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RTG MINING INC.

NI 43-101 TECHNICAL REPORT

## Mabilo Copper-Gold-Iron Property Mineral Resource Estimate

## Camarines Norte, Philippines

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## 1 Summary

## 1.1 Introduction

CSA Global Pty Ltd ("CSA Global") was retained by RTG Mining Inc. ("RTG") to complete a Mineral Resource Estimate ("MRE") at the Mabilo Copper-Gold-Iron Property ("Mabilo" or "the Property") and to prepare this Technical Report (the "Report") in accordance with National Instrument 43-101 of the Canadian Securities Administration ("NI 43-101") to support RTG's public disclosure about the Property.

The Mabilo copper-gold-silver mineralised magnetite skarn was discovered in 2012 by drill testing magnetic anomalies beneath Quaternary Labo Volcanic cover. Following infill drill testing which defined a substantial mineralised zone, a maiden Indicated and Inferred MRE was reported in November 2014 (Green et al., 2014). Additional infill and step-out drilling continued on the property until July 2015 and forms the basis for an updated MRE which is the subject of this Technical Report.

Dr Neal Reynolds, of CSA Global, visited the Property between October 28 and November 1 2015 and the Intertek laboratory in Manila on October 27. Drill collars were observed, drill core, and core handling and storage facilities were examined. Although drilling was not in progress at the time of the visit, drilling had been observed on previous visits in 2013 and 2014. CSA Global considers that the drilling and sampling process has followed appropriate procedures and protocols. CSA Global has not undertaken any check sampling or analysis, but has observed visible mineralisation in drill core that corresponds well with reported grades.

#### **1.2** Property Description and Location

The Property is located in Camarines Norte province of the Republic of the Philippines at approximate longitude 122° 47′ 00″ E latitude 14° 07′ 00″ N.

RTG is an Australian-based mining and exploration company with a principal listing on the main board of the Toronto Stock Exchange (TSX:RTG) and a secondary listing on the Australian Stock Exchange (ASX:RTG) as a result of its merger with Sierra Mining Limited ("Sierra") on 5<sup>th</sup> June 2014. The Property is held in joint venture by Mt Labo Exploration and Development Corporation ("Mt Labo"), with RTG holding an indirect interest through Mt Labo.

The Property comprises a granted exploration licence (EP014-2013-V) covering an area of 497.7212 ha and two exploration licence applications (EXPA-000188-V and EXPA-000209-V) covering an area of 3,235.1907 ha. EP014-2013-V was granted in July 2013 and has a term of two years, with an option to renew for a further four years. Mt Labo, on behalf of the Joint Venture, applied for renewal of the licence in July 2015 and the Mines and Geosciences Bureau ("MGB") has confirmed that all statutory obligations for this renewal have been met. However the renewal has not yet been finalised by the MGB in Manila and remains pending.

Galeo Equipment and Mining Company Inc. ("Galeo") is the joint venture partner with Mt Labo in the Mabilo Property and can earn up to a 42% interest in the Property by undertaking



approximately 14,000m of drilling, contributing to all joint venture expenditure in proportion to their interest, providing management services to assist with amongst other things community relations and assisting with permitting, and by mining the first 1.5 Mt of pre-strip, subject to satisfaction of a number of conditions. CSA Global understands that Galeo's current ownership of the Property stands at 36%.

The joint venture partners have embarked on a programme of land purchases in the Property area.

Mt Labo applied for a Mining Production and Sharing Agreement permit ("MPSA") related to a 5 Mt, 0.5 Mtpa direct-shipping oxide and supergene operation in September 2014.

#### **1.3** Accessibility, Climate, Local Resources, Infrastructure and Physiography

Road access from Manila is by 340 km of mainly sealed highway, taking about 6 hours. Mt Labo maintains its site office at Daet, about 30 km east of the Property. The Property is normally accessed by domestic flight from Manila to Naga followed by a two hour drive to Daet. Access around the Property area is on unsealed roads.

The Property is located in the northwest of the Philippine archipelago and experiences a tropical climate, with annual rainfall of over 3,000 mm. The area is within the typhoon belt. Excepting this risk, it is possible to work on the Property throughout the year.

The terrain in the Property area is low lying to slightly undulating with elevation from 105 m to 127 m. The Property area is mostly covered by coconut palm plantations.

The local economy is based on agriculture, but the Paracale district has a significant history of mining.

Road infrastructure is reasonably well developed in the coastal area. The International Port of Jose Panganiban is 35 km northwest of Daet and close to the old Larap mine (Figure 1).

#### 1.4 History

The Paracale Mining District is one of the largest historical gold producing regions in the Philippines, predominantly in the period before World War 2 from narrow quartz-sulphide veins. The 'iron belt' south of the gold district includes a number of historical iron mines based on magnetite skarns. The Larap mine is estimated to have produced approximately 20 Mt of iron ore from several different magnetite bodies between 1918 and 1975. Sub-economic porphyry Cu mineralisation is also reported in the belt at Matanlang.

Mabilo lies south of the main Paracale 'iron belt', though in a similar geological setting, and includes similar magnetite skarns that have been worked historically on a small scale. A number of other magnetite skarn occurrences were worked in the area in the 1960's and 1970's, including the Venida pit within the Mabilo Property.

Gold Fields Philippines Corporation ("GFPC") registered six mineral claims over Mabilo in 1987, covering the same area as the current exploration licence, and drilled 10 diamond drill holes



which formed the basis for a small historical resource estimate (not classified under CIM guidelines). GFPC was acquired by Eldore Mining Corporation ("Eldore") in 1995, which conducted an extensive ground magnetic survey in 2007. In 2011, 64% of Eldore was acquired by Sierra Mining Ltd "(Sierra") and the company name was changed to Mt Labo Exploration and Development Corporation ("Mt Labo").

## 1.5 Geology and Mineralisation

The Mabilo Property occurs in the Paracale district of the Pacific Cordillera arc belt of the Philippines archipelago. The geology of the Philippine archipelago is dominated by a complex sequence of juxtaposed and superimposed island arcs formed by multiple episodes of subduction, arc-magmatism, ocean basin closure, collision, ophiolite accretion and lateral translation of terranes through regional strike-slip faulting. The economically most important mineralisation in the Philippines occurs within porphyry copper-gold and epithermal gold-silver deposits, mostly of Pliocene age.

In the Paracale district, Pre-Pliocene arc magmatism is related to eastward subduction on the Luzon trench which was followed by collision, ophiolite obduction, and initiation of westward subduction. The Paracale Granodiorite (trondhjemite) intrudes the Cretaceous ultramafic basement. The ophiolite basement is unconformably overlain by Eocene sediments overlain by the Oligocene Larap Volcanics. Late Miocene-Pliocene dacitic intrusions cut the sedimentary belt. All these units are overlain to the south by Pliocene andesitic and dacitic pyroclastics and tuffs of the Macogon Formation, covered in turn by southeast-thickening lahar and tuff deposits of the Quaternary Labo Volcanic Complex.

Total historical gold production from the Paracale Mining District is estimated to have been 5 million ounces, predominantly from narrow quartz-sulphide veins and including alluvial gold. The Eocene sedimentary sequence hosts a number of magnetite skarns and base metal occurrences within the base metal or iron belt, including the historical Larap mine. The mineralisation is anomalous in copper, gold, and molybdenum. Low-grade porphyry copper mineralisation is also reported in the same belt.

The Mabilo skarn deposit lies about 20 km southeast of Larap and appears to be of the same style and association, although with higher grades of copper and gold. The deposit is 500 m south of the small Venida pit, concealed under cover of the Labo volcanics. The Mabilo deposit occurs in two bodies, the North Mineralised Zone ("NMZ") and South Mineralised Zone ("SMZ"), separated by an offsetting fault. The magnetite skarn is hosted by marble and calcareous sediments in the hornfelsed contact zone of a quartz-diorite intrusion. The main skarn horizon replaces a clean limestone or marble unit and has a true thickness of up to 40 to 90 m, dipping west to southwest at 20 to 40 degrees.

Primary mineralisation comprises massive magnetite intergrown with minor calc-silicate minerals, chalcopyrite and late interstitial calcite. Copper and gold grades are closely correlated and commonly reach 5% Cu and 5 g/t Au in hypogene mineralisation. The copper-gold grade of magnetite skarn is variable and barren magnetite also occurs. The magnetite skarn is variably overprinted by quartz-pyrite-arsenopyrite veining and brecciation. This event may be associated with high-grade hypogene bornite.



The upper part of the skarn is strongly oxidised with associated supergene alteration to hematite and secondary copper minerals. The oxide zone may be up to 20 m to 30 m thick and a supergene zone of high-grade sooty chalcocite locally occurs at its base. This weathering event pre-dates the Labo volcanic unconformity.

## 1.6 Exploration

Sierra commenced a drill programme at Mabilo in 2012, initially targeting magnetic bodies modelled from the magnetic survey completed by previous owners. Sierra subsequently completed its own ground magnetic surveys and revised the magnetic models. Sierra drilled 12 holes in late 2012, completed a new magnetic survey in early 2013, and commenced a second phase of drilling after the grant of the tenement in July 2013. Initial drilling encountered broad intersections of magnetite skarn with significant copper-gold-silver mineralisation.

## 1.7 Drilling

The MRE is based on the data obtained from 99 diamond drill holes for 18,188.5 m as of end September 2015 in the SMZ and NMZ areas. Holes are drilled on a nominal 40 m by 40 m drill pattern along strike, with infill to a nominal 20 m by 20 m in parts. Approximately 30% of the holes have been drilled vertically. Roughly 40% of the holes have been drilled at 60° and the remainder drilled at angles between 45° and 80°. The direction of these holes is broadly perpendicular to the mineralisation, with a number of holes drilled in directions intended to help with the understanding and interpretation of structures, which appear to be offsetting the mineralisation.

## **1.8** Sample Preparation, Analysis and Security

Drill-core handling, sampling and security were reviewed and concluded to be of good industry standard. Sampling is to geological boundaries with half-core cut using a diamond saw, with core wrapped in plastic when broken or friable. Where the core is very broken or predominantly clay, material from half of the "core" is collected using a small plastic scoop. Samples are placed in numbered plastic sample bags with sample tickets and sealed with a cable tie. The sealed samples are placed in plastic drums with Chain of Custody, Sample Dispatch and Sample Submission Forms and sent directly to the ISO-accredited Intertek Mcphar laboratory in Manila using either company vehicles or a local transport company. Remaining core is kept in the fenced and guarded company core yard in Daet. Gold was analysed by 50 g fire assay and the other elements after 4-acid digestion by ICP-MS (Inductively Coupled Plasma Mass Spectrometry) or ICP-OES.

Bulk dry density determinations were conducted on selected samples of core from all the different types of mineralisation and lithologies using the wax-coated, water immersion method. Earlier density determinations were completed before half core sampling, but are now completed prior to cutting which is more appropriate. There is a risk of positive density bias resulting from measurement bias towards intact core rather than broken core which may result from open cavities associated especially with the late pyrite overprint and partial oxidation.



Quality control completed by Mt Labo has included analysis of standards, blanks, duplicates, and external umpire analyses. In addition, Intertek conducted their own extensive check sampling as part of their own internal QA processes which are reported in the assay sheets. Pulp samples have been sent to three independent laboratories for umpire assay checks. Examination of all the QAQC data indicates that the laboratory performance has been generally satisfactory with good performance of standards, blanks and field duplicates. Although umpire assay results appear to indicate an upward bias in the primary laboratory assay results compared to the umpire assay laboratories, this is not considered to be a significant failure as all other measures tested have performed well. Therefore the original assay results are considered suitable for use in a Mineral Resource estimate.

#### 1.9 Mineral Resource Estimate

For the SMZ, the MRE is based on 3,073.71 m of assay data from 61 holes which intersected the interpreted mineralisation zones. For the NMZ, the MRE is based on 1,149.9 m of assay data from 21 holes which intersected the interpreted mineralisation zones.

A geological model was provided by Mt Labo, based on implicit modelling of the logged lithology using LeapFrog<sup>®</sup> software and understanding of deposit geometry developed over time. The model includes interpreted structures, the boundary contact surface of the overlying Labo volcanic sequence and an oxide weathering boundary surface. This model formed the basis for the interpretation of 41 separate 3-D mineralised lithological envelopes that were constructed using CAE Studio 3 ('Datamine') software. The smoothed Leapfrog generated Labo and Oxide boundary surfaces were also modified to better fit the actual drill logging data.

Modelled magnetite skarn envelopes were interpreted based on drill-hole lithological logging. The unit was limited against interpreted structures. Within the magnetite skarn, small zones along sections of the edges are not mineralised with Au and Cu above the selected 0.3 g/t Au or 0.3% Cu grade cut-off. Separate Au-Cu mineralised envelopes were generated within the magnetite skarn to ensure that grade continuity can be more accurately represented during grade estimation. Other lithological units modelled in the system are also not necessarily mineralised to potentially economic levels of Au, Cu and Fe throughout their full extent. These envelopes were modelled using lithological logging and nominal lower cut-off grades of 0.3 g/t Au or 0.3% Cu. The 3-D envelopes representing the mineralised zones were grouped into 14 domains based on lithology type and deposit location for estimation and reporting.

A block model constrained by the interpreted mineralised envelopes and boundary surfaces was constructed using Datamine. A parent cell size of 10 m E by 10 m N by 5 m RL was adopted. 1 m composited samples were used to interpolate Cu, Au, Ag and Fe grades into the block model. Block grades were validated by means of swath plots, overlapping histograms of sample and block model data and comparison of mean sample and block model grades for each domain. Cross sections showing the block model and drill-hole data were also reviewed.

Density was assigned to the model based on linear regression formulas determined for the weathered and unweathered zones. The regression formulas are based on the correlation between density and Fe which followed statistical analysis. The overall average density of the mineralised weathered zones is  $2.96 \text{ t/m}^3$  compared to  $3.70 \text{ t/m}^3$  for the unweathered zones.



The average density from measured samples taken outside the interpreted mineralised zones was assigned to waste blocks: 2.2 t/m<sup>3</sup> was assigned in the Labo volcanic sequence, 2.33 t/m<sup>3</sup> was assigned in the weathered zone and 2.71 t/m<sup>3</sup> was assigned in the unweathered zone.

Weathering State	Classification	Million Tonnes	Cu %	Au g/t	Ag g/t	Fe %	Cu Metal (Kt)	Au Oz ('000s)	Fe Metal (Kt)
Oxide + Supergene	Indicated	0.78	4.1	2.7	9.7	41.2	32.1	67.1	320.8
	Inferred	0.05	7.8	2.3	9.6	26	3.7	3.5	12.3
Fresh	Indicated	8.08	1.7	2	9.8	46	137.7	510.5	3,713.7
	Inferred	3.86	1.4	1.5	9.1	29.1	53.3	181.5	1,121.8
Combined	Indicated (Total)	8.86	1.9	2	9.8	45.6	169.8	577.6	4,034.5
Combined	Inferred (Total)	3.91	1.5	1.5	9.1	29	57	184.9	1,134.1

 Table 1: Mineral Resource Estimate as at November 2015 for the Mabilo Project

Note: Differences may occur due to rounding. All elements reported as total estimated in-situ for blocks above 0.3 g/t Au lower cut-off, no recovery factors have been considered. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

#### 1.10 Interpretation and Conclusions

The modelled mineralisation at Mabilo is a copper–gold–magnetite skarn deposit occurring within the Pacific Cordillera magmatic arc in the Philippines. This type of skarn deposit is typically associated with mid-level intermediate calc-alkaline intrusions cutting carbonate rocks in magmatic arcs, where it may be associated with porphyry copper mineral systems. The NMZ and SMZ, roughly 150 m apart, are interpreted to result from fault offset of a previously continuous skarn body, 20 to 80 m thick and dipping southwest at 30-60 degrees conformable with bedding in the host rocks. The main magnetite skarn horizon is interpreted to replace a marble horizon within hornfelsed siliciclastic and volcaniclastic sediments in the contact aureole of a quartz-diorite stock.

The magnetite skarn and the copper-gold mineralisation are very continuous, with an irregular, sharp down-dip contact with limestone. The SMZ remains open to the southeast and the NMZ remains open to the north. Variably developed late pyrite overprint of skarn and associated brecciation with silica-clay alteration increases local grade variability. As a result of the pyrite overprint, total iron values do not equate to magnetite content, which based on available metallurgical results represents about 80% of the total iron.

The magnetite skarn has been oxidised where it was exposed beneath overlying Quaternary volcanics. A supergene copper-enriched zone is locally developed below the Quaternary volcanics.

The deposits occur in Eocene sediments that are covered by 30 to 50 m of Quaternary volcanics. Palaeo-weathering beneath the volcanics has resulted in development of an oxide zone at in the upper 10 to 30 m of the skarn where it underlies the unconformity at the north end of the SMZ and in the NMZ. The oxide zone is characterised by hematite with enhanced



gold grade and reduced copper grade. A copper-enriched supergene zone is locally developed at the base of the oxide zone.

The quartz-diorite stock at Mabilo is not significantly altered. However strongly altered porphyry dykes have been intersected in the contact zone of the stock, and veins similar to D-veins in a typical porphyry-copper system have been intersected in intrusive rock and altered host metasediments. This suggests that the main stock may not be the causative intrusion and points to potential for a porphyry-copper deposit at depth. The silica-clay-pyrite alteration and hydraulic brecciation are also suggestive of acid steam-driven argillic alteration above or peripheral to a mineralising porphyry.

Exploration and discovery at Mabilo has been driven by testing of modelled magnetic bodies. Drilling has shown that high-grade mineralisation can also occur in garnet skarn without magnetite, while drilling of the Southeast Anomaly has shown that magnetite skarn can occur without significant copper-gold mineralisation. An improved understanding of zonation and mineralisation controls in the Mabilo system is needed to support effective future exploration, including understanding of lithostratigraphy, structure, alteration and intrusive events. Future exploration combining this understanding with additional targeting methods, including IP surveys and base of Labo geochemistry, has the potential to drive further discovery success.

The domains in the resource model have been developed based on geology and grade distribution, however they do not take into account all the variability in mineralisation type that is significant for metallurgical performance. This includes the degree of clay-silica-pyrite overprint and brecciation, as well as hypogene bornite domains. A geometallurgical model is a high priority using a combination of logging, multi-element analytical data, and potentially hyperspectral data on sample pulps.

#### **1.11** Recommendations

CSA Global recommends the following work be completed to support future MREs:

- A geometallurgical model should be constructed to assist in defining materials with differing metallurgical responses.
- Additional density data should be collected to ensure that density values applied in the model are fully representative of the in-situ material. This will increase confidence in the MRE.
- Additional work should be completed to define the structural geological framework, both to define exact limits of currently interpreted zones and to assist with exploration targeting.
- At the commencement of mining, reconciliation of mined material with the Mineral Resource model is recommended to validate and/or improve grade estimation techniques.
- Metallurgical testing of the various lithologies is required to establish metal recoveries in each zone and achieve greater confidence in economic cut-off grades.



## 2 Introduction

RTG Mining Inc. ("RTG") commissioned CSA Global Pty Ltd ("CSA Global") to prepare a Mineral Resource Estimate ("MRE") for the Mabilo Property ("Mabilo" or "the Property") to the standard of the Canadian National Instrument 43-101 "Standards of Disclosure for Mineral Projects" following the completion of substantial drilling programs covering the Mabilo copper-gold deposit.

## 2.1 Issuer

RTG is an Australian-based mining and exploration company with a principal listing on the main board of the Toronto Stock Exchange (TSX:RTG). RTG also has a secondary listing on the Australian Stock Exchange (ASX:RTG) as a result of its merger with Sierra Mining Limited ("Sierra") on 5<sup>th</sup> June 2014.

The Mabilo Project is held in joint venture by Mt Labo Exploration and Development Corporation ("Mt Labo"), with RTG holding an indirect interest through Mt Labo.

Galeo Equipment and Mining Company Inc ("Galeo") is the joint venture partner with Mt Labo and is earning up to a 42% interest in the Mabilo Project. CSA Global understands that Galeo's current ownership of the Property stands at 36%.

## 2.2 Terms of Reference

This report details the completion of an updated MRE for the Mabilo copper-gold deposit. The purpose of this report is to provide a Qualified Person's Independent Technical Report for the Mabilo Project area held by Mt Labo in accordance with NI 43-101 Standards of Disclosure for Mineral Projects.

Through Mt Labo, RTG also holds an interest in the Nalesbitan property, an exploration-stage gold project 25 kilometres west of Mabilo. RTG also holds an interest in five properties in Mindanao in the southern Philippines. This Report solely concerns the Mabilo Property.

Metric units were used in this report for distance and the local coordinate system used is UTM WGS84 Zone 51N. All costs discussed are in US dollars.

## 2.3 Qualified Person Property Inspection

This report has been overseen by Mr Aaron Green who is a Qualified Person ("QP") within the meaning of National Instrument 43-101 of the Canadian Securities Act. Mr Green is a full time employee of CSA Global and has more than 20 years' experience in exploration and resource evaluation.

Dr Neal Reynolds, of CSA Global, visited the Property between October 28 and November 1 2015. Dr Reynolds is a Qualified Person ("QP") within the meaning of National Instrument 43-



101 of the Canadian Securities Act and is a full time employee of CSA Global. Dr Reynolds has more than 25 years' experience in exploration and evaluation, including 20 years' experience in copper-gold exploration and evaluation in Southeast Asia.

The October 2015 site visit to the Mabilo property was undertaken after the resource drill program was complete. The site visit included the following activities:

- Meeting and discussions with key exploration personnel for project overview.
- Field inspection of the deposit area including field verification of drill-hole locations.
- Detailed assessment of drill core from 9 drill holes on several sections across the deposit, interpretation of lithostratigraphy, structure, alteration, mineralisation and oxidation, and review of the geological interpretation of the deposit.
- Detailed review and validation of drilling data.

In addition, the Intertek laboratory in Manila was visited on October 27, 2015. The sample handling area, sample preparation area, and analytical areas were examined and Intertek provided a presentation on sample handing and data flow and QAQC.

Three site visits were also undertaken by Dr Neal Reynolds between in 2013 and 2014. Resource drilling was underway during these visits when drilling, drill logging and sampling procedures were observed and validated.

Neither CSA Global nor any of its employees or associates involved in the preparation of this report has any beneficial interest in RTG or Mt Labo. CSA Global will be paid a fee for this work in accordance with normal professional consulting practice and payment of fees and expenses is in no way contingent upon the conclusions drawn in this report.

#### 2.4 Principal Sources of Information

This report is based on the following:

- Information provided by Mt Labo to CSA Global.
- Site visits made to Mabilo in October 2015 as well as three earlier visits in 2013 and 2014.
- Technical data and information provided by the current owner and operator of the property, Mt Labo, and discussions held with representatives of Mt Labo.
- Reviews of various publications and reports, both technical and commercial.
- Results of the MRE.

The information relates to recent exploration completed by Mt Labo.



## **3** Reliance on Other Experts

CSA Global has not reviewed the status of Mt Labo's tenure or joint venture agreements pertaining to the Property and has relied on information provided by Mt Labo and RTG with regard to the legal title to the mineral concessions. CSA Global's description of permitting and title is based on:

- Discussions with Johan Raadsma of Mt Labo during the site visit in October 2015 and prior discussions with Mt Labo and RTG management.
- Meeting with Attorney Bong of the Mt Labo Galeo JV during the site visit in October 2015 to present permitting status.
- Meeting with Mt Labo's lawyers, Pancho Umali and Aldwill Go of Cruz Marcelo & Tenefrancia in Manila on 3<sup>rd</sup> November.

Neither CSA Global, nor the author of this report, is qualified to provide comment on any legal issues associated with the Mabilo Project included in Section 4 of this report. Assessment and reporting of these aspects relies on information provided by Mt Labo and RTG, and has not been independently verified by CSA Global.

No warranty or guarantee, be it express or implied, is made by CSA Global or the Author with respect to the completeness or accuracy of the legal aspects of the Mabilo Project. Neither CSA Global nor the author accepts any responsibility or liability in any way whatsoever to any person or entity in respect to these parts of this document, or any errors in or omissions from it, whether arising from negligence or any other basis in law whatsoever.



## **4 Property Description and Location**

## 4.1 Location of Property

The Mabilo Property is located in the Republic of the Philippines at approximate longitude 122° 47′ 00″ E latitude 14° 07′ 00″ N and about 200 km east-southeast of the capital, Manila (Figure 1). The area of the property is approximately 3,318 ha. The Property is situated within Camarines Norte province in the Bicol Region in the southern part of Luzon Island.

The Property includes the Mabilo copper-gold-silver-magnetite skarn, discovered in late 2012 by Sierra as a result of drill testing ground magnetic anomalies, prior to the acquisition of Sierra by RTG.



Figure 1: Location map of the Mabilo Property.



## 4.2 Philippines Mining Law and Regulations

Mining and exploration tenure in the Philippines is governed by the 1995 Mining Act and its Implementing Rules and Regulations which are administered by the Department of Environment and Natural Resources ("DENR") and the Mines and Geosciences Bureau ("MGB") (MGB, 2013).

The main types of mining permits available under the Philippine Mining Act are:

- Exploration Permit ("EP");
- Mineral Agreement ("MA") which include Mineral Production Sharing Agreements ("MPSA"), Joint Venture Agreements ("JVA"), and Co-Production Agreements ("CPA");
- Financial or Technical Assistance Agreement ("FTAA"); and
- Mineral Processing Permit ("MPP").

Mineral tenements are only granted to "Qualified Persons". A legally registered foreignowned corporation is deemed a Qualified Person with respect to EPs, FTAAs and MPPs. Mineral Agreements are available only to Philippine citizens or corporations with at least 60% Philippine shareholding.

Exploration can be undertaken under an EP, MA or an FTAA. Mining can only be undertaken under a MPSA or an FTAA.

#### EΡ

An EP allows a Qualified Person to undertake exploration activities for mineral resources in certain areas open to mining in the country. EPs have a term of two years renewable for additional two year terms to a maximum of six years for metallic minerals. Mandatory area relinquishments of 25% after 2 years and 10% per year thereafter are applied.

The maximum area allowed for a corporation is 16,200 ha in any one province or 32,400 ha in the entire country.

The holder of an Exploration Permit may apply for a MA or a FTAA to conduct mining operations.

#### MA

Under a MA, the Government grants the holder the exclusive right to conduct exploration, development and mining of mineral resources within the contract area. The most common form of MA is a MPSA. An MPSA has a term of twenty-five years renewable for another twenty-five years under the same terms and conditions. The Government applies mandated taxes and royalties.

The maximum allowable area which can be held by a corporation under an MPSA is 8,100 ha in any one province or 16,200 ha in the entire country. The agreement provides for mandatory relinquishment such that the maximum final area shall not exceed 5,000 ha for metallic minerals.



A government moratorium on issue of MPSAs is currently in place under presidential Executive Order EO79. This reflected the view that the government share of projects exploited under an MPSA was too low and a push to raise their interest. Agreement has not been reached between Congress and the President and this issue will not be resolved before the presidential election in May 2016.

#### FTAA

A FTAA is an agreement for exploration, development and large scale mining of metallic minerals which allows 100% foreign equity in the project. An FTAA requires a minimum authorised capital of four million dollars (US\$4,000,000) and a capital investment of fifty million dollars (US\$50,000,000) for infrastructure and development in the contract area. The maximum area allowed is 81,000 ha and the maximum term is 25 years which can be renewed for another 25 years. Mandatory area relinquishments of 25% after 2 years and 10% per year thereafter are applied. A maximum final area of 5,000 ha for each mining area is allowed and no further relinquishments are required.

The following are the phase of mining operations of an FTAA:

- **Exploration** up to two years from date of FTAA execution, extendible for another two years;
- Pre-feasibility study if warranted up to two years from expiration of the exploration period;
- Feasibility study up to two years from the expiration of the exploration/prefeasibility study period or from declaration of mining project feasibility; and
- Development, construction and utilisation remaining years of FTAA.

#### MPP

A Mineral Processing Permit (MPP) is granted to a Qualified Person for mineral processing. This covers the milling, beneficiation, leaching, smelting, cyanidation, calcination or upgrading of ores, minerals, rocks, mill tailings, mine waste and/or other metallurgical by-products or by similar means to convert the same into marketable products.

The term of a Mineral Processing Permit is for a period of five years from date of issuance and renewable for similar periods but must not to exceed a total term of twenty-five (25) years.

#### 4.3 Mineral Tenure

The Mabilo Property consists of Exploration Permit EP-014-2013-V, Exploration Permit Application EXPA-000188-V, and Exploration Permit Application EXPA-000209-V. These are shown in Figure 2, and details listed in Table 2. All exploration and drilling activity by Mt Labo has been conducted within EP-014-2013-V, which was granted in July 2013 for two years with the option to renew for an additional four years (Table 1).

Mt Labo, on behalf of the Joint Venture, applied for renewal of the licence in July 2015 and the MGB has confimed that all statutory obligations for this renewal have been met. However the renewal has not yet been finalised by the MGB in Manila. CSA Global understands that



the four year renewal period will run from the date that the renewal is approved, not from the second anniversary of the original permit.

#### **Table 2: Mt Labo Mabilo Project Tenements**

Licence Name	Area (ha)	Grant Date	Term
Exploration Permit EP-014-2013-V	497.7212	Jul-13	2 years, option to renew for a further 4 years, renewal pending
Exploration Permit Application EXPA- 000188-V	2,737.5013	Application	
Exploration Permit Application EXPA- 000209-V	497.6894	Application	



Figure 2: Map showing the Mabilo Tenements.



To the south, the licence area is limited by blocks that contain the boundary of a Watershed Forestry Reserve. EP's are issued on a graticular basis and blocks which impinge on the forest reserve are not available for license application.

The licence and applications are held by Mt Labo in which RTG has an economic interest. Mt. Labo has entered into a Joint Venture Agreement with Galeo Equipment and Mining Company Inc. ("Galeo") under which Galeo has earned a 36% interest in the joint venture, which covers the Mt Labo tenements down to 200 m below the surface, by contributing US\$4,250,000 of exploration drilling and management services to the joint venture over a two year period. The "drilling for equity" component of the joint venture agreement represented 8,919 m of diamond core drilling.

In November 2013, a Memorandum of Understanding was entered into detailing proposed changes to the joint venture agreement (Sierra, 2013c) under which Galeo has earned 36% of the Mt Labo projects below 200 m by drilling an additional 5,000 m of diamond core (Sierra, 2013d).

Galeo and Mt Labo have signed an additional Memorandum of Understanding whereby Galeo can earn an additional 6% of the Property by mining the first 1.5 Mt of pre-strip material.

CSA Global understands that the first memorandum which grants Galeo 36% of both the surface and the deeps has been approved by shareholders. The second memorandum regarding the additional 6% still has a number of outstanding conditions.

The exploration licence gives the right to explore for sub-surface minerals. The surface rights remain with the landowners. Access rights need to be obtained from the landowners by negotiation. Some land-owners have blocked access for drilling in the past. The joint venture partners have embarked on a programme of land purchases in the Property.

Mt Labo's preferred option for a mining licence at Mabilo is an MPSA. In September 2014, Mt Labo applied for an MPSA related to a 5 Mt, 0.5 Mtpa direct shipping oxide and supergene operation. The key steps for approval of an MPSA are submission of an Environmental Impact Assessment ("EIA"), submission of a feasibility study, acceptance of the EIA as an Environmental Clearance Certificate, and acceptance of the feasibility study via a Declaration of Mining Project Feasibility ("DMPF"). Mt Labo's application undergoes its first ECC review in November 2015.

Mt Labo reports that there are no native titles or indigenous ancestral claims at Mabilo (Sierra, 2013d).

## 4.4 Royalties

There is a royalty of 1% of net mining revenue payable by Mt Labo to Mining Consultants Limited on any mining production from EP-014-2013-V under the terms of the 2011 Mabilo Royalty Agreement.



Under an MPSA production licence, a State Royalty is payable as 2% of Net Smelter Return ("NSR"). There is currently a moratorium on issue of MPSAs related to a push to raise the government's share of revenue.

## 4.5 Environmental Permits

Additional permits that must be acquired for mining include an Environmental Compliance Certificate and Mt Labo must also submit an Environmental Protection and Enhancement Program.

#### 4.6 Additional Permits

Apart from renewal of the EP, all permits are stated by Mt Labo to be in good standing and no additional permits are known to be required for the exploration programme of work proposed on the Property.



# 5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

## 5.1 Accessibility

The Property is readily accessed from Manila, the capital of the Philippines, by road and air. Road access from Manila is by 330 km on the Maharlika Highway to the Municipality of Labo, then by 9 km of sealed road to Tulay Na Lupa, followed by 3 km of partly surfaced road to the project site. The drive from Manila takes about 6 hours.

The Property is generally accessed by domestic flight from Manila to Naga, the capital of Camarines Sur province, taking about one hour, followed by a two hour drive north to Daet, the capital of Camarines Norte. Mt Labo maintains its project office and core handling and storage facility at Daet. The Mabilo deposit is about 30 km (40 minutes' drive) west of Daet, mainly on surfaced roads (Figure 1).

Access around the Property area is on unsealed roads. Drill access can readily be created through the coconut plantations (Figure 3).



Figure 3: Unsealed road in the Mabilo Property area.



## 5.2 Climate and Physiography

Camarines Norte is located in the northwest of the Philippine archipelago and experiences a tropical climate, with annual rainfall of over 3,000 mm, falling throughout the year but with a distinct wet period from October to January and a dry period from April to June. Temperature maxima and minima vary little through the year, from 28 to 32° Centigrade and from 23 to 26° Centigrade respectively. The area is within the typhoon belt of the Philippines and is at risk, especially from June to October. Excepting this risk, it is possible to work on the Property throughout the year.

The terrain in the Property area is low lying to slightly undulating. It is transected by several north-flowing streams that are moderately to deeply incised (up to 20 m) into the soft Quaternary tuffs. The elevation ranges from 105 m to 127 m. The drainage arises approximately 15 km to the south on the steep slopes of the Mount Labo stratovolcano.

The Property area is mostly covered by coconut palm plantations with areas of pineapple cultivation (Figure 4). Regenerating rainforest trees and shrubs grow along the larger watercourses and on the steeply incised slopes.



Figure 4: A clearing close to the creek in the main Mabilo prospect area with coconut plantation in the background and pineapples in the foreground.

## 5.3 Local Resources and Infrastructure

The Paracale district has a significant history of mining, mainly for gold, but also iron at the old Larap mine and other smaller iron mines.



#### 5.3.1 Population

Labo municipality, which covers the licence area, has a population of 92,000 and a population density of 160 per square km. The licence covers a rural area. The economy is based on agriculture, especially coconuts and pineapples.

#### 5.3.2 Infrastructure

Road infrastructure is reasonably well developed in the coastal area. The International Port of Jose Panganiban is 35 km northwest of Daet and close to the old Larap mine (Figure 1).

The National Transmission Company ("TRANSCO"), through the Camarines Norte Electric Cooperative (CANORECO) which is supervised by the National Electrification Administration (NEA) provides the power and energy requirements of the province. It has an installed capacity of 17.5 MVA (megavolt ampere). There is a 66 kVA (kilovolt ampere) main grid line 10 km from the Property. Grid power is established along district roads including the road which passes by Napa'od adjacent to the project site.

There is mobile /cell phone coverage throughout the project area and internet access at village of Tulay Na Lupa, 3 km south of Napa'od.



## 6 History

## 6.1 Philippines Mining

The Philippines has a long history of mining and at various times has ranked among the world's top ten producers in gold, copper, chromite, and nickel. In the 1970's, during the Marcos dictatorship, it was the world's fourth largest exporter of minerals. When the Marcos regime was overthrown in 1986, there was only one foreign company actively exploring in the country. The legacy of the 1960-70's boom includes a significant indigenous mining industry and culture and a large pool of skilled mining professionals.

Despite the high mineral endowment, rejuvenation of the Philippines mining industry has been held back by operational and investment criteria. The 1995 Mining Act improved the situation and a number of projects have been developed by foreign investors since then.

## 6.2 Paracale Mining District

The Paracale Mining District is one of the largest historical gold producing regions in the Philippines, with gold production dating to the 12<sup>th</sup> century, predominantly from narrow quartz-sulphide veins. Gold was mainly worked from veins in the margins of the Paracale Granodiorite to the northeast of Mabilo.

The sedimentary belt to the southwest of the granodiorite is termed the base metal or 'iron belt' and includes a number of historical iron mines based on magnetite skarns. Most of these are small (and none of these historical deposits are in Mt Labo's tenements), however the Larap mine is estimated to have produced approximately 20 Mt of iron ore from seven different magnetite bodies between 1918 and 1975. In 1971 the mine was said to contain approximately 49 Mt at 25.7% Fe (Sajona, 2013). This is a historic mineral reserve estimate and is not classified under CIM guidelines; the QP has not done sufficient work to classify the historical estimate as a current resource estimate and is not treating the historical estimate as a current resource estimate. The mineralisation is anomalous in copper, gold, and molybdenum as well as uranium and cobalt (Frost, 1965), although none of these were produced as commercial by-products.

Page (2002) reported that the magnetite skarn overlies a sulphide-rich skarn and quoted a historic resource of 17 Mt at 0.4 g/t Au, 0.09% Mo and 0.3 g/t Ag, and minor uranium, tungsten and bismuth. This is a historic mineral resource estimate and is not classified under CIM guidelines; the QP has not done sufficient work to classify the historical estimate as a current resource estimate and is not treating the historical estimate as a current resource estimate.

Sub-economic porphyry Cu mineralisation is also reported in the belt at Matanlang which has a reported historical resource of 65 Mt at 0.3% Cu, 0.4 g/t Au and 0.05% Mo (UNDP, 1992). This is a historic mineral resource estimate and is not classified under CIM guidelines. The QP has not done sufficient work to classify the historical estimate as a current resource estimate. The QP is not treating the historical estimate as a current resource estimate.



Mabilo lies south of the main Paracale 'iron belt', though in a similar geological setting, and includes similar magnetite skarns that have been worked historically on a small scale.

A number of other magnetite skarn occurrences have been worked historically in the area north of the Mabilo project. Iron mined by artisanal miners at Mayaman in the 1960's was described as gossanous massive pyrite (Page, 2002). Gold Fields Philippines Corporation ("GFPC") drilled six diamond drill holes in the late 1980's which returned anomalous gold and copper values in gossan and massive sulphide associated with skarn (Delfin and Tauli, 1990). The Mayaman prospect was subsequently explored by Indophil Resources. A soil sampling program defined a coincident gold and copper anomaly and follow up trenching produced wide zones of low grade (<1 g/t) gold along strike from the GFPC drilling (Page, 2002).

Two small artisanal mining operations, Binit and B1 are located about 2 km north of the Mabilo licence adjacent to an outcropping diorite intrusion.

## 6.3 Mabilo Property Historical Ownership

GFPC registered six mineral claims over Mabilo in 1987, covering the same area as the current exploration licence. GFPC was a subsidiary of Gold Fields Asia Ltd (GFAL), itself a subsidiary of Australian mining company, Renison Goldfields Consolidated Ltd. GFPC was developing the nearby Nalesbitan mine at the time.

From July 8, 1991, the six mineral claims were the subject of an application (APSA-V-001) for a MPSA for the exploration, utilisation and development of gold, copper, silver and other minerals.

In 1995, GFPC was acquired by Triarx Gold Corporation and the company name was changed to Eldore Mining Corporation ("Eldore"). In 2011, 64% of Eldore was acquired by Sierra and the company name was changed to Mt Labo Exploration and Development Corporation ("Mt Labo"). Mt Labo replaced the MPSA application with an EP application which was granted as EP-014-2013-V in July 2013.

#### 6.4 Mabilo Property Historical Exploration

Since the early 1960's, the Mabilo Property area has been explored for copper, gold and iron:

**1963-1965** – Venida, which lies within the Mabilo licence, was exploited by local artisanal miners under the management of Mr Marcus Pimental. Miners mined for iron boulders on a small scale, with estimated production of 3,000 tonnes (Fernandez, 1965).

**1965** – The Bureau of Mines conducted geological and magnetic surveys around Venida and defined an anomaly west of the old pit (Fernandez, 1965).

**1970's** –The area was prospected for iron by Mitsui Mining and Industrial Corporation (Samonte, 1975), but no records are available for this work.



**1985** – GFAL initially visited the area and collected two rock samples. These two samples returned gold assay values of 2 g/t and 6 g/t confirming the presence of gold. GFPC then continued its claims of the area (Delfin and Tauli, 1990).

**1987-1995** – Between 1987 and 1988 GFPC registered six claims in the area. GFPC conducted geochemical surveys, pitting and trenching, and a ground magnetic survey centred on the Venida pit (Delfin and Tauli, 1990). GFPC subsequently drilled 10 diamond drill holes (totalling 892.75 m) at Venida pit and reported a historical resource estimate of 430,000 tonnes at 2 g/t Au, 22 g/t Ag and 0.5 % Cu. This is a historic mineral resource estimate and is not classified under CIM guidelines.

**2007** – Eldore conducted an extensive ground magnetic survey in the area, which identified significant anomalism interpreted to represent magnetite. Seven targets were identified but not drilled.

**2012** – Venida has recently been mined on a small scale by local artisanal syndicates. CSA Global understands that this was within a small-scale mining licence issued by the provincial governor within the APSA area. Mining has now ceased and the open pit is estimated to be 150 m by 100 m in extent and up to 40 m deep. CSA Global understands that a direct-shipping ore was mined for its content of iron, copper, and gold. No production records are available. CSA Global understands that the small-scale mining licence has now expired.

## 6.5 Historic Resource Estimate

GFPC reported a historical resource of 430,000 tonnes at 2 g/t Au, 22 g/t Ag and 0.5 % Cu based on 10 diamond drill holes totalling 892.75 m at the Venida pit (Delfin and Tauli, 1990). This is a historic resource estimate and is not classified under CIM guidelines. The inputs and assumptions used for this estimate are not known. The QP has not done sufficient work to classify the historical estimate as a current resource estimate and is not treating the historical estimate as a current resource estimate and is not treating the historical estimate.

Recent undocumented small-scale mining activities at Venida will have depleted this mineralisation by an uncertain amount. RTG is not treating this historical estimate as current mineral resource or reserve and it is solely documented here for completeness. A new drilling programme will be required at Venida to determine what mineralisation remains and to explore for extensions.

## 6.6 Production from the Property

Approximately 3,000 tonnes of iron ore of unknown grade is reported to have been mined at Venida between 1963 and 1965 (Fernandez, 1965). Magnetite has been mined intermittently by small scale miners since then and, more recently, in a more systematic way by a Chinese-backed syndicate. CSA Global understands that a direct-shipping ore was mined for its content of iron, copper, and gold.



# 7 Geological Setting and Mineralisation

## 7.1 Regional Geology and Metallogeny

The geology and metallogeny of the Philippine archipelago has been described in previous reports (Green et al., 2014; Reynolds, 2013) and is not repeated in detail here. The geology of the Philippines comprises a complex sequence of juxtaposed and superimposed island arcs formed by multiple episodes of subduction, arc-magmatism, ocean basin closure, collision, ophiolite accretion and lateral translation of terranes through regional strike slip faulting, notably the 1,500 km long sinistral strike slip Philippine Fault System ("PFS").

Gold mineralisation in the Philippines occurs predominantly within deposits of porphyry copper-gold and epithermal gold (-silver) style. Late Miocene-Pliocene collision between the Philippine mobile belt and continental crustal blocks from Eurasia, which led to stalling of eastward subduction and initiation of westward subduction, immediately preceded the major Pliocene mineralisation event.

The main Pliocene porphyry copper and epithermal gold districts lie close to the PFS, associated with secondary structures (Quebral et al., 1996). Deposits tend to be clustered in discrete highly mineralised districts such as Bagio and Mankayan in Luzon and Surigao and Masara in East Mindanao. Skarn gold and copper-gold deposits and carbonate-replacement gold deposits are also commonly associated with porphyry systems. In the Philippines, the majority of known low-sulphidation deposits are also spatially associated with porphyry districts if not directly associated with individual porphyry copper-gold systems.

## 7.2 Paracale District Geology and Metallogeny

In the northeast of the Paracale district, a belt of obducted Cretaceous ultramafic rocks (serpentinite and talc schist) and Palaeogene andesitic volcanic, volcaniclastic, marine siliciclastic and carbonate rocks represents basement to the Pacific Cordillera arc (Garwin et al., 2005; Pena, 2008). The Paracale Granodiorite (trondhjemite) intrudes the Cretaceous ultramafic basement and has been interpreted either as part of the allochthonous block of Cretaceous ophiolite or as a Miocene intrusion emplaced into the accreted ultramafic basement.

Pre-Pliocene arc magmatism and sedimentary stratigraphy is related to eastward subduction on the Luzon trench which was followed by Miocene collision, ophiolite obduction, and initiation of westward subduction. The stratigraphy is cut by a series of northwest-trending thrust faults probably related to collisional events.

The ophiolite basement is unconformably overlain by Eocene sediments of the Tumbaga (formerly Universal Formation) and Bosignon formations, forming an extensive arcuate northwest-trending sedimentary belt south of the ophiolite terrain. The Tumbaga Formation comprises a sequence of silty, tuffaceous, carbonaceous and calcareous shales intercalated



with beds of conglomerate, wackes, arkose, marl and limestone, deposited in a shallow nearshore coastal environment. The upper part of the formation consists of limestone, marl and thin to medium bedded, green to black shale.



# Figure 5: Philippine magmatic arc belts showing important gold and copper districts, amended from Garwin et al. (2005).

The Tumbaga and Bosignon formations are conformably overlain by the Oligocene Larap Volcanics, a sequence of altered fragmental andesite, andesitic flow breccias and tuffs.



Multiple intrusions of the late Miocene Tamisan Diorite suite (also referred to as the Tabas Diorite) (Figure 6) were emplaced in the sedimentary belt, primarily within the Tumbaga Formation. Pliocene dacitic porphyries are also noted in various company reports.

To the south, the older formations and intrusions are unconformably overlain by Pliocene andesitic pyroclastics and tuffs of the Macogon Formation and dacitic lava, tuff and pyroclastics of the Susungdalaga Volcanics. Significant uplift during the Pliocene is indicated by raised beaches and conglomerate beds containing clasts of the Paracale granodiorite.

All of the aforementioned units are covered by southeast-thickening lahar and tuff deposits of the Pleistocene to Recent Labo Volcanic Complex.



Figure 6: Summary geology and mineral occurrences in the Paracale district.

## 7.3 Paracale District Mineralisation

The Paracale Mining District is one of the most significant historical gold producing regions in the Philippines with gold production dating back to the 12<sup>th</sup> century, predominantly from narrow quartz-sulphide veins. Total gold production largest including alluvial gold is estimated



to have been 5 million ounces. Gold was mostly mined from NNE-trending epithermal veins within and cross-cutting the margins of the Paracale Granodiorite (Figure 7), interpreted to be related to later Pliocene magmatic activity.



Figure 7: Local geology of the Mabilo Property area (from Sierra 2013a).

The Tumbaga Formation hosts a number of magnetite skarns and base metal occurrences defining the base metal and iron belt. The Larap mine produced approximately 20 Mt of iron ore from seven different magnetite bodies between 1918 and 1975. In 1971 the reserves were said to be approximately 49 Mt at 25.7% Fe (Sajona, 2013; this is a historic mineral resource estimate and is not classified under CIM guidelines). The mineralisation is anomalous in copper, gold, molybdenum, cobalt and uranium although these have not been produced as by-products. The causative intrusion for the Larap skarn has not been identified but is interpreted to underlie the deposit.

There are other smaller iron skarn prospects and occurrences throughout the belt associated with variable but generally low grades of copper, gold, silver, molybdenum, arsenic, bismuth, tungsten, cobalt and uranium. Some are associated with diorite bodies and andesitic to dacitic porphyries. Skarn mineralisation at Paracale is reported to be of Early Miocene age (20.5 Ma) by Garwin et al (2005).



Mabilo lies about 20 km southeast of Larap in a separate northwest-trending belt of Tumbaga Formation and appears to be of the same style and association, although with higher grades of copper and gold.

Low-grade porphyry copper mineralisation is also reported in the same belt of Tumbaga Formation. The best documented porphyry copper deposit is Matanlang which has a reported resource of 65 Mt at 0.35% Cu, 0.4 g/t Au and 0.05% Mo (UNDP, 1992; this is a historic mineral resource estimate and is not classified under CIM guidelines).

## 7.4 Mabilo Property Geology

Quaternary lahar and tuff deposits of the Labo Volcanics cover the southern and eastern twothirds of the Mabilo exploration licence, thickening southward from Venida. In the deposit area, the Labo Volcanics vary from about 30 m to 50 m in thickness, reflecting both palaeotopography and stratigraphic thickness. As a result of the poor exposure, younger volcanic cover, and limited drilling, the geology of the older rocks in the licence area is not well constrained.

Beneath the Labo volcanic unconformity, Tumbaga Formation sediments and volcanic sediments are intruded by a quartz diorite stock. The sediments include variably calcareous siltstones, volcanogenic sandstone and wacke, clean limestone, and silty limestone. The quartz diorite intrusion that has been drilled under cover at Mabilo is probably equivalent to the diorite intrusion mapped immediately north of the licence which is assigned to the late Miocene Tamisan Diorite suite. The sedimentary lithologies are hornfelsed and metasomatically altered in the contact zone of the intrusion (Figure 10 and Figure 8). The extensive hornfels and the irregular extent of the diorite are suggestive of a roof zone of a mid-level intrusion (Figure 9).

In the area of the resource, the bedrock geology dips moderately to steeply to the southwest (typically 50-60 degrees). A robust lithostratigraphy has not been defined and original rock-types can be obscured by alteration and mineralisation overprint. However, the main magnetite skarn is interpreted to replace a massive clean limestone unit that has been metamorphosed to marble in the contact aureole of the quartz diorite. The thickness of the unit is variable, from 15-20 m in the southern part of the SMZ and up to 50-80 m in the NMZ. This is interpreted to reflect primary sedimentary thickness variation and lateral facies variation. The overlying stratigraphy includes variably calcareous siltstone and mudstone, minor argillaceous limestone replaced by skarn, and subordinate volcaniclastic wacke horizons. The underlying stratigraphy includes similar calcareous siltstone and mudstone with limestone units (or skarn), notably a cherty limestone in the north, all underlain by a thick volcanic sandstone.

The clastic sediments have been metamorphosed to biotite hornfels and the calcareous and dolomitic siltstone and mudstone have been metamorphosed to calc-silicate or magnesian silicate hornfels in the contact aureole of the quartz diorite.

The mineralised bodies occur on the eastern contact of the quartz diorite stock that has been intersected in several drill holes. The magnetic data suggest that the stock is at least 1 km in diameter and forms the magnetic low with the north magnetic anomaly, southeast magnetic



anomaly, and NMZ and SMZ at its margins. Where drilled, the quartz diorite is relatively unaltered with hornblende partly altered to chlorite and weak feldspar retrogressive alteration. On the northeast margin of the SMZ, strongly altered porphyritic intrusive rock has been intersected in drilling. The have been interpreted as dykes in the contact zone of the main stock.

The SMZ and NMZ are cut by a significant northwest-trending northeast dipping normal fault with a throw of not more than 10 m. The NMZ is interpreted to be fault-offset from the SMZ along a later northeast-trending, probably steeply dipping, dextral fault. The Venida skarn body probably represents a further fault offset along a similar northeast-trending fault.



Figure 8: Quartz diorite with late quartz-feldspar veins and minor sericitic alteration around later thin quartz veins. MDH-24, 57 m.

## 7.5 Mabilo Area Alteration and Mineralisation

A number of magnetite skarn occurrences are known within the Tumbaga Formation north of the Mabilo block and north of the Labo Volcanic cover, including Binit, B1 and Mayaman. These are located close to the contact of mapped diorite intrusions. Binit is developed in weathered argillic-altered siltstone with abundant hematite veins and malachite staining. Garnet and wollastonite skarn rocks have been reported (JICA, 2002) but the mineralisation that is currently being mined by artisanal miners is hosted by quartz veins and hematite filled fault zones. The B1 mine is developed in strong hematite and manganese-altered breccia near the diorite margin. Samples from both are reported to be anomalous in Au, Cu, Ag, As, Fe and Mn (Sierra Mining, unpublished data).

The Venida artisanal mine is within the Mabilo Property. Magnetite mineralisation with significant associated copper-gold-silver occurs in a garnet-magnetite skarn zone. The garnet-magnetite zone grades through garnet skarn to wollastonite skarn developed in hornfelsed andesite, both of which are anomalous in copper and gold.

The Mabilo discovery was made 500 m south of Venida under cover of the Labo volcanics. Drilling targeting a magnetic anomaly intersected thick magnetite skarn with associated copper and gold mineralisation in what was initially termed the 'North Body' and 'South Body' but now referred to as the North and South Mineralised Zones ("NMZ" and "SMZ") to recognise that they are faulted offsets of the a larger continual mineralised system rather than discrete bodies. The SMZ is the larger of the zones and is located 150 m to the south of the NMZ, offset across a dextral transcurrent fault.





Figure 9: Local geology and magnetite skarn occurrences (red diamonds) in the Mabilo licence area (figure provided by Sierra).


Mineralised magnetite skarn and massive garnet skarn preferentially replaced a cleaner limestone or marble horizon within the stratigraphic sequence (Figure 10). Drilling indicates that the main mineralised skarn zone dips to the southwest at 50 to 60 degrees in both the SMZ and NMZ. The NMZ was previously interpreted to be shallow dipping or north dipping, but additional drilling shows that when the skarn, marble, and breccias in marble are treated as single unit, it dips southwest. Where not eroded, the drilled mineralised zone is estimated to have a true thickness from 20 m in the south of the SMZ to over 80 m within a thicker marble/limestone unit in the SMZ.



Figure 10: Massive magnetite skarn in sharp interfingering down-dip contact with white marble after limestone. MDH-46, 280 m.

The main magnetite zone mineralisation typically comprises massive magnetite intergrown with minor retrograde-altered calc-silicate minerals (mainly garnet with subordinate wollastonite and pyroxene), chalcopyrite and late interstitial calcite (Figure 11, Figure 12). Copper and gold grades are closely correlated and commonly reach 5% Cu and 5 g/t Au in hypogene mineralisation. The copper-gold grade of magnetite skarn is variable but averages about 1.7% Cu and 1.9 g/t Au with 7 g/t Ag and 40% Fe. In the deep southeast part of the SMZ, hypogene bornite in magnetite skarn is associated with high copper and gold grades (up to 3-8% Cu and 3-24 g/t Au).

There are indications of zonation within the skarn in time and space, with probably early barren magnetite, strongly mineralised magnetite showing equilibrium textures with



chalcopyrite, and later barren magnetite. Typically magnetite skarn is in direct replacive contact with marble at the down-dip contact of the skarn zone without any zonation (Figure 10). Locally however, magnetite skarn grades down-dip into garnet skarn. More typically, garnet skarn occurs stratigraphically above or below magnetite skarn and shows zonation from red to green garnet, with variable copper-gold mineralisation which can be of significant grade. In the SMZ, a separate mineralised garnet skarn horizon occurs in the stratigraphic hangingwall of the main magnetite skarn.

Pyroxene and wollastonite skarn may locally form an outermost zonation from garnet skarn but most pyroxene skarn occurs in calcareous hornfelsed mudstone and siltstone as replacement and veins with minor garnet (Figure 15).

Mineralisation is variably developed within calc-silicate skarn rocks. Garnet-skarn hosts economically significant copper-gold grades where chalcopyrite occurs intergrown with calc-silicates (Figure 13), pyroxene skarn is generally less mineralised but both garnet and pyroxene skarn are locally cut by later veins with chalcopyrite and minor molybdenite. Similar veins occur within altered porphyry.



Figure 11: Crudely banded massive magnetite skarn with remnant calc-silicate band on left. High-grade magnetite-chalcopyrite mineralisation on right cuts earlier banded magnetite-chalcopyrite-calc-silicate with interstitial calcite in centre. MDH-016, 139.5 m.



Figure 12. High-grade chalcopyrite in magnetite skarn, MDH-60, 212m.





Figure 13: Garnet (gt) skarn with high-grade chalcopyrite (cpy) mineralisation and no magnetite. MDH-95, 122m.



Figure 14: Massive garnet skarn strongly retrogressed to epidote, sericite and chlorite. MDH-09, 121 m. HQ core, 63mm diameter.

All prograde skarn alteration and mineralisation has been overprinted by retrograde alteration which is generally strong (Figure 14, Figure 15). Retrograde alteration phases in skarn include iron carbonate, clinozoisite, epidote, and chlorite.

The most intense retrograde event is a widespread and locally intense overprint of the skarn by quartz-pyrite-arsenopyrite veining and brecciation associated with illitic clay alteration (Figure 16). In MDH-13 in the north of the SMZ, a thick zone of silicified breccia with pyrite and arsenopyrite underlies the skarn and includes clasts with colloform epithermal textures and leached vuggy silica alteration, suggestive of an acid-leaching high-sulphidation alteration style (Figure 17). This suggests telescoping of a higher-level high-sulphidation alteration system onto the skarn.





Figure 15: Hornfels after siltstone and calcareous siltstone overprinted by strongly retrogressed calc-silicate (pyroxene) skarn with zones of strong oxidation. MDH-35, 183m.



Figure 16: Magnetite skarn with strong retrograde pyrite overprint. MDH-107, 107m.



Figure 17: Vuggy silica-pyrite altered breccia with arsenopyrite. MDH-13, 128.6 m.



The pyrite-quartz-clay veining and brecciation is probably structurally controlled and also is focused in the contact zones of magnetite skarn. The thick rubble breccia bodies are not structural however and are interpret results from hydraulic brecciation and dissolution of marble/limestone.

The retrograde event may be associated with bornite replacement of magnetite which generates higher grade copper mineralisation (Figure 18).



Figure 18: High-grade bornite associated with pyrite overprint of magnetite skarn. MDH-66, 79m.

The upper part of the skarn and host rock sequence is strongly oxidised with associated supergene alteration of the mineralisation (Figure 19). This weathering is interpreted to underlie and pre-date the Labo volcanic unconformity. The oxidised zone may be 20 m to 30 m thick, but the oxidation front is not sharp and weathered zones may occur significantly beneath this front.

The magnetite skarn is generally less oxidised than its host rocks and appears, where massive, to have acted as a resistive body to weathering. Oxidation and supergene alteration of skarn mineralisation includes replacement of magnetite by hematite, replacement of chalcopyrite by bornite, covellite and chalcocite, including high-grade supergene-enriched zones of sooty chalcocite. Small amounts of native copper are widely distributed in the oxidised zone with minor malachite. Localised supergene enrichment of copper occurs as high-grade chalcocite at the base of the oxidised zone.





Figure 19: Oxidised hematitic mineralisation after massive magnetite skarn with intervals of deeply weathered calc-silicate hornfels or skarn. 63 mm HQ core, MDH-01.



# 8 Deposit Types

The Mabilo Property hosts mineralisation of copper-gold-magnetite skarn type. Skarn describes a rock dominated by calc-silicate or calcium-magnesium silicate minerals formed by metasomatic replacement of carbonate-bearing rocks rich in calcium and magnesium. Skarn forms as a result of interaction of carbonate-bearing host rock with hydrothermal fluids derived from an igneous intrusion (Figure 20).

Skarns can host a wide variety of metallic deposits, including iron, gold, copper, molybdenum, tungsten, tin, zinc, and lead (Meinert et al., 2005). The metal endowment of a deposit relates to the chemistry and magmatic evolution of the causative intrusion, and to a lesser extent the nature of the host rocks.



Figure 20: Cartoon representation of deposit types formed around intrusive/volcanic centres in an arc setting. Note that although copper-gold skarns commonly form peripherally to mineralised porphyry centres, not all copper-gold skarns form with this association. From Kirkham and Sinclair (1995).

Copper-gold-magnetite skarn deposits are a relatively common type of skarn deposit, typically associated with mid-level intermediate calc-alkaline intrusions cutting carbonate rocks in magmatic arcs. Copper-gold-magnetite skarn deposits are commonly associated with mineralised copper-gold porphyry systems; the largest example is the Ertsberg and other skarn deposits associated with the Grasberg porphyry deposit in the Papua province of



Indonesia. However, skarn deposits may also be associated with porphyries that do not host economic porphyry-style mineralisation and with deeper level intrusions.

Skarn copper-gold-magnetite is considered to be the primary target at the Mabilo Property. While the occurrence of copper-gold-magnetite skarn may suggest some potential for porphyry copper-gold mineralisation, no indication of this type of mineralisation has been encountered and no porphyritic intrusions have been identified. There may also be potential for epithermal gold mineralisation, but this is also a secondary target; pyrite-quartz overprint of the known skarn is of epithermal style, but is not known to be gold-mineralised.



# 9 Exploration

# 9.1 Previous Exploration

The only significant previous exploration on the Property was by GFPC in 1988-89. GFPC conducted regional stream sediment sampling, base of soil profile sampling on 50 m intervals, channel sampling of pits and trenches, and a ground magnetic survey over an 800 m by 300 m area centred on and including the Venida pit (Delfin and Tauli, 1990).

GFPC subsequently drilled 10 diamond drill holes (totalling 892.75 m) in the garnet-magnetite skarn surrounding the magnetite zones previously mined in the Venida pit. A number of gold-silver-copper mineralised intersections were reported. GFPC concluded that their drill pattern had not closed off the southern extension of the shallowly dipping deposit and recommended that at least two further holes be completed, but these were not drilled. Detailed information regarding drilling at Venida is not available.

In 1995, GFPC was acquired by Triarx Gold Corporation and the company name was changed to Eldore Mining Corporation ("Eldore"). Eldore conducted an extensive ground magnetic survey in the area in 2007 (Figure 21). The survey was initially conducted on 100 m spaced east-west lines and then infilled on 50 m spaced lines over a section of a large magnetic anomaly located to the south of Venida.

The survey used company staff and equipment hired from Alpha Geoscience in New South Wales, Australia. Modelling and drill targeting was completed by Dr Clive Foss of Encom Technology ("Encom"), in Sydney, Australia (Maude, 2012). Encom noted that the magnetic susceptibilities in the area to the south of Venida were extremely high and that the strong anomalous "lows" (indicating highly magnetic rocks) were indicating magnetite mineralisation. Encom modelled seven target bodies interpreted as the sources for the magnetic anomalies but Eldore did not drill the targets.

Sierra acquired its interest in Eldore and changed its name to Mt Labo Exploration and Development Corporation in November 2011, and commenced a drill programme in 2012. Mt Labo has used models of the magnetic data as the primary tool for drill targeting and this has resulted in the successful intersection of the NMZ and SMZ. The first drilling program (MDH-01 to 12) targeted anomalies A, B, D, F and G from the Eldore magnetic survey and Encom modelling.

This resulted in initial discovery of the NMZ and SMZ, but drill holes on anomalies F and G failed to intersect magnetite skarn mineralisation. Mt Labo contracted Southern Geoscience Consultants ("SGC") to assess and re-process the ground magnetic data in 2012. SGC used 3D inversions but primarily relied on 2D sectional models utilising Potent software (Maude, 2012). SGC reported that this was necessary as the extreme magnetic contrasts in the data compromise the accuracy of 3D inversions. The SGC models were significantly different from the previous Encom models.





Figure 21: Modelled magnetic anomalies from Eldore in 2007. The data was subsequently remodelled by SGC which suggested anomalies B and D were continuous and downgraded C, E, F and G.



SGC also recognised significant QAQC problems and quality issues with the previous magnetic survey. Data re-acquisition was recommended over three priority areas to better constrain magnetic models and targets (Maude, 2012). New surveys were conducted in 2013 by Mt Labo under the supervision of SGC. Line spacing was 50 m with 25 m lines over areas considered to be more prospective (SGC's Areas 1 to 3).



Figure 22: RTP image of ground magnetic data for the Mabilo property showing the 2D magnetic models and drilling.

SGC completed Potent 2.5D modelling of the new data on multiple profiles and orientations and incorporating magnetic susceptibility data from the drilling that had been completed. Three bodies were modelled in the area of the earlier Encom models, the NMZ about 90 x 95



m and 45 m thick, the SMZ A about  $90 \times 110$  m and 50 m thick, and the SMZ B about  $200 \times 300$  m and 40 m thick. Drilling has now indicated that the SMZ A and SMZ B are continuous, and termed the SMZ. SGC also modelled two other anomalies termed the SE Anomaly and the NE Anomaly (Figure 23).



# Figure 23: Local RTP magnetic image of the Mabilo deposit showing the magnetic models and drilling.

Drilling to date suggests that the magnetic models provide a good representation of magnetite mineralisation in the NMZ and SMZ. The NE magnetic anomaly has been determined to be the result of diorite intrusives. Limited drilling at the SE anomaly has intersected significant magnetite skarn with low order Cu and Au values. Further drilling is required to adequately evaluate this anomaly.



# 10 Drilling

#### 10.1 Mabilo Drill Programmes

All drilling at the Mabilo prospect has been conducted by Mt Labo and was completed in two phases. Both phases have exclusively utilised diamond core drilling. All of the Mabilo prospect holes as used in the MRE are tabulated in Table 3, and shown in Figure 24.

-						
Hole ID	East	North	RL	Dip	Azimuth	Depth (m)
MDH-001	476065	1559983	108	-90	-	145.4
MDH-002	476313	1559726	127	-90	-	161.1
MDH-003	476550	1559897	122	-90	-	124.6
MDH-004	476165	1559876	120	-90	-	181.9
MDH-005	476105	1560272	105	-90	-	129.8
MDH-006	476116	1559996	107	-90	-	102.8
MDH-007	476077	1560033	106	-49.9	181.75	136
MDH-008	476077	1560034	106	-90	-	113.4
MDH-009	476107	1559958	108	-49.48	274.6	143.7
MDH-010	476106	1560265	106	-59.5	176.75	123.4
MDH-011	476105	1560278	105	-58.95	0.95	170
MDH-012	476154	1560263	107	-61.4	273.86	127.8
MDH-013	476037	1559981	109	-90	-	135.2
MDH-014	476104	1559931	108	-90	-	76.55
MDH-015	476109	1559971	108	-90	-	91.2
MDH-016	476136	1559829	124	-90	-	184.2
MDH-017	476052	1559932	109	-90	-	164.2
MDH-018	476139	1559895	121	-90	-	103.8
MDH-019	476111	1559865	122	-90	-	170.6
MDH-020	476134	1560255	108	-90	-	95.7
MDH-021	476033	1559979	109	-61	253.33	99.8
MDH-022	476808	1559761	114	-90	-	78.2
MDH-023	476810	1559764	114	-90	-	174.6
MDH-024	476777	1560966	84	-90	-	66.1
MDH-025	476755	1560930	86	-57	159	42.6
MDH-026	476834	1560993	82	-90	-	50.05
MDH-027	476819	1559790	114	-90	-	149.1
MDH-028	476075	1560216	105	-90	-	128.2
MDH-029	475998	1559982	111	-60	50	108.5
MDH-030	476057	1559933	109	-59.95	50.86	106
MDH-031	476075	1560216	105	-60	96	141.6

#### Table 3: Mabilo Drill Locations, Orientations and Depths.



Hole ID	East	North	RL	Dip	Azimuth	Depth (m)
MDH-032	475998	1559982	111	-90	-	120.9
MDH-033	476065	1559910	112	-70.55	53.53	119.3
MDH-034	476045	1559972	109	-59.83	46.71	106.1
MDH-035	476065	1559910	112	-90	-	196.1
MDH-036	476062	1560256	102	-80.57	82.92	113.6
MDH-037	476781	1559765	117	-90	-	232.9
MDH-038	476094	1559915	118	-59.55	49.08	132.1
MDH-039	476081	1560157	107	-59.98	90.68	123.6
MDH-040	476167	1559785	124	-90	-	185.45
MDH-041	476067	1560322	103	-60.72	88.07	134.5
MDH-042	476780	1559810	115	-90	-	120.4
MDH-043	476067	1560322	103	-76.41	89.88	115.9
MDH-044	476168	1559786	125	-57.96	54.05	154.95
MDH-045	476139	1560236	105	-90	-	131.8
MDH-046	476115	1559780	125	-89.67	100.35	325
MDH-047	476858	1559866	112	-80.8	158.8	135.5
MDH-048	476138	1560235	105	-61.62	217.6	230.9
MDH-049	476778	1559723	115	-88.73	193.48	213.7
MDH-050	476148	1560296	107	-49.12	271.4	192.4
MDH-051	476036	1559789	112	-61.15	55.05	166.8
MDH-052	476149	1560296	107	-65.15	273.3	194.1
MDH-053	476212	1559751	126	-88.78	221.47	243.9
MDH-054	476200	1560296	109	-60.48	266.9	231.8
MDH-055	476212	1559751	126	-75.29	52	180.6
MDH-056	476036	1559789	112	-65.92	55.07	252.3
MDH-057	476242	1559718	127	-87.91	184.89	287.1
MDH-058	476073	1560156	107	-90	-	200.5
MDH-059	476127	1559684	121	-70	50	154.1
MDH-060	476153	1559659	116	-69.77	53.43	297.6
MDH-061	476280	1559794	125	-59.1	229.43	164.4
MDH-062	475937	1560086	114	-60.68	134.05	118.8
MDH-063	476125	1559690	121	-70.65	52.17	142.1
MDH-064	476099	1559730	114	-66.01	53.28	129.9
MDH-065	476129	1559696	121	-69.01	56.73	262.7
MDH-066	476024	1559986	108	-62.77	51.67	171.9
MDH-067	476099	1559728	113	-61.18	50	196.9
MDH-068	475975	1559988	114	-61.73	50.17	224.6
MDH-069	476046	1559849	110	-61.52	53.17	185.5
MDH-070	476005	1560016	111	-61.16	49.81	70.8
MDH-071	476038	1559998	108	-60.63	52.15	141.3
MDH-072	476044	1559846	110	-73.82	50	275.3
MDH-073	476011	1560002	109	-60.76	50.81	124.5



Hole ID	East	North	RL	Dip	Azimuth	Depth (m)
MDH-074	476067	1559976	108	-60.63	52.36	114.8
MDH-075	476050	1559745	112	-65.04	50.8	303.7
MDH-076	476068	1559974	108	-60.46	92.31	83
MDH-077	476047	1559850	110	-45.31	53.83	139.6
MDH-078	476066	1559978	108	-60.6	185.91	261.8
MDH-079	475998	1559846	116	-60	50	140.1
MDH-080	476074	1559716	113	-65	50	304
MDH-081	476082	1559930	109	-65.15	50	174.4
MDH-082	476047	1559747	113	-60	50	277.65
MDH-083	476106	1559800	117	200.6	476106	1559800
MDH-084	475987	1560025	110	226.3	475987	1560025
MDH-085	475996.1	1559856	117	154.8	475996.1	1559856
MDH-086	476073.4	1559830	110.6	201.15	476073.4	1559830
MDH-087	476107.7	1559903	119	158.4	476107.7	1559903
MDH-088	476102.4	1559901	119	111.6	476102.4	1559901
MDH-089	476156.1	1559737	122.97	198	476156.1	1559737
MDH-090	476078.7	1559581	127.04	344.8	476078.7	1559581
MDH-091	476050	1559632	117.74	305.05	476050	1559632
MDH-092	476083.5	1559934	109.39	81.6	476083.5	1559934
MDH-093	475992.4	1559713	118.65	350.5	475992.4	1559713
MDH-094	476136.3	1559577	121.72	295	476136.3	1559577
MDH-095	476167	1559603	119	251.2	476167	1559603
MDH-096	476226	1559652	132	209.1	476226	1559652
MDH-097	476042	1559664	116.93	338.5	476042	1559664
MDH-098	475951.7	1559748	120.71	349.6	475951.7	1559748
MDH-099	476235	1559603	134.99	325.2	476235	1559603
MDH-100	476173	1559563	120.26	170.7	476173	1559563
MDH-100A	476162	1559563	120.26	343.2	476162	1559563
MDH-101	475992.4	1559764	118.83	317	475992.4	1559764
MDH-102	476022	1560167	103.32	284.7	476022	1560167
MDH-103	476037.7	1560105	103.92	232.6	476037.7	1560105
MDH-104	476021	1560166	103.49	222	476021	1560166
MDH-105	476047.7	1560136	106.79	185.1	476047.7	1560136
MDH-106	476052.6	1560193	104.82	170.8	476052.6	1560193
MDH-107	476084	1560161	106.29	163.3	476084	1560161
MDH-108	476133	1560217	104.5	123.6	476133	1560217
MDH-109	476112	1560188	104	111.2	476112	1560188
MDH-110	476028	1560091	105.9	149.1	476028	1560091
MDH-111	476059	1560254	102.9	117.1	476059	1560254





Figure 24: Drill collar plan for drilling by Mt Labo on the Mabilo Property.

The first phase of drilling was completed from September to December 2012 and comprised 12 holes (MDH-01 to -12) for 1,660 m of mainly PQ and HQ triple tube diamond drilling completed by drilling contractor Quest Exploration Drilling.



The second phase of drilling commenced in July 2013 and was suspended in July 2015 pending renewal of exploration permit EP-014-2013-V. Renewal of the licence is with the MGB in Manila and remains pending. The second phase of drilling has been completed by Galeo which was engaged in the capacity as contractor to provide drilling and limited non-technical management services for earn-in of up to 36% of the Mabilo Property under the terms of the Joint Venture Agreement with Mt Labo.

As at the 5<sup>th</sup> November 2015, a total of 112 drill holes have been drilled by Mt Labo on the property for 19,541.90 m of PQ, HQ and NQ triple tube diamond core. This includes one redrilled hole. The last two holes, MDH-110 and 111, were not completed to target depth as a result of suspension of drilling on the EP renewal data in July 2015.

# 10.2 Collar Surveying

Drill sites at Mabilo are initially pegged utilising hand-held GPS and, once drilled, the collars are again surveyed using hand-held GPS. All drill collars were subsequently surveyed by independent consultant, McDonald Consultants Inc. of Manila, using a CHC X90 Dual Frequency Differential GPS to an accuracy of 1 cm. Surveying is in UTM WGS84 Zone 51.

For the MRE that is the subject of this report, DGPS surveys were not available for a total of 30 holes (MDH-083 to MDH-111). The DGPS surveys were subsequently obtained from Mt Labo and mineralised sections of drill-holes were compared between GPS and DGPS survey pick-ups. Although changes in X-Y coordinates of up to 8 metres resulted, the variation in holes affecting the MRE has been judged not to be material.

# **10.3** Down-hole Surveying

All inclined drill holes were surveyed using a combination of Reflex EZ-TRAC downhole survey tool and Reflex GYRO. The Reflex EZ-TRAC collar result is used to process the Reflex GYRO survey, so QAQC of survey results is strictly applied to avoid erroneous data arising from magnetite skarn. The majority of holes that were vertical are less than 150 m in depth, however deviation may still be significant for vertical holes.

# **10.4** Core Orientation

Core orientation was attempted but was not successful due to fractured ground formations. Drilling of angled holes and a program of down-hole televiewing is planned for future work to help understand the geology of the deposit, orientation of lithological units and skarn, structures, and for geotechnical logging.

# 10.5 Core Quality and Recovery

The host rocks at Mabilo are strongly altered and deeply weathered. In general the magnetite skarn is less weathered and more competent, although the upper part includes haematitic broken zones. The use of PQ triple-tube coring has generally ensured good recovery. High recoveries are normally recorded in the magnetite skarn with consecutive runs of 100% common. There is some core loss in faulted and breccia zones within the magnetite, along the



margins of the bodies, and in the hematite skarn zones. The overall average recovery is greater than 90% within mineralised zones.

#### 10.6 Drill Site Security and Drill Core Handling

Mt Labo employs experienced geological and technical staff and has trained local recruits to conduct drill site monitoring ("core checkers") under the supervision of the project and drill site geologist and two experienced field technicians. A company core checker is present 24 hours per day at every drill site during drilling operations. The core checker ensures the core is moved from the core barrel to the core tray safely and oriented correctly in the tray. The checker ensures all core trays are labelled (Hole ID, From-To, box number, start and end) and that wooden blocks marking the down-hole depth are placed in the core tray between each core run. All drill site activities including core recovery, core runs, pulling core, bit changes, casing and reaming times, breakdown times and duration are recorded at site and checked by the project geologist.

Once a core box is filled, it is sealed with a wooden lid which is secured with rope or twine and either loaded directly onto a company vehicle or manually carried to the nearest site of vehicle access for loading. Core boxes are transported by company personnel in company vehicles directly to Mt Labo's office and core shed facility located in a secure compound in Daet town.

#### 10.7 Drill Results

The first five holes drilled at Mabilo were based on the old magnetic modelling and two failed to intersect significant mineralisation. Subsequent drilling based on the revised models intersected magnetite mineralisation, mostly with significant copper and gold grades. Drilling initially tested the two strongest magnetic anomalies and associated magnetic bodies modelled by SGC; the anomalies initially termed 'North Body' and 'South Body'.

On the basis of the earlier drilling targeting modelled magnetic bodies, a robust 3D geological model was developed which has driven the subsequent resource drilling program into areas where magnetic targeting is ineffective. This drilling has successfully extended and infilled the mineralised zone and partly defined its margins. Significant mineralised intersections have been returned in 82 of the 99 drill holes targeting the NMZ and SMZ (Table 4). For the SMZ the MRE is based on 3,073.71 m of assay data, from 61 holes which intersected the interpreted mineralisation zones. For the NMZ the MRE is based on 1,149.9 m of assay data, from 21 holes which intersected the interpreted mineralisation zones.

Drilling includes both inclined and vertical drill holes to test the skarn which dips moderately to the southwest to west in the northern part of the SMZ, and more steeply south west towards the southern part of the system (Figure 25). The skarn is moderately dipping to the north in the NMZ (Figure 26). True thicknesses of mineralisation are less than the drilled intersections in vertical holes.

Mineralised intersections greater than 20 m thickness were encountered in 51 drill holes. The northern part of the SMZ recorded the majority of the thickest intercepts.



Drilling has intersected significant copper-rich chalcocite supergene mineralisation zone at the northern end of the SMZ and a laterally extensive gold-rich, copper-depleted oxide mineralisation zone. The strongest mineralised intercepts include three holes that intersected thick intervals of this style, including the best interval recorded to date: MDH-66 returned 64.20 m at 3 g/t Au and 7.9 % Cu. The southern parts of the system are more affected by retrograde alteration remobilising and locally enriching gold grades. MDH-80 is an example of this, returning 28 m at 6.2 g/t Au and 3.6 % Cu.



Figure 25: Cross sections through the SMZ (locations shown in Figure 23).





Figure 26: Cross section through the NMZ (location shown in Figure 23).

The SMZ has been tested by 74 holes over an area of about 400 m by 125 m. Six drill holes were abandoned and seven drill holes did not intersect significant mineralisation. This drilling has tested the upper part of the SMZ which dips to the southwest at about 30 to 40 degrees and lower part of the SMZ which dips to the southwest at 60 to 70 degrees. The SMZ mineralisation is terminated to the northwest by an interpreted dextral cross-fault, with the NMZ as its offset continuation. The SMZ remains open to the south and southeast.

The NMZ has been tested by 26 drill holes over an area of about 200 m by 100 m. Modelling in 3D suggests magnetite has limited down dip extent where it appears to terminate in marble lithologies at relatively shallow levels (Figure 26). Potential exists for down-dip extension on the western edge of the NMZ and there is good potential to extend mineralisation to the north.

Further drilling is planned targeting extensions of the NMZ and the southern end of the SMZ.

Nine holes have been drilled to test the Southeast Anomaly magnetic model, two of which were abandoned due to drilling problems, MDH-022 before reaching the target and MDH-027 in magnetite skarn. Copper and gold grades encountered were low. Mineralisation remains open to the north, south and at depth.

Hole_ID	From (m)	To (m)	Sampling interval	Au (ppm)	Fe (%)	Cu (%)
MDH-001	26.00	92.00	66.00	2.1	46.1	3
MDH-001	107.00	109.00	2.00	0.8	20.5	0.6
MDH-001	129.00	131.00	2.00	0.4	11.2	0.6
MDH-004	64.00	70.00	6.00	1.7	31.3	1

Table 4: Significant drill-hole intersections (cut-off of 0.5% Cu or 0.5 ppm Au with a
minimum width of 2 m and internal waste is taken as less than 2 m)



Hole_ID	From (m)	To (m)	Sampling interval	Au (ppm)	Fe (%)	Cu (%)
MDH-004	147.00	156.00	9.00	0.5	4.8	1
MDH-005	51.00	113.00	62.00	2.7	48.8	2.8
MDH-007	40.00	121.00	81.00	2.6	55.5	2.6
MDH-007	127.00	129.00	2.00	4.2	30.1	3.8
MDH-009	34.00	121.00	87.00	2.9	43.5	1.7
MDH-010	59.00	123.40	64.40	2.2	45	2.3
MDH-011	60.00	105.00	45.00	1	19.3	1.1
MDH-011	108.00	142.00	34.00	0.7	22.9	0.6
MDH-011	147.00	168.00	21.00	0.7	24	0.9
MDH-012	60.00	106.00	46.00	2.7	48.6	2.8
MDH-012	110.00	115.00	5.00	1.6	49.1	1.9
MDH-013	36.12	123.15	87.03	3.4	41.5	2.4
MDH-013	129.00	133.00	4.00	0.8	15.2	0.6
MDH-014	30.80	38.35	7.55	1.6	53.2	0.1
MDH-014	42.20	67.00	24.80	1.1	53.1	0.9
MDH-014	70.00	72.10	2.10	0.6	55.7	0.3
MDH-016	104.45	159.00	54.55	5.2	50.7	3.1
MDH-016	163.00	166.00	3.00	0.5	44.3	0.6
MDH-017	45.20	78.85	33.65	1	30.1	1
MDH-017	81.20	101.00	19.80	0.7	28.1	0.7
MDH-017	104.40	154.70	50.30	1.8	42.2	1.7
MDH-017	156.80	159.20	2.40	2.3	36.9	3
MDH-018	51.30	65.50	14.20	3.9	52.1	1.9
MDH-018	77.30	82.00	4.70	0.7	61.8	0.3
MDH-018	94.35	101.00	6.65	0.4	26.7	0.6
MDH-019	74.90	77.75	2.85	0.5	19.7	0.7
MDH-019	83.40	86.00	2.60	0.8	28	0.7
MDH-019	91.87	169.00	77.13	1.7	50.5	1.4
MDH-020	53.10	81.70	28.60	4.1	36.5	10.5
MDH-023	96.00	99.50	3.50	1.8	63	0
MDH-028	51.00	89.30	38.30	2	30.5	2.1
MDH-029	69.10	89.90	20.80	2.4	32.2	22.9
MDH-030	33.00	101.00	68.00	1.9	54.6	1.1
MDH-031	46.80	113.00	66.20	2.2	48.8	2.8
MDH-031	116.00	120.90	4.90	0.8	6.9	0.6
MDH-033	46.00	93.00	47.00	1.6	56.3	1.1
MDH-034	34.90	88.70	53.80	2.4	46.5	3.1
MDH-035	48.25	164.00	115.75	2.5	46.5	2.2
MDH-035	178.00	181.80	3.80	0.5	14.4	0.6
MDH-036	55.00	78.55	23.55	1.6	45.4	1.7
MDH-036	85.80	91.80	6.00	0.8	28.9	0.7
MDH-038	115.60	124.00	8.40	0.5	3.7	0.7
MDH-040	91.00	94.00	3.00	0.3	8.8	0.8
MDH-040	99.00	101.00	2.00	1	8.3	0.9
MDH-040	107.85	159.00	51.15	3	52	2.2
MDH-041	56.20	86.30	30.10	1.6	17.8	4
MDH-041	92.50	96.40	3.90	0.6	39.7	0.8
MDH-043	48.00	51.40	3.40	0.8	9.2	2.7
MDH-044	81.00	83.00	2.00	0.2	6	0.6



Hole_ID	From (m)	To (m)	Sampling interval	Au (ppm)	Fe (%)	Cu (%)
MDH-044	111.00	124.00	13.00	0.9	21.2	0.3
MDH-045	44.00	61.60	17.60	2.1	44.3	6.5
MDH-045	70.25	84.40	14.15	0.7	5.7	1
MDH-045	87.60	96.60	9.00	1.1	11.5	0.1
MDH-046	237.30	277.75	40.45	1.9	42.9	1.4
MDH-046	284.25	288.45	4.20	2.2	50.3	2
MDH-048	42.00	140.75	98.75	1.8	44.9	1.8
MDH-048	143.00	147.60	4.60	1.1	28	1.4
MDH-048	158.50	162.00	3.50	0.6	18.6	0.5
MDH-048	176.00	178.00	2.00	1.1	25.6	1.1
MDH-048	184.00	187.00	3.00	0.7	13.4	0.6
MDH-048	190.00	200.00	10.00	1	12.2	0.8
MDH-048	203.00	206.00	3.00	1	13.5	0.9
MDH-050	72.15	90.05	17.90	1.1	27.2	0.6
MDH-050	138.60	148.10	9.50	0.8	17.9	1
MDH-052	56.90	64.00	7.10	0.9	8.1	1.3
MDH-052	67.00	75.00	8.00	1.6	19.7	0.5
MDH-052	80.40	105.00	24.60	0.6	19.2	1.1
MDH-052	108.00	147.80	39.80	1.5	36.5	1.4
MDH-052	150.15	169.80	19.65	1.9	47.7	1.9
MDH-052	174.50	190.50	16.00	1.9	40.7	1.9
MDH-053	108.00	156.00	48.00	1.6	56.7	1.4
MDH-053	160.00	179.00	19.00	3.2	42.7	1.2
MDH-053	182.00	185.00	3.00	3.4	26.2	1.4
MDH-053	187.85	212.00	24.15	3	40.5	0.7
MDH-054	58.00	61.00	3.00	0.8	5.9	0.8
MDH-054	129.00	132.00	3.00	0.5	19.4	0.9
MDH-054	146.50	150.80	4.30	0.9	30.7	0.5
MDH-054	171.00	190.80	19.80	1.8	48	2
MDH-054	207.30	212.30	5.00	1	12.6	0.7
MDH-054	216.70	219.80	3.10	0.7	11.4	0.6
MDH-055	112.00	122.00	10.00	1.2	43.4	0.5
MDH-055	126.00	133.00	7.00	0.9	49.7	0.3
MDH-055	148.00	157.90	9.90	2.1	10	0.6
MDH-056	148.70	151.80	3.10	0.2	9.6	1
MDH-056	156.00	158.00	2.00	0.1	12.9	1
MDH-056	169.00	172.00	3.00	0.2	8.3	0.6
MDH-056	190.00	199.00	9.00	1.1	23.2	1.2
MDH-056	231.40	236.30	4.90	1.5	24.2	1.5
MDH-057	89.50	111.70	22.20	0.4	4.3	1.2
MDH-057	126.00	161.00	35.00	2.6	52	2.4
MDH-057	165.00	181.50	16.50	0.7	62.5	0.7
MDH-057	191.25	194.00	2.75	0.8	50.4	0.7
MDH-057	198.00	210.00	12.00	1.2	8.5	0.8
MDH-057	232.00	236.00	4.00	0.3	5.7	0.6
MDH-057	266.00	270.50	4.50	0.4	5.7	0.7
MDH-057	273.50	279.80	6.30	0.2	4.6	0.7
MDH-059	133.00	143.00	10.00	0.9	12.8	0.8
MDH-060	135.80	153.00	17.20	1.9	17.1	1.6



Hole_ID	From (m)	To (m)	Sampling interval	Au (ppm)	Fe (%)	Cu (%)
MDH-060	180.00	238.10	58.10	1.6	41.3	1.7
MDH-060	254.00	261.10	7.10	2.1	27.2	0.4
MDH-060	267.00	279.00	12.00	1.9	34.1	0.5
MDH-061	123.60	145.47	21.87	1.1	44.7	0.8
MDH-061	148.00	164.40	16.40	1	56.1	1
MDH-064	118.30	124.00	5.70	2.2	21.4	1.7
MDH-065	109.30	112.30	3.00	0.7	9.3	0.9
MDH-065	131.00	154.30	23.30	0.8	11.4	0.7
MDH-065	157.00	163.00	6.00	0.7	9.2	0.8
MDH-065	169.00	210.55	41.55	1.5	38.2	1.8
MDH-065	212.95	217.00	4.05	2	61.5	0.7
MDH-066	37.80	102.00	64.20	3	44.5	7.9
MDH-066	137.80	142.00	4.20	0.6	8	0.8
MDH-066	144.20	149.00	4.80	0.6	3.7	1
MDH-066	162.00	167.70	5.70	0.6	9.1	0.7
MDH-067	132.00	136.90	4.90	0.8	9.8	1.1
MDH-067	139.00	142.00	3.00	0.6	16.6	0.6
MDH-067	145.00	148.00	3.00	0.7	29.7	0.6
MDH-067	151.00	177.00	26.00	2.1	48.1	1.6
MDH-068	104.00	106.00	2.00	0.4	6.4	1.6
MDH-068	148.40	153.20	4.80	0.3	5.6	0.6
MDH-068	179.50	182.15	2.65	0.8	22.9	1.9
MDH-068	196.00	198.00	2.00	0.3	5	0.6
MDH-068	208.30	214.20	5.90	0.6	8.4	0.9
MDH-068	218.00	220.00	2.00	2	6	0
MDH-069	82.00	87.43	5.43	1.3	32.8	0.9
MDH-069	101.00	133.00	32.00	2.2	46.9	1.1
MDH-069	164.00	175.00	11.00	0.6	5.2	0.8
MDH-069	179.00	181.00	2.00	0.6	5.7	0.9
MDH-071	31.00	66.00	35.00	3	39.5	4.4
MDH-071	81.20	84.00	2.80	0.8	22.6	0.8
MDH-072	88.10	91.00	2.90	0.9	17.7	0.5
MDH-072	154.00	164.00	10.00	0.9	20.7	1.5
MDH-072	168.00	171.00	3.00	0.5	24.5	0.7
MDH-072	217.00	235.00	18.00	1	28	1.2
MDH-073	38.95	55.60	16.65	4.4	44.3	0.4
MDH-073	61.90	81.10	19.20	2.2	28.4	26.2
MDH-073	84.00	87.10	3.10	0.8	31.3	2.5
MDH-073	106.00	111.00	5.00	5	19.2	5.9
MDH-074	30.80	61.00	30.20	7.2	35.3	1.6
MDH-074	89.85	93.40	3.55	1	5	1.1
MDH-075	81.00	83.00	2.00	0.3	13.9	3.5
MDH-075	148.15	165.00	16.85	0.3	11.6	1.4
MDH-075	177.00	182.00	5.00	0.8	17.4	0.5
MDH-075	207.00	231.00	24.00	2.4	39.5	2.6
MDH-075	234.25	246.00	11.75	1	40.5	1.2
MDH-075	269.50	273.00	3.50	0.6	8.6	0.5
MDH-076	36.00	47.40	11.40	8.2	48.8	0.2
MDH-077	86.00	88.00	2.00	1.3	15.8	0.4



Hole_ID	From (m)	To (m)	Sampling interval Au (ppm)		Fe (%)	Cu (%)
MDH-077	94.00	113.00	19.00	0.9	52.6	0.7
MDH-078	32.20	170.00	137.80	2.5	49.7	1.9
MDH-078	177.00	198.30	21.30	1	28.8	1
MDH-078	202.10	219.00	16.90	1.5	39.9	1.6
MDH-079	105.90	110.00	4.10	0.4	6.7	1.5
MDH-080	131.00	139.75	8.75	3.2	18.9	1.6
MDH-080	188.00	191.00	3.00	3.1	14.4	0.5
MDH-080	193.90	221.90	28.00	6.2	35	3.6
MDH-081	29.65	62.36	32.71	3.7	57.8	0.2
MDH-081	114.00	117.00	3.00	0.6	8.1	1.2
MDH-081	129.00	131.00	2.00	1.6	5	0.7
MDH-082	189.65	202.85	13.20	3.5	35.3	2.6
MDH-082	228.00	231.00	3.00	2.4	33.3	1.2
MDH-082	253.00	256.00	3.00	0.5	4.7	0.8
MDH-082	273.00	275.25	2.25	0.5	8.2	0.6
MDH-083	96.00	123.00	27.00	1.0	44.7	0.8
MDH-083	127.00	134.00	7.00	1.1	53.8	0.8
MDH-083	178.00	180.00	2.00	0.4	4.9	0.8
MDH-084	42.60	45.00	2.40	1.1	20.4	0.1
MDH-084	184.00	193.40	9.40	1.6	10.4	3.0
MDH-086	94.00	138.15	44.15	1.4	45.9	1.1
MDH-086	152.00	159.25	7.25	1.8	31.8	0.7
MDH-086	188.00	192.00	4.00	0.6	5.0	0.4
MDH-087	53.00	59.00	6.00	1.6	50.6	0.1
MDH-087	67.00	71.90	4.90	0.8	44.3	0.5
MDH-087	109.00	117.00	8.00	0.5	5.0	0.7
MDH-088	96.25	98.00	1.75	0.4	5.5	0.8
MDH-088	100.25	101.65	1.40	0.2	4.5	0.9
MDH-088	104.00	105.85	1.85	0.6	6.4	1.0
MDH-089	117.60	132.00	14.40	1.3	51.4	1.0
MDH-089	135.00	149.00	14.00	1.0	57.2	0.5
MDH-089	164.00	175.35	11.35	0.8	15.2	0.4
MDH-089	179.50	182.00	2.50	1.1	4.8	0.8
MDH-092	45.60	47.00	1.40	0.8	11.1	0.0
MDH-090	303.90	319.00	15.10	2.3	31.7	1.4
MDH-093	175.05	177.90	2.85	0.3	7.0	1.8
MDH-093	191.00	195.00	4.00	0.1	3.2	0.6
MDH-093	276.90	287.80	10.90	0.7	41.5	1.5
MDH-093	296.00	309.00	13.00	1.0	32.5	1.1
MDH-093	319.00	325.00	6.00	0.6	11.2	0.4
MDH-093	329.90	332.00	2.10	0.7	7.2	0.3
MDH-094	175.00	181.00	6.00	2.5	15.0	1.0
MDH-094	184.00	191.00	7.00	0.9	13.7	0.9
MDH-094	242.00	262.00	20.00	0.9	33.3	0.9
MDH-094	266.00	285.20	19.20	1.4	36.0	1.3
MDH-094	292.00	295.00	3.00	1.0	4.1	0.6
MDH-095	111.00	140.00	29.00	1.5	9.1	2.1
MDH-095	156.00	160.25	4.25	0.2	5.6	0.5
MDH-095	182.00	190.00	8.00	0.9	16.2	0.5



Hole_ID	From (m)	To (m)	Sampling interval	Au (ppm)	Fe (%)	Cu (%)
MDH-095	192.70	221.00	28.30	1.5	38.3	1.8
MDH-095	247.00	251.20	4.20	0.9	7.4	0.7
MDH-096	156.00	195.00	39.00	1.7	38.0	1.2
MDH-096	198.70	202.50	3.80	0.3	3.1	0.6
MDH-099	189.00	193.30	4.30	0.7	19.3	0.6
MDH-099	226.60	246.00	19.40	0.7	7.5	0.3
MDH-099	262.90	266.00	3.10	0.5	4.7	0.1
MDH-100A	281.00	318.00	37.00	3.3	38.2	3.2
MDH-100A	322.00	331.65	9.65	1.1	10.5	0.3
MDH-101	60.10	64.00	3.90	0.4	9.7	0.5
MDH-101	263.00	267.00	4.00	0.4	6.7	0.7
MDH-101	270.75	273.15	2.40	0.6	15.2	0.7
MDH-101	279.50	306.35	26.85	1.0	29.6	1.1
MDH-102	100.00	103.00	3.00	0.1	9.2	0.7
MDH-102	109.10	131.45	22.35	3.5	35.3	3.1
MDH-102	134.80	138.15	3.35	1.2	32.5	1.1
MDH-102	189.40	213.60	24.20	1.4	33.7	1.4
MDH-103	40.25	42.30	2.05	1.0	22.4	0.2
MDH-104	162.00	164.60	2.60	2.6	12.4	1.8
MDH-104	197.10	198.90	1.80	1.4	53.7	2.2
MDH-105	111.55	134.70	23.15	1.7	36.1	2.3
MDH-106	56.00	68.00	12.00	1.1	14.4	1.4
MDH-106	72.00	128.70	56.70	1.9	41.9	1.9
MDH-107	50.00	55.00	5.00	0.8	27.5	0.2
MDH-107	65.00	78.45	13.45	0.9	16.4	1.0
MDH-107	82.40	132.20	49.80	2.0	40.2	1.9
MDH-109	41.70	55.30	13.60	2.5	24.3	0.1
MDH-109	60.00	62.00	2.00	0.5	3.5	0.6
MDH-111	63.00	117.10	54.10	2.3	45.8	3.4

\*Note that as most drill holes are not drilled exactly perpendicular to the dip of the mineralisation, true thicknesses of mineralisation are less than the drilled intersections.



# 11 Sample Preparation, Analysis and Security

# 11.1 Drill Core Management and Logging

Upon delivery of drill core to the core shed, the core shed geologist checks all labelling of the core trays and recalculates the core recovery and the down-hole depths marked on the wooden blocks. Individual core trays were photographed with a digital camera (both as wet and dry core) with the tray photographs labelled showing the hole ID, metres from-to, core box number, date, start and end of the core sequence and whether the core is wet or dry.

Core logging was carried out in the core shed by Mt Labo geologists. Core logging was initially recorded on separate geological, geotechnical and structural zonal logging sheets with data either being recorded directly into a lap-top or transcribed onto Excel spread sheets for subsequent data entry.

All drill holes completed to date have been re-logged after assay results have been received. Detailed geological logging of all sampled intervals has provided a quantitative log of minerals and lithologies present for each interval. The assay data allows more detailed quantification of the copper and other sulphide minerals present.

A final Geological Summary Log was prepared after completion of the Quantitative Geological Log.

All logging sheets were validated by the data manager and archived separately as well as being combined into an Excel database with the assay results.

#### 11.2 Core Sampling

Sampling of mineralised core in the first phase of drilling (MDH-01 to 12) was conducted on standard 1 m intervals. Subsequently the sample intervals have been determined by the Project Geologist such that most intervals were approximately 1 m and none was more than 2 m. Intervals take account of geological boundaries from logging but also take into account any changes in core diameter and percentage recovery. Labo Volcanic Complex cover sequence was not sampled. All magnetite skarn, adjacent calcic skarn and ferruginous zones were sampled. Most holes terminated in calc-silicate skarn approximately 10 m below the magnetite skarn.

The sampling intervals are recorded in a Sample Log and marked on the core box with a permanent marker pen. After samples have been cut and bagged, a duplicate sample submission ticket is attached to the core tray at the top of the sample interval.

Core samples were cut in half using an electric diamond saw. Where core was broken or friable it was wrapped in plastic prior to sawing to allow a representative half sample to be collected without loss of material. Core to be sampled was initially cut perpendicular to the core axis to



separate the individual sample intervals, and then along the core axis to produce two equal halves. Where the core is broken, individual pieces are cut along the axis of symmetry to produce two identical half core samples. Where the core is very broken (fragments below 5 cm diameter) or predominantly clay, material from half of the "core" is collected using a small plastic scoop supervised by the core shed geologist to ensure that the fragments are taken uniformly along the core length and mineralised materials are represented properly.

# **11.3** Sample Handling and Security

Samples are placed in appropriate numbered plastic sample bags and laid down in sequence. The sample tickets are filled out and placed on the laid-down core samples and double checked against the label on the sample plastic bags prior to being placed in the sample bag and the bag sealed with a cable tie.

The sealed samples are placed in plastic drums labelled with the sample numbers contained in the drums and batch number. Appropriate documentation (Chain of Custody, Sample Dispatch and Sample Submission Forms) are placed in the drums which are sealed with cable ties.

The secured and sealed plastic drums are sent directly from the core shed to the laboratory using either company vehicles or a local transport company. A standard Chain of Custody form is signed by the driver responsible for transporting the samples upon receipt of samples at the core yard and is signed by an employee of the laboratory on receipt of the samples at the laboratory. Completed forms are returned to the Company for filing. Remaining core is kept in the company core yard which is in a secure compound at the company regional office in Daet town and guarded at night.

# **11.4 Magnetic Susceptibility Measurements**

Magnetic susceptibility readings were taken every 20 cm along all core, and averaged to coincide with sample intervals. Readings were taken on the flat surfaces of half core intervals and on the rounded surface of uncut core. The core size diameter and whether the core is uncut or half cut is noted in the magnetic susceptibility logs for calibrating and assessing readings in modelling of the magnetic data.

# **11.5 Bulk Dry Density Determinations**

Bulk dry density determinations were conducted on selected samples of core from all the different types of lithologies as determined by the core shed geologist. The wax-coated, water immersion method was used due to the significant porosity of most rock types (particular the magnetite mineralisation) and the very weathered nature of most of the country rock core. Initially, density determinations have been completed after sampling on remaining half core for sections which have been sampled. In the last year, density determinations have been completed on full core prior to cutting.

Samples were oven dried for four hours at 150° Celsius. Readings of the weight of the dried sample, wax-coated sample in air and wax-coated sample suspended in water were taken to



0.01 g accuracy. The scale is recalibrated between different readings and is calibrated to zero with the wire basket attached for weighing the wax-coated sample suspended in water. An independent determination of the wax density was undertaken by a commercial laboratory (Intertek Macphar) which yielded 0.88, 0.89 and 0.90 g per cubic cm. The average of 0.89 has been utilised in all calculations.

CSA Global has noted that excessive wax has been used for density determinations primarily in the overburden and weathered waste materials. Analysis of the data has shown that this is not expected to be a significant issue for the mineralised parts of the system. CSA Global has recommended revised practice.

# 11.6 Sample Analysis

Samples were sent to Intertek McPhar laboratory in Manila. Intertek McPhar laboratory is an independent, internationally recognised laboratory which has ISO accreditation (9001:2000 and 17025). Samples were crushed and pulverised (95% <75 µm). Gold was analysed by 50 g fire assay and the other elements by ICP-MS (Inductively Coupled Plasma Mass Spectrometry) or ICP-OES (Inductively Coupled Plasma Optical Emission Spectrometry) following a four-acid digest. Initial drill holes were analysed for a wide suite of elements. After establishing that the main elements of economic interest were Fe, Cu, Au and Ag, samples have been analysed for a more limited suite of elements. A combination of ICP-OES and ICP-MS has been used to allow for the accurate determination of some elements such as Fe at higher grades and others such as Ag at low levels. The analytical methods and detection limits are shown in the table below.

Element	Method	Low DL	High DL
Au	50 g Fire Assay	0.005 ppm	
Cu	OM1-OES	20 ppm	70%
Fe	OM1-OES	0.01%	70%
Zn	OM1-OES	10 ppm	70%
Ag	OM1-MS	0.5 ppm	1%
Pb	OM1-MS	5 ppm	10%
As	OM1-MS	5 ppm	50%
Мо	OM1-MS	1 ppm	10%

# Table 5: Assay method and detection limits for samples analysed at Intertek-Mcphar,Manila

# 11.7 Quality Control

The acquisition of data that provide measures of analytical accuracy, sample representivity, sub-sampling quality, and sample preparation quality are essential to determine the validity of an assay data set to be used for resource estimation. Various measures are commonly used including:

• Insertion of blind assay standards of known grade into the sample stream. Standards are used to assess the accuracy of the analytical data.



- Collection of duplicate samples, either identically re-split drill cuttings or resampling of remaining diamond core. Duplicate samples can be used to detect analytical error caused by the method used and care taken in sample collection, but in the case of core duplicates are also affected by grade homogeneity.
- Insertion of blank samples that are subjected to the same sample preparation and can be used to detect cross-contamination.
- Repeat assaying of replicate samples from same sample pulps. These data provide a measure of the analytical precision achieved by the laboratory. This data is usually acquired as part of the normal service provided by the laboratory.
- Repeat or check assays determined at a different analytical laboratory. This can be used to detect laboratory bias.

Quality control completed by Mt Labo has included analysis of standards, blanks, and duplicates. In addition, Intertek conducted their own extensive check sampling as part of their own internal QA processes which are reported in the assay sheets.

# 11.7.1 Standards

Certified Reference Materials ("CRM") were purchased from Ore Research and Exploration ("OREAS") of Australia to provide a range of copper and gold grades in fresh and oxidised samples. A total of 331 CRM samples have been submitted with the samples from the various drilling campaigns. In the first phase of drilling, CRMs were submitted every 20<sup>th</sup> sample. Standards used were OREAS 901, 503, 503b, 504, 502, 501b, 501, 401, 40, 27, 22c, 15d and 112. In the second phase of drilling CRMs were submitted every 40<sup>th</sup> sample and standards used were OREAS 504, 27 and 112, as well as a blank sample consisting of local basalt.

During the 2015 drilling CRM were submitted roughly every 40<sup>th</sup> sample with the local basalt blank samples submitted roughly every 20<sup>th</sup> sample. The standards used for the 2015 drilling were OREAS 40, 501b, 502, 503, 504, 700 and 701. The OREAS 700 and 701 CRMs are classified as a skarn mineralisation style in a magnetite skarn assemblage matrix by the supplier.

CRM data is presented as 'control charts' plotting assay values against each reported value. Also shown are the accepted value, the mean of the reported values and control limits set at  $\pm 2$  standard deviations ("SD") of the assayed mean. Comparison between the mean of the reported values and the accepted values shows how each standard has performed against expectation. The 2 SD control limits are used to determine whether individual results are within acceptable deviation from the mean as determined by the particular laboratory.

Examination of all the QAQC data indicates that the laboratory performance has been generally satisfactory for most standards for Au, Cu and Ag, with relatively few failures and acceptable levels of precision and accuracy.

Fe standard performance is mixed but most of the standards used have very low grades that are significantly below any economic cut-off (Table 8). OREAS 112 with Fe certified at 31.4%



using 4-Acid Digestion has performed well with negligible bias and no failures. Fe standards OREAS 40 and OREAS 401 have not performed as well and CSA Global notes that these highgrade standards are certified by use of Borate Fusion XRF whereas Mt Labo has had these standards assayed by means of 4-Acid Digestion, and this may be the reason for the poorer performance of these standards. CSA Global recommends use of standards with certification assay method matching intended assay method.

The majority of the standards that have been used are generally lower grade than the Mabilo mineralisation and are not matrix matched to the primary Cu-Au-Fe magnetite skarn type of mineralisation. For the 2015 drilling, two magnetite skarn matrix standards were used and while these have lower grades that the Mabilo magnetite skarn mineralisation, the standards have performed well. CSA Global recommends that further effort should be put into sourcing standards with grade ranges similar to those in the deposit.

Considering the multiple different ore types at Mabilo and the variety of standards used, CSA Global believes that laboratory accuracy and precision has been sufficiently demonstrated to use the drill assay data with a reasonable level of confidence in a MRE. Summary results tables of the CRM performance are shown in Table 6 to Table 9. An example of the control charts used to track the performance of the standards is shown in Figure 27 for the Oreas 701 CRM.

CRM Code	CRM Value	CRM	No. of	Assay Mean Au	Assay	Assay	Mean
	(ppm)	SD	Samples	(ppm)	SD	CV	Bias
OREAS 15d	1.56	0.04	10	1.63	0.07	0.04	4.2%
Oreas 501	0.20	0.01	1	0.24			17.6%
OREAS 501b	0.25	0.01	4	0.24	0.01	0.03	-3.2%
OREAS 502	0.49	0.02	35	0.49	0.01	0.02	-1.1%
OREAS 503	0.69	0.02	23	0.69	0.01	0.01	0.9%
Oreas 503b	0.70	0.02	34	0.69	0.01	0.02	-0.3%
Oreas 504	1.48	0.04	70	1.52	0.04	0.03	2.4%
OREAS 700	0.51	0.02	40	0.51	0.01	0.02	0.2%
OREAS 701	1.11	0.05	36	1.12	0.03	0.03	0.8%
OREAS 901	0.36	0.02	3	0.37	0.01	0.03	1.9%

#### Table 6: Au CRM

#### Table 7: Cu CRM

CRM Code	CRM Value (ppm)	CRM SD	No. of Samples	Assay Mean Cu (ppm)	Assay SD	Assay CV	Mean Bias
Oreas 112	51,000	2,400	25	51,033	1,230	0.02	0.1%
Oreas 501	2,708	82	1	2,591	-	-	-4.3%
OREAS 501b	2,600	110	4	2,601	69	0.03	0.0%
OREAS 502	7,549	197	35	7,544	114	0.02	-0.1%
OREAS 503	5,658	150	23	5,449	195	0.04	-3.7%
Oreas 503b	5,310	230	34	5,270	153	0.03	-0.8%
Oreas 504	11,371	320	69	11,357	273	0.02	-0.1%
OREAS 700	2,020	70	40	2,054	60	0.03	1.7%
OREAS 701	4,910	120	36	4,922	86	0.02	0.2%
OREAS 901	1,410	50	3	1,432	44	0.03	1.6%



#### Table 8: Fe CRM

CRM Code	CRM Value	CRM	No. of	Assay Mean Fe	Assay	Assay	Mean
	(%)	SD	Samples	(%)	SD	CV	Bias
Oreas 112	34.10	0.90	25	34.04	0.77	0.02	-0.2%
OREAS 40	66.72	0.39	16	62.54	1.90	0.03	-6.3%
OREAS 401	45.63	0.26	25	47.28	1.12	0.02	3.6%
OREAS 501b	4.54	0.19	4	4.64	0.05	0.01	2.2%
Oreas 503b	5.43	0.25	34	5.57	0.27	0.05	2.5%
OREAS 700	15.57	0.92	40	15.93	0.53	0.03	2.3%
OREAS 701	23.02	1.46	36	23.79	0.62	0.03	3.3%
OREAS 901	4.03	0.15	3	4.04	0.24	0.06	0.2%

#### Table 9: Ag CRM

CRM Code	CRM Value (ppm)	CRM SD	No. of Samples	Assay Mean Ag (ppm)	Assay SD	Assay CV	Mean Bias			
OREAS 112	13.20	1.20	25	12.68	0.73	0.06	-3.9%			
Oreas 501	0.84	0.16	1	1.00			19.0%			
OREAS 501b	0.78	0.13	4	0.93	0.39	0.42	18.9%			
OREAS 502	2.14	0.20	35	2.20	0.22	0.10	2.7%			
OREAS 503	1.63	0.12	23	1.57	0.15	0.09	-4.0%			
Oreas 503b	1.54	0.19	34	1.55	0.18	0.12	0.6%			
Oreas 504	3.13	0.21	70	3.22	0.26	0.08	2.8%			
OREAS 700 *	0.50	0.08	40	0.58	0.14	0.24	16.2%			
OREAS 701	1.12	0.14	36	1.13	0.12	0.11	0.9%			
OREAS 901 *	0.44	0.06	4	-	-	-	-			
* Certified grade on or below assay detection limit										





Figure 27: Standards performance OREAS 701.

#### 11.7.2 Blanks

A total of 18 CRM blanks and 567 field blanks have been submitted for assay. The supplier classifies the OREAS 22c and 27 CRMs as barren quartz and barren rhyodacite respectively. OREAS 22c has certified values for Cu and Ag and indicative Au value well below the laboratory detection limit. Below detection results were reported for Au, Cu and Ag for the single submitted standard. OREAS 27 has certified values for Cu and Ag and indicative Au value well below the laboratory detection limit and Fe at 2.43%. The results of the 17 submitted samples of this CRM have produced low level assay results very close to the detection limits for a



number of samples, but on average the results are still considered acceptable with only one significant failure for Ag.

Au field blank samples are displayed in Figure 28 including 567 analyses, of which five did not perform well showing anomalous results above 0.1 g/t for Au. This is likely to be due to the material being sourced from local basalt that may have occasional low level grades. The failures do not appear to be indicating any consistent contamination issue trends. Cu, Ag and Fe results were at satisfactorily low levels, however some variation was observed. This is also likely related to the blank material being sourced from local basalt with some low level grades. Future work should include preparation of a homogenised, certified locally sourced blank.



Figure 28: Coarse blank results for gold.

#### 11.7.3 Duplicates

Duplicate sampling has been completed on every 20<sup>th</sup> core sample. The selected intervals of half core were cut again to produce two quarter-core samples which were sampled, numbered and submitted separately. The submitted duplicates generally performed well for Cu, Au, Ag and Fe, all with a correlation co-efficient above 96% as shown in Table 10.

Results for primary versus duplicate samples are displayed in the scatter plots in Figure 29, and the quantile-quantile (Q-Q) plots in Figure 30, with the data seen in Table 10. The plots show that there is minimal bias, with modest differences in the grade population distributions only seen above the 97.5<sup>th</sup> percentile. In cases where the field duplicates have not performed well Mt Labo has requested repeat analysis of these batches.





Figure 29: Field duplicate scatter plots.

	Au	Au	Cu	Cu	Fe	Fe	Ag	Ag
	Original	кереат	Original	кереат	Original	кереат	Original	кереат
Number	527	527	525	525	520	520	525	525
Mean	0.82	0.79	1	1	19.03	19.12	4.05	4.06
Min	0.0025	0.0025	0.001	0.001	0.005	0.005	0.25	0.25
q1	0.01	0.01	0	0	3.81	3.78	0.25	0.25
Median	0.12	0.12	0	0	8.13	8.17	0.90	0.90
q3	0.81	0.79	1	1	34.95	34.38	3.30	3.30
Max	19.03	14.66	18.4278	20.1027	68.14	68.58	82.4	80.5
Variance	3.39	2.73	3	3	401.31	404.28	83.67	79.14
Std	1.84	1.65	2	2	20.03	20.11	9.15	8.90
Deviation								
Coeff.Var	2.25	2.10	2.25	2.27	1.05	1.05	2.26	2.19

#### Table 10: Field duplicate statistics



Correl Coeff.	0.96		0.98		1.00		0.99	
Percentile	Au Original	Au Repeat	Cu Original	Cu Repeat	Fe Original	Fe Repeat	Ag Original	Ag Repeat
10%	0.006	0.006	0.01	0.01	2.35	2.48	0.25	0.25
20%	0.01	0.01	0.02	0.02	3.34	3.42	0.25	0.25
30%	0.02	0.02	0.04	0.03	4.32	4.28	0.25	0.25
40%	0.05	0.05	0.07	0.07	5.85	5.82	0.50	0.50
50%	0.12	0.12	0.14	0.14	8.13	8.17	0.90	0.90
60%	0.24	0.25	0.25	0.26	13.19	12.64	1.40	1.44
70%	0.55	0.58	0.49	0.52	25.26	24.45	2.40	2.40
80%	1.16	1.16	0.99	0.97	43.18	43.21	4.22	4.60
90%	2.31	2.36	2.13	2.14	53.58	54.31	11.22	10.98
95%	3.30	3.45	3.13	3.14	58.70	59.40	18.12	19.60
97.5%	5.28	4.52	4.32	3.95	62.03	61.61	27.50	28.55
99.9%	17.06	14.09	16.61	17.62	67.95	67.62	82.03	76.52
100%	19.03	14.66	18.43	20.10	68.14	68.58	82.40	80.50



Figure 30: Field duplicates Quantile - Quantile plots.



#### 11.7.4 Umpire Laboratory Analysis

A total of 341 pulp samples were selected for umpire laboratory analysis across different mineralisation types and grades across the length of the resource and down dip. Umpire analysis was conducted at three different ISO-certified laboratories in Perth, Australia; SGS, Bureau Veritas and ALS.

The results of this work show that there is an apparent upward bias in original assay results when compared to the umpire laboratories (Table 11). The matrix matched magnetite skarn CRM materials submitted to the umpire laboratories have generally not performed well. As a result the apparent bias in the primary results are not considered to present a material issue with the primary assay data, as all other QAQC protocols employed have performed well.

	Au	Au	Cu	Cu	Fe	Fe	Ag	Ag
	Orig	Ump	Orig	Ump	Orig	Ump	Orig	Ump
Number	335	335	338	338	292	292	294	294
Mean	2.69	2.46	2.68	2.50	38.70	35.79	12.58	11.19
Min	0.01	0.006	0.003	0.005	0.08	0.1	0.6	0.06
q1	0.96	0.91	0.42	0.42	23.23	21.43	2.20	2.00
Median	1.91	1.80	1.26	1.19	43.73	39.25	5.20	4.64
q3	3.20	2.97	2.90	2.63	54.10	50.23	11.70	10.50
Max	27.18	29.40	63.91	62.40	67.13	70.4	161	165
Variance	10.42	8.75	27.20	24.89	362.4 5	314.2 3	431.8 5	383.70
Std Deviation	3.23	2.96	5.22	4.99	19.04	17.73	20.78	19.59
Coeff.Var	1.20	1.21	1.95	2.00	0.49	0.50	1.65	1.75
Correl Coeff.	0.98		1.00		0.99		0.99	
Percentage difference Original Mean vs Umpire Mean	-9.0%		-6.8%		-7.8%		-11.8%	
Democratile	Au	Au	Cu	Cu	Fe	Fe	Ag	Ag
Percentile	Orig	Ump	Orig	Ump	Orig	Ump	Orig	Ump
10%	0.304	0.24	0.12	0.12	8.20	7.90	1.20	1.17
20%	0.70	0.64	0.34	0.34	17.67	17.62	1.80	1.67
30%	1.14	1.07	0.54	0.54	29.78	26.33	2.80	2.50
40%	1.55	1.44	0.89	0.83	36.45	33.78	4.00	3.50
50%	1.91	1.80	1.26	1.19	43.73	39.25	5.20	4.64
60%	2.37	2.14	1.82	1.67	48.34	42.76	7.10	6.28
70%	2.91	2.59	2.63	2.33	52.38	47.84	9.65	8.51
80%	3.48	3.29	3.41	3.02	56.30	52.50	16.78	12.66
90%	5.08	4.72	5.62	4.99	61.26	56.69	32.04	27.47
95%	7.83	7.23	9.15	8.79	63.32	60.35	51.35	45.71
97.5%	11.78	9.72	14.34	15.05	64.83	62.00	74.38	72.17
99.9%	26.34	26.53	52.68	51.35	66.96	68.83	152.7 4	150.35
100%	27.40	20.40	<b>CD 01</b>	C2 40	(7.4.)	70.40	161.0	105.00

#### Table 11: Umpire assay statistics


## 11.8 Data Management and Database

The source database is managed by RTG's GIS and Database Administrator using Maxwell Geoservices DataShed software; an industry standard database-management system designed for geological data. All drill-hole data is stored in the database.

The database was supplied to CSA Global's data management division for validation in the form of CSV files. The validation process found no fatal flaws in the data, with a few minor issues such as missing intervals that related to waste intervals that were not sampled. Issues were highlighted and corrected by RTG.

## 11.9 Adequacy of Sampling, QAQC, and Data Management

It is CSA Global's opinion that sampling, quality control and data management are adequate.

CSA Global considers that the quality assurance procedures and quality control results are generally adequate. Although umpire assay results appear to indicate an upward bias when compared to the original analyses, all other measures taken have performed well and indicate that the original data is suitable for use in a MRE.

CSA Global considers that adequate procedures are in place to ensure security of drill core and samples from the drill rig to the laboratory.



## **12** Data Verification

## 12.1 Sample Type Review

All samples used in the MRE have been generated by diamond drilling by Mt Labo, consisting of half or quarter cut-core samples. High recoveries are generally recorded in the magnetite skarn, with consecutive runs of 100% common. There is some core loss in narrow fracture and breccia zones within the magnetite, along the margins of the mineralisation zones, and in the hematite skarn zones. The overall average recovery is greater than 90%.

Based on the review work under taken by CSA Global staff, as well as on site observations, it is believed that the drill sampling protocols are of good industry standard and that drill sample data are sufficiently reliable to be included in the MRE.

## 12.2 Geological Logging

CSA Global considers the onsite procedures employed to collect and capture geological observations are of a high standard and are appropriate to support this MRE.

## 12.3 Bulk Density

Bulk density measurements taken by means of the wax-coated water displacement method have been adequate but could be improved. Current protocol of measuring density on full core samples before cutting using wax coating is appropriate. However the application of the procedure has resulted in excessive percentage of wax in the sample measurement, which appears more due to excessive coating than to filling of cavities. The previous method of measuring density on half core samples is not optimal as core tends to break up and this has probably lead to a greater bias of sampling towards competent material. Density measurements on intact core rather than broken core may lead to a positive density bias as broken core tends to be more affected by cavities associated with pyrite overprint or oxidation.

Current sampling provides reasonable sample numbers for assessment of magnetite skarn and garnet skarn mineralisation which form the bulk of the mineralisation. Other mineralised lithological units do not have sufficient sample numbers to develop a robust relationship between grade variables and bulk density within each lithotype.

CSA Global recommends that additional bulk density measurements targeting the various mineralised lithological units be taken, especially those currently underrepresented in the data. CSA Global also recommends that other density measurement methods should be applied as a check on the wax coating method. This could include plastic wrapping which will not be as affected by cavities, or using the calliper method on the whole core.

A reasonable correlation between Fe grade and bulk density was found for all mineralised weathered and un-weathered material separately; the application of the resultant linear



regression equations to the modelled grades have resulted in reasonable overall average bulk density assignment to the model.

## 12.4 QAQC Data Verification and Validation

No fatal flaws were noted in the QA/QC review which indicates that the QA/QC procedures implemented at Mabilo are generally sufficient to ensure the quality of drill-hole samples and to assess the reliability, accuracy and precision of the assay results obtained. CSA Global does note that the majority of CRMs employed are not grade- and matrix-matched to the deposit material. This is not considered a fatal flaw as the range of CRMs employed have generally performed well and there is significant variety of mineralisation in the Mabilo deposits.

## 12.5 Database Verification and Validation

Following previous recommendations by CSA Global, Mt Labo has instituted Maxwell Geoservices DataShed software, an industry standard database management system designed for capturing and storing geological data. A data audit on the provided csv format drill data files was completed by CSA Global. Data Issues that are flagged in this step are:

- Missing Data for entire holes
- Missing Collar Co-ords
- Overlapping Intervals
- Interval > EOH
- Missing Intervals
- Missing down hole survey data
- Azimuth or DIp change > 5.00 degrees
- From >= To
- From does not start from 0

The data in the database is comprehensive and of a high standard and all issues noted were minor and were corrected by Mt Labo prior to commencement of the MRE work.

## 12.6 Site visit

Dr Neal Reynolds, of CSA Global, visited the Property between October 28 and November 1 2015. The location and orientation of several drill collars were confirmed, the core handling and storage facilities were visited and aspects of the drilling and sampling procedures and geological interpretation were assessed in detail with the site team. The site visit was undertaken after the resource drill program was suspended in July 2015. However drilling was underway during three previous site visits by Dr Neal Reynolds (December 2013, February 2014 and May 2014) and the drilling and sampling process was observed to follow appropriate procedures and protocols.



In addition, the Intertek laboratory in Manila was visited on October 27, 2015. The sample handling area, sample preparation area, and analytical areas were examined and Intertek provided a presentation on sample handing and data flow and QAQC.

CSA Global has not undertaken any check sampling or analysis, but has observed visible mineralisation in drill core that corresponds well with reported grades. CSA Global has no reason to consider that reported analytical results are not reliable.

As a result of the verification process, CSA Global is confident the quality of the data is of a high standard suitable for use in the resource estimation process.



# 13Mineral Processing and Metallurgical Testing

Limited bench-scale testwork has been conducted by Mt Labo on three samples of magnetite mineralisation from drill hole MDH-01. The test work was carried out by TBM Mining Met Services Inc. (TBM, 2013).

The samples were coarse reject material of magnetite skarn containing copper and gold from the upper part of the magnetite skarn intersected in MDH-01.

- Sample Number 2918, 53-54 m, described as fresh-transitional skarn from the top of the magnetite zone; estimated 40% magnetite, 10% hematite and 40% calc-silicate skarn plus 3.5% chalcopyrite, 1.0% chalcocite, 1% covellite and 1% pyrite.
- Sample Number 2927, 62-63 m, described as fresh-magnetite skarn; visually estimated 90% magnetite with 4 % chalcopyrite and 1% pyrite.
- Sample Number 2932, 67-68 m, described as fresh-magnetite skarn; visually estimated 80% magnetite with 10 % chalcopyrite and 4 % pyrite.

As part of the feasibility study currently in progress, Lycopodium Minerals Pty Ltd ("Lycopodium") is managing the Phase 2 metallurgical test work program, with testing and analysis undertaken by ALS Metallurgy ("ALS") in Perth, Australia. The program has focussed on optimisation of the bulk flotation process proposed during the Phase 1 work completed in January 2015 and determination of engineering design parameters, metallurgical recoveries and regent consumption for preparation of the feasibility study and economic modelling.

The Phase 2 testwork program includes flowsheet development based on master composite samples followed by variability testing, comminution testing recovery optimization, reagent optimization and thickening/filtration testing.

Key highlights of recent work include:

- Main composite test work complete
- Initial variability work complete. Some follow up work required
- Comminution circuit configuration complete
- Filtration test work complete
- Preliminary capital and operating costs complete
- Process design criteria and mass balance close to completion
- Site layout options finalised.

Testwork is ongoing and results have not been reported.



## **14Mineral Resource Estimates**

## 14.1 Overview

The reported Mineral Resource for the South Mineralised Zone (SMZ) and North Mineralised Zone (NMZ) of the Mabilo Cu-Au-Fe deposit has been prepared by, or under the supervision of, Mr Aaron Green who is a full time employee of CSA Global, and "independent" of RTG and Mt Labo within the meaning ascribed to that term in NI 43-101. Mr Green has not personally visited the project site. Dr Neal Reynolds, who is a full time employee of CSA Global and acts as a representative of the Qualified Person (QP) has visited the project on several occasions, most recently between October 28 and November 1 2015.

Mt Labo provided a geological model for the SMZ and NMZ at Mabilo, which were completed using LeapFrog<sup>®</sup> software's implicit modelling techniques based on the lithological logging of drill holes. This model provided the geometric basis for further refinement by CSA Global into mineralised lithological units suitable for use in the MRE, based on the lithological logging and assay results from the drilling data. The wireframe model that was provided included 3-D envelopes for the major rock types in the deposit namely:

- magnetite skarn,
- garnet skarn,
- massive chalcocite,
- mineralised gold oxide "cap",
- mineralised copper gold oxide,
- pyritic overprint zones, and,
- marble/limestone.

Wireframe surfaces were also provided for:

- major faults,
- the oxidation boundary,
- the Labo Formation overburden lower boundary, and
- the topographic profile.

For the magnetite skarn zones, which are by definition reasonably well mineralised with magnetite iron, the lithological logging has driven the interpretation. Within the magnetite skarn zones further differentiation to define the copper - gold mineralised magnetite skarn was required due to edge depletion of copper and gold in some areas (Figure 31). The copper - gold mineralised magnetite skarn is defined based on a nominal lower cut-off grade of 0.3 g/t Au or 0.3 % Cu. Other lithological units in the system are not necessarily mineralised to potentially economic levels throughout their full extents. For these zones, a nominal lower cut-off grade of 0.3 g/t Au or 0.3 % Cu with lithological logging has been used to generate the mineralised lithological domains. A nominal minimum downhole intersection of 2 m was used



with no edge dilution. Minor zones of internal dilution were included to maintain continuity of resource wireframes.

The upper boundary of the interpreted mineralisation is limited by the basal surface of the overlying Labo Volcanic formation, provided by RTG, was verified as reasonable and modified as required by CSA Global. The oxidised portions of the deposits have been limited using the base of complete oxidation weathering surface provided by RTG, was verified as reasonable and modified as required by CSA Global. The structural interpretation surfaces have also been used to limit mineralised zones.

All modelling and wireframing was completed using CAE Studio 3 version 3.24.73.0 ('Datamine'). Statistical analysis was completed using GeoAccess Professional (Widenbar and Associates) and Isatis 2015 (v2015.01) software packages. Variography was completed using the Isatis software package.

The estimate for the deposit used standard Datamine block models with ordinary kriging ("OK") or inverse distance to the power 2 ("IDS") grade interpolation within mineralisation wireframes. The model has been reported at a 0.3 g/t Au cut-off grade, with the Mineral Resource summarised below in Table 12.

Weathering State	Classification	Million Tonnes	Cu %	Au g/t	Ag g/t	Fe %	Cu Metal (Kt)	Au Oz ('000s)	Fe Metal (Kt)
Oxide +	Indicated	0.78	4.1	2.7	9.7	41.2	32.1	67.1	320.8
Supergene	Inferred	0.05	7.8	2.3	9.6	26	3.7	3.5	12.3
	Indicated	8.08	1.7	2	9.8	46	137.7	510.5	3,713.7
Flesh	Inferred	3.86	1.4	1.5	9.1	29.1	53.3	181.5	1,121.8
Combined	Indicated (Total)	8.86	1.9	2	9.8	45.6	169.8	577.6	4,034.5
Combined	Inferred (Total)	3.91	1.5	1.5	9.1	29	57	184.9	1,134.1

# Table 12: Mabilo Project North and South Mineralised Zones Mineral Resource Estimate (0.3 g/t Au cut-off)

Note: Differences may occur due to rounding. All elements reported as total estimated in-situ for blocks above 0.3 g/t Au lower cut-off, no recovery factors have been considered. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

There are no known environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other factors that could materially affect the MRE. However, there is a lower level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated or Measured Mineral Resources.



## 14.2 Preparation of Wireframes

## 14.2.1 South Mineralised Zone

The SMZ is interpreted to be intersected by one fault structure, striking northwest to southeast and relatively steeply dipping to the northeast, which offset and partially limit the mineralisation (Figure 31 and Figure 32). The manually interpreted sectional outlines based on the Mt Labo geological model and drill logging data were automatically triangulated using the Datamine link-string function and verified as being valid solid wireframes. Mineralised unit wireframes have been nominally extrapolated half the drill section distance beyond the drill data down dip and along strike where it was considered to be appropriate based on the geological model.

At total of 35 mineralised lithological wireframe envelopes have been modelled in the SMZ. They are grouped into mineralised lithological domain types of Cu-Au-Fe mineralisation, based on lens lithology type. There are 10 mineralised lithological domain types in the SMZ:

- two magnetite skarn envelopes,
- four copper gold mineralised magnetite skarn envelopes,
- ten garnet skarn envelopes,
- one gold oxide "cap" envelope,
- one copper gold oxide envelope,
- one supergene massive chalcocite envelope,
- two mixed garnet skarn calc silicate envelopes,
- twelve calc silicate envelopes,
- one mineralised metasediment envelope, and,
- one mineralised fault breccia envelope.

The mineralised lithological wireframe envelopes were used as hard boundaries to select sample populations for data analysis and grade estimation. The greatest volume of modelled mineralisation is contained within the magnetite skarn lenses.





Figure 31: SMZ Magnetite skarn – oblique view top, cross-section below





Figure 32: SMZ plan and section views.

## 14.2.2 North Mineralised Zone

The NMZ sits approximately 200 m north of SMZ. It is bounded by at least one fault structure, striking northwest to southeast and relatively steeply dipping to the northeast limiting the down dip extent of the mineralisation (Figure 33). Additional structures are inferred, based on the available geophysical and geological data, to limit the strike extents of the NMZ to the northwest and southeast. The manually interpreted sectional outlines based on the Mt Labo geological model and drill logging data were automatically triangulated using the Datamine link-string function and verified as being valid solid wireframes. Mineralised unit wireframes have been nominally extrapolated half the drill section distance beyond the drill data down dip and along strike where it was considered to be appropriate based on the geological model.





Figure 33: NMZ plan and section view.



At total of eight mineralised lithological lens wireframe envelopes have been modelled in the NMZ. They are grouped into mineralised lithological domain types of Cu-Au-Fe mineralisation, based on lens lithology type. There are 5 mineralised lithological domain types in the NMZ:

- one magnetite skarn envelope,
- three garnet skarn envelopes,
- one gold oxide "cap" envelope,
- one copper gold oxide envelope, and,
- two supergene massive chalcocite envelopes.

The mineralised lithological domain groupings were used as hard boundaries to select sample populations for data analysis and grade estimation, with soft boundaries between the lenses within each domain zone. The greatest volume of modelled mineralisation is contained within the magnetite skarn lenses.

## 14.2.3 Geological Surfaces

A surface representing the interpreted base of the overlying Labo Formation volcanics was provided by MT Labo, was verified as reasonable and modified as required by CSA Global. This surface has been used to limit the top of the interpreted mineralisation over both the SMZ and NMZ.

## 14.2.4 Weathering Surfaces

A surface representing the base of oxidation has been provided by Mt Labo based on drill logging data was verified as reasonable and modified as required by CSA Global. No transition surface has been generated as the transition zone is generally very narrow or non-existent. The base of oxidation surface has been used to limit the base of the interpreted oxide zone mineralisation for both the SMZ and NMZ.

## 14.2.5 Topographic Surface

The topographic surface supplied by Mt Labo to CSA Global has been generated by Survey Graphics<sup>®</sup> mapping consultants in Myaree, Perth, Western Australia. The topographic surface has been generated from aerial mapping survey data with corrections based on surveyed drill collar locations giving an accuracy of roughly 0.3 m horizontally and vertically. The topography over the deposit area is relatively flat lying with total variation in topography of less than 15 m.

## 14.2.6 Faults

One fault surface intersecting the SMZ has been provided by Mt Labo and verified as reasonable by CSA Global based on currently available drill logging information. The fault strikes northwest to southeast and is relatively steeply dipping to the northeast. It is interpreted to offset and partially limit the mineralisation and has been used to limit the mineralisation lenses where appropriate as shown in Figure 31 and Figure 32.



The NMZ is interpreted to be limited by one fault structure on the south western side, striking northwest to southeast and steeply dipping towards the northeast as shown in Figure 33. This fault structure has been used to limit the mineralisation lenses where appropriate. To the northwest and southeast based current knowledge two fault structures are inferred to limit the strike extent of the mineralisation (Figure 33). There is currently not enough data to accurately interpret the strike and dip of these structures.

## 14.2.7 Typical Cross Section

Typical cross sections through the SMZ (Figure 32) and NMZ (Figure 33) demonstrate the mineralisation wireframes with weathering, overburden and topographic surfaces.

## 14.3 Sample Statistics

#### 14.3.1 General

The wireframes for the mineralised lithological units have been used to define the resource intersections. The individual lenses have been coded into the MINZON field in the desurveyed drill data files. They are then also coded into the ZONE field based on the lithological domain they fall within, and an OXIDE field based on the base of oxidation surface. For the SMZ an additional coding field, FEZON, was required within the copper - gold depleted and enriched zones of the magnetite skarn (Figure 31) to allow for separate down-hole compositing and estimation. Table 13 shows the ZONE coding applied to resource wireframes based on mineralised lithological domain.

Table 13: Mineralised Lithological Domain ZONE coding	

ZONE Number	Mineralised Lithological Domain	No. of Lenses	Deposit
1	magnetite skarn	4	SMZ
2	garnet skarn	10	SMZ
3	mixed garnet skarn / calc silicate	2	SMZ
4	gold "cap" oxide	1	SMZ
5	copper - gold oxide	1	SMZ
6	massive chalcocite	1	SMZ
7	mineralised breccia	1	SMZ
8	calc silicate	12	SMZ
9	mineralised meta sediment	1	SMZ
11	magnetite skarn	1	NMZ
12	garnet skarn	3	NMZ
13	massive chalcocite	2	NMZ
14	gold "cap" oxide	1	NMZ
15	copper - gold oxide	1	NMZ

The drill samples used to interpret the mineralisation are predominately 1 m length with some variability reflecting geological boundaries. The raw sample lengths within the mineralisation wireframes were analysed using a normal histogram plot (Figure 34). The plot shows that the majority of samples falling within the mineralisation envelopes are at 1 m intervals.



A 1 m interval length was selected for compositing and further geostatistical analysis. This composite length reflects the majority of sample intervals and is at a suitable scale for the resource wireframes. The down hole compositing was completed using the Datamine "COMDH" process with MODE = 1. Setting MODE to 1 forces all samples to be included in one of the composites by adjusting the composite length, while keeping it as close as possible to the nominated composite length. The maximum possible composite length will then be 1.5 times the nominated composite length.

The compositing process has had a minimal influence on the mean grade of the samples as shown in Table 14. One assay for Au and eleven assays for Cu falling within the resource wireframes had negative values representing below detection limit assays. These samples were converted to half detection limit values of 0.0025 g/t for Au and 0.001 % for Cu.

Duill data	Mean values							
Drill data	Length m	Fe %	Au g/t	Cu %	Ag g/t			
Raw	0.99	37.8	1.8	1.9	9.1			
1m Composites	1.00	37.5	1.8	1.9	9.0			

## Table 14: Results of compositing on mean sample grade



Figure 34: Normal histogram of raw sample lengths within Mabilo resource wireframes

## 14.3.2 Deposit Statistics

The composite drill sample file coded according to mineralised lithological unit was exported in .csv format and this file is used in GeoAccess software for analysis. Summary statistics are shown in Table 15, showing the differences in mean grades between the various mineralised lithological domains. Histograms and probability plots in normal scale for Fe and in log scale for Au, Cu and Ag were generated to assess grade population distributions; an example of these plots for Au in the SMZ magnetite skarn zone is shown in Figure 35.



Generally the SMZ has slightly higher mean Fe and Au grades than the NMZ, while mean Cu and Ag grades are slightly higher in the NMZ.

	Fe (%)								
ZONE	Number	Minimum	Maximum	Mean	Median	Std Dev	Variance	CoV	
1	1567	4.70	69.19	50.23	51.32	9.81	96.15	0.20	
2	509	2.45	51.71	20.69	19.24	11.56	133.58	0.56	
3	163	0.65	59.50	15.82	11.13	12.27	150.46	0.78	
4	263	1.86	67.11	44.70	50.69	17.04	290.50	0.38	
5	171	4.09	70.00	44.21	51.04	18.66	348.06	0.42	
6	75	14.59	65.66	39.41	37.18	13.38	179.00	0.34	
7	102	2.17	46.98	17.32	15.58	9.62	92.55	0.56	
8	187	1.51	38.62	10.63	7.01	9.24	85.39	0.87	
9	35	1.83	8.51	4.14	3.72	1.79	3.19	0.43	
11	686	5.87	67.31	45.79	46.57	10.37	107.53	0.23	
12	269	0.44	50.52	17.87	16.01	10.52	110.75	0.59	
13	16	3.84	43.23	24.42	27.09	14.27	203.58	0.58	
14	107	4.60	61.33	25.33	22.33	13.14	172.71	0.52	
15	78	2.20	49.30	18.32	15.45	11.55	133.49	0.63	
		-	A	u (g/t)	-		-	-	
ZONE	Number	Minimum	Maximum	Mean	Median	Std Dev	Variance	CoV	
1	1567	0.01	26.45	1.94	1.45	1.91	3.66	0.99	
2	509	0.02	17.36	1.15	0.66	1.62	2.63	1.42	
3	163	0.01	23.54	1.50	0.70	2.52	6.35	1.68	
4	263	0.02	26.08	3.68	2.54	3.58	12.83	0.97	
5	171	0.07	24.70	3.07	2.10	3.34	11.14	1.09	
6	75	0.58	5.90	2.35	2.08	1.17	1.38	0.50	
7	102	0.01	7.82	0.71	0.45	0.89	0.78	1.25	
8	187	0.02	3.69	0.58	0.40	0.53	0.28	0.91	
9	35	0.06	1.14	0.35	0.25	0.27	0.07	0.76	
11	686	0.03	15.49	2.16	1.87	1.53	2.35	0.71	
12	269	0.01	4.23	0.71	0.53	0.60	0.36	0.85	
13	16	1.58	16.99	4.44	2.35	4.28	18.28	0.96	
14	107	0.07	6.85	1.31	0.92	1.26	1.58	0.96	
15	78	0.07	7.19	1.52	0.98	1.61	2.60	1.06	
		-		Cu (%)	r		-	1	
ZONE	Number	Minimum	Maximum	Mean	Median	Std Dev	Variance	CoV	
1	1567	0.00	16.27	1.65	1.29	1.52	2.32	0.92	
2	509	0.01	13.37	1.11	0.68	1.44	2.08	1.30	
3	163	0.00	7.83	0.60	0.39	0.86	0.73	1.42	
4	263	0.01	10.50	0.27	0.16	0.72	0.52	2.66	
5	171	0.15	24.60	2.84	0.86	4.09	16.69	1.44	
6	75	4.64	50.22	21.56	19.27	11.08	122.67	0.51	
7	102	0.02	3.15	0.66	0.44	0.64	0.42	0.97	
8	187	0.06	2.90	0.64	0.51	0.46	0.21	0.71	
9	35	0.19	2.24	0.85	0.55	0.59	0.35	0.70	
11	686	0.06	23.30	2.35	2.03	1.72	2.96	0.73	
12	269	0.01	7.50	0.87	0.60	0.95	0.90	1.09	
13	16	7.06	63.91	23.63	12.01	19.18	368.03	0.81	
14	107	0.02	1.52	0.32	0.24	0.31	0.09	0.95	
15	78	0.10	12.35	2.37	1.53	2.15	4.64	0.91	

#### Table 15: Summary statistics by ZONE



#### Table 15 continued:

	Ag (g/t)									
ZONE	Number	Minimum	Maximum	Mean	Median	Std Dev	Variance	CoV		
1	1567	0.25	141.11	9.46	4.79	13.22	174.63	1.40		
2	509	0.25	127.12	6.06	2.60	10.84	117.54	1.79		
3	163	0.25	54.93	3.33	1.50	6.10	37.24	1.83		
4	263	0.14	232.89	4.45	0.31	21.16	447.66	4.75		
5	171	0.25	1191.60	27.91	6.00	99.66	9932.44	3.57		
6	75	0.25	161.00	14.75	7.63	25.66	658.49	1.74		
7	102	0.25	65.74	10.30	6.20	12.27	150.49	1.19		
8	187	0.25	107.15	3.84	1.69	9.40	88.31	2.45		
9	35	0.26	4.50	1.51	0.98	1.11	1.23	0.74		
11	686	0.25	62.32	10.92	8.80	8.49	72.13	0.78		
12	269	0.25	31.42	5.54	4.05	5.09	25.88	0.92		
13	16	1.42	92.48	26.12	17.90	28.90	835.28	1.11		
14	107	0.25	21.80	3.81	2.45	4.24	17.98	1.11		
15	78	0.25	163.59	12.61	6.10	24.06	579.05	1.91		







Correlations between grade variables were also analysed. Au and Cu were generally reasonably well correlated in the skarn and other unweathered zones. This correlation appears to break down in the weathered portions of the deposit. Ag appears to correlate to a lesser extent with Au in fresh zones other than within the magnetite skarn, and again generally poorly in the weathered zones. Fe generally does not correlate well with other grade variables. The correlation matrices are presented in Table 16.

<b></b>	7	-	7		2	-	2	-	7	-	-
ZONE=1	Fe	Au	Cu	ZONE=2	Fe	Au	Cu	ZONE=3	Fe	Au	Cu
Au	-0.04			Au	0.21			Au	0.14		
Cu	-0.02	0.77		Cu	0.13	0.81		Cu	-0.09	0.8	
Ag	-0.23	0.34	0.5	Ag	0.17	0.73	0.61	Ag	-0.06	0.77	0.96
ZONE=4	Fe	Au	Cu	ZONE=5	Fe	Au	Cu	ZONE=6	Fe	Au	Cu
Au	0.22			Au	0.3			Au	0.13		
Cu	-0.03	0.1		Cu	0.06	-0.04		Cu	-0.9	-0.09	
Ag	0.12	0.23	0.18	Ag	0.13	0.03	0.15	Ag	0.14	0.12	-0.07
ZONE=7	Fe	Au	Cu	ZONE=8	Fe	Au	Cu	ZONE=9	Fe	Au	Cu
Au	0.27			Au	0.44			Au	0.72		
Cu	0.59	0.45		Cu	0.33	0.65		Cu	0.65	0.77	
Ag	0.24	0.29	0.73	Ag	0.32	0.37	0.28	Ag	0.39	0.69	0.75
ZONE=11	Fe	Au	Cu	ZONE=12	Fe	Au	Cu	ZONE=13	Fe	Au	Cu
Au	0.29			Au	0.31			Au	-0.62		
Cu	0.21	0.84		Cu	0	0.52		Cu	-0.66	0.61	
Ag	0.04	0.36	0.45	Ag	0.07	0.29	0.59	Ag	-0.44	0.16	0.28
ZONE=14	Fe	Au	Cu	ZONE=15	Fe	Au	Cu				
Au	0.19			Au	0.28						
Cu	-0.01	-0.24		Cu	0.07	0.18					
Ag	0.05	0.01	0.36	Ag	0.27	0.26	0.44				

#### Table 16: Correlation matrices by ZONE

## 14.3.3 High Grade Cuts

The grade variables in each lithological domain zone were analysed to determine if high grade cuts were required to prevent estimation bias resulting from outlier grades. The data were analysed in GeoAccess software.

Where the CoV approached or exceeded a value 1.0 and outlier grades where noted in the histograms for a given ZONE, an analysis of the spatial location of higher grades was conducted for all grade variables. This in conjunction with analysis of grade population breaks or disintegration points in the histograms and probability plots (Au in the SMZ magnetite skarn zone in Figure 35 as an example) lead to the decision to apply high grade cuts to Au, Cu and Ag in some domains as shown in Table 17. In the magnetite skarn zone of the SMZ a small number of low grade outliers were unduly affecting the grade estimation leading to the decision to apply a bottom cut to Fe in this zone. The effect of the balancing cuts on domain grade population distribution is shown for Au in the SMZ magnetite skarn zone in Figure 36.

For ZONE = 3 in the SMZ, the two individual lenses making up this zone had sufficiently different grade population distribution characteristics that separate high grade cuts were deemed necessary as shown in Table 17.



## Table 17: High grade cuts applied to grade variables by ZONE

ZONE	Fe % (bottom cut)	Au g/t (top cut)	Cu % (top cut)	Ag g/t (top cut)
1	10	15	-	80
2	-	8	8	40
3 (MINZON=20)	-	-	-	8
3 (MINZON=21)	-	9	4	30
4	-	18	1.5	50
5	-	15	20	150
6	-	-	-	100
7	-	3.5	-	50
8	-	2.2	2.2	25
9	-	-	-	-
11	-	8	8	40
12	-	3	5	-
13	-	10	-	50
14	-	5	-	15
15	-	-	7.5	50



Figure 36: Log histogram (top) and probability (below) plots for Au high grade cut composited Au in SMZ magnetite skarn zones.



The effect of these cuts on mean grades has been relatively small except in the case of Ag where small numbers of relatively very high grade outliers have resulted in some significant reductions in mean grade (Table 18). The zones affected by the more significant reductions represent a relatively small proportion of the overall model.

Careful consideration of the locations of outlier samples was taken to ensure that the high grade cuts were not applied in the case of clusters of outlier grade values that would be indicative of real high grade zones. The CSA Global MRE is reported using the cut Fe, Au, Cu and Ag values.

Zono	Zono Number		e g/t	Mean Au	µg∕t	Mean Cu %		Mean Ag	gg/t
(MINZON)	of Samples	Uncut	Cut	Uncut	Cut	Uncut	Cut	Uncut	Cut
1	1,567	50.23	50.24	1.94	1.93			9.46	9.36
2	509			1.15	1.11	1.11	1.08	6.06	5.57
3 - (20)	82							1.55	1.52
3 - (21)	81			2.04	1.79	0.83	0.78	5.12	4.82
4	263			3.68	3.65	0.27	0.22	4.45	2.98
5	171			3.07	2.99	2.84	2.81	27.91	19.42
6	75							14.75	13.74
7	102			0.71	0.66			10.30	9.97
8	187			0.58	0.56	0.64	0.64	3.84	3.22
11	686			2.16	2.12	2.35	2.30	10.92	10.81
12	43			0.71	0.70	0.87	0.86		
13	34			4.44	4.01			26.12	20.97
14	8			1.31	1.29			3.81	3.66
15	169					2.37	2.27	12.61	10.06

#### Table 18: Effect of high grade cuts on mean grade by ZONE

## 14.3.4 Geostatistical Analysis

Understanding of the grade continuity and determining its extent and orientation is achieved through interpreting and modelling the experimental variogram. The experimental variogram requires sufficient sample data to provide a reliable measure of the grade continuity. The cut composited drill hole data for ZONE = 1 (SMZ magnetite skarn) and the combined ZONE = 4 and ZONE = 5 data (SMZ gold cap oxide and SMZ copper - gold oxide zones) were separately subjected to spatial continuity analysis using Isatis software. For the oxide zones sensible variograms could not be modelled using the data from any one single ZONE necessitating the combined data set from which sensible variograms could be modelled. The zones were selected as they are the most continuous and have the highest number of samples available for analysis in the fresh and oxide respectively. The spatial continuity analysis is used to determine kriging parameters. The results from ZONE 1 were applied to all unweathered zones in the SMZ and NMZ. Results from the combined ZONE 4 and 5 data were applied to all weathered zones in the SMZ and NMZ.

For all grade variables a Gaussian transform was applied to the data as no grade variables had a normal (Gaussian) population distribution as shown for ZONE 1 in Figure 37. The modelled Gaussian variograms were then back transformed. Due to the way Datamine calculates Kriging Efficiency (KE), the back transformed nugget and sill parameters needed to be normalised to





1 to ensure the KE was correctly calculated. The KE is used to help assess geostatistical confidence in the grade estimates and assist with Mineral Resource classification.

Figure 37: Histograms of ZONE=1 grade variables - raw (left) and gaussian transformed (right) for variogram modelling



The first step in the process is to determine the direction which shows the best correlation between samples (the lowest variance for the greatest distance). Confirmation of this direction using geological knowledge is important, as the direction of greatest continuity should be able to be explained by aspects such as structural or lithological continuity. Once the direction of greatest continuity (primary strike) is obtained, the variograms for the remaining two (2) orthogonal axes are determined (cross strike and cross dip).

Two structure spherical models were used for all grade variables in the modelling. The nugget effect modelled is fairly low for Fe and Cu and moderate for Au and Ag in ZONE 1 (Table 19). In ZONE 4 and 5 the nugget is low for Fe, and moderate for Au, Cu and Ag (Table 19).

## 14.3.5 Kriging Parameters

Table 19 presents the modelled back transformed variogram parameters normalised to a sill of 1. The rotation angles obtained from modelling ZONE 1 and ZONE 4 and 5 were adjusted to match the geometric geological continuity for each of the individual interpreted mineralisation lenses as shown in Table 20 for the SMZ. The rotation angles obtained from modelling ZONE 1 and ZONE 4 and 5 were adjusted to match the geometric geological continuity for each of the shown in Table 20 for the SMZ.

Modelled	Zones parameters	Grade	Modelled	Modelled	Modelled	Nugget
Zone	are applied to	Variable	Rot. Angle 1	Rot. Angle 2	Rot. Angle 3	Nugget
	1, 2, 3, 6, 7, 8, 9,	Fe	50	0	-50	0.06633
1		Au	50	0	-50	0.17432
T	11, 12, 13	Cu	50	0	-50	0.06496
		Ag	50	0	-50	0.10813
		Fe	50	-2	-10	0.06355
1 and E	A E 1A 1E	Au	50	-2	-10	0.1346
4 anu 5	4, 5, 14, 15	Cu	50	-2	-10	0.19057
		Ag	50	-2	-10	0.21522
Modelled Zone	Grade Variable	Structure	Axis 1	Axis 2	Axis 3	Sill
1	Fe		30	20	4.8	0.50842
	Au	1	50	49	4.5	0.26106
	Cu	T	50	20	2.2	0.20228
	Ag		35	20	3	0.2998
	Fe	1	25	24	7.2	0.51744
1 8. E	Au		30	35	5	0.54566
4 & 5	Cu	Т	70	20	14	0.4956
	Ag		25	20	12	0.25515
Modelled Zone	Grade Variable	Structure	Axis 1	Axis 2	Axis 3	Sill
	Fe		70	55	5.5	0.42525
1	Au	n	93	50	37	0.56462
T	Cu	2	95	65	28	0.73276
	Ag		190	57	50	0.59207
	Fe		47	41	20	0.41901
495	Au	2	57	40	25	0.31974
4 & 5	Cu	2	120	85	15	0.31383
	Ag		145	95	14	0.52963

Table 19: Variogram parameters – Datamine 3 – 2 – 1 (Z – Y – X) axis rotation convention



# Table 20: Adjusted Variogram Rotation Angles - Datamine 3 - 2 - 1 (Z - Y - X) axis rotation convention

SMZ MINZON	Rot. Angle 1	Rot. Angle 2	Rot. Angle 3
1	50	0	-40
2	50	0	-60
3	80	-40	-60
4	-50	90	0
10	50	0	-50
11	55	0	-50
12	50	20	-50
13	50	20	-50
14	50	0	-50
15	50	0	-50
16	45	-65	15
17	-40	0	60
18	-40	0	60
19	40	20	-25
20	45	0	-60
21	50	-55	35
30	50	-2	-10
31	50	-5	-20
32	50	0	-25
33	60	0	60
40	50	0	-55
41	65	-45	-30
42	55	-50	7
43	50	0	-55
44	50	-70	-55
45	-40	50	20
46	50	0	-60
47	60	0	-40
48	55	0	-60
49	-20	65	-15
50	50	0	-67
51	50	0	-60
60	50	0	-40
NMZ ZONE	Rot. Angle 1	Rot. Angle 2	Rot. Angle 3
11	50	0	-40
12	50	0	-40
13	50	10	0
14	70	5	0
15	70	5	0

An example of the variogram modelling is shown in Figure 38 for the Gaussian transformed Au variograms in the SMZ magnetite skarn. Figure 39 shows the back-transformed Au variograms in the SMZ magnetite skarn.



Figure 38: SMZ Magnetite skarn ZONE 1 Gaussian transformed Au variograms



Figure 39: SMZ Magnetite skarn ZONE 1 back-transformed Au variograms

## 14.4 Block Model

A volume block model was constructed in Datamine constrained by the topography, mineralisation zones, weathering surface, overburden surface and model limiting wireframes. Analysis of the drill spacing shows that the nominal average drill section spacing is 40 m with drill holes nominally 40 m apart over a small majority of the modelled areas. Infill drilling has been completed to a nominal 20 m by 20 m over significant areas of the modelled areas.

The previously reported MRE completed in 2014 was completed with a larger parent block size of 20 m E by 20 m N by 4 m RL, or nominally half the majority drill spacing. Initial test estimation iterations of this current MRE were completed based on the same block size, but



validation of the results was not satisfactory. Based on this result, a parent cell size of 10 m E by 10 m N by 5 m RL or nominally half the average infill drilling section spacing was selected. When estimating at this block size, results appear to more accurately represent the drill assay result data trends. Sub-cells down to 2.5 m E by 2.5 m N by 2.5 m RL were used to honour the geometric shapes. The block model parameters are shown in Table 21.

Direction	Minimum	Maximum	Block size (m)	Sub-block size (m)			
Easting	475,180	476,880	10	2.5			
Northing	1,559,000	1,560,680	10	2.5			
Elevation	-265	165	5	2.5			
Model field name	Field name explanation						
MINZON	Mineralisation I	ens					
OXIDE	Weathering state						
ZONE	Mineralised lith	Mineralised lithological domain					
FE	Estimated Fe gr	ade %					
AU	Estimated Au gr	ade g/t					
CU	Estimated Cu gr	ade %					
AG	Estimated Ag grade g/t						
DENSITY	Density						
CLASS	JORC Classificat	ion					

## Table 21: Block Model Parameters

The blocks were coded according to their location relative to the mineralisation wireframe envelopes, overburden boundary surface and weathering surface using the same coding used for the drill samples.

## 14.5 Grade Interpolation

All holes with available assay data were used in the grade estimation. Drill holes were downhole composited, top cut and flagged as described in the sections above. Ordinary kriging (OK) was the selected interpolation method with an inverse distance squared (IDS) check estimate also carried out. Grade estimation was carried out at the parent cell scale, with sub-blocks assigned parent block values. Grade estimation was carried out using hard boundaries between each individual lens (MINZON) in the SMZ and each ZONE for the NMZ. Soft boundaries were used between the lenses within each ZONE for the NMZ.

For the magnetite skarn mineralisation in the SMZ, as noted in Section 14.2.1, some sections showed a copper - gold depletion zone at the edges (see Figure 31 example). For this reason the copper, gold and silver were separately estimated in the un-depleted and depleted zones of the magnetite skarn with hard boundaries between the two within each magnetite skarn lens. Iron was estimated into the full volume of each magnetite skarn lens as no significant change in iron grade in the copper - gold depleted versus un-depleted zones was noted.

The search ellipse size and orientations were defined based on the overall geometry and drill data density of each MINZON for the SMZ and each ZONE for the NMZ. The search ellipse was



doubled for the second search volume and then increased 20 fold for the third search volume to ensure all blocks found sufficient samples to be estimated. The search ellipse dimensions are designed to ensure that the majority of blocks were estimated from within the first search volume. The search ellipse dimensions and orientations are shown in Table 22 with the Datamine 3-2-1 (Z-Y-X) axis rotation convention followed.

SMZ - MINZON	Maior	Semi Maior	Minor	Rot. Angle	Rot. Angle	Rot. Angle
		,		1	2	3
1	80	60	20	50	0	-40
2	80	60	20	50	0	-60
3	40	30	10	80	-40	-60
4	20	15	10	-50	90	0
10	20	20	10	50	0	-50
11	60	30	10	55	0	-50
12	60	20	10	50	20	-50
13	30	20	10	50	20	-50
14	80	30	10	50	0	-50
15	60	30	20	50	0	-50
16	80	60	20	45	-65	15
17	40	20	10	-40	0	60
18	40	20	15	-40	0	60
19	60	20	15	40	20	-25
20	60	40	10	45	0	-60
21	60	40	10	50	-55	35
30	60	30	10	50	-2	-10
31	70	30	15	50	-5	-20
32	30	25	15	50	0	-25
33	60	30	15	60	0	60
40	20	20	10	50	0	-55
41	30	20	10	65	-45	-30
42	30	20	10	55	-50	7
43	20	20	10	50	0	-55
44	20	20	10	50	-70	-55
45	40	25	10	-40	50	20
46	45	45	10	50	0	-60
47	40	40	10	60	0	-40
48	60	30	10	55	0	-60
49	60	30	10	-20	65	-15
50	20	20	10	50	0	-67
51	20	20	10	50	0	-60
60	20	20	15	50	0	-40
NMZ - ZONE	Major	Semi Major	Minor	Rot. Angle 1	Rot. Angle 2	Rot. Angle 3
11	80	60	30	50	0	-40
12	80	60	20	50	0	-40
13	30	20	10	50	10	0
14	60	30	15	70	5	0
15	40	20	10	70	5	0

# Table 22: Estimation search ellipse dimensions and orientation in Datamine axis rotation convention 3-2-1 (Z-Y-X)

The minimum and maximum number of samples used to estimate each block was varied as shown in Table 23, dependant on the number of samples available in each estimation zone.



The sample numbers were also reduced as shown in Table 23 for the second and third search volumes. Test model iteration validations showed some minor issues with copper, gold and silver grade estimates in the third search volume. As a result the minimum required samples for the third search were slightly reduced compared to the iron estimate for some zones (Table 23), resulting in more satisfactory validation results. The maximum samples per drill hole allowed was varied according to the number of drill holes and associated drill samples intersecting the estimation zone as shown in Table 23. Cell discretisation was 5 E by 5 N by 5 Z and no octant based searching was utilised.

The differences in the zones estimated for iron versus those estimated for copper, gold and silver in the SMZ are due to the depletion issue, and the mineralisation lens hard / soft boundary selection differences between the SMZ and NMZ grade estimations meant that three separate estimation models were required. These were:

- the SMZ copper, gold and silver model,
- the SMZ iron model, and,
- the NMZ all grade variables model.

These three separately estimated models were then added together at the end to form one single grade-estimated model.

SMZ - MINZON - Cu,	Min.	Max.	Min.	Max.	Min.	Max.	Max. per
Au, Ag	S.Vol.1	S.Vol.1	S.Vol.2	S.Vol.2	S.Vol.3	S.Vol.3	hole
1, 2, 30, 31, 32	10	30	10	24	10	20	5
3, 11, 12, 14, 15, 16, 17, 33, 47	10	30	10	24	10	20	6
49	10	30	10	24	10	20	8
19, 20, 21	10	30	10	24	10	20	10
18	10	30	10	24	10	20	15
60	10	30	10	24	10	20	20
46	10	30	10	24	9	20	8
43	10	30	10	24	8	20	8
45	10	30	10	24	8	20	9
4	10	30	10	24	8	14	14
41	10	30	10	24	7	20	6
48	10	30	10	24	6	20	6
40, 50	10	30	10	24	6	20	7
10	10	30	10	24	6	9	9
51	10	30	10	24	5	20	6
13, 44	10	30	10	24	4	20	6
42	10	30	10	24	3	20	6

#### Table 23: Estimation sample number parameters



#### Table 23 continued:

	Min.	Max.	Min.	Max.	Min.	Max.	Max. per
SIVIZ - IVIINZON - Fe	S.Vol.1	S.Vol.1	S.Vol.2	S.Vol.2	S.Vol.3	S.Vol.3	hole
1, 2, 30, 31, 32	10	30	10	24	12	20	5
3, 11, 12, 14, 15, 16, 33, 47	10	30	10	24	12	20	6
49	10	30	10	24	12	20	8
19, 20, 21	10	30	10	24	12	20	10
60	10	30	10	24	12	20	20
17	10	30	10	24	10	20	6
18	10	30	10	24	10	20	15
46	10	30	10	24	9	20	8
43	10	30	10	24	8	20	8
45	10	30	10	24	8	20	9
4	10	30	10	24	8	14	14
41	10	30	10	24	7	20	6
48	10	30	10	24	6	20	6
40, 50	10	30	10	24	6	20	7
10	10	30	10	24	6	9	9
51	10	30	10	24	5	20	6
13, 44	10	30	10	24	4	20	6
42	10	30	10	24	3	20	6
NMZ - ZONE - Fe, Cu,	Min.	Max.	Min.	Max.	Min.	Max.	Max. per
Au, Ag	S.Vol.1	S.Vol.1	S.Vol.2	S.Vol.2	S.Vol.3	S.Vol.3	hole
11, 12	10	30	10	24	10	20	5
13	4	9	4	8	4	8	5
14, 15	10	20	10	16	8	12	5

## 14.6 Bulk Density and Material Type

Of the 1,009 bulk density measurements that were considered valid, 220 fall within the modelled mineralisation zones; 29 in the weathered zone and 191 in the un-weathered zones. Analysis of the grade variables compared with the density measurements from the weathered zones and unweathered zones did show a reasonable correlation between Fe grade and density exists in the mineralised material. The correlation co-efficient was 0.80 for combined weathered mineralised zones and 0.73 for combined unweathered mineralised zones as shown in the scatter plots in Figure 40. The linear regression equations describing these correlations are shown below:

## Weathered mineralisation Density = (0.0353 \* (Fe Grade)) + 1.5904

Unweathered mineralisation Density = (0.0354 \* (Fe Grade)) + 2.3417





Figure 40: Fe vs SG scatter plot

The mean model density for unweathered material is  $3.69 \text{ t/m}^3$  and the mean model density for weathered material is  $2.96 \text{ t/m}^3$ . This is consistent with the mean measured density of  $3.70 \text{ t/m}^3$  and  $3.01 \text{ t/m}^3$  for unweathered and weathered mineralisation respectively.

Waste blocks have been assigned the average measured density outside the interpreted mineralisation zones. In the overlying Labo Volcanic sequence the mean density is  $2.0 \text{ t/m}^3$ , for the weathered waste the mean density is  $2.33 \text{ t/m}^3$ , while for the unweathered waste rock the mean density is  $2.71 \text{ t/m}^3$ .

## 14.7 Mineral Resource Classification

The Mabilo Mineral Resource has been classified as Indicated and Inferred based on CIM Guidelines adopted under the Canadian National Instrument 43-101 ("NI 43-101"). The classification level is based upon an assessment of geological understanding of the deposit,



geological and mineralisation continuity, drill-hole spacing, quality control results and an analysis of available density information.

The SMZ and NMZ at the Mabilo Project show reasonable continuity of mineralisation within well-defined geological constraints. Drill holes are located at nominal 20 m to 40 m spacing on nominal 20 m to 40 m spaced, northeast orientated drill sections over the SMZ, and roughly north-south orientated primary sections with northeast orientated infill drill sections over the NMZ.

The drill spacing is sufficient to allow the geology and mineralisation zones to be modelled into coherent wireframes for each domain. Reasonable consistency is evident in the orientations, thickness and grades of the mineralised zones.

The Mineral Resource is classified as Indicated where, in the QP's opinion, sufficient data exists to assume geological and mineralisation continuity.

For areas with more limited data density, and limited along-strike or down-dip continuity, there is sufficient evidence to imply but not verify geological and grade continuity and these areas are classified as Inferred.

## 14.8 Results

The results of the Mineral Resource estimate for the Mabilo deposit reported above a 0.3 g/t Au cut-off grade are presented in Table 24.

Table 24: Mabilo Project North and South Mineralised Zones Mineral Resource Estimate
(0.3 g/t Au cut-off)

Weathering State	Classification	Million Tonnes	Cu %	Au g/t	Ag g/t	Fe %	Cu Metal (Kt)	Au Oz ('000s)	Fe Metal (Kt)
Oxide +	Indicated	0.78	4.1	2.7	9.7	41.2	32.1	67.1	320.8
Supergene	Inferred	0.05	7.8	2.3	9.6	26	3.7	3.5	12.3
Fresh	Indicated	8.08	1.7	2	9.8	46	137.7	510.5	3,713.7
	Inferred	3.86	1.4	1.5	9.1	29.1	53.3	181.5	1,121.8
Combined	Indicated (Total)	8.86	1.9	2	9.8	45.6	169.8	577.6	4,034.5
Combined	Inferred (Total)	3.91	1.5	1.5	9.1	29	57	184.9	1,134.1

Note: Differences may occur due to rounding. All elements reported as total estimated in-situ for blocks above a 0.3 g/t Au lower cut-off, no recovery factors have been considered. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

The Mineral Resource is reported for all model blocks above this cut-off grade. No mining activity has taken place on the SMZ and NMZ and therefore there has been no depletion of the resource.

The Mineral Resource is not believed to be materially affected by any known environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant factors.





Figure 41: Mabilo Block model coloured by Au g/t (Oblique view)



Figure 42: Mabilo Block model coloured by Cu % (Oblique view)



## 14.9 Grade Tonnage

Grade tonnage tables have been generated for Au and Cu by classification. The grade tonnage tables for Indicated Mineral Resources are shown in Table 25 and Table 26. The grade tonnage curves for the Indicated Mineral Resource are shown in Figure 43 and Figure 44.

Au g/t Cut- off grade	Million Tonnes	Au g/t	Fe %	Cu %	Ag g/t	Au Metal (KOz)	Fe Metal (Kt)	Cu Metal (Kt)	Ag Metal (KOz)
4.5	0.3	5.3	47.6	2.6	15.1	51.0	141.7	7.7	144.4
4	0.5	4.9	47.5	2.7	15.4	75.9	228.2	13.1	238.1
3.5	0.8	4.5	47.0	2.8	15.0	113.6	372.6	21.9	383.7
3	1.3	4.0	46.9	2.8	14.5	165.6	607.6	36.3	605.8
2.5	2.2	3.4	47.2	2.8	13.6	249.0	249.0 1,061.5		983.2
2	3.9	2.9	47.3	2.7	12.2	364.8	1,825.5	105.0	1,516.6
1.5	5.8	2.5	47.0	2.4	11.2	471.9	2,710.3	139.6	2,084.4
1	7.6	2.2	46.6	2.1	10.6	547.9	3,563.7	160.7	2,608.0
0.5	8.7	2.0	45.8	1.9	9.9	576.0	4,006.5	169.2	2,778.2
0.3	8.9	2.0	45.6	1.9	9.8	577.6	4,034.5	169.8	2,787.6
0	9.2	2.0	45.8	1.8	9.5	579.3	4,226.2	170.0	2,801.6

Table 25: Mabilo combined SMZ and NMZ Indicated materials Grade Tonnage Table for Au



Figure 43: Mabilo combined SMZ and NMZ Indicated materials Grade Tonnage curve for Au



Cu % Cut- off grade	Million Tonnes	Cu %	Fe %	Au g/t	Ag g/t	Cu Metal (Kt)	Fe Metal (Kt)	Au Metal (KOz)	Ag Metal (KOz)
4.5	0.2	14.7	42.4	2.8	17.1	28.9	83.4	17.7	107.8
4	0.3	11.0	44.2	3.2	16.4	33.3	133.2	31.3	158.9
3.5	0.5	8.0	45.5	3.4	15.8	41.0	231.9	55.4	259.6
3	0.9	5.9	46.3	3.4	15.7	54.3	426.6	99.3	464.2
2.5	1.7	4.4	47.1	3.2	15.1	75.7	804.8	173.2	828.4
2	3.0	3.5	47.3	2.8	14.1	104.5	1,420.6	272.5	1,357.5
1.5	4.6	2.9	47.2	2.5	13.1	132.9	2,185.7	376.9	1,950.1
1	6.4	2.4	47.0	2.3	12.0	155.2	3,016.8	467.7	2,471.1
0.5	8.0	2.1	46.3	2.1	10.6	167.1	3,711.4	530.4	2,727.5
0.3	8.5	2.0	45.7	2.0	10.1	169.2	3,881.2	550.1	2,767.4
0	9.2	1.8	45.8	2.0	9.5	170.0	4,226.2	579.3	2,801.6

#### Table 26: Mabilo combined SMZ and NMZ Indicated materials Grade Tonnage curve for Cu



Figure 44: Mabilo combined SMZ and NMZ Indicated materials Grade Tonnage curve for Cu

## 14.10 Model Validation

Model validation was carried out graphically and statistically to ensure that block model grades accurately represent the drill-hole data. Drill-hole cross sections were examined to ensure that model grades honour the local composite drill-hole grades. Overall the visual assessment indicated that the trends of the modelled grades appeared consistent with the drill hole grade trends.



A quantitative assessment of the estimate was completed by comparing the average grades of the drill composite input file against the block model grades for each zone. At the same time the OK grades were checked against the IDS grades. The results of this comparison are shown in Table 27.

ZONE	% of Model		Fe %			Cu %			Au g/t			Ag g/t		
	Tonnes	ОК	IDS	DH	ОК	IDS	DH	ОК	IDS	DH	ОК	IDS	DH	
1	57.1%	48.8	49.2	50.2	1.6	1.5	1.7	1.9	1.8	1.9	10.3	10.3	9.4	
2	11.6%	20.0	20.1	20.7	1.1	1.1	1.1	1.2	1.2	1.1	5.4	5.3	5.6	
3	4.7%	15.2	14.4	15.8	0.6	0.6	0.6	1.4	1.5	1.4	3.2	3.6	3.2	
4	2.5%	42.6	43.8	44.7	0.2	0.2	0.2	3.1	3.3	3.7	2.7	2.7	3.0	
5	2.1%	43.9	44.2	44.2	2.6	2.7	2.8	2.4	2.4	3.0	18.0	17.4	19.4	
6	0.8%	38.4	38.2	39.4	23.2	22.9	21.6	2.3	2.3	2.3	12.6	12.7	13.7	
7	0.8%	16.0	16.0	17.3	0.7	0.7	0.7	0.6	0.6	0.7	9.5	10.6	10.0	
8	3.0%	11.2	11.5	10.6	0.6	0.6	0.6	0.6	0.6	0.6	3.6	3.5	3.2	
9	0.3%	4.2	4.3	4.1	0.9	0.9	0.8	0.4	0.4	0.4	1.4	1.4	1.5	
11	13.6%	46.2	46.3	45.8	2.4	2.3	2.4	2.2	2.1	2.2	11.4	11.2	10.9	
12	2.8%	18.7	18.4	17.9	0.9	0.9	0.9	0.7	0.7	0.7	5.2	5.3	5.5	
13	0.1%	28.2	27.1	24.4	26.0	27.4	23.6	3.6	3.8	4.4	17.0	16.7	26.1	
14	0.5%	29.0	30.0	25.3	0.2	0.2	0.3	1.8	1.8	1.3	3.3	3.3	3.8	
15	0.2%	19.0	19.3	18.3	2.7	2.7	2.4	2.4	2.5	1.5	13.1	12.6	12.6	

## Table 27: Mean model OK vs IDS vs drill composite grades

Trend plots were generated for all grade variables, in easting at 40 m intervals, northing at 40 m intervals and elevation at 10 m bench heights, for model and drill hole data for the combined ZONEs in the SMZ and NMZ separately, and then for each individual ZONE. These trend plots compare the trends of data in each direction and reveal whether the estimated block grades follow the trend of sample grades in each direction.

The combined ZONE trend plots for Cu, Au and Ag in the SMZ and NMZ generally demonstrate reasonable spatial correlation of model estimate and drill-hole grades after consideration of drill coverage, volume variance effects and expected smoothing.

The trend plots for the combined ZONEs in the SMZ and NMZ for Fe did show some anomalies and model grades apparently trending higher than the drill-hole grades. This is accounted for by the volume variance effect of large model volumes in comparatively high Fe grade magnetite skarn zones. The individual ZONE plots then demonstrated that the model Fe grade trends do follow the drill-hole Fe grade trends in each ZONE.

The northing plots for the SMZ magnetite skarn for Au, Cu and Fe are shown in Figure 48 to Figure 50.





Figure 45: SMZ magnetite skarn trend plot model vs drill-hole composites for Au by northing



Figure 46: SMZ magnetite skarn trend plot model vs drill-hole composites for Cu by northing





Figure 47: SMZ magnetite skarn trend plot model vs drill-hole composites for Cu by northing

## 14.11 Previous Mineral Resource Estimates

The maiden MRE for the Mabilo project SMZ and NMZ was reported in November 2014 with the results shown in Table 28. Total Indicated Mineral Resources reported in November 2015 have increased compared to the November 2014 MRE by 3.0 Mt, as reported above a lower cut-off grade of 0.3 g/t Au. Total Inferred Mineral Resources reported in November 2015 have decreased compared to the November 2014 MRE by 1.6 Mt, as reported above a lower cut-off grade of 0.3 g/t Au with the majority of this reduction due to conversion of Mineral Resources from Inferred to Indicated. Reported grades have decreased slightly for the 2015 MRE compared to the 2014 MRE, but contained metal has increased (Table 20 and Table 21).

Weathering State	Classification	Million Tonnes	Cu %	Au g/t	Ag g/t	Fe %	Cu Metal (Kt)	Au Oz ('000s)	Fe Metal (Kt)
Oxide +	Indicated	0.73	4.4	2.8	9.5	42.6	32.2	67.0	312.7
Supergene	Inferred	0.13	3.1	2.2	10.4	34.9	3.9	9.0	43.6
Fresh	Indicated	5.13	1.7	2.1	8.3	49.9	88.9	347.0	2,563.0
	Inferred	5.37	1.5	1.7	12.9	39.1	80.4	293.0	2,101.9
Combined	Indicated (Total)	5.87	2.1	2.2	8.4	49.0	121.1	414.0	2,875.7
Combined	Inferred (Total)	5.50	1.5	1.7	12.9	39.0	84.3	302.0	2,145.6

Table 28: Mabilo Project North and South Zones Mineral Resource Estimate (0.3 g/t Aucut-off) as at November 2014

*Note: Differences may occur due to rounding. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.*


# **15 Mineral Reserve Estimates**

Mineral Reserve Estimates are not yet complete for the Mabilo Project.



# **16 Mining Methods**

Mining studies are not yet complete for the Mabilo Project.



# **17 Recovery Methods**

Although preliminary testwork has been completed, metallurgical studies are not yet complete for the Mabilo Project and results have not been reported.



# **18 Project Infrastructure**

The Mabilo Property is readily accessed from Manila, the capital of the Philippines, by road and air.

Road infrastructure is reasonably well developed in the surrounding area. The international Port of Jose Panganiban is 35 km northwest of Daet and a 66 kVA main grid line is within 10 km of the project.

The terrain in the Mabilo Project area is low lying to slightly undulating. It is transected by several north-flowing streams which provide a constant source of water.



# **19 Market Studies and Contracts**

Not applicable as marketing studies have not been completed for this project.



## 20 Environmental Studies, Permitting and Social or Community Impact

Not applicable as environmental studies are not yet been complete for the Mabilo Project.



# 21 Capital and Operating Costs

Not applicable as mining studies are not yet complete for the Mabilo Project.



# **22Economic Analysis**

Not applicable as mining studies are not yet complete for the Mabilo Project.



# 23 Adjacent Properties

CSA Global is not aware of any significant active exploration on mining properties in the immediate vicinity of the Mabilo Property. However, small-scale mining for direct shipping oxide ore is variably active at a number of skarn occurrences to the north of Mabilo. These occurrences, Binit, B1, and Mayaman, were described in Section7.5. No data is available on production or grade.



# 24 Other Relevant Data and Information

There is no other data or information that is relevant to this assessment of the Mabilo Property that has not been disclosed elsewhere in the document.



## **25 Interpretation and Conclusions**

The Mabilo Property occurs in the Paracale district of the Pacific Cordillera magmatic arc belt of the Philippines archipelago. The Paracale district has a long history of gold and iron mining. The Property comprises one granted Exploration Permit (EP-014-2013-V) and one Exploration Permit Application (EXPA-000188-V). The Property area is relatively flat lying and is accessed by 15 km of all-weather road from the nearby town of Labo.

The modelled mineralisation is a copper–gold–magnetite skarn deposit. This is a relatively common type of skarn deposit, typically associated with mid-level intermediate calc-alkaline intrusions cutting carbonate rocks in magmatic arcs. The two deposit areas modelled, the NMZ and SMZ, are roughly 150 m apart interpreted to represent fault offset of a previously continuous skarn body. The mineralised skarn relaces a clean limestone or marble unit within variably calcareous siliciclastic and epiclastic sediments of the Tumbaga Formation, metamorphosed to hornfels in the contact zone of an intrusive quartz-diorite stock. The sedimentary stratigraphy and skarn dip at generally 40-60 degrees southwest, while the skarn plunges southeast. The SMZ remains open to the southeast and the NMZ remains open to the north.

The main magnetite skarn horizon varies from 20 to over 80 m thick. The magnetite skarn and the copper-gold mineralisation are very continuous, but the down-dip contact of magnetite skarn with limestone (or limestone dissolution breccia) is irregular but sharp. Variably developed late pyrite overprint of skarn and associated brecciation with silica-clay alteration increases local grade variability. As a result of the pyrite overprint, total iron values do not equate to magnetite content, which based on available metallurgical results represents about 80% of the total iron.

The skarn occurs in Eocene sediments that are covered by 30 to 50 m of Quaternary volcanics. Palaeo-weathering beneath the volcanics has resulted in development of an oxide zone in the upper 10 to 30 m of the skarn where it underlies the unconformity at the north end of the SMZ and in the NMZ. The oxide zone is characterised by hematite with enhanced gold grade and reduced copper grade. A copper-enriched supergene zone is locally developed at the base of the oxide zone.

The quartz-diorite stock at Mabilo is not significantly altered. However, strongly altered porphyry dykes have been intersected in the contact zone of the stock, and veins similar to D-veins in a typical porphyry-copper system have been intersected in intrusive rock and altered host metasediments. This suggests that the main stock may not be the causative intrusion and points to potential for a porphyry-copper deposit at depth. The silica-clay-pyrite alteration and hydraulic brecciation are also suggestive of acid steam-driven argillic alteration above or peripheral to a mineralising porphyry.

Exploration and discovery at Mabilo has been driven by testing of modelled magnetic bodies. Drilling has shown that high-grade mineralisation can also occur in garnet skarn without magnetite, while drilling of the Southeast Anomaly has shown that magnetite skarn can occur



without significant copper-gold mineralisation. An improved understanding of zonation and mineralisation controls in the Mabilo system is needed to support effective future exploration, including understanding of lithostratigraphy, structure, alteration, and intrusive events. Future exploration combining this understanding with additional targeting methods, including IP surveys and base of Labo geochemistry, has the potential to drive further discovery success.

The domains in the resource model have been developed based on geology and grade distribution, however they do not take into account all the variability in mineralisation type that is significant for metallurgical performance. This most importantly includes the degree of clay-silica-pyrite overprint and breccciation, as well as hypogene bornite domains. A geometallurgical model is a high priority using a combination of logging, multi-element analytical data, and potentially hyperspectral data on sample pulps.

The drill data used as the basis for the MRE is stored in an industry standard relational database. The MRE is based on data obtained from 99 diamond drill holes completed as of the end of September 2015. Of the drill holes used in the modelling, 82 holes have intersected the interpreted mineralisation zones with a combined down hole distance of 4,223.61 m. Comprehensive drilling and QAQC protocols have been employed by Mt Labo and the drill data is considered acceptable for use in resource estimation.

Holes are drilled on a nominal 40 m by 40 m drill pattern along strike, with infill to a nominal 20 m by 20 m in parts. About 30% of the holes have been drilled vertically. Roughly 40% of the holes have been drilled at 60° and the remainder drilled at angles between 45° and 80°. The direction of these holes is broadly perpendicular to the mineralisation, with a number of holes drilled in directions intended to help with the understanding and interpretation of structures, which appear to be offsetting the mineralisation. The drilling density has been sufficient to develop a fairly robust geological model of the Mabilo deposits.

A geological model was provided to CSA Global by Mt Labo, based on implicit modelling of the logged lithology using LeapFrog<sup>®</sup> software and understanding of deposit geometry developed over time. The model includes lithological solid envelopes, interpreted structures, the boundary contact surface of the overlying Labo volcanic sequence and an oxide weathering boundary surface. This model formed the basis for the interpretation of 30 separate 3-D mineralised lithological envelopes that were constructed using CAE Studio 3 ('Datamine') software.

Modelled magnetite skarn envelopes were interpreted based on drill-hole lithological logging, since this unit is high in magnetite content. The unit was limited against interpreted structures. Within the magnetite skarn unit small zones along sections of the edges are not mineralised with Au and Cu above the selected 0.3 g/t Au or 0.3% Cu grade cut-off. Separate Au / Cu mineralised magnetite skarn envelopes were generated to ensure that the grade continuity can be more accurately represented during grade estimation. Other lithological units modelled in the system are also not necessarily mineralised to potentially economic levels of Au, Cu and Fe throughout their full extent. These envelopes were modelled using lithological logging and nominal lower cut-off grades of 0.3 g/t Au or 0.3% Cu. The 3-D envelopes representing the mineralised zones were grouped into 14 domains based on lithology type and deposit location for estimation and reporting.



A block model constrained by the interpreted mineralised envelopes and boundary surfaces provided by RTG was constructed using Datamine. A parent cell size of 10 m E by 10 m N by 5 m RL was adopted. 1 m composited samples were used to interpolate Cu, Au, Ag and Fe grades into the block model. Block grades validated by means of swath plots, overlapping histograms of sample and block model data and comparison of mean sample and block model grades for each domain. Cross sections showing the block model and drill-hole data were also reviewed. The modelled resources are undiluted and therefore appropriate dilution needs to be incorporated in any evaluation of the deposit.

Density was assigned to the model based on linear regression formulas determined for the weathered and unweathered zones. The regression formulas are based on the correlation between specific gravity and Fe which followed statistical analysis. The overall average density of the mineralised weathered zones is  $2.96 \text{ t/m}^3$  compared to  $3.70 \text{ t/m}^3$  for the unweathered zones. The average density from measured samples taken outside the interpreted mineralised zones was assigned to waste blocks.  $2.2 \text{ t/m}^3$  was assigned in the Labo volcanic sequence,  $2.33 \text{ t/m}^3$  was assigned in the weathered zone and  $2.71 \text{ t/m}^3$  was assigned in the unweathered zone. As additional density information is collected the density assigned to the model may change and thus affect resource tonnages.

The Mineral Resource is classified as Indicated where in the Competent Persons opinion, sufficient data exists to assume geological and mineralisation continuity. For areas with more limited data density, and limited along-strike or down-dip continuity, there is sufficient evidence to imply but not verify geological and grade continuity and these areas are classified as Inferred.

The grade, quantity and coherence of currently defined Mineral Resources are considered to be sufficient to allow eventual economic extraction, but further studies will be required to verify this opinion.



### 26 Recommendations

Further drilling is recommended to test the potential for extensions to the current Mineral Resource in the SMZ and NMZ along strike and at depth.

Additional drilling testing targets outside the NMZ and SMZ, including porphyry targets, should be guided by a lithostratigraphic and structural model for the Property based on existing drilling and geophysical data. The targeting model should also incorporate a systematic lithogeochemical and spectral alteration study, and petrogenetic and chronologic study of intrusive rocks. High-powered 3D IP is recommended as an exploration technique that has the potential to directly detect non-magnetic mineralised skarn and porphyry style mineralisation. This should be supported by base-of-Labo geochemical sampling.

Testing of the Southeast Anomaly is a priority based on better understanding of the temporal and spatial zonation from barren to mineralised magnetite skarn.

A geometallurgical model is strongly recommended to take account of the metallurgical variability that is not represented in the current resource model, especially the silica-pyriteclay overprint. A pilot study to assess the contribution of hyperspectral analysis of pulps in modelling clay distribution should be undertaken. Otherwise the geometallurgical model can be based on logging and multi-element geochemistry.

Infill drilling is recommended within the SMZ and NMZ to further validate the geological interpretation and thus add to the confidence in the results of the MRE, and potentially upgrade the Mineral Resource classification.

Additional density data should be collected to ensure that density values applied in the model are fully representative of the in situ material to increase confidence in the results of the MRE. These measurements should be directed towards collecting sufficient density data from within each different mineralised lithology type to ensure that more robust estimates of density by lithotype can be completed. They should also assess the risk of a positive density bias resulting from measurement bias towards intact core by using alternative density measurement methodology, including plastic wrapping, the calliper method on whole core, or whole-tray weighing.

Additional CRM standards that are matrix matched to the mineralisation at Mabilo should be sourced with certification assay method matching intended assay method. These standards should also be selected to match the mean and higher grade range of the mineralisation at Mabilo as current matrix matched standards are at the lower end of the grade range.

Additional work should be completed to define the structural geological framework, both to define exact limits of currently interpreted zones and to assist with further exploration targeting.



An initial geotechnical study should be completed as soon as possible using the data obtained from the drilling. This information will be required to advance the project to the mine evaluation stages.

Additional metallurgical testwork should be completed as a priority to determine processing options from the oxide zone through transition (with multiple supergene copper species) into fresh magnetite skarn and to determine how this affects copper and gold recoveries. This should also focus on the pyrite-arsenopyrite overprint and determine whether any associated gold is present. It is beyond the scope of this report to make specific recommendations on the details of the metallurgical programme.



### 27 References

- Delfin, D.M. and Tauli, G.A., 1990: Report on the Results of the initial Drilling Program conducted on the Mabilo Prospect, Labo, Camarines Norte. Goldfields Asia Ltd Report No PI 13/1990 (Unpub).
- Encom, 2007: Review of Previous Exploration by Goldfields (1989) and 2007 Ground Magnetic Survey and Exploration Recommendations. Unpublished Company Report to Eldore Mining Corporation.
- Fernandez, F.C., 1965: Geology of the Labo Iron Deposits, Labo, Camarines Norte, Philippine Bureau of Mines Manila.
- Frost, J.E., 1965: Controls of Ore Deposition for the Larap Mineral Deposits, Camarines Norte, Philippines. Unpub PhD Thesis, Stanford University.
- Garwin, S., Hall, R., and Watanabe, Y., 2005: Tectonic Setting, Geology, and Gold and Copper Mineralization in Cenozoic Magmatic Arcs of Southeast Asia and the West Pacific, Economic Geology 100th Anniversary Volume.
- Green, A., Reynolds, N., and Louw, G., 2014, NI.43-101Technical Report, Mabilo Copper-Gold-Iron Project. CSA Global Report R312.2014 to RTG Mining Inc.
- Hedenquist, J. W., Arribas, A., Jr., and Reynolds, T. J., 1998: Evolution of an intrusion-centered hydrothermal system; Far Southeast-Lepanto porphyry and epithermal Cu-Au deposits, Philippines, Economic Geology, V 93.
- JICA, 2002: Report on Co-operative Mineral Exploration in the Bicol North Area, The Republic of Philippines, Consolidated Report, Japan International Cooperation Agency, Metal Mining Agency of Japan.
- Kirkham, R.V., and Sinclair, W.D., 1995: Porphyry copper, gold, molybdenum, tungsten, tin, silver, *in* Eckstrand, O.R., Sinclair, W.D., and Thorpe, R.I., eds., Geology of Canadian Mineral Deposit Types: Geological Survey of Canada, Geology of Canada, no. 8, p. 421-446.
- Leach, 2005: Comments on the Results of Drilling in the Millsite-Sinko and Bagong Dose Areas, Nalesbitan Project Area. Report for Nalesbitan Mining by Terry Leach & Co., 37pp.
- Maude, G., 2012: Mabilo Ground TMI survey. Southern Geoscience Consultants Pty Ltd Report No. SGC2538 to Sierra Mining Ltd.
- Meinert, L.D., Dipple, G. M., and Nicolescu, S., 2005: World Skarn Deposits: in Hedenquist, J.W., Thompson, J.F.H., Goldfarb, R.J., and Richards, J.P., eds., Economic Geology 100th Anniversary Volume, Society of Economic Geologists, Littleton, Colorado, USA, p. 299-336.



MGB, 2013: website accessed 24/01/2014. http://www.mgb.gov.ph

Page, M.L., 2002: Independent Geologists Report for Indophil Resources NL Prospectus.

- Pena, R.E., 2008: Lexicon of Philippine Stratigraphy. Geol Soc. Of Philippines.
- Quebral, R., Pubellier, M. and Rangin, C., 1996: The onset of movement on the Philippine fault in eastern Mindanao: A transition from a collision to strike slip environment., Tectonics, V15.
- Reynolds, N., 2014, R118.2014 NI43-101 Technical Report RTG Mining Inc. Mabilo Copper-Gold-Iron Project.
- Samonte, C.S., 1975: Geological Verification of Iron and Copper Mineralisation of the Venida Mine Claim in Labo. Bureau of Mines.
- Sajona, F.G., 2013: Philippine Mineralisation in Time, Space and Geology., Presentation to Philippine Mineral Exploration Association.
- Sierra Mining Limited, 2013a: 2013 Annual Report. Sierra company report.
- Sierra Mining Limited, 2013b: September 2013 Quarterly Report. Announcement to the Australian Securities Exchange: 20 November 2013.
- Sierra Mining Limited, 2013c: Announcement to the Australian Securities Exchange: 20 November 2013.
- Sierra Mining Limited, 2013d: Announcement to the Australian Securities Exchange: 5 December 2013.
- TBM, 2013: Exploratory Metallurgical Testing Magnetic Separation and Flotation Three (3) Magnetite Samples. TBM Mining Met Services report to Sierra Mining Ltd.
- UNDP 1992, The Philippines; A Prospectus for the International Mining Industry, United Nations Development Program, New York.



## 28 Dates and Signatures

The following people are responsible for supervising and/or preparing this Report:

#### Certificate of Qualified Person – Aaron Green

I, Aaron Green, BSc (Hons), MAIG, GradDipAppFin, as an author of the following report prepared by CSA Global Pty Ltd. ("**CSA Global**") for RTG Mining Inc. ("**RTG**"):

 report titled "Technical Report, RTG Mining Inc., Mabilo Copper-Gold-Iron Property Mineral Resource Estimate, Camarines Norte, Philippines" dated 5<sup>th</sup> November, 2015 (the "Technical Report");

do hereby certify that:

- 1. I am a Principal Resource Geologist with CSA Global Pty Ltd at its head office at Level 2, 3 Ord Street, West Perth, WA 6005, Australia.
- 2. I am a professional geologist having graduated with a BSc (Hons) in Geology, 1993 and a Graduate Diploma in Applied Finance and Investment, 2003.
- 3. I am a Member of the Australian Institute of Geoscientists.
- 4. I have practised my profession as a geologist for the past 22 years in the mineral resources sector and engaged in the assessment, development and operation of mineral projects both within Australia and overseas.
- 5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a "qualified person" for the purposes of NI 43-101.
- 6. I am responsible for the Technical Report.
- 7. I have not personally visited the property that is the subject of the Technical Report.
- 8. I am independent of RTG applying the test set out in Section 1.5 of NI 43-101.
- 9. I have had no prior involvement with the properties that are the subject of the Report.
- 10. I have read NI 43-101, and the Technical Reports has been prepared in compliance with NI 43-101.
- 11. As of the date of this certificate, the Technical Report, to the best of my knowledge, information, and belief, contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.



Dated this 5<sup>th</sup> November, 2015.

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Aaron Green BSc (Hons), MAIG, GradDipAppFin

Director and Principal Resource Geologist

CSA Global Pty Ltd.



#### **Certificate of Qualified Person – Neal Reynolds**

I, Dr Neal Reynolds, Ph.D, FAusIMM, MAIG, as an author of the following report prepared by CSA Global Pty Ltd. ("**CSA Global**") for RTG Mining Inc. ("**RTG**"):

 report titled "Technical Report, RTG Mining Inc., Mabilo Copper-Gold-Iron Property Mineral Resource Estimate, Camarines Norte, Philippines" dated 5<sup>th</sup> November, 2015 (the "Technical Report");

do hereby certify that:

- 1. I am a Principal Geologist with CSA Global Pty Ltd at its head office at Level 2, 3 Ord Street, West Perth, WA 6005, Australia.
- 2. I am a professional geologist having graduated with a BSc (Geology), 1982, and a PhD (Geology), 1987.
- 3. I am a Member of the Australian Institute of Geoscientists and a Fellow of the Australasian Institute of Mining and Metallurgy.
- 4. I have practised my profession as a geologist for the past 28 years in areas of gold and base metals evaluation in a number of countries around the world.
- 5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("**NI 43-101**") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a "qualified person" for the purposes of NI 43-101.
- 6. I am jointly responsible for the Technical Report.
- I visited the property that is the subject of the Technical Report from October 28 to November 1 2015, December 18 to December 20, 2013, February 12 to February 14 2014, and May 13 to May 19 2014.
- 8. I am independent of RTG applying the test set out in Section 1.5 of NI 43-101.
- 9. I have had no prior involvement with the properties that are the subject of the Report.
- 10. I have read NI 43-101, and the Technical Reports has been prepared in compliance with NI 43-101.
- 11. As of the date of this certificate, the Technical Report, to the best of my knowledge, information, and belief, contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.



Dated this 5<sup>th</sup> November, 2015.



Dr Neal Reynolds PhD, FAusIMM, MAIG

Director and Principal Geologist

CSA Global Pty Ltd.