Market Update

CobaltBlue
green energy technology

04 Jul 2018

July 2018 – Highlights

Cobalt Blue Holdings Ltd

A Green Energy Exploration Company

ASX Code: **COB**

Commodity Exposure:

Cobalt & **Sulphur**

Directors & Management:

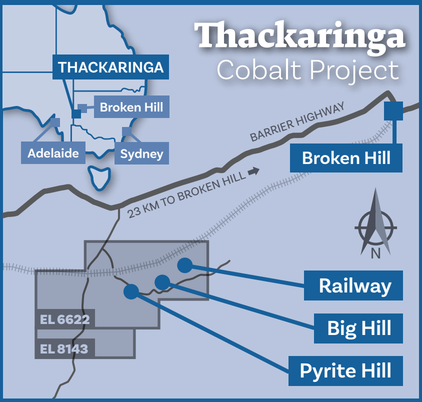
Robert Biancardi	Non-Exec Chairman
Hugh Keller	Non-Exec Director
Joe Kaderavek	CEO & Exec Director
Matt Hill	Non-Exec Director
Robert Waring	Company Secretary

Capital Structure:

Ordinary Shares at 04/07/2018:	**116.1m**
Options (ASX Code: COBO):	**24.4m**
Market Cap (undiluted):	**$111.4m**

Share Price:

Share Price at 04/07/2018:	**$0.96**



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Thackaringa Pre-Feasibility Study Announced

Ore Reserve Estimate and Positive Pre-Feasibility Study (PFS) Results for the Thackaringa Cobalt Project

KEY POINTS:

- Cobalt Blue Holdings Limited (Cobalt Blue or Company) has now delivered a PFS study for the Thackaringa Cobalt Project and spent a minimum of A$2.5m to achieve Stage 2 goals under the Thackaringa Joint Venture Agreement.
- Results justify proceeding further towards commercial development of the Thackaringa Cobalt Project. The project will now begin Bankable Feasibility Studies (BFS).
- A maiden Ore Reserve is declared for the Thackaringa Cobalt Project – Probable Ore Reserve of 46.3M tonnes @ 819 ppm cobalt.

Table 1. **PFS Key Outcomes**

Operating Metric – PFS Reserve	Input	Comments
Plant Capex (±25%)	A$550m	Incl A$66m in contingency, excl $25m pre-strip
Plant throughput	5.25Mtpa	Following commissioning period
Cobalt production (metal in sulphate)	3,657 tpa	Average over first 7 years post ramp-up
Cobalt production (metal in sulphate)	32,453 tonnes	LOM Total
C1 Cash Cost (incl sulphur credit)	US$11.90/lb	Average based on Reserve
Initial mine life (Reserve)	9.3 years	Reserve 46.3Mt @ 819ppm cobalt

The PFS clearly demonstrated the Ore Reserve case for Thackaringa was NPV positive and that the project was economic.

A Production Target (Potential Upside Mining Case) was modelled using sensitivity analysis. The Production Target of 58.7M tonnes @ 802ppm cobalt included the Probable Ore Reserve and a partial component of the Inferred Resource. Production Target outcomes are set out in Table 2.

There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised.

Table 2. **Summary of Product Target Financial Model**

Throughput, CAPEX, Costs	Input	Comments
Plant Capex (±25%)	A$550m	Incl A$66m in contingency, excl $23m pre-strip
Plant throughput	5.25 Mtpa	Following commissioning period
Cobalt production (metal in sulphate)	3,558 tpa	Average over first 10 years post ramp-up
Cobalt production (metal in sulphate)	40,331 tonnes	LOM Total
C1 Cash Cost (incl sulphur credit)	US$12.76/lb	Average based on Production Target
Initial mine life (Production Target)	12.8 years	Production Target 58.7mt @ 802ppm cobalt

Macro Assumptions	Input	Comments
A$/US$ Exchange Rate	Fwd curve	2018 $0.75, 2019 $0.73, 2020 $0.71, 2021 $0.71 then $0.70 onwards
Avg LOM Cobalt Sulphate Price	US$33.80/lb	Independent expert – CRU International
Avg LOM Sulphur Price (landed in Aus)	US$145/t	Independent expert – CRU International

Financial Metrics	Input	Comments
Pre Tax NPV (8%)	A$792m	Based on Production Target
Pre Tax IRR (%)	27.0%	
Post Tax (7.5%)	A$544m	
Post Tax IRR (%)	22.0%	
Project Payback (simple)	4 years	

Source: Cobalt Blue

- Completion of the PFS allows project financing negotiations to begin. A more detailed release on the objectives of the BFS, as well as the company's exploration plans for the next 12 months will be released in due course. Strong cash balance of A$9.8m as of 1 July 2018.
- Demand for cobalt continues to grow. According to CRU, demand will increase by 7% pa CAGR 2018-2021 supporting a global deficit even after near term African supply has entered the market.

While Cobalt Blue is pleased with the PFS outcomes, there are four key opportunities for investigation in the BFS:

- **Optimisation of process plant tailings handling and storage:** In the PFS, management of tailings amounted to A$260M over the life of the project, inclusive of capital and operating costs. A review study will be undertaken in Q3 2018 to identify possible cost saving measures.
- **Optimisation of metal recoveries:** Design criteria used during the PFS was based on batch testwork. Larger scale testing will be conducted during the BFS, incorporating recycle streams, which may increase overall metal recoveries.
- **Optimisation of average power pricing:** The PFS estimated that approximately 22% of the annual site cash costs were related to electrical power consumption from the National Electricity Market. Opportunities exist to consider onsite back-up power supply (larger scale batteries), and process plant operating philosophies, to limit consumption when the National Electricity Market prices reach short-lived peaks – intermittent peak pricing typically last for < 30 minutes.
- **Opportunities to extend mine life:** Potential to extend the project life by treating ore from inferred inventories from the known resources and from other sources beyond Thackaringa, represent opportunities for Cobalt Blue that would have significantly positive returns on capital if the Thackaringa project is developed.

Cobalt Blue's Chairman, Rob Biancardi said: *"We are pleased to announce the PFS results for the world class Thackaringa Cobalt Project. The PFS demonstrates the potential for COB to become a leading global supplier of cobalt sulphate to the lithium-ion battery industry. The Project will now move into a Bankable Feasibility Study. Further resource work will target a 20-year mine life, as the Production Target case is limited to under 13 years."*

Pre-Feasibility Study Parameters – Cautionary Statement

The PFS referred to in this announcement is based on a Probable Ore Reserve derived from Indicated Mineral Resources. No Inferred Mineral Resource Material has been included in the estimation of the Probable Ore Reserves. Cobalt Blue advises that the Probable Ore Reserve provides approximately 79% of the total tonnage underpinning the forecast production target and financial projections. The additional life of mine throughput is derived from Inferred Mineral Resources which comprise approximately 21% of the production target. The estimated Probable Ore Reserve and Inferred Mineral Resource underpinning the production target have been prepared by a Competent Person in accordance with the requirements of the JORC Code.

Cobalt Blue confirms the Inferred Mineral Resources are not material to the economic viability of the Project.

Cobalt Blue has concluded that it has reasonable grounds for disclosing a production target which includes a modest proportion of Inferred Mineral Resource of approximately 21% of the total processed material. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised.

Unless otherwise stated, all cashflows are in Australian dollars, are undiscounted and are not subject to inflation/escalation factors, and all years are calendar years.

Cautionary Statement

This report ("Report") has been prepared by Cobalt Blue and is provided on the basis that none of Cobalt Blue nor its respective officers, shareholders, related bodies corporate, partners, affiliates, employees, representatives and advisers make any representation or warranty (express or implied) as to the accuracy, reliability, relevance or completeness of the material contained in the Report and nothing contained in the Report is, or may be relied upon as a promise, representation or warranty, whether as to the past or the future. Cobalt Blue hereby exclude all warranties that can be excluded by law.

Some statements in this report regarding estimates or future events are forward–looking statements, including prospective financial material which is predictive in nature.They include indications of, and guidance on, future earnings, cash flow, costs and financial performance. Forward–looking statements include, but are not limited to, statements preceded by words such as "planned", "expected", "projected", "estimated", "may", "scheduled", "intends", "anticipates", "believes", "potential", "could", "nominal", "conceptual" and similar expressions. Forward–looking statements, opinions and estimates included in this report are based on assumptions and contingencies which may be inaccurate, and are subject to change without notice, as are statements about market and industry trends, which are based on interpretations of current market conditions. Forward–looking statements are provided as a general guide only and should not be relied on as a guarantee of future performance.

Forward-looking statements may be affected by a range of variables that could cause actual results to differ from estimated results, and may cause Cobalt Blue's actual performance and financial results in future periods to materially differ from any projections of future performance or results expressed or implied by such forward-looking statements. These risks and uncertainties include but are not limited to liabilities inherent in mine development and production, geological, mining and processing technical problems, the inability to obtain mine licenses, permits and other regulatory approvals required in connection with mining and processing operations, competition for among other things, capital, skilled personnel, changes in commodity prices and exchange rate, currency and interest rate fluctuations, various events which could disrupt operations and/or the transportation of mineral products, including labour stoppages and severe weather conditions, the demand for and availability of transportation services, the ability to secure adequate financing and management's ability to anticipate and manage the foregoing factors and risks. There can be no assurance that forward-looking statements will prove to be correct.

Statements regarding plans with respect to Cobalt Blue's mineral properties may contain forward-looking statements in relation to future matters that can only be made where the Company has a reasonable basis for making those statements. Cobalt Blue has concluded that it has a reasonable basis for providing forward looking statements included in this announcement. The detailed reasons for this conclusion are outlined throughout this announcement.

All material assumptions on which the forward-looking statements are based are set out in this document. The information in the Report is in summary form only and does not contain all the information necessary to fully evaluate any transaction or investment. It should be read in conjunction with the Company's other periodic and continuous disclose announcements lodged with ASX, which are available at www.asx.com.au and other publicly available information on the Company's website at www.cobaltblueholdings.com.au.

Executive Summary

Cobalt Blue is pleased to report a maiden Ore Reserve Statement and Preliminary Feasibility Study for the Thackaringa Cobalt Project. Mining One has issued a JORC 2012 compliant Ore Reserve Statement to Cobalt Blue, and this is detailed in the following sections in accordance with ASX Listing Rule 5.9.1.

Cobalt Blue has completed the Preliminary Feasibility Study, and has subsequently served notice to Broken Hill Prospecting Limited ('BPL'), that Cobalt Blue has fulfilled the requirements of Stage 2 of the Thackaringa Joint Venture. The outcomes of the PFS are detailed in the following sections.

The PFS has detailed a technically feasible and economic project for production of cobalt sulphate heptahydrate and elemental sulphur from the Thackaringa deposits. The project assumed a 5.25Mtpa ore throughput rate. Using the mining ore reserve, a project life of 9.3 years (10 years of operations inclusive of ramp up period) was delineated.The Production Target mine life is extended to 12.8 years (13 years of operations inclusive of ramp up period).

The PFS was based on the following broad parameters:

- Mineral Resource Estimate of **72Mt at 852ppm cobalt (Co), 9.3% sulphur (S) & 10% iron (Fe) for 61.5Kt contained cobalt** (at a 500ppm cobalt cut-off) – ASX Announcement @ 19 March 2018.
- Open pit earth moving mining operation conducted by contractors.
- Processing plant and associated infrastructure built under engineering, procurement and construction (EPC) contracts with owner-operator management.
- Power and water supply for site, to be connected to existing Broken Hill networks. Broken Hill is connected to the National Electricity Market electrical power grid, and Broken Hill is supplied with raw water from various sources, including a raw water pipeline fed from the Murray River.
- Management of the project implementation by the Cobalt Blue Management Team (Owner's Team).

Aspirational Targets versus Product Recovery Assumptions

The PFS derived cobalt and sulphur recoveries from testing 820 kg of a composite of Thackaringa ore. Empirical recovery of cobalt in the testwork was 86.8% from ore to cobalt sulphate. This was de-rated to 85.5% to allow for scale-up to commercial production. Optimisation of cobalt recovery, in the BFS, could have a positive impact on project economics. Sensitivity analysis in the PFS, showed that a 1% increase in cobalt recovery, increased post-tax NPV (7.5% WACC) by 3.3%, and a 5% increase in sulphur recovery increased post-tax NPV (7.5% WACC) by 2.4%.

Cobalt Blue has an aspirational target of 90% cobalt recovery, with higher cobalt recovery potentially achievable by improved liberation of pyrite in the concentrator circuit by using a finer particle size (a finer particle size resulted in a 2% increase in cobalt recovery in the concentrator circuit, as reported in ASX Announcement 27th Dec 2017) and use of recycle streams throughout the flowsheet to minimise cobalt losses. Similarly, Cobalt Blue has an aspirational target of 75% sulphur recovery, with higher sulphur recovery potentially achievable by optimisation of the parameters for separating sulphur from the leach residue.

Specific Note on the Tailing Storage Facility (TSF) – optimisation studies to begin

The proposed TSF is required to provide future capacity for the storage of filtered and compacted tailings from the extracted minerals of the pits on site. The project involves mining and processing with a production rate generating approximately 4.8Mtpa of tailings. Design of the TSF was conducted under Australian National Committee on Large Dams (ANCOLD) Guidelines on Consequence Category for Dams and NSW Dam Safety Committee (DSC) Guidelines on Tailing Dams. The capital and operating costs were:

Capital Costs:

Initial capital expenditure:	$A24.3m
Sustaining capital expenditure:	$A4.1m annually

Operating Costs:

Operating costs (per tonne tailings): $4/t (approx. A$17.5m p.a. at max operating rate)

Production Target LOM TSF costs were estimated to be A$260M (undiscounted).

Cobalt Blue will begin TSF review studies shortly, to identify possible cost savings measures.

Project Background

The Thackaringa Cobalt Project (the ‘Project’) is located approximately 25 km west-southwest of Broken Hill and comprises four tenements for a total area of 63 km². The project is subject to a farm-in agreement between Cobalt Blue and BPL.

The tenements host three large tonnage cobalt-bearing pyrite deposits with a reported Mineral Resource of **72Mt at 852ppm cobalt (Co), 9.3% sulphur (S) & 10% iron (Fe)** for 61Kt contained cobalt (at a 500ppm cobalt cut-off).

The Mineral Resource estimate at Thackaringa is apportioned to the three main deposits as detailed in Table 3.

Table 3. **The Mineral Resource estimates for the Thackaringa Cobalt deposits (at a cut-off of 500ppm Co) detailed by Mineral Resource category**

Note minor rounding errors may have occurred in the compilation of this table. Pyrite is estimated from block estimates by: Pyrite = S/53.333×100.

Category	Mt	Co ppm	Fe %	S %	Pyrite %[1]	Contained Co (t)	Py Mt	Density
Railway (at a 500ppm Co cut-off)								
Indicated	23	854	10.1	9.2	17	19,400	4	2.85
Inferred	14	801	10.4	9.2	17	11,100	2	2.85
Total	**37**	**842**	**10.2**	**9.2**	**17**	**30,800**	**6**	**2.85**
Big Hill (at a 500ppm Co cut-off)								
Indicated	7	712	7.2	6.9	13	5,200	1	2.77
Inferred	2	658	6.7	6.3	12	1,500	0	2.76
Total	**10**	**697**	**7.1**	**6.7**	**13**	**6,700**	**1**	**2.77**
Pyrite Hill (at a 500ppm Co cut-off)								
Indicated	22	937	10.9	10.3	19	20,300	4	2.87
Inferred	4	920	11.2	10.8	20	4,000	1	2.89
Total	**26**	**934**	**10.9**	**10.3**	**19**	**24,200**	**5**	**2.88**
Total (at a 500ppm Co cut-off)								
Indicated	52	869	10.0	9.3	17	44,900	9	2.85
Inferred	20	810	10.1	9.2	17	16,600	4	2.85
Total	**72**	**852**	**10.0**	**9.3**	**17**	**61,500**	**13**	**2.85**

Source: Cobalt Blue

PROJECT OWNERSHIP AND TIMELINE

Under the terms of the farm-in joint venture agreement, Cobalt Blue’s beneficial interest in the Project will be increased in tranches on satisfaction of certain exploration and development milestones. When Cobalt Blue has completed its farm-in obligations, it will become the registered holder of the Project tenements. BPL remains the registered holder of the Project tenements until the farm-in is complete. Further to the farm-in agreement, BPL also own a Net Smelter Royalty (2% cobalt) for the Thackaringa Cobalt Project.

Cobalt Blue has now completed a PFS study for the Thackaringa Cobalt Project. Results to date continue to justify proceeding further along the pathway towards commercial development of the Thackaringa Cobalt Project.

The Cobalt Blue project timeline is shown below. Cobalt Blue believes it has fulfilled the requirements of Stage 2 as defined in the Thackaringa Joint Venture Agreement. As such, Cobalt Blue has served noticed of this fulfilment to its JV partner, BPL.

Figure 1. **Cobalt Blue developmental timeline for the Thackaringa Cobalt Project**

Aug 2016 – Feb 2017	1 April 2018	30 June 2018	30 June 2019	
Formation	**Stage One**	**Stage Two**	**Stage Three**	**Stage Four**
Cobalt Blue formed JV & Farm-in JORC 2012 upgrade Cobalt Blue listed	**Minimum expenditure $1.2m in ground + $0.2m geophysical survey.** Delivered: • **Inferred Mineral Resource** • **Scoping Study** • **Indicated Mineral Resource** • **Aerial Geophysical Program** Target Date: **1 April 2018**	**Minimum expenditure A$2.5m in ground** Deliver: **Preliminary Feasibility Study** Target Date: **30 June 2018**	**Minimum expenditure A$5.0m in ground – Measured Mineral Resource + Ore Reserves Target** Deliver: **Bankable Feasibility Study + Project Approvals** Target Date: **30 June 2019**	Decision to Mine Project Finance

Source: Cobalt Blue

CURRENTLY COBALT BLUE HAS THE FOLLOWING BENEFICIAL INTERESTS IN THE TENEMENTS:

- **EL 6622** – 51% beneficial interest Cobalt Blue Holdings Limited
- **EL 8143** – 51% beneficial interest Cobalt Blue Holdings Limited
- **ML 86** – 51% beneficial interest Cobalt Blue Holdings Limited
- **ML 87** – 51% beneficial interest Cobalt Blue Holdings Limited

Project Strategic Rationale

The strategic rationale for the Thackaringa Cobalt Project is funded upon four tenets.

COBALT – THE WINDOW OF OPPORTUNITY

Cobalt is a key metal required for both metallurgical and chemical industries. Cobalt demand is split into new and old economy drivers. New economy drivers include two components: (1) Battery materials, as a means of distributed energy storage in an era of high energy prices, decarbonisation of power grids and powering Electric Vehicles (EVs); and (2) Superalloys. Today, most portable applications are powered by cobalt based lithium ion batteries, initially commercialised in the 1990s. Battery materials will continue to dominate global consumption and drive demand over the next 10 years+.

Cobalt supply remains tightly held by minority of commercial interests, and is largely sourced geographically from Africa (66% of 2018 global supply is from the Democratic Republic of the Congo). Uncertainty of supply remains a key risk for global consumers and will add to the price premium commanded by cobalt over the next 10+ years.

ELEMENTAL SULPHUR vs SULPHURIC ACID

The Thackaringa Cobalt Project mineral resource is composed of pyrite and silica/feldspars. Cobalt is substituted inside the pyrite mineral lattice, and is not present as a discrete mineral. Minerals processing options are centred on recovering pyrite from the ore, and subsequent downstream treatment of the pyrite concentrate.

Historically, commercial operations have roasted pyrite, generating sulphuric acid. However, there is limited demand for sulphuric acid at/near Broken Hill, and any sales would compete against low-cost sulphuric acid generated at base metal refineries.

An alternative to production of sulphuric acid, is the production of elemental sulphur. Elemental sulphur is mainly sourced from treatment of sour-gas from the oil and gas industry. There is no local producer in Australia, and hence this presents an opportunity for Cobalt Blue. Further, there is a growing Australian demand for elemental sulphur for production of fertilisers, and on-mine-site generation of sulphuric acid for metallurgical consumption.

COB seeks to generate elemental sulphur which has advantages over sulphuric acid:

- Ease to handle and transport
- No local supply competition

PRIMARY PRODUCER OF COBALT

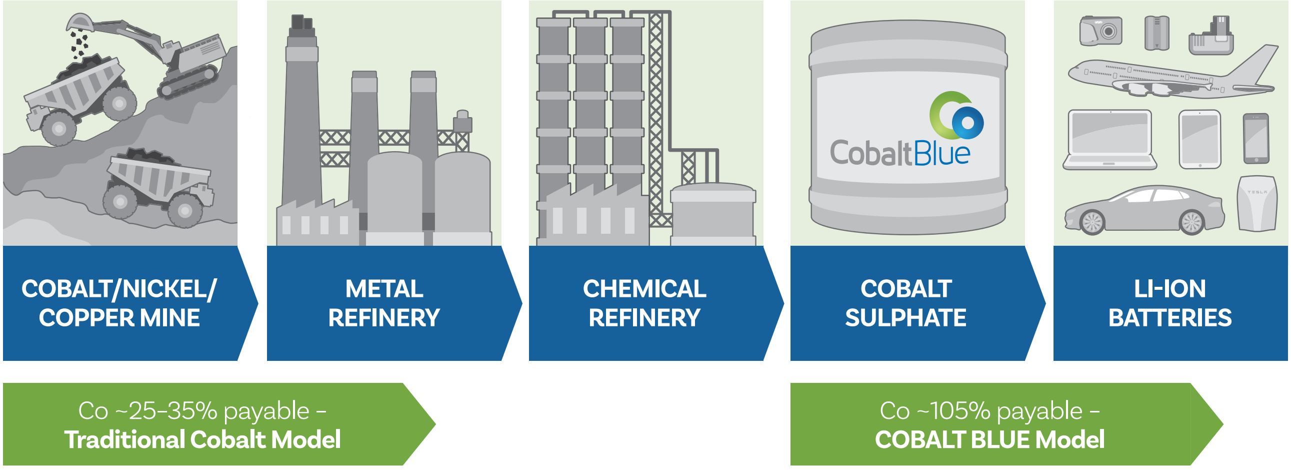
Typically, cobalt is recovered as a by-product from copper or nickel operations. In contrast, the Thackaringa Cobalt Project is aiming to be a primary producer of cobalt, as there are only minor amounts of base metals in the ore. This means that Cobalt Blue is not beholden to copper or nickel pricing for project decision-making.

The Mineral Resource has identified ~61,500 t of cobalt (ASX release "Thackaringa – Significant Mineral Resource upgrade" – 19 March 2018), and this provides Cobalt Blue with a significant resource base for developing the project.

BATTERY READY COBALT PRODUCT – MAXIMUM MARGIN OVER THE PROJECT LIFE CYCLE

The Thackaringa Cobalt Project strategy is to examine an integrated mine/refinery concept. Traditionally, cobalt mines have sold cobalt as a byproduct of either copper or nickel and received a fraction of the value of the contained cobalt. Cobalt Blue's strategic focus is upon the battery industry and producing a battery ready cobalt product (cobalt sulphate) at sufficient purity to enter the production chain directly. This allows Cobalt Blue to sell directly into the battery industry (specifically to cathode precursor manufacturers representing the front end of the industry).

Figure 2. **Cobalt Blue and the Cobalt Sulphate Production Chain**



Source: Cobalt Blue

The long-term commercial strategy is to extract the maximum cobalt margin. In a rapidly changing global market for cobalt, there is risk that demand for particular forms of cobalt will wax and wane during the life-cycle of Thackaringa.

COMMERCIAL ARRANGEMENTS

Cobalt Blue Holdings has entered into a strategic First Mover partnership with LG International (LGI), the resources investment arm of LG Corporation, acting in cooperation with LG Chem.

LG Chem is one of the largest lithium ion battery makers in the world. LG Chem possesses strong technical leadership in the development of next generation batteries, in particular for fixed storage and Electric Vehicles (EVs).

Under the First Mover partnership LG will provide capital and technical assistance for Cobalt Blue to make a high purity battery grade cobalt sulphate.

ABOUT LG INTERNATIONAL

LG International executes resources investment strategy for the LG Group. Historically, LG International has specialised in global mining investment and operations. LG International has now extended its focus to include 'Green Minerals', the raw materials of lithium-ion battery construction such as cobalt, nickel and lithium. LG International operates in close cooperation with LG Chem to secure Green Minerals for the LG Group.

Mining Factors and Assumptions used in PFS pit optimisations

Mining studies completed during the PFS demonstrated the extraction of ore from the Thackaringa deposits is achievable using proven mining methodologies. The study has supported estimation of a maiden Probable Ore Reserve.

Cobalt Blue plans to develop the mining portion of the Thackaringa site using a multi-pit open cut mining operation that will extract ore using conventional drill and blast, load and haul and dump activities.

The selected mining strategy adopted is based on the understanding of the geology and equipment capability. Overall, the following factors have been considered:

- Open pit mining methodology adopting a conventional truck – excavator operation;
- Contractor load and haul operation;
- Contractor drill and blast operation;
- Deposit depth, quality, magnitude related to the groundwater level;
- Environmental consideration, including surface water and ephemeral systems;
- Topographical limitations or lease and native title boundaries which may affect mining, surface infrastructure or waste dumps, and stockpile locations and dimensions;
- Selection of a suitable mining and material handling concept;
- Suitable mining method and equipment concept;
- Mine design of the selected concept;
- Economic analysis of the selected concept; and
- Potential mine life.

Approximately 5.25Mt of ore will be hauled annually to a stockpile area (Run Of Mine or ROM) close to the processing plant located centrally to the four major pits, north of Big Hill pit and waste material hauled to the waste dumps located in close proximity of each pit. During periods where the quantity of ore mined exceeds the quantity processed, additional temporary long term stockpile areas may be utilised.

It is envisaged that mining be conducted on a dual shift operation based on a 7-day week for 365 days of the year.

PRE-FEASIBILITY STUDY ORE RESERVE

The Thackaringa Cobalt Project PFS considers the development of the Pyrite Hill, Big Hill and Railway cobaltiferous pyrite deposits. The relevant modifying factors used for the Ore Reserve estimate were derived from the PFS in accordance with the JORC 2012 Code.

The Ore Reserve estimate for the Thackaringa Cobalt Project is summarised in Table 4.

The Ore Reserve estimate is based on and inclusive of the Mineral Resource estimate released 19 March 2018. No Inferred Mineral Resources have been used in the estimation of the Ore Reserve.

Table 4. **Thackaringa Cobalt Project – Ore Reserve Tonnage and Grade**

(Note: Minor rounding errors may have occurred in the compilation of this table)

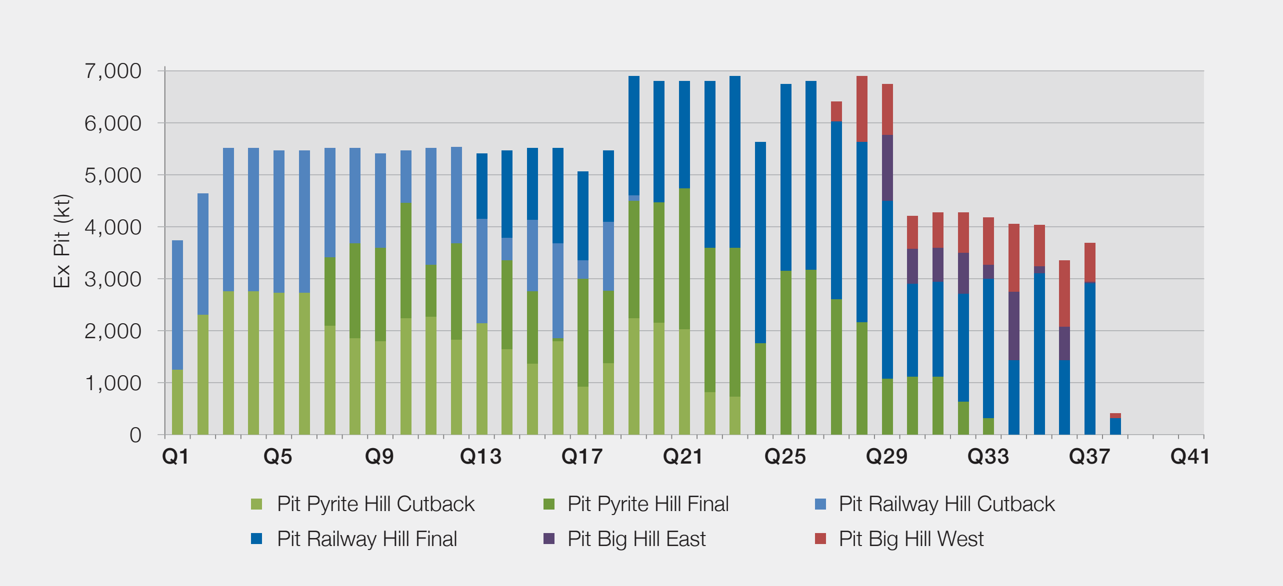
	Tonnes (Mt)	Co (ppm)	S (%)
Proved	–	–	–
Probable	46.3	819	8.83
Total Tonnes	**46.3**	**819**	**8.83**

Source: Mining One

ORE RESERVE – BASE CASE

The Base Case mine schedule sees initial operations in both Pyrite Hill and Railway Hill, with development pre-strip and minor amounts of ore accessed from near surface. The major pits have a two-stage approach, while Big Hill has no staging. Meaningful ore supply is realised from both the major deposits from quarter 2/3 and this supply continues to ramp up to a sustainable full production rate of 5.25Mtpa by quarter 6. Ore from Pyrite Hill is supplied through to quarter 33, while ore from Railway Hill continues through to quarter 38. The Big Hill ore supply commences quarter 28 and supplements the Railway Hill supply through to quarter 38. The Life of Mine is approximately 9.3 years.

Figure 3. **Ore Reserve – Base Case – Mine Schedule**



Source: Mining One

PRODUCTION TARGET (POTENTIAL UPSIDE MINING CASE)

The mine schedule considers a production target inclusive of a small component (approximately 21%) of Inferred Mineral Resources captured by the final pit designs. This production target is summarised in Table 5 and must be read in conjunction with the cautionary statement on page 3. The relative components of Ore Reserve and Inferred Mineral Resources considered in the production target schedule are illustrated in Figure 5.

Total material movement in the Potential Upside mining case for the four pits is approximately 275.2Mt comprising approximately 58.7Mt of ore and 216.5Mt of waste for an overall stripping ratio of 3.69:1, waste to ore. The depth of the pits ranges from approximately 70 m to 250 m.

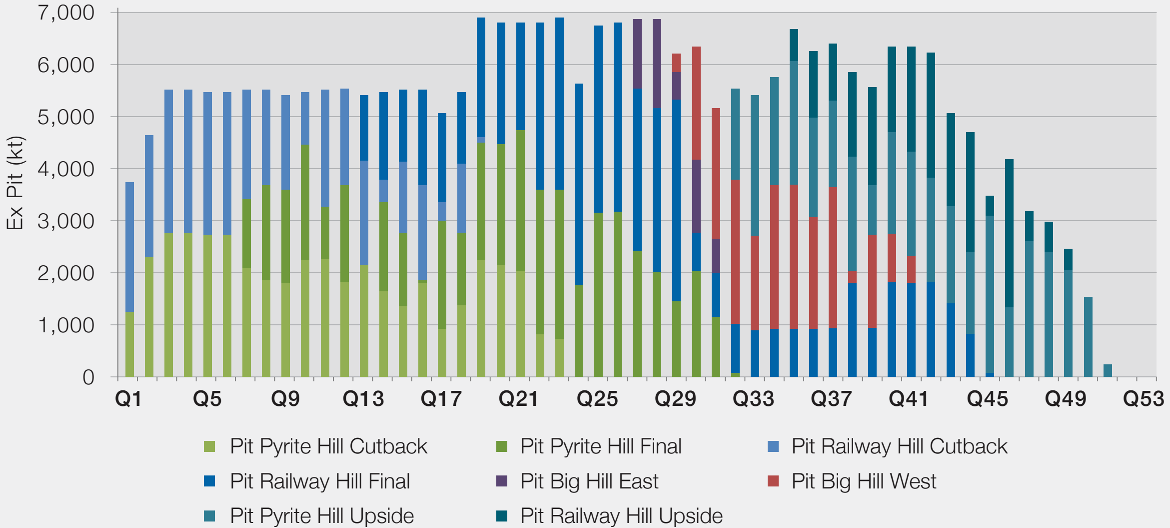
Table 5. **Thackaringa Cobalt Project – Upside Production Target**

Tonnes (Mt)	Co (ppm)	S (%)
58.7	802	8.7

Source: Mining One

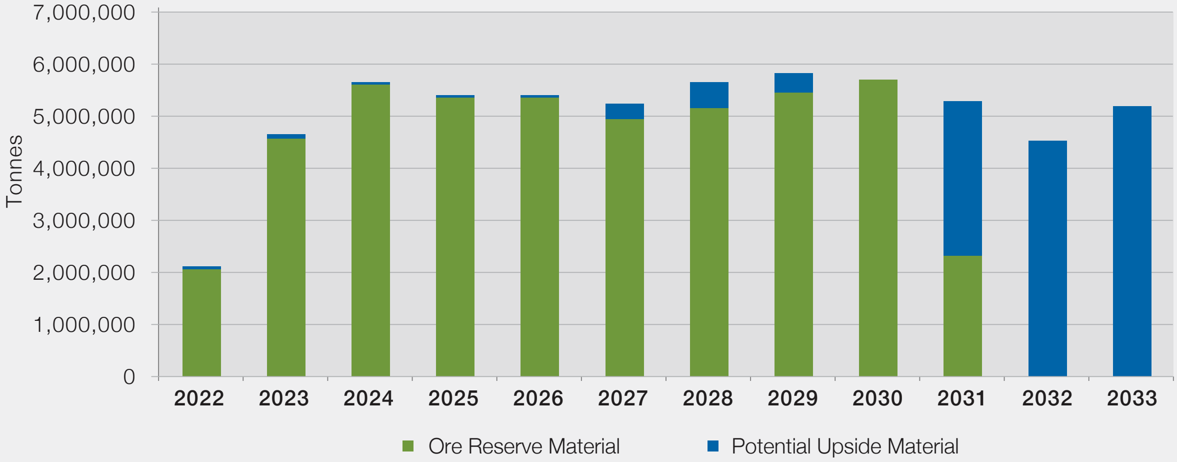
The potential Upside Case mine schedule sees initial operations in both Pyrite Hill and Railway Hill, with development pre-strip and meaningful amounts of ore accessed from near surface. The major pits have a three-stage approach, while Big Hill has no staging. The ramp up process to a sustainable full production rate of 5.25Mtpa is realised by quarter 3. Ore from stages 1 & 2 of the Pyrite Hill pit is supplied through to quarter 32, while ore from stages 1 & 2 of the Railway Hill pit continues through to quarter 44. The Big Hill ore supply commences quarter 27 and supplements the Railway Hill supply through to quarter 41. The final stages of both the Pyrite Hill and Railway Hill pits commence in quarter 32 and continues to the completion of the pits in quarter 51. The Life of Mine is approximately 12.8 years.

Figure 4. **Potential Upside Case – Mine Schedule**



Source: Mining One

Figure 5. **Production Target – Mine Schedule (material classification).**



Source: Cobalt Blue

GEOTECHNICAL

A geotechnical assessment was completed by Mining One in February 2018. The primary outcome of the assessment is to characterise the rock mass and provide indicative criteria for pit optimisations and designs (open pit slope angles). The assessment comprised of compilation and review of existing data (desktop review) and analysis of new data collected from the 2017/18 geotechnical drilling campaign. All available data was used to characterise the rock mass. The drilling for geotechnical data collection targeted conceptual pit shells generated during the scoping phase of the TCP. Sixteen (16) boreholes were drilled across the project targeting the four (4) conceptual pits. The boreholes were fully cored, HQ diameter angled holes.

The values determined in the material property assessment were used to assist in the determination of slope design configurations for the three deposits. The slope stability assessment incorporated empirical methods, kinematic analysis and limit equilibrium methods. Expected failure modes were evaluated and incorporated into the batter recommendations.

Stability analyses were performed on the final slope configurations (berm widths, batter heights and angles and overall slopes) to ensure minimum Factors of Safety (FOS) were met. Where the FOS did not meet minimum acceptance criteria, an iterative process was undertaken to obtain acceptable values. The slope design configurations were then combined with the geotechnical domains and used as design guidelines during both the optimisation and design phase of the project.

The recommended slope configuration for the three deposits are summarised in Table 6:

Table 6. **Geotechnical Pit Design Parameters**

Geotechnical Domain	Deposit	Wall	Bench Height	Batter Angle	Berm Width	IRSA
Weathered Material[1]	Pyrite Hill		20m	35°	n/a	n/a
1	Pyrite Hill	North-West	20m	65°	10.0m	46.0°
2	Pyrite Hill	North	20m	90°	13.0m	56.9°
3	Pyrite Hill	South-West	20m	70°	12.0m	46.0°
4	Pyrite Hill	East	20m	90°	13.0m	56.9°
5, 7	Big Hill West	North-West	20m	80°	11.5m	53.1°
6, 8	Big Hill West	South-East	20m	80°	11.5m	53.1°
9	Big Hill East	North-West	20m	80°	11.5m	53.1°
10	Big Hill West	South-East	20m	80°	11.5m	53.1°
11, 12, 15	Railway	North-West	20m	80°	11.5m	53.1°
13, 14, 16	Railway	South-East	20m	90°	13.0m	56.9°

Source: Mining One

[1] *Weathered material has only been modelled as single bench in Pyrite Hill. Weathered zone in Big Hill and Railway deposits is only expected to make up a couple of metres from surface and has not been modelled.*

CONTRACTOR FLEET

At this stage, Cobalt Blue will employ a contractor to operate the load and haul fleet and ancillary tasks and drilling and blasting operations. Mining will be completed on a 7 day, dual 12-hour day shift roster.

Project Financial Analysis

The PFS outcomes clearly demonstrated that the Ore Reserve case for Thackaringa was NPV positive, and that the project was economic. The key variables for the Ore Reserve are given in Table 7.

Table 7. **PFS Key Outcomes**

Operating Metric – PFS Reserve	Input	Comments
Plant Capex (±25%)	A$550m	Incl A$66m in contingency, excl $25m pre-strip
Plant throughput	5.25Mtpa	Following commissioning period
Cobalt production (metal in sulphate)	3,657 tpa	Average over first 7 years post ramp-up
Cobalt production (metal in sulphate)	32,453 tonnes	LOM Total
C1 Cash Cost (incl sulphur credit)	US$11.90/lb	Average based on Reserve
Initial mine life (Reserve)	9.3 years	Reserve 46.3Mt @ 819ppm cobalt

Pricing forecasts for sulphur and (20.5% battery grade) cobalt sulphate have been provided by CRU International, a globally recognised commodity consulting group. The forecasts consist of an explicit forecast period for cobalt (2018-2026) and sulphur (2018-2022). Following these periods, the model assumes long term (flat real) pricing.

CRU cobalt price forecasts are given in Table 17, which is in the Commodity Forecast and Marketing section of this announcement. LT pricing is assumed to be US$32.9/lb, which is the 2026F price forecast.

Sulphur price forecasts (landed Australia) have also been provided by CRU international. LT pricing is assumed to be US$114/t, which is the 2022F price forecast. LT freight (ex Vancouver) is assumed to be US$31/t.

The A$/US$ forward curve (source: the averaged published forecasts of JP Morgan, Morgan Stanley, Rabobank, and Ord Minnett as at the date of this release) is used in the following financial evaluation.

THACKARINGA COBALT PROJECT FINANCIALS USING A$ FORWARD CURVE

The following A$/US$ forward curve is shown in the table below, based on a consensus broker panel data:

Table 8. **A$/US$ forward curve**

2018	2019	2020	2021	2022	LT
$0.75	$0.73	$0.71	$0.71	$0.70	$0.70

Source: The averaged published forecasts of JP Morgan, Morgan Stanley, Rabobank and Ord Minnett as at the date of this release

A Production Target (Potential Upside Mining Case) was modelled using sensitivity analysis and the latest metal pricing information. The key variables for the Production Target are given in Table 9, and the Production Target financial metrics are NPV 8% Pre Tax A$792m (IRR 27.0%) and NPV (7.5%) Post Tax A$544m (IRR 22.0%).

Table 9. **Production Target Key Outcomes – using A$/$US forward curve**

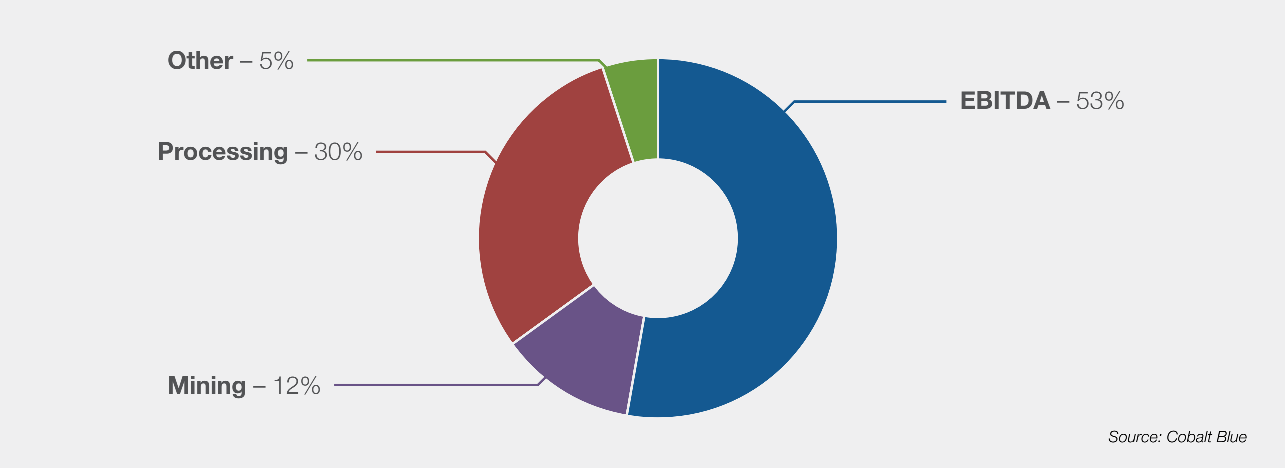
CAPEX, Throughput, OPEX, Pricing	Input	Comments
Plant Capex (±25%)	A$550m	Incl A$66m in contingency, excl $23m pre-strip
Plant throughput	5.25 Mtpa	Following commissioning period
Cobalt production (metal in sulphate)	3,558 tpa	Average over first 10 years post ramp-up
Cobalt production (metal in sulphate)	40,331 tonnes	LOM Total
C1 Cash Cost (incl sulphur credit)	US$12.80/lb	Average based on Production Target
Initial mine life (Production Target)	12.8 years	Mining Inventory 58.7mt @ 802ppm cobalt
A$/US$ Exchange Rate	Fwd curve	2018 $0.75, 2019 $0.73, 2020 $0.71, 2021 $0.71 then $0.70 onwards
Avg LOM Cobalt Sulphate Price	US$33.80/lb	Independent expert – CRU International
Avg LOM Sulphur Price (landed in Aus)	US$145/t	Independent expert – CRU International

Financial Metrics	Input	Comments
Pre Tax NPV (8%)	A$792m	Based on Production Target
Pre Tax IRR (%)	27.0%	
Post Tax (7.5%)	A$544m	
Post Tax IRR (%)	22.0%	
Project Payback (simple)	4 years	

Source: Cobalt Blue Holdings

Over the Production Target LOM the project generates 53% EBITDA margin with key cost margins being Processing 30% (of sales) and Mining 12% (of sales) as below:

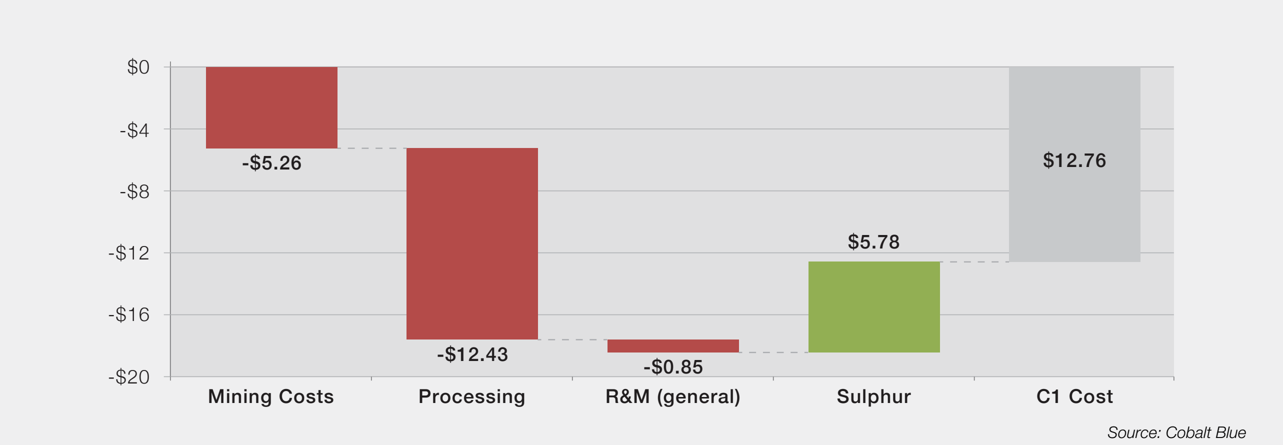
Figure 6. **Thackaringa Cobalt Project – Production Target LOM Revenue Breakdown (%)**



Source: Cobalt Blue

Cash costs (Production Target) are forecast to be ~US$12.76/lb (net of sulphur credits) with breakdown below. Mining costs shown are for a contractor operation, with processing plant and others assumed to be staff.

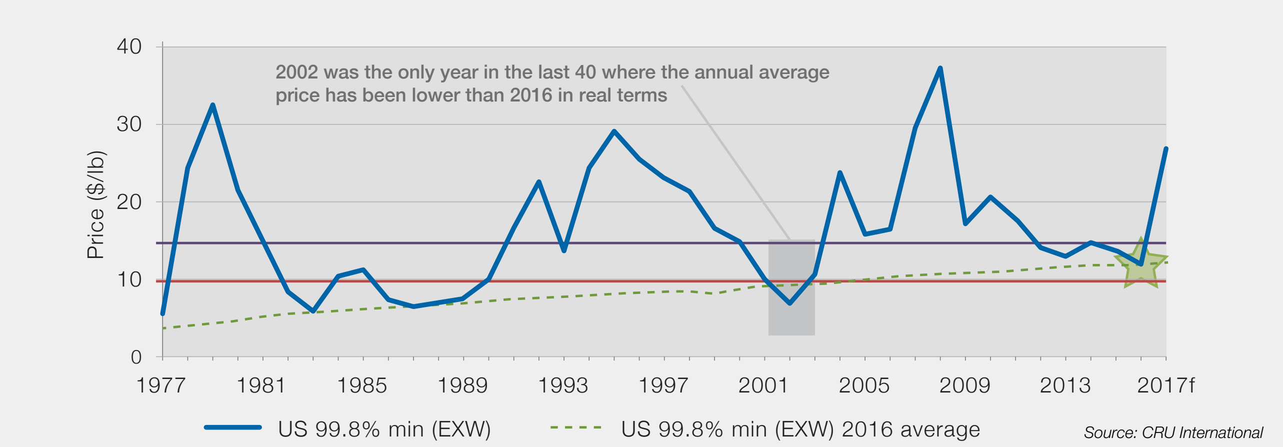
Figure 7. **Thackaringa Cobalt Project – Production Target – C1 Site Cash Cost US$/lb (net of by product)**



Source: Cobalt Blue

The cash costs determined by this study place Thackaringa in a robust position against the historical cobalt market. Analysis shows that cobalt price has dropped below (2016 Real US$) US$12/lb once in the last 40 years. This provides confidence in the economic resilience (defined as the ability to withstand low commodity pricing) of the Thackaringa Cobalt Project.

Figure 8. **Cobalt Pricing (historical) – 1 in 40 year price event - Cobalt < US$12/lb (2016 Real)**



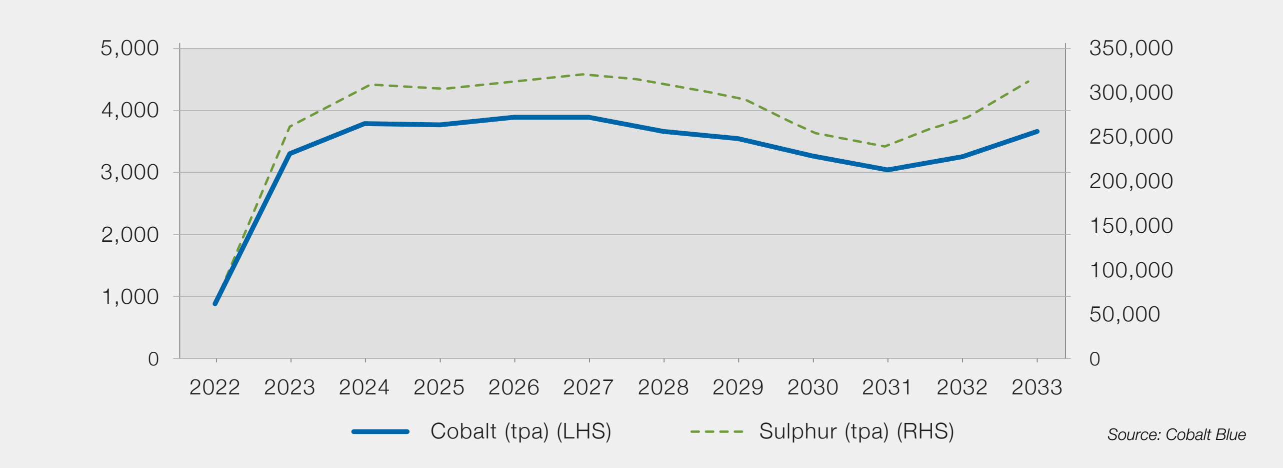
Source: CRU International

PRODUCTION PROFILE

An 18-month ramp up period has been assumed for the project (2022 – 1H 2023). Production profiles for cobalt and sulphur are shown below. In the 10 years following ramp up (Production Target LOM) the project will produce an average of 3.558Kt pa cobalt (metal equivalent) and 291Kt pa sulphur.

The project will produce cobalt sulphate to purity specifications that is acceptable (min 20.0% Co in Cobalt Sulphate in $CoSO_4.7H_2O$ crystal form) for pre cursor production (as part of the lithium ion battery industry).

Figure 9. **Production Target Case – Cobalt (metal equivalent) and Sulphur Production Profile (tpa)**



Source: Cobalt Blue

REVENUE SPLIT

The unique nature of Thackaringa ore supports high cobalt leverage – estimated to be 86% (of revenue) over the LOM (Production Target) as below:

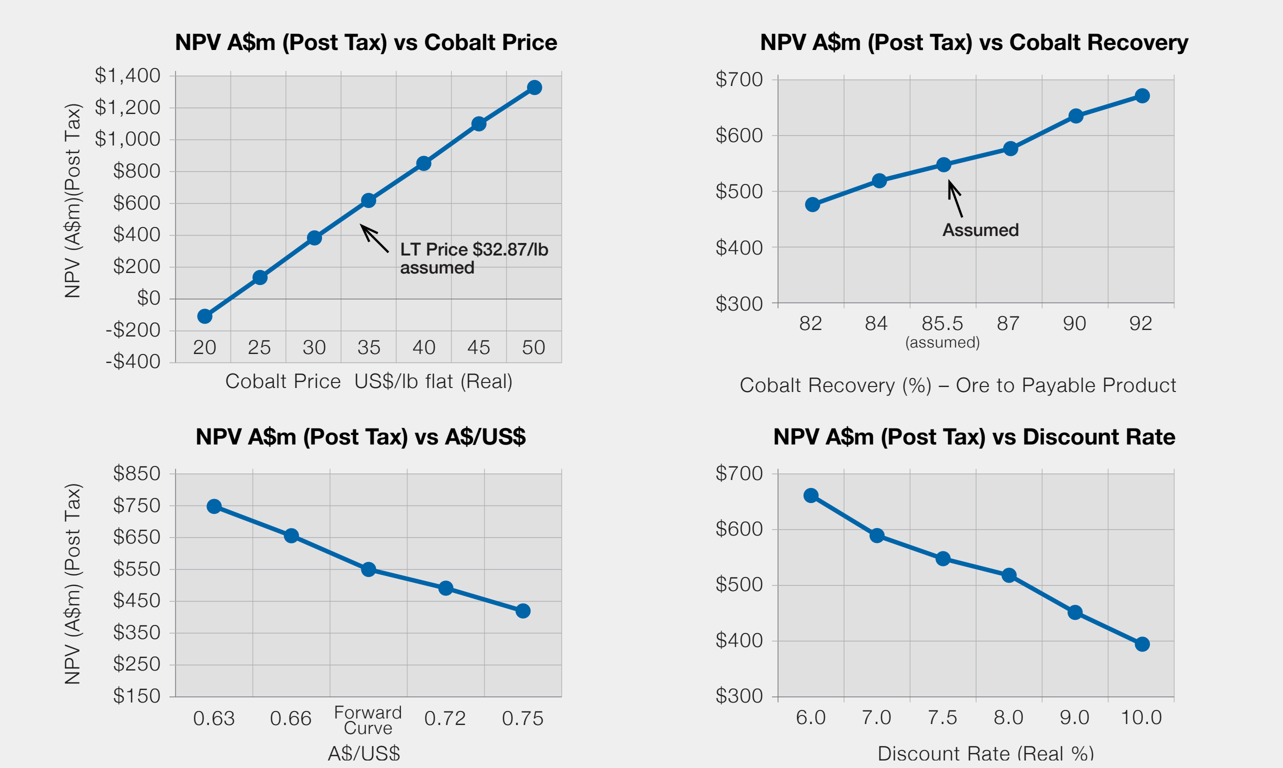
Table 10. **Production Target – Life of Mine Revenue Split**

Life of Mine (Production Target)	**Revenue** *(%)*	**Revenue** *(A$m)*
Cobalt	86.3%	4,303
Sulphur	13.7%	685

SENSITIVITY

Key inputs have been identified and Post Tax NPV sensitivity is shown as below:

Figure 10. **Summary of Project Sensitivities – MII Case (Production Target).**



Source: Cobalt Blue

All costs presented for Operating and Capital Costs have undergone detailed analysis.

Where possible first principles and initial quoted pricing have been adopted to derive costs. Where such data and/or analysis was not available, the use of appropriately experienced and capable external sources has been used to supply realistic cost estimates within standard PFS orders of accuracy, i.e. up to ± 25%.

Assistance from outside contractors and consultants has been used to derive some of the larger component costs such as operating costs associated with process plant and costs for contract mining activities.

ROYALTIES

The metals mined at Thackaringa and products produced are subject to an NSW Government 'Ad valorem' royalty. This royalty payment is levied at 4% of the total value post processing. Further to this, a royalty payment of 2%, on a net smelter return for all cobalt products, is payable to BPL. Both Royalties have been included in the mine planning and financial assessments.

CAPITAL COSTS

Assistance from GHD Pty Ltd has been used to derive some of the larger component costs such as capital costs associated with process plant and tailings dam.

Process Plant capital costs are estimated to be A$485m with a further contingency of A$66m estimated.

Table 11. **Thackaringa Process Plant Capital Costs (A$m)**

Description	Base Cost Estimate	Contingency	Base Total
Process			
Site	2.0	0.2	2.2
ROM Pad	0.0	0.0	0.0
Comminution	29.3	4.0	33.3
Flotation / Concentration	54.3	8.3	62.6
Pyrolysis Circuit	36.9	5.4	42.3
Sulphur Recovery	14.3	2.2	16.5
Pressure Oxidation (POX)	52.8	3.4	56.2
Iron Removal	3.6	0.5	4.1
Cobalt Solvent Extraction Plant	11.4	1.3	12.7
CoSO4 Crystallisation & Drying	14.9	2.4	17.3
Solution Purification	15.5	2.5	18.0
Distillation Furnace	10.6	1.2	11.8
Process Water Tank	0.5	0.1	0.6
Infrastructure Piping Pumps & Valves	16.7	2.5	19.2
Infrastructure Electrical / Instrumentation / Control	33.7	6.7	40.4
Process EPCM	42.6	4.5	47.1
Sub Total - Process	**339.0**	**45.2**	**384.3**
Infrastructure			
Civils / Earthwork	0.7	0.1	0.9
Roads & Drains	2.2	0.3	2.5
Tailings Storage Facility	20.3	4.0	24.3
HV Power Supply	30.1	4.6	34.8
Mine Water Supply	7.8	1.2	9.0
Buildings / Structures	11.5	1.2	12.7
Communications	0.5	0.1	0.6
Infrastructure Ancilliaries / General Services	35.2	4.3	39.5
Infrastructure Piping Pumps & Valves	5.5	1.1	6.6
Infrastructure Electrical / Instrumentation / Control	10.6	2.1	12.8
Spares (Mechanical & Electrical)	4.6	0.0	4.6
Infrastructure EPCM	10.1	1.0	11.2
Reagents First Fill	6.2	0.3	6.5
Sub Total - Infrastructure	**145.5**	**20.4**	**165.8**
Total - Process & Infrastructure	**484.5**	**65.6**	**550.1**

Source: Cobalt Blue

Capital for the startup of mining operations will mainly be associated with pre-strip development waste removal. First year estimates for pre-strip development are $25m for reserves only and $23m for upside production target case.

OPERATING COSTS

Mining

The load and haul fleet proposed includes 229 t Komatsu 830E rigid body dump trucks or equivalent and two Primary Excavators and a third reserve and ancillary excavator – Lieberr R9400 380 tonne excavator, Komatsu PC2000 200 tonne excavator and a backup Komatsu PC1250 111 tonne excavator.

The Fixed and Variable mining costs used in the life of mine economic evaluation for both the Reserve Base Case and production target are shown in Table 12 and Table 13. Mining costs below were quoted commercially for the PFS study.

Table 12. **Base Case – Fixed and Variable Mining unit costs by year (A$)**

MI Base Case											
Cost / tonne	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**Wt Average**
Fixed component	0.73	0.64	0.64	0.64	0.58	0.54	0.53	0.72	0.90	1.01	0.65
Variable	1.63	1.75	1.76	1.76	1.90	2.03	2.07	1.76	1.58	1.63	1.82
Total	2.36	2.39	2.41	2.40	2.48	2.57	2.60	2.48	2.49	2.64	2.47

Table 13. **Production Target Case – Fixed and Variable Mining unit costs by year (A$)**

MII Upside Case													
Cost / tonne	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**Wt Average**
Fixed component	0.73	0.64	0.64	0.64	0.58	0.54	0.52	0.61	0.59	0.59	0.64	1.05	0.63
Variable	1.63	1.75	1.76	1.76	1.90	2.03	2.05	1.84	1.83	1.97	2.03	1.74	1.87
Total	2.36	2.39	2.41	2.40	2.48	2.57	2.57	2.45	2.42	2.55	2.66	2.79	2.50

Further to the above open pit mining unit costs, stockpile management and relocation unit costs have been calculated at A$0.80/t. This cost was estimated by Mining One.

Processing Plant

Summary of process Plant costs; including labour, power, reagents, gases, water and maintenance are shown in Table 14 below:

Table 14. **Summary of Processing Plant Operating Costs (A$m)**

Area	**Cost /per annum A$m***	**Contingencies**	**Cost $/t (ROM)***	**Comment**
Labour	17.3	Includes 17% allowance	3.29	Fixed cost
Power (excluding oxygen + nitrogen)	40.5	Include 7.5% on power price	7.71	Variable to throughput
Reagents and Consumables (including liners)	18.7	Includes $68/t freight to site from Adelaide Port	3.56	Variable to throughput
Oxygen + nitrogen	8.9	Include 7.5% on power price, Include 10% consumption	1.66	Variable to throughput
Water	2.1	Include 10% on consumption	0.40	Variable to throughput
Maintenance	7.8	Includes 3.2% average	1.48	Fixed Cost

** An FX of 0.76 was used for costs (US$:AUD$)*

Power Consumption

Installed and drawn power are summarised in Table 15.

Table 15. **Estimated Power Consumption and Csosts ($A) for Processing Plant**

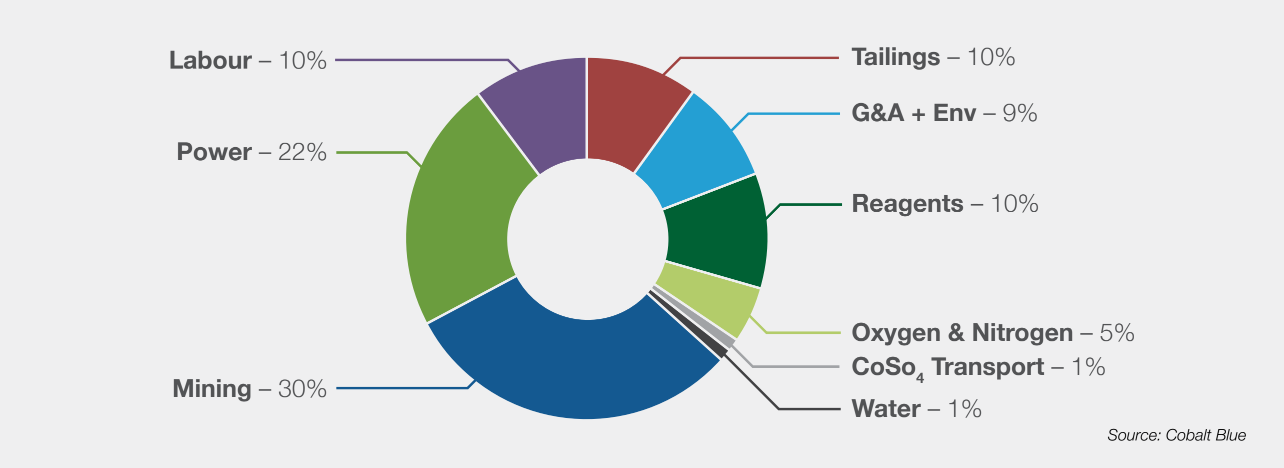
Area	Drawn		Installed		
Comminution	6	MW	7	MW	
Pyrolysis	41	MW	43	MW	
Oxygen + Nitrogen (O_2 + N_2)	9.97	MW	12	MW	
Filters	2.1	MW	3.2	MW	
Other/Miscellaneous	10	MW	12	MW	
Total Draw	69.1	MW			
Production (steam turbine)	12.5	MW			
Purchased (assumed 8160 hours/a)	56.5	MW		A$m	49.4
Allocated to O_2 + N_2	9.97	MW		A$m	8.9
Allocated rest of process plant equipment	46.6	MW		A$m	40.5

Site G&A Costs

Mining One has reviewed the costs against similar projects and determined that they are accurate and relevant, and the line item costs and manpower numbers will cover the site administration requirements. The resulting total of AUD$17.5m per year is considered to be a fixed cost.

All site costs are shown broken down in Figure 11 below.

Figure 11. **Summary of Site Operating Cash Costs (A$)**



Source: Cobalt Blue

Thackaringa Project Geology

REGIONAL GEOLOGICAL SETTING

The Thackaringa project is located in a deformed and metamorphosed Proterozoic supracrustal rock succession named the Willyama Supergroup; exposed as several inliers in western New South Wales, including the Broken Hill Block. The project area covers portions of the Broken Hill and Thackaringa group successions which host the majority of mineralisation in the region.

The Thackaringa Group comprises a thick sequence of psammite dominated metasediments, derived from relatively sandy shallow marine sediments with an evaporitic or hypersaline component represented by albitic horizons (Conor & Preiss, 2008; Stevens, et al., 1988). Within the project area, the Himalaya Formation of the upper Thackaringa Group, hosts extensive stratabound zones of cobaltiferous pyrite mineralisation that are the focus of the current study.

DEPOSIT GEOLOGY

The Thackaringa mineralisation comprises stratabound units of moderate to steeply dipping, pyritic quartz-albite gneiss that form three deposits referred to herein as Pyrite Hill, Big Hill and Railway. Pyrite Hill is geographically separate from the other deposits. Conversely, Big Hill and Railway are considered to reflect the same mineralised body, separated by a zone of low grade mineralisation and minor structural dislocation.

Controls on mineralisation are considered to include:

- Primary foliation of the host lithology as a fluid flow pathway and depositional site for the cobaltiferous pyrite; and
- Bedding parallel shear zones, generally occurring along the quartz-albite gneiss contact, responsible for evident fold thickening.

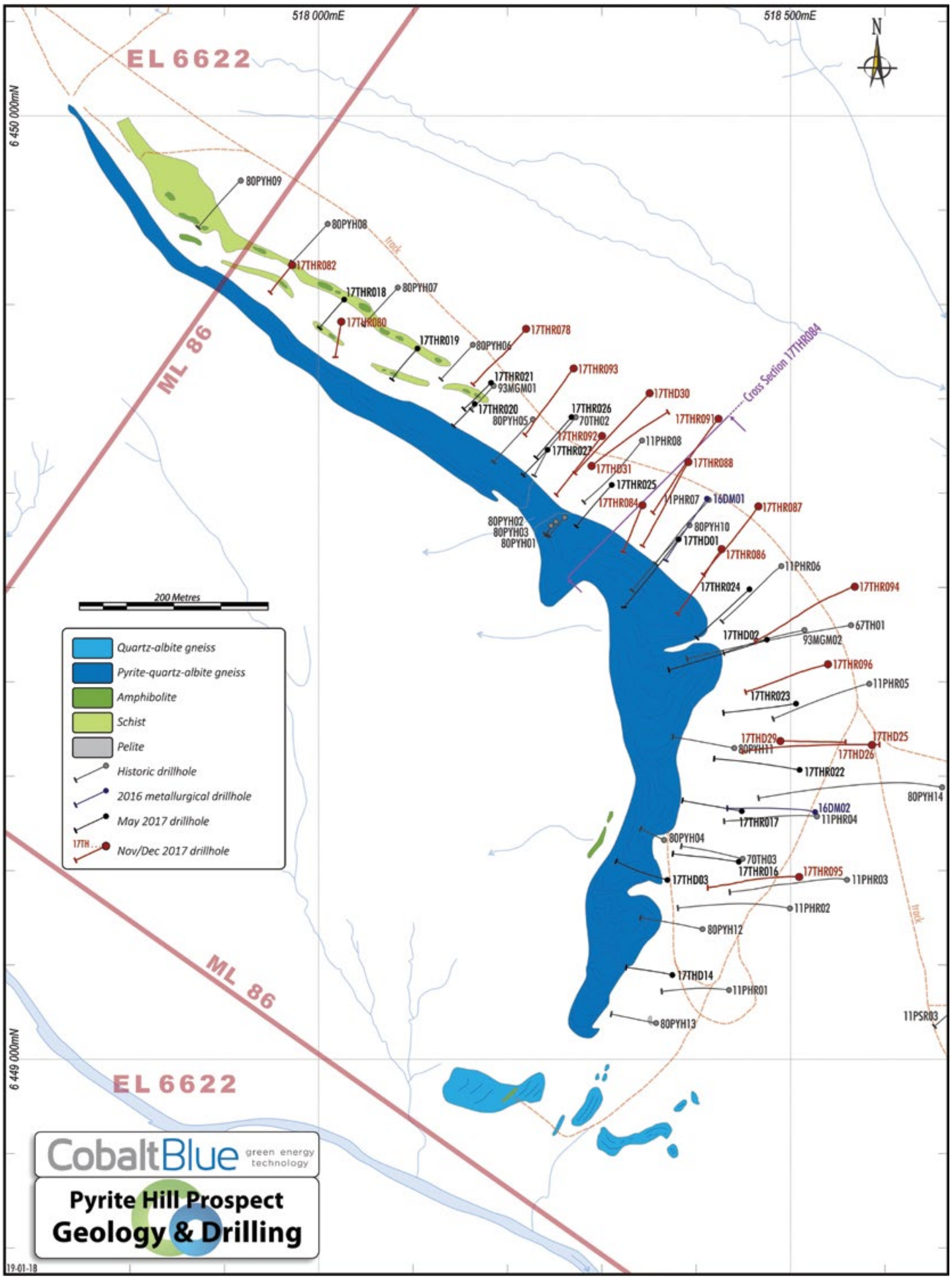
Pyrite Hill

The Pyrite Hill deposit extends over 1.2 km along strike, approximately 300 m down dip and varies in thickness from approximately 10 to 100 m. Mineralisation is hosted by quartz-albite gneiss with both the hanging wall and footwall comprised of quartz-albite-biotite gneiss with lesser quartz-albite gneiss and amphibolite sills.

The northern-western extent of the deposit is generally undeformed and dips at approximately 50° to the northeast. In the central part of the deposit, rapid thickening of mineralisation, resultant of near isoclinal folding, occurs in correlation with a general change in strike to the south and coincident steepening of dip to approximately 60° to the east.

The Mineral Resource estimate extends from the base of partial oxidation (approximately 20–25 m below surface) to 35mRL (approximately 270 m below surface).

Figure 12. **Pyrite Hill deposit plan**



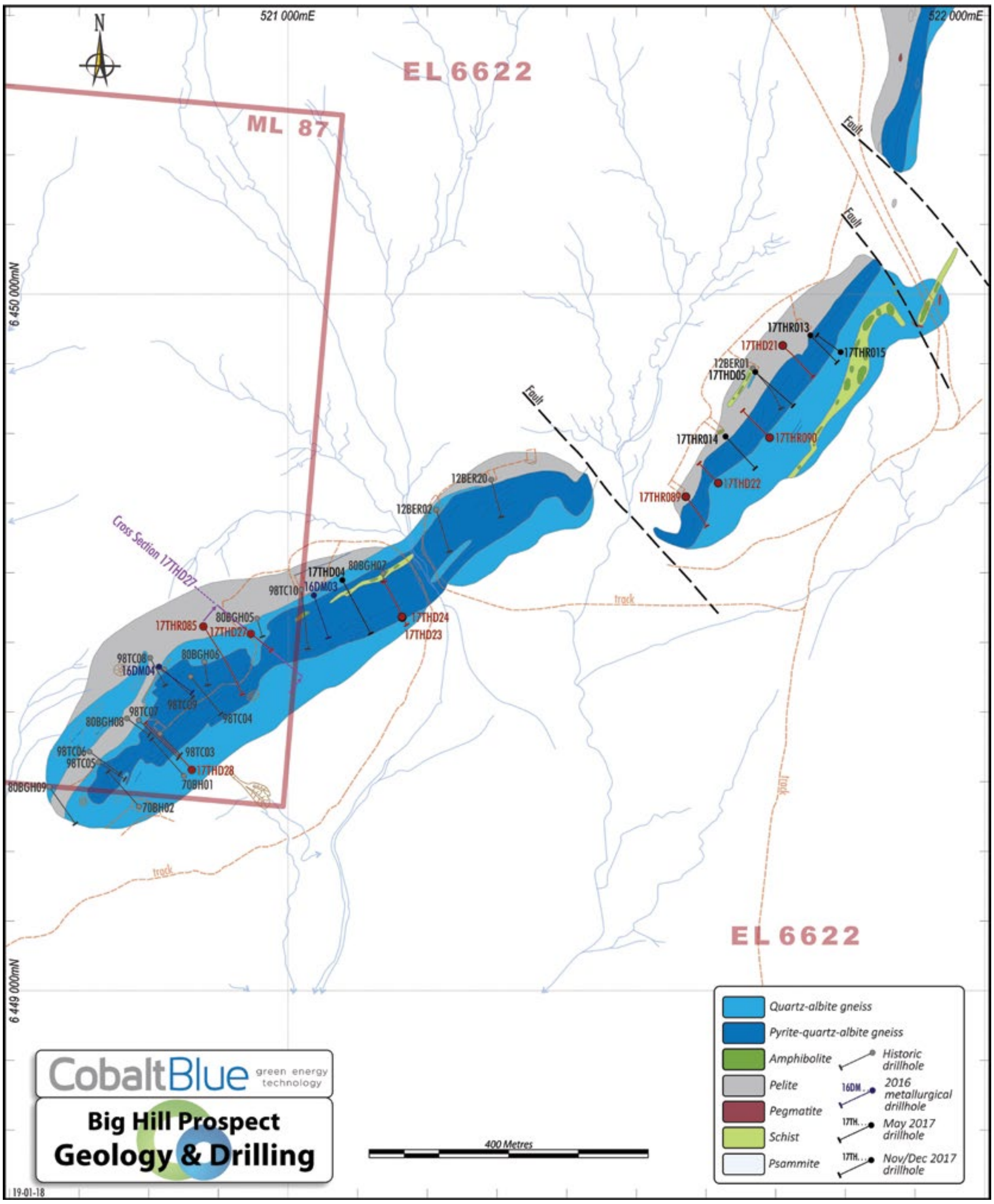
Source: Cobalt Blue

Big Hill

The Big Hill deposit has an overall strike length of 1.2 km and comprises two mineralised zones separated by a late stage dextral fault with approximately 150 m of apparent displacement. The southwestern zone occurs over 800 m of strike varying in thickness from 30–100 m due to steep isoclinal folding. The northern-eastern zone is a relatively linear, steeply dipping zone extending for some 400 m with an average thickness of 35–40 m.

The base of partial oxidation occurs approximately 10–25 m below surface with narrow zones of deeper, structurally controlled oxidation evident at the southern extent of the deposit. The Mineral Resource estimate extends from the base of partial oxidation to 150 mRL (approximately 150 m below surface).

Figure 13. **Big Hill deposit plan**



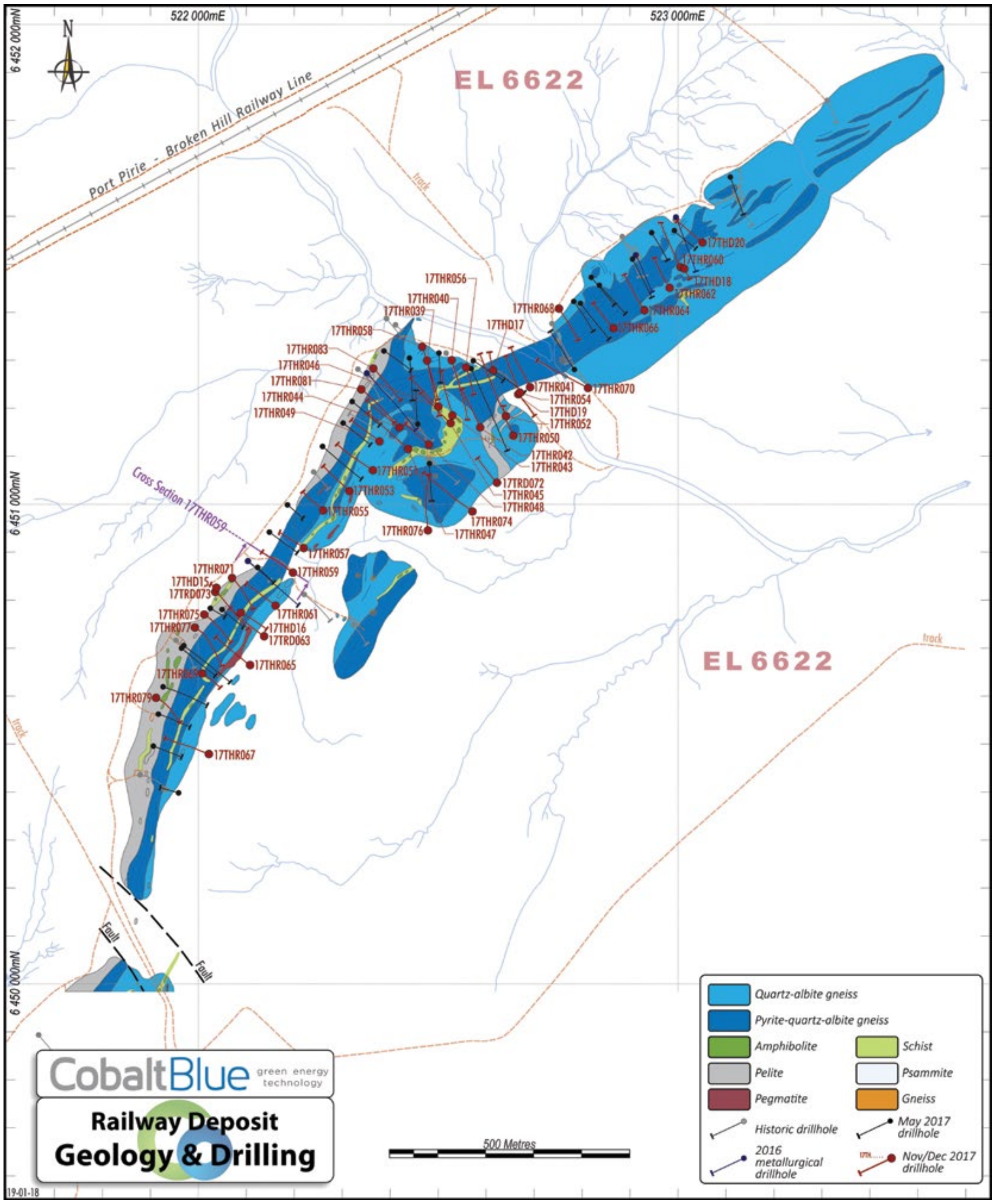
Source: Cobalt Blue

Railway

The Railway deposit is considered a north-eastern extension of the Big Hill deposit with continuous mineralisation observed over some 2.5 km. The southern extent of the deposit is generally linear with an average thickness of 30 m increasing to approximately 60 m in correlation with evidently upright isoclinal folding. The central part of the deposit is characterised by extensive ductile deformation and complex folding resulting in a rapid thickening of mineralisation up to 300 m. At the northern-eastern extent, the mineralisation is increasingly discontinuous, comprising a series or narrow lenses within a weakening low grade mineralised envelope.

The base of partial oxidation generally occurs approximately 15–20 m below surface. The Mineral Resource estimate extends from the base of partial oxidation to 50 mRL (approximately 230 m below surface) with a section between 6540950mN and 6451400mN at 0 mRL (approximately 300 m below surface).

Figure 14. **Railway deposit plan**



Source: Cobalt Blue

Metallurgy

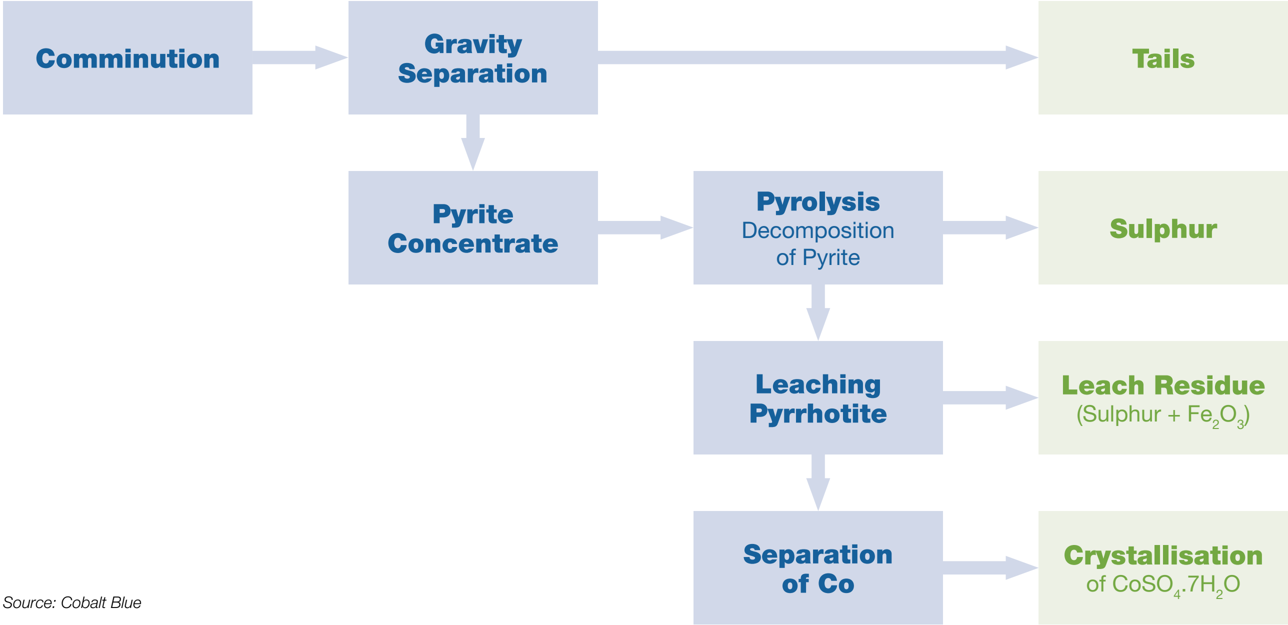
The key target metal in the ore is cobalt, and this is present within a pyrite mineral lattice as a solid-solution substitution for iron atoms. The nominal chemical formula is $(Fe_{0.99}Co_{0.01})S_2$, with the cobalt present at roughly 0.5wt% per wt% of pyrite.

The two major components of the ore are pyrite and albite, along with minor amounts of quartz, mica, silicate. The ore is differentiated from waste rock on an economic basis of cobalt content ~ 500 ppm (mining ore reserve cut-off). On account of the substitution of cobalt into pyrite, and the lack of any other cobalt-bearing minerals, the ore grades can be broadly indicated by monitoring the pyrite content, i.e. higher pyrite content in the rocks indicate higher cobalt grades.

Using the processing options studied in the Scoping Study (2017) and the Pre-Feasibility Study (2017–2018), Cobalt Blue has selected a preferred flowsheet for development of the Thackaringa cobalt project. The flowsheet is focused on concentrating the pyrite from the ore, and then processing the pyrite to recover cobalt. After a review of the current and forecast market for cobalt over the next fifteen years, the final form of cobalt selected for production was cobalt sulphate heptahydrate crystals. These salts are used in the production of lithium ion batteries.

The overall processing flowsheet in shown in Figure 14.

Figure 15. **Process block diagram selected for detailed development in the PFS**



Source: Cobalt Blue

CONCENTRATION OF PYRITE FROM ORE

The mined ore is crushed to p80 ~ 800–900 um (p100 1.2mm), and passed over gravity spirals to produce a pyrite concentrate. The gravity tails are screened and the fines fraction (<125 um) is sent to a scavenger flotation circuit to recover any sulphides. The use of gravity spirals, takes advantage of the coarse pyrite grains (p80 200-800 um), and limits costs associated with crushing and milling the ore, as would be the case for a typical flotation circuit requiring feed at p80 100–200 um.

In the PFS testwork program, 820 kg of ore at 600 ppm cobalt was trialled using a full-sized gravity spiral and a 14 L flotation cell. The recovery of cobalt to concentrate was 92%, at a grade of 3326 ppm. The ore was tested on a continuous pilot basis.

THERMAL DECOMPOSITION (PYROLYSIS) OF PYRITE CONCENTRATE

The pyrite mineral is thermally decomposed into pyrrhotite and elemental sulphur by heating to 650–700°C. A nitrogen atmosphere is used to prevent any oxidation. The off-gas is collected, and cooled to recover the sulphur. In the PFS testwork program, 100 kg of concentrate grading 3326 ppm cobalt was processed in a custom built rotary furnace. Variations in operating conditions were tested, with the best results showing that >95% of the pyrite could be converted into pyrrhotite along with the simultaneous recovery of 40% of the head sulphur. The calcine was then passed through a magnetic separator to prepare a magnetic fraction containing pyrrhotite for leaching, and a non-magnetic fraction containing unreacted pyrite for recycle to the concentrator circuit.

LEACHING AND PRODUCTION OF MIXED HYDROXIDE PRECIPITATE

The artificial pyrrhotite is leached in a low-temperature (130°C) and pressure (10–15 bar) autoclave. The resulting leach residue is screened, and the coarse fraction is sent for sulphur recovery by distillation or remelting. The fines fraction is discarded as tails from the process plant. The resulting leach solutions are treated to remove iron, copper and zinc before precipitating the cobalt as a mixed hydroxide (along with nickel and manganese).

In the PFS testwork program, ~ 30 kg of calcine product from the furnace was leached in batches of 250g to 1kg. Variations in the operating conditions were tested, with the best results showing that 97-98% of the cobalt could be leached consistently from the pyrolysis calcine.

REFINING OF THE MIXED HYDROXIDE PRECIPITATE TO PRODUCE COBALT SULPHATE CRYSTALS

In the PFS testwork program, variations on the ion-exchange and solvent extraction circuits were tested. The best conditions resulted in the production of cobalt sulphate heptahydrate grading ~20.5% with total impurities at ~800 ppm copper and 800 ppm manganese. Further optimisation of the parameters for the ion-exchange circuits, is expected to reduce the copper and manganese content reporting to the cobalt sulphate in future testwork.

A photo of the cobalt sulphate heptahydrate is shown in Figure 16.

Figure 16. **First Thackaringa cobalt sulphate**

Source: Cobalt Blue

First Thackaringa Cobalt samples

Process Plant Engineering Design

An engineering design study was completed using the metallurgical testwork results as the design criteria basis. The throughput rate was fixed to 5.25 Mtpa of ore. The methodology of the study was as follows:

- reviewing metallurgical testwork results prepared by third-parties (ALS Metallurgy, CITIC)
- reviewing flowsheets developed in the metallurgical testing program
- preparing design criteria for the process plant
- preparing mass, water and energy balances
- preparing scopes of work, and/or datasheets, for equipment vendors to design major equipment items, and prepare budget prices and proposals
- vendor experience and knowledge was incorporated into the sizing, materials of construction, selection of optimum equipment, and costings
- vendors provided “off-the-shelf” equipment in all cases, and complete modular packages where relevant (including localised PLC controls): for example crushing and milling (CITIC), dryers and kilns (ANSAC), autoclave and flash vessel (Outotec), solvent extraction (Outotec), crystallisation (Process Plant Tech), sulphur prilling (Sandvik), pressure filters (Aqseptance), etc.
- providing GHD with a scope of work for design of a tailings storage facility
- preparation of preliminary 3D layouts, preliminary process flow diagrams, and a preliminary equipment list
- providing GHD with vendor proposals, and other inputs as required, for GHD to independently prepare capital and operating costs for the process plant. This included GHD preparing preliminary electrical single line diagrams and reviewing the selection and “fit for duty” of materials transfer equipment. GHD provided industry factors for implementation of the project (electrical, piping, instrumentation, EPCM, CAPEX/OPEX contingencies, annual process plant maintenance, and process plant sustaining capital).

The GHD capital costs are reported in Table 11 in this announcement, and the operating costs are summarised in Table 14 in this announcement.

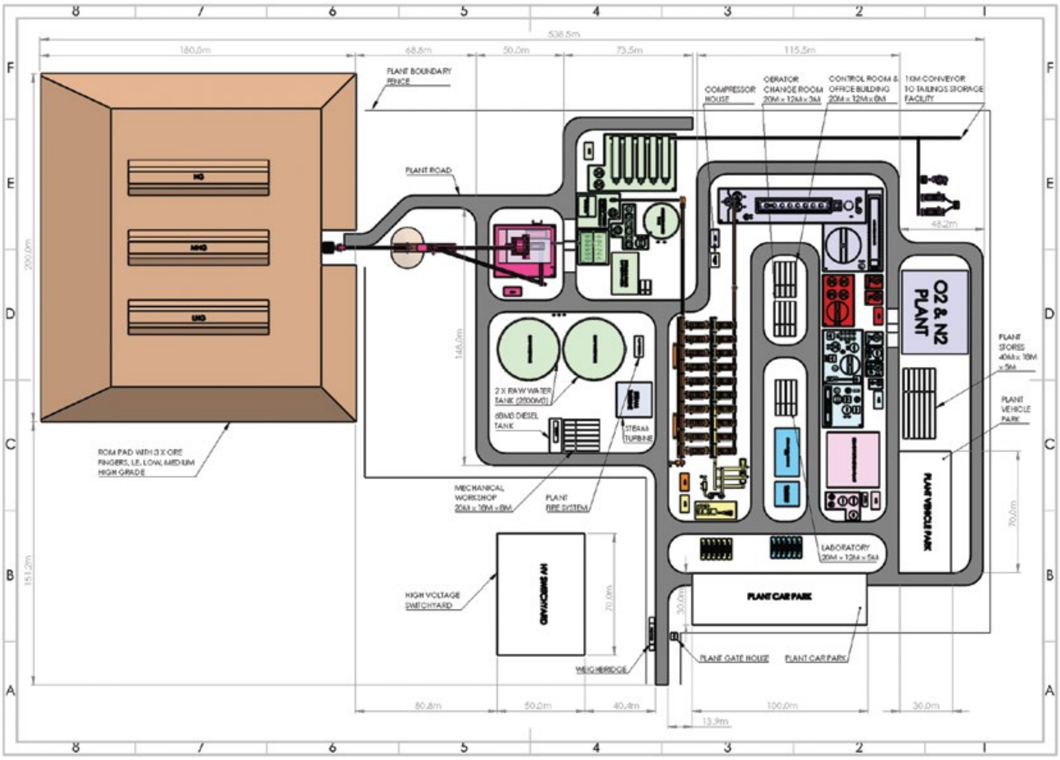
A list of the equipment vendors consulted in the study is given in Table 16.

Table 16. **List of equipment vendors used in PFS Engineering Design Study**

PKG	Vendor
Comminution and concentrator	
Crusher + SAG Mill	CITIC
Gravity Spiral	Alicoco
Float Cells	Outotec
Cyclones	Weir
Tails pressure filter	Aqseptence (Diemme)
Cons pressure filter	JORD/Diemme
1 km conveyor to tailings	Nepan Conveyors
Tailings Facility	GHD
Stacker	THOR
Tails Thickener	Outotec
Pyrolysis and sulphur recovery	
Dryer + furnace	ANSAC
Sulphur recovery	Bronswerk
Sulphur handling	Sandvik, Enersul
Nitrogen Supply	Generon
Mag separation	Eriez
Steam turbine	Siemens
Leach and cobalt recovery	
Autoclave	Outotec
Oxygen supply	Pioneer, Leader-gas
Leach residue THK	Outotec
Leach residue belt filter	JORD
Cyclone for leach residue	Weir
S recovery from residue	ANSAC, Enersul
Fe ppt THK	Outotec
IX	Puritech
MHP THK	Outotec
MHP belt filter	JORD
SX (including filters)	Outotec
Co Cyrstalliser	PPTECH
General	
Agitators	SPXflow (Lightnin)
Pumps	Weir, Global Pumps
MCC and HV switching	GHD
Power supply to site	GHD
Water supply to site	Mitchell Water

A preliminary 3D layout was prepared, and a plan view is shown in Figure 17.

Figure 17. **Thackaringa Cobalt Project – Processing Plant Layout**

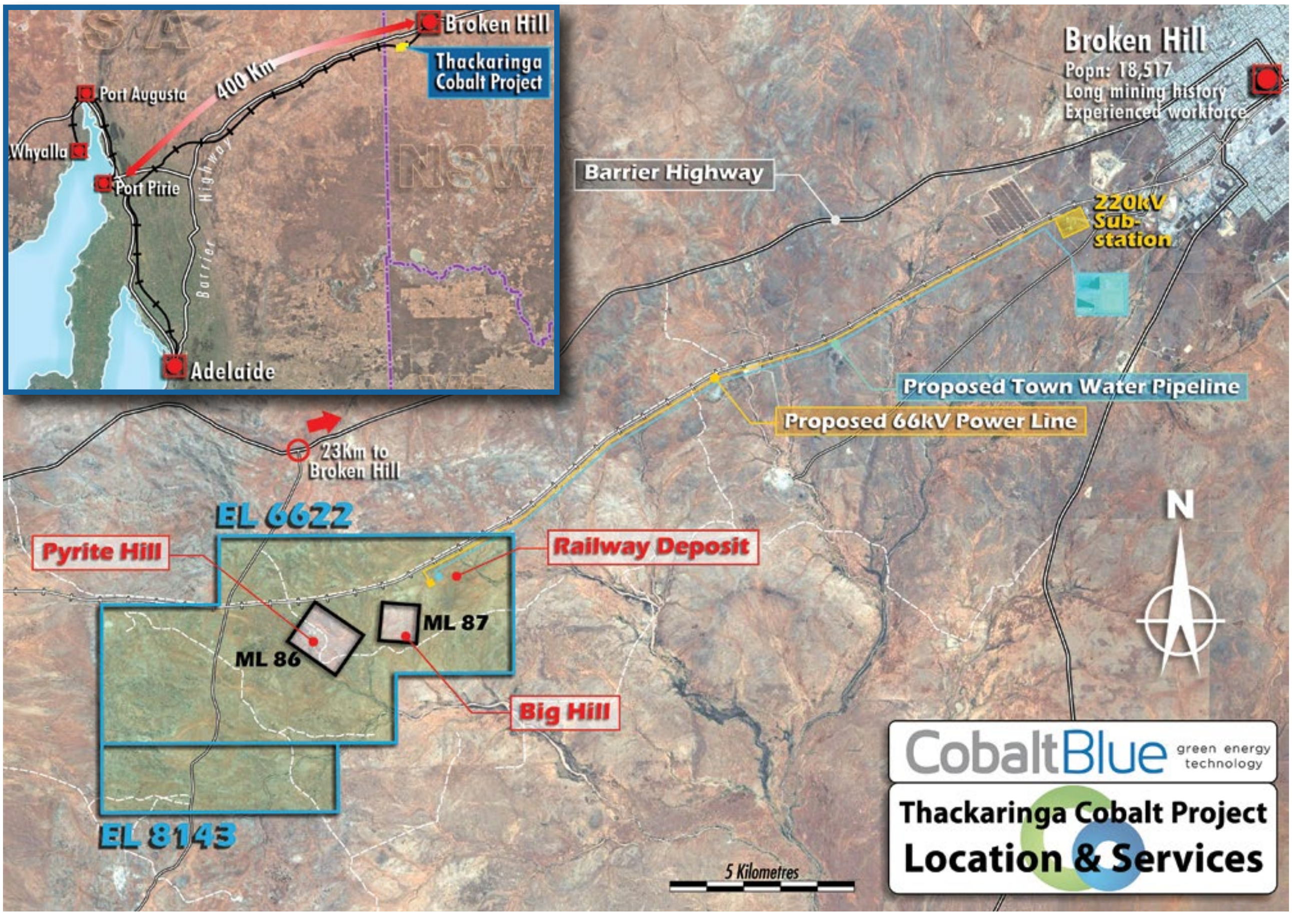


Source: Cobalt Blue

SERVICES AND INFRASTRUCTURE

The Thackaringa district map below shows the proximity to Broken Hill, the supporting rail and road network, as well as the availability of both power and water utilities to support future production.

Figure 18. **Thackaringa Cobalt Project district map**



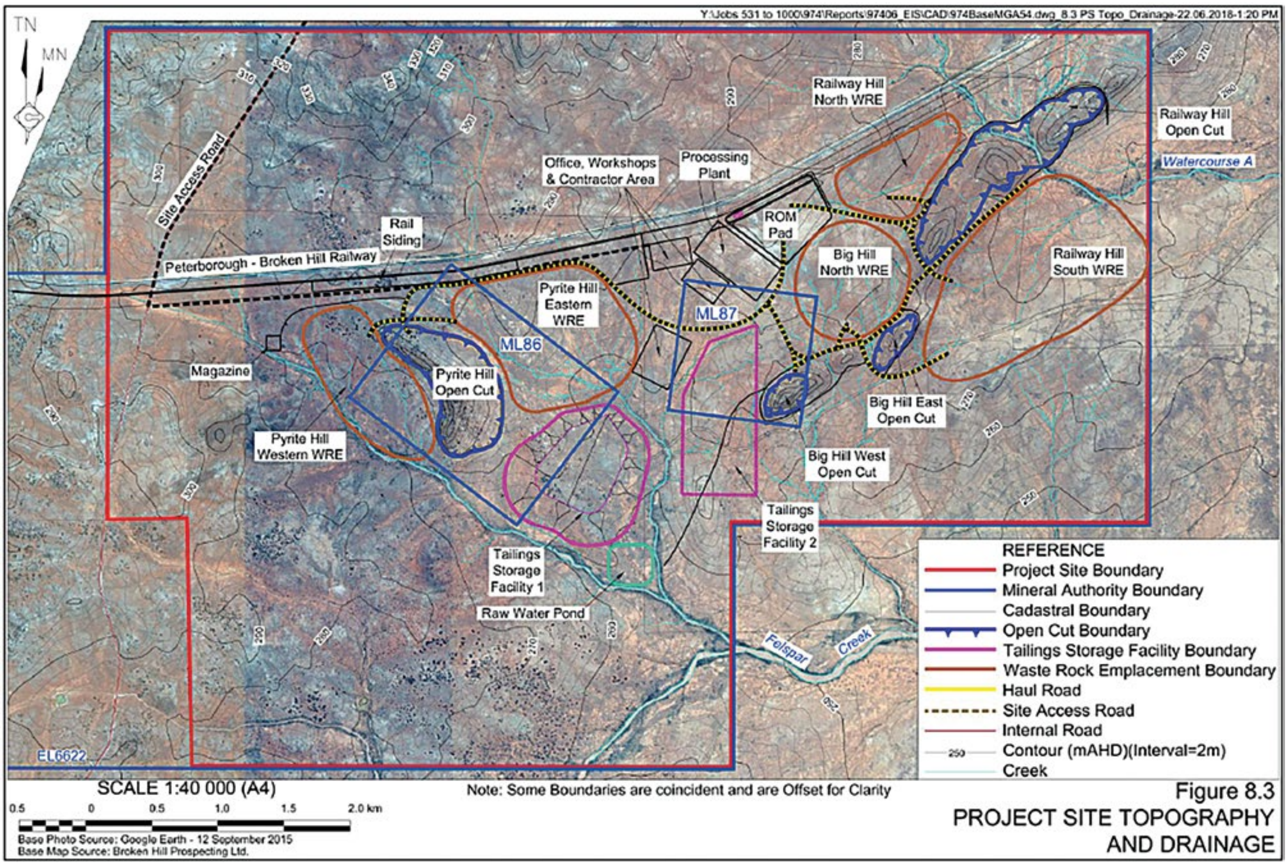
Source: Cobalt Blue

The general site infrastructure for the Thackaringa project can be broken up into three key areas. These areas include:

1. **Mining area** – open cut pits, waste dumps, heavy vehicle haulroads, Mining Contractor area, explosives magazine, ROM pad and major creek and drainage diversions.
2. **Processing** – processing plant, Electrical High Voltage yards and MCCs, tails dam and overland conveyors, water storage and catchment of dams, weighbridge and rail siding.
3. **Administration** – office and admin area, warehouse, stores and laydown yard, security facilities, change house and ablutions, site access roads and carpark.

It is proposed to develop the site by exploiting three deposits using four open-cut mining pits, a plant treating ore and producing cobalt sulphate heptahydrate crystals and associated by-products, a tailings storage facility, and supplementary infrastructure as required. A description of the tenements and deposits is provided in this announcement, and the overall proposed site layout is shown below.

Figure 19. **Site Infrastructure Plan**



Source: Cobalt Blue

TAILING STORAGE FACILITY (TSF) AND WATER MANAGEMENT

The proposed TSF is required to provide future capacity for the storage of filtered and compacted tailings from the extracted minerals of the pits on site. The project involves mining and processing with a production rate generating approximately 4.8Mtpa of tailings.

The tailings will be deposited in the TSF area utilising a conveyor and trucking system, whereby the material will be deposited into stacks which will be loaded onto 30T articulated trucks which will deposit the material around the TSF footprint as required. The deposited material will then be spread using a dozer and compacted maximise density and to limit potential Acid Mine Drainage generation at the facility.

The configuration of the TSF has gone through extensive assessment to determine a cost effective position. The proposed location and configuration was chosen to minimise material conveyance costs and deposition costs.

Design of the TSF was conducted under Australian National Committee on Large Dams (ANCOLD) Guidelines on Consequence Category for Dams and NSW Dam Safety Committee (DSC) Guidelines on Tailing Dams. The capital and operating costs were:

Initial capital expenditure:	A$24.3m
Sustaining capital expenditure:	A$4.1m annually
Operating costs (per tonne tailings):	A$4/t (approx. A$17.5m p.a. at max operating rate)

The Production Target LOM TSF costs were estimated to be A$260M.

Cobalt Blue will begin TSF review studies shortly, to identify possible cost savings measures.

ROADS

Access to the project area from Broken Hill involves travelling along the Barrier Highway towards Adelaide, for approximately 23km and taking a left turn on the existing Thackaringa Station access Road for a further 5km.

Currently the Thackaringa access road is a graded dirt road formed directly on the natural surface with unlined water drainage dips. With the implementation of the Thackaringa project the existing access road is expected to need upgrades which have been built into capital estimates.

TRANSPORT AND SERVICES

Product transport facilities will include the construction of a suitable hardstand area near the processing plant which will be used for loading cobalt sulphate filled containers onto trucks. Further to this a rail siding will be constructed adjacent to the Broken Hill – Peterborough existing rail line to allow for the transportation of sulphur product. Both the hardstand and the rail siding will be connected to the process plant by a designated product access road. It is planned for the site to purchase light weight container trailers for the internal movements of product.

Transportation of shift employees to and from the Thackaringa mine site will be via a bus service at the start and end of shift. This process is a normal function implemented to effectively manage fatigue. In addition, key management and supervisors may be issued with suitable site vehicles, which will also be utilised for transporting staff to and from the site.

WATER SUPPLY

In late 2016 the NSW Government appointed WaterNSW to build a single 270 km pipeline that will source water from the River Murray near Wentworth. The pipeline will supply up to 37.4 megalitres of raw water per day to Essential Water in Broken Hill as the local water provider. The raw water will be sourced from the River Murray near Wentworth, with the pipeline being constructed underground and expected to follow the Silver City Highway corridor to Broken Hill.

Work has started on the pipeline, with a consortium of John Holland, MPC Group and TRILITY being appointed to design, construct, operate and maintain the pipeline. Current forecasts have the pipeline completed and ready for water by December 2018.

Essential Water will continue to retain responsibility for water treatment and water distribution to its customers. Through discussions held with Essential Water, COB has applied for an allocation of 1.5GL per year for the Thackaringa project.

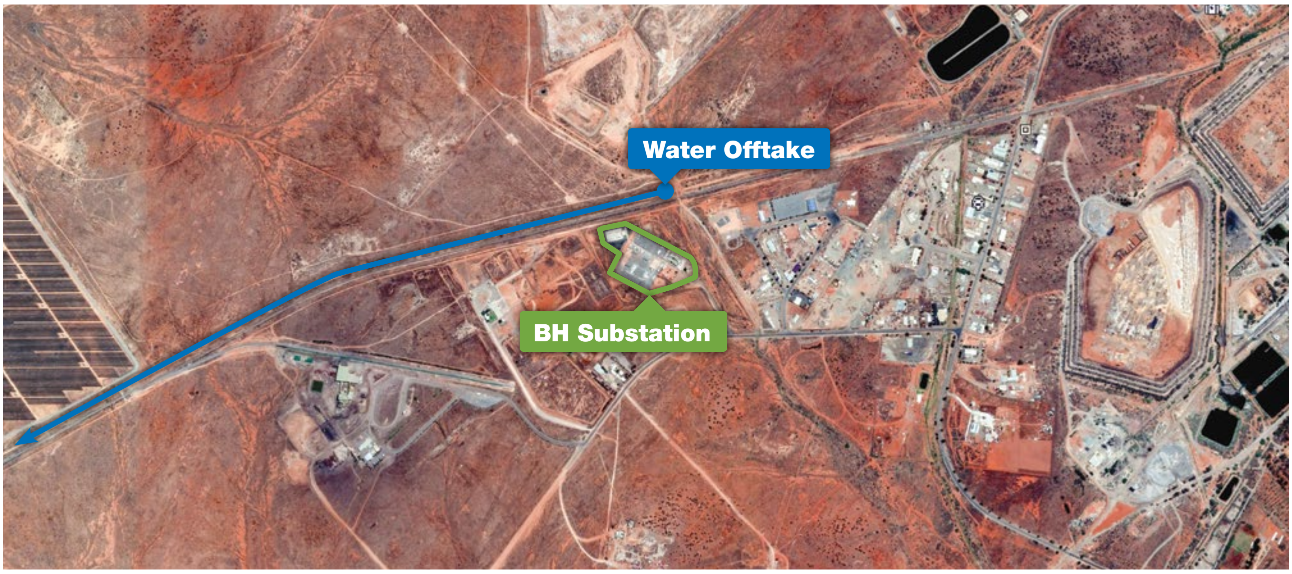
POWER SUPPLY

The regional electricity supply network, and possible connection points, was subjected to a high level options assessment in the Scoping Study. In the PFS, further assessment has determined that total power demands of up to 75MW for the site may be required.

The location of the 220 kV powerline relative to the Thackaringa Cobalt Project is shown in the sketch below. A connection enquiry has been lodged with the current preferred option to draw power from the Transgrid Broken Hill Substation, and supply the site via a new 66 kV transmission line (approx. 26 km) located adjacent the existing Broken Hill – Peterborough rail line.

Construction of such a line will involve upgrades at the existing substation yard, new overhead 66 kV lines and a suitable HV sub station yard at the Thackaringa site.

Figure 20. **Transgrid Broken Hill Substation Location**



Source: Cobalt Blue

STEAM CIRCUIT AND ENERGY RECOVERY

A critical aspect of the process plant operating cost is the power demand for the pyrolysis circuit. This can be offset with energy recovery from steam generated within the plant as waste heat. A waste steam balance was prepared in the PFS, using heat from various unit operations – principally autoclave slurry cooling, and elemental sulphur condensation. It was estimated that 12.5MW of energy could be recovered using a steam turbine.

Project Environmental Permits and Operating Approvals

TOPOGRAPHY

The project site covers an area of approximately 63 km^2 and can be considered relatively flat lying. A gentle, south dipping gradient is present across the entire project area. A series of localised ridges rise up above the surrounding plains. The ridges do not exceed 60m high. The surface drainage system consists of a series of ephemeral watercourses which feed the main creek system.

SURFACE WATER

The rainfall and evaporation statistics for Broken Hill weather station (located at Broken Hill Airport) are as follows:

- rainfall is low, with annual average rainfall approximately 254mm;
- rainfall typically occurs as infrequent, at times intense, rainfall events; and
- evaporation is approximately 2,500mm per year and exceeds average rainfall in all months.

A preliminary surface water study was conducted by Mining One, to consider potential impacts on the proposed open-pit mining operation. The study highlighted that a diversion would be required when mining ore from Railway Hill, to prevent ingress of water from the ephemeral water course into the pit.

GROUND WATER

Preliminary groundwater studies were conducted by AGE. A summary of their findings is as follows:

- Regional primary porosity and permeability is likely to have been obliterated due to the extensive structural disruption and high grade metamorphism.
- Major faults and shear zones are abundant, and commonly provide the only sufficient permeability and porosity pathways capable of storing and transmitting groundwater.
- Sections of the Project Site are covered with alluvium and colluvium that are likely to provide limited, intermittent storage and transmission of groundwater.
- No groundwater dependent ecosystems (GDEs) occur within the Project Site, however, Feldspar Creek and Pine Creek to the south and southeast of the Project Site have a moderate to low potential for GDEs.
- Standing water levels in bores surrounding the Project Site varies between 2m and 46m below surface.

ACID ROCK DRAINAGE

A preliminary study was undertaken on samples of waste rock during the PFS. The acid rock drainage characteristics were determined by Bureau Veritas (Adelaide), to the AMIRA International ARD handbook (2002) guidelines. The results were reviewed by RGS, who recommended that a sulphur cut-off of 0.35% be used to classify waste rocks as PAF (S content >0.35%) or NAF (S content of <0.35%).

NATIVE TITLE AND HERITAGE

Within the Thackaringa project area, a small block of crown land adjacent the Big Hill deposit, has been included in the Barkandji Traditional Owners determination for Native Title. Mining Title Services (MTS) researched the block, with the findings noting the block had been an old mining lease form the early 1900's, which was relinquished and reverted back to the crown.

Currently, the existing ML87 overlays a large proportion of the crown land block, and while this lease remains current, native title for that covered portion is extinguished. To assist with definitively locating the existing mining leases 86 & 87 in respect to the crown land block, surveyors from Broken Hill have completed a registered land boundary survey. This survey will also assist with the new mining lease applications.

From the survey, two small triangles of the crown land block remain within the Native Title determined block and will be subject to native title processes. The areas total some 3-5 Ha (~1% of the Thackaringa tenements). Further legal advice will be sought to clarify and assist with the process and potentially outline agreement expectations relevant to the parcel of Native Title affected land. As these negotiations are still to be finalized over the next 4-6 months, the affected areas around the Big Hill deposit have been excluded from the reported Ore Reserve and have been included in the Production Target.

Risks and Opportunities

Some of the key risks and opportunities are summarised below.

RISKS

- A major fall in the cobalt (and associated cobalt sulphate) price. The financial model assumes a LT price of approx. $33/lb.
- Regulatory approval delays
- Not achieving modelled rates for production, dilution, mining and metallurgical recovery as defined in the PFS.

OPPORTUNITIES

- Identifying and classifying 20+ year of resources to extend operational life.
- Potential to add additional ore from other sources (beyond Thackaringa) to extend operational life.
- Tailings handling and storage optimisation to reduce associated capital and operating costs.
- Cobalt product pricing margins – battery specifications may evolve to demand higher purity specifications, which increase pricing margins relative to cobalt metal.

Commodity Price Forecasts and Marketing

COBALT

Cobalt sulphate is a cobalt salt that is used for producing battery pre cursor material. These materials in turn form the basis of the lithium ion battery cathode as either an NMC (Nickel Manganese Cobalt) or NCA (Nickel Cobalt Aluminium Oxide) chemistry.

Production cost reductions and improvements in battery quality are driving tightened quality specifications for cobalt sulphates. Today, these specifications are strictly commercial in confidence as manufacturers rapidly adopt company explicit standards. The market for cobalt sulphate is quoted as low grade (20% cobalt by weight) and premium grade (20.5% cobalt by weight) with leading edge battery makers today detailing even tighter standards. The premium grade product infers impurities (such as copper and iron) individually grade less than 5 parts per million.

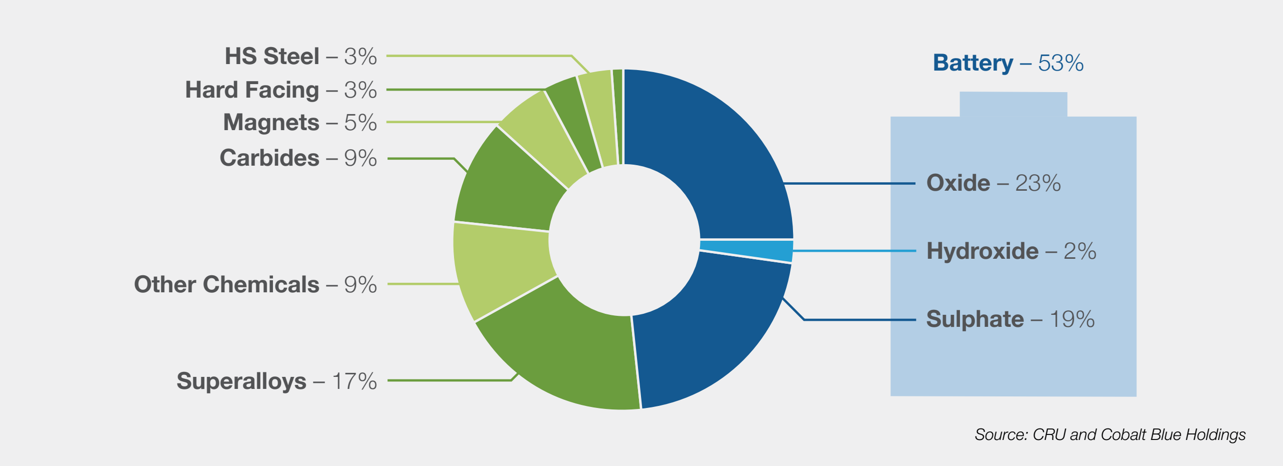
The cobalt market is split into two major segments:

Metallurgical – Accounted for 38% of cobalt consumed in 2017. Key sectors include superalloys (aircraft rotating parts, thermal sprays, prosthetics etc.), magnets, High-Speed (HS) steel and hard facing materials. Cobalt metal powders are also used in the production of carbide and diamond tools and synthetic diamonds.

Non-metallurgical – Accounted for 62% of consumption in 2017. Cobalt chemicals are used in pigments, dyes and catalysts in a number of sectors including the ceramics, plastics and paints industries. However, the bulk of chemicals are now being used in the production of batteries including NiMH and NiCd batteries (cobalt hydroxide) and Li-ion batteries (cobalt sulphate and oxide).

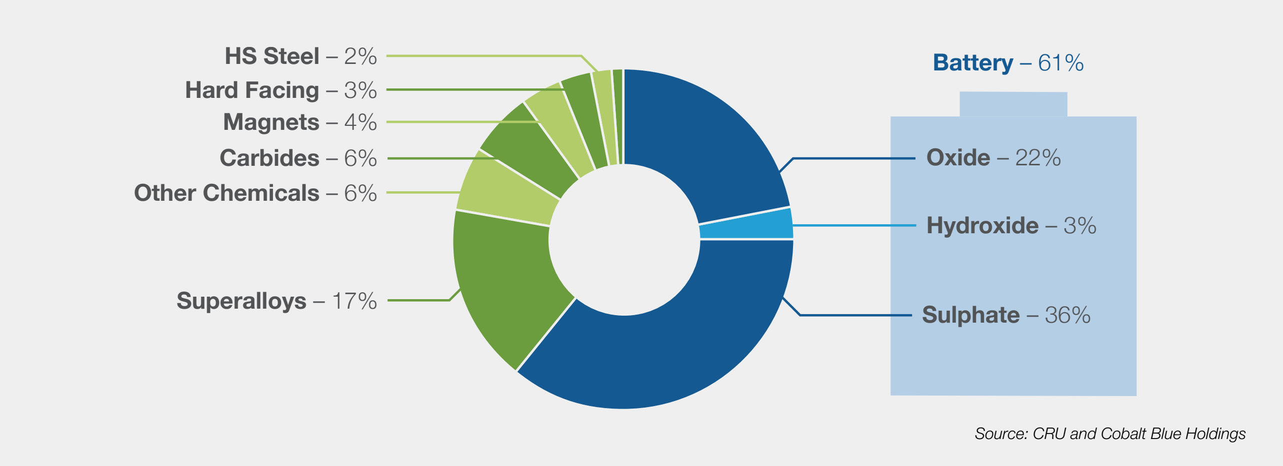
A full breakdown of cobalt demand by demand segment is shown below. The size and growth rates within the chemical sector, and in particular, lithium ion battery demand will form the largest demand influence upon the cobalt market over the next decade.

Figure 21. **Cobalt demand 2017 (actual)**



Source: CRU and Cobalt Blue Holdings

Figure 22. **Cobalt demand 2026 (forecast)**



Source: CRU and Cobalt Blue Holdings

This will allow the Thackaringa Cobalt Project to realise a cobalt price near parity (100%) with cobalt metal, rather than 25-35% (% cobalt price) currently priced by mixed cobalt concentrates and typically 60-85% (% cobalt price) commanded by cobalt hydroxides. The historical relationship (cobalt sulphate only quoted from 2015A) between cobalt sulphate and cobalt metal displays a +6.4% (2015A) to 4.4% (2017A) variation with this premium forecast moderating to 2.4% (2026F).

CRU cobalt price forecasts are contained in the table below. Long term pricing is assumed to be US$32.9/lb, which is the 2026F price forecast.

Table 17. **Cobalt Price Forecast 2016–LT**

Real prices	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	LT
Co sulphate 20.5% (ex-China 100%-Co basis $/lb 2015 basis)	10.8	25.3	35.8	34.7	34.5	34.7	35.7	37.0	35.2	33.6	32.9	32.9

Data: CRU

Against a forecast 7% demand growth rate 2018-2022, the cobalt market will enter a deficit by 2021, despite strong near-term supply growth from Democratic Republic of Congo sourced material. From 2022 onwards, the market deficit will widen as chemical demand growth (largely a function of Electric Vehicle growth) continues to tighten the market. This the timeline for the entry of the Thackaringa Cobalt Project into the global marketplace.

SULPHUR

Approximately 90% of all sulphur produced globally is used to manufacture sulphuric acid. Sulphuric acid is the number one chemical produced in the world in volume terms. Annually, almost twice as much sulphuric acid is produced as the next largest volume chemical (nitrogen). In Australia, 56% of sulphuric acid production is used for the production of fertiliser materials, with the balance of production used for metallurgical proposes. Elemental sulphur required for commercial offtake has a tolerance ranging from 95% to 99.9%.

The forecast for demand growths remain strong although pricing remains weak in fertilizers to 2019. Against this demand backdrop sulphur production growth will moderate from 4.1% pa (2016) to 1.4% pa (2022F). Whilst volatility is prevalent in the historical sulphur market, pricing has generally range traded between US$100/t to US$200/t over the last 5 years.

A long term sulphur deficit is the result of existing supply assumptions not meeting demand. It is unlikely that the deficit will manifest itself as an absolute shortage of sulphur on the international market. Global resource estimates for existing supply routes for sulphur (native elemental sulphur, sulphur in natural gas, petroleum, tar sands, and metal sulphides) total 5.0 Bn tonnes.

Smelter acid is expected to increase, but this is determined by the long term outlook for base metals and not the requirements for sulphuric acid consumption. Towards the end of the forecast period, stock draw-downs of sulphur will need to occur to satisfy demand.

Regionally, South America, Asia and Oceania (including Australia) remain key global sulphur consumers. Some established supply links to China will be utilised, but significant infrastructure needs to be built to bring new sulphur in Turkmenistan or Uzbekistan to China, and some stockpiling may need to be introduced. Demand in Australia will continue to outgrow supply and the broader Asian region is likely to remain in strong deficit.

The primary focus for elemental sulphur marketing is upon the Australian domestic demand. Australia currently imports 1.2Mtpa of elemental sulphur annually, which is forecast to grow over the long-term forecast period. It is estimated that almost all imported elemental sulphur then feeds into domestic sulphuric acid production.

Table 18. **Sulphuric acid production in Australia in 2010–2020**

	2010	2011	2012	2013	2014	2015	2016	2017	2018F	2019F	2020F
Sulphuric acid production (Mtpa)	4.35	4.35	4.26	4.36	4.54	4.53	4.53	4.63	4.70	4.71	4.20
Sulphur Imported (Mtpa)	0.91	0.91	0.89	0.94	1.00	1.00	1.02	1.09	1.19	1.21	1.25

Source: CRU

CRU sulphur price forecasts are contained in the table below. The analysis combines the source price of sulphur (Free on Board {FOB}) ex Vancouver then adds the equivalent Baltic Dry Index for ocean freight to Townsville. This is seen as a robust base for the imported price of sulphur into Australia. LT pricing is assumed to be US$114/t, which is the 2026F price forecast. LT freight is assumed to be US$31/t.

Table 19. **Sulphur Sulphur Price Forecast 2016–LT**

	Unit	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018F	2019F	2020F	2021F	2022F	LT	Avg 04-17
Vancouver FOB	US$ /t	62	58	59	47	206	66	133	186	171	109	142	142	92	97	87	77	95	104	114	114	112
Freight (Vancouver to Townsville)	US$ /t	29	31	32	48	57	29	38	39	35	34	32	21	19	23	24	25	28	30	31	31	34
Australia CFR	US$ /t	91	89	91	95	263	96	171	225	206	143	174	164	112	121	110	102	122	133	145	145	146

Source: CRU

BYPRODUCT CORRELATION – NOTE

A long term (20 year) correlation analysis (primarily aimed to gauge the price relationship between cobalt and sulphur) based on monthly data points. The study found a differentiating factor for the Thackaringa Cobalt Project is the low correlation between cobalt and sulphur pricing. As can be seen from the data table below there is a near zero (R^2 = -0.85%) correlation over this period. This phenomenon lowers project risk and volatility over the longer term. This will be particularly attractive for investment banking and other debt providers.

Table 20. **Correlation between cobalt and sulphur pricing**

	20 year duration – yearly data						
R^2	**Cobalt (US$/lb)**	**Sulphur (US$/t)**	**Feldspar (US$/t)**	**Base Metals**	**Bulk Commodities**	**Aust $**	**NEM Power (A$)**
Cobalt (US$/lb)	1.00						
Sulphur (US$/t)	-0.85%	1.00					
Feldspar (US$/t)	-18.73%	**64.78%**	1.00				
Base Metals	25.91%	55.24%	**67.58%**	1.00			
Bulk Commodities	8.76%	**89.94%**	**80.72%**	**75.92%**	1.00		
Aust $	32.95%	**82.76%**	**64.25%**	**76.94%**	**86.67%**	1.00	
Power (Wholesale NEM)	31.10%	-9.82%	-26.73%	-10.00%	-16.67%	-7.93%	1.00

Source: Cobalt Blue

Next steps for project development – BFS

In the PFS, a preliminary forward work plan was developed to undertake a BFS. The key milestones were proposed as follows:

- Drilling to define a JORC 2012 compliant Measured Resource
- Preparation of a JORC 2012 compliant Probable/Proven Ore Reserve Statement
- Confirm processing flowsheet using representative ore samples
- Complete an engineering design study to develop cost estimates to a ±15% accuracy and confidence level
- Complete environmental and relevant permit studies, in order to lodge an EIS application
- Undertake product marketing assessments, in order to negotiate offtake agreements
- Prepare a robust financial model for evaluation of the project, and at a level suitable for raising the necessary capital to implement the project.

Cobalt Blue Background

Cobalt Blue ("COB") is an exploration company focussed on green energy technology and strategic development to upgrade its mineral resource at the Thackaringa Cobalt Project in New South Wales from Inferred to Indicated status. This strategic metal is in strong demand for new generation batteries, particularly lithium-ion batteries now being widely used in clean energy systems.

COB is undertaking exploration and development programs on the Thackaringa Cobalt Project pursuant to a farm-in joint venture agreement entered into with Broken Hill Prospecting Limited ("BPL"). Subject to the achievement of milestones, COB will be entitled to acquire 100% of the Thackaringa Cobalt Project. Currently, COB has a 51% beneficial interest in the tenements comprising the Thackaringa Cobalt Project. Until Cobalt Blue's farm-in obligations have been satisfied, its interest in the tenements located at the Thackaringa Project is beneficial. Under the terms of the farm-in joint venture agreement, Cobalt Blue's beneficial interest in the Thackaringa Project will be increased in tranches on satisfaction of certain exploration and development milestones. When Cobalt Blue has completed its farm-in obligations, it will become the registered holder of the Thackaringa Project tenements. Broken Hill Prospecting remains the registered holder of the Thackaringa Project tenements until the farm-in is complete.

The Thackaringa Project, 23 km west of Broken Hill, with railway line passing through the project area, consists of four granted tenements (EL6622, EL8143, ML86 and ML87) with total area of 63km^2. The main targets for exploration are well known and document large-tonnage cobalt-bearing pyrite deposits. The project area is under-explored, with the vast majority of historical exploration directed at or around the outcropping pyritic cobalt deposits at Pyrite Hill and Big Hill.

Potential to extend the Mineral Resource at Pyrite Hill, Big Hill, Railway and the other prospects is high. Numerous other prospects within COB's tenement package are at an early stage and under-explored.

Looking forward, we would like our shareholders to keep in touch with COB updates and related news items, which we will post on our website, the ASX announcements platform, as well as social media such as Facebook (f) and LinkedIn (in). Please don't hesitate to join the 'COB friends' on social media and also to join our newsletter mailing list at our website.

Joe Kaderavek
Chief Executive Officer
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P: (02) 9966 5629

Previously Released Information

This ASX announcement refers to information extracted from the following reports, which are available for viewing on COB's website http://www.cobaltblueholdings.com

- 20 April 2018: Thackaringa JV – Stage One Completed
- 19 March 2018: Thackaringa – Significant Mineral Resource Upgrade
- 5 March 2018: PFS – Calcine and Leach Testwork Complete – Strong Results
- 24 January 2017: Significant Thackaringa Drilling Program complete – Resource Upgrade pending
- 27 December 2017: PFS – Bulk Metallurgical Testwork – Progress Update
- 4 December 2017: Railway Drilling Program confirms grade continuity at depth and strike
- 26 October 2017: Bulk Metallurgical Testwork – Strong Concentration Results
- 27 September 2017: CEO's Letter to Shareholders – September 2017
- 12 July 2017: Scoping Study update – Strong Potential for Commercialisation after Processing Testwork

COB confirms that the form and context in which the Competent Person's findings presented have not been materially modified from the original market announcement.

COB confirms it is not aware of any new information or data that materially affects the information included in the original market announcements, and, in the case of estimates of Mineral Resources, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed. COB confirms that the form and context in which the Competent Person's findings presented have not been materially modified from the original market announcement.

About Cobalt Blue Holdings Limited

Cobalt Blue ("COB") is an exploration company focussed on green energy technology and a strategy of fast-tracking development of the Thackaringa Cobalt Project in New South Wales to achieve commercial production of cobalt. This strategic metal is in strong demand for new generation batteries, particularly lithium-ion batteries now widely used in clean energy systems.

COB has entered into a farm-in joint venture agreement with Broken Hill Prospecting Limited ("BPL"). COB will undertake exploration and development programs on the Thackaringa Cobalt Project and, subject to the achievement of milestones, will acquire 100% of the Thackaringa Cobalt Project.

Competent Person's Statement

The information in this report that relates to Exploration Targets, Exploration Results, Mineral Resources and Ore Reserves is based on information compiled by Mr Peter Buckley, a Competent Person who is a Member of The Australian Institute of Geoscientists (MAIG). Mr Buckley is employed by (Left Field Geoscience Services) and engaged by Cobalt Blue Holdings on a consulting basis. Mr Buckley has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Buckley consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

Competent Person's Statement – Metallurgy

The information in this report that relates to Metallurgical Testwork Results or Engineering Design Studies is based on, and fairly represents, information and supporting documentation prepared by Dr Andrew Tong, a Competent Person who is a Member of The Australasian Institute of Mining and Metallurgy. Dr Andrew Tong is engaged by Cobalt Blue Holdings as Executive Manager. Dr Andrew Tong has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Dr Andrew Tong consents to the inclusion in the report of the matters based on his information in the form and context in which they appear.

Competent Person's Statement – Ore Reserves

The information in this report that relates to Ore Reserves is based on information compiled by Dean Basile, who is a Competent Person and is a Member of The Australasian Institute of Mining and Metallurgy (AusIMM). Dean Basile MAusIMM (CP) is a full-time employee of Mining One (at the time of estimation). Dean Basile has had sufficient experience that is relevant to the style of mineralisation and the type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Dean Basile consents to the inclusion in this report of the matters based on their information in the form and context in which it appears.

Thackaringa Cobalt Project
Probable Ore Reserve Statement

Summary of basis for Ore Reserve Statement by Mining One
(Information provided in accordance with ASX listing rule 5.9.1)

MATERIAL ASSUMPTIONS

The Ore Reserve statement prepared by Mining One is based on modifying factors including geotechnical, hydrogeological, hydrological, ecological, socioeconomic and cost estimates that describe the development of the Thackaringa Cobalt Project. Material assumptions and outcomes derived from the Preliminary Feasibility Study and applied in the estimation of the Ore Reserves are given below.

Indicated Mineral Resources have been converted to Probable Ore Reserves subject to detailed mine planning and economic evaluation based on modifying factors determined as part of the Preliminary Feasibility Study. The status of the modifying factors are considered sufficient to support the classification of Probable Reserves when based upon Indicated Resources. 89% of the Indicated Mineral Resources have been converted to Probable Ore Reserves.

The PFS production target is based on Indicated and Inferred Mineral Resources and as such the complete mining inventory considered in the PFS is not included in the Ore reserve estimate.

Table 21. **Material assumptions derived from the PFS and applied for the Ore Reserve estimate**

Input Parameters	**Unit**	**Base Case**	
Block Model Inputs		**Pyrite Hill**	**Railway/ Big Hill**
Block Model File		ph2018_extended_3.mdl	rwbh2018_13032018_new.mdl
Density	t/m3	In Feb18 Model	In Feb18 Model
Mineralisation	ppm (Co), % (Fe and S)	In Feb18 Model	In Feb18 Model
Material Classification		Class, Oxidation	Class, Oxidation
Mining Cost Adjustment Factor	numeric	mcaf_t	mcaf_t
Processing Cost Adjustment Factor	numeric	1	1
Geotechnical/Pit Parameters			
Ramp Width	m	25	25
Ramp Grade	Gradient	1:10	1:10
Batter Height	m	20	20
Berm Width	m	10m–13m	11.5m–13m
Overall Slope – all oxidation	degrees	43 to 54	50 to 54
Mining Parameters			
Mining Recovery	%	95.00	95.00
Dilution	%	5.00	5.00
Mining Cost	$/t (AUD)	~$2.47	~$2.47
Mining Cost Adjustment Factor (Depth Penalty)		In Model	In Model
Processing Plant Parameters			
Processing Cost			
Processing Cost = $/t	$/t milled (AUD)	27.50	27.50
General and Admin Cost = $/t	$/t milled (AUD)	3.50	3.50
Total Processing Cost = $/t	$/t milled (AUD)	31.00	31.00

Table 21. **Material assumptions derived from the PFS and applied for the Ore Reserve estimate** *(continued)*

Input Parameters	Unit	Base Case	
Block Model Inputs		**Pyrite Hill**	**Railway/ Big Hill**
Mill Recovery			
Cobalt as Co in CoSO4	%	85.5	85.5
Iron	%	0.0	0.0
Sulphur	%	80.0	80.0
Financial Parameters			
Sell Price	$/lb Co (AUD)	34.60	34.60
	$/t S (AUD)	149.41	149.41
Royalty	% on Revenue	4.00	4.00
	% on Co Net Value	2.00	2.00
Sell cost (Realisation Costs)/CFR – Co	$/t (AUD)	129.05	129.05
Sell cost (Realisation Costs)/CFR – Fe	$/t (AUD)	0.00	0.00
Sell cost (Realisation Costs)/CFR – S	$/t (AUD)	0.00	0.00
Discount Rate	%	8.00	8.00

The production target is based on the reported Ore Reserve estimates and a minor component of Inferred Mineral Resources (21%). The Company confirms the Inferred Mineral Resources are not material to the viability of the project. However, there is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised.

CRITERIA FOR CLASSIFICATION

The Mineral Resource classification, which forms the basis of the Ore Reserve classification, was determined by the Competent Person in accordance with the JORC 2012 Code. The classification is based on the kriging regression slope with class surfaces created from viewing the regression slopes of the estimated blocks in section. Indicated Mineral Resources are defined as all material above the 0.5 kriging regression slope surface and Inferred Mineral Resources as all material above the 0 kriging regression slope surface and below the 0.5 kriging regression slope surface.

There is some Indicated material near surface that has regression slopes less than 0.5 and this is included as Indicated due to the known mapped outcrop at surface. In addition to this a depth limit has been imposed at Railway and Big Hill. The depth limit at Big Hill is 150m elevation. The depth limit at Railway is mostly at 50m elevation with a section between 6540950mN and 6451400mN at 0m elevation. These depth limits are imposed approximately 50m below the base of the previous 2017 pit optimisations.

MINING METHOD

The PFS considers a multi-open pit mining scenario that will extract ore using conventional drill and blast, load and haul and dump processes. The operation is planned to use excavator and rigid body trucks along with a fleet of auxiliary equipment. This proposed mining method is considered appropriate for the deposit style.

Approximately 5.25Mt of ore will be hauled annually to a stockpile area (ROM) proximal to the processing plant located centrally to the pits and waste material hauled to the waste emplacements located in close proximity of each pit. During periods where the quantity of ore mined exceeds the quantity processed, additional temporary long-term stockpile areas may be utilised.

Geotechnical parameters applied to pit designs are summarised in Table 6.

As the project consists of a simple bulk massive style deposit with no internal waste, a mining recovery of 95% and mining dilution of 5% has been assumed.

Bulk density has been determined using the Archimedes method (weigh in water weight in air). Some 1,527 core samples between 1.2m and 0.1m from across the deposit have been utilised. These samples were examined statistically to eliminate errors and outliers. The valid samples were then matched with the Co, Fe and S assay values for their respective intervals. Good linear regressions are obtained with all three elements. The final densities are assigned on a block by block basis using a linear regression derived from the combined Co, Fe and S assays. The regression equation is:

Bulk density = 0.0143*(Co ppm /10000 + Fe % + S %) + 2.5722

PROCESSING METHOD

The cobalt is present within a pyrite lattice as a solid solution iron replacement. The process is to crush and coarsely grind the ore and then produce a pyrite concentrate by conventional gravity/flotation. The pyrite is concentrated and then is thermally converted to pyrrhotite by pyrolysis (roasting in an inert atmosphere, using commercially available kilns) before magnetically separating the pyrrhotite and leaching it in an autoclave in order to produce a mixed hydroxide precipitate. The mixed hydroxide is refined to produce cobalt sulphate crystals. The final form of cobalt selected for production is cobalt sulphate heptahydrate crystals, which are readily marketable. Sulphur is extracted for sale by condensation during the thermal treatment stage.

No recovery factors or allowances have been made for deleterious elements.

The overall process is as shown in Figure 15 (Metallurgy).

A drill core composite of 830 kg (607 ppm cobalt) was the basis of the PFS testwork. This composite, while providing less than ideal spatial coverage, is considered to be a suitable basis for this work given the simplicity of the target mineral assemblage. The main coverage risk will be grinding circuit design. A bulk pyrite concentrate for heat treatment (pyrolysis) and hydrometallurgical test work was produced using commercial size spirals, a laboratory unit flotation cell and a pilot scale magnetic separator. The pyrolysis was carried out in a purpose built laboratory kiln which provided design data to vendors. The downstream purification testwork was carried out at laboratory scale, also producing design data for equipment vendors.

The metallurgical overall recovery factors applied are 85.5% for Co and 80% for S.

The novel aspect of the proposed processing plant is the use of pyrolysis (to treat the pyrite concentrate) which avoids the production of SO_2 and the costs of dealing with it. The technical risk of this is ameliorated by the selection of relatively small off-the-shelf kilns which are readily adapted to this use. However, this aspect of the proposed operation should be considered of consequential potential risk to both the technical and economic viability of the project.

CUT OFF GRADES

First Principles were used to calculate cut off grades of both cobalt and sulphur and were verified by Whittle Cut-off Grade results.

Table 22. **Thackaringa Project Ore Reserve Parameters**

Parameter	Unit	Value	Calculation Code
Mining Recovery	%	95.00%	MR
Mining Dilution	%	5.00%	MD
Cobalt Processing Recovery	%	85.50%	COR
Sulphur Processing Recovery	%	80.00%	SR
Selling Price – Co	AUD$/t	76,280.52	COS
Selling Price – S	AUD$/t	149.41	SS
Ore Processing Cost	AUD$/ore t	31.00	PC
Selling Cost – Co	AUD$/t	129.05	CCO
Selling Cost – S	AUD$/t	–	CS
Royalty – Government	%	4.00%	R

First Principle calculation was applied and can be seen below for both cobalt (Co) and sulphur (S) cut-off grades.

Co Cut-off Grade = (Pc*(1-MD")"*MR")/((" COR*MR")*((" COS*(1-R)-CCO")))*1,000,000"

Co Cut-off Grade = **520.794 ppm**

or

S Cut-off Grade = (Pc*(1-MD")"*MR")/((" SR*MR")*((" SS*(1-R)-CS")))*100"

S Cut-off Grade = **28.37%**

ORE RESERVE ESTIMATION METHODOLOGY

The processing assumptions, cost operating parameters and commodity price were modelled in Dassault's Whittle 4X software (Whittle). The assumptions were checked using a set of validation methods for logic and data integrity purposes. In order to ensure a minimal variation between the whittle optimisation and the final pit designs, any areas in the shell with impractical mining widths or wall segments are removed from the shell by refining the optimisation. This ensures a minimum mining width of 25m is achieved throughout the pit shell.

The generated pit shells are then used as a base for a practical mine design. Pit designs for the Thackaringa project have been completed using the following guidelines and parameters:

- Geotechnical design parameters as summarised in Table 6;
- Optimised pit shells with minimum mining width restrictions applied; and
- Haul ramp gradient of 1:10, with a dual lane haul running width of 25m and a single lane running width of 15m.

MATERIAL MODIFYING FACTORS

The Thackaringa Project comprises two exploration leases (EL6622 & EL8143) and two mining leases (ML86 and ML87) as detailed in Table 22. These leases intersect thirteen (13) individual land titles comprising both freehold and crown land. The majority of the tenure is covered by Western Lands Lease; perpetual leases subject to the provisions of the *Western Lands Act 1901.*

Table 23. **Thackaringa tenement schedule**

Tenement	Minerals	Mining Act	Grant Date	Expiry Date	Area
EL6622	Group 1	1992	30/08/2006	30/08/2020	17 units
EL8143	Group 1	1992	26/07/2013	26/07/2020	4 units
ML86	Cobalt, Iron, Iron Minerals, Nickel, Platinum & Sulphur	1973	05/11/1975	05/11/2022	205.9 ha
ML87	Cobalt, Iron, Iron Minerals, Nickel, Platinum & Sulphur	1973	05/11/1975	05/11/2022	101.2 ha

Native Title

A small parcel of land adjacent to ML87 is subject to the Barkandji Traditional Owners Native Title determination. The area comprises approximately 55,000 m^2. Further legal advice will be sought to clarify and assist with the process and potentially outline agreement expectations relevant to the parcel of Native Title affected land. As these negotiations are still to be finalized over the next 4–6 months, the affected areas around the Big Hill deposit have been excluded from the reported Ore Reserve.

Environmental Permitting and Approvals

The following environmental approvals and permits are required:

- Development consent under Part 4 of the *Environmental Planning and Assessment Act 1979.*
- A Mining Lease under the *Mining Act 1992*. It is noted that two existing mining leases will be retained.
- An Environment Protection Licence under the Protection of the *Environment Operations Act 1997*.
- Aquifer Interference Approval under Section 91 of the *Water Management Act 2000*.
- A s138 Permit under the *Roads Act 1993.*
- An approval from ARTC to construct a railway siding and level crossing.
- A licence under the *Pipelines Act 1967.*

It is noted that project approvals inclusive of the obtainment of the aforementioned permits will commence as part of the Bankable Feasibility Study.

Infrastructure

The required site infrastructure is attributed to three primary areas:

- **Mining** – open cut pits, waste dumps, heavy vehicle haul roads, Mining Contractor area, explosives magazine, ROM pad and major creek and drainage diversions.
- **Processing** – processing plant, Electrical High Voltage yards and MCCs, tails dam and overland conveyors, water storage and catchment of dams, weighbridge and rail siding.
- **Administration** – office and admin area, warehouse, stores and laydown yard, security facilities, change house and ablutions, site access roads and carpark.

In addition to the standard infrastructure requirements, a new 26km long 66 kV transmission line will require establishment adjacent to the existing Broken Hill – Peterborough rail line, and will incorporate substation upgrades and installation of a suitable substation yard at the project site.

In order to supply water, a 26km water supply pipeline (including pumping systems) from Broken Hill will also be required adjacent to the Broken Hill – Peterborough rail corridor.

Transport

Product transport facilities will include the construction of a suitable hardstand area near the processing plant which will be used for the loading of containers full of cobalt sulphate onto trucks. Further to this, a rail siding will be constructed adjacent to the Broken Hill – Peterborough existing rail line to allow for the transportation of sulphur product. Both the hardstand and the rail siding will be connected to the process plant by a designated product access road. It is planned for the site to purchase light weight container trailers for the internal movements of product product. Transport costs of cobalt sulphate to international markets were included in the financial analysis, whereas sulphur was assumed to be sold at the mine gate and no transport costs were included for this product.

Environmental

There are two primary types of waste to be stored at the Thackaringa project – potential acid forming waste (PAF) and non-acid forming waste (NAF). From initial Acid Rock Drainage test work, the PAF material is currently defined as waste material with a sulphur grade greater than or equal to 0.35%. Encapsulation of the PAF material will be required when PAF is co-dumped with NAF waste. A PAF encapsulation strategy has been developed with a minimum 5m NAF skin required to encapsulate the PAF material, both above and below.

Field investigations have identified one faunal species likely to be impacted by the project. To minimise the impacts on this species, a biodiversity offset will be required where either an area of land containing suitable habitat is set aside for biodiversity purposes, or a payment into a fund for the management of the species.

Appendix 1 – JORC Code, 2012 Edition – Table 1

Section 1 – Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code Explanation	Commentary

Sampling techniques	▪ *Nature and quality of sampling (e.g. 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 (e.g. '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 (e.g. submarine nodules) may warrant disclosure of detailed information.*
		Diamond Drilling (DDH)
		Pre-1990
		▪ Diamond drilling was used to obtain core from which irregular intervals, reflecting visual mineralisation and geological logging were hand-split or sawn. Samples were submitted for analysis using a mixed acid digestion and AAS methodology.
		Post-1990
		▪ Diamond drilling (one drill hole) was used to obtain core from which irregular intervals, reflecting visual mineralisation and geological logging were sawn (quarter core for HQ). Samples were submitted for analysis using a mixed acid digestion and ICP-OES methodology.
		Metallurgical Drilling
		▪ Eight (8) HQ diameter diamond drill holes (DDH) were drilled at the Thackaringa project in late 2016. They were used as metallurgical reference holes and were designed to twin some of the previous reverse circulation percussion (RC) holes for QA/QC and assay comparison between DDH and RC. There were two (2) holes drilled at Pyrite Hill, two (2) at Big Hill and four (4) at Railway:
		▪ Diamond drilling was used to obtain core from which regular (one-metre) intervals were sawn with:
		  ▪ one half core dispatched for analysis using a mixed acid digestion and ICP-MS methodology (sulphur >10% by LECO);
		  ▪ the other half was further sawn such that one quarter-core was sent for metallurgical test work and the other quarter-core retained for archival purposes.
		2017 Resource Drilling Program
		▪ Fourteen HQ diameter diamond drill holes (DDH) were completed and assayed. They were used as metallurgical reference holes designed to twin some historical reverse circulation percussion (RC) holes for QA/QC and assay comparison between DDH and RC. There were four (4) holes drilled at Pyrite Hill, two (2) at Big Hill and eight (8) at Railway:
		  ▪ Diamond drilling (17THD01-03) was used to obtain core from which regular (one-metre) intervals were sawn with:
		    ▪ one half core dispatched for analysis using a mixed acid digestion and ICP-MS methodology for a suite of 48 elements (sulphur >10% by LECO);
		    ▪ the other half was retained for future metallurgical test work and archival purposes.
		  ▪ Diamond drilling (17THD04-14) was used to obtain core from which regular (one-metre) intervals were sawn with:
		    ▪ one quarter core dispatched for analysis using a mixed acid digestion and ICP-MS methodology or a suite of 48 elements (sulphur >10% by LECO);
		    ▪ the other three quarters was retained for future metallurgical test work and archival purposes.
		2017 Geotechnical Program
		▪ Sixteen HQ diameter diamond drill holes (DDH) were completed and assayed. They were used as geotechnical reference holes designed to inform pit optimisation and mine design. There were four (4) holes drilled at Pyrite Hill, six (6) at Big Hill and six (6) at Railway:
		  ▪ Diamond drilling (17THD016-24, 26-28) was used to obtain core from which regular (one-metre) intervals were sawn with:

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr><td>**Sampling techniques** *(continued)*</td><td></td><td>
- one half core dispatched for analysis using a mixed acid digestion and ICP-MS methodology for a suite of 48 elements (sulphur >10% by LECO);
- the other half was retained for future metallurgical test work and archival purposes.
- Intervals selected for sampling were derived from geological logging and as such drill holes 17THD015, 29 and 31 were not sampled as they did not intersect the mineralised envelope.
Historical Reverse Circulation Drilling
- RC drilling was used to obtain a representative sample by means of riffle splitting with samples submitted for analysis using the above-mentioned methodologies.
- Pre-2000 drill samples were assayed for a small and variable suite of elements (sometimes only cobalt). The post-2000 drill samples (5,095 samples) are all assayed by ICP-MS for a suite of 33 elements.
2017 RC Drilling Program
- Ninety-three (93) RC drill holes and three (3) RC drill holes with diamond tails were drilled and assayed to infill historical holes and support re-estimation of Mineral Resources. There were sixty-five (65) holes drilled at Railway, six (6) at Big Hill and twenty-five (25) at Pyrite Hill:
  - RC drilling was used to obtain a representative sample by means of riffle splitting with samples submitted for analysis by ICP-MS for a suite of 48 elements (sulphur >10% by LECO).
</td></tr>
<tr><td>**Drilling techniques**</td><td>
- *Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (e.g. 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).*
</td><td>
- The Thackaringa drilling database comprises a total of sixty-four (64) diamond drill holes and 139 reverse circulation (RC) drill holes (three of which have diamond tails). Diamond drilling was predominantly completed with standard diameter, conventional HQ and NQ with historical holes typically utilising RC and percussion pre-collars to an average 25 metres (see Drill hole Information for further details). Early (1960-1970) drill holes utilised HX – AX diameters dependent on drilling depth. Reverse circulation drilling utilised standard hole diameters (4.8”-5.5”) with a face sampling hammer.
- Since 2013 all diamond drilling has been completed using a triple tube system with a HQ3 diameter. Drill holes were typically drilled at angles between 40 and 60 degrees from horizontal and the resulting core was oriented as part of the logging process.
<table>
<tr><th>Year</th><th>Drilling</th><th>Metres</th></tr>
<tr><td>1967</td><td>1 diamond drill hole</td><td>304.2</td></tr>
<tr><td>1970</td><td>4 diamond drill holes</td><td>496.6</td></tr>
<tr><td>1980</td><td>18 diamond and 1 RC drill hole</td><td>1,711.23</td></tr>
<tr><td>1993</td><td>2 diamond drill holes</td><td>250</td></tr>
<tr><td>1998</td><td>11 RC drill holes</td><td>1,093.25</td></tr>
<tr><td>2011</td><td>11 RC drill holes</td><td>1,811</td></tr>
<tr><td>2012</td><td>20 RC drill holes</td><td>2,874.25</td></tr>
<tr><td>2013</td><td>1 diamond drill hole</td><td>349.2</td></tr>
<tr><td>2016</td><td>8 diamond drill holes</td><td>1,511.8</td></tr>
<tr><td>2017</td><td>30 diamond drill holes, 93 RC drill holes, 3 RC drill holes with diamond tails</td><td>18,933</td></tr>
<tr><td>**Total**</td><td>**64 diamond, 136 RC drill holes and 3 RC drill holes with diamond tails**</td><td>**29,334.53**</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr><td>Drill sample recovery</td><td>- <i>Method of recording and assessing core and chip sample recoveries and results assessed.</i>
- <i>Measures taken to maximise sample recovery and ensure representative nature of the samples.</i>
- <i>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.</i></td><td>Diamond Drilling
- Historical core recoveries were accurately quantified through measurement of actual core recovered versus drilled intervals.
- Historical diamond drilling employed conventional drilling techniques while diamond drilling completed by Broken Hill Prospecting and Cobalt Blue Holdings utilised a triple-tube system to maximise sample recovery:
  - Core recovery of 99.7% was achieved during completion of drill hole 13BED01.
  - Core recovery of 98% was achieved during the 2016 diamond drilling program.
  - Core recovery of 96.7% was achieved during 2017 diamond drilling (inclusive of diamond tails).
  - No relationship between sample recovery and grade has been observed.
Reverse Circulation Drilling
- Reverse circulation sample recoveries were visually estimated during drilling programs. Where the estimated sample recovery was below 100% this was recorded in field logs by means of qualitative observation.
- Reverse circulation drilling employed adequate air (using a compressor and booster) to maximise sample recovery.
- No relationship between sample recovery and grade has been observed.</td></tr>
<tr><td>Logging</td><td>- <i>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.</i>
- <i>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.</i>
- <i>The total length and percentage of the relevant intersections logged.</i></td><td>- A qualified geoscientist has logged all reported drill holes in their entirety. This logging has been completed to a level of detail considered to accurately support Mineral Resource estimation and metallurgical studies. The parameters logged include lithology, alteration, mineralisation and oxidation. These parameters are both qualitative and quantitative in nature.
- Diamond drilling completed during 2016–2017 by Broken Hill Prospecting/Cobalt Blue Holdings has been subject to geotechnical logging with parameters recorded including rock-quality designation (RQD), fracture frequency and hardness.
- During 2013, a considerable amount of historical drilling was re-logged through review of available core stored at Broken Hill as well the re-interpretation of historical reports where core or percussion samples no longer exist. A total of eight (8) diamond drill holes and sixteen (16) diamond drill holes with pre-collars were re-logged as detailed below:
<table>
<tr><th>Hole ID</th><th>Deposit</th><th>Max Depth</th><th>Hole Type</th><th>Pre-Collar Depth (m)</th></tr>
<tr><td>67TH01</td><td>Pyrite Hill</td><td>304.2</td><td>DDH</td><td>–</td></tr>
<tr><td>70TH02</td><td>Pyrite Hill</td><td>148.6</td><td>DDH</td><td>–</td></tr>
<tr><td>70TH03</td><td>Pyrite Hill</td><td>141.4</td><td>DDH</td><td>–</td></tr>
<tr><td>70BH01</td><td>Big Hill</td><td>102.7</td><td>DDH</td><td>–</td></tr>
<tr><td>70BH02</td><td>Big Hill</td><td>103.9</td><td>DDH</td><td>–</td></tr>
<tr><td>80PYH13</td><td>Pyrite Hill</td><td>77</td><td>DDH</td><td>–</td></tr>
<tr><td>80PYH14</td><td>Pyrite Hill</td><td>300.3</td><td>DDH</td><td>–</td></tr>
<tr><td>80BGH09</td><td>Big Hill</td><td>100.5</td><td>DDH</td><td>–</td></tr>
<tr><td>80PYH01</td><td>Pyrite Hill</td><td>24.53</td><td>PDDH</td><td>6</td></tr>
<tr><td>80PYH02</td><td>Pyrite Hill</td><td>51.3</td><td>PDDH</td><td>33.58</td></tr>
<tr><td>80PYH04</td><td>Pyrite Hill</td><td>55</td><td>PDDH</td><td>38.7</td></tr>
</table></td></tr>
</table>

Criteria	JORC Code Explanation	Commentary

Logging *(continued)*

Hole ID	Deposit	Max Depth	Hole Type	Pre-Collar Depth (m)
80PYH05	Pyrite Hill	93.6	PDDH	18
80PYH06	Pyrite Hill	85.5	PDDH	18
80PYH07	Pyrite Hill	94.5	PDDH	12
80PYH08	Pyrite Hill	110	PDDH	8
80PYH09	Pyrite Hill	100.5	PDDH	8
80PYH10	Pyrite Hill	145.3	PDDH	25.5
80PYH11	Pyrite Hill	103.1	PDDH	18
80PYH12	Pyrite Hill	109.5	PDDH	4.2
80BGH05	Big Hill	54.86	RCDDH	45.5
80BGH06	Big Hill	68.04	RCDDH	58
80BGH08	Big Hill	79.7	RCDDH	69.9
93MGM01	Pyrite Hill	70	RDDH	24
93MGM02	Pyrite Hill	180	RDDH	48

DDH	Diamond drill hole
PDDH	Diamond drill hole with percussion pre-collar
RCDDH	Diamond drill hole with reverse circulation pre-collar
RDDH	Diamond drill hole with rotary air blast pre-collar
RC	Reverse Circulation drill hole

- Litho-geochemistry has been used to verify geological logging where available for drilling completed by Broken Hill Prospecting post 2010.
- Representative reference trays of chips from reverse circulation drilling completed post 2010 have been retained by Broken Hill Prospecting.

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.*

Diamond Drilling (DDH)

Pre-1990

- Core samples were hand-split or sawn with re-logging of available historical core (see **Logging**) indicating a 70:30 (retained:assayed) split was typical. The variation of sample ratios noted are considered consistent with the sub-sampling technique (hand-splitting).
- No second half samples were submitted for analysis.
- It is considered water used for core cutting is unprocessed and unlikely to have introduced sample contamination.
- Procedures relating to the definition of the line of cutting or splitting are not available. It is expected that 'standard industry practice' for the period was applied to maximize sample representivity.

Post-1990

- NQ drilling core was sawn with half core submitted for assay.
- HQ drilling core was sawn with quarter core submitted for assay.
- No second half samples were submitted for analysis.
- It is considered water used for core cutting is unprocessed and unlikely to have introduced sample contamination.
- Procedures relating to the definition of the line of cutting or splitting are not available. It is expected that 'standard industry practice' for the period was applied to maximise sample representivity.

2016 Metallurgical Drilling

- All HQ drill core was sawn into halves, with each half then re-sawn to provide 4 lengths of quarter core for each interval.
- One half core was submitted for assay.
- One quarter core was submitted for metallurgical test work.

Criteria	JORC Code Explanation	Commentary
Sub-sampling techniques and sample preparation *(continued)*		- One quarter core was retained for archive. - It is considered that the water used for core cutting is most unlikely to have introduced sample contamination. - Sample sawing and processing for test work were undertaken according to 'standard industry practice' to maximise sample representivity. **2017 Diamond Drilling** - All HQ drill core was sawn into halves, with each half then re-sawn to provide 4 lengths of quarter core for each interval. - One quarter – one half core was submitted for assay. - One quarter – three quarter core was retained for archive and further metallurgical test work. - It is considered that the water used for core cutting is most unlikely to have introduced sample contamination. - Sample sawing and processing for test work were undertaken according to 'standard industry practice' to maximise sample representivity. **Reverse Circulation (RC) Drilling** - Sub-sampling of reverse circulation chips was achieved using a riffle splitter. - During drilling operations, the splitter was regularly cleaned to prevent down hole sample contamination. - Dry sampling was achieved with the use of adequate air, using a compressor and booster, where groundwater was encountered. **Historical Reverse Circulation Drilling** - During reverse circulation drilling completed by Broken Hill Prospecting, duplicate samples were collected at the time of drilling. These were obtained by spearing the bulk material held in the PVC sacks using a spear made of 40mm diameter PVC pipe; three samples were speared through the full depth of the bulk material and these were combined to form one sample. - The Thackaringa drilling database includes a total of 139 historical field duplicates collected during reverse circulation drilling. This reflects a ratio of approximately one field duplicate in every 32 samples (3.1%) for drill holes where duplicates were collected (31 drill holes for 4469 metres) and an overall ratio of one field duplicate in every 42 samples (2.4%) for all reverse circulation drill holes (43 drill holes for 5801.5 metres). - Statistical analysis of field duplicates collected during drilling completed by Broken Hill Prospecting (119 duplicates representing 86% of all field duplicates) considered 18 elements of which only chromium, lanthanum and titanium show some bias in the duplicate samples. For cobalt, the confidence limits were evenly placed either side of zero and the duplicates are deemed to be representative of the original samples. **2017 Reverse Circulation Drilling** - During reverse circulation drilling completed by Broken Hill Prospecting/Cobalt Blue Holdings, duplicate samples were collected at the time of drilling at an average rate of 1:23 samples. These were obtained by riffle splitting the remnant bulk sample following collection of the primary split. - Assay results include analysis of 630 field duplicate pairs from 96 RC and 3 RCDDH drill holes. - A measure of the average precision of the sampling, sample preparation and assaying methods, given by the mean per cent difference (MPD) assay values of the duplicate pairs is summarised below. Overall, the sampling and assay precision for Co, Fe and S at economically significant grades is regarded as reasonable.

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr><td>Sub-sampling techniques and sample preparation <i>(continued)</i></td><td></td><td>
Mean percent difference assay values of field duplicate pairs collected during the 2017 reverse circulation drilling
<table>
<tr><th>Co Cut-Off</th><th>Sample Count</th><th>Cobalt MPD</th><th>Sulphur MPD</th><th>Iron MPD</th></tr>
<tr><td>All</td><td>630</td><td>12%</td><td>14%</td><td>8%</td></tr>
<tr><td>500ppm</td><td>170</td><td>10%</td><td>10%</td><td>7%</td></tr>
</table>
</td></tr>
<tr><td>Quality of assay data and laboratory tests</td><td>

<i>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</i>
<i>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.</i>
<i>Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.</i>

</td><td>

The nature and quality of all assaying and laboratory procedures employed for samples obtained through drilling (diamond and reverse circulation) are considered ‘industry standard’ for the respective periods.
The assay techniques employed for drilling (diamond and reverse circulation) include mixed acid digestion with ICP-OES and AAS finishes. These methods are considered appropriate for the targeted mineralisation and regarded as a ‘near total’ digestion technique with resistive phases not expected to affect cobalt analyses.
All samples have been processed at independent commercial laboratories including AMDEL, Australian Laboratory Services (ALS), Analabs and Genalysis.
All samples from drilling completed by Broken Hill Prospecting during 2011–2012 were assayed at ALS in Orange, New South Wales. All samples from drilling completed by Broken Hill Prospecting and Cobalt Blue Holdings during 2016-2017 were processed at ALS Adelaide, South Australia. ALS is a NATA Accredited Laboratory and qualifies for JAS/ANZ ISO9001:2008 quality systems. ALS also maintains internal QAQC procedures (including analysis of standards, repeats and blanks).
QAQC procedures increased during the 2016–2017 resource definition drilling programs. To monitor the accuracy of assay results, CRM standards were included in the assay sample stream at an average rate of 1:24.
Internal lab standards were routinely included by ALS Laboratories during the 2016-2017 drilling program. The Thackaringa drilling database includes the lab standards for all drilling completed from October 2017 at an average rate of 1:6 samples

</td></tr>
</table>

2016–2017 CRM standard assay performance for cobalt, iron and sulphur

		Cobalt				Sulphur				Iron			
Standard ID	**Count**	**1SD**	**2SD**	**3SD**	**+3SD**	**1SD**	**2SD**	**3SD**	**+3SD**	**1SD**	**2SD**	**3SD**	**+3SD**
OREAS 523 (728 ppm Co)	72	59	12	1	–	61	11	–	–	53	18	1	–
OREAS 521 (386 ppm Co)	61	49	10	1	1	50	10	1	–	53	7	1	–
OREAS 166 (1970 ppm Co)	128	103	24	–	1	19	22	19	68	67	7	52	2
OREAS 165 (2445 ppm Co)	120	102	17	–	1	15	36	38	31	74	38	7	1
OREAS 163 (230 ppm Co)	140	110	25	4	1	4	6	14	116	23	91	24	2
OREAS 162 (631 ppm Co)	152	114	33	5	–	32	41	33	46	108	37	7	–
OREAS 160 (2.8 ppm Co)	121	104	10	2	5	40	49	30	2	83	–	–	38

2017 lab standard assay performance for cobalt, iron and sulphur as recorded in the Thackaringa database from October 2017

		Cobalt				Sulphur				Iron			
Standard ID	**Count**	**1SD**	**2SD**	**3SD**	**+3SD**	**1SD**	**2SD**	**3SD**	**+3SD**	**1SD**	**2SD**	**3SD**	**+3SD**
OREAS 902 (926 ppm Co)	125	39	51	28	7	114	11	–	–	86	31	8	–
OREAS 601 (5.14 ppm Co)	220	199	15	4	2	197	23	–	–	182	35	3	–
OREAS 24b (16.9 ppm Co)	439	288	142	8	1	282	123	31	3	382	27	30	–
OGGeo08 (100 ppm Co)	219	152	63	4	–	208	11	–	–	202	17	–	–
MRGeo08 (19.5 ppm Co)	222	172	47	2	1	144	78	–	–	18	52	99	53
GBM915-8 (1082 ppm Co)	127	110	17	–	–	–	–	–	–	–	–	–	–
GBM908-10 (27 ppm Co)	223	222	–	1	–	–	–	–	–	–	–	–	–

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr><td>Quality of assay data and laboratory tests <i>(continued)</i></td><td></td><td>
- Lab repeats were routinely completed by ALS Laboratories during the 2017 drilling program. The Thackaringa drilling database includes the repeat assays for all drilling completed from October 2017 at an average rate of 1:16 samples for a total of 715 repeat pairs.
Mean percent difference assay values of lab repeat pairs analysed during the 2017 drilling program (from October 2017)
<table>
<tr><th>Co Cut-Off</th><th>Sample Count</th><th>Cobalt MPD</th><th>Sulphur MPD</th><th>Iron MPD</th></tr>
<tr><td>All</td><td>715 (637)[1]</td><td>3%</td><td>3%</td><td>2%</td></tr>
<tr><td>500ppm</td><td>179 (102)[1]</td><td>2%</td><td>2%</td><td>2%</td></tr>
</table>
Sulphur analysis for lab repeats were, in part, affected by the upper detection limits (10%) of the assay technique. These results have been excluded from the above analysis
</td></tr>
<tr><td>Verification of sampling and assaying</td><td>
- <i>The verification of significant intersections by either independent or alternative company personnel.</i>
- <i>The use of twinned holes.</i>
- <i>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</i>
- <i>Discuss any adjustment to assay data.</i>
</td><td>
- Historical drilling intersections were internally verified by personnel employed by previous explorers including CRAE Pty Limited, Central Austin Pty Limited and Hunter Resources. Broken Hill Prospecting has completed a systematic review of the related data.
- The Thackaringa drilling database exists in electronic form as a Microsoft Access database. Information related to individual drill holes is stored in digital files as extracted from historical reports (typically including location plan, section, logs, photos, surveys, assays and petrology).
- Historical drilling data available in electronic form has been re-formatted and imported into the drilling database.
- Quantitative historical drilling data, including assays, have been captured electronically during systematic data compilation and validation completed by Broken Hill Prospecting.
- Samples returning assays below detection limits are assigned half detection limit values in the database.
- All significant intersections are verified by the Company's Exploration Manager and an independent geological consultant.
</td></tr>
<tr><td>Location of data points</td><td>
- <i>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.</i>
- <i>Specification of the grid system used.</i>
- <i>Quality and adequacy of topographic control.</i>
</td><td>
- Historical drill collars have been relocated and surveyed using a differential GPS (DGPS). In the instances where no collar could be located the position has been derived from georeferenced historical plans.
- During systematic data validation completed in 2016, three (3) drill holes at Big Hill were found to be incorrectly located. One collar was located and surveyed by GPS and two were digitised from georeferenced historical plans (reported to the nearest metre) as the collars had been destroyed.
- Down hole surveys using digital cameras were completed on all post 2000 drilling. Down hole surveys for some earlier drilling were estimated from hole trace and section data where raw survey data was not reported.
- All 2016 -2017 drill hole collars were located and surveyed with DGPS by an independent surveyor with reported accuracy of ±0.05m in horizontal and vertical measurement
</td></tr>
</table>

Criteria	JORC Code Explanation	Commentary
Location of data points *(continued)*		- All FY2018 drill hole collars presented in this release were located and surveyed with DGPS by an independent surveyor with reported accuracy of ±0.05m in horizontal and vertical measurement - Downhole surveys using digital cameras were completed on all FY2017/18 drill-holes. - All data is recorded in the GDA94 datum; UTM Zone 54 (MGA54). - 3D validation of drilling data has been completed by independent geological consultants to support detailed geological modelling in Micromine™ software. - The quality of topographic control is deemed adequate in consideration of the results presented in this release.

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.*
		- The data density of existing drill holes at Thackaringa has been materially increased by the FY2018 drilling program. Drilling density at each deposit varies along strike generally responsive to exploration targeting and interpreted geological complexity with the average drill line spacing for each deposit summarised below:
		  - Railway: 25–40m
		  - Pyrite Hill: 30–40m
		  - Big Hill: 40–60m
		- Drilling density is also illustrated in drilling plans presented within this release
		- Detailed geological mapping is supported by drill-hole data of sufficient spacing and distribution to complete a 3D geological modelling and Mineral Resource estimation
		- No sample compositing has been applied to reported intersections

Orientation of data in relation to geological structure	- *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering 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 2016–2017 drill holes at the Thackaringa project were typically angled at -55° or -60° to the horizontal and drilled perpendicular to the mineralised trend. - Drilling orientations are adjusted along strike to accommodate folded geological sequences. - Mineralisation at the Big Hill and Railway prospects is steeply dipping and consequently mineralised intersections will be greater than true width. At Pyrite Hill mineralisation is gently dipping and mineralised intersections will be close to true width. - The drilling orientation is not considered to have introduced a sampling bias on assessment of the current geological interpretation.
Sample security	- *The measures taken to ensure sample security.*	- Sample security procedures are considered to be ‘industry standard’ for the respective periods. - Following recent drilling completed by Broken Hill Prospecting/ Cobalt Blue Holdings, samples were trucked by an independent courier directly from Broken Hill to ALS, Adelaide. - The Company considers that risks associated with sample security are limited given the nature of the targeted mineralisation.

Criteria	JORC Code Explanation	Commentary

Audits or reviews	- *The results of any audits or reviews of sampling techniques and data.*	- In late 2016 an independent validation of the Thackaringa drilling database was completed:
		  - The data validation process consisted of systematic review of drilling data (collars, assays and surveys) for identification of transcription errors.
		  - Following review, historical drill hole locations were also validated against georeferenced historical maps to confirm their location.
		  - Three (3) drill holes at Big Hill were found to be incorrectly located. One collar was located and surveyed by GPS and two were digitised from georeferenced historical plans (reported to the nearest metre) as the collars had been destroyed. These corrections were captured in the Big Hill Mineral Resource estimate.
		  - Total depths for all holes were checked against original reports.
		  - Final 3D validation of drilling data has been completed by independent geological consultants to support detailed geological modelling in Micromine™ software.
		- Audits and reviews of QAQC results and procedures are further described in preceding sections of this table including **Quality of assay data and laboratory tests, Sub-sampling techniques and sample preparation** and **Logging.**

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr>
<td>Mineral tenement and land tenure status</td>
<td><i>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.</i>
<i>The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.</i></td>
<td>The Thackaringa Cobalt project is located approximately 25 kilometres west-southwest of Broken Hill and comprises four tenements with a total area of 63 km^2:
<table>
<tr><th>Tenement</th><th>Grant Date</th><th>Expiry Date</th></tr>
<tr><td>EL6622</td><td>30/08/2006</td><td>30/08/2020</td></tr>
<tr><td>EL 8143</td><td>26/07/2013</td><td>26/07/2020</td></tr>
<tr><td>ML86</td><td>05/11/1975</td><td>05/11/2022</td></tr>
<tr><td>ML87</td><td>05/11/1975</td><td>05/11/2022</td></tr>
</table>
The project tenure is subject to a Farm-In agreement between Cobalt Blue Holdings Limited (COB) and Broken Hill Prospecting Limited (BPL). The nature of this agreement is detailed in the COB Replacement Prospectus (as released 4 January 2017).
The nearest residence (Thackaringa Station) is located approximately three kilometres west of EL6622.
EL6622 is transected by the Transcontinental Railway; the Barrier Highway is located the north of the licence boundaries.
The majority of the project tenure is covered by Western Lands Lease which is considered to extinguish native title interest. However, Native Title Determination NC97/32 (Barkandji Traditional Owners 8) is current over the area and may be relevant to Crown Land parcels (e.g. public roads) within the project area.
The project tenure is more than 90 kilometres from the nearest National Park and or Wilderness Area (Kinchega National Park) and approximately 20 kilometres south of the nearest Water Supply Reserve (Umberumberka Reservoir Water Supply Reserve)
The Company is not aware of any impediments to obtaining a licence to operate in the area.</td>
</tr>
<tr>
<td>Exploration done by other parties</td>
<td><i>Acknowledgment and appraisal of exploration by other parties.</i></td>
<td>A detailed and complete record of all exploration activities undertaken prior to the BPL 2016 drilling program is appended to the JORC Table 1 which forms part of the Cobalt Blue Prospectus Document, available on the COB website.</td>
</tr>
</table>

Criteria	JORC Code Explanation	Commentary

Geology	▪ *Deposit type, geological setting and style of mineralisation.*	**Regional Geological Setting**
		▪ The Thackaringa project is located in a deformed and metamorphosed Proterozoic supracrustal succession named the Willyama Supergroup, which is exposed as several inliers in western New South Wales, including the Broken Hill Block (Willis, et al., 1982).
		▪ Exploration by BPL Limited has been focused on the discovery of cobaltiferous pyrite deposits and Broken Hill type base-metal mineralisation both of which are known from historical exploration in the district.
		▪ The project area covers portions of the Broken Hill and Thackaringa group successions which host the majority of mineralisation in the region, including the Broken Hill base-metal deposit. The Sundown Group suite is also present. The extensive sequence of quartz-albite-plagioclase rock that hosts the cobaltiferous pyrite mineralisation is interpreted as belonging to the Himalaya Formation, which is stratigraphically at the top of the Thackaringa Group.
		Local Geological Setting
		▪ The oldest rocks in the region belong to the Curnamona Craton which outcrops on the Broken Hill and Euriowie blocks.
		▪ The overlying Proterozoic rocks have been broadly subdivided into three major groupings, of which the oldest groups are the highly deformed metasediments and igneous derived rocks of the Thackaringa and Broken Hill groups. They comprise a major part of the Willyama Supergroup and host the giant Broken Hill massive Pb-Zn-Ag sulphide ore body. EL6622 is within the Broken Hill block of the Curnamona Craton.
		Mineralisation Style
		▪ The Thackaringa Mineral deposits (Pyrite Hill, Big Hill and Railway) are characterised by large tonnage cobaltiferous-pyrite mineralisation hosted within siliceous albitic gneisses and schists of the Himalaya Formation.
		▪ Cobalt mineralisation exists within stratabound pyritic horizons where cobalt is present within the pyrite lattice. Mineralogical studies have indicated the majority of cobalt (~85%) is found in solid solution with primary pyrite (Henley 1998).
		▪ A strong correlation between pyrite content and cobalt grade is observed.
		▪ The regional geological setting indicates additional mineralisation targets including:
		  ▪ Stratiform Broken Hill Type (BHT) Copper-Lead-Zinc-Silver deposits.
		  ▪ Copper-rich BHT deposits.
		  ▪ Stratiform to stratabound Copper-Cobalt-Gold deposits.
		  ▪ Epigenetic Gold and Base metal deposits.

Drill hole Information	▪ *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:*
	  ▪ *easting and northing of the drill hole collar*
	  ▪ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar*
	  ▪ *dip and azimuth of the hole*
	  ▪ *down hole length and interception depth*
		▪ See drill holle summaries below.

Drill hole summaries

Hole ID	Deposit	Max Depth (m)	NAT Grid ID	Easting	Northing	RL	Dip	Azimuth	Hole Type	Pre-Collar Depth
67TH01	Pyrite Hill	304.2	MGA94_54	518565	6449460	281	-55	261	DDH	
70TH02	Pyrite Hill	148.6	MGA94_54	518272	6449681	284	-61	219	DDH	
70TH03	Pyrite Hill	141.4	MGA94_54	518450	6449212	290	-62	284	DDH	
70BH01	Big Hill	102.7	MGA94_54	520851	6449309	285	-47	319	DDH	
70BH02	Big Hill	103.9	MGA94_54	520786	6449264	280	-50	319	DDH	
80PYH13	Pyrite Hill	77	MGA94_54	518358	6449038	290	-50	281	DDH	
80PYH14	Pyrite Hill	300.3	MGA94_54	518661	6449288	278	-60	281	DDH	
80PYH03	Pyrite Hill	35	MGA94_54	518252	6449570	299	-60	221	PDDH	22
80BGH09	Big Hill	100.5	MGA94_54	520657	6449293	273	-50	145	DDH	
80PYH01	Pyrite Hill	24.53	MGA94_54	518246	6449566	301	-60	203	PDDH	6
80PYH02	Pyrite Hill	51.3	MGA94_54	518261	6449574	298	-60	221	PDDH	33.58
80PYH04	Pyrite Hill	55	MGA94_54	518367	6449232	308	-60	296	PDDH	38.7
80PYH05	Pyrite Hill	93.6	MGA94_54	518227	6449678	285	-49	223	PDDH	18
80PYH06	Pyrite Hill	85.5	MGA94_54	518163	6449757	284	-54.4	223	PDDH	18
80PYH07	Pyrite Hill	94.5	MGA94_54	518084	6449818	285	-55	223	PDDH	12
80PYH08	Pyrite Hill	110	MGA94_54	518010	6449885	286	-60	223	PDDH	8
80PYH09	Pyrite Hill	100.5	MGA94_54	517917	6449932	287	-48.5	223	PDDH	8
80PYH10	Pyrite Hill	145.3	MGA94_54	518393	6449566	286	-50	223	PDDH	25.5
80PYH11	Pyrite Hill	103.1	MGA94_54	518441	6449330	297	-50	281	PDDH	18
80PYH12	Pyrite Hill	109.5	MGA94_54	518407	6449137	293	-50	281	PDDH	4.2
80BGH05	Big Hill	54.86	MGA94_54	520955	6449534	289	-60	164	RCDDH	45.5
98TC01	Railway	100	MGA94_54	522750	6451340	267	-60	159	RC	
98TC02	Railway	100	MGA94_54	522392	6451387	267	-60	141	RC	
98TC03	Big Hill	84	MGA94_54	520816	6449369	313	-60	136	RC	
98TC04	Big Hill	138.25	MGA94_54	520860	6449451	304	-60	141	RC	
98TC05	Big Hill	70	MGA94_54	520728	6449328	289	-50	123	RC	
98TC06	Big Hill	108	MGA94_54	520715	6449343	285	-60	126	RC	
98TC07	Big Hill	120	MGA94_54	520786	6449388	299	-50	134	RC	
98TC08	Big Hill	90	MGA94_54	520802	6449478	291	-60	151	RC	
98TC09	Big Hill	114	MGA94_54	520822	6449461	296	-60	134	RC	
98TC10	Big Hill	134	MGA94_54	521018	6449576	282	-50	173	RC	
98TC11	Railway	35	MGA94_54	522411	6451374	267	-60	133	RC	
80BGH06	Big Hill	68.04	MGA94_54	520880	6449472	299	-60	171	RCDDH	58
80BGH08	Big Hill	79.7	MGA94_54	520769	6449391	296	-60	127	RCDDH	69.9
80BGH07	Big Hill	23	MGA94_54	521137	6449599	274	-60	178	RC	
93MGM01	Pyrite Hill	70	MGA94_54	518185	6449714	286	-60	223	RDDH	24
93MGM02	Pyrite Hill	180	MGA94_54	518515	6449455	285	-60	259	RDDH	48
11PHR01	Pyrite Hill	150	MGA94_54	518435	6449073	285	-60	279	RC	
11PHR02	Pyrite Hill	198	MGA94_54	518500	6449159	284	-60	279	RC	
11PHR03	Pyrite Hill	240	MGA94_54	518560	6449190	280	-60	279	RC	
11PHR04	Pyrite Hill	186	MGA94_54	518529	6449257	284	-60	279	RC	
11PHR05	Pyrite Hill	234	MGA94_54	518584	6449398	280	-60	259	RC	
11PHR06	Pyrite Hill	180	MGA94_54	518491	6449523	284	-60	234	RC	
11PHR07	Pyrite Hill	174	MGA94_54	518413	6449593	283	-60	219	RC	
11PHR08	Pyrite Hill	180	MGA94_54	518343	6449656	283	-60	218	RC	
11PSR01	Pyrite Hill	59	MGA94_54	518743	6448864	268	-60	258	RC	
11PSR02	Pyrite Hill	132	MGA94_54	518719	6448960	270	-60	255	RC	
11PSR03	Pyrite Hill	78	MGA94_54	518687	6449055	273	-60	255	RC	
12BER01	Railway	157	MGA94_54	521667	6449893	278	-60	141	RC	
12BER02	Railway	132	MGA94_54	521213	6449691	274	-60	162	RC	
12BER03	Railway	151	MGA94_54	521879	6450435	289	-60	102	RC	
12BER04	Railway	148	MGA94_54	522354	6451268	274	-60	131	RC	

DDH	Diamond drill hole
PDDH	Diamond drill hole with percussion pre-collar
RCDDH	Diamond drill hole with reverse circulation pre-collar
RDDH	Diamond drill hole with rotary air blast pre-collar
RC	Reverse Circulation drill hole

Drill hole summaries (continued)

Hole ID	Deposit	Max Depth (m)	NAT Grid ID	Easting	Northing	RL	Dip	Azimuth	Hole Type	Pre-Collar Depth
12BER05	Railway	145	MGA94_54	522439	6451168	300	-60	124	RC	
12BER06	Railway	169	MGA94_54	522481	6451091	296	-60	118	RC	
12BER07	Railway	115	MGA94_54	522324	6450749	278	-60	144	RC	
12BER08	Railway	193	MGA94_54	522221	6450812	273	-60	129	RC	
12BER09	Railway	139.75	MGA94_54	522101	6450881	276	-60	129	RC	
12BER10	Railway	151	MGA94_54	521953	6450716	284	-60	129	RC	
12BER11	Railway	193	MGA94_54	522737	6451377	266	-60	153	RC	
12BER12	Railway	111	MGA94_54	522910	6451517	277	-60	153	RC	
12BER13	Railway	205	MGA94_54	522884	6451558	271	-60	156	RC	
12BER14	Railway	151	MGA94_54	523125	6451637	288	-60	152	RC	
12BER15	Railway	109	MGA94_54	523311	6451842	284	-60	154	RC	
12BER16	Railway	115	MGA94_54	522994	6451592	276	-60	156	RC	
12BER17	Railway	115.5	MGA94_54	522517	6451315	269	-60	153	RC	
12BER18	Railway	157	MGA94_54	522333	6451281	272	-60	129	RC	
12BER19	Railway	97	MGA94_54	522241	6451067	276	-60	135	RC	
12BER20	Railway	120	MGA94_54	521292	6449734	277	-60	165	RC	
13BED01	Railway	349.2	MGA94_54	522480	6451092	296	-60	301	DDH	
16DM01	Pyrite Hill	161.6	MGA94_54	518411	6449594	283	-60	216	DDH	
16DM02	Pyrite Hill	183.4	MGA94_54	518527	6449262	284	-60	285	DDH	
16DM03	Big Hill	126.5	MGA94_54	521037	6449567	283	-60	159	DDH	
16DM04	Big Hill	105.4	MGA94_54	520815	6449464	296	-55	129	DDH	
16DM05	Railway	246.5	MGA94_54	522104	6450882	277	-60	129	DDH	
16DM06	Railway	160.4	MGA94_54	522912	6451519	279	-60	153	DDH	
16DM07	Railway	242.5	MGA94_54	522995	6451598	276	-60	156	DDH	
16DM08	Railway	258.5	MGA94_54	522351	6451273	274	-60	131	DDH	
17THD01	Pyrite Hill	124.2	MGA94_54	518382	6449551	289	-40	222	DDH	
17THD02	Pyrite Hill	149.7	MGA94_54	518475	6449445	291	-40	258	DDH	
17THD03	Pyrite Hill	78.5	MGA94_54	518370	6449190	303	-40	285	DDH	
17THD04	Big Hill	119.8	MGA94_54	521078	6449589	278	-45	155	DDH	
17THD05	Big Hill	99.5	MGA94_54	521669	6449889	279	-40	131	DDH	
17THD06	Railway	165.5	MGA94_54	521970	6450705	287	-45	128	DDH	
17THD07	Railway	274.6	MGA94_54	522569	6451282	271	-45	157	DDH	
17THD08	Railway	132.5	MGA94_54	522784	6451280	269	-45	326	DDH	
17THD09	Railway	120.5	MGA94_54	522905	6451511	278	-40	153	DDH	
17THD10	Railway	84.2	MGA94_54	522992	6451569	280	-45	130	DDH	
17THD11	Railway	111.5	MGA94_54	523109	6451682	281	-40	161	DDH	
17THD12	Railway	126.5	MGA94_54	522796	6451419	273	-40	141	DDH	
17THD13	Railway	105.5	MGA94_54	522836	6451456	277	-40	139	DDH	
17THD14	Pyrite Hill	99	MGA94_54	518375	6449089	294	-60	285	DDH	
17THR001	Railway	156	MGA94_54	522615	6451277	268	-60	120	RC	
17THR002	Railway	160	MGA94_54	522573	6451299	269	-60	120	RC	
17THR003	Railway	96	MGA94_54	522124	6450868	277	-60	130	RC	
17THR004	Railway	150	MGA94_54	522387	6451319	271	-60	120	RC	
17THR005	Railway	72	MGA94_54	522024	6450783	282	-60	120	RC	
17THR006	Railway	114	MGA94_54	522049	6450780	284	-58	125	RC	
17THR007	Railway	180	MGA94_54	521965	6450699	287	-59	125	RC	
17THR008	Railway	132	MGA94_54	521917	6450562	292	-56	105	RC	
17THR009	Railway	120	MGA94_54	521906	6450496	293	-58	105	RC	
17THR010	Railway	72	MGA94_54	521959	6450398	286	-56	285	RC	
17THR011	Railway	126	MGA94_54	522302	6451169	277	-56	120	RC	
17THR012	Railway	180	MGA94_54	522440	6451304	275	-58	173	RC	

DDH	Diamond drill hole
PDDH	Diamond drill hole with percussion pre-collar
RCDDH	Diamond drill hole with reverse circulation pre-collar
RDDH	Diamond drill hole with rotary air blast pre-collar
RC	Reverse Circulation drill hole

Drill hole summaries (continued)

Hole ID	Deposit	Max Depth (m)	NAT Grid ID	Easting	Northing	RL	Dip	Azimuth	Hole Type	Pre-Collar Depth
17THR013	Big Hill	102	MGA94_54	521750	6449942	285	-60	131	RC	
17THR014	Big Hill	104	MGA94_54	521628	6449796	278	-53	130	RC	
17THR015	Big Hill	108	MGA94_54	521793	6449918	285	-58	310	RC	
17THR016	Pyrite Hill	138	MGA94_54	518446	6449209	290	-57	283	RC	
17THR017	Pyrite Hill	120	MGA94_54	518449	6449263	293	-56	282	RC	
17THR018	Pyrite Hill	78	MGA94_54	518027	6449806	290	-60	222	RC	
17THR019	Pyrite Hill	72	MGA94_54	518105	6449754	288	-55	222	RC	
17THR020	Pyrite Hill	66	MGA94_54	518166	6449695	289	-60	222	RC	
17THR021	Pyrite Hill	78	MGA94_54	518183	6449717	286	-60	222	RC	
17THR022	Pyrite Hill	156	MGA94_54	518510	6449306	287	-55	281	RC	
17THR023	Pyrite Hill	150	MGA94_54	518506	6449377	289	-57	265	RC	
17THR024	Pyrite Hill	150	MGA94_54	518457	6449498	288	-59.5	229	RC	
17THR025	Pyrite Hill	114	MGA94_54	518311	6449609	287	-60	222	RC	
17THR026	Pyrite Hill	114	MGA94_54	518268	6449681	284	-60	222	RC	
17THR027	Pyrite Hill	72	MGA94_54	518243	6449646	287	-60	222	RC	
17THR028	Railway	150	MGA94_54	522457	6451167	301	-60	350	RC	
17THR029	Railway	162	MGA94_54	522482	6451084	296	-60	175	RC	
17THR030	Railway	138	MGA94_54	522783	6451423	271	-55	140	RC	
17THR031	Railway	120	MGA94_54	522945	6451566	276	-55	145	RC	
17THR032	Railway	132	MGA94_54	522819	6451473	274	-53	140	RC	
17THR033	Railway	120	MGA94_54	522501	6451315	270	-60	175	RC	
17THR034	Railway	132	MGA94_54	522321	6451214	276	-55	127	RC	
17THR035	Railway	156	MGA94_54	522259	6451120	276	-55.2	130	RC	
17THR036	Railway	92	MGA94_54	522186	6450998	275	-61.2	130	RC	
17THR037	Railway	126	MGA94_54	522148	6450941	274	-55	126	RC	
17THR038	Railway	168	MGA94_54	521927	6450619	290	-55	108	RC	
17THD015	Railway	81.6	MGA94_54	522038	6450826	279	-80	304	DDH	
17THD016	Railway	176.9	MGA94_54	522089	6450774	287	-70	122	DDH	
17THD017	Railway	255.9	MGA94_54	522615	6451279	268	-80	350	DDH	
17THD018	Railway	72.5	MGA94_54	523013	6451491	295	-70	150	DDH	
17THD019	Railway	151.3	MGA94_54	522667	6451229	267	-70	140	DDH	
17THD020	Railway	121.7	MGA94_54	523052	6451545	290	-55	310	DDH	
17THD021	Big Hill	100	MGA94_54	521708	6449928	281	-50	133	DDH	
17THD022	Big Hill	70	MGA94_54	521618	6449729	278	-56	316	DDH	
17THD023	Big Hill	99.5	MGA94_54	521164	6449537	275	-55	337	DDH	
17THD024	Railway	69.6	MGA94_54	521164	6449536	275	-80	150	DDH	
17THD025	Pyrite Hill	24.2	MGA94_54	518588	6449334	281	-75	90	DDH	
17THD026	Pyrite Hill	240.7	MGA94_54	518586	6449334	281	-55	272	DDH	
17THD027	Big Hill	141.6	MGA94_54	520947	6449513	294	-75	130	DDH	
17THD028	Big Hill	171.7	MGA94_54	520862	6449317	285	-56	321	DDH	
17THD029	Pyrite Hill	200.5	MGA94_54	518489	6449338	290	-70	90	DDH	
17THD030	Pyrite Hill	201.5	MGA94_54	518351	6449706	281	-55	222	DDH	
17THD031	Pyrite Hill	229	MGA94_54	518289	6449629	287	-65	50	DDH	
17THR039	Railway	210	MGA94_54	522477	6451299	274	-55.8	168.7	RC	
17THR040	Railway	276	MGA94_54	522528	6451300	270	-55	164	RC	
17THR041	Railway	210	MGA94_54	522692	6451244	265	-55	339	RC	
17THR042	Railway	234	MGA94_54	522588	6451160	283	-55	336	RC	
17THR043	Railway	200	MGA94_54	522531	6451185	289	-55	341	RC	
17THR044	Railway	180	MGA94_54	522420	6451159	298	-55	311	RC	
17THR045	Railway	210	MGA94_54	522526	6451168	290	-55	311	RC	
17THR046	Railway	216	MGA94_54	522501	6451203	291	-56	311	RC	

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PDDH	Diamond drill hole with percussion pre-collar
RCDDH	Diamond drill hole with reverse circulation pre-collar
RDDH	Diamond drill hole with rotary air blast pre-collar
RC	Reverse Circulation drill hole

Drill hole summaries (continued)

Hole ID	Deposit	Max Depth (m)	NAT Grid ID	Easting	Northing	RL	Dip	Azimuth	Hole Type	Pre-Collar Depth
17THR047	Railway	246	MGA94_54	522438	6451115	297	-55	311	RC	
17THR048	Railway	122	MGA94_54	522481	6451124	298	-55	310	RC	
17THR049	Railway	138	MGA94_54	522378	6451130	292	-55	310	RC	
17THR050	Railway	154	MGA94_54	522657	6451143	274	-63	344	RC	
17THR051	Railway	174	MGA94_54	522364	6451070	283	-55	308	RC	
17THR052	Railway	246	MGA94_54	522642	6451184	274	-55	334	RC	
17THR053	Railway	156	MGA94_54	522315	6451028	278	-55	314	RC	
17THR054	Railway	180	MGA94_54	522671	6451232	267	-60	333	RC	
17THR055	Railway	114	MGA94_54	522261	6450987	278	-55	313	RC	
17THR056	Railway	102	MGA94_54	522558	6451285	271	-55	158	RC	
17THR057	Railway	111	MGA94_54	522220	6450909	274	-55	308	RC	
17THR058	Railway	210	MGA94_54	522467	6451328	270	-55	160	RC	
17THR059	Railway	150	MGA94_54	522198	6450857	274	-55	306	RC	
17THR060	Railway	181	MGA94_54	523006	6451494	294	-55	331	RC	
17THR061	Railway	138	MGA94_54	522161	6450789	277	-55	307	RC	
17THR062	Railway	168	MGA94_54	522983	6451450	296	-60	327	RC	
17TRD063	Railway	169.5	MGA94_54	522137	6450725	280	-55	305	RCDDH	96.7
17THR064	Railway	171	MGA94_54	522931	6451403	295	-56.1	329	RC	
17THR065	Railway	174	MGA94_54	522108	6450664	283	-55	304	RC	
17THR066	Railway	168	MGA94_54	522865	6451367	292	-60	318	RC	
17THR067	Railway	150	MGA94_54	522022	6450479	284	-50	291	RC	
17THR068	Railway	210	MGA94_54	522752	6451407	268	-60	148	RC	
17THR069	Railway	96	MGA94_54	522008	6450647	301	-60	117	RC	
17THR070	Railway	228	MGA94_54	522813	6451242	266	-60	300	RC	
17THR071	Railway	142	MGA94_54	522070	6450846	279	-60	130	RC	
17TRD072	Railway	210	MGA94_54	522623	6451044	271	-60	320	RCDDH	155.6
17TRD073	Railway	195.4	MGA94_54	522035	6450817	280	-55	126	RCDDH	134.9
17THR074	Railway	300	MGA94_54	522572	6450985	271	-60	310	RC	
17THR075	Railway	148	MGA94_54	522013	6450770	283	-55	121	RC	
17THR076	Railway	300	MGA94_54	522479	6450945	272	-60	355	RC	
17THR077	Railway	180	MGA94_54	521993	6450743	285	-55	117	RC	
17THR078	Pyrite Hill	157	MGA94_54	518220	6449774	281	-60	222	RC	
17THR079	Railway	120	MGA94_54	521912	6450597	289	-55	116	RC	
17THR080	Pyrite Hill	67	MGA94_54	518024	6449782	292	-55	190	RC	
17THR081	Railway	184	MGA94_54	522340	6451239	276	-55	125	RC	
17THR082	Pyrite Hill	67	MGA94_54	517972	6449842	290	-55	222	RC	
17THR083	Railway	156	MGA94_54	522365	6451282	274	-55	133	RC	
17THR084	Pyrite Hill	97	MGA94_54	518343	6449588	287	-55	205	RC	
17THR085	Big Hill	210	MGA94_54	520878	6449523	287	-60	141	RC	
17THR086	Pyrite Hill	157	MGA94_54	518427	6449541	287	-55	218	RC	
17THR087	Pyrite Hill	181	MGA94_54	518466	6449587	282	-60	218	RC	
17THR088	Pyrite Hill	175	MGA94_54	518392	6449633	282	-55	213	RC	
17THR089	Big Hill	108	MGA94_54	521571	6449709	274	-60	141	RC	
17THR090	Big Hill	96	MGA94_54	521692	6449794	284	-55	312	RC	
17THR091	Pyrite Hill	211	MGA94_54	518424	6449679	279	-55	219	RC	
17THR092	Pyrite Hill	139	MGA94_54	518301	6449661	285	-55	219	RC	
17THR093	Pyrite Hill	151	MGA94_54	518270	6449732	281	-55	219	RC	
17THR094	Pyrite Hill	240	MGA94_54	518568	6449501	279	-60	253	RC	
17THR095	Pyrite Hill	205	MGA94_54	518509	6449194	283	-55	273	RC	
17THR096	Pyrite Hill	187	MGA94_54	518540	6449419	284	-60	257	RC	

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RCDDH	Diamond drill hole with reverse circulation pre-collar
RDDH	Diamond drill hole with rotary air blast pre-collar
RC	Reverse Circulation drill hole

Criteria	JORC Code Explanation	Commentary
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.*	**Drilling** - Drill hole intercept grades are typically reported as down-hole length-weighted averages with any non-recovered sample within the reported intervals treated as no grade. The cut-off used for selecting significant intersections is selected to reflect the overall tenor of mineralisation, in most cases 500ppm cobalt. - No top cuts have been applied when calculating average grades for reported significant intersections.
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 drillhole 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').*	- Drill holes at the Thackaringa project are typically angled at 50° or 60° and drilled perpendicular to the mineralised trend with drilling orientations adjusted along strike to accommodate folded geological sequences. - Mineralisation at the Big Hill and Railway prospects is steeply dipping and consequently mineralised intersections will be greater than true width. At Pyrite Hill mineralisation is gently dipping and mineralised intersections will be close to true width. - There is insufficient geological knowledge to accurately estimate true widths and as such all drill intersections are reported as down hole lengths.
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.*	- Appropriate maps and are presented in the accompanying ASX release.
Balanced reporting	- *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.*	- No exploration results are reported in the release.

Criteria	JORC Code Explanation	Commentary
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 survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	- No further exploration data is deemed material to the results presented in this release.
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.*	- The nature and scale of future work is outlined in the accompanying release.

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in the preceding section also apply to this section.)

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.*
		- The Thackaringa drilling database exists in electronic form under the independent management of Maxwell GeoServices. The Maxwell Data Schema (MDS) strictly applies integrity to all downhole and measurement recordings. If data fails the integrity rules, the data is NOT loaded into the database.
		In general, the following rules are applied:
		  - Downhole intervals Depth_To > Depth_From
		  - Downhole intervals < Max depth
		  - No overlapping intervals
		  - Dips between -90 & 90°
		  - Azimuths, dip direction, alpha, beta are all between 0 & 360°
		  - Gamma between 0 & 90°
		  - Individual percentage values <= 100%; total of all percentage values <=100%
		  - Recovery values <= 110%; RQD values <= 100%
		  - Incremental values must have data in preceding values before the next can be entered (e.g. Cannot have Lith2 unless Lith1 exists)
		  - Cannot enter qualifiers unless the primary code is populated (e.g. Cannot have a Lith_Grainsize or a Lith_Colour unless Lith_Code is populated)
		  - Dates <= current daily (load) date; start dates <= complete dates etc.
		  - Codes for fields linked to corresponding library tables can only be loaded if they are set to Is_Active = 'TRUE' in the library table
		  - Once drill holes, linear sites and point sites have been set to Validated = 'TRUE', no data related to these can be updated, inserted or deleted.
		  - Once Load_Date and Loaded_By fields have been populated upon database loading these fields are unable to be modified. Instead any updates are recorded in the Modified_Date and Modified_By fields.
		  - A Data_Source field is required for ALL data tables
		Additionally, the MDS stores every instance (record) of data loading, data modification, and who loaded and modified that particular data, as well as data sources where appropriate. This makes the data loading process highly auditable.
		- The database was extensively examined by SRK Consulting with various minor issues identified and addressed during the geological modelling and Mineral Resource estimation process. Examples of issues examined and rectified include:
		  - Correct prioritisation of assay method where upper limits of detection are exceeded;
		  - Inclusion / exclusion and quality of historic assays;
		  - Use of correct downhole survey grid systems and survey prioritisation
		  - Inclusion of up to date density information
		  - Inclusion of up to date QAQC data including standards, duplicates, blanks and lab repeats

Criteria	JORC Code Explanation	Commentary
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.*	- The geological model used for the resource estimation has been developed by Dr Stuart Munroe of SRK Consulting in conjunction with other consultants and COB employees, following a review of previous mapping, over approximately nine days on site at the Thackaringa project during drilling in November 2017.
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.*	- The mineralisation at Thackaringa is well exposed at surface and forms prominent topographic highs. The mineralisation has been mapped by previous lease holders and presented in statutory annual reports which are in the public domain. The previous mapping has been compiled and re-mapped by Mr Garry Johansen for COB. Dr Stuart Munroe of SRK Consulting completed reconnaissance mapping and reviewed the controls on mineralisation in preparation for this resource estimate update. Confidence in the current geological model has been greatly improved by the drilling completed during 2017. - The geological model has been developed from a good understanding of the distribution of surface mineralisation, observed controls on mineralisation and the extensive drill hole intersections. Two key structural controls on mineralisation are, (1); the primary foliation (bedding), as a fluid flow pathway and site for deposition of cobaltiferous pyrite, and (2); bedding parallel shear zones at the contact of quartz – albite gneiss. These shear zones appear to be responsible for fold thickening of the quartz – albite gneiss. Much of the folding appears to be slump or soft-sediment folding. The fold hinges have a variable plunge (moderate to steeply east to north-east). - No viable alternative mineralisation models have been developed. - The mineralisation host is a quartz + albite + cobaltiferous pyrite gneiss. This rock is defined by the presence of disseminated pyrite, concentrated parallel to the primary foliation in a fine-grained, recrystalised quartz + albite groundmass. Where the pyrite is present there is an increase in the silica content and an almost complete absence of biotite and sericite. In addition to the logged geology, most of the drill holes have multi-element analysis. These data have been used to develop a lithogeochemical profile for each rock type logged. The lithogeochemistry, logged geology, structure at surface, Cobalt assay and Sulphur assay have all been used to guide the mineralised domain that contain the resource. - The gradation from a biotite schist to (quartz + albite) to (pyrite + quartz + albite) suggests the sulphide may accompany silica + sodic alteration of a micaceous schist protolith. Across the shear zones mapped at surface, the transition is rapid, however where there is no shearing at the contact, a gradational contact from biotite to albite to pyrite + albite + silica is observed. Parallel to bedding and bedding parallel shear zones (faults), continuity of the mineralisation is strong, particularly close to the shear zones.
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 Railway Big Hill portion of the deposit is approximately 3500m along strike, 350m down dip and between 20m and 300m across strike averaging around 70m across strike. This portion is partially a steeply dipping linear formation but with a complexly folded area to the North East. The linear portion is distinguished by a distinct high grade Western Hanging wall zone. - The Pyrite Hill portion of the deposit is an arc like formation some 1000m along strike, 300m down dip and between 10m and 100m across strike.

Criteria	JORC Code Explanation	Commentary

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 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 (e.g. 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 drillhole data, and use of reconciliation data if available.*
		- The wireframe geological modelling, database validation and compositing were carried out in the Leapfrog software package. The estimation and classification were completed in the Isatis software package. The final model is presented in the Surpac software package.
		- Three variables Co, Fe and S are highly correlated and have been Co-Kriged. Co-kriging involves simultaneous fitting of variogram models to the three main variables and to three cross variograms and simultaneous estimation accounting for the spatial continuity of all three variables at once. This maintains the correlations between variable which are not necessarily honoured when independent kriging is performed.
		- The orientations of both variograms and search ellipses is varied on a block by block basis. The orientations are controlled by the set of trend and fold wireframes. Each wireframe triangle centroid is assigned a dip and strike and these are estimated using a nearest neighbour estimate into the blocks prior to grade estimation.
		- Eleven domains are used all with hard boundaries to control geology, geometry and grade and ensure appropriate samples are selected for estimation.
		- No top cuts or caps are used for any of the variables as the grade distributions are not highly skewed and the estimated validate well without the need for cutting or capping.
		- Multivariate variography was completed for all domains with sufficient data. Given the folded nature of many of the domains and the use of local orientations, only two multivariate models were utilised for estimation. One for the Pyrite Hill domain and another for all of the remaining Big Hill and Railway domains.
		- 5m composites are used with residual short lengths being incorporated and redistributed such that final composite lengths may be slightly shorter and longer than 5m. This length was chosen to be consistent with the 5m x 10m x 10m block dimensions and the assumed bulk mining approach.
		- Estimation utilised a single pass approach with interpolation end extrapolation limited by both optimum sample numbers controlled by sectors and by overall search ellipse distances. Search distances are anisotropic to the ratios of the search ellipse (5:1 cross strike, 1:1 down dip), that is samples are selected / prioritised within successively larger ellipses rather than by spherical distances. A minimum of 4 samples, an optimum of 8 composites and a maximum of 16 composites was used. A higher sample search with an optimum of 32 composites and maximum of 64 was tested maximising the regression slopes and smoothing the estimate but this excessively smoothed the block distribution and did not reflect the true block variability.
		- Block size used is 5m in Easting, 10m in Northing and 10m in elevation. This compares to an average drill spacing of between 25m and 60m along strike with average sample lengths of 1m combined with variogram ranges between 115m and 160m along strike, 70m to 80m down dip and 18m to 40m across strike. Variography shown moderate to low nuggets effect.
		- Validation was completed by:
		  - statistical comparisons to declustered composite averages per domain at zero cut off
		  - statistical inspection of density, regression slopes, kriging efficiency, number of composites used
		  - visual inspection of grades, regression slopes, kriging efficiency, number of composites used
		  - Comparison of grades and tonnages above cut off to previous estimates
		  - Swath plots
		  - Global change of support checks
		- Maximum extrapolation for Inferred material is approximately 120m and averages around 80m.

Criteria	JORC Code Explanation	Commentary
Moisture	- *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	- Tonnage and assays are on a dry basis.
Cut-off parameters	- *The basis of the adopted cut-off grade(s) or quality parameters applied.*	- The Mineral Resource has been reported at a cut-off of 500ppm cobalt to appropriately reflect the tonnes and grade of estimated blocks that will meet the potential beneficiation process currently under consideration. - The reported Mineral Resource includes only material categorised as 'sulphide'; constrained by the modelled 'base of partial weathering' surface. - A complete review of modifying factors identified during the PFS has supported derivation of an economic cut-off grade reflective of the proposed product stream. This cut-off is further detailed in the body of this release. . - SRK is unaware of any other similar style of deposit that is at surface and amenable to open cut mining.
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.*	- Open pit mining is assumed as the deposits outcrop at surface. - Preliminary pit optimisations were completed for the Scoping Study using the preceding Mineral Resource estimates. These optimisations supported an open pit mining methodology with near surface resources indicating low strip ratios. - Revised pit optimisations were completed during the Preliminary Feasibility Study with all material modifying factors and assumptions outlined in the body of the release and further described in Section 4 **Estimation and Reporting of Ore Reserves.**

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.*	- Detailed metallurgical studies completed for the Preliminary Feasibility Study have examined a processing pathway comprising four primary stages of ore treatment:
		  - **Concentrate:** Preparation of a sulphide concentrate from the ore
		  - **Calcine:** Calcination (thermal treatment) of the concentrate
		  - **Leaching:** Leaching of the calcine
		  - **Product Recovery:** purification of leach liquor, followed by crystallisation of cobalt sulphate
		- Results from test work related to the stages above are summarised in the body of the release and further described in Section 4 Estimation and Reporting of Ore Reserves.

Criteria	JORC Code Explanation	Commentary
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 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.*	- In acid mine drainage terms, both economic and waste material contain significant amounts potentially acid forming materials (Pyrite and sulphur bearing minerals > 0.05% Sulphur). Sulphur has been estimated in both the Resource and waste material where information is available. A background S value of 0.05% S has been included where no assay information is available and where expected lithology types are typically below the 0.05% S value. - Additional environmental factors and assumptions are outlined in the body of the release and further described in Section 4 Estimation and Reporting of Ore Reserves.
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.*	- Bulk density has been determined using the Archimedes method (weigh in water weight in air). Some 1527 core samples between 1.2m and 0.1m from across the deposit have been utilised. These samples are examined statistically to eliminate errors and outliers. The valid samples are then matched with the Co, Fe and S assay values for their respective intervals. Good linear regressions are obtained with all three elements. The final densities are assigned on a block by block basis using a linear regression derived from the combined Co Fe and S assays. The regression equation is: Bulk density = 0.0143*(Co ppm /10000 + Fe % + S %) + 2.5722
Classification	- *The basis for the classification of the Mineral Resources into varying confidence categories.* - *Whether appropriate account has been taken of all relevant factors (i.e. 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.*	- Classification is based on the kriging regression slope with class surfaces created from viewing the regression slopes of the estimated blocks in section. Indicated is defined as all material above the 0.5 kriging regression slope surface and Inferred as all material above the 0 kriging regression slope surface and below the 0.5 kriging regression slope surface. There is some Indicated material near surface that has regression slopes less than 0.5 and this is included as Indicated due to the known mapped outcrop at surface. In addition to this, depth limits have been applied to Big Hill and Railway at 150m RL (approximately 100m below surface) and 50m RL (approximately 150m below surface) respectively. These correspond to the approximate pit base of preliminary optimisations completed for the Scoping Study using the preceding Mineral Resource estimates. - The classification reflects the competent persons view of the deposit.

Criteria	JORC Code Explanation	Commentary
Audits or reviews	- *The results of any audits or reviews of Mineral Resource estimates.*	- No audits or external reviews of this Resource have been completed to date.
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.*	- Accuracy and confidence in the estimation is expressed by the Indicated and Inferred classification applied. No additional confidence measures have been estimated or applied. - Global change of support calculations indicate that the estimate still contains an amount of smoothing that may be underestimating the grade and overestimating the tonnage above 500ppm in the order of 5% to 10%. The current estimate is therefore a compromise between local block and global grade and tonnage accuracy which is considered appropriate in the competent persons view and experience. - No mining or production has taken place.

Section 4 Estimation and Reporting of Ore Reserves

(Criteria listed in the preceding section also apply to this section.)

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 are reported inclusive of the Mineral Resources used to define the Ore Reserves.
		- Two sub-celled Mineral Resource block models were used as the basis of the work. The models encompass the three deposits in the TCP.
		- The models are:
		  - 'ph2018_extended_3.mdl' and
		  - 'rwbh2018_13032018_new.mdl'
		- These models were produced by Danny Kentwell of SRK in February 2018. The Mineral Resource Estimate of this block model was reported in accordance with the JORC 2012 Code.

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 cause.*	- Dean Basile visited site on the 30th of January 2018, inspected some of the diamond drill core and has met with relevant CBHL personnel and their consultants.
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 material Modifying Factors have been considered.*	- The study supporting this Reserve Estimate, has been prepared to a Pre Feasibility Study (PFS) level, it has largely followed the scoping study originally prepared by AMDAD in 2017. - The level of study has significantly increased in the areas of geological, geotechnical, hydrological, hydrogeological, metallurgical, cost estimation, infrastructure and environmental areas. - Most aspects of the study are conventional in nature and are based on tried and tested mining and operating practices. Modifying factors have been considered and are not considered to be anomalous with respect to industry standards. - However, of note, the proposed minerals processing plant combines well established unit processes (comminution, gravity concentration, pressure-oxidation leaching, ion-exchange and solvent-extraction, crystallisation) with a new application of technology which is currently not commercially operated in the base metals industry (pyrolysis of pyrite). Further, the proposed minerals processing flowsheet has not been tested at pilot / demonstration plant of significant scale. The minerals processing aspects of the proposed operation, should be considered of consequential potential risk to both the technical and economic viability of the project.
Cut-off parameters	- *The basis of the cut-off grade(s) or quality parameters applied.*	- As the deposit is polymetallic, a cobalt equivalent grade was determined using Cobalt and Sulphur as potential revenue sources. A Cobalt equivalent cut-off grade was used to determine if the block is to be included in the Ore Reserves Based on the price and cost assumptions.

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr>
<td>Mining factors or assumptions</td>
<td>

<i>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).</i>
<i>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.</i>
<i>The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.</i>
<i>The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).</i>
<i>The mining dilution factors used.</i>
<i>The mining recovery factors used.</i>
<i>Any minimum mining widths used.</i>
<i>The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.</i>
<i>The infrastructure requirements of the selected mining methods.</i>

</td>
<td>

The Thackaringa Cobalt Project (TCP) is a cobalt, sulphur and iron deposit.
TCP will consider cobalt and sulphur in the evaluation of the project.
It is planned that the operation use excavator and rigid body trucks along with a fleet of auxiliary equipment.
This proposed mining method is appropriate for the style and size of the mineralisation.
As TCP consists of a simple bulk massive style deposit with no internal waste, a mining recovery of 95% and mining dilution of 5% has been assumed.
Pit slope geotechnical parameters:

<table>
<tr><th></th><th>Pyrite Hill</th><th>Railway / Big Hill</th></tr>
<tr><th>Parameter</th><th><i>Value</i></th><th><i>Value</i></th></tr>
<tr><td>Batter Angle</td><td>65° – 90°</td><td>80° – 90°</td></tr>
<tr><td>IRSA</td><td>46° – 56.9°</td><td>53.1° – 56.9°</td></tr>
<tr><td>Berm Width</td><td>10 m – 13 m</td><td>11.5 m – 13 m</td></tr>
<tr><td>Bench Height</td><td>20 m</td><td>20 m</td></tr>
<tr><td>Overall Slope Angle</td><td>43° – 54°</td><td>50° – 54°</td></tr>
</table>

No Inferred Mineral Resource has been included in optimisation and/or Ore Reserves reporting. Sensitivities have been conducted to assess the potential impact of their inclusion.

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<tr>
<td>Metallurgical factors or assumptions</td>
<td>

<i>The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.</i>
<i>Whether the metallurgical process is well-tested technology or novel in nature.</i>
<i>The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.</i>
<i>Any assumptions or allowances made for deleterious elements.</i>
<i>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.</i>
<i>For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?</i>

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<td>

The cobalt is present within a pyrite lattice as a solid solution iron replacement. The process is to crush and coarsely grind the ore and then produce a pyrite concentrate by conventional gravity/flotation. The pyrite is concentrated and then is thermally converted to pyrrhotite by pyrolysis (roasting in an inert atmosphere, using commercially available kilns) before magnetically separating the pyrrhotite and leaching it in an autoclave in order to produce a mixed hydroxide precipitate. The mixed hydroxide is refined to produce cobalt sulphate crystals. The final form of cobalt selected for production is cobalt sulphate heptahydrate crystals, which are readily marketable.
Sulphur is extracted for sale by condensation during the thermal treatment stage.
A drill core composite of 830 kg (607 ppm cobalt) was the basis of the PFS testwork. This composite, while providing less than ideal spatial coverage, is considered to be a suitable basis for this work given the simplicity of the target mineral assemblage. The main coverage risk will be grinding circuit design. A bulk pyrite concentrate for heat treatment (pyrolysis) and hydrometallurgical test work was produced using commercial size spirals, a laboratory unit flotation cell and a pilot scale magnetic separator. The pyrolysis was carried out in a purpose built laboratory kiln which provided design data to vendors. The downstream purification testwork was carried out at laboratory scale, also producing design data for equipment vendors.
The metallurgical overall recovery factors applied are 85.5% for Co and 80% for S.

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</table>

Criteria	JORC Code Explanation	Commentary
Metallurgical factors or assumptions *(continued)*		▪ The novel aspect of the proposed processing plant is the use of pyrolysis (to treat the pyrite concentrate) which avoids the production of SO2 and the costs of dealing with it. The technical risk of this is ameliorated by the selection of relatively small off-the-shelf kilns which are readily adapted to this use. ▪ However, this aspect of the proposed operation should be considered of consequential potential risk to both the technical and economic viability of the project.

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.*	▪ Two field investigations have been undertaken as follows.
		▪ **Ecology –** 10 to 13 October 2017, 28 November to 1 December 2017 and 6 to 12 April 2018. Outcomes were as follows:
		  ▫ Two Endangered Ecological Communities. Neither to be disturbed.
		  ▫ One listed flora species. Will not disturbed.
		  ▫ Five listed fauna species. One, the Barrier Range Dragon, likely to be impacted. To minimise the impacts on the endangered Barrier Range Dragon, a biodiversity offset will be required where either an area of land containing suitable habitat is set aside for biodiversity purposes, or a payment into a fund for the management of the Barrier Range Dragon is made.
		▪ **Heritage –** 28 to 31 May. Results pending but advised that while sites were identified., there are no “show stoppers”
		▪ **Acid Rock Drainage –** studies were completed in 2017/18, and generally classify the material as potentially acid forming (PAF).
		▪ Conceptual desk top study reviews of the remaining environmental components have been completed, with no fatal flaws identified.
		▪ The following environmental approvals and permits are required:
		  ▫ Development consent under Part 4 of the Environmental
		  ▫ Planning and Assessment Act 1979.
		  ▫ A Mining Lease under the Mining Act 1992. It is noted that two existing mining leases will be retained.
		  ▫ An Environment Protection Licence under the Protection of the Environment Operations Act 1997.
		  ▫ Aquifer Interference Approval under Section 91 of the Water Management Act 2000.
		  ▫ As138 Permit under the Roads Act 1993.
		  ▫ An approval from ARTC to construct a railway siding and level crossing.
		  ▫ A licence under the Pipelines Act 1967

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 general standard TCP site infrastructure can be classified into three key areas:
		  ▫ Mining area
		  ▫ Processing area, and
		  ▫ Administration area.
		▪ In addition to the standard infrastructure requirements, a new 26km long 66 kV transmission line will require establishment adjacent to the existing Broken Hill – Peterborough rail line, and will incorporate substation upgrades and installation of a suitable substation yard at the TCP.
		▪ In order to supply water, a 26km water supply pipeline (including pumping systems) from Broken Hill will also be required adjacent to the Broken Hill – Peterborough rail corridor.

Criteria	JORC Code Explanation	Commentary
Infrastructure *(continued)*		- A Tailings Storage Facility utilising dry-stacking will be built. This minimises the footprint, maximises the recovery of process water for reuse and minimises the requirement to deal with acid mine drainage. - A generator powered by excess steam from the process plant and oxygen & nitrogen plants are the main infrastructure items in the process area

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 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.*
		- Costs used in the estimation of the Ore Reserves have been sourced from the following documents:
		  - **Mining Operating Costs:** Are based on a quotation estimate provided BGC mining contractors. These costs were benchmarked against mining cost estimates sourced from operations of similar size and nature.
		  - **Process Operating Costs:**
		    - The number of samples tested for the grinding circuit is considered to be “low”. The average hardness of these samples were used, not the hardest sample for the design. This could have a potential impact on the operating costs.
		    - Labour costs were estimated from the manning list using typical mining industry rates for the region
		    - Reagent costs were developed from testwork data and vendor quotes
		    - Maintenance costs were developed from a mix of vendor quotes for major wear parts and accepted factors on equipment capital cost
		    - Power consumption was based mainly on Vendor data. Power cost was based on advice from AEMO (prices on the National Electricity Market over an 18 month period) and transmission charges from Ausgrid. Just under 20% of the power will be provided through steam generation.
		  - **Project Capital Estimate (Overall capital of $700M):**
		    - Mining area – open cut pits, waste dumps, heavy vehicle haulroads, Mining Contractor area, explosives magazine, ROM pad and major creek and drainage diversions.
		    - Processing – processing plant, Electrical High Voltage yards and MCCs, tails dam and overland conveyors, water storage and catchment of dams, weighbridge and rail siding.
		    - Vendor quotations were obtained for all major equipment items using design criteria developed from testwork as well as some assumptions based on industry practice.
		    - Quite detailed scaled 3D plant layouts were prepared, which were used for material take-offs (steel, concrete), conveyor runs and civil works.
		    - Industry productivity and labour rates were used for installation costs
		    - Electrical and instrumentation capital was factored.
		    - An appropriate contingency was used
		    - Administration – office and admin area, warehouse, stores and laydown yard, security facilities, change house and ablutions, site access roads and carpark.
		  - **Site General and Administration:**
		    - Are estimated to be in the order of $17.5M per annum which are based on a “first principles” cost estimate. The labour rates are sourced from operations of similar nature and size.

Criteria	JORC Code Explanation	Commentary

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.*
		- For cost assumptions see section above – "Costs"
		- CBHL employed specialist consultants and specific industry contacts to determine a market outlook for Cobalt. The assumed commodity prices are based on anticipated 2026 prices. The following commodity prices are used (values are in USD/lb for Cobalt and USD/t for sulphur)
		  - Cobalt – $33
		  - Sulphur – $114
		- Prices are estimated at the mine gate, freight costs are estimated to be $AUD129/t cobalt sulphate.

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 cobalt market is split into two major segments: - Metallurgical –including superalloys, magnets, high-speed (HS) steel and hard facing materials. - Non-metallurgical –Cobalt chemicals are used in pigments, dyes and catalysts in a number of sectors including the ceramics, plastics and paints industries. The bulk of chemicals are now being used in the production of batteries including NiMH and NiCd batteries (cobalt hydroxide) and Li-ion batteries (cobalt sulphate and oxide). - The cobalt market began a multi-year deficit market in 2016 following seven years of overcapacity and oversupply. The market faces a similar deficit in 2018 as global refined demand surpasses the 100,000 tonne milestone. The deficit forecast for 2018 is split broadly equally between the metallurgical sectors: The former because of a decrease in refined supply for metallurgical uses in 2018, and the latter because of stronger than anticipated demand growth for Li-ion batteries - Based on a review of the current and forecast market for cobalt over the next fifteen years, the final form of cobalt selected for production was cobalt sulphate heptahydrate crystals. These salts are used in the production of batteries. - Sulphate demand growth for NMC batteries is expected from uptake of NMC in the Chinese EV market. - The Tesla Gigafactory ramp-up from 2021 to 2026 is expected to generate demand of cobalt sulphate heptahydrate crystals. - Recycling of cobalt from spent EV batteries from 2018 to 2026. - While the market specification in terms of cobalt sulphate grade was met, several minor elements were present at above market specification levels. The changes in conditions, necessary to resolve this, will be best determined in the proposed demonstration plant.
Economics	- *The inputs to the economic analysis to produce the net 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 costs used in the economic valuation are based on studies mentioned in the "Costs" section of this table. They all have a level of confidence to be included in the Ore Reserve as per the requirements listed in the 2012 JORC Code. - The inputs that inform the economic analysis include all foreseeable operating and capital costs, resulting in a positive NPV for the Ore Reserve. A discount rate appropriate to the size and nature of the organisation and deposit has been used in the estimation. - The NPV is particularly sensitive to variations in capital and processing metallurgical recovery.

Criteria	JORC Code Explanation	Commentary

Social	- *The status of agreements with key stakeholders and matters leading to social licence to operate.*	- The project would result in substantial benefits to the local community, including
		  - Additional employment and economic activity.
		  - Broadening of the based of the local mining industry, reducing downside risk in the event of downturns in commodity markets.
		  - Extending the life of the mining industry in Broken Hill, permitting more time to transition to a non-mining economy.
		- Notwithstanding this, potential adverse impacts include
		  - Competition and increased costs for housing and services.
		  - Increased burden for local businesses, including labour costs and availability
		  - Pressure on services, including health and education.
		- Taking into account potential beneficial and adverse impacts, the project is determined to provide an overall benefit to the local community; however, adverse impacts will need to be managed.

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.*	- All government agreements and approvals required to realise the Ore Reserves will be realised within the timeframes anticipated in the Pre-feasibility study, and will be in place until the end of the mine life.
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 proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	- The Ore Reserves classification is based on the JORC 2012 requirements. The basis for the classification was the Mineral Resource classification and economic cut-off grade.
Audit or Reviews	- *The results of any audits or reviews of Ore Reserve estimates.*	- No Ore Reserve audits have been carried out; however Internal Peer Review by qualified Mining One personnel has been carried out as part of this Ore Reserves Estimate. Furthermore, reliance on experts in specific fields have been employed to provide opinion and endorsement in areas that are considered innovative/new technology.

Criteria	JORC Code Explanation	Commentary
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.*	- The most significant factors affecting confidence in the Ore Reserves are: - Although previous studies have been prepared to a sufficient level of confidence, variation in the capital, operating costs, and market fluctuations will have an impact on the project economics. - In general, the modifying factors, mining and operational assumptions here are within industry accepted standard. However, the proposed processing plant is considered to be novel / new technology. No pilot / demonstration plant of significant scale has been built. This aspect of the proposed operation should be considered of consequential potential risk to both the technical and economic viability of the project.