27% Cu and 0.17 g/t Au. The 2011 resource model update showed an 11% increase in Measured and Indicated tonnes over the 2010 resource model, a reflection of the additional infill drilling. Copper and gold grades are similar between the 2011 and 2010 models.

These resources are sufficient for approximately 23 years of operation at an annual production rate of 60,000 tonnes per day.

A pre-tax economic model has been developed by Wardrop from the estimated costs and the open pit production schedule. The base case has an internal rate of return of 13.6% and a net present value (NPV) of US$372 million at an 8% discount rate for the 23-year life of mine (LOM). The payback of the initial capital is anticipated to be within 8.1 years.

3.3 SITE GEOCHEMISTRY

Results of geochemical characterization will be incorporated into mine planning and used in the assessment of potential impacts to surface and ground water quality, as well as in waste management planning. The following information on site geochemistry will be presented in this section of the Application:

- Assessment and prediction of Metal Leaching and Acid Rock Drainage (ML/ARD) potential, according to the following policy and guidelines documents:
  - Policy for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia, Ministry of Energy and Mines and Ministry of Environment, Lands and Parks, July 1998.

  - o Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia, Price and Errington, August 1998.
- Geochemical data will be presented in sufficient detail to use as a basis for water quality effects assessments.
- Description of sampling and analytical approach used in characterizing geology and geochemistry, and
- Materials at the Project that will be investigated for ML/ARD potential include overburden, pit walls, waste rock, ore, low grade ore, tailings and borrow material.

3.4 AJAX PIT DEVELOPMENT

The following information is from the Feasibility Study Technical Report (Wardrop, 2011) and will be included in the Application with updates as available.

The proposed mine plan envisages a conventional open pit operation producing 60,000 t/d. The pit has been developed to have seven phases. The mine plan is based on the extraction of 503 Mt of ore for processing during 23 years of operation at an overall stripping ratio of 2.4:1 waste to ore. Total material movement from the pit during the life of the mine is estimated at 1,701 Mt.

The information presented in this section will also be included in the Application, as well as detailed and updated information on the following:

- Description of the open pit development plan including pit phases and phase designs;
- Pit designs including slopes, haul road widths, design standards and geotechnical and hydrogeological considerations (e.g., pit wall management);
- Description of pit water management including inflow diversions and dewatering methods;
- Description of conceptual instrumentation and monitoring of the pit during operations;
- Description of the geohazards of influence to the pit; and
- Discussion of ore grade and waste control.

3.4.1 Pioneering Work

Initial preproduction pit development will be accomplished with front-end-loaders, dozers, percussion drill, and rear end dump trucks. Activities during this stage include removing overburden, developing mine access roads suitable for large mining equipment, and “face-up” of the initial pit into productive set-ups for the large shovel and mining equipment. Suitable organic material will be stockpiled for reclamation use.

3.4.2 Pit Development

Seven pitshells were selected to guide the pit design. The following design considerations were included in the feasibility design for the pit:

- 12 m bench height, single-bench mining
- 24 m double bench height between catch benches
- 24 m double bench in final wall final bench height
- 65° Bench face angle
- Berm width as per design sector

- 35 m road width
- 25 m road width at the bottom pit
- +10% maximum grade uphill loaded, and
- -10% maximum grade downhill loaded.

3.4.3 Drilling and Blasting

Blast-hole drilling in predominantly waste areas will be performed with nominal 270 mm diameter production drills. Ore and waste zones will be mined on 12 m benches with nominal 13.5 m deep holes drilled in a single pass.

A wall control program will consist of pre-splitting and cushion blasts which will be carried out along all ultimate walls, including the intermediate pit phases. The wall control pattern will include a three-row trim blast and a pre-shear line. Two lines of the trim or cushion pattern will be drilled with the production drill rig. The last cushion blast line and the pre-shear holes will be drilled with a percussion drill.

Controlled blasting techniques will be required, including cushion (trim and buffer) and pre-split/pre-shear blasting. Blast damage to the footwall slopes will be minimized to preserve strength along bedding planes defining the potential failure blocks. Waste material will be blasted to produce a suitable particle size distribution for loading and transportation in 218 t class trucks. Mineralized material will be blasted to comply with fragmentation requirements and a specified particle distribution.

A mix of ammonium nitrate/fuel oil (ANFO) and emulsion explosives will be used during this process.

3.4.4 Loading and Hauling

Primary loading of waste and ore on the full 12 m benches will be accomplished by electric-hydraulic shovels with a 42 m^3 bucket. Diesel front end loaders with 40.5 m^3 bucket will be used to work on less productive faces, for muck pile clean-up, and as back-up.

3.4.5 In-Pit crushing and conveying

The in-pit crushing and conveying system will consist of three semi-mobile crushing plants and corresponding belt conveyors. The crushers will be mounted on concrete pontoons and will be relocated according to the mine development schedule. Ore will be crushed to the size which meets the process requirements. The crushed ore will be transferred to the coarse ore stockpile by belt conveyors.

For waste, the rock will need to be crushed for handling by the down-stream belt conveyors and stacking system. The maximum lump size to be conveyed will generally be less than one third of belt width or smaller to minimize the damage to the impact idler on the transfer chutes.

Crusher installation will be divided into three phases:

- In Phase 1, a crusher will be constructed on the exit point of the ultimate pit design (out-pit crusher and will remain in this location until the end of mine life. This crusher will initially be used as an ore crusher and can be switched to be waste or ore crusher when the in-pit crushing system is in place.

- During Phase 2, two in-pit crushers will be constructed at the 796 m elevation early in Year 7 and will be ready to be operated in the middle of Year 7. The two crushers will handle ore and waste material.
- During Phase 3, the two in-pit crushers will be relocated from the 796 m elevation to the 700 m elevation. The relocation of both in-pit crushers will be done in Year 13 so that they can be used by the beginning of Year 14.

Conveyors will handle ore material from the ore crushers to the plant. Waste material will be handled from the waste crusher to the North Dump, which will be equipped with a stacking system. The conveyors will be constructed on the south and west side of the ultimate pit limit. The conveyors will be constructed on the protection berm over the northeast arm of Jacko Lake.

3.5 MINE PRODUCTION SCHEDULE

The following information is from the Feasibility Study Technical Report (Wardrop, 2011) and will be included in the Application with updates as available.

The proposed mine production schedule is based on a requirement of providing an ore production schedule of 21.9 Mt/a, for a projected mine life of approximately 23 years.

The mine plan has higher-grade ore being mined during the first six years of production. To accomplish this, the ore below a Net Smelter Return (NSR) cut-off of US$9.20/t was assumed to be stockpiled in two different stockpiles during Years 1 to 3. One stockpile would be for low-grade ore (US$4.53/t to US$5.88/t NSR) and the second would be for medium-grade ore (US$5.88 to US$9.20/t NSR).

For Years 3 to 6 only the low-grade material would need to be stockpiled since the cut-off is decreased to $5.88/t NSR. In Years 7 through 18 the cut-off decreases to US$4.53/t NSR so all of the ore can be directly fed to the process plant without stockpiling. During Year 18, the cut-off is increased to US$9.20/t NSR once again due to the availability of higher-grade ore.

3.6 PROCESS PLANT AND ORE PROCESSING

The following information is from the Feasibility Study Technical Report (Wardrop, 2011) and will be included in the Application with updates as available.

The treatment plant will consist of stage-wise crushing and grinding, followed by a flotation process to recover and upgrade copper from the feed material. A gravity circuit will be included within the flotation circuit to enhance gold recovery. The flotation concentrate will be thickened and filtered and sent to the concentrate stockpile for subsequent shipping to smelters. The final flotation tailings will be disposed of using thickened slurry deposition into the TSF. Process water will be recycled from the tailings thickener overflow and will be supplemented with process water recovered from the overflow of the concentrate thickener. Freshwater will be used for gland service, reagent preparation and gravity circuit fluidisation.

The process plant will consist of the following unit operations and facilities:

- Run-of-Mine (ROM) ore receiving and primary crushing
- covered coarse ore stockpile

- coarse ore stockpile ore reclaim
- secondary crushing
- covered High Pressure Grinder Roll (HPGR) feed stockpile
- HPGR feed stockpile ore reclaim
- HPGR crushing circuit
- ball mill grinding circuit incorporating cyclones for classification
- copper rougher flotation
- copper concentrate regrinding stages
- copper cleaner flotation
- gravity gold circuit
- copper concentrate thickening, filtration, and dispatch, and
- tailings thickening and disposal.

The crushing and processing plants will be designed to operate on the basis of two 12-hour shifts per day, for 365 d/a.

3.6.1 Primary Crushing

Primary crushing will be in-pit crushing. The mill feed will be conveyed to the covered coarse ore stockpile.

3.6.2 Coarse Ore Stockpile and Reclaim

The coarse ore stockpile is a production surge facility which will allow for a steady feed to the secondary crushing circuit. The major equipment and facilities in this area includes:

- covered coarse ore stockpile
- reclaim apron feeders
- conveyor belts, metal detectors, self-cleaning magnets, and belt tear detectors
- belt scale, and
- dust collection system.

The in-pit crusher will have reduced the ROM material to 80% size of 150 mm. This material will be conveyed to the coarse ore stockpile. The coarse ore stockpile will have a live capacity of 46,600 t. The material will be reclaimed from this stockpile by apron feeders at a nominal rate of 3,333 t/h. The apron feeders will feed a 1,828 mm wide conveyor which in turn will feed the cone crusher screen at the head of the secondary crushing circuit.

The coarse ore stockpile and reclaim area will be equipped with a dust collection system to control fugitive dust that will be generated during conveyor loading and the transportation of the feed material. The coarse ore stockpile cover will be a large dome structure with reinforced concrete ring footing and embedded metals.

3.6.3 Secondary Crushing

The secondary circuit will consist of two cone crushers and will have a crushing circuit capacity of 2,875 t/h. The cone crushers will be operated in closed-circuit with sizing screens.

The major equipment and facilities in this area includes:
- cone crusher surge bin
- splitter chute
- two double-deck vibratory screens: each 3.7 m wide x 7.3m long, 75/50 mm apertures (dry screening)
- two cone crushers, MP1000 equivalent each with 750 kW installed power
- belt feeders
- conveyor belts, metal detectors, self-cleaning magnets and belt tear detectors
- belt scale
- dust collection system.

Reclaimed material from the coarse ore stockpile will be conveyed to the secondary crushing facility. The circuit will contain a splitter chute which will dry feed two vibrating double-deck screens which will work in parallel. The screens will operate in closed circuit with two cone crushers. Screen oversize material will be directed by conveyor to the cone crusher surge bin, which will be choke fed using belt feeders. The cone crusher product will return to the screen feed conveyor where it will combine with fresh reclaimed material prior to feeding the vibratory double deck screens. The fine screened product will be delivered to the HPGR feed stockpile by conveyor.

3.6.4 HPGR Feed Stockpile and Reclaim

The major equipment and facilities in this area includes:
- HPGR feed stockpile, covered
- reclaim belt feeders
- conveyor belts, metal detectors, self-cleaning magnets and belt tear detectors
- dust collection system

The HPGR feed stockpile will have a live capacity of 36,000 t. The feed material will be reclaimed from this stockpile by belt feeders at a nominal rate of 5,435 t/h. The belt feeders will reclaim the stockpile to feed a 1,828 mm wide conveyor which in turn feeds the HPGR feed splitter chute. The HPGR tertiary crushing facility and the HPGR stockpile will be equipped with a dust collection system to control fugitive dust that will be generated during conveyor loading and the transportation of the crushed materials.

The HPGR ore stock pile cover will be a large dome structure with reinforced concrete ring footing and embedded metals.

3.6.5 HPGR Crushing

Tertiary crushing will be done using two HPGR units to crush the material to a product size P80 of 3.25 mm prior to entering the grinding circuit. The major equipment and facilities in this area includes:
- belt feeders

- two HPGR crushers: each 2,400 x 1,650 mm with two 2,600 kW motors
- HPGR screen surge bin
- two double-deck vibratory screens: 3.7 m wide x 8.54 m long, 15/6 mm apertures (wet screening

There will be two HPGR crushers, each fed independently via a belt feeder from the HPGR feed splitter chute. The HPGR circuit will be in closed circuit with a vibrating double deck screen system. The HPGR product will be conveyed to the HPGR screen feed bin. The HPGR screens will be fed by belt feeders located under the HPGR screen feed bin. The screening of the HPGR product will be a wet process at a cut size of 6 mm. Screen oversize will be returned to the HPGR feed stockpile. Screen undersize will leave the crushing circuit as independent streams via a pipeline launder and report to the grinding circuit at a process flow rate of 2,717 t/h, or 1,359 t/h per HPGR line.

3.6.6 Grinding and Classification

The grinding circuit will consist of two parallel ball mill circuits. Grinding will be a single stage operation with the ball mills in closed circuit with the classifying cyclones. The grinding will be conducted as a wet process at a total nominal rate of 2,717 t/h (1,359 t/h per grinding line). The grinding circuit will include:

- two ball mills, 7.93 m diameter x 12.8 m long each
- two cyclone feed pumpboxes
- two sets of cyclone feed slurry pumps
- two cyclone clusters
- two mass flow meters and nuclear density gauges
- two particle size analyzers
- two sampler systems

There will be two ball mills in the grinding circuit and each ball mill will be operated independently in closed-circuit with a cyclone cluster. The HPGR product will flow by gravity to the individual grinding circuits using a pipeline launder system and will enter the grinding circuit via the cyclone feed pumpbox. The product from each ball mill will be discharged into its separate cyclone feed pumpbox combining with the respective HPGR screen discharge to constitute the cyclone feed. The slurry in each cyclone feed pumpbox will be pumped to a cyclone cluster for classification. The cut size for the cyclones will be a P80 of 214 µm, and the circulating load to the individual ball mill circuits will be 300% with the cyclone underflow returning to the ball mill as feed material.

The new feed to each ball mill circuit will be 1,359 t/h and the combined total of the two mills, 2,717 t/h, will constitute the feed rate to the copper flotation circuit. The ball mills will operate at a critical speed of 75%.

The cyclone overflow from both classification circuits will be discharged into the respective copper flotation conditioning tanks ahead of the flotation process. The pulp density of the cyclone overflow slurry will be approximately 34% solids.

Provision will be made for the addition of lime to the cyclone feed pumpboxes for the adjustment of the pH of the slurry in the grinding circuit prior to the flotation process. Grinding media will be added to the

mills in order to maintain the grinding efficiency. Steel balls will be periodically added to each mill using a ball charging kibble.

3.6.7 Flotation and Regrind Circuits

The milled pulp will be subjected to flotation to recover the targeted minerals into a high-grade copper concentrate containing gold. The copper flotation circuit will include the following equipment:

- two conditioning tanks, 6.7 m diameter x 7.3 m
- flotation reagent addition facilities
- rougher flotation tank cells, two lines of six cells, 300 m^3 each
- rougher concentrate regrind mill, Isamill, 3000 L
- cleaner concentrate regrind mill, Isamill, 1,000 L
- two classification cyclone clusters (one for each regrind stage)
- first cleaner flotation tank cells – 4 x 50 m^3 each
- first cleaner scavenger flotation tank cells – 5 x 50 m^3 each
- second cleaner flotation tank cells – 6 x 5 m^3 each
- third cleaner flotation tank cells – 4 x 5 m^3 each
- pumpboxes and standpipes
- slurry and concentrate pumps
- two particle-size analyzers, one for each regrind stage
- sampling system.

The cyclone overflows from the grinding circuit will feed the flotation circuit conditioning tanks by gravity flow from the ball mill grinding circuit cyclone clusters. The slurry will be monitored for P80 particle size, and flotation feed samples will be taken periodically for process control and metallurgical accounting.

The rougher flotation circuit will consist of two six-cell flotation trains which will operate in the following manner:

- The cyclone overflow from each grinding circuit will discharge into a conditioning tank. Each conditioning tank will be equipped with an agitator and has been sized for a retention time, or conditioning period, of 3.5 minutes. The slurry will be conditioned in the conditioning tanks at the design feed rate of 1,347 t/h per line. The conditioning tanks will also receive the first cleaner scavenger tailings which will report to the conditioning tanks from the first cleaner scavenger tailings distribution box for reprocessing. Flotation reagents (potassium amyl xanthate (PAX) and the frother, methyl-isobutyl carbinol (MIBC)) will be added to the conditioning tanks as defined through testing. Provision will be made for the staged addition of the reagents in the rougher circuit as well as in the cleaner stage of the flotation circuit.
- The conditioned slurry will overflow the conditioning tanks into the head end of the rougher flotation tank cell lines. Air injection will facilitate the flotation process. The copper minerals (mainly chalcopyrite) will be selectively floated into a rougher concentrate away from the other minerals and the gangue present in the slurry. The rougher concentrate will constitute approximately 7.2% mass of the plant feed. The rougher tailings will be sampled automatically prior to discharge into the final tailings pumpbox for process control and metallurgical accounting purposes; this stream will constitute the final tailings leaving the plant.

- The rougher concentrate streams will be combined to form a single feed which will continue to the regrind and cleaner flotation sections of the flotation circuit for further processing.
- To completely liberate the fine-sized grains of the copper minerals from the gangue constituents and to enhance upgrading of the copper concentrate, stage regrinding and cleaning will be incorporated in the cleaner flotation circuit. Two stages of regrinding and three stages of flotation cleaning will ensure that a final product of acceptable grade and recovery will be achieved.
- The rougher concentrates will flow from the launders to the rougher Isamill cyclone feed pumpbox and will be pumped to the rougher regrind densification cyclone cluster along with the first cleaner scavenger concentrate. The rougher Isamill cyclones will be densification cyclones and will deliver the feed to the rougher Isamill at the required density of 50% solids.
- The rougher regrind circuit cyclone will separate the finely ground flotation concentrate into a cyclone overflow product according to the design particle size P80 of 60 µm. The coarser, denser cyclone underflow will be the feed for the rougher regrind Isamill. The Isamill product will discharge the finely milled material into the rougher Isamill discharge pumpbox. From here the finely ground product will be pumped to the first cleaner feed pumpbox where it will be recombined with the rougher regrind densifying cyclone overflow prior to reporting to the head of the first cleaner flotation cells. The rougher regrind Isamill will have a design treatment rate of 179 t/h, and will have a circulating load of approximately 10% as specified by the vendor.
- The rougher regrind circuit discharge will be combined with the second cleaner tailings to constitute the feed to the first cleaner flotation stage. This first cleaner stage will be directly followed by the first cleaner scavenger flotation stage. Tailings from the first cleaner scavenger flotation stage will report to the conditioning tank. The cleaner regrind circuit will have a similar design as the rougher regrind circuit although the design parameter in this circuit will be a particle size P80 of 18 µm. The cleaner regrind mill will have a design treatment rate of 29 t/h. A gravity concentration stage is included in the cleaner regrind circuit. The first cleaner concentrate will report to the gravity concentrator feed pumpbox and will be processed through the gravity concentrator. Tailings from the gravity concentration circuit will constitute the feed to cleaner regrind circuit.
- The cleaner regrind circuit discharge will be combined with the third cleaner tailings as the feed to the second cleaner flotation stage. The second cleaner concentrate will report to the third cleaner flotation stage as flotation feed. The concentrate from the third cleaner flotation stage will be the final copper concentrate with a design copper grade of 25% copper. The copper concentrate will feed directly to the copper concentrate thickener for dewatering.

Provision will be made for the copper concentrate thickener overflow water to be reused in the grinding and flotation circuit as process water, providing it does not have a deleterious effect on the flotation of the copper and gold minerals.

3.6.8 Gravity Circuit

The first cleaner concentrate will constitute the feed to the gravity circuit. The regrind mill will be operating in open circuit for treatment of the entire feed stream to enable gravity gold to be recovered. The gravity circuit feed material will be the first cleaner concentrate, which will be pumped to the gravity concentrator. This gravity circuit consists of one stream, equipped with a trash screen and a centrifugal gravity concentrator. The gravity concentrator will remove particles of gold and high density gold-bearing sulphide mineral particles. The gravity tailings will be discharged into the cleaner Isamill cyclone feed

pumpbox for densification ahead of the regrind mill circuit. The gravity concentrate will periodically be flushed into the gravity concentrate tank. This tank will also control the intermittent transfer of gravity concentrate as feed to the concentrate thickener, which will be the final destination for the gravity concentrate.

3.6.9 Concentrate Handling

The cleaner flotation concentrate will be thickened, filtered, and stored prior to shipment to the smelter. The concentrate handling circuit will have the following equipment:

- concentrate thickener
- concentrate thickener overflow standpipe
- concentrate thickener underflow slurry pumps
- process water tank and pumps
- concentrate stock tank
- concentrate filter press feed pumps
- concentrate filter press
- filter press washing and filtrate handling equipment
- dewatered concentrate storage and dispatch facility

The concentrate produced will be pumped from the final cleaner flotation stage to the concentrate thickener where it will be combined with the gravity concentrate in the thickener feed well. Flocculant will be added to the thickener feed to aid the settling process. The thickened concentrate will be pumped to the concentrate stock tank using thickener underflow slurry pumps. The underflow density will be 60% solids. The concentrate stock tank will be an agitated tank that will serve as the feed tank for the concentrate filter, which will be a filter press unit. Since filtration with a filter press unit will be a batch process, the concentrate stock tank will also act as a surge tank for the filtration operation. The filter press will dewater the concentrate to produce a final concentrate with a moisture content of about 10%. The filtrate will be returned to the concentrate thickener and the filter press solids will be discharged directly onto the concentrate stockpile in a designated storage facility. Concentrate will be periodically loaded into trucks for dispatch off the property.

3.6.10 Reagent Handling and Storage

Various chemical reagents will be added to the process slurry streams to facilitate the recovery of copper during the flotation process. The preparation of the various reagents will require:

- a bulk handling system
- mix and holding tanks
- metering pumps
- a flocculant preparation facility
- a lime slaking and distribution facility
- eye-wash and safety showers
- applicable safety equipment

Chemical reagents will be added to the grinding and flotation circuit to modify the mineral particle surfaces and enhance the floatability of the valuable mineral particles into the copper-gold concentrate

product. Fresh water will be used to make up or dilute the various reagents that will be supplied in powder or solid form, or which require dilution prior to the addition to the slurry. Solutions will be added to the addition points of the various flotation circuits and streams using metering pumps.

The PAX collector reagent will arrive at the plant in bulk bags and will be dumped into hoppers for withdrawal of pre-determined quantities for mixing with water to the required solution strength of 10%. The reagent will be made up in a mixing tank, and then transferred to the holding tank, from where the solution will be pumped to the addition points in the circuit. The frother reagent, MIBC, will be pumped directly from bulk containers using metering pumps.

Flocculant will be prepared as a dilute solution with 0.30% solution strength and will be further diluted in the thickener feed well.

Lime, as quick-lime, will be delivered in bulk and will be off-loaded pneumatically into a silo. The lime slurry will then be prepared in a lime slaking system as a 20% concentration slurry. This lime slurry will be pumped to the points of addition using a closed loop system. The valves will be controlled by pH monitors that will control the amount of lime added.

The following measures will be implemented to ensure spill containment:

- Reagent preparation and storage facility will be located within a containment area designed to accommodate 110% of the content of the largest tank;
- Each reagent will be prepared in its own bunded area in order to limit spillage and facilitate its return to its respective mixing tank; and
- Storage tanks will be equipped with level indicators and instrumentation to ensure that spills do not occur during normal operation.

Each reagent line and addition point will be labelled in accordance with Workplace Hazardous Materials Information Systems (WHMIS) standards. All operational personnel will receive WHMIS training, along with additional training for the safe handling and use of the reagents. Appropriate ventilation, fire and safety protection, and Material Safety Data Sheet (MSDS) stations will be provided at the facility.

3.6.11 Assay and Metallurgical Laboratory

The assay laboratory will be equipped with the necessary analytical instruments to provide all routine assays for the mine, the concentrator, and the environment departments. The primary instruments are:

- fire assay equipment
- atomic absorption spectrophotometer (AAS)
- x-ray fluorescence spectrometer (XRF)
- Leco furnace.

The metallurgical laboratory will undertake all necessary test work to monitor metallurgical performance and, more importantly, to improve process flowsheet unit operations and efficiencies. The laboratory will be equipped with laboratory crushers, ball and stirred mills, particle size analysis sieves, flotation cells, filtering devices, balances, and pH meters.

3.7 TAILINGS MANAGEMENT

The following information is from the Feasibility Study Technical Report (Wardrop, 2011) and will be included in the Application with updates as available.

3.7.1 Tailings Storage Facility

The Tailings Storage Facility (TSF) will be located approximately 3.5 km west of the open pit in between Lac Le Jeune Road and Highway 5. The main elements of the TSF will include thickened tailings stack, TSF water collection system, collection ditches, TSF underdrain, and a TSF pond emergency spillway. The ultimate deposited thickened tailings dry density is estimated as 1.62 t/m^3 (based on the assumption that the deposited thickened tailings will have a void ratio of 0.7), for a total required TSF volume of 389.6 Mm^3. The maximum elevation of the tailings would be at approximately 1,022 masl along the west side.

The TSF will be constructed in an upstream manner, with thickened tailings discharged from spigot points positioned along the west side of the facility to form a gentle slope toward the east side of the facility, at a gradient of 2 to 3%, to minimize erosion from run-off while preventing ponding on the facility. Waste rock from the open pit development will be used to construct an initial pipeline dyke to facilitate tailings discharge and to raise the tailings pile in stages to allow more tailings to be deposited within the TSF.

Water management of the TSF will include water collection ditches around the TSF for collection of seepage and runoff, and two TSF ponds. During the prefeasibility study, one TSF pond was identified to the east of the TSF, using Inks Lake as storage for water collected from the TSF and run-off from the natural ground catchment area. During development of the feasibility study, a second water collection pond was proposed to aid in design of zero surface water discharge to the environment. Two TSF water collection ponds are therefore now included in the design:

- TSF East Pond (Inks Lake) will collect water seepage from the northeast and southeast ditches; and
- TSF West Pond will collect water seepage from the northwest and southwest ditches.

The crest elevations of both TSF pond dykes will provide sufficient storage capacity to safely contain the Probable Maximum Precipitation (PMP) event.

During the operational phase of the Ajax Project, water will be withdrawn from the TSF ponds as make-up water for use in the processing plant.

3.7.2 Thickened Tailings Plant

To produce the non-segregating tailings slurry, a thickened tailings plant (TTP) will be located at elevation 930 m north of the TSF to reduce pumping power and required energy consumption. Excess water discharge elevation at the processing facility will be 929.85 m and the thickened tailings discharge elevation will be 1022 m.

The TTP design includes:

- 4500 m mill tailings pipeline;

- 3800 m discharge thickened tailings pipeline;
- 4500 m excess water pipeline;
- Two freestanding high-density 39 m diameter thickeners;
- Six positive displacement (PD) pumps and ancillary equipment including:
  - Flocculant and compressed air systems;
  - Four clean-up pumps;
  - Four thickener underflow pumps;
  - Two charging pumps to service the PD, gland, fresh and process water pumps
  - One high pressure pump to provide flushing water to the thickened tailings discharge pipeline;
  - Two excess water pumps to return thickener overflow and TSF reclaim water to the processing facility;
- Fresh water and process water tank;
- Agitated thickened tailings tank;
- Tailings feed box that splits the mill tailings flow rate into two streams to feed both tailings thickeners;
- Two oil step down transformers and one emergency generator adjacent to the TTP;
- Electrical room, control room, tool room and washroom;
- Two pump stations to service the TSF water collection system and return the collected water to the TTP. Each pump station will house one step down transformer and two TSF pond pumps; and
- Surrounding containment wall to reduce any environmental impact in the event of a major plant failure or tailings spillage.

The final plant tailings material will be initially thickened at the tailings storage facility to reduce the volume of slurry to be pumped to the tailing ponds, as well as to facilitate the recovery of process water required for re-use in the plant prior to final deposition. Water will be recovered as overflow from the tailings thickener facility for re-use in the plant as general process water.

The following information regarding the TSF will be provided in the Application:

- Detailed information on siting considerations and constraints, surface area and height, foundation characteristics and geohazards in the area;
- Embankment design criteria in accordance with the Canadian Dam Association Dam Safety Guidelines including:
  - Source of embankment construction material
  - Hazard classification
  - Seismicity
  - Storage capacity
  - Layout, and
  - Tailing properties.
- Proposed borrow locations (if any);
- Description of operations;
- Description of the water reclaim system;
- Description of any structures designed to divert water from entering the TSF;
- Description of tailings water seepage (potential flows, quality, prevention and planned management strategies) and surface drainage;
- Description of conceptual instrumentation and monitoring of the TSF during operations;

- Proposed development stages; and
- Construction methods.

3.8 WASTE ROCK STORAGE AND ORE STOCKPILES

3.8.1 Waste Rock Storage Facilities

Two waste rock storage facilities (WRF) are planned: the North Waste Dump (NWD) and the East Waste Dump (EWD).

The waste rock stacking system will consist of shiftable conveyors, travelling tripper, and spreader. A starter pile, constructed by haul trucks in 12 m lifts, will be located in the east side of the NWD area will be the starting point for the stacking system. The haul trucks will build the starter pile to the final dump height to reduce downtime due to equipment relocation. This pile will be used for the stacker and conveyor platform in Year 7. Stacking will be developed using downcast mode, carried out by radial advance stacking by shifting the conveyor around a pivot point.

The conveyor will run along the lake protection berm to the west of pit over the arm of Jacko Lake. The berm will be a minimum 20 m wide with 2:1 slopes and a crest elevation of 896.6masl. The grade of the conveyor ramp up to the peak of NWD will be 20%, and the width of the conveyor ramp on the NWD is a planned 35 m. A stacker and conveyor system will be installed at the 1,084 m elevation once the initial pile is constructed. From the total NWD capacity of 728 Mt, 141 Mt (19%) will be built by haul trucks, with the remaining capacity built utilizing the stacker system.

The first lift of the EWD will be built at the 988 m elevation, with subsequent lifts built by haul trucks in 12 m lifts. The EWD will have a top elevation of 1060 m and a tonnage capacity of 420 Mt.

This information will be updated in the Application as design proceeds. The Application will also include:

- Detailed information on siting considerations and constraints, foundation characteristics and geohazards in the area;
- Description of the WRF water management components of the Project, including:
  - Design criteria;
  - Instrumentation and monitoring; and
  - Water management and erosion control measures that will separate mine affected and non-mine affected drainages and seepages;
- Discussion of waste rock, ore stockpile and low-grade ore stockpile management, incorporating geochemical characterization and ML/ARD issues, including mitigation strategies such as segregation for acid generating (AG) and potentially acid generating (PAG) material;
- Description of pre-production development; and
- Proposed development stages.

3.8.2 Ore Stockpiles

A total of 87 Mt of material will be be stored in four stockpiles (high-grade ore stockpile, medium-grade ore stockpile, low-grade ore stockpile, and a strategic ore stockpile) all to be located to the north of the pit:

- The high grade stockpile will hold up to 2 Mt of ore which will be fed to the process plant in Years 1, 8, and 9 of the mine life;
- The medium-grade stockpile will hold 36 Mt of medium grade ore material and will be built over a base of waste material at the 986 masl elevation; a ramp will be developed at a 10% grade to its crest at the 1,022 masl elevation;
- The low-grade stockpile is designed to hold 23 Mt of low-grade ore material and will be built over a base of waste material at the 970 masl elevation; a ramp will be developed at a 10% grade to its crest at the 1,034 masl elevation.
- The strategic stockpile will contain approximately 19 Mt of low-margin mineralization over the LOM (material above the strategic cut-off grade of $4.53/t NSR).

3.9 OVERBURDEN AND TOPSOIL STOCKPILES

A total of 7.5 Mt of in-pit overburden will be stockpiled over the LOM to meet site reclamation requirements, with any remaining topsoil stored within the WRF. A total of 4.5 Mt of overburden and topsoil will be stored in the North Overburden Stockpile close to the NWD and another 3 Mt will be stored in the East Overburden Stockpile close to the EWD. The overburden tonnages in the two stockpiles are considered sufficient to cover the reclamation requirements for the NWD and EWD.

The following will be provided in the Application:

- Description of pre-production development; and
- Description of methods for stockpiling and storing surficial soils that ensure the preservation of native seedbanks to enhance ongoing and progressive reclamation practices.

3.10 MINING EQUIPMENT

The following will be provided in the Application:

- A list of mining equipment, including capacity and source, hours of use, fuel requirements, etc. for construction, operations and closure.

3.11 EXPLOSIVES MANUFACTURING AND STORAGE

The following will be provided in the Application:

- Description of the type, quantity, manufacturing, storage and use of explosives;
- Description of infrastructure for manufacturing or storing explosives, including explosives and magazines; fuel storage; ammonium nitrate storage; maintenance / wash area; process vehicles and their parking area; offices; warehouses; and buildings.
- The specified location of the various components of the facilities, with distances to vulnerable features including but not limited to dwellings, roads, and bodies of water;
- Explosives to be manufactured (e.g., ANFO, emulsion, watergel);

- Maximum quantity of explosives at each facility;
- Fuel and ammonium nitrate storage plans. Storage of ammonium nitrate will be in conformance with NRCan Explosives Regulatory Division guidelines;
- Liquid effluent disposal plans;
- Evaluation of worst case scenario (e.g., accidental explosion);
- Spill contingency plans;
- Details on any temporary explosive facilities to be used during the proposed Project start-up;
- Description of the storage quantity (maximum) and capacity of the explosive factory and magazine during both construction and operations (including the number of magazines);
- Description of the transportation method of explosives;
- Description of the mine plan pertaining to blasting; and
- Description of the potential effluent.

The Application will demonstrate that safety distances required by the Explosives Regulatory Division of NRCan have been considered and met.

3.12 SITE WATER MANAGEMENT

A water management plan will be developed to control all surface water within the mine area. Goals of the plan include:

- Preservation of water quantity and quality downstream of the Project,
- Optimization of water use,
- Maximization of water re-use,
- Minimizing mixing of clean and mine-contact water,
- Managing seepage,
- Utilizing water diversion, and
- Eliminating uncontrolled releases.

The following will be provided in the Application:

- Summary of water management facilities for the pit, TSF, WRF, ore stockpiles, concentrate stockpiles, overburden, and mine infrastructure;
- Site wide water balance/watershed model, during construction, operations, closure/decommissioning and post closure; and
- Delineation of geochemical inputs and methods utilized in geochemical predictive modeling.

The Application will integrate results of the ML/ARD prediction work, surface water quality, hydrology (including extreme events such as low (7Q10 and 7Q10 summer) and high flow scenarios), hydrogeology, and water balance information to develop water quality predictions. Predictions will be used as a basis for effects assessment; to determine materials handling procedures; and to assess and develop ML/ARD mitigation/management requirements for the project.

Fresh (non-contact) water will be required for reagent preparation, gland sealing water, potable, process water make up and for firefighting purpose. Fresh water will be pumped from Kamloops Lake and stored in a fresh/fire water tank. All water collected, recycled, and used on the project will require containment

or storage in man-made structures. Contact water will be directed to and held in one of the collection ponds.

Fresh and contact water will be available in varying quantities from the following sources:
- Fresh water via a pipeline from the Kamloops Lake pump station;
- Reclaim water from tailings thickener overflow pumped directly to the mill process water tank;
- Reclaim water from plant site concentrate thickener pumped directly to the mill process water tank;
- Reclaim, run-off, and tailings seepage water from the TSF ponds pumped to the TTP process water tank and pumped back to the processing plant; as required;
- Pit groundwater inflow collection pumped to a central pond; and
- Pit runoff pumped to a central pond.

Run-off from other site facilities will be redirected to one of the western or central storage ponds near the processing plant and WRF, or to the process water tank, as follows:
- Reclaim concentrate thickener from the plant site, tailings thickener reclaim and water from the process water tank;
- Contact water from areas above or west of the NWD will report to a western pond, which will be then pumped to the central pond;
- Contact water from areas north, south and east of the NWD, the EWD, open pit groundwater flow and runoff, and from the explosives storage area will report to a central pond

Precipitation, seepage from pitwalls, and horizontal drains will introduce water into the pit. Some of this water will be absorbed by the broken rock and hauled with the rock out of the pit. Ditches will be used to route the remaining water to sumps where the solids can settle out, and the water can be pumped to a central water pond. A large collection system of ditches, pipes, sumps, pumps, and booster pumps will contain this water. The pit dewatering system is designed to handle a two-year return period rain storm. Rain events in excess of this will cause the lower areas of the pit to flood. Predicted groundwater inflow to the open pit will contribute an average of 6 L/s over the life-of-mine, with one year projected at nearly 24 L/s.

The pit drainage and dewatering system will perform the following tasks:
- Maintain pit wall stability via horizontal depressurization holes;
- Drain water and prevent water pressures from building up behind the pit walls;
- Control surface water and runoff that enters the pit;
- Capture precipitation and drain it away from road running surfaces and active mining areas; and
- Remove surface water that is collected in sumps.

3.13 ANCILLARY INFRASTRUCTURE

The Application will include a description of the proposed site ancillary infrastructure, including:
- Warehouse (including storage of any hazardous materials);
- Truck shop
- Mine equipment and employee vehicle parking
- Mine dry

- Administration building
- Fuelling facilities
- Fire protection
- Sanitary sewage
- Domestic waste disposal (type and amount monthly and annually; disposal options; recycling programs) and wildlife protection/control
- Communications, and
- Property security and medical services.

3.14 WATER SUPPLY

Water supply systems for fresh water and process water will be provided to support the operation. The following will be provided in the Application:

- A description of how the existing water supply facilities used by the old Afton Mine will be upgraded to supply fresh water from Kamloops Lake;
- Proposed extraction/use volumes for all development phases;
- Contingencies for excess or additional water; and
- Sharing and off-take agreement accommodation with New Gold.

3.14.1 Fresh water supply system

Fresh and potable water will be supplied to a fresh/fire water storage tank from Kamloops Lake for the following uses:

- Fire water for emergency use;
- Cooling water for mill motors and mill lubrication systems;
- Gland service for the slurry pumps;
- Reagent make-up;
- Gravity circuit fluidisation water; and
- Potable water supply.

Approximately 1,688 m^3/h water was established as the design requirement of the Project. A multiple stage pumping system will be used to extract water from Kamloops Lake, comprised of the following components:

- New water intake booster pump station;
- Existing lake pump station (with new pumps added);
- Existing Booster Pump Station No. 1 (with new pumps added); and
- New booster Pump Station No. 2.

Fresh water will be pumped through multiple pumping stages to a fresh/fire water tank at the proposed plant site. The fresh/fire water tank will be equipped with a standpipe which will ensure that the tank is always holding at least 40 m^3 of water, equivalent to a two hour supply of fire water.

Potable water from the fresh water source will be treated and stored in a potable water storage tank prior to delivery to various service points.

3.14.2 Process water supply system

Some process water generated in the flotation circuit as concentrate thickener overflow solution will be re-used in the process circuit via the process water tank. Reclaimed water will also be pumped from the tailings thickener overflow to the process water tank for distribution to points of usage.

3.15 POWER SUPPLY

Power will be provided from a new tap point from the existing BC Hydro 230 kV transmission line 2L265 to the east of the project area. Approximately 9 km of 230 kV wooden pole structured overhead line will be constructed and will tie in to a new 230 kV step down substation.

The Application will include a description of the power line, including:

- Power line route and all relevant design criteria;
- Width of the right-of-way;
- Stream crossing structures (if any);
- Staging areas to facilitate the construction process;
- Size of poles;
- Power capacity of the line; and
- Construction methods.

This section will reference the Fisheries and Oceans Canada Pacific Region Operational Statements for Overhead Line Construction (Fisheries and Oceans, 2007) and Maintenance of Riparian Vegetation in Existing Rights-Of-Way (Fisheries and Oceans, 2007). Watercourse crossings will also be assessed against the Minor Works and Waters (*Navigable Waters Protection Act*) Order.

3.16 ACCESS AND SITE ROADS

A new, all-weather, 2.9 km long by 12.0 m wide road will be constructed for access to the proposed Project from Lac Le Jeune Road, which connects to Highway 1 via Copperhead Drive, west of Kamloops. This road will be used by concentrate haul trucks and service vehicles during the operations phase. The road will be a private, single-lane road with passing bays. A remote-control gate located at the entrance to the access road will provide access to the mine site during mine operations. Access roads will also be constructed to connect the various on-site buildings.

Haul roads are designed for traffic within the pit and between the pit and ore crusher, WRF, overburden stockpiles, construction areas, and truck shop. The roads are proposed as cut-and-fill balance inside the ultimate pit limit and as pure-fill roads outside the ultimate pit limits. Large rear-end-dump haul trucks (218 t class) will be used for hauling both ore and waste to their destinations.

The road design will follow the criteria of 3.5 times the width of the widest haul equipment, a safety berm of 0.5 times the diameter of the tires, and a small allowance for potential water runoff. Competent waste rock will be used for road base and capping material for both access and site roads. Safety berms and drainage channels will be regularly maintained. Road travelling surfaces will be maintained by graders and wheel dozers.

The Application will include a description of road access to and within the Project area, including:

- Alignment and relevant design criteria of Project site roads;
- Location of any temporary and ancillary Project site roads;
- Proposed borrow sources for Project site roads;
- Construction methods to be used for Project site roads; and
- The size and type of vehicles to be used.

3.17 PROJECT ACCESS AND TRANSPORT CORRIDOR

The Application will include a description of the transport corridor for the proposed Project, including:

- Description of public roads used for access/transport between the Project site and the Port of Vancouver and between Kamloops and the Project site;
- Use of transport corridor during Project construction and operations;
- The size and type of vehicles to be used;
- An estimate of the types and quantities of goods to be moved, including fuel products or other hazardous material;
- The frequency and approximate timing of trips, including trucks carrying concentrate, fuel and other supplies; and
- Traffic safety planning.

3.18 CLOSURE AND RECLAMATION

The BC *Mines Act* legislates requirements for closure and reclamation bonding. Section 10 of the *Mines Act* dictates that, as a condition of receiving a permit to commence mining, the owner give a security deposit for mine reclamation and protection of watercourses and cultural heritage resources in the amount and form specified by the Chief Inspector of Mines. The owner must also deposit an annual security to ensure that sufficient funds are available to complete all permit conditions related to reclamation.

The following will be provided in the Application:

- Description of the regulatory framework and requirements and government agreements that are needed with respect to the closure and reclamation phase of the Project;
- An overview of the proposed conceptual closure and reclamation plan;
- Description of the measures to be implemented through the mine site reclamation plan to mitigate long-term adverse effects of the Project;
- An outline of the end land use objectives, taking into consideration the recommendation of Ministry of Energy and Mines (MEM) that the reclamation program be aimed at ecological restoration of naturally occurring grassland communities, as well as information on re-vegetation species (including the possibility of cultivation of native grass seed for reclamation purposes), proposed reclamation methods and expected capability of the reclaimed area for vegetation and wildlife, especially wildlife and plant species identified as valued components;
- Description of the proposed development site at closure and after reclamation;
- A list of operational, closure, and decommissioning reclamation components and activities intended to stabilize surface materials with a vegetation cover as quickly as possible; and

- A plan for temporary closure.

It is estimated that mine closure will proceed over a two-year period, followed by a three-year reclamation and monitoring phase.

3.18.1 Tailings Storage Facility Closure

General considerations that are likely to be incorporated in the closure plan for the TSF include the following:

- Removal and restoration of disturbed areas including structure footprints, access roads, conveyance structures, pipelines, etc.;
- Stabilization, shaping, contouring, and re-vegetation of disturbed surfaces; and
- Monitoring activities to confirm the design assumptions adopted for closure.

At closure, the reclamation of the tailings stack will consist of a closure dry cover, which will be placed over the entire tailings surface area. The proposed closure cover will minimize wind and water erosion, and reduce infiltration into the TSF, eventually reducing seepage from the toe of the TSF. The TSF ponds will be decommissioned once discharge requirements are met and a stable trend is attained. The TSF pond dykes will then be breached to form a wetland, and the remaining TSF pond dykes will be re-graded.

3.18.2 Waste Rock Management Facilities Closure

Concurrent reclamation of the WRF will be undertaken during operations as sufficient area becomes available. Preliminary reclamation activities identified for the WRF include construction of erosion control structures during operation to avoid material dispersion. Following closure, re-contouring of the slopes will be carried out to ensure the physical stability of the facilities, followed by placement of topsoil, seeding and mulching.

3.18.3 Ajax Pit Closure

Following closure, site drainage will be altered to allow the open pit to be filled with water. Water quality in the open pit will be modelled prior to filling to estimate effluent water quality at full pit. As the pit fills up, water quality sampling will be conducted to verify the accuracy of the model and define water treatment requirements to meet established discharge criteria. Passive and active treatment strategies will both be considered as potential treatment options, if treatment is required. As a safety measure, an earthen berm will be constructed around the open pit to prevent accidental entry into the flooded area.

3.18.4 Processing Plant Closure

All of the buildings and structures will be dismantled and/or demolished and then removed from the mine site. Salvageable material will be re-used, recycled, or transformed into other useful forms.

All materials removed from the site will be disposed of in accordance with applicable legislation and regulations. Any contaminated material (e.g., petroleum hydrocarbons or heavy metals) will also be stored, handled, and disposed of in accordance with applicable legislation and regulations.

Once the buildings and structures have been removed, the areas will be re-contoured, covered with growth medium, and vegetated with appropriate plant species.

3.18.5 Access Road Closure

In the event that access to the site will not be required following closure, the following activities will be conducted to decommission the access road:

- Removal of any bridges, culverts, and other watercourse crossing structures;
- Restoration of affected stream banks and riparian areas; and
- Re-vegetation.

SECTION 4.0 - ASSESSMENT PROCESS

4.1 PROVINCIAL EA PROCESS

The following information regarding the provincial EA process during the pre-Application stage will be included in the Application:

- A list of agencies, departments, and organizations involved in the EA;
- A list of applicable milestones, including the issuance of Section 10 and 11 Orders, Working Group meetings, public comment periods and open houses;
- Issues tracking tables to document issues and concerns raised and the degree to which issues are considered resolved or addressed by the Proponent and other parties during the preparation of the Application. One tracking table will be prepared for each of the following groups:
  - The public;
  - Aboriginal groups; and
  - Government (including local, provincial, and federal).

4.2 FEDERAL REVIEW

In this section, the Application will provide:

- A list of federal agencies, departments, and organizations involved in the review, and their roles;
- A list of applicable federal milestones; and,
- Reference to the issues tracking table to document issues and concerns raised during the preparation of the Application, as presented in Section 4.1.

4.3 ABORIGINAL INFORMATION DISTRIBUTION AND CONSULTATION

In this section of the Application, KAM commits to provide the following:

- A summary of proponent consultation activities undertaken with the identified Aboriginal groups potentially affected by the Project (as identified in the Section 11 order or by the federal government);
- A summary of issues and concerns in issue tracking tables and explanation of how these matters were addressed;
- A description of the Aboriginal consultation programs proposed for the Application review stage; and
- Documentation of the proposed methods and process to resolve outstanding issues.

4.4 PUBLIC AND AGENCY INFORMATION DISTRIBUTION AND CONSULTATION

The Application will provide the following:

- A summary of consultations with public and other key stakeholders, federal, provincial and local government agencies;
- A description of the means of information distribution and consultation used including the following:
  - Public meetings and open houses;
  - One-on-one meetings with interested parties;
  - Publication of articles in the media, enclosures and community newspapers;
  - Interviews on local radio and television; and,
  - Participation in community events;

- A summary of issues, concerns, and interests identified during the consultations and how these matters were addressed.

4.4.1 Pre-Application Consultation

The Application will provide an outline of consultations undertaken in the pre-application stage, covering both the preparation of the AIR and Application, specifically:

- A summary of consultations with public and other key stakeholders;
- A summary of consultations with federal, provincial and local government representatives; and
- An issues tracking table (described in Section 4.1) to document issues and concerns raised by the public and government agencies and the degree to which issues are considered resolved or addressed by the Proponent and other parties during the preparation of the AIR and the Application.

4.4.2 Consultation Planned During Application Review

The Application will provide the following:

- A description of the public consultation program proposed for the Application review stage of the EA process;
- A description of the proposed programs for consultation with government agencies; and
- Documentation of the proposed methods and process to resolve outstanding issues.

PART B - ASSESSMENT OF POTENTIAL EFFECTS, MITIGATION MEASURES, AND SIGNIFICANCE OF RESIDUAL EFFECTS

Part B of the Application will describe the assessment methodology and summarize the assessment of potential effects of the Project on environmental, social, economic, health, and heritage values. KAM will indicate the anticipated effects of the Project during construction, operation, and closure and decommissioning, and describe these effects using appropriate criteria.

SECTION 5.0 - EFFECTS ASSESSMENT

In order to adequately assess proposed Project effects, the environmental and social baseline will be characterized to a level of detail sufficient to delineate the pathway of effects (e.g., project activities, cause-effect relationships, mechanisms by which stressors lead to effects) following relevant provincial and federal standards, and determine the significance of the impacts.

The assessment methodology presented in the Application will include the following:

- Scope of the EA;
- A description of the agencies, Aboriginal groups, and stakeholders that reviewed and commented on the AIR;
- A list of the guidance documents recommended by agencies used to develop the assessment methodology;
- A description of standards used for baseline studies and EA analysis;
- A list of all Valued Components (VC) considered in the EA;
- Methods used for assessing potential effects of the proposed project, including the evaluation of the significance of effects (magnitude, geographic extent, duration and frequency, reversibility, context and probability) for construction, operation, and closure/decommissioning phases of the proposed Project;
- Traditional ecological or community knowledge, where available. Where not available, KAM's efforts to obtain this information will be discussed; and
- Reference to applicable provincially/regionally developed best management practices and guidance documents that will be followed.

As noted by Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2002) the knowledge held by communities may complement known information on life history characteristics, ecological relationships, changes in distribution and abundance, and threats for a species. The definition of "community knowledge" used by COSEWIC will be adapted and expanded on to include all VC for the proposed Project assessment. For the purpose of this assessment, community knowledge will include information derived from a person or group from observation, personal experience, or cultural inheritance. These persons or groups could include (COSEWIC, 2002):

- Long-time residents of rural areas;
- Members of community organizations providing care or protection for wildlife, land, and water;
- Naturalist groups or bird watchers with long-term records of the identity and location of observed species;
- Non-government organizations;

- Commercial or recreational users such as associations of hunters, trappers, fishers, and anglers.

In predicting and assessing the proposed Project's effects, KAM will:
- Clearly state the elements and functions of the environment that may be affected, specifying the location, extent and duration of these effects and their overall impact;
- Use best available information and methods, and substantiate all conclusions;
- Discuss the assumptions that underlie any model used, the quality of the data, and the degree of certainty of the modelled results; and
- Identify any mitigation measures and residual effects, and discuss the significance of the residual effects.

5.1 PROJECT EFFECTS ASSESSMENT METHODOLOGY

The Proponent will provide in the Application a description of the assessment methodology used to determine whether the proposed project would have significant adverse environmental, social, economic, heritage and health effects, taking into account proposed mitigation measures.

5.1.1 Valued Components

This section of the Application will describe the rationale, methodology, and criteria used to identify VC. VC are aspects of the environment considered important by the Proponent (KAM and its consultants), the public, Aboriginal groups, and government agencies involved in the EA process. Importance may be determined on the basis of Aboriginal interests, scientific concern, regulatory concern, biodiversity concern, and sensitivity to proposed Project effects.

Proposed VC are summarized in Table 5.1-1 for consideration in this draft AIR. During review of the draft AIR, KAM will consult with Aboriginal groups, the public, and government to ensure that all appropriate VC are identified for presentation in the final and approved AIR.

The Application will provide the rationale for choosing and assessing each VC, based on:
- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific / professional knowledge; and
- Relevant legislation or policy concerning the VC.

VC will be discussed under five assessment categories:
- Environment
- Economic
- Social
- Heritage, and
- Health.

VC may be directly or indirectly related to a Project activity or aspect. VC may be pertinent to one or more of the five assessment categories; where this is the case, background information will be presented

in detail in the first category. Subsequent effects assessment sections will cross-reference baseline information presented previously. The pathways of effects and mitigation measures may differ for a particular VC between assessment categories.

Background information will be the foundation for the effects assessment, forming the point of reference for all predicted impacts. The Application will therefore provide for each VC:

- Relevant qualitative, semi-quantitative, or quantitative background data for respective regional and local study areas;
- Description of all standards and guidelines followed in collecting and analysing data; and
- Limitations or uncertainties associated with any analysis, including assumptions, reliability or variability of the results.

Table 5.1 - 1 Preliminary Valued Components for the proposed Ajax Project

Assessment Category	Proposed Valued Component
Environment Valued Components	1. Climate 2. Geology, Landforms and Soils 3. Surface water quality 4. Surface water quantity 5. Groundwater quality 6. Groundwater quantity 7. Fish populations and fish habitat 8. Rare plants 9. Rare and Sensitive Ecological Communities 10. Terrestrial Invertebrate VC 11. Amphibian VC 12. Reptile VC 13. Migratory Bird VC 14. Raptor VC 15. Non-migratory Gamebird VC 16. Bat VC 17. Mammal VC
Economic Valued Components	1. Labour force 2. Education and training 3. Income 4. Employment 5. Business 6. Cost of living 7. Housing 8. Infrastructure 9. Economic Diversification
Social Valued Components	1. Culture 2. Community health and well-being 3. Public facilities and services, including transportation 4. Dark sky / Shading 5. Land and Resource Use 6. Jacko Lake 7. Visual Impact / Aesthetic Features 8. Aboriginal community interests
Heritage Valued Components	1. Heritage objects 2. Heritage sites
Health Valued Components	1. Air quality (Dustfall, PM_{10} and $PM_{2.5}$) 2. Water quality 3. Noise and vibration 4. Health education 5. Healthy living

5.1.2 Spatial Boundaries

The Application will include the following:

- Criteria used to determine the extent of spatial boundaries for each VC;
- A description of the local and regional spatial extent of the EA relative to each VC; and
- Maps outlining the spatial extent of the regional and local study areas of the EA.

For the purpose of the EA, the following definitions will be used to define the study areas:

- Local study area (LSA) is defined as the project footprint and surrounding within which there is a reasonable potential for immediate impacts to occur to the specific VC due to project components or activities.
- Regional Study Area (RSA) is defined based on the Cumulative Effects Assessment Practitioners Guide (CEA Agency 1999):

  "*the spatial area within which cumulative effects are assessed (i.e., extending a distance from the project footprint in which both direct and indirect effects are anticipated to occur)*."

Study areas will be developed based on review of existing information, potential effects, and feedback received during consultation activities. The spatial boundary for the assessment of each VC in the Application will be discussed and illustrated on figures provided in Section 6 through Section 10 of the Application.

5.1.3 Temporal Boundaries

The Application will describe the rationale for the selected temporal boundaries, or period of time to be examined in the assessment, for each of the VC in the EA. VC will be considered for each phase of the Project, including:

- Pre-construction (surveying and clearing)
- Construction
- Operations
- Decommissioning and closure
- Post closure

The establishment of temporal boundaries will consider the characteristics of environmental components or populations, including:

- Magnitude, frequency, and trends in the natural annual or seasonal variation of a population or ecological component, or biophysical constraints on the VC (e.g., migration patterns, breeding patterns, freeze-thaw cycles);
- The time required for a biological, physical, and/or chemical effect to become evident; and
- The time required for a population or ecological system to recover from an effect and return to its pre-impact state.

5.1.4 Potential Effects of the Proposed Project and Proposed Mitigation

The Application will describe the approach to identification and analysis of potential project effects. Assessment of effects on VC will include consideration of direct effects from project components or

activities, and effects arising from direct effects on other VC (indirect effects) on the selected VC for each project phase. The Application will use the following approach to identify direct and indirect effects on a selected VC for each project phase:

- Interpretation of baseline information for each VC;
- Identification of project components or activities;
- Identification of pathways to each VC;
- Determination of whether there is an interaction between the project components or activities and the selected VC;
- Identification of mitigation measures for each effect, including those considered in the design of the proposed Project, and those developed through the EA process; and
- Assessment of the potential for residual adverse effects, taking into account mitigation measures identified.

Potential impacts to each VC will be identified through a pathway of effects assessment, whereby cause-effect linkages are identified between a development activity, impact mechanism, and a receptor. Proposed components and activities within the Project scope will be linked to known stressors, and the stressors will be linked to an effect on the VC (e.g., the pathways of effects will identify modes of action of stressors, be they physical, chemical, biological, economic, or social processes, on assessment endpoints). Where a Project-related effect is predicted to occur, mitigation measures will be proposed, and the significance of residual effects will be assessed.

5.1.5 Residual Effects and their Significance

The Application will include an assessment of whether any residual adverse effects after mitigation would be significant by analysing the following factors, which will be VC-specific:

- Magnitude: refers to the severity of the impact. Impacts can be high magnitude or low magnitude.
- Geographical extent: refers to the area over which the predicted impact is expected to occur. The geographic extent of effects can be local or regional.
- Duration: refers to the length of time the effect lasts. Can be defined as short term or long term.
- Frequency: refers to how often an effect is expected to occur (may be described as frequent or infrequent, or may be quantified).
- Reversibility: refers to the ability of the VC to return to its original state once the stressor is removed. Effects can be reversible or permanent.
- Context: refers to the ability of the environment to accept change. For example, the effects of a project may have an impact if they occur in areas that are ecologically sensitive, with little resilience to imposed stresses.
- Probability: the likelihood that an adverse effect will occur.

Residual effects will be carried forward into the cumulative effects assessment.

5.1.6 Cumulative Effects Assessment

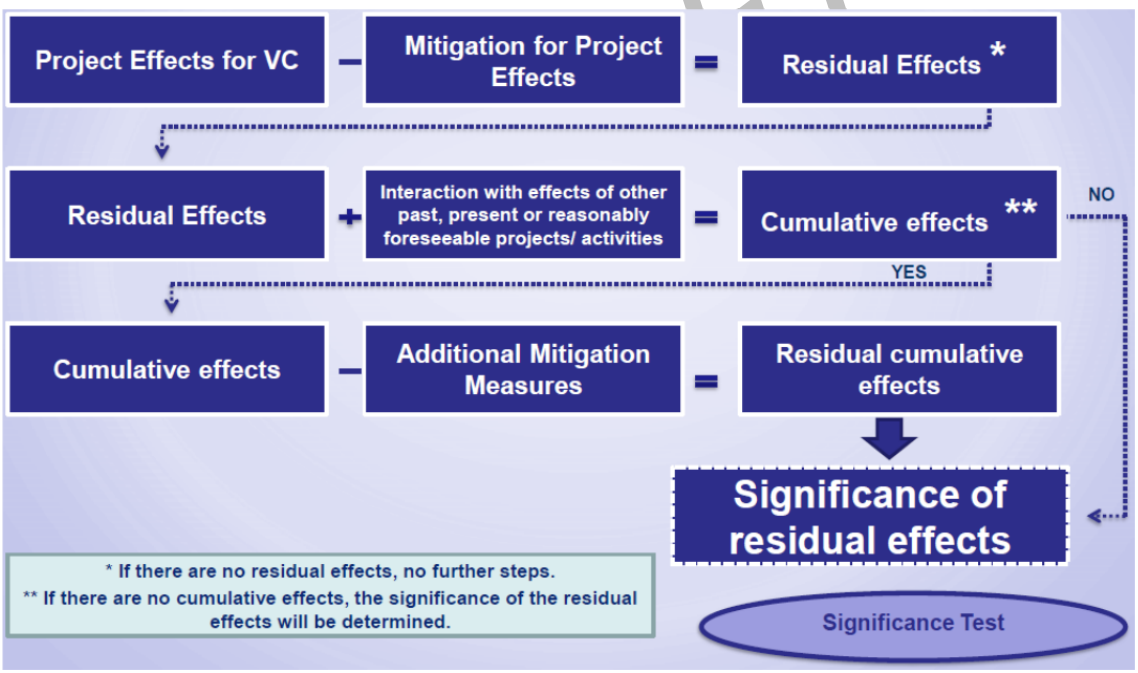
This section of the Application will discuss the provincial and federal government methodologies for Cumulative Effects Assessment (CEA). The following guidelines and standards will be referenced in the CEA:

- Cumulative Effects Assessment Practitioners Guide. CEA Agency, 1999.
- A Reference Guide for the Canadian Environmental Assessment Act. Addressing Cumulative Environmental Effects. CEA Agency, 1994.
- Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act. Operational Policy Statement. CEA Agency, 2007a.

The scope and methodology of the CEA will be designed to satisfy regulatory requirements set forth by both the BC EAO and the Canadian Environmental Assessment Agency as follows (CEA Agency, 1999):

- Determine if the project will have an effect on a VC;
- If such an effect can be demonstrated, determine if the incremental effect acts cumulatively with the effects of other actions, either past, existing or future; and
- Determine if the effect of the project, in combination with the other effects, may cause a significant change now or in the future in the characteristics of the VC after the application of mitigation for that project.

The CEA will identify the residual effects of the Project with the potential to interact with the residual effects of other projects or activities, and assess whether this interaction is likely to result in a greater impact to the identified VC, as illustrated on the following diagram (BC EAO, no date):



5.1.6.1 Potential Interaction between Residual Project Effects and Other Projects or Activities

The Application will describe the methodology for identifying potential interactions between residual project effects and other project activities. The Application will identify and describe other projects and activities with the potential to interact with the Project, and include a rationale for their inclusion.

The CEA will consider certain and reasonably foreseeable past, present, and future projects and activities. For this assessment:

- 'Certain' projects will include past and on-going projects and activities as evidenced by existing disturbance areas and facilities, current land use tenures and activities, and traditional knowledge and use.
- 'Reasonably foreseeable' projects will be projects and activities that:
  - Have entered into a formal project approval or permitting process, or
  - Have not entered a formal process but that have been discussed publicly by proponents, or
  - Have been specified through discussion with regulators, Aboriginal groups, and/or other stakeholders, and
  - Possess sufficient project-description information to inform a cumulative effects assessment.

A systematic screening methodology will be used to identify and evaluate potential projects. On a VC specific basis, the zone of influence (ZOI) of residual Project effects will be compared with the ZOI of effects from other projects and activities to assess the potential for spatial or temporal interaction or overlap of VCs with other projects and actions. Cumulative effects will be identified where an interaction is determined. The Application will include a rationale for including or excluding potentially relevant projects from the CEA, the information sources used, and documentation of efforts made to obtain the best available information.

For a project or activity to be included in the CEA, the following conditions must be met:

- The project or action may result in a residual effect on a selected VC; and
- The proposed Project-specific residual effect on that VC is likely to act in a cumulative fashion with the residual effects of other past, present, or reasonably foreseeable future projects and activities.

A preliminary list of other projects and activities that have been identified for consideration in the CEA includes:

- Land Use Plans
  - Kamloops Land and Resource Management Plan (2001).
  - TNRD Official Community Plans
- Designated Areas
  - Kamloops Community Watershed Resource Management Zone – as designated by the Kamloops Land and Resource Management Plan (LRMP), Peterson Creek is regulated in terms of the conservation of water quality and quantity, and timing of flow.
  - Lac Le Jeune Provincial Park – a 213 ha recreational park located approximately 19 km south of the Project.
- Industry
  - The new Afton Mine (active) – located approximately 9 km northwest of the Project.
  - Highland Valley Copper Mine (active) – located approximately 31 km southwest of the Project.
  - Vidette Lake Mine (decommissioned 1939) – located 34 km northwest of the Project.
  - Domtar Kamloops Pulp Mill (active) - located approximately 9 km north of the Project.
  - Tolko-Hefey Creek Plywood and Veneer (active) – located in Hefley, 19 km north of the Project.
  - LaFarge Cement plant (active) – located approximately 14 km northeast of the Project.
- Forestry: Kamloops Forest District (active) –within 4 km of the Project.
- Agriculture and ranching (active).
- Air Transport
  - Kamloops airport (active) – located approximately 10 km north of the Project.

- City of Kamloops
  - Municipal discharge into the Thompson River (sewage effluent, storms drains).
  - Domestic water supply – water extraction from wells and the Thompson River.
  - Subdivision expansion, city growth.
- Tourism and Commercial Recreation Activities
  - Recreational Hunting, Fishing, and Foraging.
  - Lac Le Jeune Resort – 19 km south of the Project.
  - Tobiano Golf Course – 22 km NW of the Project.
- Aboriginal Usage, including traditional Hunting, Fishing, and Foraging
- Climate Change.

5.1.6.2 Cumulative Effects Mitigation Measures

The Application will describe additional practicable mitigation measures, including management and compensation plans, which will be implemented to address cumulative effects. This will include a specific breakdown of the project design, mitigation, or enhancement measures to avoid or minimize any potential risks to environmental, economic, social, heritage, and health components. The Application will then assess whether there are any adverse cumulative effects, after the application of mitigation measures, and will describe the methodology for making this assessment (as described in Section 5.1.5).

5.1.6.3 Cumulative Effects Significance Assessment

The Application will include analysis of the significance of the overall residual cumulative effects of the Project considering magnitude, geographic extent, duration and frequency, reversibility, context, and probability.

SECTION 6.0 - ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS

This section of the Application will present the assessment of environmental effects on the VC identified in Table 5.1-1.

6.1 CLIMATE

6.1.1 Rationale

KAM will provide the rationale for choosing and assessing climate as a VC in the Application. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

6.1.2 Background

This section of the Application will present an introduction to the baseline information collection program (sample sites, sample frequency, etc.) for climate in the Project area and will summarize the climate characteristics in the area. A detailed meteorological report will be provided in the Application appendices.

Data will be compiled from the regional and site climate stations for:

- Mean monthly and annual temperature
- Mean monthly and annual precipitation
- Probable maximum precipitation (PMP)
- Mean monthly and annual solar radiation
- Relative humidity
- Wind speed and direction

Meteorological stations are illustrated on Figure 6.1-1.

6.1.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC;
- Maps outlining the spatial extent of the regional and local study areas of the EA; and
- Description of the period of time to be examined in the VC assessment.

The preliminary local and regional study boundary is shown on Figure 6.1-1. The local and regional study areas for climate will be associated with the air quality assessment (presented in human health effects assessment). The study boundary will be a 20 km by 20 km modelling domain, centred on the project site, and will include Knutsford and the southern portion of the city of Kamloops.

6.1.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will identify:

- Project components that will be considered in the effects analysis;
- Project activities leading to effects for each components;
- Mitigation measures that will be utilized to minimize project effects; and
- Residual effects.

The potential effects assessment of the Project on atmospheric levels of greenhouse gases (GHG) will be adapted from methodology presented in "Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners" (Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment, 2003). The general procedure is as follows:

- Preliminary scoping for GHG considerations
- Identifying GHG considerations:
  - Collect industry and project-specific information
  - Clarify magnitude, intensity and timing of emissions
  - Compare project specifics with industry profile
  - Assessing GHG considerations (describe direct and indirect emissions and related effects)
  - Management Plans, and
  - Monitoring, follow-up, and adaptive management.
- Verify GHG emission forecasts
- Determine effectiveness of GHG reduction or offset measures
- Implement remedial actions as necessary, and
- Revise monitoring or management procedures to reflect remedial measures.

6.1.5 Residual Effects and their Significance

The residual effects and significance of GHG emissions remaining after implementation of Management Plans, and any monitoring, follow-up, and adaptive management programs will be assessed.

6.1.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

6.1.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.2 GEOLOGY, LANDFORMS AND SOILS

6.2.1 Rationale

KAM will provide the rationale for choosing and assessing geology, landforms, and soils as VC in the Application. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

6.2.2 Background

This section of the Application will present a summary of the baseline information collection program and results for geology, landforms and soils in the Project. A more detailed report will be provided in the Application appendices.

Data will be compiled on the regional and site geology for the following:

- Stratigraphy
- Rock properties
- Faults and fractures
- Mineral deposits
- Geohazard baseline (seismic activity, karst, etc.)

Data will be compiled on the regional and site landforms such as:

- Topography
- Surficial geology
- Signs of terrain instability (mass movements)

Data will be compiled on the regional and site soils such as:

- Soil types
- Erosion (vulnerability)

Geologic, landform and soils information will be illustrated by maps and cross sections at appropriately detailed scales.

6.2.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary local and regional study area is shown on Figure 3.1-1.

6.2.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will identify:

- Project components that will be considered in the effects analysis
- Project activities leading to effects for each components
- Mitigation measures that will be utilized to minimize project effects, and
- Residual effects.

The potential effects assessment of the Project will include the effects of blasting on rock fracturing, pitwall and slope stability; project effects on landforms and soil erosion, and the effects of the Project on geohazards, remedial actions that will be implemented as necessary, and monitoring or management procedures to confirm the accuracy of the predictions and to reflect effectiveness of remedial measures.

6.2.5 Residual Effects and their Significance

The residual effects and significance on geology, landforms and soils remaining after implementation of management plans, and any monitoring, follow-up, and adaptive management programs will be assessed.

6.2.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

6.2.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.3 SURFACE WATER QUALITY

6.3.1 Rationale

KAM will provide the rationale for choosing and assessing surface water quality as a VC in the Application. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific / professional knowledge; and
- Relevant legislation or policy concerning the VC.

6.3.2 Background

Baseline water quality in the Project area will be characterized through a project-specific monitoring program and any regional and historical data, where available. The objective of the water quality monitoring program is to:

- Establish existing water quality conditions
- Assess potential changes to water quality as a result of mine development
- Establish water quality objectives or safe targets to be met in the receiving water during construction, operation and decommissioning, and
- Determine safe wastewater discharge limits.

This section of the Application will:

- Describe baseline surface water quality for all potentially affected waters in the Project area and in reference areas.
- Contain maps showing locations of all surface water monitoring stations in relation to Project components.
- List all relevant provincial and federal standards and guidelines used in data collection and interpretation.
- Describe sampling frequency and methods used in collection and laboratory and statistical analysis of the data.
- Describe the Quality Assurance/Quality Control (QA/QC) program, including use of replicates and blanks, and collection and analysis of samples by qualified and trained personnel. This section will also discuss acceptable data quality objectives for the QC samples and how data analysis may differ for field samples when QC objectives are not met.
- Present results in tabular and/or graphic format and compare them to current provincial and federal water quality standards for protection of aquatic life,

- Reference the applicable appendices where raw data can be found, and
- Provide a summary and interpretation of key statistical parameters of baseline water quality data.

Monitoring sites have been selected to characterize spatial variability in water chemistry. Monitoring stations are shown on Figure 6.3-1. Results of seasonal sampling events will be presented for the following sites:

- Cherry Creek upstream (regional reference upstream of Project influence)
- Cherry Creek downstream (potential effects downstream of TSF)
- Jacko Lake (potentially influenced by pit development)
- Jacko Creek (regional reference upstream of Project influence)
- Peterson Creek at outlet of Jacko Lake (directly affected by pit development) and near EWD
- Peterson Creek downstream of Project area, and
- Inks Lake (directly affected by TSF East Pond).

Samples are collected monthly (where flows allow), with weekly sampling during freshet.

Measurements of *in situ* temperature, Specific Conductance, dissolved oxygen, pH, and Oxidation/Reduction Potential (ORP) will be recorded at each of the sites. Water samples for laboratory analysis will be collected and sent to ALS Laboratory Group (ALS) in Vancouver, B.C. Parameters to be analyzed are provided in Appendix 1.

An *in situ* temperature and dissolved oxygen depth profile will be recorded at each lake, and water samples will be collected near the surface and at depth.

6.3.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

Preliminary local and regional study areas are shown on Figure 6.3-1.

The LSA for surface water quality will include any potential effects on water quality to a point downstream where the effects fall within the range of background variability.

6.3.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will identify:

- Project components that will be considered in the effects analysis
- Project activities leading to effects for each components
- Mitigation measures that will be utilized to minimize project effects, and
- Residual effects.

The Application will identify potential effects on surface water quality from construction, operation and decommissioning of the Project on the following watersheds:

- Cherry Creek
- Jacko Lake
- Jacko Creek
- Peterson Creek
- Inks Lake
- Alkali Creek
- Kamloops Lake at the location of the water intake.

Project aspects or activities that will be considered in the effects assessment include:

- Site clearing and grading
- Soil salvage and topsoil storage
- Excavation
- Explosives use
- Stream crossings and access roads
- Water management
- Pit development
- TSF
- Peterson Creek stream diversion around open pit
- Waste rock management facilities
- Civil structures, and
- Closure and reclamation activities.

Groundwater/surface water interaction will be considered when looking at the potential downstream effects of the proposed project. The primary tool for this study will be the watershed model. The watershed model will be developed based on the following data:

- Groundwater levels at well sites, streams, wetlands, springs and ponds;
- Stream flow measurements to identify gaining and losing stream reaches as well as base flow contributions; and
- Meteorological data to address net precipitation available for groundwater recharge and runoff.

The effect of the proposed project will be addressed locally with numerical or analytical models (e.g., groundwater drawdown, seepage, WRF water balance) and the results will be input to the watershed model to assess the effects on downstream flow and water quality.

Modeling procedures (2D or 3D) will be used consistent with the available information and required output. The output from these models will be synthesized within the watershed model to assess the downstream effects. Where required to spatially constrain groundwater directions, groundwater particle tracks will be generated from the proposed facilities.

The Application will identify mitigation strategies and treatment processes required to maintain water quality and discuss the effectiveness of proposed mitigation measures. Progressive reclamation activities will also be discussed as they pertain to surface water quality mitigation. A water management plan will

address the planning and design of water management infrastructure, as well as addressing sediment and erosion control measures to minimize concentrations of suspended sediments in the receiving environment, and any monitoring programs, including the establishment of additional far field monitoring sites if trends at the near field sites are evident.

In addition, the Application will contain a discussion of geological and environmental aspects that could contribute to ML/ARD and conditions in disturbed areas. The Application will present the ML/ARD prediction program and mitigation measures based on the following documents:

- Policy for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. Ministry of Energy and Mines and Ministry of Environment, Lands and Parks, July 1998.
- Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. Price and Errington, 1998.
- Prediction Manual for Drainage Chemistry from Sulphidic Geologic Material. MEND Report 1.20.1, 2009.

The ML/ARD prediction program will include:

- Identifying and describing all geological materials excavated, exposed or otherwise disturbed.
- Predicting the ML/ARD potential, and
- Developing a mitigation and monitoring program based on the ML/ARD potential.

With respect to potential effects of ML/ARD on surface water quality, the following information will also be presented in the Application:

a) Delineation of geochemical source terms and methods utilized in geochemical predictive modelling (including the use of any relevant geochemical analogues). Information will be presented in a clear and transparent manner.
b) Integration of results of the ML/ARD prediction work, water quality, hydrology, and water balance information to develop water quality predictions that will be used as a basis for impact assessment, to determine materials handling procedures, and to assess and develop ML/ARD mitigation/management requirements for the project. Geochemical modeling will be presented in a clear and transparent manner and the methods, assumptions and rationale used to estimate water quality will be thoroughly explained.
c) A prediction of water quality will be made for major mine components (concentrate, grade ore stockpiles, WRF, soil and overburden stockpiles, and TSF), site surface water discharges, groundwater seepages and relevant receiving environment locations. Water quality predictions will be conducted for key flow conditions and relevant time-steps in the mine life (e.g., temporal boundaries will include operations, closure, post-closure, workings flooded and discharging, etc.).
d) Water quality predictions and effects assessment will include pH, alkalinity, sulphate, cations, major and trace metal/metalloids, nitrogen species, etc., and include comparison to all relevant water quality guidelines and objectives.
e) The lag time to ML/ARD onset will be assessed for all potentially ARD generating materials and this information will be utilized in the development of management plans.

The Application will also include a detailed discussion of mitigation requirements for ML/ARD effects, including but not limited to the following:

a) If waste rock is segregation is proposed, the Application will demonstrate the feasibility to successfully segregate PAG and non-PAG mine waste materials during operations, propose geochemical segregation criteria and identify operational methods to achieve geochemical characterization and segregation during operations (e.g., geochemical surrogates, on site lab, procedures needed etc.). The application will include a sensitivity analysis to assess the effects of imperfect segregation of waste rock.
b) If a water cover is proposed for ML/ARD management, information will be provided to identify the types, volumes and geochemistry of mine waste to be flooded, the disposal methods and location, the time until full flooding will occur, information to demonstrate that mine wastes will remain flooded during extreme climatic events, measures to mitigate soluble contaminants that could affect water quality, an assessment of geochemical stability under flooded conditions, and monitoring and maintenance requirements to ensure geochemical and physical security of flooded mine wastes.
c) If engineered cover systems are proposed as a ML/ARD mitigation, a conceptual design will be provided including the design objectives and principles, the characteristics and volumes of cover materials required, construction methods, assessment of expected performance and long-term effectiveness under the expected range of climatic conditions, monitoring and maintenance requirements, contingency plans, cost of constructing, and long-term monitoring and maintenance plans.
d) If blending of PAG and non-PAG materials to produce a benign composite is proposed as a ML/ARD mitigation strategy, information will be presented on the geochemistry of individual wastes and mixed wastes including metal release characteristics, site specific management criteria for blending, detailed waste handling and placement plans, demonstration of adequate proportions of PAG and non-PAG wastes throughout mine life, an assessment of anticipated waste dump hydrology, proposed operational monitoring plans, and contingency plans for seepage water quality.
e) If drainage collection and treatment is proposed as a mitigation strategy, a conceptual design will be provided including location, characterization of influent and effluent chemistry and flow, demonstration of the effectiveness of the drainage collection and holding system, conceptual design information on the treatment process, predicted reagent use, assessed performance under the expected range of flow and climatic conditions, sludge disposal plan, the operating, monitoring and maintenance requirements to ensure successful treatment is sufficient to achieve long-term environmental protection requirements, and anticipated capital and operating costs.
f) ML/ARD prevention and management strategies are required for temporary closure or early-permanent closure scenarios.
g) Contingency plans will be provided where there are significant uncertainties or risks associated with the predicted water quality.
h) Concepts for operational and post-closure monitoring and maintenance plans will be provided.

6.3.5 Residual Effects and their Significance

The Application will identify and describe potential residual effects, and provide an assessment of the significance of the potential residual effects. The significance effects assessment will consider magnitude, geographic extent, duration and frequency, reversibility, context and probability of each residual effect.

The analysis of significance will include discussion of:

- Water quality modelling predictions, including geochemistry;
- Site wide water balance (watershed model); and
- Contaminant loading.

Significance will be assessed in relation to:

- Canadian Water Quality Guidelines for the Protection of Aquatic Life. Canadian Environmental Quality Guidelines. Canadian Council of Ministers of the Environment.
- Approved, Draft, and Working Water Quality Guidelines (Criteria) Reports for freshwater aquatic life. Ministry of Environment, Environmental Protection Division.

6.3.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

6.3.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.4 SURFACE WATER QUANTITY

6.4.1 Rationale

The Application will describe the rationale for selecting and assessing surface water quantity as a VC. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

6.4.2 Background

This section of the Application will provide a summary of the surface hydrology of the Project area and the source of the information. Background information will include baseline data obtained from hydrology stations established in the Project area and regional Water Survey of Canada stations, and traditional ecological or community knowledge where available.

The locations of hydrology monitoring stations are shown on Figure 6.4-1.

6.4.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary Surface Hydrology LSA and RSA boundaries are shown on Figure 6.4-1, for discussion.

6.4.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Project activities that could affect the hydrological regime include:

- Site clearing and grading
- Soil salvage and topsoil storage
- Excavation
- Water management
- Pit development
- Tailings Storage Facility development
- Waste rock management facilities, and
- Civil structures.

The Application will describe expected changes to surface hydrology resulting from infrastructure development and freshwater withdrawal requirements for the proposed Project. A site wide water balance will describe water movements within the proposed Project area, including characterization of water levels, inflows and outflows from water management infrastructure, water withdrawal requirements, and reuse and reclaim water requirements for mine processes. A pit lake water balance will estimate mine pit water filling and discharge following mine closure. Mine seepage and base flow analysis will be used to assess surface and groundwater interactions (done in conjunction with the groundwater quantity assessment). The Application will also identify mitigation strategies to minimize the effects of Project

development on the regional hydrological regime, including those of extreme events (e.g., low flows measured as 7Q10 and 7Q10-Summer).

6.4.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.4.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

Other projects or activities that may affect surface water quantity include authorized withdrawals for surface and groundwater sources for drinking water, agriculture, commercial and industrial use; and decommissioned and active mining projects in the area. These activities have the potential to affect the following hydrological aspects:

- Flow paths and drainage areas – changes to drainage areas and flow paths can affect downstream flow rates.
- Annual flow volumes – water diverted around Project components or withdrawal from local surface waters for processing requirements will affect water available for aquatic and terrestrial life, influencing fish migration between habitats and supply of nutrients to downstream areas.
- Seasonal distribution of flow: withdrawal from local surface waters for use or storage will affect hydrological regimes in local and regional watersheds, including frequency and duration of high and low flow events.

6.4.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.5 GROUNDWATER QUALITY

6.5.1 Rationale

The Application will describe the rationale for selecting and assessing groundwater quality as a VC. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

6.5.2 Background

The Application will include a characterization of the baseline groundwater quality in the study area that will include:

- Identification of and rationale for the location of the groundwater monitoring wells installed on site.
- Analysis of groundwater results and comparison to relevant BC Water Quality Guidelines and Canadian Council of the Ministers of Environment (CCME) standards.
- Interpretation of any potential relationships between groundwater quality results and geology as well as the identification of any potential spatial and temporal variations.

Background information will include traditional ecological or community knowledge (e.g., data from existing water wells and monitoring wells in the LSA and RSA, if of sufficient quality) relating to the VC, where available. The locations of groundwater monitoring wells are shown on Figure 6.5-1. The groundwater monitoring wells were established to characterize water quality in the LSA. They include wells upstream and downstream of the proposed facilities. Characterization of the local flow regime will include these wells, piezometers and wells installed adjacent to the pit, historical performance from past mining activities and development of a watershed model that includes surface water and groundwater components. Additional monitoring wells will be installed as required to adequately address potential impacts from facilities as the mine plan is advanced. The proponent will work with the City of Kamloops and FLNRO to identify existing groundwater wells and their owners in the area.

A review of the existing groundwater use in the study area will be carried out and include information such as:

- Published geology and hydrogeology reports and aerial photographs
- Soils and geologic maps and aquifer classification mapping
- Previous drilling/test pitting and hydraulic testing

- Inventory of neighbouring well users and regional groundwater use (including Aboriginal users) and surface water use (water licences). The inventory of groundwater users will include some level of ground-truthing, such as discussing with local personnel their knowledge of the area, site visits, and inspection of recent air photos.
- On site photographs
- Climate data
- Historical mine operations and site studies (e.g., Aberdeen area studies).

Groundwater characterization, including characterization of faults, has been under way in the vicinity of the open pit as part of the open pit design. During operations, the open pit will be a groundwater sink, so there will be no potential for contaminants to leave the site along deep pathways near the open pit. This deep information will also be used in an assessment of the contaminant fate and transport along deeper pathways from other mine facilities.

The Application will include sampling depth, parameters, and sampling frequencies for groundwater well monitoring. The study will also identify the potential for increases in piezometric levels in the Aberdeen Hills area that may adversely impact slope stability in that area.

6.5.3 Spatial and Temporal Boundaries

The Application will include the following:
- A description of the local and regional spatial extent of the EA relative to the VC, and
- Maps outlining the spatial extent of the regional and local study areas of the EA.
- Description of the period of time to be examined in the VC assessment.

The preliminary LSA and RSA for discussion are shown on Figure 6.5-1. Groundwater monitoring wells were established to characterize water quality in the LSA. They include wells upstream and downstream of the proposed facilities. Characterization of the local flow regime will include these wells, piezometers and wells installed adjacent to the pit, historical performance from past mining activities and development of a watershed model that includes surface water and groundwater components. Additional monitoring wells will be installed as required to adequately address potential impacts from facilities as the mine plan is advanced. Further consideration will evolve as the information gained from the current network is included in the conceptual framework.

6.5.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:
- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation, and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

The project components and activities that will be considered in the effects analysis for groundwater quality during construction, operation and closure include:
- Water management (surface runoff diversions, storage for process water)

- Open pit construction
- Pit dewatering
- Waste rock management facilities
- Processing facility
- Concentrate, ore, and overburden stockpiling
- TSF

The Application will provide an evaluation of potential effects associated with mine development, operations and closure on groundwater quality. Data collected during this investigation and other available information such as surficial geology mapping and geotechnical drilling will be used to aid with better constraining the groundwater conceptual model. The evaluation will include description of the monitoring methods, results, and the groundwater quality model developed to estimate potential impacts on groundwater quality. Predicted groundwater concentrations may be evaluated by others in a thermodynamic equilibrium model such as PHREEQC to assess major parameters and potential solubility constraints on predicted concentrations. Modeling input and output files and relevant base map files and calibration data sets will be provided in the appendices of the Application. Geochemical modeling will be presented in a clear and transparent manner and the methods, assumptions and rationale used to estimate water quality will be thoroughly explained.

Groundwater/surface water interaction will be considered when looking at the potential downstream effects of the proposed project. The primary tool for this study will be the watershed model. The watershed model will be developed based on the following data:

- Groundwater levels at measured well sites, in streams, wetlands, springs and ponds;
- Stream flow measurements to identify gaining and losing stream reaches as well as base flow contributions; and
- Meteorological data to address net precipitation available for groundwater recharge and runoff.

The effect of the proposed project will be addressed locally with numerical or analytical models (e.g., groundwater drawdown, seepage, rock dump water balance) and the results will be input to the watershed model to assess the effects on downstream flow and water quality. Modeling procedures (2D or 3D) will be used consistent with the available information and required output. The output from these models will be synthesized within the watershed model to assess the downstream effects. Where required to spatially constrain groundwater directions, groundwater particle tracks will be generated from the proposed facilities.

With respect to potential effects of ML/ARD on groundwater quality, the following information will also be presented in the Application:

a) Delineation of geochemical source terms and methods utilized in geochemical predictive modelling (including the use of any relevant geochemical analogues). Information will be presented in a clear and transparent manner.
b) Integration of results of the ML/ARD prediction work, water quality, hydrology, and water balance information to develop water quality predictions that will be used as a basis for impact assessment, to determine materials handling procedures and to assess and develop ML/ARD mitigation/management requirements for the project. Geochemical modeling will be presented in a clear and transparent manner and the methods, assumptions and rationale used to estimate water quality will be thoroughly explained.

c) A prediction of water quality will be made for major mine components (concentrate, grade ore stockpiles, WRF, soil and overburden stockpiles, and TSF), site surface water discharges, groundwater seepages and relevant receiving environment locations. Water quality predictions will be conducted for key flow conditions and relevant time-steps in the mine life (e.g., temporal boundaries will include operations, closure, post-closure, workings flooded and discharging, etc.).
d) The lag time to ML/ARD onset will be assessed for all potentially ARD generating materials and this information will be utilized in the development of management plans.

The Application will also include a detailed discussion of mitigation requirements for ML/ARD effects, including but not limited to the following:

a) If waste rock is segregation is proposed, the Application will demonstrate the feasibility to successfully segregate PAG and non-PAG mine waste materials during operations, propose geochemical segregation criteria and identify operational methods to achieve geochemical characterization and segregation during operations (e.g., geochemical surrogates, on site lab, procedures needed etc.). The application will include a sensitivity analysis to assess the effects of imperfect segregation of waste rock.
b) If a water cover is proposed for ML/ARD management, information will be provided to identify the types, volumes and geochemistry of mine waste to be flooded, the disposal methods and location, the time until full flooding will occur, information to demonstrate that mine wastes will remain flooded during extreme climatic events, measures to mitigate soluble contaminants that could affect water quality, an assessment of geochemical stability under flooded conditions, and monitoring and maintenance requirements to ensure geochemical and physical security of flooded mine wastes.
c) If engineered cover systems are proposed as a ML/ARD mitigation plans for the project, a conceptual design will be provided including the design objectives and principles, the characteristics and volumes of cover materials required, construction methods, assessment of expected performance and long-term effectiveness under the expected range of climatic conditions, monitoring and maintenance requirements, contingency plans, cost of constructing and long-term monitoring and maintenance.
d) If blending of PAG and non-PAG materials to produce a benign composite is proposed as a ML/ARD mitigation strategy, information will be presented on the geochemistry of individual wastes and mixed wastes including metal release characteristics, site specific management criteria for blending, detailed waste handling and placement plans, demonstration of adequate proportions of PAG and non-PAG wastes throughout mine life, an assessment of anticipated waste dump hydrology, proposed operational monitoring plans and contingency plans for seepage water quality.
e) If drainage collection and treatment is proposed as a mitigation strategy for the project, a conceptual design will be provided including location, characterization of influent and effluent chemistry and flow, demonstration of the effectiveness of the drainage collection and holding system, conceptual design information on the treatment process, predicted reagent use, assessed performance under the expected range of flow and climatic conditions, sludge disposal plan, the operating, monitoring and maintenance requirements to ensure successful treatment is sufficient to achieve long-term environmental protection requirements, and anticipated capita and operating.
f) ML/ARD prevention and management strategies are required for temporary closure or early-permanent closure scenarios.
g) Contingency plans will be provided where there are significant uncertainties or risks associated with the predicted water quality.

h) Concepts for operational and post-closure monitoring and maintenance plans will be provided.

6.5.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.5.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

Other projects or activities that may affect groundwater quality include authorized withdrawals for surface and groundwater sources for drinking water, agriculture, commercial and industrial use; and decommissioned and active mining projects in the area.

6.5.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.6 GROUNDWATER QUANTITY

6.6.1 Rationale

KAM will provide the rationale for choosing and assessing groundwater quantity as a VC in the Application. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

6.6.2 Background

The Application will include a characterization of the existing groundwater regime to support the definition of potential impacts, mitigation measures, monitoring and contingency planning as mine planning proceeds. The following baseline groundwater quantity information for the study area will be provided:

- Identification of the location of drill holes installed as part of groundwater and geotechnical programs;
- Installation details of groundwater monitoring wells and piezometers;
- Groundwater level measurements with an examination of seasonal fluctuations and spatial variations;
- Description of the methodology, analysis and results of hydraulic testing such as falling and rising head tests;
- Characterization of the regional and study area geology, including interpretation of aquifer and aquitard locations in the study area;
- Characterization of the bulk hydraulic conductivity for overburden and bedrock materials;
- City of Kamloops well data, drill logs, and other relevant QC-reviewed groundwater data;
- Estimates of the rate and direction of groundwater flow; and
- Expected interaction of groundwater with surface water.

Existing well locations are shown on Figure 6.5-1.

A review of the existing groundwater use in the study area will be carried out and include information such as:

- Published geology and hydrogeology reports and aerial photographs
- Soils and geologic maps and aquifer classification mapping
- Previous drilling/test pitting and hydraulic testing
- Inventory of neighbouring well users and regional groundwater use (including Aboriginal users) and surface water use (water licences). The inventory of groundwater users will include some level of ground-truthing such as verifying with local personnel about their knowledge of the area, site visit and inspection of recent air photos.
- On site photographs
- Climate data
- Historical mine operations and site studies (e.g., Aberdeen area studies).

6.6.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary LSA and RSA are shown on Figure 6.5-1. Groundwater monitoring wells were established to characterize water quality in the LSA. They include wells upslope and downslope of the proposed facilities. Characterization of the local flow regime will include these wells, piezometers and wells installed adjacent to the pit, historical performance from past mining activities and development of a watershed model that includes surface water and groundwater components. Additional monitoring wells will be installed as required to adequately address potential impacts from facilities as the mine plan is advanced.

6.6.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project, including potential for increases in piezometric levels in the Aberdeen Hills area that may adversely impact slope stability in that area. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

The project components that will be considered in the effects analysis for groundwater quantity during construction, operation and closure include:

- Water management (surface runoff diversions, storage for process water)
- Open pit construction
- Pit dewatering
- Process mill
- Concentrate stockpiling
- Waste rock management facilities
- TSF

The Application will describe the methods and results of assessments to evaluate potential effects associated with mine development, operations and closure on groundwater quantity, based on:

- A site-wide water balance (watershed) model that incorporates baseline conditions as well as the components and phases of the mine development under a range of climatic conditions. All parameters (e.g. precipitation, temperature, evapotranspiration, groundwater flows, and stream-flows) that are reported will include the source of information (empirical or estimated). The results of the water balance calculations will be reported as well as references to selected methodologies and assumptions used in the water balance.
- A numerical groundwater flow model to evaluate the potential impacts of the waste rock management facilities and open pit.

- An analytical or numerical seepage model of the Tailings Storage Facility area to identify main areas of potential seepage issues. The total seepage along the periphery of the impoundment will be calculated.

The Application will provide a description of the measures that will be considered to mitigate proposed Project effects on groundwater quantity.

Where long-term surface and groundwater data are available for the Aberdeen neighbourhood, they will be utilized in the watershed model.

A primary tool for this study will be a watershed model. The watershed model will be developed based on the following data:

- Groundwater levels at measured well sites, in streams, wetlands, springs and ponds;
- Stream flow measurements to identify gaining and losing stream reaches as well as base flow contributions; and
- Meteorological data to address net precipitation available for groundwater recharge and runoff.

A conceptual groundwater model will developed at the outset of the study and refined throughout the course of the investigations to strengthen and clarify the site understanding. The conceptual model will be developed using key hydrogeologic features and properties such as:

- Hydrogeological cross sections and mapping showing the interpreted geological setting including the known or inferred extent and continuity of stratigraphic units, aquifers and aquitards, and groundwater levels.
- Standard plots showing the relationship between hydraulic conductivity estimates and depth, rock type and spatial area.
- Standard time series plots of water levels to evaluate seasonal fluctuations as well as piezometric contoured surfaces for low and high flow periods to assess flow paths.

6.6.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.6.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;

- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

6.6.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.7 FISH POPULATIONS AND FISH HABITAT

6.7.1 Rationale

KAM will provide the rationale for choosing and assessing fish populations and fish habitat as a VC in the Application. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

6.7.2 Background

This section of the Application will provide detailed baseline information on aquatic ecology in the project area, and the source of the information. Background information will include fish and fish habitat assessments in the Project area, historical data, and traditional ecological or community knowledge, where available.

The following will be considered in the assessment:

- Rainbow trout population abundance, distribution and life history characteristics and fish habitat utilization (spawning, rearing, overwintering) in:
  - Jacko Lake
  - Jacko Creek
  - Peterson Creek
  - Inks Lake
  - Alkali Creek
  - Cherry Creek

- Fish habitat utilization (spawning, rearing, overwintering, migration corridor) and critical or important habitat in Kamloops Lake adjacent to the footprint of the freshwater intake and pump station. Species present in Kamloops Lake and potentially affected include:
  - Rainbow trout
  - Sockeye salmon
  - Coho salmon
  - Chinook salmon
  - Pink salmon
  - White sturgeon
  - Lake whitefish
  - Bull trout
  - Burbot
  - Largescale sucker
  - Dolly Varden
  - Mountain whitefish
  - Northern pikeminnow
  - Peamouth chub
  - Prickly sculpin
  - Redside shiner

Aquatic resources information (sediment quality, periphyton diversity and biomass, and benthic macroinvertebrate diversity) will be reported for all stream sites. Sediment quality, benthic macroinvertebrate diversity, and phytoplankton and zooplankton diversity will be reported for Jacko Lake and Inks Lake. Fish tissue metals loading will be reported for tissue samples collected from Jacko Lake.

The locations of aquatic sampling sites are shown on Figure 6.7-1. Aquatic sampling sites are co-located with surface water sampling sites where conditions permit.

6.7.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

Preliminary local and regional study areas for discussion are presented on Figure 6.7-1. The local study area will encompass: the footprint of the Project on Jacko Lake and Peterson Creek; Alkali Creek; the lower reaches of Cherry Creek; and the area adjacent to the water intake site on Kamloops Lake. The regional study area will include the lower watershed areas of Peterson Creek and Cherry Creek.

6.7.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and

- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

The project components that will be considered in the effects analysis for fish and fish habitat during construction, operation and closure include:

- Water management (water withdrawal from Kamloops Lake, collection of contact water and storage for process water, diversion of non-contact water)
- Open pit development, including potential for seepage or drainage of Jacko Lake into the pit
- Waste rock management facilities
- TSF
- Peterson Creek diversion
- Site and access road stream crossings
- Transmission line stream crossings

Potential effects to be assessed include:

- Loss of habitat in Peterson Creek related to the open pit and the EWD;
- Loss of habitat in Inks Lake and Alkali Creek related to development of the TSF and process water ponds;
- Loss of habitat and altered fish distribution and abundance in Peterson Creek downstream of the Project area resulting from reduced flow;
- Loss of habitat in northeast arm of Jacko Lake related to pit development;
- Loss of habitat in Kamloops Lake as a result of water intake upgrades;
- Loss of habitat in Jacko Lake as a result of seepage or drainage of lake water into the adjacent open pit;
- Direct mortality or sub-lethal effects to fish as a result of altered water quality (increased metals loading, increased temperatures, decreased dissolved oxygen concentration, etc.) or blasting activities resulting during Project construction, operation and decommissioning;
- Direct mortality of fish in Kamloops Lake resulting from water withdrawal; and
- Altered productive capacity (periphyton, aquatic macrophytes, plankton community, benthic invertebrates) resulting from changes in water quality (nutrients, temperature, suspended solids).

Fish and fish habitat effects assessment will consider results of the:

- Surface water quality and quantity assessment, and
- Groundwater quality and quantity assessment.

The Application will identify measures to avoid or minimize adverse effects on fish and fish habitat, and will recommend mitigation measures for protection of surface and groundwater quality and quantity. If there is an unavoidable Harmful Alteration, Disruption, or Destruction (HADD) of fish habitat, the Application will describe the HADD and propose a fish habitat compensation plan to ensure no net loss of productive fish habitat.

6.7.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.7.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

6.7.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.8 RARE PLANTS

6.8.1 Rationale

The Application will describe the rationale for selecting and assessing rare vascular and nonvascular plants and lichens as VC. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

Federal or provincial listing or regulation will include:

- Lists of Red and Blue-listed plant taxa thought to occur within the Kamloops forest district as provided by the BC Conservation Data Centre
- Information on known location records of Red or Blue-listed taxa in or near the study area (provided by the BC Conservation Data Centre)
- Information on SARA-listed taxa provided by the Government of Canada, and
- Taxa of regional concern.

6.8.2 Background

This section of the Application will provide detailed baseline information on the VC and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

Field surveys will be used to:
- Confirm presence of vegetation species, and
- Confirm accuracy of the typed polygons within mapped areas.

All surveys will be conducted according to Resources Information Standards Committee (RISC; formerly RIC) standards. Field sampling procedures for the ecosystem map truthing will follow the "Field Manual for Describing Terrestrial Ecosystems" (MELP and MoF, 1998). Locations of field studies and of any special habitat features will be documented using GPS receivers and recorded in NAD 83 UTMs. Representational habitats and any significant habitat features will be photographed.

6.8.3 Spatial and Temporal Boundaries

The Application will include the following:
- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

Using a combination of existing map sources and ecosystem mapping, an assessment of the expected area of disturbance associated with the pit, processing plant, TSF, WRF, and transmission line, buffered by a minimum 500 m, is proposed as the Local Study Area (Figure 6.8-1). The Regional Study Area will include the South Kamloops Landscape Unit and a portion of the Campbell Landscape Unit, including areas south of the Thompson River and west of Highway 97.

6.8.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:
- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Where project activities/disturbances associated with the proposed Project are likely to cause a negative impact on the identified VC, practicable mitigation strategies will be identified. Mitigation measures could include minor adjustments of project footprints to avoid particular sensitive habitats, specification of vegetation clearing schedules, garbage management, noxious weed control, and dust management. The potential effectiveness of each strategy will be discussed. Mitigation strategies will include proven methods, Best Management Practices (BMPs), legislative requirements (provincial and federal Acts) and species-specific recovery strategies (where available, including those in draft). In addition to mitigating potential impacts, opportunities for site restoration and enhancement will be explored to help offset potential losses and improve biodiversity.

6.8.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.8.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability
- Identification and description of monitoring programs that will be conducted to assess cumulative effects deemed significant.

6.8.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.9 RARE AND SENSITIVE ECOLOGICAL COMMUNITIES

6.9.1 Rationale

KAM will provide the rationale for choosing and assessing rare plant communities, wetlands, riparian areas, old-growth forest, grassland, and rock outcrops as VC in the Application. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

Federal or provincial listing or regulation selection will include:

- Lists of Red and Blue-listed ecological communities thought to occur within the Kamloops forest district as provided by the BC Conservation Data Centre (2010)
- Information on actual known location records of Red or Blue-listed ecological communities in or near the study area (provided by the BC Conservation Data Centre)
- SARA Schedule 1, 2 and 3 and COSEWIC listings
- Communities of regional concern.

Environment Canada (EC) has identified grasslands, including those not in pristine condition and/or being actively grazed, as a community to be assessed under rare and sensitive ecological communities. EC has noted that nearly all the grasslands in this region are grazed but remain sensitive ecosystems that support large numbers of species, including federally listed species.

6.9.2 Background

Sensitive Ecosystems are plant community driven. A plant community is a group of climactic plants that occur together in a given area (e.g., climactic stage of succession) and that can occur in a number of biogeoclimatic subzones and site series. Potentially important sites within the study area include remnant old-growth forests in otherwise heavily logged (or beetle affected) areas, wetlands, rock outcrops, and pocket grasslands removed from grazing.

This section of the Application will provide detailed baseline information on the VC (ecosystems and plant communities in the project area) and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available. The Application will describe Terrestrial Ecosystem Mapping (TEM) procedures and methodologies (including map product scale, etc.), cite list of standards to be used, and describe ground-truthing ecosystem surveys in support of TEM work.

Field surveys will be used to:

- Confirm presence of ecological communities, and
- Confirm accuracy of the typed polygons within mapped areas.

All surveys will be conducted according to RISC standards. Field sampling procedures for the ecosystem map truthing will follow BC MELP and BCMoF (1998). Locations of field studies and of any special habitat features will be documented using GPS receivers and recorded in NAD 83 UTMs. Representational habitats and any significant habitat features will be photographed.

6.9.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

Using a combination of existing map sources and ecosystem mapping, an assessment of the expected area of disturbance associated with the pit, processing plant, TSF, and WRF, buffered by a minimum 500 m, is proposed as the Local Study Area (Figure 6.8-1). The transmission line route will be assessed using existing mapping. The Regional Study Area will include the South Kamloops Landscape Unit and a portion of the Campbell Landscape Unit, including areas south of the Thompson River and west of Highway 97 (Figure 6.8-1).

6.9.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation, and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Where project activities/disturbances associated with the proposed Project are likely to cause a negative impact on a VC, practicable mitigation strategies will be identified. Potential strategies that would be recommended could include minor adjustments of project footprints to avoid particular sensitive habitats (avoidance); specification of vegetation clearing schedules, garbage management, noxious weed control, and dust management (mitigation), and compensation. The potential effectiveness of each strategy will be discussed. Mitigation strategies will include proven methods, BMPs, legislative requirements (provincial and federal Acts) and species-specific recovery strategies, including those in draft. Where any impacts to any wetlands cannot be avoided, mitigation strategies for wetlands will be proposed in accordance with the Federal Policy on Wetland Conservation, including any requirements for a Wetland Compensation Plan (WCP). In addition to mitigating potential impacts, opportunities for site restoration and enhancement will be explored to help offset potential losses and improve biodiversity.

6.9.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude

- o Geographic extent
- o Duration and frequency
- o Reversibility
- o Context
- o Probability

6.9.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - o Magnitude
  - o Geographic extent
  - o Duration
  - o Frequency
  - o Reversibility
  - o Context
  - o Probability

6.9.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.10 TERRESTRIAL INVERTEBRATE VC

6.10.1 Rationale

KAM will provide the rationale for choosing and assessing butterfly and dragonfly VC in the Application. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

Candidate VC will be selected from provincial lists (Red/Blue, Conservation Framework priority), Federal lists (SARA, COSEWIC) and regional priorities (Regionally Important, IWMS). VC will be considered on the basis of the presence of suitable/capable habitat, the availability of sufficient species knowledge to produce a meaningful assessment, and likely interactions with the project (geographically and ecologically). Federal or provincial listing or regulation selection will include:

- Lists of Red and Blue-listed terrestrial invertebrates thought to occur within the Kamloops forest district as provided by the BC Conservation Data Centre (2010)
- Information on known location records of Red or Blue-listed terrestrial invertebrates in or near the study area (provided by the BC Conservation Data Centre)
- Information on SARA-listed terrestrial invertebrates provided by the Government of Canada
- Taxa of regional concern.

6.10.2 Background

This section of the Application will provide detailed baseline information on the VC and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

Field surveys will be used to:
- Confirm presence of target wildlife and vegetation species and ecosystems.
- Confirm habitat associations of target species, and
- Confirm habitat characteristics and accuracy of the typed polygons within mapped areas.

All wildlife/habitat surveys will be conducted according to applicable RISC standards. Field sampling procedures for the ecosystem map truthing will follow BC MELP and BCMoF (1998). Locations of field studies and of any special habitat features will be documented using GPS receivers and recorded in NAD 83 UTMs. Representational habitats and any significant habitat features will be photographed.

6.10.3 Spatial and Temporal Boundaries

The Application will include the following:
- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

Using a combination of existing map sources and ecosystem mapping, an assessment of the expected area of disturbance associated with the pit, processing plant, TSF, and waste rock management facilities, buffered by a minimum 500 m, is proposed as the Local Study Area (Figure 6.8-1). The transmission line route will be assessed using existing mapping. The Regional Study Area will include the South Kamloops Landscape Unit and a portion of the Campbell Landscape Unit, including areas south of the Thompson River and west of Highway 97 (Figure 6.8-1).

6.10.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:
- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Where project activities/disturbances associated with construction and operations are likely to cause a negative impact on a VC, mitigation strategies will be identified. Potential strategies that would be recommended could include minor adjustments of project footprints to avoid particular sensitive habitats, specification of vegetation clearing schedules, garbage management, noxious weed control, and dust management. The potential effectiveness of each strategy will be discussed. Mitigation strategies will include proven methods, BMPs, legislative requirements (provincial and federal Acts) and species-specific recovery strategies, including draft (where available). In addition to mitigating potential impacts, opportunities for site restoration and enhancement will be explored to help offset potential losses and improve biodiversity.

6.10.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.10.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

6.10.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.11 AMPHIBIAN VC

6.11.1 Rationale

KAM will provide the rationale for choosing and assessing the following species as VC in the Application:

- Western toad
- Great Basin spadefoot
- Pacific chorus frog
- Columbia spotted frog

.

Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

Federal or provincial listing or regulation selection will include:

- Lists of Red and Blue-listed amphibians thought to occur within the Kamloops forest district as provided by the BC Conservation Data Centre (2010)
- Information on actual known location records of Red or Blue-listed amphibians in or near the study area (provided by the BC Conservation Data Centre)
- Information on SARA-listed amphibians provided by the Government of Canada (2007)
- Amphibians listed as part of the Identified Wildlife Management Strategy (IWMS)
- Taxa of regional concern; and
- Data from targeted wildlife surveys and from incidental observations.

6.11.2 Background

This section of the Application will provide detailed baseline information on the VC and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

Field surveys will be used to:

- Confirm presence of target amphibian species.
- Confirm habitat associations of target amphibian species, and
- Confirm habitat characteristics and accuracy of the typed polygons within mapped areas.

All wildlife/habitat surveys will be conducted according to RISC standards. Field sampling procedures for the ecosystem map truthing will follow BC MELP and BCMoF (1998). Locations of field studies and of any special habitat features will be documented using GPS receivers and recorded in NAD 83 UTMs. Representational habitats and any significant habitat features will be photographed.

6.11.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

Using a combination of existing map sources and ecosystem mapping, an assessment of the expected area of disturbance associated with the pit, processing plant, TSF, and waste rock management facilities, buffered by a minimum 500 m, is proposed as the Local Study Area (Figure 6.8-1). The transmission line route will be assessed using existing mapping. The Regional Study Area will include the South Kamloops Landscape Unit and a portion of the Campbell Landscape Unit, including areas south of the Thompson River and west of Highway 97 (Figure 6.8-1).

6.11.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Where project activities/disturbances associated with the proposed Project are likely to cause a negative impact on a VC, practicable mitigation strategies will be identified. Potential strategies that would be recommended could include minor adjustments of project footprints to avoid particular sensitive habitats, specification of vegetation clearing schedules, garbage management, noxious weed control, and dust management. The potential effectiveness of each strategy will be discussed. Mitigation strategies will include proven methods, BMPs, legislative requirements (provincial and federal Acts) and species-specific recovery strategies, including draft (where available). In addition to mitigating potential impacts, opportunities for site restoration and enhancement will be explored to help offset potential losses and improve biodiversity.

6.11.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.11.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

6.11.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.12 REPTILE VC

6.12.1 Rationale

KAM will provide the rationale for choosing and assessing the gophersnake, racer, western rattlesnake, and rubber boa as VC in the Application. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

Federal or provincial listing or regulation selection will include:

- Lists of Red and Blue-listed reptiles thought to occur within the Kamloops forest district as provided by the BC Conservation Data Centre (2010)
- Information on actual known location records of Red or Blue-listed reptiles in or near the study area (provided by the BC Conservation Data Centre)
- Information on SARA-listed reptiles provided by the Government of Canada (2007)
- Reptiles listed as part of the Identified Wildlife Management Strategy (IWMS)
- Reptiles of regional concern; and
- Data from targeted wildlife surveys and from incidental observations.

6.12.2 Background

This section of the Application will provide detailed baseline information on the VC and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

Field surveys will be used to:

- Confirm presence of target wildlife and vegetation species and ecosystems;
- Confirm habitat associations of target species; and
- Confirm habitat characteristics and accuracy of the typed polygons within mapped areas.

All wildlife/habitat surveys will be conducted according to RISC standards. Field sampling procedures for the ecosystem map truthing will follow BC MELP and BCMoF (1998). Locations of field studies and of any special habitat features will be documented using GPS receivers and recorded in NAD 83 UTMs. Representational habitats and any significant habitat features will be photographed.

6.12.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC;
- Maps outlining the spatial extent of the regional and local study areas of the EA; and
- Description of the period of time to be examined in the VC assessment.

Using a combination of existing map sources and ecosystem mapping, an assessment of the expected area of disturbance associated with the pit, processing plant, TSF, and WRF, buffered by a minimum 500 m, is proposed as the Local Study Area (Figure 6.8-1). The transmission line route will be assessed using existing mapping. The Regional Study Area will include the South Kamloops Landscape Unit and a portion of the Campbell Landscape Unit, including areas south of the Thompson River and west of Highway 97 (Figure 6.8-1).

6.12.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Where project activities/disturbances associated with construction and operations are likely to cause a negative impact on a VC, mitigation strategies will be identified. Potential strategies that would be recommended could include minor adjustments of project footprints to avoid particular sensitive habitats, specification of vegetation clearing schedules, garbage management, noxious weed control, and dust management. The potential effectiveness of each strategy will be discussed. Mitigation strategies will include proven methods, BMPs, legislative requirements (provincial and federal Acts) and species-specific recovery strategies including draft (where available). In addition to mitigating potential impacts,

opportunities for site restoration and enhancement will be explored to help offset potential losses and improve biodiversity.

6.12.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.12.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

6.12.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.13 MIGRATORY BIRD VC

6.13.1 Rationale

The Application will describe the rationale for selecting and assessing the following bird species as VC, as defined under the federal *Migratory Birds Convention Act:*

- American Bittern
- Barn Swallow

- Common Nighthawk
- Great Blue Heron,
- Lewis's Woodpecker
- Long-billed Curlew
- Olive-sided Flycatcher,
- Sandhill Crane, and
- Williamson's Sapsucker

Justification for inclusion will be based on one or more of the following:
- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

Federal or provincial listing or regulation selection will include:
- Lists of Red and Blue-listed wildlife and plant taxa thought to occur within the Kamloops forest district as provided by the BC Conservation Data Centre (2010);
- Information on actual known location records of Red or Blue-listed taxa in or near the study area (provided by the BC Conservation Data Centre);
- Information on SARA-listed taxa provided by the Government of Canada (2007);
- Taxa listed as part of the Identified Wildlife Management Strategy (IWMS); and
- Taxa of regional concern; and data from targeted wildlife surveys and from incidental observations.

6.13.2 Background

This section of the Application will provide detailed baseline information on the VC and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

Field surveys will be used to:
- Confirm presence of target wildlife and vegetation species and ecosystems;
- Confirm habitat associations of target species (including staging, wintering, and breeding); and
- Confirm habitat characteristics and accuracy of the typed polygons within mapped areas.

All wildlife/habitat surveys will be conducted according to RISC standards. Field sampling procedures for the ecosystem map truthing will follow BC MELP and BCMoF (1998). Locations of field studies and of any special habitat features will be documented using GPS receivers and recorded in NAD 83 UTMs. Representational habitats and any significant habitat features will be photographed.

6.13.3 Spatial and Temporal Boundaries

The Application will include the following:
- A description of the local and regional spatial extent of the assessment relative to the VC;

- Maps outlining the spatial extent of the regional and local study areas of the EA; and
- Description of the period of time to be examined in the VC assessment.

Using a combination of existing map sources and ecosystem mapping, an assessment of the expected area of disturbance associated with the pit, processing plant, TSF, and waste rock management facilities, buffered by a minimum 500 m, is proposed as the Local Study Area (Figure 6.8-1). The transmission line route will be assessed using existing mapping. The Regional Study Area will include the South Kamloops Landscape Unit and a portion of the Campbell Landscape Unit, including areas south of the Thompson River and west of Highway 97 (Figure 6.8-1).

6.13.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects (e.g., direct effects (habitat loss), reduced habitat effectiveness (zones of influence effects), and mortality risk) resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities; and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Where project activities/disturbances associated with construction and operations are likely to cause a negative impact on a VC, mitigation strategies will be identified where possible. Mitigation strategies will reference any available recovery strategies (including those in draft). Potential strategies that would be recommended could include minor adjustments of project footprints to avoid particular sensitive habitats, specification of vegetation clearing schedules, garbage management, noxious weed control, and dust management. The potential effectiveness of each strategy will be discussed. Mitigation strategies will include proven methods, BMPs, legislative requirements (provincial and federal Acts) and species-specific recovery strategies (where available). In addition to mitigating potential impacts, opportunities for site restoration and enhancement will be explored to help offset potential losses and improve biodiversity. Requirements for monitoring and mitigation management will be described and detailed in the Application.

6.13.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.13.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

6.13.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.14 RAPTOR VC

6.14.1 Rationale

More than 130 bird species have been detected on Project field surveys. The results of the surveys will be included and assessed in the Project's Application. Candidate VC will be selected from provincial lists (Red/Blue, Conservation Framework priority), Federal lists (SARA, COSEWIC) and regional priorities (Regionally Important, IWMS). VC will be considered on the basis of the presence of suitable/capable habitat, the availability of sufficient species knowledge to produce a meaningful assessment, and likely interactions with the project (geographically and ecologically). The Application will describe the rationale for selecting and assessing the following bird species as VC*:*

- Flammulated Owl
- Peregrine Falcon
- Prairie Falcon
- Short-eared Owl, and
- Swainson's Hawk.

Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

Federal or provincial listing or regulation selection will include:

- Lists of Red and Blue-listed wildlife and plant taxa thought to occur within the Kamloops forest district as provided by the BC Conservation Data Centre (2010);
- Information on actual known location records of Red or Blue-listed taxa in or near the study area (provided by the BC Conservation Data Centre);
- Information on SARA-listed taxa provided by the Government of Canada (2007);
- Taxa listed as part of the Identified Wildlife Management Strategy (IWMS); and
- Taxa of regional concern; and data from targeted wildlife surveys and from incidental observations.

6.14.2 Background

This section of the Application will provide detailed baseline information on the VC and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

Field surveys will be used to:

- Confirm presence of target wildlife and vegetation species and ecosystems,
- Confirm habitat associations of target species, and
- Confirm habitat characteristics and accuracy of the typed polygons within mapped areas.

All wildlife/habitat surveys will be conducted according to RISC standards. Field sampling procedures for the ecosystem map truthing will follow BC MELP and BCMoF (1998). Locations of field studies and of any special habitat features will be documented using GPS receivers and recorded in NAD 83 UTMs. Representational habitats and any significant habitat features will be photographed.

6.14.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

Using a combination of existing map sources and ecosystem mapping, an assessment of the expected area of disturbance associated with the pit, processing plant, TSF, and WRF, buffered by a minimum 500 m, is proposed as the Local Study Area (Figure 6.8-1). The transmission line route will be assessed using existing mapping. The Regional Study Area will include the South Kamloops Landscape Unit and a portion of the Campbell Landscape Unit, including areas south of the Thompson River and west of Highway 97 (Figure 6.8-1).

6.14.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities; and

- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Where project activities/disturbances associated with construction and operations are likely to cause a negative impact on a VC, practicable mitigation strategies will be identified. Potential strategies that would be recommended could include minor adjustments of project footprints to avoid particular sensitive habitats, specification of vegetation clearing schedules, garbage management, noxious weed control, and dust management. The potential effectiveness of each strategy will be discussed. Mitigation strategies will include proven methods, BMPs, legislative requirements (provincial and federal Acts) and species-specific recovery strategies (where available). In addition to mitigating potential impacts, opportunities for site restoration and enhancement will be explored to help offset potential losses and improve biodiversity.

6.14.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.14.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

6.14.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.15 NON-MIGRATORY GAMEBIRD VC

6.15.1 Rationale

The Application will describe the rationale for selecting and assessing Sharp-tailed Grouse and Ruffed Grouse as VC. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Regional significance;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

Federal or provincial listing or regulation selection will include:

- Lists of Red and Blue-listed wildlife and plant taxa thought to occur within the Kamloops forest district as provided by the BC Conservation Data Centre (2010);
- Information on actual known location records of Red or Blue-listed taxa in or near the study area (provided by the BC Conservation Data Centre);
- Information on SARA-listed taxa provided by the Government of Canada (2007);
- Taxa listed as part of the Identified Wildlife Management Strategy (IWMS); and
- Taxa of regional concern; and data from targeted wildlife surveys and from incidental observations.

6.15.2 Background

This section of the Application will provide detailed baseline information on the VC and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

Field surveys will be used to:

- Confirm presence of target wildlife and vegetation species and ecosystems,
- Confirm habitat associations of target species, and
- Confirm habitat characteristics and accuracy of the typed polygons within mapped areas.

All wildlife/habitat surveys will be conducted according to RISC standards. Field sampling procedures for the ecosystem map truthing will follow BC MELP and BCMoF (1998). Locations of field studies and of any special habitat features will be documented using GPS receivers and recorded in NAD 83 UTMs. Representational habitats and any significant habitat features will be photographed.

6.15.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

Using a combination of existing map sources and ecosystem mapping, an assessment of the expected area of disturbance associated with the pit, processing plant, TSF, and WRF, buffered by a minimum 500 m, is proposed as the Local Study Area (Figure 6.8-1). The transmission line route will be assessed using existing mapping. The Regional Study Area will include the South Kamloops Landscape Unit and a portion of the Campbell Landscape Unit, including areas south of the Thompson River and west of Highway 97 (Figure 6.8-1).

6.15.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities; and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Where project activities/disturbances associated with construction and operations are likely to cause a negative impact on a VC, mitigation strategies will be identified where possible. Potential strategies that would be recommended could include minor adjustments of project footprints to avoid particular sensitive habitats, specification of vegetation clearing schedules, garbage management, noxious weed control, and dust management. The potential effectiveness of each strategy will be discussed. Mitigation strategies will include proven methods, BMPs, legislative requirements (provincial and federal Acts) and species-specific recovery strategies (where available). In addition to mitigating potential impacts, opportunities for site restoration and enhancement will be explored to help offset potential losses and improve biodiversity.

6.15.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.15.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent

- o Duration
- o Frequency
- o Reversibility
- o Context
- o Probability

6.15.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.16 BAT VC

6.16.1 Rationale

The Application will describe the rationale for selecting and assessing the following bat species as VC*:*

- Fringed myotis
- Spotted bat
- Townsend's big-eared bat, and
- Western small-footed myotis.

Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

Federal or provincial listing or regulation the selection will include:

- Lists of Red and Blue-listed wildlife and plant taxa thought to occur within the Kamloops forest district as provided by the BC Conservation Data Centre (2010);
- Information on actual known location records of Red or Blue-listed taxa in or near the study area (provided by the BC Conservation Data Centre);
- Information on SARA-listed taxa provided by the Government of Canada (2007);
- Taxa listed as part of the Identified Wildlife Management Strategy (IWMS); and
- Taxa of regional concern; and data from targeted wildlife surveys and from incidental observations.

6.16.2 Background

This section of the Application will provide detailed baseline information on the VC and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

Field surveys will be used to:

- Confirm presence of target wildlife and vegetation species and ecosystems,
- Confirm habitat associations of target species, and
- Confirm habitat characteristics and accuracy of the typed polygons within mapped areas.

All wildlife/habitat surveys will be conducted according to RISC standards. Field sampling procedures for the ecosystem map truthing will follow BC MELP and BCMoF (1998). Locations of field studies and of any special habitat features will be documented using GPS receivers and recorded in NAD 83 UTMs. Representational habitats and any significant habitat features will be photographed.

6.16.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

Using a combination of existing map sources and ecosystem mapping, an assessment of the expected area of disturbance associated with the pit, processing plant, TSF, and WRF, buffered by a minimum 500 m, is proposed as the Local Study Area (Figure 6.8-1). The transmission line route will be assessed using existing mapping. The Regional Study Area will include the South Kamloops Landscape Unit and a portion of the Campbell Landscape Unit, including areas south of the Thompson River and west of Highway 97 (Figure 6.8-1).

6.16.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Where project activities/disturbances associated with construction and operations are likely to cause a negative impact on a VC, practicable mitigation strategies will be identified. Potential strategies that would be recommended could include minor adjustments of project footprints to avoid particular sensitive habitats, specification of vegetation clearing schedules, garbage management, noxious weed control, and dust management. The potential effectiveness of each strategy will be discussed. Mitigation strategies will include proven methods, BMPs, legislative requirements (provincial and federal Acts) and species-specific recovery strategies, including draft (where available). In addition to mitigating potential impacts, opportunities for site restoration and enhancement will be explored to help offset potential losses and improve biodiversity.

6.16.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.16.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

6.16.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.17 MAMMAL VC

6.17.1 Rationale

The Application will describe the rationale for selecting and assessing the following mammal species as VC*:*

- Moose
- Badger
- Great Basin pocket mouse, and
- Mule deer.

Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;

- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

Federal or provincial listing or regulation selection will include:

- Lists of Red and Blue-listed wildlife and plant taxa thought to occur within the Kamloops forest district as provided by the BC Conservation Data Centre (2010);
- Information on actual known location records of Red or Blue-listed taxa in or near the study area (provided by the BC Conservation Data Centre);
- Iinformation on SARA-listed taxa provided by the Government of Canada (2007);
- Taxa listed as part of the Identified Wildlife Management Strategy (IWMS); and
- Taxa of regional concern; and data from targeted wildlife surveys and from incidental observations.

6.17.2 Background

This section of the Application will provide detailed baseline information on the VC and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

Field surveys will be used to:

- Confirm presence of target wildlife and vegetation species and ecosystems,
- Confirm habitat associations of target species, and
- Confirm habitat characteristics and accuracy of the typed polygons within mapped areas.

All wildlife/habitat surveys will be conducted according to RISC standards. Field sampling procedures for the ecosystem map truthing will follow BC MELP and BCMoF (1998). Locations of field studies and of any special habitat features will be documented using GPS receivers and recorded in NAD 83 UTMs. Representational habitats and any significant habitat features will be photographed.

6.17.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

Using a combination of existing map sources and ecosystem mapping, an assessment of the expected area of disturbance associated with the pit, processing plant, TSF, and WRF, buffered by a minimum 500 m, is proposed as the Local Study Area (Figure 6.8-1). The transmission line route will be assessed using existing mapping. The Regional Study Area will include the South Kamloops Landscape Unit and a portion of the Campbell Landscape Unit, including areas south of the Thompson River and west of Highway 97 (Figure 6.8-1).

6.17.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities; and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Where project activities/disturbances associated with construction and operations are likely to cause a negative impact on a VC, mitigation strategies will be identified where possible. Potential strategies that would be recommended could include minor adjustments of project footprints to avoid particular sensitive habitats, specification of vegetation clearing schedules, garbage management, noxious weed control, and dust management. The potential effectiveness of each strategy will be discussed. Mitigation strategies will include proven methods, BMPs, legislative requirements (provincial and federal Acts) and species-specific recovery strategies (where available). In addition to mitigating potential impacts, opportunities for site restoration and enhancement will be explored to help offset potential losses and improve biodiversity.

6.17.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

6.17.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

6.17.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

6.18 SUMMARY OF ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS

Potential environmental effects will be summarized by Project phase in a table with the following format:

Table 6.18-1 Example Summary Table of Potential Environmental Effects

Valued Component	Potential Effects	Key Mitigation Measures	Summary Statement of Significance Analysis of Residual Effects

SECTION 7.0 - ASSESSMENT OF POTENTIAL ECONOMIC EFFECTS

7.1 LABOUR FORCE

7.1.1 Rationale

The Application will describe the rationale for selecting and assessing the local and regional labour force as a VC. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

7.1.2 Background

This section of the Application will provide a summary of the local and regional work force and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

7.1.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The specific data and information requirements named in the AIR Template provide indications of where and how to set boundaries. The proponent's Project description and project agreements also shape the geographic boundaries of the regional context and the site specific setting. Figure 7.1-1.presents a preliminary characterization of the economic and social study region (local and regional) for the Ajax Project. It considers Aboriginal territories, watersheds at the project site, regional district jurisdictional boundaries and planning regions, infrastructure, transportation and shipping routes identified in the project description, as well as other socioeconomic considerations in the region. The boundaries could change as socioeconomic research and public involvement processes move forward.

7.1.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

7.1.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;

- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

7.1.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

7.1.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

7.2 EDUCATION AND TRAINING

7.2.1 Rationale

The Application will describe the rationale for selecting and assessing education and training as a VC. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

7.2.2 Background

This section of the Application will provide a summary of baseline education, training and skills in the local and regional workforce. Background information will include traditional ecological or community knowledge relating to the VC, where available.

The following areas will be assessed, as applicable:

- Mining exploration and activity
- Forestry and logging
- Power generation and supply
- Agriculture and ranching
- Tourism and recreation
- Commercial recreation and sport
- Major employers involving land and resource access, and
- Other major employers such as governments, health authorities, and school boards.

The construction, operation and decommissioning of the Project provides an economic pathway of effects through the creation of employment, training opportunities, and business expenditures. The ability of people to benefit from these effects is linked to their level of education and training, as well as their ability to access the opportunities.

7.2.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary local and regional study area is shown on Figure 7.1-1.

7.2.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

The Project components that will be considered in the effects assessment for education, training and skills development will be:

- Corporate Policy, and
- Training and Education.

7.2.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent

- o Duration and frequency
- o Reversibility
- o Context
- o Probability

7.2.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - o Magnitude
  - o Geographic extent
  - o Duration
  - o Frequency
  - o Reversibility
  - o Context
  - o Probability

7.2.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

7.3 INCOME

7.3.1 Rationale

The Application will describe the rationale for selecting and assessing income as a VC. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

7.3.2 Background

This section of the Application will provide a summary of the local and regional income and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

7.3.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary local and regional study area is shown on Figure 7.1-1.

7.3.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

7.3.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

7.3.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

7.3.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

7.4 EMPLOYMENT

7.4.1 Rationale

The Application will describe the rationale for selecting and assessing employment as a VC. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

7.4.2 Background

This section of the Application will provide a summary of the local and regional employment and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

7.4.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary local and regional study area is shown on Figure 7.1-1.

7.4.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities,
- Identify and analyze benefits resulting from the proposed Project relating to employment, including economic spin offs and population growth projections (based on local labour availability, consequent in-migration to take up Project related and spin off jobs and the family characteristics of in-migrants), and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

7.4.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

7.4.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

7.4.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

7.5 BUSINESS

7.5.1 Rationale

The Application will describe the rationale for selecting and assessing business as a VC. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

7.5.2 Background

This section of the Application will provide a summary of local and regional businesses and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

The construction, operation and decommissioning of the Project provides an economic pathway of effects through the creation of employment, training opportunities, and business expenditures. The ability of people to benefit from these effects is linked to their level of education and training, as well as their ability to access the opportunities.

7.5.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary local and regional study area is shown on Figure 7.1-1.

7.5.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

7.5.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

7.5.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;

- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

7.5.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

7.6 COST OF LIVING

7.6.1 Rationale

The Application will describe the rationale for selecting and assessing cost of living as a VC. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

7.6.2 Background

This section of the Application will provide a summary of the local and regional cost of living and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

7.6.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary local and regional study area is shown on Figure 7.1-1.

7.6.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

7.6.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

7.6.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

7.7 HOUSING

7.7.1 Rationale

The Application will describe the rationale for selecting and assessing housing as a VC. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

7.7.2 Background

This section of the Application will provide a summary of the local and regional housing market and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

7.7.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary study is shown on Figure 7.1-1 for discussion.

7.7.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project, including impact to housing affordability and availability. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

The socioeconomic baseline will include a description of the existing housing stock. The effects assessment will attempt to characterize the impact of the mine on real estate prices and availability. This will be done through a review of similar studies/projects as well as a consideration of the different types of factors that can impact on real estate prices and availability (e.g., forecast employment and business opportunities, housing market in general).

7.7.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

7.7.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

7.7.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

7.8 INFRASTRUCTURE

7.8.1 Rationale

The Application will describe the rationale for selecting and assessing infrastructure as a VC. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

7.8.2 Background

This section of the Application will provide a summary of the local and regional infrastructure and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

Population, infrastructure, and services are commonly used to describe the regional and local areas and the communities located within. The pathway of effects between the proposed Project and population, infrastructure and services are generally through the presence (and/or influx) of construction and operation-related workers and their associated incomes. Higher incomes are often associated with improvements in housing, health and wellbeing to project workers and their families. The topics generally considered for the local and regional study areas in support of these pathways include:

- Population
- Housing
- Public facilities
- Public services, and

- Lands/reserve land.

7.8.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary study is shown on Figure 7.1-1 for discussion.

7.8.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

7.8.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

7.8.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

7.8.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

7.9 ECONOMIC DIVERSIFICATION

7.9.1 Rationale

KAM will provide the rationale for including economic diversification as a VC in the Application. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

7.9.2 Background

This section of the Application will provide a description of current trends in economic diversification and discuss relevant drivers of change.

7.9.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the area in which economic diversification is being considered.
- A description of the period of time over which relevant changes in the area's economy are being considered.

The preliminary study is shown on Figure 7.1-1 for discussion.

7.9.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will contain a discussion of how the project will contribute to or impact economic diversification in the region through interaction with economic drivers including but not limited to:

- Forestry
- Operation and development of other mines in the area
- Tourist attractions in the area, such as Sun Peaks resort
- Promotion of the city as the tournament capital of BC through investment in sports facilities, and
- Thompson Rivers University and the influence of international students on the Kamloops economy.

7.9.5 Residual Effects and their Significance

The residual effects and significance of the Proposed Project on the economic diversity of the area will be assessed.

7.9.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

7.9.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

7.10 SUMMARY OF ASSESSMENT OF POTENTIAL ECONOMIC EFFECTS

Potential economic effects will be summarized by Project phase in a table with the following format:

Table 7.10-1 Example Summary Table of Potential Economic Effects

Valued Component	Potential Effects	Key Mitigation Measures	Summary Statement of Significance Analysis of Residual Effects

SECTION 8.0 - ASSESSMENT OF POTENTIAL SOCIAL EFFECTS

8.1 CULTURE

8.1.1 Rationale

The Application will describe the rationale for selecting and assessing culture as a VC. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

8.1.2 Background

This section of the Application will provide a summary of the local and regional culture and the source of the information. Culture is considered shared attitudes, values, goals, and practices of the region.

8.1.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The specific data and information requirements named in the AIR Template (Environmental Assessment Office, 2010) provide indications of where and how to set boundaries. The proponent's Project description and project agreements also shape the geographic boundaries of the regional context and the site specific setting. Figure 7.1-1.presents a preliminary characterization of the economic and social study region (local and regional) for the Ajax Project. It considers Aboriginal territories, watersheds at the project site, regional district jurisdictional boundaries and planning regions, infrastructure, transportation and shipping routes identified in the project proposal, as well as other socio-economic considerations in the region. The boundaries could change as socioeconomic research and public involvement processes move forward.

8.1.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

8.1.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;

- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

8.1.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

8.1.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

8.2 COMMUNITY HEALTH AND WELL-BEING

8.2.1 Rationale

The Application will describe the rationale for selecting and assessing community health and well-being as VC. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

8.2.2 Background

This section of the Application will provide a summary of the local and regional community health and the source of the information. Background information will include community knowledge relating to the VC, where available.

Effects on community health and community well-being can arise from numerous pathways including changes to the physical, terrestrial and aquatic environments, through the changes associated with employment and business opportunities, traffic-related effects and the effects resulting from an influx of workers or return migration to the area.

8.2.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary study is shown on Figure 7.1-1 for discussion.

8.2.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

8.2.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

8.2.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency

- o Reversibility
- o Context
- o Probability

8.2.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

8.3 PUBLIC FACILITIES AND SERVICES, INCLUDING TRANSPORTATION

8.3.1 Rationale

The Application will describe the rationale for selecting and assessing public facilities and services, including transportation, as VC. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

8.3.2 Background

This section of the Application will provide a summary of local and regional public facilities and services, including transportation, and the source of the information. Background information will include community knowledge relating to the VC, where available. The pathway of effects between the proposed Project and the VC are generally through the presence (and/or influx) of construction and operation-related workers and their associated incomes.

8.3.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary study is shown on Figure 7.1-1 for discussion. The proponent will work with Interior Health to ensure appropriate delineation of the boundaries and assessment of the potential effects to community health and well- being.

8.3.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and

- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

8.3.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

8.3.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

8.3.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

8.4 DARK SKY/SHADING

8.4.1 Rationale

KAM will provide the rationale for assessing the quality of darkness of the night skies and shading as VC in the Application. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;

- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

8.4.2 Background

This section of the Application will summarize existing light levels and shading effects in neighbourhoods surrounding the proposed Project, and existing light levels at the Stake Lake observatory and in nearby residences and communities.

8.4.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary local and regional study boundary is shown on Figure 8.4-1.

8.4.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will identify:

- Project components that will be considered in the effects analysis
- Project activities leading to effects for each components
- Impact of 24-hour operations on the surrounding neighbourhoods (existing and proposed) with respect to mine lighting
- Light levels during non-daylight hours
- Shading effects of the EWD, NWD and the TSF
- Mitigation measures that will be utilized to minimize project effects, and
- Residual effects.

8.4.5 Residual Effects and their Significance

The residual effects and significance of light pollution and shading remaining after implementation of management plans, and any monitoring, follow-up, and adaptive management programs will be assessed.

8.4.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration

- o Frequency
- o Reversibility
- o Context
- o Probability

8.4.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

8.5 LAND AND RESOURCE USE

8.5.1 Rationale

The Application will describe the rationale for selecting and assessing land and resource use as a VC. Justification for inclusion will be based on one or more of the following:

- Aboriginal interest;
- Public or other stakeholder input; and
- Relevant legislation or policy concerning the VC.

8.5.2 Background

This section of the Application will provide a summary of local and regional land and resource use. Background information will include traditional ecological or community knowledge relating to the VC, where available.

The construction, operation, and decommissioning of the Project is anticipated to have effects on the physical and biophysical environments. The extent to which physical undertakings result in changes to the physical, terrestrial and aquatic environments may have implications for land and resource use and resource users in the local and regional study areas. In support of these potential pathways, the assessment will consider:

- Traditional and Domestic Land and Resource Use by Aboriginal People
  - o Location of reserve lands, Métis settlements, and traditional territories
  - o Sites of traditional or cultural importance within or near the project sites
  - o Domestic hunting, fishing and trapping by Aboriginal groups
  - o Harvesting and gathering
  - o Any traditional land use studies
- Other Land and Resource Use
  - o Human presence within or near project sites
  - o Commercial trapping
  - o Grassland conservation
  - o Agriculture
  - o Tourism, outfitting and lodges

  - o Recreational hunting and fishing
  - o Outdoor recreation
  - o Forestry
  - o Mining
  - o Protected areas
  - o Applicable land and/or resource use plans
- Heritage Resources

8.5.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary local and regional study area is shown on Figure 7.1-1.

8.5.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

8.5.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - o Magnitude
  - o Geographic extent
  - o Duration and frequency
  - o Reversibility
  - o Context
  - o Probability

8.5.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - o Magnitude

- o Geographic extent
- o Duration
- o Frequency
- o Reversibility
- o Context
- o Probability

8.5.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

8.6 JACKO LAKE

8.6.1 Rationale

Jacko Lake will be included as a VC based on public and stakeholder input during the early consultation period. KAM will describe the rationale for including Jacko Lake as a VC in the Application. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Relevant legislation or policy concerning the VC; and
- Scientific/professional knowledge.

8.6.2 Background

This section of the Application will summarize the historical (including traditional) and current uses of the lake, as well a description of its value from a socioeconomic perspective for the local and regional study area. The section will include:

- Traditional and historical information about the use of the lake;
- Overview of current use and importance of lake based on key person interviews and document analysis.

8.6.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description and map of the location of the lake and surrounding areas from which lake users are drawn;
- A description of the period of time over which the lake's importance and value will be assessed.

8.6.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Describe the perception of potential effects on the lake and suggested mitigation measures identified in key person interviews with fly fishing associations and other recreational users of the lake (e.g. trail running, mountain biking clubs).
- Address intrinsic value of the lake to recreational users, tourists and others.
- Identify potential project effects on the value of the lake to the local and regional study area, including the City of Kamloops and TNRD.
- Discuss the perception of potential effects on the lake and lake use related to geochemical and groundwater assessments.
- Assess effects of proposed project on sight lines at Jacko Lake, from specific reference points on the shore line and on the lake itself.
- Discuss Jacko Lake fish in the context of country food usage.
- Discuss contemporary Aboriginal use of the lake, including for transportation and navigation.
- Discuss refinements to Project description intended to off-set potential effects on Jacko Lake.

8.6.5 Residual Effects and their Significance

The residual effects and significance of disturbance to activities related to Jacko Lake after the implementation of mitigation measures will be assessed. Information regarding monitoring programs and/or management plans will also be covered in this section.

8.6.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

8.6.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

8.7 VISUAL IMPACT

8.7.1 Rationale

KAM will provide the rationale for including visual impact as a VC in the Application. Justification for inclusion will be based on one or more of the following:

- Public or other stakeholder input;
- Relevant legislation or policy concerning the VC; and
- Aboriginal interest.

8.7.2 Background

This section will describe the current view-shed where the proposed Project is situated and the perceived effects on the view-shed. The analysis will examine various sight lines from different locations, including residential, recreational and commercial, and assess effects based on the perceived aesthetic values associated with those uses, derived from key person interviews.

8.7.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description and map of the area in which views will be affected including lines of site, and
- A description of the period of time over which visual impacts will be assessed.

8.7.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will contain:

- An explanation of visual impacts using results from KAM visual modelling, including an analysis of lines of site;
- Site design, including visual buffers in the feasibility study; and
- Public and stakeholder input from key person interviews.

8.7.5 Residual Effects and their Significance

The residual effects and significance of disturbance to views in the project area after the implementation of mitigation measures will be assessed. Information regarding monitoring programs and/or management plans will also be covered in this section.

8.7.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude

- o Geographic extent
- o Duration
- o Frequency
- o Reversibility
- o Context
- o Probability

8.7.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

8.8 ABORIGINAL COMMUNITY INTERESTS

8.8.1 Rationale

KAM will provide the rationale for including Aboriginal community interest as a VC in the Application. Justification for inclusion will be based on identified interest or relevant legislation or policy.

8.8.2 Background

This section of the Application will provide a description of the historical and contemporary Aboriginal presence in the local study area and the regional study area. It will provide an overview of resource and land use in the local and regional study area in addition to a broad range of other socioeconomic topics to be covered in the Application.

8.8.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the areas of particular interest to Aboriginal communities; and
- A description of the period of time over which Aboriginal interests are being considered.

8.8.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will contain:

- Discussion regarding topics raised at working group meetings (and similar contexts);
- Aboriginal input from key person interviews and secondary sources.

8.8.5 Residual Effects and their Significance

The residual effects and significance of the development on the Aboriginal communities after mitigation measures will be assessed.

8.8.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

8.8.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

8.9 SUMMARY OF ASSESSMENT OF POTENTIAL SOCIAL EFFECTS

Potential socioeconomic effects will be summarized by Project phase in a table with the following format:

Table 8.9-1 Example Summary Table of Potential Social Effects

Valued Component	Potential Effects	Key Mitigation Measures	Summary Statement of Significance Analysis of Residual Effects

SECTION 9.0 - ASSESSMENT OF POTENTIAL HERITAGE EFFECTS

9.1 HERITAGE OBJECTS

9.1.1 Rationale

The Application will describe the rationale for selecting and assessing heritage objects as VC, considering baseline data, consultation activities, and any available and relevant traditional ecological or community knowledge.

Archaeological resources in BC are protected under the *Heritage Conservation Act*. The following definitions are provided in the Act:

- *heritage object means, whether designated or not, personal property that has heritage value to British Columbia, a community or an aboriginal people, and*
- *heritage value means the historical, cultural, aesthetic, scientific or educational worth or usefulness of a site or object*.

Therefore heritage objects will be considered a VC in the Project assessment.

9.1.2 Background

This section of the Application will provide a general description of the local and regional heritage environment and the source of the information. Background information will include information obtained from an archaeological assessment and traditional ecological or community knowledge relating to the VC, where available.

An archaeological assessment will include:

- Archaeological Overview Assessment (AOA), and
- Archaeological Impact Assessment (AIA).

The purpose of the AOA is to predict the potential for the presence of archaeological resources within a specific area. The degree and location of disturbance from past mining activities is assessed, and severely disturbed areas are excluded from subsequent phase work. Archaeological potential is predicted based on, but not limited to, proximity to water, slope, drainage, forest cover, the presence or absence of recorded archaeological sites, the types of known sites, the presence of terrain features with known associations with archaeological sites (e.g., terraces, knolls, slope breaks), and local knowledge. During the AOA most terrain is subject to a preliminary field reconnaissance level assessment.

An AIA consists of surface examination and subsurface testing conducted under the authority of a *Heritage Conservation Act* Inspection Permit for the purpose of identifying previously unrecorded archaeological sites or reassessing known sites. An AIA includes description of any anticipated project impacts and management measures.

9.1.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary study area for discussion is on Figure 9.1-1.

9.1.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects on heritage objects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Mitigation is undertaken in cases where unavoidable conflicts between archaeological resources and a proposed development are identified. Mitigation may involve project redesign or systematic data recovery (e.g., archaeological excavation) and follow-up analysis of any recovered artifacts or recorded features.

9.1.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

Significance will be assessed in relation to the heritage value, as defined under the *Heritage Conservation Act*, of the site.

9.1.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility

- o Context
- o Probability

9.1.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

9.2 HERITAGE SITES

9.2.1 Rationale

Each Aboriginal community in BC has a unique interpretation of cultural heritage resource values. The Application will describe the rationale for selecting and assessing heritage sites as VC, considering baseline data, consultation activities, and any shared and relevant traditional ecological or community knowledge.

Archaeological resources in BC are protected under the *Heritage Conservation Act*. The following definitions are provided in the Act:

- *heritage site means, whether designated or not, land, including land covered by water, that has heritage value to British Columbia, a community or an aboriginal people, and*
- *heritage value means the historical, cultural, aesthetic, scientific or educational worth or usefulness of a site or object*.

Therefore heritage sites will be considered a VC in the Project assessment.

Section 10 of the Forest Planning and Practices Regulation of the *Forest and Range Practices Act* outlines the government objective for cultural heritage resources that are the focus of a traditional use by an Aboriginal people and not regulated under the *Heritage Conservation Act*. Many natural resources such as plants, animals, and habitat types have cultural values. According to the Forest and Range Evaluation Program a cultural heritage resource is defined as (FREP Cultural Heritage Resource Value Data Management Guidelines, 2011):

> "*An object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal people*"

The proponent will work with Aboriginal groups to identify any additional heritage resources that are not captured within the environmental, economic, social, or health assessment categories.

9.2.2 Background

This section of the Application will provide a general description of the local and regional heritage environment and the source of the information. Background information will include information obtained

from an archaeological assessment and traditional ecological or community knowledge relating to the VC, where available.

An archaeological assessment will include:
- Archaeological Overview Assessment (AOA), and
- Archaeological Impact Assessment (AIA).

9.2.3 Spatial and Temporal Boundaries

The Application will include the following:
- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary study area for discussion is on Figure 9.1-1.

9.2.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:
- Identify and analyze potential adverse effects on heritage objects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Mitigation is undertaken in cases where unavoidable conflicts between archaeological resources and a proposed development are identified. Mitigation may involve project redesign or systematic data recovery (e.g., archaeological excavation) and follow-up analysis of any recovered artifacts or recorded features.

9.2.5 Residual Effects and their Significance

KAM will provide the following in the Application:
- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

Significance will be assessed in relation to the heritage value, as defined under the *Heritage Conservation Act*, of the object, and in consultation with affected Aboriginal groups.

9.2.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

9.2.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

9.3 SUMMARY OF ASSESSMENT OF POTENTIAL HERITAGE EFFECTS

Potential socioeconomic effects will be summarized by Project phase in a table with the following format:

Table 9.3-1 Example Summary Table of Potential Heritage Effects

Valued Component	Potential Effects	Key Mitigation Measures	Summary Statement of Significance Analysis of Residual Effects

SECTION 10.0 - ASSESSMENT OF POTENTIAL HEALTH EFFECTS

10.1 AIR QUALITY (DUSTFALL, PM_{10} AND $PM_{2.5}$)

10.1.1 Rationale

The Application will describe the rationale for selecting and assessing air quality, measured as dustfall (DF), total suspended particulate (TSP), inhalable particulate (PM_{10}), and respirable particulate ($PM_{2.5}$), as VC. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

The Government of British Columbia has a goal of leading the way in North America in healthy living and fitness. There are many factors affecting healthy living and fitness, however one of the key factors with respect to the proposed Project is environmental health, which includes air quality.

Air quality has preliminarily been identified as a VC because of the potential risks to human health from consumption of country foods directly exposed to metal-contaminated dustfall or soils. Criteria Air Contaminants (CAC), which includes particulate matter, has been identified as a VC because of the potential risks to human health from reduced air quality. Federal and provincial governments have ambient air quality objectives to ensure long-term protection of human health, an especially important issue for the Ajax Project due to its proximity to Kamloops.

10.1.2 Background

This section of the Application will provide a summary of local and regional air quality and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

The Application will present background information on air quality in the local and regional air shed. The baseline dustfall monitoring program will follow the 2004 revision of the “Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter)” (ASTM International Designation D 1739-98).

Long-term baseline information on particulate matter (PM) is available for the project area from the National Air Pollution Surveillance Program (NAPS), a combined federal, provincial, and municipal program established in 1969 to assess ambient air quality in populated regions in Canada. The NAPS Brocklehurst station is located approximately 7 km from the northern edge of the project footprint. Information on industrial facility pollutant releases and disposals to air, water and land are also available for the region from the National Pollutant Release Inventory (NPRI) of Environment Canada, under authority of the Canadian Environmental Protection Act. NPRI also provides emission estimates for motor

vehicles, agricultural activities, and forest fires. The Application will present a summary of PM and trends compiled from NAPS and NPRI datasets relevant to the Project area.

The dust inventory will include total particulate matter and the inhalable (PM_{10}) and respirable ($PM_{2.5}$) fractions. The particulate fractions will be described in terms of toxicological properties for parameters such as trace metals, and in terms of primary and precursor pollutants. The Guidance Document on Continuous Improvement (CI) And Keeping-Clean-Areas-Clean (KCAC) Canada-wide Standards for Particulate Matter and Ozone (CCME, 2007) and the provincial Guidance on Application of Provincial Air Quality Criteria for $PM_{2.5}$ (Ministry of Healthy Living and Sport, June 2009) will be referenced as a guiding principle in the development of the particulate assessment program.

10.1.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary study area boundary is the same as for climate, as shown on Figure 6.1-1. The Application will clearly define the study area and the criteria used to determine the boundaries used for assessing potential human health effects. The study area description will identify potential receptors (residential, commercial and industrial land uses) and sensitive subpopulations, as well as the distance from each to project construction and operational components. The proponent will work with Interior Health to ensure that sensitive receptors are appropriate and to set appropriate analysis requirements and data benchmarking.

10.1.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project during operations,
- Clearly describe the ambient air in the study area and the projected emissions from the project, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Project components and activities that will be considered in the effects analysis for air quality and human health include:

- trucks and heavy equipment direct emissions,
- indirect emissions from mine activity and haul-road traffic (e.g., fugitive road dust),
- emissions from blasting activities,
- stationery equipment (e.g., crushers, conveyors, generators), and
- emissions from area sources such as exposed tailings, disturbed land surfaces, waste rock piles.

Fugitive dust may be generated during all phases of the Project, from drilling, blasting, and traffic along unpaved haul roads and access roads. Dust from the TSF and waste rock management facilities could also be mobilized on windy days. Air quality dispersion modelling will be used to predict ambient air

quality during Project operation. The model used will be in accordance with Guidelines for Air Quality Dispersion Modelling in British Columbia (MOE 2008). The standards or benchmarks used towards the assessment of the human health significance of the described ambient and emission inventories and fugitive dust will be clearly presented in the Application.

Mitigation measures will be discussed to minimize the release of fugitive dust and PM during all phases of construction, operation, and decommissioning and closure as well as post-closure. A complaint response and resolution policy will be considered in mitigation measures. Progressive reclamation measures that control dust generation will also be included as mitigation. Monitoring programs, including assessment of the effectiveness of mitigation measures throughout the life of the mine and into the post-closure period, will include annual reporting requirements.

The effects assessment will consider a modelling domain 20 km by 20 km centered on the Project site. As per the MOE's direction the CALPUFF regulatory dispersion model for the year 2004 only will be used. Particulars include:

- For the entire domain the four parameters will be modelled (DF, TSP, PM_{10} and $PM_{2.5}$)
- For a series of 10 to 20 special receptors (nearby homes, schools, and places of interest) speciated DF and $PM_{2.5}$ results (e.g., specific metals like copper, arsenic, molybdenum) will be presented. Each substance will require a dedicated CALPUFF run. Results of these can be compared against Texas screening levels or Washington State acceptable source impact levels (ASILs).

10.1.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

Significance will be assessed in relation to:

- CCME Air Quality Guidelines for the Protection of Human Health and the Environment. Current guidelines are set at 25 $\mu g/m^3$ and 15 $\mu g/m^3$ for PM_{10} and $PM_{2.5}$, respectively.
- Guidance Document on Continuous Improvement (CI) And Keeping-Clean-Areas-Clean (KCAC) Canada-wide Standards for Particulate Matter and Ozone (CCME, 2007).
- Guidance on Application of Provincial Air Quality Criteria for PM2.5 (Ministry of Healthy Living and Sport, June 2009).

10.1.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

The cumulative effects assessment will consider existing industrial, commercial, and residential activities in the region. Existing activities that currently contribute to background PM in the Kamloops area near the Project site include:

- Absorbent Products Ltd. - Absorbent Products Ltd: PM
- Ainsworth Lumber Co. Ltd. - Savona Plywood Division
- Spectra Energy Transmission - CS No. 7, Savona
- Weyerhaeuser Company Limited - Kamloops Sawmill
- Domtar Pulp and Paper Products Inc. - Kamloops Mill

Other existing activities which will be included in the cumulative effects assessment include the New Afton Mine, Dawson Construction Ltd. to the east of the property, and traffic on primary and secondary roads.

10.1.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

10.2 WATER QUALITY

10.2.1 Rationale

The Application will describe the rationale for selecting and assessing water quality as a VC. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

The Government of British Columbia has a goal of leading the way in North America in healthy living and fitness. There are many factors affecting healthy living and fitness; however, one of the key factors with respect to the proposed Project is environmental health, which includes water quality. This section of the Application will assess effects of the project on intake drinking water sources within the project area and on potentially affected end users.

10.2.2 Background

This section of the Application will provide a summary of the local and regional water quality and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available. Included in this section will be a discussion of the potable water supply for the proposed Project, including treatment of any source water, compliance with the Drinking Water Protection Act, and reference to the Guidelines for Canadian Drinking Water Quality Summary Table (Federal-Provincial-Territorial Committee on Drinking Water, Federal-Provincial-Territorial Committee on Health and the Environment, December 2010).

10.2.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary study area for the human health effects assessment is the same as for the environmental health effects, as shown on Figure 6.3-1. The proponent will work with Interior Health to ensure that the proposed LSA and RSA boundaries are appropriately described in the Application.

10.2.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and post-closure,
- Outline the methodology used to identify and analyze potential adverse health effects and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Results will be assessed against the Guidelines for Canadian Drinking Water Quality Summary Table (Federal-Provincial-Territorial Committee on Drinking Water, 2010). The Application will outline the proposed mitigation measures with respect to any exceedances of the Guidelines for Canadian Drinking Water Quality and other applicable guidelines and legislation for the LOM as well as the post-closure period. Mitigation measures could include a complaint response and resolution policy.

10.2.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

Significance will be assessed in relation to:

- Canadian Environmental Quality Guidelines - Water Quality Guidelines for the Protection of Agricultural Water Uses;
- Canadian Environmental Quality Guidelines;
- Health Canada – Guidelines for Canadian Drinking Water Quality;
- Health Canada – Guidelines for Recreational Water Quality; and
- Approved, Draft, and Working Water Quality Guidelines (Criteria) Reports for drinking water, irrigation, and recreation and aesthetics. Ministry of Environment, Environmental Protection Division.

10.2.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

10.2.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

10.3 NOISE AND VIBRATION

10.3.1 Rationale

The Application will describe the rationale for selecting and assessing noise and vibration as VC. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

Due to the proximity of the project to the city of Kamloops and to rural residences, noise and vibration effects have been identified as a concern.

10.3.2 Background

This section of the Application will provide a summary of the local and regional background and the source of the information. Background information will include traditional ecological or community knowledge relating to the VC, where available.

The Quest 2900 (Type 2) integrating/datalogging sound level meter will be used to monitor baseline daytime and night time sound levels at receptor locations. The study will involve direct 24-h continuous monitoring of comprehensive sound parameters ("slow" response, "A"- weighting network, one minute intervals). A weather resistant enclosure reduces the potential for wind-induced noise.

10.3.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The study area is shown on Figure 10.3-1, for discussion. Sound levels will be compiled from manufacturer's equipment data sheets and applicable acoustical databases to refine the local and regional study areas based on sound propagation and attenuation. The proponent will work with Interior Health during the pre-Application stage to ensure that the proposed LSA and RSA boundaries are appropriately described in the Application. Receptor populations will be discussed and will include sensitive sub population identification.

10.3.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation, and decommissioning and closure activities, as well as post-closure, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

The Application will identify and evaluate potential effects of the Project on noise and vibration levels and propose mitigation measures for all phases of the Project to minimize the identified effects. Methodologies from the Health Canada document "Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise. DRAFT" (January 2011) will be referenced. During construction and operation of the Project noise will be generated from several activities, including:

- Drilling and blasting
- Heavy equipment operation (excavators, shovels, loaders, etc.)
- On-site vehicle traffic (concentrate trucks, fuel delivery trucks, etc.)
- Conveyors
- Crushing
- Milling
- Screening

The CadnaA4.1 (2010) (Computer Aided Noise Abatement) will be used to assess the noise impact from the project at the sensitive receptors. A noise modelling domain 3 km by 3 km from the site boundary will be used in accordance with the BC Oil and Gas Commission noise control guidelines and Kamloops noise control bylaw. The key technical requirements are the following:

- The sound propagation algorithms will be based on International Organization for Standardization (ISO) 9613-1 and ISO 9613-2, which are internationally recognized standards and accepted by the Energy Resources Conservation Board for sound propagation modelling. Noise modelling will be conducted by using the latest CadnaA noise modelling software (DataKustik 2010), which implements the ISO standards.
- Modelling will be based on representative ground terrain and conservative meteorological conditions that enhance sound propagation from the sources to the receivers (e.g., downwind and mild temperature inversion conditions).
    - Predicted effects will be evaluated relative to the applicable regulatory criteria. The assessment will adopt a maximum noise level of 40 dBA Leq (9) as a guideline limit in accordance with Oil and Gas Commissions noise control guidelines. The potential effects of Low Frequency Noise (LFN) will also be assessed based on Oil and Gas Commissions guideline recommendations.

Mitigation measures could include construction of a buffer between the mine and current/future Aberdeen and Knutsford neighbourhoods and a complaint response and resolution policy.

10.3.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
    - Magnitude

- o Geographic extent
- o Duration and frequency
- o Reversibility
- o Context
- o Probability

No provincial or federal standards exist for noise levels; therefore, modelled noise and predicted vibration levels will be assessed in accordance with the following guidelines for determination of significance:

- The British Columbia Noise Control Best Practices Guideline. BC Oil and Gas Commission. 2009.
- Alberta Energy and Utilities Board. Noise Control. Directive 38. Energy Resources Conservation Board. 2007.
- Environmental Code of Practice for Metal Mines. Environment Canada. 2009.
- Guidelines for Community Noise. World Health Organization. 1999.
- City of Kamloops Noise Control By-law 24-42.
- Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. US EPA Report No. 550/9-74-004. 1974.
- Acoustics - Description, Measurement and Assessment of Environmental Noise - Part 1: Basic Quantities and Assessment Procedures. International Standards Organization. 2003.

10.3.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - o Magnitude
  - o Geographic extent
  - o Duration
  - o Frequency
  - o Reversibility
  - o Context
  - o Probability

10.3.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

10.4 HEALTH EDUCATION

10.4.1 Rationale

The Application will describe the rationale for selecting and assessing health education as a VC. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

The Government of British Columbia has a goal of leading the way in North America in healthy living and fitness. There are many factors affecting healthy living and fitness; however, one of the key factors considered with respect to the proposed Project is health education. Health education will be considered as a VC due to potential project effects on continuation and expansion of opportunities for health education, for both workers employed at the mine and anyone using or visiting the area.

10.4.2 Background

This section of the Application will provide a summary of local and regional health education programs and the source of the information. Background information will include community knowledge relating to the VC, where available.

10.4.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary study area will be the same as for the economic and social effects study area, as shown on Figure 7.1-1, for discussion.

10.4.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Identify and analyze potential adverse effects resulting from the proposed Project. It will include effects of construction, operation and decommissioning and closure activities, and
- Describe measures the Proponent will commit to undertaking to mitigate the potential adverse effects identified above.

Mitigation measures could include provision of information or programs to assist employees to quit smoking, address substance abuse or maintain physical fitness.

10.4.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability

10.4.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

10.4.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

10.5 HEALTHY LIVING

10.5.1 Rationale

The Application will describe the rationale for selecting and assessing healthy living as a VC. Justification for inclusion will be based on one or more of the following:

- Federal or provincial listing or regulation;
- Aboriginal interest;
- Public or other stakeholder input;
- Scientific/professional knowledge; and
- Relevant legislation or policy concerning the VC.

The Government of British Columbia has a goal of leading the way in North America in healthy living and fitness. Healthy living will be assessed due to potential project effects on continuation and expansion of opportunities for physical activity and various recreational pursuits in the vicinity of the proposed Project, for both workers employed at the mine and anyone using or visiting the area.

10.5.2 Background

This section of the Application will provide a summary of the local and regional health, recreation, and fitness levels, and the source of the information. Background information will include community knowledge relating to the VC, where available.

10.5.3 Spatial and Temporal Boundaries

The Application will include the following:

- A description of the local and regional spatial extent of the assessment relative to the VC,
- Maps outlining the spatial extent of the regional and local study areas of the EA, and
- Description of the period of time to be examined in the VC assessment.

The preliminary study area will be the same as for the economic and social effects study area, as shown on Figure 7.1-1, for discussion.

10.5.4 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application will:

- Describe public use of the lands in the vicinity of the proposed Project, including recreational activities
- Describe those activities that may be impacted and the mitigation measures that are proposed to minimize or otherwise replace opportunities to carry out those activities
- For region-specific activities, such as hiking and cross-country skiing, indicate whether these activities could be enhanced by KAM (e.g., building trails around the proposed Project or contributing to local organizations that support recreation), and
- Information and/or education programs that encourage healthy living lifestyles for workers employed at the proposed Project.

10.5.5 Residual Effects and their Significance

KAM will provide the following in the Application:

- Identification and description of any potential residual effects;
- An assessment of the significance of the residual effects, considering:
  - Magnitude
  - Geographic extent
  - Duration and frequency
  - Reversibility
  - Context
  - Probability
- Description of potential benefits from the proposed Project and project commitments

10.5.6 Cumulative Effects Assessment

KAM will provide the following in the Application:

- Identification and description of existing or reasonably foreseeable projects or activities that have the potential to interact with the proposed Project;
- Identification and description of any potential cumulative effects;
- An assessment of the significance of the cumulative effects, considering:
  - Magnitude
  - Geographic extent
  - Duration
  - Frequency
  - Reversibility
  - Context
  - Probability

10.5.7 Conclusion

KAM commits to provide the following in the Application:

- A summary of potential residual effects;
- A summary of potential cumulative effects; and
- Discussion of significance of the residual and cumulative effects.

10.6 SUMMARY OF ASSESSMENT OF POTENTIAL HEALTH EFFECTS

Potential health effects will be summarized by Project phase in a table with the following format:

Table 10.6-1 Example Summary Table of Potential Health Effects

Valued Component	Potential Effects	Key Mitigation Measures	Summary Statement of Significance Analysis of Residual Effects

SECTION 11.0 - SUMMARY OF PROPOSED ENVIRONMENTAL AND OPERATIONAL MANAGEMENT PLANS

11.1 ENVIRONMENTAL MANAGEMENT SYSTEM

Environmental and operational monitoring and management plans will be developed as part of the Environmental Management System (EMS) to ensure that measures and controls are in place to minimise the potential for environmental degradation during all phases of Project development. The components of the EMS, including a series of monitoring and management plans, will be described in the Application.

The EMS will outline:

- Personnel responsibilities, including the role of the Independent Environmental Monitor;
- Reporting structure and responsibilities of personnel involved with environmental management;
- Preliminary procedures for reporting on environmental management and performance;
- Impact avoidance measures;
- A preliminary list of anticipated compliance monitoring obligations associated with permits and licences issued by Local, Provincial and Federal governments;
- Environmental awareness training programs that will be implemented for all personnel and contractors; and
- Training and professional development programs for Project employees and contractors.

11.2 ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS

An Environmental Management Plan (EMP) will provide clearly defined actions and procedures to ensure that human and environmental health and safety is accounted for through all phases of the Project (construction, operations, closure and post-closure). The monitoring and management plans that will be developed for the Project include, as appropriate:

- Surface Water Quality Management and Monitoring Plan,
- Groundwater Quality Management and Monitoring Plan,
- Erosion and Sediment Control Plan,
- Construction Waste Management Plan,
- Acid Rock Drainage Management Plan,
- Air Quality Monitoring and Dust Control Plan,
- Water Management and Hydrometric Monitoring Plan,
- Fisheries And Aquatic Life Monitoring Plan,
- Contaminated Sites Management Plan,
- Solid Waste Management Plan,
- Hazardous Waste Management Plan (including liquid effluent disposal),
- Accidents and Malfunctions Plan,
- Natural Hazards Management Plan (e.g. landslides, floods),
- Emergency Response Plan,
- Fire Hazard and Abatement Plan,
- Landscape Design and Restoration Plan,
- Soil Salvage and Handling Plan,

- Wildlife/Vegetation Monitoring Plan (including invasive plant management and metal uptake by plants),
- Archaeological Sites Management Plan,
- Reclamation and Closure Plan;
- Dark Sky Management and Monitoring Plan;
- Access Management Plan, and.
- Noise Management Plan.

The Application will include a general description of each of the plans for all phases of the Project, as applicable. The reclamation plans will outline effective and scientifically defensible long-term monitoring programs. Contingency plans for remedial action will be provided where there are significant uncertainties associated with reclamation success.

11.3 COMPLIANCE REPORTING

The Application will present the reporting structure as identified within the EMP. The reporting structure will include the type and frequency of reports to be submitted to EAO and other regulatory federal or provincial agencies.

PART C – ABORIGINAL GROUPS INFORMATION REQUIREMENTS

SECTION 12.0 - BACKGROUND INFORMATION

In this section of the Application, the following will be presented:

- Identification of the Aboriginal groups that could be potentially impacted by the proposed Project and their asserted or established traditional territory;
- Maps of the asserted or traditional territory of the potentially impacted Aboriginal groups; and
- Background information for each of the potentially impacted Aboriginal groups including but not limited to ethnography, language, land use setting and planning, governance, economy and reserves.

SECTION 13.0 - ABORIGINAL RIGHTS

The Application will:

- Identify past, present and anticipated future uses by Aboriginal groups of the area impacted by the project;
- Identify any specific asserted Aboriginal rights (including title) about which the Proponent receives information from Aboriginal groups or other sources;
- Identify potential impacts of the proposed Project on the uses of lands and resources for traditional purposes and asserted rights identified by way of the preceding two bullet points;
- Describe mitigation measures to avoid or reduce such impacts. Where impacts are determined to be unavoidable, accommodation of Aboriginal concerns will be discussed to the extent that the accommodation practices can be shared publically.

SECTION 14.0 - OTHER ABORIGINAL INTERESTS

The Application will:

- Identify Aboriginal interests with respect to potential social, economic, environmental, heritage and health effects of the proposed Project (to the extent not already identified in Section 13); and
- Describe how these interests have been addressed.

In addition, the Application will include

- Description of Aboriginal use of Jacko Lake for navigational purposes, and any other navigable waterbody affected by the project that may be identified during the course of the review; and
- Discussion of the Project's potential to impact traditional navigational use of Jacko Lake.

Transport Canada may require this information in order to issue approvals under the *Navigable Waters Protection Act*.

SECTION 15.0 - ABORIGINAL CONSULTATION

The Application will:

- Summarize past and planned Aboriginal consultation activities; and,
- Describe Aboriginal issues raised during these consultations and responses to these issues. Issues and responses will be summarized in a tracking table.

SECTION 16.0 - SUMMARY

This section of the Application will identify accommodation measures, including design considerations, mitigation measures and specific commitments, which address potential effects on the matters identified in this section. The information will be summarized in a table with the following format:

Table 16.0-1 Summary of Potential Effects on Aboriginal Activities and Accommodation Measures

Potential Effects on Aboriginal Activities	Accommodation Measures

PART D – FEDERAL INFORMATION REQUIREMENTS

SECTION 17.0 - FEDERAL ENVIRONMENTAL ASSESSMENT REQUIREMENTS

As the Project will require a comprehensive study under the CEAA, the Application will combine the information requested in Sections 17 and 18 of the AIR Template into one section in Part D of the Application. As defined in the CEAA Section 16 (2), every comprehensive study, mediation, or review panel must include consideration of factors in addition to those set out in Section 16 (1), including purpose of the project, alternative means of carrying out the project, need for a follow-up program, and the capacity of renewable resources that are likely to be significantly affected by the Project. The Application will provide a detailed discussion of these factors.

17.1 ENVIRONMENTAL EFFECTS

An examination of the potential environmental effects of the proposed Project, including any change that the proposed Project may cause in the environment, corresponding to the federal scope will be provided in the Application.

Environmental effect means, in respect of the project:

- Any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individual of that species, as those terms are defined in subsection 2(1) of the *SARA*,
- Any effect of any change in the environment caused by the project on
  - Health and socioeconomic conditions
  - Physical and cultural heritage
  - The current use of land and resources for traditional purposes by Aboriginal persons, or
  - Any structure, site or thing that is of historical, archaeological, paleontological or architectural significant.
- Any change to the project that may be caused by the environment, as described in Section 17.5 below.

17.2 FEDERAL COMPONENTS

The Application will contain a description of any potential changes that the Project may cause in the environment corresponding to the federal scope. Valued components and potential impacts on these components will be described in detail in previous sections of the Application. This section will make reference to the applicable subsections of Sections 6 through 10 in order to minimize redundancy.

It is anticipated that the components to be considered in the federal scope could include:

- Climate and meteorology;
- Air quality;
- Terrain, soils, geology and geohazards;
- Vegetation and plant communities;
- Wildlife and wildlife habitat;
- Surface water and groundwater quality and quantity;

- Aquatic environment (e.g. aquatic life, fish, fish habitat);
- Flora at Risk (as defined under the *SARA*);
- Fauna at Risk (as defined under the *SARA*);
- Climate change;
- Heritage and archaeological resources;
- Aboriginal traditional use (current and historic);
- Land and resource use;
- Navigation;
- Noise; and
- Human health.

The Application will provide a description of any potential changes that the Project may cause to a listed wildlife species, its critical habitat, or the residences of individuals of that species, as those terms are defined in Subsection 2(1) of the federal *SARA*. Where a species at risk has been described in Section 6, this section of the Application will reference the appropriate subsection.

17.3 NEED FOR, PURPOSE OF, AND ALTERNATIVES TO THE PROJECT

The “need for” the project is defined as the problem or opportunity that the proposed Project is intending to solve or satisfy and establishes the fundamental justification or rationale for the project. The “purpose of” the project is defined as what is to be achieved by carrying out the project.

The “alternatives to” the project are the functionally different ways to meet the project need and achieve the project purpose. The “alternatives to” assessment will:

- Identify the alternatives to the project that were considered
- Develop criteria to identify the major environmental, economic and technical costs and benefits of the alternatives; and
- Identify the preferred alternatives to the project based on the relative consideration of the environmental, economic and technical costs and benefits.

This section of the Application will be developed in accordance with:

- Addressing "Need for", "Purpose of" "Alternatives to" and "Alternative Means" under the Canadian Environmental Assessment Act (CEA Agency, 2007b).

17.4 ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT

"Alternative means" of carrying out the proposed Project are defined as the various technically and economically feasible ways that the proposed Project could be implemented. This section of the Application will be developed in accordance with:

- Addressing "Need for", "Purpose of" "Alternatives to" and "Alternative Means" under the Canadian Environmental Assessment Act. CEA Agency, 2007c.
- Guidelines for the Assessment of Alternatives for Mine Waste Disposal. Environment Canada. September 2011.

The Application will include:

- A description of the alternative means of carrying out the Project;
- The reasons for selecting the preferred option;
- An analysis of the alternative means of carrying out the proposed Project that are technically and economically feasible; and
- The environmental effects of any such alternative means.

Procedural steps for addressing alternative means will include:

- Identify the alternative means to carry out the project.
  - Develop criteria to determine the technical and economic feasibility of the alternative means;
  - Describe each alternative means in sufficient detail; and
  - Identify those alternative means that are technically and economically feasible.
- Identify the environmental effects of each alternative means.
  - Identify those elements of each alternative means that could produce environmental effects.
- Identify the preferred means.
  - Identify the preferred means based on the relative consideration of environmental effects; and of technical and economic feasibility;
  - Determine and apply criteria that identify alternative means as unacceptable on the basis of significant adverse environmental effects; and
  - Determine criteria to examine the environmental effects of each remaining alternative means to identify a preferred alternative.

Any potentially adverse impacts of the technically and economically feasible alternatives on potential or established Aboriginal rights should also be identified.

17.5 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

The Application will:

- Identify the environmental factors deemed to have possible effects on the Project, such as:
  - Extreme weather events (lightning, heavy precipitation, extreme temperatures, flooding, drought, fire and high winds, wind);
  - Natural seismic events and associated effects such as liquefaction, subsidence, etc.;
  - Fire;
  - Slope stability and mass wasting events (e.g., debris flows/torrents; rock fall; snow avalanche);
  - Winter; (freezing temperatures, ice jams, etc.) and
  - Climate change.
- Identify any changes or effects on the Project that may be caused by the above-mentioned environmental factors, whether the changes or effects occur within or outside of Canada;
- Identify the likelihood and severity of the changes or effects based on different probability patterns;
- Identify mitigation measures, including design and construction strategies, planned to avoid or minimize the likelihood and severity of the changes or effects;
- Longer-term effects of climate change will be discussed up to the projected post-closure phase of the project and will include a description of climate data used; and
- The sensitivity of the project to long-term climate variability and effects will be identified and discussed.

17.6 ACCIDENTS OR MALFUNCTIONS

The Application will:

- Identify potential accidents, malfunctions and unplanned events that could occur in any phase of the proposed Project; the likelihood and circumstances under which these events could occur; and the environmental effects that may result from such events, assuming contingency plans are not fully effective; and
- Describe how each potential accident, malfunction or unplanned event would be managed or mitigated.

Accidents or malfunctions (including evaluation of worst case scenarios) that will be discussed in the Application include:

- Fire
- Contamination of soils and/or water due to spill, leaks, etc. (e.g., fuel spills, reagents)
- Failure of Tailings Storage Facility,
- Leakage from Tailings Storage Facility, seepage collection and runoff ponds
- Pipeline leakage or failure
- Accidental leakage of effluent
- Power outages
- Flying rock from blasting
- Motor vehicle accidents
- Flooding, erosion and/or burial due to containment structure failures
- ML/ARD
- Sediment transport into watercourses
- Accidental explosion.

17.7 MITIGATION MEASURES

The Application will identify mitigation measures that are technically and economically feasible that would avoid or mitigate the environmental effects described in Section 17.2.

Potential impacts and proposed mitigation measures will be described in Sections 6 through 10 of the Application. This section will make reference to previous applicable subsections in order to minimize redundancy.

The following components will be included when describing the approach to implement mitigation measures:

- Reduction of the effects at the source will be considered and described;
- Description of standard mitigation practices, policies and commitments that constitute mitigation measures that will be applied;
- Description of the EMPs and EMS, through which the plan will be delivered;
- Overall perspective on how potentially adverse effects will be minimized and managed over time;
- Discussion of the mechanisms that will be used to require contractors and sub-contractors to comply with these commitments and policies and with auditing and enforcement programs;

- Description of actions, works, minimal disturbance footprint techniques, best available technology, corrective measures or additions planned during the project's various construction and operation phases to eliminate or reduce the significance of adverse effects;
- Inclusion of an impact statement presenting an assessment of the effectiveness of the proposed mitigation measures. The reasons for determining if the mitigation measure reduces the significance of an adverse effect shall be made explicit;
- Description of other technically and economically feasible mitigation measures considered, including the various components of mitigation, and rationale for the reasons they were rejected; and
- Identification of the extent to which technology innovations will help mitigate environmental effects.

17.8 RESIDUAL ENVIRONMENTAL EFFECTS

The Application will provide a description of residual environmental effects that would remain following the implementation of mitigation measures described in Section 17.7. Residual environmental effects will be described in Sections 6 through 10 of the Application. This section will make reference to previous applicable subsections in order to minimize redundancy.

The Application shall include a summary of the project's residual effects to clearly describe the consequences of the project, the degree to which effects can be mitigated and which effects cannot be mitigated or compensated. The residual effects, even if very small or deemed insignificant will be described.

17.9 SIGNIFICANCE ASSESSMENT/ANALYSIS

The Application will provide a discussion of the significance of the residual environmental effects identified in Section 17.8. The assessment of significance will be conducted in accordance with the methodology described in Section 5, and the results of the significance assessment will be presented in Sections 6 through 10. This section of the Application will make reference to previous applicable subsections in order to minimize redundancy.

The significance assessment will follow the guidelines outlined in the reference guide for the Canadian Environmental Assessment Act titled "Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects" prepared by the Federal Environmental Assessment Review Office (November 1994).

17.10 CUMULATIVE ENVIRONMENTAL EFFECTS

A Cumulative Effects Assessment (CEA) will be conducted for each of the previously identified VC following the methodology presented in Section 5.

The scope and methodology of the CEA will be designed to satisfy regulatory requirements set forth by both the BC EAO and the CEA Agency; therefore, this section of the Application will reference Sections 6 through 10 of the Application for the discussion of cumulative effects for individual VC.

17.11 ABORIGINAL ENGAGEMENT AND CONSULTATION

This section of the Application will list all Aboriginal groups which the Crown has identified as requiring consultation or engagement. The objective will be to identify any changes that the Project may cause in the environment and the resulting effects of any such changes on the current use of lands and resources for traditional purposes by Aboriginal persons. If the federal list and provincial list match exactly, this section of the Application will refer to Section 4.3 for a summary of the consultation activities.

If the federal list of Aboriginal groups differs from the provincial one, the following information will be presented for the federally-identified groups, as provided in Part C of the Application:

- Background information;
- Aboriginal Rights and Treaty Rights;
- Other Aboriginal Interests; and
- Aboriginal Consultation.

This section will include a summary of discussions, the issues or concerns raised, and describe any asserted or established Aboriginal rights, Aboriginal title and treaty rights. It will document the potential impact of the project on asserted or established Aboriginal rights, Aboriginal title and treaty rights, and the measures to prevent, mitigate, compensate or accommodate those potential effects.

17.12 FOLLOW-UP PROGRAMS

The Application will provide information regarding follow-up program(s) as required based on section 38(1) of CEAA. The purpose of the follow-up program is to:

- Verify the accuracy of the environmental assessment of the project; and
- Determine the effectiveness of any measures taken to mitigate the adverse environmental effects of the project.

Follow-up program design and implementation will be developed using:

- Operational Policy Statement: Follow-up Programs under the CEAA. CEA Agency. November 2007c.
- Operational Policy Statement: Adaptive Management Measures under the Canadian Environmental Assessment Act. CEA Agency. March 2009.

The Application will include the following information regarding follow-up programs:

- A discussion on the need for and requirements of a follow-up program and its objectives;
- A description of the main components of the program and each monitoring activity under that component,
- A discussion of the objectives the monitoring activity is fulfilling (e.g., confirmation of mitigation, confirmation of assumptions; verification of predicted effects);
- The structure of the program;
- A schedule for the finalization and implementation of the follow-up program;
- A description of the roles and responsibilities for the program and its review process, by both peers, Aboriginal groups, and the public;
- Possible involvement of independent researchers;
- The sources of funding for the program; and

- Information management and reporting.

17.13 CAPACITY OF RENEWABLE RESOURCES

This section of the Application will include an analysis of the capacity of renewable resources to meet the needs of the present and those of the future where these resources are likely to be significantly affected by the proposed Project.

The Application will identify those resources likely to be significantly affected by the project, and describe how the project could affect their sustainable use. The Application will also identify and describe any criteria used in considering sustainable use, based on ecological considerations such as integrity, productivity, and carrying capacity.

17.14 BENEFITS TO CANADIANS

The following summary will be included in the Application:

- Prevention or reduction of environmental effects: Project redesign, relocation and the identification of mitigation measures (e.g., fish or wildlife habitat compensation strategies) that can prevent negative impacts on the environment (e.g., cumulative effects and indirect effects on health and socioeconomic conditions, and physical or cultural heritage) or reduce a project's overall environmental footprint.
- Maximized environmental benefits: Modifications to the project that can increase ecosystem health (e.g., productivity, resiliency and adaptability), maintain biodiversity, reduce habitat fragmentation (e.g., establishment of parks and/or protected areas), and ensure the long-term viability and/or recovery of species (including Species at Risk).
- Technological innovations: Innovations in technology applied to address impacts identified in the EA that can lead to reduced environmental impacts and improvements to other projects using the same technologies.
- Reduction in project costs: Modifications to a project design can reduce project costs and increase efficiency, resulting in economic benefits to proponents.
- Protection of Aboriginal interests: Consultation with Aboriginal groups through their participation in the EA process can result in information and decisions which help avoid or reduce potential effects on the current use of lands and resources for traditional purposes by Aboriginal persons. Modifications to project design can also avoid or reduce potential impacts on existing or potential treaty and Aboriginal rights.
- Increases in scientific knowledge: Field studies, monitoring and other scientific programs carried out within an EA process can yield new and enhanced scientific information in key areas such as fisheries, wildlife, water quality and ecosystem functioning. This knowledge improves decision-making at the conclusion of the EA and can benefit the assessment of other projects including, for example, improvements in fish and wildlife habitat mitigation measures to minimize environmental impacts.
- Increase in community and social benefits: Modifications made to project design in order to address potential environmental effects can result in distinct indirect benefits to communities and can maximize social benefits. Such benefits can include enhanced access to wilderness areas for recreation, and increased community knowledge, awareness and engagement.
- Protection of public health and safety: Through assessment of potential indirect effects of projects on human health and well-being, and through consideration of such factors as accidents and

malfunctions, the protection of public health and safety can be enhanced. For example, public health can be protected by the incorporation of specific plans and procedures into project design and implementation, such as contingency and emergency response planning.

PART E – CONCLUSIONS

SECTION 18.0 - SUMMARY OF RESIDUAL EFFECTS

This section of the Application will provide a summary of the residual effects presented in tabular format. This table will provide summary information for each environmental, economic, social, heritage or health effect that cannot be completely avoided or mitigated through the re-design or relocation of the proposed Project or through Proponent commitments. The table will have the following format:

Table 18.0-1 Summary of Residual Effects

Project Phase	Project Activity	Potential Effect	Mitigation	Significance of Residual Effect
Assessment Category (Environmental, Economic, Social, Heritage Or Health)				

SECTION 19.0 - SUMMARY OF COMMITMENTS

This section of the Application will provide a summary of the Proponent's commitments to minimize the potential for the proposed Project to generate environmental, economic, social, heritage or health effects, presented in a table with the format below.

Table 19.0-1 Proponent's Table of Commitments

Commitment Number	Commitment Description	Project Phase/Timing	Source of Commitment	Responsible Agency	Status

SECTION 20.0 - CONCLUSION

This section of the Application will provide:

- A summary of the Proponent's understanding of the BC EA process in promoting sustainable development while minimizing effect to environmental, economic, social, heritage and health values.
- A description on how the proposed Project aligns with the goal of the BC EA process and, if applicable, the CEAA process; and,
- A request for an EA Certificate for the proposed Project and the need (if applicable) to successfully complete a federal EA and subsequent permitting/ authorization processes prior to proceeding with proposed Project construction, operation and decommissioning.

SECTION 21.0 - REFERENCES

A list of references used in the Application will be provided.

ASTM International Designation D 1739-98. 2004. Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter).

BC EAO. No date. Cumulative Effects and the BC EA Process. Powerpoint presentation.

BC Oil and Gas Commission. 2009. The British Columbia Noise Control Best Practices Guideline.

CCME. 2007. Guidance Document on Continuous Improvement (CI) and Keeping-Clean-Areas-Clean (KCAC). Canada-wide Standards for Particulate Matter and Ozone. PN 1389. ISBN 978-1-896997-72-8 PDF.

CEA Agency. 1994. Addressing Cumulative Effects Assessment. A Reference Guide for the Canadian Environmental Assessment Act. Prepared by the Federal Environmental Assessment Review Office.

CEA Agency. 1999. Cumulative Effects Assessment Practitioners Guide. Prepared by The Cumulative Effects Assessment Working Group and AXYS Environmental Consulting Ltd.

CEA Agency. 2007a. Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act. Operational Policy Statement. Original March 1999, Updated November 2007.

CEA Agency. 2007b. Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative Means" under the Canadian Environmental Assessment Act.

CEA Agency. 2007c. Operational Policy Statement: Follow-up Programs Under the CEAA.

CEA Agency. 2009. Operational Policy Statement: Adaptive Management Measures under the Canadian Environmental Assessment Act.

COSEWIC. 2002. Incorporating Community Knowledge into COSEWIC Assessment Process. Last Update: 2006-12-13. http://www.cosewic.gc.ca/eng/sct6/sct6_7_e.cfm

City of Kamloops. No Date. Sustainable Kamloops Plan, Information Package on Air Quality (Final Version). Found at http://64.114.94.71/environment.htm.

Energy Resources Conservation Board. Directive 38: 2007. Noise Control. Directive 38. Alberta Energy and Utilities Board.

Environmental Assessment Office. 2010. Application Information Requirements Template, with Respect to an Application for an Environmental Assessment Certificate pursuant to the Environmental Assessment Act, S.B.C.2002, c.43. October 4, 2010.

Environment Canada. 2009. Environmental Code of Practice for Metal Mines. 1/MM/17. Mining Section, Mining and Processing Division, Public and Resources Sectors Directorate, Environmental Stewardship Branch.

Environment Canada. 2011. Guidelines for the Assessment of Alternatives for Mine Waste Disposal. Guidelines for the Assessment of Alternatives for Mine Waste Disposal.

Federal Environmental Assessment Review Office. November 1994. Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects. A Reference Guide for the Canadian Environmental Assessment Act.

Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment. 2003. Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners.

Federal-Provincial-Territorial Committee on Drinking Water. 2010. Guidelines for Canadian Drinking Water Quality Summary Table. Federal-Provincial-Territorial Committee on Health and the Environment, December 2010

Fisheries and Oceans. 2007. Overhead Line Construction (Version 3.0). Fisheries and Oceans Canada Pacific Region Operational Statement. DFO/2007-1283.

Fisheries and Oceans. 2007. Maintenance of Riparian Vegetation in Existing Rights-Of-Way. Fisheries and Oceans Canada Pacific Region Operational Statement. DFO/2007-1283.

Forest and Range Evaluation Program. 2011. Cultural Heritage Resource Value Data Management Guidelines, 2011.

International Standards Organization (ISO). 2003. Acoustics - Description, measurement and assessment of environmental noise - Part 1: Basic quantities and assessment procedures. CAN/CSA-ISO 1996-1-05 (Adopted ISO 1996-1:2003, Second Edition, 2003-08-01)

Ministry of Environment, Lands, and Parks and Ministry of Forests (MELP and MoF). 1998. Field Manual for Describing Terrestrial Ecosystems.

Ministry of Environment, Lands and Parks (MELP). 1997. Terrain Classification System for British Columbia. Version 2.

Ministry of Energy and Mines (MEM) and Ministry of Environment, Lands and Parks (MELP). 1998. Policy for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia.

Ministry of Environment (MOE). 2008. Guidelines for Air Quality Dispersion Modelling.

Ministry of Healthy Living and Sport. 2009. Guidance on Application of Provincial Air Quality Criteria for $PM_{2.5.}$

Ministry of Water, Land and Air Protection (MWLAP). 2003. British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples.

Price, W.A. and Errington J.C. 1998. Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. Ministry of Energy and Mines.

U.S. Environmental Protection Agency. 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. US EPA Report no. 550/9-74-004.

Wardrop, 2009. Ajax Copper/Gold Project, Kamloops, British Columbia – Preliminary Assessment Technical Report. Document No. 0854610100-REP-R0001-02.

Wardrop, 2011. Ajax Copper/Gold Project – Kamloops, British Columbia. Feasibility Study Technical Report. Document No. 1054610300-REP-R0004-00.

World Health Organization. 1999. Guidelines for Community Noise.

Knight Piésold
CONSULTING

FIGURES

675 000 E
680 000 E
685 000 N
5 615 000 N
5 610 000 N

HIGHWAY 1
COQUIHALLA HIGHWAY
THICKENED TAILINGS EMERGENCY POND
THICKENED TAILINGS PLANT
TRUCK SHOP AND FUEL STORAGE AREA
CITY OF KAMLOOPS
STRATEGIC STOCKPILE
WALLENDER LAKE
NORTH WASTE ROCK MANAGEMENT FACILITY
NORTH OVB STOCKPILE
LOW GRADE STOCKPILE
MEDIUM GRADE STOCKPILE
PROCESSING FACILITY
OUT PIT CRUSHER
TSF WEST POND
TAILING STORAGE FACILITY
INKS LAKE
TSF EAST POND
HIGH GRADE ORE STOCKPILE
EAST WASTE ROCK MANAGEMENT FACILITY
JACKO LAKE
MAC LE JEUNE HIGHWAY
AJAX PIT
IN PIT CRUSHER
EXPLOSIVE STORAGE
PROPOSED ROAD DIVERSION
CONCEPTUAL PETERSON CREEK DIVERSION

LEGEND:

- PROPOSED ACCESS ROAD
- PROPOSED HAUL ROAD
- PROPOSED ROAD DIVERSION
- PROPOSED WATER SUPPLY LINE
- WATER SUPPLY LINE
- PROPOSED EAST POWER LINE OPTION
- ORE AND WASTE CONVEYORS
- EXISTING BURIED KINDER MORGAN PIPELINE
- CONCEPTUAL PETERSON CREEK DIVERSION
- EXISTING HIGHWAY
- STREAM/ RIVER
- TAILINGS LINE
- CITY BOUNDARY

NOTES:

1. COORDINATE GRID IS UTM (NAD83) ZONE 10.
2. PIT AND WASTE ROCK MANAGEMENT FACILITY OUTLINES BASED ON DRG. A00-10-001 REV.C, SUPPLIED BY WARDROP ENGINEERING INC, TSF OUTLINE BASED ON DRG. 1090020032AA001 SUPPLIED BY GOLDER ASSOCIATES.

SCALE A: 500 250 0 500 1000 1500 2000 2500 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	16MAY'11	ISSUED WITH REPORT	SCE	DP	SCE	CRB

KGHM AJAX MINING INC.

AJAX PROJECT

PROJECT LOCATION

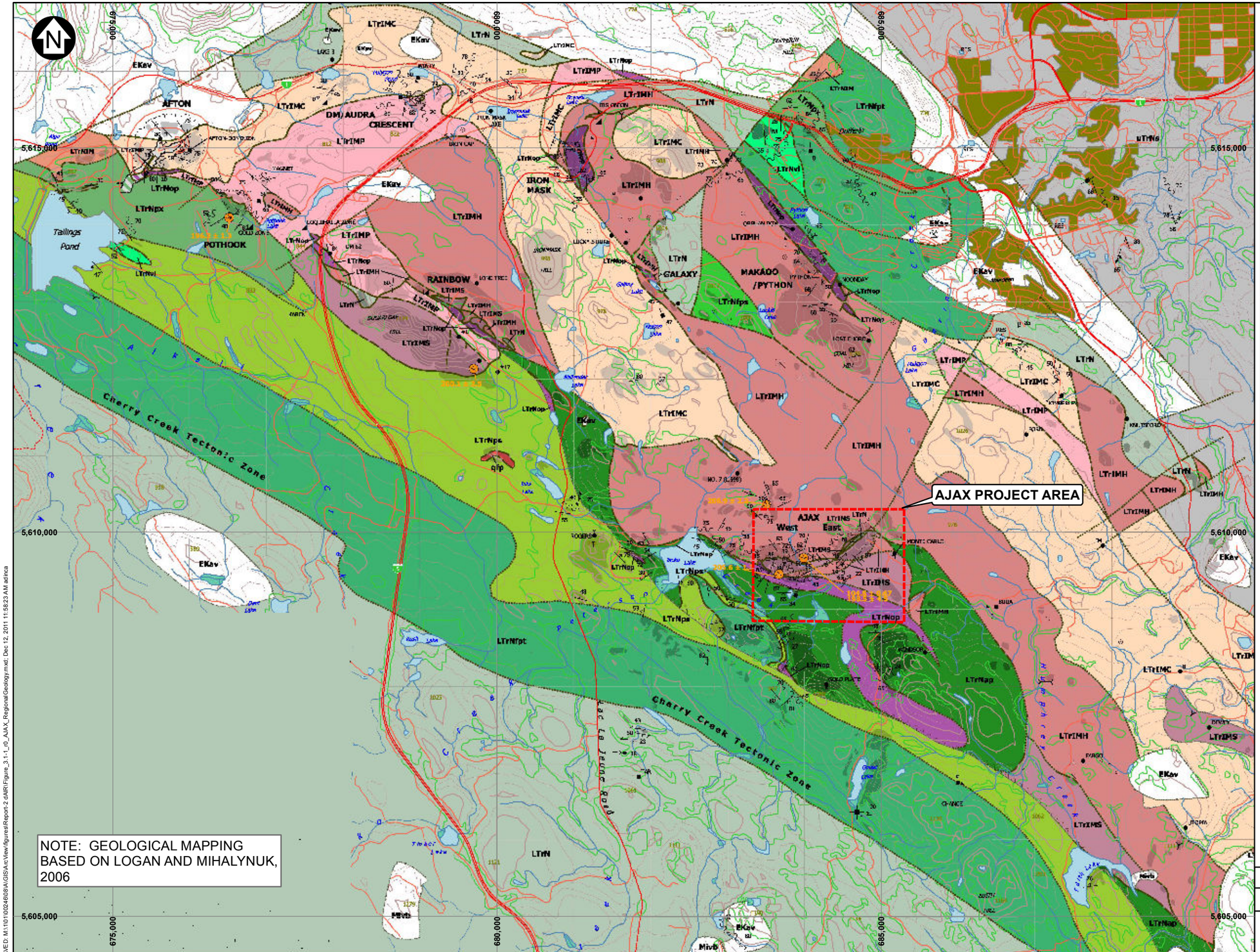
Knight Piésold CONSULTING

P/A NO. VA101-246/8

REF NO. 2

FIGURE 2.2-1

REV 0



LEGEND:

GENERAL

- RIVER
- LAKE
- CITY OF KAMLOOPS
- ROAD
- CONTOUR

GEOLOGY

- FAULT

NOTES:

1. BASE MAP: GEOLOGICAL DATA OBTAINED FROM BC GEOLOGICAL SURVEY "GEOLOGY OF THE IRON MASK BATHOLITH".

2. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:50,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

SCALE 0.5 0.25 0 0.5 1 1.5 2 2.5 km

KGHM AJAX MINING INC.

AJAX PROJECT

REGIONAL GEOLOGY IN THE PROJECT AREA

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	22JUL'10	ISSUED WITH REPORT	TS	JPN	TS	RCB

Knight Piésold CONSULTING

P/A NO. VA101-246/8 | REF NO. 2

FIGURE 3.1-1 | REV 0

KP FIGURE SAVED: M:\1011000246\08\A\GIS\Arc\Mxd\figures\Report-2 d\AR\Figure_3.1-1_r0_AJAX_RegionalGeology.mxd: Dec 12, 2011 11:58:23 AM adrica

683,000
684,000
685,000
5,610,000
5,609,000

LEGEND:

- 5M LIDAR CONTOUR
- 25M LIDAR CONTOUR
- ULTIMATE OPEN PIT DESIGN
- LAKE

GEOLOGY:

- IRON MASK HYBRID
- NICOLA VOLCANICS
- SUGARLOAF DIORITE

NOTES:

1. BASE MAP: LIDAR CONTOUR AND WARDROP GEOLOGICAL MAPPING

2. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:10,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

4. CONTOUR INTERVAL IS 5 METRES.

SCALE 0.1 0.05 0 0.1 0.2 0.3 0.4 0.5 km

KGHM AJAX MINING INC.

AJAX PROJECT

AJAX PIT GEOLOGY

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
1	24JAN'11	ISSUED WITH REPORT	TS	AMD	SCE	RCB
0	22JUL'10	ISSUED WITH REPORT	TS	JN	TS	RCB

Knight Piésold CONSULTING

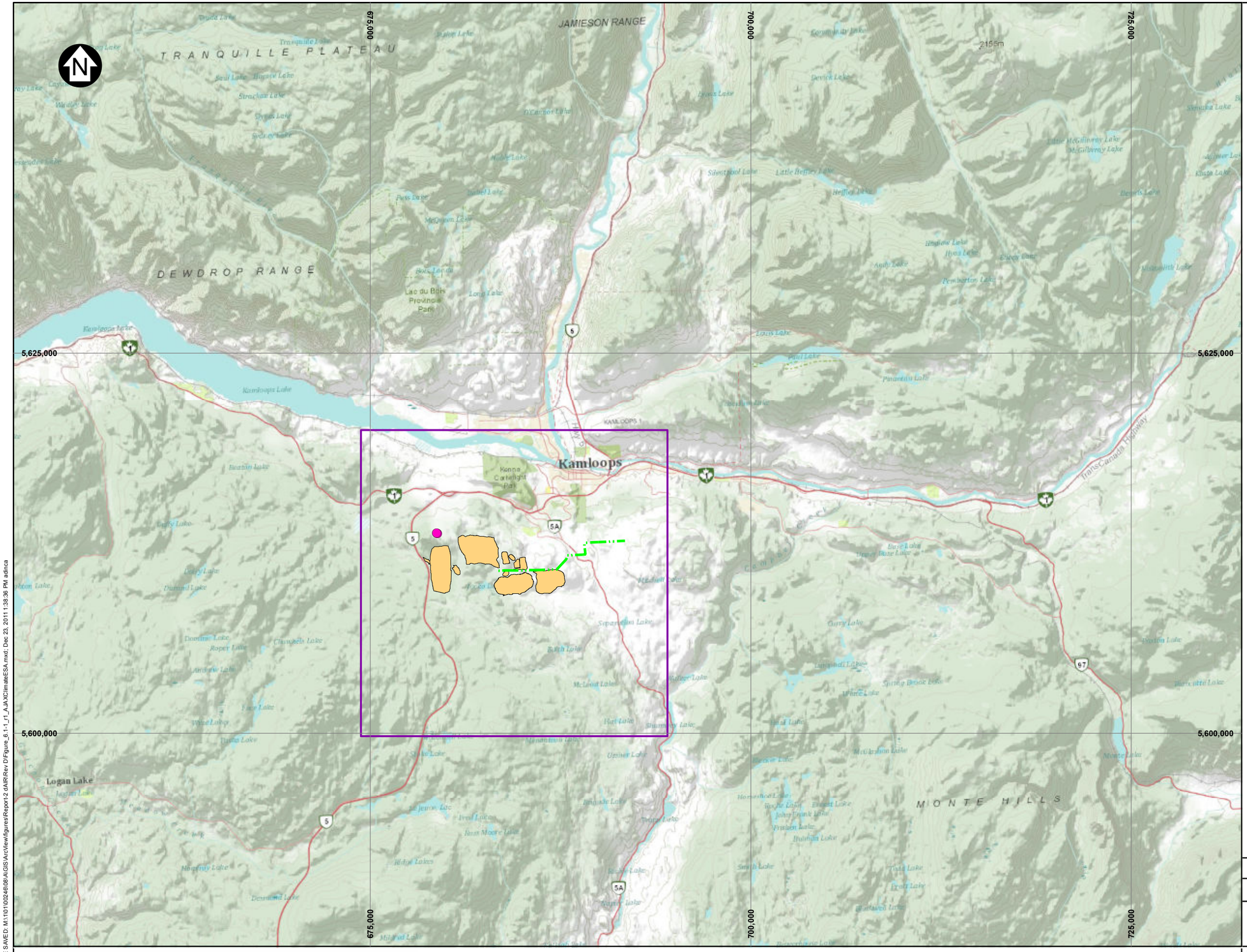
P/A NO. VA101-246/8

REF NO. 2

FIGURE 3.1-2

REV 1

KP FIGURE SAVED: M:\101\02\46\08\A\GIS\Arc\View\figures\Report-2 dAR\AJAX_Ajax_Pit_Geology_Fig_3.1-2_r1.mxd: Dec 12, 2011 1:53:42 PM adinca



LEGEND:

- CLIMATE STATION
- TRANSMISSION LINE
- REGIONAL STUDY AREA (RSA)
- MINE SITE

NOTES:

1. BASE MAP: ESRI ARCGIS ONLINE TOPOGRAPHIC MAP.

1. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD 27 UTM ZONE 12N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:250,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

4. RSA APPROXIMATES KAMLOOPS AIRSHED.

SCALE 2.5 1.25 0 2.5 5 7.5 10 12.5 km

KGHM AJAX MINING INC.

AJAX PROJECT

CLIMATE EFFECTS STUDY AREA

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
1	23DEC'11	ISSUED WITH REPORT	KK	AMD	SCE	RCB
0	11APR'11	ISSUED WITH REPORT	KK	AMD	SCE	RCB

Knight Piésold CONSULTING

P/A NO. VA101-246/8 | REF NO. 2

FIGURE 6.1-1 | REV 1

KP FIGURE SAVED: M:\101\002\6\8\AGIS\ArcView\figures\Report-2 dAIR\Rev D\Figure_6.1-1_r1_AJAXClimateESA.mxd: Dec 23, 2011 1:38:36 PM adinca

KAMLOOPS LAKE
SALSOLA POND
Cherry Creek
ICE LAKE
HUGHES LAKE
POTHOOK LAKE
NED ROBERTS LAKE
TAILINGS
GALAXY LAKE
NELSON LAKE
LOCKIE LAKE
WALLENDER LAKE
INKS LAKE
DAIRY LAKES
DAIRY LAKE
Cherry Creek Watershed
JACKO LAKE
DAM LAKE
RUSH LAKE
KWILALKWILA LAKE
GRACE LAKE
CHUWHELS LAKE
ROPER LAKE
CORNWALL LAKE
CONNOLLY LAKE
EUREKA LAKE
TIMBER LAKE
GOOSE LAKE
EDITH LAKE
SEPARATION LAKE
BERESFORD LAKES
MITCHELL LAKE
Peterson Creek Watershed
North Thompson River
South Thompson River
Kamloops
Peterson Creek
665,000
670,000
675,000
680,000
685,000
690,000
695,000
5,620,000
5,615,000
5,610,000
5,605,000
5,600,000

LEGEND:

GENERAL

- TRANSMISSION LINE
- REGIONAL STUDY AREA (RSA)
- LOCAL STUDY AREA (LSA)
- MINE SITE

MONITORING STATION

- SURFACE WATER MONITORING SITE

NOTES:

1. BASE MAP: ESRI ARCGIS ONLINE TOPOGRAPHIC MAP.
2. WATERSHED BOUNDARIES OBTAINED FROM GEOBC (CWB WATERSHEDS).
3. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD 83 UTM ZONE 10N.
4. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:100,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

SCALE 1 0.5 0 1 2 3 4 5 km

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
1	21DEC'11	ISSUED WITH REPORT	KK	AMD	SCE	RCB
0	11APR'11	ISSUED WITH REPORT	AMD	AMD	SCE	RCB

KGHM AJAX MINING INC.

AJAX PROJECT

SURFACE WATER QUALITY EFFECTS STUDY AREA

Knight Piésold CONSULTING

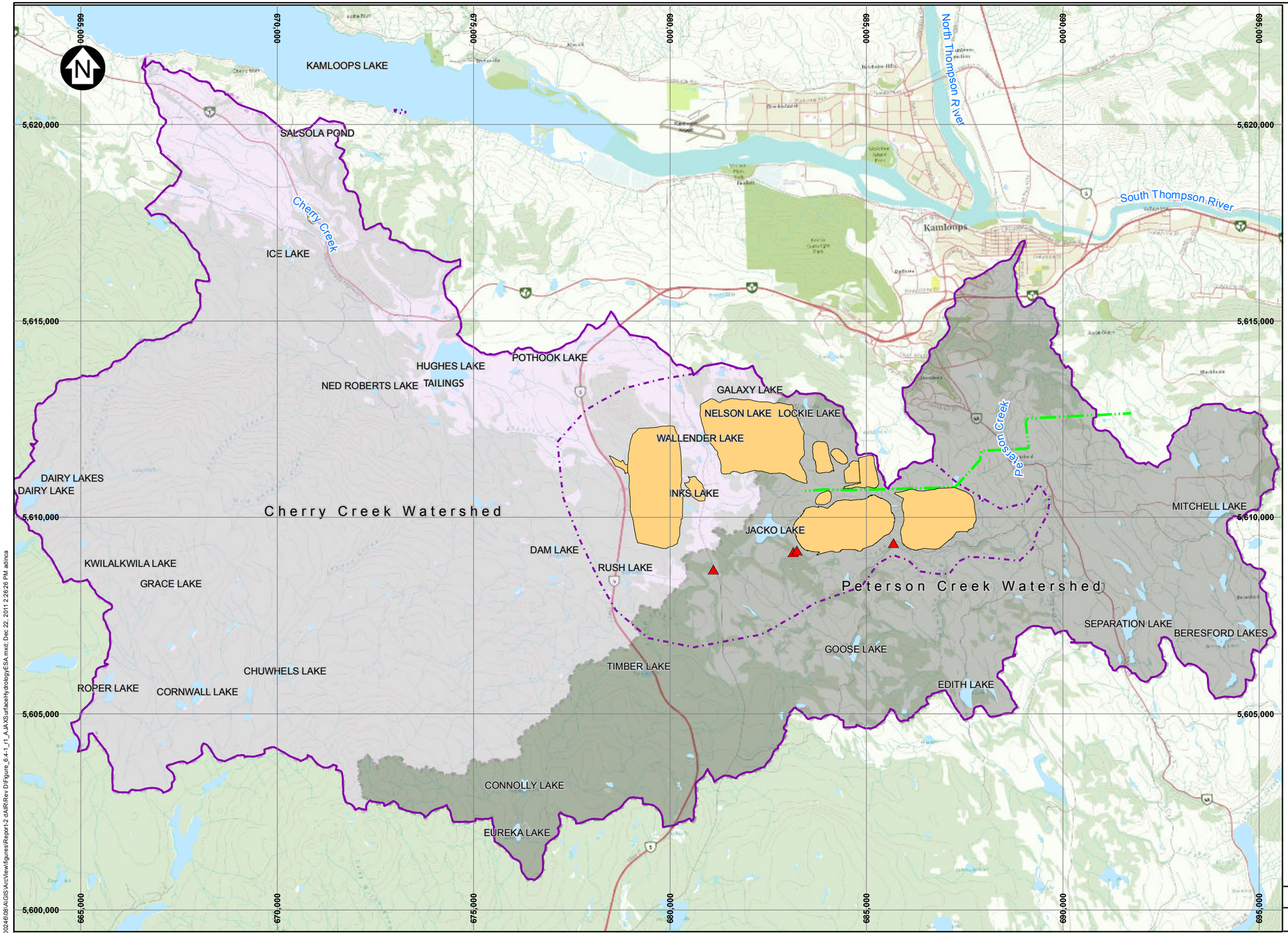
P/A NO. VA101-246/8

REF NO. 2

FIGURE 6.3-1

REV 1

KP FIGURE SAVED: M:\1\101\00246\08\A\GIS\ArcView\figures\Report-2 dAR\Rev D\Figure_6.3-1_r1_AJAXSurfaceWQESA.mxd; Dec 22, 2011 2:23:21 PM adinca



LEGEND:

GENERAL

- TRANSMISSION LINE
- REGIONAL STUDY AREA (RSA)
- LOCAL STUDY AREA (LSA)
- MINE SITE

MONITORING STATION

- HYDROLOGY SITE

NOTES:

1. BASE MAP: ESRI ARCGIS ONLINE TOPOGRAPHIC MAP.
2. WATERSHED BOUNDARIES OBTAINED FROM GEOBC (CWB WATERSHEDS).
3. COORDINATE GRID IS IN METRES.
   COORDINATE SYSTEM: NAD 83 UTM ZONE 10N.
4. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:100,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

SCALE 1 0.5 0 1 2 3 4 5 km

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
1	21DEC'11	ISSUED WITH REPORT	KK	AMD	SCE	RCB
0	11APR'11	ISSUED WITH REPORT	AMD	AMD	SCE	RCB

KGHM AJAX MINING INC.

AJAX PROJECT

SURFACE HYDROLOGY EFFECTS STUDY AREA

Knight Piésold CONSULTING

P/A NO. VA101-246/8

REF NO. 2

FIGURE 6.4-1

REV 1

KP FIGURE SAVED: M:\101\002\246\08\A\GIS\Arc\Mxd\figures\Report-2 dAR\Rev D\Figure_6.4-1_r1_AJAXSurfaceHydrobgyESA.mxd; Dec 22, 2011 2:26:26 PM adinca

665,000
670,000
675,000
680,000
685,000
690,000
695,000
5,620,000
5,615,000
5,610,000
5,605,000
5,600,000
Cherry Creek
North Thompson River
South Thompson River
Kamloops
Peterson Creek
Cherry Creek Watershed
Peterson Creek Watershed
MW11-01S/D
MW11-02D
MW11-03D/S
MW11-04D/S
MW11-05D/S
MW11-06D/S
MW11-07S/S
MW11-08S/D
MW11-10S/D

LEGEND:

GENERAL

- GROUNDWATER WELL
- TRANSMISSION LINE
- REGIONAL STUDY AREA (RSA)
- LOCAL STUDY AREA (LSA)
- MINE SITE

NOTES:

1. BASE MAP: ESRI ARCGIS ONLINE TOPOGRAPHIC MAP.
2. WATERSHED BOUNDARIES OBTAINED FROM GEOBC (CWB WATERSHEDS).
3. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD 83 UTM ZONE 10N.
4. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:100,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

SCALE 1 0.5 0 1 2 3 4 5 km

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
1	21DEC'11	ISSUED WITH REPORT	KK	AMD	SCE	RCB
0	11APR'11	ISSUED WITH REPORT	AMD	AMD	SCE	RCB

KGHM AJAX MINING INC.

AJAX PROJECT

GROUNDWATER EFFECTS STUDY AREA

Knight Piésold CONSULTING

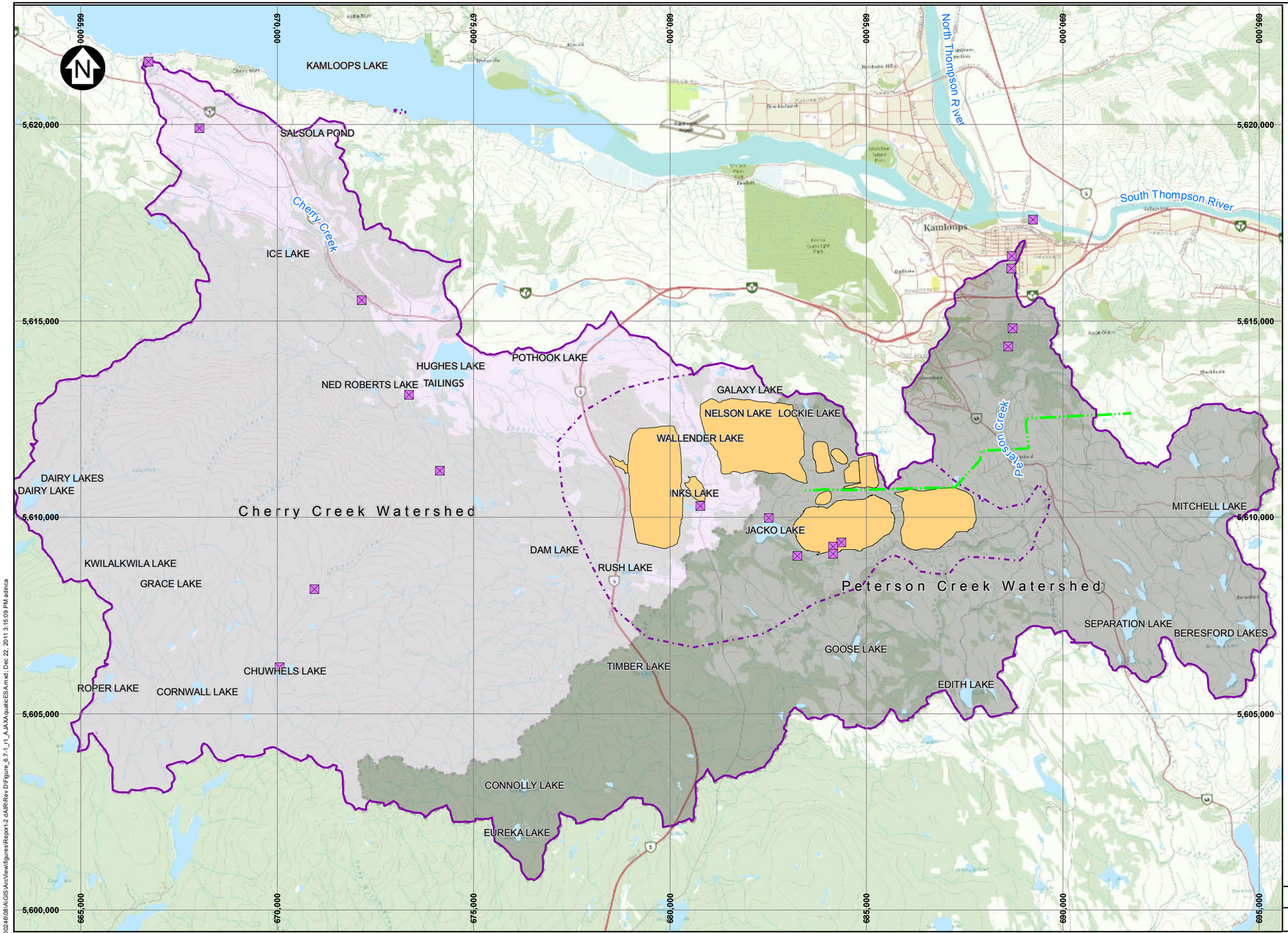
P/A NO. VA101-246/8

REF NO. 2

FIGURE 6.5-1

REV 1

KP FIGURE SAVED: M:\101\002\246\08\A\GIS\ArcView\figures\Report-2 dAft\Rev D\Figure_6.5-1_r1_AJAXGroundwaterESA.mxd: Dec 22, 2011 2:39:31 PM adinca



LEGEND:

GENERAL

- TRANSMISSION LINE
- REGIONAL STUDY AREA (RSA)
- LOCAL STUDY AREA (LSA)
- MINE SITE

MONITORING STATION

- AQUATIC BIOTA SAMPLING SITE

NOTES:

1. BASE MAP: ESRI ARCGIS ONLINE TOPOGRAPHIC MAP.
2. WATERSHED BOUNDARIES OBTAINED FROM GEOBC (CWB WATERSHEDS).
3. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD 83 UTM ZONE 10N.
4. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:100,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

SCALE 1 0.5 0 1 2 3 4 5 km

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
1	21DEC'11	ISSUED WITH REPORT	KK	AMD	SCE	RCB
0	11APR'11	ISSUED WITH REPORT	AMD	AMD	SCE	RCB

KGHM AJAX MINING INC.

AJAX PROJECT

AQUATIC EFFECTS STUDY AREA

Knight Piésold CONSULTING

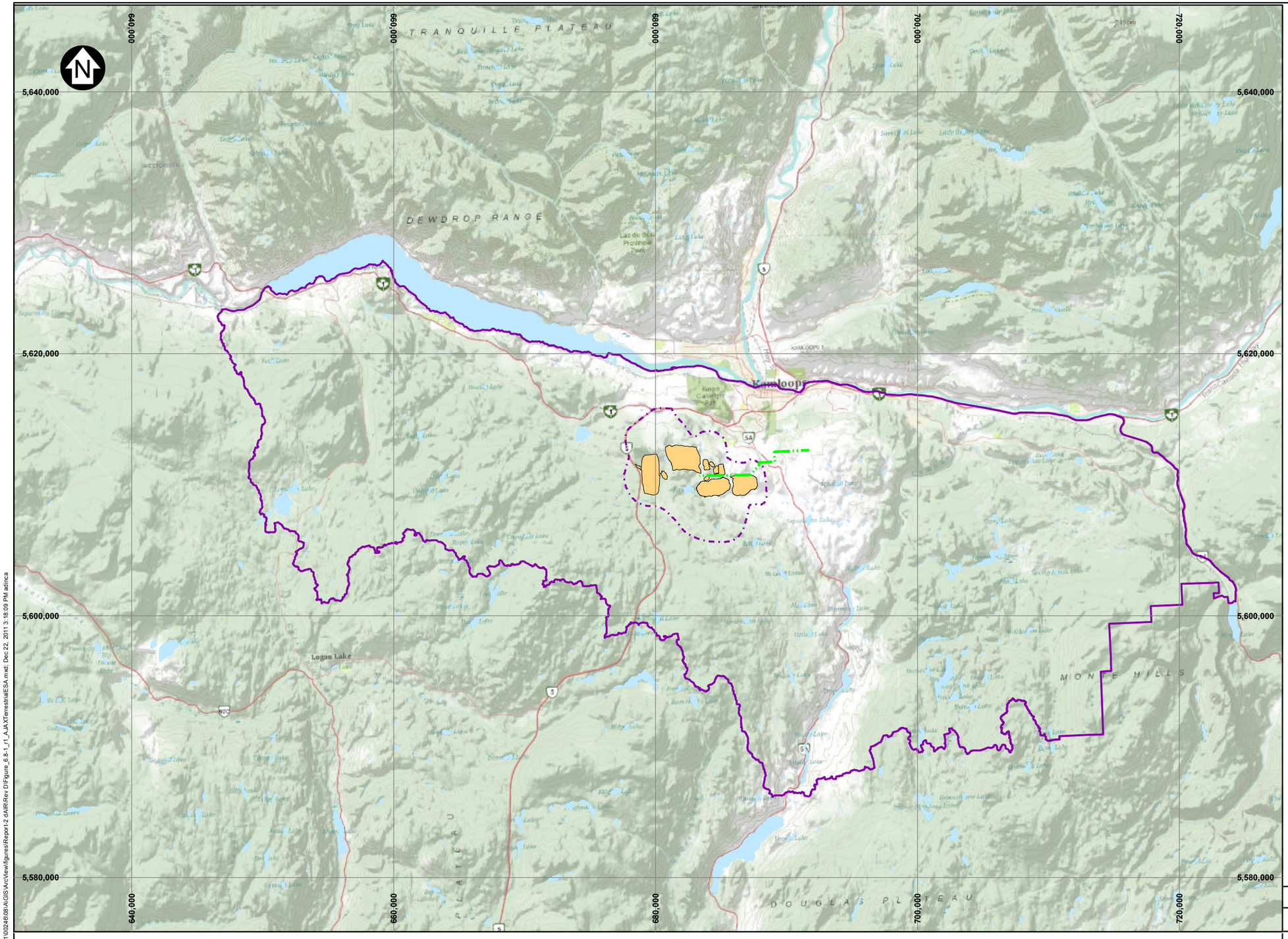
P/A NO. VA101-246/8

REF NO. 2

FIGURE 6.7-1

REV 1

KP FIGURE SAVED: M:\101\002\246\08\A\GIS\ArcView\figures\Report-2 dAR\Rev D\Figure_6.7-1_r1_AJAXAquaticESA.mxd: Dec 22, 2011 3:16:09 PM adinca



LEGEND:

GENERAL

- TRANSMISSION LINE
- REGIONAL STUDY AREA (RSA)
- LOCAL STUDY AREA (LSA)
- MINE SITE

NOTES:

1. BASE MAP: ESRI ARCGIS ONLINE TOPOGRAPHIC MAP.

2. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD 83 UTM ZONE 10N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:300,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

SCALE 3 1.5 0 3 6 9 12 15 km

KGHM AJAX MINING INC.

AJAX PROJECT

TERRESTRIAL BIOPHYSICAL EFFECTS STUDY AREA

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
1	21DEC'11	ISSUED WITH REPORT	KK	AMD	SCE	RCB
0	11APR'11	ISSUED WITH REPORT	AMD	AMD	SCE	RCB

Knight Piésold CONSULTING

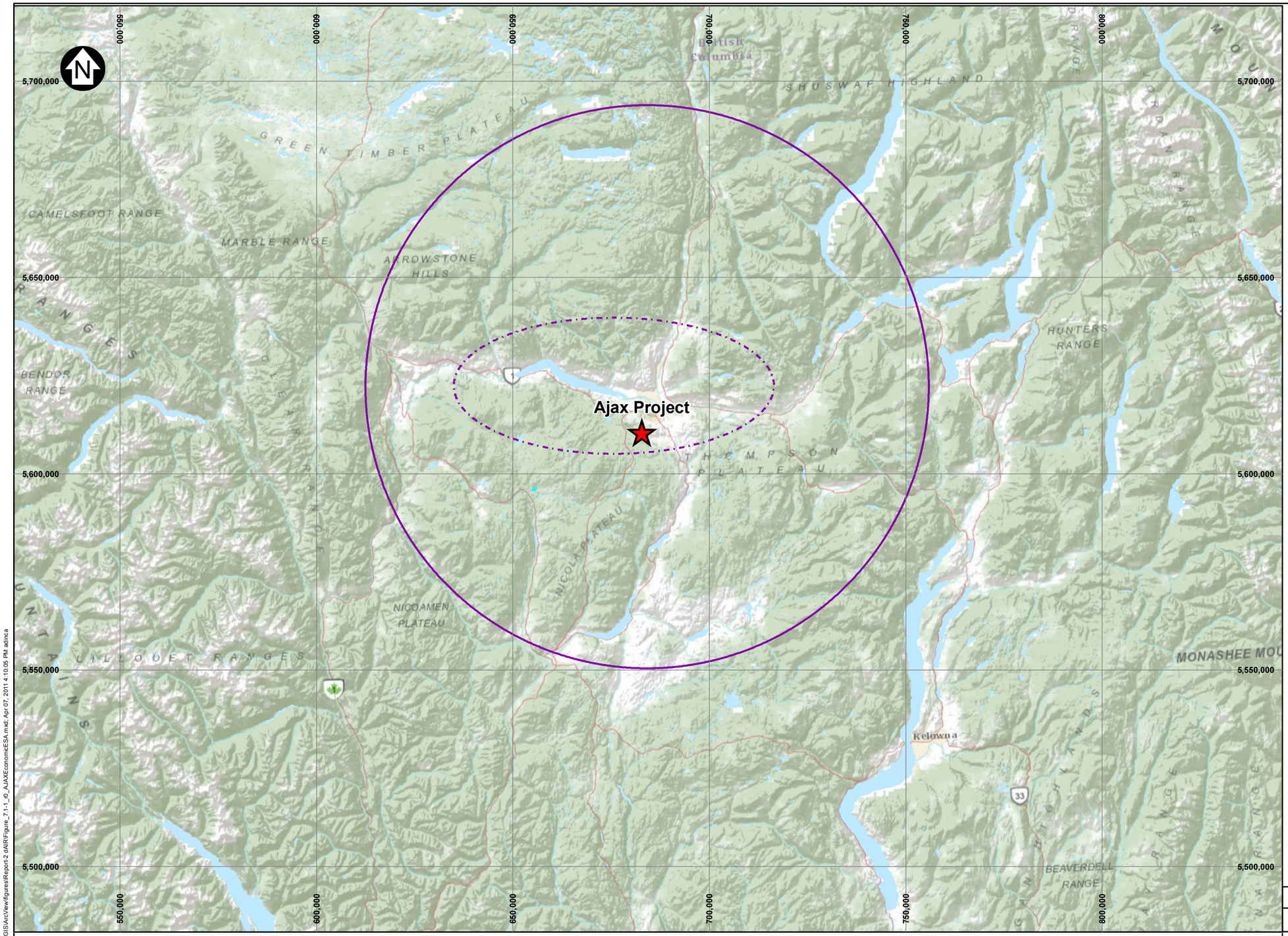
P/A NO. VA101-246/8

REF NO. 2

FIGURE 6.8-1

REV 0

KP FIGURE SAVED: M:\1\101\00246\08\A\GIS\ArcView\figures\Report-2 dir\Rev Dir\Figure_6.8-1_r1_AJAXTerrestrialESA.mxd; Dec 22, 2011 3:18:09 PM adinca



LEGEND:

GENERAL

- PROJECT LOCATION
- REGIONAL STUDY AREA (RSA)
- LOCAL STUDY AREA (LSA)

PROGRESS PRINT
APR 12, 2011 (4:10:05 PM)

NOTES:

1. BASE MAP: ESRI ARCGIS ONLINE TOPOGRAPHIC MAP.

2. CO-ORDINATE GRID IS IN METRES.
DATUM: NAD83
PROJECTION: UTM ZONE 10.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:1,000,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

SCALE 10 5 0 10 20 30 40 50 km

KGHM AJAX MINING INC.

AJAX PROJECT

ECONOMIC AND SOCIAL EFFECTS STUDY AREA

Knight Piésold CONSULTING

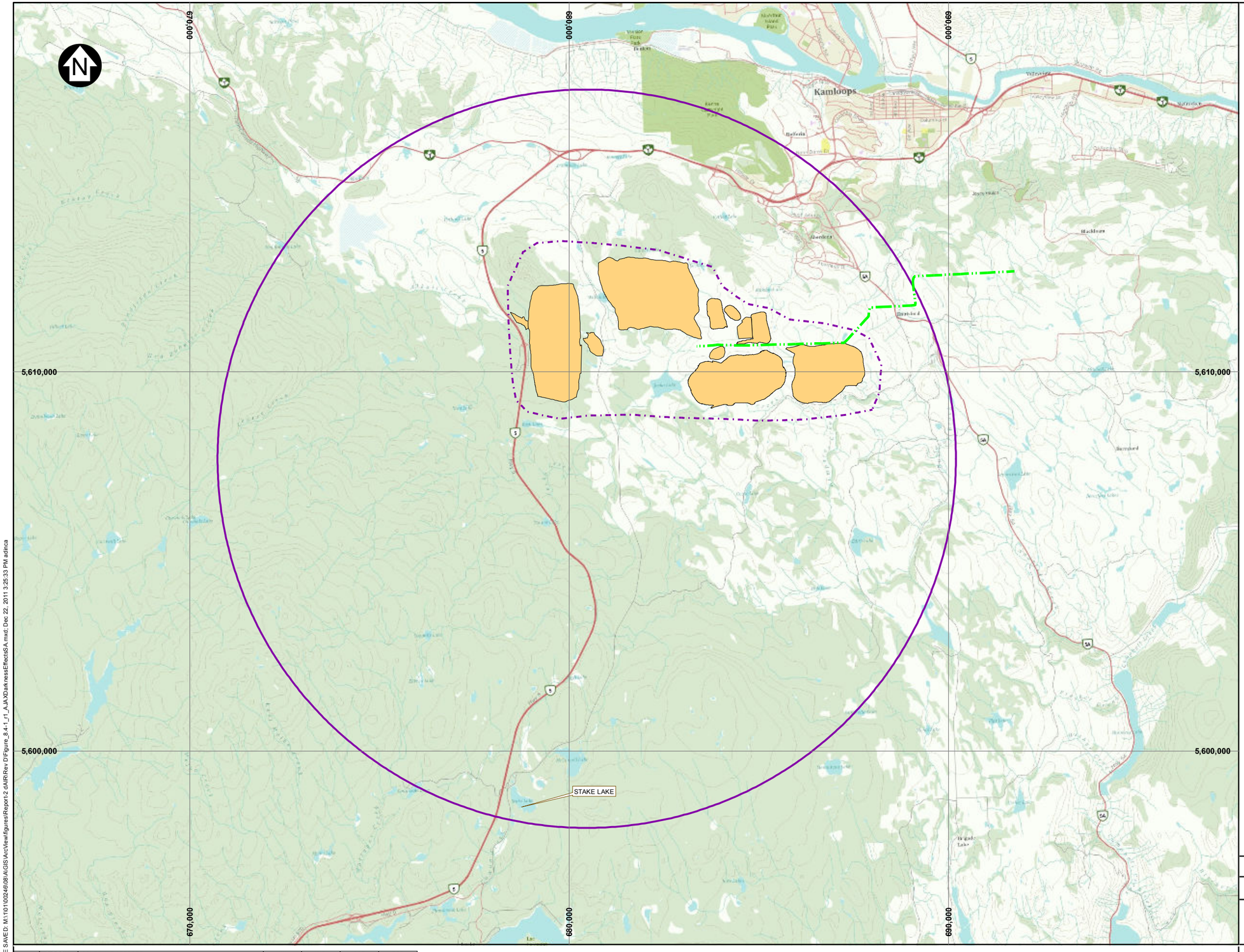
P/A NO. VA101-246/8 | REF NO. 2

FIGURE 7.1-1 | REV 0

DRAFT

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	11APR'11	ISSUED WITH REPORT	AMD	AMD	SCE	RCB

SAVED: M:\1\01\00246\08\A\GIS\ArcView\figures\Report-2 dA\R\Figure_7-1-1_r0_AJAXEconomicESA.mxd, Apr 07, 2011 4:10:05 PM adinca



LEGEND:

- TRANSMISSION LINE
- REGIONAL STUDY AREA (RSA)
- LOCAL STUDY AREA (LSA)
- MINE SITE

NOTES:

1. BASE MAP: ESRI ARCGIS ONLINE TOPOGRAPHIC MAP.

2. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD 83 UTM ZONE 10N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:100,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

SCALE 1 0.5 0 1 2 3 4 5 km

KGHM AJAX MINING INC.

AJAX PROJECT

QUALITY OF DARKNESS AND SHADING EFFECTS STUDY AREA

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
1	21DEC'11	ISSUED WITH REPORT	KK	AMD	SCE	RCB
0	09MAR'11	ISSUED WITH REPORT	KK	AMD	SCE	RCB

Knight Piésold CONSULTING

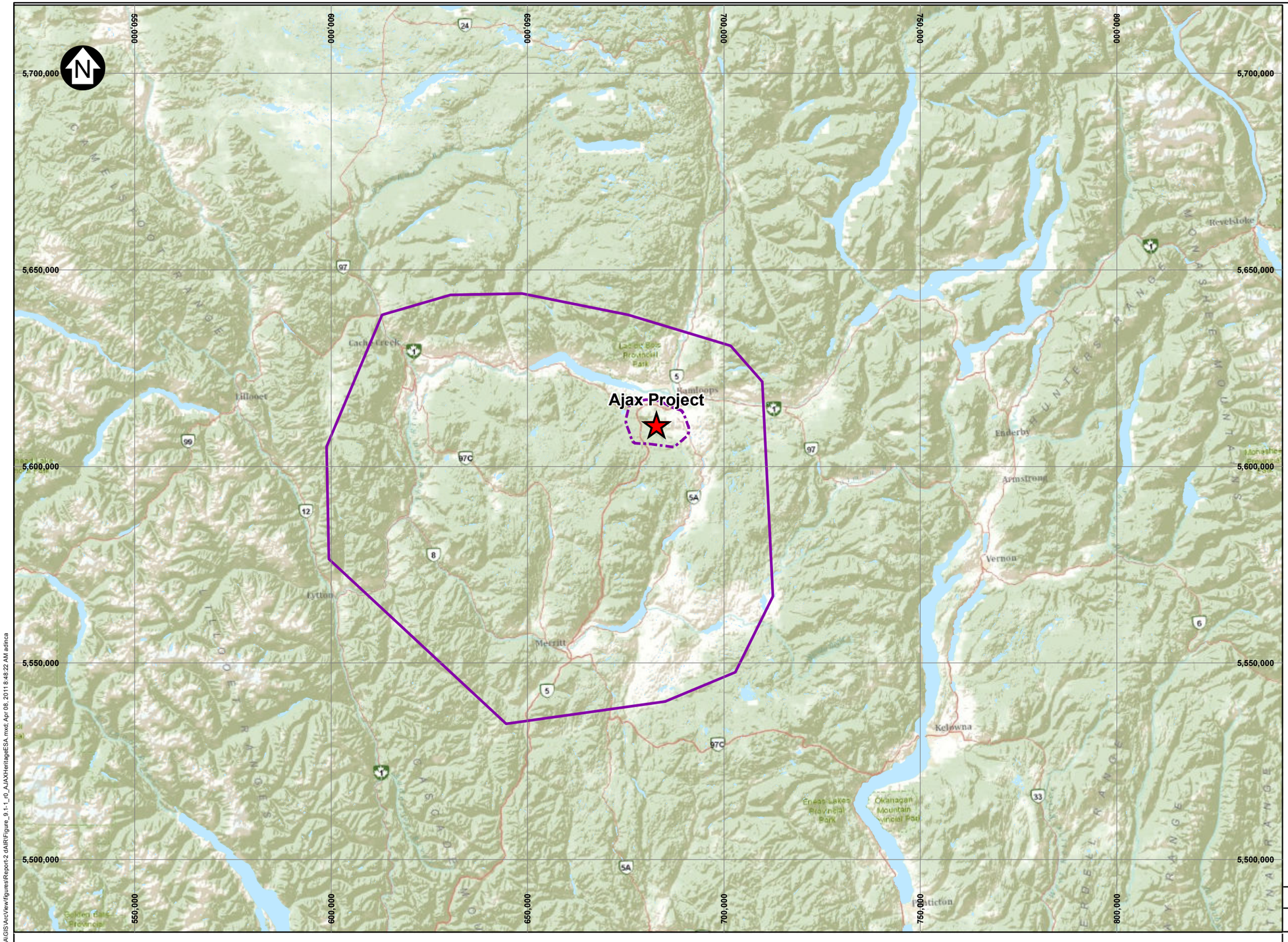
P/A NO. VA101-246/8

REF NO. 2

FIGURE 8.4-1

REV 1

KP FIGURE SAVED: M:\1011002408\A\GIS\Arc\Mewfigures\Report\2 dAIR\Rev D\Figure_8.4-1_r1_AJAX\Darknesse\Effects\SA.mxd; Dec 22, 2011 3:25:33 PM adinca



LEGEND:

GENERAL

- PROJECT LOCATION
- REGIONAL STUDY AREA (RSA)
- LOCAL STUDY AREA (LSA)

NOTES:

1. BASE MAP: ESRI ARCGIS ONLINE TOPOGRAPHIC MAP.
2. WATERSHED BOUNDARIES OBTAINED FROM GEOBC (CWB WATERSHEDS).
3. COORDINATE GRID IS IN METRES.
   COORDINATE SYSTEM: NAD83 UTM ZONE 10N.
4. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:1,000,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.
5. REGIONAL STUDY AREA APPROXIMATES KAMLOOPS LRMP.

SCALE 10 5 0 10 20 30 40 50 km

KGHM AJAX MINING INC.

AJAX PROJECT

HERITAGE EFFECTS STUDY AREA

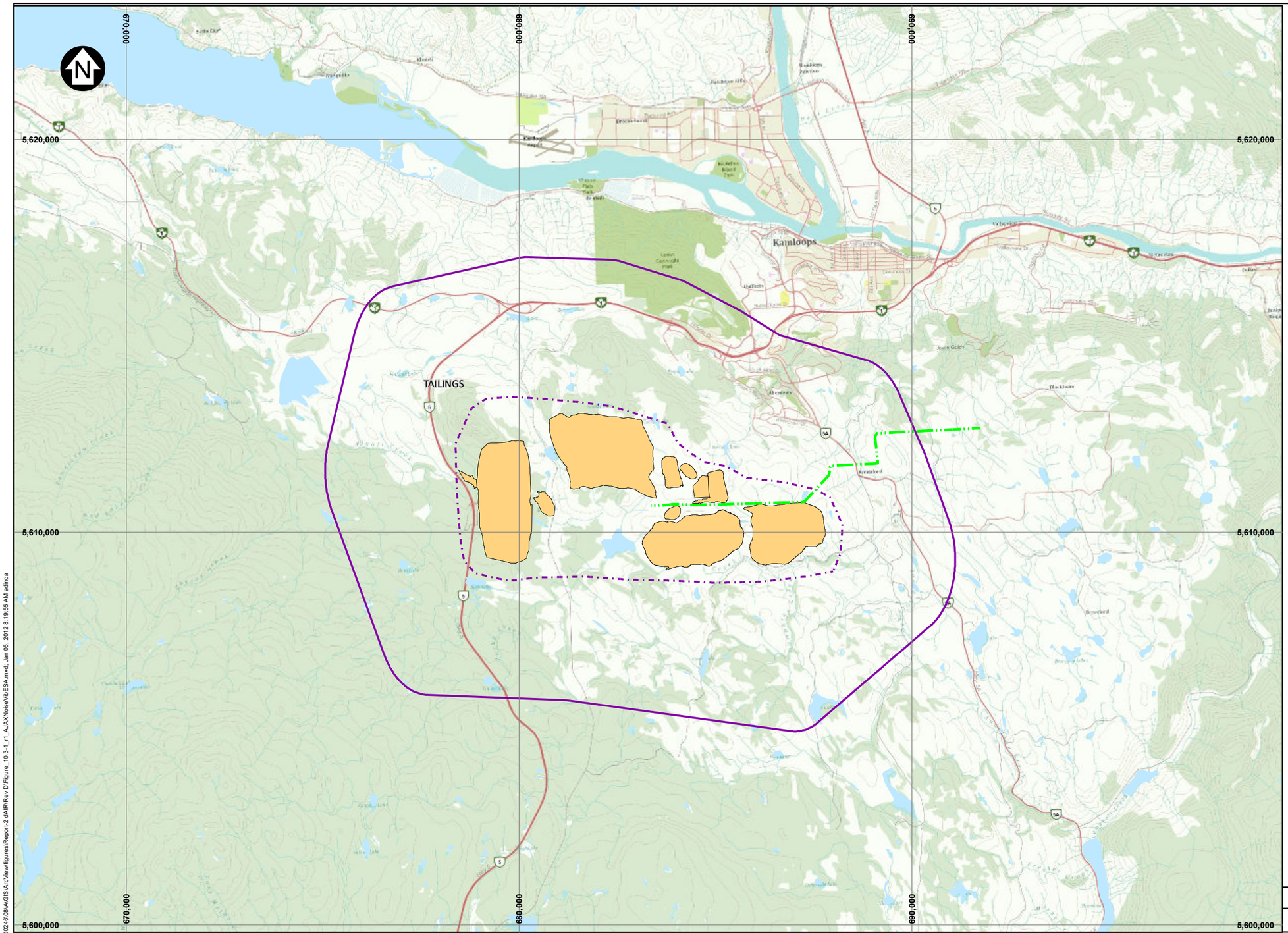
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	11APR'11	ISSUED WITH REPORT	AMD	AMD	SCE	RCB

Knight Piésold CONSULTING

P/A NO. VA101-246/8 | REF NO. 2

FIGURE 9.1-1 | REV 0

SAVED: M:\1\01\00246\08\A\GIS\ArcView\figures\Report-2 dAIR\Figure_9.1-1_r0_AJAXHeritageESA.mxd Apr 08, 2011 8:48:22 AM adrica



LEGEND:

GENERAL

- TRANSMISSION LINE
- REGIONAL STUDY AREA (RSA)
- LOCAL STUDY AREA (LSA)
- MINE SITE

NOTES:

1. BASE MAP: ESRI ARCGIS ONLINE TOPOGRAPHIC MAP.

2. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD 83 UTM ZONE 10N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:100,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

SCALE 1 0.5 0 1 2 3 4 5 km

KGHM AJAX MINING INC.

AJAX PROJECT

NOISE AND VIBRATION EFFECTS STUDY AREA

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
1	05JAN'12	ISSUED WITH REPORT	KK	AMD	SCE	RCB
0	11APR'11	ISSUED WITH REPORT	AMD	AMD	SCE	RCB

Knight Piésold CONSULTING

P/A NO. VA101-246/8 | REF NO. 2

FIGURE 10.3-1 | REV 1

KP FIGURE SAVED: M:\1011\002\46\08\AGIS\ArcView\figures\Report 2 dAIR\Rev D\Figure_10.3-1_r1_AJAXNoiseVibESA.mxd; Jan 05, 2012 8:19:55 AM adinca

Knight Piésold
CONSULTING

APPENDICES

Knight Piésold CONSULTING

APPENDIX 1

KGHM AJAX MINING INC.
AJAX PROJECT

DRAFT APPLICATION INFORMATION REQUIREMENTS / ENVIRONMENTAL IMPACT STATEMENT GUIDELINES WATER QUALITY ANALYSIS PARAMETERS

Print Jan/05/12 10:49:49

Physical Tests	MDL
Acidity to pH 8.3 (as CaCO3)	1
Alkalinity (Total as CaCO3)	1 - 2
Bicarbonate Alkalinity	1
Carbonate Alkalinity	1
Color TCU	5
Conductivity (µS/cm)	2
Hardness (Dissolved)	0.7
Hydroxide Alkalinity	1
pH (pH units)	0.01
Total Dissolved Solids	Oct-13
Total Suspended Solids	3
Turbidity (NTU)	0.1
Dissolved Anions	MDL
Bromide (Dissolved)	0.05
Chloride (Dissolved)	0.5
Fluoride (Dissolved)	0.02
Sulphate (Dissolved)	0.5
Nutrients	MDL
Ammonia (Total)	0.005 - 0.02
Nitrate (as N)	0.005
Nitrite (as N)	0.001
Nitrogen Kjeldahl (Total)	0.05
Orthophosphate	0.001 - 0.01
Phosphate (Total)	0.002 - 0.1
Cyanide	MDL
Cyanide (Free)	0.005
Cyanide (Total)	0.005
Cyanide (WAD)	0.005
Organics – Total & Dissolved	MDL
Carbon Organic	0.5

Metals - Total & Dissolved	MDL
Aluminum	0.005 - 0.01
Antimony	0.0005 - 0.001
Arsenic	0.0005 - 0.001
Barium	0.02
Beryllium	0.001 - 0.002
Boron	0.1
Cadmium	0.000017 - 0.000034
Calcium	0.1
Chromium	0.001 - 0.002
Cobalt	0.0003 - 0.0006
Copper	0.001 - 0.002
Iron	0.03
Lead	0.0005 - 0.001
Lithium	0.005 - 0.01
Magnesium	0.1
Manganese	0.0003 - 0.0006
Mercury	0.00002
Molybdenum	0.001 - 0.002
Nickel	0.001 - 0.002
Potassium	2
Selenium	0.001 - 0.002
Silver	0.00002 - 0.00004
Sodium	2
Thallium	0.0002 - 0.0004
Tin	0.0005 - 0.001
Titanium	0.01
Uranium	0.0002 - 0.0004
Vanadium	0.001 - 0.03
Zinc	0.005 - 0.01

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	20DEC'10	ISSUED WITH REPORT 101-246/8-2	SCE	RCB	RCB