Orior Capital
HONG KONG

QMines QML.AX

Red hot copper

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Executive summary

QMines has assembled a vast 978 km^2 tenement package in Queensland that includes four advanced copper-gold projects. Management's primary focus is the Mt Chalmers project in central Queensland which hosts the current JORC 2012 compliant inferred resource of 3.9Mt at 1.15% copper, 0.81 g/t gold and 8.4 g/t silver, or ~1.9% copper equivalent (CuEq). The company also owns the Silverwood, Herries Range and Warroo projects in southern Queensland. QMines raised A$11.5m before fees in its recent IPO, and plans to deploy these funds primarily to exploration.

QMines looks compellingly priced: Based on Friday's closing share price of A$0.29/share the market is valuing QMines at a market capitalisation of A$32.1m and an EV of A$21.2m. Based on the current resource at Mt Chalmers of 73,000 tonnes CuEq (3.9Mt at 1.9% CuEq), QMines is trading at an EV/t of resource of A$290. This looks cheap compared to peer companies. A sample of five ASX and TSX-V listed copper-gold explorers and developers with projects in Australia and the US currently trades at an EV-weighted average EV/t of A$534. **On this basis, QMines is trading at a 46% discount to its peers.** Valuing QMines on the current resource and in line with peers **suggests a valuation of A$0.45/share (45 cents per share).** This is 55% above the current share price.

This valuation does not take into account the defined JORC 2012 compliant exploration targets. Management's focus is initially on the Botos and Woods Shaft targets at Mt Chalmers, and Grieves Quarry, Silverwood. In aggregate, these targets range from 3.3Mt at ~0.8% CuEq to 5.0Mt at ~1.2% CuEq, or 27,280 tonnes CuEq to 58,340 tonnes CuEq based on recent metals prices. Subject to access, management believes these targets can be brought into inferred resources with a small number of confirmatory drill holes. This could boost QMines' copper resources to between 100,280 tonnes CuEq and 131,340 tonnes CuEq, **representing a potential increase in resources of 37% to 80%.** If these targets are included together with associated costs of, say A$1.0m, QMines would be valued at an EV/t resource of between A$169 (top end of target range) and A$221 (bottom end). **These figures represent substantial discounts of 68% and 59% to peers.**

Scenario analysis plots potential share price outcomes based on exploration success: A number of scenarios are developed to examine how valuations might develop over the next couple of years as QMines explores its various prospects. Adding in the mid-point of the JORC 2012 compliant exploration targets could boost the valuation to A$0.64 (64 cents per share). Subsequently doubling the size of the resource at Mt Chalmers could underpin a valuation of A$0.94/share, more than 3x the current share price.

Mt Chalmers remains under-explored in modern times: Mt Chalmers is a well-preserved volcanic massive sulphide (VMS) system situated in the early Permian Berserker Beds that contains copper, gold, silver, zinc and lead. The area hosts more than 50 historical mines including the historical Mt Chalmers mine. Despite a rich history, and a large body of academic work, substantial parts of the region remain under-explored. The area has not been fully consolidated for half a century, much of the historical drilling was relatively shallow with an average depth of just 68m, and the area has not been subjected to systematic modern exploration. **The Mt Chalmers deposit remains open both along strike and at depth. The area is highly prospective, and presents a plethora of enticing drill targets.**

VMS deposits tend to occur in clusters of between 5 and 40 events within an area of several tens of square kilometres. There are a number of exposed altered and mineralised zones within the Berserker Beds that remain to be tested for VMS mineralisation. There may well be hidden orebodies within the volcanic pile yet to be discovered. Indeed, the outcropping Mt Chalmers orebody may not be the largest in the area.

Mt Wheeler is prospective for high-grade, epithermal gold deposits: QMines also owns the Mt Wheeler project area which lies 7km north of Mt Chalmers and at the northern end of a ~14km gold trend that extends from the New Zealand Gully in the south. There are more than 20 historical gold workings in the area. Some were mined at grades in excess of 20 g/t gold. None have benefited from systematic modern exploration.

Southern Queensland assets under-explored: In addition to Mt Chalmers, QMines has secured three projects in southern Queensland, all of which host prolific historical mining areas. At Silverwood, the Geological Survey of Queensland (GSQ) undertook two diamond drill programs between 1969 and 1971, and reported numerous intersections of massive sulphide mineralisation at Grieves Quarry. The Herries Range gold project area hosts a number of goldfields and at least 63 historical hard rock gold mines, of which the majority mined 'bonanza' gold grades of 2 oz/t or more. Management's initial appraisal has highlighted several zones prospective for gold mineralisation. The Warroo project area is prospective for large porphyry or intrusion related gold-copper mineralisation. **None of these projects have been systematically drilled in modern times.**

Exploration program already underway: Management has planned a 32,000m drilling campaign comprising 30,000m RC and 2,000m diamond drilling that is focused on Mt Chalmers. The maiden 11-hole, 1,575m diamond drilling program was completed at the end of April with assay results expected over the coming weeks. The next phase is for 3,000m of RC drilling that is designed to test extensions to the known resource below, and adjacent to, the historical open pits.

Strong cash position: QMines has a net cash position of A$10.9m, more than enough to fund management's initial exploration plans. Following the successful IPO, management are not expected to come back to the market anytime soon, and then only after positive exploration results have been reported, resources have been upgraded, or a meaningful and accretive acquisition has been secured.

Good potential for acquisitions: There are a large number of gold and base metals projects across Queensland, a number of which either no longer appear to be the primary focus of their owners, or are too small to warrant independent development, or both. This may present QMines with opportunities to grow the portfolio through acquisitions. One example of this might be Resources & Energy Group's Mount Mackenzie project which is located some 150km northwest of Rockhampton. The current resource at Mount Mackenzie has been estimated at 3.42Mt at 1.18g/t gold and 9g/t silver for a total of 129,000 oz gold and 862k oz silver. Resources and Energy's flagship project is the East Menzies Gold Project in Western Australia.

Copper prices have soared: The LME copper price reached US$10,537/t last week, a new all-time high. Copper prices have more than doubled from their March 2020 lows. This sharp rise has been driven by economic recovery, low copper inventories, transitory factors such as labour strikes in Chile, and a realisation that copper is essential for a 'green recovery'. The simple fact is that electricity generation, transmission infrastructure, energy storage and consumption are all copper dependent. An electric vehicle typically contains

about four times as much copper as a conventional internal combustion engine model. At current metals prices, QMines' inferred resource is ~68% copper and ~28% gold.

Gold prices expected to remain strong: Gold prices are off their recent peak though still substantially higher than the levels seen over the past few years. Given the prospects for substantial economic stimulus in the US, the relatively weak US dollar, and the low global interest rate environment, gold prices are expected to remain strong.

Management have a good track record of adding value: Mr Andrew Sparke, Executive Chairman and James Anderson, GM Operations previously managed Alt Resources. At Alt Resources, the team made three strategic acquisitions to consolidate a substantial land package around Bottle Creek, Western Australia, effectively consolidating the area for the first time in decades. In 24 months, they completed some 40,000m of RC drilling, delivered a maiden resource, subsequently upgraded the resource to 571,000 oz gold and 4.5 moz silver, and delivered a maiden ore reserve. In May 2020, Aurenne Ularring, a private equity group agreed to buy Alt Resources at a 74% premium to the closing share price immediately prior to the offer. In terms of rapidly drilling identified targets and seeking bolt-on acquisitions, QMines is expected to adopt a similar strategy.

Queensland is a great jurisdiction: Based on information from the Australian Government, Queensland hosts 12% of Australia's copper reserves and measured and indicated resources, and 31% excluding Olympic Dam. The State ranks 16th in the Frazer Institute's most recent Investment Attractiveness Index, higher than Chile and Peru, the two largest copper producing countries. Queensland benefits from well-developed base metals processing capacity, and excellent infrastructure.

Share price catalysts: A number of factors are expected to drive the share price over the next couple of years. This includes positive drilling results from the substantial planned exploration campaign, resource updates, further target generation, permitting approvals, completing a feasibility study, acquiring value accretive assets, and rising commodity prices.

In summary, QMines provides investors with one of a relatively few ways to gain exposure to copper exploration on the ASX. There is huge exploration potential, and the company looks enticingly valued. Management has done this before, successfully.

Simon Francis May 2021

Key financial data and management

Figure 1: Shareholding structure

ASX code		QML	Shareholder	Shares	Stake
Shares outstanding	Millions	110.5			%
Share price	A$/share	0.29	Directors	30,700,000	28%
Market capitalisation	A$ m	32.1	Other founders	16,300,000	15%
Cash balance	A$ m	10.9	Seed investors	14,869,052	13%
Enterprise value	A$ m	21.2	Project vendors	10,166,667	9%
Options, 3 years, 37.5 cents	Millions	4.2	IPO	38,493,696	35%
Fully diluted shares	Millions	114.7	Total	110,529,415	100%

Source: QMines

Key Management:

Andrew Sparke, Executive Chairman: Mr Sparke has over 15 years' experience as a fund manager, corporate advisor and broker to a number of ASX listed resources companies. He has significant experience in Chairman, Executive Director and Non-Executive Director roles and has been involved in successful corporate transactions including IPOs and M&A transactions. Mr Sparke is keenly focused on identifying undervalued stocks, refining their strategy and focusing management on key value drivers. Mr Sparke is Managing Director of Olive Capital Pty Ltd, a resource focused capital markets advisory firm. He was an Executive Director of Alt Resources Ltd (ASX: ARS) and Non-Executive Chairman of Torian Resources (ASX:TNR). He is a member of the Australian Institute of Company Directors and holds a Bachelor of Business (Marketing) and a Masters (Finance).

Daniel Lanskey, Managing Director: Mr Lanskey has over 20 years' experience with Senior Management and Director roles in Resources and Oil&Gas. He was a founder and Managing Director of Austex Oil Ltd (ASX:AOK) from 2006 to 2015. During this time Mr Lanskey grew the annual revenue from start-up to US$30m. He is currently a Non-Executive Director of Macarthur Minerals Ltd (ASX:MIO, TSXV:MMS) and Timeless Capital Corp (TSXV:TLC). He was a former Director of Raya Group Ltd (ASX:RYG), Pryme Energy Ltd (ASX:PYM) and Needle Capital Corp (TSXV:NEDL). Mr Lanskey holds a Graduate Certificate in Entrepreneurship and Venture Development from Griffiths University in Queensland. He is also a member of the Australian Institute of Company Directors.

Mr James Anderson, GM Operations: Mr Anderson's background is in corporate operations, logistics, and supply chain management. He moved into the minerals exploration industry in 2011. Mr Anderson was a founder of Alt Resources Ltd (ASX:ARS), which was recently acquired by a large private equity firm. He was formerly the CEO at SMP International and Australia, Managing Director of Aloha and General Manager of Sunseeker International. Mr Anderson is a significant stakeholder in QMines.

Hamish Grant, Exploration Geologist: Mr Grant has eight years' experience as an exploration geologist in Australia and overseas in both greenfield and brownfield exploration and resource definition. Mr Grant has spent the majority of his career working on orogenic gold, intrusive related gold and porphyry copper projects. He has most recently worked with Alt Resources Ltd (ASX:ARS) as a project manager and played a major role in defining the maiden resource at the Mt Ida Project. Mr Grant holds a Bachelor of Science (Geology) from the Otago University in New Zealand.

QMines looks enticingly valued

- Based on the current resource, the market is valuing QMines at a 46% discount to its ASX and TSX-V listed copper-gold explorer and developer peers
- Factoring in the JORC compliant exploration target suggests a discount to peers of between 68% at the top end of the target range, and 59% at the bottom end
- Factors expected to drive the shares over the next couple of years include further target generation, drill results, resource updates, potential acquisitions, and rising commodity prices

The market is valuing QMines at a market capitalisation of A$32.1m and an EV of A$21.2m. Based only on the historical resource at Mt Chalmers of 3.9Mt at 1.9% CuEq (~73,000 tonnes CuEq), QMines is being valued at an EV/t of resource of A$290. A sample of five ASX and TSX-V listed copper-gold explorers and developers with projects in top-tier jurisdictions currently trades at an EV-weighted average EV/t of A$534. **On this basis, QMines is trading at a 46% discount to peers.**

This valuation does not take into account the JORC compliant exploration targets that have been identified from historical drilling and which management believes, subject to access, can be brought into inferred resources with a small number of confirmatory drill holes. The exploration targets at Botos and Woods Shaft at Mt Chalmers and Grieves Quarry, Silverwood, which are management's initial focus, range from 27,280 tonnes CuEq to 58,340 tonnes CuEq based on recent metals prices. Assuming this material can be brought into resources, the expanded resource would be between 100,280 tonnes CuEq and 131,340 tonnes CuEq. If the exploration target is included, QMines would be trading in an EV/t resource range of A$169 (based on 131,340 tonnes CuEq) and A$221 (based on 100,280 tonnes CuEq). **These figures represent substantial discounts of 68% and 59% to peers.**

Figure 2: EV per tonne of resource, based on JORC compliant exploration targets

Enterprise value, current	A$ m	21.2
Existing resource	Tonnes, CuEq	73,000
EV/t based on existing resource	**A$/t**	**290**
Discount to peer group		46%
Enterprise value, after A$1.0m expenditure	A$ m	22.2
Bottom end of exploration target range	Tonnes, CuEq	27,280
Existing resource plus bottom end of target	Tonnes, CuEq	100,280
EV/t resource	**A$/t**	**221**
Discount to peer group		59%
Enterprise value, after A$1.0m expenditure	A$ m	22.2
Top end of exploration target range	Tonnes, CuEq	58,340
Existing resource plus top end of target	Tonnes, CuEq	131,340
EV/t resource	**A$/t**	**169**
Discount to peer group		68%

Note: Exploration targets range from 3.3Mt at ~0.8% CuEq (~27,280 tonnes CuEq) to 5.0Mt at ~1.2% CuEq (58,340 tonnes CuEq). Exploration target tonnages are based on US$9,890/t copper, US$1,780/oz gold, US$26/oz silver, US$2,100/t lead and US$2,950/t zinc.

Source: QMines, Orior Capital estimates

Valuation scenarios

Four valuation scenarios are presented to demonstrate how valuations might develop over the next couple of years as QMines explores its various prospects. **These are not forecasts.** Rather, the scenarios serve to illustrate how exploration success could potentially impact QMines' share price.

Scenario A values the current resource at Mt Chalmers in line with peers at A$530/t. In this scenario, **QMines is valued at A$0.45/share (45 cents per share).** The shares are currently trading at about two-thirds of this valuation; even based solely on the historical resource at Mt Chalmers, and giving no value for the exploration targets nor any further exploration success, QMines looks cheap.

Scenario B adds in the mid-point of the exploration target being 4.2Mt at 1.0% CuEq, or 41,270 tonnes CuEq based on recent metals prices. In this scenario, QMines would have a total resource of ~114,270 tonnes CuEq. Based on the current market valuations of QMines' peers, **this could support a valuation of A$0.64/share (64 cents per share), more than double the current share price.**

Figure 3: QMines valuation scenarios

Scenario	Resources and assumptions	Value A$ m
Scenario A	**Current Mt Chalmers resource, 73,000 t CuEq**	
Mt Chalmers	3.9Mt at 1.9% CuEq or 73,000 CuEq valued at an EV of A$530/t	38.7
Net cash		10.9
Asset value		49.5
Shares o/s, millions		110.5
Value per share, A$/share		**0.45**
Scenario B	**Current resource plus mid-point of targets, 114,270 t CuEq**	
Mt Chalmers	3.9Mt at 1.9% CuEq or 73,000 tonnes CuEq at an EV of A$530/t	38.7
Mid-point of identified targets	4.2Mt at 1.0% CuEq or 41,270 tonnes CuEq at an EV of A$530/t	21.9
Net cash after IPO	Minimal expenditure to firm-up targets	9.9
Asset value		70.4
Shares o/s, millions		110.5
Value per share, A$/share		**0.64**
Scenario C	**Doubles the resource at Mt Chalmers, total 195,177 t CuEq**	
Mt Chalmers	7.8Mt at 1.9% CuEq or 146,000 tonnes CuEq at an EV of A$530/t	77.4
Mid-point of identified targets	4.2Mt at 1.0% CuEq or 41,270 tonnes CuEq at an EV of A$530/t	21.9
Net cash after IPO	Assume a further A$5m deployed to exploration	4.9
Asset value		104.1
Shares o/s, millions		110.5
Value per share, A$/share		**0.94**
Scenario D	**Total resource of 300,000 tonnes CuEq**	
All projects	Eg 15Mt at 2.0% CuEq, or 20Mt @ 1.5% CuEq at an EV of A$530/t	159.0
Net cash	Assume funds are fully deployed to exploration and/or acquisitions	-
Asset value		159.0
Shares o/s, millions		110.5
Value per share, A$/share		**1.44**

Source: Orior Capital estimates

Scenario C factors in some further exploration success at Mt Chalmers, doubling the resource to 146,000 tonnes CuEq. This could be 7.8Mt at 1.9% CuEq, for example, or say, 10Mt at 1.46% CuEq. Management's plan is to undertake 30,000m of RC drilling and 2,000m of diamond drilling focused

in and around Mt Chalmers. The expected cost of this drill program is A$5.1m. **Doubling the resource at Mt Chalmers, at a cost of say A$5m, could underpin a valuation of A$0.94/share (94 cents per share).** If this can be achieved in, say, two years, it would represent a return of 80% pa.

Scenario D makes a broad brushed assumption about further exploration upside or acquisitions of projects that are viewed as accretive to the portfolio, or both, resulting in aggregate resources of 300,000 tonnes CuEq. This could be 15Mt at 2.0% CuEq, or say, 20Mt at 1.5% CuEq. This scenario assumes the net proceeds from the IPO are fully deployed. **Achieving this resource could support a valuation of A$1.44/share.**

Peer valuations

There are a number of companies listed on the ASX and TSX-V that are exploring and developing VMS style, predominantly copper-gold projects. A sample of five of these companies trades at a simple average of A$529 per tonne of CuEq resource, and an EV weighted average A$534/t.

Figure 4: ASX and TSX-V listed copper-gold explorer and developer peers

Company	Code	Project	Location	EV A$ m	EV/t CuEq A$/t
Eagle Mountain Mining	EM2.AX	Oracle Ridge	Arizona, USA	178	831
KGL Resources	KGL.AX	Jervois Copper	Australia	250	487
New World Resources	NWC.AX	Antler Copper Mine	Arizona, USA	119	691
Peel Mining	PEX.AX	Mallee Bull	Australia	89	260
Sandfire Resources America	SFR.V	Black Butte	Montana, USA	221	374
Simple average					**529**
EV weighted average					**534**

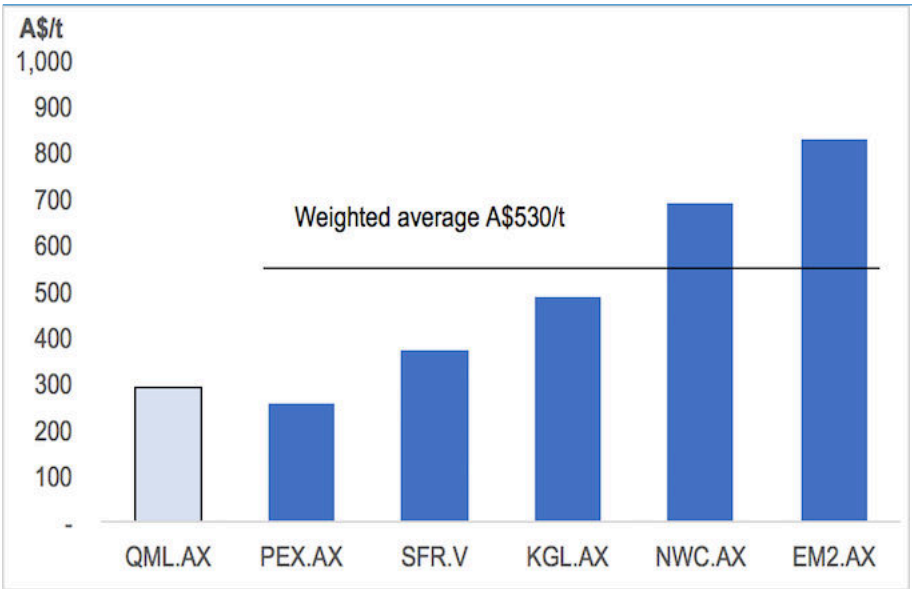
Source: Company data, Orior Capital

Figure 5: ASX-listed copper-gold explorers and developers' resources

Company	Project	Resources
Eagle Mountain Mining	Oracle Ridge	12.2Mt at 1.51% Cu, 16.3 g/t Ag and 0.19 g/t Au
KGL Resources	Jervois Copper	19.07Mt at 2.15% Cu, 27.6 g/t Ag and 0.29 g/t Au at Reward, Rockface and Bellbird, and 1.9Mt at 0.86% Cu and 74.2 g/t Ag at Reward South
New World Resources	Antler Copper Mine	4.7Mt at 1.95% Cu, 4.13% Zn, 0.94% Pb and 35.9 g/t Ag (historic)
Peel Mining	Mallee Bull, May Day, Southern Nights	6.76Mt at 1.8% Cu, 31 g/t Ag, 0.4 g/t Au, 0.6% Pb, 0.6% Zn at Mallee Bull, 4.95Mt at 5% Zn, 2% Pb, 78 g/t Ag, 0.3% Cu, 0.4 g/t Au at Southern Nights, and 1.07Mt at 1.02 g/t Au, 26.3 g/t Ag, 0.74% Zn, 0.5% Pb at May Day
Sandfire Resources America	Black Butte	10.0Mt at 2.9% Cu measured and indicated, and 2.7 Mt at 3.0% Cu inferred at the Johnny Lee deposit, and 8.3Mt at 2.4% Cu at the Lowry deposit.

Source: Company disclosures

Figure 6: QMines versus peers, EV/t resource CuEq



Source: Company data, Orior Capital estimates

Some companies with resources are excluded from comparison. Stavely Minerals is developing the Stavely Project in western Victoria, Australia. The project has a resource of 28Mt at 0.4% copper (gold and silver not tested) for 110,000 tonnes contained copper that represents the surface expression of high-grade lode-style copper veins. Recent drilling has targeted a porphyry at depth, with some holes as much as 1,800m deep. Stavely is expected to update its mineral resources imminently.

Newport Exploration owns the Chu Chua project in British Columbia. The deposit is a Cyprus-type VMS body hosted in two steeply dipping lenses of massive pyrite-chalcopyrite and magnetite. A NI 43-101 compliant resource was completed in 2012 reporting an inferred resource of 2.5Mt at 2% copper, 9.4 g/t silver, 0.5 g/t gold and 0.3% zinc, using a 1% copper cut-off. Newport also holds a 2.5% gross overriding royalty on several oil and gas permits in the Cooper Basin in Australia, that are operated by Beach Energy and by Santos Ltd. In the year to July 2020, royalty income was C$10.8m. This royalty appears to contribute significantly to the company's market capitalisation, which makes valuing the Chu Chua VMS project separately, difficult.

Another company, Zenith Minerals, is developing the Develin Creek copper-zinc project in Queensland as well as three gold projects. Develin Creek is located about 80km north of Mt Chalmers. In 2015, the company reported a resource of 2.57Mt grading 1.76% copper, 2.01% zinc, 0.24g/t gold and 9.6g/t silver (2.62% CuEq). Zenith is excluded from comparison. According to the company's website, Zenith is involved in 10 different projects. One of these is the Earaheedy zinc project which is a joint venture between Zenith and Rumble Resources Limited. Zenith holds a 25% interest in the Earaheedy Joint Venture. Since the announcement of a major zinc-lead discovery at Earaheedy in April 2021, Zenith's share price has risen sharply, making it difficult to accurately ascertain the market value for Develin Creek.

Share price catalysts

A number of factors may propel the shares including:

Drilling results: Management plans a substantial exploration program, that includes 30,000m of RC drilling and 2,000m of diamond drilling at the high-priority Mt Chalmers target. Assays for the first 11 holes are expected in the next few weeks.

Resource updates: Given the highly prospective nature of both Mt Chalmers and the southwest Queensland assets, management is hopeful of being able to increase resources in the short to medium term.

Target generation: Management is compiling a substantial historical database of drill data and geochemistry. Other work planned in order to aid target generation includes airborne magnetics surveys, downhole EM, and surface auger geochemistry.

Permitting: There are a number of pending exploration licence area approvals. QMines may also be granted additional licence areas. The company may apply for, and be granted, mining licences.

Completing a feasibility study: Federation Resources completed a feasibility study for Mt Chalmers in March 1997 that was based on a proposed 500,000 tpa operation. Traprock Mining, the vendor of the project to QMines, had also planned to put the mine into production.

Acquisitions: Management's stated intention is to acquire additional assets and resources where it is value accretive to do so. Acquisitions of additional projects could happen at any time.

Copper price: LME copper prices have more than doubled since March 2020 reaching a new all-time high. Further price rises seem likely driven by a recovery in economic activity, low copper inventories, and the expectation of rapid demand growth as copper will become integral to the 'green recovery' and the anticipated electrification of global transportation.

Gold price: Given the prospects for further substantial economic stimulus in the US, the relatively weak US dollar, and the low global interest rate environment, gold prices are expected to remain strong.

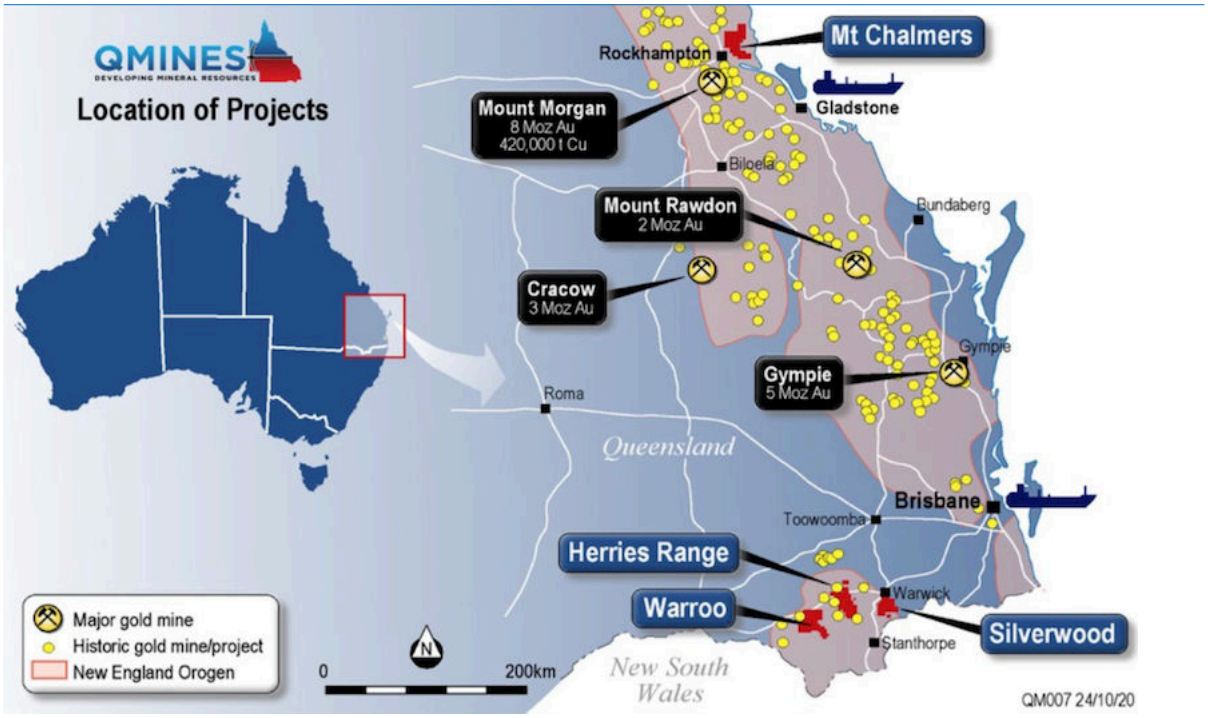
Exciting portfolio in a great jurisdiction

- QMines' projects cover a vast 978 km^2 tenement package that captures more than 100 historical mines and workings, all of which are under-explored in modern times
- The company is the first to consolidate the highly prospective Mt Chalmers mine area for 50 years
- Queensland is a top-tier mining jurisdiction, ranked 16th by the Frazer Institute in 2020, with excellent infrastructure and access to processing capacity

Critical mass

QMines has assembled a vast tenement package across central and southern Queensland that includes the Mt Chalmers, Silverwood, Herries Range and Warroo projects. The Mt Chalmers area is a well-preserved, VMS system that contains copper, gold, silver, zinc and lead. The project encompasses the historical Mt Chalmers mine, which hosts the existing 3.9Mt at 1.9% CuEq inferred resource, as well as a number of other prospects. There a number of highly prospective anomalous targets in and around the Mt Chalmers area. QMines is the first company to have consolidated the whole region in about 50 years.

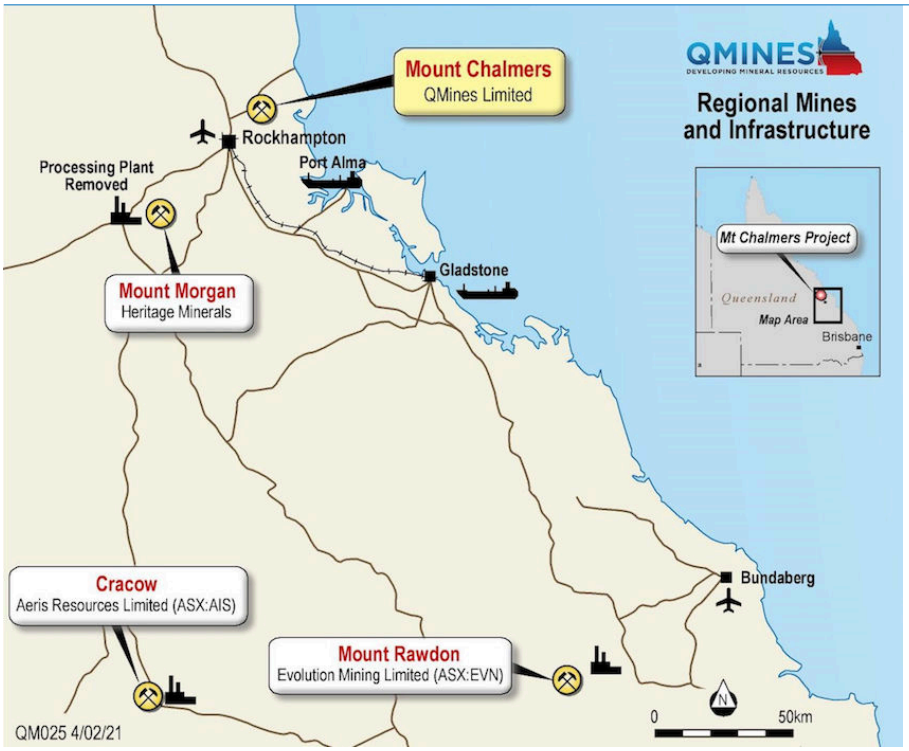
Figure 7: Location map



Source: QMines

There are a number of well-known copper and gold mines in the broader area. Mount Morgan, which was once the largest gold mine in the world, is located some 60km to the southwest of Mt Chalmers and has similar geology. The area is well served with excellent infrastructure.

Figure 8: Mines in the vicinity of Mt Chalmers, and local infrastructure



Source: QMines

Tenements

QMines controls nine granted Exploration Permit for Minerals (EPMs), and has a further two EPMs pending approval. The total land package of the approved and pending permits is 978 km^2. All of the tenements are for 'all minerals' except for coal. The total annual expenditure commitment for the granted permits is estimated at A$455,000 to A$575,000 pa. The Mt Chalmers tenements cover the historical Mt Chalmers copper-gold mine, as well as the Woods Shaft gold prospect, and a number of other VMS anomalous targets, the historical New Zealand Gully goldfield and other gold prospects hosted in both hard rock and alluvial occurrences.

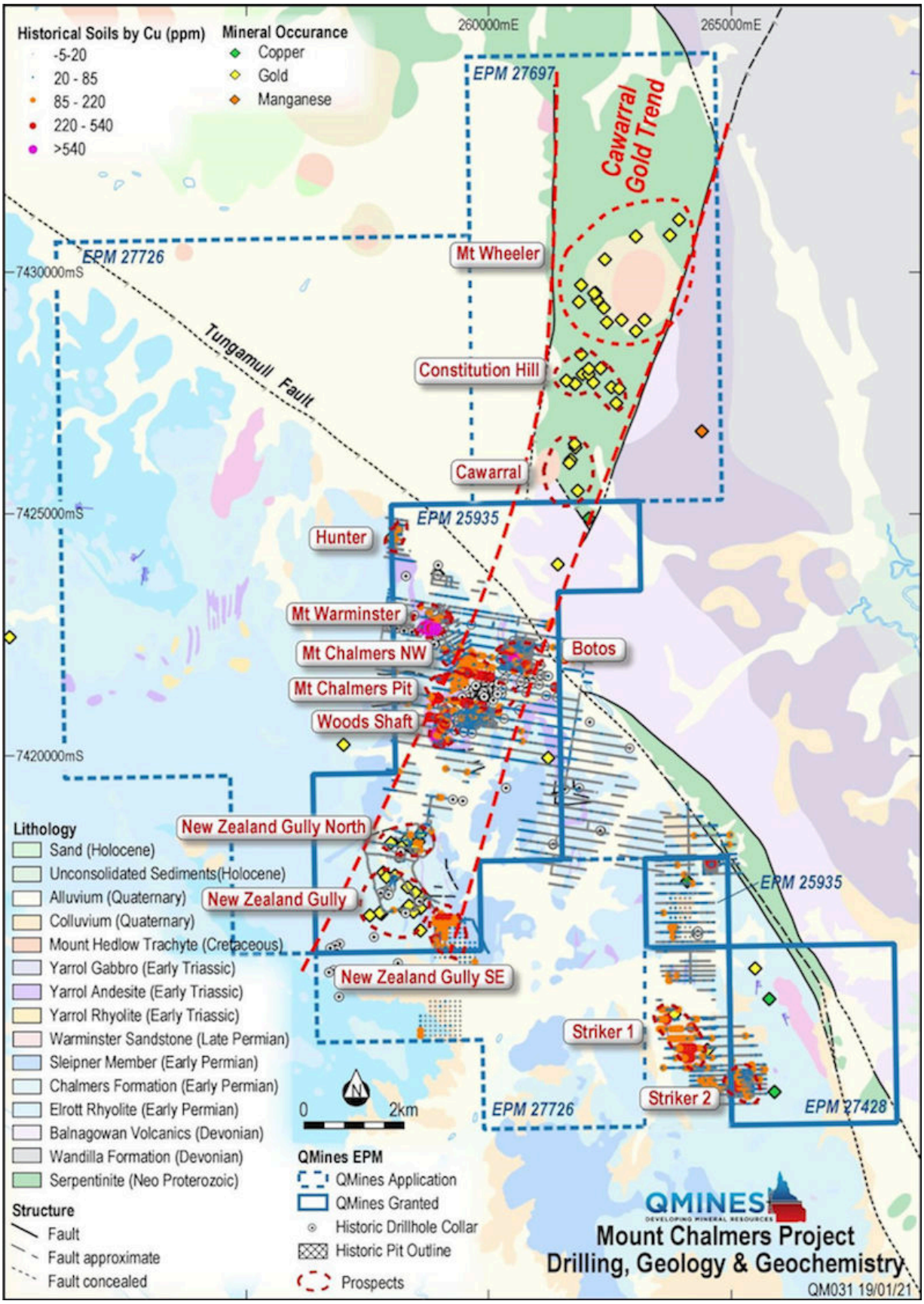
Figure 9: QMines tenements

Tenement Number	Tenement Name	Status	Granted	Expiry	Expenditure Commitment 2021, A$	Sub-Blocks	Area Km^2
EPM 25935	Mt Chalmers	Granted	21/07/16	20/07/21	10,000	13	39
EPM 27726	Mt Chalmers	Pending			Outcome based	37	111
EPM 27697	Mt Chalmers (Mt Wheeler)	Pending			Outcome based	12	36
EPM 27428	Mt Chalmers (Striker 2)	Granted	19/02/20	18/02/25	14,000	4	12
EPM 27281	Silverwood	Granted	05/02/20	05/02/25	56,000	28	84
EPM 27724	Silverwood	Granted	11/02/21	10/02/26	Outcome based	50	150
EPM 25785	Herries Range 1	Granted	30/04/15	29/04/23	80,000	24	72
EPM 25786	Herries Range 2	Granted	30/04/15	29/04/23	125,000	59	177
EPM 25788	Herries Range 3	Granted	30/04/15	29/04/23	125,000	27	81
EPM 26178	Warroo	Granted	17/08/16	16/08/21	45,000	21	63
EPM 27725	Warroo	Granted	11/02/21	10/02/26	Outcome based	51	153
Total							**978**

Note: As of 16 March, 2021. The EPMs pending approval were applied for in October 2020

Source: QMines

Figure 10: Mt Chalmers area map showing geology, drilling and geochemistry



Source: QMines

Resources and exploration targets

The Mt Chalmers mine hosts an inferred resource of 3.9Mt at a grade of 1.87% CuEq, representing 73,000 tonnes CuEq. This resource, and the exploration targets set out below, are based on historical drilling, much of which was conducted in the late 1970s and early 1980s. There is a substantial body of historical exploration work that management is compiling in order to help generate targets. The area has not been subject to modern exploration.

Management has conservatively chosen a cut-off grade for the resource of 0.75% CuEq. It is worth noting that at current prices of ~US$10,239/t copper and ~US$1,844/oz gold, 1% copper is equivalent to about 1.73 g/t gold. Management's cut-off grade represents a gold equivalent (AuEq) grade of 1.3 g/t. This seems high given the shallow depth of the resource. At a cut-off of 0.5% CuEq, which represents a AuEq grade of 0.86 g/t, the inferred resource at Mt Chalmers would be 79,400 tonnes CuEq, about 9% higher than the stated resource.

Figure 11: Mt Chalmers inferred resource estimates at various cut-off grades

Cut-Off CuEq %	Mt	Cu %	Au g/t	Ag g/t	CuEq %	Cu kt	Au koz	Ag koz	CuEq kt
0.00	6.3	0.83	0.56	6.6	1.33	52.3	114.4	1,330	84.1
0.25	6.0	0.86	0.59	6.8	1.39	51.9	113.8	1,310	83.5
0.50	4.9	1.00	0.69	7.6	1.61	49.2	108.9	1,200	79.4
0.75	3.9	1.15	0.81	8.4	1.87	44.9	101.9	1,061	73.0
1.00	3.1	1.30	0.95	9.2	2.13	40.1	94.1	917	65.9
1.25	2.5	1.44	1.08	9.9	2.39	35.5	85.9	787	59.0
1.50	2.0	1.56	1.24	10.7	2.65	30.8	78.1	676	52.1
2.00	1.3	1.78	1.59	12.3	3.16	22.4	64.2	498	39.8
3.00	0.5	2.05	2.37	16.1	4.10	11.2	41.6	282	22.4

Note: Copper equivalent figures are calculated in the Independent Geologists Report based on US$6,655/t Cu, US$1,900/t Au and US$25/oz Ag

Source: Independent Geologists Report in QMines' Prospectus

The exploration targets at Woods Shaft, Botos, Mt Warminster and Grieves Quarry are also based on historical results. Management's initial focus is on the Botos and Woods Shaft targets at Mt Chalmers, and Grieves Quarry, Silverwood. In aggregate, these targets range from 3.3Mt at ~0.8% CuEq to 5.0Mt at ~1.20% CuEq, or 27,280 tonnes CuEq to 58,340 tonnes CuEq based on recent metals prices. The mid-point is 4.2Mt at ~1.0% CuEq, or 41,270 tonnes CuEq. Management believes that subject to access these targets can be brought into inferred resources quickly and cheaply with a number of confirmatory drill holes.

Figure 12: Exploration targets (based on historical drilling)

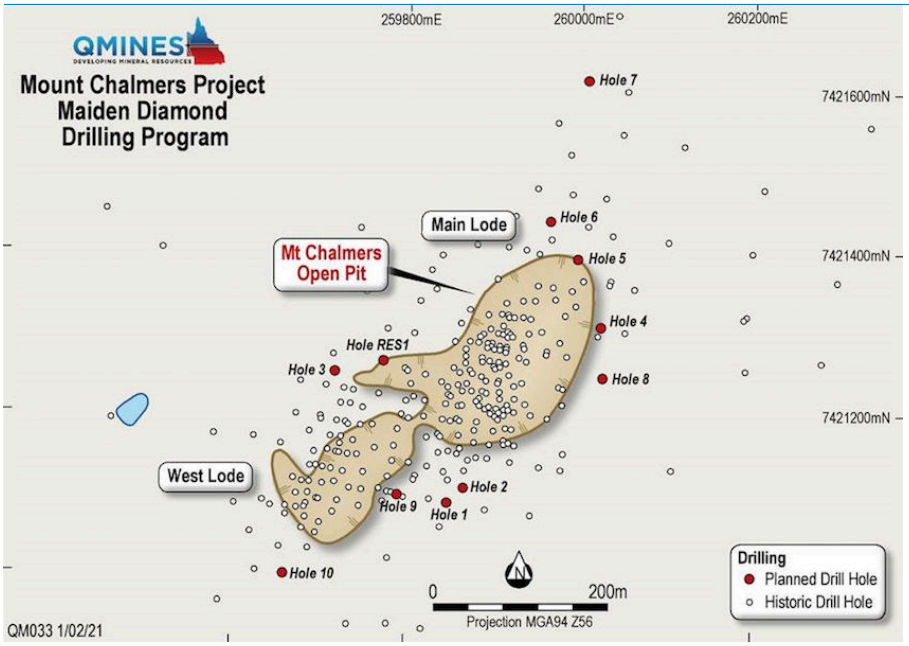
Project	Prospect	Tonnes m	Cu %	Au g/t	Zn %	Cut off
Mt Chalmers	Woods Shaft	1.0 - 1.5	0.2 - 0.3	0.6 - 1.0	n.a.	0.5 g/t Au
Mt Chalmers	Botos	1.5 - 2.5	0.1 - 0.2	0.5 - 0.8	1.1 – 1.4	0.5 g/t Au
Mt Chalmers	Mt Warminster	1.5 - 1.8	0.1 - 0.2	n.a.	0.5 - 0.7	1% ZnEq
		Tonnes m	**Zn %**	**Cu %**	**Ag g/t**	**Cut off**
Silverwood	Grieves Quarry	0.8 - 1.0	3.2 - 3.7	0.3 - 0.5	15 - 25	2% Zn

Source: QMines

The plan

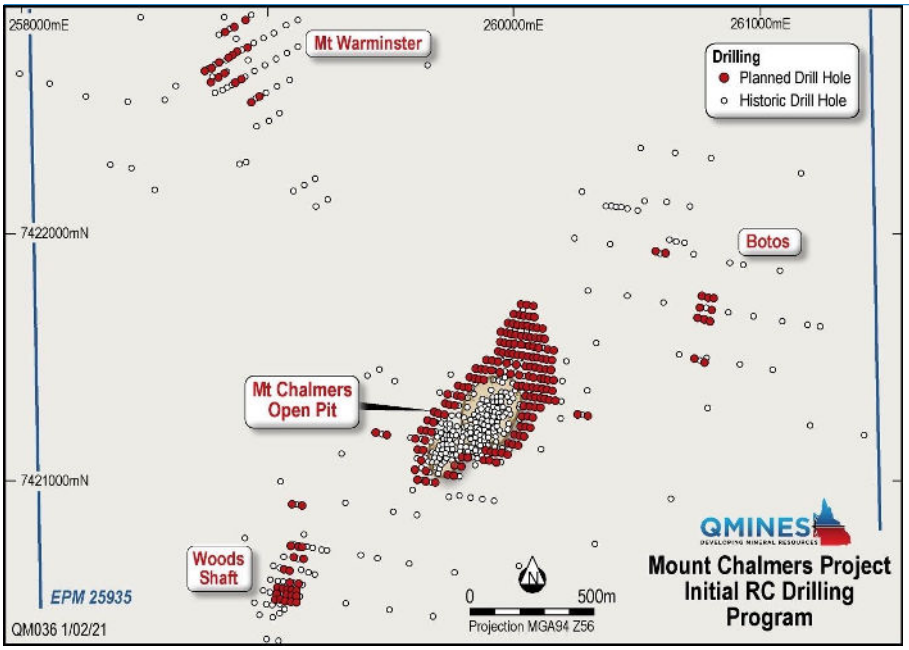
QMines has planned a substantial exploration program that includes exploration drilling, geophysical surveys including downhole EM, and ground-based magnetics and soil geochemical sampling. The initial objectives are to extend and increase the Mt Chalmers resource and to bring the exploration targets at Botos and Woods Shaft into inferred resources. The maiden diamond drilling program, comprising 11 holes over 1,575m was completed in April with assay results expected over the next few weeks. The next phase comprises 3,000m of RC drilling and is focused on testing extensions to the known resource below, and adjacent to, the historical open pits.

Figure 13: Mt Chalmers historical drill locations and QMines' initial 11-hole drill program



Source: QMines

Figure 14: Planned drilling at Mt Chalmers, showing first 25,000m of planned RC



Source: QMines

Figure 15: QMines exploration plans based on the minimum IPO subscription of A$10m

Project	Budget A$ m	Exploration plans
Mt Chalmers	6.1	30,000m of RC and 2,000m of diamond drilling. Geophysical surveys including downhole EM and ground-based magnetics and soil geochemical sampling.
Silverwood	0.1	Digital modelling and drill planning, soil sampling and mapping
Warroo	0.1	Historical data digitisation, drill target planning, geochemical soil tests, mapping
Herries Range	0.6	Historical data digitisation, drill target planning, geochemical soil tests, mapping
Total	**6.9**	**30,000m RC and 2,000m diamond drilling**

Source: QMines

Great jurisdiction

Queensland is an established and well-regarded mining jurisdiction with a rich history in copper and gold. Queensland was ranked 16th in the Frazer Institute's Investment Attractiveness Index in 2020. Notably, Queensland ranks ahead of Chile and Peru, the two largest copper producing countries. According to the Australian Government's Australia's Identified Minerals Resources 2013 report, Queensland hosts some 10.9Mt of JORC reserves and measured and indicated copper resources. This is 12% of Australia's total resources, though this figure is heavily skewed by Olympic Dam. Stripping out Olympic Dam, Queensland represents 31% of Australia's copper resources. Queensland also benefits from excellent mine related infrastructure and processing capacity. According to the Australian Mine Atlas there are 16 copper, zinc or lead processing plants in Queensland. This compares to only 6 in Western Australia.

Figure 16: Australia copper resources

State	EDR (t Cu)	Portion	Inferred Res (t Cu)	Portion	Total (t Cu)	Percent
South Australia	62,400,000	68%	27,218,000	62%	89,618,000	66%
Olympic Dam	55,900,000	61%				
Other	6,500,000	7%				
Queensland	10,932,000	12%	7,902,000	18%	18,834,000	14%
New South Wales	11,843,000	13%	4,390,000	10%	16,233,000	12%
Western Australia	4,555,000	5%	3,512,000	8%	8,067,000	6%
Other	1,822,000	2%	878,000	2%	2,700,000	2%
Australia	**91,100,000**	**100%**	**43,900,000**	**100%**	**135,452,000**	**100%**

Note: Economic Demonstrated Resources (EDR) includes JORC reserves, and measured and indicated resources

Source: Australian Mine Atlas

Mt Chalmers: A target rich environment

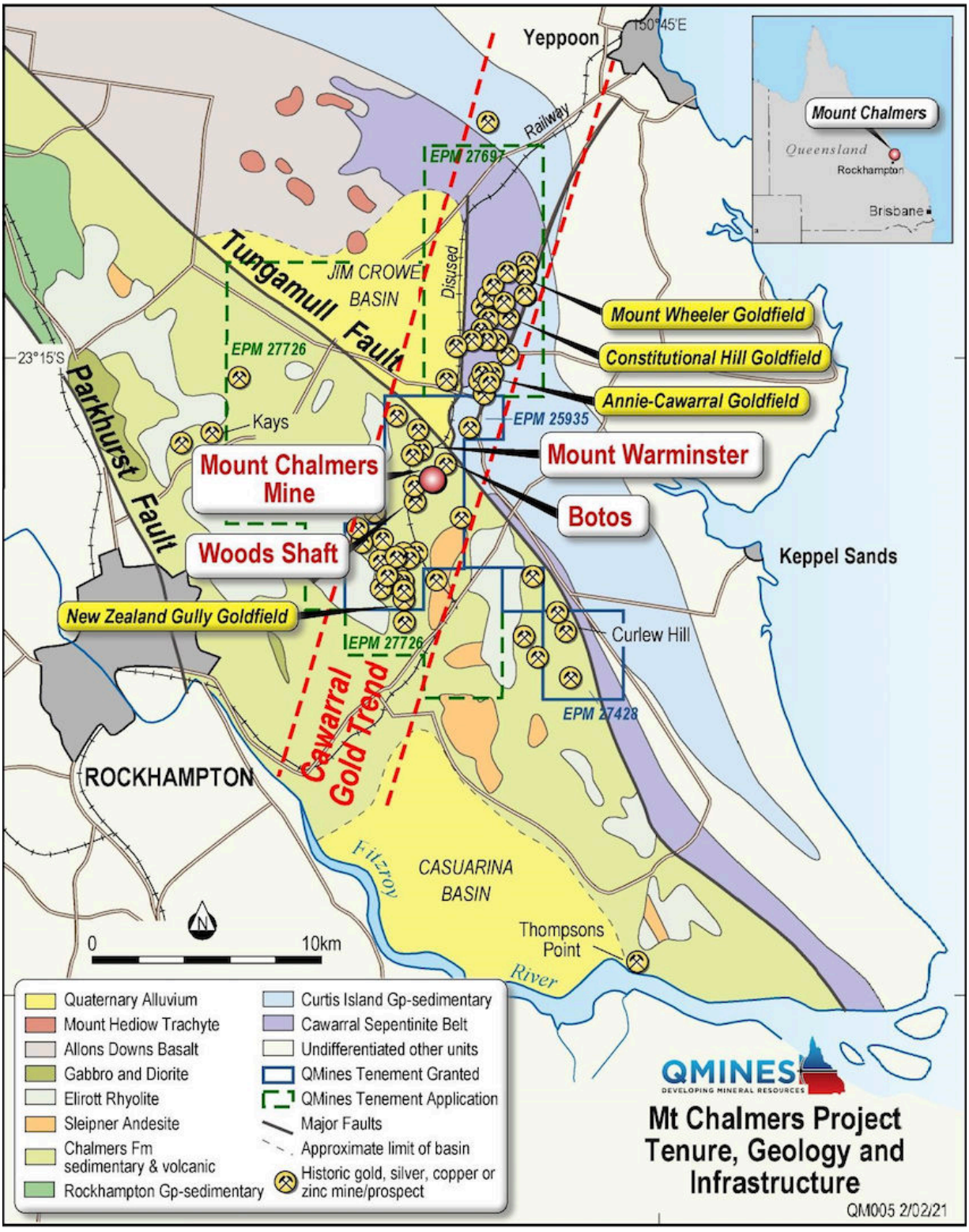
- QMines has consolidated substantial, highly prospective tenement areas in and around Mt Chalmers, the first company to do so in about 50 years
- There is a vast historical database that should aid in identifying targets; there are already JORC compliant exploration targets at Woods Shaft, Botos and Mt Warminster that could substantially boost resources with relatively little drilling
- The Mt Chalmers mine, which hosts the current resource, remains open beneath the Main Lode and West Lode, and down dip from these lodes

The Mt Chalmers project is situated 17km northeast of Rockhampton, Queensland, and 600km north of the state capital of Brisbane. The area is a well-preserved, VMS system that contains copper, gold, silver, zinc and lead. VMS deposits tend to follow tectonic plate boundaries and ancient underwater volcanic activity. They tend to occur in clusters of between 5 and 40 events within an area of several tens of square kilometres. This clustering of ore lenses in close proximity, and the polymetallic nature of the deposits suggests potential for long-term production. They are an important source of copper, accounting for ~6% of global production, as well as a significant supplier of zinc (~22%), lead (~10%), gold (~2%) and silver (~9%). The Mt Morgan copper-gold deposit is hosted by similar volcanics, and is located about 60km to the southwest.

The Mt Chalmers project area hosts more than 50 historical mines. This includes the historical Mt Chalmers mine, which hosts the existing 3.9Mt inferred resource, and which is open at depth and along strike, and which may host additional peripheral mineralised bodies. There are also a number of prospects in the immediate vicinity of Mt Chalmers. This includes Woods Shaft (gold and base metals), Botos (gold and copper), and Warminster (copper and zinc). Based on historical drill results there are immediate exploration targets at each of these prospects. The New Zealand Gully Goldfield lies to the south of Mt Chalmers and at the southern end of the Carawal Gold Trend, which stretches 14km north-northeast to the Mt Wheeler Goldfield. Management has already identified several anomalous zones within the New Zealand Gully Goldfield that may present drill targets with further work. In addition to these areas, QMines has acquired the Mt Wheeler project (EPM pending approval), which is considered prospective for high-grade, epithermal gold deposits.

While the Mt Chalmers area is the subject of much academic work, and has been explored by various groups over the years, it has not been subjected to systematic modern exploration. Much of the historical drilling is relatively shallow. The area has not been fully consolidated for half a century. **All in all, the area is highly prospective, and presents a plethora of appealing drill targets.** Mt Chalmers will be management's key focus for exploration work once the IPO is completed.

Figure 17: Mt Chalmers geological setting, mineral occurrences and infrastructure



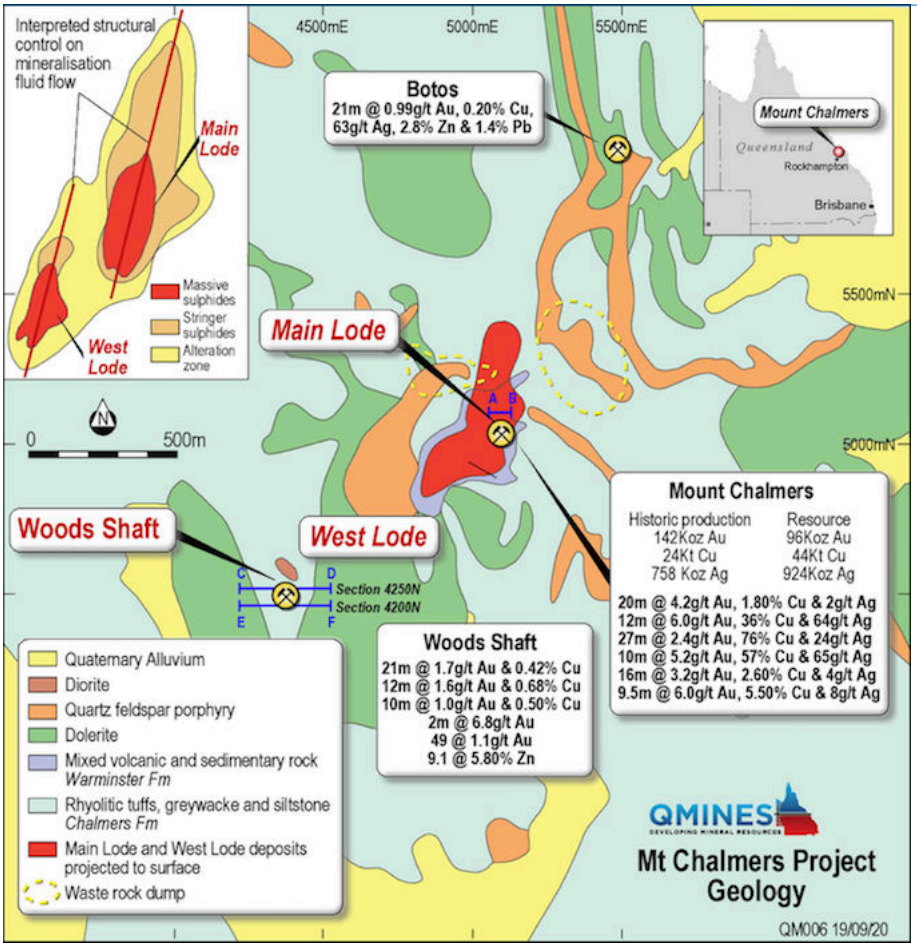
Source: QMines

The Mt Chalmers project area is situated in the early Permian Berserker Beds in the fault-bounded Berserker Graban, a structure some 120km in length and up to 15km in width. The graben is juxtaposed along its eastern margin against the Tungamull Fault and in the west, against the Parkhurst Fault. The mineralisation system is considered comparable to the Kuroko-style VMS systems of Tertiary age (66 Ma to 2.6 Ma) in Japan (Taube 1990). According to Sainty (1992), the

Berserker Beds overlie the coralline limestone-bearing Early Devonian Etna Beds, and occupy the graben. The block is situated at the eastern edge of the Rockhampton Group, which is an early Carboniferous shallow shelf sedimentary sequence, characterised by oolitic limestones. The Tungamull fault is located 2km east of the Mt Chalmers mine, and demonstrates outcrops of sheared serpentinite. Aeromagnetic data shows that the Tungamull fault dips moderately to the east, consistent with a thrust fault origin.

The project area is about 20km inland from the coast. It covers agricultural land and uncleared bushland. The area rises to a maximum of 400m to 500m above sea level, with hilly areas at 50m to 150m above sea level. Summers are hot and humid, and winters are mild. Average rainfall in the region is ~500mm pa, with most rain falling in December to March. The area is readily accessible by sealed roads and gravel tracks.

Figure 18: Mt Chalmers mine geology



Source: QMines

Vast historical database

The Mt Chalmers deposit was discovered in 1860. Copper was discovered in the deeper lode system in 1898. The deposit was mined until 1914, when it was closed as copper prices fell. Mount Morgan Ltd re-opened the mine as a temporary wartime measure in 1941-1943. Since 1960, there has been extensive exploration in the Mt Chalmers area. A number of companies have undertaken a range of geological activities including mapping, induced polarisation studies, rock and soil

sampling, and drilling. In 1976-1982, Geopeko Ltd, operating through a joint venture, carried out extensive programs at the Mt Chalmers mine area, Woods Shaft, Mt Warminster, Botos and other areas. Geopeko discovered the West Lode at Mt Chalmers in 1977, which was mined by Mt Morgan in 1979-1982. Notably, Federation Resources completed a feasibility study in March 1997 that was based on a proposed 500,000 tpa operation. Federation concluded the operation would be 'break-even' but this was at far lower commodity prices than today; copper prices averaged US$1.04/lb in 1996 and US$1.03/lb in 1997 and gold prices averaged US$388/oz in 1996, and US$331/oz in 1997. Echo Resources commissioned a mineral resource estimate in 2008, adopting the results of the Federation feasibility study. Traprock Mining, the vendor of the project to QMines also planned to put the mine into production.

Figure 19: Mt Chalmers area, summary of drill hole data included in the historical resource

Hole Type	Operator	Period	Hole IDs	Number of holes	Percussion m	Diamond m	Total m
Diamond	Mines Dept.	1936-37	DDH0001 - DDH0007	7	-	729	729
	CEC	1963/74	DDH0008 - DDH0023	16	-	2,210	2,210
	Geopeko	1976/81	DDH0024 - DDH0075	53	2,658	3,046	5,704
	Federation	1995	FRD001 - FRD026	28	1,450	1,304	2,754
Total				**104**	**4,107**	**7,288**	**11,396**
Percussion	Geopeko	1976/81	PDH0001 - PDH0190	200	10,828	-	10,828
	Geopeko	1980/82	TH0001 - TH0078	78	883	-	883
All Holes				**382**	**15,818**	**7,288**	**23,107**

Source: McDonald Speijers Mineral Resource Estimate, April 1996

Most of the historical drilling is shallow, with most holes drilled to depths of 20m to 150m below surface (before the open-pit mine was developed) with an average depth of about 68m. A number of holes ended in mineralisation suggesting there is scope to extend mineralisation below the level of historical mine.

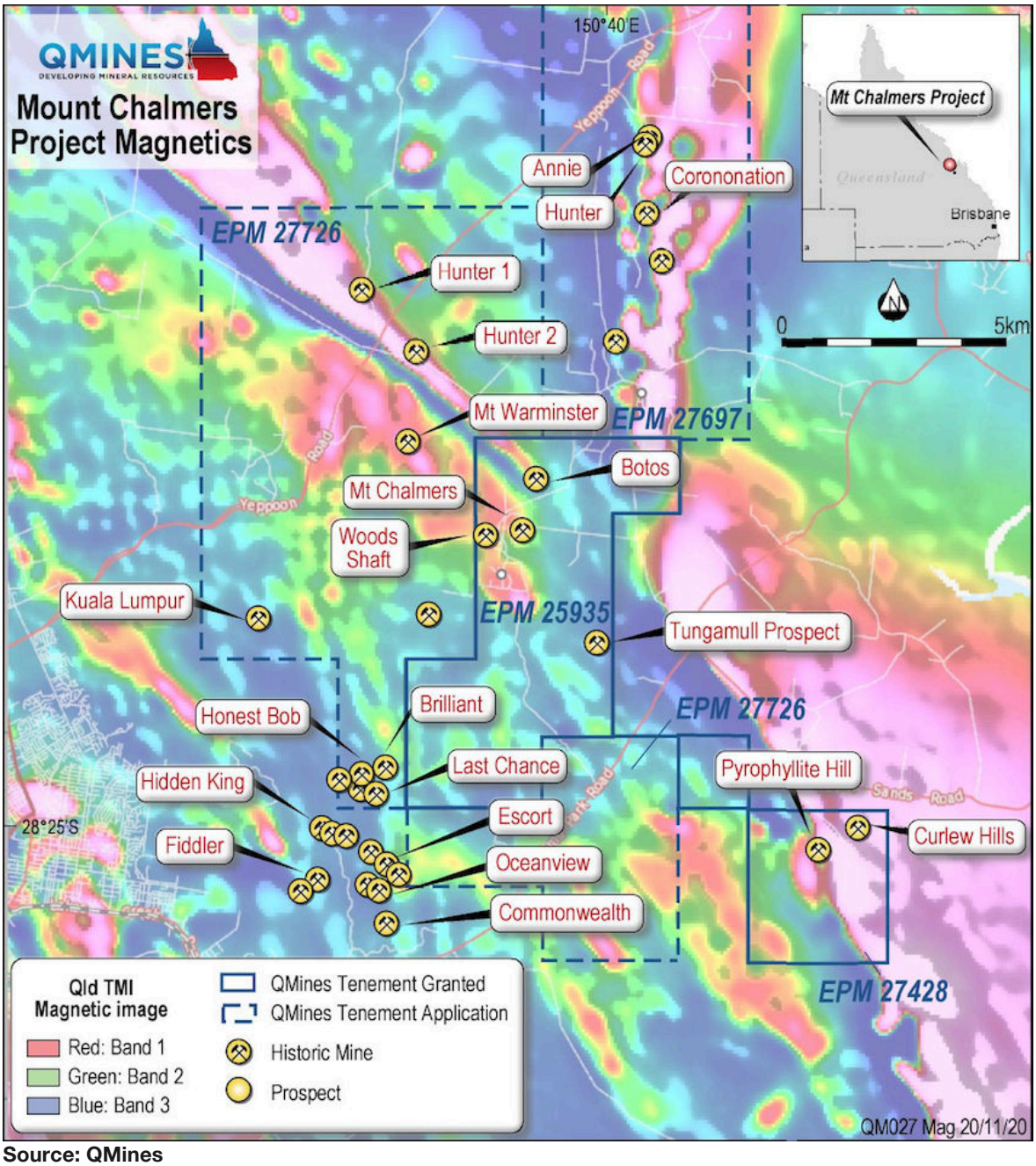
There is also a vast amount of historical soil geochemistry results that management is in the process of digitising. This work was conducted across the Mt Chalmers area, and demonstrates widespread copper-in-soil anomalies. There are a number of enticing results that warrant further investigation.

Magnetics

VMS deposits typically differ significantly from their host rocks in terms of a number of geophysical characteristics. This results from differences in physical and chemical properties between the deposits and the host rocks. These properties include density, magnetic intensity and susceptibility, gravity, electrical resistance, and acoustical velocity. For example, VMS mineralisation results in the precipitation of pyrite, pyrrhotite, chalcopyrite, sphalerite, and galena, all of which are relatively dense minerals. As a result, VMS deposits are ideally suited for geophysical exploration.

Management plans to test the region with geophysical surveys including downhole EM, ground-based magnetics and soil geochemical sampling.

Figure 20: Mt Chalmers project magnetic survey results

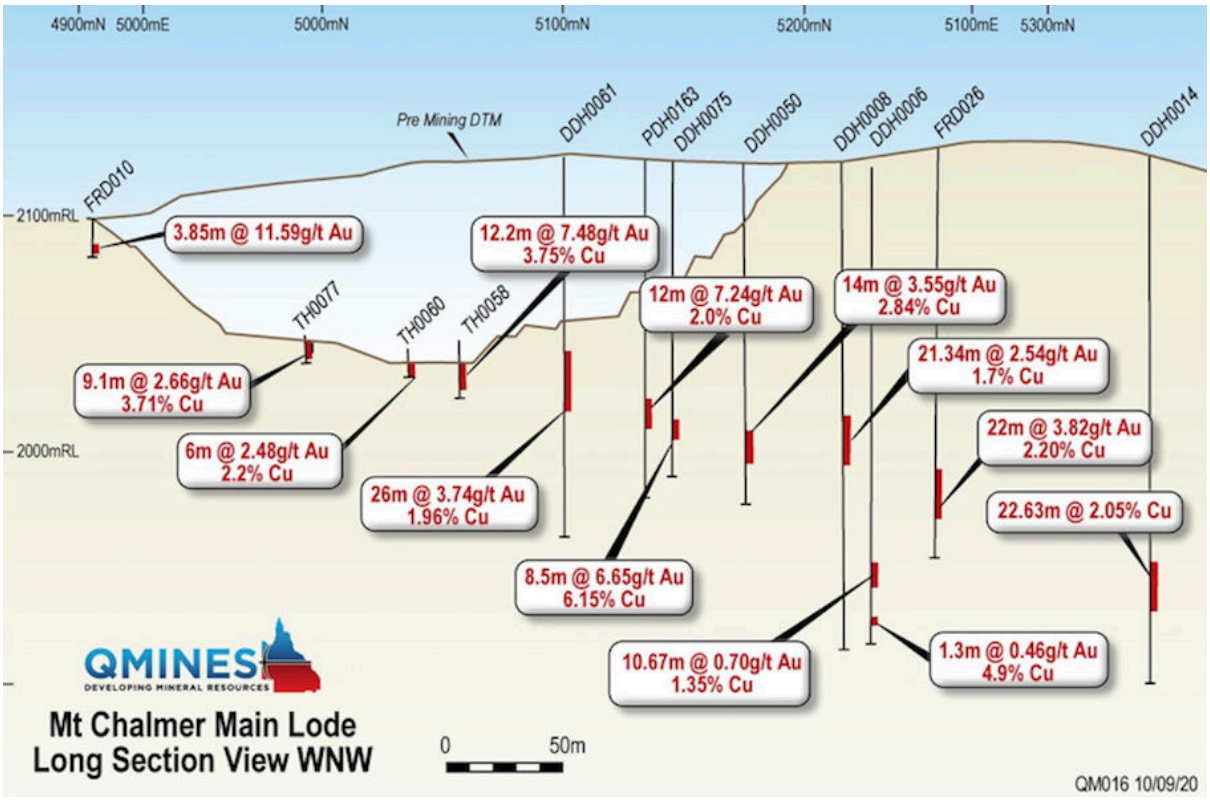


Source: QMines

Mt Chalmers mine

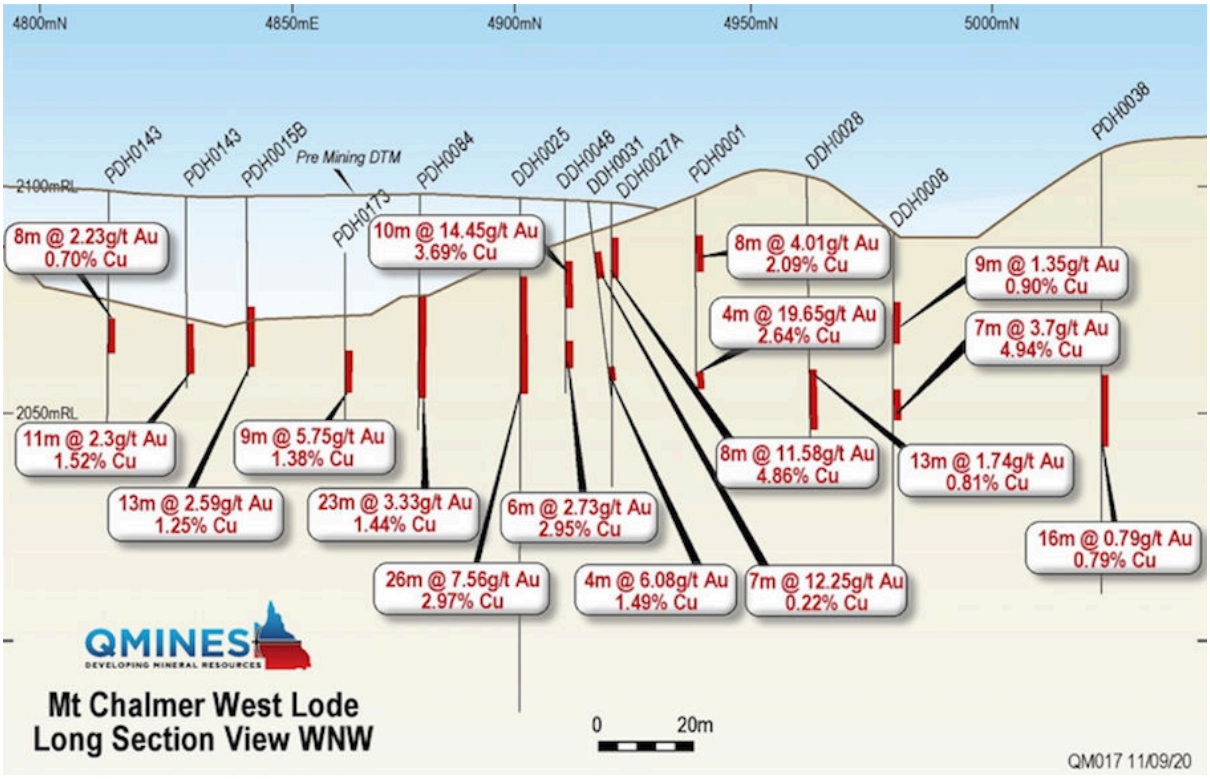
The Mt Chalmers orebody comprises two parallel, elongated lenses of massive barite-pyrite-chalcopyrite underlain by substantial zones of copper and gold-bearing stringer sulphides. The massive sulphide mineralisation occurs on the flank of a rhyolite dome (and has similarities to the Kuroko VMS in Japan) and consists of massive, layered and fragmental sulphides. These zones of sulphide fragments are within a sulphide-barite-talc matrix, implying partial re-sedimentation of the massive sulphide. The upper band of each lens appears to grade down slope over a limited lateral interval into a bedded carbonate-pyrite band. The two lodes are shallowly dipping, the Main Lode being draped over the crest of a 300m diameter siliceous pyroclastic dome, while the West Lode is on the western flank of the same dome. The dome has a relative relief of 120m.

Figure 21: Mt Chalmers section, main lode, looking W-NW



Source: QMines

Figure 22: Mt Chalmers section, west lode, looking W-NW



Source: QMines

Underlying the massive sulphide mineralisation is an extensive well developed network of stringer veins. Footwall alteration at Mount Chalmers is dominated by silica along with extensive zones of chlorite alteration. The Main Lode measures roughly 500m by 100m and is up to 60m thick including the stringer zone. The West Lode is centred 150m southwest of the Main Lode and measures roughly 200m by 90m and is 30m thick.

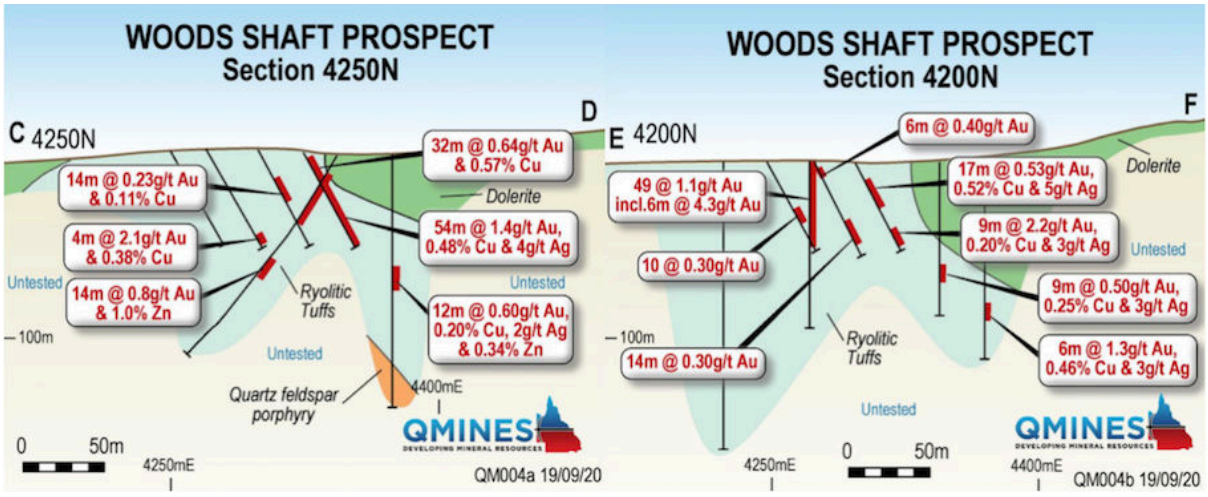
Past exploration has identified a number of targets that may benefit from having modern exploration applied. Notable targets include:

- Massive sulphide bodies and deeper stockwork and disseminated mineralisation beneath the Main Lode and West Lodes
- Down dip extensions to these lodes
- Possible peripheral mineralised bodies resulting from structural dislocation of the Main Lode
- Massive sulphide lenses in new stratigraphic sections of the volcano-sedimentary pile of the Berserker Beds

Woods Shaft

Woods Shaft is located 700m southwest of Mt Chalmers and is at the same stratigraphic horizon being the middle of the rhyolite-shale series within the Chalmers Formation. It comprises an intense iron-barite alteration zone, developed within interbedded chert, slate and jasper. The sequence has been intruded by an antiformal dolerite sill, as well as a magnetic diorite plug. The geology is similar to the Main Lode at Mt Chalmers though historical drilling results suggest Woods Shaft is more gold dominant.

Figure 23: Woods Shaft cross sections



Source: QMines

The Metallica Minerals NL Annual Report 1998-1999 states that geochemical soil anomalies are well-defined and correspond to the alteration zones with peak values of 4,400 ppm copper, 600 ppm gold, 3,100 ppm zinc, 1,200 ppm lead and 4 ppm silver. Cran (1986) calculated resources to 90m depth of 379,000 tonnes at 1.33 g/t gold for the southern area and possible resources of 367,000 tonnes at 1.62 g/t gold in other areas.

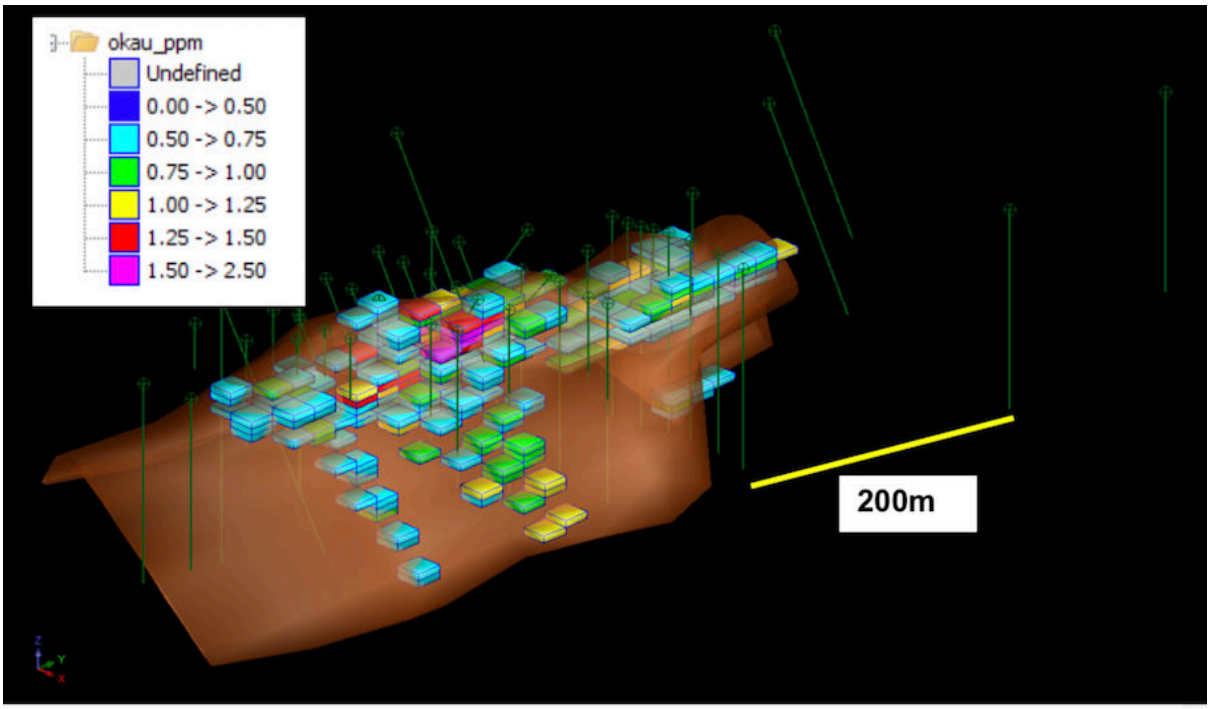
Newmont estimated a resource at the project in 1986. Mineralisation comprises semi-massive and bed parallel stringer-type pyrite with varying amounts of gold, and chalcopyrite together with lower amounts of galena and sphalerite.

The current strike length is 250m and mineralisation remains open at depth and to the south and east. Further drilling is expected to target extensions to the known mineralisation. **Woods Shaft is a highly prospective target with further drilling both warranted and highly anticipated.**

Exploration target

The Woods Shaft JORC 2012 compliant exploration target is based on 48 historical drill holes drilled in 1970s and 1990s, for a total of 5,213m. This drilling was mostly RC and diamond. A 3D interpretation of the assays and geological logs from these holes was completed on 50m sections. The target has a strike length of 350m, is 200m wide and has a thickness varying between 4m and 30m. The target is open to the north for at least 100m, and in some places in open at depth. **The exploration target is 1.0-1.5Mt at 0.6-1.0 g/t Au and 0.2-0.3% Cu.**

Figure 24: Woods Shaft exploration target, looking down and to north west, interpreted mineral zone in brown, blocks above a 0.5g/t gold cut off



Source: QMines

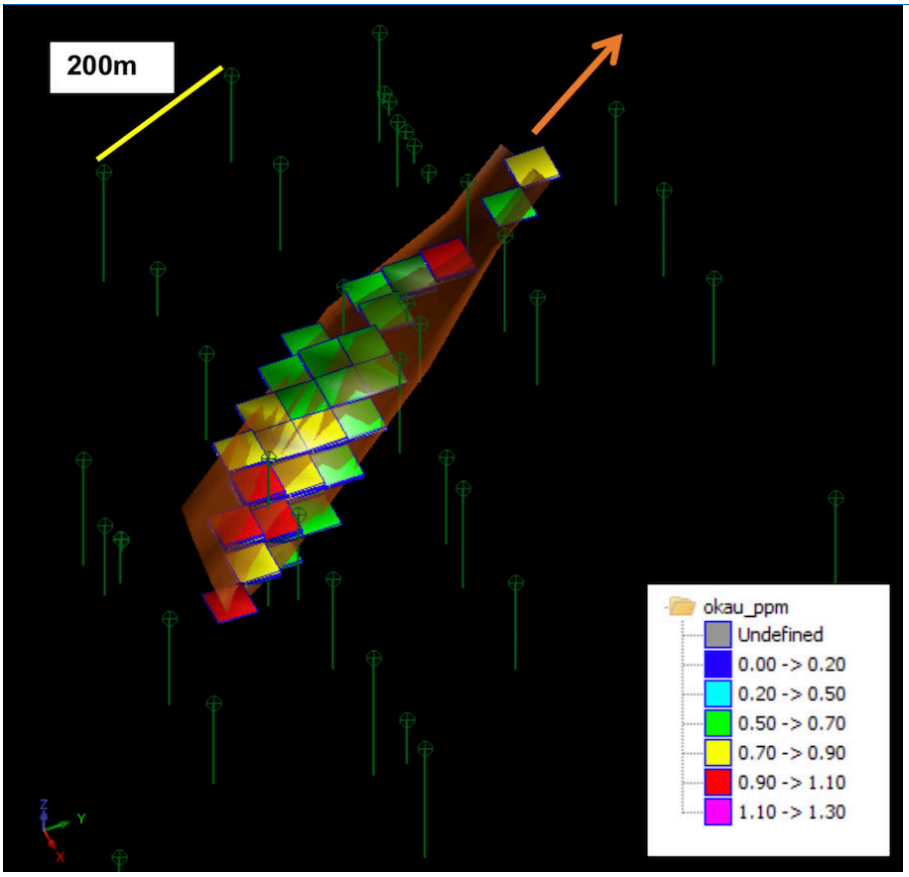
Botos

The Botos project is located 1km northeast of Mt Chalmers and is the same stratigraphic position, in the middle of a rhyolite-shale series within the Chalmers Formation, but on the eastern limb of a north-northwest trending syncline. It is characterised by extensive sericitic alteration. GeoPeko Ltd drilled the area in targeting copper-lead-gold soil anomalies. Notably, percussion hole **PDH13** intersected 21m at 0.9 g/t gold, 0.2% copper, 63 g/t silver, 2.8% zinc and 1.4% lead. **Botos is also a highly prospective target with further drilling both warranted and highly anticipated.**

Exploration target

Management has identified 42 drill holes at Botos that were drilled by Geopeko for a total of 5,469m. The holes are a mixture of percussion, RC and diamond drilling. The JORC 2012 compliant exploration target is based on just 3 holes intersecting significant mineralisation. The target is flat-lying, has a strike length of 750m, is 200m wide, with a thickness that varies from 4m to 10m. The 3D geological interpretation is based on 200m spaced sections. The target remains open along strike. **The exploration target is 1.5-2.5Mt at 0.5-0.8 g/t Au, 1.1-1.4% Zn, 0.5-0.7% Pb, 0.1-0.2% Cu and 30-50 g/t Ag.**

Figure 25: Botos exploration target, looking west northwest, showing blocks above a 0.5 g/t gold cut-off



Source: QMines

Mt Warminster

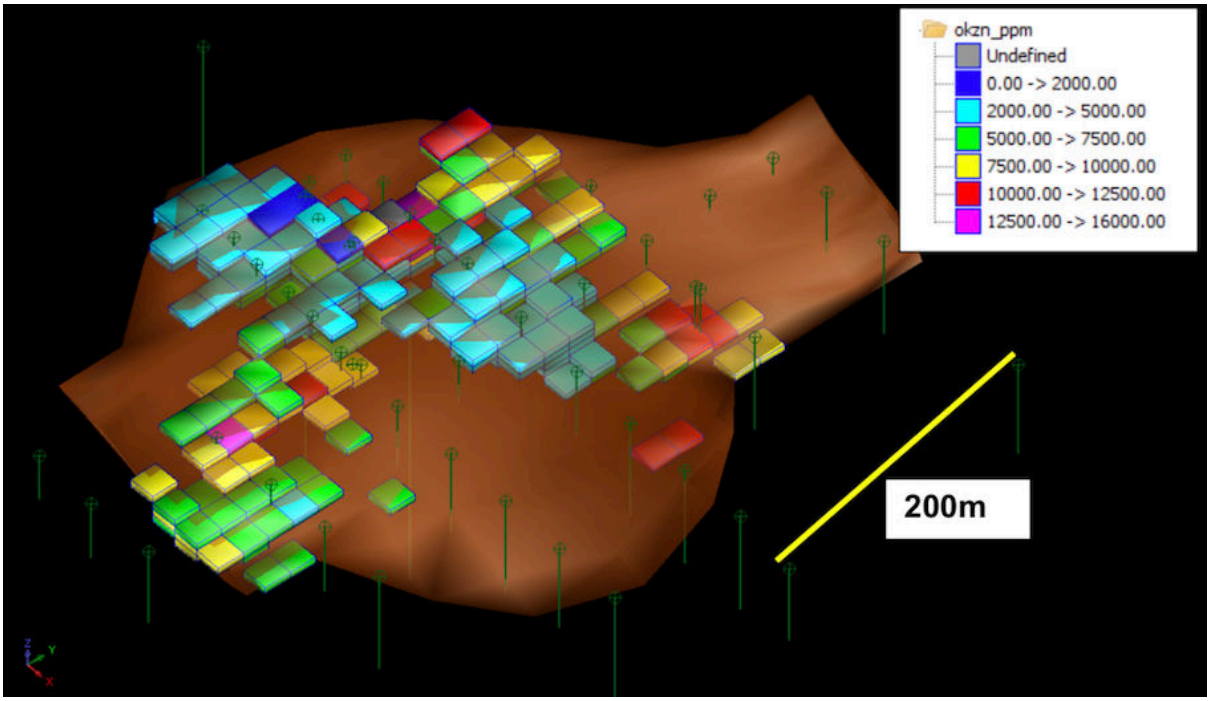
Mt Warminster is a polymetallic prospect located about 2km northwest of the Mt Chalmers mine. The area between Mt Chalmers and Mt Warminster demonstrates silicification and has an associated magnetic anomaly, and anomalous lead-zinc soil geochemistry results. Historical drilling by Geopeko indicated that mineralisation is centred around the historical workings. Based on historical drilling of 59 holes (mainly Geopeko) for a total of 3,194m, the deposit has a strike length of 500m, measures 120m to 350m wide, and is 6m to 40m thick.

Exploration target

The JORC 2012 compliant exploration target at Mt Warminster has a strike length of 500m, is 120m to 350 wide, and is 6m to 40m thick. It is based on 50m spaced sections and a cut-off of 1% zinc

equivalent. **The target is 1.5-1.8Mt at 0.5-0.7% Zn, 0.1-0.2% Cu, 0.25-0.35% Pb and 8-12 g/t Ag.**

Figure 26: Mt Warminster exploration target looking northwest, showing a 1% ZnEq cut-off



Source: QMines

New Zealand Gully Goldfield

In addition to the VMS targets, the New Zealand Gully Goldfield lies some 5km south of Mt Chalmers. The goldfield has hosted some of the richest alluvial gold deposits ever mined in Queensland. These alluvial deposits were sourced from a series of quartz reefs in the Berserker range. Traprock (the vendor to QMines) identified three gold in soil anomalies and geophysical targets on a north-south fault structure which hosts some of the larger mines on the field. Management plans to conduct further compilation of the historical data before defining drill targets.

Striker 2

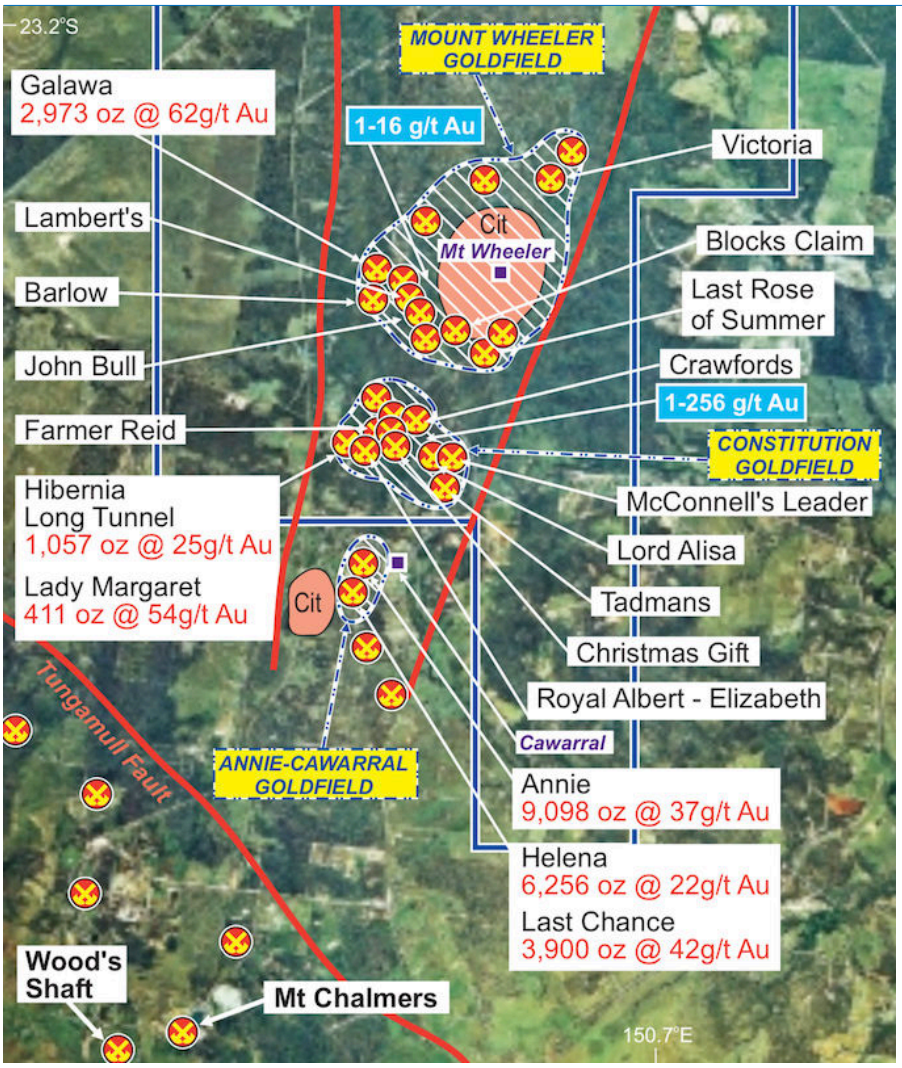
The Striker 2 prospect comprises a 300m by 150m zone of intense pyrite-chlorite-muscovite alteration and minor gossan with a similar sequence of rock as at Mt Chalmers. Metallica Minerals noted (Annual Report 1998-1999) that there are barite rich tuffs towards the eastern margin of the alteration halo, and jasper to the west. Quartz feldspar porphyry and andesite/dolerite dykes are present. The alteration zone demonstrates a copper-lead-zinc-silver soil geochemistry anomaly which was tested with 7 historical drill holes that returned results up to 1.25% copper and 0.45 g/t gold. Metallica further noted an untested gold in soil anomaly immediate west of the alteration zone.

Mt Wheeler: Highly prospective gold area

- Mt Wheeler lies at the northern end of a ~14km gold trend that extends from the New Zealand Gully in the south
- The area is considered highly prospective for high-grade, epithermal gold deposits
- Despite a large number of historical mines, the area has seen little recent drilling

The Mt Wheeler project area is located 25km northeast of Rockhampton and 7km north of Mt Chalmers. It covers the northern part of the more than 14km long Cawarral Gold Trend stretching from the New Zealand Gully in the south to Mt Wheeler in the north. There are more than 20 historical gold workings in the tenement area, some more than 100 years old, and none of which have benefited from systematic modern exploration. The area is part of EPM 27697, which is pending approval. QMines acquired the company holding the EPM application, Rocky Copper, in December 2020 for A$50,000, which was paid in shares at the IPO price.

Figure 27: Mt Wheeler project area showing the historic Mount Wheeler and Constitution Hill goldfields



Source: Echo Resources prospectus, 2006

Mt Wheeler forms a steep, rocky peak in the middle of the project area, rising to 350m above sea level. There are a number of low hills on the fringes of this peak. The surrounding area is mostly uncleared bushland. Historically, this hindered access to the project area, rendering exploration difficult. The western part of the tenement extends over flat agricultural and pastoral country. The project area is served by the Rockhampton-Yeppoon road and a number of smaller roads that connect small townships such as Cawarral.

The Mt Wheeler project area hosts two distinct styles of mineralisation. There are copper-gold-silver VMS deposits hosted within the Berserker Group and with similar mineralisation to Mt Chalmers. There is also gold-bearing mesothermal quartz reef veins and shears within serpentinite and gabbro. These quartz veins are generally narrow though they were mined historically. The deposits occur in a north-northeast bearing belt that includes the Mt Wheeler, Constitution Hill and Cawarral goldfields, all hosted in serpentinite. The area is considered prospective for high-grade, epithermal tonnage gold deposits.

Despite the highly prospective nature of the area, and the large number of historical mines, the region has seen relatively little modern exploration and almost no recent drilling. Historical work, testing for gold, platinum group elements and base metal mineralisation has included mapping, stream, soil and rock geochemistry, airborne and ground magnetic, radiometric and induced polarisation surveys, but only very limited drilling.

Potential for high-grade deposits

Historical production from selective mining of bedrock reefs in the Mount Wheeler, Constitution Hill and Cawarral Goldfields from 1881-1922 was recorded to be about 26,500 oz gold from 40,500 tonnes ore, at an average grade of around 20 g/t gold, including gold recovered from re-processed tailings.

The Galawa mine, on the western side of Mount Wheeler was developed to a depth of ~55m. Gold mineralisation has been reported in a number of quartz stringers and ferruginous veins hosted by weathered serpentinite. The main reef was ~1m thick. Gold production in the period 1881-1892 was recorded at 2,973 oz gold from 1,476 tonnes ore, at an average grade of 62 g/t gold. A further 366 oz gold was recovered from the re-treatment of tailings in 1897-1899. According to Echo Resources' 2006 Prospectus, rock chip sampling from a 30m long and 1-2m wide gossanous zone close to Lamberts workings, located ~300m east-southeast of Galawa returned a maximum result of 16.5 g/t Au. The mine was subject to an unsuccessful drill program in 1997-1998, when three of the four completed holes intersected old mine workings. The mine remains untested for extensions to the historical mineralisation.

Constitution Hill lies to the immediate south of Mt Wheeler. It hosts the historical Hibernia, Long Tunnel and Lady Margaret mines. The Hibernia and Long Tunnel Mines comprise small open cuts with a number of shafts and adits driven into pyritic serpentinite along the line of a north-northeast striking quartz reef that varies in thickness from several centimetres to 1m, on the southern slope of Constitution Hill. These workings extend over some 200m. Mined quartz from these workings are reported to have grades of 60-90 g/t gold. Gold production from the Hibernia and Long Tunnel Mines in 1890-1907 was 1,057 oz gold from 1,303 tonnes at an average grade 25 g/t gold. The Lady Margaret mine, located ~150m southeast of the Long Tunnel mine, was worked in 1895-1905. In 1904-1908, recorded production was 411 oz gold from 238 tonnes ore at an average grade of 54 g/t

gold.

Echo Resources reported (Prospectus, 2006) that grab samples of quartz-chalcopyrite-galena vein material from dumps in the Constitution goldfield returned gold values of 256 g/t gold, 147 g/t gold and 43 g/t gold, while sheared serpentinitic rocks returned values up to 1.8 g/t gold.

Historical drilling in 1997-1998, by Marlborough Gold Mines, in joint venture with Qld Gold Pty Ltd in the Annie-Cawarral Goldfield, intercepted best results of 2m at 255.53 g/t gold from surface (drill hole **MWC-7**) and 7m at 3.5 g/t gold from 83m (**MWC-4**) in the vicinity of the Helena historic workings.

Southern Queensland project area

- QMines has secured three projects in southern Queensland, all of which host prolific historical mining areas but are under-explored in modern times
- At Grieves Quarry, drilling by GSQ in 1961-1971 returned numerous intersections of massive sulphide mineralisation
- Management's initial appraisal of the Herries Range project area has highlighted several zones prospective for gold mineralisation

Silverwood and Grieves Quarry

The Silverwood gold and base metals project is located 15km south of Warwick, and 24km northeast of Stanthorpe. The project comprises two contiguous EPMs with a combined area of 234 km^2. The tenements host numerous historic mines and minerals occurrences for both gold and base metals. This includes the Silverwood copper mine and Grieves Quarry located about 8km to the northwest.

The Silverwood copper mine workings were first developed in 1917. The Stanthorpe Mining Company operated the mine from 1966 to 1970, with production believed to have been some 42.5 tonnes of copper. The mine hosts the Day Dawn and Wilson's Lodes in which copper mineralisation occurs as chalcopyrite in a siliceous brecciated zone that is 0.3m to 1.0m wide. Historical ore reserves were estimated at 10,000 tons, though that was well before the JORC code was established. A treatment plant to produce copper concentrates was built near Warwick in 1969, and subsequently used for crushing limestone. The Geological Survey of Queensland (GSQ) undertook two diamond drill programs in the Silverwood Valley between 1969 and 1971, drilling 17 holes for a total of 1,505m. **The program reported numerous intersections of massive sulphide mineralisation at Grieves Quarry**. GSQ did not assay for gold.

Figure 28: Grieves Quarry drill intercepts used for the exploration target

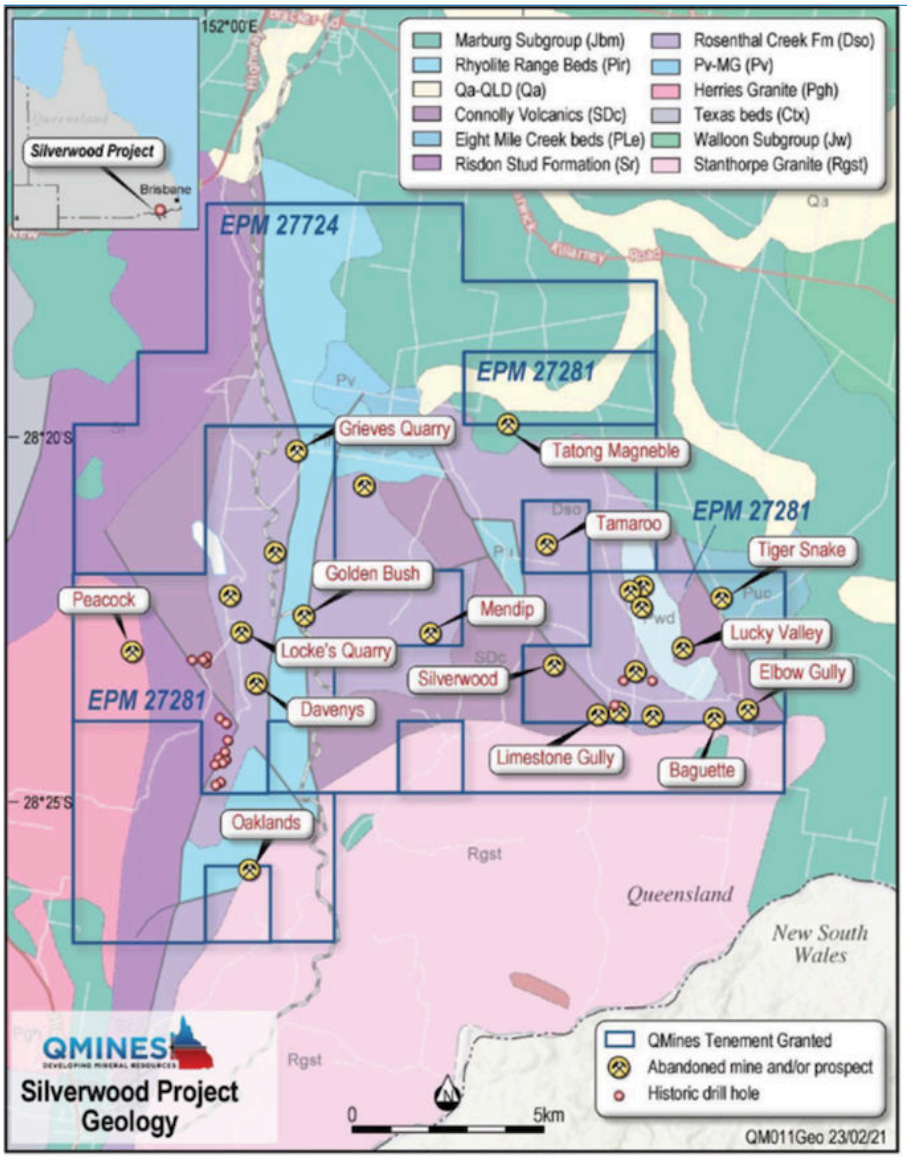
Hole	Interval m	From m	Zinc %	Cu %	Ag g/t	Pb %
LS19	27.61	0	2.5	0.4	16.5	0.4
including	6.8	22.6	3.9	0.5	29.1	0.7
LS21	49.17	0	2.4	0.3	13.4	0.3
including	15.2	21.2	5.0	0.2	25.8	0.5
LS22	35.58	0	4.7	0.5	47.7	1.4
including	10.8	21.2	9.0	0.8	104.7	3.1
LS23	13.95	15.84	1.0	0.2	5.7	0.1
NS02	27.18	62.1	5.8	0.7	19.2	0.4
including	12.3	71.6	8.9	1.2	43.8	0.1
NS03	11.81	47.8	0.8	0.1	16.7	0.5
NS05	16.35	92.46	1.0	0.1	4.8	0.0

Source: QMines

The interpreted mineralised zone has a strike length of 200m, is 200m wide and varies in thickness from 6m to 50m. It dips steeply close to surface and at 20-30^0 to the east below surface. Mineralisation is open along strike, and may be much more open down dip.

A number of companies conducted exploration through the 1970s and 1980s. Amoco Minerals Australia (1974) and Penzoil of Australia (1978) explored for massive sulphide undertaking mapping, as well as electromagnetic, ground induced polarization, magnetic, and geochemical surveys, but no drilling. Other companies also undertook limited fieldwork, but no drilling. In the 2000s, a number of companies reviewed these historical efforts, but fieldwork was limited and no further drilling was undertaken.

Figure 29: Silverwood project geology

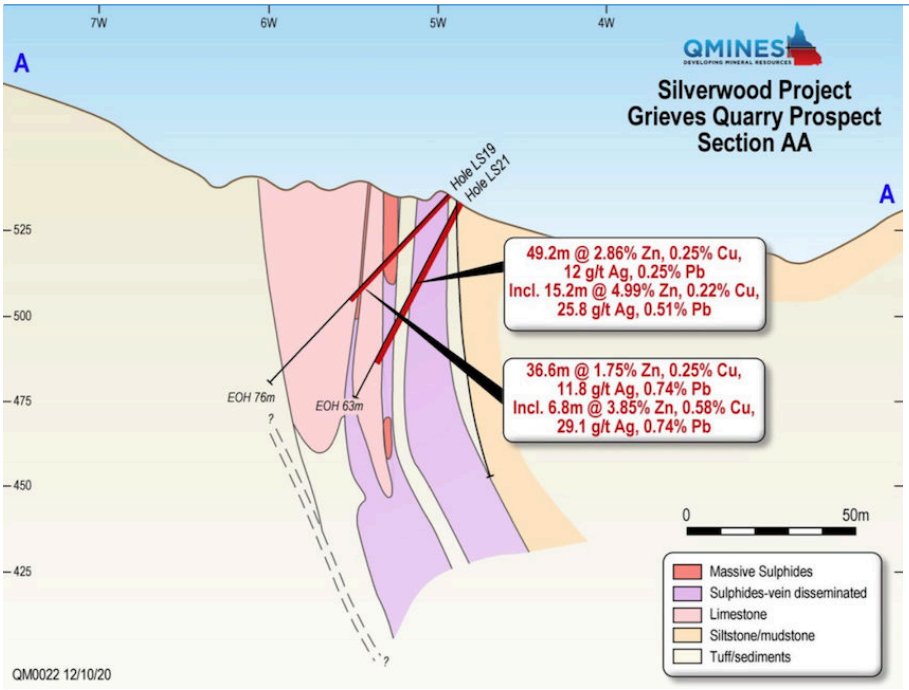


Source: QMines

The mineralisation at Silverwood and Grieves Quarry is associated with sulphide exhalite onto the sea floor formation hosted in volcanics (VMS) and also to dissolution, brecciation and sulphide replacement of carbon host rocks. There is also potential for gold in calcareous or carbonate sedimentary rocks, such as skarn-hosted gold and Carlin-style gold.

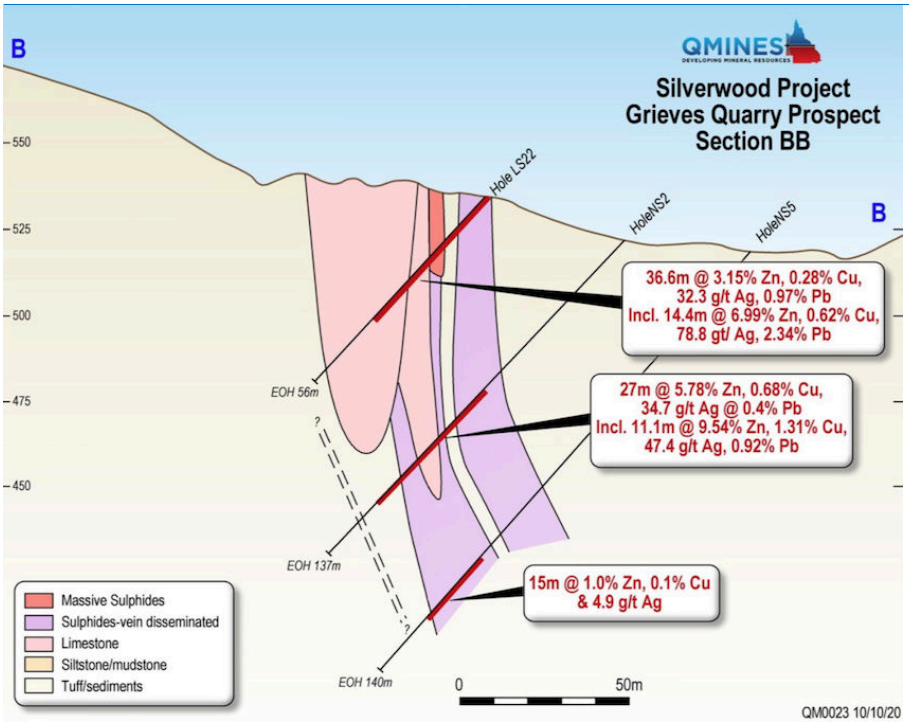
Management's work plan includes data composition, a review of the Grieves Quarry mineralisation aiming to determine drill targets, as well as geochemical and stream and soil sampling.

Figure 30: Grieves Quarry Section AA, interpreted from 1968-1971 drilling



Source: QMines

Figure 31: Grieves Quarry Section BB, interpreted from 1968-1971 drilling



Source: QMines

Herries Range

The Herries Range gold project is located 40km west of Warwick and 25km northwest of Stanthorpe, in southwest Queensland. The project comprises three contiguous EPMs, with a combined area of 330 km^2 covering the central and southern portions of the Warwick Goldfields. The project is within 18km of the Warroo copper-gold project. It is about three hours by road from Brisbane.

The land is open, employed for sheep and cattle grazing, and there is ready access for fieldwork. There is a good road network with the Cunningham Highway passing through the northern part of the project area, and the New England Highway passing to the east.

The project area encompasses a number of goldfields including Canal Creek in the west, and Pikedale Goldfield to the south. There are at least 63 historical hard rock gold mines, of which the majority mined 'bonanza' gold grades of 2 oz/t or more. In addition, there are more than 100km of alluvial gold workings within the tenement area.

Gold mineralisation in the area is associated with pyrite, which is disseminated through fractured sedimentary rocks, in larger sheers, and also as multiple quartz veins. Over time, these gold pyrite rocks have weathered, resulting in alluvial gold deposits over a vast area. The largest of these alluvial gold 'runs' was at Canal Creek where an estimated 20,000 oz gold was recovered by historical alluvial miners. Today, modern mechanical operations and a number of metal detector operations recover gold in the area.

Historical exploration

While a number of companies have performed exploration work at Herries Range, including mapping, sediment and soil sampling, and bulk leach sampling, the area remains substantially untested with drilling. In 1989, Saracen Minerals drilled five holes for a total of 197m across two abandoned mine sites with disappointing results. In the late-1980s to early-1990s, a number of major companies held tenements in the area including Freeport Minerals Australia, Newmont Australia and BHP Gold, but after the 1987 stock market crash, exploration activity was poorly funded. As a result, and **to QMines' advantage, the area remains largely untested with drilling.** The historical mapping and available geophysical information that is available should give QMines a head start in assessing potential drill targets.

Management's initial appraisal of the project area has highlighted several zones prospective for gold mineralisation. This includes:

Palgrave Goldfield – Mountain Maid – Madam Ross – Telegraph zone: Mountain Maid and Madam Ross were the two largest historical mines in the district, located about 3km apart. The workings at both mines were in multiple high-grade vein systems, with Mountain Maid demonstrating a strike length of at least 650m, and Madam Ross striking for 750m.

Pikedale Goldfield: A group of six hard rock gold mines hosting high-grade vein systems in pyritic slates and greywacke sandstones. At Kaffir Chief, an underground sampling program conducted by Queensland Mines Department in the 1970s returned average gold grades in the bottom section of the mine of 14.9 g/t gold, with a high result of 207 g/t gold from an existing pillar.

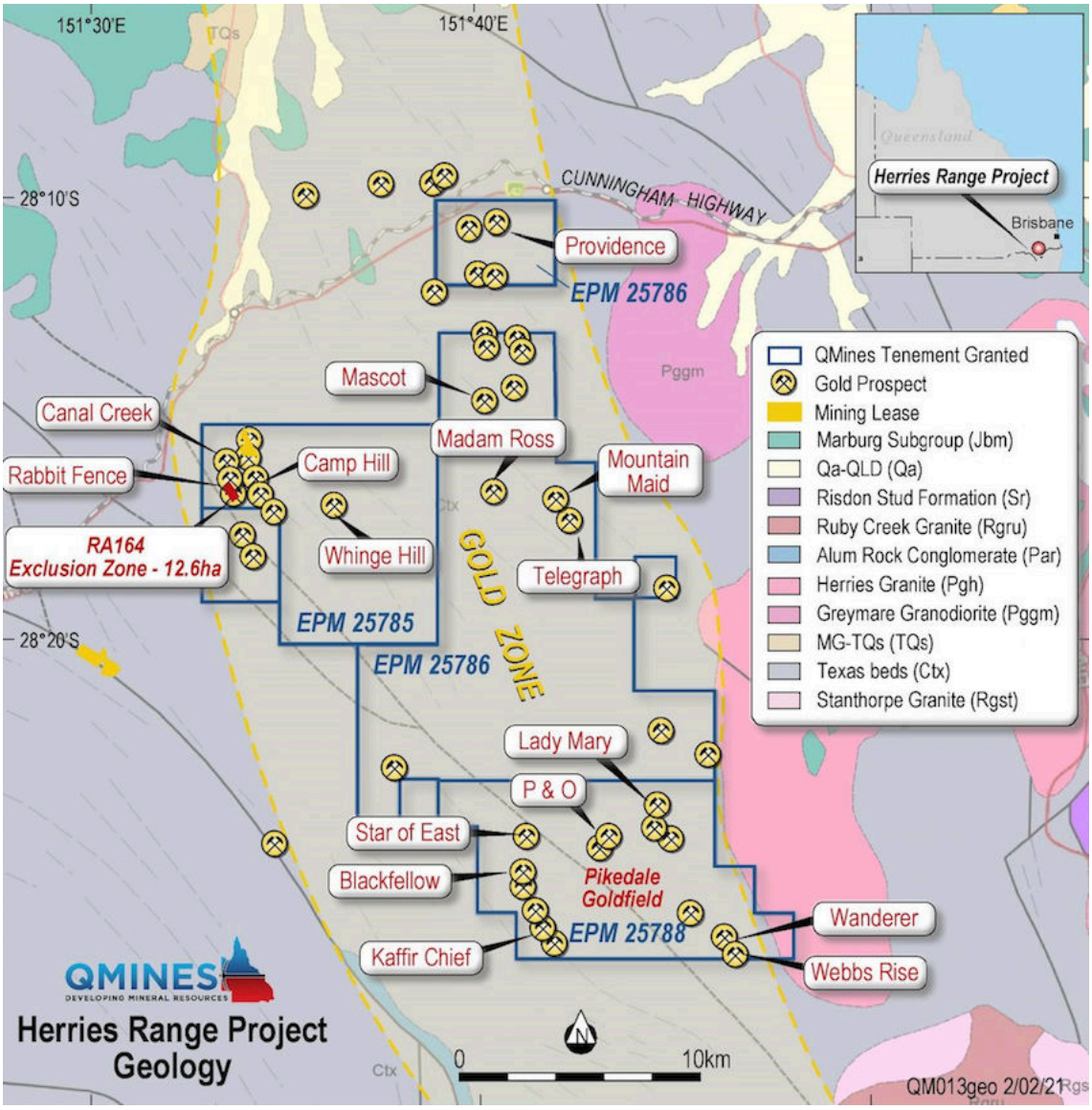
Camp Hill - Rabbit Fence - Whinge Hill zone: A 7km zone containing 10 creeks and gullies, some of which have been worked historically for alluvial gold. Vein and hard rock mines are in the area.

Puddler - Hunts Gull - Mascot Mine Cluster: A 8km long zone that hosts 13 small scale hard rock gold mines and prospects, and extensive alluvial workings. At Mascot, the largest of the historical hard rock mines, the mineralised reef is some 550m in length.

Hunters Gully - Mount Burrabaranga zone: The area hosts a northerly trending elevated and sand-covered ridge that extends for more than 5km. There are scattered alluvial workings through the area. The ridge is drained by 8 creeks, with historical pan concentrate tests by Saracen reporting values ranging from 3.7 g/t gold to 236 g/t

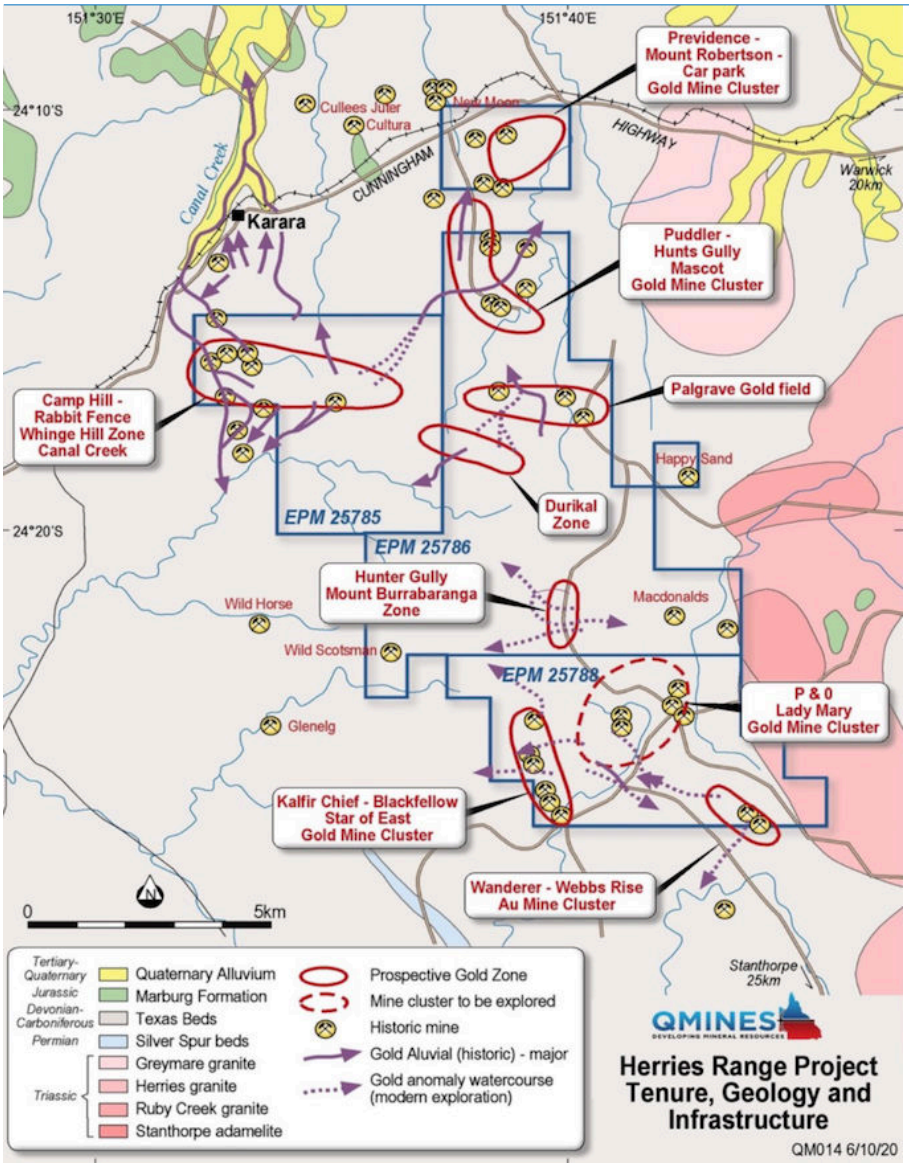
Durikai Zone: A 5km long zone drained by six gold-anomalous creeks and gullies. Saracen undertook pan-concentrate samples in 1989 with results varying from 0.5 g/t to 22 g/t gold. Apart from this work, the area remains unexplored.

Figure 32: Herries Range project area



Source: QMines

Figure 33: Herries Range Prospective Zones for Exploration



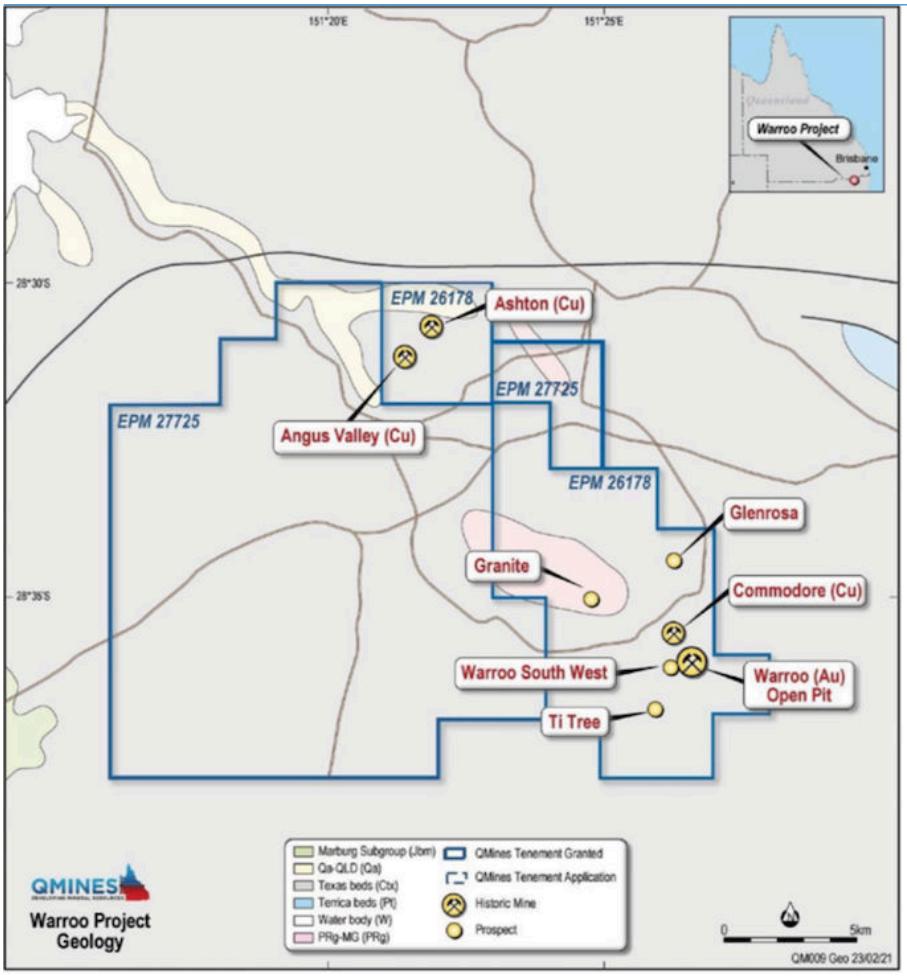
Source: QMines

Warroo

The Warroo gold and copper project is situated in the Traprock Region of southeast Queensland, some 50km west of Stanthorpe and 35km northeast of Texas. The project area comprises two exploration permits with a combined area of 216 km^2. The strategy at Warroo is similar to that at other projects. Given the highly prospective nature of the region, management has sought to tie-up a far larger land package than was held by historical miners.

The Warroo project area is prospective for large porphyry or intrusion related gold-copper mineralisation. There is good potential to define mesozonal or epizonal intrusion related gold mineralisation. There are a number of historical workings in the area and the project hosts a number of gold and copper targets including the former Warroo mine area that justify following up. Historical exploration was sporadic and shallow; the project area remains largely untested.

Figure 34: Warroo project geology



Source: QMines

The Warroo Mine commenced production in 1906 and was worked intermittently until 1992. The mine produced 21 tonnes of copper, 283 oz of gold and 901 oz of gold in 1910-1911, and a further 923 oz of gold in 1912-1913. When the mine was reopened in 1931, some 5 oz of gold was recovered from 8 tonnes of ore. More recently, Valdora Minerals worked the asset in 1990-1992, mining around 214,000 tonnes at 1.94 g/t gold for a heap leach operation (with actual gold production figures unknown).

Other historical mines in the area include the Ashton copper mine, which was discovered in 1897 and worked until around 1900, and the Commodore copper mine which was discovered in 1905 and produced 206 tonnes of copper grading 6% to 20% copper in 1906-1913. At Commodore, gold grades in the supergene zone were reportedly as high as 25 g/t, though there is no record of total production. These deposits were mined close to surface. At Warroo, later mining was open-cut and focused on oxide ores down to a depth of 40m. At Commodore, historical exploitation was to a depth of just 35m.

Over the years, several companies have explored the area. Duval Mining (Australia) Ltd conducted regional and more detailed sampling and mapping. Duval identified the Glenrosa prospect and confirmed the Warroo prospect. At Warroo, the company drilled 26 percussion holes and 1 diamond hole, and identified a new gold zone with a strike length of more than 1km. The best intercept from these holes was 8m at 13.46 g/t gold. Valdora Minerals undertook regional mapping, and heavy

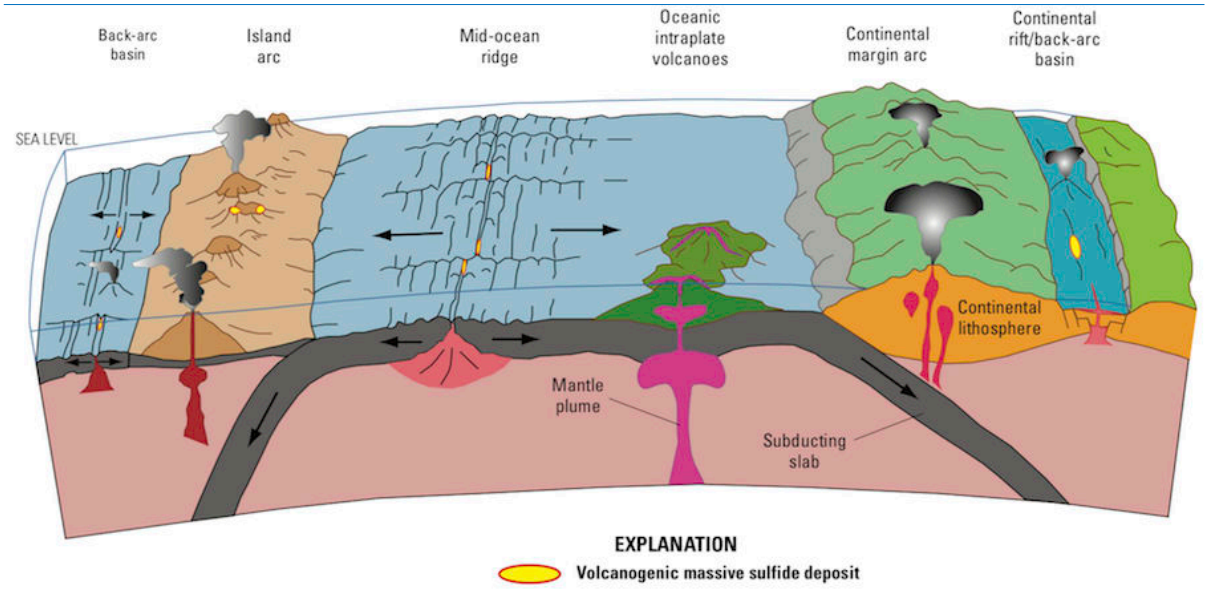
minerals sampling that generated several new areas of interest, though no follow-up work seems to have been completed. Also, Oxiana Exploration Pty Ltd, in joint venture with Qld Gold and Minerals NL undertook soil and rock sampling at the Ashton-Angus Valley, Glenrosa, and Warroo Waroo. A gold mineralised epithermal style quartz breccia vein was identified at Ti Tree, 800m south of Warroo. **Despite this work, undertaken by several companies over a long period, Traprock estimated that only 20% of the area has been explored, and even then, only to shallow depths.**

QMines' intended work program includes data compilation, stream and soil geochemical follow-up sampling, reconnaissance and rock-chip sampling of structural zones associated with the projects at Warroo, Glenrosa and Ti Tree, sampling of the highly potassic zones in the Mt Bullaganang granite for alteration and sheeted veins, possibly extending the IP coverage, and planned drill to test targets. The budget for this work is around A$600,000 in the next two years.

Appendix 1: Kuroko style VMS systems

Volcanogenic massive sulphide (VMS) deposits are stratabound concentrations of sulphide minerals precipitated from hydrothermal fluids in extensional seafloor environments. Tectonic settings giving rise to VMS deposits include mid-oceanic ridges, volcanic arcs (intra-oceanic and continental margin), back-arc basins, rifted continental margins, and pull-apart basins. The composition of volcanic rocks hosting individual sulphide deposits range from felsic to mafic. Bimodal mixtures also occur. Deposits range in age from Early Archean (3.55 Ga) to Holocene (which commenced about 11,650 years ago). Indeed, deposits are forming in numerous modern oceanic settings. Globally, there are almost 1,100 recognized VMS deposits.

Figure 35: Tectonic VMS deposit tectonic formation settings



Source: USGS, Volcanogenic Massive Sulphide Occurrence Model

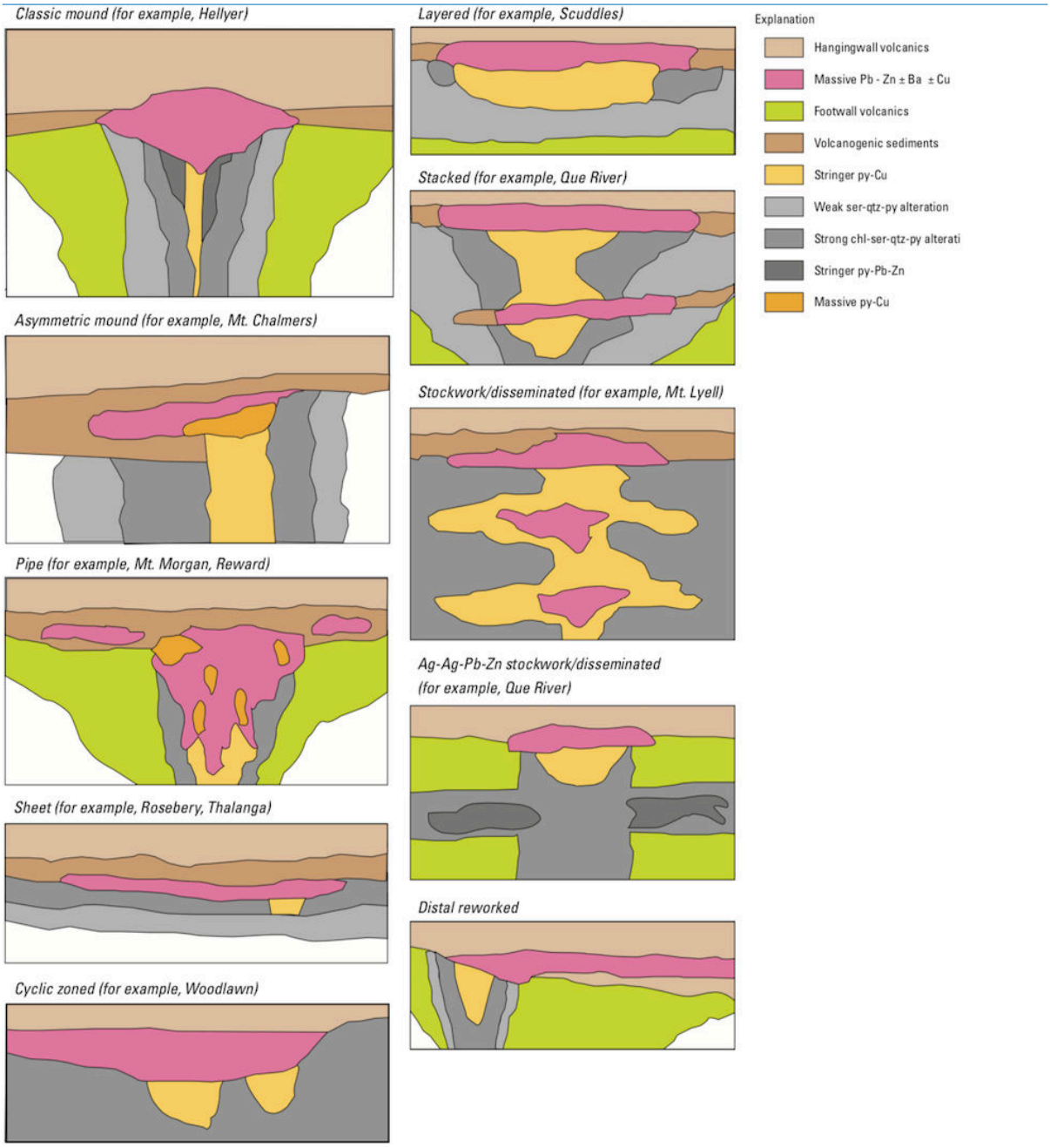
VMS deposits are characterized by abundant iron sulphides (pyrite or pyrrhotite), with varying amounts of subordinate chalcopyrite and sphalerite. In some deposits, other mineral phases including bornite, tetrahedrite, galena and barite are concentrated. Massive sulphide bodies typically demonstrate lensoidal or sheet-like forms. Many deposits overlie zones of sulphide-bearing stringer or stockwork vein systems. These zones represent ducts of fluid flow beneath the seafloor. In many deposits, the massive sulphide body has distinct zones with iron and copper at the base and zinc-iron-lead-barite at the top and margins.

VMS deposits have typical dimensions of 100m to 500m (10,000m^2 to 250,000m^2 in plan-view) though some deposits are far larger. The Besshi deposit on Shikoku, Japan measures 3,500m by 1,800m, with a plan view of 6.3 km^2. These wide variations reflect a number of geophysical properties including the structural and volcanic controls on mineralisation, the nature and duration of the hydrothermal activity, the topography of the seafloor, the permeability of the footwall strata, and the level of subsequent deformation through shearing, faulting, folding and other processes.

Reference: USGS, Volcanogenic Massive Sulphide Occurrence Model, https://pubs.usgs.gov/sir/2010/5070/c/SIR10-5070-C.pdf

In the absence of significant deformation, VMS deposits can form as sheets, in layers, or as mounds, lenses, pipes or stockworks. In sheet-like deposits the dimensions of the sulphide zone can exceed its thickness by an order of magnitude or more. Despite the substantial footprint of the Besshi deposit, it is only about 30m thick. The Thalanga deposit in Queensland, Australia has a strike length of ~3km, but is only 10m to 20m thick in most places. Other shapes of deposits may reflect the nature of the host rock. The Tambo Grande deposit in Peru measures 500m by 350m and is 250m thick. This type of 'equidimensional' deposit reflects sulphide deposition within a confine space such as a graben, or volcanic basin. Pipe-shaped deposits, such as at Mount Morgan, and Highway-Reward in Queensland, have thicknesses that are much great than the 'footprint dimensions'. This typically reflects sub-seafloor mineralisation and the replacement of permeable volcanic or sedimentary units by sulphides.

Figure 36: Different forms and style of VMS deposits



Source: USGS, Volcanogenic Massive Sulphide Occurrence Model

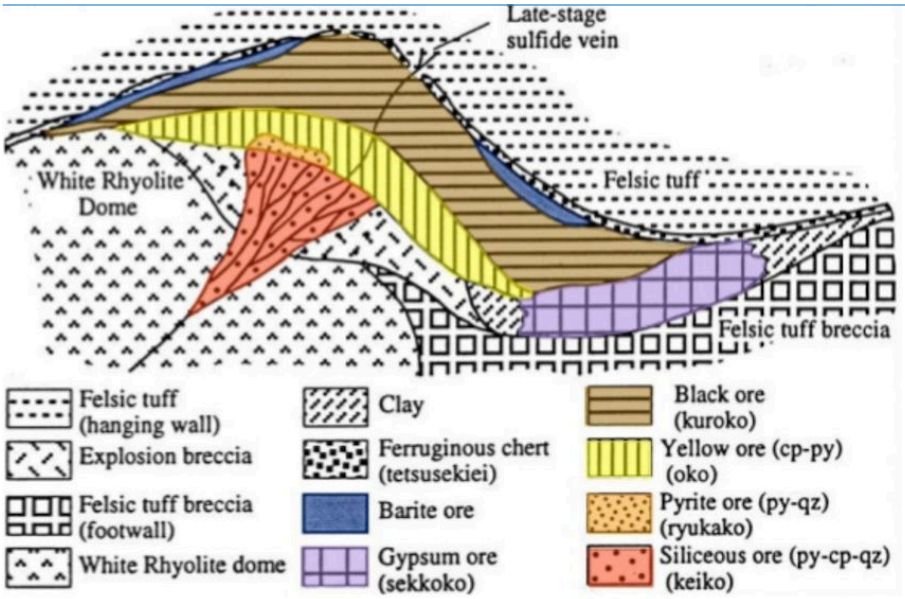
Kuroko style deposits

Kuroko (literally translated as “black clad”) deposits are named after the black lead zinc ore that was mined in Japan for hundreds of years. Many mines also had stockwork orebodies of yellow ore (“oko”) containing pyrite and chalcopyrite. Fine grained ores of zinc and lead sulphides, together with copper, pyrite and barite were formed during the extrusion of rhyolite domes through the processes of hydrothermal exhalation through submarine vents and mound-building on the sea-floor. The mounds grow by the upward replacement of sulphide assemblages that are stable at higher temperature. This results in a typical lead-zinc-silver-gold enrichment in the outer and upper part of the mound.

Mineral zoning is believed to be almost entirely attributable to temperature changes, with pyrite-chalcopyrite precipitating at higher temperatures within and in close proximity to the feeder vent. Galena-sphalerite-barite are precipitated towards the peripheral parts of the brine, where the solution is cooler and the sulphate concentrations higher after mixing with seawater.

One characteristic of Kuroko VMS systems is that they tend to occur in clusters along the same stratigraphic horizon and in districts that are well-defined. Mt Warminster, Woods Shaft, Botos and Hunter are probably all hosted in the same horizon as Mt Chalmers. Within a district, deposits typically become smaller and have more simple grading with increasing distance from the heat source.

Figure 37: Idealised cross section of Kuroko style VMS



Source: Dr Abdel Monem Soltan, Ain Shams University, Egypt

These deposits typically exhibit a number of characteristic zones:

- **Iron-silica sediment or exhalite zone:** This is the highest stratigraphic zone, and comprises Si-Fe-Mn±Au. It becomes highly siliceous directly above the ore zone. It rarely continues for more than 1km from the ore body.
- **Barite ore zone:** This is composed of Ba-Zn-Pb-Ag-Au with pyrite-carbonate.
- **High-grade massive sulphide "black ore" zone:** Comprises Zn-Pb with pyrite-arsenopyrite±Ba-Ag-Au. Textures can be laminated, bedded or fragmented and framboidal pyrite is common with sericite-carbonate-quartz with or without talc alteration.
- **Massive low-grade ore zone:** Contains zinc, lead and copper ("semi-black ore") with pyrite, with a massive texture with carbonate-quartz-chlorite alteration.
- **Massive chalcopyrite-pyrite Cu-Fe±Au "yellow ore" zone:** This zone also contains pyrrhotite and magnetite and is considered to be replacement at the base of the "black ore" zone which was deposited previously. Massive, banded or brecciated textures are developed with chlorite-quartz alteration.
- **Massive pyrite Fe±Cu ore zone:** Contains lesser pyrrhotite-magnetite and quartz.
- **Stringer Fe-Cu±Au (siliceous yellow ore) zone:** Hosting pyrite-chalcopyrite and lesser magnetite-pyrrhotite.
- **Stringer Zn-Pb±Ba-Ag-Au (siliceous black ore) zone:** Occurring as network veins and dissemination within sericite-quartz± K-feldspar-carbonate alterations assemblages.
- **Stringer pyrite ore:** Occurs as veins and disseminations within quartz-chlorite-sericite alteration assemblages.

Mt Chalmers

At Mt Chalmers, the dominant zones are the massive chalcopyrite-pyrite "yellow ore" zone and the stringer Fe-Cu±Au (siliceous yellow ore) zone. The iron silica, barite and massive low-grade ore zones are subordinate, and the high-grade massive sulphide "black ore", massive pyrite, and stringer Zn-Pb±Ba-Ag-Au (siliceous black ore) zones virtually absent.

Importantly, the outcropping Mt Chalmers orebody may not be the largest in the area. There are a number of exposed altered and mineralised zones within the Berserker Beds that remain to be tested for VMS mineralisation. **There may well be hidden orebodies within the volcanic pile yet to be discovered.**

Appendix 2: Companies mentioned

Figure 38: Companies mentioned in this report

Company	Stock code
QMines	QML.AX
Beach Energy	BPT.AX
Eagle Mountain Mining	EM2.AX
KGL Resources	KGL.AX
New World Resources	NWC.AX
Newport Exploration	NWX.V
Peel Mining	PEX.AX
Resources & Energy Group	REZ.AX
Rumble Resources	RTR.AX
Sandfire Resources America	SFR.V
Santos	STO.AX
Stavely Minerals	SVY.AX
Zenith Minerals	ZNC.AX

Source: Company data

The author

Simon Francis is a UK qualified chartered accountant with significant experience in the natural resources and minerals sector. Simon led research in the sector in various roles at major financial institutions including Macquarie, Samsung and HSBC, in a career spanning more than 20 years. He has been involved in approximately US$4bn of capital raising, for a number of natural resources companies. Simon has been engaged in the financing of early stage companies using production agreements, and has privately funded exploration companies in various metals and jurisdictions. Simon seeks to deploy capital in undervalued mining and resources opportunities that have been missed by the market.

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(b) 1,700,000 options with an exercise price of $0.375 and a 3-year term;

(c) out-of-pocket expenses in the course of completing the Services;

(d) $5,000 (excluding GST) for the publishing of this report;

(e) 1,011,100 shares in the capital of the company; and

(f) approximately $12,000 (plus GST) in capital raising fees.

Further to this, the Company's executive Chairman, Andrew Sparke, is the sole director and shareholder of Olive Capital Pty Ltd which is an Authorised Representative of Kerr Allan Financial for which Olive Capital has paid a fee. Olive Capital has not received any fee's from QMines. Turkey Investments Pty Ltd ATF The Turkey Family Trust, for which Andrew Sparke is a director and shareholder, owns 24,385,000 shares in QMines.

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