ASX MEDIA RELEASE

Havilah Resources
A New Mining Force in South Australia

18 June 2019

Positive Kalkaroo PFS
Supports Large Scale Copper Project

HIGHLIGHTS

- **Positive PFS project economics supports a large-scale open pit copper-gold mine at Kalkaroo in north-eastern South Australia, near Broken Hill.**
- **Estimated pre-tax $NPV_{7.5\%}$ of $564 million and IRR of 26% at USD$2.89/lb copper, USD$1,200/oz gold, AUD$:USD$0.75.**
- **Average annual production of 30,000 tonnes of copper and 72,000 ounces of gold anticipated over a 13 year production period (recovered metal).**
- **Highly sensitive to commodity prices with a 10% increase in metal prices resulting in a 48% increase in the pre-tax $NPV_{7.5\%}$ to $835 million.**
- **Estimated C1 cost of USD$1.67/lb.**
- **Estimated pre-production Capex of $332 million.**
- **100.1 million tonne Ore Reserve (Proven - 90.2 million tonnes, Probable - 9.9 million tonnes) that contains 474,000 tonnes of copper and 1.41 million ounces of gold.**
- **Project significantly de-risked with grant of Mineral Leases and ownership of the surrounding pastoral property.**
- **Favourable logistics and low sovereign risk in mining friendly South Australia.**
- **Ongoing studies being undertaken by Havilah aim to investigate some of the potential upside scenarios identified by the PFS.**
- **Excellent exploration upside to boost resources at Kalkaroo with deposit being open down-dip and along strike.**

Note: All amounts in this document are in Australian dollars unless otherwise specified.

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Havilah Resources Limited (**Havilah**) is pleased to release details of the Kalkaroo prefeasibility study **(PFS)** report by independent mining consultants, RPMGlobal Asia Limited **(RPM)**, originally prepared for Wanbao Mining Limited.

Havilah is releasing the PFS at this time in order to inform the market ahead of the release of the Notice of Meeting for the approval of the proposed transaction with SIMEC Mining, a member of the GFG Alliance (ASX release of 1 May 2019). In the meantime, Havilah continues to work with RPM on various opportunities identified in the PFS to potentially enhance the project. Havilah will release these results in an updated PFS during the fourth quarter of 2019, if the outcomes are sufficiently material.

Land Access and Tenement Status

Havilah owns the 550 km^2 Kalkaroo Station pastoral property on which the Kalkaroo Project is located, and presently has the property de-stocked in order to carry out conservation activities that will continue for the duration of the mining operation.

Copper concentrates from the Kalkaroo Project are planned to be transported via road train 50 km south to the Transcontinental railway line and then via rail to Port Pirie or elsewhere (**Figure 1**).

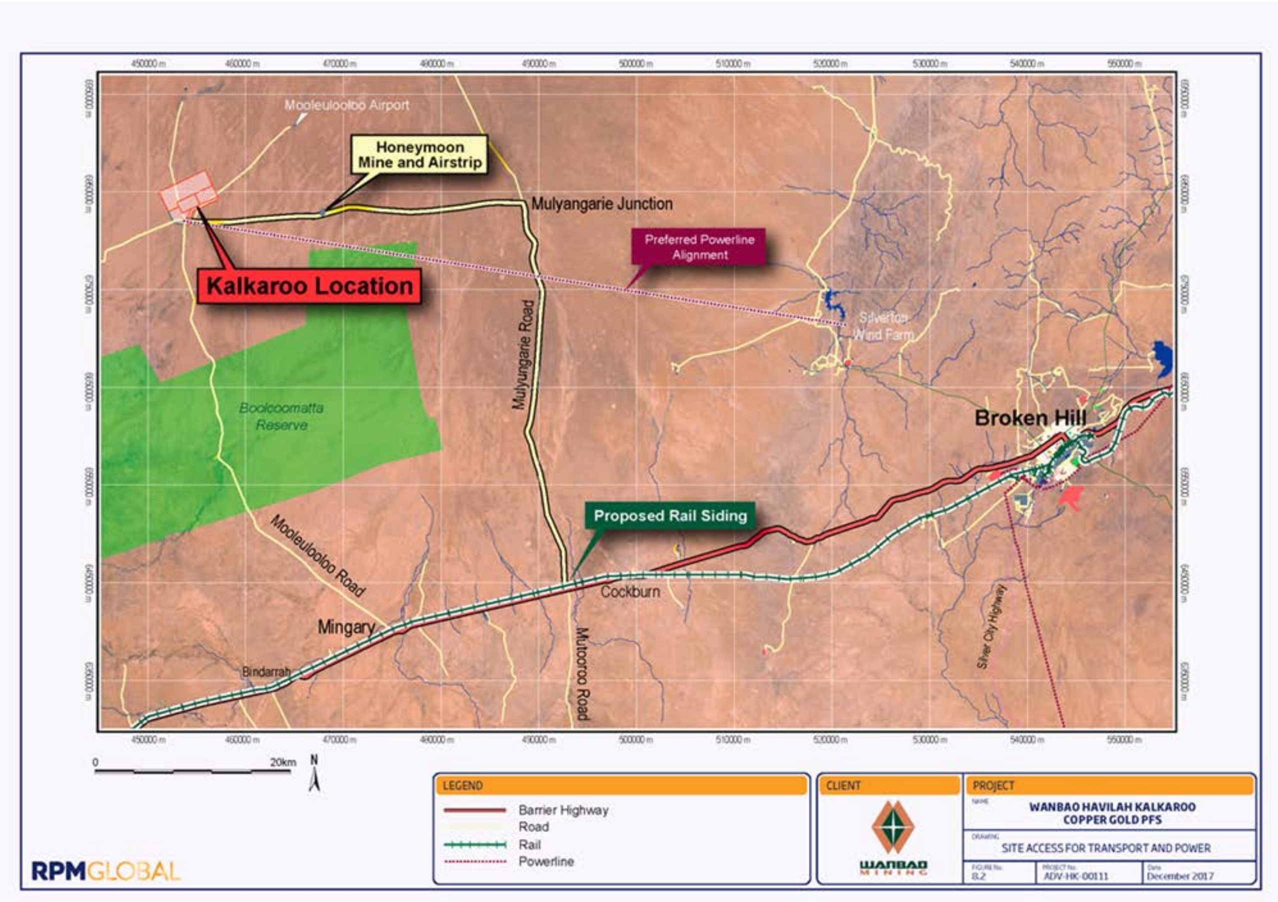

Figure 1 Kalkaroo lies in northeastern South Australia 100 km west-northwest of Broken Hill.

Havilah's right to mine is secured by three Mineral Leases and two Miscellaneous Purposes Licences covering Kalkaroo that were recently granted by the Department for Energy and Minerals (ASX release of 22 May 2019). Havilah also owns 100% of the surrounding 998 km^2 Exploration Licence 5800, which allows for expansion of the mining area via new Mineral Lease or Miscellaneous Purposes Licence applications if required.

Geology

The primary Kalkaroo deposit comprises structurally controlled replacement style stratabound chalcopyrite and pyrite sulphide mineralisation that is amenable to standard sulphide flotation methods to produce a high quality copper concentrate. Weathering has superimposed a supergene mineralisation profile in the upper part of the deposit with a gold cap saprolite zone, native copper zone and a secondary sulphide (chalcocite-pyrite) zone developed above the primary sulphide (chalcopyrite-pyrite) zone (**Figure 2**). Mineralisation is open down dip and along strike to the east and west. There is potential for breccia-stockwork vein style mineralization in a major mineralized fault zone in the central part of the deposit.

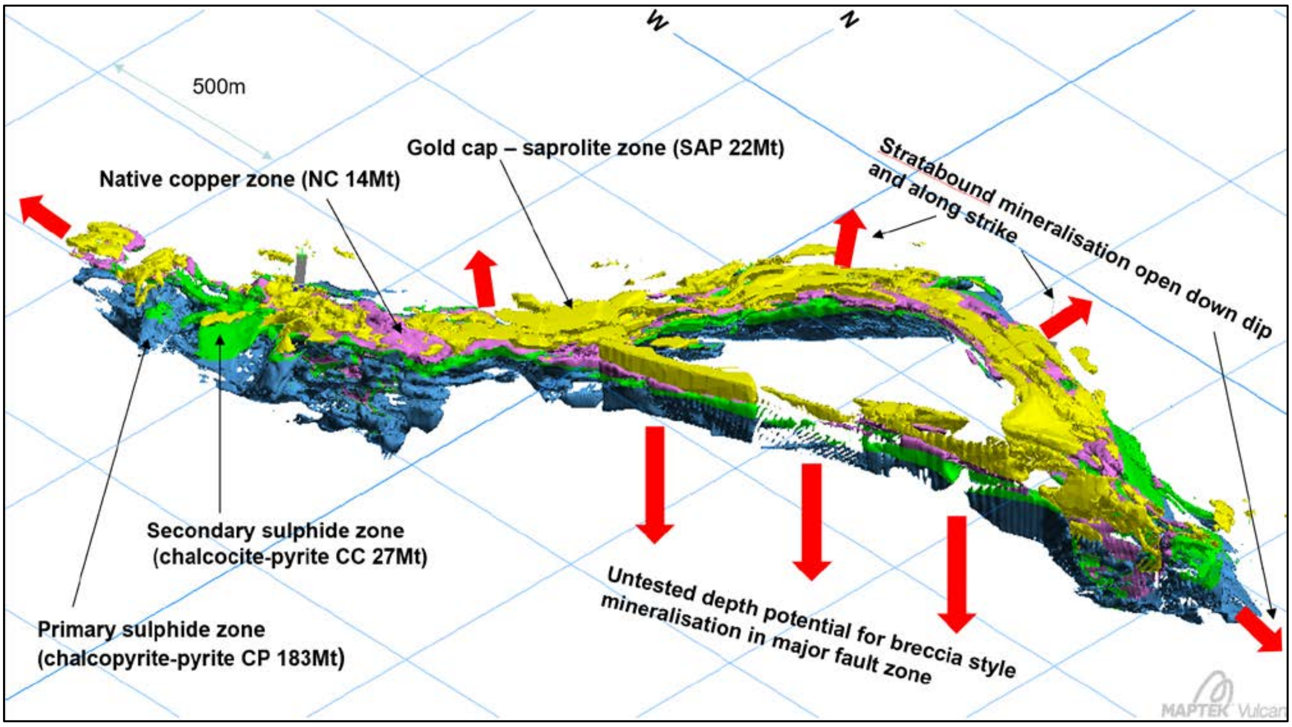

Figure 2 3D view of the Kalkaroo orebody showing the different copper-gold mineralisation types.

Mineral Resources and Ore Reserves

The PFS is based on the geological model developed by Havilah and verified by RPM, which comprises a saprolite gold resource forming a gold-rich cap on top of a mostly sulphide copper-gold resource (**Figure 3**). Measured, Indicated and Inferred Mineral Resources totalling 1.1 million tonnes of copper and 3.1 million ounces of gold are estimated (ASX release of 30 January 2018). There is excellent potential to expand the current resource base with further step out drilling down dip, along strike and in a major mineralised fault zone (**Figure 2**).

The block model was constructed in Vulcan 3D mining software using 10 m x 10 m x 10 m parent ore blocks and estimation was performed using ordinary kriging and inverse distance techniques as described in detail in the Section 3 of Appendix 1. Various checks and comparisons were made with earlier resource estimates in order to ensure there were no inconsistencies.

The saprolite gold resources was calculated with a 0.2 g/t gold lower cut-off grade, while for the main Kalkaroo copper-gold resource a 0.4% copper equivalent lower cut-off grade was applied. The copper equivalent calculation methodology was based on 1ppm gold = 8,169ppm copper using a conversion factor of 32,151 troy ounces per metric tonne using metal price assumptions as detailed in Section 3 of Appendix 1.

Total Ore Reserves of 100.1 million tonnes have been estimated by RPM (**Table 1**) in accordance with the guidelines of the JORC Code (2012) as originally reported in the ASX release of 18 June 2018 and as set out in Section 4 of Appendix 1. As the Kalkaroo Project is polymetallic with multiple ore processing routes, a net processing return cut-off approach was used to define Ore. This involved estimating a net value for each block taking into account revenue and project costs. A positive value indicated a profitable block and was hence assigned as "ore".

As 90% of the Ore Reserve is of Proved status, RPM considers **"...there is sufficient confidence in the Mineral Resources for them to be utilised for Detailed Feasibility planning with no further exploration drilling".**

Table 1 Ore Reserves as at January 2018

Category	Tonnage (Mt)	Copper Grade (%)	Gold Grade (g/t)	Copper Content (kt)	Gold Content (koz.)
Proved	90.2	0.48	0.44	430	1,282
Probable	9.9	0.45	0.39	44	125
Total	**100.1**	**0.47**	**0.44**	**474**	**1,407**

Note: Estimate has been rounded to reflect accuracy. All the estimates are on a dry tonne basis. Refer to Section 4 of Appendix 1 for further details of the modifying factors applying to this Ore Reserve.

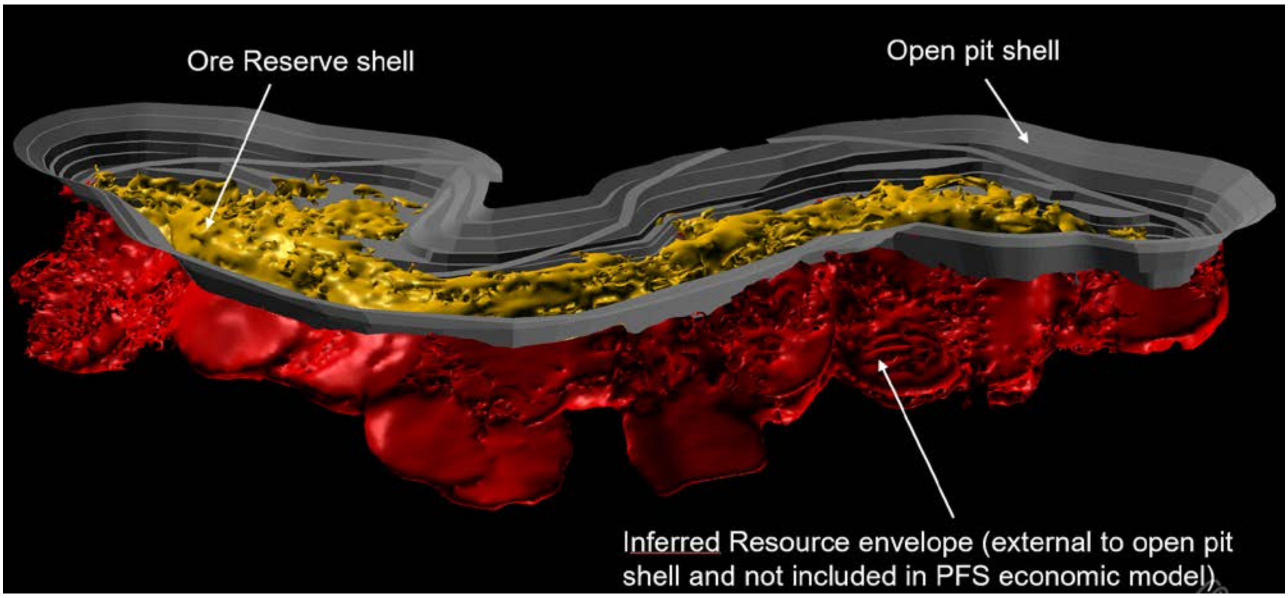

Figure 3 Kalkaroo PFS conceptual open pit, showing Ore Reserve shell (yellow) within the open pit and Inferred Resources (red) external to the open pit and not included in the PFS economic model.

Mining

The mining method is conventional open cut bulk mining using truck and excavator equipment. The PFS is based on an owner operated mining fleet.

The pit development is in a staged cutback to sequence extraction from generally high value to lower value and shallower to deeper ore over the life of the mine (as reflected in the gold and copper ore grade plots in **Figure 4**). The first year mining consists entirely of overburden pre-strip of the 50 or so metres of Tertiary sands and clays (Y00 in **Figure 4**). The next three years (Y01-Y03 in **Figure 4**) are focused on mining the softer oxidized saprolite gold, native copper and chalcocite ore types at an annual production rate averaging around 4 million tonnes per annum, which is the nominal capacity of the oxide ore processing plant.

The ore mining rate almost triples in the fifth year (Y04) peaking at approximately 12 million tonnes per annum and coinciding with the sulphide ore concentrator plant coming on stream in order to process the significant amounts of chalcocite (**CC**) ore being mined. The excess saprolite gold (**SAP**) and native copper (**NC**) ore mined in this year will be stockpiled, with processing spread out over the next two years. With the bulk of the oxidized ore mined by the end of the fifth year, production in subsequent years is largely from deeper sulphide ores with a milling throughput rate of nominally 7 million tonnes per annum. As the mining operation moves deeper the proportion of chalcopyrite (**CP**) ore increases until it becomes the predominant ore type mined and processed in the later years (Y11-Y13 in **Figure 4**).

Over the life of the mine the total waste material mined is 352 million tonnes while total ore is 100 million tonnes, giving an overall life of mine waste: ore ratio of 3.5:1.

After the initial ramp-up, and during the 13 year production period (Y01-Y13) of continuous ore mining and processing, the Kalkaroo operation is anticipated to deliver on average 30,000 tonnes per year of copper metal and 72,000 ounces per year of gold (recovered metal).

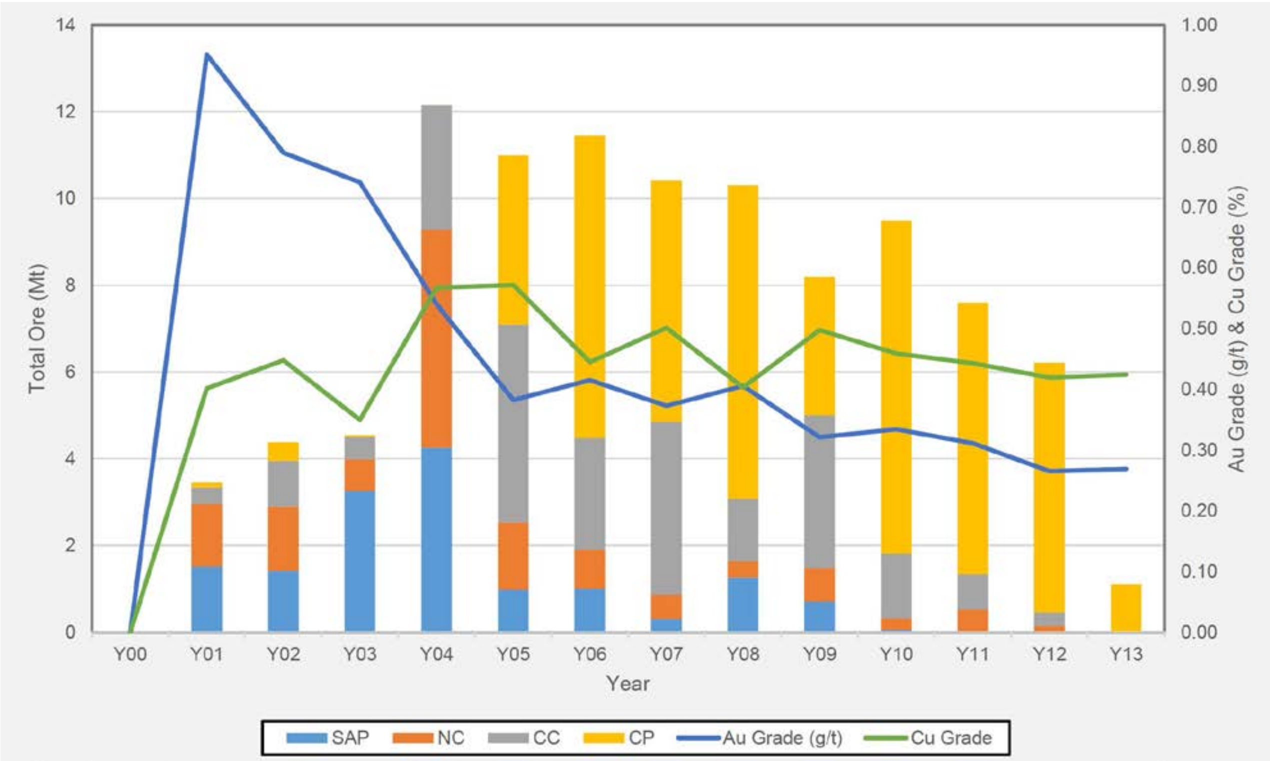

Figure 4 Ore type mined per year (saprolite gold (SAP), native copper (NC), chalcocite (CC), chalcopyrite (CP)) and average yearly mining grades for copper and gold.

Processing

Four ore types comprise the Kalkaroo orebody (**Figure 2**) and are controlled by the generally decreasing degree of oxidation in the deposit with increasing depth, namely:

- Saprolite gold (SAP): A clay-rich ore hosting free gold and some copper.

- Native copper (NC): Clay and strongly weathered rock (saprock) containing coarse to fine native copper (a naturally occurring form of copper metal), as well as gold and some chalcocite.
- Chalcocite (CC): Weathered rock with supergene enrichment of the copper-rich sulphide, chalcocite with free gold, gold bearing pyrite and minor native copper.
- Chalcopyrite (CP): Primary copper sulphide and gold bearing pyrite in a generally competent unweathered metamorphosed sedimentary host rock.

Testwork supports the separate blending of the oxide (saprolite gold and native copper) and sulphide (chalcocite and chalcopyrite) ore types for co-processing in separate oxide and sulphide processing plants. Recovery of the various economic minerals employs conventional processing methods and is mainly dependent on the ability to separate the economic minerals from the gangue. For the oxide ores this means shearing, scrubbing and milling the oversize material, while for the more competent sulphide ores conventional crushing and milling can be used. Further details of proposed ore processing are provided in Section 4 of Appendix 1. Overall copper and gold recoveries vary by ore type as summarised in **Table 2**.

Table 2 Metal Recoveries

Ore Type	Copper Recovery %	Gold Recovery %	Notes
Saprolite Gold (SAP)	47	49	By flotation with two stages of cleaning
Native Copper (NC)	83	67	Classification and flotation
Chalcocite (CC)	76	53	Standard flotation
Chalcopyrite (CP)	92	90	Standard flotation

Site water, which has Total Dissolved Solids (mostly sodium chloride) of around 22,000 ppm, was used for all metallurgical tests and did not adversely impact the recoveries, with the exception of saprolite gold ore.

The final saleable product produced by the conventional flotation processing circuit is copper concentrate containing average levels of 27.5% copper and 12.7 g/t gold.

Capital Expenditure

Pre-Production capex is estimated at $332 million with total capital cost, including sustaining and mine closure capital, estimated at $680 million over the project life, inclusive of owner operated mining fleet and sustaining costs to maintain the various capital items, as summarised in **Table 3** below.

Table 3 Capital Expenditure Summary ($ Million)

Capital Category	Pre-Production	Remaining Primary	Sustaining	Total
Mining Fleet	76		73	149
Oxide Process Plant	83		9	92
Sulphide Process Plant		145	15	160
Infrastructure	127	30	5	162
Mine Closure		35		35
Contingency	46	36		82
Total Capital Cost	**332**	**246**	**102**	**680**

Figure 5 shows the timing of capital expenditure, including the construction of the sulphide plant from Year 03. Expenditure up to the end of Year 01 is $332 million, which is 57% of the total primary expenditure. The expenditure in Years 03 and 04 is $198 million, primarily allocated to construction of the sulphide plant. The highest sustaining cost is replacement of mining equipment at $73 million.

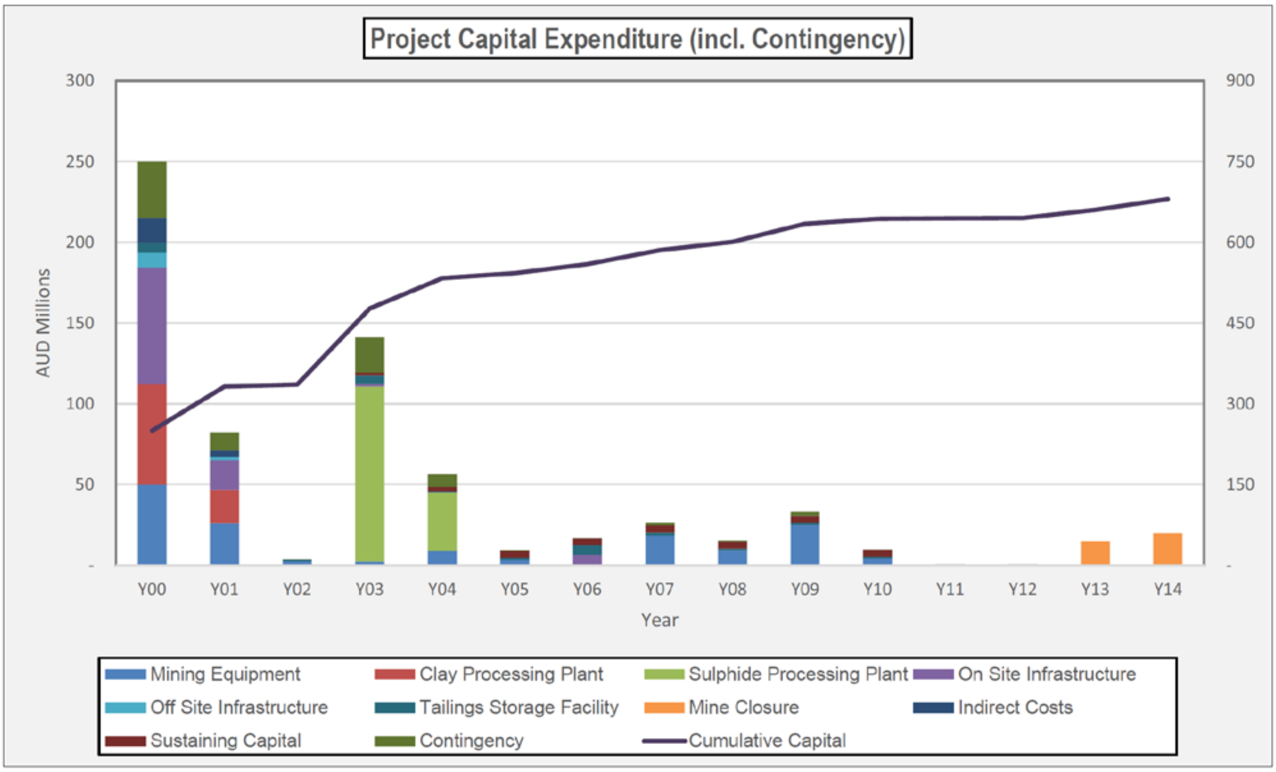

Figure 5 Project Capital Expenditure Timing.

The project capital costs and operating costs for equipment were based on recent quotes from suppliers and RPM's internal cost database. Non-equipment costs were estimated based on published data, for example labour costs and RPM's experience with similar scaled operations. The derivation of major operating costs is largely estimated from first principles.

Operating Expenditure

The average operating cost over the life of the mine is $26.20 per feed tonne with the key areas being processing costs (39%) and mining costs (29%), as summarized in **Table 4** below.

Table 4 Mine Operating Costs

Cost Category	$/t Feed Ore	$/lb Cu Payable***
Mining	7.72	0.66
Processing	10.14	0.86
Transport/Smelting	4.38	0.37
Admin/Infrastructure/Rehab	1.57	0.13
Contingency	2.38	0.20
Total C1	26.20	2.23
Total C2	32.18	2.74

*** Costs based on equivalent units of copper metal produced.

Note: Slight rounding errors may affect total numbers. Royalty cost not included in C1 or C2 is $1.62/t feed ore and $0.14/lb Cu Payable. Native title payments are not included.

This assumes an owner operated fleet as noted above, which increases the capex by $149 million (refer **Table 3**) but does reduce the mining costs by eliminating the mining contractor margin. This is significant in an open pit mining operation like Kalkaroo where there are large mining volumes. The following chart (**Figure 6**) shows that the operating costs ramp up to approximately $290 million per annum once the oxide and sulphide processing plants reach full production and mining is at full capacity.

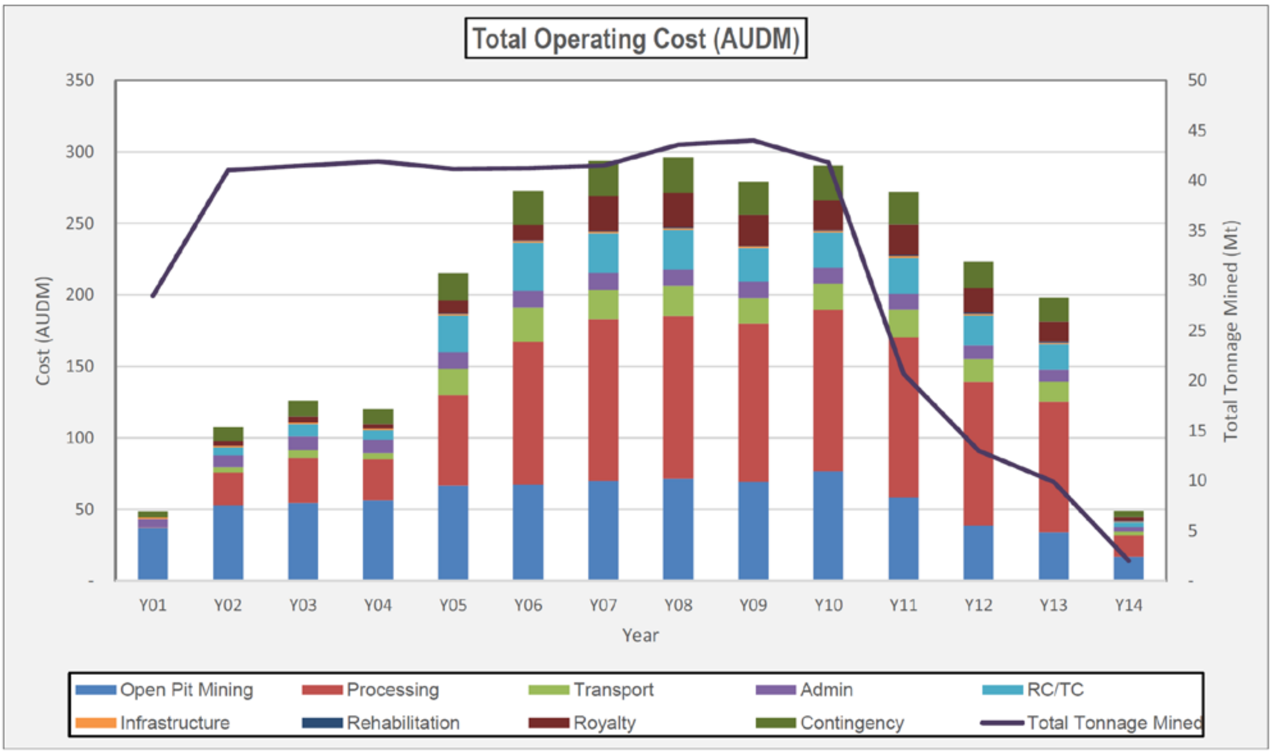

Figure 6 Project Operating Cost.

Economic Model Outcomes

An economic model for the Kalkaroo Project was prepared by RPM using its in-house economic modelling software. The economic model develops mining costs from first principles with key physicals from the production schedule and fleet calculator software as shown in the flow sheet below (**Figure 7**). Non-mining costs are determined and combined with the mining costs to obtain the annual operating cost expenditure. In parallel a capital expenditure schedule is developed to create a total cash outflow schedule.

The total mine revenue is determined based on the specifications of the copper concentrate sold and the sales price estimate, based on relevant payability factors. The latter were determined by Shanghai Metals Market who were commissioned by Havilah to approach various Chinese mainland smelters to obtain indicative copper concentrate payabilities specifically for the Kalkaroo copper concentrates.

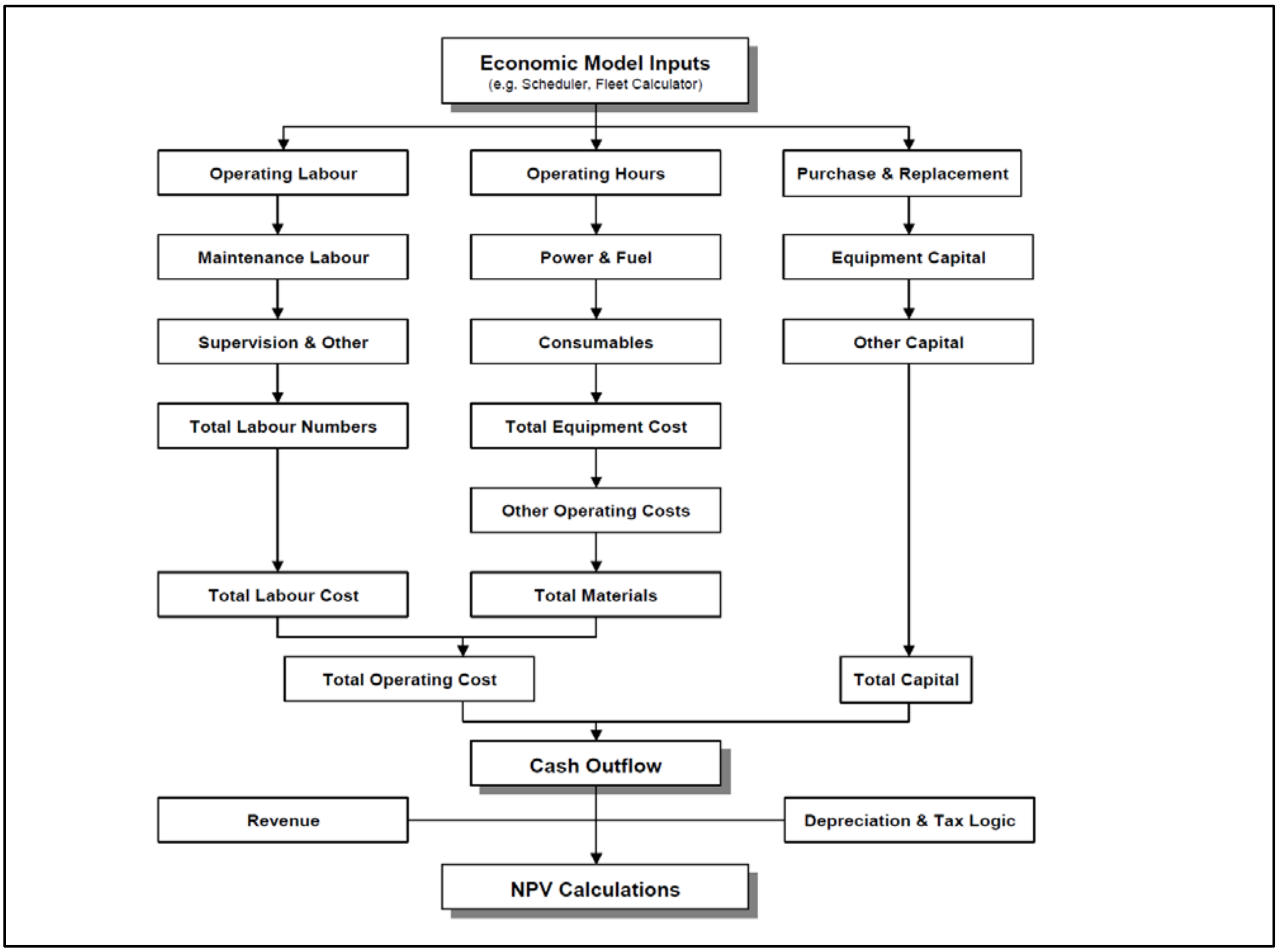

Figure 7 Economic model flow sheet used to calculate project cash flow and NPV.

The following cost centres were used in the economic model:

- Open Cut Waste Removal.
- Open Cut Ore Mining.
- Open Cut Support.
- Process Plant.
- Mine Administration and Development.
- Infrastructure.
- Mine to Market/Port.
- Royalty and Government Charges (Note: Native title payments are not included).

The economic model results are summarised in a constant-dollar (no inflation allowance) cash flow analysis, from which is calculated both a net present value (**NPV**) and a discounted cash flow internal rate of return (**IRR**) on both a pre-tax and an after-tax basis.

The Kalkaroo economic model has generated a pre-tax NPV of $564 million based on a discount rate of 7.5% and a C1 operating costs margin of USD$/lb Cu payable of USD$1.22/lb (**Table 5**). The Kalkaroo Project becomes cash flow positive in Year 5, meaning that the large capital expenditure for processing plants, infrastructure and mining equipment is paid back in Year 5.

Table 5 Economic Evaluation Results

Item	Units	LOM
Mill Feed	M t	100.2
Copper Recovered	K t	392
Gold Recovered	K Oz	935
Mine Life	Years	15*
Total Revenue	$ M	4,542
Total Operating Costs	$ M	2,789
Pre-Tax NPV		
DCF @ 5%	$ M	724
DCF @ 7.5%	$ M	564
DCF @ 10%	$ M	434
IRR		26%
Post-Tax NPV		
DCF @ 5%	$ M	478
DCF @ 7.5%	$ M	357
DCF @ 10%	$ M	258
IRR	%	21%
Capital Expenditure		
Pre-production	$ M	332
Post-production	$ M	246
Sustaining	$ M	102
Total CAPEX	$ M	680
C1 operating cost	USD$/lb Cu Payable**	$1.67
C1 operating cost margin	USD$/lb Cu Payable**	$1.22
C2 operating cost	USD$/lb Cu Payable**	$2.06

** Total mine life of 15 years which includes 1 year of start-up, 13 years of production and 1 year of closure.*
*** Costs based on equivalent units of copper metal sold, with gold expressed as copper at the metal prices stated below – ie 1 oz gold has the same value as 1200/2.89 = 415 lbs of copper. Payable refers generally to the recovered metal x smelter payability factor.*

Key assumptions and modifying factors applied in the economic model are as follows:

- Annual ore production rate as summarised in Figure 4.
- Various metal recoveries as summarised in Table 2.
- Capex and opex as summarised in Tables 3 and 4.
- Long-term metal price of USD$2.89/lb for copper and USD$1,200/oz for gold.
- AUD:USD exchange rate of 0.75.
- 7.5% base discount rate (DCF) for the NPV calculations.
- Government royalty of $0.14/lb Cu. Royalty at 2% of revenue for first five years and thereafter 5% of revenue under “Reduced Royalty for New Mines” subject to approval by the South Australian Government.

- Income tax at 30% of taxable income.
- Diesel fuel price of $0.60 per litre.
- Power price of $0.30 per kWh.
- Depreciation on initial capital items over 10 years assuming diminishing value method.
- Local labour costs based on published salary information.
- Equipment maintenance carried out by Havilah's workforce.
- Native title payments under the negotiated native title agreement are not included.
- The contingent liability in relation to payments to Glencore, that is required to be paid based on 10% of Havilah's share of any future mining profits from the Kalkaroo Project, until the total amount paid reaches $7 million is excluded.

RPM concluded that **"the Project has no significant issues that would prevent successful mining and processing of the ore. Furthermore, there are a number of opportunities to increase the Mineral Resource, increase product output and add value to the Project".**

Sensitivity Analysis

Sensitivity analyses were undertaken to assess the potential change in value due to a number of key project variables. The Kalkaroo Project is moderately insensitive to inputs such as transport, power and capex in comparison to commodity prices to which the Kalkaroo Project is highly sensitive as summarised in the pre-tax $NPV_{7.5\%}$ matrix table below.

Table 6 Pre-tax $NPV_{7.5\%}$ value matrix in AUD$M for variable AUD$ copper and gold metal prices

	Gold AUD$/Oz				
Copper AUD$/lb	$1,333	$1,467	**$1,600**	$1,733	$1,867
3.33	171	239	308	376	445
3.60	301	369	438	506	575
3.86	427	496	**564**	633	701
4.13	560	629	698	766	835
4.40	690	759	827	896	965

** The metal price scenario and the resulting pre-tax $NPV_{7.5\%}$ for this PFS are highlighted by the bold type and yellow highlight.*

Ongoing PFS Work Planned by Havilah

Havilah has undertaken additional metallurgical test work in several areas (ASX release of 9 May 2019) that were recommended by RPM in the PFS with the following key outcomes:

1. Improved gold recoveries in the saprolite gold ore (>90% vs 49% gold recovery used in the current PFS financial model).
2. Confirmation of appreciable cobalt and gold grades in clean pyrite concentrates generated from the copper tailings (weighted average of approximately 2.5 g/t gold and 3,000ppm cobalt).
3. Update of payability terms that would be applicable specifically for Kalkaroo copper concentrates based on targeted marketing studies for Chinese smelters. Marketing studies are continuing in order to further define the target market and terms for payment.

The new metal recovery data plus the revised capex and opex estimates for the additional processing required are being applied in a new round of trade-off studies that in turn will better inform future financial models in an updated PFS. The objective, if feasible, is to sufficiently increase ore block values such that a portion of the large Kalkaroo Inferred Resource can eventually be incorporated within a larger optimized open pit design. While this will potentially increase mine life and also total life of mine revenues, the effect on NPV, IRR and profit margins, is yet to be determined and is therefore uncertain.

Commenting on the positive PFS outcomes, Technical Director, Dr Chris Giles said: "The PFS demonstrates that Kalkaroo as it presently stands is a potentially attractive open pit copper-gold project, with a pre-tax $NPV_{7.5\%}$ of $564 million.

"There is also excellent upside to extend the mine life if we can incorporate the substantial Inferred Resources into the mining plan and also through discovery of additional nearby resources, given that the Kalkaroo orebody remains open down-dip and along strike.

"We are continuing to work on these various upside opportunities with the assistance of RPM in order to determine what effect they could potentially have on the mining economics." he said.

For further information visit www.havilah-resources.com.au
Contact: Mr Walter Richards, CEO, on (08) 8155-4500 or email: info@havilah-resources.com.au

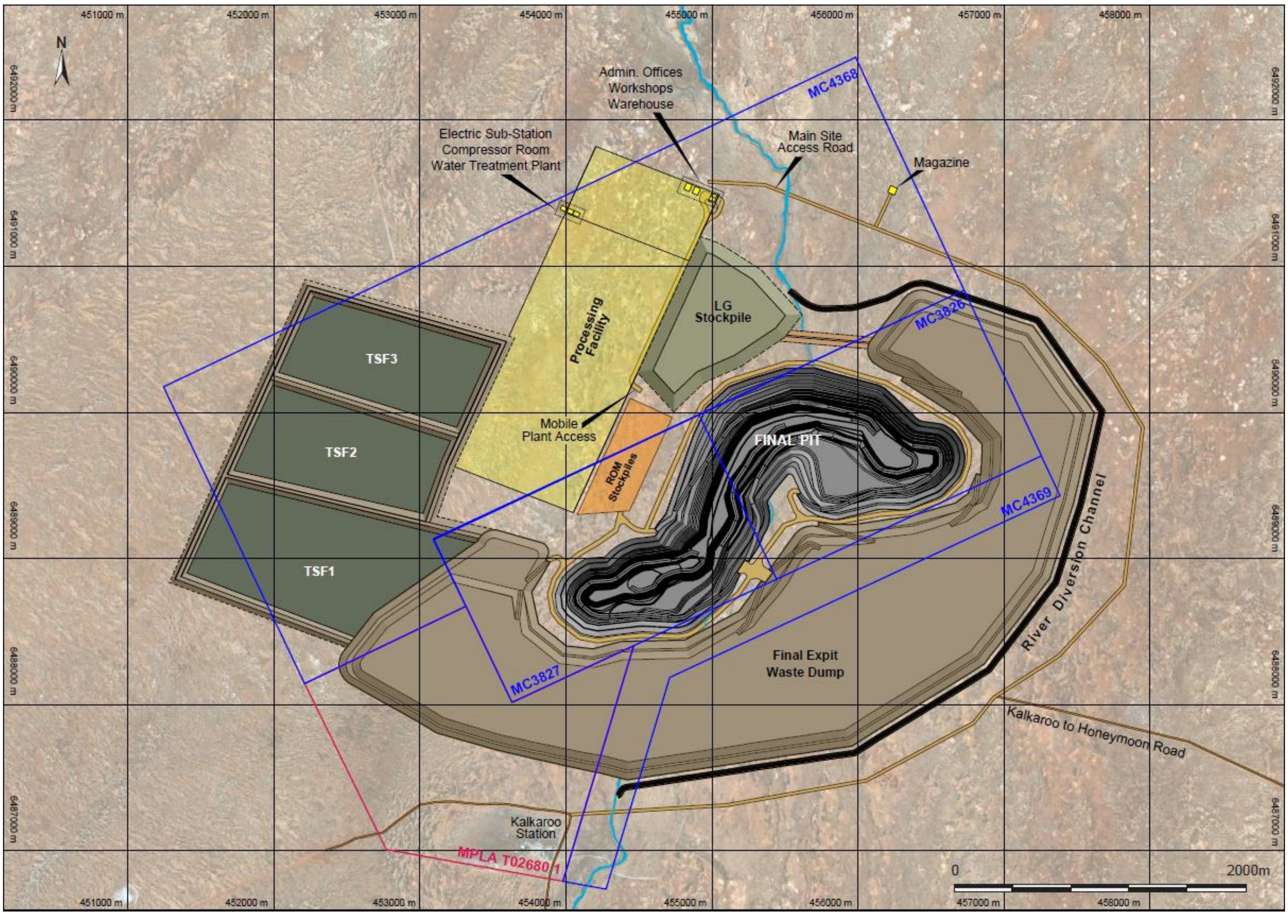

Figure 8 Kalkaroo site layout showing the final open pit outline and other mining infrastructure.

Kalkaroo Published JORC Mineral Resource Estimate

	Classification	Category	Tonnes	Copper %	Gold g/t	Copper tonnes	Gold ounces
Gold Cap[1]	Measured	Oxide Gold Cap	12,000,000		0.82		
	Indicated	Oxide Gold Cap	6,970,000		0.62		
	Inferred	Oxide Gold Cap	2,710,000		0.68		
	Total	**Oxide Gold Cap**	**21,680,000**		**0.74**		**514,500**
Sulphide[2]	Measured	Sulphide Copper-Gold	85,600,000	0.57	0.42		
	Indicated	Sulphide Copper-Gold	27,900,000	0.49	0.36		
	Inferred	Sulphide Copper-Gold	110,300,000	0.43	0.32		
	Total	**Sulphide Copper-Gold**	**223,800,000**	**0.49**	**0.36**	**1,096,600**	**2,590,300**
		Total Kalkaroo	**245,480,000**			**1,096,600**	**3,104,800**

Based on JORC resource estimates, details released to ASX: 1. 23 March 2017 and 2. 30 Jan 2018. Havilah confirms that it is not aware of any new information or data that materially affects the resource figures included in the above table and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed.

The Mineral Resources are reported inclusive of Ore Reserves (that is, Ore Reserves are not additional to Mineral Resources). RPM did not re-estimate the Inferred Resource as originally published by Havilah and similarly did not re-estimate Havilah's saprolite gold cap resource, as the primary focus of their study was the Measured and Indicated sulphide resource components for the purposes of estimating an Ore Reserve for the PFS.

Cautionary Statement

This announcement contains certain statements which may constitute "forward-looking statements". Such statements are only predictions and are subject to inherent risks and uncertainties which could cause actual values, performance or achievements to differ materially from those expressed, implied or projected in any forward-looking statements. Investors are cautioned that forward-looking statements are not guarantees of future performance and investors are cautioned not to put undue reliance on forward-looking statements due to the inherent uncertainty therein.

Competent Persons Statement

The estimates of Mineral Resources presented in this Report have been carried out in accordance with the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves" (The JORC Code – 2012 Edition).

The information in this announcement that relates to Mineral Resources as referenced in the PFS is based on information compiled by Mr Robert Dennis who is a Member of the Australasian Institute of Geoscientists and Australian Institute of Mining and Metallurgy. Mr Dennis is a full time employee of RPM. Mr Dennis is the Competent Person for this Mineral Resource estimate as used in the PFS and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he has undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves'.

The information in the report to which this Competent Persons Statement is attached, relates to the Ore Reserves of the Kalkaroo Copper Gold Project, and is based on information compiled and reviewed by Mr Igor Bojanic, who is a Fellow of the Australasian Institute of Mining and Metallurgy, and is a full-time employee of RPM. Mr Igor Bojanic has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which, he has undertaken to qualify as a Competent Person, as defined in the 2012 Edition of the Australasian Code for the Reporting of Mineral Resources and Ore Reserves. Mr Igor Bojanic is not aware of any potential for a conflict of interest in relation to this work for the Client.

Igor Bojanic (B.Eng.(Mining, Hons), FAusIMM

The Company confirms that it is not aware of any new information or data that materially affects the Mineral Resource or the Ore Reserve and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed.

Appendix 1

The table below is a description of the assessment and reporting criteria for the Kalkaroo copper-gold resource and the Gold Cap saprolite gold resource at Kalkaroo, in accordance with Table 1 of The Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves. Sections 1,2 and 3 have been presented in the previous Kalkaroo resource statement (ASX release of 30 January 2018). Section 4 relates specifically to the Ore Reserve estimate by RPMGlobal, as described in this announcement and first released to the ASX on 18 June 2018 (ASX release of 18 June 2018). Havilah confirms that it is not aware of any new information or data that materially affects the Mineral Resources or the Ore Reserve and that all material assumptions and technical parameters underpinning the Mineral Resources and Ore Reserve estimates in the relevant market announcements continue to apply and have not materially changed.

Section 1 Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• The drilling database includes 411 Havilah drillholes (totalling 68,550 metres) of which there are 25,209 metres of drill core and 43,341 metres of reverse circulation (RC) and aircore (AC). The AC informs only a small portion of the Resource. • 47 earlier non-Havilah drillholes completed by major mining companies, namely Placer Dome, Newcrest and MIM totalling approximately 10,718 m were also used in the resource estimation. • RC and AC assay samples averaging 2-3kg were riffle split as 1-2m intervals. • Drill-core samples were mostly collected as half core over 1m intervals, unless the geological boundaries dictated otherwise. • All Havilah samples were collected into pre-numbered calico bags and packed into polyweave bags by Havilah staff for shipment (usually by Havilah staff) to the assay lab in Adelaide.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• All RC holes were drilled using standard face-sampling bits, with bit sizes ranging from 120mm to 136mm. All samples were collected via riffle splitting directly from the cyclone. • All AC holes used a 121mm blade bit • Diamond core sizes ranged from NQ (50mm) to PQ3 (83mm). Triple tube methods were used where required to maximize core recoveries. • Drill core was routinely orientated where ground conditions allowed, mainly using the spear technique.

Criteria	JORC Code explanation	Commentary
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Overall, RC sample recoveries and diamond drill core recoveries were considered to be quite acceptable for interpretation and modelling purposes. • Core recovery for Havilah diamond drillholes was measured directly and averaged 93 %. • The sample yield and wetness of the RC and AC samples was routinely recorded in drill logs. Very few samples were too wet to split. No evidence of RC sample bias due to preferential concentration of fine or coarse material was observed. • Sample recoveries were continuously monitored by the geologist on site and adjustments to drilling methodology were made to optimize sample recovery and quality where necessary.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• All RC and AC samples and drillcore was logged by experienced geologists directly into a digital logging system with data uploaded directly into an XL spreadsheet and transferred to a laptop computer. • All drillcore and RC chip trays have been photographed. • All drillcore and RC chip sample trays and some back-up samples are stored on site at Kalkaroo. All RC and AC samples were logged in detail by experienced geologists directly into a digital logging system with data uploaded. • Logging is semi-quantitative and 100% of reported intersections have been logged. • Logging is of a sufficiently high standard to support any subsequent interpretations, resource estimations and mining and metallurgical studies.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• RC or AC drill chips were received directly from the drilling rig via a cyclone and were riffle split as 1-2m intervals to obtain 2-3kg samples. • Half core samples were collected at 1m intervals, unless otherwise dictated by the geology. • Sampling size is considered to be appropriate for the style of mineralisation observed. Assay repeatability for gold and other metals has not proven to be an issue. • All Havilah samples were collected in numbered calico bags that were sent to ALS assay lab in Adelaide. • At ALS assay lab the samples are crushed in a jaw crusher to a nominal 6mm (method CRU-21) from which a 3 kg split is obtained using a riffle splitter. The split is

Criteria	JORC Code explanation	Commentary
		pulverized in an LM5 to 85% passing 75 microns (method PUL-23). These pulps are stored in paper bags. • All samples are then analysed for a 33 element package using ALS's ME-ICP61 suite, whereby samples undergo a 4 acid digest and analysis by ICP-atomic emission spectrometry and ICP mass spectrometry. Over limit Cu, Pb and Zn are re-assayed using ME-OG62. • Gold is analysed by 50g fire assay, with AAS finish using ALS method Au-AA26. • The total assay methods are standard ALS procedure and are considered appropriate for the main economic elements sought (i.e. Cu and Au).
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	• A range of elements were analysed by a range of slightly different techniques by the four companies, all of which are considered acceptable. • Havilah samples were also subjected to the following additional check assaying to provide more reliable results where coarser grained native copper and to a lesser extent, gold, was present. • Screen copper analyses were routinely carried out for samples where native copper had been identified during geological logging. • Screen fire gold analyses were routinely carried out where the initial gold assays were in excess of 0.5ppm. • Assay data accuracy and precision was continuously checked through submission of field and laboratory standards, blanks and repeats which were inserted at a nominal rate of approximately 1 per 20 drill samples. • Assay data for laboratory standards and repeats were statistically analysed and any samples that lay outside of a two standard deviation benchmark were re-assayed.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* *The use of twinned holes.* *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Ten pairs of twinned RC/DD holes were analysed with comparisons made for the relative intersection widths, hole size, volume differences, metre x %Cu and metre x gm Au, RC sample size and quality and any possible contamination issues. It was found that although there were wide variations in total copper metal and gold metal calculations between twinned holes, the overall average RC and drillcore metal calculations produced similar results (within 8% for copper and within 6% for gold). There was no observed bias between the drill methods

Criteria	JORC Code explanation	Commentary
		and no significant differences in intersection widths. • Rigorous internal QC procedures are followed to check all assay results (see section 3) • All data entry is under control of the responsible geologist, who is responsible for data management, storage and security. • RPM completed independent re-assay of field duplicates, specific native copper samples and pulp duplicates. The analysis demonstrated acceptable results but with greater variability for the coarse native copper and gold in the smaller pulp sample repeats.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• Diamond drillholes were surveyed at approximately 30m downhole intervals using an Eastman single or multi-shot down-hole camera or a digital camera. • Earlier Havilah RC holes were not surveyed and were assumed not to have deviated significantly from their collar azimuth and inclination. Later RC holes were surveyed in the rods with only dip measurements recorded. The last RC program used non-magnetic drill rods to allow dip and azimuth readings to be collected with only minor (±1°) deviations noted. • Drillhole collar coordinates are surveyed in UTM coordinates using a differential GPS system with an x:y:z accuracy of 20cm:20cm:40cm and are quoted in ADG 66 datum.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Havilah drilling was completed on nominal 25m sections perpendicular to the strike of the primary copper-gold mineralisation at Kalkaroo West and on nominal 100m sections perpendicular to the strike of the Kalkaroo Main Dome mineralisation. Holes were drilled towards the south at -60 to -75°. • Earlier non-Havilah holes were drilled at various oblique angles and directions including to the north. • The intersection angle is between 60 and 90 degrees through the Kalkaroo Main Dome style mineralisation and between 20 and 45 degrees through the more steeply dipping Kalkaroo West vein style mineralisation. The deposit is largely untested deeper than 250m below surface. • Sample compositing was not used.
Orientation of data in relation to	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering*	• The drillhole azimuth and dip was chosen to intersect the mineralized zones as nearly as possible to right angles and at

Criteria	JORC Code explanation	Commentary
geological structure	*the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	the desired positions to maximize the value of the drilling data. • At this stage, no material sampling bias is known to have been introduced by the drilling direction.
Sample security	• *The measures taken to ensure sample security.*	• RC and AC chip samples are directly collected from the riffle splitter in numbered calico bags. • Several calico bags are placed in each polyweave bag which are then sealed with cable ties. The samples are transported to the assay lab by Havilah personnel at the end of each field stint. • There is minimal opportunity for systematic tampering with the samples as they are not out of the control of Havilah until they are delivered to the assay lab. • This is considered to be a secure and reasonable procedure and no known instances of tampering with samples occurred during the drilling programs
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• Ongoing internal auditing of sampling techniques and assay data has not revealed any material issues. • Robert Dennis visited the site in November 2016 and found field procedures to be adequate. • RPM completed independent re-sampling and assaying and found results to be adequate.

Section 2 Reporting of Exploration Results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a license to operate in the area.*	• Security of tenure is via current mining lease applications and an underlying exploration licence (EL5800) owned 100% by Havilah.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Kalkaroo was explored by a number of major mining groups in the past including Placer, Newcrest Mining and MIM Exploration, who completed more than 45,000 metres of drilling in the region. • All previous exploration data has been integrated into Havilah's databases.
Geology	• *Deposit type, geological setting and style of*	• Kalkaroo consists of stratabound replacement and vein style copper-gold

Criteria	JORC Code explanation	Commentary
	mineralisation.	mineralisation within Willyama Supergroup rocks of the Curnamona Craton • The stratabound mineralization is uniformly distributed along more than 3 km of strike that follows an arc around the 35 degree dipping northern nose of the Kalkaroo south dome. It is hosted by an 80m -120m thick mineralised horizon that is sandwiched between psammitic footwall rocks and a thick pelitic hangingwall sequence. • In part, the mineralization is associated with near-vertical, mineralised quartz vein breccia fracture/fault fillings, which probably formed channel ways for the mineralising fluids. Interference folding resulted in dome structures which probably acted as structural traps for the rising mineralising fluids carried by these vertical structures. • The mineralising events were associated with iron-rich and sodium-rich alteration fronts, which are manifest as widespread fine-grained magnetite in the lower sandy formations and as pervasive albite alteration. • Erosion in the Mesozoic and Tertiary period exposed the Kalkaroo deposit to prolonged and deep weathering. Consequently, the deposit shows typical supergene enrichment features in its upper part, caused by oxidation of the primary sulphides in the weathering zone, forming a soft clay rich rock called saprolite. This is manifest in a sub-horizontal stratification of the ore minerals from top to bottom; 1. Supergene free gold in saprolite, with generally minor copper, recoverable by gravity and cyanide leaching methods. 2. Native copper and gold in saprolite, largely recoverable by gravity methods. 3. Chalcocite dominant with gold, recoverable by conventional flotation. 4. Chalcopyrite dominant with gold and locally rich molybdenum, recoverable by conventional flotation.
Drill hole information	• *A summary of all information material to the under-standing of the exploration results including a tabulation of the following information for all Material drill holes:* o *easting and northing of the drill hole collar* o *elevation or RL (Reduced Level –*	• A total of 493 Havilah drillholes totalling approximately 82,434 metres were used in the resource estimation of which there are 25,209 metres of drill core and 57,225 metres of reverse circulation (RC) and aircore (AC). • 65 earlier non-Havilah drillholes totalling

Criteria	JORC Code explanation	Commentary
	elevation above sea level in metres) of the drill hole collar o *dip and azimuth of the hole* o *down hole length and interception depth* o *hole length* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	approximately 15,047 metre were also used in the resource estimation. • This includes three generations of pre-Havilah drillholes, completed by major mining companies, namely Placer Dome, Newcrest and MIM. • There is good correlation of the geology and assay data between these earlier drillholes and Havilah drillholes.
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• Exploration drilling results are not being reported for the Mineral Resource area.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• Down-hole lengths are reported. Drillholes are always oriented with the objective of intersecting mineralisation as near as possible to right angles, and hence down-hole intersections in general are as near as possible to true width. • For the purposes of the geological interpretations and resource calculations the true widths are always used.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported. These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• Exploration drilling results are not being reported for the Mineral Resource area.
Balanced Reporting	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• Exploration drilling results are not being reported for the Mineral Resource area.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical*	• Exploration drilling results are not being reported for the Mineral Resource area.

Criteria	JORC Code explanation	Commentary
	survey results; bulk samples - size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large- scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Additional infill drilling may be carried out in the future to upgrade Inferred and Indicated Resources to Measured Resources and also to explore strike and depth extensions outside of the current resource envelope.

Section 3 Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• All drill data is directly logged into a field based digital logging system and then uploaded to an Access database by the responsible geologist, who also carries out verification and data checking at the time. • Laboratory assay data is received digitally and uploaded to the database electronically with relevant QC checks. • All data in the database is validated for consistency and accuracy. Various powerful QC checks for overlapping data, missing assays and other errors are performed at the time the data is transferred into the Vulcan 3D database for the resource modelling work. Errors identified are immediately fixed and cross-checked to ensure there are no systemic errors. • All original assay data sheets, logging files, drill chips and half or quarter core are retained for validation purposes. • Standard deviation plots of all data (e.g. assays, densities, recoveries, sample quality) were used to identify outliers for subsequent investigation for errors. • Drillhole collar locations were checked for consistency on cross sections. • Drillhole plots were examined to ensure consistency of surveys. • Examination of the database has not revealed any systemic issues of concern that could significantly affect the current resource estimation.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	• A site visit was conducted by Robert Dennis of RPM during November 2016. Robert inspected the deposit area, drill core, the core logging and sampling

Criteria	JORC Code explanation	Commentary
	• *If no site visits have been undertaken indicate why this is the case.*	facility. During this time, notes and photos were taken. Discussions were held with site personnel regarding drilling and sampling procedures. No major issues were encountered.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• There is a high level of confidence in the geological interpretation of the Kalkaroo deposit, in large part because of the detailed logging undertaken and the experience of the geologists involved. This has allowed a consistent picture of the stratigraphic and structural controls on alteration and mineralisation to be developed for the entire deposit that accords with a comprehensive regional geological understanding, as described in Section 2. • It is important to note that the Kalkaroo mineralisation does not outcrop, so virtually all geological information about the deposit is either gained from drilling data or geophysics. • The main component of the copper-gold mineralisation is replacement style hosted in a favourable stratigraphic horizon which has been displaced and enriched in places with later faulting and vein emplacement. • Superimposed on the primary chalcopyrite copper mineralisation is deep weathering that has produced a vertical zonation in the mineralogy, from gold only in a secondary weathering cap, through native copper and chalcocite • The Dome is transected by a major E-W trending, sub-vertical, quartz-carbonate vein breccia system. A later shear offsets the mineralisation and vein/breccia system by 200m to the north along the western limb of the Dome. • In general the stratigraphy and mineralisation of the Kalkaroo deposit is remarkably uniform over the entire strike length of the Main Dome. • Greater complexity occurs at the western (Kalkaroo West) and eastern ends of the deposit, where considerable disruption occurs due to faulting, and this has required adjustments to the search ellipsoid orientations to avoid biasing errors. • The geology is a major control in guiding the resource estimation. Firstly, in guiding the search ellipsoid orientations and secondly, in outlining different ore types and domains within the overall

Criteria	JORC Code explanation	Commentary
		deposit. • Mineralised envelopes for copper mineralisation were interpreted on drill section using geological logs, copper grades ≥0.2% copper. • Mineralised envelopes for gold mineralisation were interpreted on drill section using geological logs, gold grades ≥0.2ppm. • Along strike mineralisation outlines were generally terminated at half the drill hole spacing beyond the last known section of mineralisation. • Down dip mineralisation extrapolation is generally less than 100m below the deepest sectional intercepts, unless strike geological continuity is being interpreted across undrilled sections from one deeply drilled section to another. • The interpreted geological domains are used to control the resource estimation process. • Alternative interpretations will likely result in similar tonnage and grades for the Kalkaroo deposit due to the significant width and strike extent of the deposit.
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• The Kalkaroo mineralisation exists around an arcuate domal structure which has been drilled more than 3km along strike. Copper-gold mineralisation is continuous throughout this strike length and is open at depth along its entire length and is open at both ends. • The true width of mineralisation ranges from 40-80 metres thick, while the plan width of mineralisation above cutoff varies from 50 to 200 metres. • Mineralisation generally has an upper bound 50 metres below the topography and at its deepest has been intersected in a single drillhole 500 metres below the topographic surface.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate*	• Polygons and hence triangulations are based on interpretations completed on nominal 25m sections for Kalkaroo West and nominal 50-100m sections for Kalkaroo Main Dome. Sectional interpretations are made perpendicular to the strike. • Triangulated interpretations have been generated for the following lithological domains: a. Namba b. Eyre

Criteria	JORC Code explanation	Commentary
	takes appropriate account of such data. • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	c. Saprolite (sap) d. Kalkaroo Main Dome (k), subdivided into k2.2, k2.5, k2.8, k3.2 and k3.5 e. Kalkaroo West (kw), subdivided into kw2.2, kw2.5, kw2.8 and kw3.5 f. Kalkaroo West Vein (kwest_vn) g. Kalkaroo West Vein (cent_vn) • Lithological logging of drill cuttings and core defined different oxidation levels with increasing depth. • These observations have been used to divide mineralisation into discrete oxidation domains. From top down these are: saprolite, native copper, chalcocite and chalcopyrite. • Statistical analysis was completed for each domain to ascertain the distribution of grades and examine whether any extreme values/outliers existed. Extreme values were investigated and were found to be minimal in number and not deemed to have a material impact on estimated grades. Variogram modelling was completed for each element in each domain. • The block model was constructed in Vulcan 10.0 software with parent blocks of 10mE by 10mN by 10mRL. • Compositing used 1m downhole sample lengths with length weighted assay composites used during estimation to account for small composite intervals at domain boundaries. • Estimation was performed using ordinary kriging and inverse distance techniques. • Estimation passes for the Kalkaroo deposit were generally as follows: First pass search was 50 metres. If interpolation did not fill all blocks on the first pass, then the search ellipsoid was increased to 100m. If interpolation did not fill all blocks on the second pass, then the search ellipsoid was increased to 200m. Domains estimated using unfolding had a search perpendicular to dip and strike of mineralisation set to a ratio of 0.2 of the domain width. • Cu, Au and specific gravity were estimated separately for each combination of lithology and oxidation domains. Estimation domain boundaries relate to mineralised boundaries and were used as hard estimation

Criteria	JORC Code explanation	Commentary
		boundaries. • Up to three estimation passes with increasing search neighbourhood size was used. • Search ellipsoid orientation was controlled using stratigraphic surfaces during estimation with unfolding methods. • An octant based search was used for sample selection during grade estimation. • A minimum of 4 and maximum of 32 composites were used per block estimate. • Estimates and calculations were validated visually in Vulcan software to ensure blocks contained all required variables, default codes were correctly applied to blocks and that all domain and oxidation codes were represented. The domain variables were correctly assigned according to priority order within defined triangulations, examination of code allocation within overlapping areas to ensure proper priority order application, inspection for evidence of blocks leaking from a domain due to triangulation errors such as openings, crossing or inconsistency and comparison of domain wireframe volumes to block model domain volumes to ensure block parent and sub-block size is appropriate. • Statistical comparisons of raw sample data versus de-clustered data versus block model data were completed. Drift plots were generated on 200 metre section spacing to check block estimation versus original drill sample grade. • The Kalkaroo resource estimate as at March 2017 was compared to the previous resource estimate from March 2012. Variances identified were primarily due to additional infill drilling providing clarification of previous measured and indicated resources and down dip drilling which allowed reporting of inferred resource classification.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• Tonnes have been estimated on a dry basis through the determination of dry specific gravity using the Archimedes principle.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• Gold Cap resource has been calculated using a 0.2g/t gold lower cut-off grade. • For the Kalkaroo main copper-gold resource a 0.4% copper equivalent lower cut-off grade was applied. Mineral

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		resources have been reported using a copper equivalent grade calculated using a six month average World Bank copper and gold price from 1st July 2016 to 31st December 2016 with gold set at US$1,287/oz (A$1727/oz at AUD = 0.74USD) and a copper price of US$5,030/tonne (A$ 6,797 / tonne at AUD = 0.74 USD) and assuming comparable recoveries for both metals. On this basis, 1 ppm Au = 8169 ppm Cu using a conversion factor of 32151 troy ounces per metric tonne. • Copper equivalent grades in the saprolite mineralisation have been set to zero. • Cut-off factors include considerations developed in the PFS study.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	• The Kalkaroo resources are expected to be mined as a conventional open pit mining operation using excavators and large trucks. • The broad nature of the mineralisation lends itself to an open pit mining operation, initially as a free dig operation due to soft and weathered nature of the host material, as evidenced in the neighbouring Portia gold mine. • No assumptions have been made about mining selectivity for specific material types or quality. • No external mining dilution or other factors have been applied to the resource estimate. • Previously reported prefeasibility studies indicate that there is a sound basis for determining reasonable prospects for eventual economic extraction of the Kalkaroo copper-gold mineralisation.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• No metallurgical assumptions have been applied to the resource model. • Metallurgical test work to date indicates that gold and copper can be recovered satisfactorily from the four main ore types. Acceptable sulphide concentrate grades can be achieved, without any penalty element issues
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for*	• A comprehensive (1400 page) mining lease proposal document, which addresses a range of environmental issues connected with the proposed Kalkaroo mining operation in some detail

Criteria	JORC Code explanation	Commentary
	eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	has been approved by DSD following public comment. • Mining development is subject to the approval of a Program for Environmental Protection and Rehabilitation (PEPR) by the Department for State Development. • This study will comprehensively address all environmental and social impacts and the risk mitigation methodologies to be employed.
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• A total of 11,774 core samples were measured for density. • Most SG calculations were made using the weight in air vs weight in water method. • Density of the ore material generally decreases with increasing weathering and this has been taken into account when estimating tonnages for the various ore types. • It is assumed that the bulk density will have little variation within the separate material types across the breadth of the project area. Therefore a single value applied to each material type is considered acceptable.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• The estimates have been classified into Measured, Indicated and Inferred Mineral Resources according to the JORC 2012 code, taking into account drilling density, geological confidence, estimation pass and confidence and continuity of the mineralisation around the likely economic cut-off grades. Classification of mineralisation with the Kalkaroo project was based on confidence of geological interpretation driven by drill density: a. Measured Mineral Resources are restricted to where drill spacing is less than 50 metres. b. Indicated Mineral Resources are defined where drill spacing is between 50 and 100 metres. c. Inferred Mineral Resources are defined where drill spacing is between 100 and 200 metres. • The Mineral Resource estimate appropriately reflects the view of the Competent Person.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• The resource estimation work was undertaken by independent resource geologist, Mr Steve Sullivan who has had more than 30 years' experience in the

Criteria	JORC Code explanation	Commentary
		mining industry, the majority of which has been spent in resource estimation. • All drilling data and relevant interpretations were supplied to Maptek by Havilah and there were extensive technical discussions during the estimation process between Havilah geologists and Maptek to ensure that all of Havilah's geological knowledge and interpretations were taken into account in generating the block model. • Havilah conducted internal peer review of the resource processes and reporting outcomes numerous times throughout the resource estimation work. Several external parties have reviewed prior work at Kalkaroo and provided feedback which was incorporated into the current resource report. • RPM audited the Resource estimate inclusive of independent swath plot review, classification checks and re-reporting of the estimate and verified the estimate.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• The relative accuracy of the Mineral Resource is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC Code. • Geological and block models have been validated visually against drilling and statistically against input data sets on a domain and swath basis. • The Mineral Resource estimate is based on the assumption that open cut mining methods will be applied and that grade control sampling will be available for selective material delineation. As such the resource estimate should be considered to represent a global resource estimate. • No production data is available to reconcile results.

Section 4 Estimation and Reporting of Mineral Reserves

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• *Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.* • *Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.*	• The Mineral Resources have been estimated in accordance with the JORC Code (2012). The Competent Person for the Mineral Resource estimate is Mr. Robert Dennis who is a full time employee of RPM Advisory Pty Ltd and is a Member of the Australasian Institute of Geoscientists with sufficient relevant experience to qualify as a Competent Person. • The Mineral Resources are inclusive of these Ore Reserves.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• RPM attended a site visit from 9th to 12th November 2016. RPM representatives were Mr Dan Peel (Mining Engineer) and Mr Robert Dennis (Geologist). The field visit involved a meeting between Havilah and RPM in Adelaide on 9th November followed by a field visit to the Project area from 10th to 12th November 2016. • Both Mr Dennis and Mr Peel were full time employees of RPM at the time. • No material physical change has occurred at the site since the visit.
Study status	• *The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.* • *The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that*	• A pre-feasibility study has been completed by RPM. The outcomes of the PFS form the basis for the Ore Reserve estimate • In RPM's opinion the mine plan is technically achievable and economically viable. The mine plan aims to account for all material considerations including Modifying Factors.

Criteria	JORC Code explanation	Commentary
	material Modifying Factors have been considered.	
Cut-off parameters	• *The basis of the cut-off grade(s) or quality parameters applied.*	• A Net Processing Return ("NPR") cut-off was used to define "ore" and "waste" as traditional cut-off grade is unsuitable for a multi-element deposit with multiple rock types and processing streams. The NPR has been defined as the net margin per tonne of rock. That is, a positive NPR value indicates that if the material if processed will generate a positive economic margin and hence can be considered "ore".
Mining factors or assumptions	• *The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).* • *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.* • *The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc.), grade control and pre-production drilling.* • *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).* • *The mining dilution factors used.* • *The mining recovery factors used.* • *Any minimum mining widths used.* • *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.* • *The infrastructure requirements of the selected mining methods.*	• The mining method proposed is conventional open cut mining with bulk movement of rock. The mining method has been selected based on the proximity of the mineralisation to the surface and the characteristics of the deposit. • The geotechnical parameters are developed from a number of specialist studies completed since 2008. In 2017 MiningOne were engaged to review the geotechnical and hydrological outcomes. The design criteria was improved based on Havilah's operating experience at its Portia Mine. • Ultimate pit limits were estimated using Whittle 4X software. Inferred Resources were excluded from the ultimate pit analysis as well as all mine planning. • As the Resource block model has a size of 10m by 10 m by 10 m which is larger than the likely smallest mining unit, it is assumed this block accounts for ore loss and dilution. • Based on Resource block size, mining modifying factor assumed no ore loss and no dilution. • Minimum mining width of 25 m. • Inferred Resources are assumed to be waste rock in this PFS. • The conventional open cut mining method does not require any specialised infrastructure. • The reference point at which Reserves are defined is effectively the ore ROM pad at the processing plant.
Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.*	• Extensive metallurgical test work was undertaken as part of the PFS. This was combined with test work that had been undertaken over the last decade to derive

Criteria	JORC Code explanation	Commentary

	• *Whether the metallurgical process is well-tested technology or novel in nature.*
	• *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.*
	• *Any assumptions or allowances made for deleterious elements.*
	• *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.*
	• *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*
		metallurgical recovery factors.
		• The metallurgical recovery for copper and gold metal varies depending on the head grade and processing method. In general:
		  • Saprolite ore: copper 47%; gold 49%.
		  • Native Copper: copper 83%; gold 67%.
		  • Chalcocite Oxide Plant: copper 76%; gold 53%.
		  • Chalcocite Sulphide Plant: copper 78%; gold 53%.
		  • Chalcopyrite: copper 92%; gold 90%
		• The Oxide processing plant is primarily designed to treat blended Saprolite and Native Copper ores at a nominal 4 million tonnes per annum.
		• Blended oxide ores would be crushed with two stages of toothed roll crushers and scrubbed, with the oversize reporting to a ball mill in closed circuit with a hydrocyclone nest, and the overflow feeding a flotation circuit with two stages of cleaning. Within the milling circuit, gravity gold would be recovered by a Knelson concentrator while native copper would be captured through screening and upgraded by jigging. The final copper-gold flotation concentrate would thickened, and like the gravity gold and native copper concentrates, filtered. The flotation tailings would be thickened and the underflow would be discharged to Tailings Storage Facility
		• The Oxide processing plant would also have the ability to treat Chalcocite ores, additionally incorporating a jaw crusher and a SAG mill to prepare the Chalcocite ores for flotation. The flotation rougher concentrate would be reground and upgraded in three stages of cleaning.
		• The Sulphide processing plant is designed to treat a blend of Chalcocite and Chalcopyrite ores at a nominal 7 million tonnes per annum and would be a conventional hard rock processing facility. It would employ a SABC comminution circuit (gyratory crusher/SAG mill/Ball mill/pebble crusher in closed circuit with a hydrocyclone nest) feeding a flotation circuit with three stages of cleaning. The comminution circuit would include a Knelson concentrator for the recovery of gravity gold while the flotation rougher concentrate would be regrind prior to the production of a final concentrate. The final copper-gold flotation concentrate would thickened, and like the gravity gold concentrate, filtered. The flotation tailings would be thickened and the underflow would be discharged to Tailings Storage Facility.

Criteria	JORC Code explanation	Commentary
Environmental	• *The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	• Havilah has undertaken extensive environmental assessments as part of its government applications • No fatal flaws have been identified by Havilah that would prevent the project from gaining development approval. No flora, fauna, heritage or land use issues were identified. The station is has been de-stocked and hence not in use. The area is arid and sparsely populated. • South of the proposed mining area is the Boolcoomatta Reserve which has protected area status within the Australian National Reserve System due to the property being subject to a conservation covenant. The proposed site activities will need to be undertaken in a manner to act as a barrier for the defence of the Reserve's native species and communities to enable them to sustain themselves in the long term. • It is understood from Havilah that the mining application approvals are imminent.* • No deleterious elements that would have a harmful effect on the *Havilah note: The relevant Mineral Leases have now been granted as stated in the text.
Infrastructure	• *The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	• The construction of site infrastructure and connection to services is proposed commensurate with any new mining development. • Water will be gained for site use form dewatering activities for the open pit. • Power will be gained from a grid connection to Broken Hill. • It is assumed labour will be primarily sourced from Broken Hill though a mining camp will be constructed on site. Access to the site will be from up-grading existing roads. The proposal also will aim to share infrastructure with the nearby Honeymoon Mine. • Mine products will be railed to Port Pirie for

Criteria	JORC Code explanation	Commentary
Costs	• *The derivation of, or assumptions made, regarding projected capital costs in the study.* • *The methodology used to estimate operating costs.* • *Allowances made for the content of deleterious elements.* • *The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co- products.* • *The source of exchange rates used in the study.* • *Derivation of transportation charges.* • *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.* • *The allowances made for royalties payable, both Government and private.*	• Site capital and operating costs for all cost centres have been estimated largely from first principles. The level of accuracy and approach is commensurate with a pre-feasibility study. • Transport charges are based on recent quotes for a project in South Australia and internal databases. • Treatment and refining charges are based on outcomes form a marketing study and internal research. • Royalties are as legislated by the South Australian government.
Revenue factors	• *The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.* • *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	• A copper of US$6,380/t and gold price of US$1,200/oz. was applied in the economic modelling of the Project. • The price estimate is based on recent Consensus Economics published metal price long term forecasts (www.consensuseconomics.com) • An exchange rate of USD/AUD 0.75 applied.
Market assessment	• *The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.* • *A customer and competitor analysis along with the identification of likely market windows for the product.* • *Price and volume forecasts and the basis for these forecasts.* • *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	• The demand for copper and gold is considered in the metal price used. • It was considered that copper and gold will be marketable for beyond the processing life of these Reserves. • The commodity is not an industrial metal. • The levels of potentially deleterious elements are sufficiently low to not trigger penalty payments
Economic	• *The inputs to the economic analysis to produce the net*	• An economic model was prepared to estimate the technical value of the Project.

Criteria	JORC Code explanation	Commentary
	present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc. • *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	• The model is in calendar years and real cash flows. • The Net Present Value is positive for both the base case scenario and reasonable sensitivity analyses. • On this basis the PFS considers the Project economic.
Social	• *The status of agreements with key stakeholders and matters leading to social licence to operate.*	• It is understood that Havilah has an active community consultation program. • Due to its isolated location there are few stakeholders, primarily pastoralists in the area. • Havilah are not aware of any local pastoralists that are within a 15 km radius from Kalkaroo and hence any direct impact will be limited. No borewater is known to be extracted within 25 km of the site. • A native title mining agreement (NTMA) with the Adnyamathanha and Wilyakali native title claimants has been approved by the governing boards of both the Adnyamathanha and Wilyakali people and has been signed by Havilah.
Other	• *To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:* • *Any identified material naturally occurring risks.* • *The status of material legal agreements and marketing arrangements.* • *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.*	• Ingress of water and geotechnical issues are addressed by site. • RPM is not aware of any commercial, legal or marketing arrangements issues. • Progress of government agreements and approvals are in line with a Project in a development phase. • It is understood Havilah will aim to gain all remaining government approvals for mining in the next 12 months.* *Havilah note: The relevant Mineral Leases have now been granted as stated in the text.

Classification	• *The basis for the classification of the Ore Reserves into varying confidence categories.* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• The Ore Reserve is classified as Proved and Probable in accordance with the JORC Code, corresponding to the resource classifications of Measured and Indicated. • The deposit's geological model is well understood with a large proportion of Measured status Resources. The Ore Reserve
Criteria	JORC Code explanation	Commentary
	• *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	classification is considered appropriate given the nature of the deposit, the moderate grade variability, drilling density, structural complexity and mining history. • No Measured was included in the Probable Ore Reserve • No Inferred Mineral Resources were included in the Ore Reserve estimate.
Audits or reviews	• *The results of any audits or reviews of Ore Reserve estimates.*	• RPM has completed an internal review of the Ore Reserve estimate and found it to be reasonable.

Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.* • *It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• Mining is a relatively high risk business when compared to other industrial and commercial operations. Each deposit has unique characteristics and responses during mining and processing, which can never be wholly predicted. • As a relatively high risk business, uncertainty always exists in regard to the outcomes. Whilst an effective management team can identify the known risks and take measures to manage and mitigate those risks, there is still the possibility for unexpected and unpredictable events to occur. It is not possible therefore to totally remove all risks or state with certainty that an event that may have a material impact on the operation of a mine, will not occur. • The accuracy and confidence limits are based on the outcomes of a pre-feasibility study and have therefore been completed to an engineering accuracy of +/-25%. • The Ore Reserve estimate is a global estimate for the proposed Project.