Berg Project

NI 43-101 Technical Report and Preliminary Economic Assessment

British Columbia, Canada

Effective Date: June 12, 2023

Prepared for: Surge Copper Corp.
888-700 West Georgia Street
Vancouver, BC, V7Y 1G5, Canada

Prepared by: Ausenco Engineering Canada Inc.
1050 West Pender Street Suite 1200
Vancouver, BC, V6E 3S7, Canada

List of Qualified Persons:
Kevin Murray, P. Eng., Ausenco Engineering Canada Inc.;
Peter Mehrfert, P. Eng., Ausenco Engineering Canada Inc.;
Ali Hooshiar, P. Eng., Ausenco Engineering Canada Inc.;
Jonathan Cooper, P. Eng., Ausenco Sustainability Inc.;
Scott Weston, P. Geo, Ausenco Sustainability Inc.;
Marc Schulte, P. Eng., Moose Mountain Technical Services;
Sue Bird, P. Eng., Moose Mountain Technical Services.

CERTIFICATE OF QUALIFIED PERSON

Kevin Murray, P. Eng.

I, Kevin Murray, P. Eng., certify that:

1. I am employed as Manager Process Engineering with Ausenco Engineering Canada Inc., with an office address of 1050 West Pender Street, Suite 1200, Vancouver, BC Canada, V6E 3S7.
2. This certificate applies to the technical report titled *"Berg Project, NI 43-101 Technical Report and Preliminary Economic Assessment"* (the "Technical Report"), prepared for Surge Copper Corp. (the "Company") with an effective date of June 12, 2023 (the "Effective Date").
3. I graduated from the University of New Brunswick, Fredericton NB, in 1995 with a Bachelor of Science in Chemical Engineering.
4. I am a member in good standing of Engineers and Geoscientists British Columbia, License# 32350, and Northwest Territories Association of Professional Engineers and Geoscientists' Registration# L4940.
5. I have practiced my profession for 22 years. I have been directly involved in all levels of engineering studies from preliminary economic analysis (PEA) to feasibility studies including being a Qualified Person for flotation projects including NorthWest Copper Corp's Kwanika- Stardust PEA, NorZinc Ltd.'s Prairie Creek PEA, Ero Copper Corp.'s Boa Esparença Feasibility Study, Skeena Resources Ltd's Eskay Creek Feasibility Study. I have been directly involved with test work and flowsheet development from preliminary testing through to detailed design and construction with Teck and have direct operations support experience at Red Lake Gold Mine, Porcupine Gold Mine and Éléonore Gold mine as well has commissioning support a Magino Gold mine.
6. I have read the definition of "Qualified Person" set out in the National Instrument 43-101 Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for those sections of the Technical Report that I am responsible for preparing.
7. I have not visited the Berg Project.
8. I am responsible for 1.1, 1.11.1-1.11.9, 1.12, 1.14, 1.15, 1.16, 1.17.1, 1.17.5, 2, 18.1, 18.2, 18.3.1-18.3.6, 18.3.8, 19, 21.1, 21.2.1, 21.2.2, 21.2.3.2,21.2.4-21.2.9, 21.2.10.1, 21.2.10.3, 21.2.11, 21.3.1, 21.3.3, 21.3.4, 22, 24, 25.1, 25.10, 25.11, 25.13-25.15, 25.16.5, 25.16.6, 25.17.5, 26.1, 26.5, and 27 of the Technical Report.
9. I am independent of the Company as independence is defined in Section 1.5 of NI 43-101.
10. I have had no previous involvement with the Berg Project.
11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with that Instrument. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those sections of the Technical Report not misleading.

Dated: July 28, 2023.

"Signed and sealed"

Kevin Murray, P. Eng.

Ausenco Permit to Practice 1001905
Engineers and Geoscientists British Columbia

CERTIFICATE OF QUALIFIED PERSON
Peter Mehrfert, P. Eng.

I, Peter Mehrfert, P. Eng., certify that:

1. I am employed as a Process Engineer with Ausenco Engineering Canada, with an office at 1050 W Pender St, Vancouver, BC V6E 3S7.
2. This certificate applies to the technical report titled *"Berg Project, NI 43-101 Technical Report and Preliminary Economic Assessment"* (the "Technical Report"), prepared for Surge Copper Corp. (the "Company") with an effective date of June 12, 2023 (the "Effective Date").
3. I graduated from the University of British Columbia in 1996 where I obtained a Bachelor of Applied Science in Mining and Mineral Process Engineering.
4. I am a Professional Engineer, registered with Engineers and Geosciences of British Columbia, member number 100283.
5. I have practiced my profession for 28 years and have been involved in the design, evaluation and operation of mineral processing facilities during that time. Approximately half of my professional practice has been the supervision and management of metallurgical test work related to feasibility and prefeasibility studies of projects involving flotation technologies. Previous copper projects that I have worked on that have similar features to the Berg Project are: Gibraltar, Mt Milligan, Jose Maria, Highland Valley Copper, Santo Tomas and Copper Creek.
6. I have read the definition of "Qualified Person" set out in the National Instrument 43-101 Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for those sections of the Technical Report that I am responsible for preparing.
7. I have not visited the Berg Project site.
8. I am responsible for sections 1.7, 1.10, 1.17.3, 13, 17, 25.5, 25.9, 25.16.2, 25.17.2, 26.3, and 27 of the Technical Report.
9. I am independent of the Company as independence is defined in Section 1.5 of NI 43-101.
10. I was involved with coordinating metallurgical test work on the Berg Project in 2010. I have had no other involvement with the Berg Project prior to this study.
11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with that Instrument. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those sections of the Technical Report not misleading.

Dated: July 28, 2023.

"Signed and sealed"

Peter Mehrfert, P. Eng.

Ausenco Permit to Practice 1001905
Engineers and Geoscientists British Columbia

CERTIFICATE OF QUALIFIED PERSON

Jonathan Cooper, M.Sc., P.Eng.

I, Jonathan Cooper, M.Sc., P.Eng., certify that:

1. I am employed as a Water Resources Engineer with Ausenco Sustainability ("Company"), with an office address of 11 King Street West, Suite 1500, Toronto, Ontario M5H 4C7.
2. This certificate applies to the technical report titled *"Berg Project, NI 43-101 Technical Report and Preliminary Economic Assessment"* (the "Technical Report"), prepared for Surge Copper Corp. (the "Company") with an effective date of June 12, 2023 (the "Effective Date").
3. I graduated from the University of Western Ontario with a Bachelor of Engineering Science in Civil Engineering in 2008, and University of Edinburgh with a Master of Environmental Management in 2010.
4. I am a Professional Engineer registered and in good standing with Engineers and Geoscientists British Columbia (EGBC), registration number 37864.
5. I have practiced my profession for continuously for over 15 years with experience in the development, design, operation, and commissioning of surface water infrastructure. Previous projects that I have worked on that have similar features to the Berg Project are Kwanika-Stardust for NorthWest Copper located in British Columbia and Colomac Gold Project located in the Northwest Territories.
6. I have read the definition of "Qualified Person" set out in the National Instrument 43-101 Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for those sections of the Technical Report that I am responsible for preparing.
7. I have not visited the Berg Project.
8. I am responsible for 1.11.11, 18.3.9, and 27 of the Technical Report.
9. I am independent of the Company as independence is defined in Section 1.5 of NI 43-101.
10. I have had no previous involvement with the Berg Project.
11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with that Instrument. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those sections of the Technical Report not misleading.

Dated: July 28, 2023.

"Signed and sealed"

Jonathan Cooper, M.Sc., P.Eng.

Ausenco Sustainability Inc. Permit to Practice 1003471
Engineers and Geoscientists British Columbia

CERTIFICATE OF QUALIFIED PERSON

Scott Weston, P. Geo.

I, Scott Weston, P. Geo., certify that:

1. I am a Professional Geoscientist, currently employed as Vice President, Business Development with Ausenco Sustainability Inc. ("Ausenco"), with an office address of 4515 Central Boulevard, Burnaby, B.C., Canada.

2. This certificate applies to the technical report titled "*Berg Project NI 43-101 Technical Report and Preliminary Economic Assessment*" (the "Technical Report") prepared for Surge Copper Corp. ("the "Company") that has an effective date of June 12, 2023 (the "Effective Date").

3. I graduated from University of British Columbia, Vancouver, B.C., Canada 1995 with a Bachelor of Science, Physical Geography, and Royal Roads University, Victoria, B.C., Canada 2003 with a Master of Science, Environment and Management.

4. I am a Professional Geoscientist of Engineers and Geoscientists British Columbia; registration number 124888.

5. I have worked as a geoscientist continuously for 27 years, leading or working on teams advancing multidisciplinary environmental projects related to natural resource development. Examples of projects I have been involved with include: Wasamac Project FS, Eskay Creek Mine PFS, Las Chispas Mine FS, and Casino Project FS.

6. I have read the definition of "Qualified Person" set out in the National Instrument 43-101 Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for those sections of the Technical Report that I am responsible for preparing.

7. I have not visited the Berg Project.

8. I am responsible for Sections 1.13, 1.17.7, 3.2, 20, 25.12, 25.16.7, 25.17.6, 26.7, and 27 of the Technical Report.

9. I am independent of the Company as independence is defined in Section 1.5 of NI 43-101.

10. I have had no previous involvement with the Berg Project.

11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with that Instrument. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those sections of the Technical Report not misleading.

Dated: July 28, 2023.

"Signed and sealed"

Scott Weston, P. Geo.

Ausenco Sustainability Inc. Permit to Practice 1003471
Engineers and Geoscientists British Columbia

CERTIFICATE OF QUALIFIED PERSON
Mohammad Ali Hooshiar Fard, P.Eng.

I, Mohammad Ali Hooshiar Fard, P.Eng., certify that:

1. I am employed as a Geotechnical Engineer with Ausenco Engineering Canada Inc. (Ausenco), with an office at 1050 W Pender St, Vancouver, BC V6E 3S7.
2. This certificate applies to the technical report titled *"Berg Project NI 43-101 Technical Report and Preliminary Economic Assessment"* (the "Technical Report"), prepared for Surge Copper Corp. (the "Company") with an effective date of June 12, 2023 (the "Effective Date").
3. I graduated from Sharif University of Technology with a BSc and MSc in Materials Science and Engineering in 2003 and 2006, respectively. In 2011 I graduated from the University of Alberta with a PhD in Materials Engineering.
4. I am a Professional Engineer registered with the Engineers and Geoscientists British Columbia (No. 40965) and Engineers Yukon.
5. I have practiced my profession for 20 years with experience in designing tailings and waste rock storage facilities as well as managing geotechnical field investigation and lab testing programs for mining projects across the globe. A summary of the more recent portion of my professional career is as follows:
   a. Geotechnical Mining Engineer, Ausenco, Canada 2018–present
   b. Geotechnical Mining Engineer, AECOM, Canada 2013–2017
   c. Senior Geotechnical Consultant, SRK Consulting Inc., Canada 2011–2013
6. I have read the definition of "Qualified Person" set out in the National Instrument 43-101 Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for those sections of the Technical Report that I am responsible for preparing.
7. I visited the Berg Project on October 24, 2022.
8. I am responsible for 1.11.10, 1.17.6, 18.3.7, 25.7, 26.6, and 27 of the Technical Report.
9. I am independent of the Company as independence is defined in Section 1.5 of NI 43-101.
10. I have had no previous involvement with Berg Project.
11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with that Instrument. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those sections of the Technical Report not misleading.

Dated: July 28, 2023.

"Signed and sealed"

Mohammad Ali Hooshiar Fard, P.Eng.

Ausenco Permit to Practice 1001905
Engineers and Geoscientists British Columbia

CERTIFICATE OF QUALIFIED PERSON

Marc Schulte, P. Eng.

I, Marc Schulte, P.Eng., certify that:

1. I am employed as a Mining Engineer with Moose Mountain Technical Services, with an office address of #210 1510 2nd Street North Cranbrook, BC V1C 3L2.

2. This certificate applies to the technical report titled *"Berg Project, NI 43-101 Technical Report and Preliminary Economic Assessment"*, (the "Technical Report"), prepared from Surge Copper Corp. (the "Company") with an effective date of June 12, 2023 (the "Effective Date").

3. I graduated with a Bachelor of Science in Mining Engineering from the University of Alberta in 2002.

4. I am a member of the self-regulating association Engineers and Geoscientists BC (#54035).

5. I have worked as a mining engineer for 21 years since my graduation from university. Throughout my career I have worked on numerous open pit base metals projects, within project engineering studies and within mine operations, on Mineral Reserve estimates, mine planning, and mine cost estimates.

6. I have read the definition of "Qualified Person" set out in the National Instrument 43-101 Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purpose of N I43-101.

7. I have visited the Berg Project site on October 24, 2022.

8. I am responsible for Sections 1.9, 1.17.4, 15, 16, 21.2.3.1, 21.2.10.2, 21.3.2, 25.8, 25.16.4, 25.17.4, 26.4, and 27 of the Technical Report.

9. I am independent of Surge Copper Corp, as independence is described by Section 1.5 of NI 43–101.

10. I have had no previous involvement with the Berg Project

11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with that Instrument. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those sections of the Technical Report not misleading.

Dated: July 28, 2023.

"Signed and sealed"

Marc Schulte, P.Eng.

CERTIFICATE OF QUALIFIED PERSON
Sue Bird

I, Sue Bird, P.Eng., certify that:

1. I am employed as a Geological Engineer with Moose Mountain Technical Services, with an office address of #210 1510 2nd Street North Cranbrook, BC V1C 3L2.

2. This certificate applies to the technical report titled *"Berg Project, NI 43-101 Technical Report and Preliminary Economic Assessment",* (the "Technical Report"), prepared from Surge Copper Corp. (the "Company") with an effective date of June 12, 2023 (the "Effective Date").

3. I graduated with a Geologic Engineering degree (B.Sc.) from the Queen's University in 1989 and a M.Sc. in Mining from Queen's University in 1993.

4. I am a member of the self-regulating association Engineers and Geoscientists BC (#25007).

5. I have worked as a geological and mining engineer for 30 years since my graduation from university. I have worked on precious metals, base metals and coal mining projects, including mine operations and evaluations. Similar resource estimate projects specifically include those done for Artemis' Blackwater gold project, Ascot's Premier Gold Project, Spanish Mountain Gold, all in BC; O3's Marban and Garrison, gold projects in Quebec and Ontario, respectively, as well as numerous due diligence gold projects in the southern US done confidentially for various clients.

6. I have read the definition of "Qualified Person" set out in the National Instrument 43-101 Standards of Disclosure for Mineral Projects ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purpose of N I43-101.

7. I have not visited the Berg Project site.

8. I am responsible for Sections 1.2-1.6, 1.8, 1.17.2, 3.1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 23, 25.2-25.6, 25.16.1, 25.16.3, 25.17.1, 25.17.3, 26.2, and 27 of the Technical Report.

9. I am independent of Surge Copper Corp, as independence is described by Section 1.5 of NI 43–101.

10. I have had no previous involvement with the Berg Project.

11. I have read NI 43-101 and the sections of the Technical Report for which I am responsible have been prepared in compliance with that Instrument. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those sections of the Technical Report not misleading.

Dated: July 28, 2023.

"Signed and sealed"

Sue Bird, M.Sc., P.Eng.

Important Notice

This report was prepared as National Instrument 43-101 Technical Report for Surge Copper Corp. (Surge Copper) by Lead Author (Ausenco), Moose Mountain Technical Services, collectively the Report Authors. The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in the Report Authors' services, based on i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This report is intended for use by Surge Copper subject to terms and conditions of its contracts with each of the Report Authors. Except for the purposes legislated under Canadian provincial and territorial securities law, any other uses of this report by any third party are at that party's sole risk.

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1 SUMMARY

1.1 Introduction

Surge Copper Corp. (Surge Copper or the "Company") commissioned Ausenco Engineering Canada Inc. and Ausenco Sustainability Inc. (Ausenco) to compile a preliminary economic assessment (PEA) of the Berg Project. The PEA was prepared in accordance with the Canadian disclosure requirements of National Instrument 43-101 – Standards and Disclosures for Mineral Projects (NI 43-101) and the requirements of Form 43-101 F1.

The Berg Project involves the development of "supergene" and "hypogene" mineralization types all located in the Tahtsa Ranges. The responsibilities of the engineering companies contracted by Surge Copper to prepare this report are as follows:

- Ausenco managed and coordinated the work related to the report and developed PEA-level design, including capital and operating cost estimates for the process plant, general site infrastructure, water management, tailings storage facility, geotechnical assessment, environment and permitting, economic analysis, and completed a review of the environmental studies.
- Moose Mountain Technical Services ("Moose Mountain" or "MMTS") designed the open pit mine, mine production schedule, and mine capital and operating cost estimates. They also developed the Mineral Resource Estimate for the Berg Project and completed the work related to property description, accessibility, local resources, geological setting, deposit type, drilling, exploration works, sample preparation and analysis and data verification.

1.2 Mineral Tenure, Surface Rights, Water Rights, Royalties and Agreements

On December 15, 2020, Surge Copper announced the signing of a Definitive Option Agreement (the "Option Agreement") with Thompson Creek Metals, a wholly owned subsidiary of Centerra Gold, to acquire 70% ownership of the Project subject to achieving certain milestones. The property consists of 102 mineral claims and one mining lease covering an area of approximately 48,187.7 hectares (ha). Ninety-one claims and one lease are registered to Thompson Creek Metals Company Inc and subject to the Option Agreement with the other eleven claims registered to Surge and owned 100% by Surge.

Surface rights over the Berg property are owned by the Province of British Columbia.

A 1% net smelter return royalty is held by Royal Gold on eight of the mineral claims and the one mining lease, including those which host the deposit on the main Berg property.

1.3 Geology and Mineralization

The Berg deposit consists of two main intrusive bodies: a north-trending, elongate body of quartz diorite (Unit QDR) that intrudes the contact between Hazelton Group and Skeena Group east of the mineralized area, and the Berg Stock which is a multi-phase composite quartz monzonite stock that intrudes the Hazelton Group andesitic rocks.

Alteration and mineralization at Berg are localized in and adjacent to the quartz monzonite Berg Stock. Hydrothermal alteration zones are spatially related to the central Berg Stock and extend up to 1,000 m from the intrusive contact. Typical copper and molybdenum mineralization occurs primarily in potassically-altered rocks related to the earlier phases of the Berg Stock (QPP-P1 and PBQP-P2), with most hypogene mineralization occurring in several generations of quartz-sulphide veins.

1.4 History

The Tahtsa Ranges were first prospected in the early 1900's after gold was discovered near Sibola Mountain. Within the Berg deposit area, drilling by Kennecott during 1965 and 1966 delineated two main mineralized zones; a northeast zone that contains primary (hypogene) and some supergene mineralization, and a south zone with widespread supergene mineralization.

In 1972, exploration and development of the property were taken over by Canex Placer Limited (Placer Dome Inc.). A total of 119 diamond drill holes for 20,127.9 m had been completed on the Berg Property to 1980.

Between 1982 and 2007, there was no active exploration on the project. In September 2006, Terrane purchased Kennecott's share of the Berg Joint Venture to become 100% owners.

In 2010, Thompson Creek Metals Company Inc. (TCM) purchased Terrane and continued exploration and drilling. TCM continues as a subsidiary of Centerra gold which purchased TCM in 2016.

Several other prospects and showings within the greater Berg Project are important targets as discussed in the history section of this report.

1.5 Exploration

From 2021 to 2023 Surge Copper has rehabilitated the historic Berg access trail, upgraded the Berg camp and built the Sibola camp, completed 20 core holes for 7504 metres of drilling, completed 20 IP lines over multiple targets, conducted widespread soil sampling and prospecting, and completed a property wide airborne ZTEM-Magnetic survey. Thompson Creek Metals (TMC) conducted various sampling and IP and TEM surveys from 2014 through 2017 on the Berg deposit as well as on the Bergette and Tara/Sibola prospects. Recent compilation work at Bergette shows a prominent magnetic ring structure at Bergette that has been truncated by a northwest trending fault. This fault also offsets and divides the Bergette copper in soil anomaly into a West Target area and an East Target area. The West Target area is well constrained by historic soil sampling whereas the East Target area remains open for expansion and has seen no historic drilling.

1.6 Drilling

Drilling on the Berg Project started in 1964 with Kennecott and has continued intermittently to 2021 with Surge Copper completing 2,855 m of drilling in 2021. There are total of 220 drillholes with 56,056 m of drilling used in the resource estimate. In 2022 Surge drilled 10 holes at the Bergette, Sibola, and Sylvia targets for an additional 4782 m of drilling. Also, in 2022 Surge Copper collected 7,067 samples of historic Berg drill core along with available drill core pulps and analysed for gold as these intervals had not been analysed for gold previously.

1.7 Metallurgical Testwork

A series of metallurgical test programs were conducted on samples from the Berg deposit between 2008 and 2012, on behalf of previous owners. The two main test programs, conducted by G&T Metallurgical, evaluated varying grade regimes of hypogene and supergene materials. These test programs included a significant number of locked cycle tests and were sufficient to develop preliminary recovery estimates for copper, molybdenum and silver as a function of head grade. The larger test program included pilot scale testing with a goal of producing sufficient bulk concentrate to demonstrate bench scale copper-moly separations. The metallurgical performance of the pilot circuit was inferior to the bench scale locked cycle tests, and quality of the resulting bulk concentrates likely compromised the subsequent Cu-Mo separation results. Molybdenum concentrates grading over 50% Mo were produced from both lithologies, however separation circuit recoveries were somewhat low. For the purposes of this report, it is believed that improved molybdenum recoveries can be realized across a Cu-Mo separation circuit, given the high content of molybdenum in the feed.

The developed recovery equations predict that recoveries of 80.9% and 75.8% for copper and molybdenum, respectively, would be achieved at the average LOM head grades. Silver recovery is predicted to be 65% at LOM head grades. Gold recovery was estimated at 55% based on previous project experience and benchmarks.

The test programs indicated that copper concentrates grading at least 25% copper could be produced following regrinding the rougher concentrate and suitable cleaner flotation conditions. The bulk concentrates contained significant levels of molybdenum, which when recovered in a Cu-Mo separation circuit would increase the final copper grade further. Minor element analysis of hypogene and supergene concentrates did not detect deleterious elements at problematic levels that would affect marketability of the concentrates. The supergene concentrate analyzed did contain somewhat elevated fluorine levels, however it is uncertain whether this would be problematic, particularly with the expected mining sequence that projects processing a mix of hypogene and supergene after Year 2.

Comminution testing is somewhat limited, however MacPherson Autogenous Grindability tests were conducted on 175 kg composites of both hypogene and supergene. The samples were considered to be of medium hardness in terms of the autogenous work index, hence an Axb value of 52 was used for SAG mill design calculations. The limited Bond ball mill work index tests that were completed also suggested that the material was of medium hardness with respect to grinding in a ball mill, and a BMWi value of 15.8 kWh/t was used for grinding circuit design.

1.8 Mineral Resource Estimate

The Mineral Resource Estimate (MRE) has an effective date of June 7, 2023, and is summarized in Table 1-1 below. The resource is constrained by an open pit with a “reasonable prospect of eventual economic extraction” using a cut-off of C$8.50/t and the parametres as defined in the notes to Table 1-1. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

The Net Smelter Return (NSR) equations and metallurgical recovery formulae are summarized in Section 14.13. The copper equivalent values (CuEq) are calculated from NSR.

There are no other known factors or issues that materially affect the MRE other than normal risks faced by mining projects in the Province of British Columbia, Canada, in terms of environmental, permitting, taxation, socio-economic, marketing, and political factors.

Table 1-1: Summary of the Mineral Resource Estimate at a C$8.50 NSR Cut-off

Zone	Class	Tonnage (Mt)	Grades - In situ						Metal - In situ				
			NSR ($/t)	Cu (%)	Mo (%)	Ag (g/t)	Au (g/t)	CuEq (%)	CuEq (Mlbs)	Cu (Mlbs)	Mo (Mlbs)	Ag (Moz)	Au (koz)
Supergene	Measured	14	43.03	0.39	0.03	5.64	0.04	0.55	169	120	8	3	18
	Indicated	227	32.60	0.29	0.02	5.37	0.03	0.42	2,095	1,443	107	39	224
	M+I	**241**	**33.20**	**0.29**	**0.02**	**5.39**	**0.03**	**0.43**	**2,264**	**1,564**	**115**	**42**	**242**
	Inferred	42	18.12	0.17	0.01	3.26	0.02	0.23	214	160	8	4	29
Hypogene	Measured	19	35.02	0.26	0.04	4.60	0.03	0.46	197	110	16	3	16
	Indicated	743	28.18	0.21	0.03	4.37	0.02	0.37	6,073	3,399	500	104	481
	M+I	**762**	**28.35**	**0.21**	**0.03**	**4.38**	**0.02**	**0.37**	**6,271**	**3,508**	**516**	**107**	**497**
	Inferred	500	22.91	0.17	0.03	3.75	0.02	0.30	3,322	1,885	280	60	255
Oxides	Measured	0.2	18.39	0.14	0.02	3.37	0.03	0.24	1	1	0	0	0
	Indicated	5.6	17.19	0.13	0.01	5.13	0.03	0.22	27	16	2	1	4
	M+I	5.8	**17.24**	**0.13**	**0.01**	**5.06**	**0.03**	**0.22**	**28**	**17**	**2**	**1**	**5**
	Inferred	0.1	17.87	0.12	0.01	7.53	0.02	0.23	1	0	0	0	0
Total	Measured	34	38.22	0.31	0.03	5.02	0.03	0.50	368	230	24	5	34
	Indicated	976	29.15	0.23	0.03	4.61	0.02	0.38	8,197	4,859	609	145	709
	M+I	**1,009**	**29.45**	**0.23**	**0.03**	**4.62**	**0.02**	**0.38**	**8,564**	**5,089**	**633**	**150**	**744**
	Inferred	542	22.54	0.17	0.02	3.71	0.02	0.30	3,536	2,045	288	65	284

Notes:
1. The Mineral Resource Estimate has been prepared by Sue Bird, P.Eng., an independent Qualified Person.
2. Resources are reported using the 2014 CIM Definition Standards and were estimated in accordance with the CIM 2019 Best Practices Guidelines.
3. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
4. The Mineral Resource has been confined by a “reasonable prospects of eventual economic extraction” pit using the following assumptions:
   a. Cu price of US$4.00/lb, Mo price of US$15.00/lb, Au price of US$1,800/oz, Ag price of US$23/oz at an exchange rate of 0.77 US$ per C$.
   b. 96.5% payable for Cu, 90.0% payable for Ag and Au, 99.0% payable for Mo, 1% unit deduction for Cu and Mo, Cu concentrate smelting of US$75/dmt, US$0.08/lb Cu refining, US$1.30/lb Mo refining, transport and offsite costs of US$100/wmt and US$130/wmt for Cu and Mo concentrates respectively, a 1.0% NSR royalty, and uses average recoveries for Cu, Mo, Ag, and Au of 82%, 70%, 66% and 55% respectively in the supergene & leach cap and of 80%, 78%, 64% and 55% respectively in the hypogene.
   c. Within oxides and supergene; CuEq = NSR/78.9, within sulphides; CuEq = NSR/75.99.
5. Mining costs of C$2.50/t mineralized material, C$2.50/t waste.
6. Processing, G&A, and tailings management costs of C$8.50/t.
7. Pit slopes of 45 degrees.
8. Numbers may not sum due to rounding.

1.9 Mining Methods

The deposit is amenable to open pit mining practices. Open pit mine designs, mine production schedules, and mine capital and operating costs have been developed for the Berg deposit at a scoping level of engineering. The mineral resources form the basis of the mine planning.

The open pit activities are designed for approximately thirty years of operation. Mine planning is based on large scale conventional drill/blast/load/haul open pit mining methods suited for the project location and local site requirements. The subset of mineral resources contained within the designed open pits are summarized in Table 1-2, with an $8.50/t NSR cut-off grade, and form the basis of the mine plan and production schedule.

Table 1-2: PEA Mine Plan Production Summary

Subset Metric	Amount
PEA Mill Feed	978 Mt
Mill Feed NSR Grade	$27/t
Copper Grade, Cu	0.22%
Molybdenum Grade, Mo	0.025%
Silver Grade, Ag	4.5 g/t
Gold Grade, Au	0.02 g/t
Waste Overburden and Rock	1,101 Mt
Waste: Resource Ratio	1.1

Notes:

1. The PEA Mine Plan and Mill Feed estimates are a subset of the June 7, 2023, Mineral Resource estimates and are based on open pit mine engineering and technical information developed at a Scoping level for the Berg deposit.
2. PEA Mine Plan and Mill Feed estimates are mined tonnes and grade, the reference point is the primary crusher.
3. Mill Feed tonnages and grades include open pit mining method modifying factors, such as dilution and recovery. 2% contact dilution (at 0.10% Cu, 0.003% Mo, 2 g/t Ag and 0.01 g/t Au grades) is added to whole block (15 m x 15 m x 15 m) measured tonnes and grade out of the resource block model. 98% mining recovery is estimated to account for effects of mis-directed loads, carryback and stockpile base losses.
4. Cut-off grade of C$8.50/t NSR assumes:
   a. Cu price of US$4.00/lb, Mo price of US$15.00/lb, Ag price of US$23/oz, Au price of US$1,800/oz, at an exchange rate of 0.77 US$ per C$.
   b. 96.5% payable for Cu, 99.0% payable for Mo, 90.0% payable for Ag and Au, , 1% unit deduction for Cu and Mo, Cu concentrate smelting of US$75/dmt, US$0.08/lb Cu refining, US$1.30/lb Mo refining, transport and offsite costs of US$100/wmt concentrates, a 1.0% NSR royalty, and uses average metallurgical recoveries for Cu, Mo, Ag, and Au of 82%, 70%, 66% and 55% respectively in the supergene & leach cap and of 80%, 78%, 64% and 55% respectively in the hypogene.
5. The cut-off grade covers processing costs of C$5.50/t, administrative (G&A) costs of C$1.50/t, and tailings deposition costs of C$1.50/t.
6. The resources delineated by the pit design selected for this study include Inferred Resources. The reader is cautioned that Inferred Resources are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that Inferred Resources will ever be upgraded to a higher category.
7. Estimates have been rounded and may result in summation differences.

The economic pit limits are determined using the Pseudoflow implementation of the Lerchs-Grossman algorithm. Ultimate pit limits are split up into six phases or pushbacks to target higher economic margin material earlier in the mine life. Upper benches will be accessed via internal cut ramps on topography, or via ramps left behind on phased pit walls. In-pit ramps will access material below the pit rim.

Pit designs are configured on 15 m bench heights, with minimum 8 m wide berms placed every bench. Bench face and inter-ramp slope angle criteria is dependent on lithology, alteration, and azimuth, with over 40 unique geotechnical zones as input. A scoping level structural geology model has defined these zones, based on geologic mapping, historical reports, and rock properties via lab work on core samples.

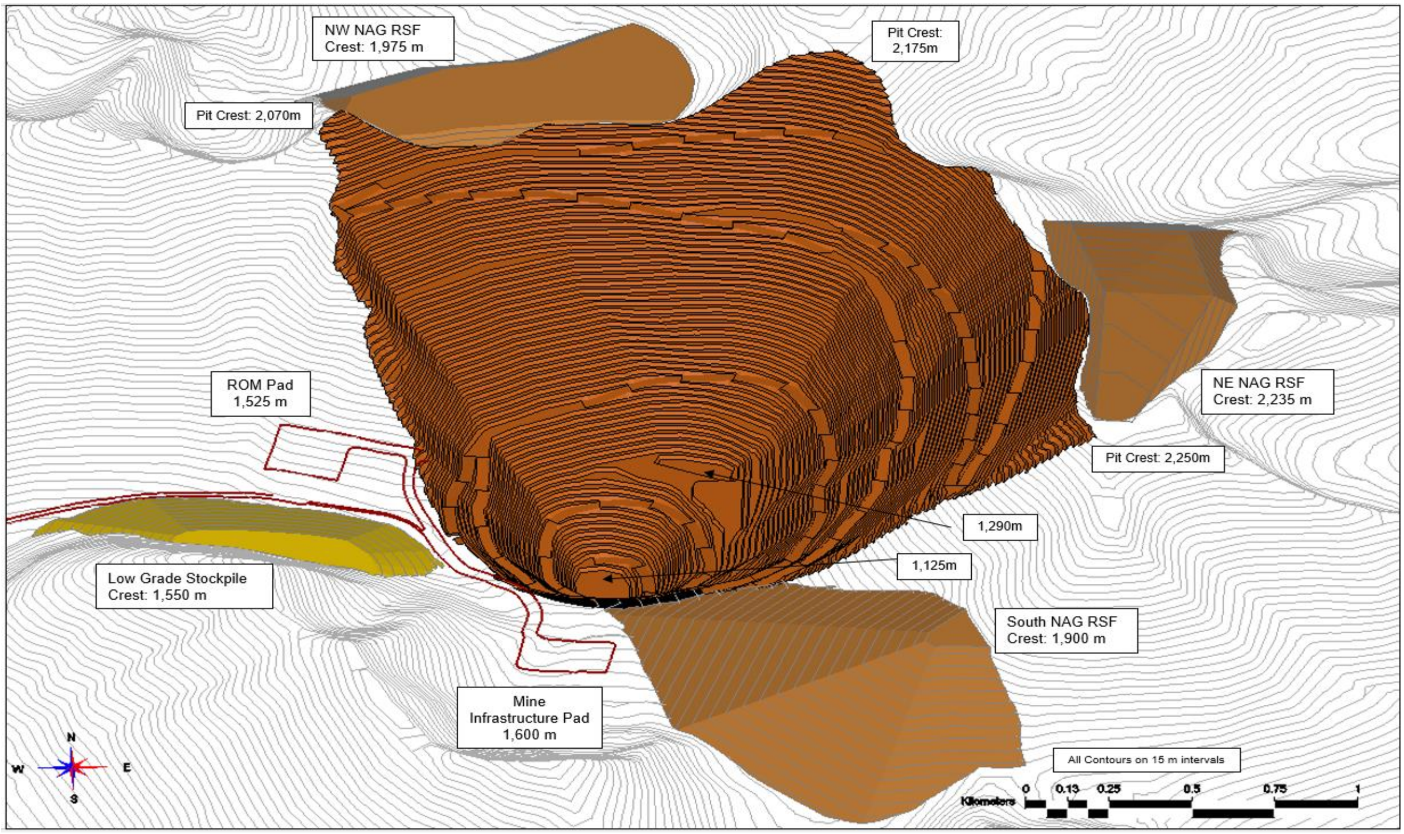
The mill will be fed with material from the pits at an average rate of 32.4 Mt/a (90 kt/d). Resource from the open pit will report to a ROM pad and primary crusher directly adjacent to the pit rim, where it will be conveyed to the mill.

Some of the waste rock (non acid generating, NAG) will be placed in three facilities adjacent to the open pit, two northeast of the pit, and one south of the pit. Potentially acid generating (PAG) waste rock will also report to the ROM pad for crushing and conveyance to the TWMF. Only ~8% of waste materials planned from the open pit have sufficient data for geochemical classification, with source data only available directly within the resource areas of the open pit. Most of the waste material is coming from areas adjacent to the resource, which have not been sampled for mineralization nor acid potential defining elements. It is assumed that some of this waste material above the resource, specifically the overburden, will be NAG.

Cut-off grade optimization is employed, which feeds a low-grade stockpile adjacent to the ROM pad. This stockpile is planned for reclamation to the mill at the end of the mine life.

The proposed mining layout is illustrated in Figure 1-1.

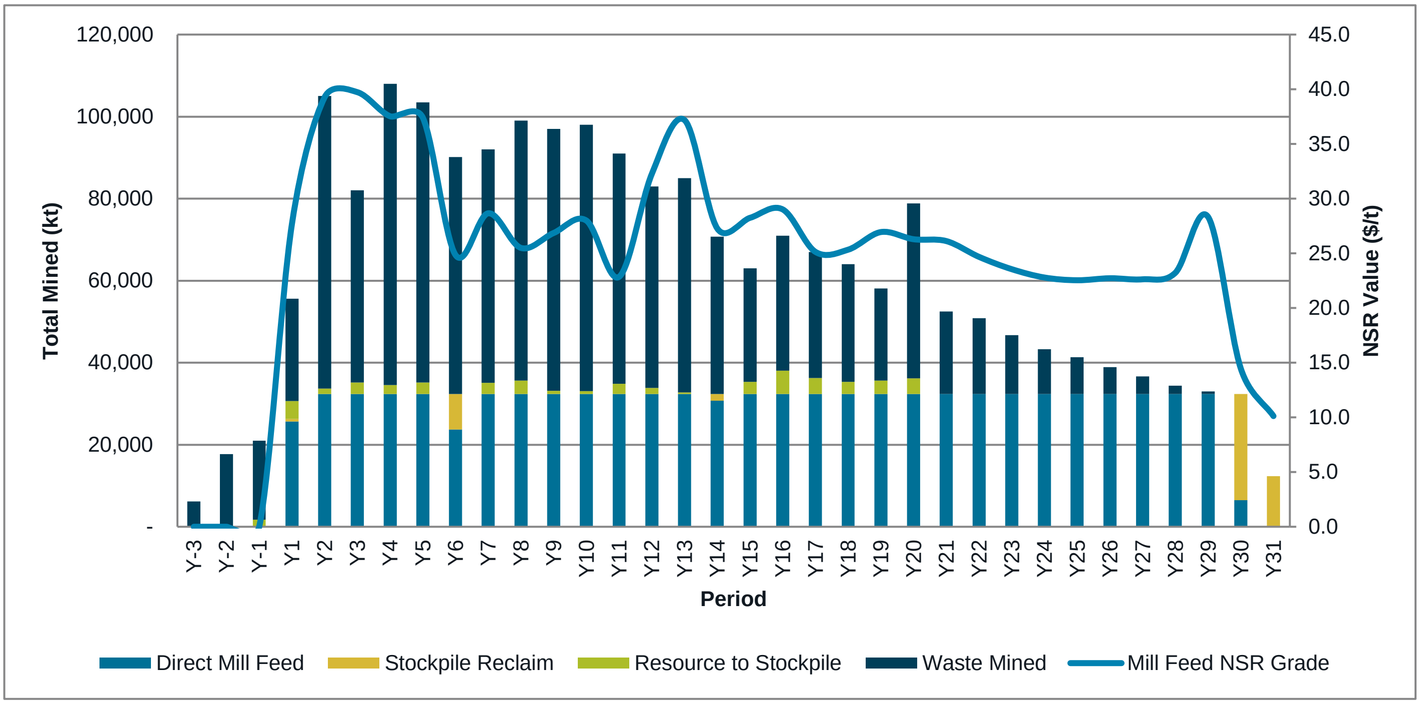
Figure 1-1: Illustration of Mining Features



Source: Moose Mountain, 2023.

The mine production schedule is summarized in Figure 1-2 below.

Figure 1-2: Mine Production Schedule Summary



Source: Moose Mountain, 2023.

Mining operations will be based on 365 operating days per year with two 12-hour shifts per day. An allowance of 10 days of no mine production has been built into the mine schedule to allow for adverse weather conditions.

The mining fleet will include electric powered rotary drills (305 mm holes) and diesel powered rotary drills (228 mm holes) for production drilling in waste and mineralization, diesel-powered down the hole (DTH) drills (144 mm hole size) for highwall control drilling, 34 m^3 bucket size electric cable shovels, 22 m^3 diesel hydraulic excavators, and 22 m^3 bucket sized wheel loaders for production loading, and 231 t payload rigid-frame haul trucks for production hauling, plus ancillary and service equipment to support the mining operations. In-pit dewatering systems will be established for the pit. All surface water and precipitation in the pits will be gravity drained, or directed via submersible pumps, to ex-pit settling ponds directly outside the pit limits.

The startupmine equipment fleet is planned to be purchased via a lease financing arrangement. Maintenance on mine equipment will be performed in the field with major repairs and planned interval maintenance in the shops located adjacent to the open pit.

1.10 Recovery Methods

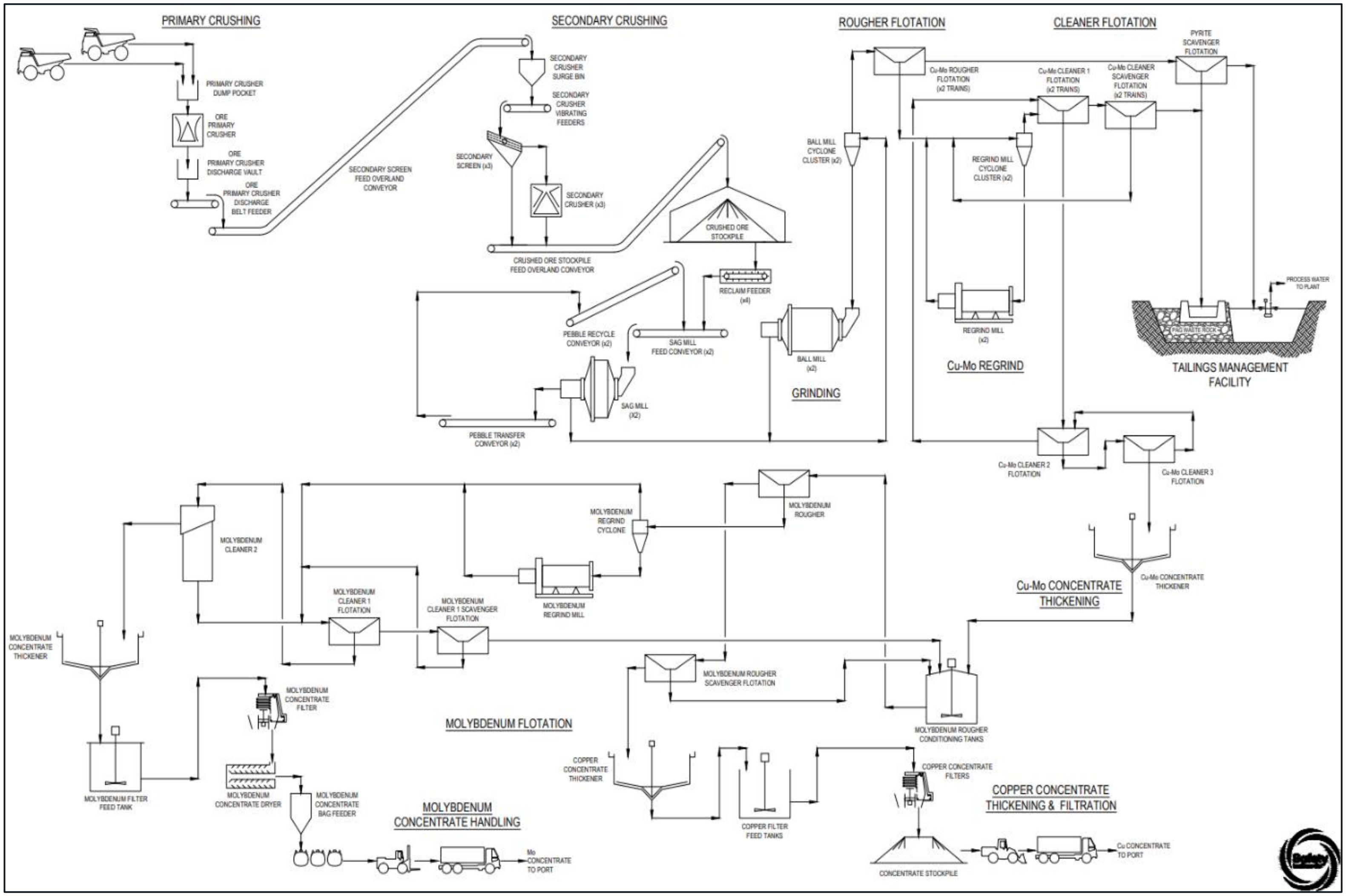
The process design is based on processing mineralized material from the Berg deposits through copper and molybdenum flotation to produce saleable copper and molybdenum concentrates. The design is based on previous testwork programs performed on the deposit, Ausenco's extensive database of reference projects and in-house modelling programs. The plant is designed for a throughput of 90,000 t/d at 92% availability. The crushing circuit is designed with an availability of 75%. The plant will operate with two 12-hour shifts per day, 365 days per year.

The process plant features the following:

- two-stage crushing of ROM material;
- a crushed material stockpile to provide buffer capacity ahead of the grinding circuit;
- a Semi Autogenous Grinding (SAG) mill with trommel screen followed by a ball mill with cyclone classification;
- copper and molybdenum bulk flotation with regrinding prior to cleaner flotation;
- copper - molybdenum separation flotation;
- thickening, filtration and loading of copper and molybdenum concentrates; and
- tailings pumping and disposal.

The simplified process flow diagram for the project is shown below in Figure 1-3.

Figure 1-3: Process Flow Diagram



Source: Ausenco, 2023.

1.11 Project Infrastructure

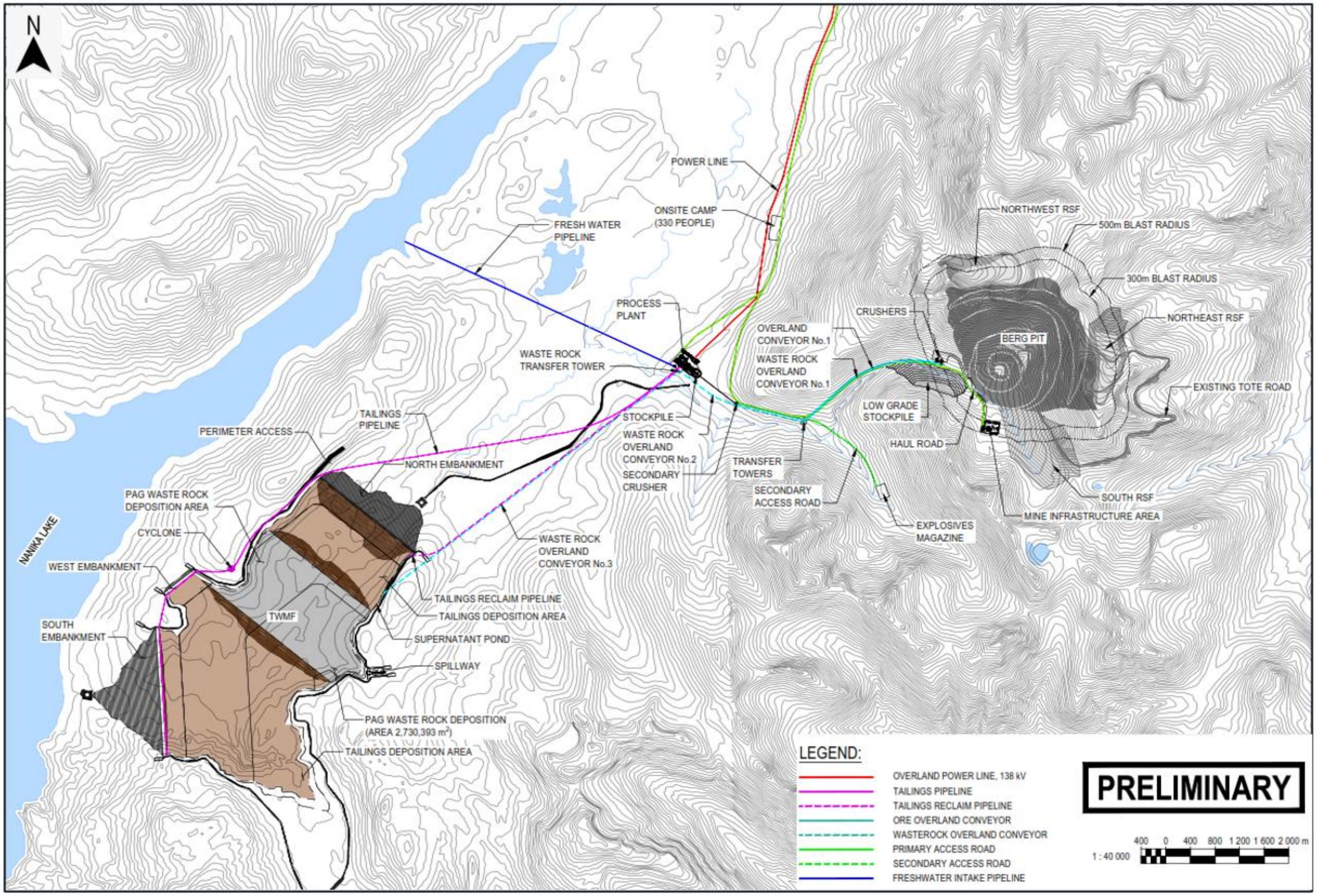
1.11.1 Overview

Infrastructure at the Berg Project includes on-site infrastructure such as earthworks development, site facilities and buildings, on-site roads, water management systems, and site electrical power facilities. Off-site infrastructure includes site access roads, fresh water supply, power supply, piping, camp, and tailings storage facility. The project infrastructure will include:

- Mine facilities, including mining administration offices, a mine fleet truck shop and wash bays, and mine workshop.
- Common facilities, including an entrance/exit gatehouse, a security/medical office. Overall site administration building, potable water and fire water distribution systems, compressed air, power distribution facilities, diesel reception and communications area.
- A near pit mineralized material and waste crushing facility with associated electrical infrastructure.
- Process facilities housed in the process plant, including grinding and classifications, flotation, regrinding, concentrate handling, reagent mixing and distribution, assay laboratory and process plant workshop and warehouse.
- Other infrastructure includes on site camp, tailings, and waste management facility (TWMF) and non-acid generating rock storage facility (NAG RSF).
- The overall site layout was developed using the following criteria and factors:
  - The facilities described above must be located on the Berg property to the greatest extent possible.
  - The location of the process plant is at a lower elevation to the Berg open pit to reduce risks and lower operating costs.
  - The location of the NAG RSF must be close to the open pit to reduce haul distance.
  - The location of the primary mineralized material and potentially acid generating (PAG) waste crushing must be close to the Berg deposits to reduce haul distance.
  - The TWMF should be located at a site that takes advantage of sloped natural terrain to adequately drain entrained water and reduce earthworks, concrete, and structural development if possible.
  - The arrangement of the administration buildings, mine workshops, processing plant and additional offices should be optimized for foot and vehicle traffic.

The Berg Project layout is shown in Figure 1-4.

Figure 1-4: Overall Site Plan



Source: Ausenco, 2023.

1.11.2 Site Access

The Berg Project is located approximately 85 km from the town of Houston, BC. Access to the site is via forest service roads, specifically the Morice Forest Service Road (FSR) and Sibola Forest Service Road. The Morice FSR currently serves as access for industrial use in the region including forestry, the Huckleberry Mine site and active construction of the Coastal Gaslink Pipeline. At approximately the 100 km mark of the Morice FSR begins the Sibola FSR that leads to both Surge's current Sibola exploration camp and the Berg access road. It should be noted that the project is envisioned to access the Berg site via a newly created road to the north and west of Mount Ney.

1.11.3 Water Supply

The Berg Project will source fresh water from Nanika Lake. Water will be pumped from the lake through a 4.6 km pipeline to the processing plants where storage tanks will be located. This water will be the source of potable water across the site.

1.11.4 Power Supply

Power will be provided from a connection to BC Hydro's electrical grid via a 138-kV transmission line. The transmission line will be stepped down to the 25 kV at the substation for distribution to different power requirements across the project site.

1.11.5 Logistics

The copper concentrate will be transported from the project site to port in Stewart, BC, where the concentrate will subsequently be transported by sea to clients. Molybdenum concentrate will be transported from the project site to one of several north American molybdenum smelter locations. Each of the transport options is envisioned to use a mix of truck and rail where possible.

1.11.6 On-Site Roads

The project site will have unpaved roads connecting the access road to the gatehouse. In addition to the existing roads on site, new roads will be constructed linking the guard house, the administration building, the process plant, the explosive storage buildings, the primary and waste crusher and the TWMF and mining facilities.

1.11.7 Fuel Storage

The diesel storage facility consists of five bulk storage tanks. Each tank will have 100,000 L of capacity, for a total storage capacity of 500,000 L.

1.11.8 Buildings

The plant site consists of the necessary infrastructure to support the processing operations. All infrastructure buildings and structures will be built and constructed as per applicable codes and regulations. The project site will include administration building, plant maintenance shop and warehouse, and other buildings. The camp will have individual dormitory-style rooms for 330 camp personnel. In addition, the security and medical office will be part of the permanent on-site camp.

1.11.9 Material Handling

The material from the pit will be diverted to two main destinations depending on the grade and material type. A portion of the NAG material will be crushed and conveyed to the TWMF for dam construction. The PAG will be crushed and conveyed to the Tailings and Waste Management Facility and the mineralized material will be hauled to the primary crusher and then conveyed to the secondary crusher.

1.11.10 Tailings and Waste Management Facility (TWMF)

Process tailings and PAG waste rock will be permanently stored in the TWMF located south of the process plant. The primary design of the TWMF includes three embankments. The north embankment will be built from the NAG waste rock while south and west embankments will be constructed from overburden and tailings underflow. Process tailings (slurry) will be placed against these embankments creating beaches toward the centre where the PAG waste rock will be stored subaqueously. The TWMF is designed to hold approximately 900 Mt (652 Mm^3) of tailings material. All the tailings will be pumped overland from the process plant. The primary design objectives for the TWMF are the secure confinement of process tailings, subaqueous deposition of PAG waste rock to prevent potential acid rock drainage (ARD), and the protection of regional groundwater and surface water during mine operations and in the long term (post-closure).

1.11.11 Site Water Management

Non-contact runoff will be diverted away from mining facilities via excavated channels and berms to minimize the amount of contact runoff to be collected and managed. Runoff from the process plant and camp areas will be collected in channels and conveyed to storage ponds for treatment or release to the environment.

1.12 Markets and Contracts

Project economics were estimated based on long-term metal prices of US$4.00/lb Cu, US$15.00/lb Mo, US$23.00/oz Ag and US$1,800.00 Au. These prices are in accordance with consensus market forecasts from various financial institutions and are consistent with historic prices for these commodities.

No contracts for transportation or off-take of the concentrates are currently in place, but if they are negotiated, they are expected to be within the industry norms. Similarly, there are no contracts currently in place for supply of reagents, utilities, or other bulk commodities required to construct and operate the Project.

1.13 Environmental, Permitting and Social Considerations

1.13.1 Environmental Considerations

The Berg Project involves the development of the Berg copper-molybdenum-silver-gold deposit. The Berg property is in the Tahtsa Ranges, a 15 to 20 kilometres (km) wide belt of mountains within the Hazelton Mountains. The Hazelton Mountains lie along the eastern flank of the Kitimat Range of the Coast Mountains and form part of the Skeena Arch. The area is characterized by wilderness, forestry, and mineral exploration land use. The project area is located within the headwater catchment of the Morice River, which flows into the Bulkley River and ultimately the Skeena River, which discharges into the Pacific Ocean approximately 150 km northwest of the project area. The two main watersheds that contain sites of proposed project infrastructure are Bergeland Creek and the Ney River. Most of the proposed mine facilities are within the Bergeland Creek watershed. The property is located within an overlapping zone including the Wet'suwet'en and Cheslatta Carrier Nation traditional territories.

Several limited field and screening environmental baseline studies and reports were completed between 1988 and 2017. The programs involved the collection of baseline data within the proposed project footprint area and commenced the process of identifying potential environmental constraints and opportunities related to the proposed development of the project.

The environmental baseline studies included:

- Water quality (1988; 2007 – 2011; 2013 - 2017);
- Hydrology and meteorology (2007-2017);
- Reconnaissance (1:20,000) fish and fish habitat inventory of selected streams in the Nanika and Tahtsa watersheds (2008); and
- ARD testing for Berg deposit (2007).

It should be noted that much of the data collected for baseline studies is not recent. Applicable British Columbia (BC) guidelines recommend that relatively recent baseline information will be required for baseline development and impact assessment, particularly for surface water. Therefore, in assessing the utility of using older baseline data, direct discussions should be conducted with provincial and federal regulators.

Ongoing and expanded baseline studies including air quality, noise, groundwater quality and quantity, vegetation, and wildlife will be required to support the project through pre-feasibility, feasibility, and environmental assessment/permitting stages of the project. The results of baseline studies will be used to minimize impact of the project on valued ecosystem components and to optimize the location and operation of project infrastructure.

As the project progresses through the pre-feasibility, feasibility, and environmental assessment/permitting stages, several environmental management and monitoring plans will be required for the purpose of guiding the development and operation of the project and mitigating and limiting environmental impacts. These plans will be complementary to the engineered designs that will be required for the storage of tailings, waste rock, mineralized material, and conveyance/storage/treatment of mine contact water (refer to Section 18 of this report).

There are two provincial parks within 30 km downstream of the project including the Nineikekh/Nanika-Kidprice Park, located approximately 16 km north of the Project site, and Morice Lake Park, located approximately 22 km northwest of the Project site.

1.13.2 Permitting Considerations

The major federal legislation and associated authorizations anticipated for the project include an Impact Assessment, issued under the Impact Assessment Act, and a Fisheries Act Authorization, issued under the Fisheries Act. When a project falls under both provincial and federal environmental assessment responsibility, there is an agreement in place between BC and Canada which enables the two governments to carry out a single, cooperative environmental assessment while retaining their respective decision-making powers. Provincial and federal ministers make independent decisions on whether to issue an Environmental Assessment Certificate from a single report. The project as envisioned in this report may require a Fisheries Act Authorization and Fish Habitat Compensation Plan. A Schedule 2 amendment to the Metal and Diamond Mining Effluent Regulations (MDMER) may also be required subject to further fish and fish habitat surveys required for areas where mine waste will be stored.

The major provincial legislation and associated authorizations anticipated for the project include the following: a BC Environmental Assessment Certificate, issued under the *BC Environmental Assessment Act*, a BC Mines Act Permit, issued under the *Mines Act*; and Effluent and Air Emissions Permits, issued under the *BC Environmental Management Act*.

1.13.3 Closure and Reclamation Considerations

Under the BC Mines Act, anyone who engages in mining exploration work or mining operations determined by regulation must submit a reclamation plan. A conceptual reclamation and closure plan and a closure security estimate will need to be developed to support the submission of an economic assessment (EA) report to the province or to the federal agency. The reclamation security will need to be posted to BC government prior to the commencement of construction.

A key closure objective for the mine will be for effluent to meet applicable water quality objectives without ongoing treatment for ARD. The current Conceptual Closure and Reclamation Plan for the project includes the following measures:

- Partial backfilling of open pits and flooding of the remaining open pit.
- Once depleted, the mineralized material stockpile will be reclaimed.
- The surface infrastructure on the site will be decommissioned and removed from the site upon completion of mining.
- Explosives, explosives magazines, fuel, and storage facilities will be removed from the site.
- Concrete slabs and footings will be broken and placed appropriately to meet project closure and reclamation objectives.
- Process buildings, camp facilities, pipelines, conveyor systems, and equipment will be removed from site or appropriately landfilled in an approved facility.
- Waste rock stockpiles will be re-contoured for geotechnical stability, capped with a graded earthfill/rockfill cover to facilitate runoff and minimize infiltration, and revegetated.
- Compacted surfaces including laydowns, civil pads, and roads will be decompacted, re-contoured, capped with a graded earthfill/rockfill cover to facilitate runoff and minimize infiltration, and revegetated.
- The TWMF’s embankments will be revegetated to establish an erosion resistant surface.
- The tailings beach will be capped with soil and revegetated.
- Water treatment will be continued until the TWMF water quality meets discharge criteria. Once TWMF water quality meets discharge criteria, water treatment will be stopped, diversions will be decommissioned, and the TWMF will be allowed to discharge naturally via a closure spillway.
- For mine roads, all culverts will be removed and cross-ditches installed for drainage. The mine site access road will not be deactivated until it is no longer required for access for continued reclamation activities and monitoring.

Closure planning will include dialogue with Indigenous groups and stakeholders to determine post-mining land use objectives and necessary investigations required to achieve and monitor those objectives.

1.13.4 Social Considerations

The property is located within an overlapping zone including the Wet'suwet'en and Cheslatta Carrier Nation traditional territories.

Baseline socio-economic and cultural baseline studies have not yet been completed for the Berg Project. Archaeological Overview Assessments and Archaeological Impact Assessments have also not been completed. These assessments will be required at the appropriate time as the project advances into the feasibility and permitting phases and the full extent of the disturbed footprint of the project has been identified.

In 2010, Surge Copper entered a Letter of Understanding with the Cheslatta Carrier Nation. The agreement outlined the terms for information exchange, consultation, and involvement between the two groups. In 2013, an Amended Letter of Understanding was signed with the Cheslatta Carrier Nation.

In 2013, Surge Copper entered a Communications & Engagement Agreement (CEA) with the Office of the Wet'suwet'en. The CEA outlines the partie's commitment to communicate and engage with each other to develop a respectful, mutually beneficial working relationship with respect to exploration and project development.

In 2014, Surge Copper entered a Cooperation Protocol Agreement with the Skin Tyee Nation, which is located within Wet'suwet'en traditional territory.

Surge Copper will be required to consult with local First Nations as part of the EA process, as identified by the provincial government's Section 11 Order and as indicated in the federal government's EA guidelines when they are issued for the project. On-going consultation efforts will aim to engage both community leaders and members and attempt to resolve potential issues and concerns as they arise.

1.14 Capital and Operating Costs

1.14.1 Capital Cost Estimate

The capital costs provided in this PEA are reported in Canadian dollars (C$) with no allowance for escalation or exchange rate fluctuations. The capital cost estimate conforms to Class 5 guidelines for a preliminary economic assessment level estimate with a +50%/-30% accuracy according to the Association for the Advancement of Cost Engineering International (AACE International). The capital cost estimate was developed in Q2 2023 dollars based on budgetary quotations for equipment and construction contracts, as well as Ausenco's in-house database of projects and advanced studies including experience from similar operations.

The total initial capital cost for the Berg Project is C$1,968 M, and the LOM sustaining cost including financing is C$1,733 M. The capital cost summary is presented below in Table 1-3 and Table 1-4.

Table 1-3 provides a summary of the capital costs for the Project. Table 1-4 provides a summary of the same capital costs for the Project, categorized by the work breakdown structure (WBS) of the capital cost estimate.

Table 1-3: Capital Cost Summary

Capital Category	Initial Capital (C$M)
Mining	
Pre-Stripping	143
Mining Equipment Down Payments	123
Mining Capital	124
Subtotal	**390**
Processing	
Crushing and Grinding	506
Processing	157
Concentrate Handling	31
Subtotal	**693**
Infrastructure	
Power Supply	66
Site Access and Buildings	106
Tailings and Waste Management	149
Subtotal	**321**
Total Directs	**1,404**
Indirects	110
Engineering Services	152
Owner's Cost	35
Contingency	266
Total	**1,968**

Note: Values shown in the press release are rounded to zero decimal places

Table 1-4: Capital Cost Summary

WBS (Work Breakdown Structure)	WBS Description	Initial Capital (C$M)	Sustaining Capital Cost (C$M) LOM	Total Cost (C$M)
1000	Mining	389.7	669.4	1,059.1
2000	Process Plant	693.1	-	693.1
3000	Tailings Facilities	148.9	863.7	1,012.6
4000	On Site Infrastructure	76.4	-	76.4
5000	Off Site Infrastructure	95.8	-	95.8
Total Directs		**1,403.9**	**1,533.1**	**2,937.0**
6000	Indirects	110.4	-	110.4
7000	EPCM Services	152.1	-	152.1
8000	Owner's Cost	35.5	-	35.5
Total Indirects		**298.0**	-	298.0
9100	Contingency	266.1	-	266.1
	Closure	-	200.0	200.0
Project Total		**1,968.0**	**1,733.1**	**3,701.1**

Note: Values shown in the press release are rounded to zero decimal places

1.14.2 Operating Cost Estimates

The costs considered on-site operating costs are those related to mining, processing, tailings handling, maintenance, power, and general and administrative activities (G&A).

A summary of the operating costs is presented below in Table 1-5. The unit operating cost is C$10.66/t milled, including an annual G&A cost of C$13.3 M.

Table 1-5: Operating Cost Summary

Cost Area	Annual Costs (C$M)	C$/t Milled
Mining	150.9	5.00
Process	172.6	5.25
G&A	13.3	0.41
Total	**336.8**	**10.66**

1.15 Economic Analysis

The economic analysis was performed assuming an 8% discount rate. On a pre-tax basis the net present value (NPV) discounted at 8% is C$3,549.7 M; the internal rate of return (IRR) is 25.3%, and payback period is 3.3 years. On a post-tax basis, the NPV discounted at 8% is C$2,083.6 M; the IRR is 20.0%, and the payback period is 3.9 years. A summary of project economics is shown graphically in Table 1-6. The analysis was done on an annual cashflow basis; the cashflow output is shown graphically in Figure 1-5 and summarized in Table 1-6.

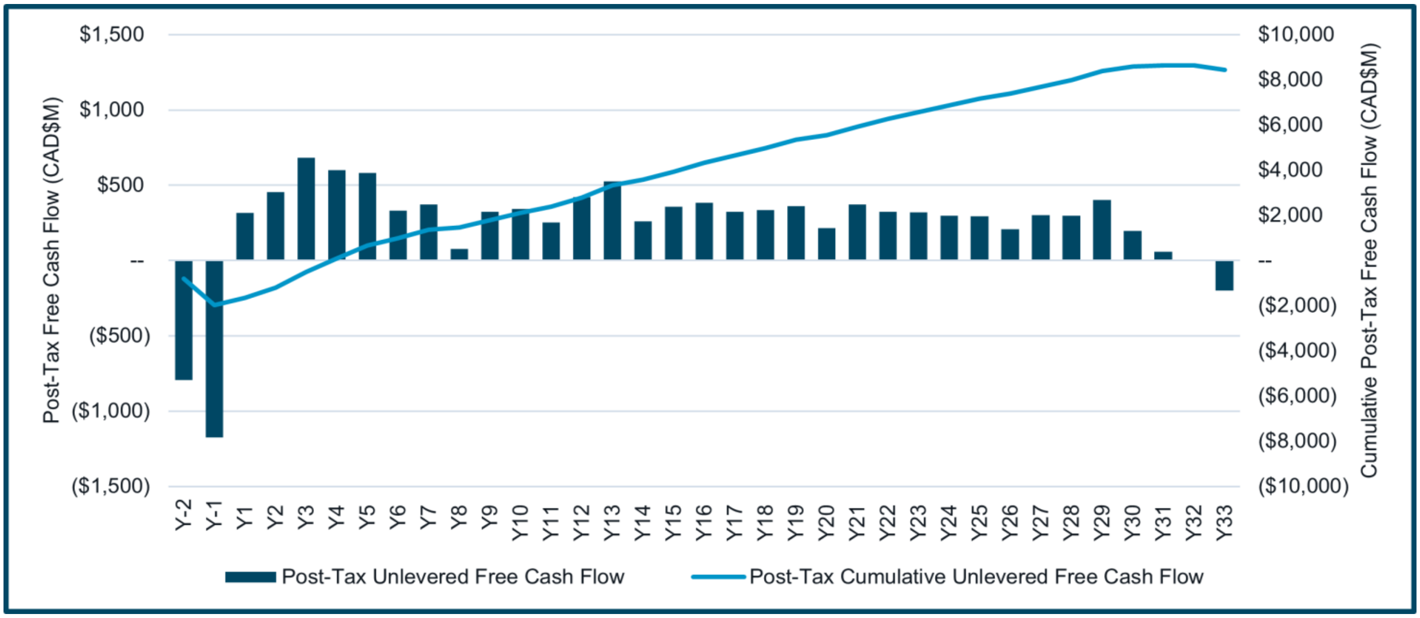
Readers are cautioned that the PEA is preliminary in nature. It includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the PEA will be realized.

Table 1-6: Economic Analysis Summary

General		LOM Total / Avg.
Copper Price (US$/lb)		4.00
Molybdenum Price (US$/lb)		15.00
Silver Price (US$/oz)		23.00
Gold Price (US$/oz)		1,800
Mine Life (Years)		30.4
Total Mill Feed Tonnes (kt)		978,234
Total Waste Tonnes (kt)		1,101,471
Average Strip Ratio (w:o)		1.13
Production		**LOM Total / Avg.**
Mill Head Grade – Cu (%)		0.22%
Mill Head Grade – Mo (%)		0.02%
Mill Head Grade – Ag (g/t)		4.5
Mill Head Grade – Au (g/t)		0.02
Mill Recovery Rate – Cu (%)		80.9%
Mill Recovery Rate – Mo (%)		75.9%
Mill Recovery Rate – Ag (%)		64.8%
Mill Recovery Rate – Au (%)		55.0%
Total Mill Recovered – Cu (mlbs)		3,836
Total Mill Recovered – Mo (mlbs)		402.6
Total Mill Recovered – Ag (koz)		90,717
Total Mill Recovered – Au (koz)		393.8
Average Annual Production – Cu (mlbs)		125.9
Average Annual Production – Mo (mlbs)		13.3
Average Annual Production – Ag (Moz)		3.0
Average Annual Production – Au (koz)		12.9
Operating Costs		**LOM Total / Avg.**
Mining Cost (C$/t Milled)		5.00
Processing Cost (C$/t Milled)		5.25
G&A Cost (C$/t Milled)		0.41
Total Operating Costs (C$/t Milled)		10.66
Cash Costs (By-Product Basis) (C$/lb Cu)		0.46
AISC (By-Product Basis) (C$/lb Cu)		0.82
Cash Costs (Co-Product Basis) (C$/lb CuEq)		1.75
AISC (Co-Product Basis) (C$/lb CuEq)		1.98
Production		**LOM Total / Avg.**
Initial Capital (C$M)		1,968
Sustaining Capital (C$M)		1,533
Closure Capital (C$M)		200
Financials	**Pre-Tax**	**Post-Tax**
NPV (8%) (C$M)***	3,549.7	2,083.6
IRR (%)***	25.3%	20.0%
Payback (Years)	3.3	3.9

* Cash costs consist of mining costs, processing costs, mine-level G&A, offsite charges, and royalties.
** AISC includes cash costs plus sustaining capital and closure costs.
*** Values shown in the press release are rounded to zero decimal places.

Figure 1-5: LOM Post-Tax Free Cash Flow



Source: Ausenco, 2023.

1.15.1 Sensitivity Analysis

A sensitivity analysis was conducted on the base case pre-tax and post-tax NPV and internal rate of return (IRR) of the project, using the following variables: metal prices, discount rate, head grade, total operating cost, and initial capital cost.

A summary of post-tax economic sensitivities to copper price, molybdenum price, copper recovery, molybdenum recovery, total opex and total capex is shown in Table 1-7.

Table 1-7: Post-Tax Sensitivity Summary

After-Tax NPV8% & IRR Sensitivity to Copper and Molybdenum Prices

		Copper Price						
		$2.80	$3.20	$3.60	$4.00	$4.40	$4.80	$5.20
Molybdenum Price		(30%)	(20%)	(10%)	-	10%	20%	30%
$10.50	(30%)	$229	$698	$1,160	$1,618	$2,073	$2,526	$2,979
$12.00	(20%)	$390	$855	$1,317	$1,773	$2,227	$2,680	$3,133
$13.50	(10%)	$549	$1,012	$1,473	$1,929	$2,382	$2,835	$3,288
$15.00	-	$707	$1,170	$1,629	**$2,084**	$2,537	$2,990	$3,443
$16.50	10%	$864	$1,327	$1,784	$2,238	$2,692	$3,144	$3,597
$18.00	20%	$1,022	$1,483	$1,939	$2,393	$2,846	$3,299	$3,752
$19.50	30%	$1,179	$1,639	$2,095	$2,548	$3,001	$3,454	$3,906

		Copper Price						
		$2.80	$3.20	$3.60	$4.00	$4.40	$4.80	$5.20
Molybdenum Price		(30%)	(20%)	(10%)	-	10%	20%	30%
$10.50	(30%)	9%	12%	15%	18%	20%	23%	25%
$12.00	(20%)	10%	13%	16%	18%	21%	23%	26%
$13.50	(10%)	11%	14%	17%	19%	22%	24%	26%
$15.00	-	12%	15%	17%	**20%**	22%	25%	27%
$16.50	10%	13%	16%	18%	21%	23%	25%	28%
$18.00	20%	14%	16%	19%	21%	24%	26%	28%
$19.50	30%	15%	17%	20%	22%	24%	27%	29%

After-Tax NPV8% & IRR Sensitivity to Copper and Molybdenum Process Recoveries

		Copper Recovery						
		69%	73%	77%	81%	85%	89%	93%
Molybdenum Recovery		(15%)	(10%)	(5%)	-	5%	10%	15%
65%	(15%)	$1,253	$1,460	$1,667	$1,872	$2,078	$2,283	$2,488
68%	(10%)	$1,324	$1,531	$1,737	$1,943	$2,148	$2,353	$2,558
72%	(5%)	$1,395	$1,602	$1,807	$2,013	$2,218	$2,423	$2,628
76%	-	$1,466	$1,672	$1,878	**$2,084**	$2,289	$2,494	$2,698
80%	5%	$1,536	$1,743	$1,949	$2,154	$2,359	$2,564	$2,769
83%	10%	$1,607	$1,813	$2,019	$2,224	$2,429	$2,634	$2,839
87%	15%	$1,678	$1,884	$2,089	$2,295	$2,499	$2,704	$2,909

		Copper Recovery						
		69%	73%	77%	81%	85%	89%	93%
Molybdenum Recovery		(15%)	(10%)	(5%)	-	5%	10%	15%
65%	(15%)	15%	17%	18%	19%	20%	21%	22%
68%	(10%)	16%	17%	18%	19%	20%	21%	23%
72%	(5%)	16%	17%	18%	20%	21%	22%	23%
76%	-	17%	18%	19%	**20%**	21%	22%	23%
80%	5%	17%	18%	19%	20%	21%	22%	24%
83%	10%	17%	18%	20%	21%	22%	23%	24%
87%	15%	18%	19%	20%	21%	22%	23%	24%

After-Tax NPV8% & IRR Sensitivity to Total Opex and Total Capex

	Total Opex						
Total Capex	(30%)	(20%)	(10%)	-	10%	20%	30%
(30%)	$3,664	$3,371	$3,078	$2,785	$2,493	$2,200	$1,908
(20%)	$3,431	$3,138	$2,845	$2,552	$2,259	$1,967	$1,674
(10%)	$3,198	$2,904	$2,611	$2,318	$2,025	$1,732	$1,438
-	$2,964	$2,670	$2,377	**$2,084**	$1,790	$1,495	$1,199
10%	$2,730	$2,436	$2,142	$1,848	$1,553	$1,257	$959
20%	$2,495	$2,201	$1,906	$1,611	$1,314	$1,017	$720
30%	$2,259	$1,965	$1,669	$1,372	$1,075	$777	$479

	Total Opex						
Total Capex	(30%)	(20%)	(10%)	-	10%	20%	30%
(30%)	36%	34%	32%	30%	28%	26%	24%
(20%)	31%	29%	28%	26%	24%	22%	20%
(10%)	27%	26%	24%	23%	21%	19%	18%
-	24%	23%	21%	**20%**	18%	17%	15%
10%	22%	20%	19%	18%	16%	15%	13%
20%	20%	18%	17%	16%	14%	13%	12%
30%	18%	17%	15%	14%	13%	12%	10%

1.16 Conclusions and Interpretations

The mineral resource estimate includes combined Measured & Indicated resource of 1.0 Bt grading 0.23% copper, 0.03% molybdenum, 4.6 g/t silver, and 0.02 g/t gold, containing 5.1 Blb of copper, 633 Mlb of molybdenum, 150 Moz of silver, and 744 koz of gold, plus an additional 0.5 Bt of material in the Inferred category. The metallurgical testing completed on composites from 2007 and 2008 drill samples suggests that the mineralized material is amenable to processing by conventional froth flotation techniques. The grinding energy requirements appear to be similar to other copper porphyry deposits, and typical processing conditions are suitable to achieve recoveries and concentrate qualities that support the project economics.

The Berg property is amenable to conventional truck and shovel open pit mining. Mining operations should be able to feed 32.9 Mt/a of mineralized material (averaging 0.22% Cu and 0.025% Mo) for processing over a 30-year project life. In Year 1, a ramp up throughput of 26.3 Mt is targeted. Low grade resource is stockpiled in the early years of the mine life and re-handled to the primary crushers later in the mine life. Based on the assumptions and parametres in this report, the PEA show positive economics (i.e., C$2,083.6 M post-tax NPV (8%) and 20.0%, post-tax IRR). The PEA supports a decision to carry out additional studies to progress the project further into detailed assessment.

1.17 Recommendations

1.17.1 Overall Recommendations

The Berg Project demonstrates positive economics, as shown by the results presented in this technical report. It is recommended to continue developing the project through prefeasibility study. Table 1-8 summarizes the estimated cost for the recommended future work on the Berg Project.

Table 1-8: Cost Summary for the Recommended Future Work

Item	Budget (C$M)
Exploration and Drilling	3.00
Metallurgical Test Work	0.65
Mining Methods	1.81
Process and Infrastructure Engineering	0.75
Site-wide Assessment & TMSF Studies	0.84
Environmental, Permitting, Social and Community Recommendations	0.80
Total	**7.85**

1.17.2 Exploration and Drilling

It is recommended to drill 8,500 m at the Berg deposit to address geotechnical studies, metallurgical sampling as well as exploration and infill drilling to upgrade the Inferred resources within the current resource pit Measured and Indicated.

The Berg property contains multiple other exploration targets with porphyry copper deposit characteristics that have potential to provide additional mill feed to a future mining operation, including but not limited to: Bergette, Sibola and

Sylvia prospects as detailed in Section 9. Additional study and exploration work is warranted across the highly prospective claim block to fully evaluate the potential for additional mill feed.

1.17.3 Metallurgical Testwork

Additional metallurgical testwork required to advance the project is recommended to include:

Comminution testing on variability samples that provide spatial coverage of the deposit and sufficiently represent the quantities of supergene and hypogene materials. This testing should be completed on ½ HQ drill core so that SMC tests can be conducted. Bond ball mill Wi tests would also be conducted on all samples.

Bench scale flotation testing on master composites and variability samples of hypogene and supergene materials. The variability samples should also provide sufficient spatial coverage of the deposit as well as representative ranges of Cu:S ratios. The master composite testing should investigate the potential to apply a coarser primary grind sizing and alternate pulp chemistries. It is recommended that Coarse Particle Flotation be evaluated as a means to minimize primary grinding energy.

Copper-molybdenum separation testing should be conducted using bulk concentrate generated through well controlled batch test protocols. The testing should include a locked cycle test once suitable open circuit conditions are determined.

Regrind energy tests are recommended to confirm the regrind mill sizing for this circuit.

The total cost of this testing is estimated at C$650,000. The described testing may require 3,400 kg of sample.

1.17.4 Mining Methods

The following recommendations are made regarding advancing the mine engineering of the Berg Project to a Pre-Feasibility Study:

- Updated topographic survey of all planned operational areas. (C$0.15M).
- Targeted open pit geotechnical drilling using acoustic or optical televiewer and triple tube core barrels (C$0.85M:
  - laboratory testing for intact rock strength (unconfined compressive strength tests, triaxial compressive strength tests, point load tests, and indirect tensile strength tests) and for discontinuity strength (direct shear tests).
  - build updated fault and rock mass fabric models.
  - Packer testing should be conducted to determine pit hydrogeology, hydraulic conductivity and refine pit water inflow estimates.
  - build updated overburden contact, leach cap contact, dyke, and gypsum surface models.
- Geochemical characterization of waste rock for the purposes of updated PAG modelling. It is possible to utilize exploration and geotechnical drill core for geochemical samples, and no additional drilling has been planned for these studies in the estimated budgets (C$0.26M).
- A site study of mountain operation avalanche risks and potential mitigations should be undertaken (C$0.20M).
- Condemnation drilling of the footprints identified for the waste rock storage facilities, as well as site infrastructure. Condemnation drilling is done to ensure no valuable mineralization exists below these planned facilities, so that it is not locked in the ground from future potential exploitation (C$0.15M).

- Drill penetration and blast fragmentation studies, testing properties in all lithologies, as well as within mineralized areas and within waste rock. It is possible to utilize exploration and geotechnical drill core for rock samples, and no additional drilling has been planned for these studies in the estimated budgets (C$0.05M).
- Updates to designs of open pits, waste storage piles, stockpiles, and mine haul roads incorporating results from all other recommended work programs (C$0.10M).
- Mine operational and cost trade-off studies examining contractor vs. owner equipment fleet, lease vs. purchase equipment fleet, cost comparisons of various equipment class sizes, and utilization of electrically driven mine equipment (including trolley systems for haulers) over diesel driven units (C$0.05M).

1.17.5 Process and Infrastructure Engineering

The estimated cost for process and infrastructure engineering for the PFS is C$750,000. Engineering deliverables would include:

- process trade-off studies (comminution, copper-molybdenum separation optimization studies):
  - Coarser primary grinds could be employed and trade off studies reviewing the associated reduction in applied grinding energy and capital expenses against copper and molybdenum recoveries should be evaluated;
  - Inclusion of coarse particle flotation should also be investigated.
- flow diagrams (comminution, recovery processes, tails);
- detailed equipment list;
- power listing and consumption estimate;
- architectural (building sizes) to estimate steel and concrete quantities;
- detailed material and water balance;
- detailed process design criteria;
- general Arrangements (GA) and Elevation drawings (for crushing/overland conveying, comminution, flotation, tailings);
- electrical single line drawing;
- equipment and supply quotations updated, and sources determined;
- estimate of equipment and materials freight quantities;
- capital cost estimate;
- operating cost estimate;
- major equipment spares and warehouse inventory cost estimate;
- construction workhours estimate; and
- construction schedule.

1.17.6 Site-Wide Assessment and TWMF Studies

Due to the conceptual nature of this study and the limited information available at the time of writing, assumptions have been made regarding the layout, MTOs, and construction of the proposed TWMF. Construction material geotechnical properties are required to perform slope stability analyses and other geotechnical assessments to confirm that the TWMF can be built as designed. A tailings/PAG waste rock deposition plan will be required which may lead to the conceptual staging requiring adjustment to contain the given capacities.

Additional studies and data collection will be required to advance project development beyond the conceptual level. Some, but not necessarily all, of the current data gaps that need to be addressed in future studies include the following:

- Geological and geotechnical site investigations and laboratory programs should be carried out for infrastructure, process plant, and TWMF, including drilling and in-situ and laboratory testing, to understand subsurface soil and rock characteristics, construction material properties, and existing groundwater levels.
- Seepage analysis for the TWMF needs to be investigated.
- Additional geotechnical testing of the anticipated tailings, waste rock, and other associated construction materials, (e.g., horizontal drain gravel and sand and candidate geomembranes) should be carried out.
- Hydrological information should be gathered from site-specific climate studies to detail ponds and channels.
- Hydrogeological information from desktop studies and site investigations should be gathered to better understand subsurface flow regimes.

As additional information is obtained, assumptions made in this study can be verified or updated to advance the project to the next level of design. The cost of implementing the above recommendations is estimated at C$840,000.

1.17.7 Environmental, Permitting, Social and Community Recommendations

The following recommendations are made regarding future studies and activities related to areas of environment, permitting and community engagement. These studies and activities will be necessary to support the project to the PFS stage and provide a strong basis for future EA preparation and permitting. The estimated total cost for the recommended future studies and activities is C$800,000.

1.17.7.1 Meteorology and Climate

- Develop and implement multi-year baseline meteorological monitoring plan for key areas within the Project area based on the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC ENV 2016).
- Develop plans that eliminate or mitigate environmental risk for PFS.

1.17.7.2 Surficial Hydrology

- Develop and implement multi-year baseline hydrological monitoring plan for key areas within the Project area based on the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC ENV 2016).
- Develop a conceptual water balance model and assess the need for water treatment.
- Develop plans that eliminate or mitigate environmental risk for PFS.

1.17.7.3 Hydrogeology

- Develop and implement multi-year baseline groundwater monitoring plan (quality and quantity) for key areas within the Project area based on the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC ENV 2016).
- Develop a conceptual groundwater model and assess the need for water treatment.
- Develop plans that eliminate or mitigate environmental risk for PFS.

1.17.7.4 Surface Water Quality

- Develop and implement multi-year baseline surface water quality monitoring plan that includes physical and chemical parametres, aquatic sediments, tissue residues, and aquatic life (invertebrates, algae, macrophytes) for key areas within the Project area based on the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC ENV 2016).
- Assess the need for water treatment.
- Develop plans that eliminate or mitigate environmental risk for PFS.

1.17.7.5 Fish and Fish Habitat

- Develop and implement multi-year baseline fish and fish habitat monitoring plan for key areas within the Project area based on the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC ENV 2016).
- Develop plans that eliminate or mitigate environmental risk for PFS.

1.17.7.6 Terrestrial and Wildlife Monitoring

- Develop and implement multi-year baseline vegetation/ecosystem and wildlife/wildlife habitat survey plan for key areas within the Project area.
- First Nations and other land users should be closely involved in the development and execution of wildlife baseline studies, especially in relation to traditional and current use of the land for harvesting.
- Develop plans that eliminate or mitigate environmental risk for PFS.

1.17.7.7 Socio-Economic, Cultural Baseline Studies and Community Engagement

- Develop and implement a socio-economic and cultural baseline study.
- Complete AOA or AIA on locations of proposed project infrastructure.
- Carry on with commitments previously made to stakeholders, including:
  - Continuing to meet as a group for follow-up discussion on project plans.
  - Developing Terms of Reference for defining collaboration process and procedures.
  - Working towards defining communications, processes, and procedures to guide the project through the next stages.

1.17.7.8 Environmental Constraints Mapping

- To assist in the development of the project at the PFS stage, environmental constraints mapping should be developed and continuously updated, based on the results of historical and future baseline environmental and land use studies. This mapping should be utilized to limit risks at the design stages of the Project.

2 INTRODUCTION

Surge Copper Corp. (Surge Copper), a Canadian company that is advancing an emerging critical metals district in British Columbia, Canada and listed on the TSX-V (SURG), commissioned Ausenco Engineering Canada Inc. and Ausenco Sustainability Inc. (Ausenco) to compile a preliminary economic assessment (PEA) of the Berg Project. The PEA was prepared in accordance with the Canadian disclosure requirements of National Instrument 43-101 (NI 43-101) and in accordance with the requirements of Form 43-101 F1.

The responsibilities of the engineering companies who were contracted by Surge Copper to prepare this report are as follows:

- Ausenco managed and coordinated the work related to the report and developed PEA-level design, including capital and operating cost estimates for the process plant, general site infrastructure, water management, tailings storage facility, geotechnical assessment, environment and permitting, economic analysis, and completed a review of the environmental studies.
- Moose Mountain Technical Services (“Moose Mountain” or “MMTS”) designed the open pit mining, mine production schedule, and mine capital and operating cost estimates. They also developed the Mineral Resource Estimate for the Berg Project and completed the work related to property description, accessibility, local resources, geological setting, deposit type, drilling, exploration works, sample preparation and analysis and data verification.

2.1 Terms of Reference

The purpose of this report is to present the results of the PEA and to support Surge Copper’s disclosure in a new release dated June 13, 2023, titled, “Surge Copper Announces Maiden Berg PEA: C$2.1 billion NPV8% and 20% IRR.”

All measure units used in this Report are metric unless otherwise noted and currency is expressed in Canadian dollars (C$). The Report uses English.

Mineral Resources are estimated in accordance with the 2019 edition of the Canadian Institute of Mining, Metallurgy and Exploration (CIM) Estimation of Mineral Resources & Mineral Reserves Best Practice Guidelines (2019 CIM Best Practice Guidelines) and are reported using the 2014 CIM Definition Standards for Mineral Resources and Mineral Reserves (2014 CIM Definition Standards).

Readers are cautioned that the PEA is preliminary in nature. It includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the PEA will be realized.

2.2 Qualified Persons

The Qualified Persons for the report are listed in Table 2-1. By virtue of their education, experience, and professional association membership and independence from Surge Copper, the individuals presented in Table 2-1 are each considered to be a “Qualified Person” as defined by NI 43-101.

Table 2-1: Report Contributors

Qualified Person	Professional Designation	Position	Employer	Independent of Surge Copper Corp.	Report Section
Kevin Murray	P. Eng.	Manager–Process Engineering	Ausenco Engineering Canada Inc.	Yes	1.1, 1.11.1-1.11.9, 1.12, 1.14, 1.15, 1.16, 1.17.1, 1.17.5, 2, 18.1, 18.2, 18.3.1-18.3.6, 18.3.8, 19, 21.1, 21.2.1, 21.2.2, 21.2.3.2,21.2.4-21.2.9, 21.2.10.1, 21.2.10.3, 21.2.11, 21.3.1, 21.3.3, 21.3.4, 22, 24, 25.1, 25.10, 25.11, 25.13-25.15, 25.16.5, 25.16.6, 25.17.5, 26.1, 26.5, 27
Peter Mehrfert	P. Eng.	Principal Process Engineer	Ausenco Engineering Canada Inc.	Yes	1.7, 1.10, 1.17.3, 13, 17, 25.5, 25.9, 25.16.2, 25.17.2, 26.3, 27
Ali Hooshiar	P. Eng.	Geotechnical Engineer	Ausenco Engineering Canada Inc.	Yes	1.11.10, 1.17.6, 18.3.7, 25.7, 26.6, 27
Jonathan Cooper	P. Eng.	Water Resources Engineer	Ausenco Sustainability Inc.	Yes	1.11.11, 18.3.9, 27
Scott Weston	P. Geo.	Vice President – Business Development	Ausenco Sustainability Inc.	Yes	1.13, 1.17.7, 3.2, 20, 25.12, 25.16.7, 25.17.6, 26.7, 27
Marc Schulte	P. Eng.	Vice President – Mine Engineering	Moose Mountain Technical Services	Yes	1.9, 1.17.4, 15, 16, 21.2.3.1, 21.2.10.2, 21.3.2, 25.8, 25.16.4, 25.17.4, 26.4, 27
Sue Bird	P. Eng.	Vice President - Resources	Moose Mountain Technical Services	Yes	1.2-1.6, 1.8, 1.17.2, 3.1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 23, 25.2-25.6, 25.16.1, 25.16.3, 25.17.1, 25.17.3, 26.2, 27

2.3 Site Visits and Scope of Personal Inspection

A summary of the site visits completed by the QP's is presented in Table 2-2.

Table 2-2: Summary of QP's Site Visits

Qualified Person	Date of Site Visit	Days on Site
Kevin Murray, P. Eng.	Has not visited site	-
Peter Mehrfert, P. Eng.	Has not visited site	-
Ali Hooshiar, P. Eng.	October 24, 2022	1 day
Jonathan Cooper, P. Eng.	Has not visited site	-
Scott Weston, P. Geo.	Has not visited site	-
Marc Schulte, P. Eng.	October 24, 2022	1 day
Sue Bird, P. Eng.	Has not visited site	-

Ali Hooshiar visited the property on October 24, 2022. During the visit he was able to review the general topography of the project site and site access from Houston, BC.

Marc Schulte visited the property on October 24, 2022. During the visit he reviewed selected drill core, site access from Houston, BC, and the general topography of the open pit area.

2.4 Effective Dates

The effective date of the overall report is June 12, 2023.

The effective date of the Mineral Resource Estimate is June 7, 2023.

2.5 Information Sources and References

The sources of information include historical data and reports compiled by previous consultants and researchers of the Project and supplied by Surge Copper personnel, as well as other documents cited throughout the report and referenced in Section 27. The QPs have relied on various email exchanges with Surge Copper representatives, excel spreadsheets, and previously completed reports filed on System for Electronic Document Analysis and Retrieval (SEDAR) by previous owners.

The QP's opinions contained herein are based on information provided to the QPs by Surge Copper throughout the course of the investigations. The QPs have relied upon the work of other consultants for metallurgy project areas in support of this technical report, as noted in Section 2.2. The QPs have relied on Surge Copper's internal experts and legal counsel for details on Project history, regional geology, geological interpretations, and information related to ownership and environmental permitting status. The QPs have relied on Surge Copper for forward-looking commodity pricing assumptions.

The QPs have not performed an independent verification of land title and tenure information as summarized in Section 4 of this report, which was verified separately by Surge Copper legal counsel. The QPs did not verify the legality of any underlying agreement(s) that may exist concerning the permits or other agreement(s) between Surge Copper and third parties, and as such, expresses no opinion as to the ownership status of the Project.

The QPs have fully relied upon and disclaim responsibility for information supplied by experts retained by Surge Copper Corp. related to taxation as applied to the financial model and used in Sections 1, 22 and 25 of the Report.

This report has been prepared using the documents noted in Section 27 (References). The QPs used their experience to determine if the information from previous reports was suitable for inclusion in this technical report and adjusted information that required amending. This report includes technical information that required subsequent calculations to derive subtotals, totals, and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, the QPs do not consider them to be material.

2.5.1 General

Reports and documents listed in Section 3 and Section 27 of this Report were used to support preparation of the Report.

2.5.2 Previous Technical Reports

- "Updated Technical Report and Mineral Resource Estimate on the Berg Project, British Columbia." Report prepared by Tetra Tech Canada Inc. Prepared for Surge Copper Corp. Effective Date: March 9, 2021.
- "Updated Technical Report and Mineral Resource Estimate on the Berg Project, British Columbia." Report prepared by Tetra Tech Canada Inc. Prepared for Thompson Creek Metals Company Inc. Effective Date: October 22, 2018.
- "2009 Mineral Resource Estimate on the Berg Copper-Molybdenum-Silver Property, Tahtsa Range, British Columbia." Report prepared by Stewart Harris of Equity Exploration Consultants Ltd. and Darin Labrenz of Terrane Metals Corp. Prepared for Terrane Metals Corp. Effective Date: June 2009.

2.5.3 Definitions

Table 2-3: Unit Abbreviations

Unit	Meaning
(°)	degree
%	percent
a	annum
asl	Above sea level
B	billion
C	Celsius
C$	Canadian dollar
cm	centimetre
dmt	dry metric tonne
g	gram
h	hour
ha	hectare
kg	kilogram
km	kilometre
km^2	square kilometres
km^3	cubic kilometres
kV	kilovolt
kW	kilowatt
kWh/a	kilowatt hour per annum
kWh/t	kilowatt hour per metric tonne
L	litre
lb	pound
M	million
m	metre
m^2	square metre
m^3	cubic metre

Unit	Meaning
m^3/h	cubic metres per hour
masl	metres above sea level
mg	milligrams
min	minute
mL	millilitres
mm	millimetre
Mm^3	Cubic millimetres
Mt	million tonnes
Mt/a	million tonnes per annum
MWh	megawatt hour
µm	micron
oz	ounce
ppm	parts per million
s	second
t	metric tonne
t/d	metric tonnes per day
t/h	metric tonnes per hour
t/m^3	metric tonnes per cubic metre
t/y	metric tonnes per year
US$	United States dollar
%w/w	weight per weight

Table 2-4: Name Abbreviations

Abbreviation	Meaning
AA	Atomic Absorption
ARD	Acid rock drainage
AND	Aphanitic andesite dykes
AIA	Archaeological Impact Assessments
AOA	Archaeological Overview Assessments
AACE	Association for the Advancement of Cost Engineering International
BCEAA	*British Columbia Environmental Assessment Act*
BC	British Columbia
BEC	Biogeoclimatic Ecosystem Classification
CCME	Canadian Council of Ministers of the Environment
CDA	Canadian Dam Association
CEA	Communications & Engagement Agreement
CPO	Chief Permitting Officer
CPP	Cumulative probability plots

Abbreviation	Meaning
CuEq	Copper equivalent
C.V.	Coefficient of Variations
CRM	Certified reference material
DCF	Discounted cash flow
DL	Detection Limit
DTH	Down the hole
EA	Environmental assessment
EAC	Environmental assessment certificate
EAO	Environmental Assessment Office
ECCC	Environment and Climate Change Canada
EDGM	Earthquake design ground motion
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMLI	Energy, Mines and Low Carbon Innovation
EPCM	Engineering procurement construction management
EOP	End of Period
ERM	Environmental Resources Management
EV	Electric vehicle
DFO	Fisheries and Oceans Canada
FOS	Factor of Safety
FS	Feasibility Study
FSR	Forest Service Road
G&A	General and administrative
GA	General arrangements
GET	Ground engaging tools
GME	General Mine Expense
GPS	Global Positioning System
HARD	Half absolute relative difference
IAA	*Impact Assessment Act*
IAAC	Impact Assessment Agency of Canada
IDF	Inflow design flood
IP	Induced polarization
IRR	Internal rate of return
LOM	Life of mine
MCE	Maximum credible earthquake
MTO	Material take-offs
MDMER	Mining and Diamond Mining Effluent Regulations
MMER	Metal Mining Effluent Regulations

Abbreviation	Meaning
MRE	Mineral Resource Estimate
MYAB	Multi-Year Area-Based
NTS	National Topographic Service
NSP	Net smelter prices
NSR	Net smelter return
NAG	Non-acid generating
NPV	Net Present Value
PBQP	Plagioclase-biotite-quartz porphyry
PCC	Process Control Charts
PAG	Potentially acid generating
PEA	Preliminary economic assessment
PFD	Process flow diagram
PFS	Pre-feasibility study
PGA	Peak ground acceleration
PMF	Probable maximum flood
QA/QC	Quality assurance/quality control
QP	Qualified person
QDR	Quartz diorite
QMP	Quartz monzonite
QFP	Quartz-feldspar porphyry
QPP	Quartz-plagioclase porphyry
RQD	Rock quality designation
ROM	Run of mine
SAG	Semi Autogenous Grinding
SAP	Site Alteration Permit
SDS	Safety data sheets
SEDAR	System for Electronic Document Analysis and Retrieval
TC	Treatment charges
TSA	Timber supply area
TWMF	Tailing and Waste Management Facility
UCS	Unconfined compressive strength
UCF	Undiscounted cashflow
VWP	Vibrating wire piezometres
WRSF	Waste rock storage facility

3 RELIANCE ON OTHER EXPERTS

3.1 Property Agreements, Mineral Tenure, Surface Rights and Royalties

The QPs have not independently reviewed ownership of the Project area and any underlying property agreements, mineral tenure, surface rights, or royalties. The QPs have fully relied upon, and disclaim responsibility for, information derived from Surge Copper and legal experts retained by Surge Copper for this information through the following documents:

- Kennecott, 2006 Berg Property Sale and Royalty Agreements with Terrane Metals Corp. September 12, 2006 14 p.
- International Royalty Corporation, 2008. Notice of Assignment of royalties from TMC to IRC
- Thompson Creek Metals Company, 2008. Notice of Assignments with Terrane Metals Corp. September 12, 2006 14 p.

This information is used in Section 4, 14, 16, and 18 and in support of sections 22, 24, and 25, as well as any other sections of the report that rely on the ownership and underlying agreements.

3.2 Environmental, Permitting, Closure, Social and Community Impacts

The QPs have fully relied upon and disclaim responsibility for information supplied by Surge Copper and experts retained by Surge Copper for information related to environmental (including tailings and water management) permitting, permitting, closure planning and related cost estimation, and social and community impacts as follows:

- AMEC Earth & Environmental, 2007. ARD Testing Results, Berg deposit, BC. Prepared for Terrane Metals Corporation.
- AMEC Earth & Environmental, 2008. Reconnaissance (1:20,000) Fish and Fish Habitat Inventory of Selected Streams in the Nanika and Tahtsa Watersheds. Prepared for Terrane Metals Corporation.
- BC Ministry of Forests and Range. 2021. Biogeoclimatic Ecosystem Classification (BEC) and Ecology Research Program. Available at: https://www.for.gov.bc.ca/hre/becweb/index.html (Accessed May 2023).
- ERM, 2015. Berg Project: 2014 Meteorology, Hydrology and Water Quality Data Report. Prepared for Thompson Creek Metals Company Inc.
- ERM, 2018. Berg Project: 2017 Meteorology, Hydrology and Water Quality Data Report. Prepared for Thompson Creek Metals Company Inc.
- Norecol Environmental Consultants Ltd., 1988. Placer Dome Berg property Overview Report. Prepared for Placer Dome Inc.
- Norecol Environmental Consultants Ltd., 1989. Placer Dome Water Quality Report. Prepared for Placer Dome Inc.
- Rescan, 2013. Berg Project Water Quality Summary, 2007 – to 2011. Prepared for Thompson Creek Metals Company Inc.
- Rescan, 2013. Berg Project: 2012 Hydrology and Meteorology Data Report. Prepared for Thompson Creek Metals Company Inc.

This information is used in Section 20 of the Report.

4 PROPERTY DESCRIPTION AND LOCATION

4.1 Property Location

The Berg property is located in the Tahtsa Ranges, which is a 15- to 20-kilometre-wide belt of mountains within the Hazelton Mountains. The Hazelton Mountains lie along the eastern flank of the Kitimat Range of the Coast Mountains and form part of the Skeena Arch. The Tahtsa Ranges represent a transitional zone between the rugged, predominantly plutonic, Coast Mountains to the west and the rolling hill region of sedimentary and volcanic rocks that underlie the Nechako Plateau to the east. The centre of the Berg property lies at 53º 47’ 53.02”N, and 127º 24’ 51.27”W, or 5,962,220 mN and 604,444 mE, UTM Zone 9, WGS 84. The Berg deposit is centred at approximately 603,450 mE, 5,962,920 mN (Figure 4-1).

4.2 Surge Copper Option Agreement with Thompson Creek Metals

On December 15, 2020, Surge Copper announced the signing of a Definitive Option Agreement (the “Option Agreement”) with Thompson Creek Metals, a wholly owned subsidiary of Centerra Gold, pertaining to the Project. Under this agreement, Surge Copper was granted the exclusive option to acquire 70% ownership of the Project by reaching certain milestones and making certain payments as outlined below:

- Issuing C$5,000,000 in common shares of Surge.
- Incurring expenditures on the Project of not less than C$8,000,000 within five years of entering into the agreement, with a C$2,000,000 commitment within 24 months.

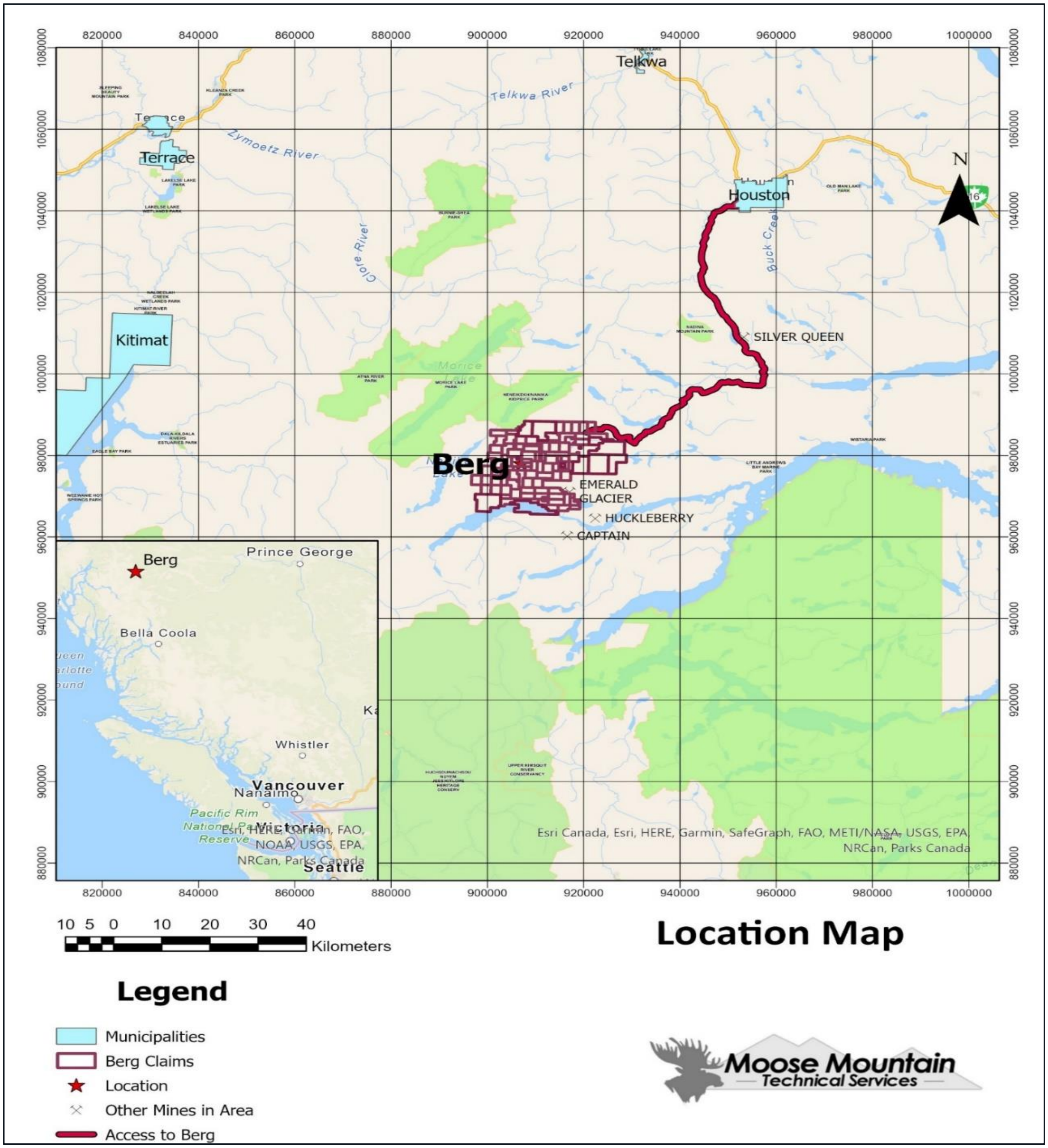
Upon meeting the above commitments, a Surge Copper and Thompson Creek Metals will be deemed to have formed a 70%:30% joint venture with respect to the Project, with Surge Copper to be the first operator.

To date, Surge Copper has complied with the Option Agreement and made payments and milestones as listed above. The company has not yet reached the full expenditures on the Berg Project but is ahead of schedule and expects to complete the work requirements within the agreed timeline.

4.2.1 Mineral Tenure

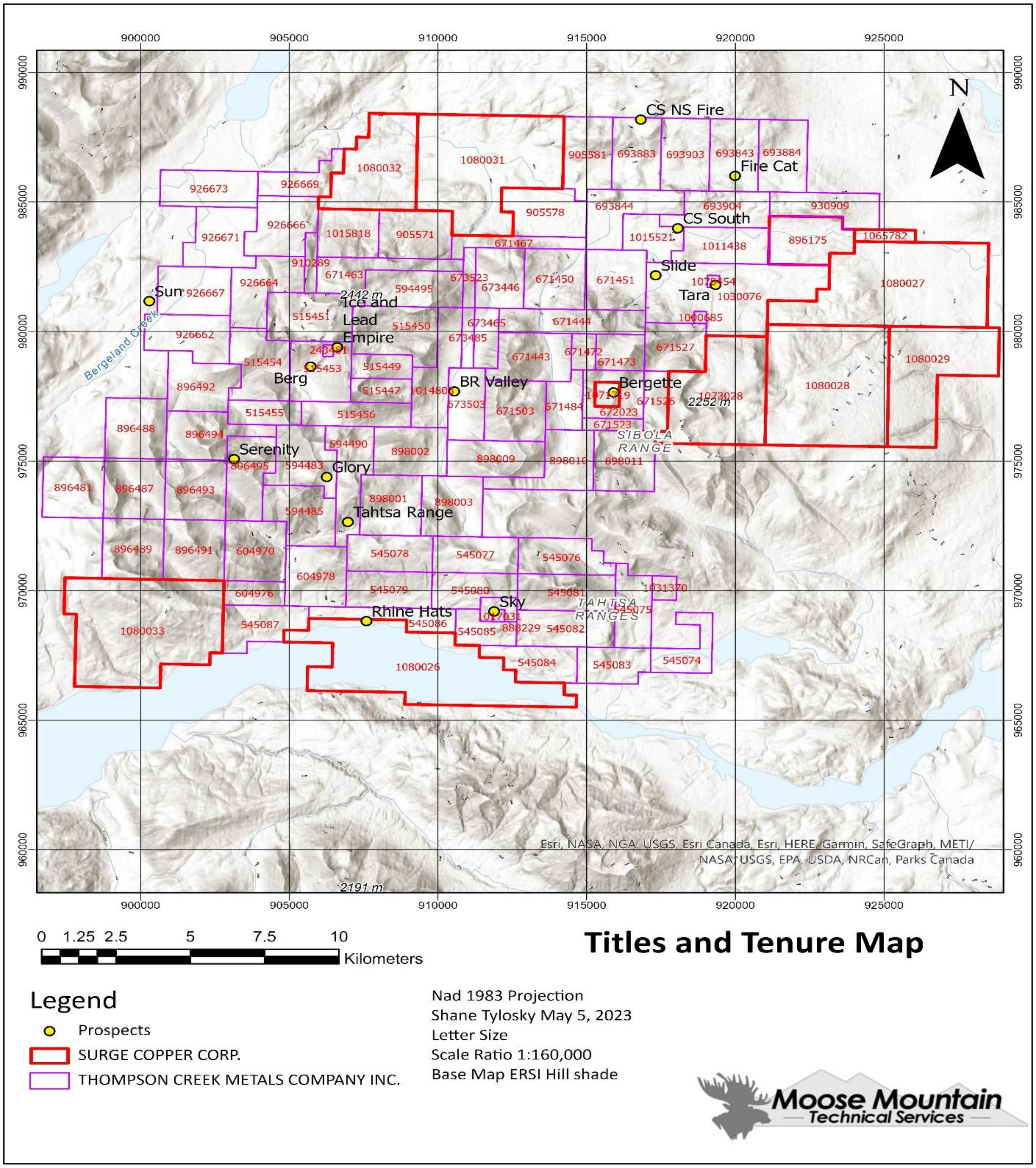
The property consists of 102 mineral claims and one mining lease covering an area of approximately 48,187.7 ha as illustrated in Figure 4-1. Ninety-one claims and one lease are registered to Thompson Creek Metals Company Inc. and subject to the Option Agreement with the other 11 claims registered to Surge and owned 100%. Thompson Creek Metals is a wholly owned subsidiary of Centerra Gold Inc. The claims are illustrated in Figure 4-2 and listed in Table 4-1.

Figure 4-1: Property Location Map



Source: MMTS, 2023

Figure 4-2: Mineral Tenure Map



Source: MMTS, 2023.

4.3 Surface Ownership and Land Access Agreements

Surface rights over the Berg property are owned by the Province of British Columbia. In August of 2022 Surge received an approval for a 5 year Exploration Permit that allows for further exploration activities on the Berg property. It should be noted that some aspects of project infrastructure fall outside of the Berg property boundary and that consolidation of surface access will be required prior to development of the project as outlined in this report.

No major existing environmental liabilities have been noted by the authors. There is an access trail leading to the property dating from the historic drilling programs that may require reclamation in the future. There are also drill access roads on the property from historic and recent drilling since 2007, and a tent camp and core storage yard.

To the extent known, there are no other significant factors and risks that may affect access, title, or the right or ability to perform work on the property.

4.4 Royalties and Liens

A 1% net smelter return royalty is held by Royal Gold on eight of the mineral claims and the one mining lease, including those which host the deposit on the main Berg property.

Table 4-1: Mineral Tenure for Berg property

Tenure #	Claim Name	Owner	Title Type	Title Sub Type	Issue Date	Good To Date	Area (ha)
1070454	-	Thompson Creek Metals Company Inc	Mineral	Claim	18-08-2019	30-06-2029	19.1
243481	-	Thompson Creek Metals Company Inc	Mineral	Lease	27-08-1968	27-08-2023	16.8
515447	-	Thompson Creek Metals Company Inc	Mineral	Claim	28-06-2005	30-06-2029	191.0
515449	-	Thompson Creek Metals Company Inc	Mineral	Claim	28-06-2005	30-06-2029	191.0
515450	-	Thompson Creek Metals Company Inc	Mineral	Claim	28-06-2005	30-06-2029	572.7
515451	-	Thompson Creek Metals Company Inc	Mineral	Claim	28-06-2005	30-06-2029	553.6
515453	-	Thompson Creek Metals Company Inc	Mineral	Claim	28-06-2005	30-06-2029	477.4
515454	-	Thompson Creek Metals Company Inc	Mineral	Claim	28-06-2005	30-06-2029	496.5
515455	-	Thompson Creek Metals Company Inc	Mineral	Claim	28-06-2005	30-06-2029	229.3
515456	-	Thompson Creek Metals Company Inc	Mineral	Claim	28-06-2005	30-06-2029	343.9
545074	SOUTH 1	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	287.1
545075	SOUTH 2	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	363.5
545076	SOUTH 3	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	401.6
545077	SOUTH 4	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	401.6
545078	SOUTH 5	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	401.6
545079	SOUTH 6	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	401.8
545080	SOUTH 7	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	344.4
545081	SOUTH 8	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	459.1

Tenure #	Claim Name	Owner	Title Type	Title Sub Type	Issue Date	Good To Date	Area (ha)
545082	SOUTH 9	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	459.3
545083	SOUTH 10	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	325.4
545084	SOUTH 11	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	363.7
545085	SOUTH 12	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	229.6
545086	SOUTH 13	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	306.2
545087	SOUTH 14	Thompson Creek Metals Company Inc	Mineral	Claim	10-11-2006	30-06-2029	401.9
594483	BERG C	Thompson Creek Metals Company Inc	Mineral	Claim	18-11-2008	30-06-2029	477.8
594485	BERG D	Thompson Creek Metals Company Inc	Mineral	Claim	18-11-2008	30-06-2029	478.0
594490	BERG A	Thompson Creek Metals Company Inc	Mineral	Claim	18-11-2008	30-06-2029	477.8
594495	BERG I	Thompson Creek Metals Company Inc	Mineral	Claim	18-11-2008	30-06-2029	458.0
604970	-	Thompson Creek Metals Company Inc	Mineral	Claim	26-05-2009	30-06-2029	478.1
604976	-	Thompson Creek Metals Company Inc	Mineral	Claim	26-05-2009	30-06-2029	191.3
604978	-	Thompson Creek Metals Company Inc	Mineral	Claim	26-05-2009	30-06-2029	478.2
671443	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	477.4
671444	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	458.1
671450	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	477.1
671451	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	477.1
671463	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	381.6
671467	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	228.9
671472	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	114.6
671473	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	229.1
671484	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	248.3
671503	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	477.6
671523	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	95.5
671526	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	191.0
671527	-	Thompson Creek Metals Company Inc	Mineral	Claim	19-11-2009	30-06-2029	381.9
672023	-	Thompson Creek Metals Company Inc	Mineral	Claim	20-11-2009	30-06-2029	305.6
673446	-	Thompson Creek Metals Company Inc	Mineral	Claim	24-11-2009	30-06-2029	381.7
673465	-	Thompson Creek Metals Company Inc	Mineral	Claim	24-11-2009	30-06-2029	190.9
673485	-	Thompson Creek Metals Company Inc	Mineral	Claim	24-11-2009	30-06-2029	95.5
673503	-	Thompson Creek Metals Company Inc	Mineral	Claim	24-11-2009	30-06-2029	343.8
673523	-	Thompson Creek Metals Company Inc	Mineral	Claim	24-11-2009	30-06-2029	95.4
693843	-	Thompson Creek Metals Company Inc	Mineral	Claim	04-01-2010	30-06-2029	457.5
693844	-	Thompson Creek Metals Company Inc	Mineral	Claim	04-01-2010	30-06-2029	476.8
693883	-	Thompson Creek Metals Company Inc	Mineral	Claim	04-01-2010	30-06-2029	457.5
693884		Thompson Creek Metals Company Inc	Mineral	Claim	04-01-2010	30-06-2029	457.5
693903	-	Thompson Creek Metals Company Inc	Mineral	Claim	04-01-2010	30-06-2029	457.5

Tenure #	Claim Name	Owner	Title Type	Title Sub Type	Issue Date	Good To Date	Area (ha)
693904	-	Thompson Creek Metals Company Inc	Mineral	Claim	04-01-2010	30-06-2029	438.6
888229	SOUTH 15	Thompson Creek Metals Company Inc	Mineral	Claim	11-09-2011	30-06-2029	95.7
896481	BERGW2	Thompson Creek Metals Company Inc	Mineral	Claim	11-09-2011	30-06-2029	477.9
896487	BERGW8	Thompson Creek Metals Company Inc	Mineral	Claim	11-09-2011	30-06-2029	477.9
896488	BERG W11	Thompson Creek Metals Company Inc	Mineral	Claim	11-09-2011	30-06-2029	477.7
896489	BERGW10	Thompson Creek Metals Company Inc	Mineral	Claim	11-09-2011	30-06-2029	478.1
896491	BERGW6	Thompson Creek Metals Company Inc	Mineral	Claim	11-09-2011	30-06-2029	478.1
896492	BERG W15	Thompson Creek Metals Company Inc	Mineral	Claim	11-09-2011	30-06-2029	458.4
896493	-	Thompson Creek Metals Company Inc	Mineral	Claim	11-09-2011	30-06-2029	477.9
896494	BERG W15	Thompson Creek Metals Company Inc	Mineral	Claim	11-09-2011	30-06-2029	458.6
896495	BERG W17	Thompson Creek Metals Company Inc	Mineral	Claim	11-09-2011	30-06-2029	458.7
898001	BERG EXT 1	Thompson Creek Metals Company Inc	Mineral	Claim	19-09-2011	30-06-2029	478.0
898002	BERG EXT 2	Thompson Creek Metals Company Inc	Mineral	Claim	19-09-2011	30-06-2029	458.6
898003	BERG EXT 3	Thompson Creek Metals Company Inc	Mineral	Claim	19-09-2011	30-06-2029	478.0
898009	BERG EXT 4	Thompson Creek Metals Company Inc	Mineral	Claim	19-09-2011	30-06-2029	458.7
898010	BERG EXT 5	Thompson Creek Metals Company Inc	Mineral	Claim	19-09-2011	30-06-2029	477.8
898011	BERG EXT 6	Thompson Creek Metals Company Inc	Mineral	Claim	19-09-2011	30-06-2029	477.8
905571	BERG N1	Thompson Creek Metals Company Inc	Mineral	Claim	06-10-2011	30-06-2029	457.8
905578	BERG N6	Thompson Creek Metals Company Inc	Mineral	Claim	06-10-2011	30-06-2029	476.8
905581	BERG N7	Thompson Creek Metals Company Inc	Mineral	Claim	06-10-2011	30-06-2029	476.6
910289	BERG W21	Thompson Creek Metals Company Inc	Mineral	Claim	12-10-2011	30-06-2029	95.4
926662	BERG NW1	Thompson Creek Metals Company Inc	Mineral	Claim	31-10-2011	30-06-2029	458.2
926664	BERG NW2	Thompson Creek Metals Company Inc	Mineral	Claim	31-10-2011	30-06-2029	477.1
926666	BERG NW4	Thompson Creek Metals Company Inc	Mineral	Claim	31-10-2011	30-06-2029	476.9
926667	BERG NW7	Thompson Creek Metals Company Inc	Mineral	Claim	31-10-2011	30-06-2029	458.1
926669	BERG NW6	Thompson Creek Metals Company Inc	Mineral	Claim	31-10-2011	30-06-2029	286.0
926671	BERG NW8	Thompson Creek Metals Company Inc	Mineral	Claim	31-10-2011	30-06-2029	476.9
926673	BERG NW10	Thompson Creek Metals Company Inc	Mineral	Claim	31-10-2011	30-06-2029	457.7
930909	BERG NE1	Thompson Creek Metals Company Inc	Mineral	Claim	24-11-2011	30-06-2029	400.5
1000685	BERGETTE 1	Thompson Creek Metals Company Inc	Mineral	Claim	24-06-2012	30-06-2029	19.1
1011438	BERG NE2	Thompson Creek Metals Company Inc	Mineral	Claim	24-07-2012	30-06-2029	419.7
1014803	BERGETTE 2	Thompson Creek Metals Company Inc	Mineral	Claim	26-11-2021	30-06-2029	477.4
1015521	BERG NE3	Thompson Creek Metals Company Inc	Mineral	Claim	27-12-2012	30-06-2029	286.1
1015818	BERG N11	Thompson Creek Metals Company Inc	Mineral	Claim	08-01-2013	30-06-2029	381.5
1017031	SOUTH 16	Thompson Creek Metals Company Inc	Mineral	Claim	19-02-2013	30-06-2029	19.1
1030076	BERG NE4	Thompson Creek Metals Company Inc	Mineral	Claim	06-08-2014	30-06-2029	1278.7
1031370	SOUTH 17	Thompson Creek Metals Company Inc	Mineral	Claim	04-10-2014	30-06-2029	76.5

Tenure #	Claim Name	Owner	Title Type	Title Sub Type	Issue Date	Good To Date	Area (ha)
1080031	-	Surge Copper Corp	Mineral	Claim	11-12-2021	30-06-2029	1830.3
1080032	-	Surge Copper Corp	Mineral	Claim	11-12-2021	30-06-2029	896.1
896175	Sylvia	Surge Copper Corp	Mineral	Claim	07-09-2011	30-06-2029	476.9
1065782	Sylvia	Surge Copper Corp	Mineral	Claim	15-01-2019	30-06-2029	95.4
1080027	-	Surge Copper Corp	Mineral	Claim	11-12-2021	30-06-2029	1908.3
1080028	-	Surge Copper Corp	Mineral	Claim	11-12-2021	30-06-2029	1909.9
1080029	-	Surge Copper Corp	Mineral	Claim	11-12-2021	30-06-2029	1145.8
1073028	East BERGETTE	Surge Copper Corp	Mineral	Claim	30-11-2020	30-06-2029	1222.4
1071719	BERGETTE	Surge Copper Corp	Mineral	Claim	29-10-2021	30-06-2029	76.4
1080033	-	Surge Copper Corp	Mineral	Claim	11-12-2021	30-06-2029	1913.8
1080026	TR	Surge Copper Corp	Mineral	Claim	11-12-2021	30-06-2029	1914.3

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

The following descriptions are taken from the Berg Assessment Report (Harris and Peat, 2008).

5.1 Climate

The weather, typical of mountainous terrain along the east flank of the Coast Mountains, can be unsettled with rapid changes. Seasonal temperatures vary from -15ºC in winter to 20ºC during the summer. The mean daily temperatures for July and January are approximately 15ºC and -9ºC, respectively. The Tahtsa region receives 1,009 mm of rain and 976 cm of snow annually. The Kemano region receives 1,771 mm of rain and 215 cm of snow annually. In winter, snow is typically less than 2 m deep on the valley floors, but deeper snow can accumulate in creek gullies and on north and east-facing slopes, giving rise to small permanent snowfields. The Berg property is snow-covered between mid-November and late-May, thereby limiting exploration activities to the summer months.

High winds are common in the area and occasionally reach gale force. Exploration reports also indicate that dense fog sometimes envelopes the area for days at a time and reduces visibility to metres.

5.2 Physiography

The Berg deposit is located in the Tahtsa Range, a 15 to 20 km wide belt of mountains within the Hazelton Mountains. The Hazelton Mountains lie along the eastern flank of the Kitimat Ranges of the Coast Mountains and form part of the Skeena Arch. The Tahtsa Ranges represent a transitional zone between the rugged, predominantly granitic Coast Mountains to the west and the rolling hill region of sedimentary and volcanic rocks that underlie the Nechako Plateau to the east.

The 2021 version of the biogeoclimatic ecosystem classification subzone/variant map for the Morice Subunit, Nadine Resource District, Skeena Region identifies the following biogeoclimatic zones in the project area (Government of BC 2021):

- Boreal Altai, Fescue Alpine: The terrain is often steep and rugged. Much of Boreal Altai Fescue Alpine is well-vegetated alpine tundra. Soils are typically shallow and derived from weathered bedrock. Vegetation is primarily dwarf willows, grasses, sedges, and lichens.
- Engelmann Spruce-Subalpine Fir, Moist Cool: Soils in this biogeoclimatic zone are typically coarse-textured Humo-Ferric Podzols. Major tree species include subalpine fir, mountain hemlock, amabilis fir, whitebark pine, and lodgepole pine.
- Mountain Hemlock, Leeward Moist Maritime: Soils in this biogeoclimatic zone are typically Humo-Ferric and Ferro-Humic Podzols. Major tree species include mountain hemlock, amabilis fir, western hemlock, and subalpine fir.

The Berg property is located within the Morice Timber Supply Area (TSA) administered by the Nadina Natural Resource District office in Burns Lake. This TSA covers approximately 1.5 million hectares of the Skeena Natural Resource Region.

The Tahtsa Ranges are further subdivided into the Tahtsa, Sibola, Whitesail, and Chikamin Ranges; of these, the Berg deposit is hosted in the Sibola Range. These are separated by major valleys whose bottoms range in elevation from 800 to 950 masl. Mt. Ney is the highest peak in the Tahtsa Ranges at 2,470 m and is 4 km northeast of the Berg property. A number of other mountains and ridges are 2,000 m or more in elevation and occur as serrate peaks modified by cirque glaciation.

5.3 Local Resources

5.3.1 Community Services

Personnel for construction, exploration, mining, and support are available in local northern BC communities such as Prince George, Terrace, Smithers, and Houston. Prince George and Terrace are approximately four hours driving distance from the property, while Smithers and Houston are approximately two and one, respectively. Helicopter services are available from Smithers and Houston. Except for Houston, each of these communities has daily scheduled flights to Vancouver and elsewhere.

5.3.2 Infrastructure

Infrastructure available for the Berg property consists of the Morice Tahtsa and Sibola Mainline Forest Service Roads, providing road access to approximately 16 km from the Berg deposit. The remaining length of the Berg access road has been recommissioned by Surge in recent years and allows for seasonal access by light duty all wheel drive vehicles.

Sufficient low-relief terrain resides within the Property for siting of infrastructure for mining or process operations, such as waste disposal facilities, haul roads and plant site. Land use for exploration and mining purposes is governed by the Mineral Tenure Act, the Mines Right of Way Act, the Mines Act, and other applicable laws of the Province of British Columbia.

The CN rail mainline parallels Highway 16 linking Prince George and Prince Rupert.

5.3.3 Power

There is currently no power available on the property. The nearest source of electric power is the Huckleberry Mine transmission line, approximately 22 km to the east that sources power from the BC provincial grid at the Houston substation. Rio Tinto also operates the Kemano power generating station approximately 50 km to the west of the Berg Project.

5.3.4 Water

An abundance of water as lakes, rivers and groundwater is available in valleys and base level elevation. Melting of mountain snow and ice lenses found at elevation supply overland flow and perched groundwater flow in the warmer months of June through September. The shallow groundwater flow contributed to the leaching and supergene enrichment found on the property. Artesian water flow is observed from uncapped historical drilling holes on the main slopes of the Berg cirque.

5.4 Property Access

Site access is currently achieved by the Berg access road, with staging areas from the nearby forest service roads including an exploration camp located on the Sibola forest service road.

The site can be accessed by road by heading south on the Morice-Nadina FSR (Huckleberry Mine Road) which joins BC Highway 16 near Houston. The Morice-/Nadina FSR is an all-season gravel road that was upgraded to provide access to the Huckleberry Mine. At kilometre marker 100.5, head west on the Sibola FSR which has seen recent work and upgrades to allow for forestry and exploration activities.

At kilometre 16.4 on the Sibola FSR the Berg Access road starts and traverses 16 km across creek fords and a mountain pass to arrive at the Berg Camp and the Berg deposit. The Berg Camp is located on a tributary to the north fork of Bergeland Creek, 6 km northwest of the pass at 1,555 m asl. Historically, this is the route used for road access to the Berg deposit. The southern portion of the Property can be reached via the Sweeny Lake Road, which departs from the Huckleberry Mine Road at ~113 km and continues to Tahtsa Lake. This road connects to a series of logging access roads that reach the southwestern corner of the property.

The route is typically free of snow between July and October.

5.5 Topographic Reference

The Berg deposit is centred at approximately 603,450 mE, 5,962,920 mN (UTM WGS 84 Zone 9), and is located on the National Topographic Service (NTS) mapsheet 093E/14W.

6 HISTORY

The following has been compiled from several Assessment Reports primarily from Harris and Peat (2008), and from Harris (2012).

The Tahtsa Ranges were first prospected in the early 1900's after gold was discovered near Sibola Mountain. Prior to the late 1920's, several lead-zinc-silver, gold-tungsten and copper showings had been staked. In 1948, the Lead Empire Syndicate re-staked claims originally located by Cominco Ltd. in 1929 over several lead-zinc occurrences. These are now recognized as part of the Berg porphyry system.

6.1 Berg

The potential for porphyry copper style mineralization at Berg was first understood by Kennco (formerly Kennecott), based on their experience in the southwestern United States. Increased exploration expenditures in 1964 enabled bulldozer trenching and diamond drilling that demonstrated the deep effects of surface leaching and revealed the widespread presence of supergene mineralization, a feature not common in the Canadian Cordillera. Subsequent work shows that rocks are leached in places to depths of more than 30 m, and these rocks are underlain by an extensive "blanket" of supergene copper enrichment.

Drilling by Kennecott during 1965 and 1966 delineated two main mineralized zones: a northeast zone that contains primary (hypogene) and some supergene mineralization, and a south zone with widespread supergene mineralization. At the end of the 1966 field season, the property consisted of 108 mineral claims on which there had been a total of 3,886 m of diamond drilling in 23 holes. During 1967, a 3,325-m drill program tested the south zone on a widely spaced grid and three holes explored areas peripheral to the main area of interest. From 1968 to 1970, the property was dormant but metallurgical testing was done on composite samples of drill core. In 1971, three additional holes were drilled in the northeast zone. At the end of the 1971 exploration program, a total of 49 diamond drill holes of mainly NQ (47.6 mm diameter) and BQ (36.5 mm diameter) core had been completed with a total length of 7,875.8 m.

In 1972, exploration and development of the property were taken over by Canex Placer Limited (Placer Dome Inc.) under agreement with Kennecott. From 1972 to 1975, Placer Dome drilled an additional 52 drill holes of NQ and PQ (85 mm diameter) core totalling 9,689.4 m. The PQ holes were utilized to collect metallurgical samples and to address low core recovery issues from previous years. Another 8 HQ (63.5 mm diameter) core holes totalling 1,099.0 m were drilled in 1980.

A total of 119 diamond drill holes for 20,127.9 m had been completed on the Berg property to 1980. A limited amount of pre-2007 drill core is still cross stacked on the property at the old camp site, but most of the mineralized sections have been consumed for metallurgy test work and core box identification is sometimes difficult due to deterioration over the years.

Between 1982 and 2007, there was no active exploration on the project, although Placer had arranged for/or conducted in-house revised resource estimates, additional economic analyses, conceptual mine layouts, and environmental reports. No mining activity has occurred on the property. Detailed descriptions of these activities can be found in reports prepared in accordance with NI 43-101 in June 2008 by Harris and Stubens titled "Technical Report — Mineral Resource Estimate, Berg property, Tahtsa Range, British Columbia", and in June 2009 by Harris and Labrenz titled "2009 Mineral Berg 2017 Aeromagnetic and Geological Mapping Surveys January, 2018 Thompson Creek Metals Company Inc. 9 Resource

Estimate on the Berg Copper-Molybdenum- Silver Property, Tahtsa Range, British Columbia". This information has been summarised below.

In 2006, Placer Dome was purchased by Barrick Gold, who sold the Canadian assets to Goldcorp Inc. Terrane Metals Corp. (Terrane) purchased certain Canadian assets from Goldcorp, including their share of the Berg Project. In September 2006, Terrane purchased Kennecott's share of the Berg Joint Venture to become 100% owners.

An exploration program consisting of 11,288.8 m of diamond drilling in 29 holes and a pole-dipole induced polarization (IP) survey was performed in 2007 by Terrane. A subsequent follow-up exploration program was carried out on the property in 2008 by Terrane, consisting of 11,659.6 metres of diamond drilling in 31 holes and a total field ground magnetic survey performed in the deposit area to determine the geophysical characteristics of the deposit. Both the 2007 and 2008 programs were carried out by Equity Exploration Consultants Ltd. (formerly Equity Engineering Ltd.) under contract to Terrane Metals Corp., from a camp constructed in the drill area. Environmental baseline studies commenced in 2007 and continued into 2008 and were implemented by AMEC Earth and Environmental. This work included review of environmental data for the project site and collection of long lead time data including water quality, hydrology, meteorology, and acid rock drainage/mine leachate test work.

In 2010, Thompson Creek Metals Company Inc. (TCM) purchased Terrane and, in 2011, drilled 36 diamond drill holes for 10,677.6 m. The program was carried out by Equity under contract to Berg Metals from the re-established Berg Camp within the drill area. The program was successful in providing data to refine the deposit's geological model and test prospective areas outside the limits of previous drilling (Harris and Peat, 2011).

Exploration activities which have been completed since 2011 are described in Section 9 of this report. On October 20, 2016, TCM was acquired by Centerra Gold Inc. TCM continues as a subsidiary of Centerra Gold. In December 2020, Surge Copper Corp. (Surge) entered into an Option Agreement with Thompson Creek to acquire up to 70% ownership in the Property and has since conducted various drilling, geophysical, and geochemical surveys on the property, and as described in Section 4.2 of this report.

Numerous regional mineral prospects exist within the current property bounds. The following sections recount historical exploration activities conducted on these prospects prior to Surge's involvement in the Project.

6.2 Additional Prospects

The prospects discussed below occur outside of the Berg Mineral Resource Estimate boundary. However, they occur on the broader continuous claim blocks, which comprise the Berg property.

6.2.1 Bergette

The Bergette Prospect located 10.3 km to the east-northeast (Figure 4-2) of the Berg deposit, forms part of the broader Berg Project and has seen intermittent exploration since its discovery. It represents an important prospect on the Property. It was initially prospected, and silt sampled by Kennecott Explorations during their exploration programs in the region between 1961 and 1964 (Church, 1971); the results of this work were moderately encouraging and from 1971 to 1973 a program of drilling, mapping and soil sampling was undertaken by Granges Exploration. Geologic mapping by Church (1971) showed the area to be underlain by volcanic and sedimentary rocks of the Hazelton Group intruded by the Sibola Stock, a composite granodiorite intrusion with both equigranular and porphyritic phases.

Soil sampling during the 1971 and 1972 programs demonstrated that mineralization at Bergette is marked by a strong Cu-Mo response in soil (Reid, 1971), which extends over a 2 x 5 km northeast-trending zone (Reid, 1972). Responses are strongest over the core of the Bergette mineralization, but are continuous both north and south along strike, suggesting that the mineralized system is larger than what is currently outlined by drilling and rock sampling.

In 1973, an 11.3 line-km frequency domain IP survey was completed over Bergette, extending 1,600 m to the north up Bergette Valley. The survey identified several IP anomalies to the east and northeast of the main Bergette mineralization; however, the depth of penetration for the survey was only 100 – 150 m with gaps in the survey over geochemical anomalies (Hallof and Goudie, 1973). Several shallow drill holes testing the IP anomalies surrounding the main Bergette mineralization were proposed, though no reported work was done to follow-up on this survey. Several of these IP anomalies extend onto the Property.

In 1977, a report was prepared for New Frontier Exploration Inc., by Granges' personnel summarizing the findings of the early 1970s exploration programs and recommending additional soil sampling, mapping, and drilling (Shear, 1977). No recorded work was undertaken to implement the recommendations of the report.

6.2.2 Tahsta Range, Serenity

The Tahtsa Range Showing (093E 007) lies just over 4 km to the south-southeast of the Berg deposit (Figure 4-2) and was historically reported to be a series of northeast-trending, steeply-dipping quartz veins with pyrite, chalcopyrite, galena, specular hematite, and trace amounts of gold (Duffell, 1957). The area was worked in 1984 as the Smokey Pines claim block by Ryan Exploration, with a four-man crew conducting two days of mapping and taking 34 grab samples (Hooper, 1984). The 1984 work was designed to follow-up on a series of trench samples taken in 1982 with reported returns up to 12,000 gpt Ag from the "Saddle Showing", several hundred metres west of the location of the Tahtsa Range MINFILE showing location. Note that primary records from this 1982 trenching program have not been located, and information about it is taken from Hooper (1984). Though the 1984 program failed to replicate the extremely high silver grades reported from the earlier work, they did confirm the presence of a steeply-dipping, northeast-trending vein system with samples containing up to 0.56% Cu, 47 gpt Ag and 0.75 gpt Au. Hooper (1984) also traversed and took rock samples in the creek valleys to the northwest and south of the Tahtsa Range Showing. Samples to the south were anomalous in copper and zinc but were generally low grade. Samples from the area to the northwest returned significant copper, zinc, and silver values with up to 1.2% Cu, 1.8% Zn and 269 gpt Ag from select samples of mineralized veins and float. Additional work to follow -up on the mineralized veins was recommended but never conducted.

6.2.3 Lead Empire, Set, Lost, Ice

While it does not contain any mineral resources or contribute to the Berg deposit, the Lead Empire represents an important prospect on the Property. The Lead Empire Showing (MINFILE 093E/014) lies approximately 1.2 km to the northeast of the Berg deposit (Figure 4-2). This area was first staked by W.H. Padmore in 1948 and 1951 to cover the stockwork veins and shear zones associated with a diorite or gabbro stock. Mineralization includes vein-hosted galena, sphalerite, pyrite and molybdenite, in addition to covellite, chalcopyrite and disseminated pyrite. Mineralization was also noted to contain minor gold and silver content although no values are known. Work completed in the 1951-52 seasons focused mostly on claim access and included trail cutting and cabin construction along with some stripping and trenching (Duffell, 1957).

Further work was completed during the 1969-71 field seasons when the LOST, ICE, SET, and IT claims were staked by Sierra Empire Mines Ltd ("Sierra Empire"). In 1969, Sierra Empire surveyed historical surface workings, conducted geological mapping, bulldozed 29 trenches (totalling 925 m) to bedrock, constructed 2.4 km of road and drilled 17 holes for 976 m (EMPR, 1969). The following year, further surface geological mapping, 1.6 km of road construction and 150 m of trenching was completed (EMPR, 1970). In 1971, another eight drill holes totalling 1,529 m was completed (EMPR, 1971).

Unfortunately, there are no records for this work; however, it appears from air photos that the focus of this work was completed up to two kilometres northeast of the Lead Empire MINFILE occurrence, though at least one road was constructed to within one kilometre from the MINFILE location. Furthermore, MacIntyre (1985) denotes Pb-Zn mineral occurrences in both the MINFILE location and proximal to the extensive road workings to the northeast.

The Lead Empire area was prospected during the 2016 field program with no significant results (Branson and Guestrin, 2016).

6.2.4 CS, NS, Fire, Smoke Mountain, Fire Cat

While they do not contain any mineral resources or contribute to the Berg deposit, the CS, NS, Fire, Smoke Mountain, and Fire Cat represent important prospects on the Property. The CS and NS showings (MINFILE 093E/090) lie on the northern boundary of the Property approximately 15.0 km from the Berg deposit (Figure 4-2) and was previously worked as part of the Smoke Mountain (Belik, 1974; Walker, 1974) and Fire (Ditson, 1990; Linden, 1991; Lui, 2007) claims. The first publicly recorded work is a 9.3 line-km dipole-dipole IP survey that identified four or five anomalous zones (Walker, 1974) that were followed-up with 646 m of diamond drilling over seven holes (Belik, 1974). Belik (1974) reported minor chalcopyrite and molybdenite along with carbonate, gypsum, magnetite/hematite, and chlorite alteration, but did not include assay results. Additional surface work and resampling of the 1974 drill holes was completed by Placer Dome in 1990 and 1991 (Ditson, 1990; Linden, 1991).

Of note, numerous silt and soil samples collected in 1990 contain elevated gold values. Resampling of the drill core returned up to 1,530 ppm Cu over 1.7 m and 0.15 gpt Au over 2.4 m in DH74-3, and 0.48 gpt Au over 1.0 m in DH74-1. No further work on the claims was recommended due the lack of economic mineralization. However, it was noted that porphyry style mineralization and alteration is restricted to the northern contact of the Kasalka intrusion and the Jurassic Hazelton Group volcanic rocks, though it appears this was not the target of the 1974 drilling and has not been fully tested at depth.

The area southeast of the CS Showing was staked as the Fire Cat claims by Patti Walker of Smithers, BC, and optioned by Rimfire Minerals Corporation, who conducted a program of mapping, rock, soil, and silt sampling in 2007. Lui (2007) concluded that copper mineralization at the main Fire Cat (and nearby Hulk) Showing is related to hydrothermal fluid flow along lithological contacts and does not have characteristics of porphyry style mineralization. In addition to the moderate copper values at the Fire Cat and Hulk showings (0.1–1% Cu), a gold-in-soil anomaly was noted near the southern end of the Property, and follow-up work was recommended in the form of a grid soil survey over the area.

No further work has been conducted on these showings.

6.2.5 CS South, Tara, Slide

The CS South area is located approximately 4.0 km south of the CS and Fire showings, 7.0 km north of Bergette and west of the Tara Showing (MINFILE 093E/091). It is traversed by the historical haul road from the Sibola FSR to the Berg deposit (Figure 4-2) and was previously worked as the Slide claims during the 1970s when owned by Hudson's Bay Oil and Gas Corporation. Exploration by Hudson's Bay consisted of 11 percussion drill holes and a ground-based magnetometer survey covering approximately 4 km^2. Work was centred on a small quartz diorite plug belonging to the Bulkley Plutonic Suite (Figure 7-1); it is not clear if the existence of this plug was known prior to the initial exploration, though its presence would likely explain targeting work in this area.

The first five holes were drilled in 1974 and, despite revealing low base metal contents, Kilby (1974a) concluded that as only two of the holes had reached bedrock, the program was not a complete test of the mineralization potential of the area. The following year, a magnetometer survey showed the presence of a 1 x 1 km magnetic high corresponding to a quartz diorite body. A further six percussion holes were attempted, none of which reached bedrock (Hall, 1975a).

An additional five diamond drill holes were completed by Noranda in 1975 on their Sibola Property, located on what is now the Tara Showing. The holes contained only minor mineralization, with two 10-foot samples returning >0.1% Cu (Belik, 1975).

A geological and sampling program done on the Sibola Property in 1991 described the Tara Showing as comprising minor chalcopyrite and malachite associated with a weak stockwork of drusy quartz veinlets and local, irregular shaped zones of intense bleaching and silicification, approximately 200 m east of the most easterly 1975 Noranda drill hole. The best rock assay returned 0.13% Cu, 137 ppb Au and 42.7 ppm Ag, with two other samples returning anomalous Au, As and Sb. Trenching the overburden to the north, east and southwest was recommended, but was never carried out (Belik, 1991).

Approximately 200 m south of the Tara Showing, a tertiary felsic stock within a broad quartz-sericite-pyrite alteration zone with good exposure in the creek canyon was identified. In the canyon, altered rocks are typically pale greenish grey to white and contain abundant finely disseminated pyrite with a quartz-sericite-clay matrix with patchy silicification imparting a spotted Dalmatian-type texture to altered units. At the southern end of the canyon, a late stage, steeply-dipping, hydrothermal breccia body exposed over 12 m contains angular to rounded, altered, pyritic, felsic fragments up to 10 cm hosted in a brown-weathering, crystalline, pyritic carbonate matrix. Geochemical results collected from the canyon were not encouraging (Belik, 1991).

6.2.6 Sky, Rhine Ridge

The Sky Showing (MINFILE 093E/098) occurs in the south-eastern corner of the Berg property, 10 km northwest of the Huckleberry Mine (Figure 4-2).

Following initial government mapping of the region in the 1930s and 1960s, two field programs were undertaken in 1988 and 1989. In 1988, Geostar Mining Corporation undertook a program consisting of reconnaissance soil sampling along contour lines with minor accompanying prospecting. Pardoe (1988) notes the significance of a large gossan and reports anomalous copper, silver, lead, and molybdenum from isolated rock sampling. The results of the soil survey were quite encouraging with well-defined copper-silver and lead-zinc anomalies, as well as sporadic enrichment in gold. A follow-up program was recommended and conducted by Canadian-United Minerals in 1989 and consisted of tightly focused soil sampling, detailed mapping, and extensive rock sampling of the mineralized zones. Harrison (1989) concluded that the Au-Ag-Cu-Pb-Zn mineralization is associated with massive pyrite-arsenopyrite veins, and that vein formation was most likely related to hydrothermal fluids exsolved from the porphyry body during cooling. Additional work was recommended to explore for additional veining in the surrounding area, but never carried out.

A single silt sample from the area downslope of the Sky Showing was analyzed as part of the 2008 QUEST-WEST project (Jackman, 2009). The sample is strongly anomalous in copper, zinc, arsenic, lead, and molybdenum, suggesting the stream sediments were sourced from well-mineralized bedrock. Interestingly, the drainage indicated as the source for the sample does not flow directly over the 1988/1989 work area, but instead drains a lower portion of the slope below this showing.

6.2.7 Sun

The Sun Zone is located 6 km west of the Berg deposit, downstream along Bergeland Creek (Figure 4-2). The area was first explored for mineral potential by Placer Development Ltd., in 1980 to determine if the ground had any viable exploration targets, as the area was being considered as a potential storage site for tailings from the Berg deposit. Outcrop is limited in the area and, as such, the 1980 program consisted of soil sampling and ground geophysics. Examination of the limited outcrop that is present shows a lack of any sulphide or other mineralization (Cannon and Pentland, 1980). Results of the soil survey show several minor anomalies, the best of which is a Cu- Mo-Ag-Pb-Zn zone near the northeastern corner of the grid. Notably, the entire area is covered by a thick layer of glacial till, thus any soil anomalies are likely reflective of transported material. In the case of this anomaly, it is also downstream of the Berg deposit and transport of material from that source must be considered as a potential source of the soil anomaly. Follow-up soil sampling was conducted in 1981 and is reported to have extended the anomaly slightly to the north and west (Smee, 1991), though the original data is not available for this survey and these results have not been verified. Similarly, results of the IP and magnetometer surveys showed several minor anomalies but did not present any highly compelling targets for future work.

An additional follow-up survey was conducted in 1991 by Placer Dome, to determine conclusively if the soil anomaly is the result of bedrock mineralization or simply derived from transported material from the Berg deposit. Smee (1991) examined the anomalous zone with a variety of techniques, subjecting it to several extraction methods and assessing variation in metal content with soil profile depths, coming to the conclusion that the anomaly was formed in situ (as opposed to as the result of hydromorphic transport), but that its source material had been transported downstream from the Berg deposit as a result of catastrophic flooding events. Further work was not recommended.

Several highly anomalous silt samples from this area are included in the 2008 QUEST-WEST database (Jackman, 2009), though the mineralization in these samples is believed to be sourced from the Berg deposit itself, as opposed to a downstream source near the Sun Zone.

7 GEOLOGICAL SETTING AND MINERALIZATION

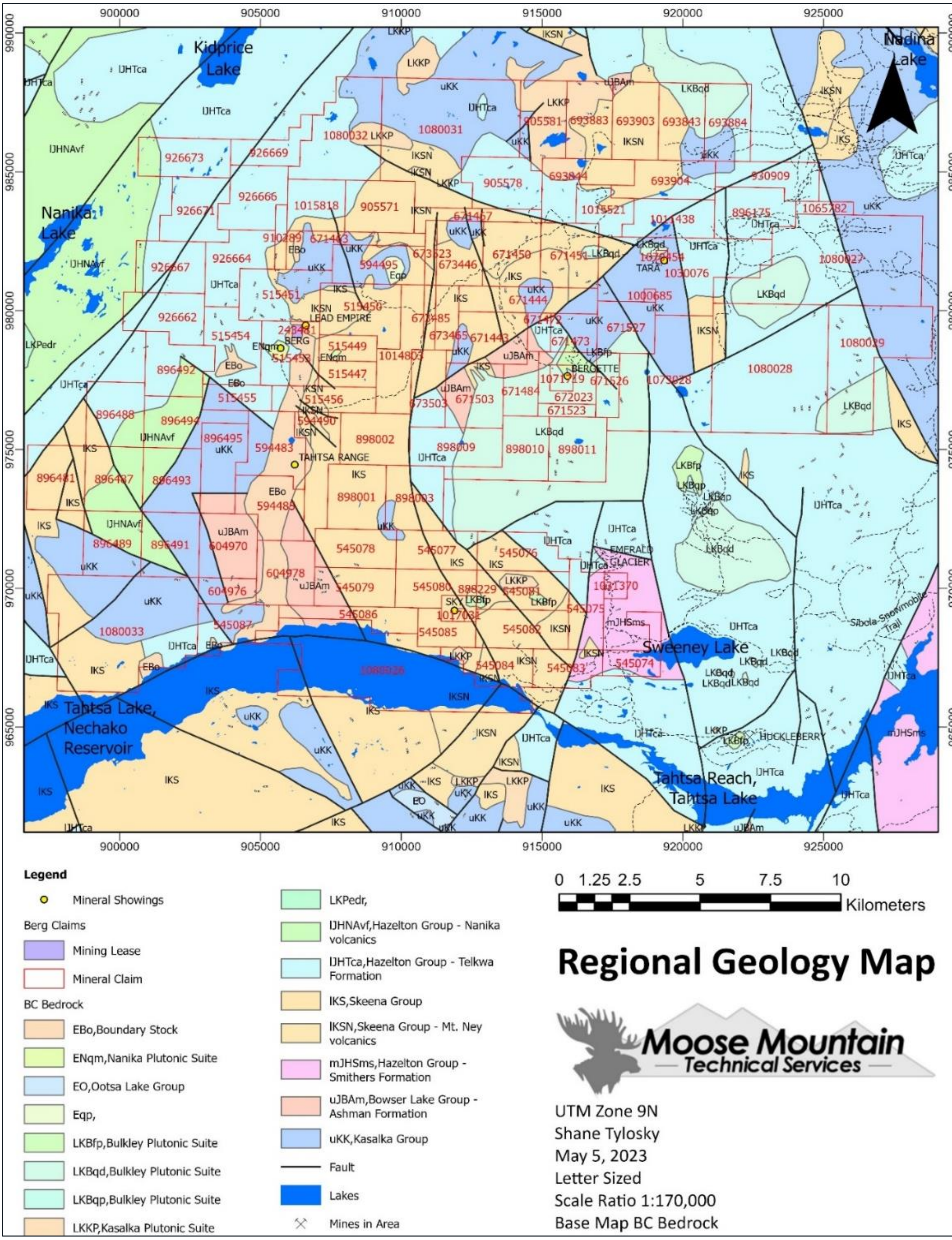
The following descriptions of regional and local geology have been extracted and modified from Harris and Stubens (2008), Harris and Labrenz (2009) and Neilsen (2017).

7.1 Regional Geology

The Berg Property occurs within the western margin of the Stikine Tectono-stratigraphic terrane composed of volcanic and marine sedimentary strata of Lower Devonian to Middle Jurassic age, and supracrustal sequences of Middle Jurassic to Early Tertiary age. The main rocks exposed across the region are Early to Mid Jurassic Hazleton Group andesitic volcanic and minor sedimentary rocks, Early Cretaceous Skeena Group, including sedimentary rocks of the Smithers Formation and volcanic rocks of the Telkwa Formation, and late Cretaceous Kasalka Group hornblende bearing andesites. Intruding into these rocks through the region are several igneous suites including the Late Triassic Stikine Suite, the Early to Middle Jurassic Topley Suite, the Middle Jurassic Three Sisters Suite, the Late Jurassic to Early Cretaceous Francois Lake Suite, the Late Cretaceous Bulkley Suite, and the Tertiary Nanika, Babine, Quanchus, and Goosly Lake Suites. In the region, the Bulkley Intrusive Suite (70 to 84 M) is associated with numerous important mineral deposits and occurrences including Huckleberry, Whiting Creek, Bergette, Coles Creek, and the Ox and Seel deposits. The Bulkley Suite has calc-alkaline chemistry suggesting the magmatism formed in a typical arc setting. The Berg Deposit occurs around a Middle Eocene (52 Ma to 47 Ma) composite quartz monzonite stock associated with the Nanika Intrusive suite.

The region contains structural elements dominated by dextral shearing, compressional faulting, and crustal extension and rifting. The amalgamation of the Stikine Terrane with ancestral North America in the Middle Jurassic resulted in compressional stresses and the development of deep-seated faults. Subsequent relaxation and extension was accompanied by the emplacement of calc-alkalic intrusive rocks and associated porphyry related mineralization. Extensional tectonics in the late Eocene resulted in the formation of north-south trending horsts and grabens which are a key control on exposed levels of mineralization in the district and add structural complexity to some mineralized zones.

Figure 7-1: Berg Regional Geology Map



Source: MMTS, 2023.

7.2 Berg Deposit Geology

The Berg Deposit is hosted primarily within Hazlton Group Telkwa Formation andesitic volcanic and volcaniclastic rocks and Cretaceous to Eocene granitic bodies. The well-studied Berg deposit description is based upon research conducted on the geology, alteration, and mineralization by Panteleyev (1976, 1981), Heberlein and Godwin (1984), and Heberlein (1995).

Two main intrusive bodies are exposed in the Property area. The largest consists of a north-trending, elongate body of quartz diorite (Unit QDR) that intrudes the contact between Hazelton Group and Skeena Group east of the mineralized area. The intrusion extends from 750 m north of the Berg Stock to over 6.5 km to the south (see Figure 7-2). It ranges in width from 600 m on the property area to over 2 km at its southern extremity. Compositional and textural zonation of the quartz diorite is evident with a central core of pink quartz monzonite exposed 1.6 km south of the camp that grades outwards into quartz diorite and hornblende quartz diorite. Porphyritic phases are also present.

The other prominent intrusion in the deposit area is the Berg Stock, a multi-phase composite quartz monzonite stock that intrudes the Hazelton Group andesitic rocks. It is broadly cylindrical, approximately 600 to 750 m in diameter with typically sharp, subvertical contacts. Locally, these contacts are complex with brecciated xenoliths of andesitic rocks with diffuse clast boundaries. Panteleyev (1976, 1981) subdivided this composite stock into four main phases:

- A core of pre-mineral, very coarsely porphyritic quartz monzonite (Unit QMP) as shown in the photo of Figure 7-2.
- A pre-mineral coarse-grained plagioclase-biotite-quartz porphyry (Unit PBQP) that wraps around the northern flank of the QMP core as shown in Figure 7-3.
- A northwest trending, pre-mineral medium-grained porphyritic quartz-plagioclase porphyry (Unit QPP) that extends to the west from the southern and western portion of the QMP core; and
- A narrow, subvertical and northeast-trending late-to post-mineral quartz-feldspar porphyry (Unit QFP) dyke or zone of dyking that cuts across each of the above phases and also cuts quartz diorite along trend and northeast of the stock.

Figure 7-2: QMP Unit

Source: TetraTech, 2021.

Figure 7-3: PBQP Unit

Source: TetraTech, 2021.

These units are illustrated in the map of Figure 7-5 and described below.

The QMP unit is characterized by very coarse-grained plagioclase, quartz, biotite and commonly megacrystic orthoclase. The quartz, in particular, is distinctive and commonly comprising coarse resorbed crystals with sub-rounded and wormy boundaries and with poikilitic intergrowths of plagioclase. Feldspars and biotite are euhedral and minor hornblende is typically replaced by biotite.

The PBQP is a slightly finer-grained quartz monzonite than the QMP with a typically darker grey to brown matrix containing plagioclase, quartz, and biotite with rare orthoclase. Biotite is twice as abundant and typically finer-grained than in the QMP, comprising 2 mm books compared with the 4 - 6 mm books in unit QMP. Internal contacts and cross-cutting relationships within the Berg Stock between the PBQP and the QMP are poorly understood due to lack of drilling, but contacts with the andesitic country rocks appear to be largely subvertical.

Unit QPP is also quartz monzonitic in composition and has the finest grain size of the Berg Stock phases. This leucocratic phase is medium-grained, comprised mainly of plagioclase and quartz with notably absent or rare orthoclase and biotite. The QPP also exhibits characteristically strong and pervasive sericite alteration and local fine secondary biotite. This unit appears to cut the QMP and to have a strong degree of structural control in its emplacement forming a west-northwest trending subvertical keel along the southern margin of the stock.

The QFP dyke forms the backbone of the northeast-trending ridge that transects the Berg deposit. This dyke is also very coarse-grained, closely resembling the QMP with coarse-grained plagioclase, biotite, resorbed and subrounded quartz, hornblende, and common orthoclase megacrysts. Distinctive and characteristic coarse-grained crystals of sphene are also present. Epidote commonly replaces orthoclase and chlorite. Calcite and pyrite are also present as alteration products, particularly after mafic minerals. Quartz-molybdenite veining and chalcopyrite are rare within the QFP. This unit is also the only phase of the Berg Stock that intersects the quartz diorite. This dyke narrows or bifurcates to only a few metres wide where it has been intersected by drilling at the southwest and northeast margins of the stock.

Dark green, typically fine-grained to aphanitic andesite dykes (Unit AND) as shown in Figure 7-4 cut all units. These dykes are typically very narrow and comprise plagioclase and hornblende with accessory magnetite and calcite amygdales. They are likely to be steeply-dipping or subvertical and appear to be coincident with narrow zones of faulting and clay±sericite alteration, particularly along dyke contacts.

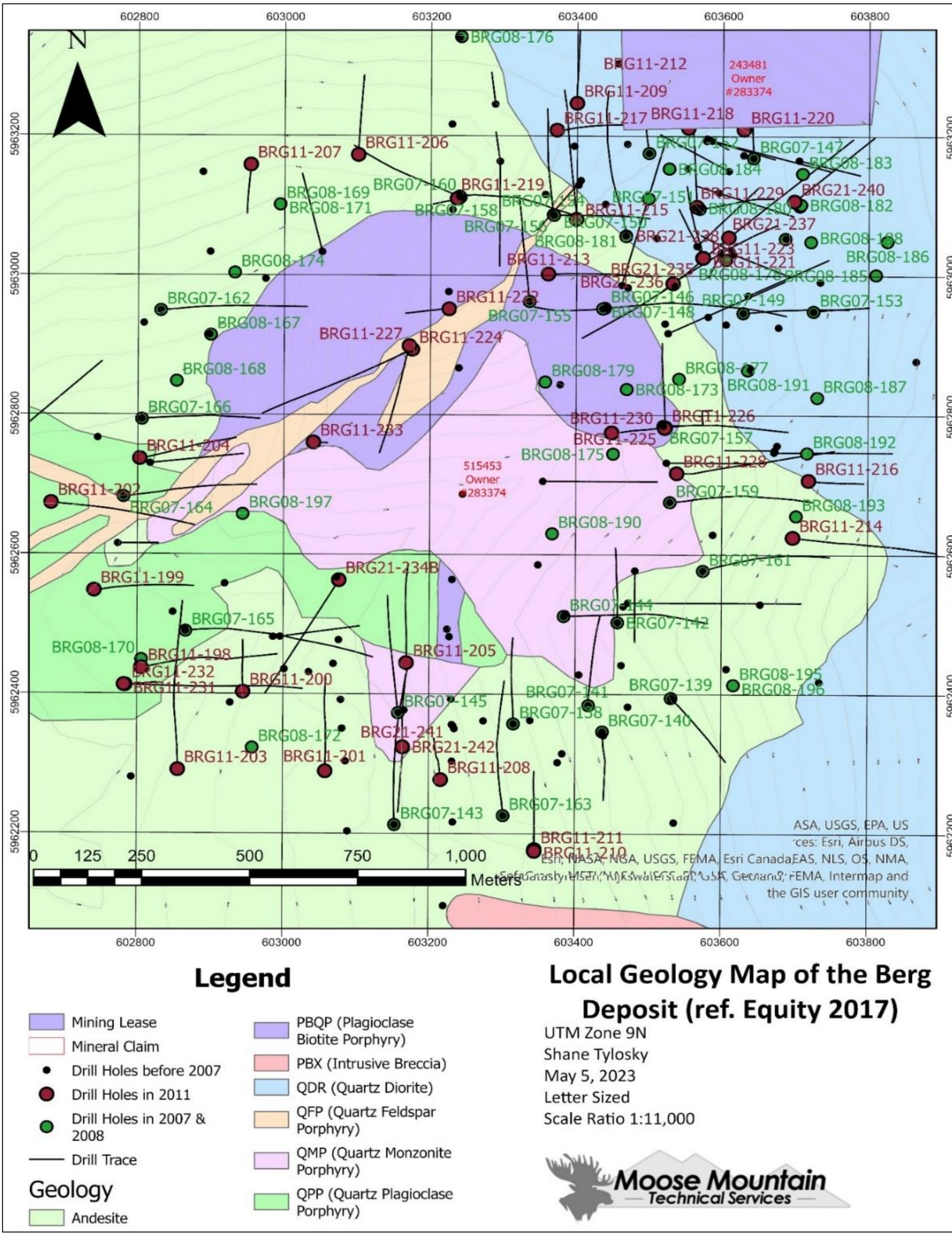
Figure 7-4: Aphanitic Andesite Dykes (Unit AND)

Source: TetraTech, 2021.

These various intrusive phases intrude Hazelton Group volcanic and sedimentary rocks, comprising dominantly subaerial medium to coarse-grained andesitic lapilli tuffs (Units ANTF and ANLT) and lesser flows (Unit ANDF), breccias and volcaniclastic sediments (Unit GRWK). Minor shale (Unit SHAL), siltstone (Unit SLST), chert (Unit CHRT) and limestone (Unit LMST) are also present. Outside the area influenced by the quartz diorite and Berg Stock, the Hazelton Group rocks vary from dark grey to grey-green, purple, and red with obvious textures and bedding (Harris and Stubens, 2008).

Mapping and sampling results to date suggest the Serenity-Tahtsa South area could be the top of a porphyry system that is spatially related to the north-south trending Boundary Stock (Eocene). However, this target area lacks a prominent limonite-jarosite zoned gossan as seen in the upper parts of the Berg deposit, 6 km to the north along trend. The Bergette target area lies within the Sibola Stock (Late Cretaceous) 10 km east of the Berg deposit within a parallel N-S oriented regionally anomalous aeromagnetic trend (Jago and Pond, 2018).

Figure 7-5: Berg Geology Map



Source: MMTS, 2023.

7.2.1 Structure

Structures at the deposit consist of poorly developed open folds with north to northeast axial trends causing local dips of 10° to 30°. Fractures and Miocene basalt dykes parallel this structural trend that may have acted as the principal structural control for the emplacement of intrusions in the area. This relationship is supported by the pronounced elongation of the quartz diorite intrusion (Harris and Stubens, 2008).

Presence of QFP dykes is possibly hosted within steep northeast-trending structures, which may represent early mineralization related conduits or be strictly post-mineralization. Numerous post-mineralization dykes, such as the QFP, have been logged in drill core. Geophysical surveys over the deposit do not suggest that there are any major dislocating faults, which transect the Berg deposit. However, little work has been completed to characterize local deposit scale structure.

7.2.2 Alteration

At hand-specimen scale the quartz diorite, comprising the intrusive body into the Hazelton and Skeena Group of the Berg property, is fine-grained and pale grey or dark grey-brown where hornfelsed or biotite-altered. This unit is a fine-grained rock consisting of plagioclase, hornblende, biotite, and quartz overprinted by biotite, chlorite, and minor epidote alteration. Where the quartz diorite is mineralized, quartz veining, chalcopyrite, pyrite and molybdenite are present in association with biotite alteration. This grades outwards into biotite-chlorite±epidote alteration with pyrite overprinting primary magnetite. A well-developed thermal aureole up to 120 m wide occurs on both sides of the intrusion and into Hazelton Group andesitic rocks in the deposit area. The western contact of the quartz diorite and Hazelton Group andesitic rocks is subvertical and diffuse in nature in the deposit area due to the nature of the hornfelsing and overprinting alteration. Hornfelsed rocks are typically brownish purple due to the abundance of secondary biotite.

Within the alteration aureoles of the various intrusive phases, primary textures are largely obscured, or rocks are recrystallized and dark grey or brown in colour. Relict clasts and phenocrysts are locally recognizable within the alteration halos. This succession strikes north and dips shallowly to moderately to the east and is tops-up.

Alteration and mineralization at Berg are localized in and adjacent to the quartz monzonite Berg Stock. Hydrothermal alteration zones are spatially related to the central quartz monzonite stock and extend up to 1,000 m from the intrusive contact. Alteration types are divided into potassic, phyllic, argillic and propylitic facies whose diagnostic mineral assemblages vary with lithology. Potassic alteration is expressed as pervasive orthoclase alteration in unit QMP, orthoclase on fracture/veinlet selvages and pervasive fine-grained biotite in the matrix of the PBQP, and pervasive fine-grained biotite alteration and replacement of mafic minerals in the quartz diorite and andesite. A subzone of biotite alteration with anhydrite veining lies proximal to the inner contact of this biotite-altered one against the Berg Stock. This phase of alteration is also associated with the replacement of plagioclase phenocrysts in the Berg Stock.

A phyllically-altered zone is dominantly controlled by fractures with quartz and pyrite and is best developed in all units around the margins of the Berg Stock. Where fracture densities are greatest this fracture selvage-controlled alteration can be pervasive as in the QPP and in portions of the QMP. Similar to the biotite alteration zone, propylitic alteration is also concentrically zoned about the Berg Stock. A transitional zone of biotite-chlorite alteration lies inboard of a zone of chlorite-epidote-carbonate-albite as biotite decreases. Primary magnetite is also present, particularly within the biotite-chlorite zone, where not completely sulphidized to pyrite and chalcopyrite. Fracture-controlled retrograde chlorite-epidote-carbonate alteration is also present overprinting other alteration facies as the hydrothermal system collapsed. Chlorite, epidote, calcite, and hematite are present in the late-mineral QFP dykes and carbonate-chlorite-sphalerite-pyrite veins are likely also related to this retrograde event (Technical Report Mineral Resource Estimate, 2008).

A cap of pervasive kaolinite-clay±silica (argillic alteration) overprints potassic and phyllic alteration within the supergene zone and is likely related to acidic solutions formed from the breakdown of pyrite (Technical Report Mineral Resource Estimate, 2008).

Thus far, a porphyry target has not been identified in the Serenity Valley; however, two targets have been identified based on alteration and mineralization mapping. These targets sit at the headwall of the Bergeland Valley and at the confluence of Tahtsa Creek and an unnamed creek draining the Tahtsa Valley (Assessment Report, 2018).

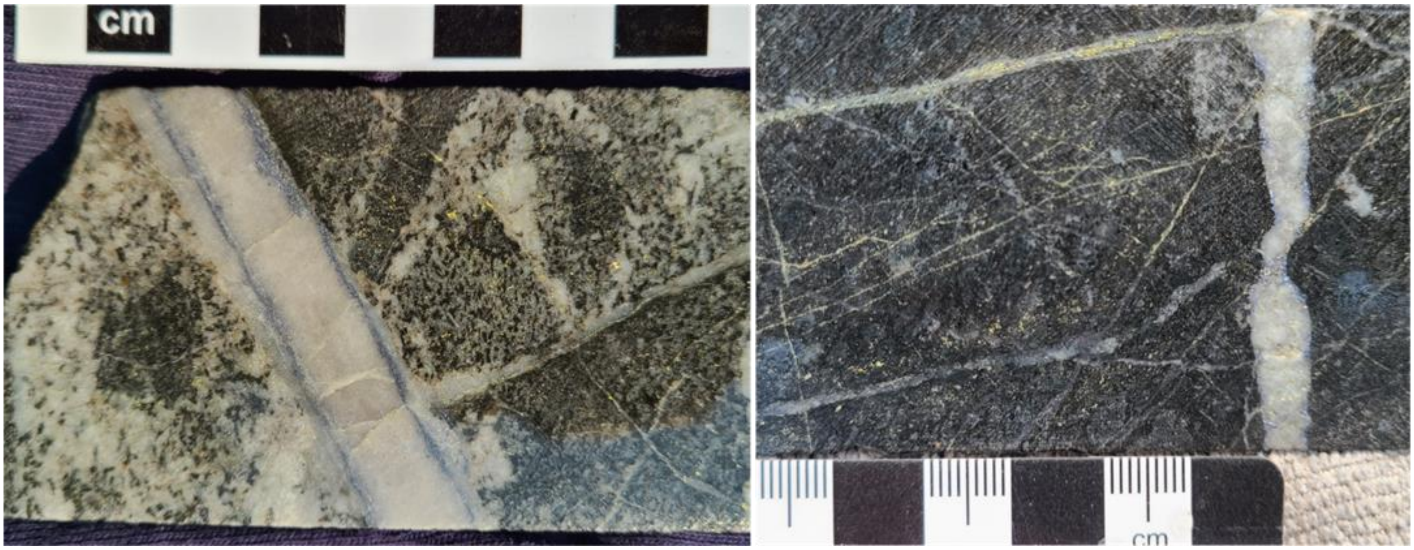
7.2.3 Mineralization

Mineralization is related to hydrothermal activity associated with the intrusive granitic bodies of the Berg Stock and consists of porphyry style mineralization with minor late polymetallic veins. Such mineralization is extensive throughout the region, and similar examples of both vein and porphyry systems have been mined within several kilometres of the Property boundary, including at the Emerald Glacier (polymetallic veins) and Huckleberry (porphyry) mines.

Mineralization at the main Berg deposit is localized in and adjacent to the two Eocene intrusions in the area: quartz diorite, and quartz monzonite of the composite Berg Stock. Three phases of porphyry mineralization and their relative ages were identified during relogging in 2017 of 1,555 m of drill core collected from the 2011 campaign. The relogging program concluded that cross-cutting vein relationships and the distribution of alteration assemblages identified at least three porphyry intrusion events (QPP-P1, PBQP-P2, and QMP-P3) despite their similar mineralogy. QPP-P1 is strongly altered, with only relict phenocrysts and contains the highest vein density of all the porphyry bodies. PBQP-P2 is also altered, but to a lesser degree, and has lower vein density. QMP-P3 hosts the fewest veins and is the least altered of the intrusive bodies within the Berg composite stock and includes well preserved igneous biotite books. Previous logging had identified sericitic alteration within QMP-P3, with the 2017 relogging program suggesting this is instead supergene-related clay (2017 Assessment Report). The Berg Stock is the prime control on copper-molybdenum mineralization at the Berg property as the deposit forms an annulus around the stock. Mineralization occurs in a highly fractured zone superimposed on hornfelsed Hazelton Group andesitic volcanic rocks, the adjacent quartz diorite intrusion, and, to a lesser degree, the Berg Stock (Figure 7-5) (Harris and Stubens, 2008). Current known mineralization extends in a cylinder about the central core with a diameter of approximately 1300 m and depth of up to 900 m. It remains open at depth at to the east near surface.

Typical copper and molybdenum mineralization (Figure 7-6) occur primarily in potassically-altered rocks related to the earlier phases of the Berg Stock (QPP-P1 and PBQP-P2), with most hypogene mineralization occurring in several generations of quartz-sulphide veins. The earliest veins appear to be the most copper- and molybdenum-rich. Associated alteration envelopes are either potassic or non-existent, implying equilibrium with the potassically- altered wall rocks. Later veins are typically poor in Cu ± Mo sulphides and are associated with phyllic and propylitic alteration assemblages. Calcite ± gypsum ± quartz-sphalerite-pyrite ± galena veins are a common late vein type and contain up to 1,020 g/t Ag. This argentiferous mineralization is particularly prevalent within the PBQP-P2 in the West Shell and to a lesser extent with PBQP-P2 in the North Shell.

Figure 7-6: Typical Copper and Molybdenum Mineralization



Source: Surge Copper, 2023.

A well-developed supergene enrichment blanket overprints and is developed above the hypogene mineralization and is subdivided into three mineralogically distinct zones: (1) supergene sulphide (chalcocite with lessor covellite, and digenite), (2) supergene oxide (malachite/azurite, cuprite, tenorite, and native copper) and (3) leached capping.

The presence or absence of these zones is determined by several factors including fracture intensity, abundance of hypogene sulphide and topography. Topography has the greatest effect on supergene profile development. Three different profiles corresponding to ridge-top, slope and valley floor environments are recognized (Neilsen, 2017). In the ridge-top environments the supergene profile is complex, consisting of a strong leached and oxidized zone underlain by a thick but poorly enriched supergene sulphide zone. In the valley floor environments, where the water table is at or close to the surface, leaching is minimal and fresh hypogene minerals occur at surface. The most complex profile is developed on steep slopes, where highly variable water table levels and a high rate of ground water migration have coupled to produce a strongly enriched supergene sulphide zone overlain by a zone of supergene oxide. The supergene sulphide zone is dominant with supergene oxide and leached zones making up a small portion of the preserved supergene profile. The supergene sulphide zone overprints hypogene mineralization with the proportion of supergene sulphides relative to hypogene sulphides decreasing with depth.

The boundary between the supergene and underlying hypogene zones is marked by the last logged occurrence of chalcocite in drill core and can also correlate, but not consistently to the upper limit of gypsum fracture-filling. Supergene oxide mineralization is also strongly developed on the margins of, and commonly within, post-mineral andesite dykes where they transect the supergene zone. The buffering effect of the carbonate-bearing andesite dykes and the QFP dykes with the acidic cupriferous leachate appears to have resulted in the precipitation of the supergene oxide minerals, chiefly tenorite, malachite, and azurite as illustrated in Figure 7-7. Supergene mineralization is less commonly present on the QFP dyke contacts.

Figure 7-7: Supergene Mineralization

Source: Surge Copper, 2023.

8 DEPOSIT TYPES

The following has been extracted from Nielsen, 2017.

> "The Berg deposit is a classic calc-alkaline copper-molybdenum porphyry deposit of Eocene age. These deposits are typically associated with commonly zoned and/or multi-phase granodiorite to quartz monzonite intrusions and volcanic or sedimentary country rocks. These deposits are marked by complex alteration zones that are usually centred about the intrusive complex. The alteration systems are typically comprised of a potassic core enveloped by an overlapping peripheral zone of propylitic alteration. These alteration assemblages can be overprinted by zones of phyllic and/or argillic alteration that are either zonal in distribution (between the potassic and propylitic zones) or structurally-controlled.
>
> Copper and molybdenum mineralization are more abundant in the potassic core while pyrite is more prevalent in the propylitic and phyllic zones. The abundance of pyrite in these systems can result in the formation of strongly acidic groundwaters that, under appropriate climactic conditions, generate argillically-altered oxidized zones and supergene Cu mineralization. Mineralization consists of: chalcopyrite, chalcocite, covellite, digenite, bornite, molybdenite and locally Cu oxide minerals. The sulphides are hosted in quartz veinlet stockworks, veins, breccias, disseminations and replacements. The oxides are found close to surface in the Oxidized and Supergene Zones."

9 EXPLORATION

In 2021 Surge Copper rehabilitated the historic Berg access road to allow 4 wheel drive and heavy equipment access, re-established the Berg exploration camp, and completed 2855 metres of core drilling in 10 holes. An airborne ZTEM survey was conducted over the Berg and Ootsa properties. In 2022 Surge Copper conducted surface sampling and prospecting across the Berg property, completed 4 IP survey grids, and drilled 10 holes at the Bergette, Sibola, and Sylvia prospects. The Surge exploration program are described in Section 9.4.

9.1 Previous Operator Exploration 2011-2020

9.1.1 Berg

In 2014, TCM contracted UTM Exploration Services Ltd., of Smithers, BC to conduct a 21-day prospecting and sampling program of the Berg claims. The program involved predominantly expansive, wide reaching reconnaissance work on all “soon to lapse” peripheral claims surrounding the main Berg deposit. Approximately 24,939 ha were acquired from 2011 to 2014 requiring ongoing active exploration. The design and intention of the 2014 program was to physically examine other areas that showed potential for new mineralization and extensions to known mineralization.

A 2015 surface exploration program was conducted by Equity Exploration Consultants Ltd. On behalf of Berg Metals. A crew of four people were on-site for approximately five weeks, and conducted geological mapping and rock, soil, and silt sampling on eight separate zones outside the main Berg deposit.

In 2016, Equity Exploration Consultants were also retained to conduct field exploration at Berg. Work on the Property consisted of camp construction, 17.4 line-km of Induced Polarization (IP) geophysical surveying, geological mapping, rock, soil and till sampling over approximately a four-week period.

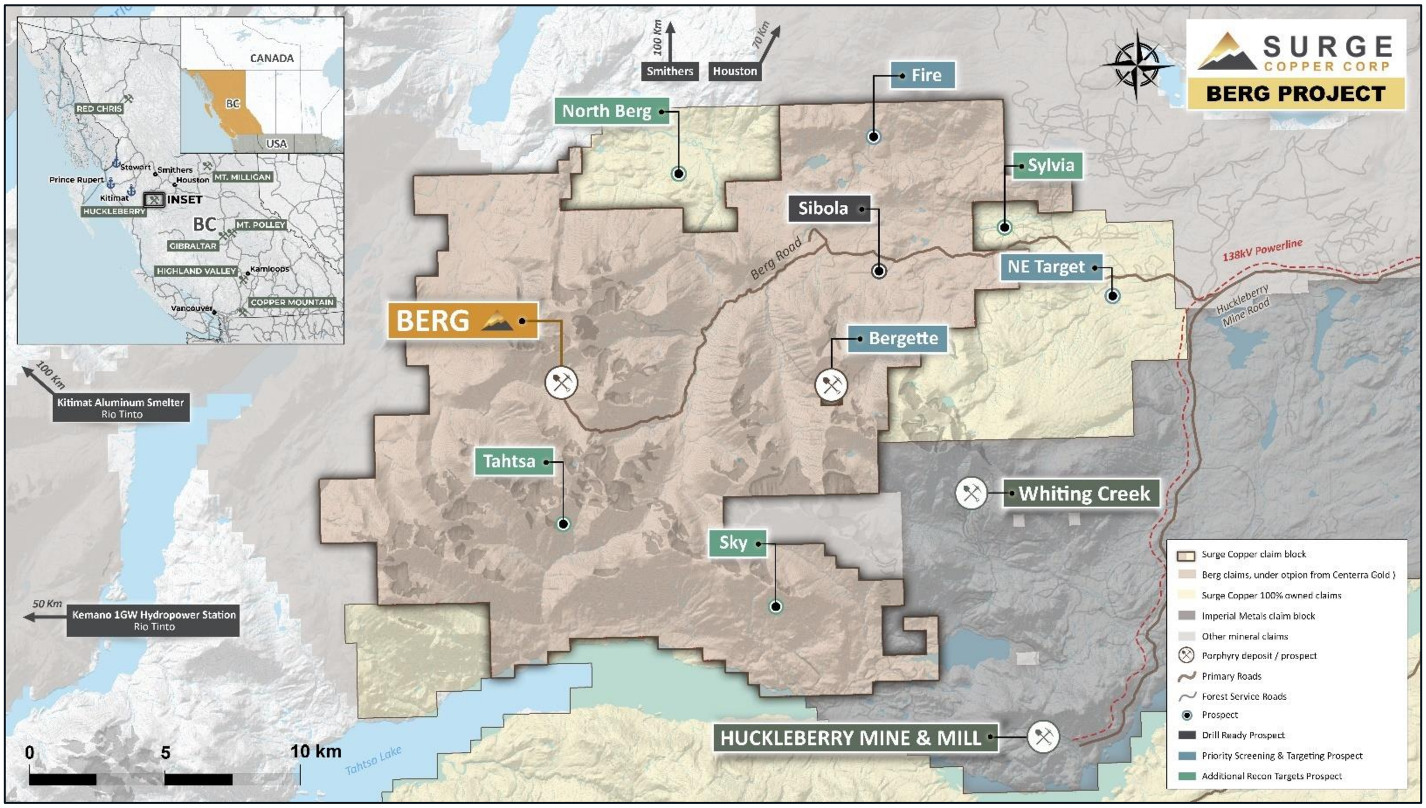
In 2017, an exploration program at Berg was carried out by Equity under contract to TCM, between July 19 and September 11, 2017. The program was split into three phases. The first phase comprised a review of Berg core to determine if further exploration work was required at the deposit. The second phase comprised geological mapping of the Tahtsa-Serenity map area by a crew of three people (refer to Section 9.3). A small camp (Tahtsa Camp) was established in a south-facing alpine cirque at the foot of the southern spur of Mt. Ney, referred to as “Tahtsa Valley” for the Tahtsa-Serenity mapping. This camp was taken down September 6, 2017. The third phase consisted of evaluating regional magnetic anomalies, through focused geological mapping and prospecting. Where feasible, the geological mapping of the Tahtsa and Serenity Valleys proceeded on foot, with the more outlying areas being accessed by helicopter.

Additionally, a mineralogical program consisting of 237 samples were analyzed by Terraspec from various locations around the Berg Property and a targeted magnetic susceptibility program on 253 samples was completed to characterize the various lithologies and alteration styles observed on the property (Nielson, 2017).

9.2 Other Mineral Prospects and Showings

Surge Copper has recently consolidated the claim holdings over the Bergette Prospect, as illustrated in Figure 9-1 (and also in Figure 4-2) to ensure that the target can now be evaluated as a whole, under one ownership structure. The main showings within the Surge holdings are summarized in the sections below.

Figure 9-1: Berg Claims and Deposits/Prospects



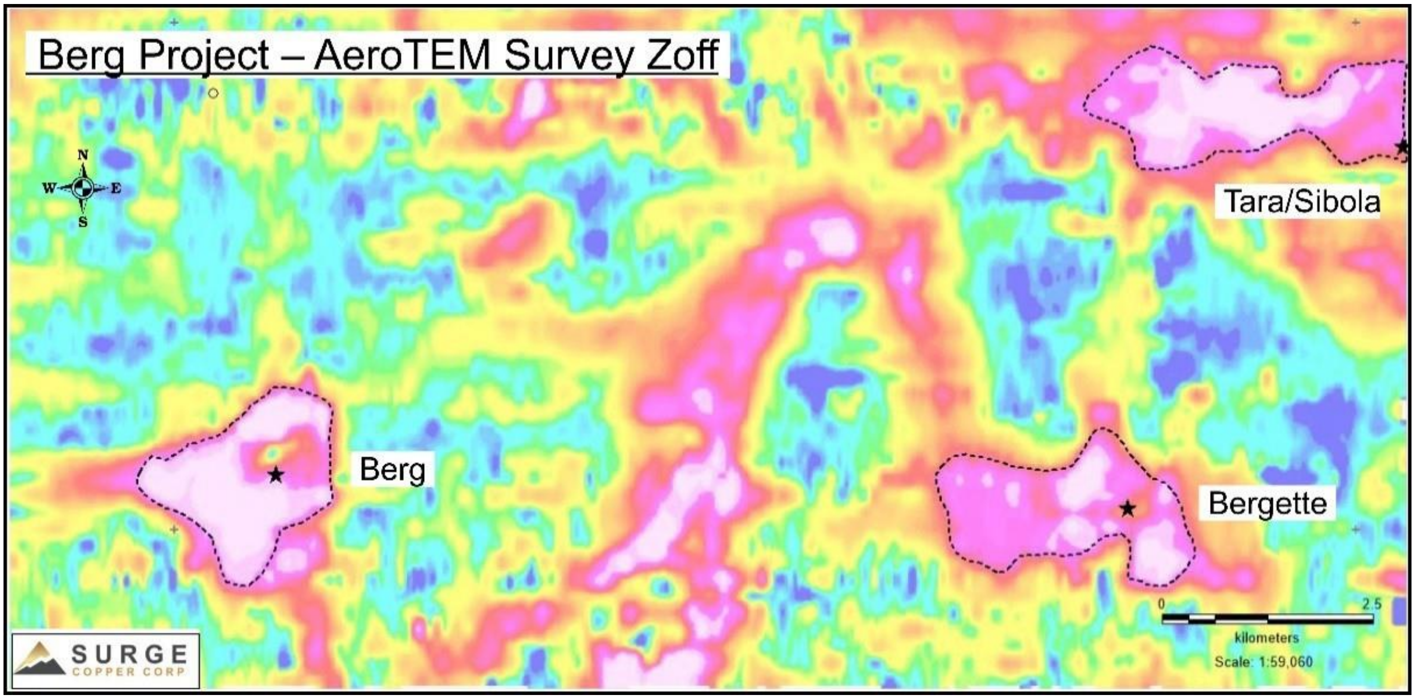
Source: Surge Copper, 2023.

9.2.1 Bergette

Surge Copper has recently consolidated the claim holdings over the Bergette Prospect (Figure 4-2) so the target can now be evaluated as a whole, under one ownership structure. Bergette is currently the most extensively explored area on the entire Berg claim block outside the main Berg deposit itself. Exploration conducted prior to 2010 for the prospect is described in Section 6.1, and work completed by TCM is described below.

An airborne AeroTEM III survey flown over the Berg and Bergette areas in 2010 shows Bergette has a similar size resistivity response (Z1-Off) as the Berg deposit (Figure 9-2 below). The Tara/Sibola prospect to the north of Bergette also shows a very prominent anomaly in the airborne survey.

Figure 9-2: Data from a 2010 Airborne AeroTEM III Survey showing Z1-Off Results (in nT/s).



Source: Surge, 2023.

Known mineralization at Bergette is hosted within a large (6 km²) gossan, which itself contains a 4 km² copper in soil anomaly that remains open to the east. Most historic work and drilling occurred within two zones within the west side of the copper in soil anomaly, a Southern Zone, and a Northern Zone. The eastern side of the copper in soil anomaly remains underexplored.

The Southern Zone is a fractured and vuggy breccia zone that is hosted by the Sibola Stock and healed/filled with gypsum, pyrite, molybdenite, chalcopyrite, pyrite, magnetite, and epidote. This was the largest zone of mineralization defined by the historical drilling and contains zones grading 0.3% Cu over tens of metres. The Northern Zone comprises sets of mineralized fractures that extend over a much larger part of the Sibola Stock and are responsible for much of the gossan in the area (Church, 1971). These fractures are typically filled with quartz, pyrite, and chalcopyrite with rare occurrences of molybdenite and other copper sulphide minerals. Where these fracture sets are well-developed, they are associated with intervals, up to tens of metres thick, that consist of vein-hosted and disseminated copper sulphide minerals and mantled by barren country rock. For example, a 1972 percussion drill hole (P9-72, collared approximately 1 km north of the breccia zone within the Southern Zone; Table 9-1) returned 0.45% Cu over 12.2 m within a 64.0 m zone hosting 0.32% Cu. Highlights from percussion and diamond drilling conducted between 1971-1973 include 0.29% Cu over 70.1 m (GF #1), 0.24% Cu over 88.39 m (GF #4), 0.15% Cu over 203.76 m (GF #2), 0.74% Cu over 12 m (GF #3), 0.42% Cu over 30.48 m (P9-72) and 0.45% Cu over 12.2 m (P9-72). A compilation of significant historical drill results is shown in Table 9-1.

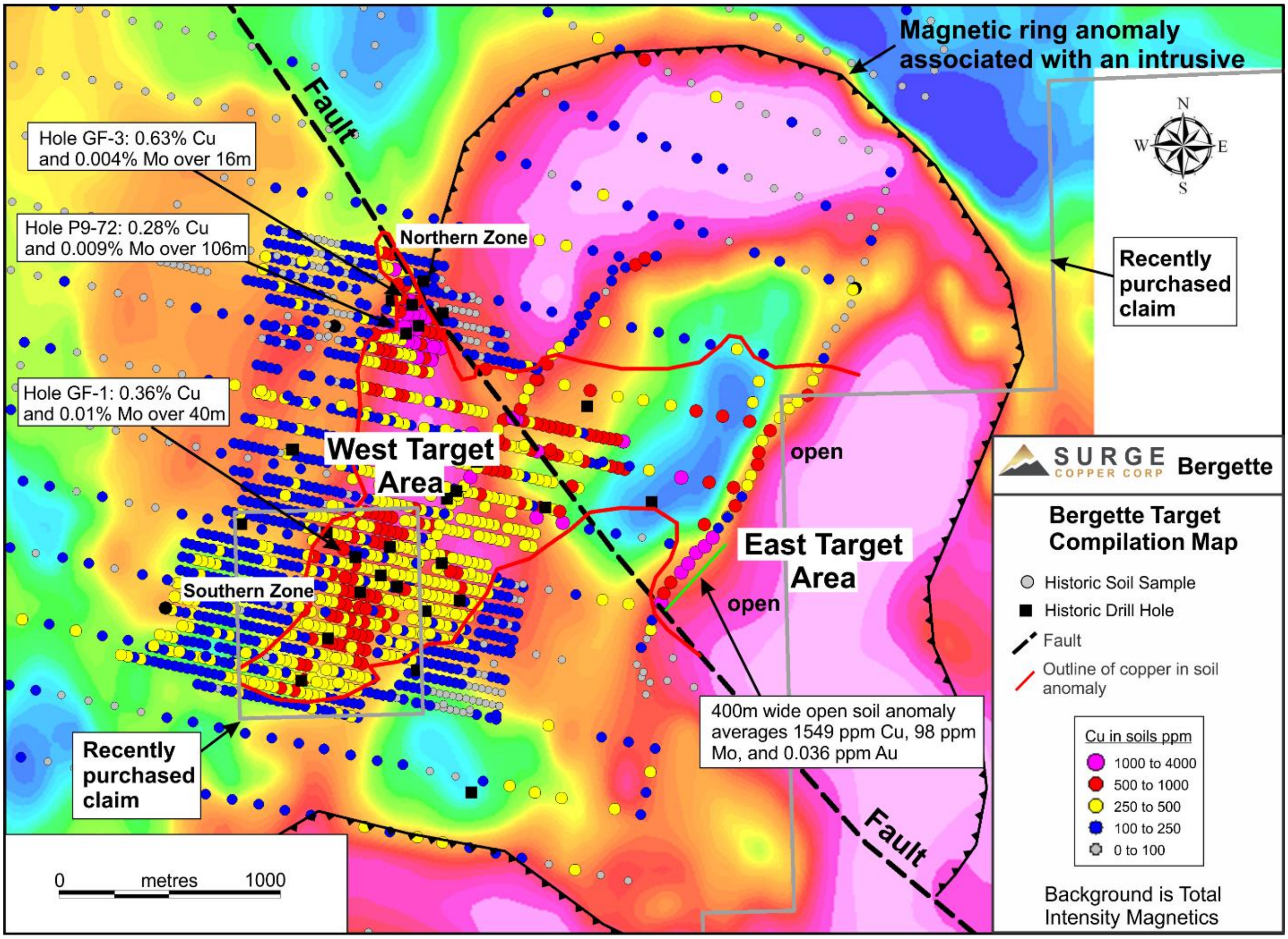
Table 9-1: Significant Historical Bergette Drilling Intercepts

Year	Hole ID	From (m)	To (m)	Interval (m)	Cu (%)	Mo (%)	Ag (oz/t)
1971	GF-1	170.69	240.79	70.10	0.29	0.011	0.02
1971	incl.	219.46	240.79	21.33	0.43	0.008	0.02
1971	GF-2	5.49	209.25	203.76	0.15	0.003	0.02
1971	incl.	45.72	76.20	30.48	0.2	0.002	0.02
1971	incl.	176.78	182.89	6.10	0.34	0.003	0.02
1971	GF-3	36.58	48.77	12.19	0.74	0.005	0.04
1971	GF-4	106.68	195.07	88.39	0.24	0.012	0.03
1971	incl.	106.68	112.78	6.10	0.38	0.001	0.02
1971	incl.	152.4	195.07	42.67	0.34	0.020	0.04
1972	P2-72	45.72	51.82	6.10	0.12	0.044	-
1972	P2-72	67.06	70.10	3.04	0.26	0.009	-
1972	P9-72	6.10	70.10	64.00	0.32	0.010	-
1972	incl.	18.29	48.77	30.48	0.42	0.010	-
1972	incl.	39.62	48.77	9.15	0.54	0.008	-
1972	P9-72	100.58	112.78	12.20	0.45	0.011	-
1972	P11-72	45.72	54.86	9.14	0.25	0.005	-

Source: Nielsen, 2017.

Recent compilation work shown in Figure 9-3 shows a prominent magnetic ring structure at Bergette that has been truncated by a northwest trending fault. This fault also offsets and divides the Bergette copper in soil anomaly into a West Target area and an East Target area. The West Target area is well constrained by historic soil sampling whereas the East Target area remains open for expansion and has seen no historic drilling. The East target area contains a 1.25 km long copper (Cu) in soil anomaly that is open to the east and includes a 400 m wide section with soil values averaging 1,549 ppm Cu, 98 ppm Mo, and 0.036 ppm Au. This zone of very high Cu in soils correlates well with a magnetic high interpreted to represent the eastern contact of the Sibola Stock (inner part of the magnetic donut shaped feature). The presence of high copper in soils corresponding with the projected contact of the intrusion, makes for an excellent target for “contact style” mineralization within wallrocks adjacent to the main stock, such as that seen at the Berg, Huckleberry, and Ox deposits.

Figure 9-3: Compilation Map of the Bergette Target Showing Copper in Soil Values and Historic Drill Hole Collars Overlain on Airborne Total Intensity Magnetics



Source: Surge, 2023.

9.2.2 Tahsta Range, Serenity

The Tahtsa Range Showing (093E 007) lies just over 4 km to the south-southeast of the Berg deposit (Figure 4-2) and was historically reported to be a series of northeast-trending, steeply-dipping quartz veins with pyrite, chalcopyrite, galena, specular hematite, and trace amounts of gold (Duffell, 1957). Historical work conducted in this area prior to 2014 has documented presence of Cu-Zn +/- Ag grades unreproduced occurrence of Au mineralization from a northeast-trending and steeply-dipping vein systems with rock samples in the northwestern area known as the Saddle Showing up to 1.2% Cu, 1.8% Zn and 269 gpt Ag (Hooper, 1984). Follow-up work in 2015 at this showing confirmed presence of polymetallic Cu-Zn-Pb-Ag-Au mineralization, and a broader geochemical anomaly with elevated Cu, Mo, Pb, Zn, Ag, Au, and Sb values (Swanton, 2015).

A silt sample collected as part of the QUEST-WEST project (Jackman, 2009) reported strongly anomalous Mo-Cu- Ag-Pb from the drainage south of the Tahtsa Range Showing.

Exploration conducted prior to 2010 for the prospect is described in Section 6.2, and work completed from 2011 to 2019 is described below.

As follow-up to historical work which identified Cu-Zn +/- Ag and possible gold mineralization, a prospecting and soil sampling was completed in the Tahtsa-Serenity area in 2015. Resampling of the "Saddle Showing" confirmed high grade mineralization with the best sample returning 13,140 gpt Ag, >20.0% Pb, 1.04% Cu, 6.20% Zn, and 5.72 gpt Au. Within the Serenity Cirque and northwest of the "Saddle Showing," several rock grabs from northeast-trending and steeply-dipping polymetallic veins were collected containing up to 2.25% Cu and 1.23% Zn. To the south along the east-west trending creek, rock grabs from previously unsampled outcrops returned assay values from 100–1,220 ppm Cu. Contour soil sampling above the creek confirmed the presence of a copper-bearing hydrothermal system of unknown size and extent, revealing a 1.5 x 0.75 km zone of elevated Cu, Mo, Pb, Zn, Ag, Au, and Sb (Swanton, 2015).

Also, in 2015, a set of magnetite-epidote veins with isolated occurrences of chalcopyrite, extending over 300-400 m, were discovered approximately one kilometre north of the Serenity Cirque, two and a half kilometres south of the Berg deposit, and within a couple hundred metres of the Berg access road. These veins are weakly anomalous in Cu (50–200 ppm) and slightly enriched in As and Zn (100–300 ppm and 50–70 ppm, respectively). Though the metal contents of the veins are low, they may represent a distal part of the Berg porphyry system or another centre of mineralization (Swanton, 2015).

In 2016, a limited campaign of prospecting was conducted in various areas within the Tahtsa-Serenity drainage system (Branson and Guestrin, 2016). This mapping defined a ~1,000 m gossan zone centred on the confluence of Tahtsa Creek and the south-flowing unnamed creek that originates in the Tahtsa cirque. Rock and soil samples from this area returned anomalous Au, Cu, and Mo. The saddle showing was visited but not sampled, as this had been done the previous year (Swanton, 2015).

In 2017, Equity on behalf of TCM, undertook a geological mapping program of the Tahtsa-Serenity area with the aim of investigating the magnetic anomaly surrounding the Serenity Valley and the argentiferous veins at the Tahtsa Range showing. The program concluded that the magnetic anomaly is likely related to topographically high magnetic intrusive rocks and adjacent hornfelsed sedimentary rocks. The argentiferous veins at the Tahtsa Range were found to be subvertical and NNE-striking (10- 30°), which Nielson (2017) concluded is not compatible with the hypothesis that these veins are porphyry-related D-veins (Branson and Guestrin, 2016; Swanton, 2015).

9.2.3 Lead Empire, Set, Lost, Ice

The Lead Empire area was prospected during the 2016 field program with no significant results (Branson and Guestrin, 2016) and is described in Section 6.3.

9.2.4 CS South, Tara, Slide

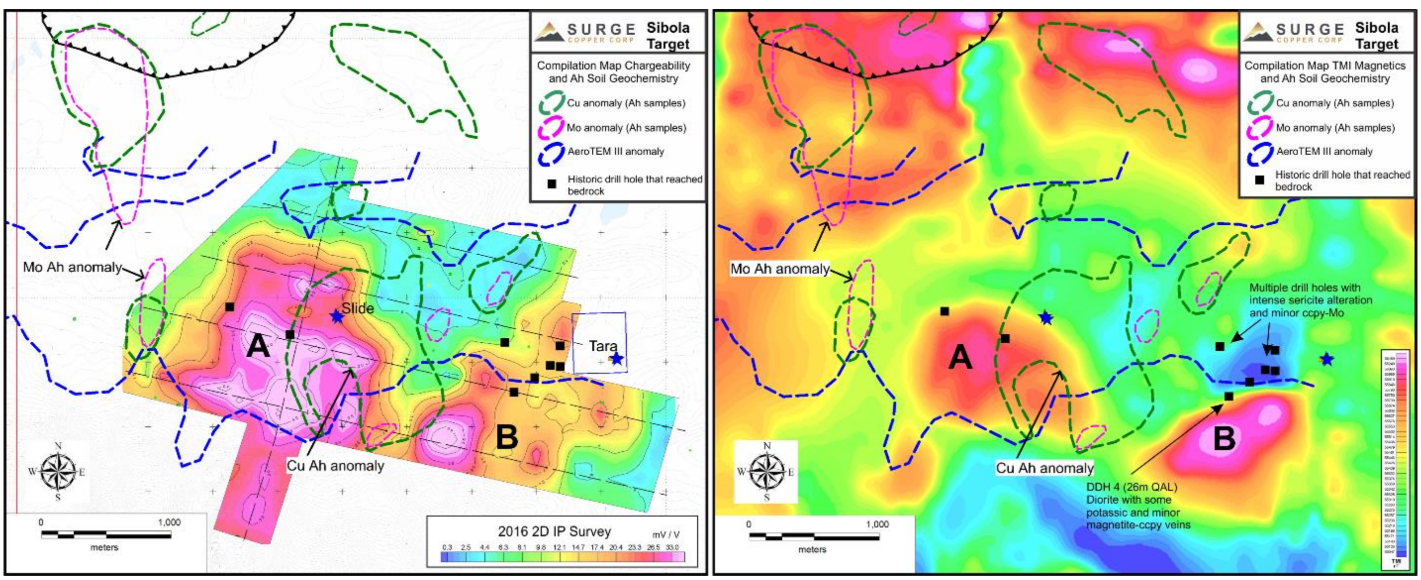
In 2015, a total of 454 Ah horizon soil samples were collected in the CS South area and three distinct multi-element anomalies were identified, with the largest approximately 3.0 x 0.75 km in size. Further work was recommended due to its proximity to an airborne-detected conductor with a similar response to the Berg deposit (Swanton, 2015).

In 2016, a single prospecting and mapping traverse was carried out in the CS South area. No significant mineralization was encountered (Branson and Guestrin, 2016). A 17.4 line-km IP survey was completed in the CS South zone to follow up on three distinct multi-element geochemical anomalies from Ah sampling completed in 2015 (Swanton, 2015). Four east-west lines were initially completed and produced a high chargeability and low resistivity response. As a result, a fifth north-south cross-line was surveyed to define the centre of the response and better characterize the anomaly. The anomaly was determined be 1,500 m x 1,000 m and at least 400 m in depth, dipping to the east and centred at 614,045 mE, 5,966,380 mN. The anomaly is coincident with an oval-shaped 1,300 m x 900 m high magnetic and EM response from a helicopter-borne survey completed in 2010 (Branson and Guestrin, 2016).

Geophysical data and limited historic drilling suggest the Slide and Tara targets are related to the same large porphyry related alteration system, and collectively this zone is referred to as the Sibola Target. Limited historic drilling shows the target area is covered by four to 50 m of overburden with multiple drill holes hitting intense sericite alteration with or without pyrite-chalcopyrite-molybdenite, and minor secondary potassium feldspar, biotite, and magnetite.

A compilation map of the Sibola Target is shown in Figure 9-4. An IP survey over the area shows a 2 km by 2 km chargeability anomaly that is open to the south. Two prominent magnetic highs correspond with zones of high chargeability (labelled A and B in the Figure) and remain largely untested. The nearest drill hole to target B intersected altered diorite with patchy zones of potassic alteration and magnetite-chalcopyrite veinlets, highlighting the potential of the target.

Figure 9-4: Compilation Maps of the Sibola Target. (Left) Induced Polarization Chargeability, Outline of the AeroTEM Airborne Geophysical Anomaly, and Anomalous Ah Soil Geochemistry. (Right) Total Magnetic Intensity Airborne Magnetics.



Source: Surge, 2023.

9.2.5 Sky, Rhine Ridge

The Sky Showing (MINFILE 093E/098) occurs in the south-eastern corner of the Berg Property, 10 km northwest of the Huckleberry Mine (Figure 4-2). It is marked by an extensive gossan related to a swarm of porphyritic quartz monzonite to granite dykes and intrusive bodies, which were emplaced into sedimentary and volcanic rocks of the Cretaceous Skeena Group (Harrison, 1989). The gossan is the result of widespread pyritic alteration along the contacts of these dykes in association with arsenopyrite. Anomalous copper, silver, lead, and molybdenum mineralization has been observed from rock sampling (Pardoe, 1988) with some sporadic gold mineralization noted in soils.

In 2015, a soil and prospecting grid was sampled several hundred vertical metres below the Sky showing. Prospecting and soil sampling on the lower portion of the grid showed no evidence of mineralization. The upper portion however hosts a 2 km long soil anomaly directly downslope from the veins of the Sky Showing. Follow-up work was recommended to fill in the gap between the 1988 and 2015 sampling areas (Swanton, 2015).

Sampling on Rhine Ridge in 2015 returned moderately anomalous Cu-Pb-Zn values (>100 ppm in select samples) and follow-up work was recommended (Hutter et al., 2014).

A description of historical exploration on this prospect is described in Section 6.6.

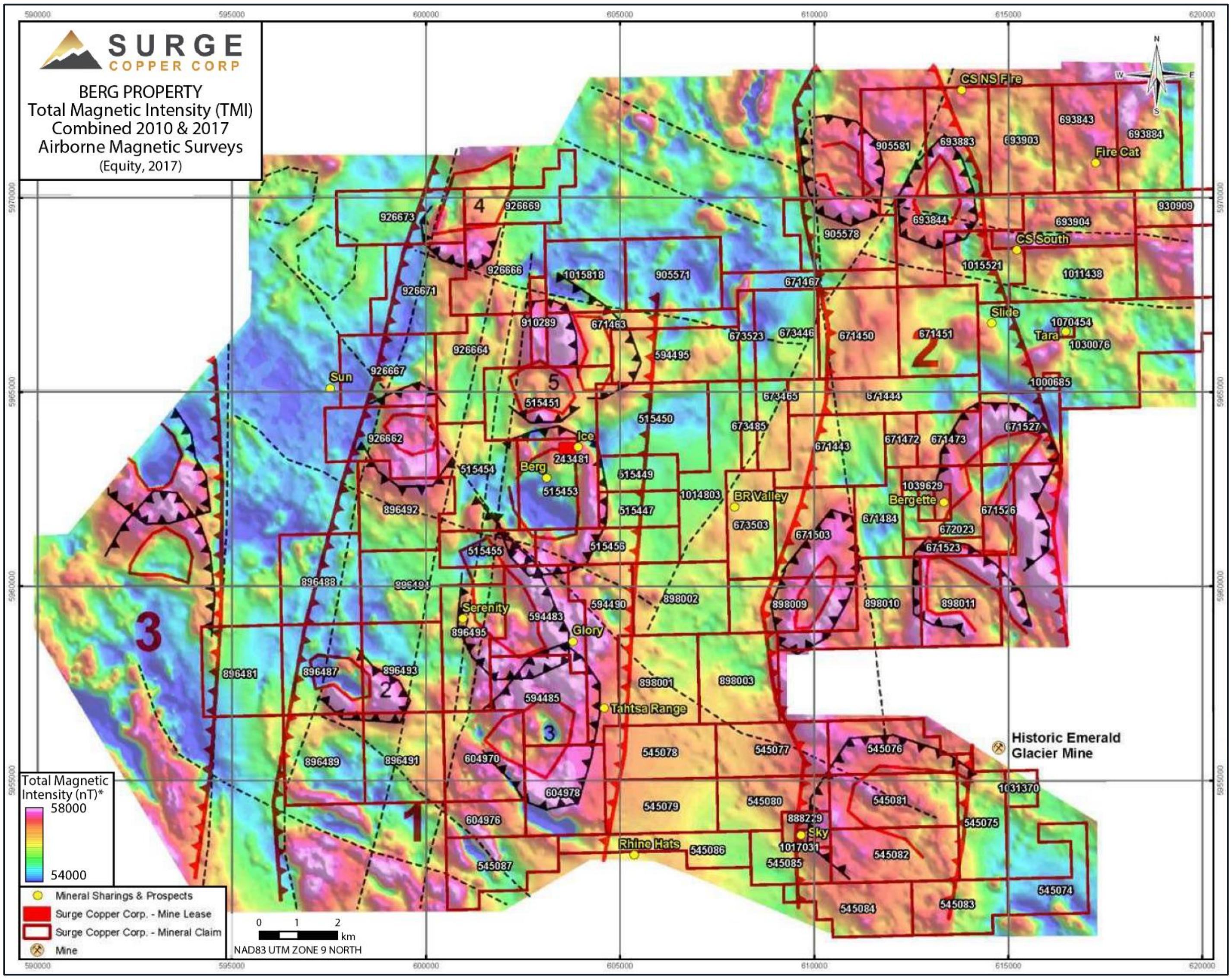
9.3 Other Work

Terrane Metals conducted an airborne geophysical (magnetic and EM) survey in 2010 over an area of ~130 km² covering what is now the east-central portion of the current Property. The survey encompassed the Berg, Bergette, BR Valley and CS South areas as they are defined in the current report. Results of the survey showed a clearly defined conductivity anomaly over the Berg deposit, with similar anomalies in the Bergette and CS South areas. In addition to the broad conductors defined over these zones, several strong linear conductors were identified paralleling both the BR Valley and the unnamed valley to the east (Labrenz, 2010).

During March 3 to 12, 2017, Geotech Ltd. Carried out a helicopter-borne geophysical survey over the Berg Property that extended the coverage completed in 2010 over the Berg Property. The survey results were merged and levelled with the 2010 coverage (Figure 9-5).

In the summer of 2017, Equity, on behalf of TCM, conducted a regional target evaluation program which investigated 13 magnetic anomalies from the aeromagnetic survey completed earlier in 2017. Two targets were interpreted to be most prospective for follow-up work, these being: target 12 (target had not been named in 2017 Assessment report) consisting of an altered pyritic diorite which is cross-cut by quartz-molybdenite veinlets; and targets 3/4/6 (Bergette), which form a cluster of low magnetic anomalies and strong limonitic alteration.

Figure 9-5: Merged 2010 and 2017 Total Magnetic Intensity Geophysics



Source: Equity, 2017.

9.4 Exploration By Surge Copper 2021 to 2023

This section is largely summarized from McDowell (2022 and 2023) and is presented here with only minor revision.

9.4.1 2021 Exploration

In 2021 Surge Copper rehabilitated the historic Berg access road to allow 4 wheel drive and heavy equipment access, re-established the Berg exploration camp and completed 2855 metres of core drilling in 10 holes. Drilling commenced in early September 2021 and ended in early October. A property wide helicopter-borne ZTEM and aeromagnetic survey was conducted over the combined Ootsa and Berg Properties by Geotech Ltd.

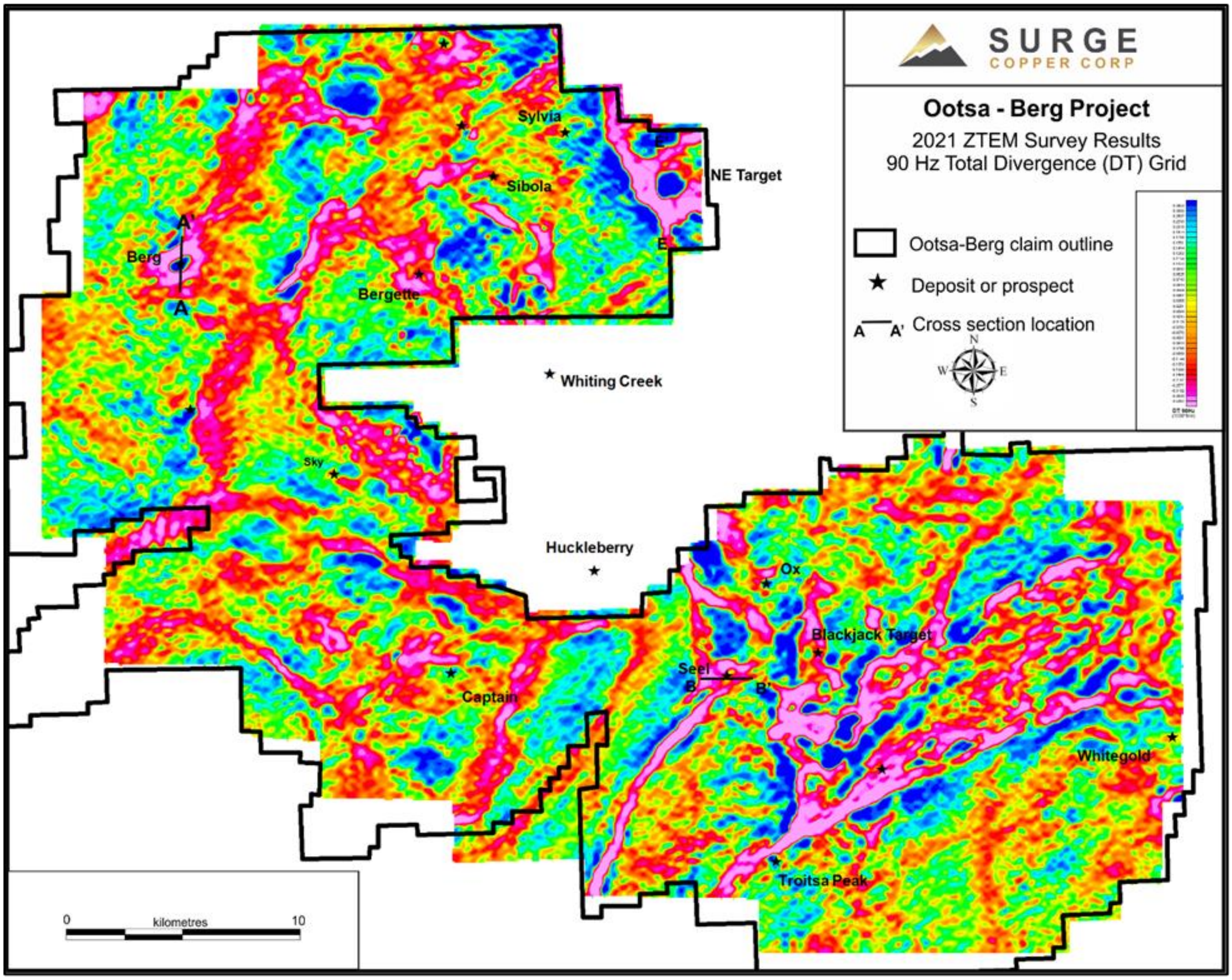
9.4.1.1 Airborne ZTEM-Mag Survey

In June 2021 Geotech Ltd. carried out a helicopter-borne ZTEM and aeromagnetic survey over the combined Ootsa and Berg Properties. A total of 4,224 line-kilometres of geophysical data were acquired over a total contiguous area of 1,154 km^2. Lines were survey flown in a south to north direction with traverse line spacings of 300 m. Tie lines were flown perpendicular to traverse lines at 3000m spacings. Details of the survey logistics can be found in Geotech (2021).

The ZTEM system is proprietary to Geotech Ltd. and is a modern geophysical technique that can quickly and cost-effectively image the subsurface three-dimensional distribution of certain physical quantities down to depths exceeding 2 km. Combined with other information, this data can be used to map geological structures, lithology, and alteration zones critical in exploring porphyry copper deposit systems.

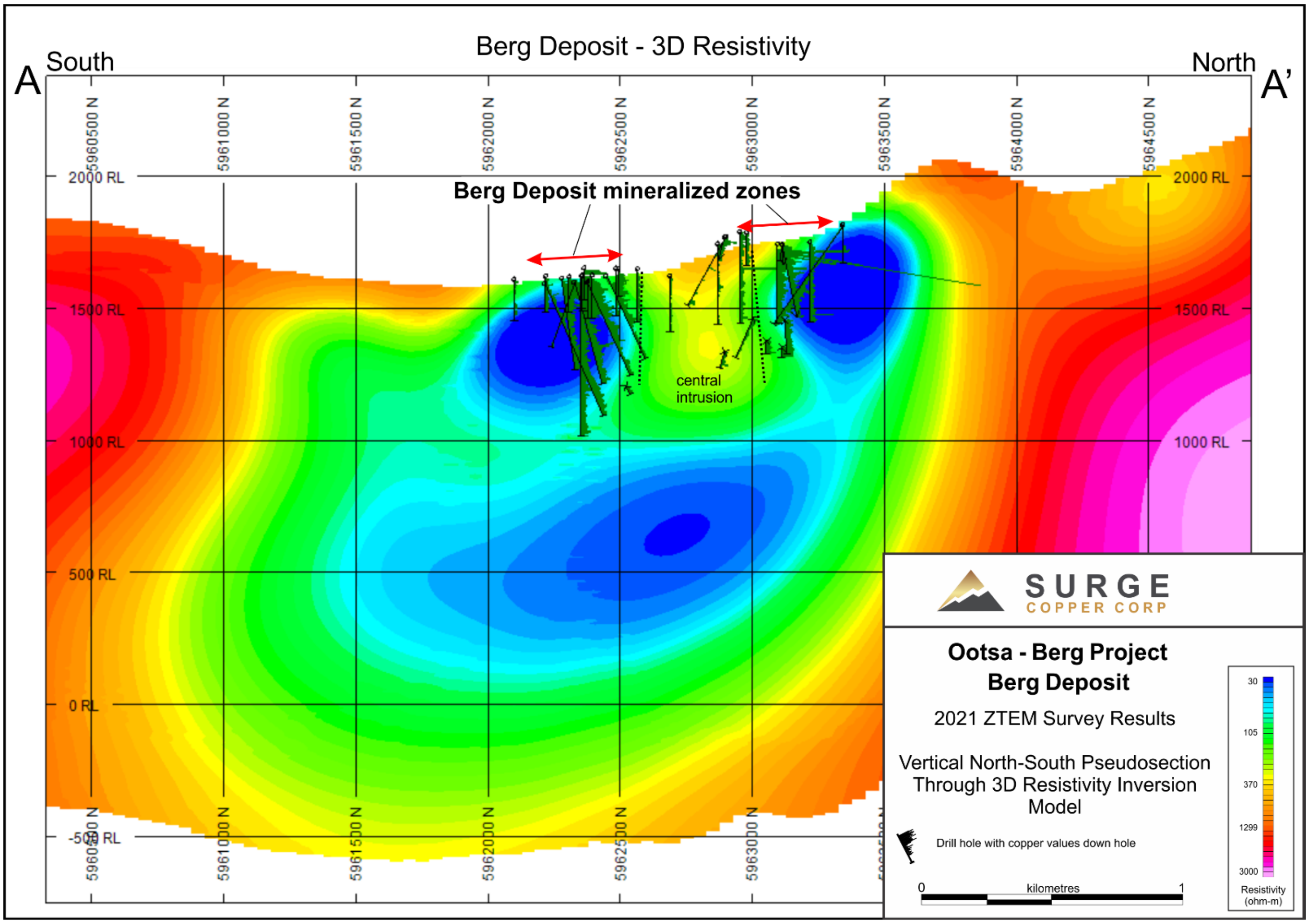
The following description is summarised from Ebert (2022). Mineralized zones at all known deposits in the district are associated with relative conductors. Berg displays a subtle resistive centre likely reflecting the weakly altered Berg central intrusion, with a large and prominent conductive zone that correlates very well with known mineralization. The ZTEM expression over Berg forms a very pronounced circular donut feature. The Seel Deposit also shows a strong correlation with a sub circulate ZTEM conductor. Both the Berg and Seel deposits occur along linear conductor zones up to 10km long, and both occur at the termination of the linear trend or at the intersection of linear trends with different orientations. The Berg deposit is located with a large magnetic low sitting at the center of circular magnetic high, likely reflecting the intrusive geometry and a hornfelsed ring surrounding the intrusion. The gold enriched porphyry mineralization at Seel is associated with magnetic highs, therefore ZTEM conductors with an overlapping magnetic high could have Cu-Au porphyry potential.

Figure 9-6: ZTEM 90 Hz Total Divergence (DT) Map over the Ootsa Berg Property



Source: Surge Copper, 2021.

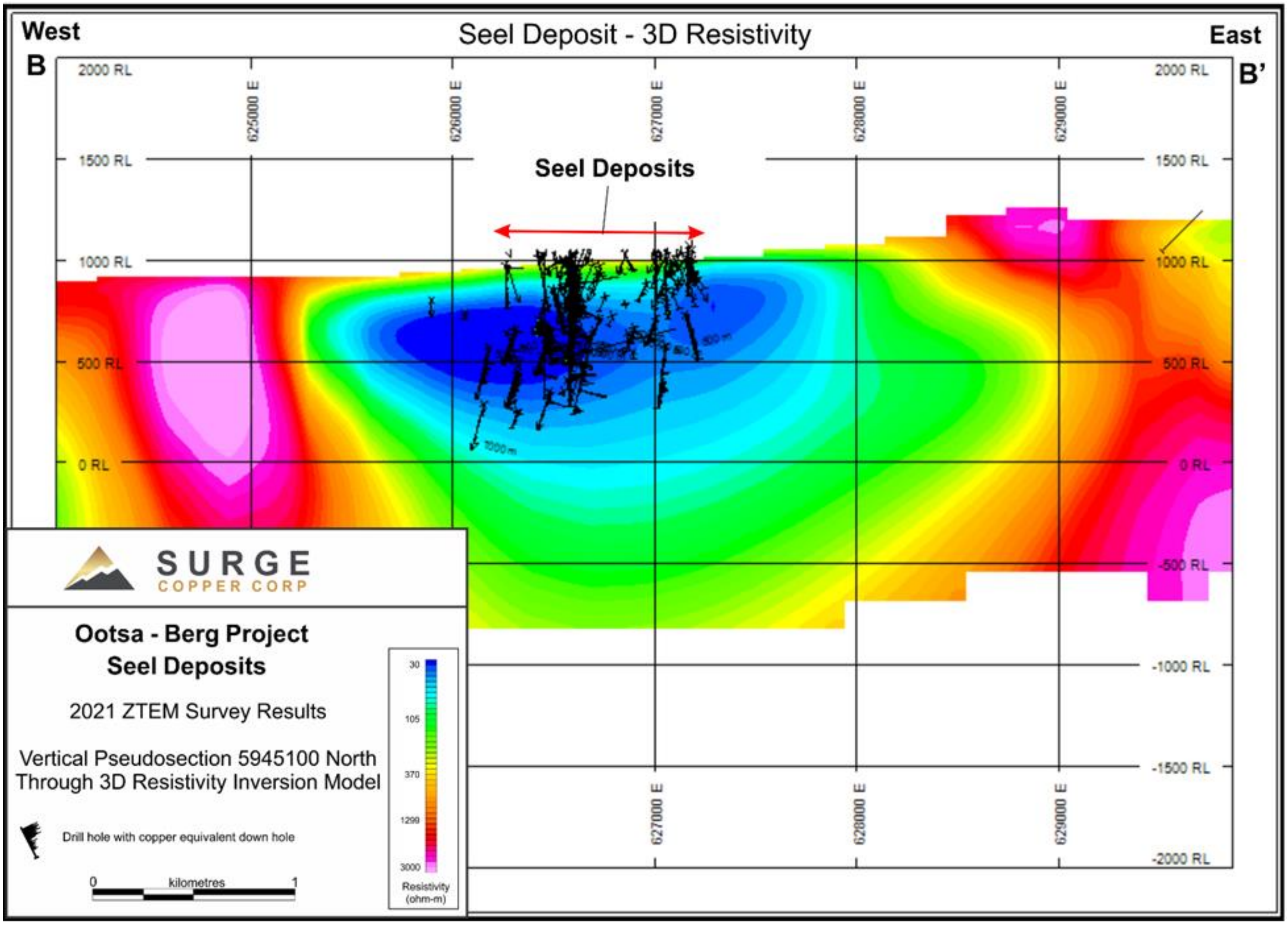
Figure 9-7: ZTEM Resistivity Voxel slice through Berg, view looking north



Source: Surge Copper, 2021.

Figure 9-8 and Figure 9-9 show vertical pseudosections through the inverted 3D resistivity data, showing the deposit scale signatures for the Berg and Seel deposits. These ZTEM resistivity responses are similar for all the known deposits and major prospects in the district and collectively characterize porphyry style mineralization as broad resistivity lows directly associated with mineralization surrounded by a larger resistivity highs.

Figure 9-8: ZTEM Resistivity Voxel slice through the Seel deposit



Source: Surge Copper, 2021.

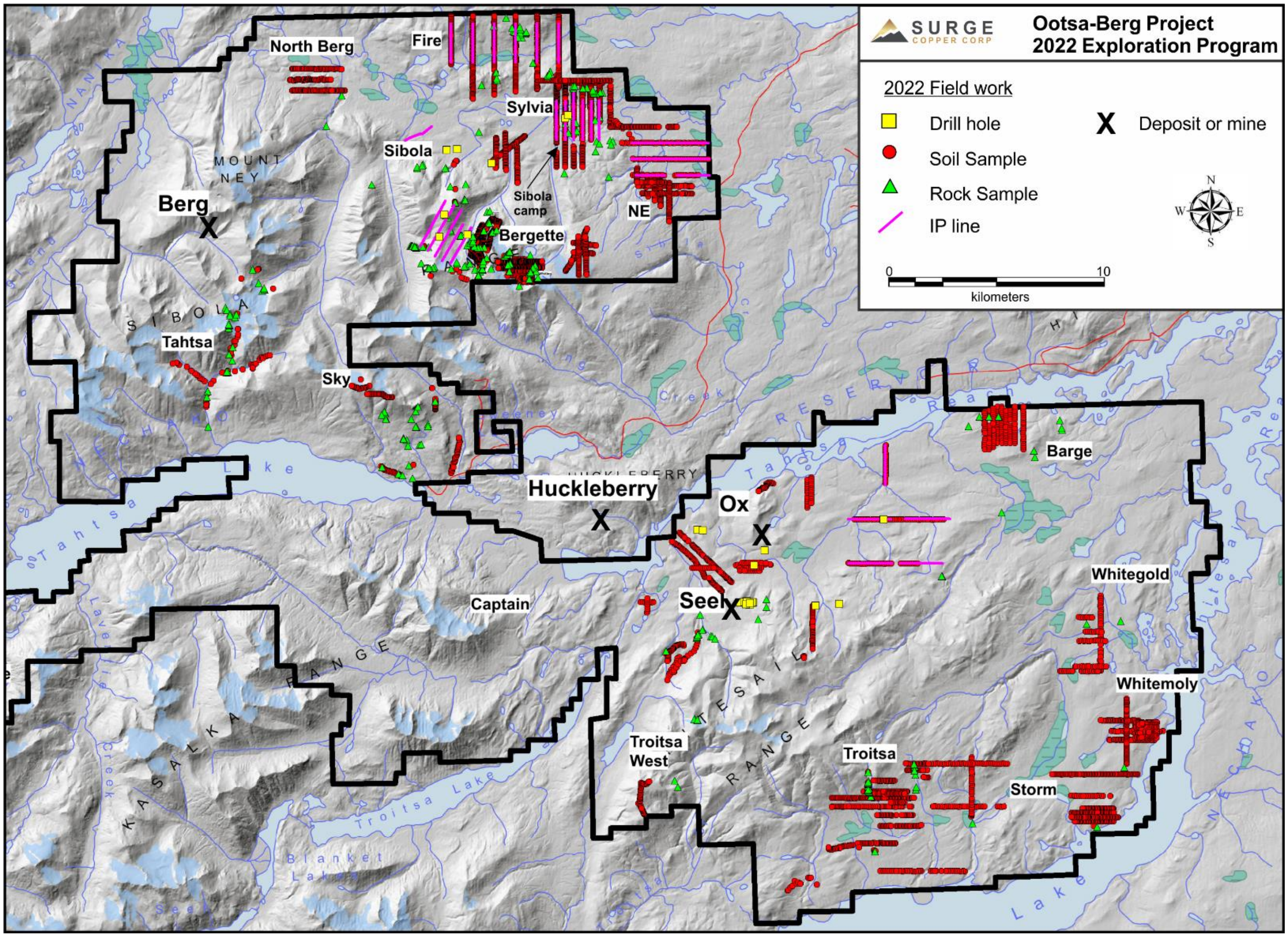
9.4.2 2022 Exploration

Mineral exploration work in 2022 on the Ootsa and Berg projects comprised 15,327 m of NQ diamond drilling in 38 holes, the collection of 337 rock samples and 4,412 soil samples and 59.55-line kilometres (23 lines) of DC resistivity-induced polarization geophysical surveys. Surge also sent a total of 7,067 historic drill core and stored pulps from the Berg deposit to the lab for gold fire assay. These samples had not been previously tested for gold.

The 2022 exploration program took place in two phases with the first phase based out of the Ootsa exploration camp from late May into August and focused on targets on the Ootsa Property. The second phase focused on the Berg property from August to mid September and is the focus of this discussion. During 2022, the 20-man Sibola exploration camp was established at low elevation and all Berg property exploration was staged out of this camp. During 2022, ten core holes were drilled on the Berg property including four holes at high elevation at Bergette that were helicopter supported and

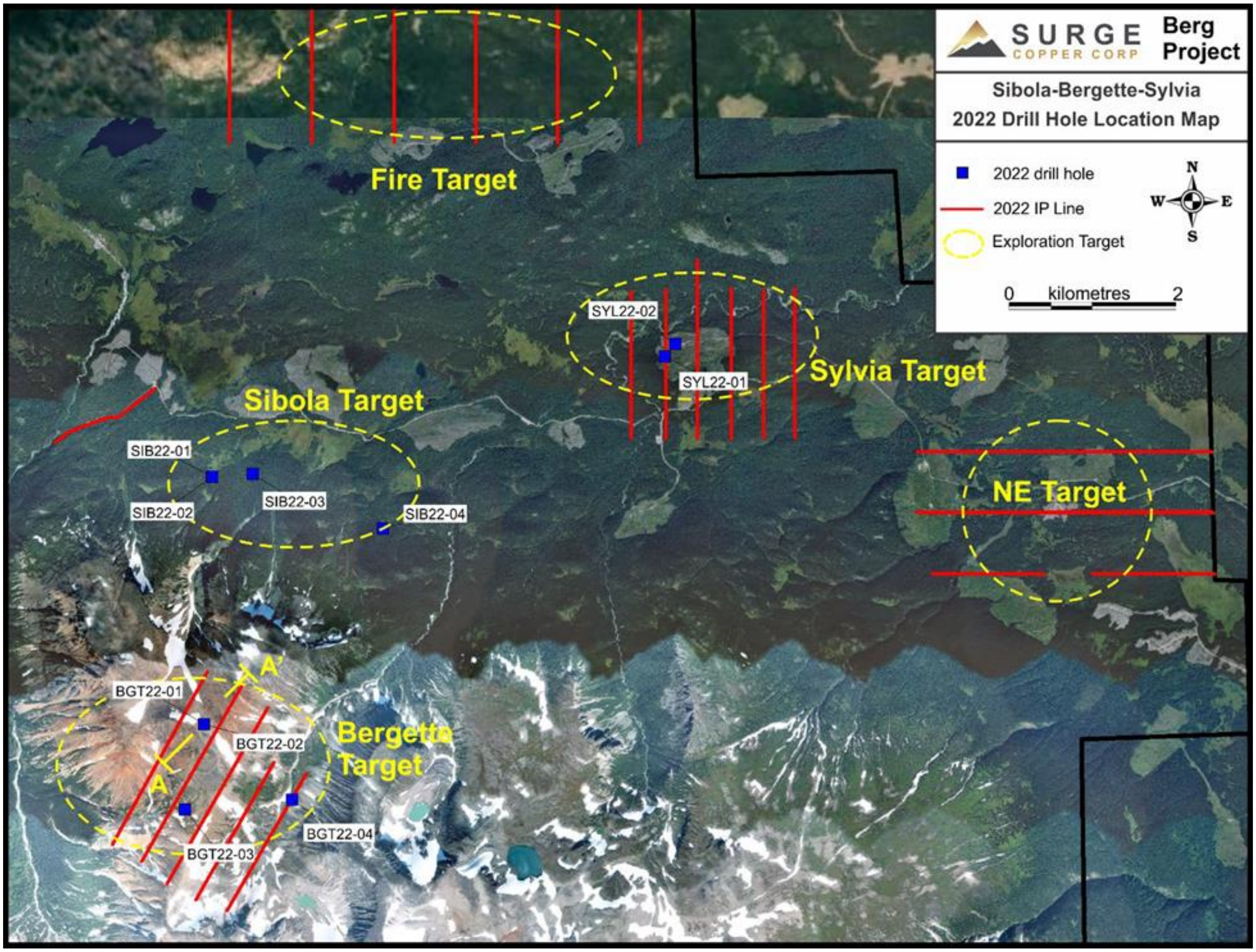
6 holes at low elevation at Sibola and Sylvia that were drilled with a skid mounted rig. Twenty induced polarization (IP) geophysical lines were completed on the Bergette, Sylvia, Fire, NE, and Sibola targets.

Figure 9-9: 2022 Surge Copper Exploration Map showing IP Survey Lines and Drill Collars



Source: Surge Copper, 2021.

Figure 9-10: 2022 Drill Holes and IP lines at the Sibola-Bergette-Sylvia-Fire Targets



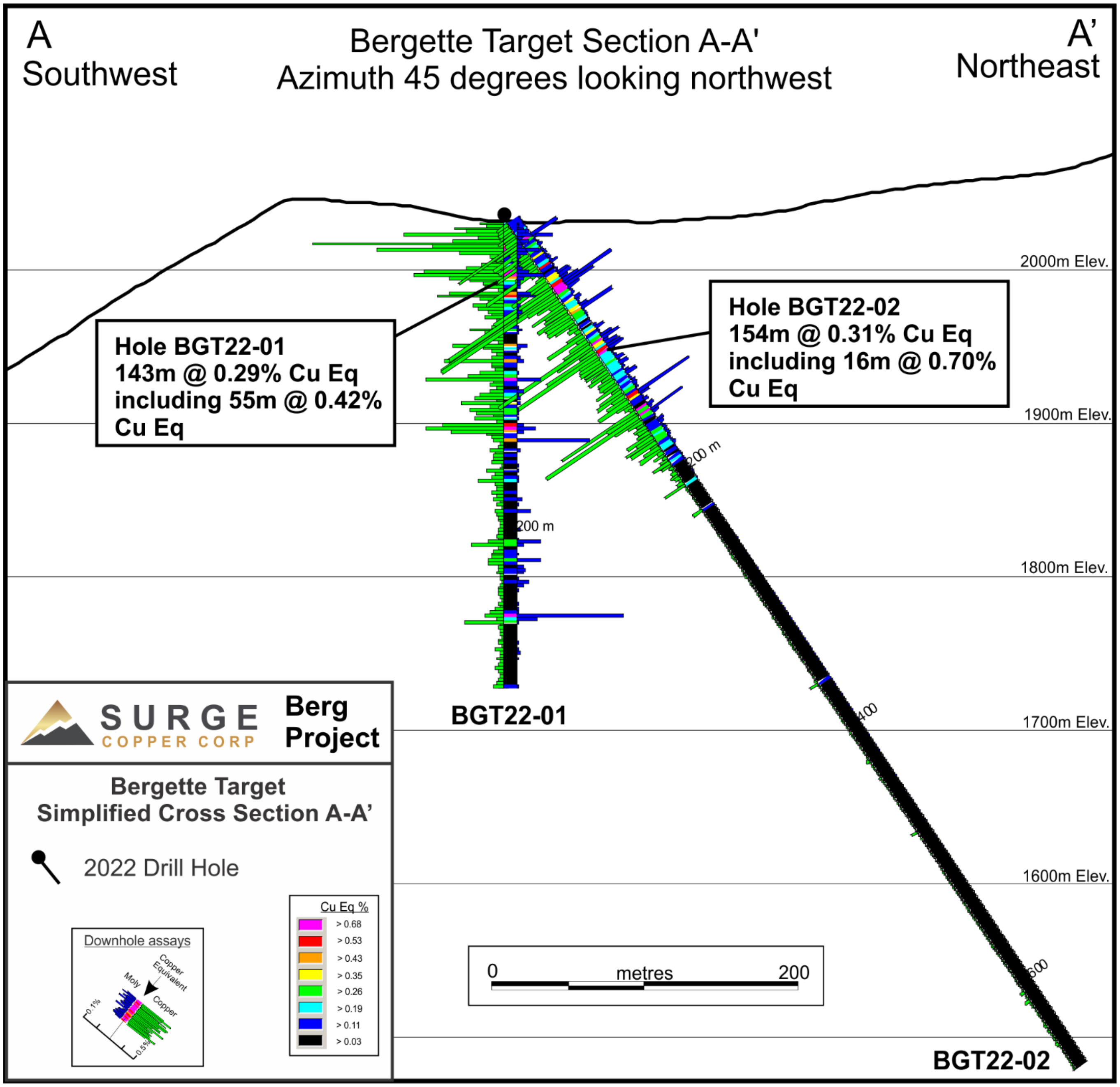
Source: Surge Copper, 2022.

9.4.2.1 Bergette Target

The Bergette target is hosted within a kilometre scale Cu-in-soil anomaly that overlies a distinct ZTEM geophysical anomaly. The target has been drilled previously, most notably in 1972, with encouraging results. The 2022 helicopter-supported drilling indicates mineralization at Bergette is coincident with a moderate induced polarization chargeability response and moderate to high magnetic values and is hosted in stockwork quartz veining containing magnetite-chalcopyrite-molybdenite-pyrite.

BGT22-01 was drilled vertically and returned 143 m grading 0.23% Cu, 0.01% Mo and 0.03 g/t Au from 3 m depth. The host rock is a biotite dominant intrusive with multiple brecciated fault-affected horizons. BGT22-02 (same drill pad as BGT22-01) demonstrated the longest mineralized intercept from the Bergette target to date. The hole intersected 176 m grading 0.22% Cu, 0.012% Mo and 0.03 g/t Au from 8m depth in a faulted biotite intrusive as in BGT22-01. BGT22-03 & 04 did not encounter significant mineralization. Both holes targeted chargeability and associated magnetic highs and both encountered magnetite bearing intrusions with or without minor pyrite.

Figure 9-11: Cross section through Bergette showing drill holes BGT22-01 and BGT22-02



Source: Surge Copper, 2022.

9.4.2.2 Sibola Target

The Sibola Target features a large zone of coincident ZTEM, IP chargeability and magnetic anomalies within a low-lying till-covered valley. Four holes drilled into the target in 2022 over a 2 km strike length confirmed strong hydrothermal alteration including variable amounts of pyrite, sericite, propylitic alteration and silicification. SIB22-01 intersected a 3 m interval of high-grade silver (312 g/t Ag) and 0.12% Cu from 66 m depth. The hole also intersected a 53m wide interval grading 0.10 g/t Au and 2.0 g/t Ag from 224 m depth. This broad interval of anomalous gold is associated with thin silica-pyrite and calcite veinlets and variable silica and sericite alteration in a fine-grained volcanic rock. SIB22-02, drilled from the same pad as SIB22-01, intersected a 2 m zone with 66.1 g/t Ag at 492 m depth. SIB22-03 was weakly mineralized overall apart from a discrete 2 m horizon that graded 3.68 g/t Au and 12.1 g/t Ag at 410 m depth in millimetre scale quartz-carbonate-magnetite pyrite veins. The host rock is a weakly porphyritic to equigranular felsic intrusive (diorite?) that has undergone moderate to strong silica-chlorite-sericite-epidote-potassic alteration. SIB22-04 intersected mixed volcanic and weakly porphyritic dioritic intrusive with variable chlorite-sericite-silica-epidote (propylitic) alteration. Magnetite is common to abundant in this drill hole. Overall, the hole was weakly mineralized with only discrete horizons of Ag-Zn-Pb +/- Cu in localized quartz-carbonate veins. Propylitic alteration is common to dominant in the Sibola holes with pyrite abundance ranging from present to abundant throughout.

9.4.2.3 Sylvia Target

The Sylvia target has been previously drilled in 1974, 1975 and 1996 and contains known porphyry copper style mineralization associated with a 1 km long intrusion located in a till covered valley. Six IP lines were completed over Sylvia in 2022 and 2 holes were drilled. The first hole at Sylvia in 2022 (SYL22-01) was abandoned due to difficult ground conditions and the rock produced was not sent out for analytical testing. SYL22-02 intersected intrusive dykes but did not intersect the main Sylvia intrusion. It did produce widespread alteration including quartz veinlets and disseminated pyrite with local chalcopyrite and molybdenite and intersected 8 metres of anomalous mineralization grading 0.12% Cu from 186 to 194 m depth. The main IP and geologic target at Sylvia remains incompletely tested by drilling.

9.4.3 2023 Exploration

At the time of writing this report Surge Copper is conducting an exploration program on the Berg Property based out of the road accessible Sibola Camp. Surface exploration including sampling, prospecting, and mapping has been ongoing across the low elevation areas of the Berg Property. During 2023 to date the Company has collected over 2300 soil samples and conducting mapping and rock sampling over select target areas. New copper in soil anomalies and new zones of alteration and veining have been identified and are being advanced and evaluated. Starting mid July the Company will open up the Berg camp and undertake a 6 to 8 hole, 3500 m diamond drill program at Berg.

10 DRILLING

Section 10 outlines the details of all known drilling at Berg to date. The technical report from 2021 (Tetra Tech, 2021) 'Updated Technical Report and Resource Estimate on the Berg Project, BC' report from 2021 contained a comprehensive description of historical drilling campaigns, major parts of which have been copied into Section 10.1, with modifications and additions by MMTS as noted.

Surge Copper completed nine diamond drill holes in 2021, the results of the campaign are being reported in Section 10.2.

10.1 Previous Operator Drilling

10.1.1 Berg Deposit Drilling Summary to 2011

Previous drill programs on the Property have been carried out by Kennecott (1964-1971), Sierra Empire (1972), Placer Dome (1972-1980), Terrane (2007-2008), and Berg Metals (2011). A summary of the core drilling completed on the current Berg deposit area to date is shown in Table 10-1.

Table 10-1: Summary of Drilling from 1964 – 2011

Company	Date	No. of Holes	Total Metres	Core Size	No. of Samples
Kennecott	1964	7	969.71	NX	297
Kennecott	1965	6	1,236.14	BX	374
Kennecott	1966	10	1,680.20	NQ	534
Kennecott	1967	22	3,324.95	NQ	995
Kennecott	1971	3	664.77	NQ	202
Sierra Empire	1972	10	1,463.65		499
Placer Dome	1972	14	3,465.24	NQ	1,011
Placer Dome	1973	12	3,313.02	NQ	986
Placer Dome	1974	19	1,843.75	PQ	583
Placer Dome	1975	8	1,067.39	PQ	339
Placer Dome	1980	8	1,099.08	HQ	330
Terrane	2007	29	11,288.90	HQ, NQ	5,347
Terrane	2008	31	11,659.61	HQ, NQ	5,841
TCM	2011	36	10,677.64	HQ, NQ	6,140
TOTAL	**-**	**215**	**53,754.05**	**-**	**23,478**

10.2 Drilling by Surge Copper

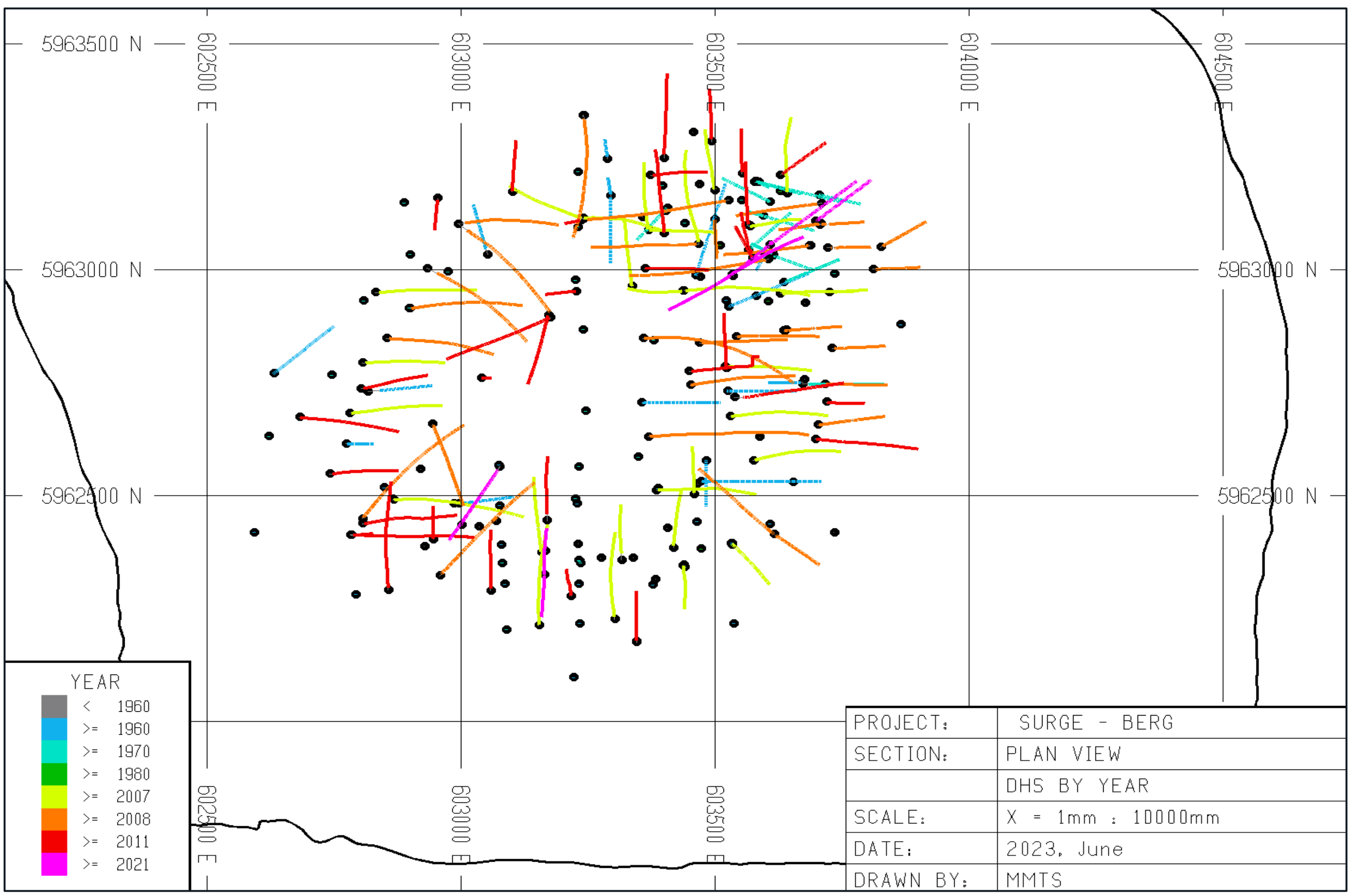
10.2.1 Drill Campaign Overview

Drilling at the Berg deposit commenced in early September 2021 after two months of access road rehabilitation, camp construction and road and drill pad building. A total of 2,855 m was drilled at Berg, in 10 holes. The drill program was designed to test the expansion potential of the near-surface high-grade mineralization in these areas, as well as to fill in data gaps within areas of lower drill density. Hole BRG21-234 was lost at a depth of 133 m due to difficult ground conditions. The hole was re-drilled as BRG21-234B which was successfully completed to target depth.

The 2021 Berg holes were surveyed by hip chain and compass from adjacent surveyed hole collars and confirmed by hand-held GPS. All downhole surveys were done by a Reflex downhole survey instrument.

A plan map of all drilling to date is illustrated in Figure 10-1 showing the Year drilled, with the resource pit outline also plotted.

Figure 10-1: Plan Map of Drillholes



Source: MMTS, 2023.

10.2.2 Significant Intercepts

The results shown in Table 10-2 were compiled by Surge Copper and reported in separate news releases between March 8th and March 21, 2022. The following paragraphs are taken from the Surge Copper news releases dated in March 2022, and serve to accompany Table 10-2.

Width referred to drill hole intercepts; true widths had not been determined. EOH = end of hole.

Table 10-2: Summary of Significant Intercepts in the 2021 Drilling by Surge Copper

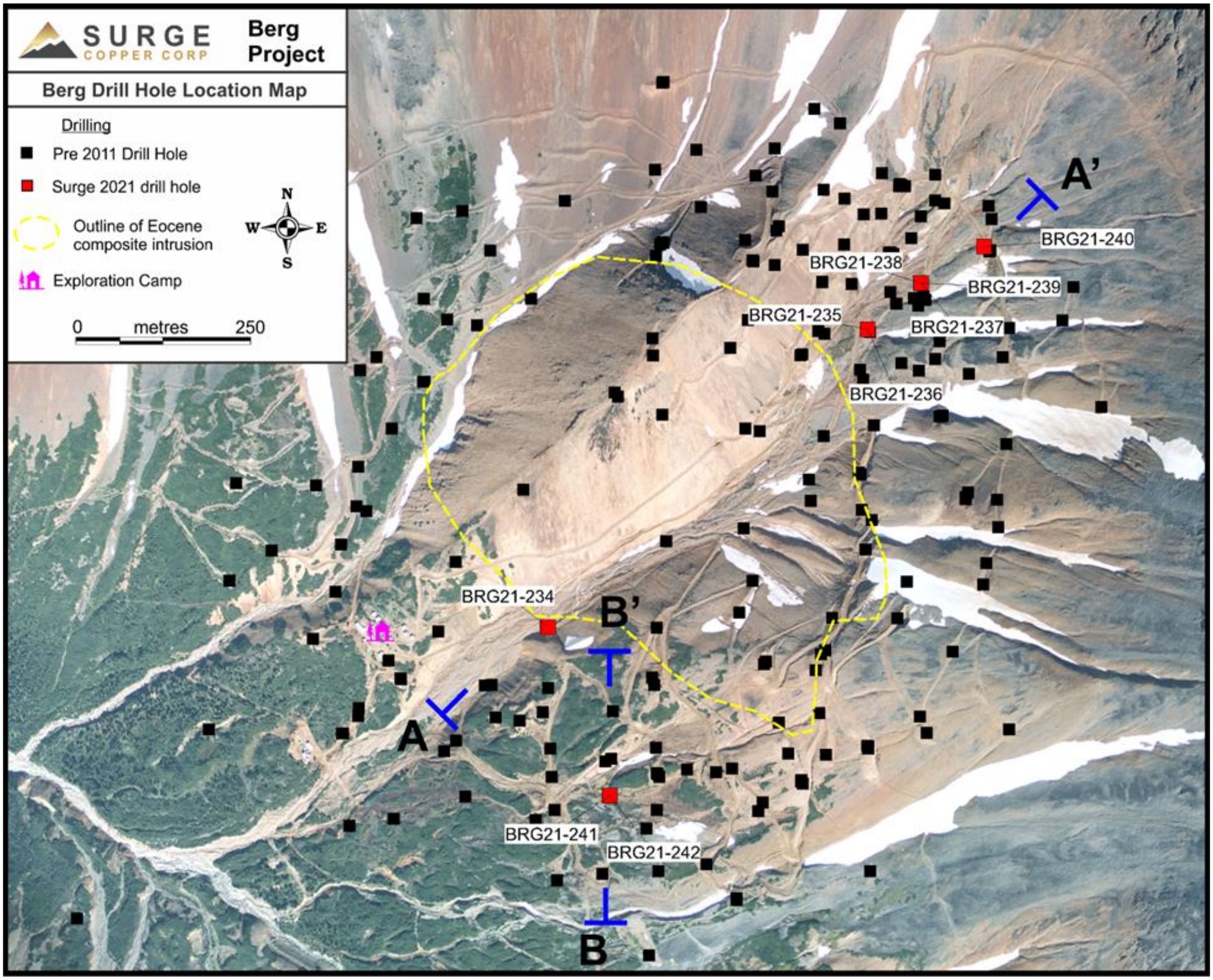
Drill Hole	From (m)	To (m)	Width (m)	Cu (%)	Mo (%)	Au (g/t)	Ag (g/t)	Comments
BRG21-234B	15	340.1 EOH	325.1	0.3	0.016	0.03	4.3	-
including	15	120	105	0.57	0.028	0.04	4.6	Chalcocite blanket
BRG21-235	20	182	162	0.37	0.075	0.03	4.3	-
including	20	110	90	0.43	0.073	0.04	4.5	Chalcocite blanket
BRG21-235	182	327 EOH	145	0.14	0.023	0.01	1.6	Eocene intrusion
BRG21-236	24	381 EOH	357	0.38	0.038	0.04	5.6	-
including	24	116	92	0.52	0.07	0.05	4.8	Chalcocite blanket
BRG21-237	34	166	132	0.56	0.047	0.05	7.6	Chalcocite blanket
BRG21-237	184	255 EOH	71	0.32	0.077	0.03	5.1	-
BRG21-238	24	168	144	0.47	0.014	0.04	5.1	-
including	26	126	100	0.59	0.016	0.05	6.2	Chalcocite blanket
BRG21-239	20	243 EOH	223	0.42	0.022	0.04	5.4	-
including	76	190	114	0.51	0.025	0.05	5.7	-
including	76	114	38	0.67	0.032	0.05	8.2	Chalcocite blanket
BRG21-240	14	96	82	0.22	0.006	0.03	3.1	Chalcocite blanket
including	26	44	18	0.31	0.003	0.04	2.7	-
BRG21-241	20	166	146	0.4	0.014	0.02	6.5	-
including	22	90	68	0.58	0.038	0.03	6	Chalcocite blanket
including	30	52	22	0.85	0.024	0.04	8.2	Chalcocite blanket
BRG21-242	28	396 EOH	368	0.37	0.039	0.03	5.5	-
including	28	138	110	0.51	0.021	0.03	3.9	Chalcocite blanket
including	52	96	44	0.62	0.019	0.04	4.4	Chalcocite blanket

*Drill hole intercept, true widths have not been determined. EOH = end of hole.

10.2.3 Berg Drilling

In 2021 Surge utilized a skid mounted core drill to complete a 10 hole 2855 metre core drilling program at Berg drilling NQ2 size core. The hole locations are shown on Figure 10-2 and are described below. Figure 10-3 and Figure 10-4 illustrate section A-A' and B-B' through the 2021 Surge drilling.

Figure 10-2: 2021 Berg Drill Collar Location Map with Section Lines



Source: Surge Copper, 2021.

Hole BRG21-234 was lost at a depth of 133 m due to difficult ground conditions and was successfully re-drilled from the same pad as hole BRG21-234B. This hole was located in the southern part of the Berg deposit and was mineralized from the start of bedrock at 15 m depth to the end of the hole at 340.1 m depth. The entire hole returned 325.1 m grading 0.30% Cu, 0.016% Mo, and 4.3 g/t Ag including a near-surface higher grade zone associated with a chalcocite blanket that returned 105 m grading 0.57% Cu, 0.028% Mo, and 4.6 g/t Ag from 15 to 120 m depth. Hole 234B encountered alternating feldspar-biotite porphyritic lithologies with variably hornfelsed and sericitized volcanic horizons throughout its length.

Holes BRG21-235 and 236 were collared in the northeast part of the Berg deposit. Hole BRG21-235 intersected 162 m grading 0.37% Cu, 0.075% Mo, and 4.3 g/t Ag from 20 m downhole depth before encountering the weakly mineralized central Berg Eocene composite intrusion which returned 145 m grading 0.14% Cu and 0.023% Mo from 182 m depth to the end of the hole at 327 m. Hole BRG21-235 also encountered the chalcocite blanket which returned 90 m grading 0.43% Cu, 0.073% Mo, and 4.5 g/t Ag from 20 m depth. From the start of bedrock at 8 m to 20 m depth, hole BRG21-235 intersected a highly oxidized leached cap that contains low copper but elevated gold and molybdenum, returning 12 m grading 0.03% Cu, 0.110% Mo, 0.05 g/t Au, and 4.9 g/t Ag. Both 235 & 236 encountered extensive quartz-feldspar porphyritic and quartz diorite lithologies with some intermixed andesitic tuff units and discreet andesite dykes.

Hole BRG21-236 returned 357 m grading 0.38% Cu, 0.038% Mo, and 5.6 g/t Ag from 24 m depth to the end of the hole at 381 m depth. Hole BRG21-236 also encountered the chalcocite blanket which returned 92 m grading 0.52% Cu, 0.070% Mo, and 4.8 g/t Ag from 24 to 116 m depth. Hole BRG21-236 contained a highly oxidized leached cap from the start of bedrock at 8.6 m depth to 24 m, returning 0.06% Cu, 0.098% Mo 0.06 g/t Au, and 1.9 g/t Ag.

Hole BRG21-237 was angled toward the Berg Intrusion and encountered leached cap from the start of bedrock to 34 m downhole. The chalcocite enrichment blanket was encountered from 34 to 166 m downhole returning 132 m grading 0.56% Cu, 0.047% Mo, and 7.6 g/t Ag. This was followed by 18 m of weakly mineralized late porphyry dike from 166 to 184 m, then 71 m grading 0.32% Cu, 0.077% Mo, and 5.1 g/t Ag to the end of the hole at 255 m. Lithologies from hole 237 included mixed quartz-feldspar, quartz diorite and quartz monzonite porphyritic units with horizons of andesite lapilli tuff that showed variable sericite-potassic-silicic alteration.

Hole BRG21-238 was angled away from the Berg Intrusion and encountered 18 m of leached cap from 6 to 24 m downhole. The hole returned 144 m grading 0.47% Cu, 0.014% Mo, and 5.1 g/t Ag from 24 to 168 m depth, including 100 m of chalcocite blanket grading 0.59% Cu, 0.016% Mo, and 6.2 g/t Ag from 26 to 126 m downhole. The top of hole 238 encountered a quartz diorite unit crosscut with minor andesite dykes while the bottom two-thirds of the hole was dominated by andesitic lapilli tuff with variable silicic and clay alteration.

BRG21-239 was a vertical hole that encountered leached cap from 6 to 20 m depth followed by 223 m grading 0.42% Cu, 0.022% Mo, and 5.4 g/t Ag from 20 m to the end of the hole at 243 m depth. The hole includes 114 m grading 0.51% Cu, 0.025% Mo and 5.7 g/t Ag from 76 to 190 m depth which partially incorporates the chalcocite blanket. The top half of hole 239 featured mineralized mixed quartz diorite and quartz monzonite porphyritic rocks that straddled a fault zone near 75m depth. The bottom half of the hole was dominated by an andesitic lapilli tuff unit with both silicic and clay alteration common throughout the extent of the hole.

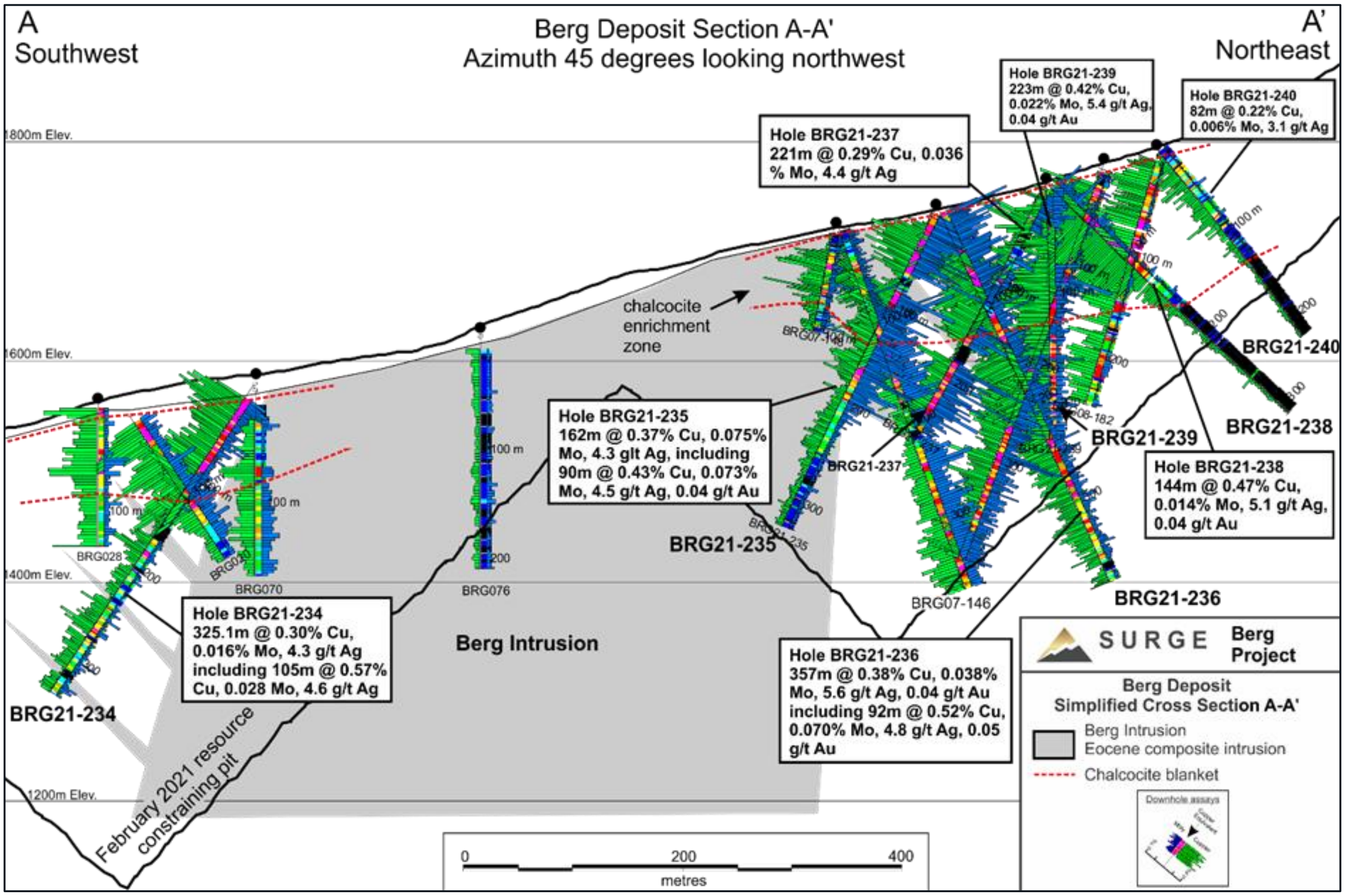
BRG21-240 was angled away from the Berg Intrusion and tested the far northeast side of the deposit where chalcocite blanket development and hypogene copper and molybdenum grades decrease. The hole defines the width of the mineralized zone on the northeast side of the Berg Intrusion to be 400 m. The thickness of the mineralized zone increases toward the Berg central intrusive stock where the zone is over 400 m thick as shown on Figure 10-3 and likely extends considerably deeper along the near-vertical contacts of the Berg Intrusion. This hole was dominated by a mineralized quartz diorite unit with interspersed andesite tuff and dykes. Zones of moderate to strong silicic flooding with subordinate clay alteration were common below the leached oxidized upper portion.

Table 10-3: Select Analytical Results from 2021 Berg Drilling by Surge Copper

Drill Hole	From (m)	To (m)	Width (m)*	Cu %	Mo %	Au g/t	Ag g/t	Comments
BRG21-234B	15	340.1 EOH	325.1	0.30	0.016	0.03	4.3	
including	15	120	105	0.57	0.028	0.04	4.6	chalcocite blanket
BRG21-235	20	182	162	0.37	0.075	0.03	4.3	
including	20	110	90	0.43	0.073	0.04	4.5	chalcocite blanket
BRG21-235	182	327 EOH	145	0.14	0.023	0.01	1.6	Central Berg intrusion
BRG21-236	24	381 EOH	357	0.38	0.038	0.04	5.6	
including	24	116	92	0.52	0.070	0.05	4.8	chalcocite blanket
BRG21-237	34	255 EOH	221	0.29	0.036	0.03	4.4	
BRG21-237	166	184	18	0.04	0.000	0.02	2.3	late mineral porphyry dike
BRG21-237	184	255 EOH	71	0.32	0.077	0.03	5.1	
BRG-238	24	168	144	0.47	0.014	0.04	5.1	
including	26	126	100	0.59	0.016	0.05	6.2	chalcocite blanket
BRG-239	20	243 EOH	223	0.42	0.022	0.04	5.4	
including	76	114	38	0.67	0.032	0.05	8.2	chalcocite blanket
including	76	190	114	0.51	0.025	0.05	5.7	
BRG21-240	14	96	82	0.22	0.006	0.03	3.1	chalcocite blanket
including	26	44	18	0.31	0.003	0.04	2.7	chalcocite blanket
BRG21-241	20	166	146	0.40	0.014	0.02	6.5	
including	22	90	68	0.58	0.038	0.03	6.0	chalcocite blanket
including	30	52	22	0.85	0.024	0.04	8.2	chalcocite blanket
BRG21-242	28	396	368 EOH	0.37	0.039	0.03	5.5	
including	28	138	110	0.51	0.021	0.03	3.9	chalcocite blanket
including	52	96	44	0.62	0.019	0.04	4.4	chalcocite blanket

*Drill hole intercept, true widths have not been determined. EOH = end of hole.

Figure 10-3: **Berg Cross Section A-A'**

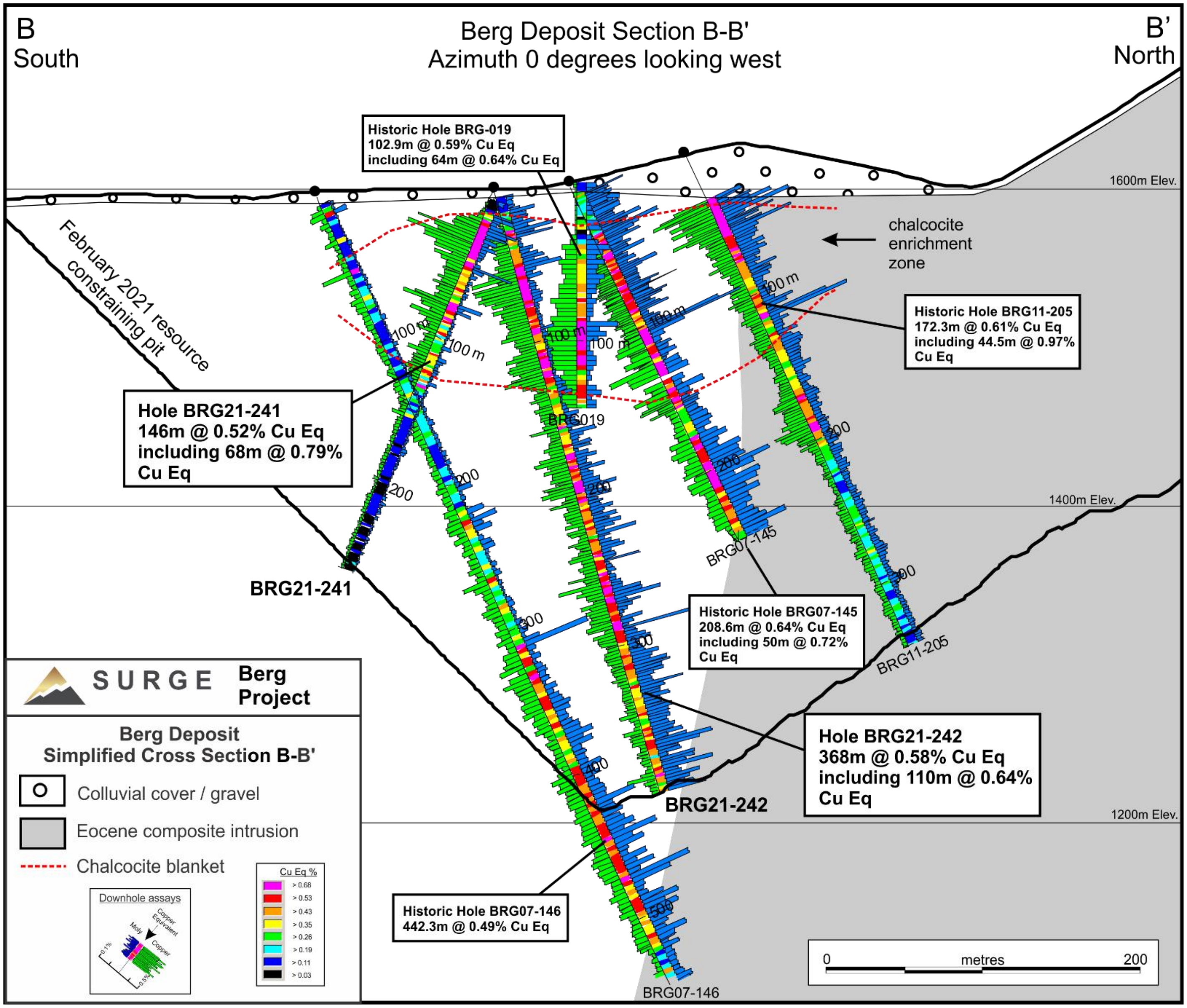


Source: Surge Copper, 2021.

Hole BRG21-241 was angled away from the central Berg Intrusion and encountered leached cap from the start of bedrock at 6 m to 20 m downhole. The chalcocite enrichment blanket was encountered from 20 to 90 m downhole returning 68 m grading 0.58% Cu, 0.038% Mo, and 6.0 g/t Ag. The chalcocite blanket includes a higher-grade zone returning 22 m grading 0.85% Cu, 0.024% Mo, and 8.2 g/t Ag. Andesite tuff was the dominant lithology in this hole, which showed variably strong silicic alteration and biotite-chlorite hornfelsing.

Hole BRG21-242 was angled toward the central Berg Intrusion and encountered 22 m of leached cap from 6 to 28 m downhole. The hole returned 368 m grading 0.37% Cu, 0.039% Mo, and 5.5 g/t Ag from 28 m to the end of the hole at 368 m and the hole ended in mineralization. Hole BRG21-242 intersected 110 m of chalcocite blanket grading 0.51% Cu, 0.021% Mo, and 3.9 g/t Ag from 28 to 138 m downhole, including 44 m grading 0.62% Cu, 0.019% Mo, and 4.4 g/t Ag from 52 m depth. Hole 242 encountered mixed quartz porphyritic and andesitic tuff units throughout with variably strong silicic and hornfels alteration.

Figure 10-4: Berg Cross Section B-B’



Source: Surge Copper, 2021.

10.3 Drill Core Storage

As per TetraTech’s 2021 updated technical report, all drill core from 2007, 2008 and pre-1980 is being stored on the property below the original Berg Camp. Drill core from 1980 is located on a spur road in the camp area. Historical drill core is reasonably well preserved. All 2011core is being stored in a cold storage warehouse facility in Prince George.

Approximately half of the 2021 Berg drill core is stored at the Berg site, and half is stored at the Ootsa Exploration Camp where it was transported by helicopter in 2021 and sampled.

10.4 Drill Results and Database

All geological and geotechnical logs and analytical results have been compiled into a digital drill hole database by previous as well as current operators and consultants over time. From 2007 onwards, the database contains a variety of QA/QC samples including blind blanks, certified reference material, and duplicates that are up to industry standards and which have been reviewed in detail by MMTS (see Section 11).

The database also contains many pre-2007 data which is currently being referred to as 'historical' with a lower data confidence level as original sample IDs and assay methods are often unknown, records incomplete, and quality control insertion rates at zero. MMTS reviewed scans of hand-written historical internal lab records for the Placer Dome years 1972-1980 and corresponding external lab certificates from which check-assay scatter plots were produced. This analysis is presented in Section 12.

11 SAMPLE PREPARATION, ANALYSES AND SECURITY

The following sections describe the sample collection, handling, preparation, and analytical methods employed during the 2021 drilling program. The QP was not present during drilling activities but has since inspected representative intervals of the drill core and has collected independent samples at site, as described in Section 12.

Description of the sample collection, handling, preparation, and analytical methods employed during the 2007 to 2011 drilling campaigns are described in previous NI 43-101 Technical Reports by Harris and Stubens (2008), Harris and Labrenz (2009) and TetraTech (2021). The QP has read the descriptions contained in these reports.

In addition, MMTS has reviewed and reinterpreted the 2007-2011 assay results and QC sample performance after the decision was made to include Au in resource modelling and after a few mislabels were identified (Section 11.5).

In 2022, Surge Copper re-sampled a significant amount of pre-existing core from 2007 and 2008 to generate an additional approx. 4,300 Au results (Section 11.4). Also, Surge re-submitted almost 3,000 pulps from the 2011 drilling campaign to Actlabs for Au analysis. These samples had only been selectively analyzed previously, with a focus on Ag, Cu, and Mo.

11.1.1 Sample Collection and Sample Security 2021-2022

The drill core from the 2021 exploration program at Berg was handled within the guidelines of best industry practices. The drill crew delivered core to the camp site at the end of each shift. Surge personnel would then photograph, measure, log and mark the core for sampling. Both gas-powered and electric core saws were used to split the core in half with one half placed in marked polyurethane sample bags with corresponding sample tags and sealed with plastic zip ties. Individual core samples were typically 2 m in length and 100% of the drill core length was sampled. Four to five sample bags were inserted into each rice sack and subsequently marked and sealed with plastic zip ties.

Duplicate samples, blanks and certified standards were included with every sample batch and subsequently checked to ensure proper quality assurance and quality control.

The drill core samples were transported to Smithers by Surge personnel or a licensed expediting company and dropped off to Bandstra Transport, a Smithers based bonded carrier, who transported the samples to ALS preparation facilities in Kamloops. After the various prep steps were completed, ALS Kamloops transferred a representative pulp of the sample to ALS North Vancouver for analysis.

The 2022 re-sampling of 2007-2008 core was completed at the company's core facilities at Berg. All historic holes that were still in good enough shape to take a sample from and that did not have a previous gold assay were sampled by splitting the remaining half core in the historic boxes, resulting in a quarter core sample sent to the lab for Au analyses. Sample transport was in line with the process for 2021 drill core sampling described above.

All the 2011 pulps sampled for gold in 2022 were stored in a cold storage facility in Prince George since 2011. They were in pristine condition when sampled and were sent directly from the PG storage to Actlabs in Kamloops by Banstra Transportation on packaged pallets. For logistical reasons Surge decided to rely on lab internal blanks, standards, and duplicates for QA/QC for the pulp analyses.

11.2 Assay Analytical Methods 2021-2022

11.2.1 2021 Assaying at ALS

2021 drill core samples were analyzed by ALS Canada, a ISO/IEC 17025:2017 accredited independent laboratory. Upon receipt at ALS's Kamloops preparation facility, the samples were recorded (code LOG-21), weighed (WEI-21), crushed to 70% passing 2 mm (CRU-31), then a split of approx. 250 g (SPL-21) was pulverized to 85% passing 75 µm (PUL-31), see descriptions below.

The pulps were then transferred to ALS North Vancouver for the following analyses:

- ME-ICP61: four-acid digestion with an ICP-AES finish and a 33-element report.
- For samples that exceeded the reporting limit for Cu, Pb, Zn, the ME-OG62 package was requested.
- Au-ICP21: a 30 g fire assay method with ICP-AES finish was chosen.

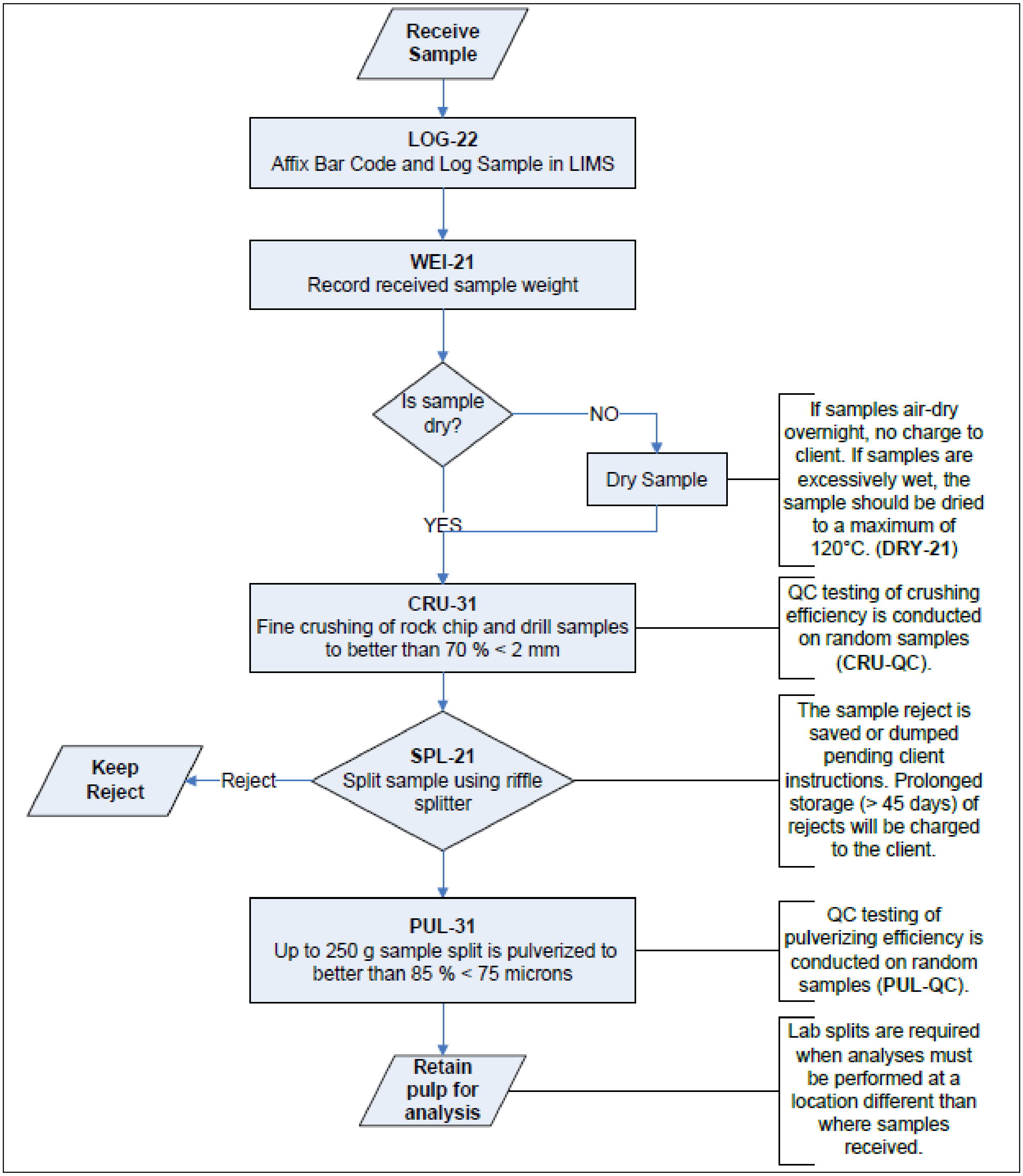
The following descriptions about sample preparation, digestion and analysis were copied from applicable ALS assay procedure fact sheets:

- **Standard Sample Preparation (PREP-31): Dry, Crush, Split, Pulverize**

The sample is logged in the tracking system, weighed, dried, and finely crushed to better than 70 % passing a 2 mm (Tyler 9 mesh, US Std. No.10) screen. A split of up to 250 g is taken and pulverized to better than 85 % passing a 75 micron (Tyler 200 mesh, US Std. No. 200) screen.

The ALS preparation flow chart is shown in Figure 11-1.

Figure 11-1: ALS Sample Preparation Chart



Source: ALS, 2023.

- **ME-ICP61 – Trace Level Methods Using Conventional ICP-AES Analysis**

Sample Decomposition: HNO3-HclO4-HF-HCl digestion, HCl Leach (GEO 4ACID)

Analytical Method: Inductively Coupled Plasma – Atomic Emission Spectroscopy (ICP-AES)

A prepared sample (0.25 g) is digested with perchloric, nitric, hydrofluoric, and hydrochloric acids. The residue is topped up with dilute hydrochloric acid and the resulting solution is analyzed by inductively coupled plasma-atomic emission spectrometry. Results are corrected for spectral interelement interferences.

NOTE: Four acid digestions are able to dissolve most minerals; however, although the term "near-total" is used, depending on the sample matrix, not all elements are quantitatively extracted.

- **ME-OG62 – Ore Grade Elements by Four Acid Digestion Using Conventional ICP-AES Analysis**

Sample Decomposition: HNO3-HclO4-HF-HCl Digestion (ASY-4A01)

Analytical Method: Inductively Coupled Plasma – Atomic Emission Spectroscopy (ICP-AES)

Assays for the evaluation of high-grade materials are optimized for accuracy and precision at high concentrations. Ultra-high concentration samples (> 15 -20%) may require the use of methods such as titrimetric and gravimetric analysis, to achieve maximum accuracy.

A prepared sample is digested with nitric, perchloric, hydrofluoric, and hydrochloric acids, and then evaporated to incipient dryness. Hydrochloric acid and de-ionized water are added for further digestion, and the sample is heated for an additional allotted time. The sample is cooled to room temperature and transferred to a volumetric flask (100 mL). The resulting solution is diluted to volume with de-ionized water, homogenized and the solution is analyzed by inductively coupled plasma – atomic emission spectroscopy or by atomic absorption spectrometry. Results are corrected for spectral interelement interferences.

NOTE: ICP-AES is the default finish technique for ME-OG62. However, under some conditions and at the discretion of the laboratory an AA finish may be substituted. The certificate will clearly reflect which instrument finish was used.

- **Au-ICP21 – Fire Assay Fusion – ICP-AES Finish**

Sample Decomposition: Fire Assay Fusion (FA-FUSPG1 & FA-FUSPG2)

Analytical Method: Inductively Couple Plasma – Atomic Emission Spectrometry

A prepared sample is fused with a mixture of lead oxide, sodium carbonate, borax, silica, and other reagents as required, inquarted with 6 mg of gold-free silver and then cupelled to yield a precious metal bead. The bead is digested in 0.5 mL dilute nitric acid in the microwave oven. 0.5 mL concentrated hydrochloric acid is then added, and the bead is further digested in the microwave at a lower power setting. The digested solution is cooled, diluted to a total volume of 4 mL with de-mineralized water, and analyzed by inductively coupled plasma atomic emission spectrometry against matrix-matched standards.

11.2.2 2022 Re-sampling and Assaying at Actlabs

For the 2022 re-sampling campaign, both the re-sampled quarter core and the pulps chosen for re-submission and Au analysis were sent to Actlabs in Kamloops, BC, the facilities are equally ISO/IEC 17025:2017 certified.

The 2007-2008 core was prepared as per method RX1 below while the 2011 pulps did not require any further preparation or homogenization as they had been cold-stored and were determined by the QP of the project to still be in pristine condition.

The requested Au analysis was '1A2', a fire assay method on a 30g sample with an atomic absorption finish for both the core samples and the pre-existing pulps from 2011. The following paragraphs detail the procedures at Actlabs:

- **Core and Rock Sample Preparation - Method Code RX1:**

As a routine practice the entire sample is dried at 60°C, crushed to 80% passing 2 mm (10 mesh), riffle split to obtain a representative 250 g sub-sample, and then pulverized to at least 95% passing 105 µm (150 mesh). The quality of crushing and pulverization is routinely checked and recorded as part of the quality assurance program.

- **Gold by Fire Assay with AA Finish - Method Code 1A2:**

A 30 g sample is mixed with fire assay fluxes (borax, soda ash, silica, litharge) with Ag added as a collector and the mixture is placed in a fire clay crucible. The mixture is then preheated at 850°C, intermediate 950°C and finish 1,060°C with the entire fusion process lasting 60 minutes. The crucibles are then removed from the assay furnace and the molten slag (lighter material) is carefully poured from the crucible into a mould, leaving a lead button at the base of the mould. The lead button is then placed in a preheated cupel which absorbs the lead when cupelled at 950°C to recover the Ag (doré bead) + Au.

Samples are processed in batches of 42 samples, which contain up to 35 client samples plus seven internal Quality Control (QC) samples (two blanks, three sample duplicates, and two certified reference materials – one high and one low) for at least 20% QC in each batch.

After fire assay fusion, the entire Ag + Au doré bead is dissolved in aqua regia and the gold content is determined by AA (Atomic Absorption) spectroscopy. AA is an instrumental method of determining element concentration by introducing an element in its atomic form, to a light beam of appropriate wavelength causing the atom to absorb light. The reduction in the intensity of the light beam directly correlates with the concentration of the elemental atomic species.

11.3 Quality Control of Laboratory Analysis – 2021 Drilling

Surge's QA/QC protocol at Berg in 2021 included the regular insertion of one blind certified reference material (CRM or standard) and one blind blank into the sample stream at low to acceptable rates and distributions to control lab reported data for contamination and accuracy. Equally, the Surge team took an acceptable number of field duplicate samples to understand sample precision Table 11-1 reports QA/QC insertion rates and totals for the Berg Project over time, including 2021.

Any standards that returned Cu or Mo data with results outside acceptable limits (greater than one standard deviation) were investigated and resolved prior to accepting the data. Internal lab certified standards were also plotted and reviewed as part of the routine QA/QC checks.

Table 11-1: QA/QC Insertion Rates and Totals

Sample type	Material description	Historical (1964-1980)		2007		2008		2011		2021		2007-2021		
		count	% of total	count	% of total	count	% of total	count	% of total	count	% of total	count	% of total	overall
PRIMARY	1/2 core sample	6,150	100.0%	4,066	72.5%	4,431	72.0%	4,913	80.0%	**1,252**	**85.0%**	20,812	81.5%	87.0%
PRIMARY	chips	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	
FIELDORIG	1/4 core sample field original	0	0.0%	135	2.4%	147	2.4%	154	2.5%	**73**	**5.0%**	509	2.0%	
CORIG	coarse reject original	0	0.0%	133	2.4%	145	2.4%	153	2.5%	0	0.0%	431	1.7%	
UMPIREORIG	check-assay original	0	0.0%	210	3.7%	241	3.9%	0	0.0%	0	0.0%	451	1.8%	
FIELDDUP	1/4 core sample field duplicate	0	0.0%	135	2.4%	147	2.4%	154	1.1%	**73**	**5.0%**	509	2.0%	3.7%
CDUP	coarse reject duplicate	0	0.0%	133	2.4%	145	2.4%	153	3.9%	0	0.0%	431	1.7%	
BLANK 1	blanks	0	0.0%	216	3.9%	0	0.0%	0	0.0%	0	0.0%	216	0.8%	3.6%
BLANK 2		0	0.0%	0	0.0%	0	0.0%	67	1.1%	0	0.0%	67	0.3%	
BLANK 3		0	0.0%	52	0.9%	287	4.7%	239	3.9%	0	0.0%	578	2.3%	
BLANK 15km		0	0.0%	0	0.0%	0	0.0%	0	0.0%	**58**	**3.9%**	58	0.2%	
BergHypHigh	standards	0	0.0%	0	0.0%	93	1.5%	89	1.4%	0	0.0%	182	0.7%	3.5%
BergHypLow		0	0.0%	0	0.0%	96	1.6%	91	1.5%	0	0.0%	187	0.7%	
BergSupHigh		0	0.0%	0	0.0%	47	0.8%	47	0.8%	0	0.0%	94	0.4%	
BergSupLow		0	0.0%	0	0.0%	46	0.7%	39	0.6%	0	0.0%	85	0.3%	
CDN-CM-1		0	0.0%	122	2.2%	6	0.0%	15	0.2%	0	0.0%	143	0.06%	
CDN-CM-34		0	0.0%	0	0.0%	0	0.0%	0	0.0%	**17**	**1.2%**	17	0.1%	
CU126		0	0.0%	76	1.4%	1	0.0%	13	0.2%	0	0.0%	90	0.4%	
CU133		0	0.0%	70	1.2%	2	0.0%	13	0.2%	0	0.0%	85	0.3%	
UMPIREDUP	check-assay duplicate	0	0.0%	227	$0.04	270	4.4%	0	0.0%	0	0.0%	497	1.9%	2.3%
UMPIREDUPLABDUP	check-assay duplicate lab dup	0	0.0%	8	$0.00	10	0.2%	0	0.0%	0	0.0%	18	0.1%	
CHECKBLANK	check-assay blank	0	0.0%	12	$0.00	14	0.2%	0	0.0%	0	0.0%	26	0.1%	
CHECKBLANKDUP	check-assay blank duplicate	0	0.0%	1	0.0%	2	0.0%	0	0.0%	0	0.0%	3	0.0%	
CHECKSTANDARD	check-assay standard	0	0.0%	13	0.2%	23	0.4%	0	0.0%	0	0.0%	36	0.01%	
CHECKSTANDARDDUP	check-assay standard duplicate	0	0.0%	1	0.0%	1	0.0%	0	0.0%	0	0.0%	2	0.0%	
Total		**6,150**	**100.0%**	**5,610**	**100.0%**	**6,154**	**100.0%**	**6,140**	**100.0%**	**1,473**	**100.0%**	**25,527**	**100.0%**	**100.0%**
Total intervals sampled		6,150		4,544		4,964		5,220		1,325		22,203		
Total blanks		0		268	5.9%	287	5.8%	306	5.8%	58	4.4%	919	4.1%	
Total CRMs		0		268	5.9%	291	5.9%	307	5.9%	17	1.3%	883	4.0%	
Total Duplicates		0		268	5.9%	292	5.9%	307	5.9%	73	5.5%	940	4.2%	
Total check-assays		0		262	5.8%	320	6.4%	0	0.0%	0	0.0%	582	2.6%	

Table 11-1 shows both % of total samples including all QC ('% of total' column right of 'count' for each year) as well as % of interval sampled only at the bottom of the list, coloured by a simple conditional formatting to highlight the spread between this small sub-set of results. The QC insertion rates for 2021 were below industry standard for CRMs, and no check-assaying was completed. Field duplicate and blank insertion rates were acceptable.

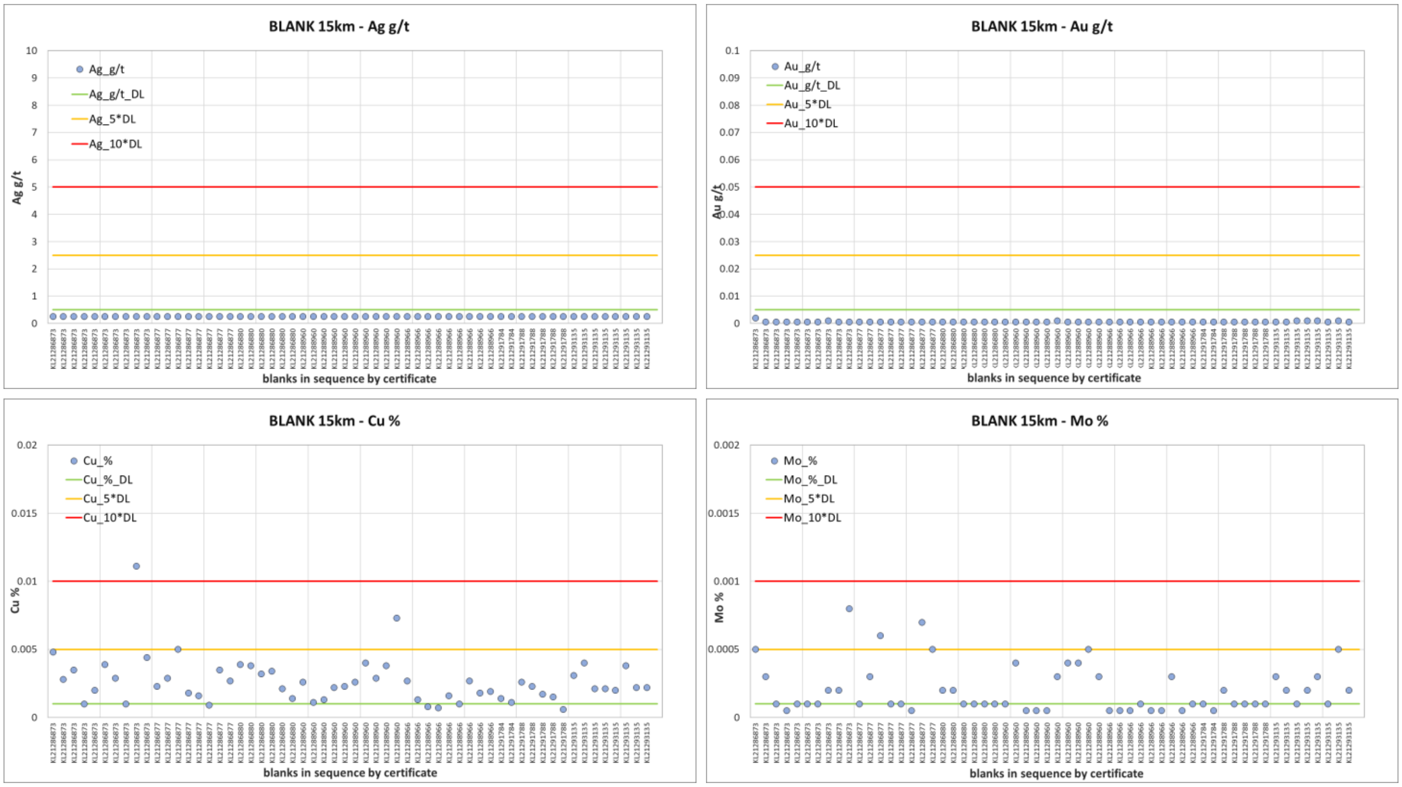
11.3.1 Blanks – 2021 Drilling

Surge Copper inserted 58 blind blanks of approx. 1 kg each at regular intervals of approx. one blank in 20 samples into the stream of 1,325 sampled intervals, which approached the recommended rate of 5% and is acceptable. A material called 'Blank 15 km' was used, which differed geochemically (and therefore most likely in its physical properties) from blanks used at the project previously (2007-2011, see Table 11-1). This material appeared to be an intermediate igneous rock and was sourced from a blast pit located near the 15 km marker on the Troitsa Forest Services Road, about 2 km beyond the Ootsa exploration camp. MMTS does not have any information about hardness or fraction size of the material.

Figure 11-2 plots the 2021 blank performance for Ag, Au, Cu, and Mo and indicated that minor sample contamination did happen. The likely natural background variability of approximately 5-30 ppm Cu and 0.5-1 ppm Mo appeared to have contributed to the scatter past the 5*DL warning thresholds, but overall, the weakly elevated concentrations in blanks, for Mo in particular, were generally recorded within broader mineralized intervals. Given the very low levels for both metals, this is considered to be of no consequence for resource estimation. Ag and Au consistently reported below detection limit. Neither acid soluble Cu nor Re data was available for 2021.

A single sample labelled 'blank' in the database (#62970) appeared to indicate considerable Ag, Cu, and Mo contamination but after further review was determined to be different, weakly mineralized material as other elements like Ca, Cr, Fe, and S were equally not in line with overall expected values and could not be a result of contamination. The sample was labelled 'unknown' (UNK) and not included in the graphs below.

Figure 11-2: Blind Blank Performance for Ag, Au, Cu, and Mo



Source: MMTS, 2023.

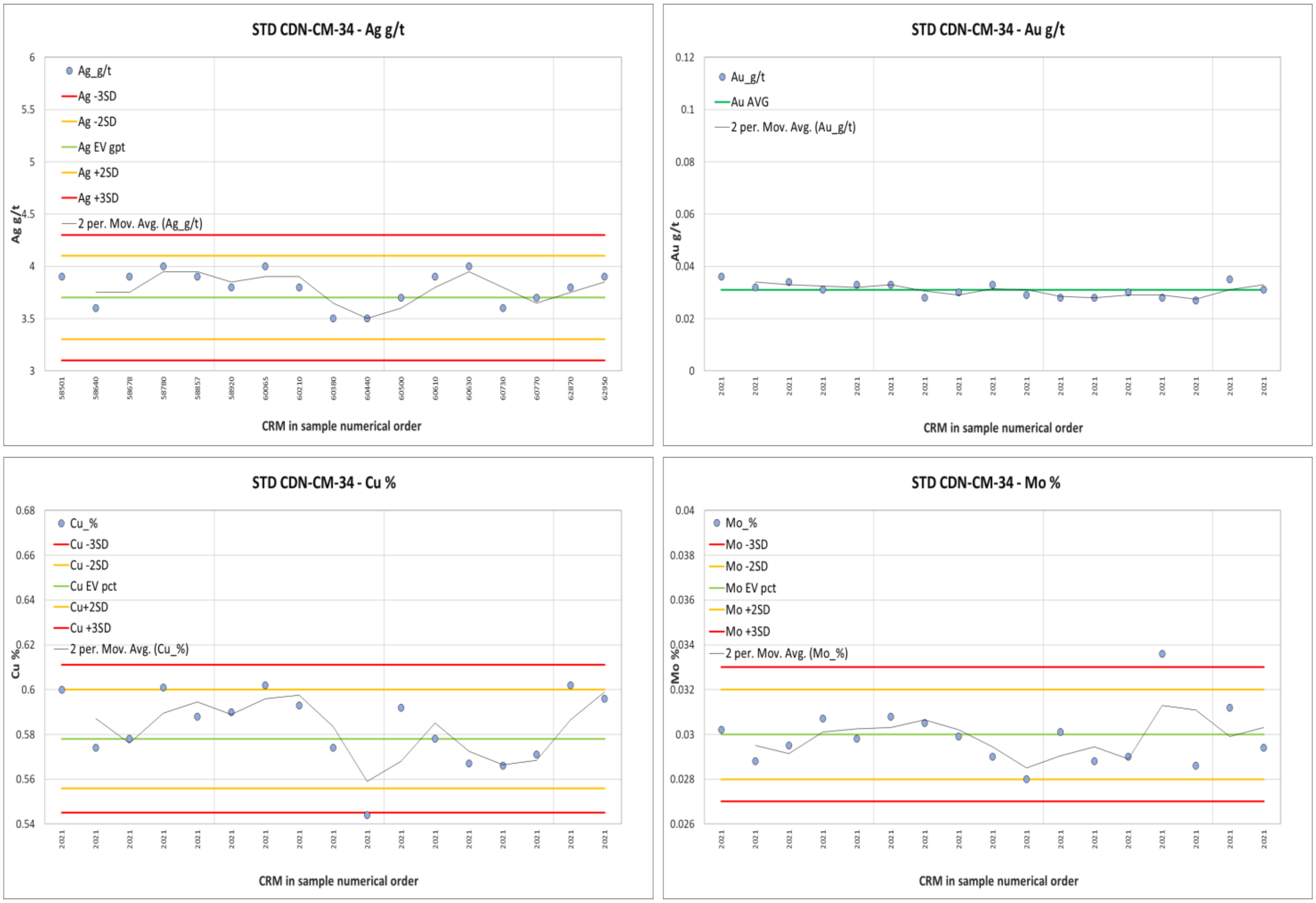
11.3.2 Certified Reference Materials – 2021 Drilling

The single utilized CRM for 2021 was CDN-CM-34 which is certified for Cu, Mo, Ag, and S, but not for Au. It was inserted 17 times to control analytical accuracy. The following plots show the performance for each relevant element over the duration of the campaign.

Overall, considering the relatively small number of data, ALS has analyzed CDN-CM-34 accurately, with no significant trends discernible and the results mostly within +/-2 standard deviations (inter-lab 2SD as certified by CDN). Cu appeared to report slightly higher than EV of 0.578% Cu, but one single value exceeded the -3SD threshold and as a result, the mean only calculated to 0.583% Cu, The Mo plot showed one CRM analysis as exceeding the +3SD threshold, the other 16 results plotted within +/-2SD of EV of 0.03% Mo. The Ag results plotted within +/-2SD of EV of 3.7 ppm Ag.

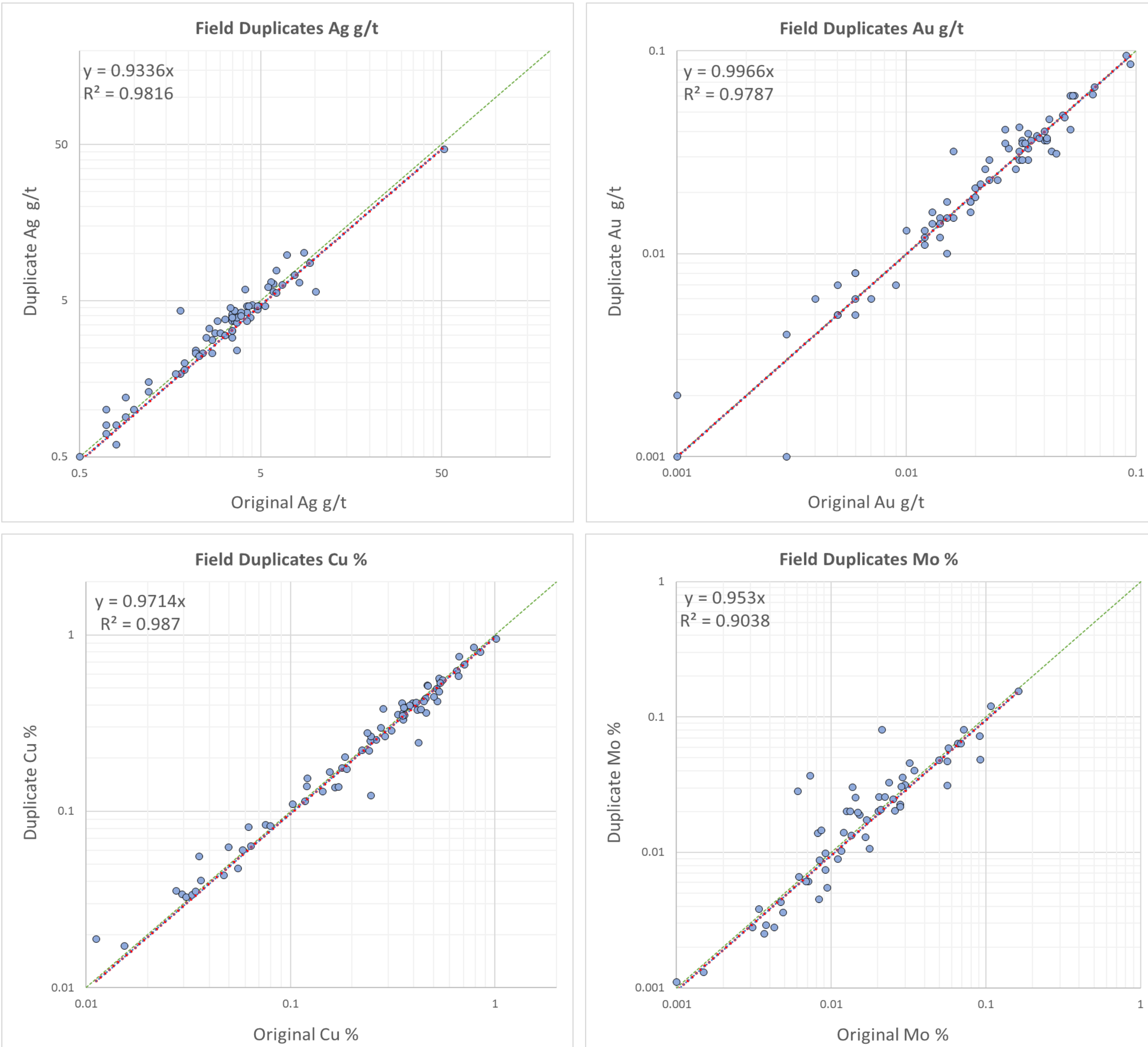
CDN-CM-34 contains no certification for Au and was therefore not suitable for accuracy control, but the Au data in Figure 11-3 appeared to indicate reasonably good precision.

Figure 11-3: CRM Performance for Ag, Cu, Mo with Indicated Precision for Au



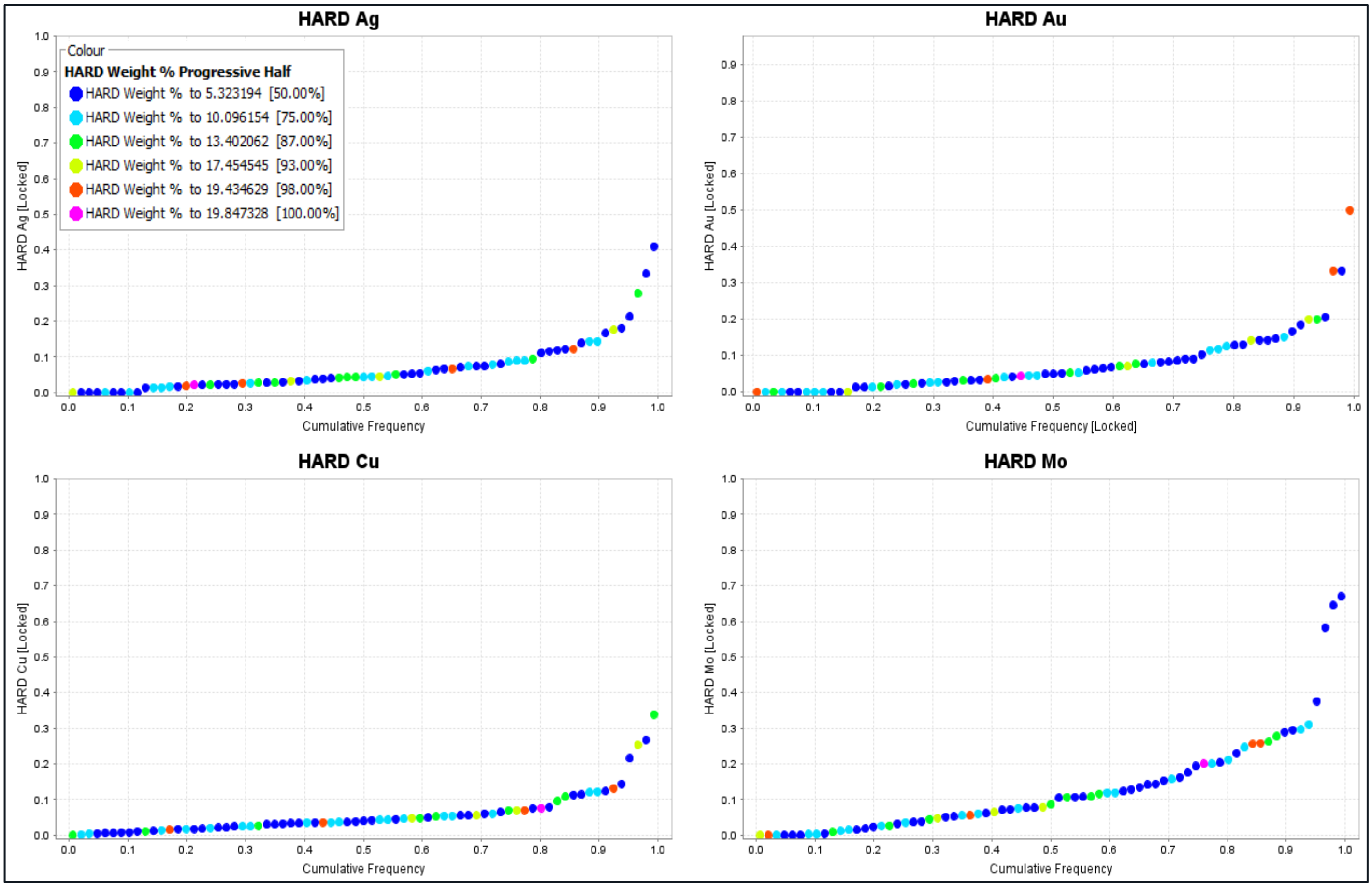
Source: MMTS, 2023.

Figure 11-4: Field Duplicate Performance for Ag, Au, Cu, and Mo



Source: MMTS, 2023.

Figure 11-5: HARD Plots for Ag, Au, Cu, and Mo, Coloured by Weight HARD



Source: MMTS, 2023.

11.4 Quality Control of Laboratory Analysis 2022 Re-sampling for Core (Au)

During the 2007 and 2008 drilling campaigns, Terrane as the operator of the project continuously cut and sampled the produced core, then had every sample analyzed for Ag, Cu, and Mo (by ALS AA46) and but only every other sample by ME-MS41 (which also reported Ag, Cu, Mo, among many others). The ME-MS41 aqua regia method by ALS did include an Au assay as well, but at a very high detection limit of 0.2 ppm, generally unsuitable for the Berg deposit. In 2007, Terrane requested approx. 2,700 samples to be analyzed for Au via fire assay (ALS AA23) in accordance with their internal system of selecting every other sample in a series. In 2008, this was discontinued and no more useful Au data was generated. In addition, select samples were analyzed for acid soluble Cu.

In 2022, Surge Copper re-sampled 4,290 intervals from 2007-2008 drill core (holes BRG07-139 to BRG08-197, except for BRG07-142, BRG08-186, and BRG08-196) for which Au data was not yet available and sent the material to Actlabs in Kamloops for fire assay Au analysis as per Section 11.2.

Surge provided MMTS with a database that detailed which interval of each selected drill hole was re-sampled, including the original sample number and the new 2022 sample number, which STD and blank was inserted at what position, plus comments. Surge had cut the existing half core into quarter core while maintaining the original sample interval, wherever possible.

To control the quality of the assay results, Surge inserted 205 blanks (BLK) and 46 standards (CRM) at mostly regular intervals of approximately one QC sample every 10 core samples, often alternating between blank and CRM material, but did not define and take field duplicate samples, as summarized in Table 11-2. Surge also did not re-sample any core for which Au was already available, so ALS's Au-AA23 method of 2007 and the 2022 Actlabs fire assay method 1A2 could not be directly compared.

Table 11-2: 2022 Re-sampling of Core QA/QC Insertion Rates and Totals

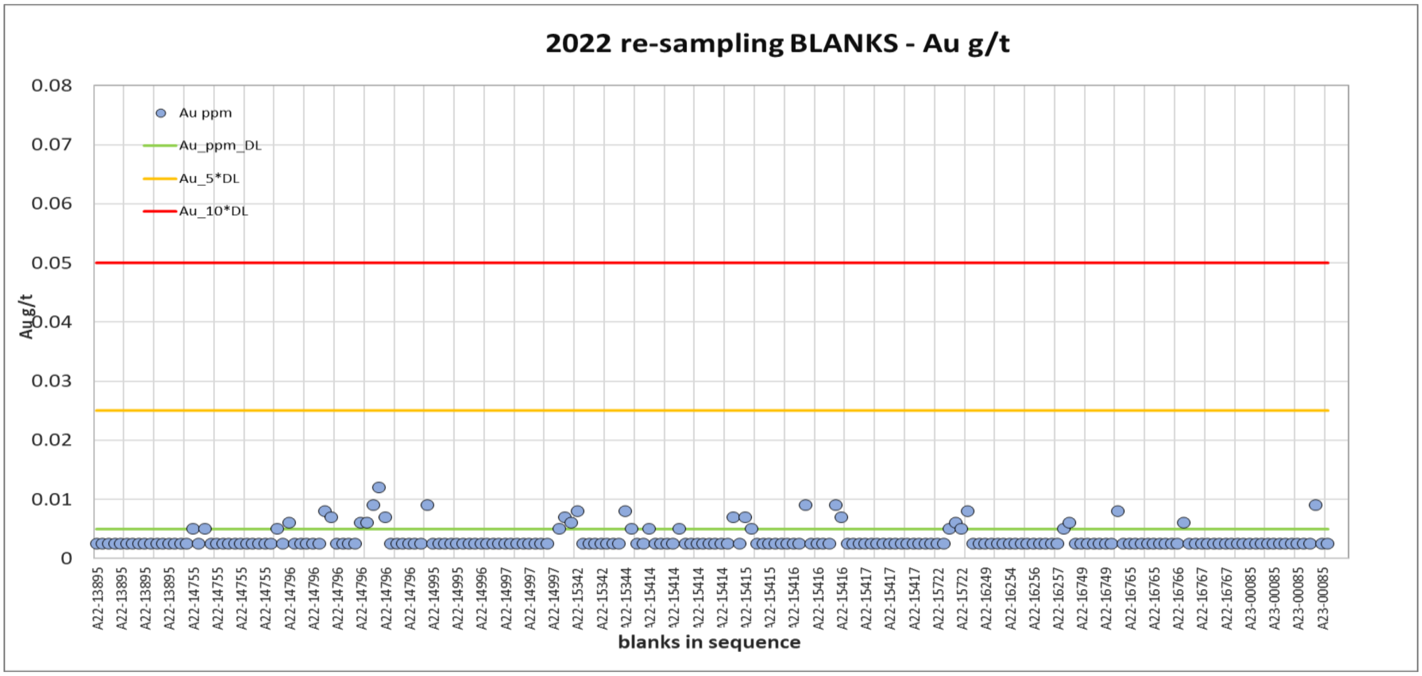
2022 Re-sampling	Count	% of Total
Intervals (core)	4,281	94.5%
BLK	205	4.5%
CRM	46	1.0%
duplicates	0	0.0%
Total	**4,532**	**100.0%**

11.4.1 Blank Performance – 2022 Re-sampling of Core

Multiple different blanks appear to have been inserted, representing unmineralized, likely igneous rocks, presumably taken from multiple outcrop locations along the road towards the Berg Project.

Overall, none of the blanks indicated significant contamination that would have triggered a follow-up with Actlabs, >80% of all blanks reported below detection limit of 0.005 ppm. See Figure 11-6 for a plot of the blank Au re-sampling performance.

Figure 11-6: 2022 Core Re-sampling Blank Performance (Au)



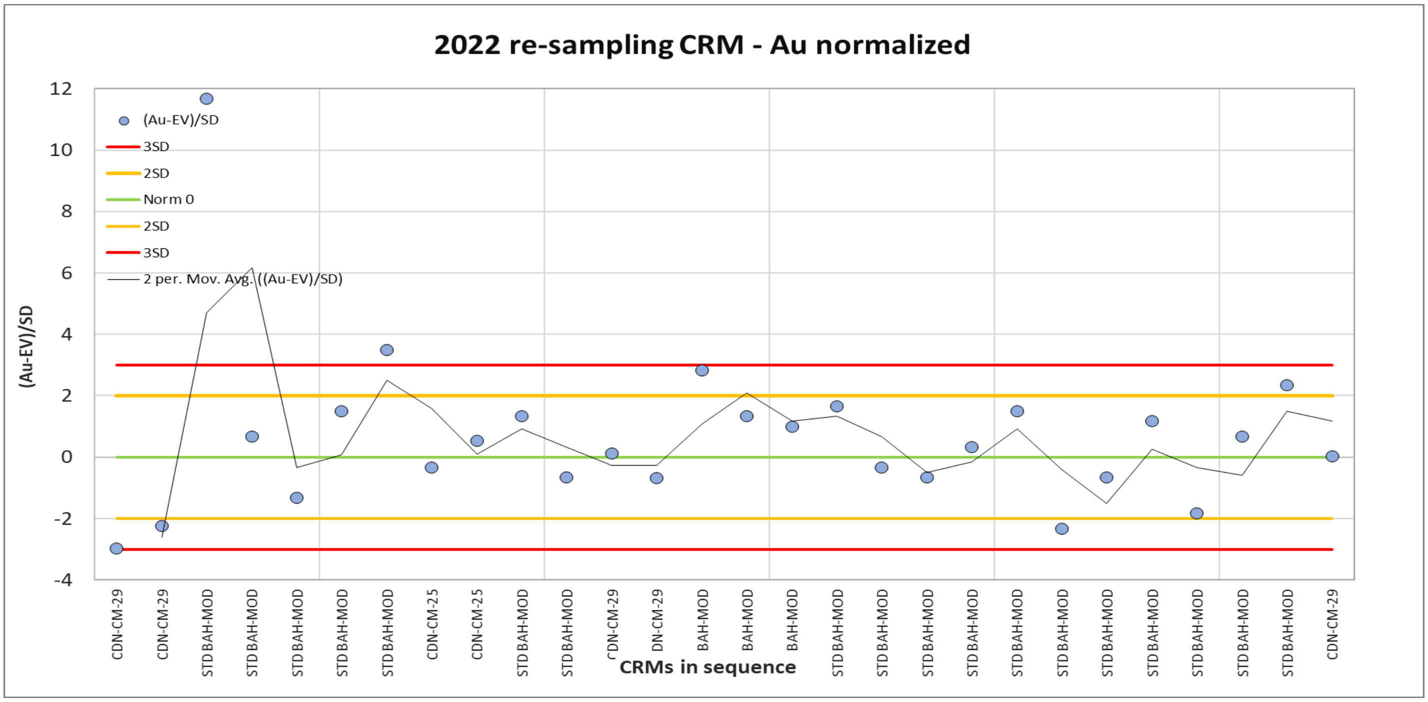
Source: MMTS, 2023.

11.4.2 CRM Performance – 2022 Re-sampling of Core

Four different standards were selected by Surge to control analytical accuracy over a representative range of Au grades, however, the project-specific standard ‘BergSupHigh’ as the lowest-grade material chosen and inserted 17 times has never been certified for Au, only for Cu. As a result, the following Au-normalized PCC-style plot only included the other three CRMs, CDN-CM-25, CDN-CM-29, and BAH-MOD. The ‘between labs’ standard deviation in BAH-MOD was considered by Smee and Associates as too large to fully certify the Au grade of the material, it was therefore considered as an ‘indicated mean’ only.

The 29 available data points in Figure 11-7 scattered around the calculated zero centre line (Au actual minus Au certified mean, divided by ‘between lab’ standard deviation) with three outliers that exceeded the 3SD threshold. The strongest outlier was a mislabel. On average, the CRMs read slightly high, but MMTS found the results overall acceptable.

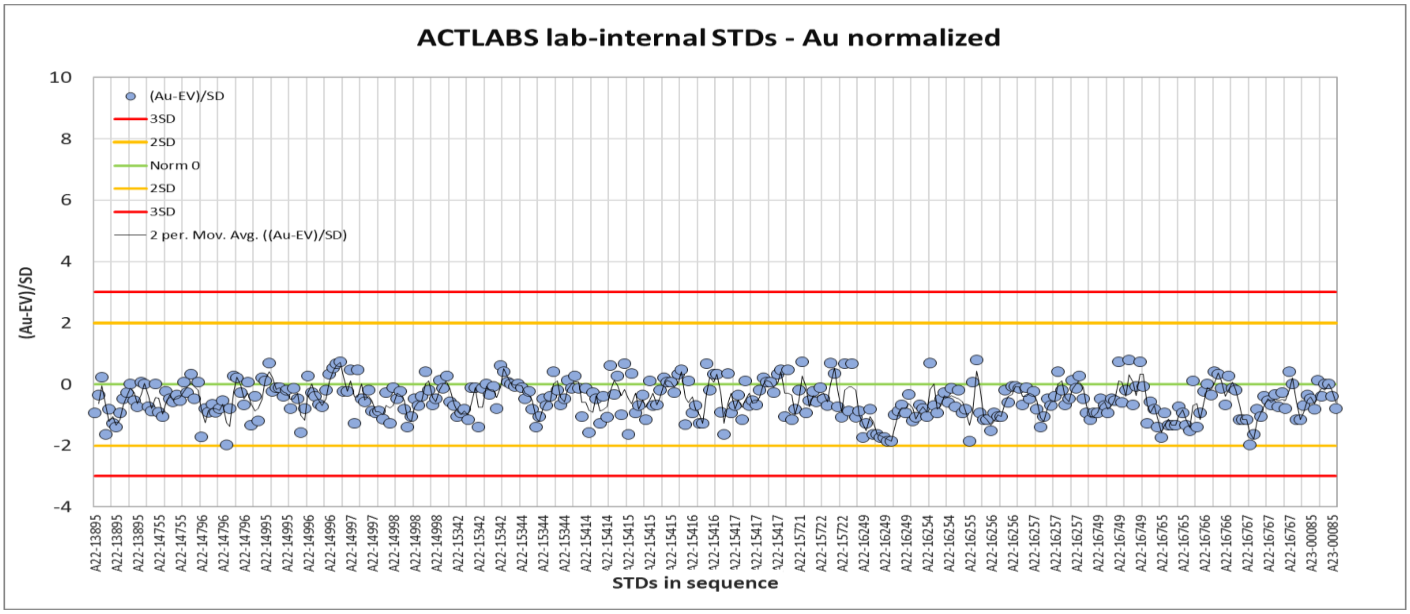
Figure 11-7: 2022 Core Re-sampling – CRM Performance (Au)



Source: MMTS, 2023.

For confirmation, MMTS compiled and reviewed Actlabs-internal quality control sample performance for the 348 STDs of OREAS 228, OREAS 239, OREAS 254, and OREAS E1336 that accompanied each of Surge's sample batches for this re-sampling program (Figure 11-8). The results plotted exclusively within the +/-2SD thresholds of the Au-normalized chart but also demonstrated a significant negative bias as ca. 80% of data fell below zero, resulting in a mean of -0.51 for the population.

Figure 11-8: 2022 Core Re-sampling Actlabs-internal – CRM Performance (Au Normalized)

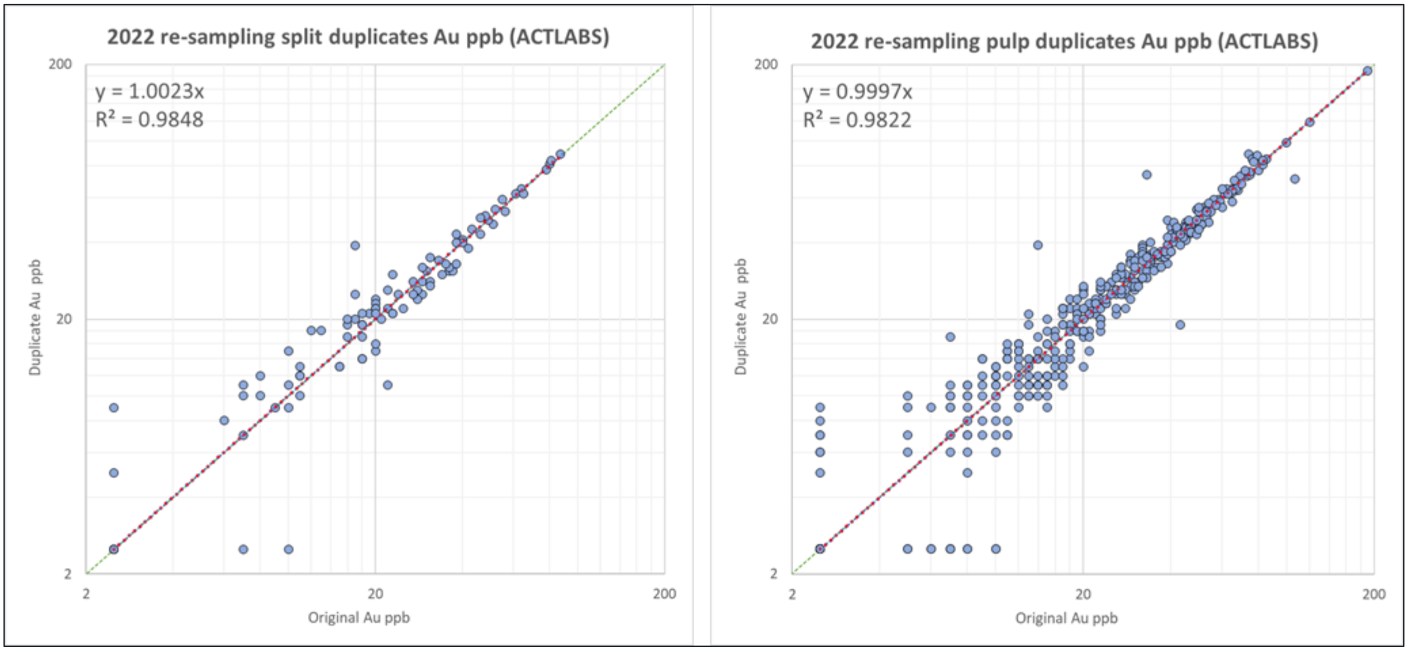


Source: MMTS, 2023.

11.4.3 Duplicate Performance – 2022 Re-sampling of Core

Surge did not include any field duplicate samples nor were coarse reject or pulp duplicates requested from the lab at specific intervals, so to assess repeatability, MMTS used Actlabs coarse reject split duplicate (97 data points) and pulp duplicate data (382). Both graphs inFigure 11-9 demonstrated good correlations with very few outliers despite the overall low Au grade and limited data range.

Figure 11-9: 2022 Core Re-sampling Actlabs – Internal Duplicate Performance (Au)



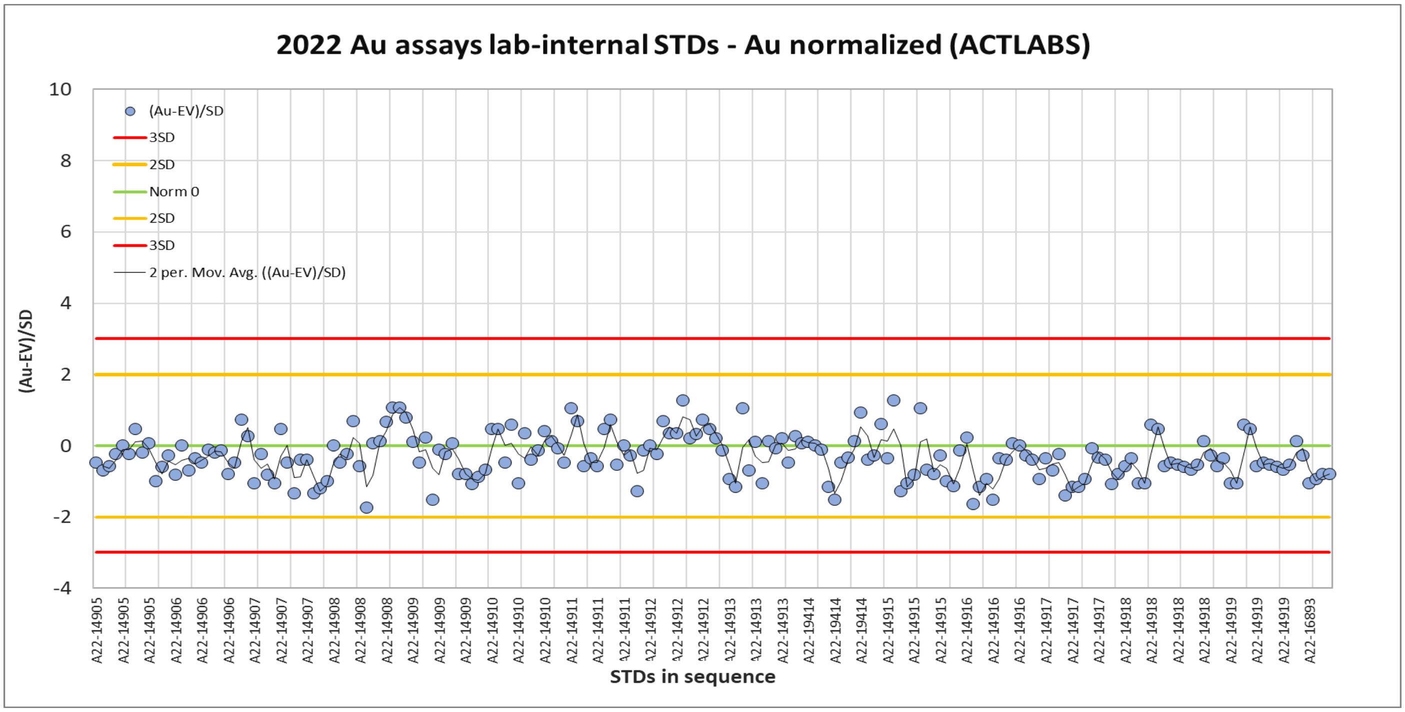
Source: MMTS, 2023.

11.5 Quality Control of Laboratory Analysis 2022 Re-assaying of Pulps (Au)

Of the 6,140 samples submitted to ALS Labs in 2011 by TCM (from 35 holes, including QC samples), only 1,041 across nine holes were analyzed for Au by fire assay (ALS Au-AA25). Surge selected approx. 3,000 pulps from 31 2011 drill holes that had only been analyzed for Ag, Cu, and Mo via AA46 or AA46 and ME-MS41 and submitted them to Actlabs in Kamloops for fire assay Au analysis (1A2).

Fewer than 15 original quality control sample pulps were included in the program and Surge did not insert any new QC samples. MMTS therefore reviewed the Actlabs-internal QC samples and presented their performance below in Figure 11-10 (excluding blanks as contamination control as no significant sample prepping was required).

Figure 11-10: 2022 Pulp Re-assaying Actlabs – Internal STD Performance (Au)

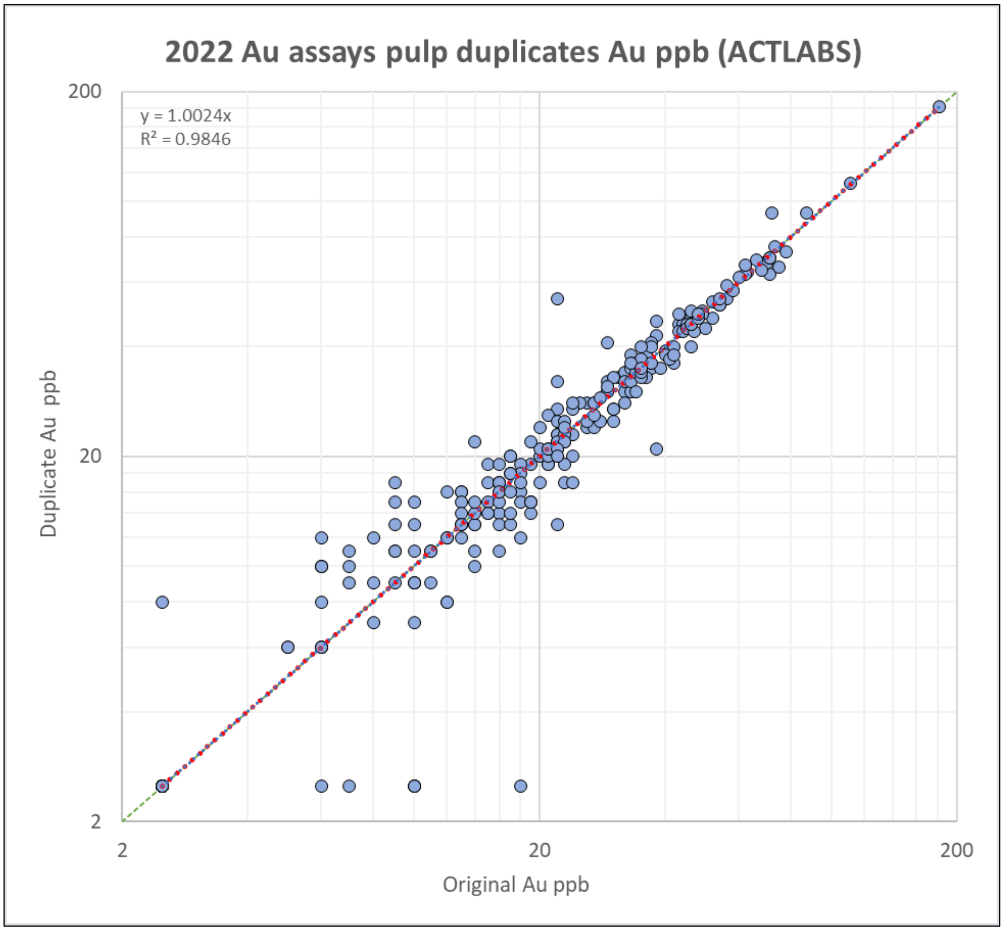


Source: MMTS, 2023.

Actlabs STDs OREAS 239 and OREAS E1336 were normalized and graphed in sequence of received certificates. The expected values for both standards at 510 ppb and 3,550 ppb Au respectively were somewhat suboptimal for this program as they covered a Au range well above that of a low-Au porphyry system like Berg. The results of the 188 STDs did plot consistently within the +/-2SD threshold lines but were overall biased low (mean of -0.31), with the certificates at the start and end of the program most pronounced.

Actlabs internal pulp duplicate procedure also included a total of 250 original-duplicate pairs distributed over all 16 relevant certificates. The correlation as expressed by R2 in Figure 11-11 was very good as expected, despite the relatively small grade spread from 2.5 ppb (1/2 detection limit or DL) to <200 ppb and general proximity to DL for most of the data.

Figure 11-11: 2022 Pulp Re-assaying Actlabs – Internal Pulp Duplicate Performance (Au)



Source: MMTS, 2023.

MMTS regarded both the accuracy and precision of the data from the 2022 pulp re-assay program as acceptable.

11.6 Quality Control of Laboratory Analysis 2007-2018 Review

This Section aims to expand on QA/QC review and analysis as shown in previous NI 43-101 Technical Reports by Harris and Stubens (2008), Harris and Labrenz (2009), and TetraTech (2021). Au had not been included in resource estimation prior and accordingly, an acceptable sampling, prepping and analysis performance with respect to Au has not been demonstrated in previous reports. This data is plotted in Sections 11.6.1 to 11.6.3.

Several CRMs were utilized over multiple drill campaigns and plotting of all available multi-element data over time rather than per drill season was considered potentially beneficial to the understanding of the analytical data.

TetraTech had presented 2011 CRM performances for Ag, Cu, and Mo as z-score control charts, with samples sorted by number rather than by drill hole, certificate, or report date. This could have masked analytical trends in data for which the sample numbering may have been out of sequence. Normalized control charts with data sorted by drill hole were produced by MMTS to confirm (see Section 11.6.2)

The project-specific CRMs BergHypHigh, BergHypLow, BergSupHigh, and BergHypLow were created in 2008, not analyzed or certified for Au, and individual lab means and standard deviations were of such variability for Ag that all four were released by Smee & Associates as either 'indicated' (>15% relative standard deviation or RSD) or 'provisional' (5-15% RSD), not 'certified'.

The seven participating analytical labs at time of certification were instructed to analyze the provided material by using a four-acid digestion with ICP-ES or AAS finish. However, for the actual drilling campaigns in 2008 (Terrane) and 2011 (TCM), both operators decided on a more selective aqua regia digestion for all their samples including the CRMs, accepting a possible slight low bias, if any, for Cu and Mo in the CRMs during the QC part of their respective programs.

Purchased CRMs that were utilized prior to 2021 were CDN-CM-1, WCM-CU126, and WCM-CU133. In 2007, these were used exclusively as the project-specific CRMs were not yet available. In 2008, they were inserted only during sampling of the first hole of the campaign (BRG08-167), Terrane then switched to the Berg CRMs after that. In 2011, the purchased CRMs were inserted sporadically during the second half of the drill campaign (41 total, 14% of all inserted CRMs that year).

In 2018, TCM contracted Bureau Veritas to check-assay a selection of 60 single pulps from the 2011 drilling campaign, requesting MA250 four-acid digestion with ICP-MS finish plus Au analysis using a 30 g sample and fire-assay method FA430. These results are shown in 11.6.4.

11.6.1 Blank Performance Au (2007-2011)

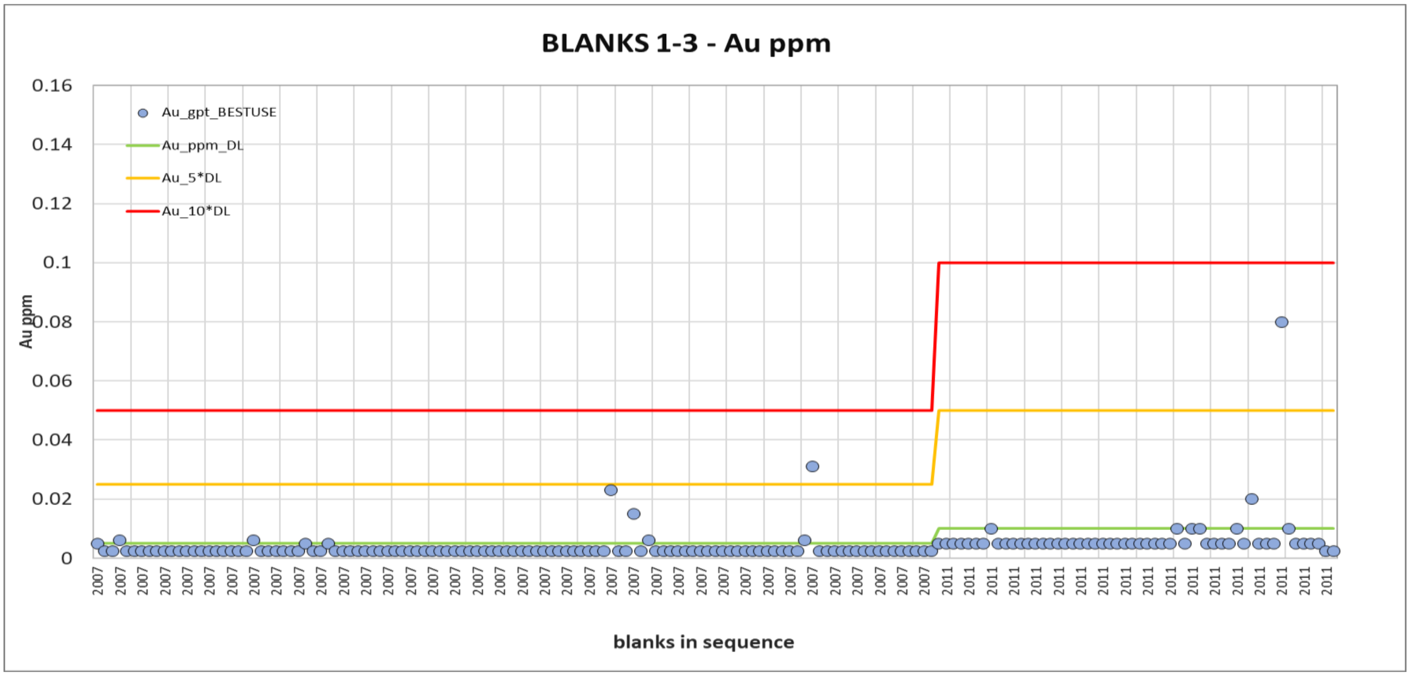
Based on a quick review of the overall assay results, three different materials were inserted into the sample stream as blind blanks between 2007 and 2011. The actual physical properties of the materials like grain size or hardness remained undetermined. For this report, they were generically named blank 1, blank 2, and blank 3 for review but combined for reporting. Blank 1 was used exclusively in 2007, and blank 2 exclusively in 2011, while blank 3 was used during all three seasons.

Since Au was not a focus at the Berg Project at that time, only 167 of a total of 861 blanks were analyzed for Au, none in 2008.

Figure 11-12Figure 11-2 illustrated the Au assay results over time with a linear graphic expression of detection limit (DL) as well as 5*DL and 10*DL threshold lines included. For 2011, Thompson Creek Metals requested fire assay method Au-AA25 instead of the previously used Au-AA23 which resulted in the shift in limit of detection.

No blank exceeded the 10*DL failure threshold and only three samples plotted above the 5*DL warning line. Based on the available data MMTS concluded that sample contamination was not a concern at ALS.

Figure 11-12: 2007-2011 Blanks Performance Au (2007-2011)



Source: MMTS, 2023.

11.6.2 Certified Reference Materials Performance Au (2007-2011)

Two standards were used between 2007 and 2011 that are certified for Au: CDN-CM-1 and WCM-CU133. Given the complete sampling yet incomplete assaying protocols of the operators at the time, only 57 of 143 CDN-CM-1 standards were analyzed for Au (28 of 85 for WCM-CU133). All data was being generated in 2007 only.

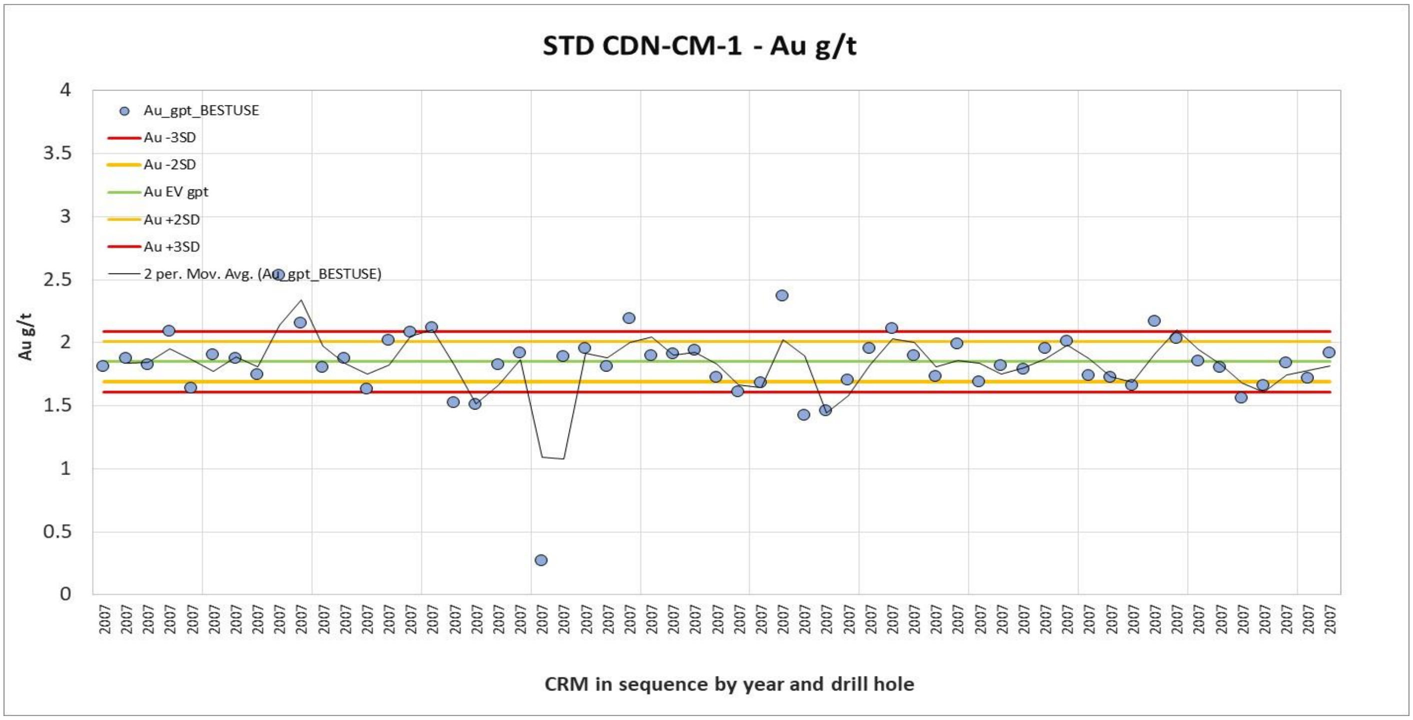
CDN-CM-1 was a standard that had been produced from 680 kg of material from the Cu-Mo-Au Casino deposit in BC, Canada, which at first approximation could be classified as very similar to the Berg mineralization, and 20 kg of a Au-Cu-Mo concentrate. This resulted in a mean Au grade of 1.85 g/t, which is higher than the best mineralized intercepts at the Berg system would grade.

A total of 12 labs participated in the certification process, each assaying 10 30 g samples by fire assay. The 120 results were used to calculate mean and standard deviation.

As illustrated in Figure 11-13, the data series for CDN-CM-1 demonstrated 14 CRMs plotting outside the +/-3SD failure threshold that should have triggered re-assaying of significant portions of the sample set. MMTS was not provided the certificates of such re-assaying, if indeed requested at the time. The far outlier at Au=0.272 g/t was likely a sample mix-up in the respective lab as the ME-MS41 portion of the requested analyses appeared correct. Overall, the data displayed significant scatter and 24 samples exceeded the +/-2SD warning threshold, which equals to >40% of the data.

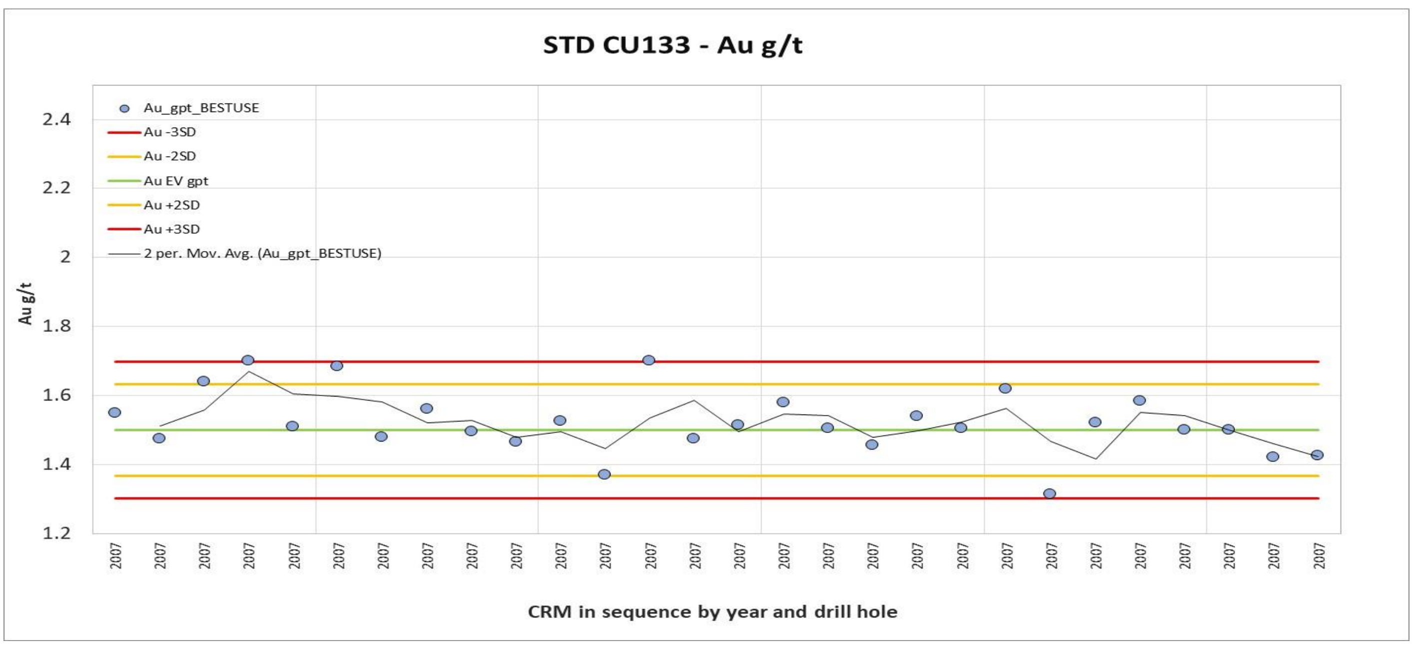
Figure 11-14 illustrates the performance of CDM CU133 for Au which has much less scatter and no fails.

Figure 11-13: 2007 CRM Performance (Au) – CDN-CM-1



Source : MMTS, 2003.

Figure 11-14: 2007 CRM Performance (Au) – CU133



Source: MMTS, 2023.

The mean and standard deviation calculation of CRM CU133 by WCM Minerals was based on three reputable laboratories analyzing the material four times each, for a total of 12 data points per respective metal (Au, Cu, Mo).

Overall, the material at a mean of 1.5 g/t was unsuitably high in Au grade to effectively control the accuracy of analysis of even the highest-grade Berg samples. Multiple data were approaching or slightly exceeding the +/-3SD failure threshold, highlighting the substantial scatter of the dataset, but the average of the Au assays at 1.52 g/t matched the expected value (mean) of the CRM.

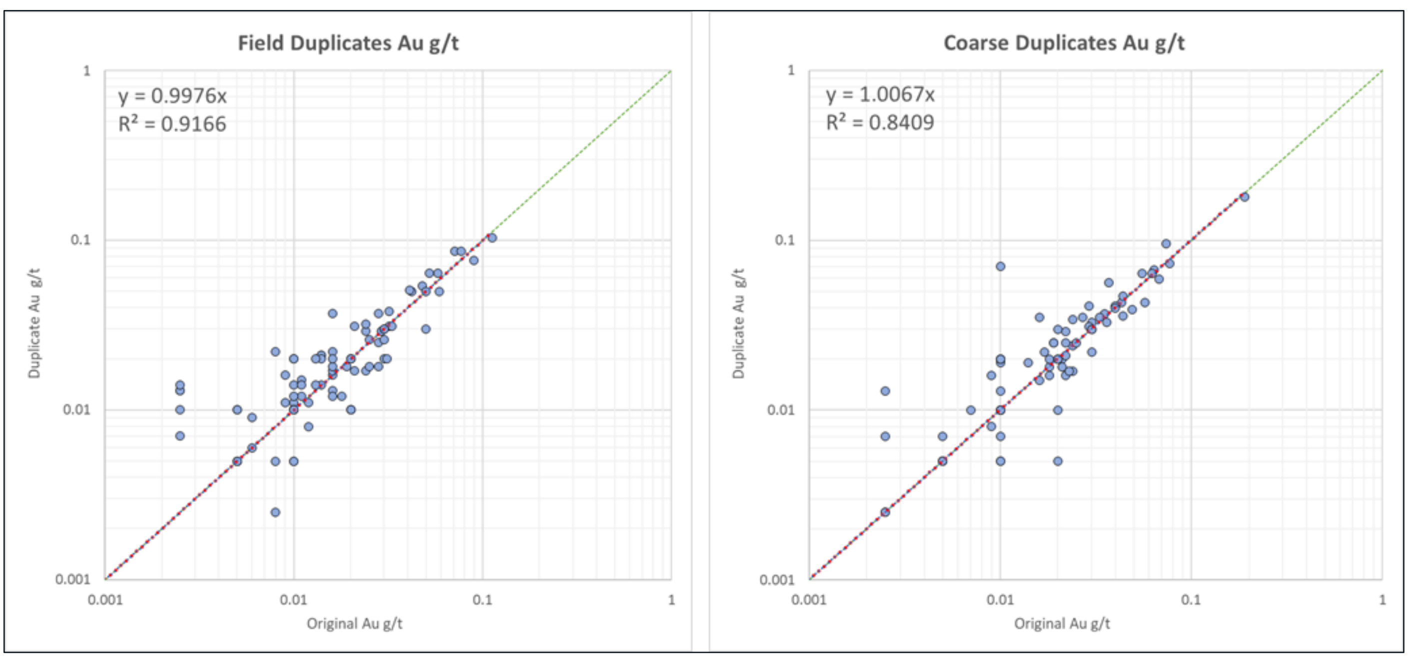
In summary, Au data has been poorly assured and controlled using unsuitable CRMs with inconsistent performance in 2007 and has not been controlled at all in 2008 and 2011.

11.6.3 Duplicate Performance Au (2007-2011)

From 2007 to 2011, a significant and representative number of field duplicate samples were taken, and coarse reject duplicates requested at ALS to control sample precision (see Table 11-1 for insertion rates). In line with the description of the blanks Au analysis, only a fraction of the duplicates (or originals) was analyzed for Au to be able to determine repeatability (field duplicates: 109 of 436 or 25%; coarse duplicates: 90 of 431 or 21%).

The XY scatter plots and calculated R2 in Figure 11-15 demonstrated acceptable correlations between the Au results for the sample pairs despite the comparatively small grade range of effectively 0.01 g/t to <0.2 g/t. Pulp duplicates were not requested at the time and therefore a data precision progression across the sampling and preparation stages could not be demonstrated.

Figure 11-15: 2007-2011 Precision Control by Field and Coarse Duplicate Sampling



Source: MMTS, 2023.

11.6.4 Normalized Control Charts for Ag, Mo, and Cu – 2007-2011

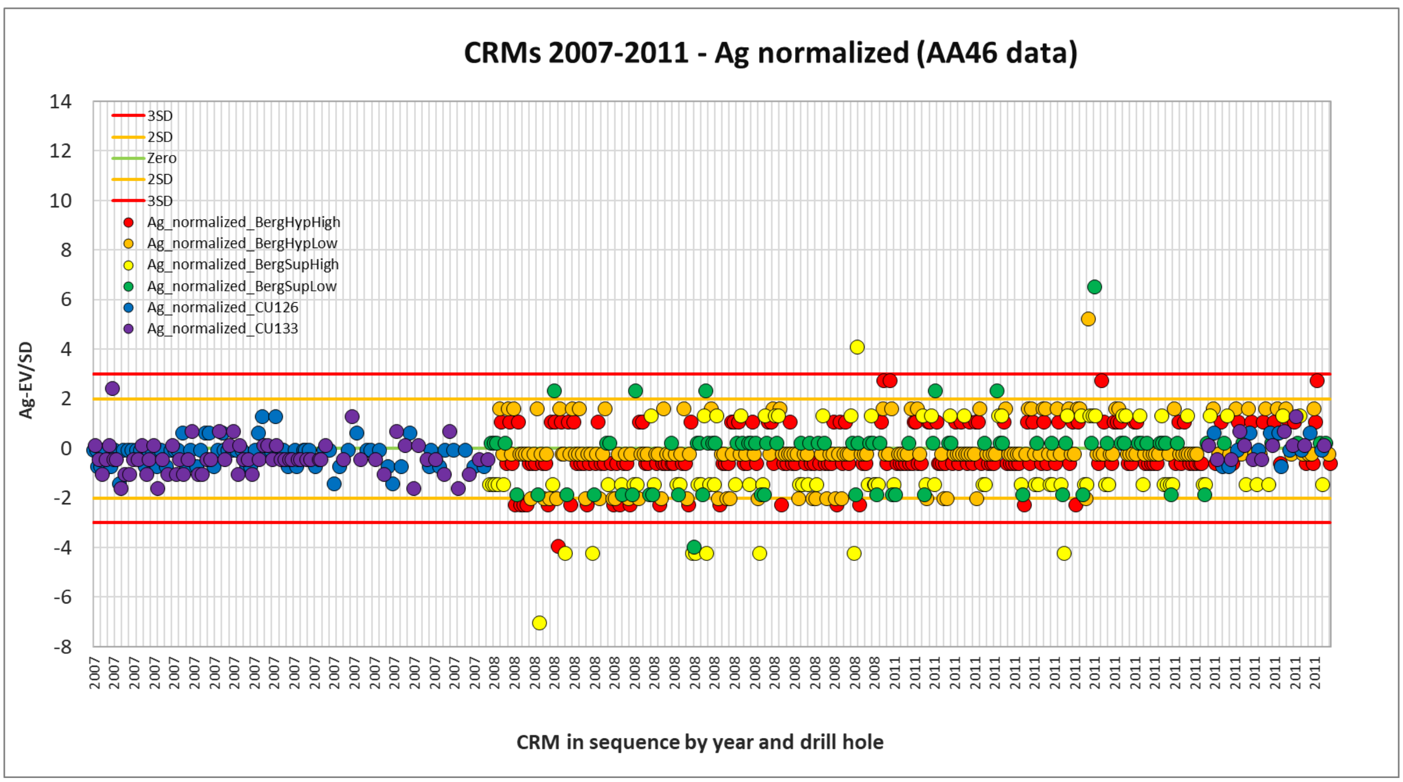
MMTS has generated Process Control Charts (PCCs) that included Ag, Cu, and Mo results reported by ALS (AA46) to assess data accuracy over time (2007-2011, three drilling campaigns). To normalize, the CRM-specific 'between labs' calculations for expected value/certified mean and standard deviations for each metal were used across all 866 available assays as follows: Cu (actual assay) minus EV (certified mean), divided by SD (between labs standard deviation). Plots are made with the colours of the data points reflecting the standards used.

As illustrated in Figure 11-16 and Figure 11-17 for Ag and Mo respectively, both performed reasonably well with an acceptable scatter and number of +/-3SD or +/-3SD threshold exceedances and importantly, without significant trends or shifts in the dataset.

The very prevalent 'grouping' of normalized Ag results of the project-specific CRMs around the EV, +2SD, and -2SD were a function of the relatively low Ag grades of <5g/t for all four of them. Equally, several Ag results that exceeded the +/-3SD failure threshold could be attributed to the same cause and were therefore not a concern to MMTS.

CU126 and CU133 were certified for significantly higher, more applicable Ag grades (9.1 and 20.8 g/t, respectively) and were analyzed with higher variability as a result. Overall, these two standards provided very good accuracy control, with only one result from early 2007 exceeding the +/-2SD warning limit. CDN-CM-1 had not been certified for Ag and its Au assay results were therefore not considered in the Ag graph.

Figure 11-16: 2007-2011 CRM Performance (Ag Normalized)

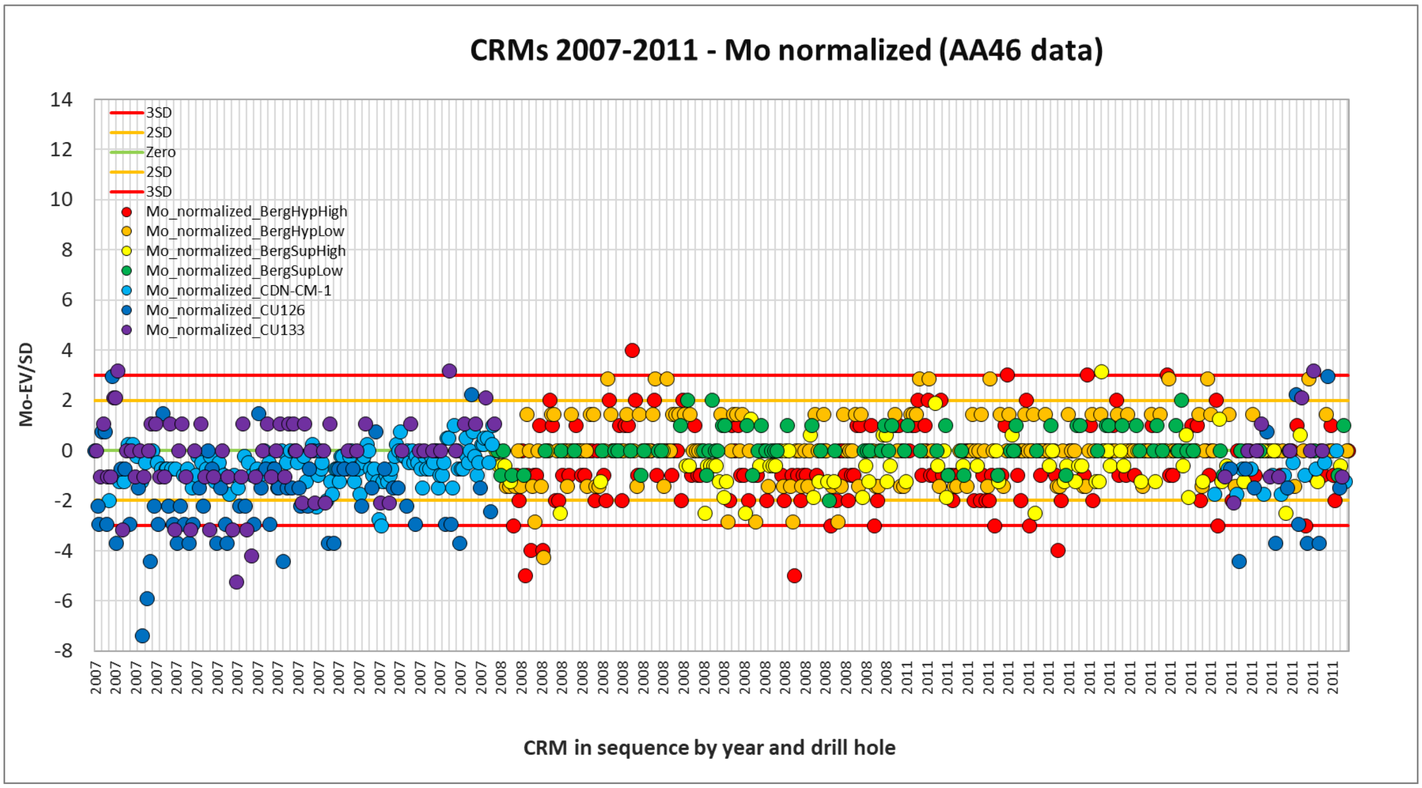


Source: MMTS, 2023.

Normalized Mo analyses (Figure 11-17) is generally around zero and within the +/-3SD acceptance window, but several observations were made:

- CDN-CM-1 performed much more consistently than CU126 and CU133 but overall, with a slightly low bias of approx. 5%.
- All STDs except for CDN-CM-1 and CU126 presented a pattern of repeating results around zero, a function of the AA46 method reporting in 10 ppm increments on STDs that were relatively low-grade Mo (130-330 ppm Mo).
- CU126 analyses contained a few -3SD failures in two certificates that should have triggered batch re-assaying.
- BergSupHigh reported a small but consistent low bias.
- Several project-specific CRM analyses at the start of the 2008 campaign exceeded the -3SD control limit. According to Harris and Labrenz (2009), the batches containing these results were re-assayed and the failures corrected in the process, but since the outliers still plot, Surge's assay database appears to still work off the original data.

Figure 11-17: 2007-2011 CRM Performance (Mo Normalized)

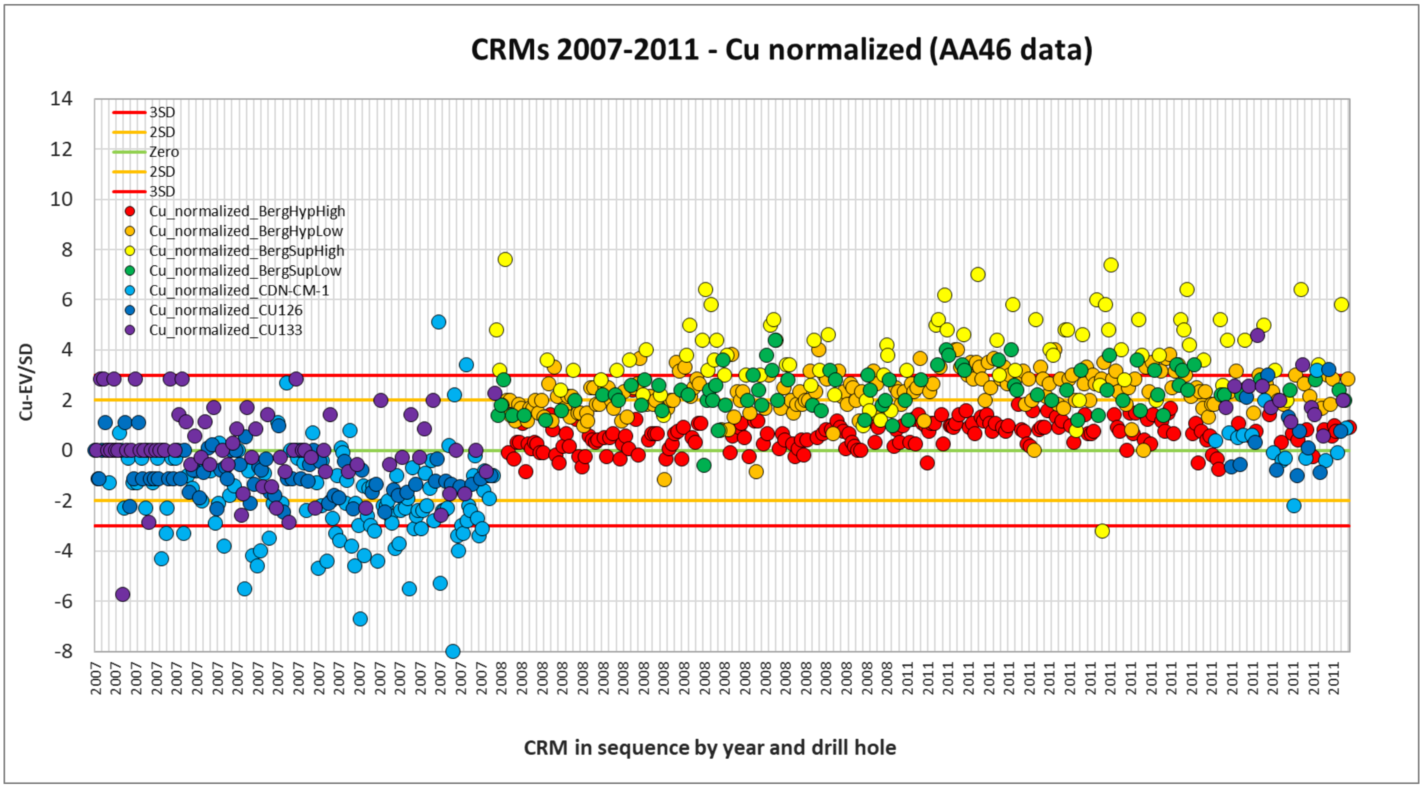


Source: MMTS, 2023.

As previously discussed by Harris and Labrenz (2009) for the 2008 data and shown in Figure 11-18 for 2008-2011, Cu exhibits a strong high bias in the four project-specific standards: BergHypHigh, BergHypLow, BergSupHigh, and BergHypLow. The high bias trend increases over time through 2011 and is most pronounced in BergSupHigh.

Purchased CRMs in 2007 are biased low in 2007, with a significant number of outliers/failures.

Figure 11-18: 2007-2011 CRM Performance (Cu Normalized)



Source: MMTS, 2023.

Harris and Labrenz reported in 2009 that ALS internal accuracy control also appeared to record a high Cu bias but did not provide statistical or graphical evidence at the time:

> *"This bias can also be seen in the internal standards employed by ALS. Although the amount of bias varied, all standards had an increasing high bias over the duration of the program. Consultations with ALS indicated that the problem is restricted to atomic absorption data which has shown some elevation, possibly due to erroneous calibration solutions. There has been no resolution to why the in-house standards are biased to the extent that they are."*

Consequently, MMTS has conducted a more in-depth analysis of the project-specific CRM issue as presented in the next two sections.

11.6.5 Lab Internal QA/QC for Cu from 2008-2011

The lab-internal QA/QC data for the two methods reported by ALS (Cu-AA46/46a and ME-MS41), have also been reviewed, focusing on Cu only and the years 2008 and 2011.

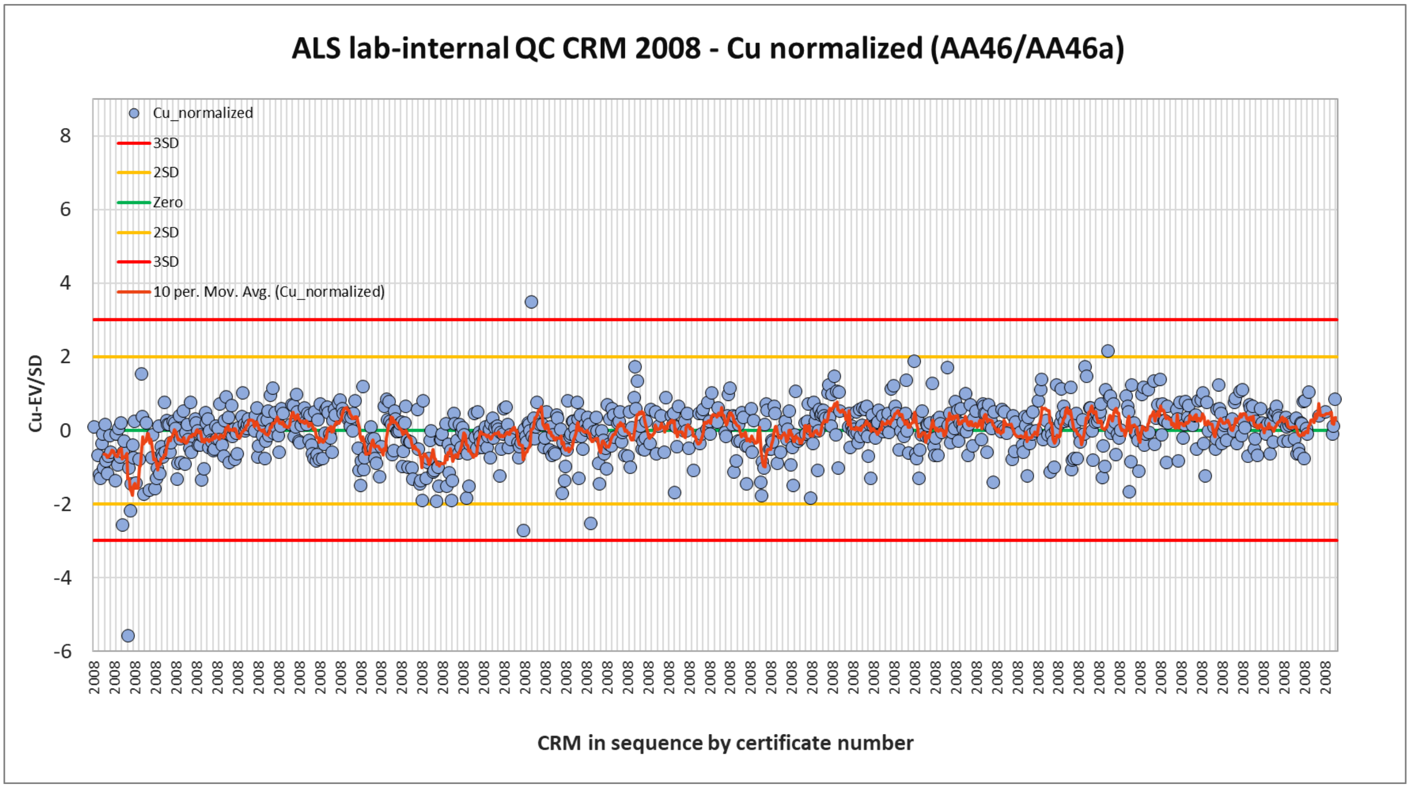
For the AA46/AA46a method quality control, assay results of standards GBM302-10, GBM306-12, GBM306-13, GBM398-4c, GBM399-5, GBM-903-13, and OREAS 14P were normalized as above and graphed by year due to the large number of data (1,689 assays). The ME-MS41 method has 276 data points from standards GBM3961c, GBM908-5, GBM908-10, and

GBM999-5 and are plotted together for both years. Certification documentation of additional standards that were used by ALS at the time are not considered for the plots below.

The resulting graphs confirmed that, while biased moderately but consistently high in 2011, the lab-internal control standards performed as expected overall as illustrated in Figure 11-19 through Figure 11-21. Only very few results exceeded the +/-3SD failure threshold and no discernible trends over time.

AA46 data for 2008 showed an acceptable performance that matched the expected Cu value for much of the year, despite two intermittent periods early in the campaign where the data showed a low bias. Results averaged 1.83% Cu, which compared to the expected average of 1.84% Cu.

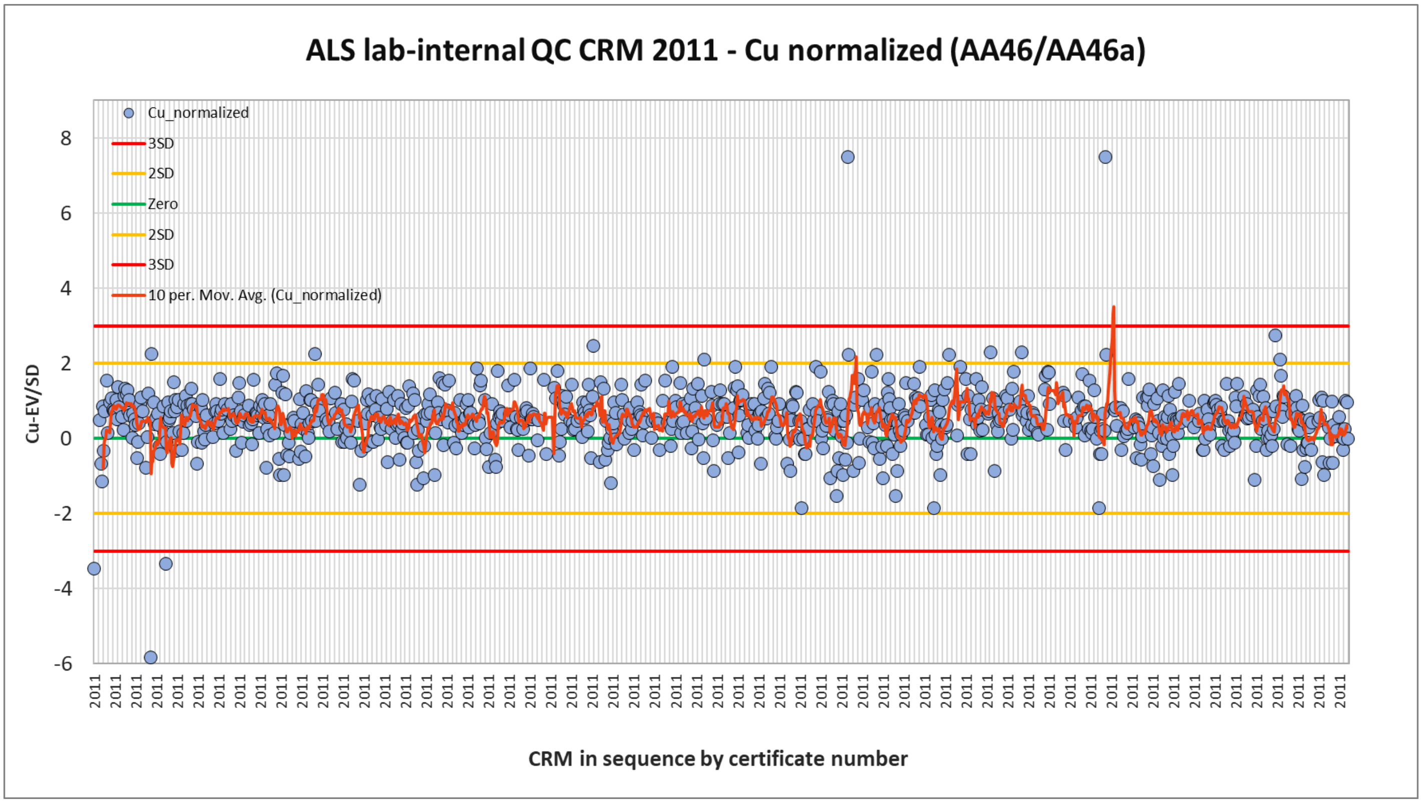
Figure 11-19: 2008 ALS-Internal CRM Performance for Method AA46/AA46a (Cu Normalized)



Source: MMTS, 2023.

In 2011, the AA46 data averaged 1.22% Cu (versus 1.20% Cu expected average of this dataset), which translated into a normalized 'value' of 0.51. Figure 11-20 illustrates the consistency of the moderately high bias for the whole 2011 campaign.

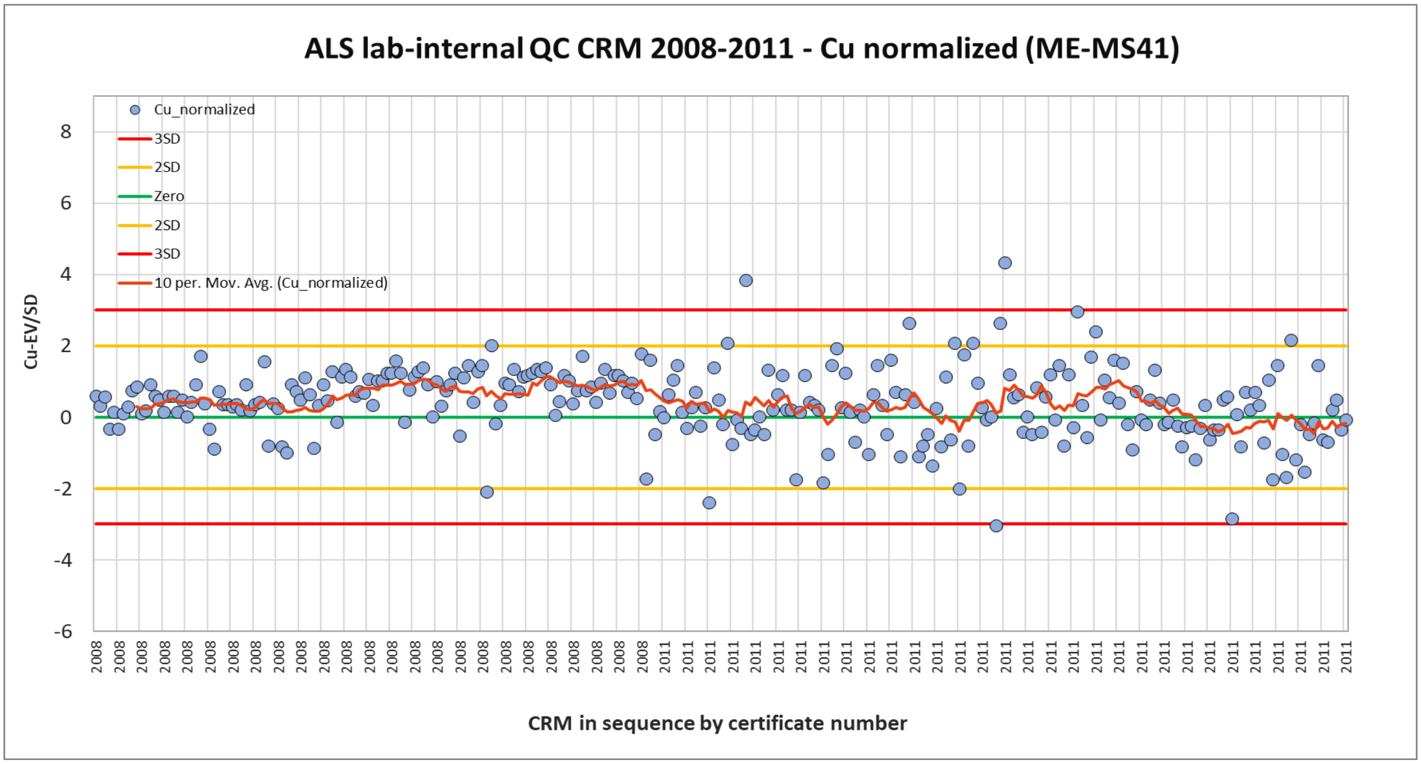
Figure 11-20: 2011 ALS-Internal CRM Performance for Method AA46/AA46a (Cu Normalized)



Source: MMTS, 2023.

As illustrated in Figure 11-21, the ME-MS41 control data displayed a moderately high bias in 2008 data, followed by a noticeable increase in scatter starting in 2011 but without the high bias from three years earlier. The utilized standards were certified for significantly lower Cu grades (avg. 0.208% Cu) compared to the AA46 control material above. The actual average of the assays was 0.213% Cu.

Figure 11-21: 2008-2011 ALS-Internal CRM Performance for Method ME-MS41 (Cu Normalized)



Source: MMTS, 2023.

In summary, ALS internal QA/QC results for both methods used in the respective Cu reports between 2008 and 2011 were quite consistent and a strong data 'shift' as shown in the client CRM data of Figure 11-18 at the start of the 2008 campaign could not be detected. The weak to moderate high bias does not replicate the very strong initial high bias as shown in BergHypLow, BergSupHigh, and BergSupLow. In addition, there is no significant long-term drift in the ALS-internal data while the project-specific CRMs displayed a significant drift towards even higher results over the course of the two drill campaigns.

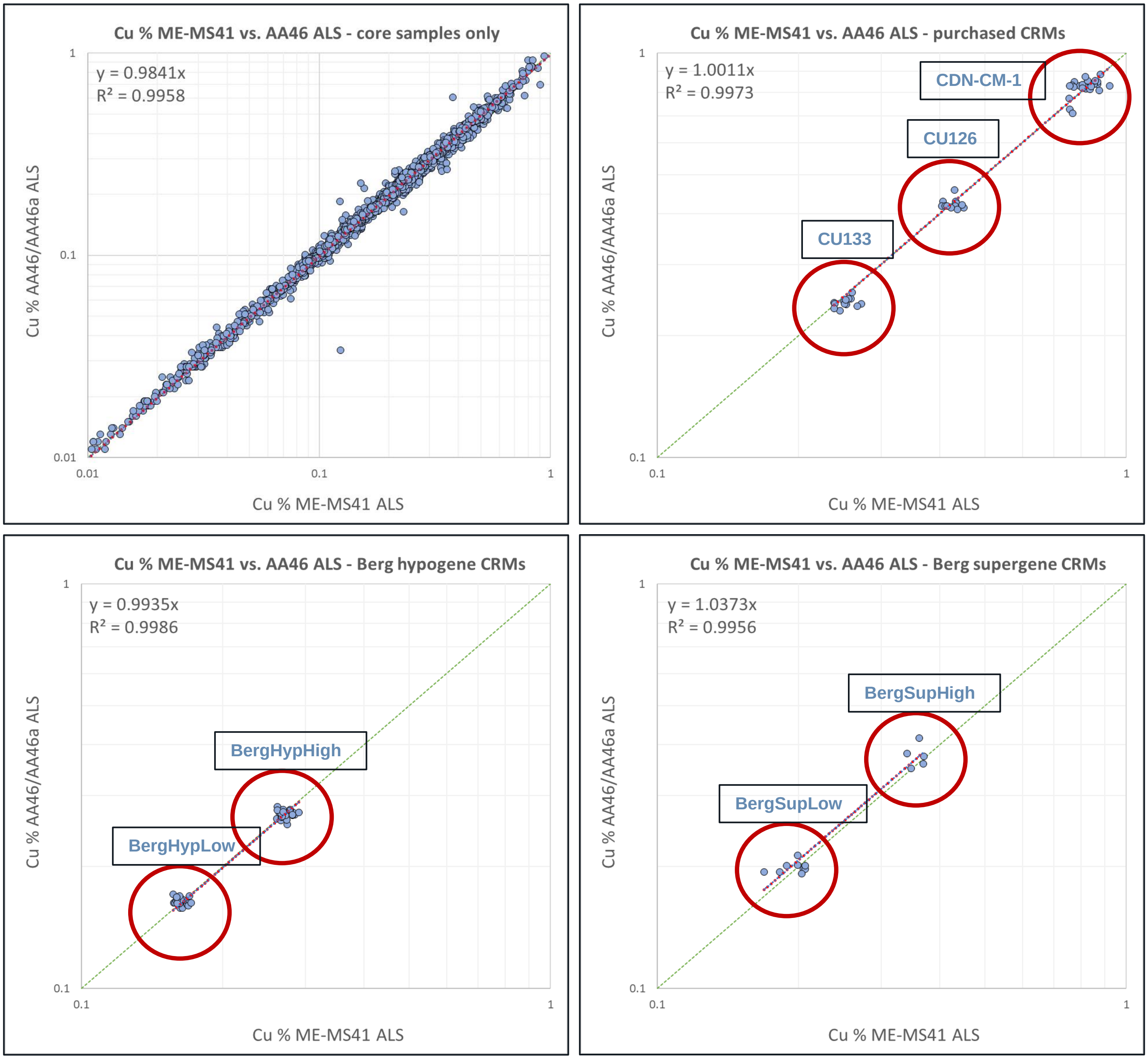
The project-specific standards were not certified on assay results from comparable digestion methods and may not have been fully suitable for Cu quality control for that reason. ALS was one of the seven participating laboratories for the certification process and had reported higher mean Cu values than were calculated for the final certified Cu mean in every instance.

11.6.6 Project-specific CRM Performance for Cu – Comparison of Assay Method

MMTS used 29 2007-2011 assay certificates that were randomly selected to assess the assay database for accuracy and completeness (see Section 12), and also to compare the Cu-AA46 data against ME-MS41 Cu data, where available. The data subset included 2,288 samples (106 blanks, 111 CRMs, and 2,071 core samples) or approx. 13% of all data. The 106 blanks were not considered for the plots below because the Cu detection limit for AA46/AA46a was unsuitably high at 0.002% (2007-2008) or 0.001% (2011).

Figure 11-22 shows four plots which compare the core samples, the purchased CRMS, and the Berg standards separate by hypogene and supergene.

Figure 11-22: 2008-2011 AA46/AA46a vs. ME-MS41 (Cu)

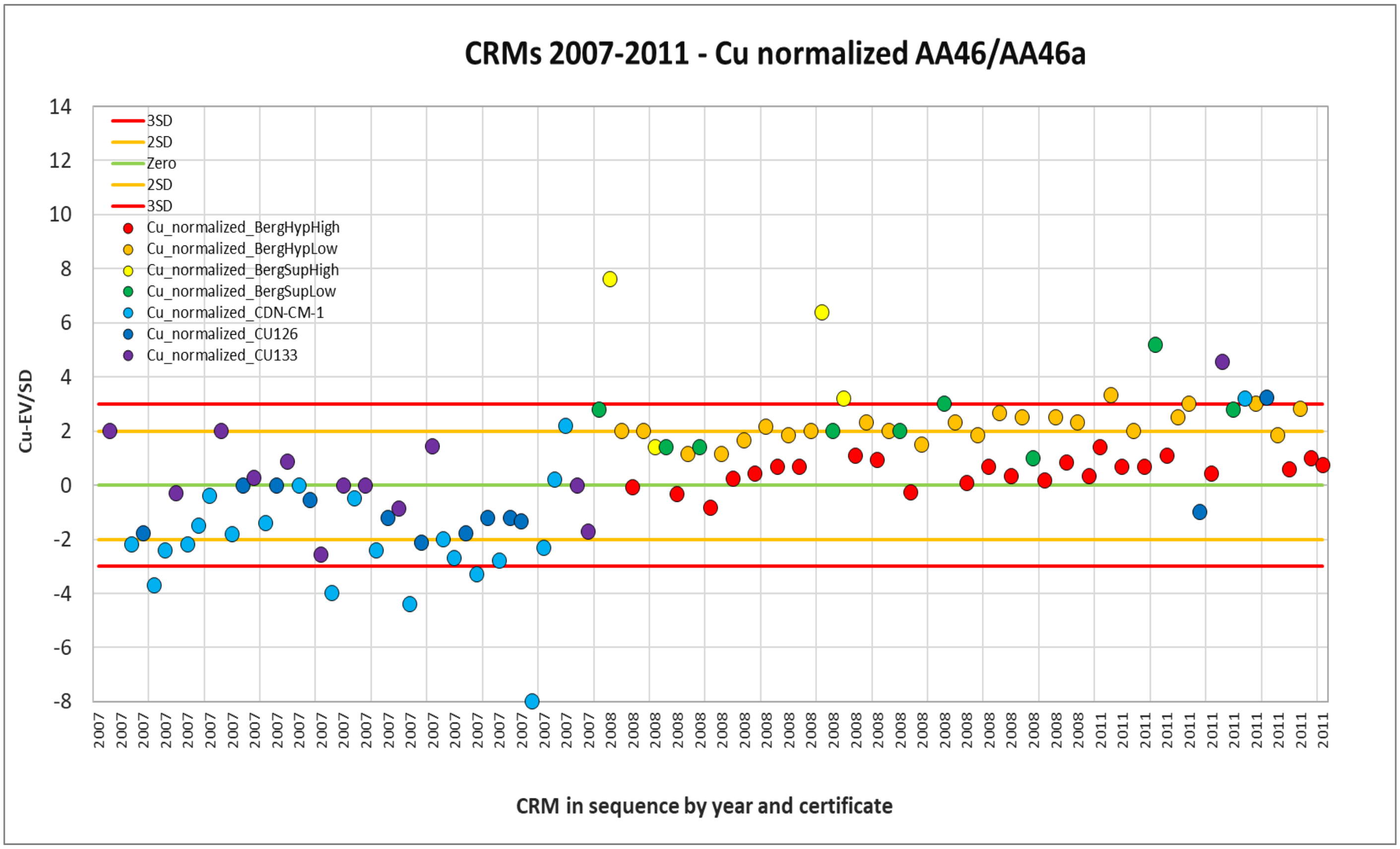


Source: MMTS, 2023.

The core sample XY scatter plot confirmed a very good correlation between the two methods over a representative range of Cu grades from 10 ppm to approximately 1% Cu, despite a few outliers on either side of the 1-1 linear trendline. The various CRMs each plot in small groups as expected, indicating overall good precision and good correlation between methods. CU133 displays a slight bias towards ME-MS41. The two project-specific Berg standards made from supergene Berg material both plot weakly but noticeably towards the AA46 method.

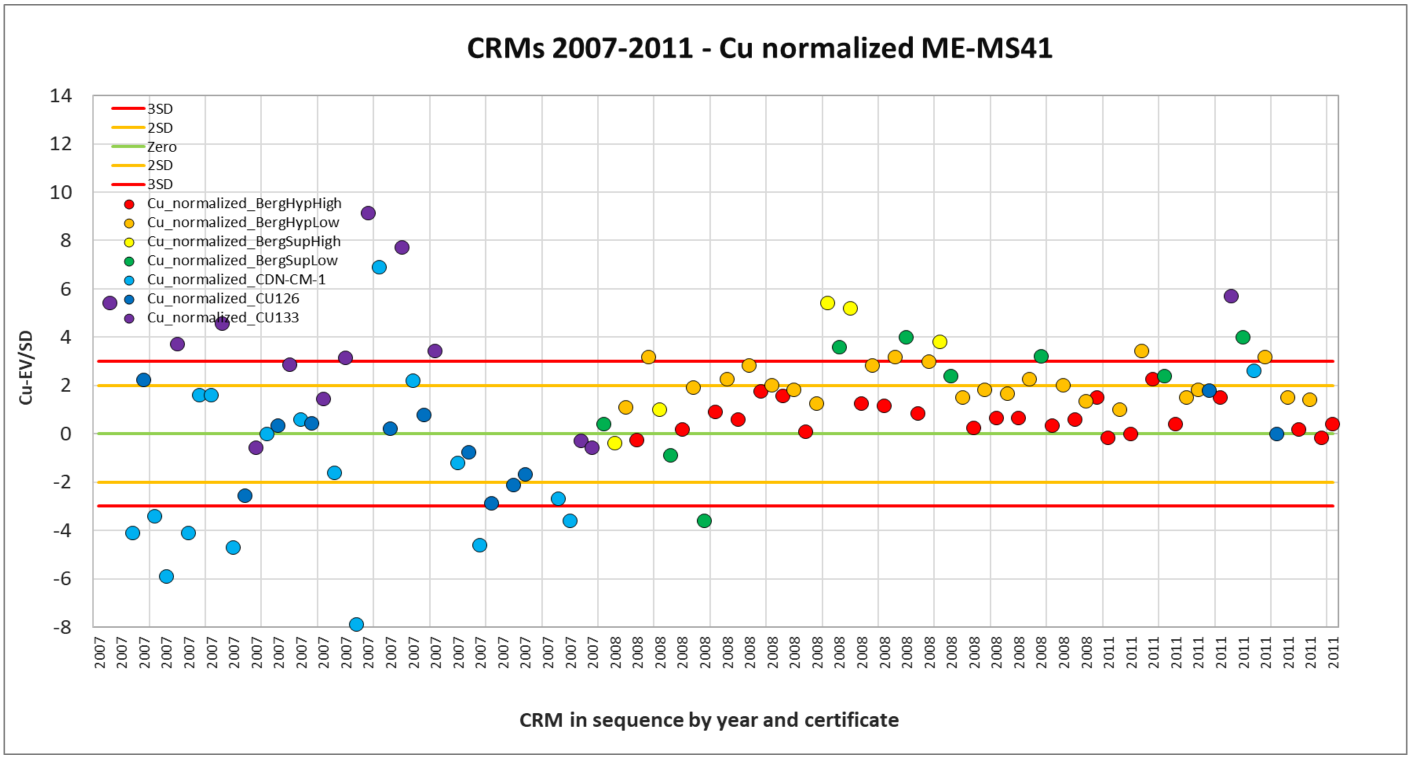
Figure 11-23 and Figure 11-24 are graphs of the CRM Cu data from AA46/46a and ME-MS41, respectively. The plots are of the certified Cu values, using the respective 'between lab' standard deviations for data normalization. The results are very comparable. Therefore, MMTS concludes that an erroneous calibration solution for the atomic absorption process (as was discussed by ALS in 2009) is not the cause of the high bias for the project-specific standards.

Figure 11-23: 2007-2011 CRM Performance for AA46/AA46a (Cu Normalized)



Source: MMTS, 2023.

Figure 11-24: 2007-2011 CRM Performance for ME-MS41 (Cu Normalized)

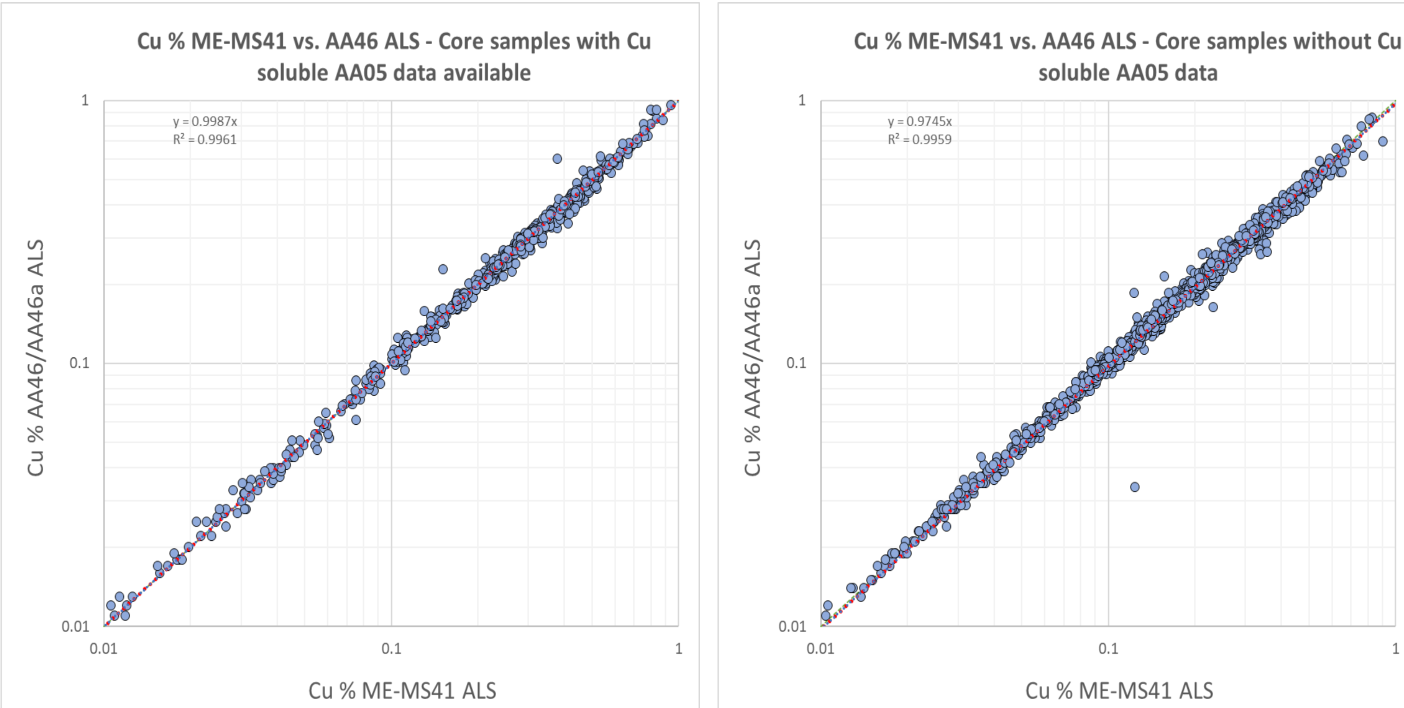


Source: MMTS, 2023.

The dataset contained 550 core samples that were additionally analyzed by Cu-AA05 (acid soluble Cu), presumably because they represented the supergene fraction of the mineralization that hypothetically would have been mineralogically comparable to BergSupLow and BergSupHigh source material. These two supergene standards exhibited the strongest high Cu bias in Figure 11-8, which could have indicated that a mineralogical component contributed to or caused the issue.

Filtering the data accordingly did not change R2 or y significantly for hypothetical hypogene against hypothetical supergene samples, as shown in Figure 11-25, indicating that the mineral composition of BergSupLow and BergSupHigh was not the cause of the strong high bias.

Figure 11-25: 2007-2011 AA46/AA46a vs. ME-MS41 Cu in Core Samples, Split by Cu Soluble Designation



Source: MMTS, 2023.

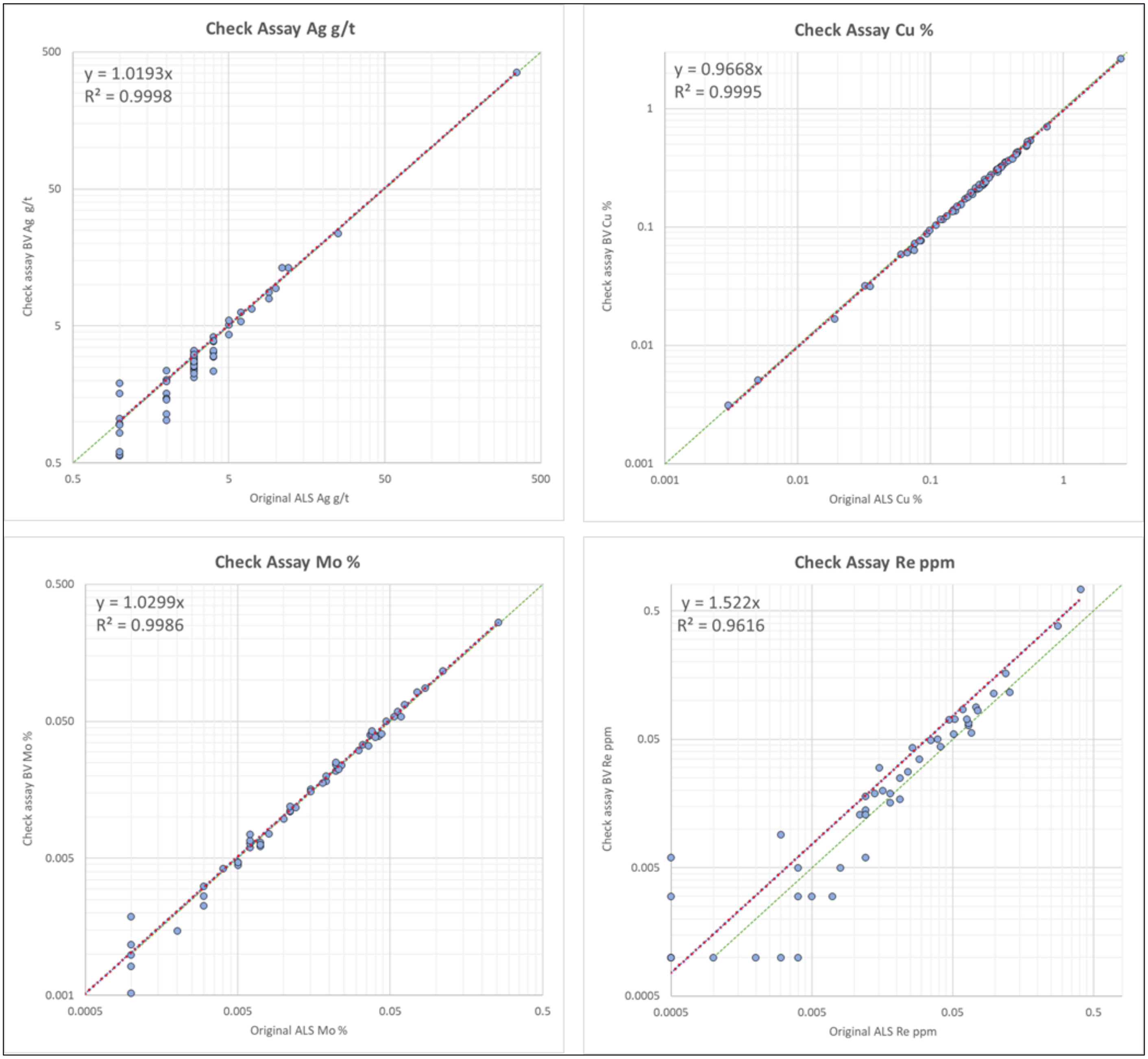
11.6.7 2018 Check-assaying

In 2018, Thompson Creek selected 60 previously analyzed samples from holes BRG11-200 to BRG11-233 for check-assay purposes and submitted the respective pulps to Bureau Veritas for four-acid digestion and ICP-MS finish (MA250) as well as fire assay gold analysis (FA430). Figure 11-26 demonstrates a very good correlation between the original aqua-regia data (ALS ME-MS41) and the check-assay data for Ag, Cu, and Mo. The R2 for all three metals exceeded 0.99.

Very limited original Au data was available for these samples; therefore, a meaningful Au correlation could not be established.

However, rhenium (Re) data was available from both datasets and given its potential future economic significance, a correlation has been produced for Re as well (Figure 11-26, bottom right). The Re XY scatter plot demonstrated an acceptable correlation but with consistently higher results reported by Bureau Veritas, presumably because of the more aggressive digestion method.

Figure 11-26: 2018 Check-Assay of 2011 Samples (Ag, Cu, Mo, Re Results)



Source: MMTS, 2023.

11.7 QP Opinion of Sample Collection, Preparation, Analysis and Security

The methods implemented by Surge Copper during the 2021 drilling for sample collection, preparation and analysis were developed using standard industry practices. Analytical results for QA/QC insertions were monitored internally. The procedures maximized use of sample volumes to measure physical and chemical parametres relevant to current and future project studies. The analytical laboratory selected is a recognized accredited laboratory, which adheres to recognized ISO standards. Sample handling and processing was completed with appropriate chain of custody and storage was in a secure facility.

Blanks and standards demonstrated acceptable levels of contamination and accuracy, respectively. Analysis of the field duplicates indicated good precision for silver, gold, copper, and molybdenum.

The 2022 re-sampling program did not include a suitable amount of blind QA/QC sample insertions to assess data accuracy and precision independently from lab internal QA/QC data and protocols. Only the blank insertion rate at approximately 5% to control contamination was sufficient.

The 2022 re-assaying program also did not include an appropriate amount of QA/QC samples, specifically certified reference material to control accuracy of results.

No check-assaying was performed for the latest 2021-2022 drilling, re-sampling, and re-assaying programs, but as demonstrated in 11.6.6, a limited number of check-assays were completed with regards to 2011 core sample assay results.

The QP confirms the collection, analysis and security is reliable and suitable for mineral resource estimation but recommends using more than one suitable standard in future drilling campaigns to better reflect the respective metal ranges, including Au.

12 DATA VERIFICATION

12.1 Audit of the Drill Hola Assay Database

Surge provided MMTS with a database export of all available assay results for the Berg deposit. The data can be split into two main groups:

- Historical assays: pre-2007 data for Cu, CuOx, and MoS2 with limited Au and Ag results. Historical records consist of both certified lab data files (check-assay purposes) and scans of hand-written on-site assay lab records.
- Current assays: 2007-2022, including the 2022 re-sampling program. This data was generated by certified laboratories in Canada and included an acceptable amount of both blind and lab-internal QC samples to control contamination, precision, and accuracy issues, if any.

MMTS performed a detailed review of the assay data which included producing industry-standard graphs of multiple elements of interest for blanks, certified reference material, and various duplicates through the preparation stages (field, coarse reject, and pulp). During that validation process, occasional inconsistencies and mis-labels were noted and corrected.

In addition, MMTS used raw data from 29 randomly selected ALS certificates of 2007-2011 to assess the overall accuracy of the database for Ag, Au, Cu, CuOx, Mo, and Re. This represents approx. 25% of all results from those years, depending on the element in focus. MMTS also compiled >5,600 acid-soluble Cu-AA05 data from original certificates to further verify the CuOx portion of the Berg database.

Surge Copper's 2022 data generated from re-sampling of 2007-2008 core and analyzing for Au by Actlabs was equally validated by comparing the database against a raw data compilation from original certificates (>4,500 data points, 100% of the re-sampling program including QC samples).

Historical data was verified by double-checking the database against a representative number of scans of original hand-written data sheets, and also manually compiling data from scanned certificates and historical data files for check-assay review.

12.2 Assay Data Checks

MMTS spot-checked approx. 25% of the 2007-2011 assay data present within the database against original lab certificates and found the assay component of the database to be reliable and accurate. In addition, MMTS verified 100% of 2021 drill assays and 100% 2022 re-sampling and re-assaying data and found the provided data to be reliable and accurate as well.

The database verification against all original acid soluble Cu data certificates returned 100% data accuracy.

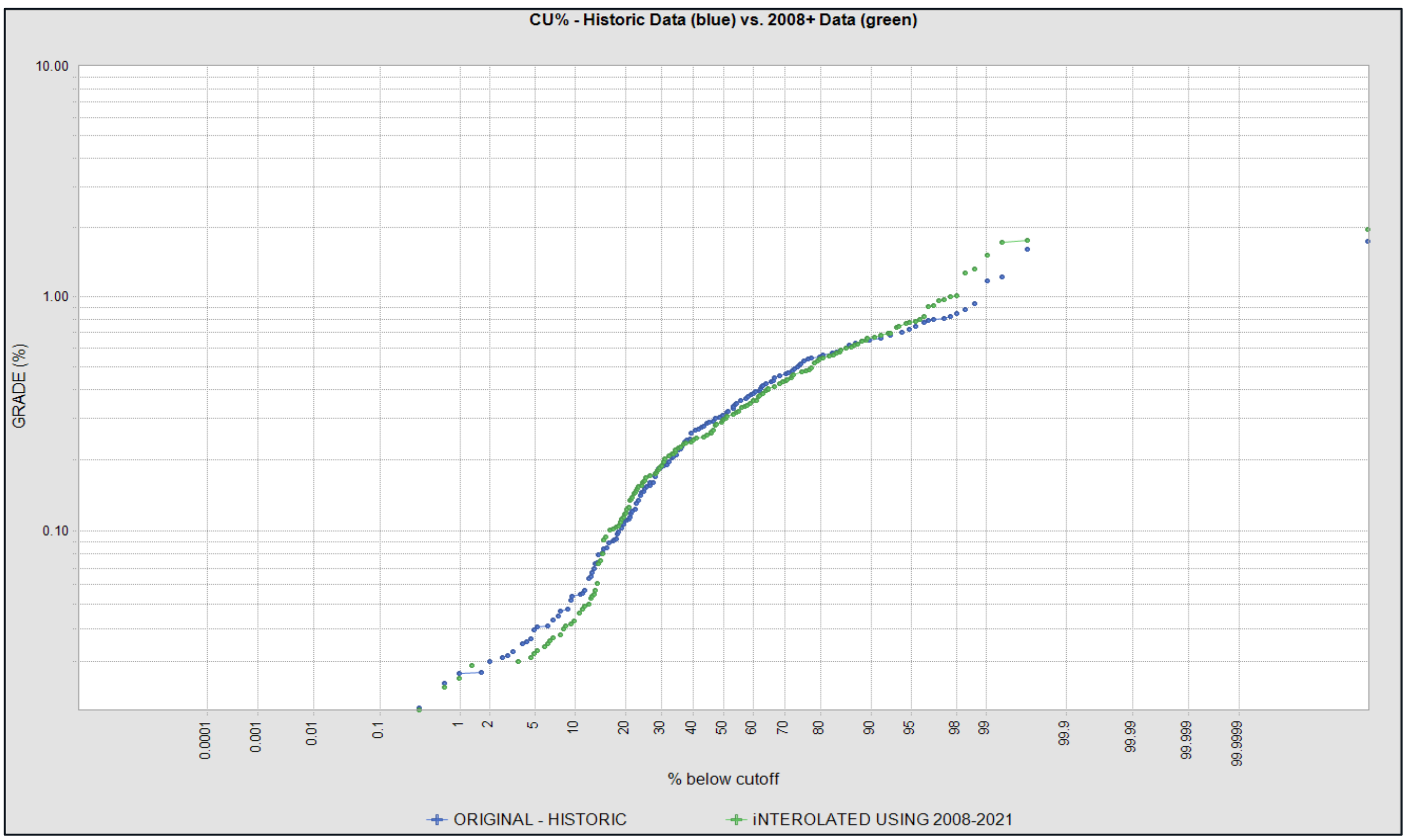
MMTS identified a very small number of mislabels in the database, mainly regarding CRM and BLK samples. These were corrected. MMTS used the 2021 reported sample weight to identify potential sample interval inconsistencies. Surge Copper was notified of the findings. Sample weight data was not readily available for any sampling or re-sampling prior to 2021.

12.3 Validation of Historical Data

Approximately 33% of the data is from historical drillholes (years 1964 to 2007) with no QA/QC available. This data has been validated using Point Validation. Point Validation interpolates the assays at the historic locations using all data except the historic data, thus, theoretically, removing any variations in grade due to location alone. Figure 12-1 through Figure 12-4 illustrate comparisons of the original historic data to the interpolated data using more recent drilling in the form of cumulative probability plots (CPPs). The plots are for Cu, Mo, Ag and Au, respectively. In each case, very little bias is apparent, with a particularly close correlation for Cu. Grades in all cases for the more recent data with QA/QC are higher at the higher end of the distribution. The Mo data indicates a low bias for the historic data with Au slightly high at the lower grades (below 40ppb) and a slightly low bias above this cut-off grade. Overall, it is found that the historic assaying tends to under-estimate the higher grades and therefore may be slightly conservative.

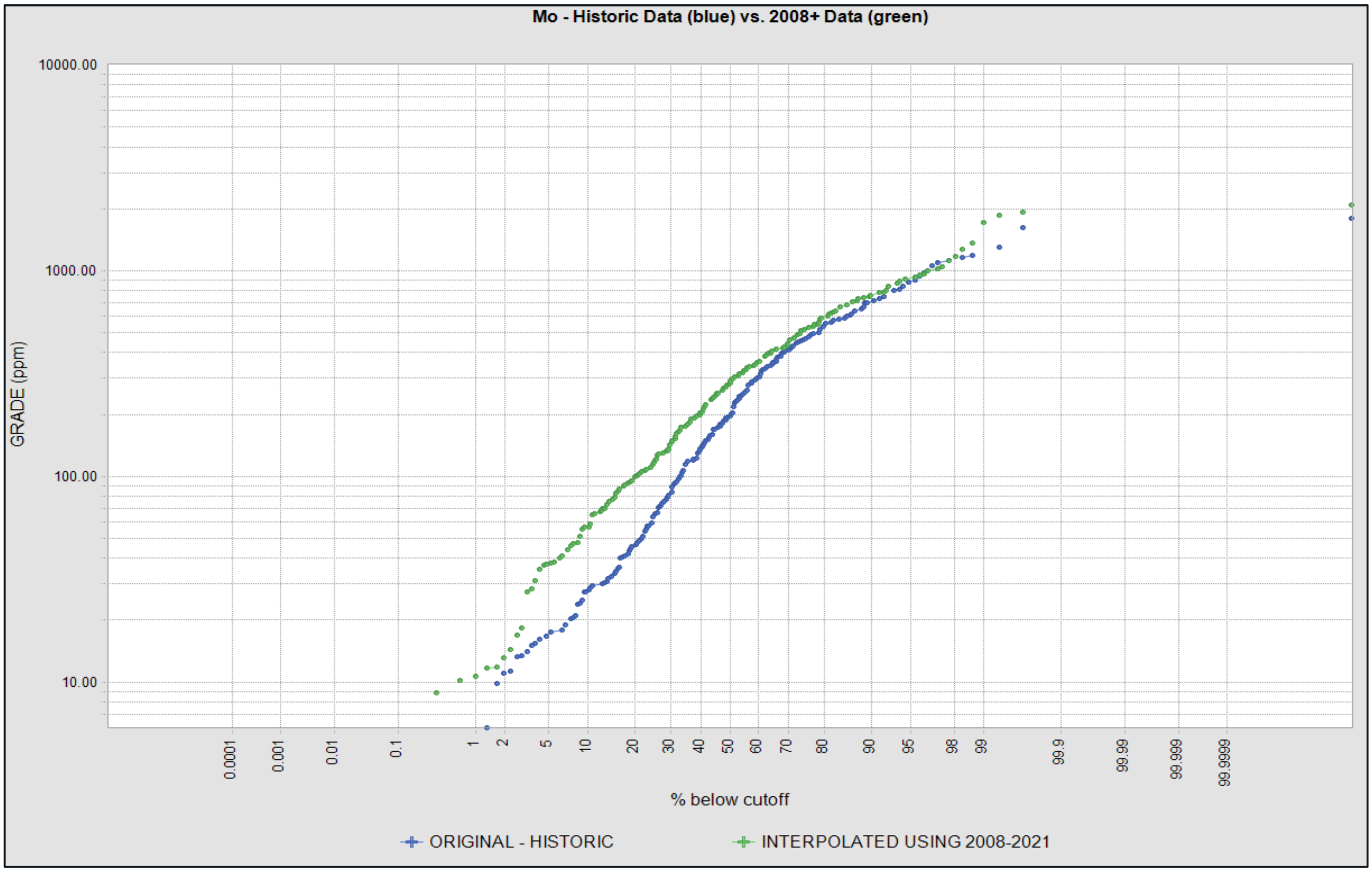
It had been noted previously that data in the “S-series” from 1972 could not be used as it did not match the surrounding data (TetraTtech, 2021). This was also investigated with Point Validation, and the results for Cu and Mo are shown in Figure 12-5 and Figure 12-6, respectively. It is found that there is no bias for the Cu grade and therefore the Cu in the 1972 “S-series” has been used in the Cu modelling. However, the Mo data shows a low bias and therefore the data from this drilling has not been used for the Mo interpolations.

Figure 12-1: Historic Data Validation – Cu



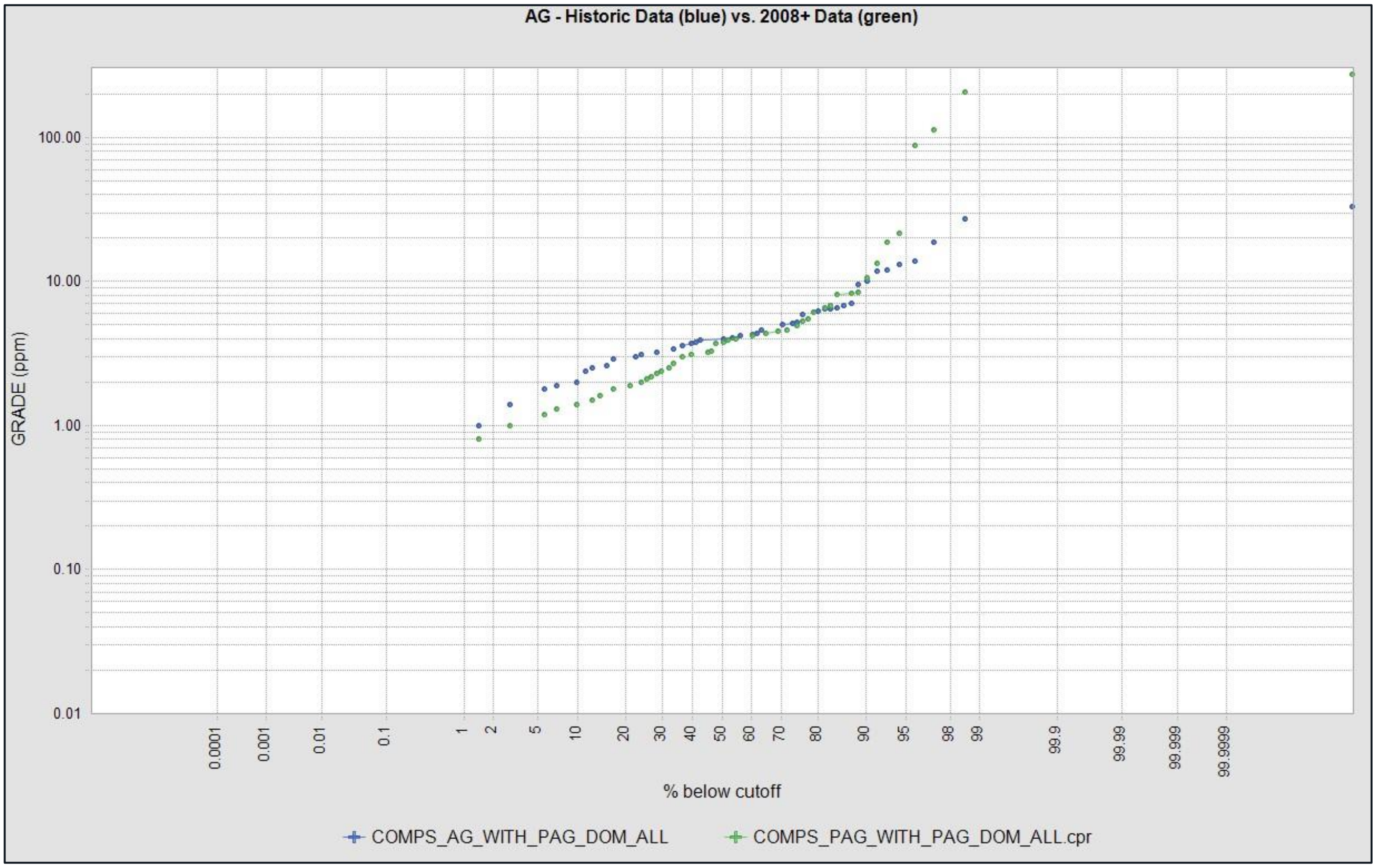
Source, MMTS, 2023.

Figure 12-2: Historic Data Validation – Mo



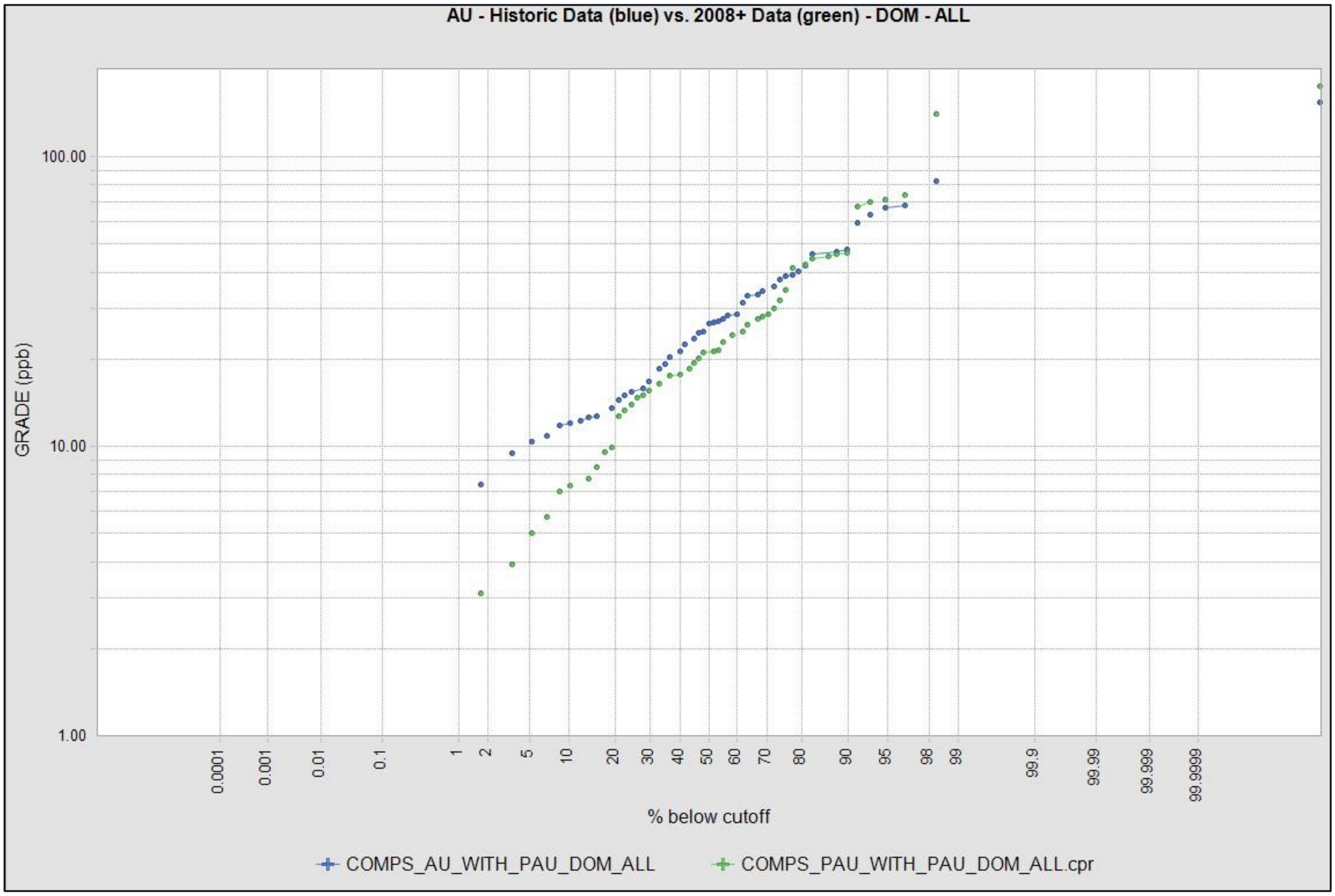
Source: MMTS, 2023.

Figure 12-3: Historic Data Validation – Ag



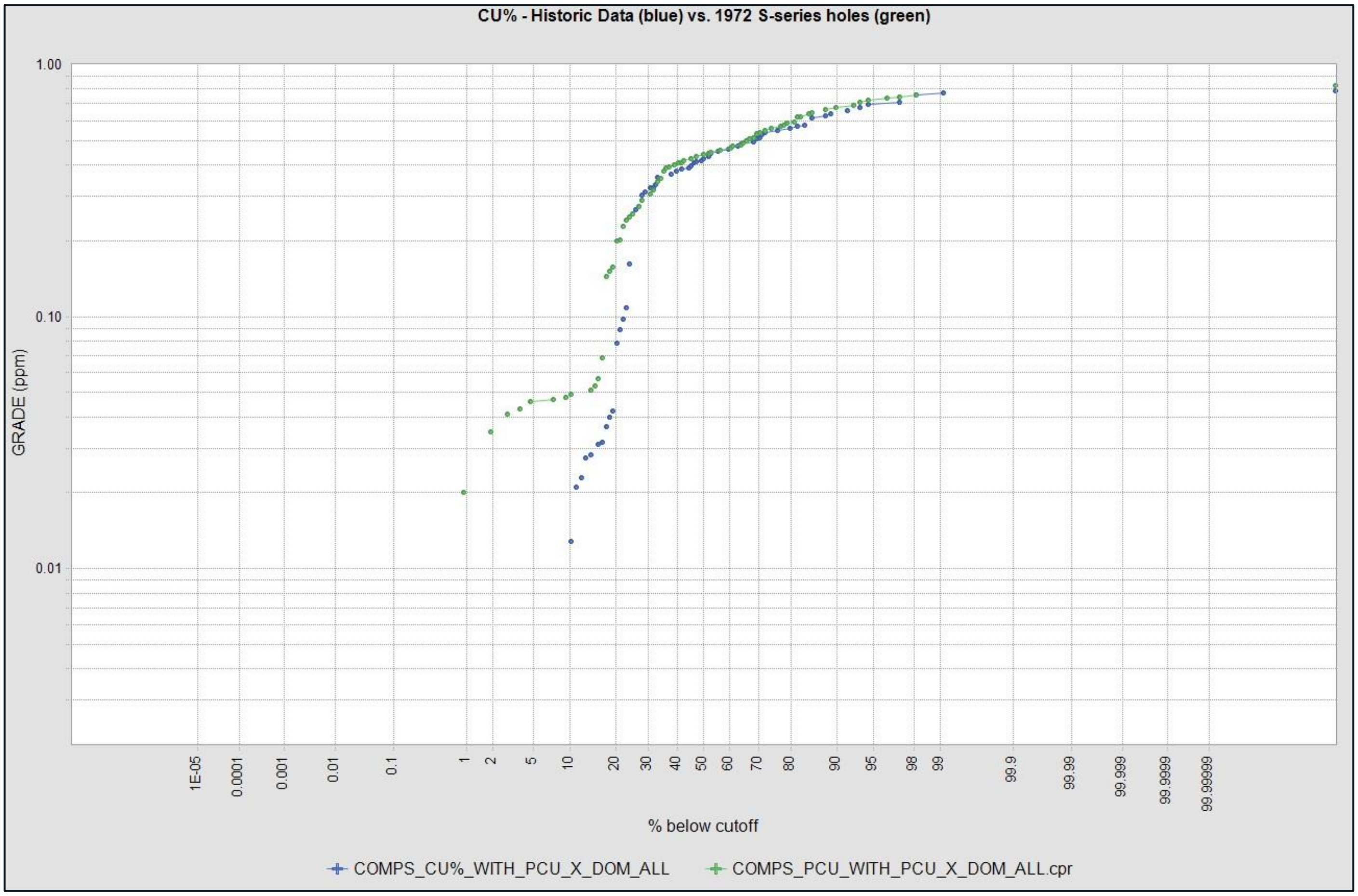
Source: MMTS, 2023.

Figure 12-4: Historic Data Validation – Au



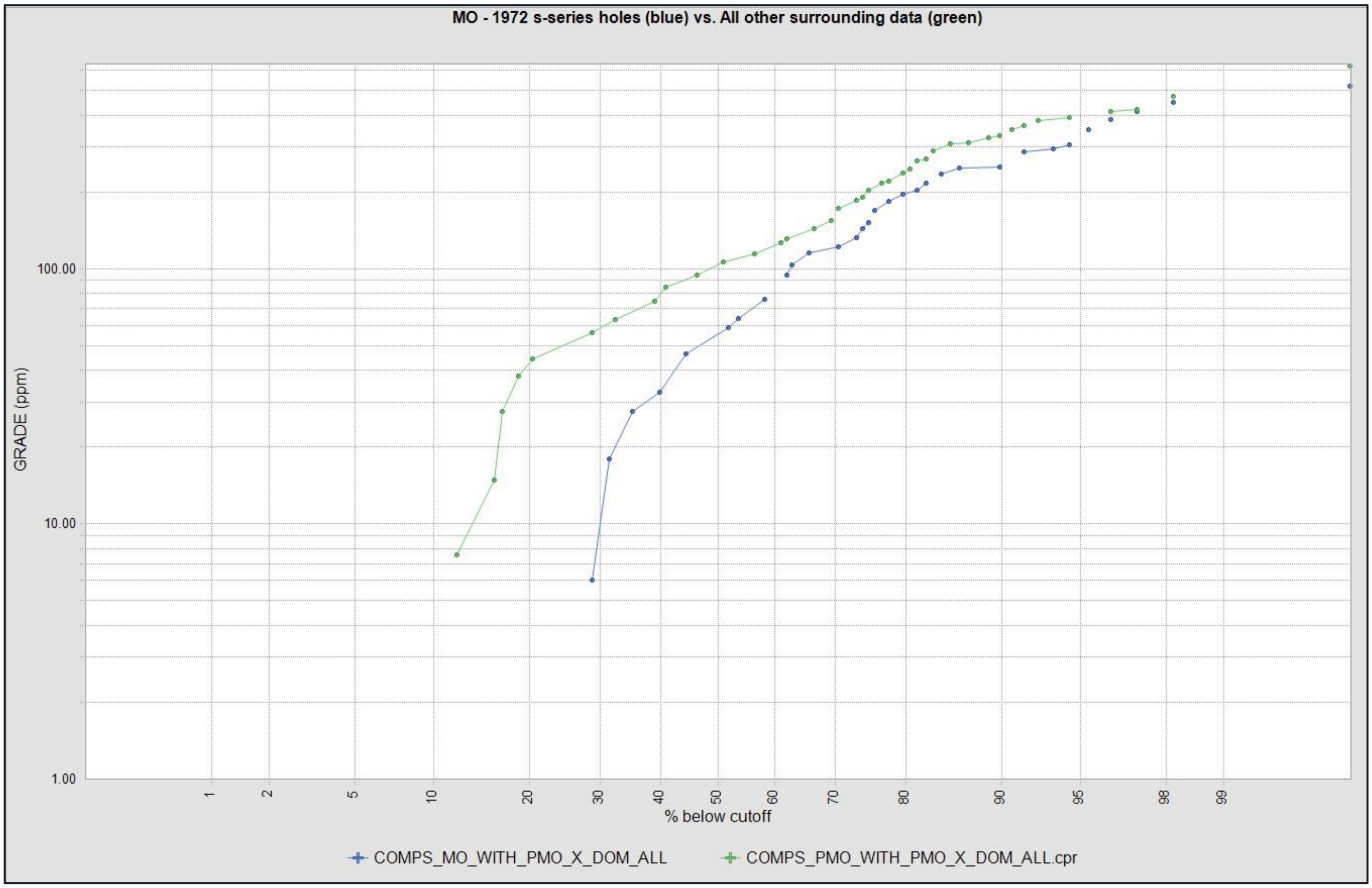
Source: MMTS, 2023.

Figure 12-5: Historic Data Validation of 1972 “S-series” Data – Cu



Source: MMTS, 2023.

Figure 12-6: Historic Data Validation of 1972 "S-series" Data – Mo



Source: MMTS, 2023.

12.4 QP Opinion on Data Verification

The QP has audited the assay data and drilling logs and compared digital analytical data to laboratory certificates. The QP is satisfied that the geological database accurately reflects field observations and laboratory analysis and is adequate to support mineral resource estimation.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Introduction

Numerous metallurgical testwork programs have been completed on samples from the Berg deposit from 2008 to 2012. The testwork included mineralogy, comminution, and flotation testing.

13.2 Metallurgical Testwork

A brief overview of the previous testwork programs is provided below:

- Preliminary Metallurgical Assessment of samples from the Berg Copper-Molybdenum Project – KM2075 (G&T Metallurgical Services Ltd. (G&T), Kamloops, BC – March 2008) – The scope of this testwork included mineralogical analysis, grindability tests, flotation tests, flowsheet development and locked cycle flotation testing.
- Bench Scale and Pilot Plant Testing Berg Project – KM2218 (G&T Metallurgical Services Ltd. (G&T), Kamloops, BC – March 2010) – the test program included chemical and mineralogical analysis, locked cycle flotation testing and pilot plant flotation testing including copper-molybdenum separation testing.
- An Investigation into the Grindability Characteristics of Samples from the Berg Project – Project 12156-001 (SGS Mineral Services (SGS), Lakefield, ON – May 2009) – In this program, grindability testing was performed on two bulk samples that had been prepared during the parallel G&T Metallurgical test program.
- Scoping Metallurgical Testing Program (Resource Development Inc. (RDi), Wheat Ridge, CO – January 2012) – this limited test program was commissioned by new project owners to confirm flotation performance and investigate separation of copper and molybdenum from the bulk concentrate.

The testwork programs are summarized in Table 13.

Table 13-1: Metallurgical Testwork Summary

Year	Test Programs	Laboratory
2007-2008	Preliminary Metallurgical Assessment – Berg Copper-Molybdenum Project – KM2075	G&T Metallurgical Services Ltd.
2009	The Grindability Characteristics of Samples from the Berg Project	SGS Lakefield Research Limited
2009-2010	Bench Scale and Pilot Plant Testing Berg Project – KM2218	G&T Metallurgical Services Ltd.
2012	Scoping Metallurgical Testing of Sample from Berg Project, Canada	Resource Development Inc.

13.3 Sample Representativity and Composition

The samples selected for the each of the test programs are considered to be reasonably representative of the deposit with respect to grade, spatial coverage and lithology. Samples for all the test programs were selected by the previous ownership and are described below:

For the 2007-2008 G&T test program, four composite samples were constructed using 61 individual samples obtained from 2007 drill holes, each weighing between 3 to 8 kg. The samples were selected by lithology and grade ranges. The chemical compositions of the composites are shown in Table 13-2 along with summarized spatial information on the composite source samples.

Table 13-2: Chemical Composition of the KM2075 Master Composites (2007-2008 Test Program)

Composite	# of Drill Holes	Depth Range (m)	Assay – Percent				
			Cu	Fe	Mo	S(s)	CuOx
Low Cu Oxide Supergene	4	39 - 145	0.37	2.16	0.029	1.63	0.046
High Cu Oxide Supergene	4	48 - 136	0.37	2.85	0.025	1.78	0.056
Low Grade Hypogene	6	90 - 344	0.31	4.69	0.034	4.21	-
High Grade Hypogene	4	81 - 435	0.38	4.41	0.041	4.79	-

Mineralogical assessments using point counting techniques were completed on two master composites at primary grind sizes of approximately 165 µm P80. Results are summarized in Table 13-3.

Table 13-3: Mineralogical Characteristics of the KM2075 Master Composites (2007-2008 Test Program)

Composite	Grind Size µm P80	Liberation %		Mineral Composition – Percent				
		CuS	Md	Cp	Bn	Ch/Cv	Md	Py
High Grade Hypogene	158	55	66	1.11	0.01	<0.01	0.06	5.9
Low Copper Oxide Supergene	170	52	71	0.87	<0.01	0.09	0.05	3.9

The sulphide mineral assemblages of both the measured hypogene and supergene composites were somewhat similar. Sulphide mineral content ranged between 5-7% with pyrite and chalcopyrite being the dominant sulphide minerals. Approximately 15% of the copper in the supergene composite was present in chalcocite/covellite, compared to the hypogene composite in which copper was nearly all present in chalcopyrite. Chalcocite/covellite can be partially digested in a CuOx assay protocol (typically 10% sulphuric acid), which likely accounts for a portion of the values measured in Table 13-2. Liberation levels of both copper sulphides and molybdenite were sufficient at these primary grind sizes for effective recovery in a rougher flotation circuit.

For the 2009-2010 G&T test program, the bench scale and pilot plant composites were constructed from coarse crushed rejects obtained from 2008 drill core samples. A total of 946 samples with a mass of approximately 5.5 t were provided, selected from at least 15 drill holes. The composites were assembled by lithology and grade ranges, the chemical compositions are shown in Table 13-4.

Table 13-4: Chemical Composition of the KM2218 Composites (2009-1010 Test Program)

Composite	Assay – Percent						Assay - g/t
	Cu	Cu(Ox)	Mo	S(t)	S(s)	C	Ag
Supergene Lo Cu Lo Mo	0.21	0.014	0.014	3.23	2.75	0.10	3
Supergene Lo Cu Avg Mo	0.20	0.024	0.045	2.60	2.53	0.08	2.4
Supergene Avg Cu Avg Mo	0.42	0.043	0.033	1.61	1.6	0.06	2.9
Supergene Hi Cu Avg Mo	0.79	0.076	0.034	1.84	1.82	0.04	11

Composite	Assay – Percent						Assay - g/t
	Cu	Cu(Ox)	Mo	S(t)	S(s)	C	Ag
Supergene Hi Cu Hi Mo	0.66	0.066	0.089	2.23	1.91	0.13	7.5
Hypogene Lo Cu Lo Mo	0.20	0.004	0.023	2.59	2.38	0.39	3
Hypogene Lo Cu Avg Mo	0.21	0.003	0.041	2.46	2.30	0.26	2.7
Hypogene Avg Cu Avg Mo	0.32	0.004	0.042	2.80	2.59	0.15	33.9
Hypogene Hi Cu Avg Mo	0.56	0.002	0.067	2.82	2.74	0.22	9.7
Hypogene Hi Cu Hi Mo	0.54	0.003	0.075	3.71	3.51	0.17	7.1
Supergene PP Composite	0.39	0.045	0.033	2.51	2.36	0.05	4.9
Hypogene PP Composite	0.29	0.003	0.060	3.44	3.25	0.30	5.2

The copper content in these samples ranged from 0.20-0.80%, and the molybdenum content ranged from 0.014-0.09%. Sulphur analyses indicated that 94% of the sulphur was present in sulphide form, on average. The copper oxide assays measured 7 to 12% of the total copper contents in the supergene composites, which could be related to chalcocite/covellite contents.

Mineralogical modal analyses by point counting methods were carried out on three of the samples tested in this program. Both mineral composition and liberation data were derived from the modal data. The mineralogical composition of the three composites is summarized in Table 13-5. Mineral composition was measured on two additional composites, a summary of copper distribution by mineral form is presented in Table 13-6.

Table 13-5: Mineralogical Characteristics of the KM2218 Composites (2009-2010 Test Program)

Composite	Grind Size µm P80	Liberation %		Mineral Composition – Percent				
		CuS	Md	Cp	Bn	Ch/Cv	Md	Py
Supergene Hi Cu Avg Mo	88	55	78	1.01	0.01	0.31	0.16	3.3
Supergene Hi Cu Hi Mo	93	46	73	1.08	0.01	0.34	0.14	5.4
Hypogene Low Cu Low Mo	147	40	49	0.59	0.02	0.01	0.03	3.6

The sulphide content in these samples ranged between 4-7%. The pyrite to copper sulphide ratios in these samples ranged from 3:1 to 6:1. These ratios are moderately high and can present challenges in producing high grade copper concentrates in the cleaner circuit.

Table 13-6: Copper Distribution by Mineral Form in the KM2218 Composites (2009-2010 Test Program)

Composite	Copper Distribution – Percent		
	Cp	Bn	Ch/Cv
Supergene Hi Cu Avg Mo	52.6	1.2	46.2
Supergene Hi Cu Hi Mo	59.9	0.6	39.5
Supergene Avg Cu Avg Mo	62.9	5.0	32.1
Supergene PP Composite	60.0	9.8	30.2
Hypogene Low Cu Low Mo	91.4	6.0	2.6

The supergene composites contained elevated levels of chalcocite/covellite. The material could be expected to produce higher grade copper concentrates due to the secondary copper sulphide mineral content. Chalcocite/covellite is often more fine-grained compared to chalcopyrite and may require a finer primary grind size and slightly higher dosages of collector for effective rougher flotation recovery.

Sixty-three of the samples received in the KM2218 test program were allocated to form hypogene and supergene composites for comminution testing. Each composite had a mass of approximately 175 kg. The composites were shipped to SGS Lakefield for the 2009 grindability test program.

An additional 69 kg of drill core samples were received at G&T Metallurgical, of which 39 kg was forwarded to Resource Development Inc. in 2011 for a subsequent metallurgical test program. The samples were combined to form a single composite of approximately 85% hypogene and 15% supergene materials. The composite sample assayed 0.36% Cu, 296 ppm Mo, 2.87% Fe, 2.25% S(total) and 4.5 ppm Ag.

13.4 Comminution Testwork

A modest amount of comminution testing has been completed for the Berg Project.

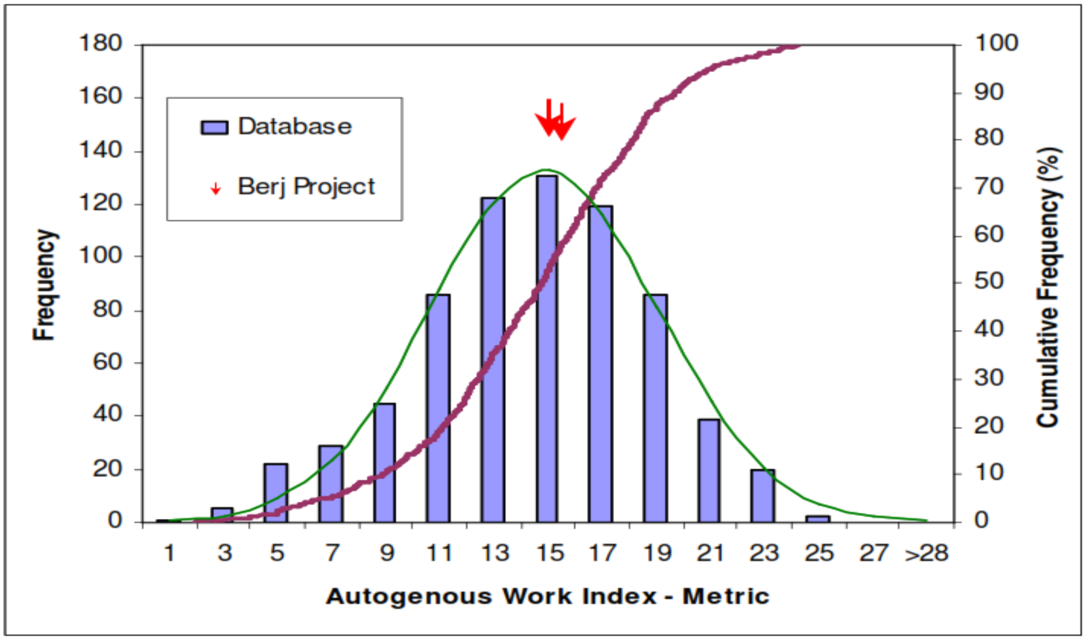
One sample each of supergene and hypogene material was evaluated using a MacPherson autogenous grindability test protocol, conducted by SGS Lakefield. The test results are summarized in Table 13.

Table 13-7: MacPherson Grindability Test Summary

Sample	Feed (kg/h)	Autogenous Work Index (kWh/t)	Hardness Percentile	Gross Specific Energy Input (kWh/t)	P80 (µm)
Supergene	9.3	15	53	8.6	337
Hypogene	8.3	15.5	59	9.9	285

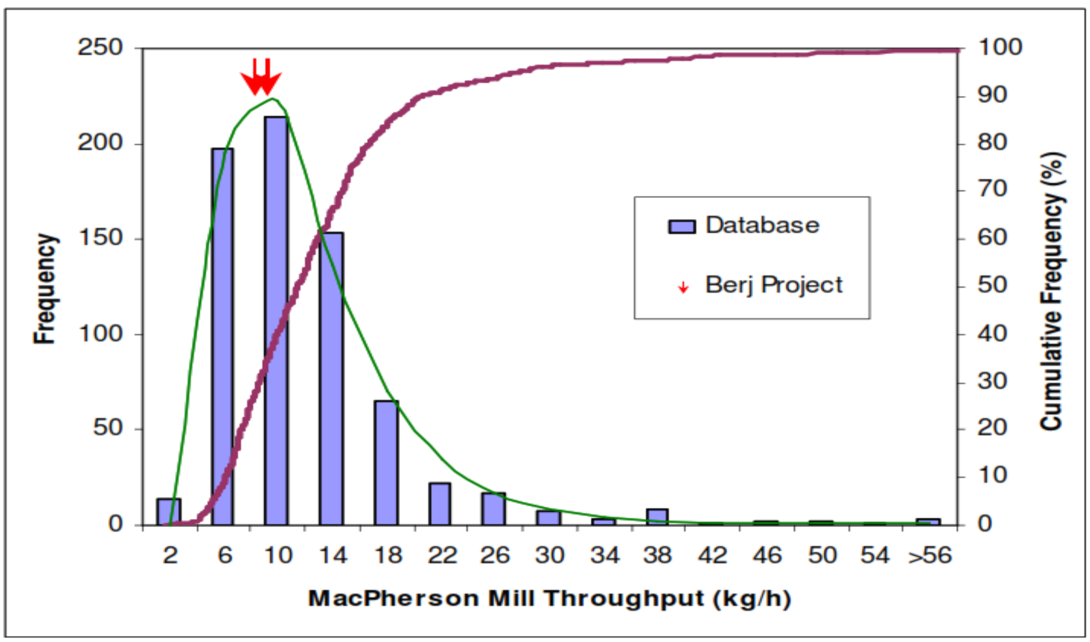
The supergene sample was categorized as medium, in terms of throughput rate and gross specific energy input, while the hypogene sample was moderately hard. The samples were characterized as medium in terms of autogenous work index (AWi) due to the relatively fine grind achieved, especially for the hypogene sample. The autogenous work index, MacPherson mill throughput, and specific energy consumption are compared to the SGS database (at the time of testing) in Figure 13-1 to Figure 13-3. These results were correlated against Ausenco's extensive database of comminution data and an Axb value of 52 was estimated to be appropriate for SAG mill design purposes.

Figure 13-1: MacPherson Autogenous Grindability Test Database



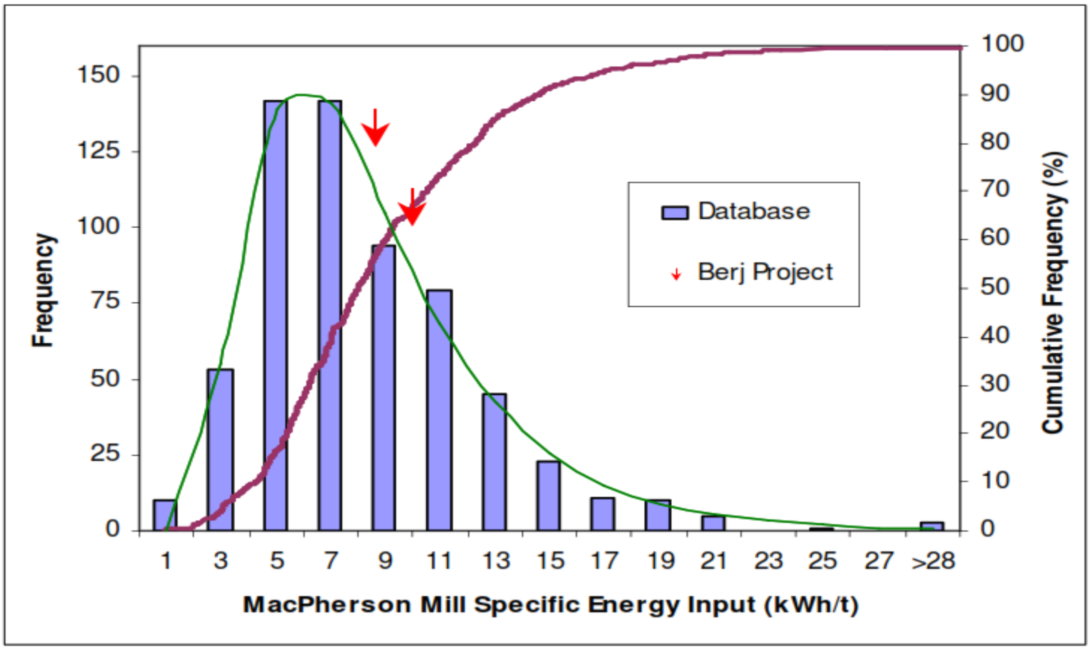
Source: SGS Lakefield, 2009.

Figure 13-2: MacPherson Mill Throughput Database



Source: SGS Lakefield, 2009.

Figure 13-3: MacPherson Mill Specific Energy Input Database



Source: SGS Lakefield, 2009.

Bond ball mill grindability tests were performed using a 106µm closing screen. The test results are summarized in Table 13. The bond ball mill work indices measured by SGS fell into the medium range of hardness, while the G&T Metallurgical result was hard.

Table 13-8: Bond Ball Mill Grindability Test Results

Sample	Laboratory	F80 (µm)	P80 (µm)	Work Index (kWh/t)
Hypogene Low Grade	G&T KM2075	2,427	71	18.4
Supergene	SGS	2,339	84	14.2
Hypogene		2,609	80	15.4

13.5 Flotation Testwork – Flowsheet Development

13.5.1 2008 G&T Metallurgical Test Program (KM2075)

In 2008, G&T Metallurgical conducted flotation testwork aimed at developing suitable flowsheet and flotation conditions. This test program was carried out on four master composites representing hypogene and supergene deposit types. The bulk of the testing was carried out on the high grade hypogene and low copper oxide supergene composites. The low grade hypogene and high copper oxide supergene composites were subjected to only one flotation test each.

Rougher kinetic tests were used to establish the primary grind versus metal recovery relationship in the rougher circuit. Batch open circuit cleaner tests were used to define the grade-recovery relationships through the cleaning steps. The effect of variable regrind discharge sizing was also investigated through the open circuit cleaner tests. In the final stages of the program, locked cycle tests were carried out on three of the four master composites.

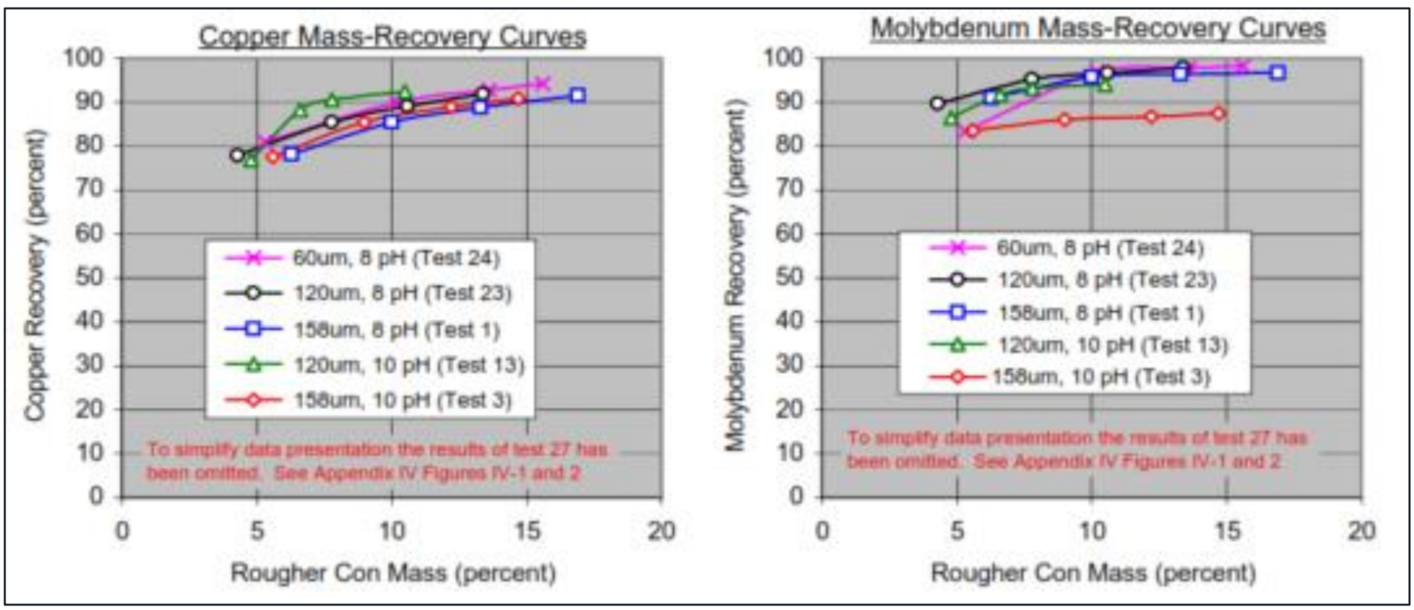
13.5.1.1 Rougher Tests

Rougher kinetic tests were carried out on the high grade hypogene and low copper oxide supergene composites. The tests were carried out at variable primary grind sizing and pH conditions. The results of this phase of the test program are illustrated in Figure 13-4 and Figure 13-5.

For the high grade hypogene composite, copper and molybdenum recoveries to rougher concentrate ranged between 90-95% and 88-98%, respectively. These metal recoveries were achieved at feed mass recoveries to the rougher concentrate between 11 to 17%. Recoveries were somewhat insensitive to primary grind size and pulp pH.

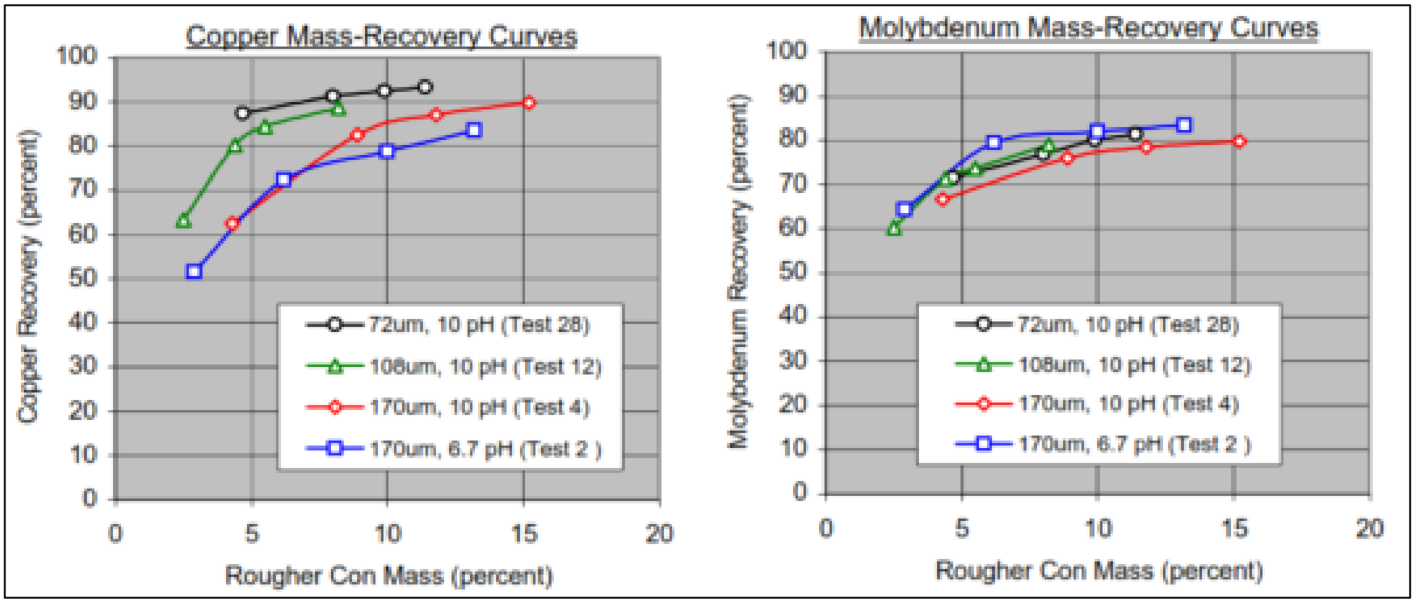
The supergene composite had a somewhat low natural pH of 6.8 following primary grinding, which appeared to negatively affect performance. Once this was adjusted to pH 10 with lime, recovery varied slightly as a function of primary grind. Copper recoveries varied from 90% at coarser grinds to 93% at a primary grind of 70µm P80. Molybdenum recoveries averaged 80%.

Figure 13-4: Effect of Rougher Mass Recovery on Rougher Concentrate – High Grade Hypogene



Source: G&T Metallurgical, 2008.

Figure 13-5: Effect of Rougher Mass Recovery on Rougher Concentrate – Low Cu Oxide Supergene



Source: G&T Metallurgical, 2008.

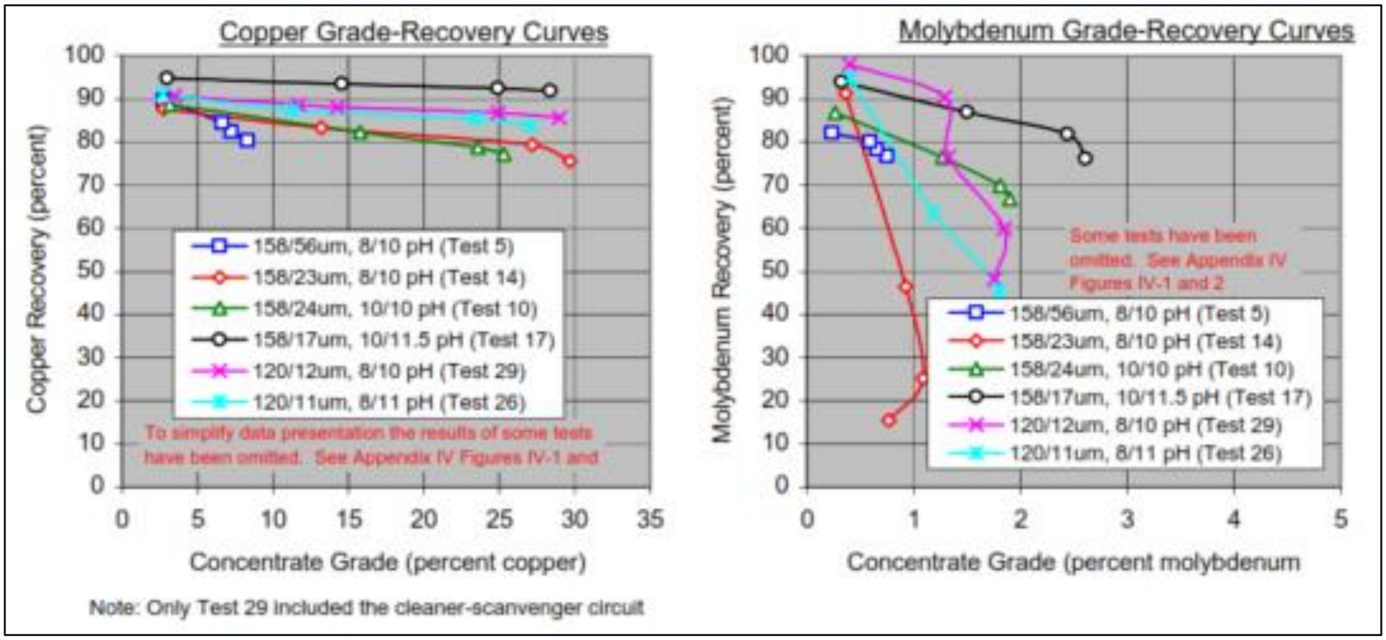
13.5.1.2 Cleaner Tests

Open circuit batch cleaner tests were used to establish the grade-recovery curves for both copper and molybdenum. The high grade hypogene and low copper oxide supergene composites were used for all these tests. The results of the open circuit testing are summarized in Figure 13-6 and Figure 13-7.

Bulk final concentrates assaying between 25-30% copper were produced on the high grade hypogene cleaner tests. Copper recovery to final concentrate varied between 80-90%. Overall molybdenum recoveries were quite variable. The best molybdenum recovery of 80% was achieved in bulk concentrate assaying 2.5% molybdenum. Regrinding to a cleaner feed sizing of approximately 20µm P_{80} was beneficial, but finer regrinding did not improve performance.

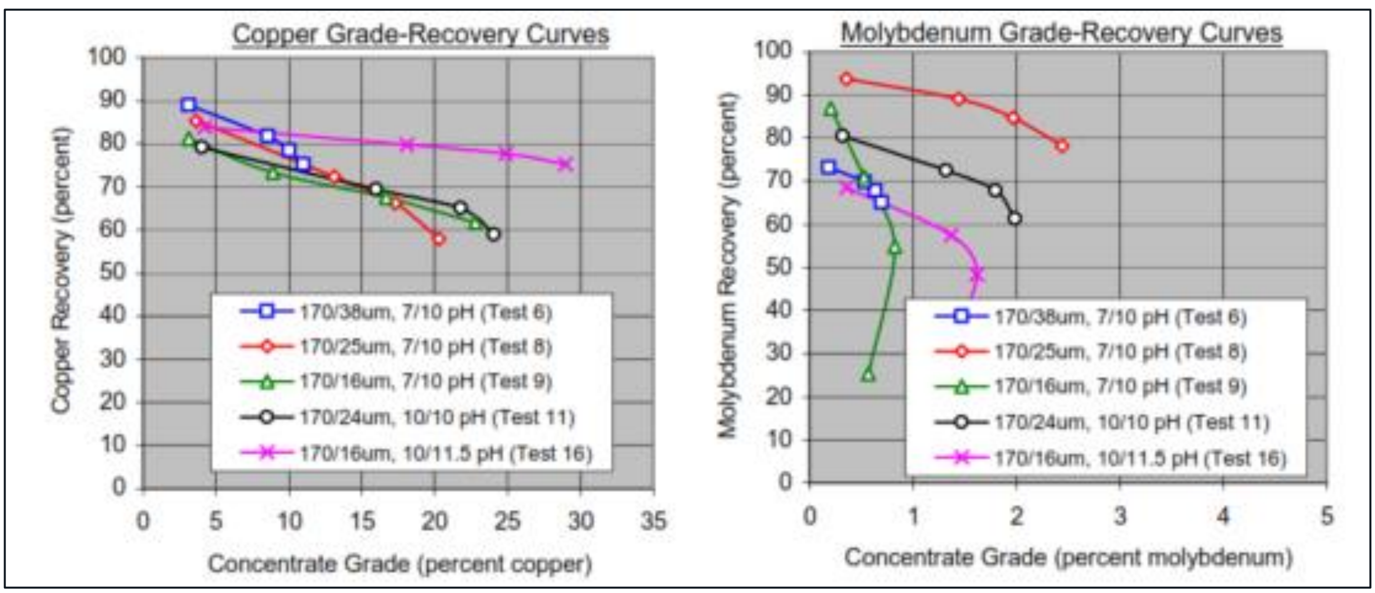
The low copper oxide supergene composite produced lower final copper recoveries at lower bulk concentrate copper grades. The best copper recovery was 78% to a bulk concentrate containing 25% copper. This result was achieved with pH 10 in the rougher, pH 11.5 in the cleaner circuit, elevated collector dosages and a regrind discharge sizing of 16µm P_{80}. Molybdenum recoveries to final bulk concentrate were quite variable.

Figure 13-6: Cleaner Circuit Grade Recovery Curves – High Grade Hypogene



Source: G&T Metallurgical, 2008.

Figure 13-7: Cleaner Circuit Grade Recovery Curves – Low Cu Oxide Supergene



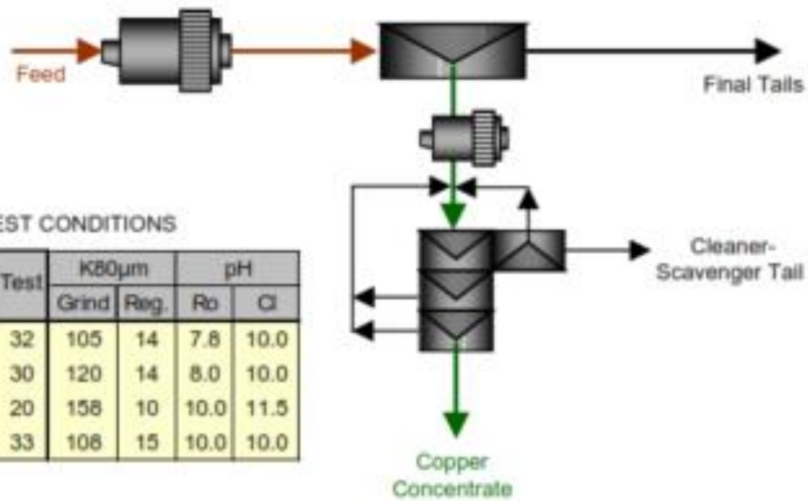
Source: G&T Metallurgical, 2008.

13.5.1.3 Locked Cycle Tests

Four locked cycle tests were carried out to confirm closed circuit metallurgical performance. Two tests were conducted on the high grade hypogene composite and a single test was conducted on each of the low grade hypogene and low copper oxide supergene composites. The flowsheet, test conditions, and metallurgical results are displayed in Figure 13-8. In these metallurgical balances, Copper Concentrate refers to the Bulk Concentrate, as it still contains molybdenum which would be removed by subsequent Cu-Mo separation. The following comments were observed from the inspection of the test data:

- The best result on the high grade hypogene composite produced bulk concentrate copper and molybdenum recoveries of 86% and 82% at a 26% copper grade in the final bulk concentrate.
- The low grade hypogene composite generated copper and molybdenum recoveries of 83% and 73% at a bulk concentrate grade of 29% copper.
- Bulk final concentrate copper and molybdenum recoveries were 85% and 61% at a copper grade of 26% for the low copper oxide supergene composite.
- All composites produced acceptable bulk concentrate copper grades at 85% copper recovery. Molybdenum recovery varied between 60-80% and was higher for the hypogene samples. Very high lime addition to the cleaner circuit, pH target of 11.5, compromised molybdenum recovery on the high grade hypogene composite.

Figure 13-8: Locked Cycle Test Flowsheet and Metallurgical Performance Data (KM2075)



TEST CONDITIONS

Comp	Test	K80µm		pH	
		Grind	Reg.	Ro	Cl
L/G HG	32	105	14	7.8	10.0
H/G HG	30	120	14	8.0	10.0
H/G HG	20	158	10	10.0	11.5
L/CuO SG	33	108	15	10.0	10.0

Note: The cleaner-scavenger circuit was not included in Test 20.

CYCLE TEST METALLURGICAL BALANCE DATA

Composite and Product	Mass percent	Assay - percent or g/t				Distribution - percent			
		Cu	Fe	Mo	S	Cu	Fe	Mo	S
Low Grade Hypogene (Test 32)									
Flotation Feed	100.0	0.33	4.7	0.035	4.1	100	100	100	100
Copper Concentrate	0.9	29.0	26.8	2.73	33.6	83	5	73	8
Cleaner Scavenger Tail	10.9	0.10	18.8	0.067	19.7	4	43	21	52
Rougher Tail	88.2	0.05	2.8	0.003	1.9	14	52	6	40
High Grade Hypogene (Test 30)									
Flotation Feed	100.0	0.39	4.5	0.040	4.6	100	100	100	100
Copper Concentrate	1.3	26.0	28.5	2.53	32.5	86	8	82	9
Cleaner Scavenger Tail	8.4	0.15	17.9	0.055	18.0	3	33	12	33
Rougher Tail	90.3	0.04	2.9	0.003	3.0	10	59	7	58
High Grade Hypogene (Test 20)									
Flotation Feed	100.0	0.39	3.7	0.046	4.5	100	100	100	100
Copper Concentrate	1.1	30.9	26.6	1.00	32.0	90	8	25	8
Cleaner Scavenger Tail	11.0	0.12	12.9	0.26	15.5	3	38	61	37
Rougher Tail	87.9	0.03	2.3	0.007	2.8	6	54	14	54
Low Copper Oxide Supergene (Test 33)									
Flotation Feed	100.0	0.39	2.3	0.033	1.4	100	100	100	100
Copper Concentrate	1.3	26.1	24.5	1.60	30.9	85	13	61	28
Cleaner Scavenger Tail	9.6	0.20	11.0	0.056	10.5	5	46	16	71
Rougher Tail	89.1	0.04	1.1	0.008	0.0	10	41	22	2

Source: G&T Metallurgical, 2008.

13.5.2 2009-2010 G&T Metallurgical Test Program (KM2218)

A series of open circuit and locked cycle tests were carried out to help define the copper and molybdenum recoveries as a function of head grade. The pilot plant was used to produce large quantities of bulk copper and molybdenum concentrates for bench scale copper-molybdenum separation testing.

The following comments summarize the key features of the flowsheet used in this test program:

- The feed samples were ground to a primary grind varying between 80 to 160 µm P_{80}. Finer primary grind sizes were applied to the supergene composite; however, it was not confirmed that these were specifically required to achieve acceptable metallurgical performance. The bulk rougher concentrates were reground to between 10 to 30 µm P_{80} prior to the three stages of cleaning.
- Fuel oil was added to the primary grind as a primary molybdenum collector. Potassium amyl xanthate was added in the rougher and cleaner circuit as the primary copper sulphide collector.
- Rougher flotation was carried out at a natural pH of 8.0 for hypogene material and pH 10.0 for supergene. The cleaner circuit pH varied between 10 and 11 throughout the test program.

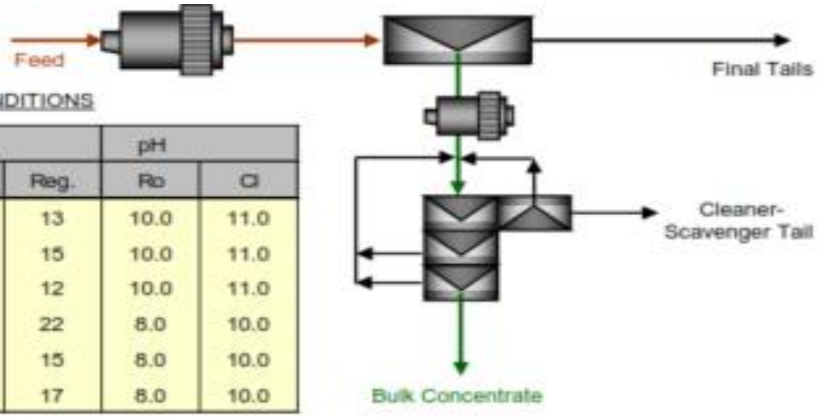
Limited open circuit cleaner tests were conducted on each composite prior to locked cycle tests, only the locked cycle results are discussed.

13.5.2.1 Locked Cycle Tests – Bench Scale Composites

Locked cycle tests were carried out on 6 of the 10 bench scale composites, representing both supergene and hypogene deposit types. The results of the locked cycle tests are shown in Figure 13-10. The metallurgical performance can be summarized as follows:

- The average and high-grade supergene composites exhibited similar metallurgical performance. On average, copper recovery of 86% was achieved to a bulk concentrate which graded 28% copper, along with 87% molybdenum recovery.
- The copper recovery for the low-grade supergene composite was 69% with 16.5% copper grade in the final bulk concentrate. Molybdenum recovery to the bulk concentrate was only 19%. This locked cycle test was preceded by only one open circuit test, which had worse copper performance across the cleaner circuit. It is believed that conditions were not optimized for this sample.
- Copper recoveries ranging from 78 to 88% were achieved on the hypogene composites, along with molybdenum recoveries of 83 to 95% to the bulk concentrates. The low-grade composite produced a bulk concentrate grading only 15.5% copper, possibly due to unoptimized collector dosages applied with this ratio of pyrite to copper sulphides. The other two hypogene composites produced bulk concentrates with 25 to 28% copper along with 3.6 to 4.2% molybdenum. These would be considered somewhat high molybdenum contents to feed a Cu-Mo separation circuit.

Figure 13-9: Locked Cycle Test Flowsheet Metallurgical Performance Data (KM2218)



TEST CONDITIONS

Comp	Test	K80µm Grind	K80µm Reg.	pH Ro	pH Cl
SG L Cu L Mo	21	87	13	10.0	11.0
SG A Cu A Mo	23	87	15	10.0	11.0
SG H Cu H Mo	20	93	12	10.0	11.0
HG L Cu L Mo	17	147	22	8.0	10.0
HG A Cu A Mo	18	157	15	8.0	10.0
HG H Cu H Mo	19	147	17	8.0	10.0

CYCLE TEST METALLURGICAL BALANCE DATA

Composite and Product	Mass percent	Assay - percent or g/t Cu	Mo	Fe	S	Ag	Distribution - percent Cu	Mo	Fe	S	Ag
SG Lo Cu Lo Mo (Test 21)											
Flotation Feed	100.0	0.21	0.014	5.35	3.01	4	100	100	100	100	100
Copper Concentrate	0.9	16.5	0.3	24.3	33.5	177	69	19	4	10	40
Cleaner Scav Tail	12.1	0.33	0.07	23.5	21.7	12	19	62	53	87	37
Rougher Tail	87.0	0.029	0.003	2.65	0.11	1	12	19	43	3	23
SG Avg Cu Avg Mo (Test 23)											
Flotation Feed	100.0	0.41	0.031	2.17	1.46	4	100	100	100	100	100
Copper Concentrate	1.2	30.7	2.4	24.5	36.4	220	87	92	13	29	73
Cleaner Scav Tail	6.2	0.29	0.02	16.9	15.8	5	4	5	48	66	9
Rougher Tail	92.7	0.040	0.001	0.91	0.07	1	9	3	39	5	17
SG Hi Cu Hi Mo (Test 20)											
Flotation Feed	100.0	0.68	0.093	3.43	1.87	9	100	100	100	100	100
Copper Concentrate	2.3	25.7	3.3	21.5	29.4	312	86	81	14	36	78
Cleaner Scav Tail	10.1	0.26	0.05	12.7	11.4	8	4	5	37	61	9
Rougher Tail	87.7	0.082	0.014	1.89	0.07	1	11	14	48	3	13
HG Lo Cu Lo Mo (Test 17)											
Flotation Feed	100.0	0.18	0.023	2.88	1.96	3	100	100	100	100	100
Copper Concentrate	0.9	15.5	2.3	33.5	40.1	185	78	88	11	19	53
Cleaner Scav Tail	5.3	0.21	0.02	13.5	13.4	8	6	4	25	36	13
Rougher Tail	93.8	0.032	0.002	1.98	0.94	1	16	8	64	45	34
HG Avg Cu Avg Mo (Test 18)											
Flotation Feed	100.0	0.28	0.039	4.05	2.48	11	100	100	100	100	100
Copper Concentrate	0.9	24.8	3.6	30.0	36.7	419	79	83	7	13	35
Cleaner Scav Tail	6.0	0.33	0.08	13.2	12.7	80	7	12	20	31	45
Rougher Tail	93.1	0.040	0.002	3.20	1.49	2	13	5	74	56	20
HG Hi Cu Hi Mo (Test 19)											
Flotation Feed	100.0	0.55	0.080	3.49	3.33	8	100	100	100	100	100
Copper Concentrate	1.8	28.0	4.3	29.1	35.3	328	88	95	15	19	69
Cleaner Scav Tail	8.4	0.16	0.02	15.4	15.6	12	3	2	37	39	13
Rougher Tail	89.8	0.056	0.003	1.88	1.57	2	9	3	48	42	19

See the appropriate tests in Appendix II for additional metallurgical balance data.

Source: G&T Metallurgical, 2010.

13.5.3 2012 Scoping Metallurgical Test Program – Resource Development Inc.

13.5.3.1 Rougher Flotation Tests

A total of nine rougher flotation tests were performed with the primary objective of optimizing the process parameters determined in the previous test programs. The variables investigated included grind size, flotation time, flotation pH and collectors. Selected flotation test results are summarized in Table 13.

The test results indicate the following:

- The copper recovery in the rougher concentrate improved with increasing fineness of grind.
- The copper recovery increased by approximately 1-2% as the flotation pH was increased from pH 8.0 to 9 and 10.
- SIPX, 3477 and 8989 were not as effective as copper collectors as PAX.
- The molybdenite recovery performance appeared to be independent of grind and pH.
- The results shown below align with the locked cycle testing conducted at G&T Metallurgical.

Table 13-9: Rougher Flotation Test Results – RDi

Test No.	Process Conditions	Rougher Concentrate (9 min)					Tailings %		Cal. Feed %	
		Recovery %			Grade %					
		Wt.	Cu	Mo	Cu	Mo	Cu	Mo	Cu	Mo
4.	P_{80} = 150mesh, PAX/ Fuel Oil pH = 9	5.1	85.0	92.4	5.26	0.54	0.050	0.002	0.316	0.030
5.	P_{80} = 150mesh, PAX/ Fuel Oil pH = 10	5.4	87.4	91.9	5.79	0.53	0.048	0.003	0.360	0.031

Source: Resource Development Inc. 2012.

13.5.3.2 Open Cycle Cleaner Flotation Tests

A single open circuit cleaner flotation test was run with a 2 kg charge using the best reagent suite and process conditions developed for rougher flotation. The results for this single cleaner flotation circuit were poor, as high losses were measured across the cleaner stages. The cause of the low performance was uncertain, and it did not align with the locked cycle tests conducted at G&T Metallurgical.

An additional open circuit cleaner test using 30 kg of feed was conducted to generate bulk concentrate for limited Cu-Mo separation testing. This test measured performance worse than the 2 kg test, cleaner losses were high, and the generated bulk concentrate graded only 10% copper due to pyrite dilution. Size analyses suggest that the rougher concentrate was reground to approximately 40 µm P80 prior to cleaning. This bulk concentrate was divided in half to conduct two preliminary Cu-Mo separation tests, a rougher test, and a single stage cleaner test. In both tests, NaHS was effective at depressing copper, however demonstrating molybdenum upgrading performance was limited due to the sample mass. A molybdenum 1st cleaner concentrate grading 35.7% Mo was generated.

13.6 Pilot Plant Testing

G&T Metallurgical conducted a series of pilot plant runs in the 2010 test program (KM2218). Bulk composites of both hypogene and supergene deposit types, approximately 2.5 and 2.3 t respectively, were processed. The composites were assembled from crushed drill core rejects as discussed in Section 13.3, and sub-samples were used for bench scale tests in advance of the pilot testing. The principal objectives were to evaluate metallurgical performance on a continuous basis and to produce bulk concentrates for bench scale Cu/Mo separation tests.

Effectively, eight full pilot plant runs were conducted. Crushed feed was processed for 4 to 8 hours each run day in the continuous circuit which included rod mill primary grinding, rougher flotation, stirred mill regrinding and cleaner flotation. Composite samples of the key circuit process streams were collected over 2 or 3-hour periods; assay and mass flow data were then used to construct appropriate metallurgical balances for each sampling period.

13.6.1 Locked Cycle Test Results

A series of locked cycle tests were carried on both the hypogene and supergene pilot plant feed samples. The test conditions and the results of the locked cycle tests are summarized in Table 13 and Table 13. The following comments provide a synopsis of the key test findings:

- Locked cycle tests were carried out on the supergene pilot plant feed composite with and without the use of Cytec 3302 in the cleaner scavenger circuit. Under both conditions, 80% of the feed copper and 81% of the feed molybdenum were recovered in the final bulk concentrates. The average copper content in the final concentrate was 24% for the tests with Cytec 3302. The molybdenum grade in the bulk concentrate averaged 1.8%.
- Two locked cycle tests were carried out on the hypogene pilot plant feed composite. On average, 85% of the feed copper was recovered into the final bulk concentrate grading 26% copper. Average molybdenum recovery to the bulk concentrate was 92% with an average grade of 5.8%.
- Silver recoveries to the copper concentrate ranged between 46-72%. The silver grade in the copper concentrates ranged between 275 to 431 g/t.

Table 13-10: Locked Cycle Test Conditions

Composite	Test	Grind P80 µm		pH		PAX g/t		Fuel oil, g/t				Cytec 3302 g/t
		Primary	Regrind	Ro	Cl	Ro	Clnr	PG	RG	Clnr	Clnr Scav	Clnr Scav
PP Supergene	29	100	11	10	11	11	19	40	50	60	-	40
PP Supergene	33	100	16	10	11	14	19	40	50	60	-	40
PP Supergene	39	100	14	10	11	14	19	40	50	60	40	-
PP Supergene	52	100	12	10	11	14	19	40	50	60	40	-
PP Hypogene	31	143	10	8	10	20	9	10	20	12	-	20
PP Hypogene	35	143	13	8	10	20	9	10	20	12	-	20

Table 13-11: Locked Cycle Test Results

Composite	Product	Mass %	Assay - % or g/t				Distribution - %			
			Cu	Mo	S	Ag	Cu	Mo	S	Ag
Supergene PP Comp (Avg Test 29 & 33) with Cytec 3302	Flotation feed	100	0.38	0.031	2.29	7	100	100	100	100
	Bulk Concentrate	1.3	24.3	1.7	31.0	307	80	81	17	64
	Cleaner Scav Tail	7	0.38	0.03	25.2	12	7	9	78	13
	Rougher Tail	91.8	0.053	0.003	0.10	2	13	10	5	23
Supergene PP Comp (Avg Test 39 & 52) without Cytec 3302	Flotation feed	100	0.38	0.031	2.29	7	100	100	100	100
	Bulk Concentrate	1.3	22.8	1.9	30.6	275	80	81	19	72
	Cleaner Scav Tail	7.1	0.4	0.05	23.8	11	7	10	78	15
	Rougher Tail	91.6	0.053	0.003	0.10	1	13	8	2	14
Hypogene PP Comp (Avg Test 31 % 35)	Flotation feed	100	0.28	0.057	2.98	10	100	100	100	100
	Bulk Concentrate	0.9	26.0	5.8	36.2	431	85	92	11	46
	Cleaner Scav Tail	8.8	0.12	0.02	17.6	15	4	4	52	15
	Rougher Tail	90.3	0.032	0.003	1.20	5	11	4	37	39

13.6.2 Pilot Plant Performance Data

The pilot plant performance data for each of the pilot runs is summarized in Table 13-12 and Table 13-13. Between 1 and 3 circuit surveys were conducted each run day, the average results for the surveys are presented. The following points should be considered in evaluating these results:

- Replicating bench scale results in a continuous pilot flotation circuit can be challenging, particularly at the throughput of this campaign. At a feed rate of 100 kg/hr and these copper feed grades, maintaining steady mass recoveries through the cleaner circuit may have been difficult. The effects of adding reagents continuously in a full closed-circuit arrangement may have also compromised metallurgical performance over the limited run time.
- The average metallurgical performance for the supergene composite was poorer in the pilot plant compared to locked cycle testing. Average copper recovery was 68% into the final bulk concentrate assaying 15.5% copper.
- Average molybdenum recovery for the pilot runs on the supergene composite was 52% to the bulk concentrate assaying 0.7% molybdenum. The molybdenum recoveries were considerably lower than locked cycle tests, the greatest variance in losses was across the cleaner circuit.
- Metallurgical performance for the hypogene pilot plant composite was similar to the locked cycle testing. The average copper recovery to the final bulk concentrate was 81.4% and average copper grade was 22.4%.
- Average molybdenum recovery to the final bulk concentrate across all hypogene pilot samples was 87.5%, with an average grade of 4.6%. This compares to an average molybdenum recovery of 92% with an average grade of 5.8% in the locked cycle testing.
- There is some uncertainty in the mass balance results, particularly for molybdenum, as significant variances between sampled and reported assay data were observed. This could be related to circuit sampling issues or challenges in achieving steady state operation within each run period.

Table 13-12: Pilot Plant Data and Bulk Concentrate Performance – Supergene

Run Day	Feed (kg)	Prm Grd µm P80	Regrind µm P80	Mass %	Assay - % or g/t				Distribution - %			
					Cu	Mo	S	Ag	Cu	Mo	S	Ag
P1	502	117	23	1.9	13.4	0.7	38.1	141	68.2	50.4	32.5	58
P2	250	95	18	1.7	15.0	1.3	33.9	188	68.1	70.8	23.7	60
P7	460	133	18	1.5	18.3	0.3	37.3	227	65.5	18.4	28.8	61
P8 / 9	500	102	13	1.5	15.4	0.4	26.6	167	71	35.4	21.1	60

Note: Rougher concentrate from P8 was upgraded in a separate cleaner circuit on P9, combined results are presented. Rougher concentrate was also generated in P10, not shown, but this concentrate was only upgrade using bench scale open circuit protocols.

Table 13-13: Pilot Plant Data and Bulk Concentrate Performance – Hypogene

Test	Feed (kg)	Prm Grd µm P80	Regrind µm P80	Mass %	Assay - % or g/t				Distribution - %			
					Cu	Mo	S	Ag	Cu	Mo	S	Ag
P3	544	119	14	1.0	22.2	4.7	37.1	357	82.3	88.4	14.2	71
P4	821	129	23	1.1	20.6	3.2	37.6	310	76.3	81.1	16.9	65
P5	764	176	30	1.4	15.4	2.4	41.2	264	79.9	77.1	21.0	67
P6	302	175	N/A	1.0	24.2	5.6	36.7	379	84.1	91.0	19.0	68

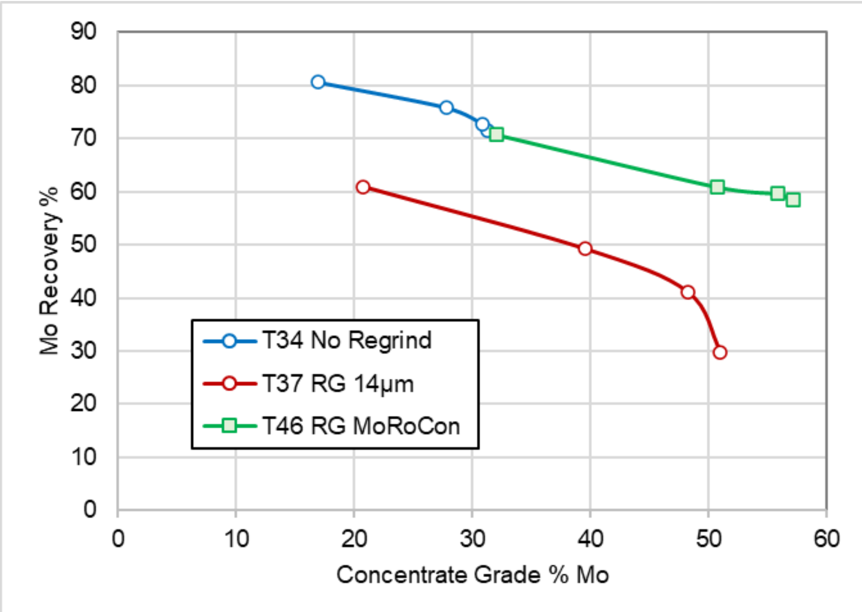
13.6.3 Copper-Molybdenum Separation Testing

In the 2010 test program, KM2218, G&T Metallurgical conducted bench scale testing to evaluate copper-molybdenum separation using bulk concentrates produced in the pilot plant program. A series of tests were conducted on hypogene material, however only a single test was conducted on supergene material. Feed for the hypogene separation tests was a blend of P3 to P6 bulk concentrates. For the supergene deposit type, a sample of rougher concentrate generated in the pilot plant was upgraded on the bench and subsequently used for Cu-Mo separation testing.

Bench scale rougher kinetic and open circuit cleaner tests were carried out on the hypogene bulk concentrate. Selected results are displayed in Figure 13-12 and discussed below:

- The composite sample of final bulk concentrate had a feed grade of approximately 22.5% copper and 4.80% molybdenum.
- Final molybdenum grades of 50% and higher were produced when regrinding was applied, however molybdenum recovery across the circuit was low. It would be expected that circuit recoveries would improve in closed circuit.
- Regrinding of the molybdenum rougher concentrate appeared to be more effective than regrinding the bulk concentrate prior to rougher flotation. In Test 46, a 1st cleaner concentrate grading 50.7% Mo was produced at a molybdenum circuit recovery of 61%.
- Molybdenum rougher flotation was carried out at very low pulp densities which may have compromised rougher performance.

Figure 13-10: Copper-Molybdenum Separation Test Results - Hypogene



Source: Ausenco, 2023.

Supergene rougher concentrate generated in the pilot plant, presumably on run day P10, was upgraded using bench scale equipment to produce a suitable bulk concentrate for subsequent Cu-Mo separation testing. The rougher concentrate was upgraded in three stages of open circuit dilution cleaning. The resulting bulk concentrate was divided into five feed charges to use for a copper-molybdenum separation test, conducted in a locked cycle format. The results of this testing are discussed below:

- The rougher concentrate was reground to approximately 15µm P80 prior to dilution cleaning at pH 11, however the bulk concentrate graded 15.5% Cu and 0.8% Mo. Iron and sulphur assays suggest that the bulk concentrate still contained elevated levels of pyrite. Both copper and molybdenum recoveries across the cleaner circuit were low at 65 and 49%, respectively.
- Molybdenum recovery across the Cu-Mo separation circuit was 55% to a final molybdenum concentrate grading 50.5% Mo and 2.3% Cu.

There is a possibility of improving the metallurgical performance of the copper-molybdenum separation for both material types. The high grade of molybdenum in the bulk rougher concentrate should help to achieve higher separation circuit molybdenum recoveries. Additional testing will be required to prove this.

13.7 Concentrate Quality

In 2009, G&T Metallurgical conducted minor elemental scans on the bulk concentrates produced in locked cycle tests 30 and 33 within the KM2075 test program. Contents of the elements of interest are summarized in Table 13. The following comments summarized the results:

- Fluorine was measured at approximately 400 ppm in the supergene concentrate but was quite low in the hypogene concentrate. While the level in the supergene concentrate should be reviewed with a concentrate marketing specialist, these levels could be mitigated through blending.
- There does not appear to be any other minor element contents in these concentrates that would negatively impact concentrate marketability.
- Silver and gold are present in the bulk concentrate at 240 g/t and 2 g/t, respectively. Both are at levels that will likely be payable in the bulk concentrate.
- The scans show 5-8 g/t rhenium content in the bulk concentrate.

Table 13-14: Minor Element Composition of the Concentrates

Element	Unit	Bulk Concentrate Assays		Typical Penalty Limit
		High Grade Hypogene	Low Oxide Supergene	
Arsenic	%	0.01	0.02	0.2
Antimony	ppm	51	38	500
Bismuth	ppm	112	70	200
Cadmium	ppm	8	8	300
Cobalt	ppm	68	77	-
Copper	%	26.0	26.1	
Fluorine	ppm	41	397	300
Gold	ppm	2.2	1.7	-
Lead	%	0.05	0.03	1
Mercury	ppm	0.1	0.04	5
Molybdenum	%	2.5	1.6	-
Nickel	ppm	90	386	-
Nickel + Cobalt	%	0.02	0.05	0.5
Selenium	ppm	80	70	300
Silver	ppm	243	244	-
Rhenium	ppm	7.7	4.5	-
Zinc	%	0.12	0.16	3

13.8 Recovery Estimates

Results from the locked cycle tests conducted in both programs by G&T Metallurgical were used to determine recovery estimates for the Berg deposit. Results for the samples that were atypical in grade or mineral assemblage were not included for the purpose of the analysis. In total, results from four supergene and five hypogene composites were considered. In some cases, the results from two locked cycle tests on the same composite were averaged to provide a single data point for the model. The results from one composite from each lithology were excluded as it appeared that the cleaner circuit conditions were not optimized and contributed to elevated losses.

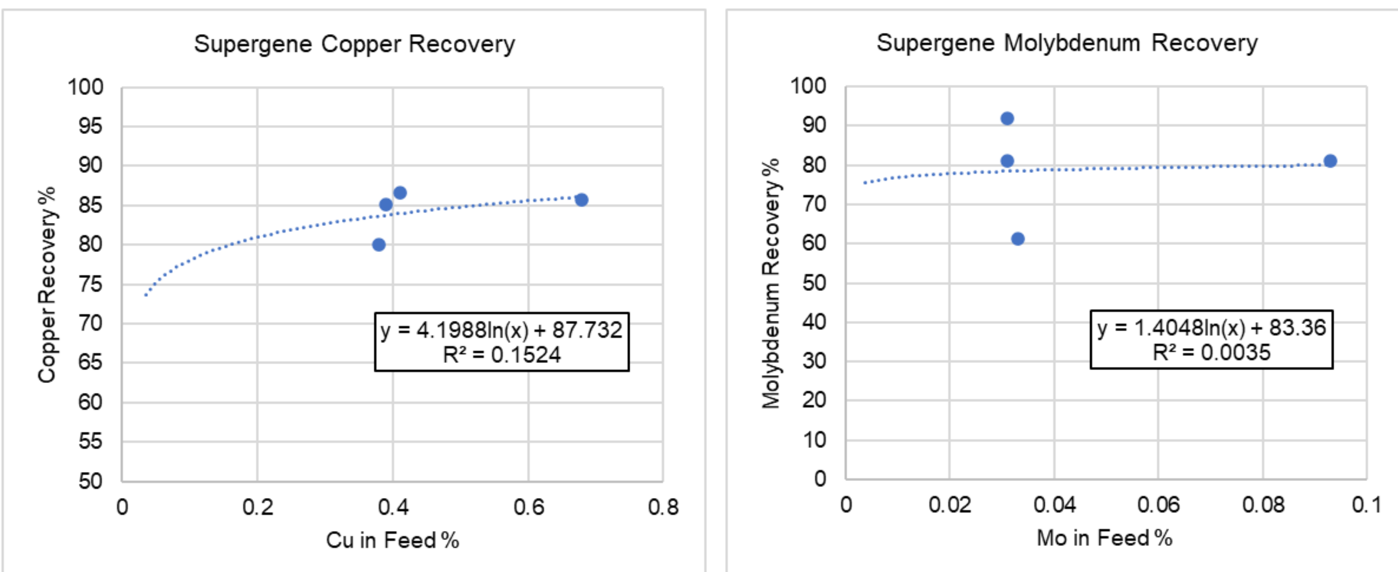
Silver data was only measured in the KM2218 program, so a single global recovery model was determined from this data.

It is proposed that metal recovery equations can be reasonably estimated by using measured recoveries to bulk concentrates. For molybdenum, additional Cu-Mo separation circuit recoveries have been applied to estimate recovery to final molybdenum concentrates. It is believed that considerably better Cu-Mo separation circuit performance can be achieved than what has been measured in bench scale testing, due to the various challenges interpreted in the metallurgical test reports. Given that the bulk concentrates are expected to contain relatively high levels of molybdenum, estimated at 1.7 and 3.5% for the supergene and hypogene mine life averages, respectively, it is reasonable to expect the resulting Cu-Mo separation circuit to operate with high molybdenum recoveries and achieve circuit tail grades that are regularly achieved in industry. On this basis, Cu-Mo separation circuit molybdenum recoveries of 95 and 90% are estimated for hypogene and supergene respectively, corresponding to molybdenum contents of 0.18% in the resulting copper concentrates.

Relationships of locked cycle test bulk concentrate recoveries to feed grades are shown in Figure 13-11, Figure 13-12 and Figure 13-13.

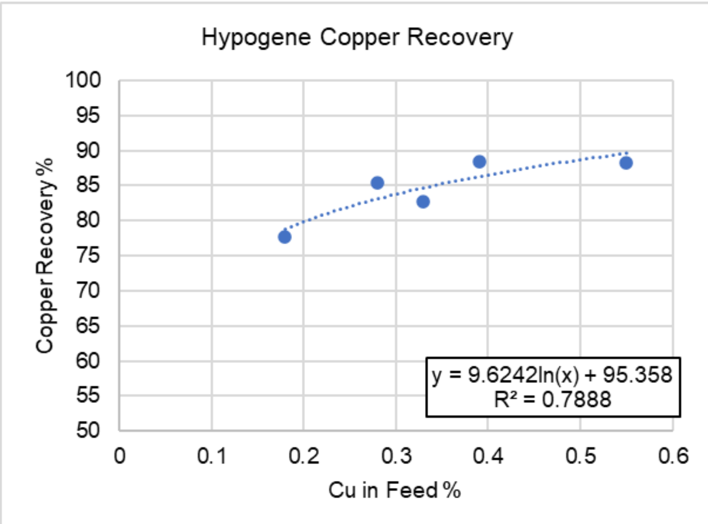
The recovery equations, with the respective molybdenum separation circuit factors applied to molybdenum, are presented in Table 13.

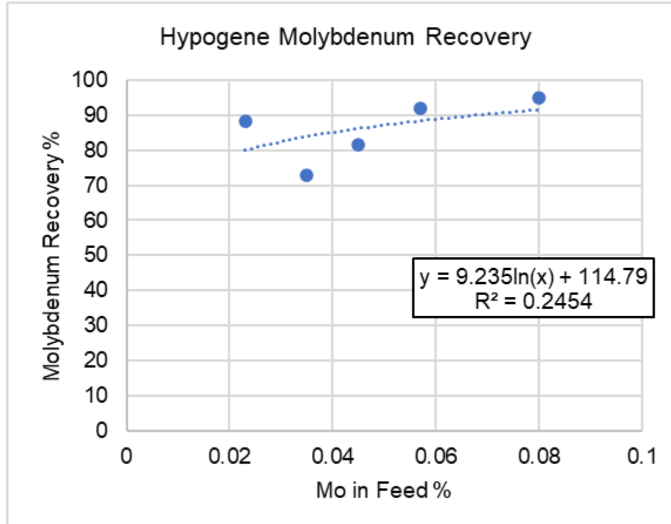
Figure 13-11: Recovery to Bulk Concentrate – Supergene



Source: Ausenco, 2023.

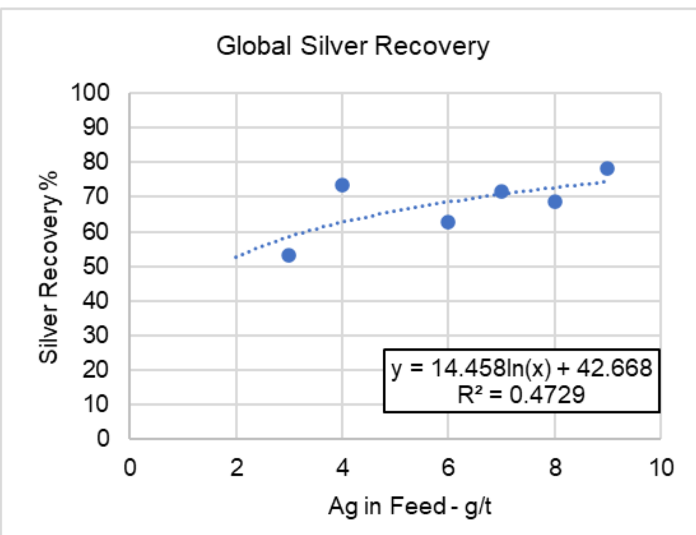
Figure 13-12: Recovery to Bulk Concentrate – Hypogene





Source: Ausenco, 2023.

Figure 13-13: Recovery Curve – Silver



Source: Ausenco, 2023.

Table 13-15: Recovery Equations to Final Concentrates

Metal	Supergene deposit	Hypogene deposit
Copper	Rec = 4.20*ln(Cu %) + 87.73	Rec = 9.62*ln(Cu %) + 95.36
Molybdenum	Rec = 1.26*ln(Mo %) + 75	Rec = 8.77*ln(Mo %) + 109.1
Silver	Rec = 14.46*ln(Ag g/t) + 42.67	

13.9 Comments

A considerable collection of metallurgical testing has been completed on samples from the Berg deposit, between 11-15 years ago. The samples originated from 2007 and 2008 drill programs. The testwork appears to have been conducted on a mix of ½ drill core and supplemental crushed assay rejects. While ½ drill core would have been required for the SGS comminution testing, it is not clear how much of the metallurgical testing was completed on crushed assay rejects. Future metallurgical testing should be conducted on ½ drill core samples.

The hypogene materials appear to respond to beneficiation by froth flotation like typical copper porphyry deposits. Controlling pyrite throughout the process will generally be the main concern in developing suitable process conditions. The body of testwork completed utilized significant dosages of a non-selective strong xanthate collector, PAX, which suggests that there is opportunity to optimize pulp chemistry. Improving metallurgical performance of supergene material will require additional testwork, which needs to better characterize the mineral composition and texture. An improved understanding of the extent of this mineralization will assist in developing a suitable processing strategy.

Two concentrates produced in the 2008 metallurgical test program were analyzed for minor elements. The only deleterious element detected that could be above penalty levels was fluorine in the supergene concentrate. It is not certain if this would result in any concentrate marketing penalties. Analysis of additional concentrates is recommended.

14 MINERAL RESOURCE ESTIMATES

14.1 Summary

An updated mineral resource estimate ("MRE") has been completed on the Berg deposit with block model estimation performed by Sue Bird, P.Eng., of MMTS, an independent Qualified Person as defined by NI 43-101. The MRE benefits from 2,855 metres of new drilling completed by Surge in 2021 and 7,261 new gold assays collected by Surge from historical core and pulp samples during 2022 and 2023. Improved metallurgical recovery assumptions have also been incorporated based on an extensive review of historical metallurgical testwork by Ausenco and Surge.

14.2 Mineral Resource Estimate

The MRE has an effective date of June 7, 2023, and is summarized in Table 14-1 below. The resource is constrained by an open pit with a "reasonable prospect of eventual economic extraction" using a cut-off of C$8.50/t and the parametres as defined in the notes to Table 14-1. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

The Net Smelter Return (NSR) equations and metallurgical recovery formulae are summarized in Section 14.13. The copper equivalent values (CuEq) are calculated from the NSR.

There are no other known factors or issues that materially affect the MRE other than normal risks faced by mining projects in the province of British Columbia, Canada, in terms of environmental, permitting, taxation, socio-economic, marketing, and political factors.

Table 14-1: Summary of the Mineral Resource Estimate at a C$8.50 NSR Cut-off

Zone	Class	Tonnage (Mt)	Grades - In situ						Metal - In situ				
			NSR ($/t)	Cu (%)	Mo (%)	Ag (g/t)	Au (g/t)	CuEq (%)	CuEq (Mlbs)	Cu (Mlbs)	Mo (Mlbs)	Ag (Moz)	Au (koz)
Supergene	Measured	14	43.03	0.39	0.03	5.64	0.04	0.55	169	120	8	3	18
	Indicated	227	32.60	0.29	0.02	5.37	0.03	0.42	2,095	1,443	107	39	224
	M+I	**241**	**33.20**	**0.29**	**0.02**	**5.39**	**0.03**	**0.43**	**2,264**	**1,564**	**115**	**42**	**242**
	Inferred	42	18.12	0.17	0.01	3.26	0.02	0.23	214	160	8	4	29
Hypogene	Measured	19	35.02	0.26	0.04	4.60	0.03	0.46	197	110	16	3	16
	Indicated	743	28.18	0.21	0.03	4.37	0.02	0.37	6,073	3,399	500	104	481
	M+I	**762**	**28.35**	**0.21**	**0.03**	**4.38**	**0.02**	**0.37**	**6,271**	**3,508**	**516**	**107**	**497**
	Inferred	500	22.91	0.17	0.03	3.75	0.02	0.30	3,322	1,885	280	60	255
Oxides	Measured	0.2	18.39	0.14	0.02	3.37	0.03	0.24	1	1	0	0	0
	Indicated	5.6	17.19	0.13	0.01	5.13	0.03	0.22	27	16	2	1	4
	M+I	5.8	**17.24**	**0.13**	**0.01**	**5.06**	**0.03**	**0.22**	**28**	**17**	**2**	**1**	**5**
	Inferred	0.1	17.87	0.12	0.01	7.53	0.02	0.23	1	0	0	0	0
Total	Measured	34	38.22	0.31	0.03	5.02	0.03	0.50	368	230	24	5	34
	Indicated	976	29.15	0.23	0.03	4.61	0.02	0.38	8,197	4,859	609	145	709
	M+I	**1,009**	**29.45**	**0.23**	**0.03**	**4.62**	**0.02**	**0.38**	**8,564**	**5,089**	**633**	**150**	**744**
	Inferred	542	22.54	0.17	0.02	3.71	0.02	0.30	3,536	2,045	288	65	284

Notes:

1. The Mineral Resource estimate has been prepared by Sue Bird, P.Eng., an independent Qualified Person.
2. Resources are reported using the 2014 CIM Definition Standards and were estimated in accordance with the CIM 2019 Best Practices Guidelines.
3. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
4. The Mineral Resource has been confined by a “reasonable prospects of eventual economic extraction” pit using the following assumptions:
    a. Cu price of US$4.00/lb, Mo price of US$15.00/lb, Au price of US$1,800/oz, Ag price of US$23/oz at an exchange rate of 0.77 US$ per C$;
    b. 96.5% payable for Cu, 90.0% payable for Ag and Au, 99.0% payable for Mo, 1% unit deduction for Cu and Mo, Cu concentrate smelting of US$75/dmt, US$0.08/lb Cu refining, US$1.30/lb Mo refining, transport and offsite costs of US$100/wmt and US$130/wmt for Cu and Mo concentrates respectively, a 1.0% NSR royalty, and uses average recoveries for Cu, Mo, Ag, and Au of 82%, 70%, 66% and 55% respectively in the supergene & leach cap and of 80%, 78%, 64% and 55% respectively in the hypogene.
    c. Within oxides and supergene; CuEq = NSR/78.9, within sulphides; CuEq = NSR/75.99.
5. Mining costs of C$2.50/t mineralized material, C$2.50/t waste.
6. Processing, G&A and tailings management costs of C$8.50/t.
7. Pit slopes of 45 degrees.
8. Numbers may not sum due to rounding.

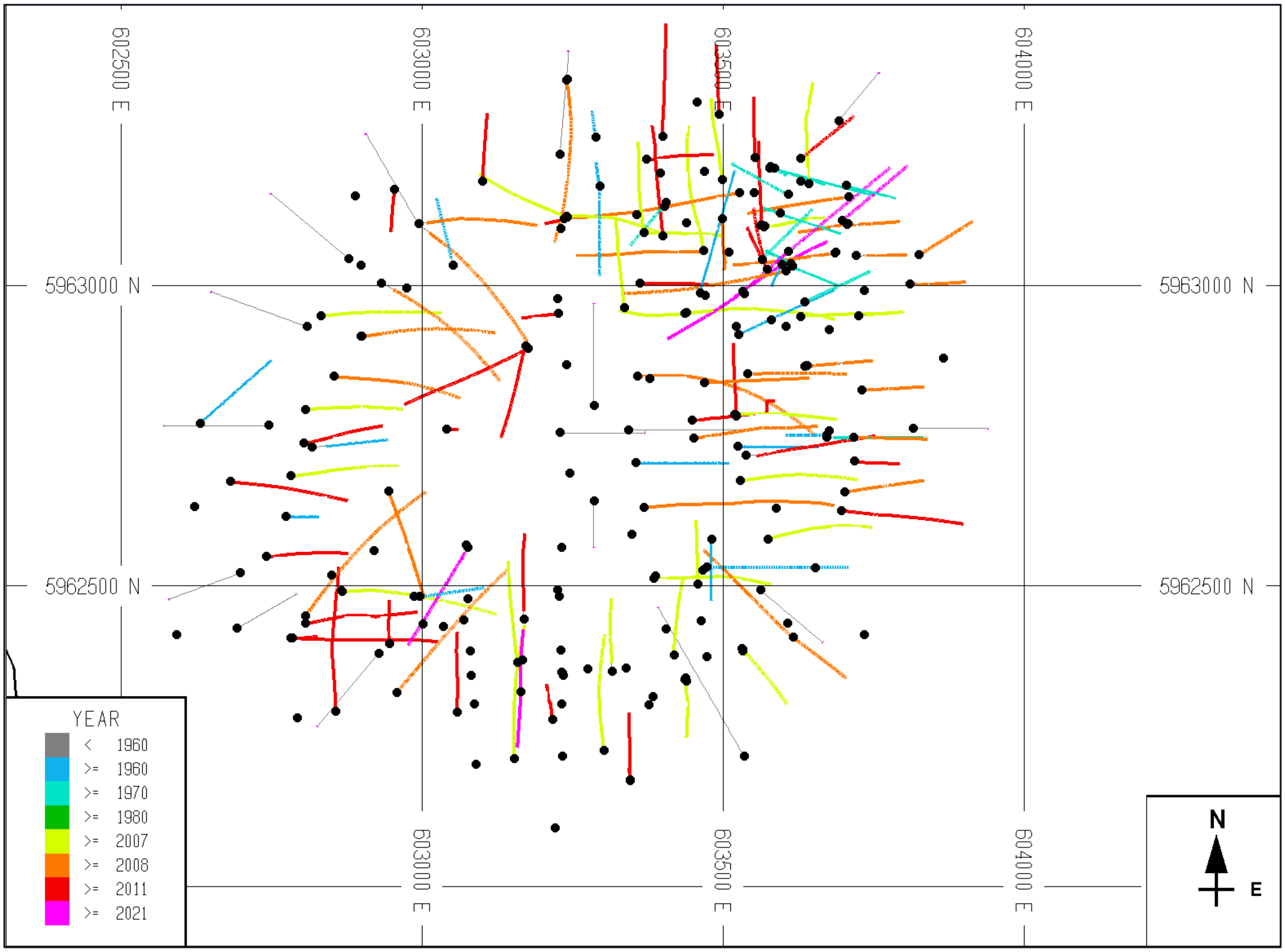
14.3 Key Assumptions and Data used in the Resource Estimate

A summary of the drillholes used for the resource estimate of the Berg deposit is summarized in Table 14-2. Figure 14-1 is a plan map of all drillholes. Historical drillholes have been validated as discussed in Section 12 of this report and were used for the interpolations. Only data from 2007 onwards (64% of total assayed length) has been used in the Classification of the resource.

Table 14-2: Summary of Drillholes used in the MRE by Year

Year	DH Length (m)	# DHs	Assay Length (m)	% of Total Assayed
1964	969.7	7	830.4	1.5%
1965	1,236.1	6	1,144.4	2.1%
1966	1,680.2	10	1,621.4	3.0%
1967	3,097.0	20	2,816.9	5.2%
1971	664.8	3	627.0	1.1%
1972	4,928.9	24	5,724.7	10.5%
1973	2,987.2	10	2,978.2	5.4%
1974	1,843.8	19	1,759.9	3.2%
1975	1,067.4	8	1,024.4	1.9%
1980	1,099.1	8	965.9	1.8%
2007	11,288.9	29	10,972.9	20.1%
2008	11,659.6	31	11,251.5	20.6%
2011	10,677.9	36	10,299.8	18.8%
2021	2,855.1	9	2,651.8	4.9%
Grand Total	**56,055.6**	**220**	**54,669.3**	**100%**

Figure 14-1: Drillholes by Year

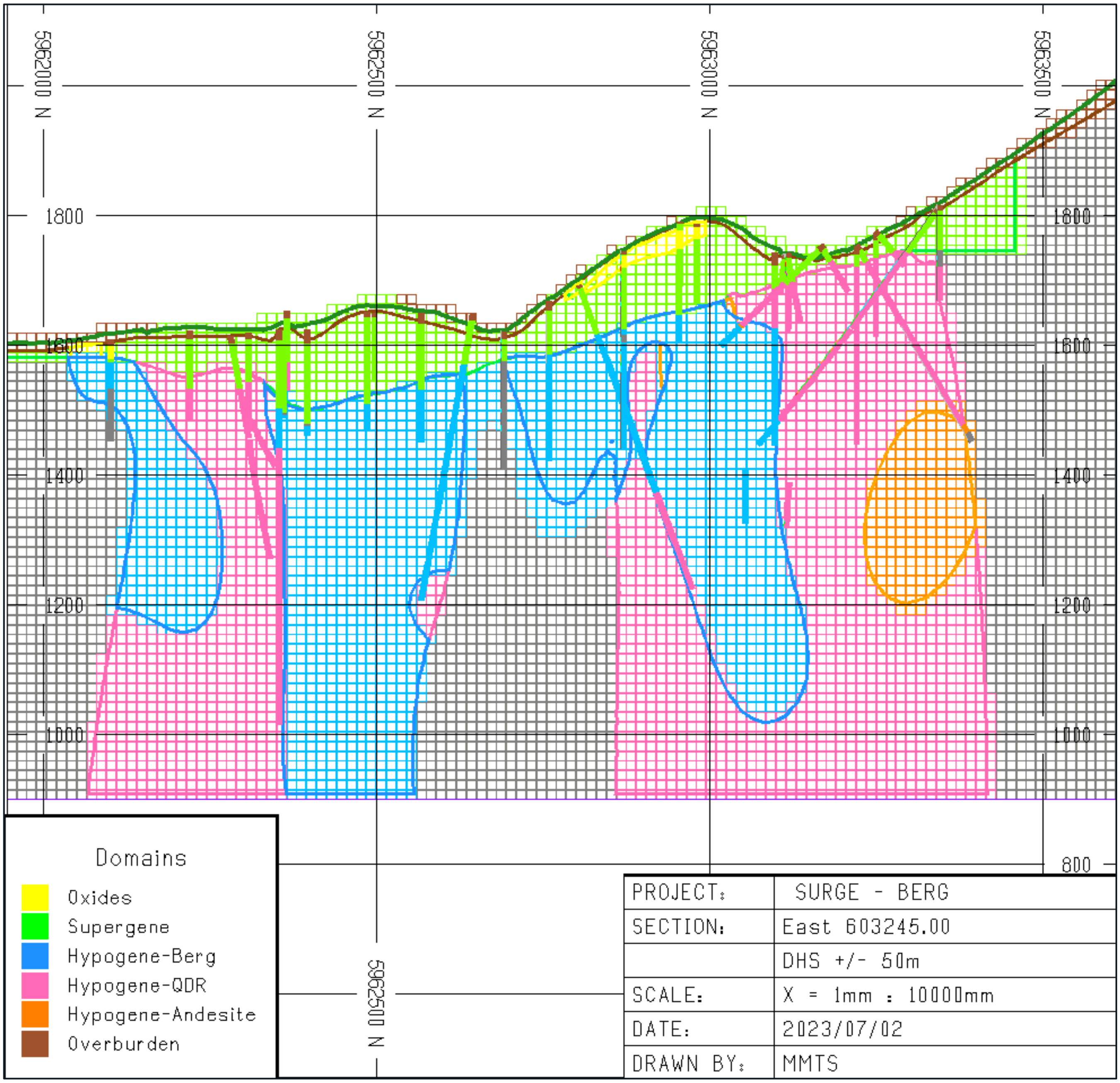


Source: Moose Mountain, 2023.

14.4 Domains

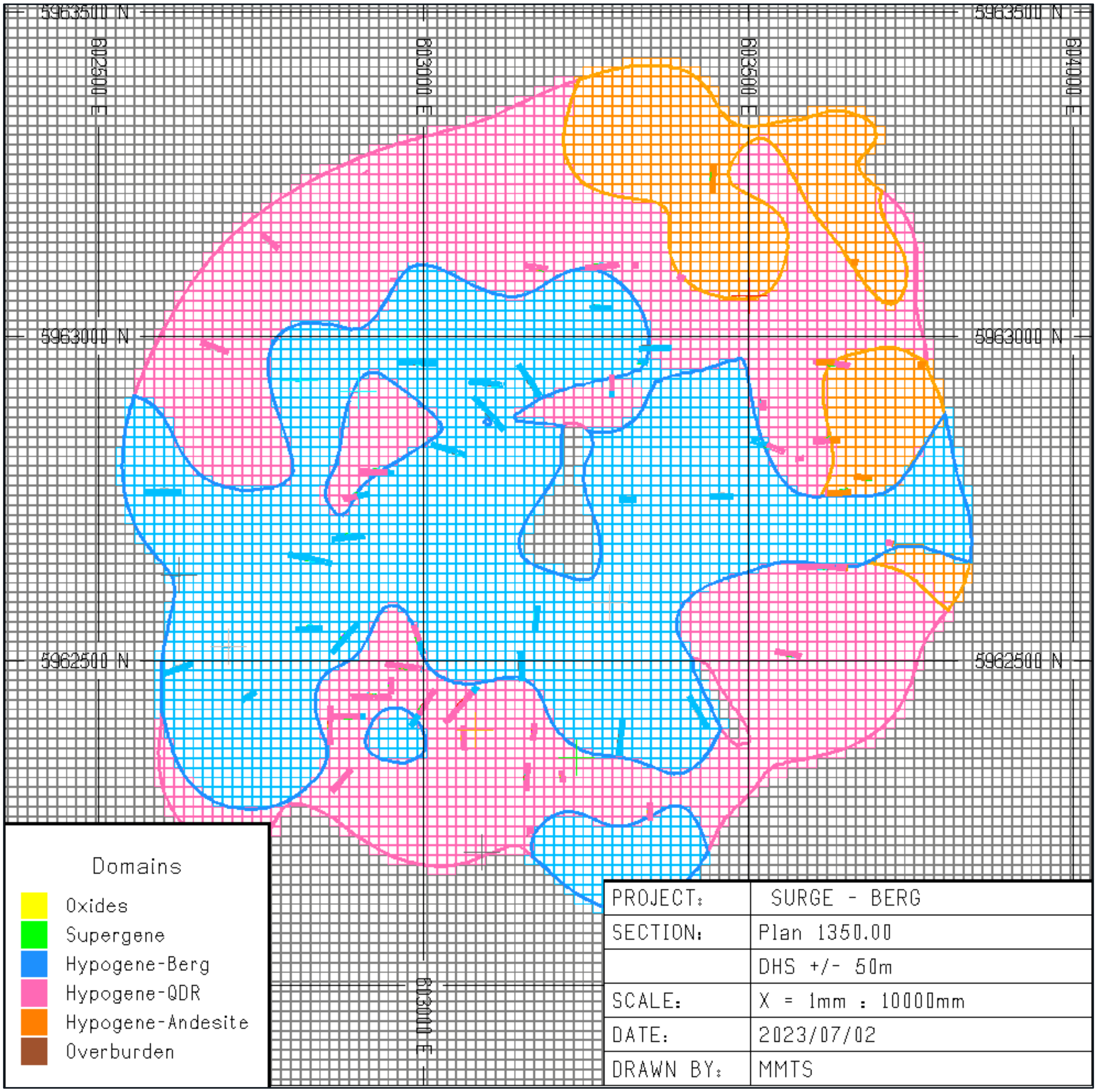
The domains modelled include the overburden, the oxide, the supergene enrichment layer, and within the hypogene zone lithologies including the Berg Stock, QDR and Andesite as illustrated in Figure 14-2.

Figure 14-2: Modelled Domains in Section



Source: Moose Mountain, 2023.

Figure 14-3: Modelled Domains in Plan



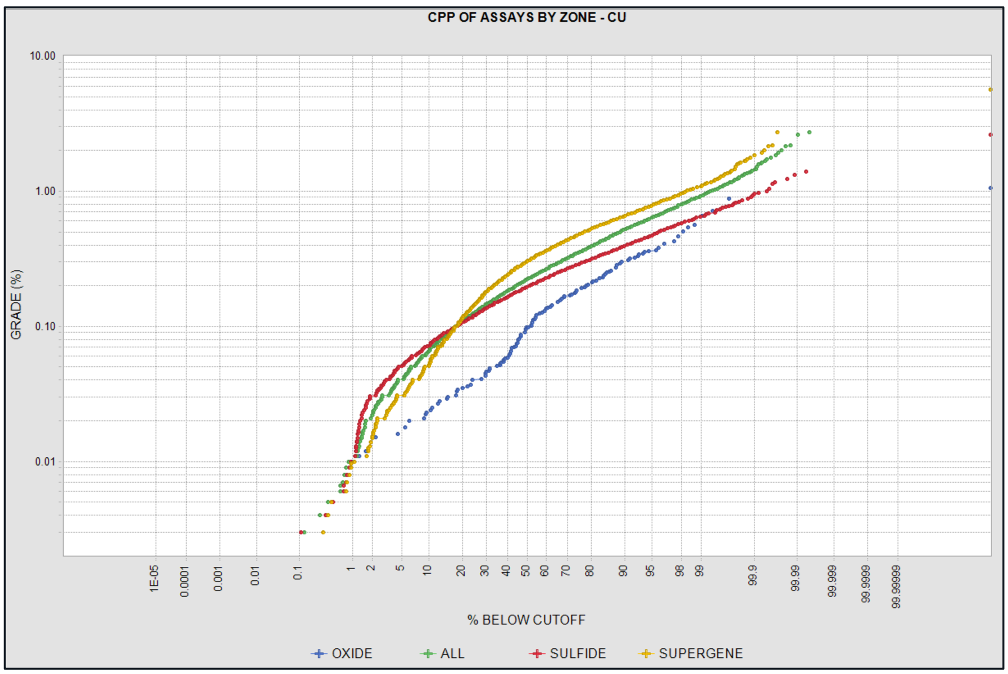
Source: Moose Mountain, 2023.

14.5 Assays and Composite Statistics

The assay statistics were examined using boxplots, histograms, and cumulative probability plots (CPPs). Figure 14-4 through Figure 14-7 are CPPs for the Cu, Mo, Ag and Au by oxidation zone, respectively. The CPPs indicate no significant outlier populations, with the Au plot illustrating potentially two populations above and below 100ppb. This higher occurrence of Au grades is seen to be concentrated in the north and within the supergene zone. Table 14-3 summarizes the assay statistics for each domain and shows reasonable Coefficient of Variations (C.V.s) for all domains and metals. The high C.V. for Ag is handled by compositing and during interpolations using outlier restrictions as summarized below.

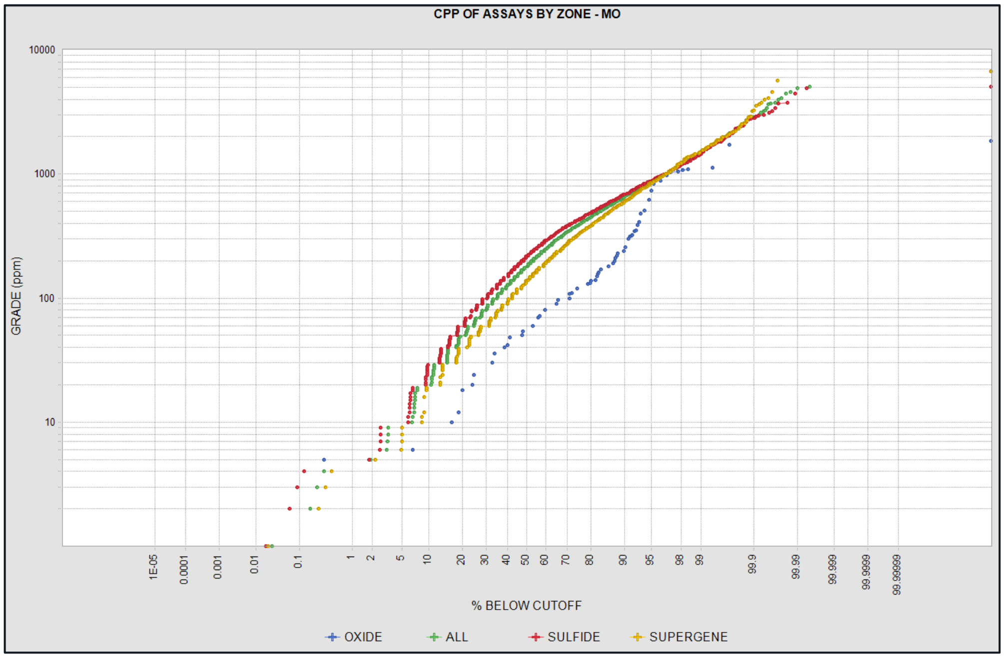
Based on this analysis, no capping has been done on the assays.

Figure 14-4: CPP of Assays - Cu



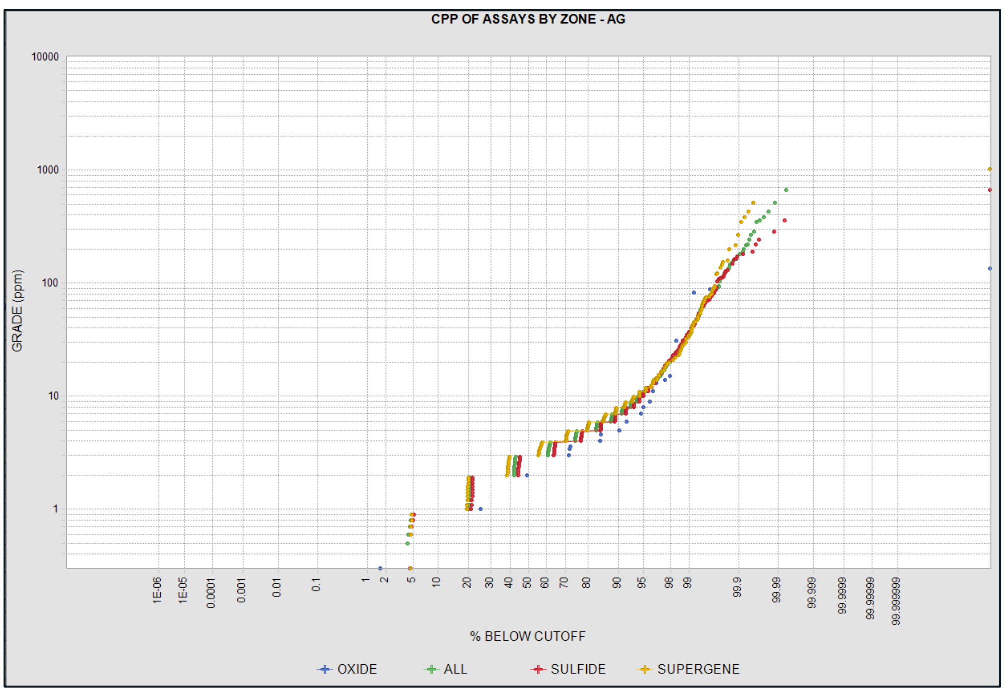
Source: Moose Mountain, 2023.

Figure 14-5: CPP of Assays - Mo



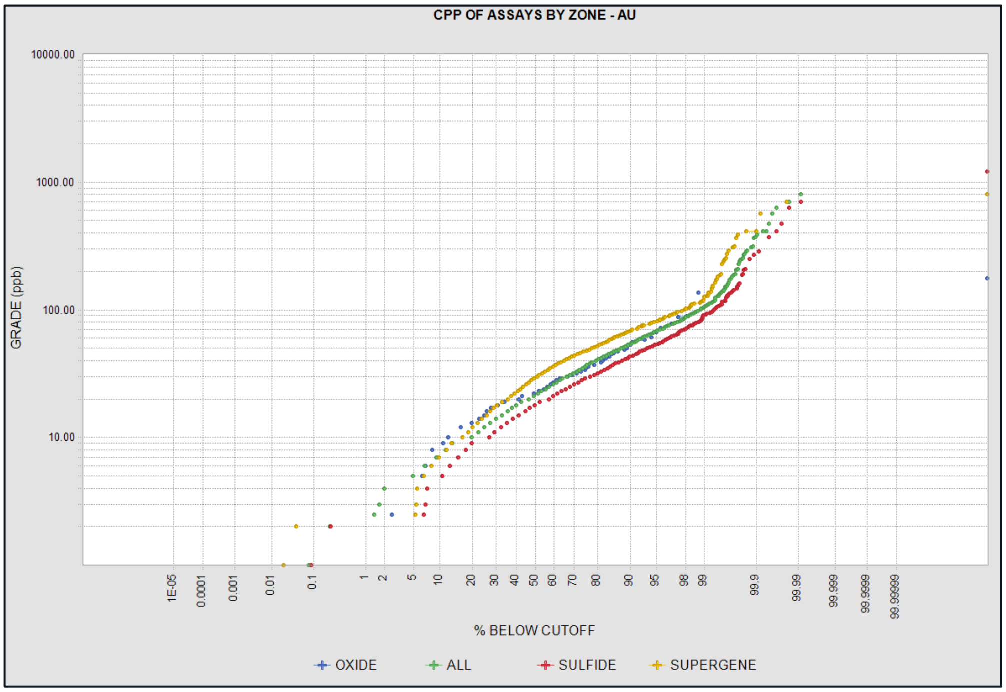
Source: Moose Mountain, 2023.

Figure 14-6: CPP of Assays - AG



Source: Moose Mountain, 2023.

Figure 14-7: CPP of Assays - Au



Source: Moose Mountain, 2023.

Table 14-3: Summary Statistics by Domain for Cu, Mo, Ag and Au

Parameter	Cu (%)					Mo (ppm)				
	Oxide	Supergene	Andesite	Berg	QDR	Oxide	Supergene	Andesite	Berg	QDR
# Samples	254	10,556	8,432	5,236	3,890	254	10,556	8,432	5,236	3,890
# Missing	3	257	496	611	9	3	257	496	611	9
Min	0.001	0.001	0.000	0.000	0.002	5.0	1.0	0.0	0.0	1.0
Max	1.053	5.640	1.320	1.010	2.630	1850.0	6740.0	5077.1	3416.7	4900.0
Wtd mean	0.152	0.343	0.240	0.148	0.280	130.8	240.1	344.4	284.6	265.3
Wtd CV	0.97	0.76	0.54	0.62	0.60	1.8	1.4	1.0	1.1	1.1
Parameter	Ag (ppm)					Au (ppb)				
	Oxide	Supergene	Andesite	Berg	QDR	Oxide	Supergene	Andesite	Berg	QDR
# Samples	213	7,134	6,939	4,490	3,590	152	4,831	5,814	2,913	2,586
# Missing	44	3,679	1,989	1,357	309	105	5,982	3,114	2,934	1,313
Min	0.3	0.3	0.0	0.0	0.3	2.5	1.0	0.0	0.0	1.0
Max	135.0	1020.0	357.0	670.0	131.0	137.0	800.0	1215.0	635.0	153.0
Wtd mean	4.7	5.0	4.5	4.3	4.7	28.0	37.2	23.7	14.9	30.9
Wtd CV	2.6	3.8	2.3	4.4	1.5	0.7	0.9	1.3	1.5	0.6

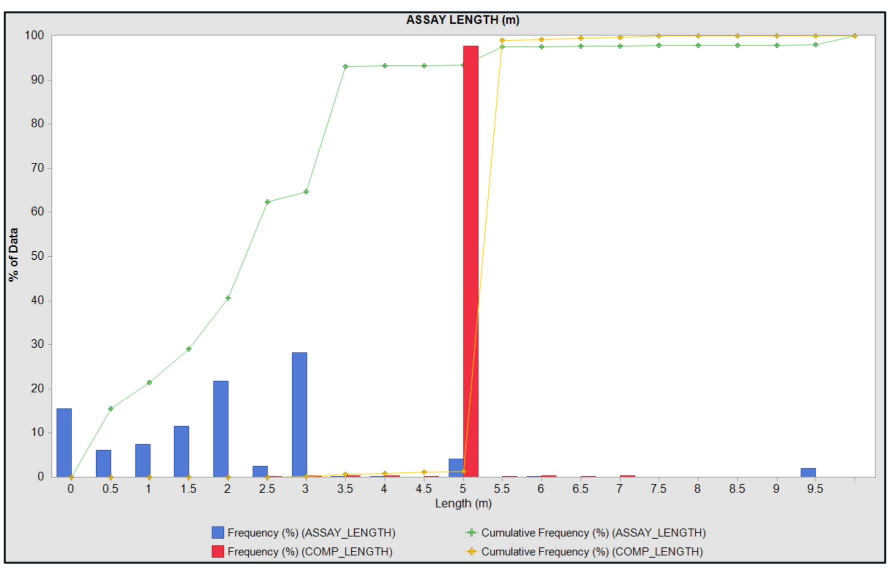
14.5.1 Compositing

Compositing has been done in 5 m lengths, which is longer than the large majority of assay lengths, as illustrated in Figure 14-8. Lengths shorter than 2.5 m have been combined with the prior composite. The domain boundaries have been honoured during compositing. Table 14-4 summarizes and compares the assay and composite statistics showing that the weighted average grades for each metal have changed very little during compositing and therefore no bias has been introduced. This table also illustrates that the Coefficient of Variation of the composites for each metal remains low.

Table 14-4: Summary of Assay and Composite Statistics

Source	Parameter	Cu (%)	Mo (ppm)	Ag (ppm)	Au (ppb)
Assays	Num Samples	28,464	28,464	22,415	16,309
	Num Missing	338	338	6,387	12,493
	Min	0.001	1.0	0.3	1.0
	Max	5.640	6740.0	1020.0	1215.0
	Wtd Mean	0.267	280.6	4.6	27.3
	Wtd C.V.	0.76	1.17	3.24	1.10
Composites	Num Samples	10,492	10,492	7,137	5,480
	Num Missing	496	496	3,851	5,508
	Min	0.001	1.6	0.3	2.0
	Max	3.046	3376.2	481.6	522.4
	Wtd Mean	0.267	280.1	4.6	26.9
	Wtd C.V.	0.71	1.02	2.32	0.89
Difference (%)		0.00%	-0.19%	0.00%	-1.45%

Figure 14-8: Histograms of Assay and Composite Length



Source: Moose Mountain, 2023.

A summary of the outlier restrictions used during interpolations is summarized in Table 14-5. This outlier has been applied for distances beyond 5 m both to reduce the grade variability and for the interpolated tonnages and grades at all cut-offs to validate the data, and do not have any bias.

Table 14-5: Summary of Outlier Restrictions

Element	Units	Outlier Restriction Value	Distance (m)
Cu	%	2	5
Mo	ppm	2000	5
Ag	ppm	300	5
Au	ppb	1500	5

14.6 Bulk Density Assignment

The bulk density measurements have been assigned by domain based on over 3,000 measurements made on the core as summarized in Table 14-6.

Table 14-6: Summary of Bulk Density by Domain

Parameter	Oxide	Supergene	Andesite	Berg	QDR	Overburden	Outside domains
Num Samples	223	673	985	632	502	12	138
Num Missing	1517	9079	7220	4166	3262	533	2664
Min	2.21	1.53	1.98	1.53	1.72	2.38	2.2
Max	3.29	4.34	4.01	2.96	4.33	2.81	2.97
Weighted mean	2.62	2.60	2.75	2.63	2.72	2.56	2.73
Weighted CV	0.0388	0.0688	0.0453	0.038	0.0474	0.044	0.0317

14.7 Variography

Variograms parametres are summarized in Table 14-7. The rotation values are the rotation of the principal axes the Y-axis, X-axis, and Z-axis, respectively, using the right-hand rule with positive rotation upwards.

Table 14-7: Summary of Variogram Parametres

Parameter	Au	Ag	Cu	Mo
ROTY-1	30	50	15	70
ROTX-1	-45	0	0	60
ROTZ-1	40	15	5	10
ROT-Y-2	75	0	315	310
ROT-X-2	0	-25	-5	60
ROT-Z-2	90	0	-70	0
Nugget	0.11	0.11	0.11	0.11

Parameter	Au	Ag	Cu	Mo
Sill1	0.55	0.85	0.45	0.49
Sill2	0.35	0.04	0.44	0.4
Range1-Y	40	25	110	35
Range1-X	25	15	50	10
Range 1-Z	15	20	25	20
Range2-Y	125	250	250	250
Range2-X	250	115	225	155
Range2-Z	60	250	165	250

14.8 Block Modelling

Block dimensions are 5 m x 5 m x 5 m with the extent of the block model summarized in Table 14-8.

Table 14-8: Berg Model Extents

Direction	Minimum	Maximum	Extent	Block size	# Blocks
Easting	601,700	605,000	3,300	15	220
Northing	5,961,450	5,964,825	3,375	15	225
Elevation	900	2,280	1,380	15	92

The model is a multiple percent model with the with the domains coded with up to two domains per block. Figure 14-2 and Figure 14-3illustrated the domain coding in section and plan respectively.

Interpolation has been done using Ordinary Kriging (OK) in all cases with hard domain boundaries. Two domains per block have been modelled with the total block grades calculated as the volume weighted mean within each domain within the block.

Search parameter orientations varied circularly the centre of the deposit to mimic the cylindrical nature of the mineralization with the interpolations done in four passes. The restrictions on search distances and composite selection for each of the four passes of the interpolations are given in Table 14-9. The interpolations have also restricted the high-grade outliers to ensure that metal content is not over-estimated in any domains. The outlier values are summarized in Table 14-5. Composite values above the Outlier Restricted values are used in the interpolations only up to 5m from the composite.

Table 14-9: Summary of Search Distances and Composites Selection

PASS	Distance (m)			Sample Selection			
	Y	X	Z	Min Comps	Max. Comps	Max / Hole	Max / Quad
1	63	56	41	2	8	2	2
2	125	113	83	2	8	2	2
3	188	169	124	2	8	2	2
4	250	225	165	2	8	2	2

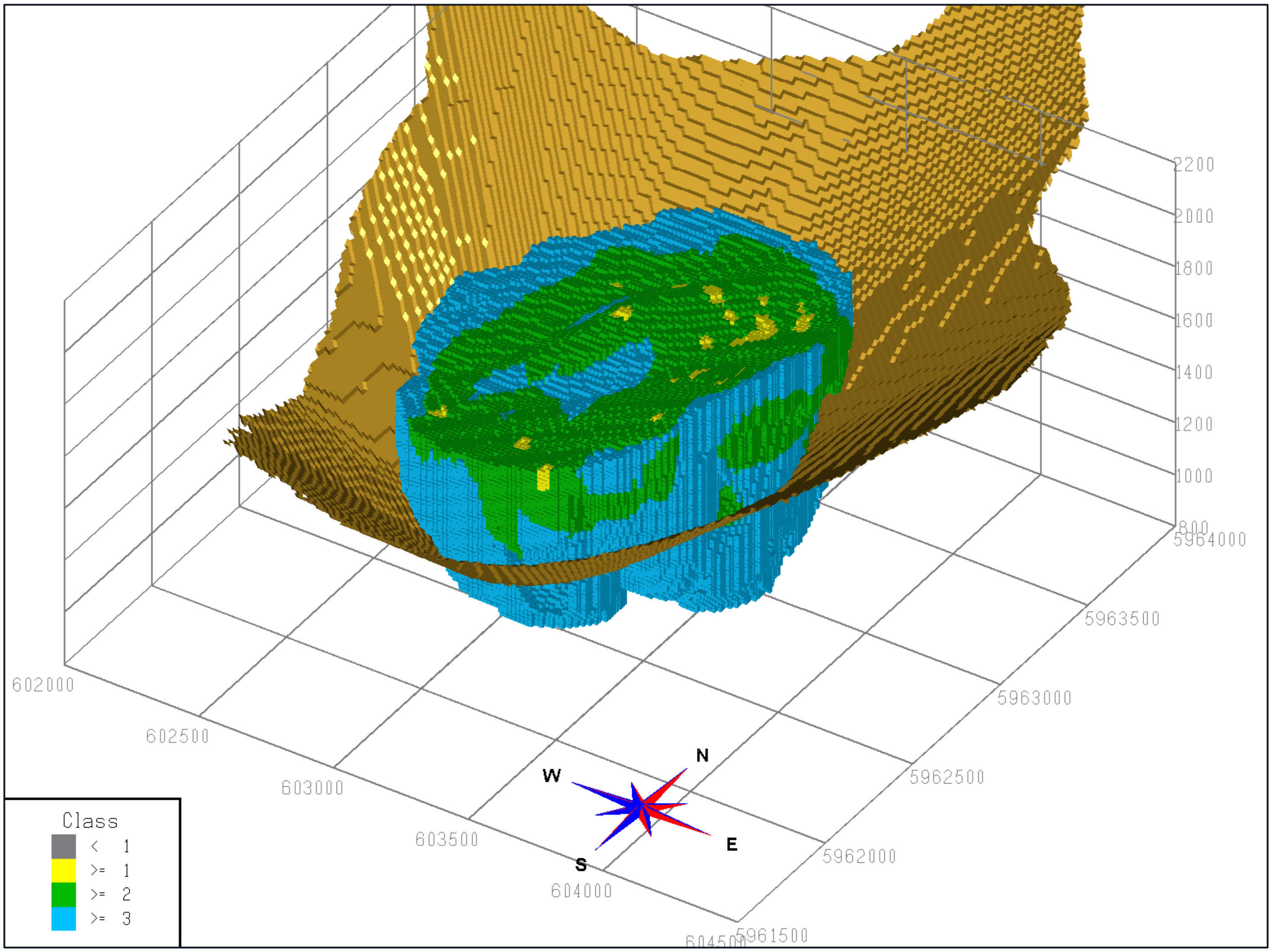
14.9 Classification

The resource estimate is classified using only holes drilled since 2007. Classification criteria are summarized in Table 14-10 with Measured =1, Indicated=2, and Inferred=3. Distances used to define the Classification are based on the variography. Figure 14-9 illustrates the Classification in three dimensions with the resource pit also shown.

Table 14-10: Classification Criteria

Class	Criteria	Distance (m)	
		Average	to Furthest DH
Measured	Closest 2 Drillholes	<= 30	<= 50
	Closet 3 Drillholes	<= 40	<= 57
Indicated	Closest 2 Drillholes	<= 120	<= 170
	Closet 3 Drillholes	<= 140	<= 200
Inferred	All other blocks within the domains and interpolated with Cu	Range of the Cu Variogram	

Figure 14-9: Three-dimensional View of the Resource Pit with the Classification



Source: Moose Mountain, 2023.

14.10 Model Validation

14.10.1 Global Grade Validation

Resource validation was completed to ensure there was no global bias compared NN grades to those of the final grade interpolation at zero cut-off. Table 14-11 and Table 14-12. Figure 14-12 summarizes this comparison, illustrating that the difference between the de-clustered composite data (NN model) and the final modelled grades is minimal.

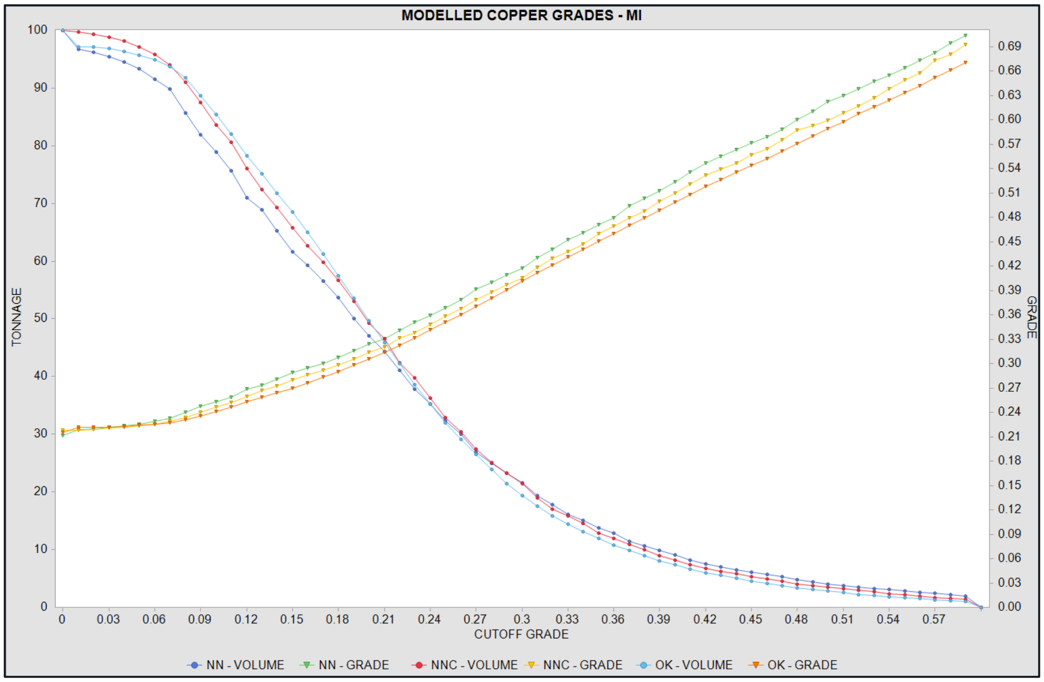
Table 14-11: Summary of Model Grade Comparison with De-Clustered Comp

Model	Parameter	Cu	Mo	Ag	Au
OK Model	Num Samples	126,760	126,760	126,760	126,760
	# Missing	0	0	0	0
	Min	0	0	0	0
	Max	1.514	1,596.400	123.900	250.900
	Wtd mean	0.219	268.570	4.390	22.210
	Wtd CV	0.536	0.740	1.280	0.640
NN Model	Num Samples	126,760	126,760	126,760	126,760
	# Missing	0	0	0	0
	Min	0	0	0	0
	Max	1.710	2,299.000	199.400	232.100
	Wtd mean	0.216	264.830	4.730	21.960
	Wtd CV	0.640	0.920	1.940	0.860
Difference (%)		1.5%	1.4%	-7.2%	1.1%

14.11 Grade-Tonnage Curves

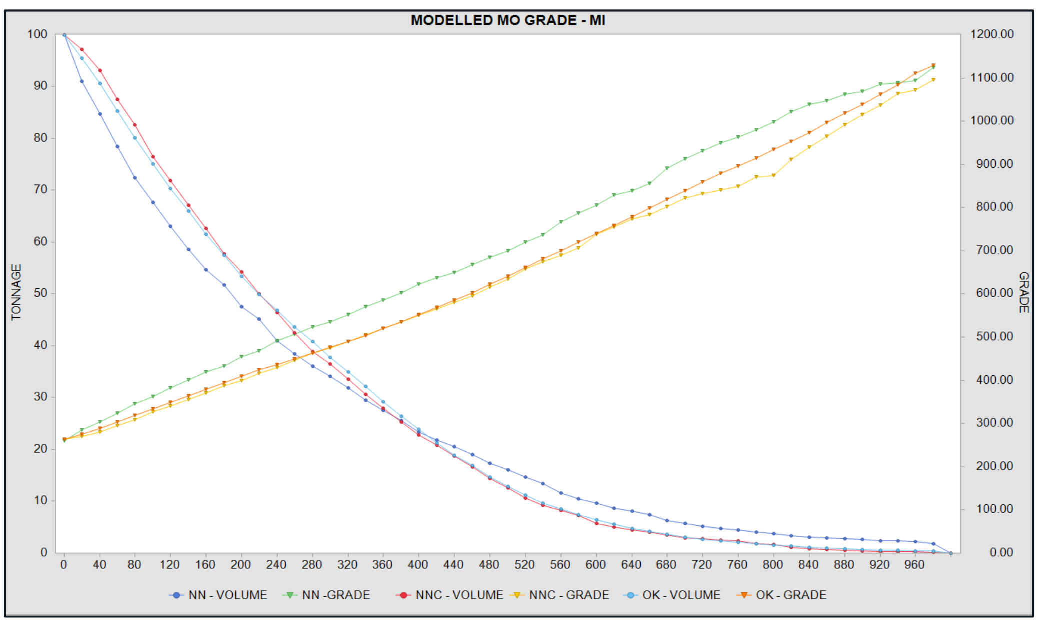
Grade–tonnage curves have been created to compare interpolated grades with the de-clustered composite grades throughout the grade distribution. Figure 14-10 through Figure 14-13 illustrate this comparison for Cu, Mo, Ag and Au respectively, showing increased smoothing (reduced grades and increased tonnage) compared to the NN grade curves. The NN model has also been corrected for Volume-Variance affects using the Indirect Lognormal correction (ILC) to account for the reduction in variance from composite sample size to block size, as illustrated in the Grade-Tonnage figures. The final modelled grades (labelled OK in the figures) are at or below the Volume-Variance corrected Grade-tonnage curves (labelled NNC) throughout the grade distribution.

Figure 14-10: Grade-Tonnage Curve Comparison for Cu



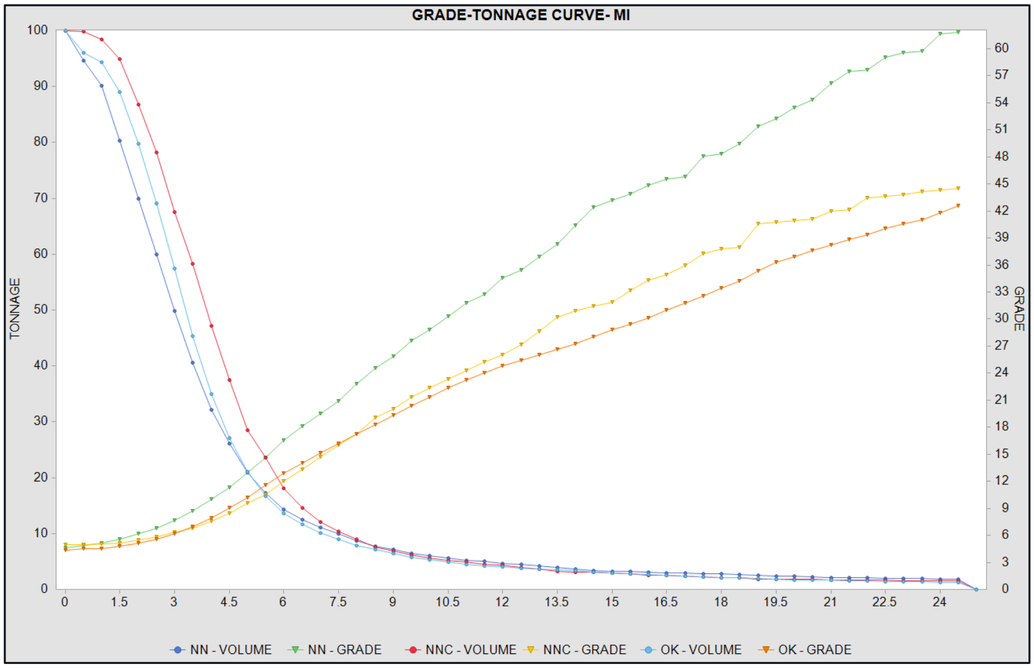
Source: Moose Mountain, 2023.

Figure 14-11: Grade-Tonnage Curve Comparison for Mo



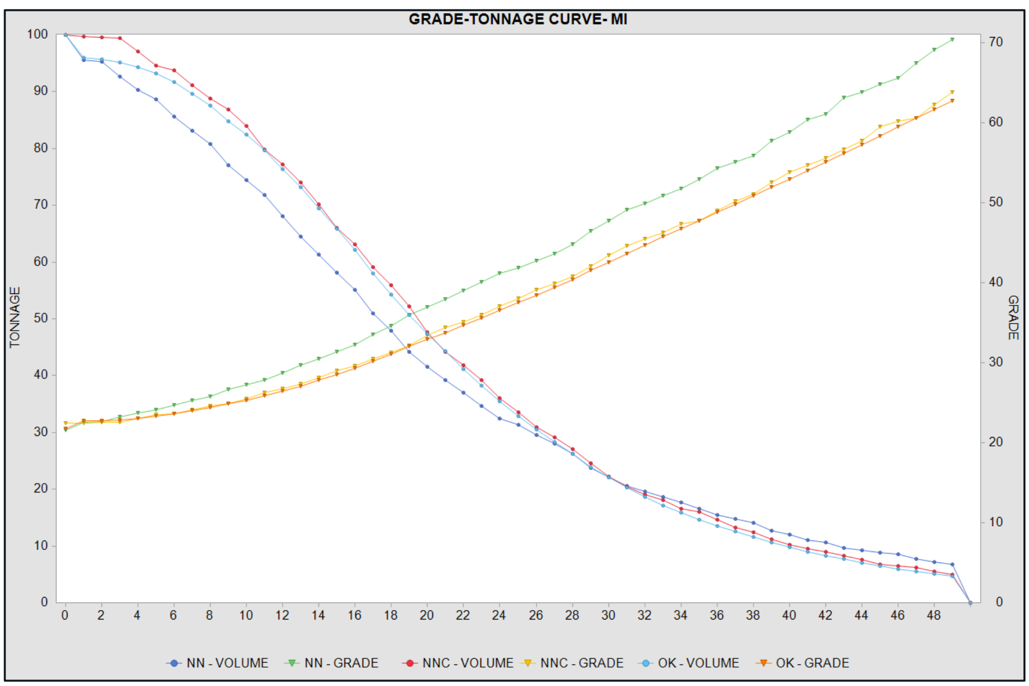
Source: Moose Mountain, 2023.

Figure 14-12: Grade-Tonnage Curve Comparison for Ag



Source: Moose Mountain, 2023.

Figure 14-13: Grade-Tonnage Curve Comparison for Au

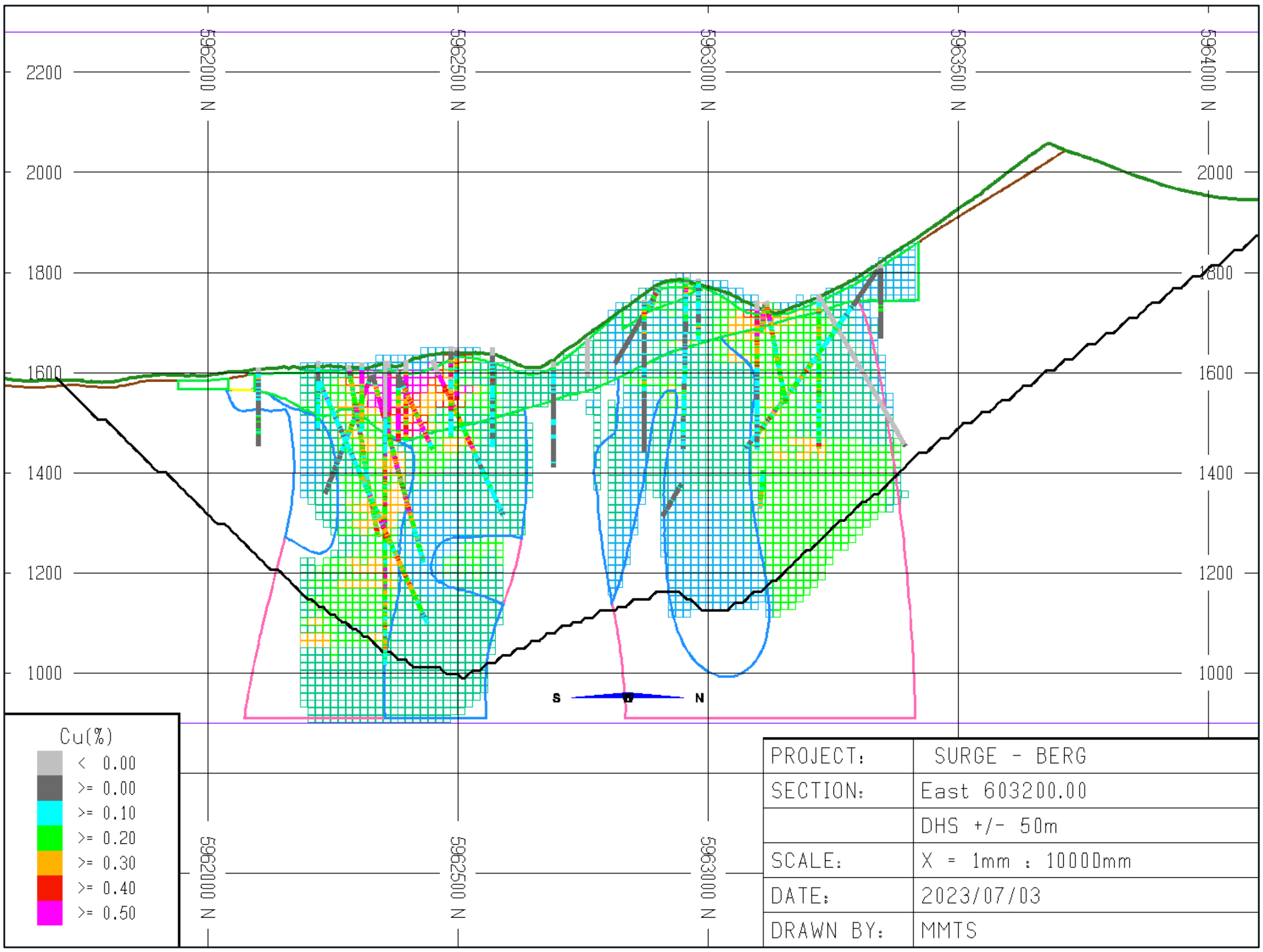


Source: Moose Mountain, 2023.

14.12 Visual Comparisons

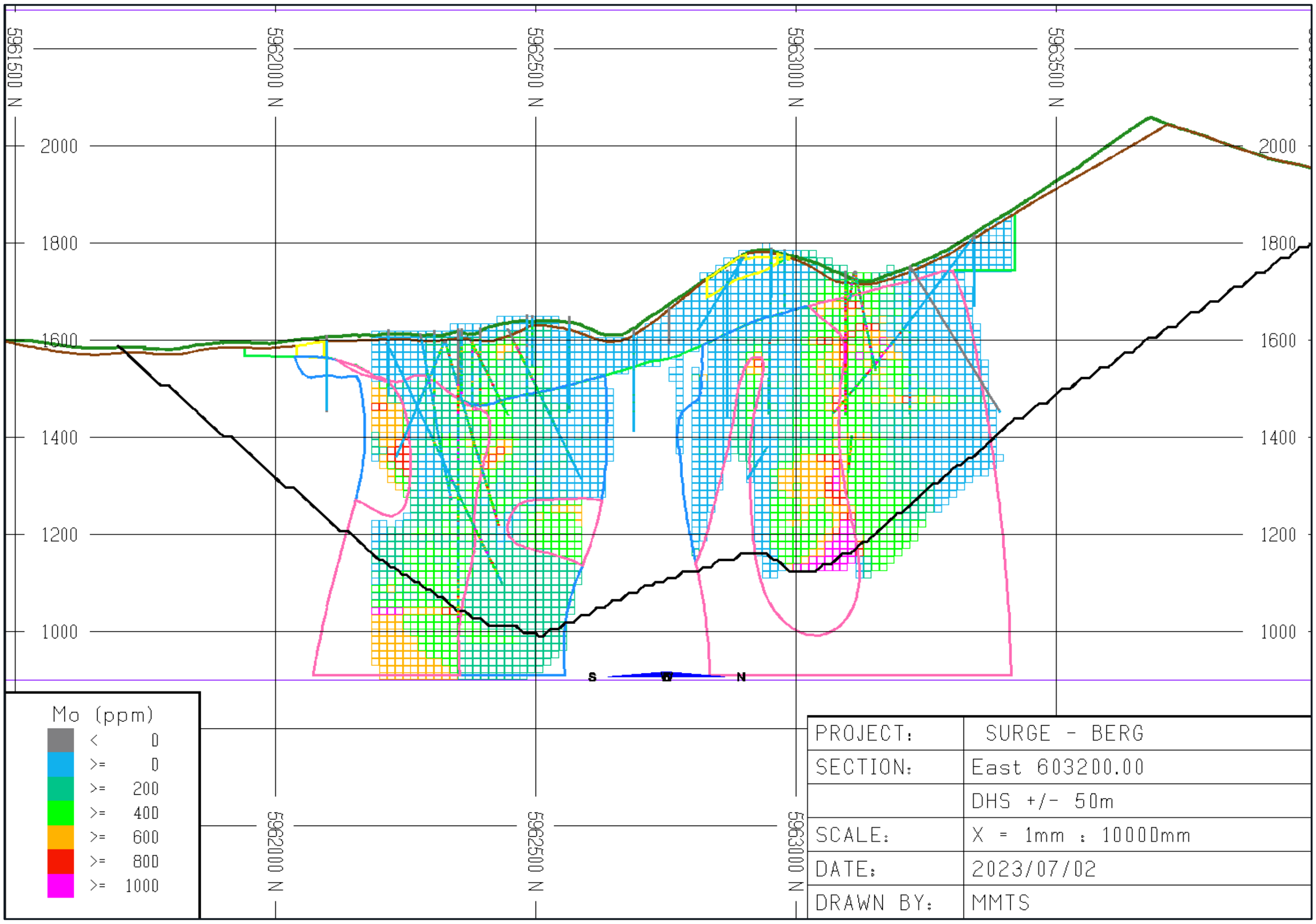
Further validation on local grade estimation has been done through visual comparisons of the modelled grades with the assay and composite grades in section, plan and through three-dimensional checks. Figure 14-14 through Figure 14-17 illustrate the block grades and assay grades in north-south cross-sections for Cu, Mo, Ag, and Au, respectively. The resource pit shape is also illustrated on the sections. Modelled grades show similar grade distributions and values throughout the model to that of the drillhole data.

Figure 14-14: Modelled Grades Compared to Assays – Cu



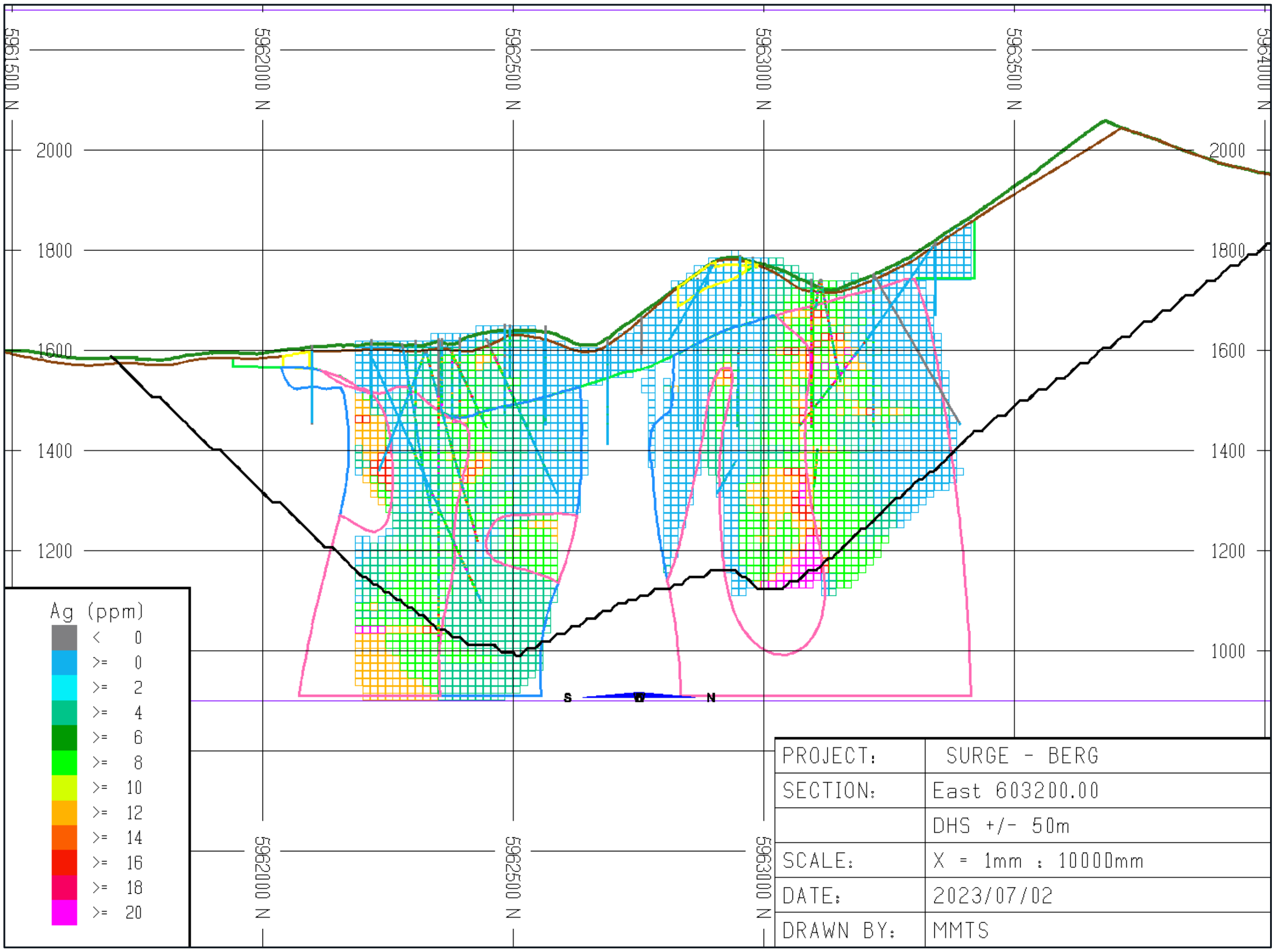
Source: Moose Mountain, 2023.

Figure 14-15: Modelled Grades Compared to Assays – Mo



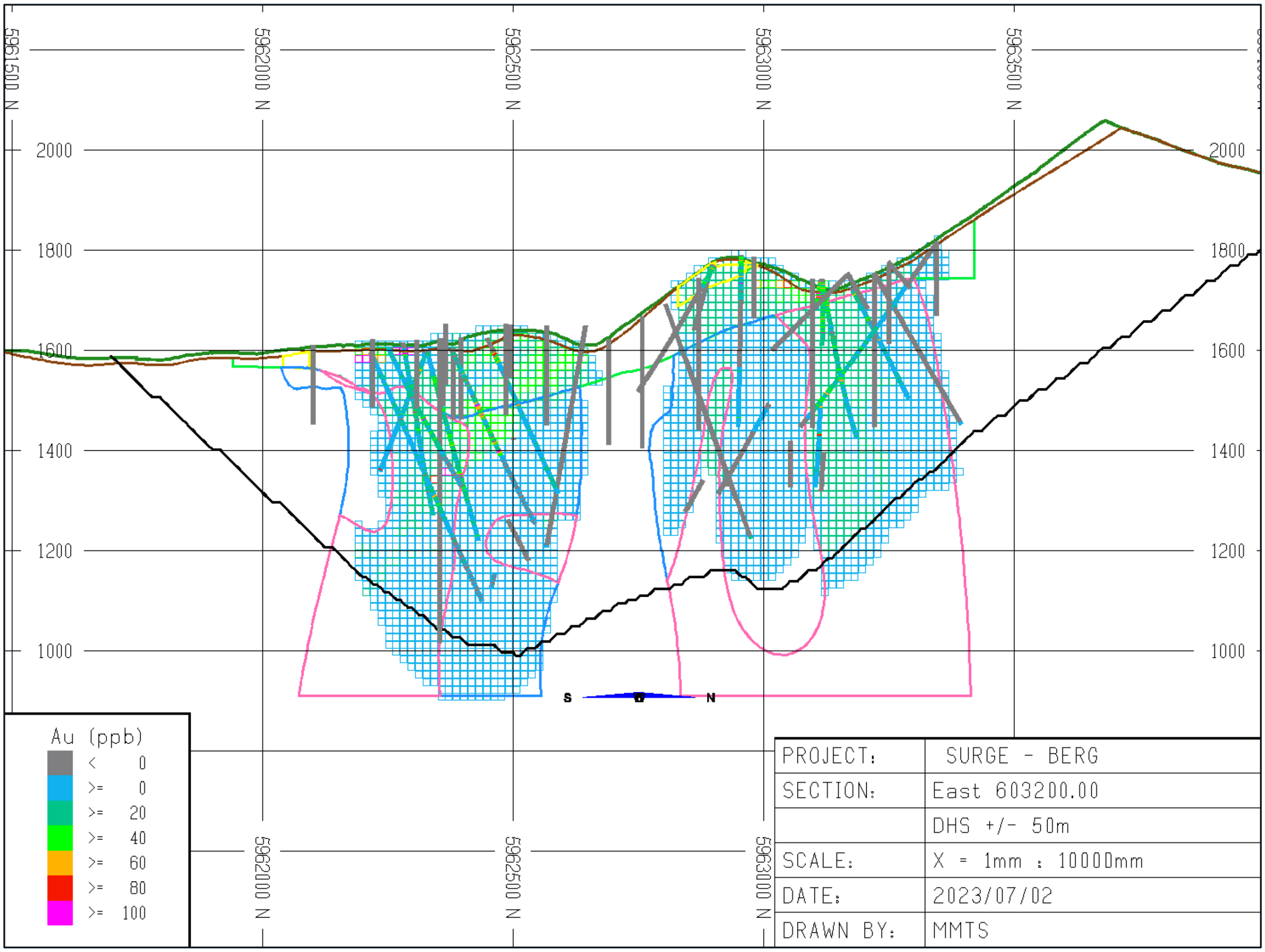
Source: Moose Mountain, 2023.

Figure 14-16: Modelled Grades Compared to Assays - Ag



Source: Moose Mountain, 2023.

Figure 14-17: Modelled Grades Compared to Assays – Au



Source: Moose Mountain, 2023.

14.13 Reasonable Prospects of Eventual Economic Extraction

Open pit resources are confined by a "reasonable prospects of eventual economic extraction" shape defined by a Lerchs-Grossman pit using the 100% case and the Net Smelter Prices (NSPs) which are the same as those used for the mining study of this report. Mining costs are based on studies within this report with open pit mining costs of C$2.50/t within both mineralized and waste material, and C$1.8/t overburden. All pit slopes are assumed to be 45 degrees for the Lerchs-Grossman pit.

Metal prices and smelter term inputs for the Net Smelter Price are summarized in Table 14-12.

Table 14-12: Summary of Net Smelter Term Values

Item	Unit
Copper Price	US$4.00/lb
Molybdenum Price	US$15.00/lb
Silver Price	US$23.00/oz
Gold Price	US$1,800.00/oz
US Exchange Rate	0.77 US$: 1 C$
Cu and Mo unit deduction	1.0%
Payable Copper	96.5%
Payable Molybdenum	99.0%
Payable Silver and Gold	90.0%
Concentrate Moisture	8%
Copper Concentrate Smelting	US$75/dmt
Copper Refining (includes Silver and Gold Refining)	US$0.075/lb
Molybdenum Refining	US$1.300/lb
Offsite Costs (Transport, Insurance)	US$100.00/wmt
Royalty	1.0%
Copper Net Smelter Price	C$4.31/lb
Molybdenum Net Smelter Price	C$16.96/lb
Silver Net Smelter Price	C$0.79/g or C$24/oz
Gold Net Smelter Price	C$61.53/g or C$1,914/oz

The NSR for each block is calculated as follows:

NSR= (Cu Grade* NSP for Cu * Cu Process Recovery * 2205 lb/t) + (Mo Grade* NSP for Mo * Mo Process Recovery * 2205 lb/t) + (Ag Grade * NSP for Ag * Ag Process Recovery) + (Au Grade * NSP for Au * Au Process Recovery)

14.13.1 Recoveries

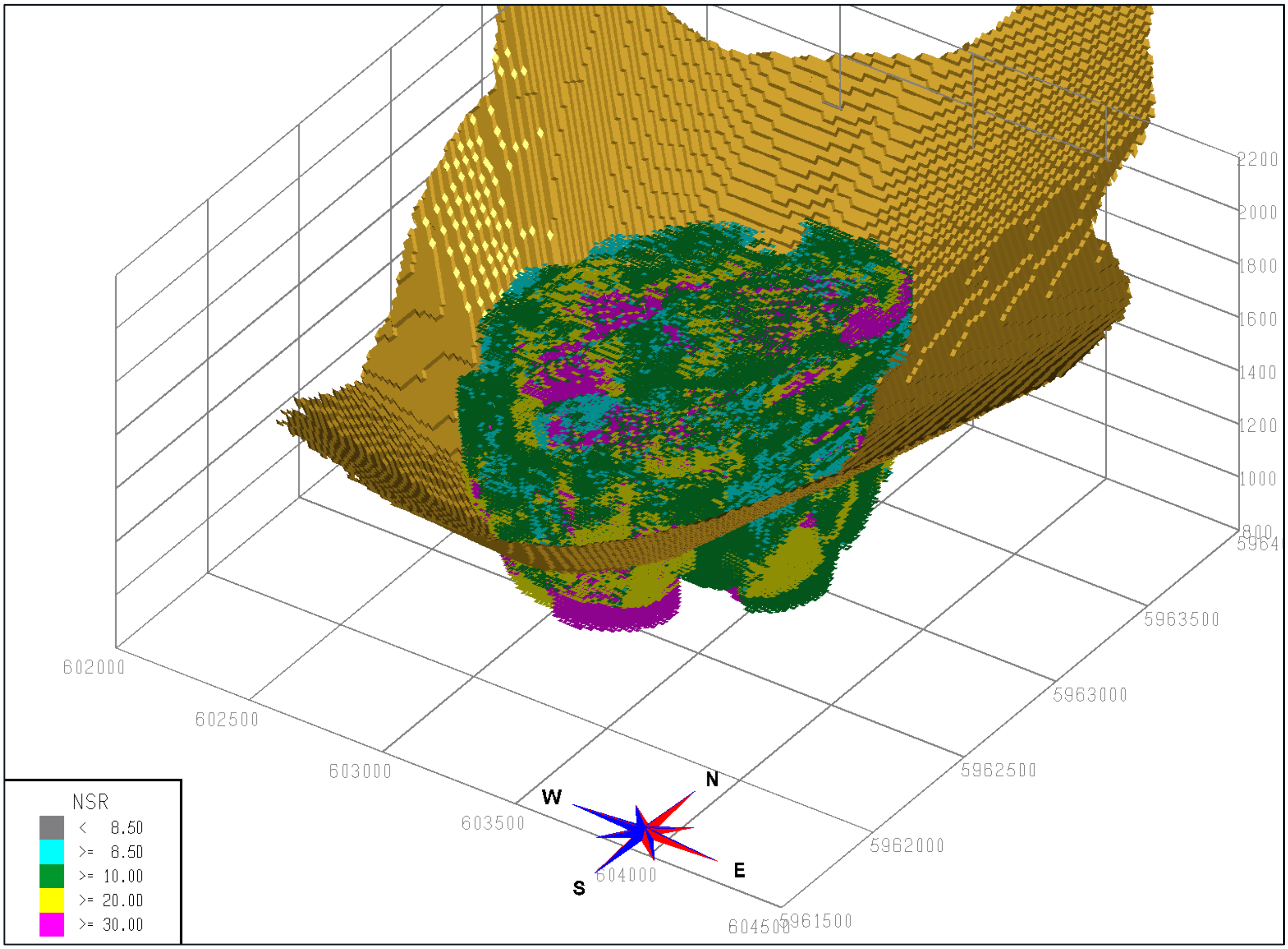
Grade dependent metallurgical recoveries for pit optimization and cut-off grade estimations are based on metallurgical studies done for this report and are summarized below:

- Leach Cap/Supergene Cu Recovery = 4.199 * ln (Cu grade) + 87.73
- Hypogene Cu Recovery = 9.624 * ln (Cu grade) + 95.36
- Leach Cap/Supergene Mo Recovery = 1.260 * ln (Mo grade) + 75.00
- Hypogene Mo Recovery = 8.770 * ln (Mo grade) + 109.10
- Ag Recovery = 14.458 * ln (Mo grade) + 42.67
- Au Recovery = 55%

The base case cut-off grades are based on Processing costs of C$5.50/tonne processed, G&A costs of C$1.50/t processed and Stockpile Rehandle costs of C$1.50/t processed for a total of C$8.50/t processed.

The final resource pit with NSR values above the base case cut-off of C$8.50/t is illustrated in Figure 14-18.

Figure 14-18: Resource Pit and NSR of Blocks Above Cut-off



Source: Moose Mountain, 2023.

14.14 Risk Assessment

A description of potential risk factors is given in Table 14-13 along with either the justification for the approach taken or mitigating factors in place to reduce any risk.

Table 14-13: List of Risks and Mitigations/Justifications

No.	Description	Justification/Mitigation
1	Classification Criteria	Based on Variography
2	Geologic Model	Geologic interpretations are well established, with variography and search parametres following the lithologies and oxidation zones.
3	Metal Price Assumptions	Resource pit and cut-off are based on metal prices below the current 3-year trailing average.
4	High Grade Outliers	Outlier restriction applied to ensure mean grades match the data. Grade-tonnage curves show model validates well with de-clustered composite data throughout the grade distribution.
5	Processing and Mining Costs	Costs based on Process and Mining studies. Cut-off grade covers Processing plus G&A costs

15 MINERAL RESERVE ESTIMATES

This section is not relevant to the Technical Report.

16 MINING METHODS

16.1 Introduction

Open pit mine designs, mine production schedules and mine capital and operating costs have been developed for the Berg deposit at a scoping level of engineering.

The open pit activities are designed for approximately thirty years of operation. Mine planning is based on large scale conventional drill/blast/load/haul open pit mining methods suited for the project location and local site requirements. The subset of mineral resources contained within the designed open pits are summarized in Table 16-1, with a C$8.50/t NSR cut-off grade and form the basis of the mine plan and production schedule.

Table 16-1: PEA Mine Plan Production Summary

Subset Metric	Amount
PEA Mill Feed	978 Mt
Mill Feed NSR Grade	$27/t
Copper Grade, Cu	0.22%
Molybdenum Grade, Mo	0.025%
Silver Grade, Ag	4.5 g/t
Gold Grade, Au	0.02 g/t
Measured Classification	32 Mt
Indicated Classification	755 Mt
Inferred Classification	191 Mt
Waste Overburden and Rock	1,101 Mt
Waste: Resource Ratio	1.1

Notes:
1. The PEA Mine Plan and Mill Feed estimates are a subset of the June 7, 2023 Mineral Resource estimates and are based on open pit mine engineering and technical information developed at a Scoping level for the Berg deposit.
2. PEA Mine Plan and Mill Feed estimates are mined tonnes and grade, the reference point is the primary crusher.
3. Mill Feed tonnages and grades include open pit mining method modifying factors, such as dilution and recovery. 2% contact dilution (at 0.10% Cu, 0.003% Mo, 2 g/t Ag and 0.01 g/t Au grades) is added to whole block (15 m x 15 m x 15 m) measured tonnes and grade out of the resource block model. 98% mining recovery is estimated to account for effects of mis-directed loads, carryback and stockpile base losses.
4. Cut-off grade of C$8.50/t NSR assumes:
   a. Cu price of US$4.00/lb, Mo price of US$15.00/lb, Ag price of US$23/oz, Au price of US$1,800/oz, at an exchange rate of 0.77 US$ per C$;
   b. 96.5% payable for Cu, 99.0% payable for Mo, 90.0% payable for Ag and Au, 1% unit deduction for Cu and Mo, Cu concentrate smelting of US$75/dmt, US$0.08/lb Cu refining, US$1.30/lb Mo refining, transport and offsite costs of US$100/wmt concentrates, a 1.0% NSR royalty, and uses average metallurgical recoveries for Cu, Mo, Ag, and Au of 82%, 70%, 66% and 55% respectively in the supergene & leach cap and of 80%, 78%, 64% and 55% respectively in the hypogene;
5. The cut-off grade covers processing costs of C$5.50/t, administrative (G&A) costs of C$1.50/t, and tailings deposition costs of C$1.50/t.
6. The resources delineated by the pit design selected for this study include Inferred Resources. The reader is cautioned that Inferred Resources are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that Inferred Resources will ever be upgraded to a higher category.
7. Estimates have been rounded and may result in summation differences.

The economic pit limits are determined using the Pseudoflow implementation of the Lerchs-Grossman algorithm. Ultimate pit limits are split up into six phases or pushbacks to target higher economic margin material earlier in the mine life. Upper benches will be accessed via internal cut ramps on topography, or via ramps left behind on phased pit walls. In pit ramps will access material below the pit rim.

Pit designs are configured on 15 m bench heights, with minimum 8 m wide berms placed every bench. Bench face and inter-ramp slope angle criteria is dependent on lithology, alteration, and azimuth, with over 25 unique geotechnical zones as input. A scoping level structural geology model has defined these zones and corresponding bench angles, based on geologic mapping, historical reports, and rock properties via lab work on core samples.

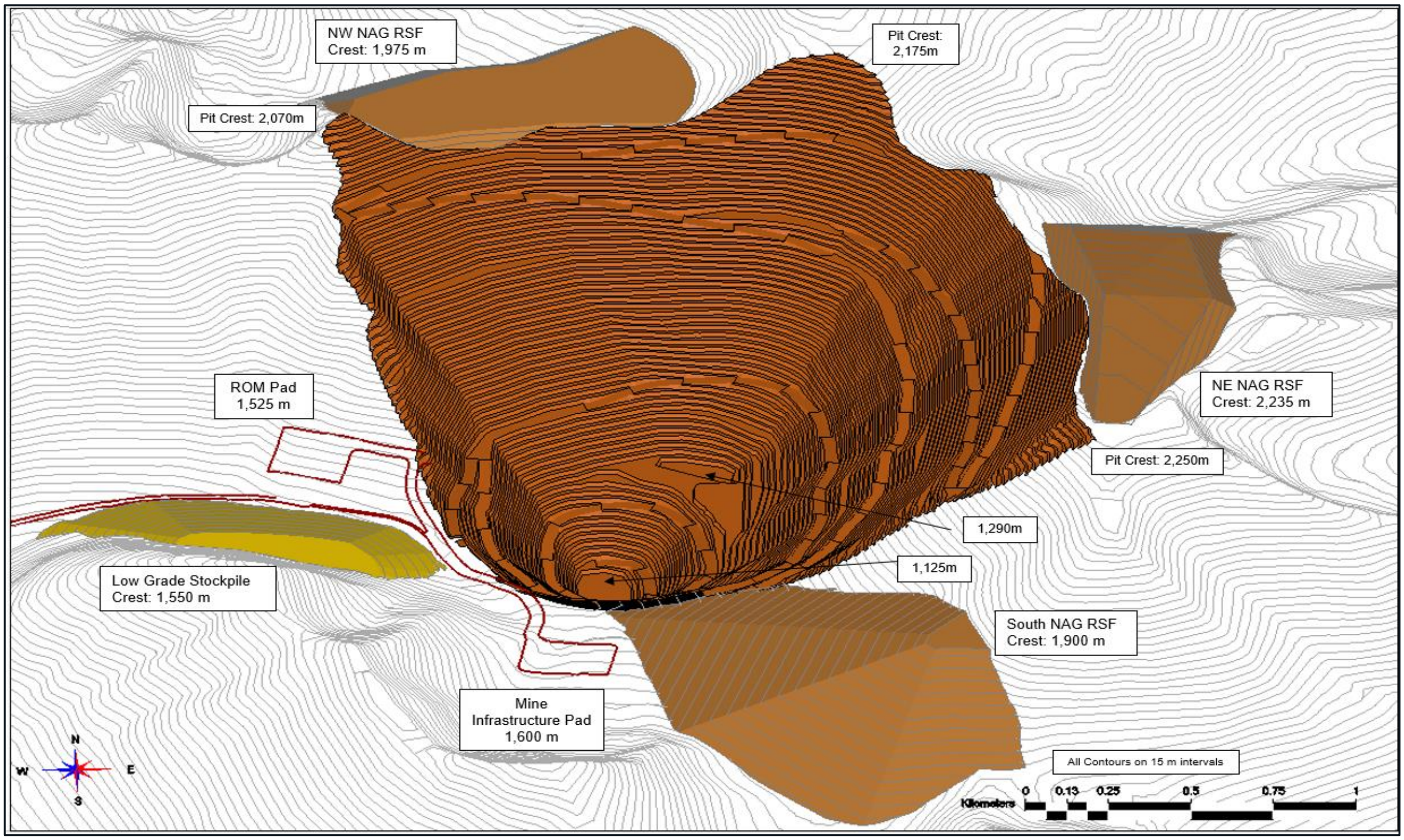
The mill will be fed with material from the pits at an average rate of 32.4 Mt/a (90 kt/d). Resource from the open pit will report to a ROM pad and primary crusher directly adjacent to the pit rim, where it will be conveyed to the mill.

Some of the waste rock (non acid generating, NAG) will be placed in three facilities adjacent to the open pit, two northeast of the pit, and one south of the pit. Potentially acid generating (PAG) waste rock will also report to the ROM pad for crushing and conveyance to the TWMF. Only ~8% of waste materials planned from the open pit have sufficient data for geochemical classification, with source data only available directly within the resource areas of the open pit. Most of the waste material is coming from areas adjacent to the resource, which have not been sampled for mineralization nor acid potential defining elements. It is assumed that some of this waste material above the resource, specifically the overburden, will be NAG.

Cut-off grade optimization is employed, which feeds a low grade stockpile adjacent to the ROM pad. This stockpile is planned for reclamation to the mill at the end of the mine life.

The proposed mining layout is illustrated in Figure 16-1.

Figure 16-1: Mining Layout



Source: Moose Mountain, 2023.

Mining operations will be based on 365 operating days per year with two 12-hour shifts per day. An allowance of 10 days of no mine production has been built into the mine schedule to allow for adverse weather conditions.

The mining fleet has been envisioned as using electric power where equipment is currently available for sale in the general market. It is assumed that as the project progresses, and additional battery and electric options become available the company will make use of these options to the fullest extent possible. Equipment as envisioned will include electric powered rotary drills (305 mm holes) and diesel powered rotary drills (228 mm holes) for production drilling in waste and mineralization, diesel-powered down the hole (DTH) drills (144 mm hole size) for highwall control drilling, 34 m^3 bucket size electric cable shovels, 22 m^3 diesel hydraulic excavators, and 22 m^3 bucket sized wheel loaders for production loading, and 231 t payload rigid-frame haul trucks for production hauling, plus ancillary and service equipment to support the mining operations. In-pit dewatering systems will be established for the pit. All surface water and precipitation in the pits will be gravity drained, or directed via submersible pumps, to ex-pit settling ponds directly outside the pit limits.

The startup mine equipment fleet is planned to be purchased via a lease financing arrangement. Maintenance on mine equipment will be performed in the field with major repairs and planned interval maintenance in the shops located adjacent to the open pit.

It is the QP’s opinion that the developed mine production schedule and overall mine plan are reasonable and can be used for a PEA.

16.2 Key Design Criteria

The following mine planning design inputs were used:

- Topography is based on a LiDAR survey of the region.
  - The survey does not cover upper areas of the open pit, outside the limits of the resource block. Regional CANVEC data was used as a supplement in these areas. An updated topography survey should be carried out in advance of any updated engineering studies.
- Resource block model on 15 m spacing in all three dimensions.
  - Resource model contains Cu, Mo, Ag and Au grades, bulk densities, lithologies (Monzonite, Diorite, Volcanics), alterations (Leach Cap, Supergene, Hypogene), resource classifications (Measured, Indicated, Inferred), and PAG classification.
- Measured, Indicated, and Inferred class mineral resources are included in pit optimizations and mill feed estimates.
- Grade dependent metallurgical recoveries for pit optimization and cut-off grade estimations, with unique criteria for each alteration
  - Leach Cap/Supergene Cu Recovery = 4.199 * ln (Cu grade) + 87.73
  - Hypogene Cu Recovery = 9.624 * ln (Cu grade) + 95.36
  - Leach Cap/Supergene Mo Recovery = 1.260 * ln (Mo grade) + 75.00
  - Hypogene Mo Recovery = 8.770 * ln (Mo grade) + 109.10
  - Ag Recovery = 14.458 * ln (Mo grade) + 42.67
  - Au Recovery = 55%

16.2.1 Net Smelter Return, Net Smelter Price, and Cut-off Grade

A net smelter return (NSR) block grade item is used for the Project to facilitate the mine planning process.

NSR grade values are calculated for each mineralized block by summing the unit values calculated for each contributing metal using net smelter prices (NSP), process recoveries, and block grades. NSR grade is expressed in dollars per tonne ($/t) and represents the economic return the mine expects to receive for each recovered tonne before on-site operating costs.

NSP is used in this report to differentiate between market metal prices and net project metal prices. NSP is the net metal price after smelter, refining terms, and offsite charges are applied. The NSP can be considered the price available at the mine gate. The NSP calculation using inputs shown in Table 16-2.

Table 16-2: Net Smelter Price

Item	Unit
Copper Price	US$4.00/lb
Molybdenum Price	US$15.00/lb
Silver Price	US$23.00/oz
Gold Price	US$1,800.00/oz
US Exchange Rate	0.77 US$: 1 C$
Cu and Mo unit deduction	1.0%
Payable Copper	96.5%
Payable Molybdenum	99.0%
Payable Silver and Gold	90.0%
Concentrate Moisture	8%
Copper Concentrate Smelting	US$75/dmt
Copper Refining (includes Silver and Gold Refining)	US$0.075/lb
Molybdenum Refining	US$1.300/lb
Offsite Costs (Transport, Insurance)	US$100.00/wmt
Royalty	1.0%
Copper Net Smelter Price	C$4.31/lb
Molybdenum Net Smelter Price	C$16.96/lb
Silver Net Smelter Price	C$0.79/g or C$24/oz
Gold Net Smelter Price	C$61.53/g or C$1,914/oz

The NSR for each block is calculated as follows:

NSR= (Cu Grade* NSP for Cu * Cu Process Recovery * 2205 lb/t) + (Mo Grade* NSP for Mo * Mo Process Recovery * 2205 lb/t) + (Ag Grade * NSP for Ag * Ag Process Recovery) + (Au Grade * NSP for Au * Au Process Recovery)

The economic cut-off grade is chosen as the NSR grade required to pay for processing costs, general and administration costs, and tailings management costs. The cut-off grade calculation uses the inputs shown in Table 16-3.

Table 16-3: Economic NSR Cut-off Grade

Item	Unit
Process Costs	$5.50/t
G&A and Site Costs	$1.50/t
Stockpile Rehandle Costs	$1.50/t
Economic Cut-off Grade	$8.50/t

16.2.1.1 Mining Loss & Dilution

The mineral resources are based on 15 m x 15 m x 15 m block sizes. This block sizing is also appropriate for the for the drill/blast/load practices chosen for this mine plan. It is assumed that the effects on metal grades from mining selectivity are mostly built into the whole block grades.

A measurement of waste to resource block contact edges is also carried out for all mineralized blocks. Based on these measurements, an additional 2% contact dilution, at 0.10% Cu, 0.003% Mo, 2 g/t Ag and 0.01 g/t Au grades, is added to whole block measured tonnes and grade.

A 98% mining recovery is estimated to account for effects of mis-directed loads, carry back and stockpile base losses.

16.2.1.2 Pit Slopes

The pit slope criteria are based on scoping level geotechnical work done on the Berg deposit (BGC, 2009), based on available data including geologic mapping, historical reports, and rock properties such as rock-quality designation (RQD), fracture intensity, and unconfined compressive strength (UCS), obtained via lab work on core samples.

Inter-ramp scale geometries were determined from stability analyses of potential plane shear and wedge failure, rock mass stability, and bench geometry. Generic non-circular rock mass stability analyses were conducted for each geotechnical unit to determine slope height versus slope angle relationships for use in inter-ramp and overall slope scale designs.

Pit designs are configured on 15 m bench heights, with minimum 8 m wide berms. Unique bench face and inter-ramp slope inputs are based on lithology, alteration, and azimuth. These slope criteria are summarized in Table 16-4.

Table 16-4: Pit Slope Design Inputs

Domain	Azimuth Start (°)	Azimuth End (°)	Bench Face Angle (°)	Interramp Angle (°)	Calc Berm Width (m)	Overall Angle (°) (for pit optimization)
Leach Cap	070	300	60	34	13.6	33
Leach Cap	300	314	60	32	15.3	31
Leach Cap	314	000	60	30	17.3	29
Leach Cap	000	070	60	32	15.3	31
Supergene	094	276	65	44	8.5	43
Supergene	276	285	65	43	9.1	41
Supergene	285	300	65	37	12.9	35
Supergene	300	314	65	33	16.1	32
Supergene	314	000	65	31	18.0	30
Supergene	000	070	65	33	16.1	32
Supergene	070	085	65	37	12.9	35
Supergene	085	094	65	43	9.1	41
Hypogene Volcanics	000	300	70	49	8.0	43
Hypogene Volcanics	300	000	70	35	16.0	34
Hypogene Monzonite	178	294	70	49	8.0	47
Hypogene Monzonite	294	075	70	36	15.2	35

Domain	Azimuth Start (°)	Azimuth End (°)	Bench Face Angle (°)	Interramp Angle (°)	Calc Berm Width (m)	Overall Angle (°) (for pit optimization)
Hypogene Monzonite	075	094	70	39	13.1	38
Hypogene Monzonite	094	156	70	35	16.0	34
Hypogene Monzonite	156	166	70	39	13.1	38
Hypogene Monzonite	166	178	70	43	10.6	41
Hypogene Diorite	060	307	70	49	8.0	47
Hypogene Diorite	307	320	70	43	9.1	41
Hypogene Diorite	320	340	70	37	14.4	36
Hypogene Diorite	340	013	70	35	16.0	34
Hypogene Diorite	013	060	70	36	15.2	35
Overburden	000	360	45	33	8.1	31

The open pits contemplated for this mine plan are not the same as those contemplated for the geotechnical analysis. It is recommended that further field data collection along the proposed open pit highwalls, lab testing of samples, and updated geotechnical models be built to refine design criteria in future engineering studies.

16.3 Pit Optimization

The economic pit limits are determined using the Pseudoflow implementation of the Lerchs-Grossman algorithm. This algorithm uses the grades and densities for each block of the 3D block model and evaluates the costs and revenues of the blocks within potential pit shells. The routine uses input economic and engineering parametres and expands downwards and outwards until the last increment is at break-even economics.

Additional cases are included in the analysis to evaluate the sensitivities of open pit mined resources to waste mining ratio and high-grade/low-grade areas of the deposits. In this study, the various cases or pit shells are generated by varying the input metal prices and comparing the resultant waste and mill feed tonnages and metal grades for each pit shell.

By varying the economic parametres while keeping inputs for metallurgical recoveries and pit slopes constant, various generated pit cases are evaluated to determine where incremental pit shells produce marginal or negative economic returns. This drop-off is due to increasing waste mining ratios, decreasing metal grades, increased mining costs associated with the larger or deeper pit shells, and the value of discounting costs before revenues. The economic margins from the expanded cases are evaluated on a relative basis to provide payback on capital and produce a return for the project. At some point, further expansion does not provide significant added value. A pit limit can then be chosen that has suitable economic return for the deposit.

Price inputs for the Pseudoflow runs are listed Table 16-2 above and operating cost assumptions are provided in Table 16-5. The input metal prices are varied from 10% to 130% of base case values.

Table 16-5: Operating Cost Inputs into Pseudoflow Shell Runs

Item	Unit
Pit rim mining cost	$2.50/t mined, pit rim of 1,550 masl
Incremental haulage cost	$0.040/t added every 15 m bench below pit rim
Waste crush/convey costs	$0.50/t of waste rock
Processing cost	$5.50/t
General/Administration cost	$1.50/t

For each pit shell, an undiscounted cashflow (UCF) is generated based on the shell contents and the economic parametres listed in Table 16-5. The UCFs for each case are compared to reinforce the selected point at which increased pit expansions do not increase the project value. Note that the economics are only applied for comparative purposes to assist in the selection of an ultimate pit limit for further mine planning, they do not reflect the actual financial results of the mine plan.

As the mineable inventory grows with each case, the potential mine life increases. A pit shell, smaller than the undiscounted economic cut-off point, has been selected to limit the project to ~30 years of production. Time value discounting destroys the value of pit contents larger than this limit.

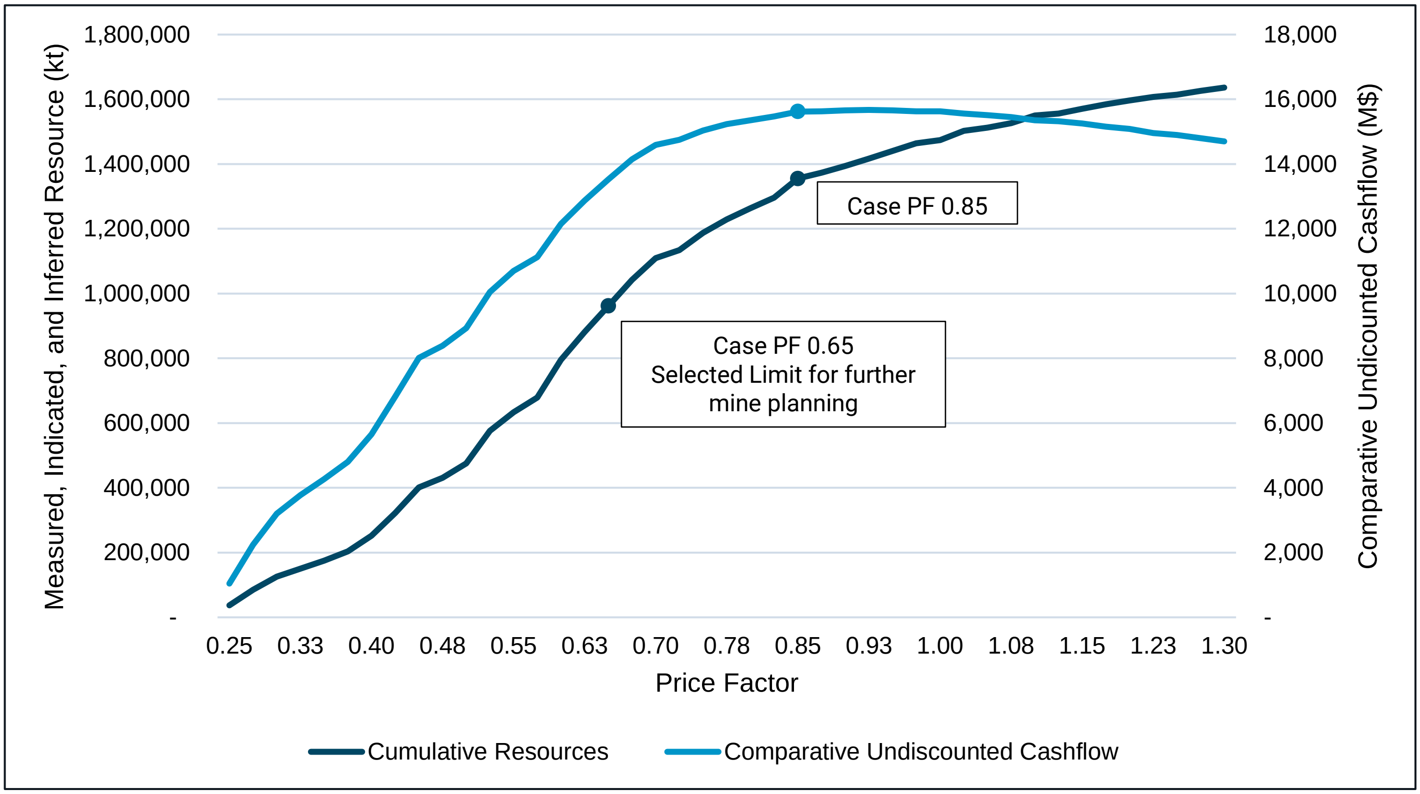
The chosen pit shell is then used as the basis for more detailed design and economic modelling.

16.3.1 Ultimate Pit Limits

Figure 16-2 shows the contents of the generated Pseudoflow pit shells for the Berg deposit. An inflection point can be seen in the curve of cumulative resources and UCF by pit case. This point indicates Case PF 0.85 as a point at which larger pit shells will not produce significant increases to project value. The PF 0.65 point is selected as the PEA project limits, which represents a 30-year project life at 90 kt/d mill throughput. Once time value discounting is considered, shells beyond the 0.65 PF case do not produce increased project value but, in the future as the project develops, a larger pit shell could generate additional value to the project.

Once several variables were assessed, including overall pit size, stripping ratio metrics and discounted economics performance, the pit shell generated from Case PF 0.65 is selected as the ultimate pit limits for Berg and is used for further mine planning as a target for detailed open pit designs with berms and ramps.

Figure 16-2: Pseudoflow Pit Shell Resource Contents by Case



Source: Moose Mountain, 2023.

16.4 Pit Designs

Ultimate pit limits are generally split up into phases or pushbacks to target higher economic margin material earlier in the mine life. Minimum pushback distances of 75 m are honoured. The pit is split into six phases with the higher-grade first phase mined ahead of pushbacks to the east, north and west.

Targets for the first phase use Case PF 0.28 of the optimization runs described in Section 16.3.1. Pushbacks then proceed to lower value pit shell targets, while balancing the needs for operable bench widths, and available ramp access to all future benches. The pit designs are carried out, with benches and ramping, that take these operability factors into consideration.

Bench design inputs are listed in Table 16-4. Two-way haul roads of 32 m width are designed to accommodate 230 t payload class rigid frame haul trucks. Haul road grades are limited to a maximum of 10%. Access ramps are not designed for the last bench (15 m) of the pit bottom, on the assumption that the bottom ramp segment will be removed using some form of retreat mining.

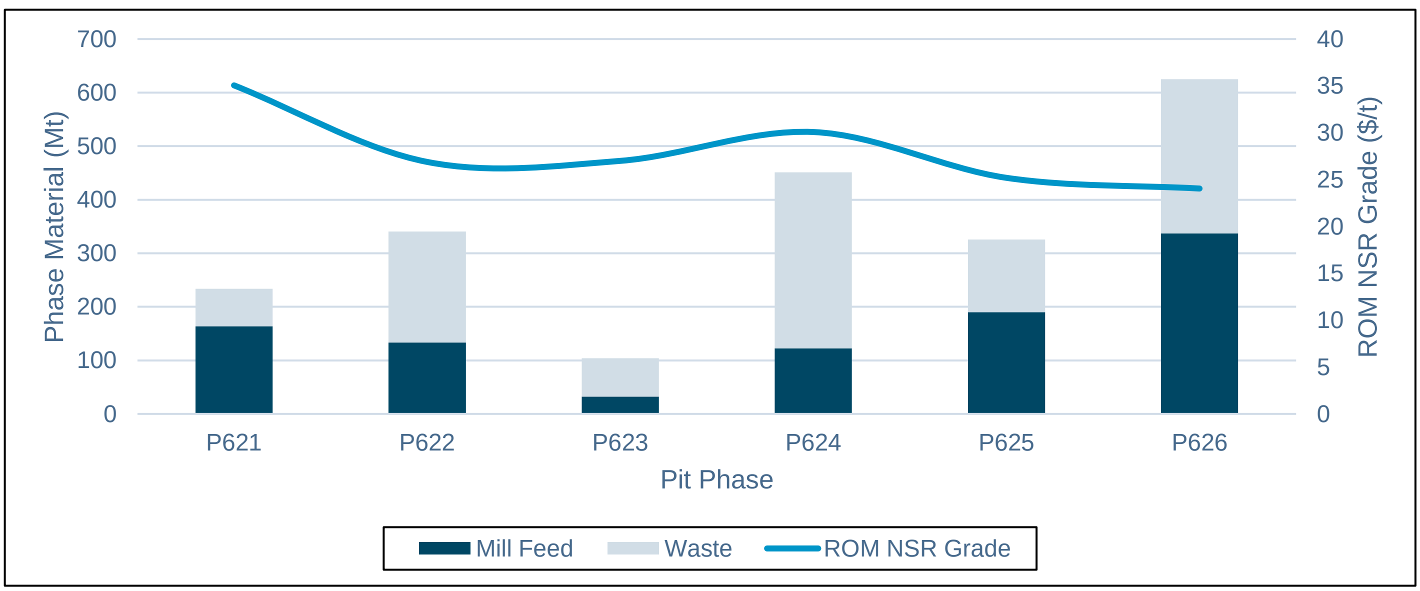
Contents of the designed open pits are presented in Table 16-6. The contents for each designed pit phase are presented graphically in Figure 16-3.

Table 16-6: Contents of Designed Pit Phases

Pit Phase	Pit Name	Mill Feed (Mt)	ROM NSR Grade ($/t)	Waste (Mt)	Waste: Resource Ratio (t/t)
Initial Phase 1	P621	163.6	35.06	69.8	0.4
Eastern Pushback 1	P622	133.1	26.89	207.5	1.6
Eastern Pushback 2	P623	32.2	27.00	71.7	2.2
Northern Pushback	P624	122.3	30.08	328.8	2.7
Western Pushback 1	P625	190.0	25.19	135.7	0.7
Western Pushback 2	P626	337.2	24.05	288.0	0.9
Grand Total		**978.2**	**27.35**	**1,101.5**	**1.1**

Notes:
1. The PEA Mine Plan and Mill Feed estimates are a subset of the June 7, 2023 Mineral Resource estimates and are based on open pit mine engineering and technical information developed at a Scoping level for the Berg deposit.
2. PEA Mine Plan and Mill Feed estimates are mined tonnes and grade, the reference point is the primary crusher.
3. Mill Feed tonnages and grades include open pit mining method modifying factors, such as dilution and recovery. 2% contact dilution (at 0.10% Cu, 0.003% Mo, 2 g/t Ag and 0.01 g/t Au grades) is added to whole block (15 m x 15 m x 15 m) measured tonnes and grade out of the resource block model. 98% mining recovery is estimated to account for effects of mis-directed loads, carryback and stockpile base losses.
4. Cut-off grade of C$8.50/t NSR assumes:
   a. Cu price of US$4.00/lb, Mo price of US$15.00/lb, Ag price of US$23/oz, Au price of US$1,800/oz, at an exchange rate of 0.77 US$ per C$;
   b. 96.5% payable for Cu, 99.0% payable for Mo, 90.0% payable for Ag and Au, , 1% unit deduction for Cu and Mo, Cu concentrate smelting of US$75/dmt, US$0.08/lb Cu refining, US$1.30/lb Mo refining, transport and offsite costs of US$100/wmt concentrates, a 1.0% NSR royalty, and uses average metallurgical recoveries for Cu, Mo, Ag, and Au of 82%, 70%, 66% and 55% respectively in the supergene & leach cap and of 80%, 78%, 64% and 55% respectively in the hypogene;
5. The cut-off grade covers processing costs of C$5.50/t, administrative (G&A) costs of C$1.50/t, and tailings deposition costs of C$1.50/t.
6. The resources delineated by the pit design selected for this study include Inferred Resources. The reader is cautioned that Inferred Resources are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that Inferred Resources will ever be upgraded to a higher category.
7. Estimates have been rounded and may result in summation differences.

Figure 16-3: Designed Phase Pit Contents



Source: Moose Mountain, 2023.

16.4.1 Pit Phase Descriptions

The phased pit designs are shown in Figure 16-4 to Figure 16-8. Sections through the deposit showing the resource model grades are illustrated in Figure 16-9 to Figure 16-12, hatched blocks indicate inferred class materials. Property lease boundaries are not shown in these drawings as these sit several kilometres away from the open pit limits.

16.4.1.1 Phase I, P621

This phase targets the high-grade, near surface central portion of the deposit. The upper benches of this phase will be accessed via in-pit cut ramps developed during the construction period of the project. Pit ramps are left behind in the highwall for access to future east and north highwall pushbacks. These ramps run from the 2,160 masl elevation in the east, down to the pit exit at the 1,500 masl elevation in the south, switchbacking at the 2,070, 1,905, and 1,770 masl elevations. In pit ramping is also incorporated from the pit exit, running counterclockwise down to the pit bottom on the 1,500 masl elevation.

16.4.1.2 Phase 2 and Phase 3, P622 and P623

These phases target deeper, higher waste mining ratio mineralization to the east and below the phase 1 pit, pushing out the highwall to the final pit limits in the east. The ramping left behind in the phase 1 pit will be used to access the upper benches of the phase 2 pit at the 2,250 masl elevation. At the 1,920 masl elevation, the phases split into two separate pushbacks, with phase 2 highwall designed at an operable distance from the phase 1 highwall, and phase 3 all the way to the ultimate limits. In pit ramping is left behind on the phase 2 highwall to access the phase 3 benches. In pit ramping is left behind on the phase 3 highwall to connect with ramping left behind on the phase 1 highwall in the north, to access future pushbacks to the north. These phases mine to a pit bottom at the 1,350 masl elevation, with an in pit ramp connecting the pit exit in the south at the 1,515 masl elevation, counter clockwise down to the pit bottom.

16.4.1.3 Phase 4, P624

This phase pushes the highwall to the north ultimate pit limits, targeting a high grade pocket at the 1,500 masl pit bottom. The grades for this phase are higher than those from phases 2/3, but the negative economic impact of the higher waste to mineralization ratio outweighs the benefits of the higher grade, from a pit phase sequencing perspective. The top of the pit at the 2,175 masl elevation is accessed via highwall ramps left behind in phase 1 and 3. In pit highwall ramps are left behind to access future pushbacks to the west, running from the 2,075 masl elevation down to the pit bottom, switchbacking at the 1,920, 1,800, 1,695, and 1,605 masl elevations. A pit exit at the 1,550 masl elevation ties into the southern pit exit established in phase 2, and material below 1,550 masl will be hauled up a ramp from the pit bottom.

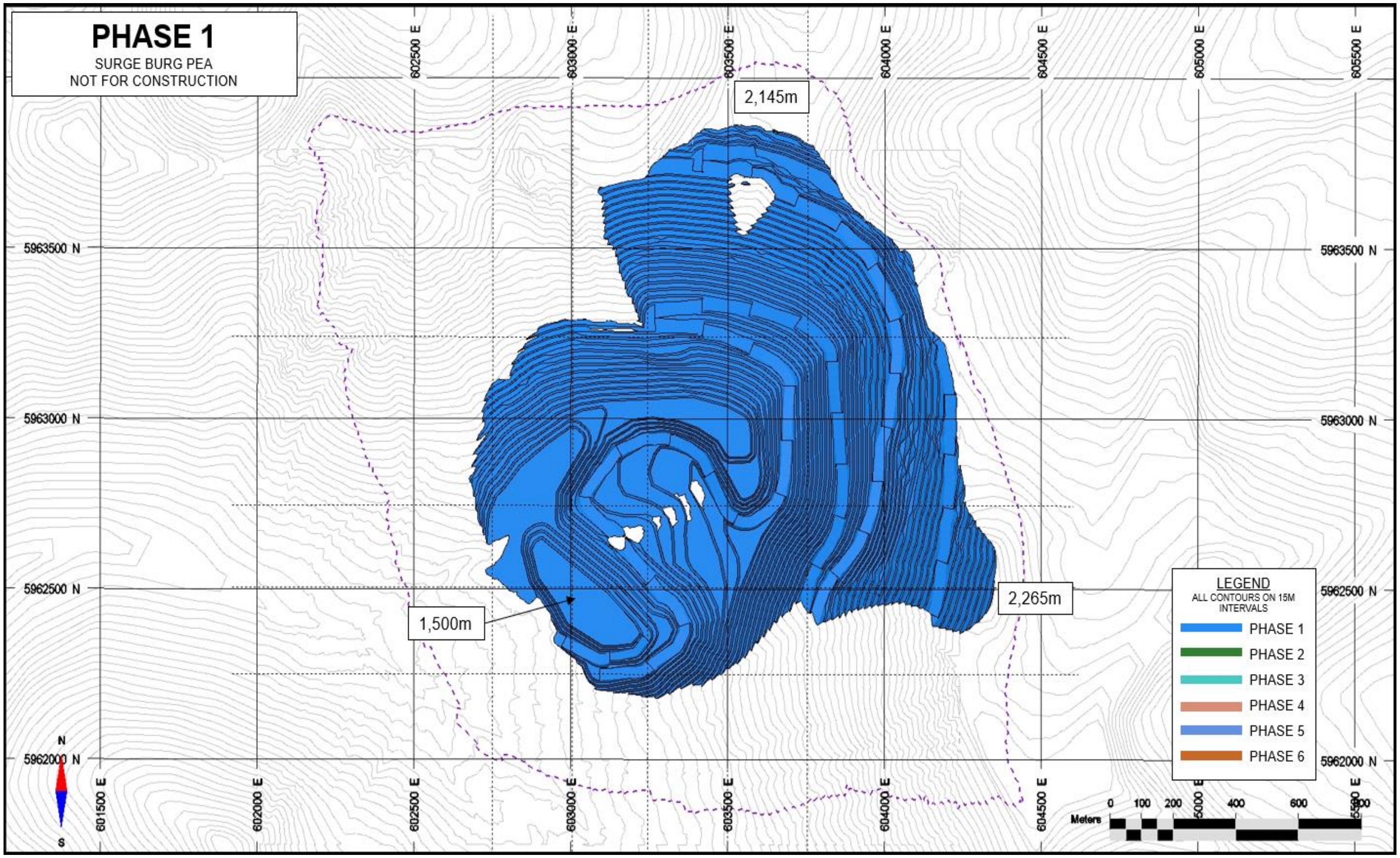
16.4.1.4 Phase 5, P625

This phase pushes the highwall out in the west, but not to the ultimate pit limit. Enough room is left behind in this pit phase for one more pushback. This phase extends the pit deeper into lower grade and higher waste to mineralization ratio material. Access to the top of the pit at the 2,050 masl elevation down to the pit exit at the 1,515 masl elevation will be via in pit highwall ramps left behind in the phase 4 pit. In pit highwall ramps are left behind to access the final pit pushback to the west, running from the 1,950 masl elevation down to the pit exit, switchbacking at the 1,875, 1,800, 1,710, and 1,620 masl elevations. In pit ramping connects the pit exit to the bottom of the pit at the 1,260 masl elevation.

16.4.1.5 Phase 6, P626

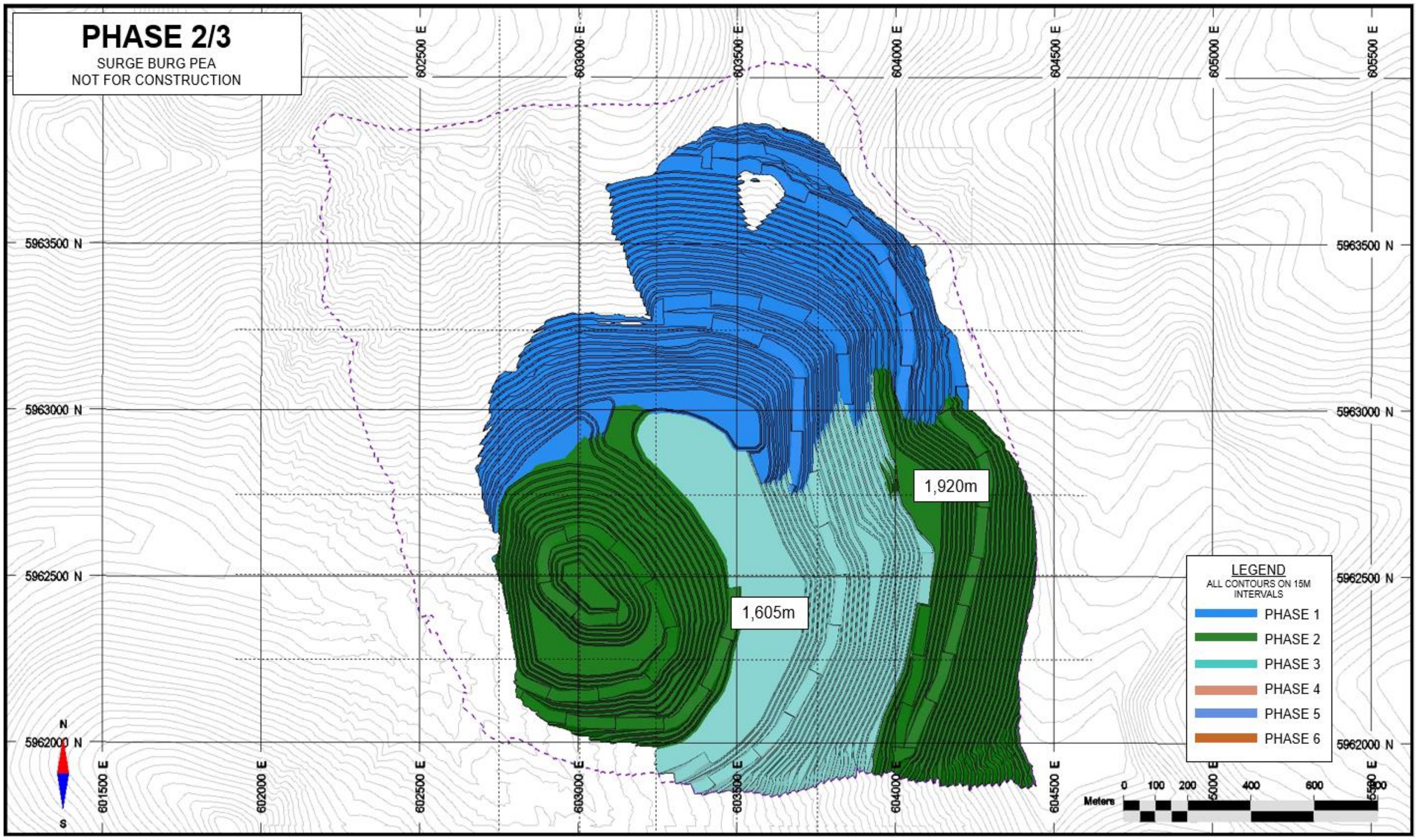
The final phase pushes out the west and south highwalls to the ultimate pit limits. This phase extends the pit deeper into lower grade and higher waste to mineralization ratio material. Access to the top of the pit at the 2,075 masl elevation down to the pit exit at the 1,605 masl elevation will be via in pit highwall ramps left behind in the phase 4 and 5 pits. In pit highwall ramps are left behind to access the top of the pit at the end of the mine life. In pit ramping connects the pit exit to the bottom of the pit at the 1,125 masl elevation, switchbacking at the 1,425 masl elevation.

Figure 16-4: Phase 1 Pit Design, P621



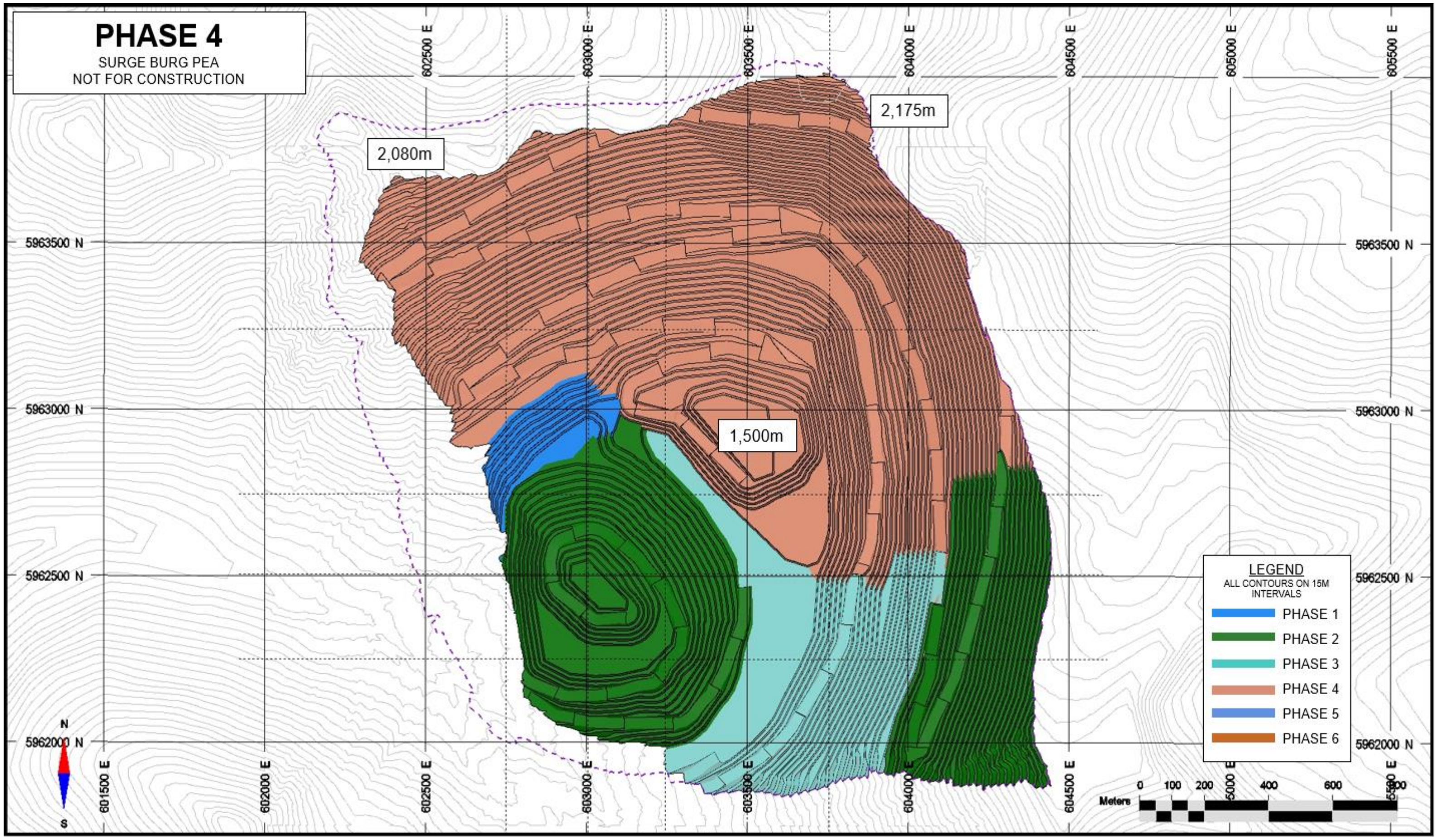
Source: Moose Mountain, 2023.

Figure 16-5: Phase 2/3 Pit Design, P622



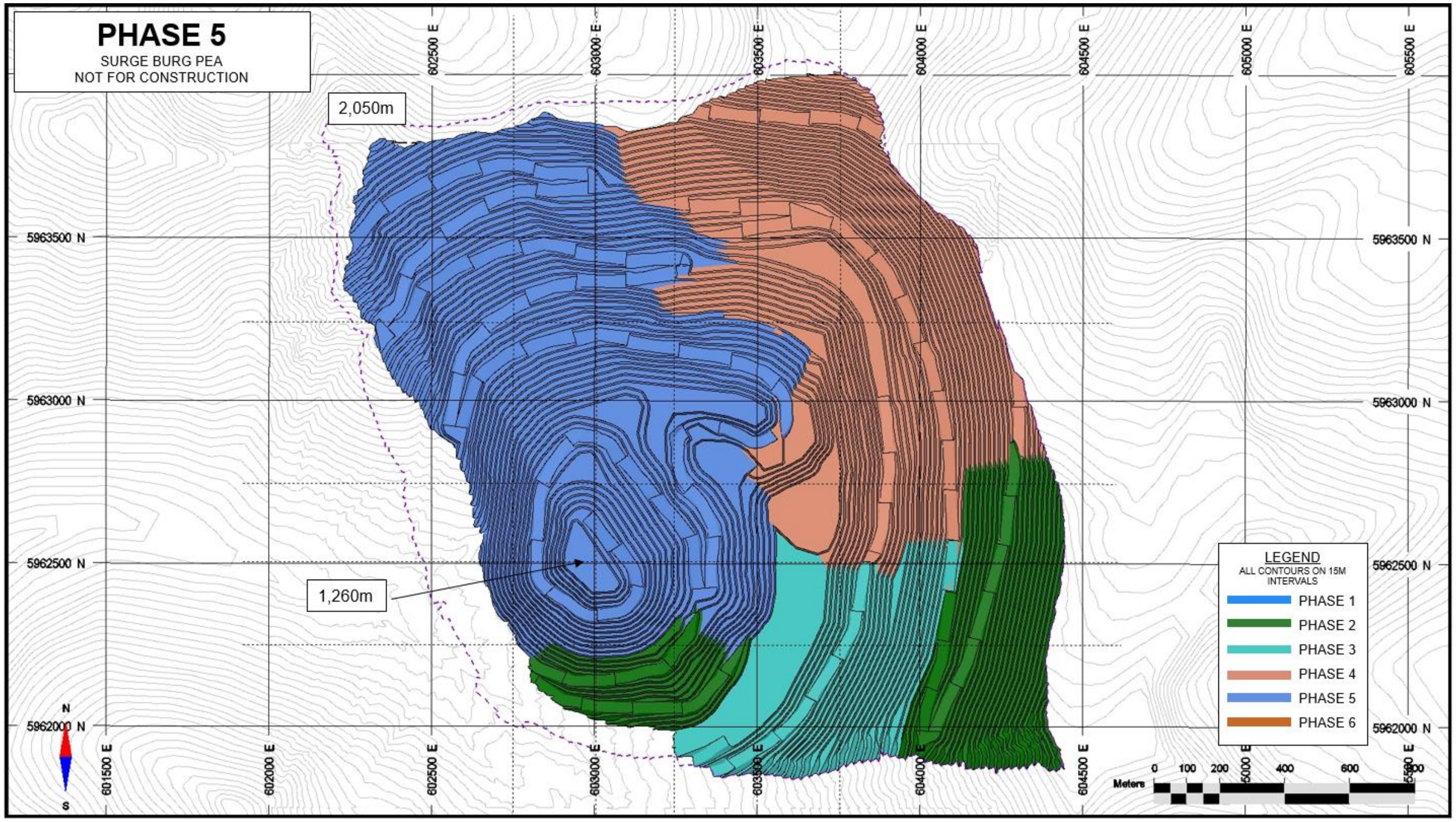
Source: Moose Mountain, 2023.

Figure 16-6: Phase 4 Pit Design, P624



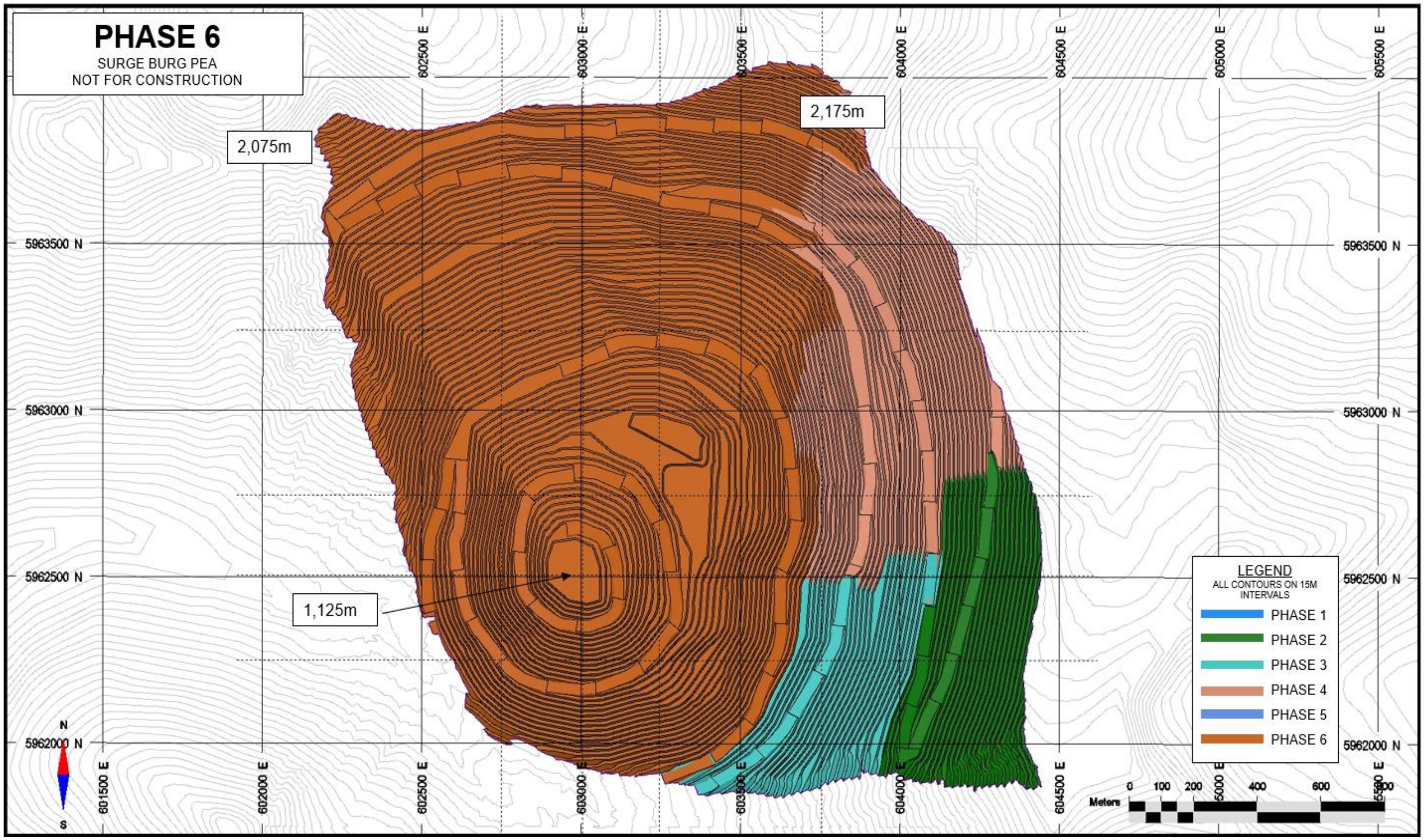
Source: Moose Mountain, 2023.

Figure 16-7: Phase 5 Pit Design, P625



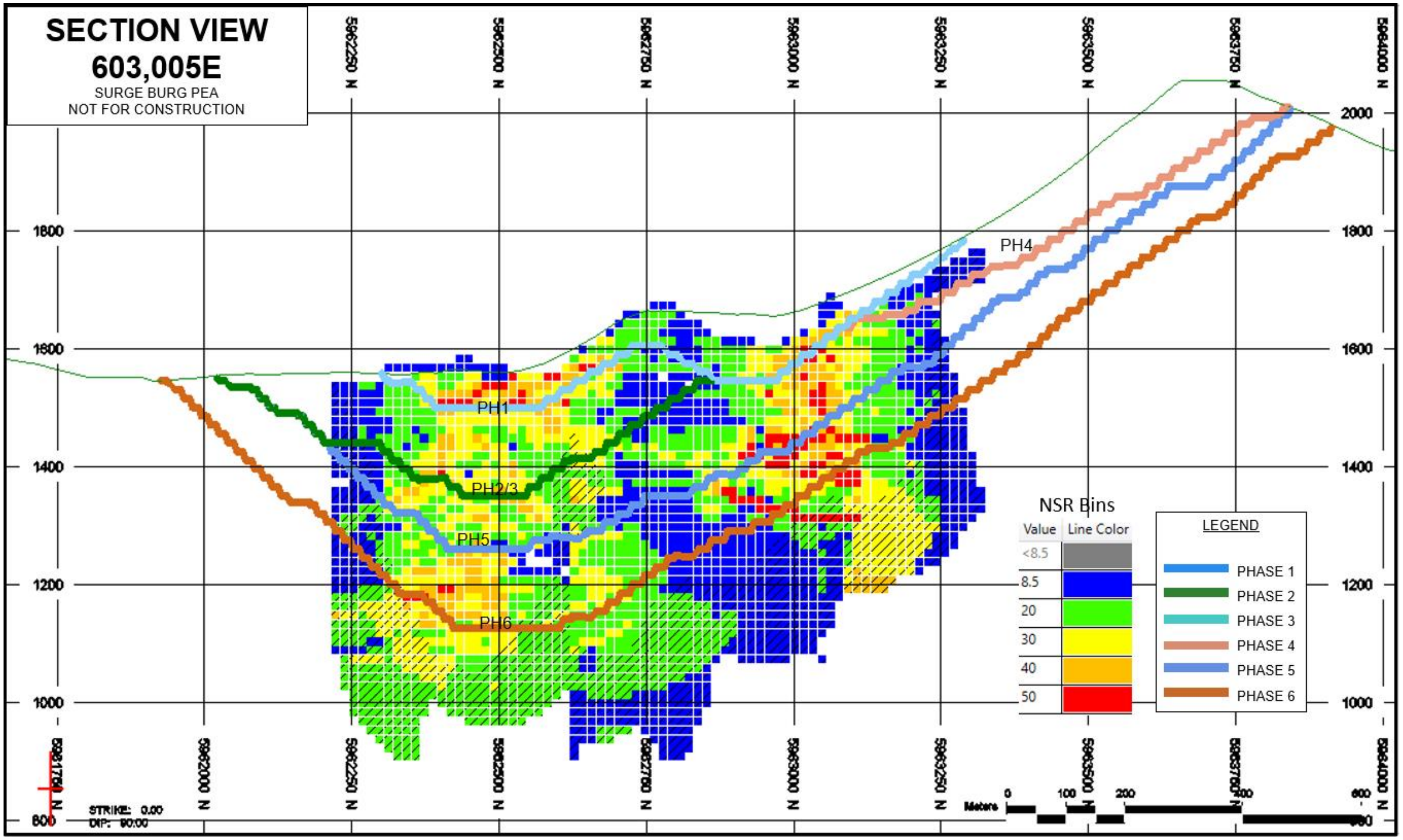
Source: Moose Mountain, 2023.

Figure 16-8: Phase 6 Pit Design, P626



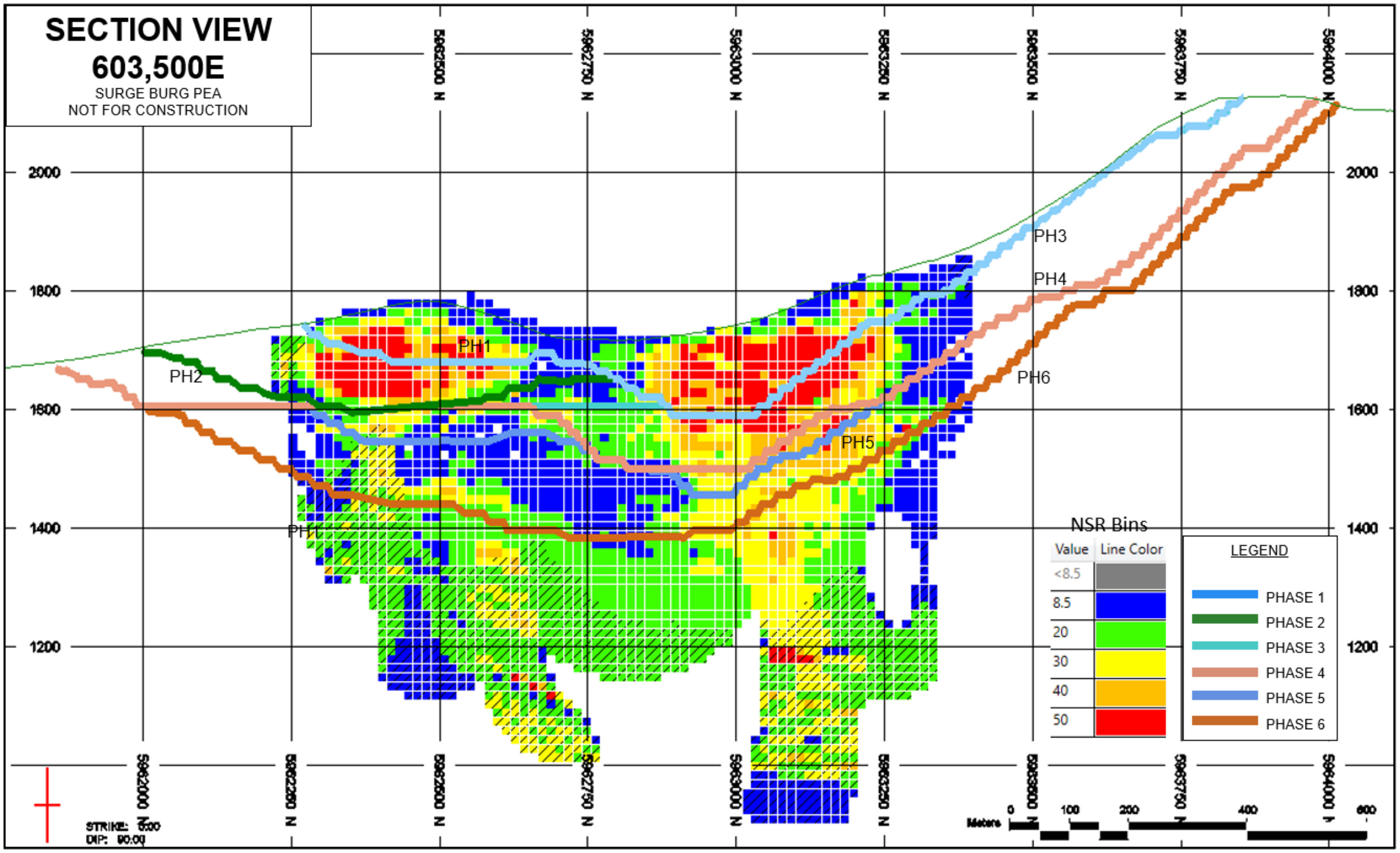
Source: Moose Mountain, 2023.

Figure 16-9: Pit Designs, NS Section, 603,005E



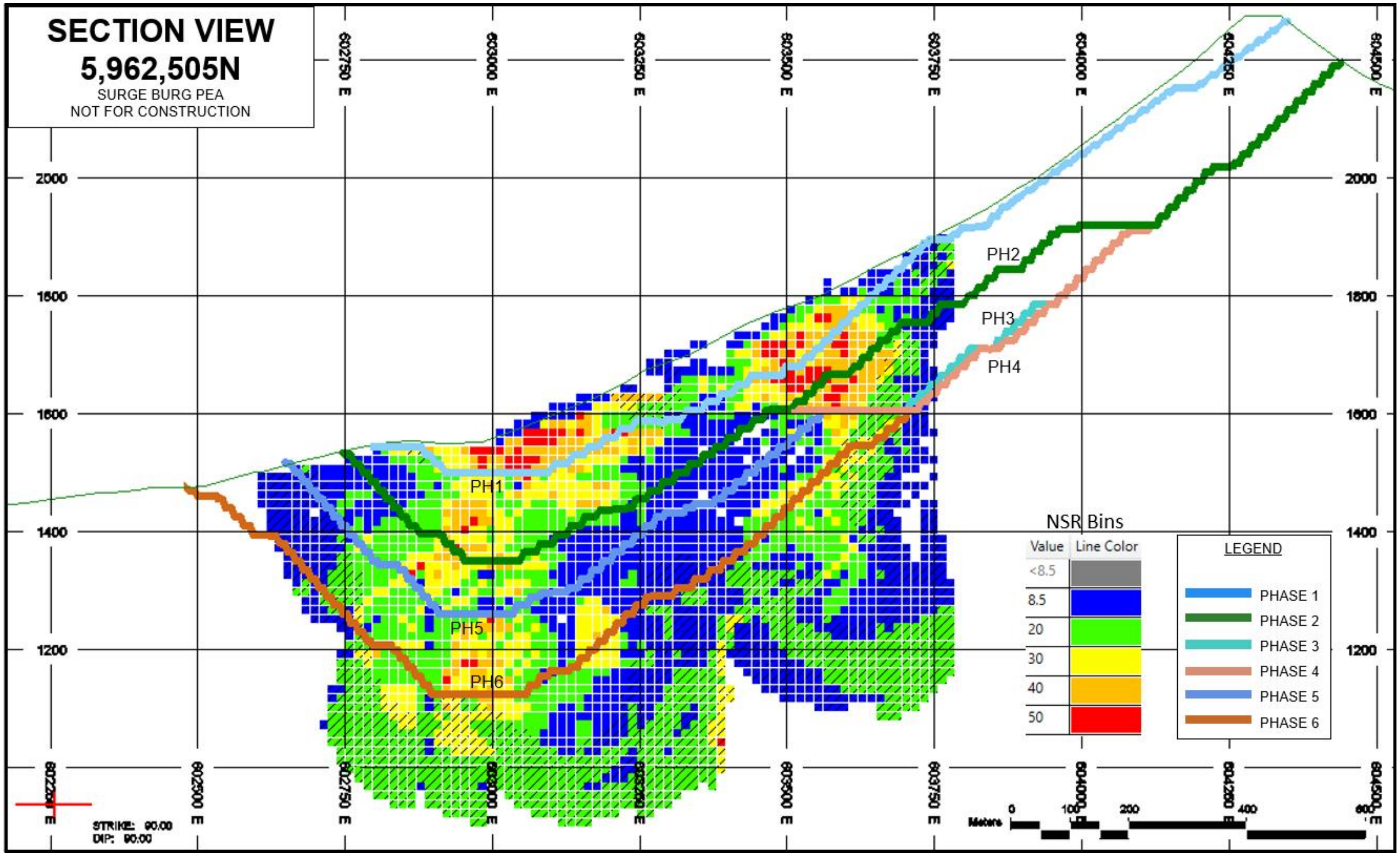
Source: Moose Mountain, 2023.

Figure 16-10: Pit Designs, NS Section, 603,500E



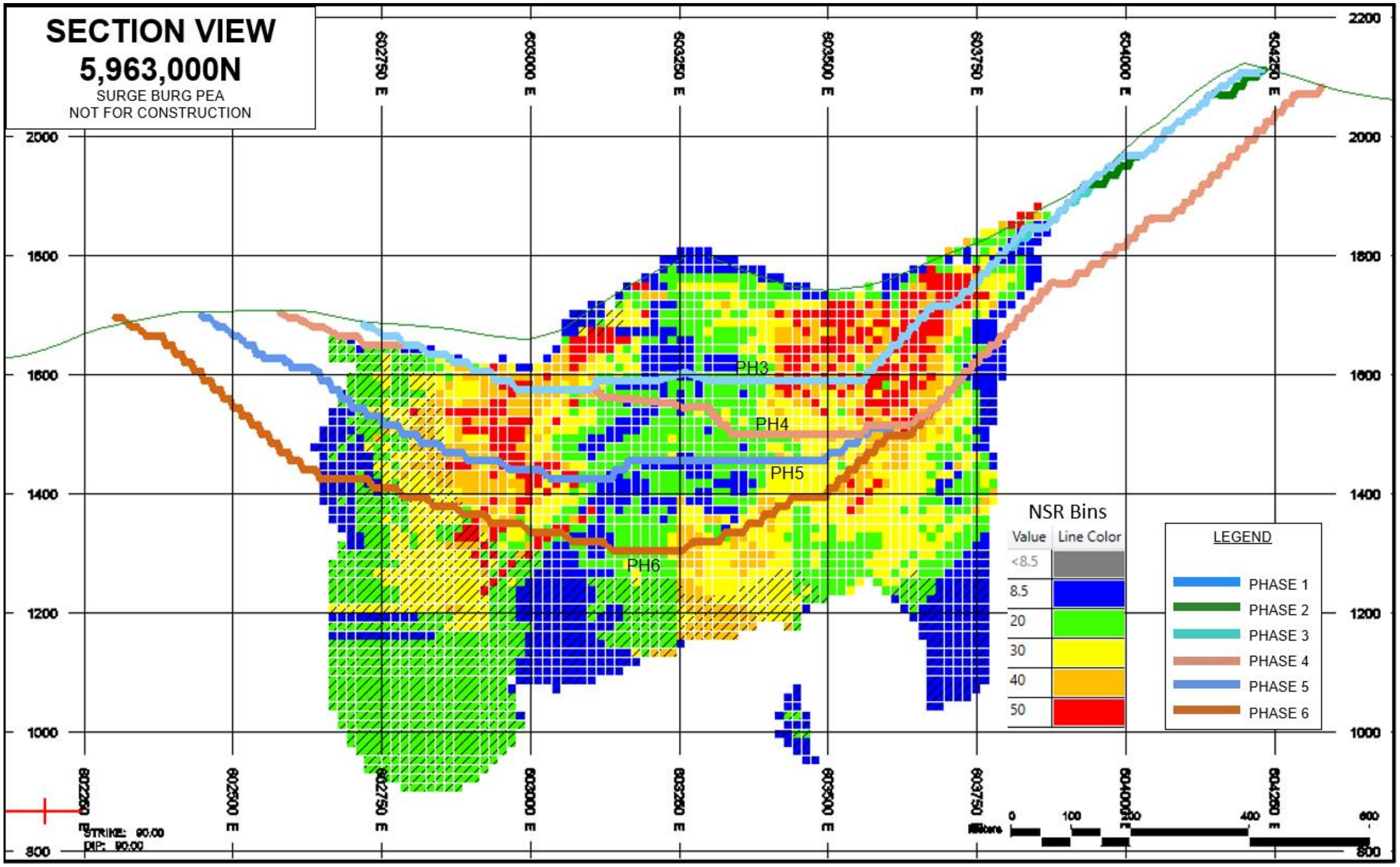
Source: Moose Mountain, 2023.

Figure 16-11: Pit Designs, EW Section, 5,962,505N



Source: Moose Mountain, 2023.

Figure 16-12: Pit Designs, EW Section, 5,963,000N



Source: Moose Mountain, 2023.

16.5 Low Grade Storage Facilities

When resources are mined from the pit, they will either be delivered to the crusher, the ROM stockpile located next to the crusher, or the low grade stockpile.

The crusher and ROM stockpiles are located 0.5 km west of the open pit limits.

Cut-off grade optimization on the mine production schedule sends resource between C$8.50/t and C$12/t NSR to a low grade stockpile located directly south of the ROM pad. These stockpiled resources are planned to be re-handled back to the crusher at the end of the mine life.

Preliminary designs for these facilities are completed assuming:

- Bottom-up construction/top down reclamation
- 2.5:1 overall slopes
- Storage density of 2.1 t/m^3
- Crest elevation of 1,550 masl

The low grade stockpile is shown in the mining layout drawings in Figure 16-1.

16.6 Waste Rock Storage Facilities

Most of the waste rock from the open pit, when designated as PAG will also report to a separate but adjacent waste ROM pad for crushing and conveyance to the TWMF for permanent storage.

Sulphur and calcium assays have been interpolated into a rudimentary PAG block model, with sulphur assumed to be an acid generator and calcium a neutralizing agent. Industry standard ratios of sulphur to calcium are applied to define blocks as PAG or NAG. Since the exploration drillholes and the assays for these elements were taken in the mineralization, only ~8% of waste materials planned from the open pit have samples within an adequate distance for the interpolation and classification to be practical. The other 92% of waste material is coming from areas above or outside the resource, which have not yet been sampled for mineralization nor acid potential defining elements.

A reasonable assumption is made that some of this waste material above the resource, specifically the overburden, will be NAG. A portion of this rock material will be transported and used for TWMF dam construction. For the remainder, waste rock storage facilities are planned for these NAG waste materials mined from the open pits. Three separate facilities are planned for the project.

It is recommended that future field programs collect sample data in the planned waste materials, ahead of any further project engineering, to better define expected PAG and NAG quantities. Significant savings to mine operating costs could be achieved via placement of waste directly outside the pit limits at mined elevations.

The “Northeast NAG RSF” facility is located directly east of the pit and is planned to store any NAG waste material mined from the upper benches of the phase 1 and 2 open pits.

The “Northwest NAG RSF” facility is located directly north of the pit and is planned to store any NAG waste material mined from the upper benches of the phase 4, 5 and 6 open pits.

The “South NAG RSF” facility is located directly south of the open pit and is planned to store all remaining NAG waste materials mined throughout the open pit life.

Preliminary designs for these facilities are completed assuming:

- Side Slope construction
- 37 degree slopes on the NE and NW NAG facilities
- 3:1 overall slopes on the south NAG facility
- Storage density of 2.1 t/m^3
- A sloping crest on the NE NAG facility from the 2235 masl down to the 2110 masl, with a maximum facility height of 320 m
- A crest elevation of 1975 masl on the NW NAG facility, with a maximum facility height of 240 m
- A crest elevation of 1,900 masl on the South NAG facility, with a maximum facility height of 355 m.

NAG waste mined from the pit will also be used to construct mine haul roads connecting the pit rim with the ROM pad, mine infrastructure pad, low grade stockpile, and the waste facilities. Material take-offs, cut and fill quantities, for these short ex-pit haul roads have not been completed for this mine plan, as material needs are expected to be comparatively minimal to overall pit waste production.

The waste storage facilities are shown in the mining layout drawings in Figure 16-1.

16.7 Production Schedule

Production requirements by scheduled period, mine operating considerations, product prices, recoveries, destination capacities, equipment performance, haul cycle times and operating costs are used to determine the optimal production schedule from the phased pit contents.

The open pit mine production schedule is included as Table 16-7. Figure 16-13 shows the mill production tonnage and grade forecast; Figure 16-14 provides an illustration of the projected material mined and waste mining ratio; Figure 16-15 illustrates the mining sequence through the various pit phases.

The production schedule is based on the following input parametres:

- The operations are scheduled on annual periods.
- The mineral resource and associated waste material quantities are split by pit phase and bench quantities.
- An annual mill feed rate of 32.4 Mt/a (90 kt/d) is targeted.
- Year 1 ramp up throughput of 26.3 Mt is targeted (81% of nameplate).
- Within a given pit phase, each bench is fully mined before progressing to the next bench.
- Pit phases are mined in sequence, where the second pit phases do not mine below the first pit phases.

- Pit phase vertical progression is limited to no more than 120 m in each year (8x15 m benches); average annual phase progression is 60 m.
- Pre-production mining targets bench advance through the phase 1 pit to be able to adequately supply mill feed quantities in Year 1. No specific waste rock target is set for any construction materials though it should be noted that scheduled waste provides sufficient quantities of construction material.
- Resource tonnes released in excess of the mill capacity are stockpiled, including those mined in the construction phase.
- Low-grade resource is stockpiled in the early years of the mine life and re-handled to the primary crushers later in the mine life.
- Shovel and haul truck operating hour estimates are run as part of the mine schedule. Haul cycle times are simulated from all pit benches to all destinations. Total pit production is balanced on calculated hauler operating hour requirements. This strategy is used to avoid large spikes and dips in the number of haulers in the LOM schedule but leads to some variations in total tonnes mined in each period. Cycle time simulations should be refined in future engineering studies.

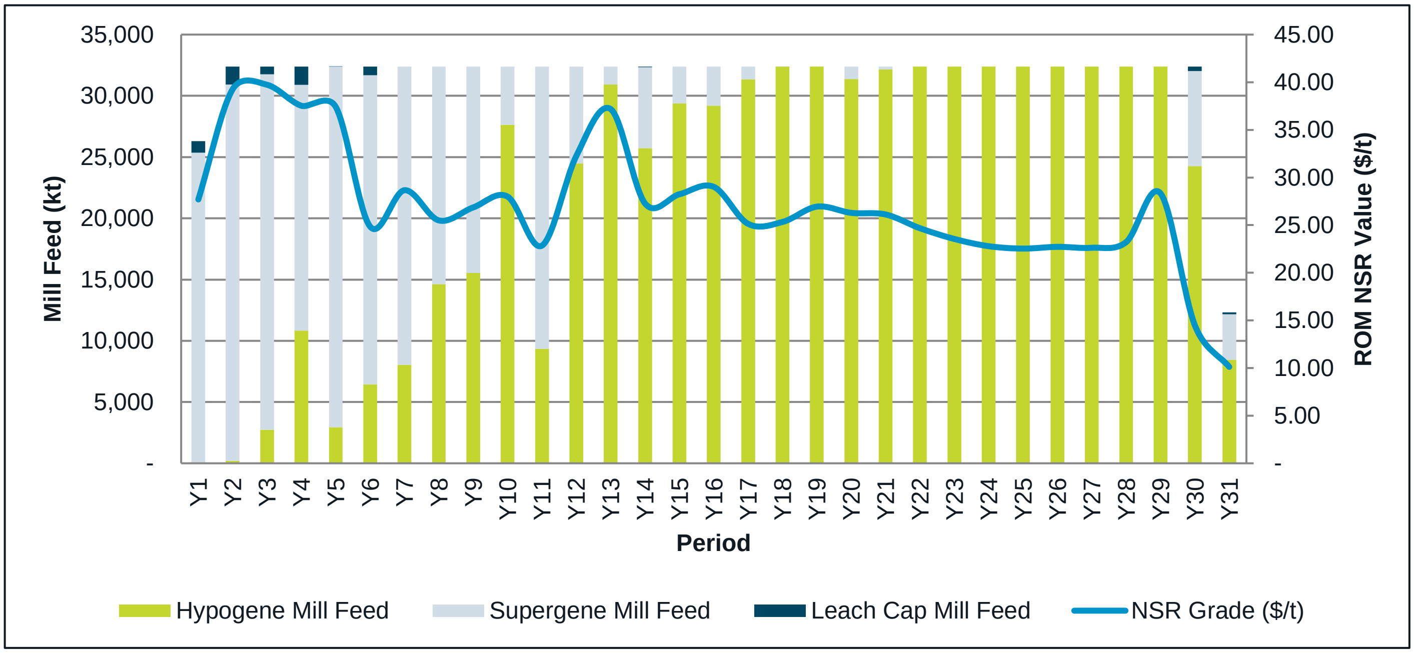
Table 16-7: Mine Production Schedule (PP to Year 15)

Mine Production	Units	LOM	PP	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15
Mill Feed	**Mt**	**978.2**	**0**	**26.3**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**
NSR	**$/t**	**27.35**	**0.00**	**27.70**	**39.28**	**39.73**	**37.53**	**37.41**	**24.84**	**28.66**	**25.50**	**26.86**	**27.99**	**22.85**	**32.26**	**37.18**	**27.27**	**28.25**
Cu	%	0.22	0.00	0.26	0.34	0.34	0.27	0.33	0.23	0.26	0.22	0.23	0.23	0.23	0.30	0.29	0.20	0.23
Mo	%	0.025	0.00	0.02	0.03	0.03	0.03	0.03	0.01	0.01	0.02	0.02	0.02	0.01	0.02	0.04	0.03	0.02
Ag	g/t	4.5	0.0	4.4	5.6	5.8	8.8	4.5	4.0	6.3	4.1	3.6	4.0	3.7	4.5	4.4	3.6	4.5
Au	g/t	0.02	0.00	0.04	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.03
Resource Mined from Pit	Mt	978.2	1.7	30.1	33.7	35.2	34.5	35.2	23.8	35.1	35.6	33.2	33.1	34.9	33.9	32.7	30.7	35.4
NSR	$/t	27.35	23.20	25.31	38.15	37.41	35.85	35.25	29.48	27.25	24.06	26.44	27.59	21.88	31.27	36.88	28.24	26.74
Mined Directly to Mill	Mt	929.1	0	25.7	32.4	32.4	32.4	32.4	23.8	32.4	32.4	32.4	32.4	32.4	32.4	32.4	30.7	32.4
NSR	$/t	28.23	0.00	27.76	39.28	39.73	37.53	37.41	29.48	28.66	25.50	26.86	27.99	22.85	32.26	37.18	28.24	28.25
Direct to Mill Feed Cutoff	$/t	0.00	0.00	13.00	12.00	12.00	12.00	13.00	8.50	12.00	11.00	10.00	10.00	10.00	10.00	10.00	8.50	12.00
Mined to Stockpile	Mt	49.2	1.7	4.4	1.3	2.8	2.1	2.8	0	2.7	3.2	0.8	0.7	2.5	1.5	0.3	0	3.0
NSR	$/t	10.64	23.20	10.83	10.16	10.45	10.04	10.31	0.00	10.32	9.78	9.18	9.18	9.20	9.23	9.08	0.00	10.34
Stockpile Retrieval to Mill	Mt	49.2	0	0.6	0	0	0	0	8.6	0	0	0	0	0	0	0	1.7	0
NSR	$/t	10.64	0.00	24.96	0.00	0.00	0.00	0.00	12.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.81	0.00
Waste Mined	Mt	1,101.5	43.1	24.9	71.3	46.8	73.5	68.3	57.7	56.9	63.4	63.8	64.9	56.1	49.1	52.3	38.3	27.6
Waste Rock	Mt	941	13.6	15.7	55.5	41.1	64.4	57.6	49.5	46.0	52.4	57.0	58.0	45.6	43.6	46.7	35.2	27.0
Overburden	Mt	161	29.5	9.2	15.8	5.7	9.1	10.7	8.3	10.9	10.9	6.8	6.9	10.5	5.5	5.5	3.1	0.7
Waste:Resource Ratio		1.1	25.5	0.8	2.1	1.3	2.1	1.9	2.4	1.6	1.8	1.9	2.0	1.6	1.5	1.6	1.2	0.8
Total Material Mined	Mt	2,079.7	44.8	55.0	105.0	82.0	108.0	103.5	81.5	92.0	99.0	97.0	98.0	91.0	83.0	85.0	69.0	63.0
Total Material Moved	Mt	2,128.9	44.8	55.6	105.0	82.0	108.0	103.5	90.1	92.0	99.0	97.0	98.0	91.0	83.0	85.0	70.7	63.0

Table 16-8: Mine Production Schedule (Year 16 to Year 31)

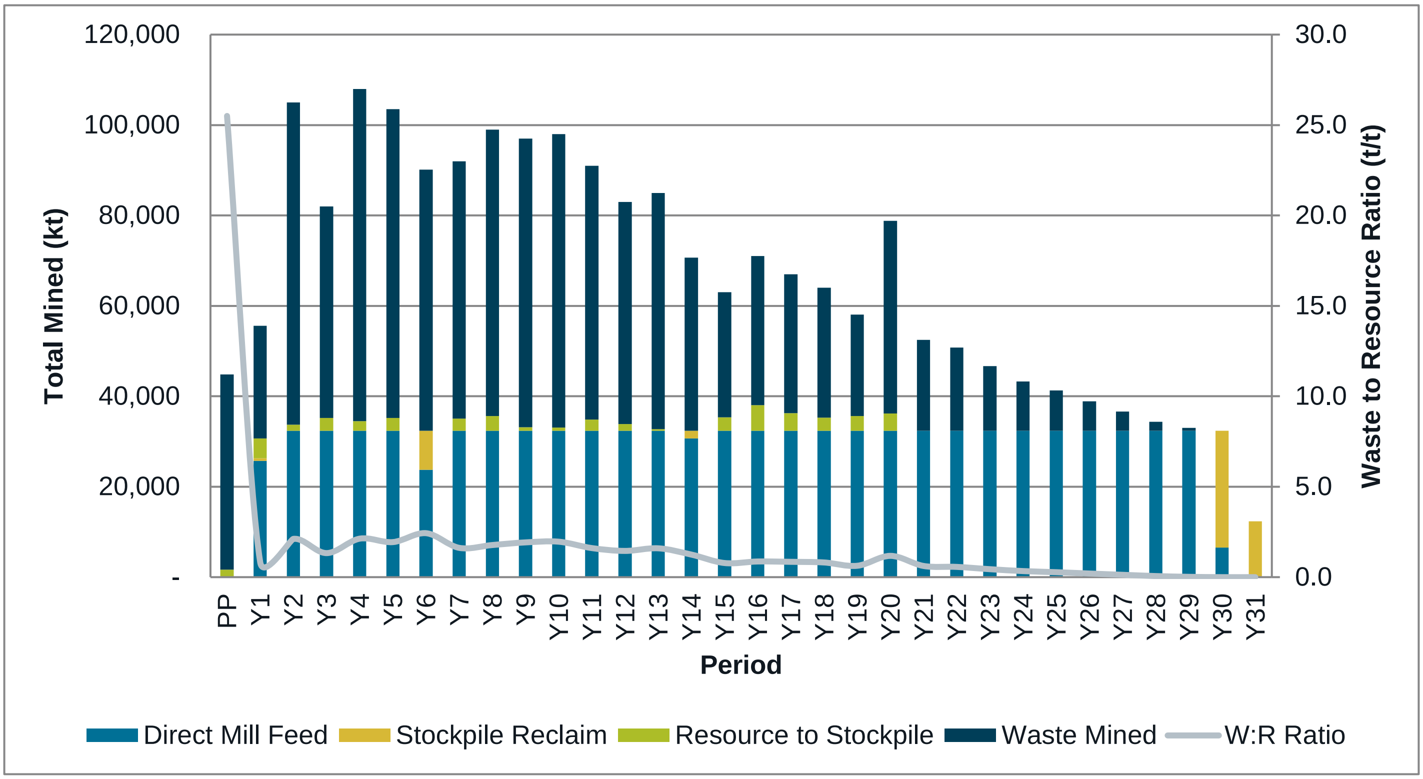
Mine Production	Units	LOM	Y16	Y17	Y18	Y19	Y20	Y21	Y22	Y23	Y24	Y25	Y26	Y27	Y28	Y29	Y30	Y31
Mill Feed	**Mt**	**978.2**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**32.4**	**12.3**
NSR	**$/t**	**27.35**	**29.02**	**25.13**	**25.33**	**26.94**	**26.29**	**26.12**	**24.68**	**23.55**	**22.79**	**22.54**	**22.72**	**22.62**	**23.22**	**28.33**	**14.48**	**10.12**
Cu	%	0.22	0.21	0.19	0.20	0.20	0.23	0.21	0.19	0.17	0.16	0.16	0.15	0.15	0.17	0.19	0.12	0.10
Mo	%	0.025	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.01	0.01
Ag	g/t	4.5	4.2	3.4	4.4	4.3	4.8	4.1	3.9	3.6	3.9	4.6	5.8	5.4	4.1	3.7	2.5	2.1
Au	g/t	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Resource Mined from Pit	Mt	978.2	38.0	36.3	35.3	35.6	36.2	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	6.5	0
NSR	$/t	27.35	26.23	23.58	24.11	25.42	24.63	26.12	24.68	23.55	22.79	22.54	22.72	22.62	23.22	28.33	31.78	0.00
Mined Directly to Mill	Mt	929.1	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	6.5	0
NSR	$/t	28.23	29.02	25.13	25.33	26.94	26.29	26.12	24.68	23.55	22.79	22.54	22.72	22.62	23.22	28.33	31.78	0.00
Direct to Mill Feed Cutoff	$/t	0.00	12.00	12.00	12.00	12.00	12.00	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	0.00
Mined to Stockpile	Mt	49.2	5.6	3.9	2.9	3.2	3.8	0	0	0	0	0	0	0	0	0	0	0
NSR	$/t	10.64	10.21	10.47	10.44	10.25	10.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stockpile Retrieval to Mill	Mt	49.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25.9	12.3
NSR	$/t	10.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.12	10.12
Waste Mined	Mt	1,101.5	33.0	30.7	28.7	22.5	42.6	20.1	18.4	14.3	10.9	8.9	6.5	4.2	2.0	0.6	0	0
Waste Rock	Mt	941	32.2	29.3	26.7	21.3	40.9	17.8	16.4	14.3	10.9	8.9	6.5	4.2	2.0	0.6	0	0
Overburden	Mt	161	0.8	1.4	2.0	1.2	1.8	2.3	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0
Waste:Resource Ratio		1.1	0.9	0.8	0.8	0.6	1.2	0.6	0.6	0.4	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.0
Total Material Mined	Mt	2,079.7	71.0	67.0	64.0	58.1	78.8	52.5	50.8	46.7	43.3	41.3	38.9	36.6	34.4	33.0	6.5	0.0
Total Material Moved	Mt	2,128.9	71.0	67.0	64.0	58.1	78.8	52.5	50.8	46.7	43.3	41.3	38.9	36.6	34.4	33.0	32.4	12.3

Figure 16-13: Mine Production Schedule, Mill Feed Tonnes & Grade



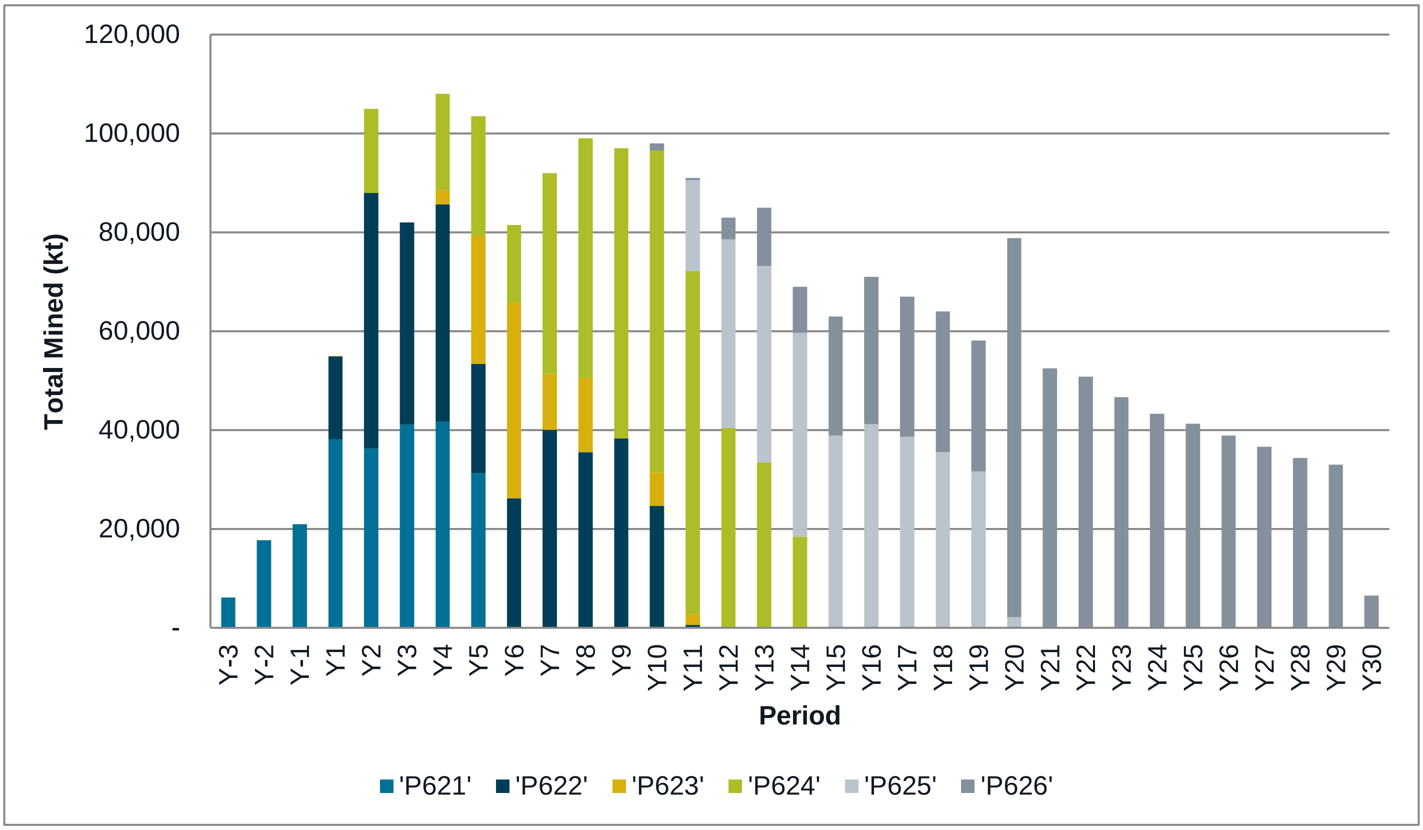
Source: Moose Mountain, 2023.

Figure 16-14: Mine Production Schedule, Material Mined & Waste Mining Ratio



Source: Moose Mountain, 2023.

Figure 16-15: Mine Production Schedule, Phase Development



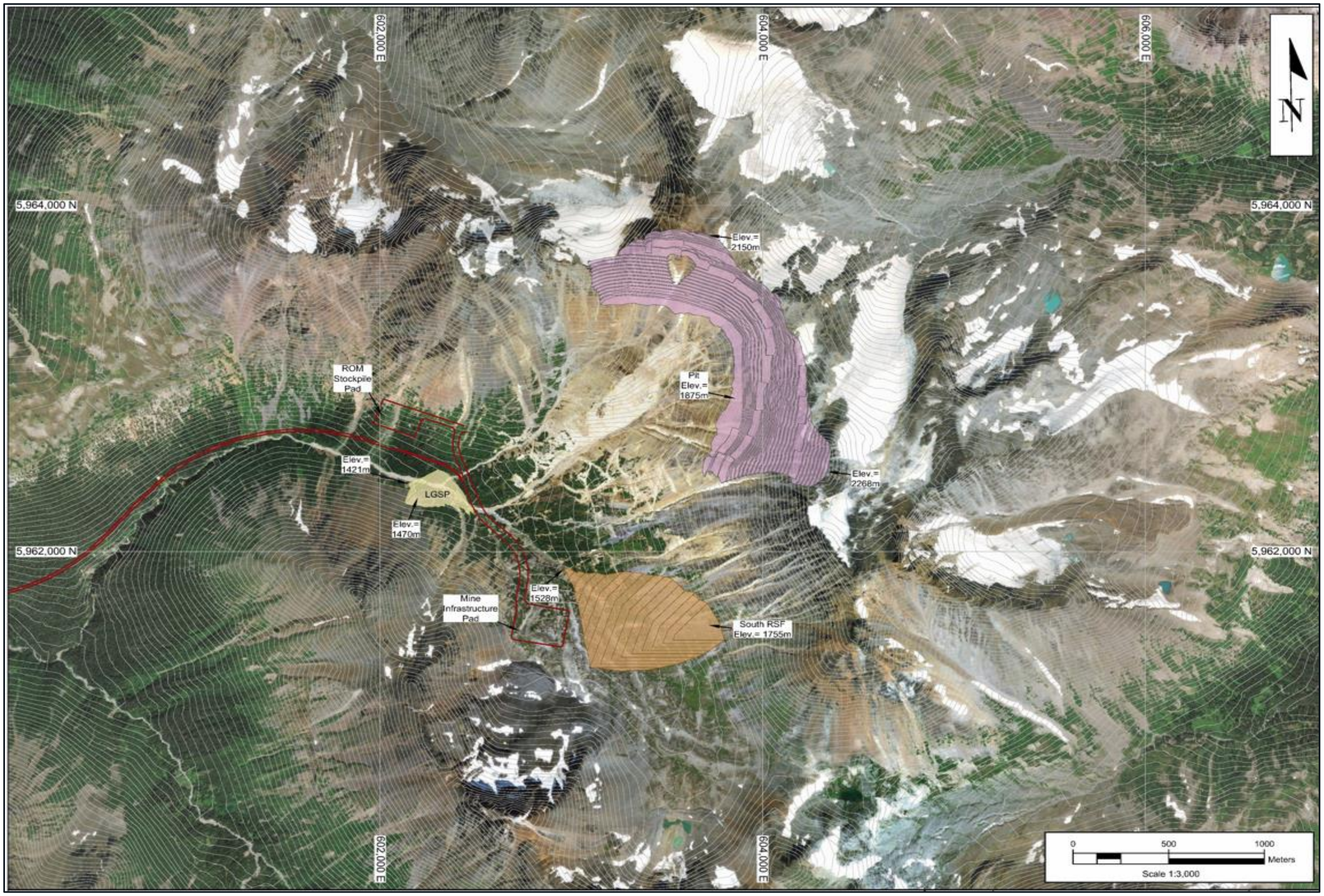
Source: Moose Mountain, 2023.

16.7.1 Mining Sequence

The following end of period (EOP) plan figures, for Y-1, Y1, Y3, Y10, Y20 and end of mine life, illustrate the general mine development sequence.

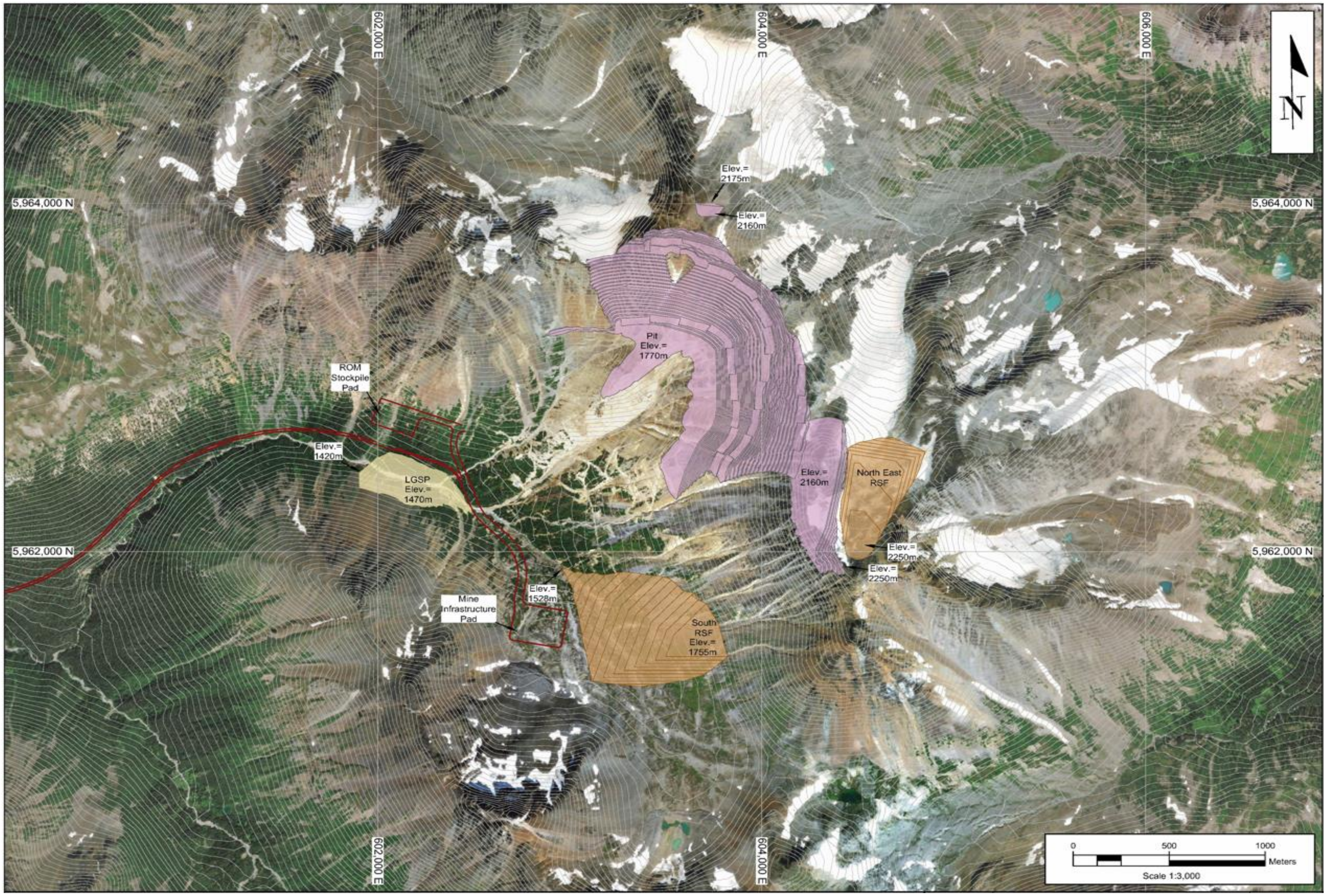
It should be expected that the mine production schedule and general mine sequence will be refined in future engineering studies, accounting for potential adjustments to the resource block model, as well as more robust mine engineering beyond scoping level engineering.

Figure 16-16: Y-1 Mining EOP



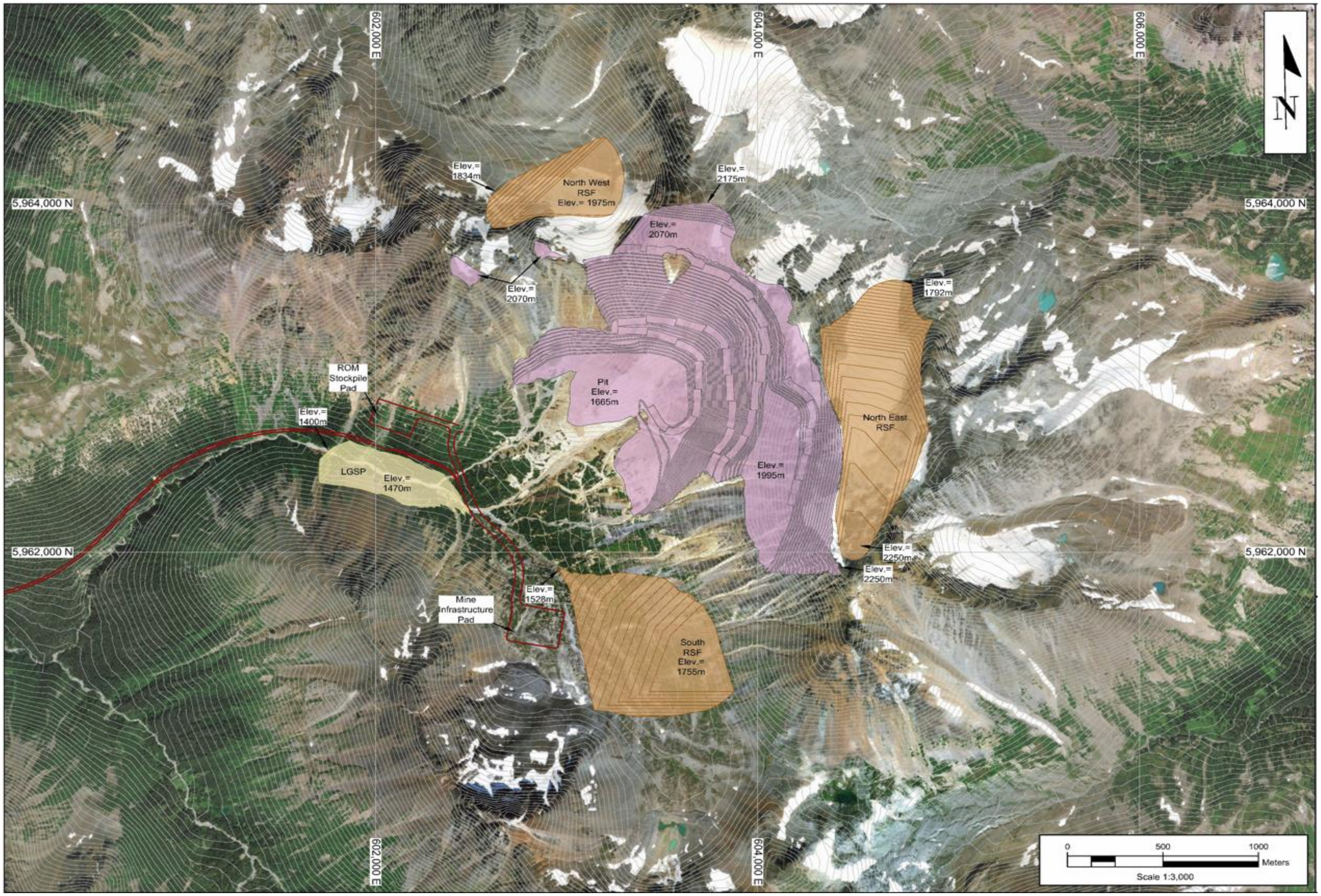
Source: Moose Mountain, 2023.

Figure 16-17: Y01 Mining EOP



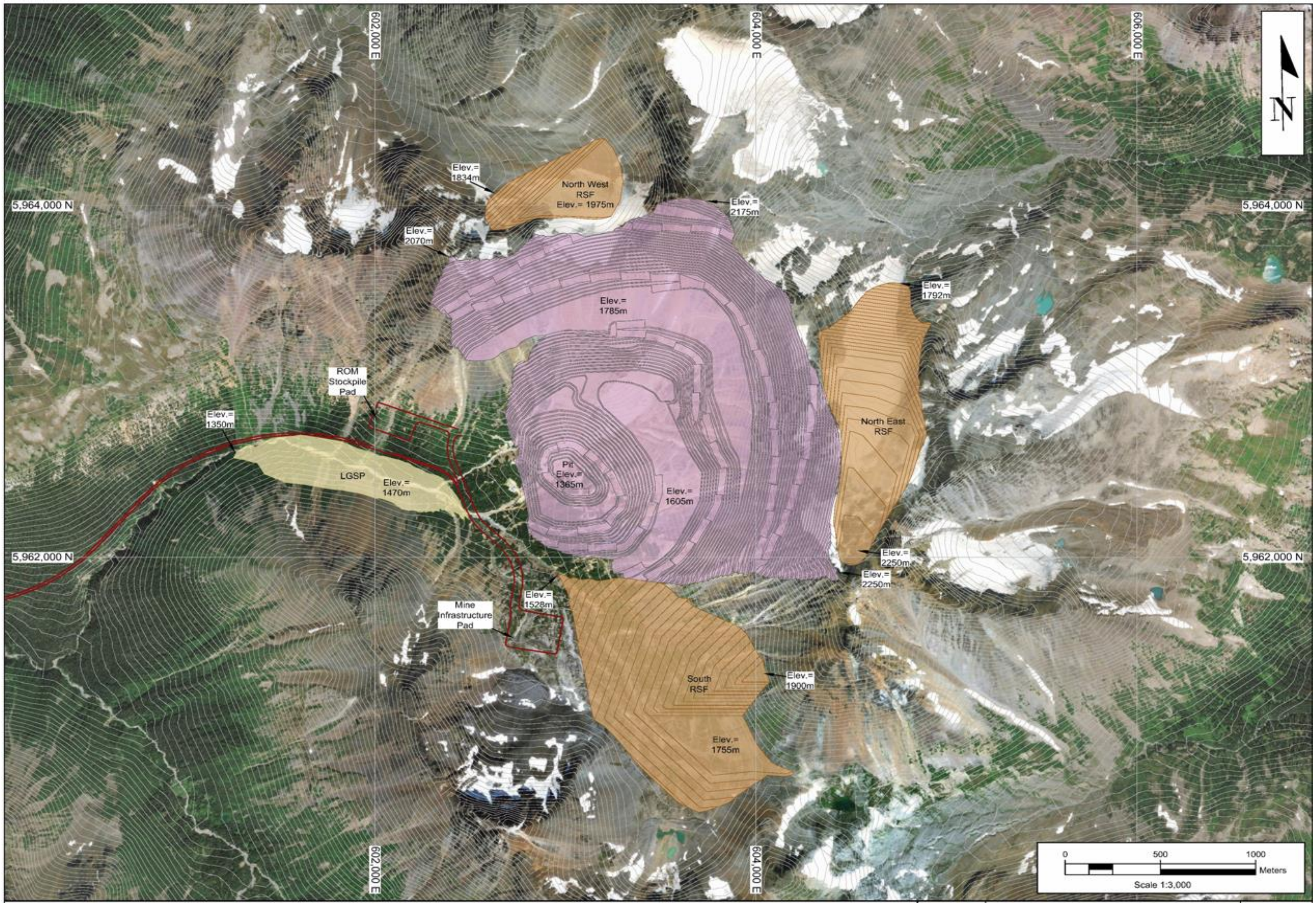
Source: Moose Mountain, 2023.

Figure 16-18: Y03 Mining EOP



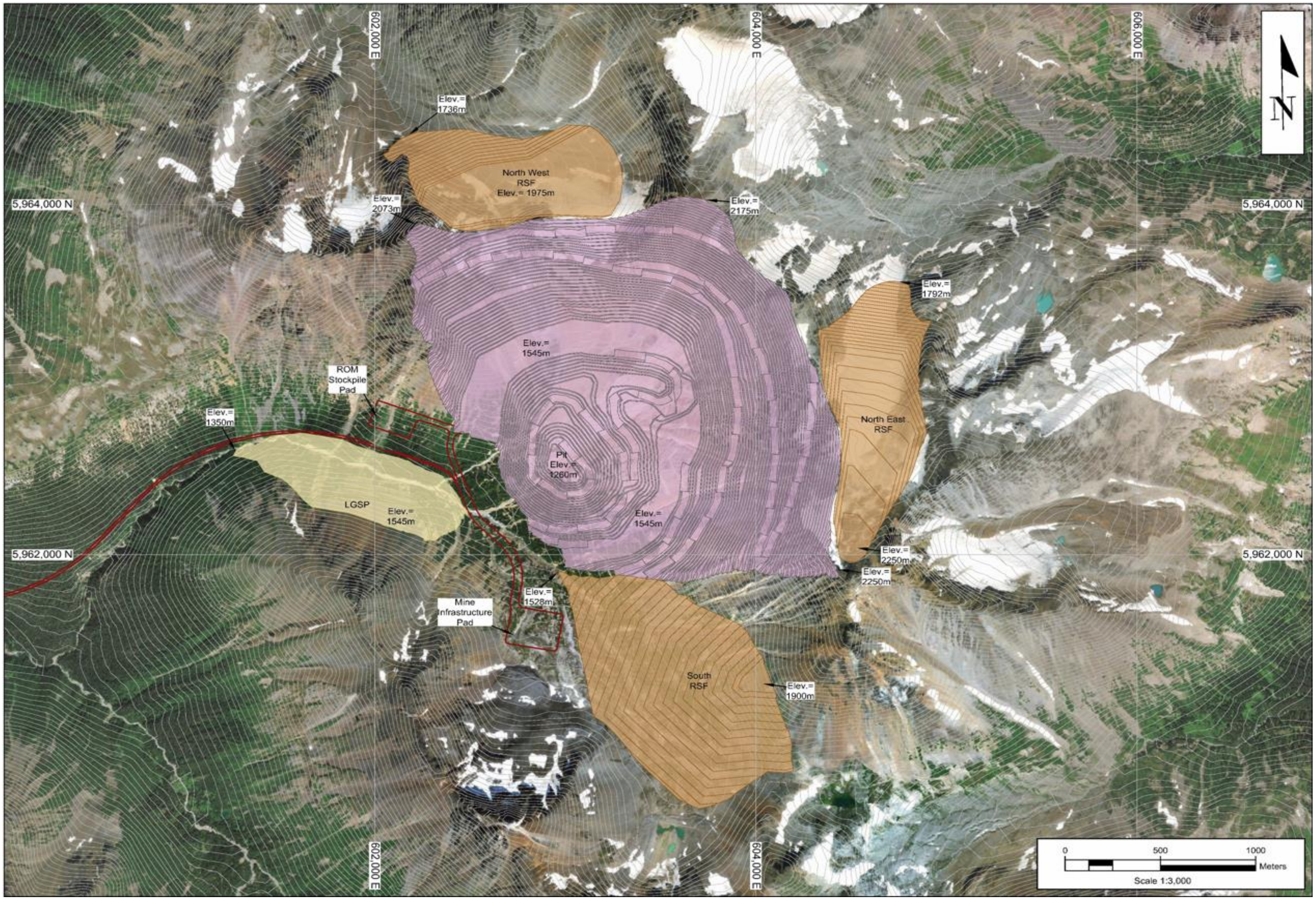
Source: Moose Mountain, 2023.

Figure 16-19: Y10 Mining EOP



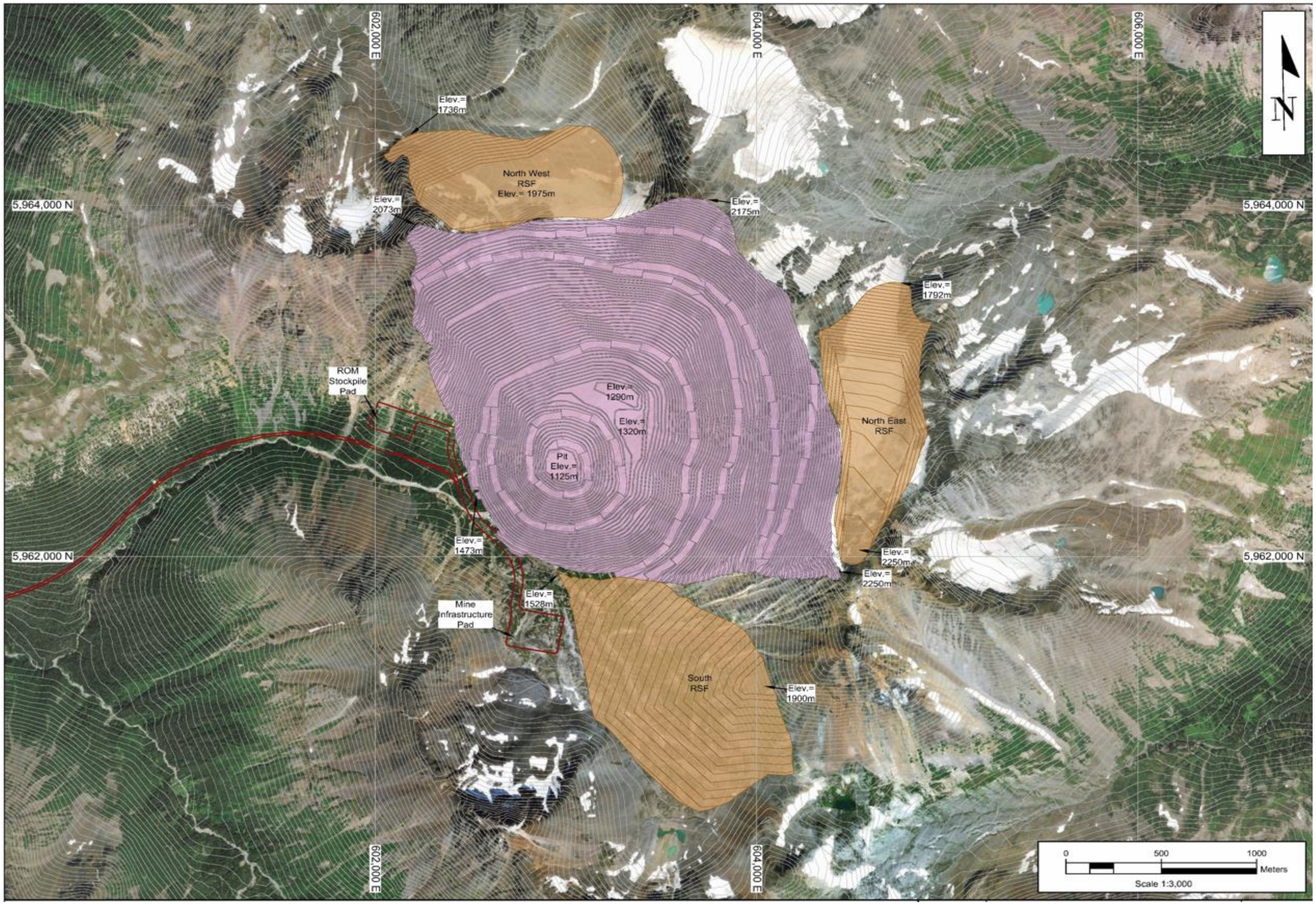
Source: Moose Mountain, 2023.

Figure 16-20: Y-20 Mining EOP



Source: Moose Mountain, 2023.

Figure 16-21: End of Mine Life EOP



Source: Moose Mountain, 2023.

16.8 Operations

The planned owner operated mining operations are to be typical of large scale open pit operations in similar terrain.

In-situ rock is drilled and blasted on 15 m benches to create suitable fragmentation for efficient loading and hauling of both resource and waste rock. It is assumed that overburden material does not require drilling and blasting. Electric rotary drills are used for production drilling, with support from diesel powered rotary drills. Tertiary diesel powered down the hole (DTH) drills are also included for highwall geotechnical drilling, and for pre-shearing or buffer blasting on the pit walls. Pioneer drills will be utilized for developing cut roads and blasting on small benches at the tops of pit phases.

Powder factors of 0.30 kg/t in resource and 0.27 kg/t in waste rock are proposed. The blasting activities are planned to fall under a contract service agreement with the explosive supplier. The supplier will provide the blasting materials and technology for the mine, including the blasting trucks. An explosive plant has not been scoped for this project, with the assumption that materials will be delivered to site from other nearby regional plants. A mixed emulsion type of explosive is assumed. The supplier mixes explosive on site. The owner's blasting crew takes delivery of the blasting materials, loads the holes, and performs the blasting operations. It is recommended to conduct drill penetration and blast fragmentation studies on the various Berg rock types as part of further project engineering.

Blasthole cutting will be assayed on regular intervals, with results informing an operational grade control block model, which will influence short to medium range mine planning. Systems on-board the drills and shovels will allow for delineation of mineralization from waste at the face, based on the grade control plans from the technical services team.

All resource material, waste rock and overburden require loading from the open pits into haul trucks. Electric cable shovels are the primary loading units. Diesel powered hydraulic shovels are included in the fleet to load resource material and to provide flexibility to the fleet. A wheel loader is also specified for re-handling material, loading overburden, pit clean up, road construction, snow removal, or as an alternate to load trucks in the pit if periodic low shovel availability requires it. The wheel loader will also support ROM pad activities, as needed.

Fuel and electricity will both be distributed into the open pit to power the mobile mine fleet.

Resource, waste rock, and overburden will be hauled out of the pit and to scheduled destinations with diesel powered rigid frame haul trucks. Mine pit services include:

- haul road maintenance
- shovel face maintenance
- pit floor and ramp maintenance
- stockpile and RSF maintenance
- mobile fuel and lube services
- electric cable support for shovels and drills
- ditching
- dewatering
- secondary blasting and rock breaking
- snow removal
- reclamation and environmental control
- lighting

- transporting personnel and operating supplies

Direct mining operations and mine fleet maintenance are planned as an Owner's fleet with direct operating costs falling under mine operations. General mine expense (GME), or indirect supervision and departmental costs for mine operations, mine maintenance and mine technical services, also falls under mine operations.

Mining operations are based on 365 operating days per year with two 12-hour shifts per day. An allowance of 10 days of no production has been built into the mine schedule to allow for adverse weather conditions.

The number of hourly mine operations personnel, including maintenance crews, peaks at 344 persons. Due to the shift rotation, only one-quarter of full personnel complement will be on shift at a given time. Salaried personnel of approximately 38 persons will be required for mine operations, including the mine and maintenance supervision, mine engineering and geology.

16.9 Mining Equipment

The mine equipment descriptions are based on typical fleet contingents utilized in other large scale North American open pit mine operations. It should be expected that equipment specifications and fleet sizes will be altered with further project engineering and optimization.

Production drilling will be carried out with 305 mm (12”) electric driven rotary drills, with support from 228 mm (9”) diesel driven rotary drills. Highwall control and depressurization drilling will be carried out with 144 mm (5.5”) down-the-hole (DTH) drills. Smaller tracked pioneer drills will be employed as needed throughout the mine life.

Electric cable shovels (34 m^3 bucket) are proposed as the primary loading units to keep operating costs as low as possible. Hydraulic face shovels (22 m^3 bucket) are proposed to support the cable shovels, based on their ability to minimize losses and dilution along waste and mineralization contact, and to navigate into tighter mining areas. A front end wheel loader (22 m^3 bucket) is proposed to provide additional loading flexibility, and to provide the ability to load the crusher when required.

Rigid-frame haulers (231 tonne payload) are proposed. This truck size strikes a balance between flexibility to mine on smaller pit benches and in selective mining scenarios but are not so small that the fleet size is excessive. While the current mining plan envisions a diesel-powered haul truck fleet, it is expected that at the time of a construction decision, sufficient electric alternatives will be available for purchase. Most of the life of mine (LOM) hauls are downhill loaded to the ROM pad, which is an ideal scenario for an electric powered fleet.

Graders will be used to maintain the haul routes for the haul trucks and other equipment within the pits and on all routes to the various waste storage locations and the crusher. Rigid frame haul trucks outfitted with a water tank (170,000 L) are included for haul road maintenance. Track dozers (450 kW and 325 kW) are included to handle waste rock at the various waste storage locations and to support the in pit activities, including cutting roadways to access the upper benches of the open pit. Wheel dozers (370 kW) will support maintenance at the shovel faces, and along the pit floors. Front-end wheel loaders with a cable reeler attachment will support electrical distribution to the drills and shovels. Hydraulic excavators (3.8 $m^3$and 3.0 m^3 bucket) are included as pit support, grade control support, and pioneer mining support. Articulated haul trucks (40 t payload) are included as a support hauler for overburden, as well as accessing smaller pit mining areas such as pit bottoms of initial bench access when bench diving. Custom fuel/lube trucks are included for mobile fuel/lube support. Various small mobile equipment pieces are proposed to handle all other pit service and mobile equipment maintenance functions.

Pits will be dewatered via gravity drainage out of horizontal drilled holes in the pit walls, or with conventional dewatering equipment: submersible pumps placed in pit bottom sumps, and/or vertical pumping wells established along the pit perimeter. A nominal amount of pumping has been assumed for this pit, based on other regional large scale open pits, but it is recommended to conduct additional hydrogeologic test work and analysis to further refine this estimate in future mine planning. Pit water will be pumped to collection ponds adjacent to the pits, where it will be managed as per the overall site water management plan.

Mine fleet maintenance activities are generally performed in the maintenance facilities located near the plant site. Maintenance for the larger pieces of equipment, such as shovels and drills, is done in the field by a mobile maintenance crew.

Primary mining equipment requirements are summarised in Table 16-9. The equipment classes, as well as number of units, are preliminary scoping level estimates, and modifications in future studies should be anticipated.

Table 16-9: Primary Mining Fleet Schedule

Description	PP*	Y01	Y02-Y11	Y12-Y13	Y14-Y20	Y21-Y27	Y28-Y29	Y30-Y31
Drilling								
Electric Rotary Drill 305 mm (12”) holes	0	2	3	3	2	1	1	0
Diesel Rotary Drill 228 mm (9”) holes	2	2	3	3	3	3	2	1
Loading								
Electric Cable Shovel 34.0 m^3bucket	0	1	2	2	2	2	2	2
Hydraulic Shovel 22.0 m^3 bucket	1	3	4	2	2	2	1	1
Wheel loader 22.0 m^3 bucket	1	2	2	2	2	2	1	1
Hauling								
Rigid frame haul truck 231 t payload	10	16	33	33	22	15	15	7

*Pre-Production

16.10 Risks

Risks to the PEA defined mill feed quantities, metal grades, associated waste rock quantities and the estimated costs to exploit include changes to the following factors and assumptions:

- metal prices;
- interpretations of mineralization geometry and continuity in mineralization zones;
- geotechnical and hydrogeological assumptions, including potential avalanche risk from operating on side slopes;
- geochemical assumptions for mined waste materials;
- ability of the mining operation to meet the annual production rate and anticipated grade control standards and recoveries;
- ability of the milling operation to meet the annual production rate and recoveries;
- operating cost assumptions and cost creep;
- ability to meet and maintain permitting and environmental licence conditions, and the ability to maintain the social licence to operate; and
- ability to access capital for project financing.

17 RECOVERY METHODS

17.1 Overview

Based on the analysis of past metallurgical testing, discussed in Section 13, and Ausenco's process design expertise, a conventional copper-molybdenum flotation process was chosen as the most suitable for the deposit and project economics. The unit operations selected are typical for copper-molybdenum recovery and the proposed flowsheet uses standard processes and technologies.

The process will beneficiate copper and molybdenum from both supergene and hypogene materials. Key process design parameters include:

- Nominal throughput of 90,000 t/d or 32.9 Mt/a
- Bulk rougher flotation to be conducted at a feed sizing of 80 percent passing 161 µm.

17.2 Process Plant Description

The process design is comprised of the following circuits:

- Two-stage crushing of ROM material;
- A crushed mineralized material uncovered stockpile to provide buffer capacity ahead of the grinding circuit;
- SAG mill with trommel screen followed by a ball mill with cyclone classification;
- Copper and molybdenum bulk flotation with regrinding prior to cleaner flotation;
- Copper - molybdenum separation flotation;
- Thickening, filtration and loading of copper and molybdenum concentrates; and
- Tailings pumping and disposal.

17.3 Process Design Criteria

Along with the design parameters listed in Section 17.1, Table 17 presents additional design criteria developed for the copper/molybdenum flotation plant.

Table 17-1: Process Design Criteria

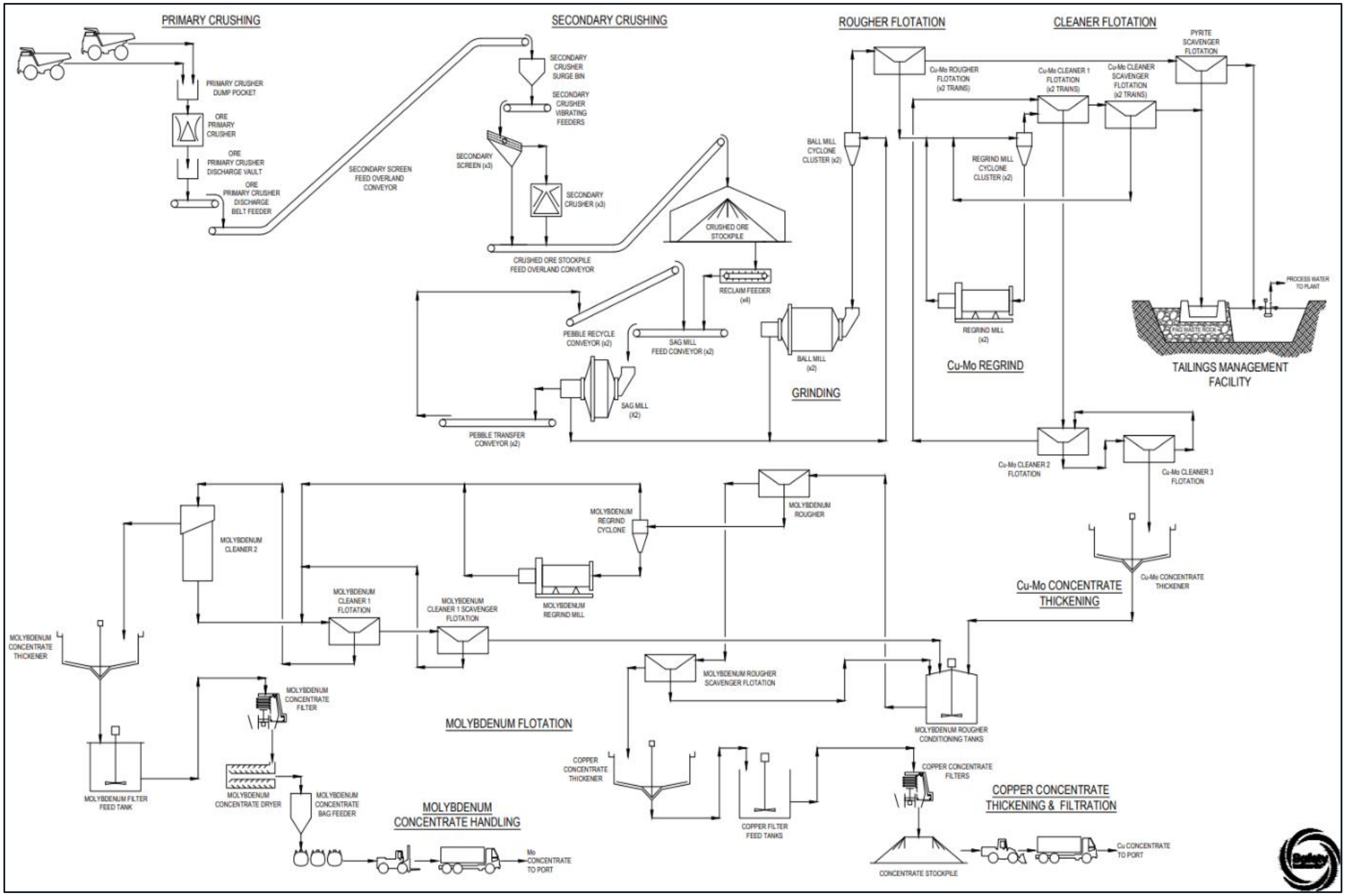
Description	Units	Value
Annual throughput	Mt/a	32.9
Daily throughput	kt/d	90
ROM head grade, copper – design	%	0.45
ROM head grade, molybdenum – design	%	0.040
ROM head grade, silver – design	g/t	4.5
Crushing and grinding circuit	-	2C-SABC
Crushing availability	%	75

Description	Units	Value
Grinding and flotation availability	%	92
Concentrate filtration availability	%	85
Crushing plant capacity, for design (dry)	t/h	6,000
ROM feed size, F100	mm	1,000
Bond crushing work index	kWh/t	13.5
Primary crushing product size, P80	mm	529
Secondary crushing feed size, F100	mm	390
Secondary crushing product size, P80	mm	153
Grinding circuit	-	2 operating lines
Grinding plant capacity, for design (dry)	t/h	4,076
JK Drop Weight Axb value (estimated) – design	-	52.0
Bond ball mill work index – design	kWh/t	15.8
Bond abrasion index – design	g	0.15
Grinding feed size, F100	mm	42
Grinding product size, P80	µm	161
SAG Mill Specific Energy	kWh/t	6.3
Ball Mill specific energy	kWh/t	8.1
Copper rougher	-	2 operating lines, tank cell
Residence time, design	min	20
Pyrite scavenger	-	2 operating lines, tank cell
Residence time, design	min	8
Regrind mill	Type	2 horizontal stirred
Regrind circuit product size, P80	µm	20
Bulk cleaner	# stages	4 stages, tank cells
Molybdenum rougher	-	1 operating line, tank cells
Residence time, design	min	25
Molybdenum rougher scavenger	-	1 operating line, tank cells
Residence time, design	min	15
Regrind mill	Type	1 horizontal stirred
Regrind circuit product size, P80	µm	20
Molybdenum cleaner	# stages	2 stages; tank cells, column
Final copper concentrate moisture	%w/w	10
Final copper concentrate grade	%Cu	26
Final molybdenum concentrate moisture	%w/w	5
Final molybdenum concentrate grade	%Mo	50

17.3.1 Process Flow Sheet

An overall process flow diagram (PFD) showing the unit operations in the process plant is presented in Figure 17-1.

Figure 17-1: Process Flowsheet



Source: Ausenco, 2023.

17.4 Plant Design

The processing facilities are described in the following sections below.

17.4.1 Crushing Circuit

Primary crushing will be conducted near the pit boundary limits and reduce run-of-mine (ROM) feed material from 80 percent (F80) passing 529 mm to a P80 of 141 mm. ROM material will be truck dumped into the primary crusher dump pocket which will feed the primary gyratory crusher. The crushing circuit is designed for an annual operating time of 6,570 h or 75% availability. The circuit is sized for a maximum throughput of 6,000 t/h from the outset of the Project.

The primary crushed material will fall into the primary crusher discharge vault and onto the primary crusher discharge belt feeder. The feeder will deliver crushed material to the overland conveyor which will deliver material to the secondary crusher surge bin. Vibrating feeders will draw from surge bin to feed three secondary screens and crushers. Screen undersize and secondary crushed material will discharge onto the crushed stockpile feed conveyor which will deliver material to the covered stockpile. Twin reclaim feeders will draw from the stockpile to feed each SAG mill feed conveyor.

The crushing, conveying and stockpile circuits include the following major equipment and facilities:

- ROM crusher dump pocket
- Primary gyratory crusher (1,200 kW)
- A rock breaker
- Primary crusher discharge conveyor (1,800 mm belt width, 26 m long)
- Secondary cone crushers – 3 (750 kW each)
- An overland conveyor (1,200 mm belt width, 2 sections, 3.4 km total length)
- A covered feed stockpile (12-hour live capacity, approximately 48,900 t).

17.4.2 Grinding Circuit

The grinding circuit consists of a SAG mill followed by a ball mill in a closed circuit with hydrocyclones. The circuit is sized based on SAG mill feed size of 80% passing (F80) 42 mm and a ball mill product of 80% passing (P80) 161 µm. The SAG mill slurry discharged through a trommel screen, where oversize pebbles are recycled to the SAG mill via conveyors. Trommel screen undersize discharges into the cyclone feed pumpbox.

Each ball mill is fed by cyclone underflow. The ball mills discharge through a trommel, and the oversize is screened out and discharged to a scats bunker, whereas the trommel undersize discharges into the corresponding cyclone feed pumpbox.

Water is added to the cyclone feed pumpbox to obtain the appropriate density prior to pumping to the cyclones. Cyclone overflow advances to the flotation circuit.

Major equipment in this area includes:

- SAG mills
- Ball mills
- Primary cyclone clusters.

17.4.3 Bulk Copper-Molybdenum Flotation

The copper-molybdenum bulk flotation will consist of rougher flotation cells, pyrite scavenger cells, concentrate regrind circuit, three-stage copper-moly cleaner flotation cells and copper-moly scavenger flotation cells.

The overflow from the primary cyclone cluster reports to the rougher cell feed box. Frother and collector reagents are added to this feed box. Process water and flotation (low-pressure) air is added to each of the cells to maintain the pulp density of 35% w/w in each cell and initiate bubble formation required for flotation.

The rougher concentrate is collected from each rougher cell and pumped to regrinding, while the tailings are advanced to the pyrite scavenger flotation circuit. The rougher tailings are scavenged in the pyrite flotation circuit to separate the higher grade sulphur bearing material from the tailings and deposit it in a separate section of the tailings storage facility.

Rougher flotation concentrate will report to the regrind cyclone cluster. Regrind cyclone underflow will report to a high intensity grinding mill. Reground material and regrind cyclone overflow will report to the first copper-moly cleaner flotation cells. Tailings from the first cleaner stage will report to the cleaner scavenger stage. Concentrate from the first cleaner stage will report to the second and third copper-moly cleaner stages subsequently. Third cleaner concentrate will report to the elevated copper-moly concentrate thickener. Cleaner scavenger tails will join the pyrite rougher concentrate for separate tailings disposal.

17.4.4 Molybdenum Flotation

The molybdenum flotation circuit consists of a conditioning tank, rougher flotation, regrind circuit, scavenger flotation, two stages of cleaner and one stage of cleaner scavenger flotation.

The underflow from the copper-moly concentrate thickener will be pumped to the molybdenum rougher conditioning tank. After conditioning, copper-moly concentrate will be pumped to the rougher flotation. The concentrate from rougher flotation will be delivered to the regrind circuit and the tailings will advance to the rougher scavenger cells. The concentrate from rougher scavenger will be recirculated to the rougher conditioning tank and the tailings will be report to the copper concentrate thickener. Reground material and regrind cyclone overflow will advance to the first molybdenum cleaner flotation cells.

Tailings from the first cleaner stage will report to the cleaner scavenger stage. Concentrate from the first cleaner stage will report to the second cleaner stage. Second cleaner concentrate will report to the molybdenum concentrate thickener. The concentrate from the cleaner scavenger stage will go back to the first cleaner stage and the tailings will return to the rougher conditioning tank.

17.4.5 Copper Concentrate Handling

Copper concentrate will be thickened to approximately 60% solids in the high-rate copper concentrate thickener. Thickener overflow will report to the process water tank. Copper concentrate underflow will be pumped to the copper filter feed tank where the copper concentrate slurry will pass through a concentrate filter. Filtrate from the copper concentrate filter will be pumped back to the copper concentrate thickener. Copper concentrate filter cake at 8% moisture will be discharged to a covered concentrate loadout stockpile. Copper concentrate will be reclaimed by front-end loader and loaded into containerized highway haulage trucks.

17.4.6 Molybdenum Concentrate Handling

Molybdenum concentrate will be thickened to approximately 60% solids in the high-rate molybdenum concentrate thickener. Thickener overflow will report to the process water tank. Molybdenum concentrate underflow will be pumped to the molybdenum filter feed tank where the molybdenum concentrate slurry will pass through a concentrate filter. Filtrate from the molybdenum concentrate filter will be pumped back to the molybdenum concentrate thickener. Molybdenum concentrate filter cake at 10% moisture will report to the molybdenum concentrate dryer. Dried molybdenum concentrate at 5% moisture content will report to the molybdenum concentrate storage bin. Molybdenum concentrate will be withdrawn from the storage bin into a packing system. The molybdenum concentrate will be bagged for transport by truck.

17.4.7 Tailings Handling

The tailings from each train of pyrite scavenger flotation cells will report a rougher tailings pumpbox. Two sets of rougher tailings pumps in series will draw from the pumpbox, sending sulphur depleted tailings through 2 HDPE lines to the tailings impoundment. The pyrite scavenger concentrates and cleaner scavenger tails will report to an additional tailings pumpbox with dedicated pumps to deliver high sulphur tailings to a separate location at the tailings facility.

17.4.8 Reagents Handling and Storage

Reagents used in the process plant and associated areas are described in the following sections. Details on handling and storage are given, along with the estimated yearly consumption for each item.

In general, each set of compatible reagent mixing and storage systems are located within containment areas to prevent spillage and contamination of the environment and unintended mixing with other reagents. Storage tanks are equipped with level indicators, instrumentation, and alarms to ensure spillage does not occur during normal operation. Appropriate ventilation, fire and safety protection, eyewash stations and Safety Data Sheets (SDS) are located throughout the facilities. Sumps and sump pumps are provided in the containment areas for spillage control. Table 17 shows the reagents used in the process plant.

Table 17-2: Reagents Handling & Storage

Reagent	Preparation Method	Used
PAX	Delivered in bulk bags and transferred into a storage tank for dosing into flotation	Collector
Methyl Isobutyl Carbinol (MIBC)	Delivered in intermediate bulk containers and dosed neat into flotation	Frother
Fuel Oil (Diesel)	Delivered by truck and transferred into a storage tank for dosing into flotation	Enhancer
Lime	Delivered as powdered quicklime, stored in silo, dosed dry to regrind mill, also slaked and dosed as a slurry	pH control
Sodium hydrosulphide	Delivered at a 40% concentration, diluted to 20% and dosed at various points in molybdenum flotation	Copper depressant

17.5 Reagents Consumables, Energy, Water and Process Materials Requirements

17.5.1 Energy, Water and Process Materials Requirements

Plant services and utilities include air, water, and electricity for the plant and its associated areas. The descriptions of the various services are given below, along with estimated yearly consumption of each type of utility for the plant.

Table 17-3 shows the reagent consumptions throughout the life of mine.

In general, redundant systems are used to ensure availability of the process plant. Appropriate fire and safety protection systems are used throughout the plant, including level indicators, alarms, and emergency shutdown switches.

Table 17-3: Reagent and Comminution Consumables Consumption

Reagent	Unit	Consumption
Primary Crusher Liners	Sets/a	2
Secondary Crusher Liners	Sets/a	18
Secondary Screen Deck panels	Sets/a	6
SAG Mill Media	t/a	7,030
SAG Mill Liners	Sets/a	4
Ball Mill Media	t/a	12,910
Ball Mill Liners	Sets/a	2
Collector 1 (PAX)	t/a	493
Frother 1 (MIBC)	t/a	821
Fuel Oil	t/a	494
Quicklime	t/a	34,493
Sodium Hydrosulphide	t/a	1,955
Nitrogen Air	Nm^3/hr	1,000
Bulk Regrind Mill Media	t/y	964
Bulk Regrind Mill Liners	Sets/y	1
Molybdenum Regrind Mill Media	t/y	19.9
Molybdenum Regrind Mill Liners	Sets/y	1

17.5.2 Process and Instrument High-Pressure Air

Plant air compressors supply air at 862 kPa to various processing plant equipment as needed. An air dryer is used to remove moisture before use in instrumentation. There are dedicated air compressors for concentrate filter, and blowers for the flotation cells. It is expected that a vendor supplied nitrogen plant will be installed to provide flotation gas to the molybdenum circuit.

17.5.2.1 Raw Water Supply System

Raw water is supplied by a nearby Nanika Lake to a raw/fire water tank. This water is used for a variety of purposes requiring clean water with low dissolved solids and salt content:

- Gland water for pumps;
- Reagent make-up;
- Pulp density control for various process plant unit operations;
- Fire water used in the sprinkler and hydrant system;
- Cooling water for mill motors and lubrication systems; and
- Dilution and froth water in the molybdenum circuit.

The total estimated amount of raw water used from the lake per year is approximately 3.30 Mm^3.

17.5.2.2 Process Water Supply System

Process water supply to the plant consists of recycled overflow streams from the bulk and concentrate thickeners, concentrate filters and tailings storage facility.

The total amount of process water circulated around the plant is approximately 66.02 Mm^3/y, or 7,537 m^3/h.

17.5.2.3 Fire Water Supply System

Fire water is sourced from the raw/fire water tank. A pump skid with a dedicated electrical pump, a jockey pump, and a diesel-powered pump supplies emergency fire water distribution to the plant.

17.5.2.4 Projected Process Plant Energy Requirements

The total installed power for the process plant and estimated power consumption is given in Table 17. Further discussion on the operating costs and power consumption for each area of the process plant is given in Section 18. The total power requirements for the process plant are 667,309 MWh/a.

Table 17-4: Process Plant Power Requirements

Area	Installed Power (kW)	Consumption (MWh/a)
Crushing	4,397	19,550
Stockpile & Reclaim	440	2,437
Grinding	71,645	520,805
Flotation & Regrind	18,475	97,597
Concentrate Handling	624	3,418
Reagents Handling	465	2,586
Plant Services	3,841	20,916
Total	**99,888**	**667,309**

18 PROJECT INFRASTRUCTURE

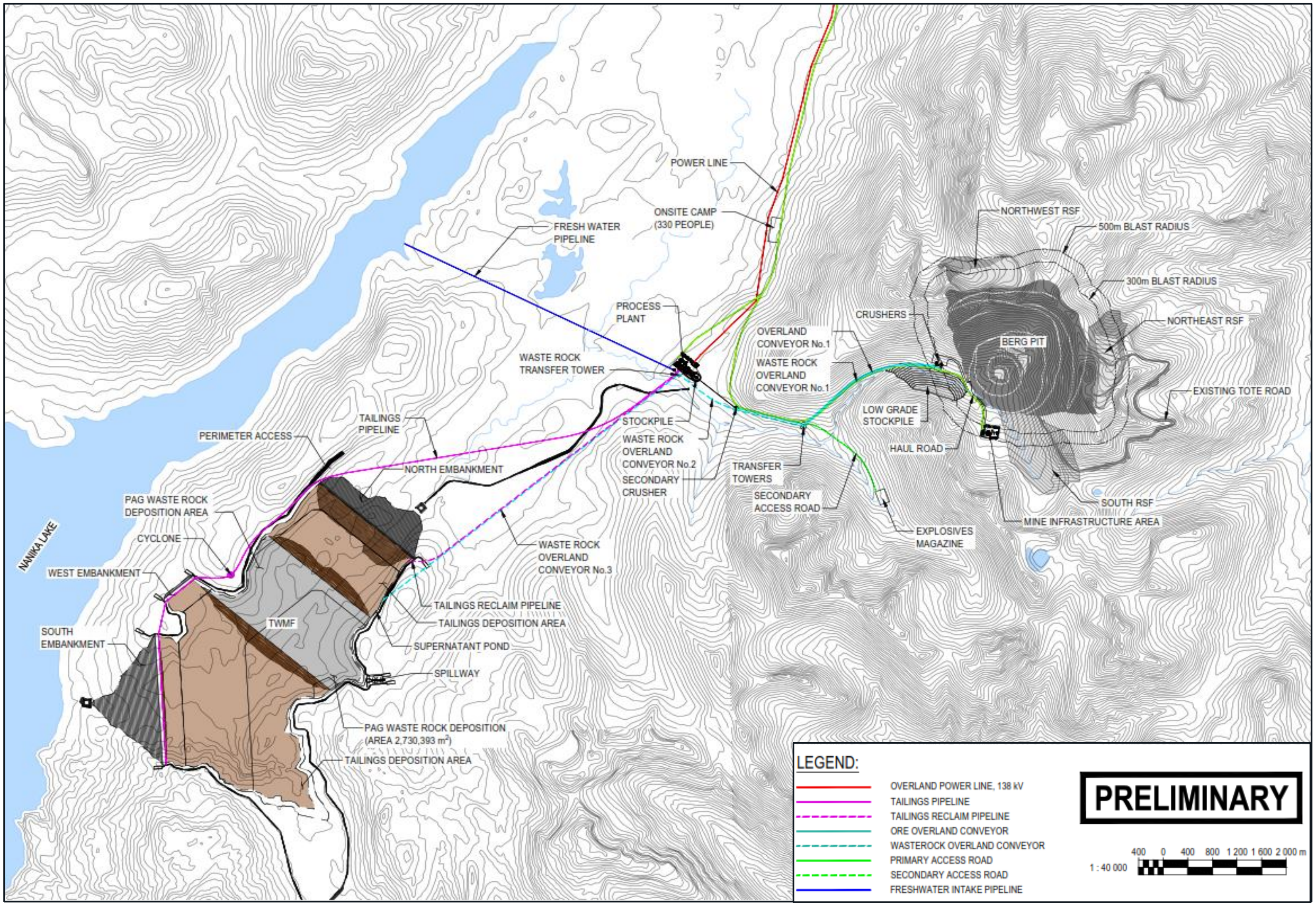
18.1 Overview

Infrastructure at the Berg Project includes on-site infrastructure such as earthworks development, site facilities and buildings, on-site roads, water management systems, and site electrical power facilities. Off-site infrastructure includes site access roads, fresh water supply, power supply, piping, camp, and tailings storage facility. The site infrastructure will include:

- Mine facilities, including mining administration offices, a mine fleet truck shop and wash bays, a mine workshop, and a mine water treatment plant.
- Common facilities, including an entrance/exit gatehouse, a security/medical office. Overall site administration building, potable water and fire water distribution systems, compressed air, power generation and distribution facilities, diesel reception and combustion plants, communications area, and sanitation systems.
- A near pit mineralized material and waste crushing facility with associated electrical infrastructure.
- Process facilities housed in the process plant, including grinding and classifications, flotation, regrinding, concentrate handling, thickening, dewatering and filtration, reagent mixing and distribution, assay laboratory and process plant workshop and warehouse.
- Other infrastructure includes on site camp, TWMF and WRSF.
- The overall site layout was developed using the following criteria and factors:
    - The facilities described above must be located on the Berg property to the greatest extent possible.
    - The location of the process plant is downhill to the Berg open pit to reduce risks and lower operating costs.
    - The location of the WRSF must be close to the open pit to reduce haul distance.
    - The location of the primary mineralized material and PAG waste crushing must be close to the Berg deposits to reduce haul distance.
    - The TWMF should be located at a site that takes advantage of sloped natural terrain to adequately drain entrained water and reduce earthworks, concrete and structural development if possible.
    - The arrangement of the administration buildings, mine workshops, processing plant and additional offices should be optimized for foot and vehicle traffic.

The Berg Project layout is shown in Figure 18-1.

Figure 18-1: Overall Site Plan



Source: Ausenco, 2023.

18.2 Off-Site Infrastructure

18.2.1 Site Access

The Berg Project is located approximately 85 km from the town of Houston, BC. Access to the site is via forest service roads, specifically the Morice Forest Service Road (FSR) and Sibola Forest Service Road. The Morice FSR currently serves as access for industrial use in the region including forestry, the Huckleberry Mine site and active construction of the Coastal Gaslink Pipeline. At approximately the 100 km mark of the Morice FSR begins the Sibola FSR that leads to both Surge's current Sibola exploration camp and the Berg Access Road. It should be noted that the project is envisioned to access the Berg site via a newly created road to the north and west of Mount Ney.

18.2.2 Water Supply

Freshwater will be sourced from Nanika Lake. The water will be transported through pumps. Approximately 4,565 m of overland pipeline will be installed from Nanika Lake to the process plant where freshwater tanks will be located. This water will be the source of potable water on site, used for the building facilities and process plant.

18.2.3 High Voltage Power Supply

Permanent electrical power is provided by a transmission line and connects to the BC Hydro electrical grid. This assumes the right-of-way for transmission lines and estimated alignment and design. The 138-kV transmission line will connect to a substation at the site before being stepped down to 25 kV for distribution to different power requirements across the project site.

18.2.4 Logistics

The copper concentrate will be transported from the project site to Stewart, BC, where the concentrate will subsequently be transported by sea to clients. Molybdenum concentrate will be transported from the project site to one of several North American molybdenum smelter locations. Each of the transport options is envisioned to use a mix of truck and rail where possible.

18.3 On-Site Infrastructure

18.3.1 Site Preparation

The infrastructure will be cleared, and the topsoil will be removed before construction. Drains, safety bunds and backfilling with granular material and aggregates for road construction are all elements of the initial site development.

Site civil work includes design for the following infrastructure:

- Roads for light vehicles and heavy equipment
- Access roads
- Topsoil and overburden stockpile area
- Mine facility platforms and process facility platforms
- ROM stockpile area

- TWMF area
- WRSF area
- Water management facilities, ditches, and drainage channels.

18.3.2 On-Site Roads

The project site has unpaved roads connecting the access road to the gatehouse. In addition to the existing roads on site, new roads will be constructed linking the guard house, the administration building, the process plant, the explosive storage buildings, the primary and waste crusher and the TWMF.

18.3.3 Fuel

The diesel storage facility consists of five bulk storage tanks. Each tan will have 100,000 L of capacity, for a total storage capacity of 500,000 L.

18.3.4 Mining Infrastructure

18.3.4.1 Truck Shop/Wash

The truck shop/wash is a pre-engineered building with a concrete floor, overhead crane, and overhead doors with fire protection and alarm systems. There will be a total of four maintenance bays. Two maintenance bays will be assigned to preventive maintenance, one will be for corrective maintenance, and the last bay will be multipurpose. Additionally, a single welding bay and truck wash will be located at the front of the truck workshop building.

18.3.4.2 Mine Offices

The mine office is a modular building for open pit operations. The building is equipped with fire protection and an alarm system.

18.3.5 Process Plant Infrastructure

18.3.5.1 Plant Warehouse/Shop

The plant warehouse/shop is a pre-engineered building with concrete floor, overhead doors, fire protection and alarm systems. This building will be used for general storage, to store equipment spares for the process plant, to maintain and store light vehicles assigned to the plant, and repair and maintain process plant equipment as necessary. This building is equipped with fire protection and an alarm system.

18.3.5.2 Process Plant Control Room

The process plant control room is a modular office. This building is attached to the process plant and contains dual operator stations. This building is equipped with fire protection and an alarm system.

18.3.5.3 Assay Laboratory

The assay laboratory is a one-story modular building comprised of storage area, office, scale room, AA room, wet lab, and met labs. This building is equipped with fire protection and an alarm system. The laboratory requires bottled nitrogen and hoods with ventilation.

18.3.5.4 Material Handling

The material from the pit will be diverted to two main destinations depending on the grade and material type. A portion of the barren stripped NAG material will be crushed to less than 300 mm and conveyed to the TWMF for dam construction, the balance will be hauled to the waste rock storage facilities.

PAG waste material will be crushed to less than 300 mm and transported and placed in the TWMF via a 10.9 km waste overland conveyor.

The mineralized material will be hauled to the primary crusher or low-grade stockpiles. Crushed material will be conveyed to the secondary crusher via 3.4 km of overland conveyor.

18.3.6 On-Site Infrastructure

Table 18-1 shows the list of buildings required on the mine site.

18.3.6.1 Gate House and Truck Scale

The gate house is a security trailer office with a lockable gate and communications to the main site. The truck scale is located adjacent to the main access road by the guard house.

18.3.6.2 Security / Medical Facilities

The security/medical facilities are a modular building located near the Gate House. The security facilities include rooms for personnel screening during rotations in and out of site. The medical facilities consist of first aid and emergency response rooms for on-site treatment and headquarters for mine rescue team. These facilities are equipped with fire protection and an alarm system.

18.3.6.3 Main Administration Building

The main administration building is a modular, multiple level building comprised of a change/lunch facility, offices, meeting rooms, washrooms, desks, fire protection, and alarm systems. The offices will have space for relevant employees. There will be 20 processing plant offices and 21 general and administrative offices.

18.3.6.4 Accommodation

Permanent accommodations on site will be in a camp of 330 individual dormitories. The camp will be a modular building with multiple levels and will include a kitchen, dining area, and recreation room. There will be a boot and jacket room for personnel entering and leaving the accommodations. The camp will be built to accommodate workers for the construction phase of the project and will be converted thereafter for use by operational workers.

Table 18-1: Building List

Building Name	Building Type	L (m)	W (m)	H (m)	Area (m^2)
Primary Crushing	Stick-built	51	14	33	694
Secondary Crushing	Stick-built	32	26	25	811
Transfer Towers (x4)	Stick-built (x4)	10	8	7	80
Stockpile Cover	Geodesic Dome	116	116	44	10,536
Grinding	Pre-Engineered	86	51	20	4,343
Copper Flotation	Pre-Engineered	36	61	20	2,196
Molybdenum Flotation	Pre-Engineered	52	40	20	2,081
Concentrate Filtration	Pre-Engineered	30	13	12	390
Tailings Storage Facilities	Stick-built	10	10	3	100
Substation (e-rooms x2)	Modular (x2)	14	7	5	95
Gate House	Modular	6	4	3.5	24
Admin Building	Modular, Multiple Level	18	18	7	335
Change-House	Modular	18	15	3	275
Plant Admin Building	Modular, Multiple Level	18	18	7	335
Truck Shop	Pre-Engineered	25	65	16	1,613
Warehouse/Workshop	Pre-Engineered	15	36	6.4	540
Permanent Camp	Modular, Multiple Level	162	40	6	6,480

18.3.7 Tailings and Waste Management Facility (TWMF)

Desktop siting and waste material deposition trade-off studies were carried out to evaluate potential sites and disposal methods for tailings and waste rock. Several potential storage sites were identified for tailings, potentially acid generating (PAG) waste rock, and non-acid generating (NAG) waste rock for different mine plan and PAG/NAG scenarios. Finally, it was decided to progress with a co-placement of material with the Tailings and Waste Management Facility storage facility (TWMF) of tailings and PAG waste rock. Process tailings and PAG waste rock will be permanently stored in the TWMF located in near proximity to the process plant while taking advantage of natural topography to minimize dam fill material and overall footprint. Process tailings will be placed against these embankments creating beaches toward the centre where the PAG waste rock will be stored subaqueously (Figure 18-1).

The primary design objectives for the TWMF are the secure confinement of tailings, subaqueous deposition of PAG waste rock to prevent potential acid rock drainage (ARD), and the protection of regional groundwater and surface water during mine operations and in the long term (post-closure). The design of the TWMF and associated water management facilities has taken into account the following:

- staged development of the facility over the life of the project,
- flexibility to accommodate operational variability in the waste rock and tailings (plant shutdowns, deposit variability, and placement during variable climate conditions), and
- control, collection, and removal of contract water from the facility during operations for reuse as process water to the maximum practical extent.

The design criteria for the TWMF considered the following requirements for tailings slurry and PAG waste rock while maintaining a minimum of 3 m water cover over the PAG waste rock to prevent acidification:

- Tailings slurry storage requirement: approximately 900 Mt (650 Mm^3)
- PAG waste rock storage requirement: approximately 600 Mt (335 Mm^3)
- Slurry tailings density: dry density of 1.40 t/m^3
- Underflow tailings (sand) density: dry density of 1.65 t/m^3
- Waste rock density: dry density of 1.8 t/m^3
- Subaqueous deposition of PAG waste rock (maintaining minimum 3m water cover)
- Limiting watershed disturbance to a single catchment basin
- Limiting impacts to wildlife and fisheries resources.

The TWMF includes the following embankments:

- North embankment
- South North embankment
- West North embankment

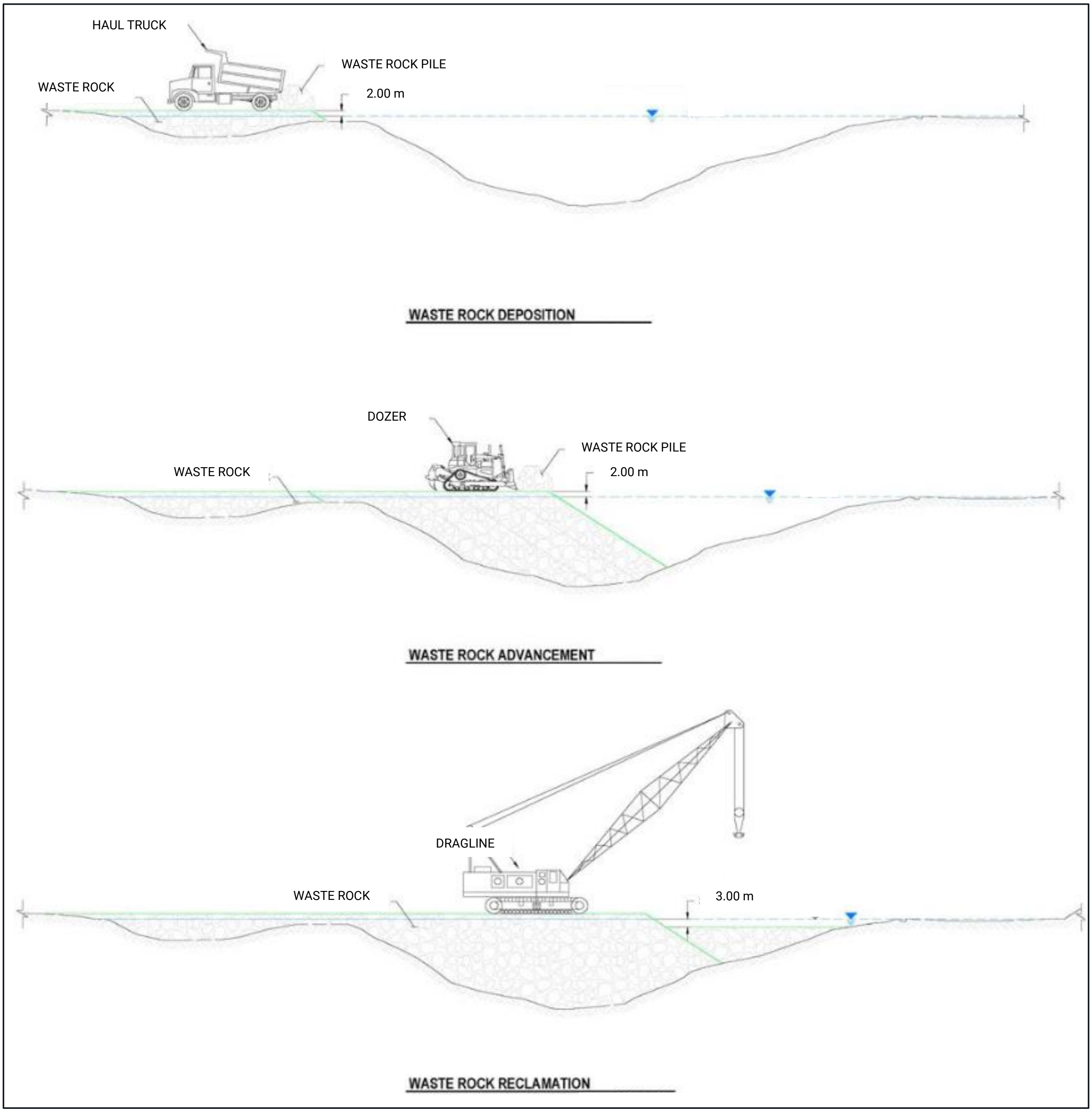
The north embankment will be entirely built by NAG waste rock while south and west embankments will be built by sand (overburden and tailings underflow which both are assumed to be NAG). In addition, it is assumed that construction of the embankments by sand is only possible seven (7) months of the year due to the cold weather climate and the tailings underflow generated during the five (5) cold months of the year will be deposited in the TWMF along with the tailings slurry.

Tailings will be transported from the process plant to the TWMF via a pipeline and then will be discharged into the facility from the top of the embankments' crests.

The PAG waste rock will be transported to the TWMF by an overland conveyor and then placed in a temporary stockpile. Then, front end loaders will load haul trucks which will deposit the PAG waste rock into the TWMF.

The deposition of the PAG waste rock will be by creating berms across the facility. The berms will be constructed 2 m above the water surface with a crest width of 65 m to provide sufficient operating area for haul trucks, dozers, and dragline excavator. The heavy equipment will utilize the centre 30 m, while lighter equipment, dozers, will push the PAG waste rock to create the 65 m wide berms. Once completed the next berm will be constructed next to the completed berm. During the construction of the next berm, dozers and dragline excavator will remove the upper 5 m and place the material to the southwest of the berm to minimize sediment migration toward the north due to excavation operations (Figure 18-2). The final height of the berm will be 3 m below the water surface during operations.

Figure 18-2: PAG Waste Rock Deposition Plan Schematic



Source: Ausenco, 2023.

18.3.7.1 Hazard Classification

The design standards for the TWMF are based on the relevant federal and provincial guidelines for construction of mining tailings storage facilities in Canada. The following regulations and guidelines were used to determine the dam hazard classification and suggested minimum target levels for some design criteria, such as the inflow design flood (IDF) and earthquake design ground motion (EDGM): Technical Bulletin – Application of Dam Safety Guidelines to Mining Dams (CDA, 2019).

Based on the simplified dam breach analysis and expected area of inundation downstream of the tailings and PAG waste rock storage facility, the consequence of a dam failure is “very high” for the TWMF based on CDA 2007 (revised 2013). Therefore, the facility was designed in accordance with the recommended parametres in the guidelines.

To be conservative, the inflow design flood (IDF) utilized for the design of the TWMF during operations and post-closure is the probable maximum flood (PMF) for a “very high” dam classification. The spillway for the TWMF is designed to pass the PMF. The earthquake Design Ground Motion (EDGM) parametres have been determined for the TWMF using estimates from the Natural Resources Canada (NRCan) seismic hazard calculator and our professional experience in British Colombia. The design earthquake utilized for the TWMF is the maximum credible earthquake (MCE) for a “very high” dam classification post-closure. The subsequent peak ground acceleration (PGA) for the MCE event is 0.126 g.

18.3.7.2 Facility Design

The TWMF footprint will be logged and cleared for foundation preparation and embankment construction. Basin preparation will include the removal of soft overburden material from low points within the topography. Soft overburden materials will be removed beneath the embankment foundations prior to fill placement. The focus of material removal is expected to be within low points. A foundation drainage network will be developed within the base of the embankments using selective placement of waste rock and dual wall HDPE pipe wrapped in a non-woven geotextile fabric.

18.3.7.2.1 North Embankment

The starter North embankment will be constructed by NAG waste rock during the pre-production period using downstream raise methodology that provides the most stable configuration of all embankment raise methods.

NAG waste rock will be transported to the TWMF using an overland conveyor and placed in a borrow source stockpile for embankment construction materials. It will then be loaded into haul trucks, and transported to the north embankment where it will be spread and compacted with dozers and compactors into 1m lifts. The North embankment will be constructed with overall 2.5:1 (H:V) interior slopes and 3:1 (H:V) exterior slopes based on stability analyses. The construction will continue in the same manner until the end of the project.

18.3.7.2.2 South and West Embankments

The South and West embankments will be constructed with overburden and tailings underflow using centreline raise methodology with a low permeability core constructed from local borrow sources along the centreline crest of the embankments.

Overburden will be transported to the TWMF using an overland conveyor and placed in a borrow source stockpile for south embankment construction materials. It will then be loaded into haul trucks, and transported to the south embankment where it will be spread and compacted with dozers and compactors into 1 m lifts.

Tailings underflow will be utilized for construction of the south and west embankments. Tailings underflow will be transported using pipelines from the cyclopac to the crests of the embankments where the underflow will be discharged on the downstream slopes where they will be spread and compacted by dozers and compactors to construct the embankments. The South and West embankments will be constructed with near vertical interior slopes (centreline raise) and 4:1 (H:V) exterior slopes based on stability analyses.

18.3.7.3 Stability Analysis

A section through the highest portions of the embankments were selected as the critical section. Stability of the embankments were assessed using the limit-equilibrium modelling software Slope/W, (Geostudio, 2018). Analyses were undertaken for both static and pseudo-static (earthquake loading) conditions with the calculated factors of safety (FOS) higher than the minimum required values in accordance with CDA guidelines of 1.5 FOS for static and 1.0 FOS for pseudostatic. The tailings embankment is designed to withstand potential dynamic displacement without release of tailings during the maximum design earthquake event. The embankment stability analyses exceeded both static and pseudo-static CDA guidelines.

18.3.7.4 Monitoring

Instrumentation and monitoring will be required to assess embankments' performances and must be incorporated in the next phase of the study. Vibrating wire piezometres (VWPs) will be installed to monitor pore pressure within the TWMF and permanent embankment fill materials, and slope inclinometres and survey monuments will be installed in the permanent embankments to monitor slope movement and deformation.

18.3.8 Power and Electrical

The HV transmission from the grid will be connected by distribution line to a 138 kV/25 kV substation on site. The substation will distribute power to various areas of the project including the process plant, administration building and the mining areas. Four distribution lines will be constructed at the project site to provide stepped-down power to the site administration and process facilities, and the Berg pit. A 25-kV line will be stepped down to 4.16 kV before distribution to the process plant.

18.3.9 Site Water Management

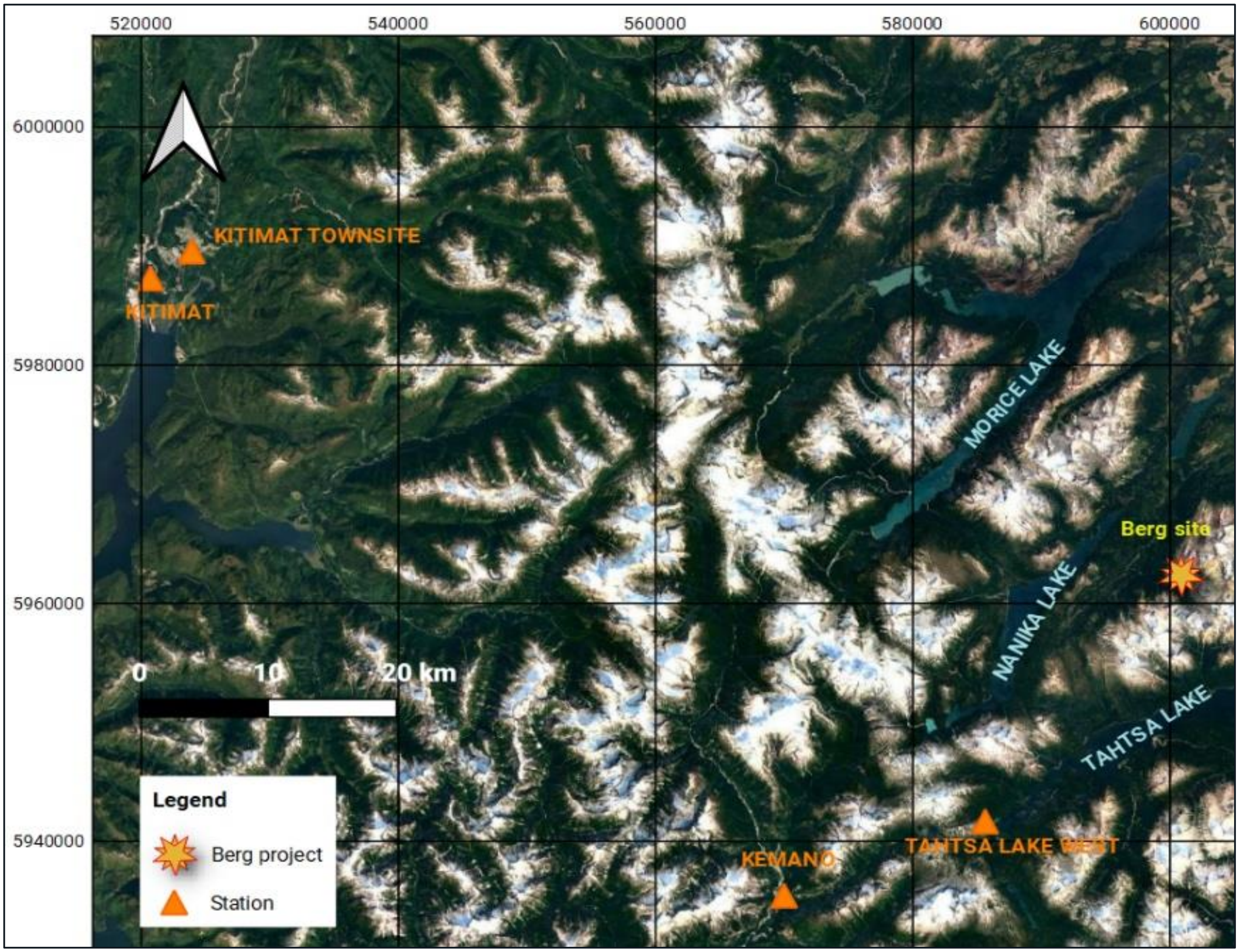
This section discusses site-wide water management, the design of water management structures, hydrology, and water balance. Major drainage paths within the study area were delineated through GIS analysis of LiDAR elevation data with a 5m contour resolution.

18.3.9.1 Climate and Hydrology

Based on the Köppen climate classification (1884), Berg Project is located in subarctic climate (type "Dfc") and temperate zones, typically long, very cold freezing winters and short, cool summers. Total annual precipitation is 1,986.9 mm, of which 58% occurs in the between October to January.

The climate stations close to the Project site are Tahtsa Lake West, Kemano, Kitimat and Kitimat Townsite (see Figure 18-3). Table 18-1 shows a brief description of their geographical location relative to the site and their data history period. The climate normal data (1981-2010) for the Kemano station (Table 18-2) is chosen for water balance analysis. The extreme precipitation events for the Berg site were estimated based on the IDF curves from Kitimat station, optioned from Environment Canada (see Appendix A). Table 18-3 summarizes storm events for the various return period.

Figure 18-3: Project Location and Nearby Climate Stations



Source: Ausenco, 2023.

Table 18-2: Climate Stations Close to the Berg Site

Station Name	Station ID	Distance to Site (km)	Elevation (masl)	Latitude	Longitude	Data Period
Tahtsa Lake West	1087950	25	862.6	53°37'00" N	127°42'00" W	1981 - 2000
Kemano	1064020	40	66.0	53°33'47" N	127°56'34" W	1951 - 2023
Kitimat	1064288	80	12.8	54°03'00" N	128°41'00" W	1979 - 1994
Kitimat Townsite	1064320	80	98.0	54°03'13" N	128°38'03" W	1954 - 2022

Table 18-3: Kemano Station (1981 – 2010)

Month	Daily Temperature (°C)			Rainfall (mm)	Snowfall (cm)	Precipitation (mm)
	Average	Maximum	Minimum			
Jan	-1.5	1.1	-4	190.2	59.7	249.8
Feb	0.4	3.6	-3	136.3	34.3	170.6
Mar	3.3	7.6	-1.1	122.2	15.3	137.5
Apr	7.2	12.6	1.8	98.1	2.2	100.3
May	11.1	17.0	5.2	68.7	0.0	68.7
Jun	14.4	20.2	8.5	62.5	0.0	62.5
Jul	16.5	22.3	10.5	61.9	0.0	61.9
Aug	16.4	22.1	10.6	76.9	0.0	76.9
Sep	12.7	17.4	7.9	162.5	0.0	162.5
Oct	7.2	10.4	4	315.2	2.5	317.7
Nov	1.9	4.1	-0.4	257.6	35.5	293.1
Dec	-0.8	1.3	-3	219.6	65.8	285.4
Annual total	**7.4**	**11.6**	**3.1**	**1,771.6**	**215.3**	**1,986.9**

Table 18-4: Extreme Storm Events for Kitimat Station (mm)

Return Period Duration	2-year	5-year	10-year	25-year	50-year	100-year
5 min	2.1	2.9	3.5	4.5	5.4	6.4
10 min	3.2	4.2	5.2	6.8	8.0	8.6
15 min	4.4	5.7	6.4	7.4	8.0	8.6
30 min	6.5	7.7	8.8	10.5	12.1	14.1
1 hr	10.4	12.8	14.6	17.1	19.3	21.6
2 hr	17.6	21.8	24.9	29.5	33.4	37.8
6 hr	41.2	53.6	62.6	75.1	85.1	95.8
12 hr	63.0	80.9	94.3	113.3	129.0	146.2
24 hr	91.7	116.9	132.3	150.6	163.2	175.1

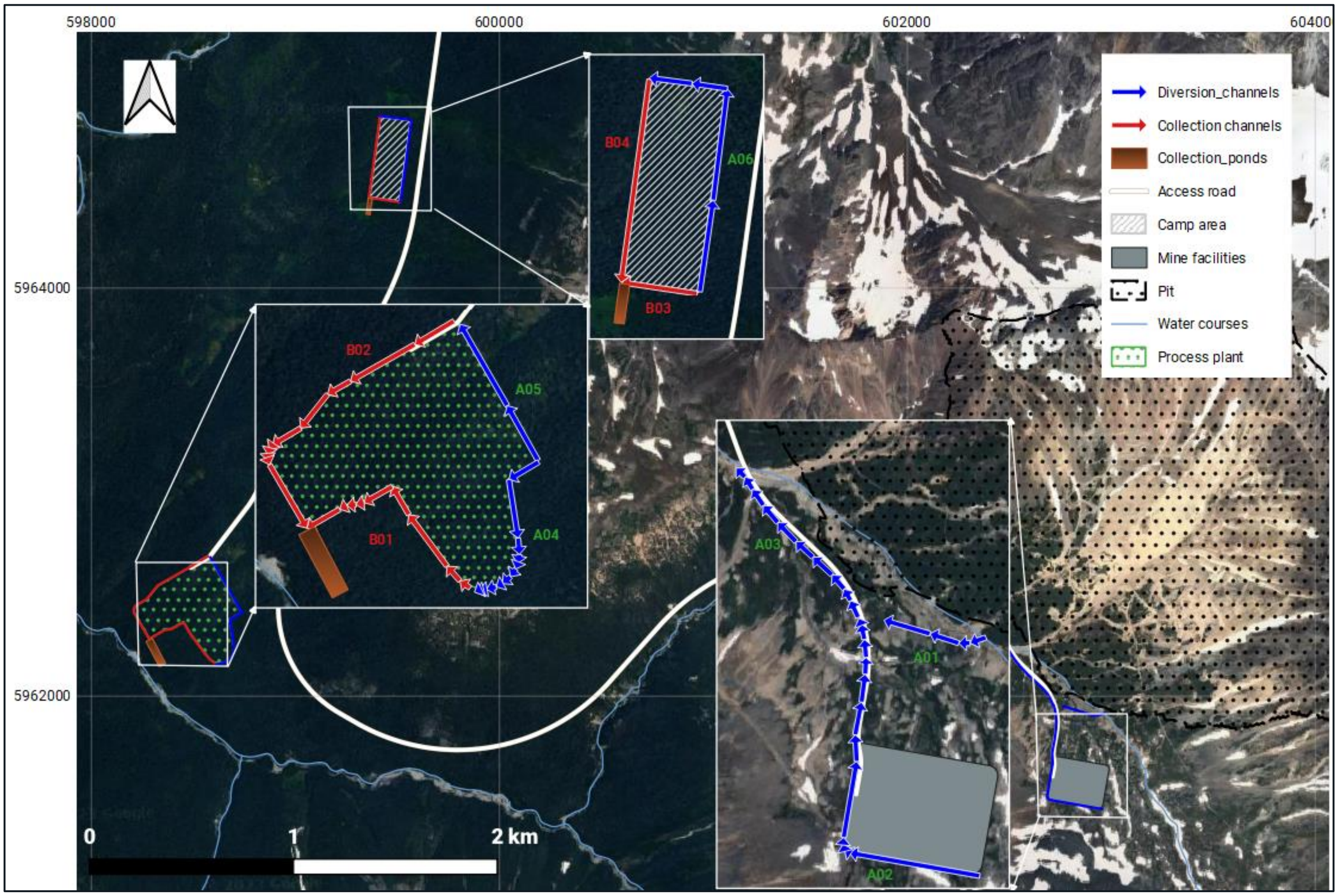
18.3.9.2 Water Management Structures

This section summarizes a list of proposed water management structures for the Berg site.

- Diversion channels: diversion channels are required to divert non-contact runoff away from the facilities and to minimize the amount of contact runoff to be collected and managed. The design criterion for the diversion channels was the conveyance of 1:100-year peak flow without overflow.
- Collection channels: collection channels collect contact runoff from the Process plant and Camp area. The design criterion for collection channels was the conveyance of 1:100-year peak flow without overflow.
- Collection ponds: collection ponds were proposed to store contact runoff from the collection channels. The collection ponds' design criteria were to store 1:100-year 24 hr flood with a minimum freeboard of 0.5 m. The stored contact water should be either treated and released to the environment or reused for process purposes.

A total of six diversion channels/berms with a total length of approximately 2,527 m was designed (blue lines in Figure 18-3) to divert the non-contact runoff approaching Berg Project facilities.

Figure 18-4: Water Management Structures



Source: Ausenco, 2023.

In addition to diversion channels/ditches, a collection system, including four collection channels (Figure 18-3), was designed to manage contact water from the Process Plant and Camp area. The collected contact water will be retained in two collection ponds near each facility. Figure 18-3 also shows the proposed alignments for the diversion channels/berms, collection channels, and collection ponds.

18.3.9.3 Rainfall – Runoff Modelling

To estimate design flows along the water management system, flood from the design event was routed along the alignments using the Rational method where the drainage areas were small and had uniform soil and cover characteristics with no significant flood storage. Based on BC MoTI (2019), for rural watersheds up to 10 km^2, the Rational method may be suitable for calculating design flow. The Rational method is a simplified procedure and is not applicable to a complex watershed with more drainage areas. The hydrologic modelling results were used to size the water management structures of the Berg site preliminarily.

Channels and ponds were sized using estimated peak flow rates and flood volumes from the Rational method and frequency analysis results. Collection channels were designed trapezoidal of 2H:1V side slopes with a base width of 1 m and a minimum depth of 1 m. Similarly, diversion channels were designed with a 2H:1V side slope with base widths ranging from 1 to 3 m and a minimum depth of 1 m. Diversion berms are proposed on several of the diversion channel to reduce the overall excavation depth and to provide freeboard.

18.3.9.4 Site-wide Water Balance

A preliminary site-wide water balance analysis was performed for the Berg site and is the results are summarized in this section.

In this analysis, a comparison between water requirements, and available water from the collection system was made to identify the site-wide water balance. The following water components were considered in this calculation:

- Surface runoff from precipitation on Berg pit, process plant, and camp area
- Evaporation from pond
- Process water requirement.

As shown in Table 18-5, there is a net annual water surplus of 365 m^3/h for average climate scenarios. It should be noted that groundwater modelling was not conducted at the time of this report, and pit dewatering values are calculated based on precipitation only; therefore, groundwater input must be added in the next phase of the project.

Table 18-5: Site-wide Water Balance (m^3/hr) – Average Condition

Water Component (m^3/hr)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Process Plant Make-up Water Demand	340	340	340	340	340	340	340	340	340	340	340	340	340
Precipitation Contact Water on Pits													
Precipitation	833	661	535	780	282	206	193	281	709	1,381	1,166	962	666
Contact Water from Net Precipitation and Evaporation													
Process Plant Area	36	28	23	33	15	12	12	14	31	59	50	41	30
Camp Area	10	8	6	9	4	3	3	4	9	17	14	12	8
Ponds Direct Precipitation	2	1	1	2	1	1	1	1	1	3	2	2	1
Pond Evaporation	0	0	0	0	1	1	1	1	0	0	0	0	0
Deficits/Excess (-/+) Water Available for Process Demands													
Water Deficits/Excess (-/+) in Average Conditions	541	359	226	484	-39	-119	-133	-41	410	1,119	893	677	365

*Note: The Pit dewatering values are calculated based on precipitation only. Groundwater input must be added in the next phase.

19 MARKET STUDIES AND CONTRACTS

19.1 Market Studies

No market studies or product valuations were completed as part of the 2023 PEA. Market price assumptions were based on a review of public information, industry consensus, standard practices, and specific information from comparable operations in the region.

Copper (Cu) concentrates are widely traded. Concentrates can be marketed directly from producer (mine) to smelter, or through third party concentrate trading entities.

Surge Copper were not provided with indicative smelter terms, assumptions for 'payability' terms were based on a review of specific information from comparable recent studies. The net 'payability' for the metals contained in both concentrates are 96.5% for copper, 99% for molybdenum, and 90% for both silver and gold. The treatment charges (TC) of US$70/dmt and refining charges (RC) of US$0.070/payable lb Cu and US$1.25/payable lb molybdenum (Mo) were deducted from the payable value of the concentrates to account for the costs of smelting and refining. The TC/RCs are influenced by global supply and demand and governed by mine and smelter economics based on metal prices and operating costs. TC/RCs may be based on variable annual negotiations, fixed rates and/or market benchmarks.

19.2 Commodity Price Projections

Project economics were estimated based on long-term metal prices of US$4.00/lb Cu, US$15.00/lb Mo, US$23.00/oz silver (Ag) and US$1,800.00/oz gold (Au). These prices are in accordance with consensus market forecasts from various financial institutions and are consistent with historic prices for these commodities. Ausenco also considers the prices used in this study to be consistent with the range of prices being used for other project studies.

19.3 Contracts

No contracts for transportation or off-take of the concentrates are currently in place, but if they are negotiated, they are expected to be within the industry norms. Similarly, there are no contracts currently in place for supply of reagents, utilities, or other bulk commodities required to construct and operate the Project.

20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

20.1 Introduction

This section provides an overview of the setting of the Berg Project. It outlines existing biological and physical baseline conditions, proposed new baseline studies to support future permitting applications, existing permits, and future regulatory and permitting requirements including required management plans for water, site environmental monitoring, and waste disposal. In addition, this section also discusses socio-economic baseline conditions, the status of community consultation and engagement, and conceptual mine closure and reclamation planning for the project. Recommendations are also provided if the decision is made to progress the project through the prefeasibility study, feasibility study, environmental assessment and permitting phases.

The Berg property is in the Tahtsa Ranges, a 15 to 20 km wide belt of mountains within the Hazelton Mountains. The Hazelton Mountains lie along the eastern flank of the Kitimat Range of the Coast Mountains and form part of the Skeena Arch. The Tahtsa Ranges represent a transitional zone between the rugged, predominantly granitic Coast Mountains to the west and the rolling hill region of sedimentary and volcanic rocks that underlie the Nechako Plateau to the east. The centre of the Berg property lies at 53°47’53.02” N and 127°24’51.27” W.

The Berg Project is situated on amongst a group of 91 unpatented mineral claims and one mining lease covering an area of approximately 34,798 ha. The surface rights over the property are owned by the Crown and administered by the Government of BC, although a detailed review of other potential rights such as placer, timber, water, grazing, trapping, outfitting, etc. has not been undertaken at this time. The property is located within an overlapping zone of both the Wet’suwet’en traditional territory and Cheslatta Carrier Nation traditional territory.

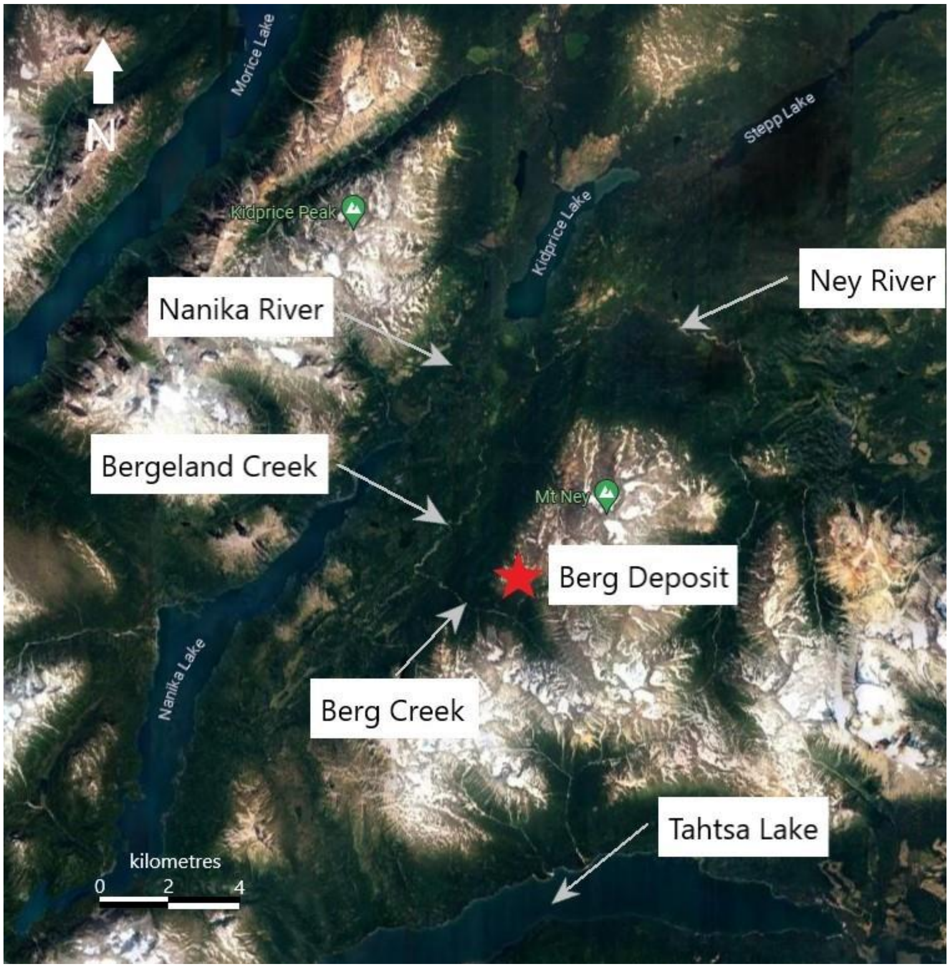
20.2 Environmental and Social Setting

Information on the project climate and physiographic setting is included in Section 5. Figure 20-1 depicts the environmental setting and shows the location of the main watercourses referenced in sections that follow.

The environmental baseline studies available for review include:

- Berg property overview report (Norecol 1988);
- Berg property water quality report (Norecol 1989);
- Berg Project water quality summary 2007 – 2011 (Rescan 2013);
- Berg Project: 2012 hydrology and meteorology data report (Rescan 2013a);
- Berg Project: 2014 meteorology, hydrology, and water quality report (ERM 2015);
- Berg Project: 2017 meteorology, hydrology, and water quality report (ERM 2018);
- Reconnaissance (1:20,000) fish and fish habitat inventory of selected streams in the Nanika and Tahtsa watersheds (AMEC 2008); and
- ARD testing results, Berg Deposit (AMEC 2007).

Figure 20-1: Environmental Setting



Source: Google, 2023.

A summary of the available environmental, social and community studies and factors potentially affecting the project are provided in the following sections. It should be noted that much of the data collected for baseline studies is not recent. Applicable BC guidelines (BC ENV 2016) recommend that relatively recent baseline information will be required for baseline development and impact assessment, particularly for surface water. Therefore, in assessing the utility of using older baseline data, direct discussions should be conducted with provincial and federal regulators.

20.2.1 Hydrology and Climate

The hydrological regime of the project region is a snowmelt-dominated streamflow regime. The general area is characterized by high flows in the late spring due to snow melt and low flows during the winter months. Flows decrease through the drier summer months, with some rebound in discharges during the autumn months because of fall storms and increased precipitation frequency.

The project area is located within the headwater catchment of Morice River, which flows into Bulkley River and ultimately Skeena River, which discharges into the Pacific Ocean approximately 150km northwest of the project area.

The two main watersheds that contain sites of proposed project infrastructure are Bergeland Creek (84.1 km^2) and Ney River (51.7 km^2). Most of the proposed mine facilities are within the Bergeland Creek watershed.

AMEC Earth and Environmental initiated hydrometric monitoring in July 2007 with six continuous flow monitoring stations and four staff gauges. The selected sites corresponded to sites selected for water quality sampling. Hydrometric monitoring occurred during the 2007, 2008, and 2011 seasons. Environmental Resources Management (ERM) continued hydrometric monitoring at the six previously installed continuous flow monitoring stations during the 2012 season. Total runoff, monthly runoff distribution, peak flow, and low flow were computed for each of the six monitoring stations.

Beginning in the 2014 season, and continuing through the 2017 season, the hydrometric monitoring data collection was limited, and focused on stream flow measurements for calculation of parameter loadings as derived from the water quality samples. The scope of streamflow measurements was limited to data collection in May and October at three sites: mouth of Berg Creek, Bergeland Creek downstream of confluence with Berg Creek, and upper reach of Bergeland Creek. The observed hydrologic conditions were generally consistent with previous years. Insufficient data appear to be available for development of stage discharge curves and detailed hydrological modelling.

Meteorological studies related to the project began in 2007 with the installation of the Berg meteorological station. Following installation, the station was actively maintained until the fall of 2009, after which the station remained operational, but no station maintenance or data retrieval was performed until the fall of 2011. In September and October 2011, a satellite telemetry system was added to the station and the original aluminum tower was replaced with a galvanized steel tower. A second meteorological station, Bergeland, was installed in August 2013 at a lower elevation, between Bergeland Creek and Nanika Lake, close to the proposed tailings area. In May 2015, the existing satellite telemetry equipment at the Berg station was upgraded with new equipment. Meteorological data for the following parametres was collected until 2017: wind speed and wind direction, air temperature, relative humidity, snow depth, net radiation, solar radiation, and precipitation.

There is no record of further hydrological or climate monitoring since 2017.

Long-term monitoring of the project study area will be required if the project advances through FS, EA, and permitting to further characterize the hydrological conditions and develop a water balance model and long-term life of mine water management plan. More recent meteorological data will also be required to supplement the historic data previously collected. Section 26.7 provides recommendations for the meteorological data collection and hydrological studies that will support the advancement of the project through the pre-feasibility study (PFS) stage.

20.2.2 Surface Water Quality

Surface water quality monitoring programs have been conducted in 1988 by Norecol (Norecol 1988), in 2007-2011 by AMEC Earth & Environmental (Rescan 2013) and in 2013-2017 by ERM (ERM 2015, ERM 2018). The 2007-2011 monitoring programs collected preliminary baseline water quality data from 11 streams in the Project area, including areas near the Berg deposit, areas near potential future infrastructure, and reference sites. The 2013-2017 monitoring programs reduced the scope of water quality collection to three sites--at mouth of Berg Creek, Bergeland Creek downstream of confluence with Berg Creek, and upper reach of Bergeland Creek--in May and October of each year. These sites emphasize the deposit area and sites near potential future infrastructure.

The monitoring programs indicated that water quality at the sampling locations in Berg Creek and the downstream sampling location in Bergeland Creek are pH neutral, with soft to medium water hardness, and had elevated levels of aluminum, cadmium, copper, iron, lead, and zinc compared to British Columbia (BC) water quality guidelines and Canadian Council of Ministers of the Environment (CCME) water quality guidelines. The sampling program also indicated seasonal variability between the May and October samples.

The 2007-2011 monitoring program indicated that surface water in the sampled streams in the immediate deposit area had low pH, hard water, and elevated levels of fluoride, sulphate, aluminum, cadmium, chromium, cobalt, copper, iron, lead, selenium, silver, and zinc compared to BC water quality guidelines and CCME water quality guidelines.

Long-term water quality monitoring efforts should focus on areas potentially affected by proposed mine infrastructure (refer to Section 18) and should meet the requirements of an Environmental Assessment application as outlined in Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC ENV 2016). That guidance document specifies the sampling frequency and stipulates that sampling would continue until the temporal and spatial variability of water quality parametres are firmly established. Section 26.7 provides recommendations for the surface water quality studies that will support the advancement of the project through the PFS stage.

20.2.3 Hydrogeology

Based on the available environmental studies reviewed, there are no indications to date of completed hydrogeological investigations. If the project advances through the FS, EA and permitting stages, groundwater monitoring and sampling data will need to be adequate to support the EA and to support the development of an integrated numerical 3D groundwater model and a long-term life of mine water management plan. Section 26.7 provides recommendations for hydrogeological studies that will support the advancement of the project through the PFS stage.

20.2.4 Fish and Fish Habitat

AMEC Earth and Environmental completed a modified Reconnaissance (1:20,000) Fish and Fish Habitat Inventory (RFFHI) in September 2007 in the immediate and surrounding areas of the proposed Berg mine site (AMEC 2008). This work built upon previous environmental work completed by Norecol in 1988 (Norecol 1988).

The main waterbodies that may potentially be impacted by the project include Bergeland Creek, Nanika River, Kidprice Lake, Nanika Lake, and Tahtsa Lake. A waterfall at the outlet of Kidprice Lake forms a blockage to further upward migration of salmon and trout to upstream reaches of Nanika River (Norecol 1988). A summary of fish species known to be in the area based on historical data is presented in Table 20-1.

Table 20-1: List of Known Fish Species in the Study Area

Mainstem Streams	Common Name	Scientific Name
Nanika Lake	Cutthroat trout	*Oncorhynchus clarki*
	Dolly varden	*Salvelinus malma*
	Lake chub	*Couesius plumbeus*
	Lake trout	*Salvelinus namaycush*
	Rainbow trout	*Oncorhynchus mykiss*
Nanika River	Bull trout	*Salvelinus confluentus*
	Chinook salmon	*Oncorhynchus tshawytscha*
	Coho salmon	*Oncorhynchus kisutch*
	Cutthroat trout	*Oncorhynchus clarki*
	Dolly varden	*Salvelinus malma*
	Lamprey (general)	*Lampetra sp*
	Mountain whitefish	*Prosopium williamsoni*
	Pink salmon	*Oncorhynchus gorbuscha*
	Prickly sculpin	*Cottus asper*
	Rainbow trout	*Oncorhynchus mykiss*
	Sculpin (general)	*Cottus sp*
	Sockeye salmon	*Oncorhynchus nerka*
	Steelhead	*Oncorhynchus mykiss*
Bergeland Creek	Dolly varden	*Salvelinus malma*
Tahtsa Lake	Dolly varden	*Salvelinus malma*
	Mountain whitefish	*Prosopium williamsoni*
	Sculpin (general)	*Cottus sp*
	Rainbow trout	*Oncorhynchus mykiss*
Kidprice Lake	Dolly varden	*Salvelinus malma*
	Longnose sucker	*Catostomus catostomus*
	Rainbow trout	*Oncorhynchus mykiss*

The 2007 field program conducted sampling at three locations in the lower reach of Bergeland Creek, two locations in the lower reach of Ney River (tributary to Kidprice Lake), and one location on a tributary to Tahtsa Lake. No fish were captured in the reaches assessed in September 2007.

No critical fish habitat was identified within the study area based on the regulatory regime and scientific understating at the time of the studies (AMEC 2008). Some of the larger watercourses at lower elevations likely provide high quality spawning, rearing, and overwintering habitat for salmonids and other fish species. Although no fish were caught in the sampling period, a lack of visible barriers in the lower stream reaches suggests that fish presence is probable. The sampling occurred late in the year which could explain the absence of fish as they may have already travelled to the lower lakes or larger rivers for overwintering. Bergeland Creek, Berg Creek, Ney River, and the lower reaches of a tributary to Bergeland Creek are presumed fish bearing (AMEC 2008).

To establish a better understanding of fish community and habitat baseline conditions within the project site and to support future permitting and approvals, further sampling and assessments are recommended. Section 26.7 provides recommendations for fish and fish habitat studies that will support the advancement of the project through the PFS stage. In the long-term, the baseline program for fish and fish habitat for the project should be designed to meet the requirements which will support the submission of an EA application. Fish community and fish habitat should include other aquatic resources such as benthic invertebrates and periphyton. BC EAO requires baseline data collection to occur for a minimum of 24 consecutive months. This work will be integral to supporting potential applications for authorizations under the Fisheries Act, including the requirement for a Fisheries Authorization, fish habitat compensation plan, and a Schedule 2 amendment under the Metal and Diamond Mining Effluent Regulations (MDMER).

20.2.5 Soils, Vegetation and Wildlife

Based on the available environmental studies reviewed, there are no indications to date of completed soils, vegetation or wildlife programs.

20.2.5.1 Soils and Vegetation

The 2021 version of the biogeoclimatic ecosystem classification subzone/variant map for the Morice Subunit, Nadine Resource District, Skeena Region identifies the following biogeoclimatic zones in the project area (Government of BC 2021):

- Boreal Altai, Fescue Alpine
- Engelmann Spruce-Subalpine Fir, Moist Cool
- Mountain Hemlock, Leeward Moist Maritime

The following sections provide general descriptions published by the BC Ministry of Forests for the identified biogeoclimatic zones:

Boreal Altai Fescue Alpine: The terrain is often steep and rugged. Much of Boreal Altai Fescue Alpine is well-vegetated alpine tundra. Soils are typically shallow and derived from weathered bedrock. Vegetation is primarily dwarf willows, grasses, sedges, and lichens.

Engelmann-Spruce-Subalpine Fir Moist Cool: Soils in this biogeoclimatic zone are typically coarse-textured Humo-Ferric Podzols. Major tree species include subalpine fir, mountain hemlock, amabilis fir, whitebark pine, and lodgepole pine.

Mountain Hemlock Leeward Moist Maritime: Soils in this biogeoclimatic zone are typically Humo-Ferric and Ferro-Humic Podzols. Major tree species include mountain hemlock, amabilis fir, western hemlock, and subalpine fir.

The Berg property is located within the Morice Timber Supply Area (TSA) administered by the Nadina Natural Resource District office in Burns Lake. This TSA covers approximately 1.5 million hectares of the Skeena Natural Resource Region.

20.2.5.2 Wildlife and Wildlife Habitat

Some project area overlaps with the approved ungulate winter range #U-6-003 for mountain goat (*Oreamnos americanus*) (Government of BC 2013). Some project area may also overlap the northern boundary of the Tweedsmuir-Entiako caribou range (Government of BC 2023). During past field programs, incidental sightings of wildlife use in the project area included grizzly bears (*Ursus arctos*), mountain goats (*Oreamnos americanus*), moose (*Alces alces*), American Robin (*Turdus migratorius*), Clark's Nutcracker (*Nucifraga columbiana*), Grey Jays (*Perisoreus canadensis*), Spotted Sandpipers (*Actitis macularia*), and Dark-eyed Junco (*Junco hyemalis*) (AMEC 2008).

Additional surveys will need to be completed related to the areas of terrain/soils, vegetation/ecosystem and wildlife/wildlife habitat for the mine infrastructure presented in Section 18. Section 26.7 provides recommendations for soils, vegetation and wildlife studies that will support the advancement of the project through the PFS stage.

20.2.6 Geochemistry

AMEC Earth & Environmental completed an initial acid rock drainage (ARD) characterization of the Berg Project as part of the baseline environmental work. No previous ARD work had been completed. In August 2007, 45 drill core samples and ten surface water samples were collected as part of an initial ARD/ML characterization program. All rock samples were from the 2007 exploration drilling program and were representative of a range of rock and alteration types within the resource area of the project. Samples extended only a limited distance from the main area of the mineralized rock and do not necessarily represent all waste rock within the proposed open pit.

The initial conclusions based on the preliminary ARD testwork were (AMEC 2007):

- The primary distribution of acid producing, and acid neutralizing minerals has been strongly modified by supergene mineralization processes.
- The post-mineral dyke has a preliminary non-acid generation (NAG) classification.
- All other rock types (Berg stock, andesite, quartz diorite) are preliminary classified as potentially acid generating (PAG), with 39 out of 42 samples (86.7%) having NPR values less than 1.
- There is naturally occurring, metal rich acidic drainage at the site that exceed MDMER monthly mean concentrations.

The initial ARD characterization program did not cover the entire range of disturbed area and material types that could potentially be affected by the project. ARD characterization beyond this initial assessment should continue as the Berg deposit is developed. Additional sample selection and analyses have been recommended in Section 26.7 to help support and advance the project through the PFS stage.

20.2.7 Socio-Economic and Cultural Baseline Studies and Community Engagement

20.2.7.1 Land Use and Cultural Heritage

The property is located within Traditional Territories of both the Wet’suwet’en and Cheslatta Carrier Nation.

Baseline socio-economic and cultural baseline studies have not yet been completed for the Berg Project. Archaeological Overview Assessments (AOA) and Archaeological Impact Assessments (AIA) have also not been completed. An AOA and AIA will be required at the appropriate time as the project advances into the feasibility and permitting phases and the full extent of the disturbed footprint of the project has been identified.

20.2.7.2 Community Engagement

In 2010, Surge Copper entered a Letter of Understanding with the Cheslatta Carrier Nation. The agreement outlined the terms for information exchange, consultation, and involvement between the two groups. In 2013, an Amended Letter of Understanding was signed with the Cheslatta Carrier Nation (Surge Copper 2023).

In 2013, Surge Copper entered a Communications & Engagement Agreement (CEA) with the Office of the Wet'suwet'en. The CEA sets for the respective party's commitment to communicate and engage with each other to develop a respectful, mutually beneficial working relationship with respect to exploration and project development (Surge Copper, 2023).

In 2014, Surge Copper entered a Cooperation Protocol Agreement with the Skin Tyee Nation, which is located within Wet'suwet'en traditional territory (Surge Copper 2023).

20.2.7.3 Consultation Policy Requirements

Both the BC Environmental Assessment Act (BCEAA) and the federal Impact Assessment Act (IAA) contain provisions for consultation with First Nations and the public as a component of the EA process. Further engagement and consultation measures will comply with federal and provincial regulations, best practices, and Surge Copper's internal company policies.

20.2.7.4 First Nations

Surge Copper will be required to consult with local First Nations as part of the EA process, as identified by the provincial government's Section 11 Order and as indicated in the federal government's EA guidelines when they are issued for the project. On-going consultation efforts will aim to engage both community leaders and members, attempting to resolve potential issues and concerns as they arise.

20.2.7.5 Government

Surge Copper will engage and collaborate with federal, provincial, regional, and municipal government agencies and representatives as required with respect to topics such as land and resource management, protected areas, official community plans, environmental and social baseline studies, and effects assessments. Surge Copper will be required to participate in a project specific working group at the early stages of the EA process which will include representatives from many government groups. Surge Copper will be required to consult with the working group on project-related developments during the EA process.

20.2.7.6 Public and Stakeholders

Surge Copper will consult with the public and relevant stakeholder groups including land tenure holders, economic development organizations, businesses, and contractors (e.g., suppliers and service providers), and special interest groups (e.g., environmental, labour, social, health, and recreation groups), as appropriate.

20.3 Permitting

This section summarizes the existing permits in place for the project and the federal and provincial legislation and associated permits, licences and approvals that will apply or potentially will apply to the construction and operations of the project, as currently proposed.

20.3.1 Existing Permits

A Multi-Year Area-Based (MYAB) permit (MX-1-836; originally issued on November 24, 2010) was amended on August 12, 2022, and expires on March 31, 2027. The amended permit authorizes the use of the existing Berg camp and CS South camp, geophysical surveying with exposed electrodes, advancement of 100 surface diamond drill holes, four helipads, 3 km of exploration access construction, and 25 km of exploration access modifications with several conditions. Exploration activities above 1,200 masl in elevation are not authorized between November 1 and July 15 of each calendar year.

20.3.2 Environmental Approvals

Major mining projects in BC are subject to an Environmental Assessment (EA) and review prior to certification and issuance of permits to authorize construction and operations. The EA process is a means of addressing the potential for adverse environmental, social, economic, health, and heritage effects or the potential adverse effects on Indigenous interests or rights prior to project approval.

At the provincial level, proposed mining developments that exceed any of the thresholds specified in the Reviewable Projects Regulation (BC Reg. 370/2002) are required under the BCEAA to obtain an EA Certificate (EAC) before the issuance of any permits to construct and operate. The project will require a BC provincial EAC.

At a federal level, proposed mining developments that exceed any of the thresholds specified in the Regulations Designating Physical Activities (SOR/2012-147) are required under the Impact Assessment Act (IAA) to obtain a federal decision statement before the issuance of any permits to construct or operate. The project will require a federal decision statement.

When a project falls under both provincial and federal environmental assessment responsibility, there is an agreement in place between BC and Canada which enables the two governments to carry out a single, cooperative environmental assessment while retaining their respective decision-making powers. Provincial and federal ministers make independent decisions on whether to issue an EAC from a single report.

Surge Copper has not filed a federal or provincial EA application. Once an application is filed, the BC Environmental Assessment Office (EAO) and Impact Assessment Agency of Canada (IAAC) will issue their decision for the project. Once the project has the provincial EAC and a federal decision statement, Surge Copper can apply for the necessary statutory permits and authorizations to commence project construction.

20.3.3 Anticipated Provincial and Federal Approvals and Authorizations

Table 20-2 presents a preliminary list of the key provincial and federal authorizations, licences, and permits that will be required to develop the project.

Table 20-2: Preliminary List of Provincial and Federal Authorizations Likely Required for the Berg Project

Legislation	Issuing Agency	Authorization	Purpose
Provincial			
BC Environmental Assessment Act	BC Environmental Assessment Office (BC EAO)	BC Environmental Assessment Certificate	Minimize or avoid adverse environmental, heritage, health, social, and economic effects and incorporate environmental factors and Indigenous and stakeholder consultation into decision making.
Mines Act	BC Ministry of Energy, Mines and Low Carbon Innovation (EMLI)	Mines Act Permit	Authorizes development including fuel storage, operations, closure, reclamation, and abandonment.
Mineral Tenure Act	EMLI	Mineral Claim Acquisition	Subsurface rights to minerals in a defined unit, up to 10,000 tonnes per year per unit.
	EMLI	Mining Lease changes	Conversion of mineral claim to a mining lease is necessary before production can exceed above limits
Environmental Management Act (EMA)	BC Ministry of Environment and Climate Change Strategy (ENV)	EMA Effluent Permit	Authorizes discharge of liquid effluent to the environment.
		EMA Air Permit	Authorizes discharge of airborne emissions to the environment.
EMA Hazardous Waste Regulation	ENV	Hazardous Waste Regulation	Authorizes temporary storage of hazardous waste.
Drinking Water Protection Act	Northern Health	Camp operating permit	Issues a camp operation permit for sewage disposal, drinking water supply, and food handling.
Public Health Act			
Municipal Wastewater Regulation			
Forest Act and Forest and Range Practices Act	Ministry of Forests (FOR)	Occupant Licence to Cut (OLTC)	Authorizes cutting and removal of trees of merchantable size.
		Road Use Permit	Authorizes use of a Forest Service Road.
		Special Use Permit	Authorizes the construction of and use of a new road. Authorizes occupation of Crown Land.
Heritage Conservation Act	FOR	Heritage Inspection Permit S 12.2	Authorizes investigation through an archaeological impact assessment or mitigation of impacts to sites (should any be identified) through systematic data recovery after an impact assessment has been completed.
		Site Alteration Permit (SAP) as needed S 12.4	Authorizes alteration or removal of site (should any be identified and impacted by the Project).
Land Act	FOR	Licence of Occupation	Authorizes occupation of Crown Land including temporary borrow and gravel pits, construction staging areas, and for remote areas where precise tenure boundaries are not required.
Water Sustainability Act	FOR	Change Approval S11	Changes in and about a stream are carried out under change approvals and notifications. These approvals authorize work in and around streams.

Legislation	Issuing Agency	Authorization	Purpose
		New Water Licence S10	Water licences allow licensees to divert, store, and use specific quantities of water for one or more water use purposes. A water licence may also authorize works related to the diversion and use of the water.
Wildlife Act	FOR	Authorization Permits for general wildlife (relocation)	If work occurs within identified wildlife areas. A blanket permit applies across the entire project.
Federal			
Impact Assessment Act (IAA)	Impact Assessment Agency of Canada (IAAC)	Federal Decision Statement	Minimize or avoid adverse environmental, heritage, health, social, and economic effects and incorporate environmental factors and Indigenous and stakeholder consultation into decision making.
Fisheries Act	Fisheries and Oceans Canada (DFO)	Section 35 Authorization	May require authorization(s) if the Project causes serious harm to fish or fish habitat (e.g., watercourse crossings and clearing riparian vegetation)
		Scientific Licence	Licence required to harvest fish for experimental, scientific, educational, or public display purposes.
	Environment and Climate Change Canada (ECCC)Metal and Diamond Mining Effluent Regulations, SOR/2002-222	Schedule 2 Amendment Authorization to deposit an effluent that contains a deleterious substance	Metal and Diamond Mining Effluent Regulations are intended to reduce threats to fish and their habitat by improving the management of harmful substances in metal and diamond mining effluent.
Migratory Birds Convention Act	ECCC	Damage or Danger Permit	May require a permit if the Project is shown to affect nesting habitats used by migratory birds or if activities occur during the nesting season (e.g., clearing of vegetation, disturbance to nests)
Species at Risk Act (SARA)	ECCC	Species at Risk Permit	Permits may be required if the Project has the potential to affect a species listed on Schedule 1 of the Act, including any part of its critical habitat, or the residences of its individuals.
Nuclear Safety and Control Act	ECCC	Licence	A licence is required for possession of instruments containing radioactive material, such as nuclear density gauges (portable and fixed).
Radiocommunication Act	ECCC	Licence	A licence is required for use of radio equipment on site.
Transportation of Dangerous Goods Act	ECCC	Permit	Transportation and handling of dangerous goods as described by the regulation.
Explosives Act	Natural Resources Canada	Manufacturing/Storage Licence	Explosives authorizations are required during construction and operations. Authorization is required to manufacture and operate an explosives storage facility. Licences are required by either the company or blasting contractor.
Canadian Navigable Waters Act	Transport Canada	Permit	May require authorization(s) if the Project activities include works built in, on, over, under, through, or across any navigable water that may interfere with navigation.

20.3.3.1 Anticipated Major Provincial Authorizations

The major BC provincial authorizations anticipated for the project include the following:

- *Mines Act*

  All mines in BC must hold a permit issued by the Chief Permitting Officer (CPO), under the Mines Act and in accordance with Part 10 of the Health, Safety and Reclamation Code for Mines in British Columbia. Permitting under the Mines Act is applicable for all on-site mining activities and considers detailed designs for all project components and phases of mine life, including construction, operation, reclamation, and closure. An amendment application must be made if a proponent wishes to change any component of their mines act permit unless the changes meet the criteria of a deemed authorization or a departure from approval.

- *Environmental Management Act* Effluent and Air Emissions permits.

  The Environmental Management Act is the primary legislation that enables the BC to regulate the introduction of waste to the receiving environment. The Waste Discharge Regulation of EMA prescribes those discharges of wastes from mining activities to the environment require authorization under the EMA.

  An EMA permit to authorize the ongoing discharge of waste for a mining project is required for:

  - Effluent discharges (e.g., tailings pond supernatant, mine-influenced runoff, and sewage)
  - Air emissions (e.g., refuse incinerator emissions, emissions from large power-generating plants, emissions from milling processes, etc.)
  - Solid wastes (e.g., mill tailings, water treatment plant sludge, municipal and industrial refuse, etc.)

  An EMA permit will set the terms and conditions for the waste discharge, with the goal of ensuring the protection of human health and the environment. The terms and conditions of an EMA permit may include limiting the quantity and quality of waste contaminants and monitoring the discharge and the receiving environment.

- *Joint Mines Act/Environmental Management Act* Application

  Mines Act and Environmental Management Act permits are required for all new mines in BC to allow for mining activities and associated discharges to the environment. Although these permits fall under the jurisdiction of EMLI and ENV, respectively, complex applications allow for an integrated permitting process that will enable proponents to apply for a coordinated authorization review process. Complex projects are referred to the coordinated authorization process, including a mining project that is an extension, expansion or re-start requiring multiple authorizations.

20.3.3.2 Anticipated Major Federal Authorizations

- *Fisheries Act*

  In effect since June 2019, Canada's modernized Fisheries Act, RSC 1985, c. F-14 provides protection for all fish and fish habitats. Where works may cause the harmful alteration, disruption, or destruction of fish habitat, authorization from Fisheries and Oceans Canada (DFO) under Section 35 of the Fisheries Act may be required. A Fisheries Authorization and Fish Habitat Compensation Plan may be required if the proposed mine infrastructure associated with a proposed project will impact fish-bearing water.

Mining projects in BC may also require authorizations from ECCC under Section 36 of the *Fisheries Act*, which prohibits the deposition of deleterious substances into water frequented by fish. If the deposition of a deleterious substance into waters frequented by fish is due to the proposed establishment of a tailings impoundment area or other mine waste storage facility, an authorization from ECCC, in the form of a Schedule 2 (SOR/2002-222) amendment to the MDMER under Section 36 of the Fisheries Act, may be required.

The project as envisioned in this report may require a Fisheries Act Authorization and Fish Habitat Compensation Plan. A Schedule 2 amendment to the MDMER may also be required subject to further fish and fish habitat surveys required for areas where mine waste will be stored (waste rock, tailings, mineralized material, and untreated contact water / mine effluent).

20.4 Environmental Management and Monitoring Plans

As the project progresses through the PFS and EA/permitting stages, several environmental management and monitoring plans will be required to guide the development and operation of the project and mitigate and limit environmental impacts. These plans will be complementary to the engineered designs that will be required for the storage of tailings, waste rock, mineralized material, and conveyance/storage (refer to Section 18 of this report). A preliminary list of the plans that will need to be developed are provided below.

- Environmental Management System
- Surface Erosion Prevention and Sediment Control Plan
- Soil Management Plan
- Construction Environmental Management Plan
- ML/ARD Management Plan
- Mine Site Water Management Plan
- Discharge Management Plan
- Vegetation Management Plan
- Invasive Plant Management Plan
- Wildlife Management Plan
- Archaeological Management and Impact Mitigation Plan
- Mine Site Traffic Control Plan
- Fuel Management and Spill Control Plan
- Combustible Dust Management Plan
- Chemicals and Materials Storage, Transfer, and Handling Plan
- Waste (Refuse and Emissions) Management Plan
- Reclamation and Closure Plan
- Occupational Health and Safety Plan
- Aquatic Effects Monitoring Plan
- Stakeholder and Indigenous Nations Communication Plan
- Mine Emergency Response Plan

20.5 Other Potential Environmental Concerns

There are two provincial parks within 30 km downstream of the project including:

- The Nineikekh/Nanika-Kidprice Park approximately 16 km north of the Project site. This park covers 17,006 ha and provides important habitat for wildlife that live in and around the park. Lower elevations in the park are moderate value habitat for grizzly bears in late spring, summer, and fall. Caribou have also been observed in the park. The fishery values include populations of Chinook and sockeye salmon, rainbow and cutthroat trout, mountain whitefish, Dolly Varden char, and the blue-listed bull trout. Nanika Falls is a barrier to upstream fish passage. Rainbow trout and Dolly Varden char occur above the falls in Anzac, Stepp, and Kidprice lakes.
- The Morice Lake Park is located approximately 22 km northwest of the Project site. This park covers 52,430 ha and provides important habitat for grizzly bears, mountain goats, moose, deer, and caribou. It is also at the headwaters of an important salmon and steelhead river.

20.6 Conceptual Mine Closure and Reclamation Plan

Under the *BC Mines Act*, anyone who engages in mining exploration work or mining operations determined by regulation must submit a reclamation plan. A conceptual reclamation and closure plan and a closure security estimate will need to be developed to support the submission of an EA report to the province or to the federal agency. The reclamation security will need to be posted to BC government prior to the commencement of construction.

A key closure objective for the mine will be for effluent to meet applicable water quality objectives without ongoing treatment for ARD. The current Conceptual Closure and Reclamation Plan for the project includes the following measures:

- Partial backfilling of open pits with non-acid generating waste rock or an offsite source of material, and flooding of the remaining open pit.
- The mineralized material stockpile will be reclaimed, once depleted.
- The surface infrastructure on the site will be decommissioned and removed from the site upon completion of mining.
- Explosives, explosives magazines, fuel, and storage facilities will be removed from the site.
- Concrete slabs and footings will be broken and placed appropriately to meet project closure and reclamation objectives.
- Process buildings, camp facilities, pipelines, conveyor systems, and equipment will be removed from site or appropriately landfilled in an approved facility.
- Waste rock stockpiles will be re-contoured for geotechnical stability, capped with a graded earthfill/rockfill cover to facilitate runoff and minimize infiltration, and revegetated.
- Compacted surfaces including laydowns, civil pads, and non-site access roads will be decompacted, re-contoured, capped with a graded earthfill/rockfill cover to facilitate runoff and minimize infiltration, and revegetated.
- The TWMF’s embankments will be revegetated to establish an erosion resistant surface.
- The tailings beach will be capped with soil and revegetated.
- Water treatment will be continued until the TWMF water quality meets discharge criteria. Once TWMF water quality meets discharge criteria, water treatment will be stopped, diversions will be decommissioned, and the TWMF will be allowed to discharge naturally via a closure spillway.
- For mine roads, Surge Copper will remove all culverts and install cross-ditches for drainage. The mine site access road will not be deactivated as it will be required for access for continued reclamation activities and monitoring.

Closure planning will include dialogue with Indigenous groups and stakeholders to determine post-mining land use objectives and necessary investigations required to achieve and monitor those objectives.

The estimated closure and reclamation costs are discussed in Section 21.2.11.

21 CAPITAL AND OPERATING COSTS

21.1 Introduction

The capital and operating cost estimates presented in this PEA provide substantiated costs that can be used to assess the preliminary economics of the Berg Project. The estimates are based on an open pit mining operation as well as the construction of a process plant, tailings storage facility and infrastructure as well as owner's costs and provisions. The processing plant nameplate capacity is 90,000 t/d (32.9 Mt/a), with a life of mine of 30 years.

All capital and operational cost estimates are presented in Canadian dollars (C$), with exchange rate variations factored in. An exchange rate of 0.77 (C$/US$) has been applied as necessary.

21.2 Capital Cost Estimate

21.2.1 Capital Cost Summary

The capital cost estimate conforms to Class 5 guidelines of the Association for the Advancement of Cost Engineering International (AACE International), with an estimated accuracy of +50%/-30% accuracy. The capital cost estimate was developed in Q2 2023 Canadian dollars based on Ausenco's in-house database of projects and advanced studies as well as experience from similar operations.

The total initial capital cost for the Berg Project is C$1,968 M, and the LOM sustaining cost including financing is C$1,733 M. The capital cost summary is presented below in Table 21-1. Table 21-2 provides a summary of the same capital costs for the Project, categorized by the work breakdown structure (WBS) of the capital cost estimate.

Table 21-1: Capital Cost Summary

Capital Category	Initial Capital (C$M)
Mining	
Pre-Stripping	143
Mining Equipment Down Payments	123
Mining Capital	124
Subtotal	**390**
Processing	
Crushing and Grinding	506
Processing	157
Concentrate Handling	31
Subtotal	**693**
Infrastructure	
Power Supply	66
Site Access and Buildings	106
Tailings and Waste Management	149
Subtotal	**321**
Total Directs	**1,404**
Indirects	110
Engineering Services	152
Owner's Cost	35
Contingency	266
Total	**1,968**

Note: Values shown in the press release are rounded to zero decimal places.

Table 21-2: Capital Cost Summary, by WBS Code

WBS	WBS Description	Initial Capital (C$M)	Sustaining Capital Cost (C$M) LOM	Total Cost (C$M)
1000	Mining and Waste Rock Handling	389.7	669.4	1,059.1
2000	Process Plant	693.1	-	693.1
3000	Tailings Facilities	148.9	863.7	1,012.6
4000	On Site Infrastructure	76.4	-	76.4
5000	Off Site Infrastructure	95.8	-	95.8
Total Directs		**1,403.9**	**1,533.1**	**2,937.0**
6000	Indirects	110.4	-	110.4
7000	EPCM Services	152.1	-	152.1
8000	Owner's Cost	35.5	-	35.5
Total Indirects		**298.0**	**-**	298.0
9100	Contingency	266.1	-	266.1
	Closure	-	200.0	200.0
Project Total		**1,968.0**	**1,733.1**	**3,701.1**

Note: Values shown in the press release are rounded to zero decimal places.

The capital cost for the project is split into initial capital and sustaining capital costs. The initial capital is any project development cost incurred during the pre-production years. Sustaining capital is the capital incurred to support production from the project.

21.2.2 Basis of Capital Cost Estimate

The data for the estimates has been derived from a variety of sources, including the following:

- Mining schedule;
- Conceptual engineering design by Ausenco and Moose Mountain;
- Major mechanical equipment costs are based on vendor quotations, first principles, and Ausenco's database of historical projects;
- Material take-offs (MTOs) for concrete, steel, electrical, instrumentation, in-plant piping and platework were factored by benchmarking against similar projects with equivalent technologies and unit operation;
- Topographical information considered;
- Engineering design at a PEA level;
- Cost escalation to 2023 when historical pricing is considered; and
- A growth and contingency allowance were included.

21.2.3 Area 1000 – Mine Capital Costs

21.2.3.1 Mine Capital Costs

Mine capital costs have been derived from vendor quotations and historic data collected by Moose Mountain at other Canadian open pit mining operations, applied to the owner operated Berg mine plan and PEA production schedule.

Pre-production mine operating costs (i.e., all mine operating costs incurred before mill start-up) are capitalized and included in the capital cost estimate. Pre-production pit operating costs include drill and blast, load and haul, support, and GME costs. All mine operations site development costs, such as clear and grub, topsoil stripping, haul road construction, stockpile preparation, and pit dewatering, are capitalized under this category.

The initial mine equipment mobile fleet is planned to be purchased either through financing or lease agreements with the vendors. Down payments and monthly lease payments are capitalized through the initial and sustaining periods of the project. All expansion and replacement fleet purchases made after year 5 of the project are planned as capital (non-lease) purchases.

The following items are also capitalized:

- pit electrification and distribution;
- explosives mixing plant and magazine;
- maintenance shop tooling and supplies;
- mine rescue gear and safety supplies;
- radio communications systems;

- mine survey gear and supplies;
- site GPS (global positioning system) and machine guidance systems;
- geotechnical instrumentation;
- geology, grade control, and mine planning software licences;
- mine fleet spare parts inventory; and
- piping for pit dewatering.

Table 21-3 summarizes the Mine Area Capital Cost estimates for the Berg PEA Project. It is the QP's opinion that these estimates are reasonable for the location and planned mine development and can be used for a PEA.

Table 21-3: Mining Initial Capital Costs

WBS Description	Initial Capital (C$M)
Capitalized Mine Development Costs	142.5
Initial Mine Fleet Capital	95.2
Mine Operations Infrastructure Capital	10.8
Indirects	1.6
Contingency	15.9
Total Initial Mining Capital	**266.0**

21.2.3.2 Additional Facilities

The mine additional facilities costs include the mine infrastructure and services costs and waste rock handling costs. The mine infrastructure and services cost comprise of mine administration building, truck shop and explosives magazine. The waste rock handling costs comprise of waste rock conveying equipment and bulk material quantities. Table 21-4 shows the mine additional facilities cost.

Table 21-4: Mine Additional Facilities Cost

WBS	WBS Description	Initial Capital (C$M)
1200	Mine Infrastructure and Services	9.5
1400	PAG Waste Rock handling	114.2
Total Mine Additional Facilities Cost		**123.6**

Note: Totals may not sum due to rounding.

21.2.4 Area 2000 – Process Capital Costs

The definition of process equipment requirements was based on process flowsheets and process design criteria, as defined in Section 17. All major equipment was sized based on the process design criteria to derive a mechanical equipment list. Mechanical scopes of work were developed, and major equipment were sent for budgetary pricing to equipment suppliers. For mechanical equipment costs, 40% of the value was sourced from budgetary quotes; the remainder was sourced by benchmarking against other recent flotation concentrator mining projects and studies.

In support of the major installation construction contracts, engineering for the process plant was completed to a PEA-level of definition. Bulk material quantities were derived for earthworks and priced from other benchmark projects. All other quantities for electrical and instrumentation, concrete, steel, piping, cable, and platework were factored and priced.

Process plant costs are summarized in Table 21-5 and described in the following sections. Direct costs include all contractors' direct and indirect labour, permanent equipment, materials, freight, and mobile equipment associated with the physical construction of the areas.

Table 21-5: Process Plant Capital Cost

WBS	WBS Description	Initial Capital (C$M)
2100	Crushing	95.2
2200	Stockpile & reclaim	74.0
2300	Grinding	336.6
2400	Flotation & regrind	147.6
2500	Concentrate Handling	30.6
2700	Reagents	6.0
2800	Process Plant Services	3.2
Total Initial Process Plant Cost		**693.1**

Note: Totals may not sum due to rounding.

21.2.5 Area 3000 – Tailings Facility

The breakdown of the tailings facilities capital cost is presented below in Table 21-6. These facilities include tailings handling and tailings storage facility.

Table 21-6: Additional Facilities Cost

WBS	WBS Description	Initial Capital (C$M)
3110	Tailings Handling	78.1
3120	Tailings Storage Facility	70.9
Total Tailings Facility Cost		**148.9**

Note: Totals may not sum due to rounding.

21.2.6 Area 4000 – On-Site Infrastructure Capital Costs

In support of the major installation construction contracts, engineering for the project was completed to a PEA-level of definition. Bulk material quantities were derived for earthworks including the entire project site, process plant, TWMF and water management structures, and priced from other benchmark projects. The power requirements for the project were estimated based on the electrical equipment list developed for the process plant, power demand for the mining operations and allowances for other site requirements such as pit dewatering, lighting, etc.; the cost of the substation and cable routing was estimated based on benchmarked North American projects.

The buildings required for the operation were sized and costed based on benchmark projects with similar weather and snow conditions located in Canada.

The breakdown of the on-site infrastructure capital costs is shown in Table 21-7.

The on-site infrastructure covers the cost of the site earthworks, site-wide electrical distribution, fuel storage, sewers, and various infrastructure buildings.

Table 21-7: On-Site Infrastructure Capital Costs

WBS	WBS Description	Initial Capital (C$M)
4100	Bulk Earthworks	20.4
4200	Power Generation & Distribution	8.8
4300	Infrastructure Buildings	5.6
4400	Site Services	37.0
4500	Mobile Equipment	4.6
Total Initial On-Site Infrastructure Cost		**76.4**

Note: Totals may not sum due to rounding.

21.2.7 Area 5000 – Off-Site Infrastructure Capital Costs

The breakdown of the costs for the off-site infrastructure planned for the project is shown in Table 21-8.

The off-site infrastructure costs include building the main access road, water supply, high voltage power supply, tailings storage facility, permanent camp, and pipeline.

Table 21-8: Initial Off-Site Infrastructure Capital Costs

WBS	WBS Description	Initial Capital (C$M)
5100	Main Access Road	6.9
5200	Power Supply	57.3
5300	Water Supply	4.6
5400	Construction & Permanent Camp	27.0
Total Initial Off-Site Infrastructure Cost		**95.8**

Note: Totals may not sum due to rounding.

21.2.8 Area 6000 - 9000 – Indirect Capital Costs

Indirect capital costs are calculated as a percentage of the direct costs. The indirect capital costs are summarized in Table 21-9 and described below.

Project indirect costs include the following:

- Temporary construction facilities and services;
- Messing and catering during construction;
- Vendor reps and assistance;
- Equipment Spares;

- First fills and initial charges; and
- Project delivery.

Provision costs include the following:

- Contingency

Table 21-9: Indirect Capital Costs Summary

WBS	WBS Description	Initial Capital (C$M)
6100	Field Indirects – Temporary Construction Facilities & Services	40.6
6200	Messing and catering during construction	32.2
6400	Vendor Reps and Assistance	9.9
6500	Equipment Spares	19.8
6600	First Fills and Initial Charges	7.9
6800	Freight & Logistics	Included in Direct Costs
Total Project Indirects		**110.4**
7100	Engineering Services – EPCM	152.1
7200	Commissioning Services	Included with EPCM
Total Project Delivery		**152.1**
8000	Owner's Costs	35.5
Total Owner's Cost		**35.5**
Total Indirects, Project Delivery, Owner's Costs		**298.0**
9000	Contingency	266.1
Total Indirects		**564.1**

Note: Totals may not sum due to rounding.

21.2.9 Area 8000 – Owner (Corporate) Capital Costs

The Owner's costs are estimated as 4% of total direct costs and are calculated to be C$35.5 M Owner's costs include such things as project staffing and miscellaneous expenses, pre-production labour, home office project management, home office finance, legal costs, insurance and bonds, licences, and fees.

21.2.10 Sustaining Capital

21.2.10.1 Overview

The life of mine sustaining cost for the project is estimated at C$1,533.1 M, which includes C$669.4 M in mine sustaining costs and C$863.7 M in additional facilities costs.

21.2.10.2 Mining

Down payments, monthly lease payments, and outright purchases for the mine equipment fleet scheduled throughout the life of mine are capitalized through the sustaining periods of the project.

The sustaining costs for mining also include the cost of expanding the open pit mining operation infrastructure, such as explosive storage, pit electrification and distribution, maintenance tooling, radio communications, geotechnical instrumentation, and the mobile fleet spare parts inventory. A fleet management and dispatch system is also added in the sustaining capital period of the project.

Table 21-10 summarizes the Mining Sustaining Cost estimates for the Berg PEA Project.

Table 21-10: Mining Sustaining Capital Costs

WBS Description	Sustaining Capital (C$M)
Sustaining Mine Fleet Capital	648.9
Mine Operations Infrastructure Capital	20.5
Total Mining Sustaining Capital	**669.4**

21.2.10.3 Additional Process Facilities

The sustaining cost under additional process facilities includes the tailings storage facility expansion cost. The total estimated LOM sustaining cost of tailings storage facility is C$ 863.7 M.

21.2.11 Closure and Reclamation Planning

The closure cost for the project is estimated at C$ 200.0 M.

21.3 Operating Cost Estimate

The costs considered on-site operating costs are those related to mining, processing, tailings handling, maintenance, power, and general and administrative activities.

A summary of the operating costs is presented below in Table 21-11.

The unit operating cost is C$10.66/t milled, including an annual G&A cost of C$13.3 M.

Table 21-11: Operating Cost Summary

Cost Area	Annual Costs (C$M)	C$/t Milled
Mining	150.9	5.00
Process	172.6	5.25
G&A	13.3	0.41
Total	**336.8**	**10.66**

Note: Totals may not sum due to rounding.

21.3.1 Basis of Estimate

Key assumptions were made to estimate the operating costs for the Project:

- Cost estimates are based on Q2 2023.
- Costs are expressed in Canadian Dollars (C$).

- Where applicable, an exchange rate of US$ 0.77 per C$ 1.00 was used.
- Power cost of C$ 0.065 per kilowatt-hour (kWh) was assumed.
- A diesel cost of C$ 1.11 per litre was assumed based on trailing 3 year average price.
- A throughput of 90,000 t/d or 32.9 Mt/a was used for the processing plant.
- Plant crusher availability is assumed to be 75%, while the availability for the rest of the process plant is assumed to be 92%.
- ROM and concentrate grades, and recoveries are based on metallurgical testwork results described in Section 13.
- Material and equipment are purchased as new.
- Reagent consumption rates are based on metallurgical testwork results and in-house benchmarks.
- Grinding media consumption rates are based on mineral material characteristics as described in Section 13.

21.3.2 Mine Operating Costs

Mine operating costs are built up from first principles and applied to the Berg PEA mine production schedule. Cost inputs are derived from vendor quotations and historical data collected by Moose Mountain. This includes cost and consumption rates for such inputs as fuel, lubes, explosives, tires, undercarriage, ground engaging tools (GET), drill bits/rods/strings, machine parts, machine major components, labour rates, and operating and maintenance labour ratios. Equipment and labour productivity inputs are estimated for the specific equipment fleet and rationalized to existing Canadian open pit mine operations. Simulated hauler cycle times from source pit benches to planned destinations are utilized to inform hauler productivities.

Annual production tonnes are taken from the Berg PEA mine production schedule. Drilling, loading, and hauling hours are calculated based on the capacities and parametres of the specified equipment fleet. The production tonnes and primary fleet hours also provide the basis for blasting consumables and support fleet inputs.

Estimated life-of-mine unit mining costs are shown in Table 21-12. It is the qualified person's (QP) opinion that the estimates are reasonable for the location and planned mine operation activities and can be utilized for a PEA.

Table 21-12: Mine Operating Cost Summary

Cost Area	C$/t Mined	C$/t Milled	LOM C$M
Drilling	0.20	0.42	412
Blasting	0.38	0.79	774
Loading	0.28	0.57	559
Hauling	1.03	2.15	2,103
Support	0.33	0.69	676
Site Development	0.02	0.04	34
Direct Costs – Total	2.24	4.66	4,558
GME Costs – Total	0.16	0.34	331
Total Mine Operating Cost	**2.40**	**5.00**	**4,889**

Note: Totals may not sum due to rounding.

21.3.3 Process Operating Costs

The process operating cost estimate is based on a 90,000 t/d mill consisting of crushing, grinding, copper & molybdenum flotation and concentrate regrind, concentrate dewatering and tailings handling. The operating cost estimates are summarized below in Table 21-13.

Table 21-13: Process Plant Operating Cost Summary

Cost Area	Annual Costs (C$M)	C$/t Milled	LOM C$M
Power	49.8	1.52	1,484
Reagents & Consumables	79.4	2.42	2,365
Maintenance	13.6	0.41	405
Labour	29.7	0.91	886
Total	**172.6**	**5.25**	**5,139**

Note: Totals may not sum due to rounding.

21.3.3.1 Reagents and Consumables

Reagents, grinding media, and various consumables are required to process the mineralized material from the Berg deposits. The consumption rates of each of the consumable items are based on the metallurgical testwork outlined in Section 13 and based on the planned process plant throughput of 90,000 t/d. The total costs of the reagents and consumables by area as well as the costs of mobile equipment used are shown below in Table 21-14.

Table 21-14: Reagents and Consumables Cost Summary

Cost Area	Annual Costs (C$M)	C$/t Milled
Crushing	4.2	0.13
Grinding	47.0	1.43
Bulk Flotation	24.0	0.73
Molybdenum Flotation	2.9	0.09
Plant Services	0.6	0.02
Mobile Equipment	0.8	0.02
Total	**79.4**	**2.42**

Note: Totals may not sum due to rounding.

21.3.3.2 Maintenance Consumables

Annual maintenance consumable costs were calculated based on a total installed mechanical capital cost by area using a weighted average factor from 3% to 5%. The maintenance cost is divided in the process and non-process areas. The process area includes the crushing, grinding, flotation, reagent handling and plant services areas. The non-process areas include waste rock handling and tailings storage facility. The unit maintenance cost for the process areas is C$0.28/t of feed and for non-process areas is C$0.13/t of feed. The total maintenance consumable operating cost is C$13.6 M/a or C$0.41/t of feed.

21.3.3.3 Power

The electrical energy consumption is divided in the process and non-process areas. The non-process areas include the waste rock handling and tailings facility. The process plant energy consumption is estimated to be 667,309 MWh per year and non-process areas energy consumption is estimated to be 99,239 MWh per year. Electricity will be provided to site at a unit cost of C$0.065/kWh based on similar operation.

The unit power cost for the process plant is estimated at C$1.32/t plant feed and for non-process area is estimated at C$ 0.20/t plant feed. The total power operating cost is C$49.8 M/a or C$1.52/t of feed.

21.3.3.4 Labour

Labour includes all processing and maintenance labour costs.

Processing production labour was developed using benchmarks from similar project and includes operation departments such as metallurgy, mill operations, maintenance, and the assay lab.

Each position was defined and classified as salary and wages. Costs included taxes and benefits. The annual cost is C$13.9 M/a for process operations labour and C$11.6 M/a for process maintenance labour. The total labour operating cost is C$29.7 M/a or C$0.91/t of feed. The estimated labour force for plant operations and plant maintenance was estimated at 62 and 80 people, respectively. The estimate was based on providing a labour force to support continuous operations at 24 h/d, 365 d/a.

Annual maintenance supplies costs were estimated as a percentage of major capital equipment costs plus an allowance for freight charges.

21.3.4 General and Administrative Operating Costs

The general and administrative (G&A) operating costs cover the expenses of the operating departments, and a summary is presented in Table 21-15.

General and administrative (G&A) costs were developed using Ausenco’s in-house data on existing Canadian operations. The costs were estimated based on the following items:

- Human resources (including recruiting, training and community relations);
- Infrastructure power (HVAC and administrative buildings);
- Site administration, maintenance, and security (including office equipment, garbage disposal);
- Assets operation (including non-operation-related vehicles);
- Health and safety (including personal protective equipment, hospital service cost);
- Environmental (including sampling, DSTF operation);
- IT and telecommunications (including hardware and support services); and
- Contract services (including insurance, sanitation, licence fees and legal fees).

The total annual G&A cost was estimated at C$13.3 M/a during production or C$0.41/t plant feed.

Table 21-15: G&A Cost Summary

G&A Expenses	Annual Costs (C$M)	$/t Milled
General Administrative Costs	2.1	0.06
Personnel Transportation	1.9	0.06
Catering and Housekeeping	7.6	0.23
Laboratory Costs	0.3	0.01
Insurance	1.3	0.04
Total	**13.3**	**0.41**

Note: Totals may not sum due to rounding.

22 ECONOMIC ANALYSIS

22.1 Forward-Looking Information Cautionary Statements

The results of the economic analyses discussed in this section represent forward-looking information as defined under Canadian securities law. The results depend on inputs that are subject to known and unknown risks, uncertainties, and other factors that may cause actual results to differ materially from those presented here. Information that is forward-looking includes the following:

- mineral resource estimates;
- assumed commodity prices and exchange rates;
- the proposed mine production plan;
- projected mining and process recovery rates;
- assumptions as to mining dilution and ability to mine in areas previously exploited using mining methods as envisaged
- the timing and amount of estimated future production;
- sustaining costs and proposed operating costs;
- assumptions as to closure costs and closure requirements; and
- assumptions as to environmental, permitting, and social risks.

Additional risks to the forward-looking information include:

- changes to costs of production from what is assumed;
- unrecognized environmental risks;
- unanticipated reclamation expenses;
- unexpected variations in quantity of mineralized material, grade, or recovery rates;
- accidents, labour disputes and other risks of the mining industry;
- geotechnical or hydrogeological considerations during mining being different from what was assumed;
- failure of mining methods to operate as anticipated;
- failure of plant, equipment, or processes to operate as anticipated;
- changes to assumptions as to the availability of electrical power, and the power rates used in the operating cost estimates and financial analysis;
- ability to maintain the social licence to operate;
- changes to interest rates; and
- changes to tax rates.

22.2 Methodologies Used

The Project has been evaluated using a discounted cash flow (DCF) analysis based on an 8% discount rate. Cash inflows consist of annual revenue projections. Cash outflows consist of capital expenditures, including pre-production costs; operating costs; taxes; and royalties. These are subtracted from the inflows to arrive at the annual cash flow projections. Cash flows are taken to occur at the mid-point of each period. It must be noted that tax calculations involve complex variables that can only be accurately determined during operations and, as such, the actual post-tax results may differ from those estimated. A sensitivity analysis was performed to assess the impact of variations in metals price, discount rate, head grade, recovery, total operating cost, exchange rate, and total capital costs.

The capital and operating cost estimates developed specifically for this project are presented in Section 21 of this report in Q2 2023 Canadian dollars. The economic analysis has been run on a constant dollar basis with no inflation.

22.3 Financial Model Parametres

22.3.1 Assumptions

The economic analysis was performed assuming a copper price of US$4.00/lb, molybdenum price of US$15.00/lb, silver price of US$23.00/oz and gold price of US$1,800/oz; these metal prices were based on a 3 year trailing average and consensus analyst estimates. The forecasts used are meant to reflect the average metals price expectation over the life of the project. No price inflation or escalation factors were taken into account. Commodity prices can be volatile, and there is the potential for deviation from the forecast.

The economic analysis also used the following assumptions:

- construction period of two years;
- total mine life of 30.4 years;
- cost estimates in constant Q2 2023 Canadian dollars with no inflation or escalation factors considered;
- results based on 100% ownership with a 1% net smelter return (NSR) royalty;
- capital cost funded with 100% equity (no financing cost assumed except where stated in mining equipment);
- all cash flows discounted to start of construction period using middle of period discounting convention;
- all metal products are sold in the same year they are produced;
- project revenue is derived from the sale of copper concentrate and molybdenum concentrate; and
- no contractual arrangements for refining currently exist.

22.3.2 Taxes

The Project has been evaluated on a post-tax basis to provide an approximate value of the potential economics. The tax model was compiled by independent tax consultant Wentworth Taylor and calculations are based on the tax regime as of the date of the PEA technical report. At the effective date of this report, the Project is assumed to be subject to the Income Tax and Mineral Tax applicable in British Columbia, Canada, resulting in estimated total payments of $4,857.6 million over the life of mine.

22.4 Economic Analysis

The economic analysis was performed assuming an 8% discount rate. The pre-tax NPV discounted at 8% is $3,549.7 M; the internal rate of return IRR is 25.3%, and payback period is 3.3 years. On a post-tax basis, the NPV discounted at 8% is $2,083.6 M; the IRR is 20.0%, and the payback period is 3.9 years. A summary of project economics is shown in Table 22-1. The analysis was done on an annual cashflow basis; the cashflow output is shown graphically in Figure 22-1 and with detail in Table 22-2.

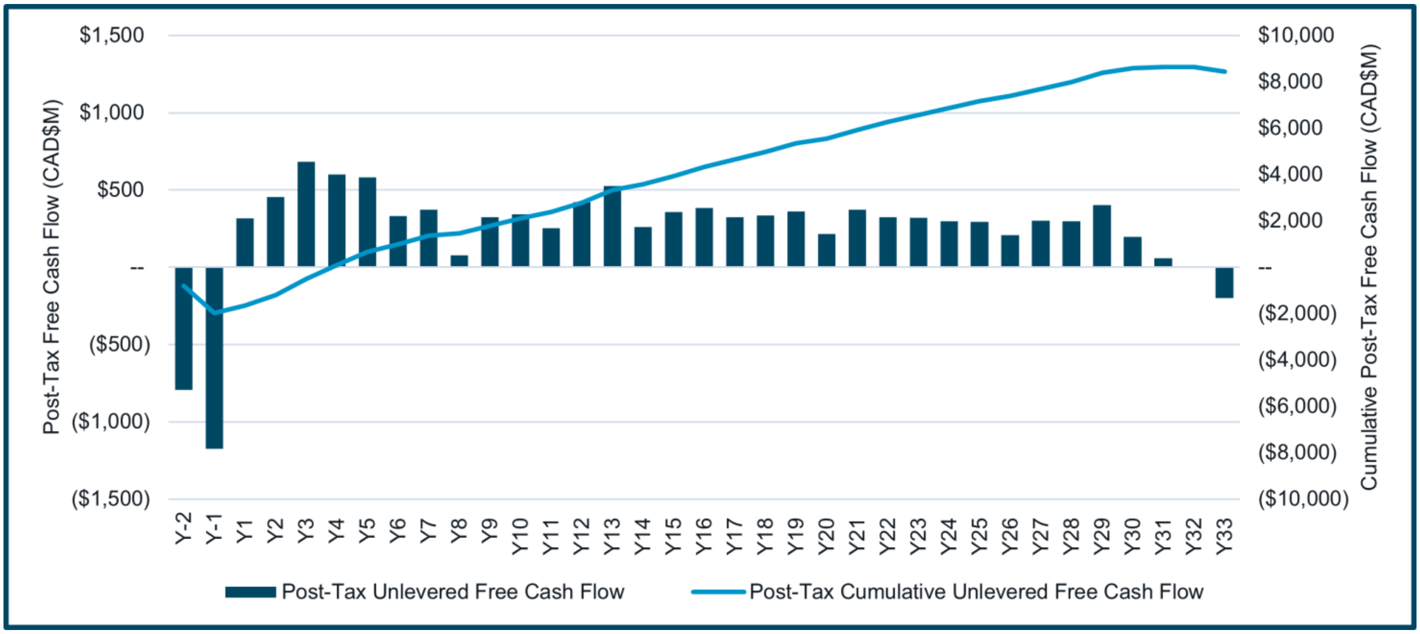
Readers are cautioned that the PEA is preliminary in nature. It includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the PEA will be realized.

Table 22-1: Economic Analysis Summary

General		LOM Total / Avg.
Copper Price (US$/lb)		4.00
Molybdenum Price (US$/lb)		15.00
Silver Price (US$/oz)		23.00
Gold Price (US$/oz)		1,800
Mine Life (Years)		30.4
Total Mill Feed Tonnes (kt)		978,234
Total Waste Tonnes (kt)		1,101,471
Average Strip Ratio (w:o)		1.13
Production		**LOM Total / Avg.**
Mill Head Grade – Cu (%)		0.22%
Mill Head Grade – Mo (%)		0.02%
Mill Head Grade – Ag (g/t)		4.5
Mill Head Grade – Au (g/t)		0.02
Mill Recovery Rate – Cu (%)		80.9%
Mill Recovery Rate – Mo (%)		75.9%
Mill Recovery Rate – Ag (%)		64.8%
Mill Recovery Rate – Au (%)		55.0%
Total Mill Recovered – Cu (mlbs)		3,836
Total Mill Recovered – Mo (mlbs)		402.6
Total Mill Recovered – Ag (koz)		90,717
Total Mill Recovered – Au (koz)		393.8
Average Annual Production – Cu (mlbs)		125.9
Average Annual Production – Mo (mlbs)		13.3
Average Annual Production – Ag (Moz)		3.0
Average Annual Production – Au (koz)		12.9
Operating Costs		**LOM Total / Avg.**
Mining Cost (C$/t Milled)		5.00
Processing Cost (C$/t Milled)		5.25
G&A Cost (C$/t Milled)		0.41
Total Operating Costs (C$/t Milled)		10.66
Cash Costs (By-Product Basis) (C$/lb Cu)		0.46
AISC (By-Product Basis) ($/lb Cu)		0.82
Cash Costs (Co-Product Basis) ($/lb CuEq)		1.75
AISC (Co-Product Basis) ($/lb CuEq)		1.98
Production		**LOM Total / Avg.**
Initial Capital ($M)		1,968
Sustaining Capital ($M)		1,533
Closure Capital ($M)		200
Financials	**Pre-Tax**	**Post-Tax**
NPV (8%) ($M)***	$3,549.7	2,083.6
IRR (%)***	25.3%	20.0%
Payback (Years)	3.3	3.9

* C1 Cash Costs includes mining costs, processing costs, mine-level G&A, offsite charges, and royalties.
** C3 AISC includes cash costs plus sustaining capital and closure cost.
*** Values shown in the press release are rounded to zero decimal places.

Figure 22-1: LOM Post-Tax Free Cash Flow



Source: Ausenco, 2023.

Table 22-2: Project Cash Flow (Year -2 to Year 20)

Macro Assumptions	Units	Total / Avg.	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Copper Price	US$/lb	4.00	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Molybdenum Price	US$/lb	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Silver Price	US$/oz	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00
Gold Price	US$/oz	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00
Revenue	**$M**	**30,261.8**	--	--	**831.5**	**1,447.9**	**1,462.1**	**1,365.2**	**1,387.5**	**914.5**	**1,043.0**	**937.7**	**993.1**	**1,032.5**	**844.6**	**1,191.2**	**1,369.3**	**997.5**	**1,036.1**	**1,061.8**	**919.6**	**927.7**	**989.9**	**964.1**
Off-Site Costs	$M	(2,544.1)	--	--	(69.2)	(122.0)	(124.0)	(108.2)	(120.4)	(76.6)	(84.7)	(78.8)	(85.4)	(87.9)	(71.0)	(101.6)	(118.1)	(85.7)	(87.3)	(90.1)	(78.8)	(77.7)	(83.6)	(80.2)
Royalties	$M	(77.2)	--	--	(7.6)	(13.3)	(13.4)	(12.6)	(12.7)	(8.4)	(9.6)	(8.6)	(9.1)	(9.4)	(7.7)	(10.9)	(12.5)	(9.1)	(9.5)	(9.7)	(8.4)	(8.5)	(9.1)	(8.8)
Operating Cost	$M	(10,431.9)	--	--	(287.1)	(381.0)	(392.5)	(423.8)	(428.9)	(418.2)	(396.1)	(414.9)	(412.5)	(418.0)	(414.5)	(379.0)	(390.0)	(339.1)	(332.8)	(368.6)	(334.8)	(323.4)	(323.2)	(338.3)
EBITDA	**$M**	**17,008.7**	--	--	**467.6**	**931.6**	**932.3**	**820.6**	**825.6**	**411.3**	**552.6**	**435.3**	**486.2**	**517.1**	**351.4**	**699.6**	**848.6**	**563.5**	**606.5**	**593.4**	**497.6**	**518.1**	**574.1**	**536.8**
Initial Capex	$M	(1,968.0)	(794.4)	(1,173.6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sustaining Capex	$M	(1,533.1)	--	--	(89.8)	(346.0)	(76.6)	(69.5)	(66.0)	(40.7)	(3.0)	(268.8)	(18.5)	(10.2)	(5.3)	(10.8)	(12.5)	(154.9)	(45.0)	(9.6)	(15.4)	(1.4)	(4.7)	(152.0)
Closure Capex	$M	(200.0)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Change in Working Capital	$M	--	--	--	(53.4)	(44.4)	(0.6)	8.6	(1.1)	36.5	(11.1)	9.2	(4.4)	(2.9)	14.5	(28.6)	(13.4)	27.0	(3.4)	(0.5)	9.8	(1.2)	(4.9)	2.6
Pre-Tax Unlevered Free Cash Flow	**$M**	**13,307.6**	**(794.4)**	**(1,173.6)**	**324.4**	**541.2**	**855.1**	**759.7**	**758.4**	**407.1**	**538.6**	**175.7**	**463.3**	**504.0**	**360.7**	**660.3**	**822.8**	**435.6**	**558.1**	**583.3**	**492.0**	**515.5**	**564.5**	**387.4**
Pre-Tax Cumulative Unlevered Free Cash Flow	$M		(794.4)	(1,968.0)	(1,643.6)	(1,102.4)	(247.2)	512.4	1,270.9	1,677.9	2,216.5	2,392.2	2,855.5	3,359.5	3,720.2	4,380.5	5,203.2	5,638.8	6,197.0	6,780.3	7,272.2	7,787.7	8,352.3	8,739.6
Payback (Years)		3.3	--	--	--	--	--	3.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mining Tax	$M	(1,654.5)	--	--	(9.5)	(18.9)	(18.9)	(16.7)	(16.8)	(16.1)	(74.3)	(21.6)	(61.9)	(67.1)	(45.6)	(91.0)	(110.3)	(54.3)	(74.2)	(77.2)	(63.8)	(68.3)	(75.2)	(51.1)
Income Tax Payable	$M	(3,203.1)	--	--	--	(66.0)	(154.4)	(143.5)	(159.1)	(58.9)	(92.0)	(74.8)	(77.3)	(92.7)	(60.5)	(147.2)	(185.8)	(121.7)	(125.1)	(123.6)	(104.4)	(111.4)	(126.9)	(120.0)
Post-Tax Unlevered Free Cash Flow	**$M**	**8,450.0**	**(794.4)**	**(1,173.6)**	**314.9**	**456.4**	**681.8**	**599.5**	**582.6**	**332.1**	**372.2**	**79.2**	**324.1**	**344.3**	**254.6**	**422.1**	**526.7**	**259.6**	**358.8**	**382.5**	**(323.7)**	**335.9**	**362.4**	**216.3**
Post-Tax Cumulative Unlevered Free Cash Flow	$M		(794.4)	(1,968.0)	(1,653.1)	(1,196.8)	(514.9)	84.6	667.2	999.3	1,371.5	1,450.7	1,774.8	2,119.0	2,373.6	2,795.7	3,322.4	3,582.0	3,940.8	4,323.3	4,647.1	4,982.9	5,345.3	$5,561.6
Payback (Years)		3.9	--	--	--	--	--	3.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Production Summary																								
Total Resource Mined	kt	978,234	--	1,692	30,052	33,701	35,193	34,512	35,208	23,751	35,105	35,647	33,185	33,101	34,890	33,860	32,746	30,700	35,368	38,028	36,250	35,297	35,644	36,184
Total Resource Milled	kt	978,234	--	--	26,300	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400
Total Waste Mined	kt	1,101,471	23,865	19,272	24,948	71,299	46,807	73,488	68,292	57,749	56,895	63,353	63,815	64,900	56,110	49,140	52,254	38,300	27,632	32,972	30,750	28,703	22,452	42,629
Total Material Mined	kt	2,079,706	23,865	20,963	55,000	105,000	82,000	108,000	103,500	81,500	92,000	99,000	97,000	98,000	91,000	83,000	85,000	69,000	63,000	71,000	67,000	64,000	58,096	78,813
Project Mine Life (Years)		30.4	--	--	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Leach Cap - Resource Milled	kt	5,937	--	--	947	1,486	634	1,514	21	719	--	--	--	--	--	--	--	70	--	--	--	--	--	--
Leach Cap - Resource Milled	kt	282,703	--	--	25,353	30,714	29,028	20,043	29,435	25,237	24,352	17,771	16,871	4,777	23,057	7,931	1,481	6,611	3,009	3,191	1,067	18	--	1,030
Leach Cap - Resource Milled	kt	689,595	--	--	--	200	2,739	10,843	2,944	6,444	8,048	14,630	15,529	27,623	9,344	24,469	30,919	25,719	29,391	29,210	31,333	32,382	32,400	31,370
Total Resource Milled	kt	978,234	--	--	26,300	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400
Cu Grade	%	0.22%	--	--	0.26%	0.34%	0.34%	0.27%	0.33%	0.23%	0.26%	0.22%	0.23%	0.23%	0.23%	0.30%	0.29%	0.20%	0.23%	0.21%	0.19%	0.20%	0.20%	0.23%
Mo Grade	%	0.02%	--	--	0.02%	0.03%	0.03%	0.03%	0.03%	0.01%	0.01%	0.02%	0.02%	0.02%	0.01%	0.02%	0.03%	0.03%	0.02%	0.03%	0.03%	0.03%	0.03%	0.02%
Ag Grade	g/t	4.5	--	--	4.4	5.6	5.8	8.8	4.5	4.0	6.3	4.1	3.6	4.1	3.7	4.5	4.4	3.6	4.5	4.2	3.4	4.4	4.3	4.8
Au Grade	g/t	0.02	--	--	0.04	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.02	0.02	0.02	0.02	0.02
Processing																								
Cu Concentrate (dry)	kt	6,444.8	--	--	204.9	335.0	334.8	263.6	328.1	225.8	253.2	214.6	226.1	227.3	220.6	300.5	291.5	197.7	228.8	205.0	175.8	187.9	195.0	222.4
Cu Concentrate (wet)	kt	7,005.2	--	--	222.7	364.1	363.9	286.6	356.7	245.5	275.2	233.2	245.8	247.1	239.8	326.6	316.9	214.9	248.7	222.9	191.0	204.2	212.0	241.8
Mo Concentrate (dry)	kt	365.2	--	--	5.6	13.8	14.8	17.0	13.9	6.4	6.5	9.1	10.8	11.9	4.2	8.3	18.1	15.1	11.4	16.3	14.8	12.4	14.5	8.7
Mo Concentrate (wet)	kt	384.4	--	--	5.9	14.5	15.6	17.9	14.6	6.7	6.9	9.6	11.4	12.6	4.5	8.7	19.0	15.9	12.0	17.2	15.6	13.1	15.2	9.2
Payable Copper	**mlbs**	**3,702**	--	--	**118**	**192**	**192**	**151**	**188**	**130**	**145**	**123**	**130**	**131**	**127**	**173**	**167**	**114**	**131**	**118**	**101**	**108**	**112**	**128**
Payable Molybdenum	**mlbs**	**399**	--	--	**6**	**15**	**16**	**19**	**15**	**7**	**7**	**10**	**12**	**13**	**5**	**9**	**20**	**17**	**12**	**18**	**16**	**14**	**16**	**10**
Payable Silver	**koz**	**81,645**	--	--	**2,159**	**3,529**	**3,730**	**6,141**	**2,737**	**2,381**	**4,073**	**2,454**	**2,034**	**2,387**	**2,140**	**2,729**	**2,642**	**2,065**	**2,697**	**2,523**	**1,954**	**2,658**	**2,580**	**2,945**
Payable Gold	**koz**	**354**	--	--	**16**	**22**	**16**	**14**	**13**	**15**	**12**	**13**	**12**	**12**	**14**	**16**	**16**	**10**	**13**	**12**	**9**	**10**	**10**	**12**
Payable CuEq	**mlbs CuEq**	**5,825**	--	--	**160**	**279**	**281**	**263**	**267**	**176**	**201**	**180**	**191**	**199**	**163**	**229**	**264**	**192**	**199**	**204**	**177**	**179**	**191**	**186**
Copper Revenue	**$M**	**19,231**	--	--	**611**	**1,000**	**999**	**787**	**979**	**674**	**756**	**640**	**675**	**678**	**658**	**897**	**870**	**590**	**683**	**612**	**524**	**561**	**582**	**664**
Molybdenum Revenue	**$M**	**7,764**	--	--	**119**	**292**	**314**	**362**	**295**	**135**	**138**	**194**	**230**	**254**	**90**	**177**	**384**	**322**	**243**	**346**	**315**	**265**	**307**	**185**
Silver Revenue	**$M**	**2,439**	--	--	**64**	**105**	**111**	**183**	**82**	**71**	**122**	**73**	**61**	**71**	**64**	**82**	**79**	**62**	**81**	**75**	**58**	**79**	**77**	**88**
Gold Revenue	**$M**	**828**	--	--	**37**	**51**	**38**	**33**	**31**	**34**	**27**	**30**	**27**	**29**	**32**	**36**	**7**	**24**	**30**	**28**	**22**	**23**	**24**	**27**
Total Revenue	**$M**	**30,262**	--	--	**832**	**1,448**	**1,462**	**1,365**	**1,388**	**915**	**1,043**	**938**	**993**	**1,033**	**845**	**1,191**	**1,369**	**997**	**1,036**	**1,062**	**920**	**928**	**990**	**964**
Royalties	$M	277	--	--	8	13	13	13	13	8	10	9	9	9	8	11	13	9	9	10	8	9	9	9
Total Operating Costs	$M	10,432	--	--	287	381	392	424	429	418	396	415	412	418	414	379	390	339	333	369	335	323	323	338

Macro Assumptions	Units	Total / Avg.	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Mine Operating Costs	$M	4,889.2	--	--	135.7	197.5	09.0	240.4	245.4	234.7	212.6	231.4	229.0	234.5	231.0	195.5	206.5	155.6	149.3	185.1	151.3	140.0	139.7	154.8
Processing - Power	$M	1,483.7	--	--	39.9	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1
Processing - Reagents + Consumables	$M	2,365.0	--	--	63.6	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3
Processing - Maintenance	$M	404.9	--	--	10.9	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Processing - Labour	$M	885.5	--	--	23.8	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3
G&A Costs	$M	403.6	--	--	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Total Operating Cost Per Tonne	*$/t Milled*	*10.66*	--	--	*10.92*	*11.76*	*12.11*	*13.08*	*13.24*	*12.91*	*12.23*	*12.81*	*12.73*	*12.90*	*12.79*	*11.70*	*12.04*	*10.47*	*10.27*	*11.38*	*10.33*	*9.98*	*9.98*	*10.44*
Cash Costs (By-Product Basis)																								
C1 (mining costs, processing costs, mine-level G&A, offsite charges, and royalties)	US$/lb	0.46	--	--	0.94	0.27	0.27	(0.17)	0.63	1.56	1.07	1.28	1.12	0.95	1.87	0.88	0.10	0.18	0.45	0.12	0.21	0.30	0.05	0.76
C3 (cash costs plus sustaining capital and closure costs)	US$/lb	0.82	--	--	1.53	1.66	0.57	0.18	0.90	1.80	1.09	2.96	1.23	1.01	1.90	0.93	0.15	1.23	0.71	0.18	0.32	0.31	0.09	1.68
Total Initial Capital	**$M**	**1,968**	**794**	**1,174**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
Mining PreStrip	$M	142.5	67.7	74.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mining Equip (+ Indirects + Contingency)	$M	123.5	77.0	46.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mining Infrastructure + PAG Waste Rock	$M	123.6	123.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Processing	$M	693.1	231.0	462.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tailings	$M	148.9	49.6	99.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
On-site Infrastructure	$M	76.4	25.5	50.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Off-site Infrastructure	$M	95.8	31.9	63.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indirects	$M	110.4	36.8	73.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EPCM & Expenses	$M	152.1	50.7	101.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Owner's Costs	$M	35.5	11.8	23.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Provisions (Process Contingency)	$M	266.1	88.7	177.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Sustaining Capital	**$M**	**1,533.1**	**--**	**--**	**89.8**	**346.0**	**76.6**	**69.5**	**66.0**	**40.7**	**3.0**	**268.8**	**18.5**	**10.2**	**5.3**	**10.8**	**12.5**	**154.9**	**45.0**	**9.6**	**15.4**	**1.4**	**4.7**	**152.0**
Mining Equipment	$M	669.4	--	--	89.8	143.0	76.6	69.5	66.0	40.7	3.0	5.0	18.5	10.2	5.3	10.8	12.5	1.8	45.0	9.6	15.4	1.4	4.7	8.5
Tailings	$M	863.7	--	--	--	203.0	--	--	--	--	--	263.8	--	--	--	--	--	153.2	--	--	--	--	--	143.5
Closure Cost	**$M**	**200.0**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Offsite Charges	$M	2,544	--	--	69	122	124	108	120	77	85	79	85	88	71	102	118	86	87	90	79	78	84	80
Transport (Road and Ocean Freight) - Cu Conc.	$M	909.8	--	--	28.9	47.3	47.3	37.2	46.3	31.9	35.7	30.3	31.9	32.1	31.1	42.4	41.2	27.9	32.3	28.9	24.8	26.5	27.5	31.4
Transport (Road and Ocean Freight) - Mo Conc.	$M	64.9	--	--	1.0	2.4	2.6	3.0	2.5	1.1	1.2	1.6	1.9	2.1	0.8	1.5	3.2	2.7	2.0	2.9	2.6	2.2	2.6	1.5
Treatment Charge - Cu Concentrate	$M	585.9	--	--	18.6	30.5	30.4	24.0	29.8	20.5	23.0	19.5	20.6	20.7	20.1	27.3	26.5	18.0	20.8	18.6	16.0	17.1	17.7	20.2
Refining Charge - Cu	$M	336.5	--	--	10.7	17.5	17.5	13.8	17.1	11.8	13.2	11.2	11.8	11.9	11.5	15.7	15.2	10.3	11.9	10.7	9.2	9.8	10.2	11.6
Refining Charge - Mo	$M	647.0	--	--	9.9	24.4	26.2	30.2	24.6	11.3	11.5	16.2	19.2	21.2	7.5	14.7	32.0	26.8	20.2	28.9	26.2	22.0	25.6	15.5

Table 22-3: Project Cash Flow (Year 21 to Year 33)

Macro Assumptions	Units	Total / Avg.	21	22	23	24	25	26	27	28	29	30	31	32	33
Copper Price	US$/lb	4.00	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Molybdenum Price	US$/lb	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Silver Price	US$/oz	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00
Gold Price	US$/oz	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00
Revenue	**$M**	**30,261.8**	**955.2**	**898.1**	**857.1**	**828.0**	**814.6**	**815.3**	**817.3**	**849.3**	**1,040.2**	**527.1**	**142.8**	**--**	**--**
Off-Site Costs	$M	(2,544.1)	(80.9)	(75.9)	(72.7)	(69.5)	(67.1)	(64.4)	(65.6)	(71.3)	(89.6)	(44.2)	(11.7)	--	--
Royalties	$M	(277.2)	(8.7)	(8.2)	(7.8)	(7.6)	(7.5)	(7.5)	(7.5)	(7.8)	(9.5)	(4.8)	(1.3)	--	--
Operating Cost	$M	(10,431.9)	(280.9)	(316.6)	(279.9)	(280.5)	(287.6)	(282.7)	(279.0)	(308.1)	(285.7)	(232.4)	(81.7)	--	--
EBITDA	**$M**	**17,008.7**	**584.6**	**497.3**	**496.7**	**470.4**	**452.4**	**460.7**	**465.2**	**462.2**	**655.5**	**245.6**	**48.1**	**--**	**--**
Initial Capex	$M	(1,968.0)	--	--	--	--	--	--	--	--	--	--	--	--	--
Sustaining Capex	$M	(1,533.1)	(10.1)	(6.8)	(4.3)	(8.9)	(0.1)	(100.7)	(0.5)	--	(1.0)	--	--	--	--
Closure Capex	$M	(200.0)	--	--	--	--	--	--	--	--	--	--	--	--	(200.0)
Change in Working Capital	$M	--	(1.6)	5.9	1.7	2.3	1.3	(0.4)	(0.3)	(1.2)	(15.8)	37.9	23.9	7.8	--
Pre-Tax Unlevered Free Cash Flow	**$M**	**13,307.6**	**572.9**	**496.5**	**494.1**	**463.8**	**453.6**	**359.6**	**464.5**	**461.0**	**638.7**	**283.6**	**72.0**	**7.8**	**(200.0)**
Pre-Tax Cumulative Unlevered Free Cash Flow	$M		9,312.6	9,809.1	10,303.1	10,766.9	11,220.5	11,580.1	12,044.6	12,505.6	13,144.2	13,427.8	13,499.8	13,507.6	13,307.6
Payback (Years)		3.3	--	--	--	--	--	--	--	--	--	--	--	--	--
Mining Tax	$M	(1,654.5)	(75.8)	(64.8)	(65.0)	(61.0)	(59.8)	(47.8)	(61.4)	(61.1)	(86.3)	(32.5)	(6.3)	--	--
Income Tax Payable	$M	(3,203.1)	(123.6)	(105.9)	(108.0)	(103.7)	(100.6)	(104.0)	(100.0)	(101.5)	(148.5)	(53.7)	(8.4)	--	--
Post-Tax Unlevered Free Cash Flow	**$M**	**8,450.0**	**373.5**	**325.8**	**321.1**	**299.1**	**293.3**	**207.8**	**303.1**	**298.4**	**403.8**	**197.4**	**57.3**	**7.8**	**(200.0)**
Post-Tax Cumulative Unlevered Free Cash Flow	$M		5,935.1	6,260.9	6,582.0	6,881.1	7,174.4	7,382.2	7,685.2	7,983.6	8,387.4	8,584.9	8,642.2	8,650.0	8,450.0
Payback (Years)		3.9	--	--	--	--	--	--	--	--	--	--	--	--	--
Production Summary															
Total Resource Mined	kt	978,234	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	6,519	--	--	--
Total Resource Milled	kt	978,234	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	12,332	--	--
Total Waste Mined	kt	1,101,471	20,072	18,415	14,275	10,895	8,900	6,484	4,231	1,979	598	--	--	--	--
Total Material Mined	kt	2,079,706	52,472	50,815	46,675	43,295	41,300	38,884	36,631	34,379	32,998	6,519	--	--	--
Project Mine Life	yrs	30.4	1	1	1	1	1	1	1	1	1	1	0	--	--
Leach Cap - Resource Milled	kt	5,937	--	--	--	--	--	--	--	--	--	370	176	--	--
Leach Cap - Resource Milled	kt	282,703	249	--	--	--	--	--	--	--	--	7,775	3,704	--	--
Leach Cap - Resource Milled	kt	689,595	32,151	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	24,255	8,451	--	--
Total Resource Milled	kt	978,234	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	32,400	12,332	--	--
Cu Grade	%	0.22%	0.21%	0.19%	0.17%	0.16%	0.16%	0.15%	0.15%	0.17%	0.19%	0.12%	0.10%	--	--
Mo Grade	%	0.02%	0.02%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.04%	0.01%	0.01%	--	--
Ag Grade	g/t	4.5	4.1	3.9	3.6	3.9	4.6	5.8	5.4	4.1	3.7	2.5	2.1	--	--
Au Grade	g/t	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	--	--
Processing															
Cu Concentrate (dry)	kt	6,444.8	202.3	178.0	164.9	153.3	146.2	136.7	142.9	157.5	180.5	110.2	33.6	--	--
Cu Concentrate (wet)	kt	7,005.2	219.9	193.5	179.3	166.7	158.9	148.6	155.3	171.2	196.2	119.8	36.5	--	--
Mo Concentrate (dry)	kt	365.2	12.0	13.0	13.2	13.3	13.1	13.1	12.8	13.6	19.6	6.6	1.1	--	--
Mo Concentrate (wet)	kt	384.4	12.6	13.7	13.9	14.0	13.8	13.8	13.5	14.3	20.7	6.9	1.2	--	--
Payable Copper	**mlbs**	**3,702**	**116**	**102**	**95**	**88**	**84**	**79**	**82**	**90**	**104**	**63**	**19**	**--**	**--**
Payable Molybdenum	**mlbs**	**399**	**13**	**14**	**14**	**15**	**14**	**14**	**14**	**15**	**21**	**7**	**1**	**--**	**--**
Payable Silver	**koz**	**81,645**	**2,420**	**2,274**	**2,079**	**2,268**	**2,759**	**3,713**	**3,366**	**2,410**	**2,118**	**1,283**	**398**	**--**	**--**
Payable Gold	**koz**	**354**	**10**	**10**	**9**	**8**	**8**	**8**	**8**	**8**	**9**	**8**	**3**	**--**	**--**
Payable CuEq	**mlbs CuEq**	**5,825**	**184**	**173**	**165**	**159**	**157**	**157**	**157**	**163**	**200**	**101**	**27**	**--**	**--**
Copper Revenue	**$M**	**19,231**	**604**	**531**	**492**	**458**	**436**	**408**	**426**	**470**	**539**	**329**	**100**	**--**	**--**
Molybdenum Revenue	**$M**	**7,764**	**255**	**276**	**282**	**283**	**278**	**279**	**272**	**289**	**418**	**140**	**23**	**--**	**--**
Silver Revenue	**$M**	**2,439**	**72**	**68**	**62**	**68**	**82**	**111**	**101**	**72**	**63**	**38**	**12**	**--**	**--**
Gold Revenue	**$M**	**828**	**24**	**23**	**21**	**20**	**18**	**18**	**18**	**19**	**21**	**20**	**7**	**--**	**--**
Total Revenue	**$M**	**30,262**	**955**	**898**	**857**	**828**	**815**	**815**	**817**	**849**	**1,040**	**527**	**143**	**--**	**--**
Royalties	$M	277	9	8	8	8	7	8	8	8	10	5	1	--	--
Total Operating Costs	$M	10,432	281	317	280	280	288	283	279	308	286	232	82	--	--

Macro Assumptions	Units	Total / Avg.	21	22	23	24	25	26	27	28	29	30	31	32	33
Mine Operating Costs	$M	4,889.2	97.5	133.1	96.4	97.0	104.2	99.2	95.5	124.6	102.2	49.0	11.6	--	--
Processing - Power	$M	1,483.7	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	18.7	--	--
Processing - Reagents + Consumables	$M	2,365.0	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	78.3	29.8	--	--
Processing - Maintenance	$M	404.9	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	5.1	--	--
Processing - Labour	$M	885.5	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	11.2	--	--
G&A Costs	$M	403.6	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	.3	--	--
Total Operating Cost Per Tonne	*$/t Milled*	*10.66*	*8.67*	*9.77*	*8.64*	*8.66*	*8.88*	*8.73*	*8.61*	*9.51*	*8.82*	*7.17*	*6.63*	--	--
Cash Costs (By-Product Basis)															
C1 (mining costs, processing costs, mine-level G&A, offsite charges, and royalties)	US$/lb	0.46	0.13	0.26	(0.04)	(0.11)	(0.15)	(0.52)	(0.36)	0.07	(0.87)	1.01	2.08	--	--
C3 (cash costs plus sustaining capital and closure costs)	US$/lb	0.82	0.19	0.31	(0.00)	(0.03)	(0.15)	0.47	(0.36)	0.07	(0.86)	1.01	2.08	--	--
Total Initial Capital	**$M**	**1,968**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
Mining PreStrip	$M	142.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Mining Equip (+ Indirects + Contingency)	$M	123.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Mining Infrastructure + PAG Waste Rock	$M	123.6	--	--	--	--	--	--	--	--	--	--	--	--	--
Processing	$M	693.1	--	--	--	--	--	--	--	--	--	--	--	--	--
Tailings	$M	148.9	--	--	--	--	--	--	--	--	--	--	--	--	--
On-site Infrastructure	$M	76.4	--	--	--	--	--	--	--	--	--	--	--	--	--
Off-site Infrastructure	$M	95.8	--	--	--	--	--	--	--	--	--	--	--	--	--
Indirects	$M	110.4	--	--	--	--	--	--	--	--	--	--	--	--	--
EPCM & Expenses	$M	152.1	--	--	--	--	--	--	--	--	--	--	--	--	--
Owner's Costs	$M	35.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Provisions (Process Contingency)	$M	266.1	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Sustaining Capital	**$M**	**1,533.1**	**10.1**	**6.8**	**4.3**	**8.9**	**0.1**	**100.7**	**0.5**	**--**	**1.0**	**--**	**--**	**--**	**--**
Mining Equipment	$M	669.4	10.1	6.8	4.3	8.9	0.1	0.6	0.5	--	1.0	--	--	--	--
Tailings	$M	863.7	--	--	--	--	--	100.2	--	--	--	--	--	--	--
Closure Cost	**$M**	**200.0**	--	--	--	--	--	--	--	--	--	--	--	--	200.0
Offsite Charges	**$M**	**2,544**	**81**	**76**	**73**	**70**	**67**	**64**	**66**	**71**	**90**	**44**	**12**	**--**	**--**
Transport (Road and Ocean Freight) - Cu Conc.	$M	909.8	28.6	25.1	23.3	21.6	20.6	19.3	20.2	22.2	25.5	15.6	4.7	--	--
Transport (Road and Ocean Freight) - Mo Conc.	$M	64.9	2.1	2.3	2.4	2.4	2.3	2.3	2.3	2.4	3.5	1.2	0.2	--	--
Treatment Charge - Cu Concentrate	$M	585.9	18.4	16.2	15.0	13.9	13.3	12.4	13.0	14.3	16.4	10.0	3.1	--	--
Refining Charge - Cu	$M	336.5	10.6	9.3	8.6	8.0	7.6	7.1	7.5	8.2	9.4	5.8	1.8	--	--
Refining Charge - Mo	$M	647.0	21.3	23.0	23.5	23.6	23.2	23.2	22.7	24.1	34.8	11.7	2.0	--	--

22.5 Sensitivity Analysis

A sensitivity analysis was conducted on the base case pre-tax and post-tax NPV and IRR of the project, using the following variables: metal prices, discount rate, head grade, total operating cost, and initial capital cost.

The post tax sensitivity analysis results are summarized in Table 22-4 as presented in the press release, and in detail Table 22-5; the pre-tax sensitivity analysis results are shown in detail in Table 22-6.

As shown in Figure 22 -2 and Figure 22-3, the sensitivity analysis revealed that the project is most sensitive to changes in commodity price and head grade, and less sensitive to discount rate, total operating cost, and initial capital cost.

Table 22-4: Post-Tax Sensitivity Summary

After-Tax NPV8% & IRR Sensitivity to Copper and Molybdenum Prices

			Copper Price						
			$2.80	$3.20	$3.60	$4.00	$4.40	$4.80	$5.20
			(30%)	(20%)	(10%)	-	10%	20%	30%
Molybdenum Price	$10.50	(30%)	$229	$698	$1,160	$1,618	$2,073	$2,526	$2,979
	$12.00	(20%)	$390	$855	$1,317	$1,773	$2,227	$2,680	$3,133
	$13.50	(10%)	$549	$1,012	$1,473	$1,929	$2,382	$2,835	$3,288
	$15.00	-	$707	$1,170	$1,629	**$2,084**	$2,537	$2,990	$3,443
	$16.50	10%	$864	$1,327	$1,784	$2,238	$2,692	$3,144	$3,597
	$18.00	20%	$1,022	$1,483	$1,939	$2,393	$2,846	$3,299	$3,752
	$19.50	30%	$1,179	$1,639	$2,095	$2,548	$3,001	$3,454	$3,906

			Copper Price						
			$2.80	$3.20	$3.60	$4.00	$4.40	$4.80	$5.20
			(30%)	(20%)	(10%)	-	10%	20%	30%
Molybdenum Price	$10.50	(30%)	9%	12%	15%	18%	20%	23%	25%
	$12.00	(20%)	10%	13%	16%	18%	21%	23%	26%
	$13.50	(10%)	11%	14%	17%	19%	22%	24%	26%
	$15.00	-	12%	15%	17%	**20%**	22%	25%	27%
	$16.50	10%	13%	16%	18%	21%	23%	25%	28%
	$18.00	20%	14%	16%	19%	21%	24%	26%	28%
	$19.50	30%	15%	17%	20%	22%	24%	27%	29%

After-Tax NPV8% & IRR Sensitivity to Copper and Molybdenum Process Recoveries

			Copper Recovery						
			69%	73%	77%	81%	85%	89%	93%
			(15%)	(10%)	(5%)	-	5%	10%	15%
olybdenum Recove	65%	(15%)	$1,253	$1,460	$1,667	$1,872	$2,078	$2,283	$2,488
	68%	(10%)	$1,324	$1,531	$1,737	$1,943	$2,148	$2,353	$2,558
	72%	(5%)	$1,395	$1,602	$1,807	$2,013	$2,218	$2,423	$2,628
	76%	-	$1,466	$1,672	$1,878	**$2,084**	$2,289	$2,494	$2,698
	80%	5%	$1,536	$1,743	$1,949	$2,154	$2,359	$2,564	$2,769
	83%	10%	$1,607	$1,813	$2,019	$2,224	$2,429	$2,634	$2,839
	87%	15%	$1,678	$1,884	$2,089	$2,295	$2,499	$2,704	$2,909

			Copper Recovery						
			69%	73%	77%	81%	85%	89%	93%
			(15%)	(10%)	(5%)	-	5%	10%	15%
olybdenum Recove	65%	(15%)	15%	17%	18%	19%	20%	21%	22%
	68%	(10%)	16%	17%	18%	19%	20%	21%	23%
	72%	(5%)	16%	17%	18%	20%	21%	22%	23%
	76%	-	17%	18%	19%	**20%**	21%	22%	23%
	80%	5%	17%	18%	19%	20%	21%	22%	24%
	83%	10%	17%	18%	20%	21%	22%	23%	24%
	87%	15%	18%	19%	20%	21%	22%	23%	24%

After-Tax NPV8% & IRR Sensitivity to Total Opex and Total Capex

		Total Opex						
		(30%)	(20%)	(10%)	-	10%	20%	30%
Total Capex	(30%)	$3,664	$3,371	$3,078	$2,785	$2,493	$2,200	$1,908
	(20%)	$3,431	$3,138	$2,845	$2,552	$2,259	$1,967	$1,674
	(10%)	$3,198	$2,904	$2,611	$2,318	$2,025	$1,732	$1,438
	-	$2,964	$2,670	$2,377	**$2,084**	$1,790	$1,495	$1,199
	10%	$2,730	$2,436	$2,142	$1,848	$1,553	$1,257	$959
	20%	$2,495	$2,201	$1,906	$1,611	$1,314	$1,017	$720
	30%	$2,259	$1,965	$1,669	$1,372	$1,075	$777	$479

		Total Opex						
		(30%)	(20%)	(10%)	-	10%	20%	30%
Total Capex	(30%)	36%	34%	32%	30%	28%	26%	24%
	(20%)	31%	29%	28%	26%	24%	22%	20%
	(10%)	27%	26%	24%	23%	21%	19%	18%
	-	24%	23%	21%	**20%**	18%	17%	15%
	10%	22%	20%	19%	18%	16%	15%	13%
	20%	20%	18%	17%	16%	14%	13%	12%
	30%	18%	17%	15%	14%	13%	12%	10%

Table 22-5: Post-Tax Sensitivity Summary

Sensitivity to Metal Price

Post-Tax NPV Sensitivity To Discount Rate

Discount Rate	Commodity Price				
	(20.0%)	(10.0%)	--	10.0%	20.0%
1.0%	$3,800	$5,406	$7,024	$8,645	$10,268
3.0%	$2,478	$3,695	$4,914	$6,133	$7,354
5.0%	$1,577	$2,529	$3,478	$4,425	$5,372
8.0%	$703	$1,398	**$2,083**	$2,766	$3,448
10.0%	$317	$897	$1,466	$2,031	$2,595

Post-Tax IRR Sensitivity To Discount Rate

Discount Rate	Commodity Price				
	(20.0%)	(10.0%)	--	10.0%	20.0%
1.0%	12.3%	16.2%	20.0%	23.5%	26.9%
3.0%	12.3%	16.2%	20.0%	23.5%	26.9%
5.0%	12.3%	16.2%	20.0%	23.5%	26.9%
8.0%	12.3%	16.2%	**20.0%**	23.5%	26.9%
10.0%	12.3%	16.2%	20.0%	23.5%	26.9%

Post-Tax NPV Sensitivity To Opex

Opex	Commodity Price				
	(20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	$1,181	$1,870	$2,554	$3,236	$3,918
(10.0%)	$942	$1,635	$2,319	$3,001	$3,683
--	$703	$1,398	**$2,083**	$2,766	$3,448
10.0%	$463	$1,159	$1,848	$2,531	$3,213
20.0%	$218	$920	$1,612	$2,296	$2,978

Post-Tax IRR Sensitivity To Opex

Opex	Commodity Price				
	(20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	15.0%	18.8%	22.3%	25.7%	29.0%
(10.0%)	13.6%	17.5%	21.1%	24.6%	27.9%
--	12.3%	16.2%	**20.0%**	23.5%	26.9%
10.0%	10.8%	14.9%	18.7%	22.3%	25.8%
20.0%	9.4%	13.6%	17.5%	21.2%	24.6%

Post-Tax NPV Sensitivity To Initial Capex

Initial Capex	Commodity Price				
	(20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	$964	$1,652	$2,333	$3,015	$3,696
(10.0%)	$834	$1,525	$2,209	$2,891	$3,572
--	$703	$1,398	**$2,083**	$2,766	$3,448
10.0%	$570	$1,267	$1,957	$2,641	$3,324
20.0%	$435	$1,136	$1,830	$2,516	$3,199

Post-Tax IRR Sensitivity To Initial Capex

Initial Capex	Commodity Price				
	(20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	15.0%	19.6%	24.0%	28.1%	32.1%
(10.0%)	13.5%	17.8%	21.8%	25.6%	29.2%
--	12.3%	16.2%	**20.0%**	23.5%	26.9%
10.0%	11.2%	14.9%	18.4%	21.7%	24.9%
20.0%	10.3%	13.8%	17.1%	20.2%	23.1%

Post-Tax NPV Sensitivity To Recovery Mill

Recovery Mill	Commodity Price				
	(20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	($351)	$258	$820	$1,376	$1,925
(10.0%)	$198	$831	$1,456	$2,073	$2,687
--	$703	$1,398	**$2,083**	$2,766	$3,448
10.0%	$1,201	$1,958	$2,709	$3,459	$4,208
20.0%	$1,693	$2,513	$3,332	$4,149	$4,967

Post-Tax IRR Sensitivity To Recovery Mill

Recovery Mill	Commodity Price				
	(20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	5.8%	9.6%	13.0%	16.1%	19.1%
(10.0%)	9.2%	13.0%	16.6%	19.9%	23.1%
--	12.3%	16.2%	**20.0%**	23.5%	26.9%
10.0%	15.1%	19.3%	23.2%	26.9%	30.5%
20.0%	17.9%	22.2%	26.3%	30.2%	34.0%

Post-Tax NPV Sensitivity To Head Grade

Head Grade	Commodity Price				
	(20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	($445)	$167	$720	$1,266	$1,805
(10.0%)	$155	$784	$1,403	$2,015	$2,624
--	$703	$1,398	**$2,083**	$2,766	$3,448
10.0%	$1,246	$2,009	$2,766	$3,523	$4,278
20.0%	$1,789	$2,622	$3,453	$4,284	$5,115

Post-Tax IRR Sensitivity To Head Grade

Head Grade	Commodity Price				
	(20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	5.1%	9.0%	12.4%	15.6%	18.6%
(10.0%)	9.0%	12.8%	16.3%	19.6%	22.8%
--	12.3%	16.2%	**20.0%**	23.5%	26.9%
10.0%	15.4%	19.5%	23.4%	27.2%	30.8%
20.0%	18.3%	22.6%	26.8%	30.7%	34.5%

Post-Tax NPV Sensitivity To Exchange Rate

Exchange Rate	Commodity Price				
	(20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	$1,939	$2,793	$3,645	$4,497	$5,349
(10.0%)	$1,256	$2,020	$2,778	$3,536	$4,293
--	$703	$1,398	**$2,083**	$2,766	$3,448
10.0%	$244	$883	$1,513	$2,136	$2,756
20.0%	($154)	$451	$1,033	$1,609	$2,180

Post-Tax IRR Sensitivity To Exchange Rate

Exchange Rate	Commodity Price				
	(20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	19.2%	23.6%	27.8%	31.8%	35.7%
(10.0%)	15.5%	19.6%	23.5%	27.3%	30.9%
--	12.3%	16.2%	**20.0%**	23.5%	26.9%
10.0%	9.5%	13.3%	16.9%	20.2%	23.4%
20.0%	7.0%	10.8%	14.2%	17.4%	20.5%

Table 22-6: Pre-Tax Sensitivity Analysis

Sensitivity to Metal Price

Pre-Tax NPV Sensitivity To Discount Rate

Discount Rate	Commodity Price (20.0%)	(10.0%)	--	10.0%	20.0%
1.0%	$5,970	$8,535	$11,100	$13,665	$16,230
3.0%	$3,994	$5,922	$7,851	$9,780	$11,708
5.0%	$2,666	$4,162	$5,658	$7,154	$8,650
8.0%	$1,401	$2,475	**$3,550**	$4,624	$5,699
10.0%	$852	$1,739	$2,625	$3,511	$4,398

Pre-Tax IRR Sensitivity To Discount Rate

Discount Rate	Commodity Price (20.0%)	(10.0%)	--	10.0%	20.0%
1.0%	15.3%	20.4%	25.3%	30.1%	34.6%
3.0%	15.3%	20.4%	25.3%	30.1%	34.6%
5.0%	15.3%	20.4%	25.3%	30.1%	34.6%
8.0%	15.3%	20.4%	**25.3%**	30.1%	34.6%
10.0%	15.3%	20.4%	25.3%	30.1%	34.6%

Pre-Tax NPV Sensitivity To Opex

Opex	Commodity Price (20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	$2,140	$3,215	$4,289	$5,364	$6,438
(10.0%)	$1,770	$2,845	$3,919	$4,994	$6,068
--	$1,401	$2,475	**$3,550**	$4,624	$5,699
10.0%	$1,031	$2,105	$3,180	$4,254	$5,329
20.0%	$661	$1,736	$2,810	$3,885	$4,959

Pre-Tax IRR Sensitivity To Opex

Opex	Commodity Price (20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	18.7%	23.7%	28.4%	33.0%	37.4%
(10.0%)	17.0%	22.1%	26.9%	31.5%	36.0%
--	15.3%	20.4%	**25.3%**	30.1%	34.6%
10.0%	13.5%	18.7%	23.7%	28.5%	33.1%
20.0%	11.6%	17.0%	22.1%	27.0%	31.7%

Pre-Tax NPV Sensitivity To Initial Capex

Initial Capex	Commodity Price (20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	$1,763	$2,837	$3,912	$4,986	$6,061
(10.0%)	$1,582	$2,656	$3,731	$4,805	$5,880
--	$1,401	$2,475	**$3,550**	$4,624	$5,699
10.0%	$1,220	$2,294	$3,369	$4,443	$5,518
20.0%	$1,039	$2,113	$3,188	$4,262	$5,337

Pre-Tax IRR Sensitivity To Initial Capex

Initial Capex	Commodity Price (20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	19.0%	25.2%	31.0%	36.6%	41.9%
(10.0%)	17.0%	22.6%	27.9%	33.0%	37.9%
--	15.3%	20.4%	**25.3%**	30.1%	34.6%
10.0%	13.8%	18.6%	23.2%	27.6%	31.8%
20.0%	12.6%	17.1%	21.4%	25.5%	29.4%

Pre-Tax NPV Sensitivity To Recovery Mill

Recovery Mill	Commodity Price (20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	($137)	$722	$1,582	$2,441	$3,301
(10.0%)	$632	$1,599	$2,566	$3,533	$4,500
--	$1,401	$2,475	**$3,550**	$4,624	$5,699
10.0%	$2,170	$3,352	$4,534	$5,716	$6,898
20.0%	$2,937	$4,226	$5,515	$6,804	$8,094

Pre-Tax IRR Sensitivity To Recovery Mill

Recovery Mill	Commodity Price (20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	7.2%	11.9%	16.2%	20.3%	24.2%
(10.0%)	11.4%	16.2%	20.8%	25.3%	29.5%
--	15.3%	20.4%	**25.3%**	30.1%	34.6%
10.0%	19.0%	24.5%	29.7%	34.6%	39.4%
20.0%	22.6%	28.3%	33.8%	39.0%	44.0%

Pre-Tax NPV Sensitivity To Head Grade

Head Grade	Commodity Price (20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	($259)	$584	$1,427	$2,270	$3,113
(10.0%)	$567	$1,525	$2,484	$3,442	$4,400
--	$1,401	$2,475	**$3,550**	$4,624	$5,699
10.0%	$2,241	$3,433	$4,624	$5,816	$7,008
20.0%	$3,087	$4,397	$5,707	$7,017	$8,327

Pre-Tax IRR Sensitivity To Head Grade

Head Grade	Commodity Price (20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	6.5%	11.2%	15.5%	19.6%	23.5%
(10.0%)	11.1%	15.9%	20.5%	24.9%	29.2%
--	15.3%	20.4%	**25.3%**	30.1%	34.6%
10.0%	19.3%	24.7%	30.0%	35.0%	39.7%
20.0%	23.1%	28.9%	34.4%	39.7%	44.7%

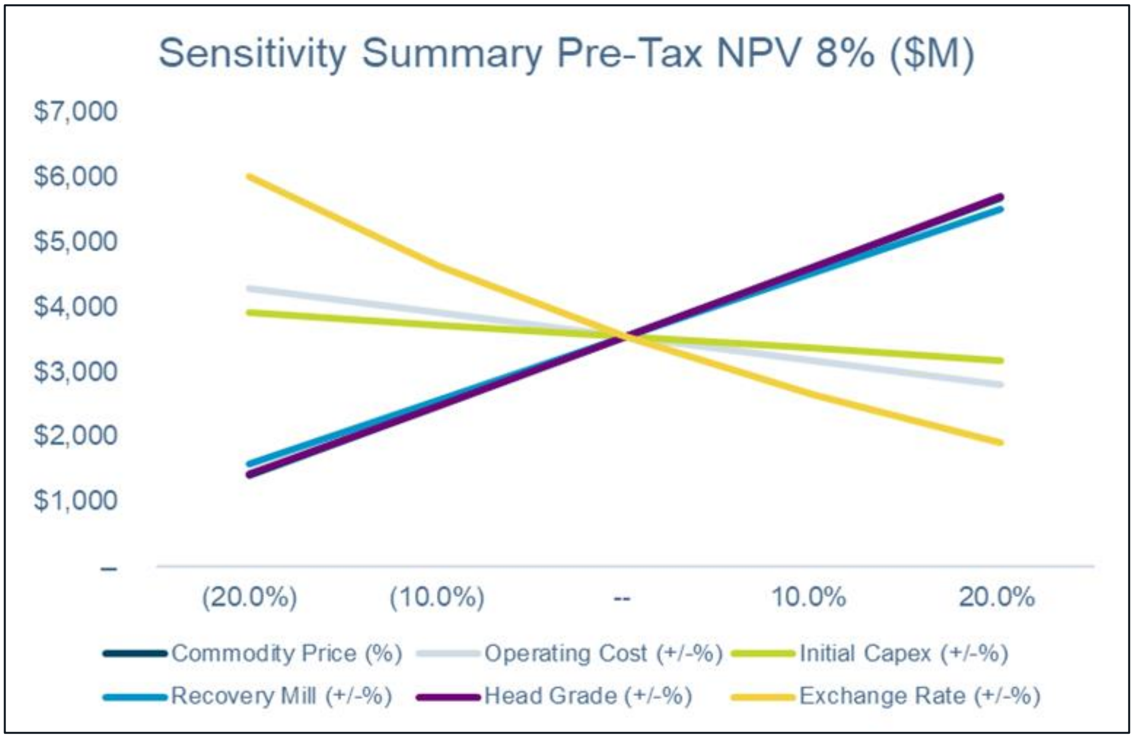
Pre-Tax NPV Sensitivity To Exchange Rate

Exchange Rate	Commodity Price (20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	$3,323	$4,666	$6,009	$7,353	$8,696
(10.0%)	$2,255	$3,449	$4,643	$5,837	$7,031
--	$1,401	$2,475	**$3,550**	$4,624	$5,699
10.0%	$702	$1,678	$2,655	$3,632	$4,609
20.0%	$119	$1,014	$1,910	$2,805	$3,701

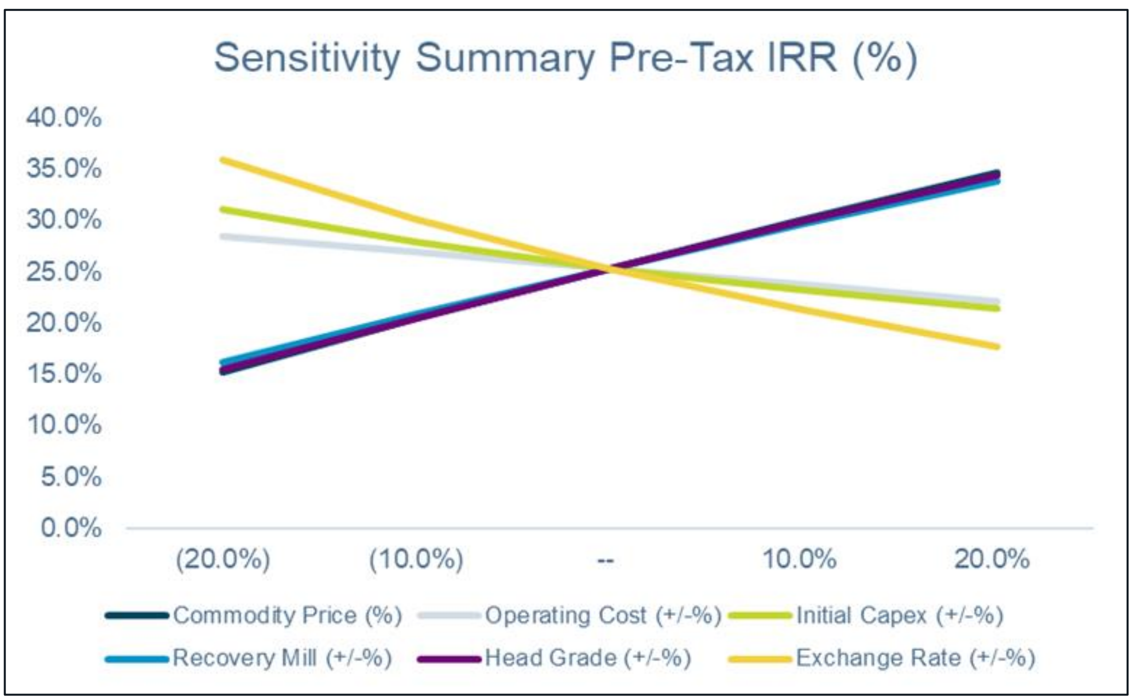
Pre-Tax IRR Sensitivity To Exchange Rate

Exchange Rate	Commodity Price (20.0%)	(10.0%)	--	10.0%	20.0%
(20.0%)	24.3%	30.2%	35.8%	41.2%	46.3%
(10.0%)	19.4%	24.9%	30.1%	35.1%	39.9%
--	15.3%	20.4%	**25.3%**	30.1%	34.6%
10.0%	11.7%	16.6%	21.3%	25.7%	30.0%
20.0%	8.7%	13.3%	17.7%	22.0%	26.0%

Figure 22-2: Pre-Tax NPV and IRR Sensitivity Results

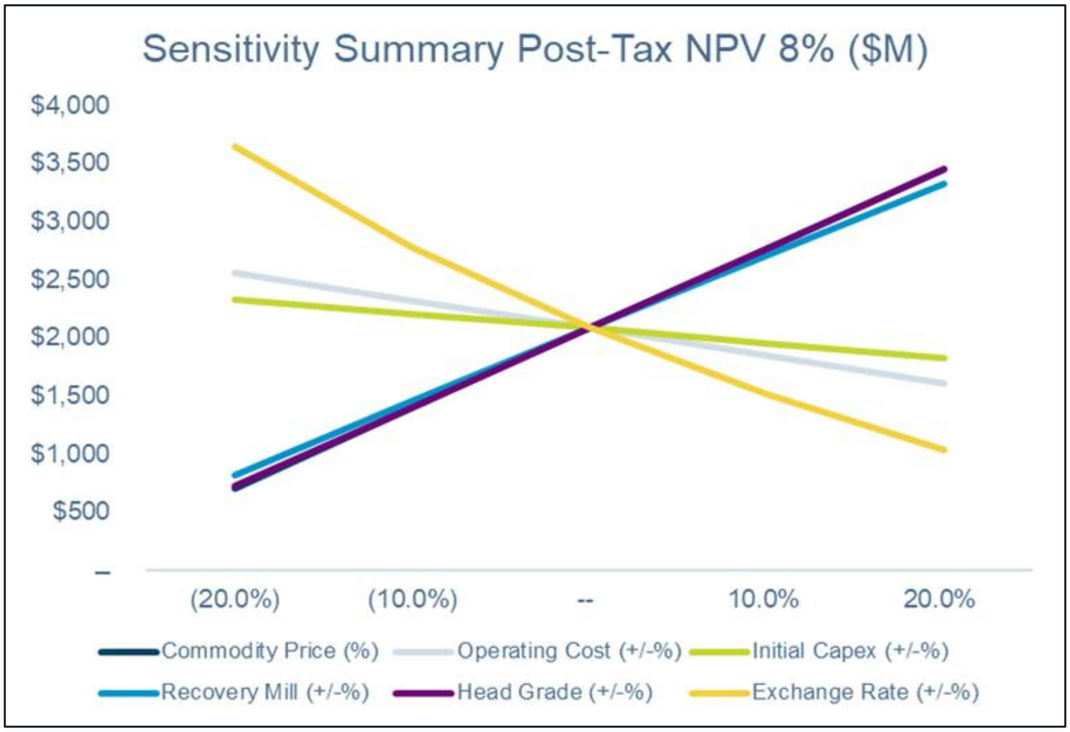


Source: Ausenco, 2023.

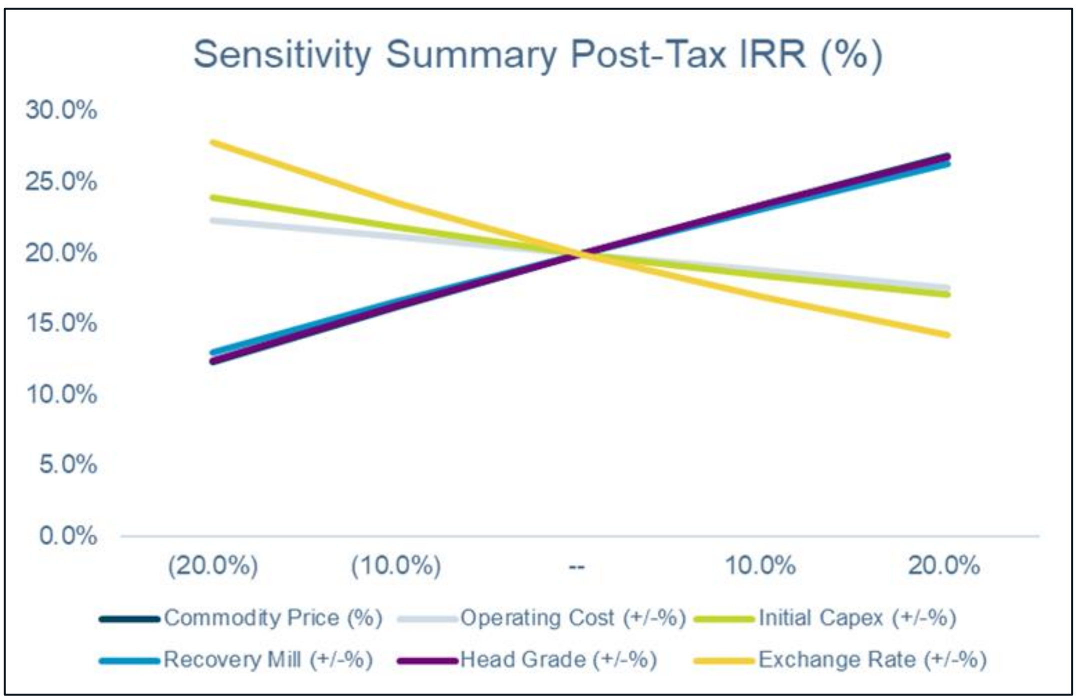


Source: Ausenco, 2023.

Figure 22-3: Post-Tax NPV and IRR Sensitivity Results



Source: Ausenco, 2023.



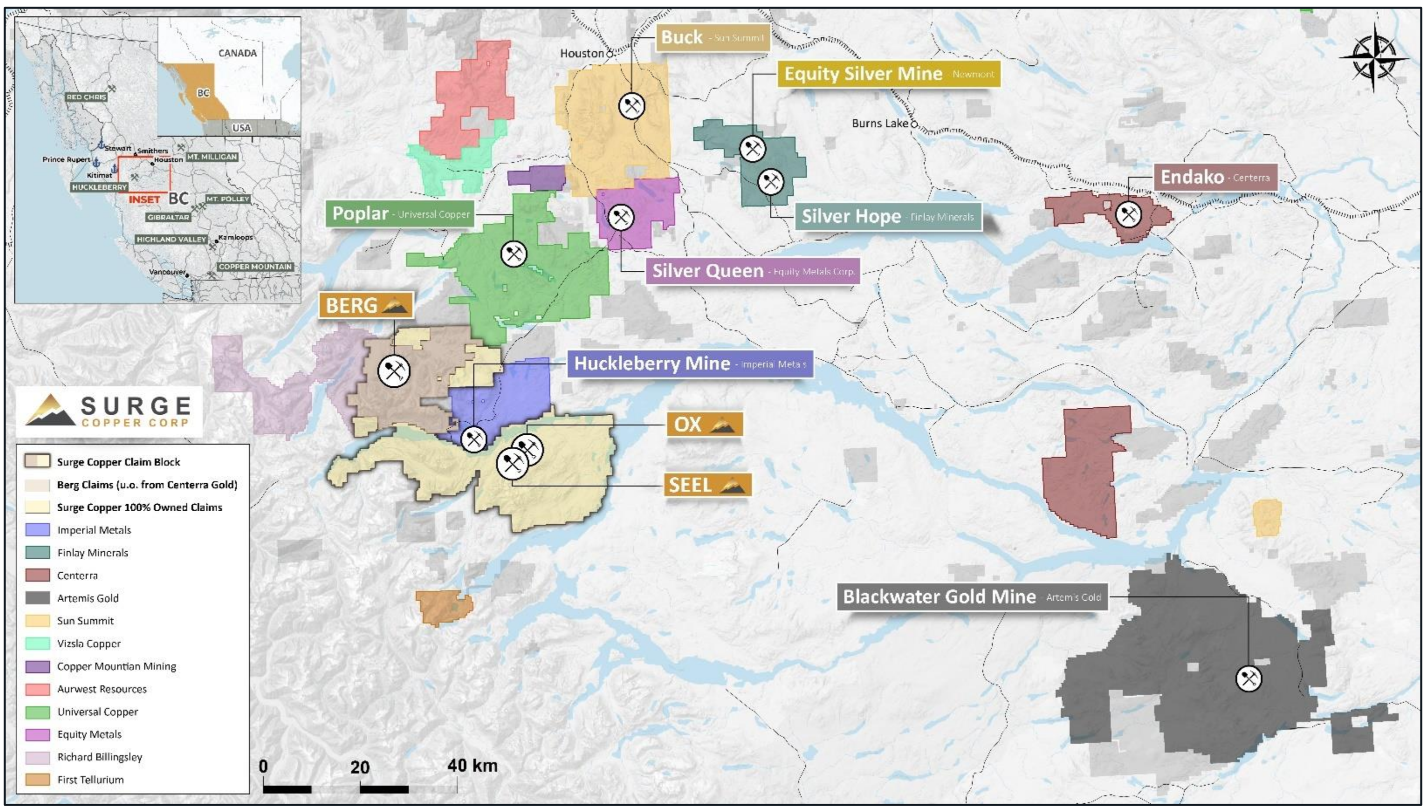
Source: Ausenco, 2023.

23 ADJACENT PROPERTIES

There are several other junior exploration companies that are active in the area specifically accessed by the Morice FSR. These include Equity Metals Corp. with the Silver Queen deposit, Universal Copper with the Poplar Deposit directly to the northeast of the Berg Project and Sun Summit Metals with the Buck Project to the northeast of Berg nearer to Houston, BC, as illustrated in Figure 23-1. The mineralization on these properties in not necessarily indicative of the mineralization style at the Berg Project.

The Huckleberry Mine, owned by Imperial Metals, is an open pit copper-molybdenum mine located 22 kilometres to the southeast of Berg. The mine had production capacity of approximately 20,000 tonnes per day. The mine commenced operations in 1997 and ceased operations in August 2016 and has since been on care and maintenance. Much of the mining equipment and the process plants remain on site (Imperial Metals, 2017). The mine geology and deposit style is similar to the Berg deposit; the QP has not personally observed the Huckleberry Deposit.

Figure 23-1: Regional District Claims



Source: Surge Copper, 2023

24 OTHER RELEVANT DATA AND INFORMATION

This section is not relevant to this report.

25 INTERPRETATION AND CONCLUSIONS

25.1 Introduction

The QPs note the following interpretations and conclusions in their respective areas of expertise, based on the review of data available for this Report.

25.2 Mineral Tenure, Surface Rights, Water Rights, Royalties and Agreements

- The mineral tenure held and optioned is valid and sufficient to support the Mineral Resources.
- Surface rights will be required from the Crown before operations.
- Royalties are payable to third parties.
- It must be noted that some project infrastructure is located on ground not owned by Surge Copper. This ground will need to be consolidated in order for the project to proceed as envisioned in this report.
- To the extent known there are no other significant factors and risks that may affect Access, title or the right or ability to perform work on the property.

25.3 Geology and Mineralization

- The deposit is an example of a porphyry Cu-Mo deposit.
- Knowledge of the deposit settings, lithologies, mineralization style and setting, and structural and alteration controls on mineralization is sufficient to support the Mineral Resource estimation.
- The quantity and quality of the lithological, collar and downhole survey data collected in the drill programs are sufficient to support Mineral Resource estimation.
- Surge Copper has been drilling on the Property since 2021.
- The sample security, sample preparation and analytical procedures during the exploration programs by Surge followed accepted industry practice appropriate for the stage of mineral exploration undertaken.
- Data verification has been conducted by MMTS, and no material issues have been identified by those programs.
- Data collected prior to 2007 has been sufficiently verified and these drillholes can support Mineral Resource estimation.

25.4 Exploration, Drilling and Analytical Data Collection in Support of Mineral Resource Estimation

The historic drilling has been verified with QAQC methods and/or comparisons to more recent drilling. In the opinion of the QP drilling to date is of sufficient quality and spacing to support the classification of the resource defined in this report. The QP confirms the collection, analysis and security is reliable and suitable for mineral resource estimation.

There are several additional exploration targets within the Project that warrant further exploration and drilling, as detailed in this report and expanded on in the recommendations of Section 26.

25.5 Mineral Processing and Metallurgical Testwork

A significant amount of metallurgical testing has been completed on samples that appear to be representative of the deposit. The samples were assembled to represent varying grade ranges of supergene and hypogene mineralization. The metallurgical performance achieved in these test programs is somewhat typical of copper porphyry deposits. The flowsheet conditions applied were reasonable for a preliminary metallurgical evaluation, however, the project would likely benefit from further testing to optimize reagent conditions and exploit the potential of coarser primary grind sizes. Ratios of pyrite to copper sulphides will be a critical consideration in processing these materials, so future testing should ensure that these ratios are better estimated across the deposit and samples are selected to represent these material characteristics.

Minor element contents were only measured on two concentrates generated in the initial metallurgical test program. These results do not indicate that concentrate marketability would be affected by penalty element levels. Silver levels of 250 g/t in the concentrates are likely of economic interest but the pay ability terms of the 2 g/t gold contents are not certain.

Due to the feed grades, the bulk concentrates can contain considerable levels of molybdenum. These levels of molybdenum should recover well across a copper-moly separation circuit, however testing to date has not yet demonstrated this. Molybdenum concentrate qualities of 50% Mo or greater were demonstrated using typical processing conditions with NaHS. This type of metallurgical testing relies on generating sufficient quantities of representative quality bulk concentrate, which was not specifically achieved in the test programs possibly due to operational challenges.

The comminution testing completed on the samples is somewhat limited compared to the amount of flotation testing. The results measured suggest that the materials are of medium hardness with respect to SAG and ball milling requirements.

25.6 Mineral Resource Estimate

The mineral resource estimate includes combined Measured & Indicated resource of 1.0 billion tonnes grading 0.23% copper, 0.03% molybdenum, 4.6 g/t silver, and 0.02 g/t gold, containing 5.1 billion pounds of copper, 633 million pounds of molybdenum, 150 million ounces of silver, and 744 thousand ounces of gold, plus an additional 0.5 billion tonnes of material in the Inferred category.

Mineral resources that are not mineral reserves do not have demonstrated economic viability.

25.7 Geotechnical

The project has presented a TWMF that has not been previously studied. As such there is little to no geotechnical data in the area. Risks to the TMWF location and study area are as follows:

- Ground conditions, geological containment, and stability of the proposed TWMF area are unknown as a geotechnical program has not been completed.
- There is a possibility for cost increase if the geotechnical or hydrogeological considerations for the TWMF are different from the criteria considered in this study impacting the capital, sustaining capital and operating costs of the Project.

25.8 Mining Methods

A reasonable open pit mine plan, including pit and stockpile designs, mine production schedules, mine fleet selection, and mine capital and operating costs have been developed for the Berg Project PEA.

Pit layouts and mine operations are typical of other regional open pit porphyry operations, and the unit operations within the developed mine operating plan are proven to be effective for these other operations.

The mine plan and estimated mine capital and operations costs are reasonable at a scoping level of engineering and support the cash flow model and financials developed for the PEA.

25.9 Recovery Methods

The recovery methods required for processing mineralized materials are supported by preliminary historical testwork as well as financial evaluations and includes a copper-molybdenum concentrator. The process flowsheet designs were based on testwork results and industry standard practices and developed to optimize recovery while minimizing capital expenditure and life of mine operating costs.

The concentrator is designed to process on average, 90,000 t/d (32.9 Mt/a) of mineralized material. Mined materials are crushed, conveyed, ground, and processed by bulk rougher flotation. Bulk rougher flotation concentrate is then reground and upgraded by bulk cleaner flotation. Rougher tails are fed to the pyrite rougher flotation to reduce sulphur levels in the rougher tailings before reporting to the tailings storage facility. The pyrite concentrate and cleaner tails are combined for separate transport and deposition in the tailings facility. The bulk cleaner concentrate is further processed in the copper-molybdenum separation circuit. Molybdenum rougher flotation tails or copper concentrate is thickened, filtered and loaded onto weighed trucks for transport. Regrinding, along with two stages of cleaning and significant circulating loads are proposed to upgrade the molybdenum rougher concentrate prior to shipment. The comminution and recovery process are widely used in industry with no significant elements of technological innovation.

25.10 Project Infrastructure

The Berg Project includes on-site infrastructure such as civil, structural and earthworks development, site facilities and buildings, on-site roads, water management systems, and site electrical power facilities. Off-site infrastructure includes site access roads, fresh water supply, power supply and concentrate transportation. The site infrastructure will include:

- Mine facilities, including mining administration offices, a mine fleet truck shop and wash bays, and a mine workshop.
- Common facilities including an entrance/exit gatehouse, a security/medical office, overall site administration building, potable water and fire water distribution systems, compressed air, power generation and distribution facilities, diesel reception and combustion plants, communications area and sanitation systems.
- Process facilities housed in the processing plant, including crushing, grinding and classification, flotation, product regrind, concentrate handling, thickening, dewatering and filtration, reagent mixing and distribution, assay laboratory and process plant workshop and warehouse.
- Other infrastructure includes the on-site man-camp, TWMF and WRSF.

The Berg Project is located approximately 85 km from the town of Houston, BC. Access to the site is via forest service roads, specifically the Morice Forest Service Road (FSR) and Sibola Forest Service Road. The Morice FSR currently serves as access for industrial use in the region including forestry, the Huckleberry Mine site and active construction of the Coastal Gaslink Pipeline. At approximately the 100-km mark of the Morice FSR, begins the Sibola FSR that leads to both Surge's current Sibola exploration camp and the Berg Access Road. It should be noted that the project is envisioned to access the Berg site via a newly created road to the north and west of Mount Ney.

A 138-kV transmission line will connect to an on-site substation before being stepped down to 25-kV for distribution to different power requirements across the site.

Fresh water will be sourced from Nanika Lake and pumped to the process plant where a freshwater tank will be located.

The overall site layout was developed using the following criteria and factors:

- The facilities described above must be located on the Berg property to the greatest extent possible.
- The location of the process plant is at a lower elevation to the Berg open pit to reduce risks and lower operating costs.
- The location of the NAG RSF must be close to the open pit to reduce haul distance.
- The location of the primary mineralized material and potentially acid generating (PAG) waste crushing must be close to the Berg deposits to reduce haul distance.
- The TWMF should be located at a site that takes advantage of sloped natural terrain to adequately drain entrained water and reduce earthworks, concrete, and structural development if possible.
- The arrangement of the administration buildings, mine workshops, processing plant and additional offices should be optimized for foot and vehicle traffic.

25.11 Market Studies and Contracts

No market studies or product valuations were completed as part of the 2023 PEA. Market price assumptions were based on a review of public information, industry consensus, standard practices and specific information from comparable operations in the region.

Surge Copper were not provided with indicative smelter terms, assumptions for 'payability' terms were based on a review of specific information from comparable recent studies. The net 'payability' for the metals contained in both concentrates are 96.5% for copper, 99% for molybdenum, and 90% for both silver and gold.

Project economics were estimated based on long-term metal prices of US$4.00/lb Cu, US$15.00/lb Mo, US$23.00/oz silver (Ag) and US$1,800.00/oz gold (Au) which was established by Surge Copper with reference to 3-year trailing spot prices and consensus forecasts from various financial institutions.

No contracts for transportation or off-take of the concentrates are currently in place, but if they are negotiated, they are expected to be within the industry norms. Similarly, there are no contracts currently in place for supply of reagents, utilities, or other bulk commodities required to construct and operate the Project.

25.12 Environmental Studies, Permitting and Social or Community Impact

Several limited field and screening environmental baseline studies and reports were completed between 2007 and 2017. The programs involved the collection of baseline data within the proposed project footprint area and commenced the process of identifying potential environmental constraints and opportunities related to the proposed development of the project.

It should be noted that much of the data collected for baseline studies is not recent. Applicable BC guidelines recommend that relatively recent baseline information will be required for baseline development and impact assessment, particularly for surface water. Therefore, in assessing the utility of using older baseline data, direct discussions should be conducted with provincial and federal regulators.

In addition, there have been no baseline studies completed to date on air quality, noise, greenhouse gases and climate change, groundwater quality and quantity, vegetation, and wildlife. Ongoing and expanded baseline studies will be required to support the project through pre-feasibility, feasibility, and environmental assessment/permitting stages of the project. The results of baseline studies will be used to minimize impact of the project on valued ecosystem components and to optimize the location and operation of project infrastructure. Baseline study recommendations for the purpose of advancing the project to the PFS stage are provided in Section 26.11.

In terms of water management, the main consideration for the project is the location of the tailings facility in Bergeland Creek and the potential loss of fish habitat. The project as envisioned in this report may require a Fisheries Act Authorization and Fish Habitat Compensation Plan. A Schedule 2 amendment to the MDMER may also be required subject to further fish and fish habitat surveys required for areas where mine waste will be stored.

As additional baseline data is collected and community engagement efforts proceed, changes to project infrastructure design (and estimated costs) may be required at the PFS level and future stages including permitting due to the following:

- Fish and fish habitat characteristics for the areas of proposed project disturbance as related to future permitting requirements and risks.
- Refined understanding of hydrological and hydrogeological conditions as related to water balance.
- The quality of mine contact water based on geochemical characterization and predictions.
- Refined understanding of vegetation/ecosystem and wildlife/wildlife habitat.
- Traditional land use activities undertaken by Wet’suwet’en, Cheslatta Carrier Nation, and other First Nations near the project area.
- Locations of archaeological sites and those of cultural importance to First Nations.

25.13 Capital Cost Estimates

The capital and operational cost estimates provided in this PEA offer expenses that can be utilized to evaluate the Berg Project’s preliminary economics. The calculations are based on the open pit mining operation, the development of a processing plant, infrastructure, tailings storage facility and management facility, and owner’s expenses and provisions.

The capital cost estimate conforms to Class 5 guidelines of the Association for Advancement of Cost Engineering International (AACE International) for a PEA-level with an estimated accuracy of +50%/-30%. The capital costs estimate was developed in Q2 2023 Canadian dollars based on Ausenco’s in-house database of projects and studies as well as experience from similar operations.

The total initial capital cost for the Berg Project is C$1,968.0 M, and the LOM sustaining cost including financing is C$1,733.1 M. The capital costs are summarized in Section 21.

25.14 Operating Cost Estimates

The operating cost estimate was developed in Q2 2023 using data from projects, studies, and previous operations from Ausenco's internal database. The operating cost estimate is around +50%/-30% accurate. The estimate covers the TWMF, mobile equipment, G&A, and mining and processing. Section 21 includes a summary of the operating expenses.

The unit operating cost per tonne of material milled is C$10.66 and the LOM operating cost is C$10.4 billion.

25.15 Economic Analysis

Based on the assumptions and parametres in this report, the PEA show positive economics (i.e., C$2,083.6 M post-tax NPV (8%) and 20.0%, post-tax IRR).

The preliminary economic assessment is preliminary in nature and includes Inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary economic assessment will be realized.

25.16 Risks

25.16.1 Exploration and Drilling

The Berg property contains multiple other exploration targets with porphyry copper deposit characteristics that have potential to provide additional mill feed to a future mining operation, including but not limited to: Bergette, Sibola and Sylvia deposits, as detailed in Section 9. These targets have seen considerable exploration work by Surge Copper and previous operators. Some targets are being advanced in preparation for drill testing, and some targets are more advanced and have been drill tested and remain open for further testing. Targets that have been drill tested and show promising results include, but are not limited to: Bergette, where hole BRG22-02 encountered 0.22% copper and 0.012% molybdenum over 176 m, Sylvia where historic drill hole S-8 intersected 0.33% copper and 0.02% molybdenum over 63 m, and Sibola where hole SIB22-01 intersected 312 g/t silver over 3 m and another interval of 0.10 g/t gold over 52 m. Additional study and exploration work is warranted across the highly prospective claim block to fully evaluate the potential for additional mill feed.

25.16.2 Metallurgical Testing and Recovery Methods

The metallurgical test programs did not include modern drop weight tests for SAG mill design. While the MacPherson test is quite comprehensive and uses a significant quantity of sample, the level of confidence sizing SAG mills with these results may not be comparable to JK Drop Weight based methods. The grinding circuit has been designed to process a feed with an effective Axb value of 52, based on the limited comminution testing completed. Additional comminution testing will need to be completed on a suitable number of representative samples to confirm the variability in comminution properties.

The flotation circuit has been designed to accommodate pyrite recovery in order to produce tailings that meet a sufficient quality for cyclone sand dam construction in terms of having a low ARD potential. This processing strategy has low risk, but it has not yet been demonstrated through laboratory testing.

Molybdenum recovery across the Cu-Mo separation circuit has not yet been successfully demonstrated at the levels proposed in the recovery model. Additional testing is required to confirm the expected metallurgical performance and the processing requirements.

25.16.3 Mineral Resource Estimate

The project has presented a TWMF that has not been previously studied. As such there is little to no geotechnical data in the area. Risks to the TMWF location and study area are as follows:

- Ground conditions, geological containment, and stability of the proposed TWMF area are unknown as a geotechnical program has not been completed.
- There is a possibility for cost increase if the geotechnical or hydrogeological considerations for the TWMF are different from the criteria considered in this study impacting the capital, sustaining capital and operating costs of the Project.

25.16.4 Mining

The project is at a scoping-level of engineering. There has been limited geotechnical, hydrogeological, and geochemical information and data collected across the project. Further field work, lab work and modelling are required to advance the engineering to the next stage of Pre-Feasibility or Feasibility. It can be anticipated that further field drilling and advancement of the project engineering will materially alter the existing mine plan, reducing the plan's risk and identifying and exploiting the potential opportunities that arise.

Risks to the estimated mill feed quantities, metal grades, associated waste rock quantities, and estimated costs in this technical report include changes to the following factors and assumptions:

- Metal prices
  - Decreases in metal prices may increase the economic cutoff grade, or reduce the size of the open pit, with either outcome reducing the size of the resource base to include into the mine plan.
- Interpretations of mineralization geometry and grade continuity in mineralization zones
  - Decreases in the resource base could significantly alter the mine plan.
- Geotechnical and hydrogeological assumptions
  - Further geotechnical study may show a required shallowing of pit slope angles, which likely would in turn increase the overall LOM stripping ratio to access the resource.
  - Further hydrogeological study may identify a more onerous (costly) pit water management and slope depressurization solution.
- Geochemical assumptions for mined resource and waste materials
  - Risks exists that the low grade stockpiling plans will not meet end of mine life metallurgical and environmental parametres to be considered as mill feed.

- Further geochemical characterization, specifically in the open pit waste overburden and bedrock, may identify a more onerous (costly) PAG management solution.

- Avalanche risk assumptions
  - The ability to develop and maintain access to upper elevations of the open pit is critical to achieving the PEA mine plan.
- Mine operation and process plant production rates and recoveries
  - Reduced selectivity with the mining fleet, reduced mining or mill processing recoveries, or increased mining dilution would result in an increased cost of achieving the planned PEA metal production.

25.16.5 Site Infrastructure

Risks related to the site infrastructure include the following:

- Waste Overland Conveyors consist of three sections with two transfer towers. If the second or third sections stop suddenly, the previous conveyor sections need to stop immediately to avoid overflow and damage to the transfer towers. More study in this area is needed in future studies to assess the risks and consider proper mitigation mechanism.
- A mineralized material transferring conveyor that consists of two sections taking materials downhill to the secondary crushers, with over 400 m downhill elevation difference. If the second section stops abruptly, the first section will also need to stop causing the whole circuit to halt to avoid overflow and damage to the transfer towers.

25.16.6 Commodity Prices

The ability of mining companies to fund the advancement of their projects through exploration and development is influenced by commodity prices. Variations in the commodity prices may lead to reduced or elevated revenues compared to those projected in this study.

25.16.7 Environmental Permitting

The Berg Project overall does not represent any obvious fatal flaws that would preclude the ability to permit the project either federally or provincially. Both Canada and BC employ rigorous but well-defined processes to complete environmental assessments and overall permitting for activities in their respective jurisdictions and it would be anticipated that the Berg Project would fall under these processes and timelines.

The main risks associated with permitting the project would include:

- Potential lack of support of First Nations.
- Potential impacts to fish and fish habitat that cannot be readily compensated for, resulting in difficulties in receiving Fisheries Authorization and/or MDMER Schedule 2 amendment.
- Potential location of tailings facility in a watercourse that is in the headwaters of an important salmon fishery.
- Potential for water treatment for mine effluent over long periods of time post closure or in perpetuity.
- Potential for disturbance of archeological sites caused by exploration activities without first completing and Archeological Overview Assessment.

- The implementation of the recommendations presented in Section 26.7 will help to quantify, qualify, and mitigate these risks.

25.17 Opportunities

25.17.1 Exploration and Drilling

The Berg property contains multiple other exploration targets with porphyry copper deposit characteristics that have potential to provide additional mill feed to a future mining operation, including but not limited to: Bergette, Sibola and Sylvia deposits as detailed in Section 9. These targets have seen considerable exploration work by Surge copper and previous operators. Some targets are being advanced in preparation for drill testing, and some targets are more advanced and have been drill tested and remain open for further testing. Targets that have been drill tested and show promising results include but are not limited to; Bergette where hole BRG22-02 encountered 0.22% copper and 0.012% molybdenum over 176 m, Sylvia where historic drill hole S-8 intersected 0.33% copper and 0.02% molybdenum over 63 m, and Sibola where hole SIB22-01 intersected 312 g/t silver over 3 m and another interval of 0.10 g/t gold over 52 m. Additional study and exploration work is warranted across the highly prospective claim block to fully evaluate the potential for additional mill feed.

25.17.2 Metallurgical Testwork and Recovery Methods

Additional comminution data will provide an opportunity to review the grinding circuit design, which could include evaluating the use of High Pressure Grinding Roll technology as a means to improve energy efficiency.

There may be an opportunity to reduce grinding circuit energy while maintaining copper and molybdenum recoveries if Coarse Particle Flotation techniques are employed. This processing technique could also provide benefits in the construction of the tailings facility, as it could generate more material that is suitable for placement on the dams.

There may also be an opportunity to reduce the regrinding energy requirement by using more selective flotation collectors, such that less pyrite enters the cleaner circuit. Additional metallurgical testing is required to confirm this.

25.17.3 Mineral Resource Estimate

The opportunity to increase confidence in the resource estimate includes upgrading of the Inferred material within the open pit by infill drilling to increase the drill spacing and upgrade to Measured or Indicated as outlined in the Recommendations section of this report.

25.17.4 Mining

The project is at a scoping-level of engineering. Further field work, lab work and modelling are required to advance the engineering to the next stage of Pre-Feasibility or Feasibility. It can be anticipated that further field drilling and advancement of the project engineering will materially alter the existing mine plan, reducing the plan's risk and identifying and exploiting the potential opportunities that arise.

Opportunities to the estimated mill feed quantities, metal grades, associated waste rock quantities, and estimated costs in this technical report include changes to the following factors and assumptions:

- Metal prices
    - Increases in metal prices may decrease the economic cutoff grade, or increase the size of the open pit, with either outcome increasing the size of the resource base to include into the mine plan.
- Interpretations of mineralization geometry and grade continuity in mineralization zones.
    - Increases in the resource base could significantly alter the mine plan.
- Geotechnical and hydrogeological assumptions
    - further geotechnical study may show a potential to increase pit slope angles, which likely would in turn decrease the overall LOM stripping ratio to access the resource, specifically in the early stages of the project.
    - further hydrogeological study may identify a less onerous (costly) pit water management and slope depressurization solution.
- Geochemical assumptions for mined resource and waste materials
    - Further geochemical characterization, specifically in the open pit waste overburden and bedrock, may identify a less onerous (costly) PAG management solution.
- Mine operation and process plant production rates and recoveries
    - increased selectivity with the mining fleet, increased mining or mill processing recoveries, or decreased mining dilution would result in decreased costs of achieving the planned PEA metal production;
- Mine sequencing
    - Several areas of high economic margin material exist relatively close to surface within the planned open pit, and additional engineering may present the opportunity to increase early production in these areas and enhance economics of the overall project.
    - Several cutoff grade optimization solutions should be tested on the LOM mine plan, as increased low grade stockpiling may enhance the economics of the overall project.

25.17.5 Site Infrastructure

The following opportunities have been identified:

- Opportunity to conduct a more robust geochemical analysis to define the NAG/PAG spilt. This study can help reduce the PAG crushing and handling costs as well as the tailings handling and storage costs.
- Using regenerative conveyors to add power to the overall system and reducing the overall power consumption required from the BC Hydro provincial grid.
- Opportunity to explore removing the curved conveyors in the next phase through site/topography assessment.
- Opportunity to use the site as a pumped hydroelectric energy storage facility during the closure phases of the project by pumping back the water, stored in the pit during low power consumption periods and using the resulting elevation drop to generate power to be supplied back into the BC Hydro grid.

25.17.6 Environmental Permitting

Several opportunities as listed below should be contemplated as the project continues the development path.

- Strong cooperation between First Nations, regulatory agencies and project proponents have recently been seen to have great success. Specifically in BC there have been recent efforts for Indigenous led assessment that ensure the respective communities are well informed throughout the permitting process. Should such an opportunity be possible with respective First Nations it could be considered an opportunity to bolster the partnership between all groups while at the same time reducing risks for permitting delays.
- A strong environmental baseline and focus on the use of low impact and sustainable technologies will aid the permitting process as showing lesser overall impacts to the environment. Through the EA process having a well-developed Tailings Alternatives Assessment backed by a robust dataset for environmental baseline may allow for a fast track process in any Schedule 2 amendment needed for mine construction.
- The use of low carbon initiatives and green technology as it becomes available will lessen overall impact on the environment and reduce carbon footprint for the life of the project. Such technologies, while potentially not currently on the market, should be evaluated as they become available and the project progresses. Such technologies could include:
    - trolley assisted truck haulage to maximize electrical haulage;
    - adoption of battery electric vehicles as they become available for purchase (specifically for the truck haulage of mine rock); and
    - use of downhill generative conveyors to generate electricity during operations.
- Leverage the critical metals (mainly copper and molybdenum) that are contained within the resource to align with Canada's recent strategy to ensure strong supply of materials needed to advance the current electrical transportation and energy transition goals. As the transition to more renewable energy systems progresses, and societies look to electrify more aspects of the economy, including the increased adoption of electric vehicles, Canada and other partner countries will increasingly rely on critical metals that the Berg project will be able to supply. As opportunities are presented by regulatory or administrative bodies the Berg project should look to take advantage of any of these programs.

26 RECOMMENDATIONS

26.1 Overall Recommendations

The Berg Project demonstrates positive economics, as shown by the results presented in this Technical Report.

It is recommended to continue developing the project through prefeasibility study (PFS). Table 26-1 summarizes the estimated cost for the recommended future work on the Berg Project.

Table 26-1: Cost Summary for the Recommended Future Work

Item	Budget ($M)
Exploration and Drilling	3.00
Metallurgical Test Work	0.65
Mining Method	1.81
Process and Infrastructure Engineering	0.75
Site-wide Assessment and TWMF Studies	0.84
Environmental, Permitting, Social and Community Recommendations	0.80
Total	**7.85**

26.2 Exploration and Drilling

It is recommended to drill 8,500 m at the Berg deposit to address geotechnical studies, metallurgical sampling as well as exploration and infill drilling to upgrade the resource from Inferred to Measured and Indicated within the current resource pit. The estimated cost for exploration and drilling for the PFS is C$3,000,000.

The Berg property contains multiple other exploration targets with porphyry copper deposit characteristics that have potential to provide additional mill feed to a future mining operation, including but not limited to: Bergette, Sibola and Sylvia prospects as detailed in Section 9. Additional study and exploration work is warranted across the highly prospective claim block to fully evaluate the potential for additional mill feed.

26.3 Metallurgical Testwork

Additional metallurgical testwork required to advance the project is recommended to include:

Comminution testing on variability samples that provide spatial coverage of the deposit and sufficiently represent the quantities of supergene and hypogene materials. This testing should be completed on ½ HQ drill core so that SMC tests can be conducted. Bond ball mill Wi tests would also be conducted on all samples.

Bench scale flotation testing on master composites and variability samples of hypogene and supergene materials. The variability samples should also provide sufficient spatial coverage of the deposit as well as representative ranges of Cu:S ratios. The master composite testing should investigate the potential to apply a coarser primary grind sizing and alternate pulp chemistries. It is recommended that Coarse Particle Flotation be evaluated as a means to minimize primary grinding energy.

Copper-molybdenum separation testing should be conducted using bulk concentrate generated through well controlled batch test protocols. The testing should include a locked cycle test once suitable open circuit conditions are determined.

Regrind energy tests are recommended to confirm the regrind mill sizing for this circuit.

The total cost of this testing is estimated at C$650,000. The described testing may require 3400 kg of sample.

26.4 Mining Methods

The following recommendations are made regarding advancing the mine engineering of the Berg Project to a Pre-Feasibility Study, with estimated budget for each recommended program included:

- Updated topographic survey of all planned operational areas (C$0.15M).
- Targeted open pit geotechnical drilling using acoustic or optical televiewer and triple tube core barrels (C$0.85M):
  - laboratory testing for intact rock strength (unconfined compressive strength tests, triaxial compressive strength tests, point load tests, and indirect tensile strength tests) and for discontinuity strength (direct shear tests);
  - build updated fault and rock mass fabric models;
  - Packer testing should be conducted to determine pit hydrogeology, hydraulic conductivity and refine pit water inflow estimates;
  - build updated overburden contact, leach cap contact, dyke, and gypsum surface models.
- Geochemical characterization of waste rock for the purposes of updated PAG modelling. It is possible to utilize exploration and geotechnical drill core for geochemical samples, and no additional drilling has been planned for these studies in the estimated budgets (C$0.26M).
- A site study of mountain operation avalanche risks and potential mitigations should be undertaken (C$0.20M).
- Condemnation drilling of the footprints identified for the waste rock storage facilities, as well as site infrastructure. Condemnation drilling is done to ensure no valuable mineralization exists below these planned facilities, so that it is not locked in the ground from future potential exploitation (C$0.15M).
- Drill penetration and blast fragmentation studies, testing properties in all lithologies, as well as within mineralized areas and within waste rock. It is possible to utilize exploration and geotechnical drill core for rock samples, and no additional drilling has been planned for these studies in the estimated budgets (C$0.05M).
- Updates to designs of open pits, waste storage piles, stockpiles, and mine haul roads incorporating results from all other recommended work programs (C$0.10M).
- Mine operational and cost trade-off studies examining contractor vs. owner equipment fleet, lease vs. purchase equipment fleet, cost comparisons of various equipment class sizes, and utilization of electrically driven mine equipment (including trolley systems for haulers) over diesel driven units (C$0.05M).

26.5 Process and Infrastructure Engineering

The estimated cost for process and infrastructure engineering for the PFS is C$750,000. Engineering deliverables would include:

- Process trade-off studies (comminution, copper-molybdenum separation optimization studies);
  - Coarser primary grinds could be employed and trade off studies reviewing the associated reduction in applied grinding energy and capital expenses against copper and molybdenum recoveries should be evaluated;
  - Inclusion of coarse particle flotation should also be investigated;
- Flow diagrams (comminution, recovery processes, tails);
- Detailed equipment list;
- Power listing and consumption estimate;
- Architectural (building sizes) to estimate steel and concrete quantities;
- Detailed material and water balance;
- Detailed process design criteria;
- General arrangements (GA) and elevation drawings (for crushing/overland conveying, comminution, flotation, tailings);
- Electrical single line drawing;
- Equipment and supply quotations updated and sources determined;
- Estimate of equipment and materials freight quantities;
- Capital cost estimate;
- Operating cost estimate;
- Major equipment spares and warehouse inventory cost estimate;
- Construction workhours estimate; and
- Construction schedule.

26.6 Site-wide Assessment and TWMF

Due to the conceptual nature of this study and the limited information available at the time of writing, assumptions have been made regarding the layout, MTOs, and construction of the proposed TWMF. Construction material geotechnical properties are required to perform slope stability analyses and other geotechnical assessments to confirm that the TWMF can be built as designed. A tailings deposition plan will be required which may lead to the conceptual staging requiring adjustment to contain the given capacities.

Additional studies and data collection will be required to advance project development beyond the conceptual level. Some, but not necessarily all, of the current data gaps that would need to be addressed in future studies include the followings:

- Geological and geotechnical site investigations and laboratory program should be carried out for infrastructure, Process plant, WRSF and TWMF, including drilling and in-situ and laboratory testing, to understand subsurface soil and rock characteristics, construction material properties, and existing groundwater levels.
- Seepage analysis for the TWMF needs to be investigated.
- Additional geotechnical testing of the anticipated tailings, waste rock, and other associated construction materials, (e.g., horizontal drain gravel and sand and candidate geomembranes) should be carried out.
- Hydrological information should be gathered from site-specific climate studies to detail ponds and channels.
- Hydrogeological information from desktop studies and site investigations should be gathered to better understand subsurface flow regimes.

As additional information is obtained, assumptions made in this study can be verified or updated to advance the project to the next level of design. The cost of implementing the above recommendations is estimated at C$840,000.

26.7 Environmental Studies, Permitting, Social or Community Recommendations

The following recommendations are made regarding future studies and activities related to areas of environment, permitting and community engagement. These studies and activities will be necessary to support the project to the PFS stage and provide a strong basis for future EA preparation and permitting. The estimated total cost for the recommended future studies and activities is C$800,000.

26.7.1 Meteorology and Climate

- Develop and implement multi-year baseline meteorological monitoring plan for key areas within the Project area based on the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC ENV 2016).
- Develop plans that eliminate or mitigate environmental risk for PFS.

26.7.2 Surficial Hydrology

- Develop and implement multi-year baseline hydrological monitoring plan for key areas within the Project area based on the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC ENV 2016).
- Develop a conceptual water balance model and assess the need for water treatment.
- Develop plans that eliminate or mitigate environmental risk for PFS.

26.7.3 Hydrogeology

- Develop and implement multi-year baseline groundwater monitoring plan (quality and quantity) for key areas within the Project area based on the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC ENV 2016).
- Develop a conceptual groundwater model and assess the need for water treatment.
- Develop plans that eliminate or mitigate environmental risk for PFS.

26.7.4 Surface Water Quality

- Develop and implement multi-year baseline surface water quality monitoring plan that includes physical and chemical parametres, aquatic sediments, tissue residues, and aquatic life (invertebrates, algae, macrophytes) for key areas within the Project area based on the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC ENV 2016).
- Assess the need for water treatment.
- Develop plans that eliminate or mitigate environmental risk for PFS.

26.7.5 Fish and Fish Habitat

- Develop and implement multi-year baseline fish and fish habitat monitoring plan for key areas within the Project area based on the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC ENV 2016).
- Develop plans that eliminate or mitigate environmental risk for PFS.

26.7.6 Terrestrial and Wildlife Monitoring

- Develop and implement multi-year baseline vegetation/ecosystem and wildlife/wildlife habitat survey plan for key areas within the Project area.
- First Nations and other land users should be closely involved in the development and execution of wildlife baseline studies, especially in relation to traditional and current use of the land for harvesting.
- Develop plans that eliminate or mitigate environmental risk for PFS.

26.7.7 Socio-Economic, Cultural Baseline Studies and Community Engagement

- Develop and implement a socio-economic and cultural baseline study.
- Complete AOA or AIA on locations of proposed project infrastructure.
- Carry on with commitments previously made to stakeholders, including:
    - Continuing to meet as a group for follow-up discussion on project plans.
    - Developing Terms of Reference for defining collaboration process and procedures.
    - Working towards defining communications, processes, and procedures to guide the project through the next stages.

26.7.8 Environmental Constraints Mapping

- To assist in the development of the project at the PFS stage, environmental constraints mapping should be developed and continuously updated, based on the results of historical and future baseline environmental and land use studies. This mapping should be utilized to limit risks at the design stages of the Project.

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