

# BBA capabilities and experience



# Safety is second nature to us.

We rigorously manage our onsite presence.

- ▶ Health and Safety Policy;
- ▶ Health and Safety Prevention Program;
- ▶ Pre-site Coaching Program.

We strive for prevention both on site and at the office.

- ▶ Health and Well-being policy;
- ▶ Ongoing awareness program;
- ▶ Near-miss reporting program;
- ▶ Health and Well-being Program.

## Overview

- Founded in 1980;
- Privately-owned Canadian consulting firm;
- Serving the Energy and Natural Resources Sectors;
- Providing support from early concepts and studies to engineering, commissioning, and operational readiness.

## Differentiators

- Practice-centred business (PCB);
- State-of-the-art solutions: practical, reliable, cost-effective, and environmentally friendly.

45

years of  
innovation

19

offices across Canada  
and abroad

1,600+

employees

275+

Trail, Vancouver,  
Calgary

410+

Toronto,  
Montreal

45+

International



Serving the energy  
and natural resources industry  
for over 40 years

A national and **international** reach  
with a local presence

Trail  
Vancouver  
Calgary  
Edmonton  
Sudbury  
Toronto  
Rouyn-Noranda  
Val-d'Or  
Mont-Tremblant  
Concord

Boisbriand  
Montreal  
Mon-Saint-Hilaire  
Quebec City  
Labrador City  
Sept-Îles  
Saguenay  
Santiago, Chile  
Salt Lake City, USA

## Our values

We always find a way to make it work.  
We exceed expectations by taking  
our clients' challenges as our own.



We aim for quality in everything we  
do. Working together with our clients  
from ground level, we do it right the  
first time.



People first

Ingenuity

Eco-mindfulness

Rigour

Fun and collaboration



The health, safety and wellness  
of our employees, clients and  
the public are our responsibility.  
We treat them as family.



As we develop our projects, we  
respect, protect and care for the  
environment and its resources.  
They are our legacy to future  
generations.



By collaborating and sharing  
our knowledge, we empower  
each other.

# Long-term relationships are strongly based on delivery of value

250 

Clients in the industrial  
and public sector

150 

Clients in the mining and  
metals sector

80 

Clients in the power  
sector

55 

Clients in the oil, gas,  
and biofuels sector

## Teck

150 projects

15 years of relationship

## Evolugen

600 projects

40 years of relationship

## ArcelorMittal

600 projects

35 years of relationship

## Codelco

15+ projects

10 years of relationship

## Glencore

600 projects

28 years of relationship

## IOC/Rio Tinto

2,000 projects

40 years of relationship

## Hydro-Québec

1,000 projects

40 years of relationship

## CMP

7 projects

3 years of relationship

# Where BBA's mining journey began



**1980**

Supported mining clients from day one with strong expertise in electrical engineering and automation.

**2018**

Added geology and environmental services to move upstream in the project lifecycle.

**2025**

Strengthened our capabilities with the arrival of Tierra Group's world-class expertise in geotechnical, civil and structural, working closely with USA and South American mine sites.

**1**

**2**

**3**

**4**

**5**

**2005**

Launched our mining studies group in Montréal and expanded nationally with offices from coast to coast.

**2022**

Expanded internationally by establishing a mining presence in Chile and the U.S. (Salt Lake)

As well as the addition of two environmental firms: CPP and Synergis. Adding environmental experts from early planning to post-construction.

# Covering the full lifecycle

Our services leverage our involvement from study phases to detailed engineering to construction management, commissioning, start-up, and operational support.





# Mining and Metals

Our customized solutions strengthen your profitability and support your business objectives.



## Mining & mineral processing

**GOLD AND PRECIOUS METALS**  
**IRON ORE**  
**BASE METALS**  
**BATTERY MINERALS**

FROM PRELIMINARY DESIGN

TO COMMISSIONING

### Resource estimation

- Studies - PEA, PFS, FS)
- Energy studies – electrical and thermal
- Life-of-mine planning
- Environmental and permitting (EIA)

### Design and management

- Mining
- Material handling
- Process plant
- Water management
- Geotechnical
- Power generation and T&D
- EPCM

### POV & commissioning

- POV
- Risk management
- Procedures and safety plans
- Training
- Commissioning
- Site restart

### Optimization & site support

- Audits
- Tailings dam assessment
- Asset management
- Laboratory testing services
- Blast and fragmentation modelling
- Rock mechanics
- Acoustics and vibration
- Mine closure / remediation



# Integrated Team Capabilities

Structural Inspection and Repair Plans  
Bulk Material Handling  
Process Engineering  
Maintenance Engineering  
Pit Dewatering  
Asset Management  
Secondments  
Dam Safety and Tailings Facility Reviews



**Environment, earth sciences, civil & structural**  
180+ resources



**Geology, mining & metallurgy**  
80+ resources



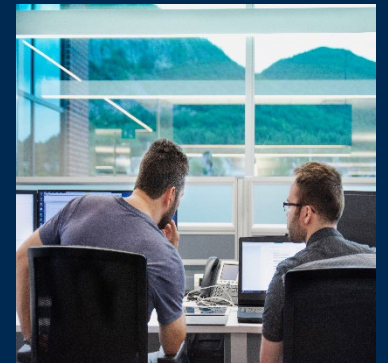
**Mechanical & piping**  
270+ resources



**Electrical, automation & industrial IT**  
450+ resources



**Ops Excellence/readiness, commissioning & VPO**  
22+ resources



**Project execution professionals**  
55+ resources

BBA is one of Canada's largest mining and metal processing groups.

## Civil, Structural, Geotechnical, and Surface Water Management



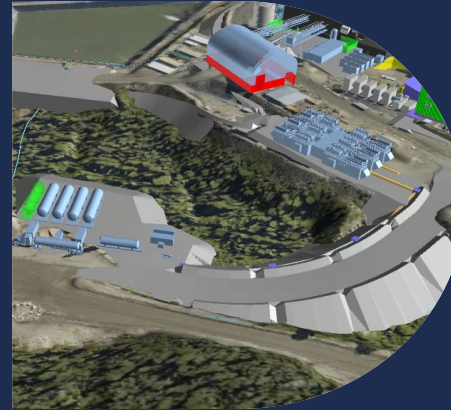
### Civil - Structural

- Steel/concrete structures for plant expansion, building inspection, and structural retrofit;
- Design of concrete, steel, and wood structures;
- Structural modelling, visual simulations;
- Anchorage and seismic support.



### Civil - Geotechnical

- Geotechnical site investigations, site inspection, and supervision;
- Shallow and deep foundation design;
- Slope stability and seepage analysis;
- Static/ Dynamic Foundations design.



### Mine - Geotechnical

- Road design and optimization (Haulage, Railway);
- Stockpile (Ore, Waste) design and management;
- Drainage and rainwater retention systems;
- Public utility services.

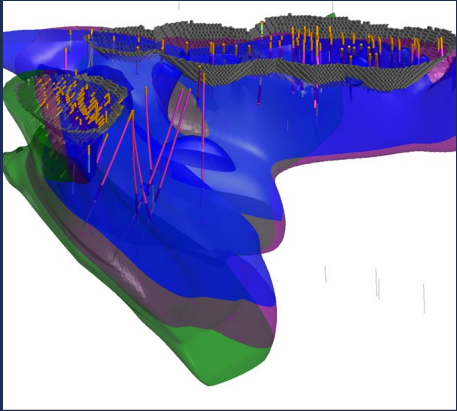


### Hydrotechnical

- Meteorology: measurements and data analysis;
- Hydrology: Surface water balances and flows at watershed scale;
- Free-surface hydraulics: Hydrodynamics of flows in rivers, lakes and estuaries;
- Dam Breach and flood mapping.

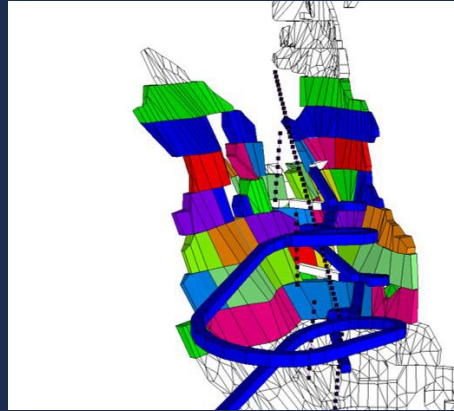


## Geology, Rock Mechanics, Hydrogeology, and Waste Management



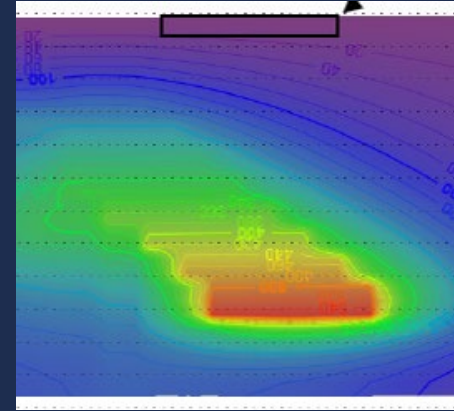
### Geology

- Drillhole planning and logging;
- Economic geology and Mineral resource modeling and estimate;
- Reconciliation and dilution;
- Due diligence, QA/QC;
- NI 43-101, JORC, and S-K 1300 compliant technical reports;
- Datamine and Leapfrog.



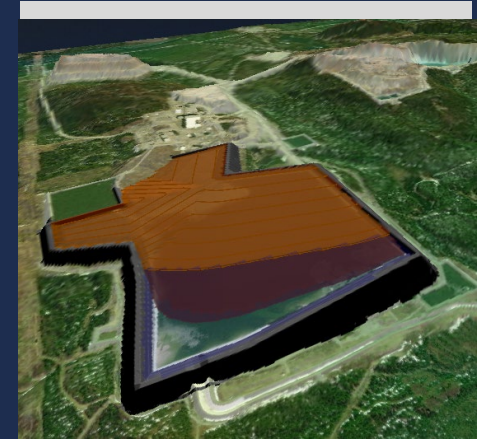
### Rock Mechanics

- Rock mass characterization, stability analysis, and stope/pillar dimensioning and dilution estimates;
- Ground control, geomechanical risk assessment, instrumentation, compliance reviews, audits and training;
- Numerical modeling: Map3D, RS3, Flac3D.



### Hydrogeology

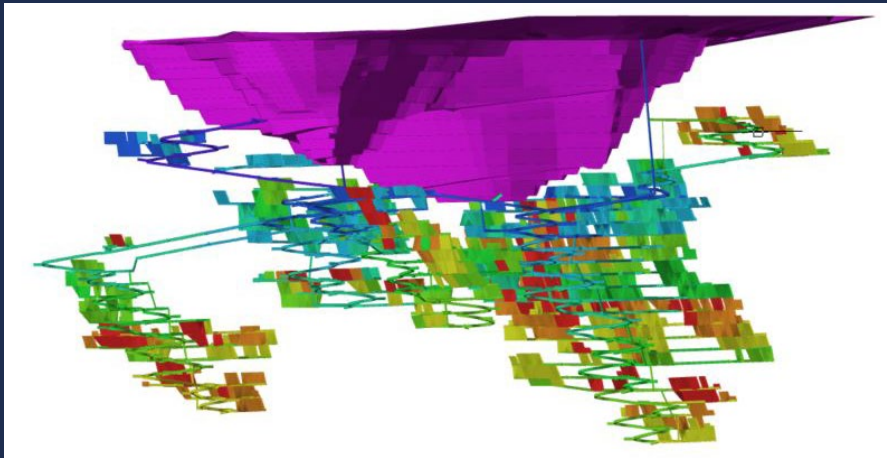
- Packer testing;
- Hydraulic conductivity and groundwater inflow for underground operations;
- Instrumentation (VW piezometer, Logger Installation);
- Water quality sampling;
- 3D Transient Modeling – FeFlow and ModFlow.



### Tailings & Mine Waste Management

- Technology and site selection;
- Infrastructure design, dams, basin, ditches;
- Volumetric & Civil design, TSF development & sequence, construction stages, progressive reclamation & closure;
- CAPEX, OPEX, estimation, evaluation, assessment
- DSR, DSI, EoR, PEER Review, Risk Mgmts

## Mine Design and scheduling, material handling, and infrastructure



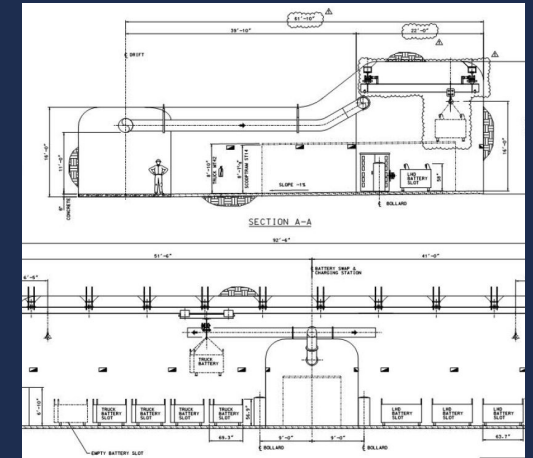
### Mine Design and Scheduling

- Cut-off and dilution analyses; (design, fragmentation analysis, vibration analysis and modelling, etc.);
- Pit and stope optimization analyses;
- Design (open pit, various underground methods);
- Scheduling (LOM, budgets, forecasts);
- Equipment selection and estimation;
- Drill-and-blast evaluation.
- Ventilation (design, modelling, simulations, ventilation-on-demand);
- Rock stockpile design (waste, overburden, ore);
- Technical reports (NI 43-101, JORC, S-K 1300).



### Material Handling

- Haulage simulation;
- Conveyance (traditional, vertical, train, railveyor);
- Battery Electric Vehicles, Trolley-assist systems.



### Infrastructure

- Charging and battery swap stations;
- Electrical substations;
- Garage and warehouses;
- Automation facilities;
- Surface power.

## Environment, process, mechanical, and electrical



### Environmental / Permitting

- Permits and approvals;
- Assessments and Impact studies;
- Monitoring (flora, fauna, etc.);
- Assessment of atmospheric emissions, noise, and decarbonization;
- Liaison, coordination, and negotiation with regulators and local communities.



### Process / Metallurgy

- Process development and optimization with control strategies;
- Process simulation with equipment specification;
- Mass and heat balance, catalyst performance, optimal heat recovery;
- Risk review (HAZOP).



### Mechanical

- Equipment sizing, selection, and specification;
- Piping layout, design, support, and stress analysis;
- Hydraulic analysis (fluids, steam, pulp), dust control, and vibration analysis;
- Brownfield and greenfield layout and design;
- Material handling.



### Electrical

- Power syst. and network integration studies;
- High-, medium-, and low-voltage design;
- Collector systems design;
- Network stability and power flow;
- Equipment Procurement, Control, Switchgear replacement and design;
- Transmission/Distribution lines and substations;
- Rotating machines specifications and sizing.



## Automation, instrumentation, and commissioning



- Unity programming of Schneider Electric M580 PLCs and Wonderware System Platform HMI;
- Surface/Underground ore handling, fuel delivery, compressed air, process water, dewatering, backfill, garage and lube bays;
- Development of control narratives and functional descriptions for various mining processes;
- Automation of PLC/HMI programming using Unity and Wonderware System Platform;
- Detailed engineering for ore processing facility, including crusher, material handling facilities, electrical distribution, roads, pump stations, and truck shop;
- Pre-Operational Verification: safe testing procedures, operational readiness preparation with certificate of acceptance;
- Commissioning planning, system testing, preparation of detailed reports.

## Laboratories

- Self-heating lab for metallurgy testing (Concord);
- Electrical equipment testing and high voltage testing (Concord):
- Digital power system (Toronto and Vancouver);
- Automation testing lab (Sudbury and Vancouver).



## 3D Scanning and Drone services

- Capture of current site conditions;
- Brownfield design;
- As-built modelling;
- Structural inspections;
- Concrete inspections;
- Thermal Inspections;
- Monitoring;
- LiDAR data collection;
- Schedule reductions.







# Bloom Lake Mine

CLIENT

IRON ORE QUÉBEC  
13 KM NORTH OF FERMONT, QUÉBEC

LOCATION

Originally developed by Consolidated Thompson and later owned by Cliffs Natural Resources, the Bloom Lake project changed hands following market downturns before being acquired by Champion Iron in 2016. BBA has been supporting the project since its inception—from early designs through ownership transitions and the successful 2018 restart by Quebec Iron Ore, which included major upgrades to the concentrator, recovery circuit, and the construction of a 3.5 km conveyor to optimize operations.

- **Long-standing involvement** from early-stage studies to current operations, ensuring project continuity.
- **Led key phases:** audits, PFS, FS, and mine design—laying the technical foundation for success.
- **Supported both OPEX and CAPEX planning,** delivering practical, cost-effective solutions.
- **Ongoing partnership** through operational support and optimization initiatives.
- **Bloom Lake was BBA's largest client in 2024,** reflecting the scale and trust of our collaboration.



# Bingham Canyon Mine



CLIENT

KENNECOTT RIO TINTO  
SALT LAKE CITY, UTAH

LOCATION

The Bingham Canyon Mine, one of the largest open-pit copper mines in the world, has been in operation for over a century in Utah. To improve operational performance and support its modernization efforts, Rio Tinto Kennecott launched a series of strategic upgrades. BBA supported these efforts through advanced electrical and automation solutions, contributing to improved safety, energy efficiency, and long-term asset reliability.

- **Trusted expertise leading to strategic opportunity:** Our successful work in electrical and automation with Rio Tinto's Canadian teams led them to encourage us to open a Salt Lake office.
- **U.S. expansion milestone:** This led to the opening of our first U.S. office—right in Salt Lake—to better support local operations.
- **Ongoing collaboration:** We continue to support Kennecott through specialized mandates, a testament to the trust we've earned.







# Cerro Negro Norte



CLIENT  
LOCATION

COMPAÑÍA MINERA DEL PACÍFICO  
ATACAMA REGION, CHILE

CMP, a major iron ore producer in Chile, engaged BBA to support a FEL1 study comparing over 30 development scenarios across two districts. The goal was to identify the best path forward to FEL2—balancing returns, social acceptance, and environmental impact—with support from BBA’s process engineering expertise.

- **First international iron ore mandate:** Our entry into South America, supporting CMP with Canadian-grade expertise.
- **Specialized process engineering:** Delivered advanced flotation strategies inspired by complex Labrador deposits.
- **Exported know-how:** Successfully transposed our iron ore processing knowledge to a new geological and operational context.
- **Trusted collaboration:** CMP selected BBA despite a competitive market—proof of our reputation and technical edge
- **Strategic footprint:** This project helped anchor our presence in Chile and demonstrate our global adaptability.



Across the Americas,  
our mining expertise  
and trusted partnerships  
deliver lasting value,  
at every stage of the  
project lifecycle.

# Major mining studies in Canada

Client - Project – Location	Mine type	PEA   OMM   Scoping	PFS	FS	Detailed engineering	Greenfield project
Vale - Coleman Mine L170 OB – Sudbury, ON	UG		✓			
Vale - Coleman Mine Second Egress – Sudbury, ON	UG			✓		
Vale - Stobie Mine – Sudbury, ON	OP		✓	✓		
Osisko Mining - Windfall Lake – Near Lebel-sur-Quévillon, QC	UG			✓		✓
IAMGOLD - Côté Gold Project – Gogama, ON	OP				✓	✓
Argonaut Gold - Magino Mine – Wawa, ON	UG				✓	✓
New Gold - Rainy River Gold Project – Fort Francis, ON	OP				✓	
Osisko Metals - Pine Point PEA and PEA update – Northwest Territories	OP/UG	✓				
Vale - Coleman Mine Second Egress – Sudbury, ON	UG		✓			
Doré Copper - Corner Bay/Copper Rand – Chibougamau, QC	UG	✓				✓
Alamos Gold - Lynn Lake – MB	OP			✓	✓	
Barkerville Gold Mines - Cariboo Gold Project – Wells, BC	UG			✓		
International TowerHill Mines - Livengood Gold – Alaska, USA	OP		✓			✓
Coeur Silvertip Holdings - Operations Restart – Northern BC	UG		✓		✓	✓
Newcrest Red Chris Mining - Block cave boxcut/portal – Dease Lake, BC	OP				✓	
Wesdome - Kiena project – Val-d'Or, QC	UG	✓	✓			
HudBay Mining - Copper Mountain Trolley Assist – Princeton, BC	OP			✓		
Hudbay - WIM and 3 Zone – MB	UG		✓			

Note- This is a Selected shortlist from last few years. BBA can provide other mining project lists upon request, including international projects.

## International Projects

COMPANY	PROJECT	LOCATION	YEAR	COMMODITY
Titan Mining	Killbourne Graphite	New York, USA	2024	Graphite
Ivanhoe Electric	Santa Cruz MRE	Arizona, USA	2024	Copper
Ivanhoe Electric	Santa Cruz MRE	Arizona, USA	2024	Copper
Ivanhoe Electric	Santa Cruz MRE	Arizona, USA	2024	Copper
Cordoba Minerals	Alacran Project	Colombia	2024	Copper - Polymetal
Sama Resources	Samapleu-Grata Deposits	Cote d'Ivoire	2024	Nickel - Polymetal
Imerys Ceramics	EMILI Project	France	2023	Li
Sama Resources	Samapleu-Grata Deposits	Cote d'Ivoire	2023	Nickel - Polymetal
Tumad Mining	Lapseki	Turkey	2023	Gold
Equinox Gold Corp. / Bear Creek Mining Corp.	Mercedes	Mexico	2022	Gold
International Tower Hill Mines	Livengood Gold	Alaska, USA	2021	Gold
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Newcore Gold	Enchi Gold Project	Ghana	2021	Gold
SRG Mining	Lola Graphite Project	Guinea	2019	Graphite
IAMGOLD	Rosebel Gold Mines	Suriname	2018	Gold
IAMGOLD	Saramacca Gold Mines	Suriname	2018	Gold
Managem	Tri-K	Guinea	2018	Gold
IAMGOLD	Rosebel Gold Mines	Suriname	2017	Gold
Black Iron	Shymanivske	Ukraine	2017	Iron
Teranga Gold	Banfora	Burkina Faso	2017	Gold
EMC / Glencore	Guelb El Aouj	Mauritania	2016	Iron
International Tower Hill Mines	Livengood Gold	Alaska, USA	2016	Gold
Tumad Mining	Lapseki Gold project	Turkey	2016	Gold

# Our next challenges to overcome?

We are proud professionals who impact society's development positively by providing practical and technologically advanced solutions in a mindful way.

Discipline	E-mail*
VP International Operations	<a href="mailto:Benoit.richard@bbaconsultants.com">Benoit.richard@bbaconsultants.com</a>
Regional Director Mining	<a href="mailto:Amanda.Fitch@bbaconsultants.com">Amanda.Fitch@bbaconsultants.com</a>
Expert Advisor- Mining Studies	<a href="mailto:Colin.hardie@bbaconsultants.com">Colin.hardie@bbaconsultants.com</a>

\*bba.ca transitioning to bbaconsultants.com on April 1, 2025.