Ardea Resources Limited

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ASX Symbol

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Fully Paid Ordinary Shares
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Unlisted options exercisable at $0.25
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Unlisted Loyalty options exercisable at $0.77
14,904,637

Directors/Employee Performance Rights
4,485,000

ABN 30 614 289 342

Ardea Delivers Outstanding Pre-Feasibility Study for the Goongarrie Nickel Cobalt Project with Significant Expansion Potential

Study into the production of high quality nickel and cobalt sulphates has confirmed the economic viability of this scalable, multi-decade production opportunity in Western Australia.

- **1.0 Mtpa base case** over an initial **25-year mine life** is readily capable of expansion to reflect the orebody's larger production potential.
- **95.5 % cobalt recovery** and **94.5 % nickel recovery** (life of mine).
- **Strong financials** for both the base 1.0 Mtpa and 1.5 Mtpa cases.

Case	***Pre-tax NPV$_8$***	*Post-tax NPV$_8$*	*IRR*	*Payback*
1.0 Mtpa	**A$1.43 billion**	A$1.04 billion	25 %	5.3 years
1.5 Mtpa	**A$1.93 billion**	A$1.40 billion	25 %	5.6 years

- 1.0 Mtpa base case production.
  - **5,500 tpa of cobalt sulphate** (1,180 tpa contained cobalt).
  - **41,500 tpa of nickel sulphate** (9,300 tpa contained nickel).
  - Capital cost of A$599 million including A$77 million contingency.
  - **Competitive industry C1 cash cost of US$0.42/lb nickel metal** (after cobalt credits).
- **Strong interest from potential EPC and offtake partners.**
- Definitive Feasibility Study (DFS) programs underway.
- **Upside options being assessed**, including higher throughput/shorter autoclave residence time, multiple parallel trains, mineralised neutraliser optimisation, and scandium production.
- **Goongarrie reserve is less than 5 % of the total Kalgoorlie Nickel Project (KNP) resource,** confirming the project's potential scalability.

Ardea Resources Limited ("Ardea" or "the Company") is pleased to announce outstanding results from the Pre-Feasibility Study (PFS) on its 100%-owned Goongarrie Nickel Cobalt Project (Goongarrie) 85 km north of Kalgoorlie.

Most importantly, the PFS confirms that Goongarrie could become a multi-decade producer of high quality cobalt and nickel sulphate products to support the rapidly growing electric vehicle (EV) and battery storage markets. With significant potential upside available in up-scaling the project, initial Definitive Feasibility Study (DFS) programs are now underway.

The PFS Base Case is based upon mining and processing 1 million tonnes per annum (Mtpa) of run of mine ore over an initial 25 year mine life.

Commenting on the results, Ardea Chair Ms Katina Law stated:

"The PFS has delivered outstanding results for Ardea. It demonstrates the strong financial returns of the Goongarrie Nickel Cobalt Project based on current commodity prices and with demand for both nickel and cobalt sulphate continuing to grow, the potential returns to our investors could be much higher.

The large resource, simple leach kinetics of the Goongarrie ore and exploration potential of the broader area provide significant opportunity to increase the scale of production and as such, Ardea will assess opportunities to further enhance the project economics concurrently with the DFS."

"Ardea is focused on the rapid development of Goongarrie to meet market demand. We have already commenced initial DFS programs and a scoping study on an expanded 2.25 Mtpa production scenario is being evaluated. The Company looks forward to updating the market as we advance Goongarrie towards production."

Table 1-1 – Goongarrie Nickel Cobalt Project key parameters summary – 1.0 Mtpa base case highlighted

Parameter		Units		
Autoclave Throughput			**1.0 Mtpa**	**1.5 Mtpa**
Life Of Mine			**25**	25
Production LOM average	Nickel sulphate	tpa	**41,500**	55,300
	Cobalt sulphate	tpa	**5,500**	6,900
	Contained nickel	tpa	**9,300**	12,350
	Contained cobalt	tpa	**1,180**	1,450
Recovery LOM average	Nickel	%	**94.5 %**	94.5 %
	Cobalt	%	**95.5 %**	95.5 %
Nickel sulphate price #		US$/lb	**8.84**	8.84
Cobalt sulphate price#		US$/lb	**41.63**	41.63
Exchange Rate		A$:US$	**0.788**	0.788
Initial Capital		A$ M	**599**	746
C1 Cash Cost	before Co credits	US$/lb	**5.59**	5.32
	after Co credits	US$/lb	**0.42**	0.45
AISC	after Co credits	US$/lb	**1.00**	0.99
Pre-Tax NPV @ 30 Jun 20, 8.0% (real)		A$ billion	**1.43**	1.93
Pre Tax IRR (real)		%	**29 %**	29 %
Post-Tax NPV @ 30 Jun 20, 8.0% (real)		A$ billion	**1.04**	1.40
Post-Tax IRR (real)		%	**25%**	25%
Payback		Years	**5.3**	5.6

#Nickel sulphate and cobalt sulphate prices are average recorded transaction prices for February 2018 in the People's Republic of China, the world's largest consumer of these products (Source: SMM, see Section 13). Note: production tonnages are rounded to reflect degree of certainty.

1. Pre-Feasibility Study Overview

The completion of the robust and highly-scalable Goongarrie Nickel Cobalt Project PFS outlines a manageable capital and low operating cost base case which utilises simple open pit mining and processing of 1.0 Mtpa of autoclave ore feed over an initial 25-year period. This is capable of generating exceptional returns and significant long-term value for the Company and our shareholders.

The key financial highlights of the project include a projected average annual **EBITDA of A$210 million** based on current pricing for sulphates, which generates a forecast project Net Present Value (**$NPV_{8\%}$ post tax**) **of A$1.04 billion** and an **IRR of 25 %**. Forecast pre-production capital expenditure is A$599 million including a A$77 million contingency.

The PFS considered production levels of a 1.0 Mtpa base case and 1.5 Mtpa. The 1.0 Mtpa case represents a lower capital expenditure starter option that is readily expandable for greater throughput by the installation of additional modular processing trains. The production levels considered are viable on a single standalone process train design basis.

The 1.0 Mtpa base case was selected to minimise initial funding requirements given the current market capitalisation of Ardea. A larger scale project is potentially fundable with a consortium or strategic partners assisting in development of the project as the resource base at Goongarrie is large.

Goongarrie and the larger, encompassing Kalgoorlie Nickel Project (KNP) are sizeable, globally significant deposits that provide the potential capacity for high rates of production over many decades. There is considerable opportunity to expand the mine life and annual production in the future by including additional open pit inventory which is not currently included in the mining schedule. The reserves reported in this announcement (see Section 4.2) represent only that material at Goongarrie that informs the mining schedule and represents less than 5 % of the overall KNP resource.

These outcomes are based on an average price of US$8.84/lb nickel sulphate and US$41.63/lb of cobalt sulphate (see Section 10 regarding pricing selected). An A$:US$ exchange rate of **0.788** has been selected for the life of the project.

Additional key information from the PFS

Resource Endowment	• The PFS for Goongarrie covers a subset of the defined 83 Mt at 0.10 % cobalt and 0.79 % nickel resource. • The KNP total resource (*see* Ardea Resources Annual Report 2017) of over 750 Mt which represents over 375 kt of contained cobalt metal and over 5.5 Mt of contained nickel metal, offers further opportunities to develop additional resources, reserves and processing hubs, all within 150 km of the vibrant mining centre of Kalgoorlie-Boulder.
Infrastructure	• The KNP is located in a stable mining region with resources largely concentrated on granted Mining Leases with established road, rail, port and gas infrastructure and a highly skilled work-force and support services available in nearby Kalgoorlie-Boulder.
Processing	• Goongarrie utilises a fifth generation Pressure Acid Leach / Mixed Sulphide (PAL/MS) flowsheet, using modular components and is based on the approach used by Sumitomo's very successful Coral Bay operation in the Philippines. Goongarrie bench-marks exceptionally well with world-wide PAL operations, with the modular approach also offering the opportunity to up-scale production levels by adding multiple trains over time. • The dominant goethite ore at Goongarrie is highly favoured as the desired feed of successful operations. The ore offers exceptional leach kinetics and contains amongst the highest cobalt grade for a deposit in a politically stable jurisdiction.

Prices for both cobalt and nickel are currently being driven by the rapidly increasing demand from the Automotive Electrification Revolution and Battery Storage markets. Nearly every auto manufacturer has detailed programs, plans, and in some cases product lines for implementation and manufacture by the middle of the 2020s. Lithium ion batteries of various type almost universally contain nickel- and cobalt-bearing cathodes and will be used in all electric vehicles. More importantly, several kilograms of cobalt metal are required for each automobile battery.

Cobalt prices have climbed in the past year to reach decade high levels, with demand anticipated to outstrip supply over the coming years as both the EV and Battery Storage markets continue to grow. Wider macroeconomic issues (political, supply, workplace issues) from predominant cobalt supplier the Democratic Republic of Congo are presenting risks to the supply side balance. Respected analysts including the CRU Group are predicting substantial growth in cobalt and nickel prices into the next decade.

Following a detailed analysis of cobalt and nickel markets, spot prices for the metal sulphates were selected for the PFS as the Goongarrie project will produce and sell sulphates. Market prices for cobalt sulphate and nickel sulphate have been sourced from long term respected analysts Shanghai Metals Markets, who have intimate knowledge of the world's largest cobalt and nickel sulphate market, China. Prices used in the study are average sulphate trading prices for February 2018 and underpin the cashflow forecasts in Figure 1-1. See Section 10 for more information in relation to the reasons behind the selection of February 2018 spot prices.

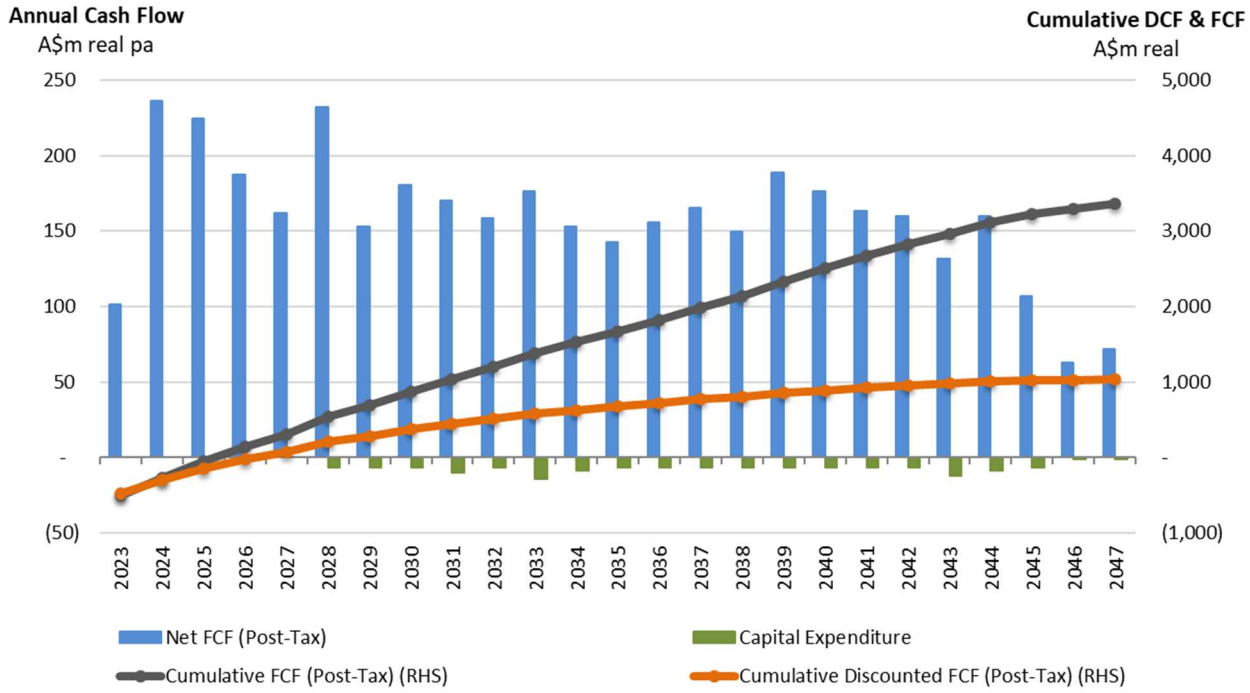

Figure 1-1 – Goongarrie Nickel Cobalt Project 1.0 Mtpa base case cashflow. Free cash flow (FCF) is the sum of all operating outcomes relating to revenue minus expenses, net working capital derived from debtor and creditor payments, capital expenditure and tax payments.

In comparison to historic evaluations of the Goongarrie deposits, the 2018 PFS was optimised for both cobalt and nickel production with the PFS flowsheet utilising proven technologies, which allows very high recoveries exceeding 94% for both cobalt and nickel. This is a function of both the outstanding homogeneity and predictability of mineralisation at Goongarrie, and of the amenability of the ore to the selected flowsheet.

This PFS has been completed to a high degree of detail, meeting accepted industry pre-feasibility requirements and as such sets a strong foundation to advance the project to definitive feasibility, then funding, a development decision, construction and production by 2022.

2. Tenure

The Goongarrie Nickel Cobalt Project covers 142 km^2 within the larger Kalgoorlie Nickel Project (KNP) which totals some 1,738 km^2 (Figure 2-1).

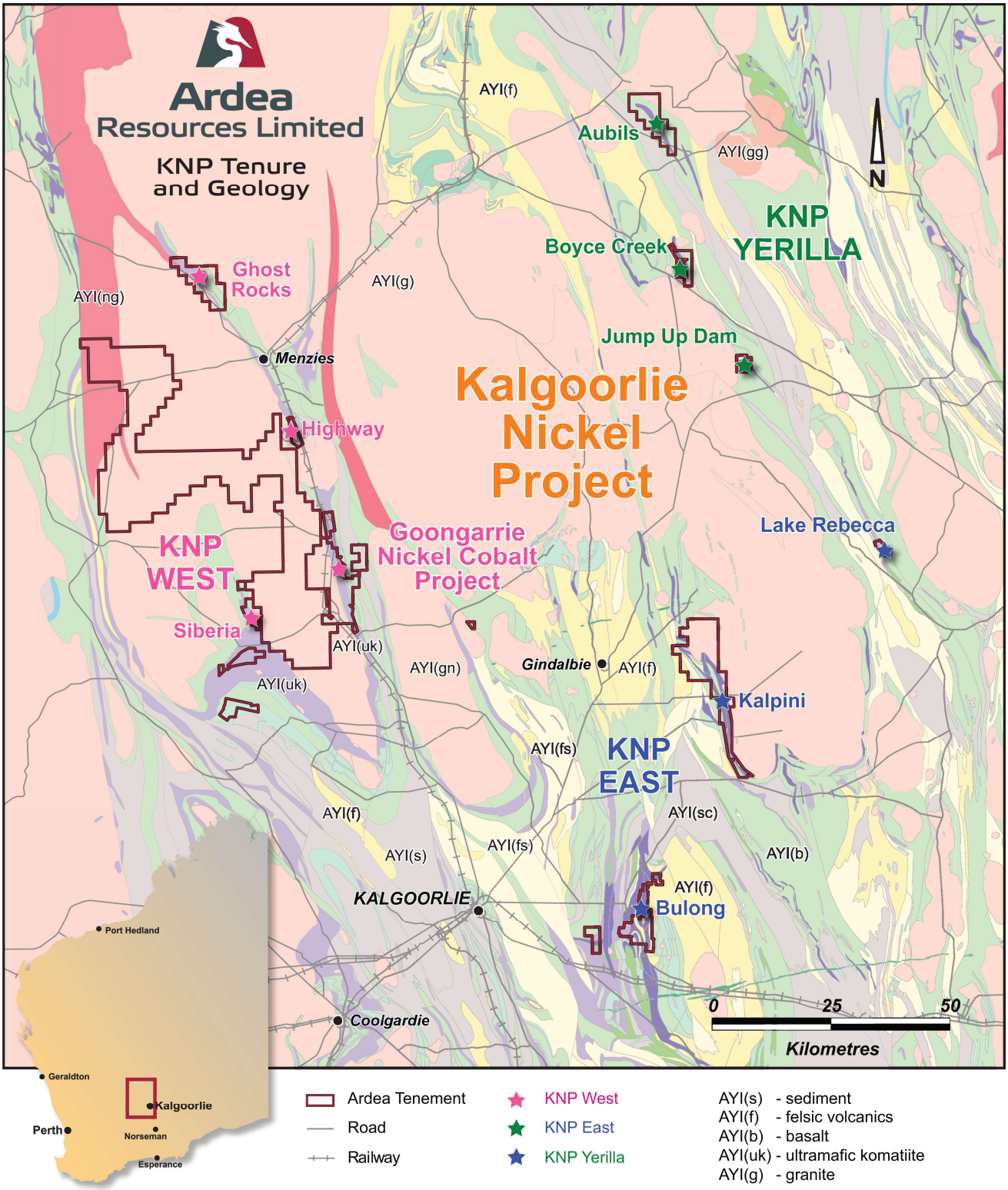

Figure 2-1 – The Kalgoorlie Nickel Project (KNP) Regional Geology, showing project areas.

The majority of resources defined are located on granted Mining Leases, mainly granted in the early 2000s (Figure 2-2).

Ardea retains 100% ownership of all Mining Leases at Goongarrie and, other than legislated government royalties, there are no encumbrances on the project.

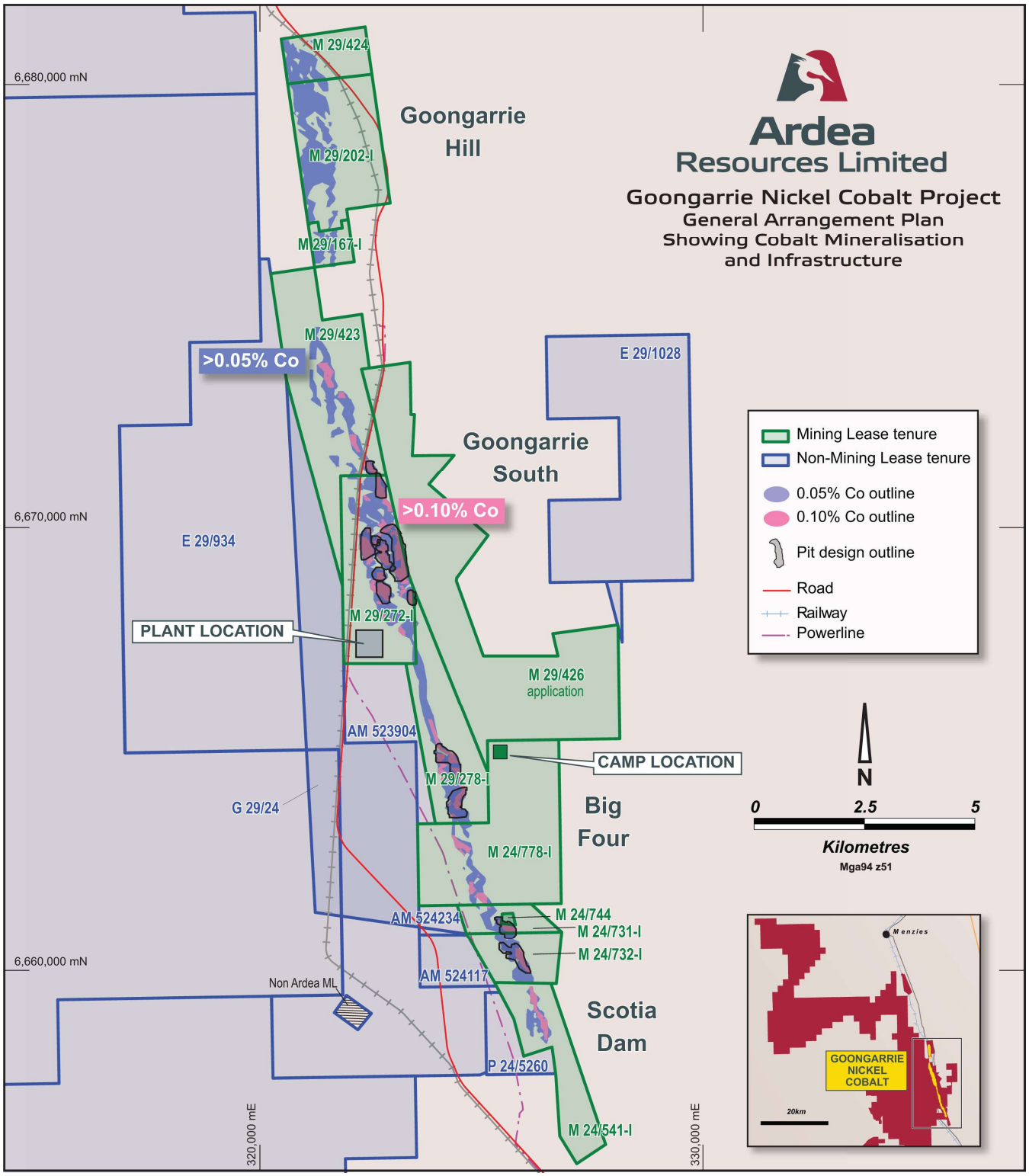

Figure 2-2 – The Goongarrie Nickel Cobalt Project, with mining licence tenure shown in green.

3. Resources

The PFS has focused on a small subset of the Goongarrie resource estimated by Hyland Geological and Mining Consultants Pty Ltd (HGMC), based on over 115,000 metres of drilling in over 2,370 drill holes (for further detail see ASX announcement dated 14 March 2018).

The total resource within the Cobalt Zone of the Goongarrie global resource is 83.1 Mt at 0.10 % cobalt and 0.81 % nickel, for 81,700 t of contained cobalt metal and 672,300 t of contained nickel metal[1]. This is part of the overall Goongarrie resource, which is defined as **215.6 Mt at 0.06 % cobalt and 0.71 % nickel**, and includes **130,700 t of contained cobalt metal**, and **1,522,700 t contained nickel metal**.

A full breakdown of the Goongarrie Resource is provided in Table 3-1. This resource includes all of the Cobalt Zone resource and additionally the greater tonnes of lower grade material outside of the Cobalt Zone. It was this overall resource that was used to fully define the reserves for Goongarrie.

Goongarrie encompasses four deposits of laterite mineralization hosted in the regolith above ultramafic cumulate rocks of the Walter Williams Formation (WWF). Updated estimates of the nickel and cobalt Mineral Resources for the project which includes the Goongarrie Hill (GH), Goongarrie South (GS), Big Four (BF) and Scotia Dam (SD) areas were completed by HGMC in early 2018 and inform the Mining Study component of the Ardea PFS.

Table 3-1 – Summary of total mineral resources within the Goongarrie Nickel Cobalt Project area, comprising resources at Goongarrie Hill, Goongarrie South, Big Four, and Scotia Dam (14 March 2018).

Camp	Domains	Cut-off %	Resource category	Size (Mt)	Cobalt (%)	Nickel (%)	Contained metal Co (t)	Contained metal Ni (t)
Goongarrie Hill	Ni & Co	≥ 0.5% Ni or > 0.08% Co	Inferred	52.5	0.04	0.65	21,600	340,400
			Subtotal	*52.5*	*0.04*	*0.65*	*21,600*	*340,400*
Goongarrie South	Ni & Co	≥ 0.5%Ni or > 0.08% Co	Measured	10.3	0.10	0.98	10,200	101,200
			Indicated	56.2	0.07	0.72	37,200	407,000
			Inferred	32.2	0.06	0.69	20,300	221,200
			Subtotal	*98.7*	*0.07*	*0.74*	*67,700*	*729,300*
Big Four	Ni & Co	≥ 0.5%Ni or > 0.08% Co	Indicated	45.5	0.06	0.71	28,200	320,700
			Inferred	9.9	0.06	0.63	6,100	61,900
			Subtotal	*55.4*	*0.06*	*0.69*	*34,300*	*382,700*
Scotia Dam	Ni & Co	≥ 0.5% Ni or > 0.08% Co	Indicated	3.3	0.09	0.81	3,000	26,900
			Inferred	5.7	0.07	0.76	4,100	43,300
			Subtotal	*9.0*	*0.08*	*0.78*	*7,100*	*70,200*
Total	All	≥ 0.5% Ni or > 0.08% Co	Measured	10.3	0.10	0.98	10,200	101,200
			Indicated	105.0	0.07	0.72	68,400	754,600
			Inferred	100.3	0.05	0.67	52,100	666,900
Goongarrie Resource Global			**TOTAL**	**215.6**	**0.06**	**0.71**	**130,700**	**1,522,700**

Note: All nickel and cobalt domains are included, and are encapsulated by an envelope defined by nickel grades equal to or greater than 0.5%. Note that figures are rounded to reflect degree of certainty and may not tally.

The combined Goongarrie Hill, Goongarrie South, Big Four and Scotia Dam deposits (from north to south) form a continuous zone of mineralisation that extends over a strike length of more than 16 km, is up to 1 km wide and averages approximately 40 m in thickness.

[1] Brief mineral resource breakdown within the Cobalt Zone portion of the Goongarrie Nickel Cobalt Project area at Goongarrie, comprising resources at Goongarrie South, Big Four, and Scotia Dam. For further detail see ASX announcement dated 14 March 2018.

Deposit(s)	Resource category	Size(Mt)	Cobalt(%)	Nickel(%)	Contained Co (t)	Contained Ni (t)
Goongarrie South	Total	53.1	0.10	0.82	52,000	436,600
Big Four	Total	25.0	0.10	0.77	24,000	192,100
Scotia Dam	Total	5.0	0.11	0.87	5,600	43,600
Goongarrie Cobalt Zone TOTAL		**83.1**	**0.10**	**0.81**	**81,700**	**672,300**

Note: Cobalt Zone domains comprise cobalt domains and cobalt bearing areas of the nickel domain. The cobalt domains (blue areas, Figure 1) are defined where 1) Co ≥ 0.08% and 2) Co< 0.08% and Ni ≥ 0.5%. From the nickel domain (grey areas, Figure 1), only areas where Co≥0.08% are included. Note that figures are rounded as appropriate to reflect degree of certainty and may not tally exactly. See announcement dated 14 March 2018 for full details.

The resource estimates have been classified in accordance with the JORC 2012 guidelines with Measured, Indicated and Inferred Mineral Resources defined at Goongarrie South, both Indicated and Inferred Mineral Resources defined at Big Four and Scotia Dam and an Inferred Mineral Resource defined at Goongarrie Hill.

4. Mining and Ore Reserves

Auralia Mining Consulting Pty Ltd (Auralia) completed the mining section of the PFS, incorporating pit optimisation, design, scheduling and costing, and have defined a JORC 2012 compliant Ore Reserve. The study draws its Ore Reserve from only two separate Mineral Resources; Goongarrie South and Big Four. No other areas were considered as part of this study.

Nickel and cobalt mineralisation at Goongarrie is hosted within a series of shallow flat-lying deposits, with most mineralisation occurring within 50 m of surface However, localised penetrative weathering (on underlying structures) results in deep, V-shaped mineralised zones that provide continuous vertical mineralised intercepts in excess of 100 m.

The deposits lend themselves to simple open-pit mining with minimal dilution. The schedule assumes the development of 13 separate open pits. The PFS assumes that mining will be undertaken by conventional open pit methods, utilising truck and excavator fleets.

The Goongarrie ore is soft and is amenable to free digging by excavators with minimal blasting required only where surface hardcap deposits are present. The deposit is characterised by low strip ratios of around 1.5:1.

The PFS assumes that mining at Goongarrie will be operated with a contract mining operation with all mobile equipment to be provided, operated and maintained by a mining contractor or contractors over the life of the project.

Mining costs were sourced specifically for this project from independent mining contractors.

4.1. Pit Optimisation and Schedules

To maximise the NPV of any project, it is necessary to develop the pits in stages so that the highest value material is mined and processed first. The selection of the areas to mine was completed using a combination of:

1) the order of development of the shells in Whittle optimisations (priority for areas of highest value); and
2) a focus on targeting high grade material (defined using nickel equivalent grades[2] ≥1.3 % for 1.0 Mtpa schedule, ≥1.0 % for 1.5 Mtpa schedule), to develop the highest recovered value for around 40 Mt of ore.

The main cobalt-nickel resources are at Patricia Anne (scheduled pits 1 and 2), Pamela Jean (scheduled pit 3) and Elsie Tynan (scheduled pit 4) (Figure 4-1).

[2] Nickel equivalent (Nieq %) = $Ni\ grade + \frac{Co\ grade \times Co\ price}{Ni\ price}$. Prices used are US$15,120 /t for nickel and US$96,600 /t for cobalt. . No assumption about recovery is included here. Recoveries are addressed elsewhere throughout the mining schedule and financial model.

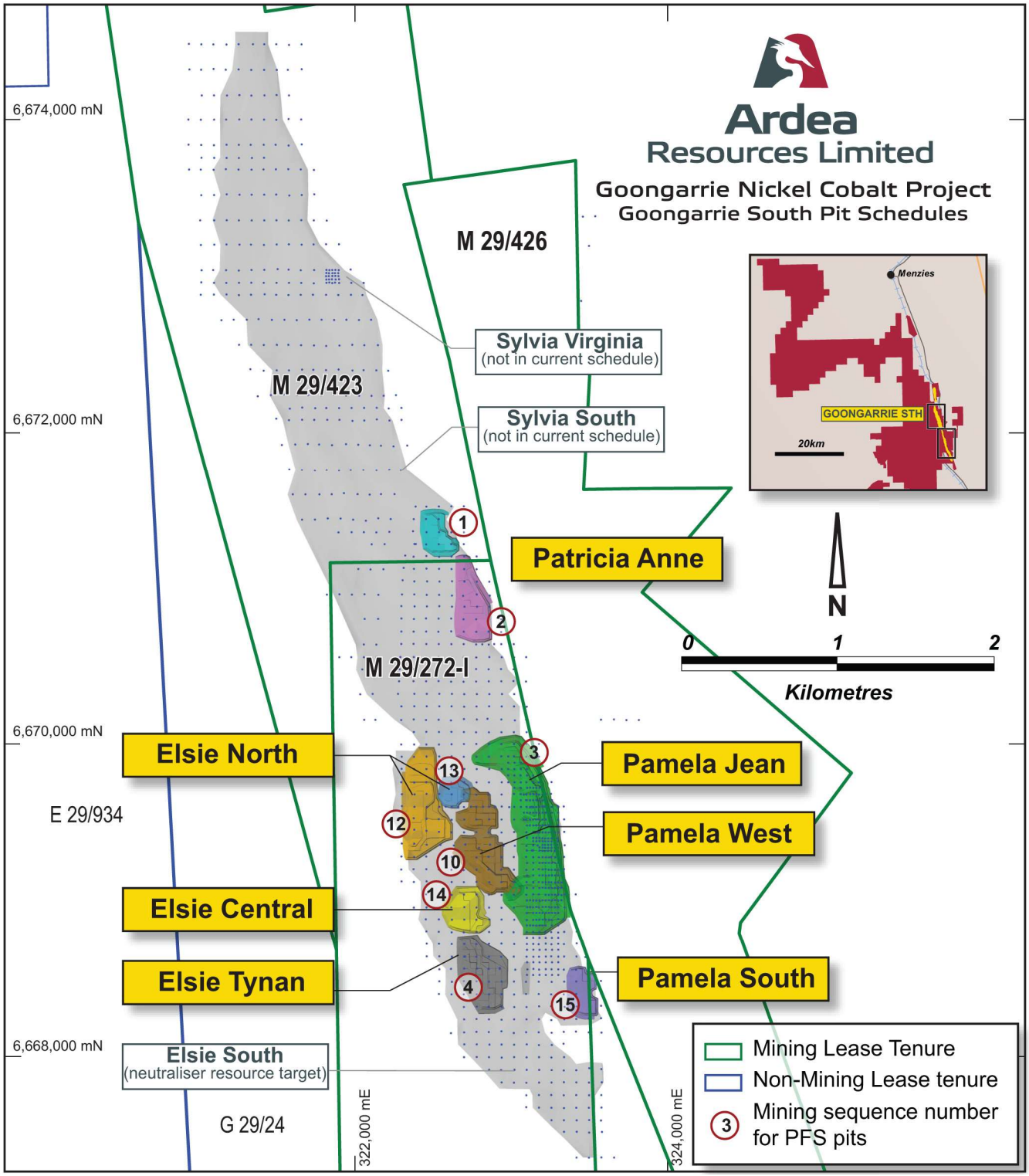

Figure 4-1 – Pit schedules for the Goongarrie South part of the Goongarrie Nickel Cobalt Project

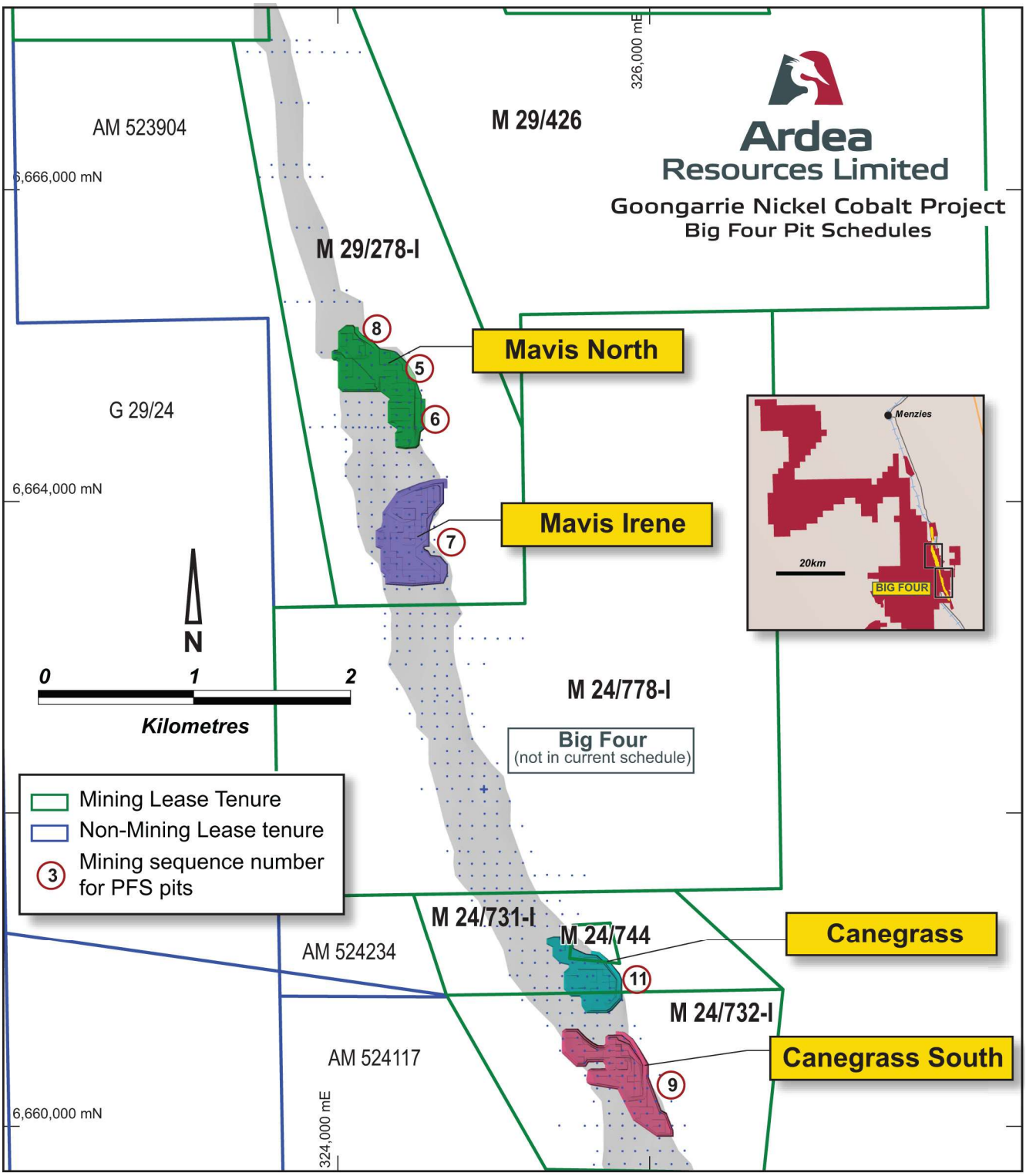

Figure 4-2 – Pit schedules for the Big Four part of the Goongarrie Nickel Cobalt Project

Goongarrie Nickel Cobalt Project
Goongarrie South cross sections
Pamela Jean Zone, Pit GS5

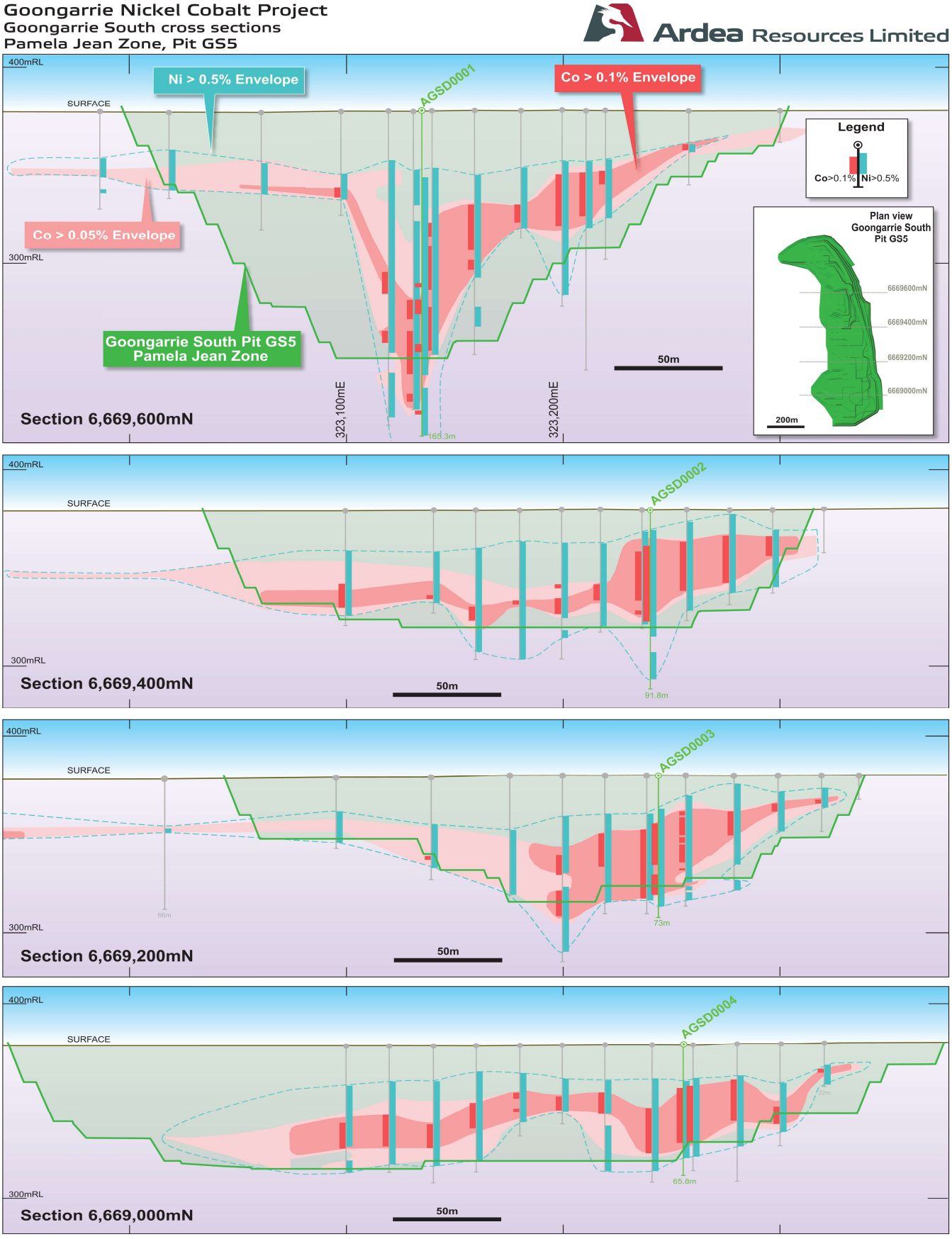

Figure 4-3 – Cross sections of the Pamela Jean orebody showing modelled pit profiles (scheduled pit 3)

Mining then proceeds to the Big Four pits at Mavis North (scheduled pits 5, 6, and 8) and Mavis Irene (scheduled pit 7) (Figure 4-2).

The plant will be located 1 km southwest of Elsie Tynan and 3 km northwest of Mavis North (refer general arrangement plan (Figure 2-2). As well as targeting optimised cobalt-nickel revenues, open pit scheduling takes into account the recovery of carbonate material for use in post-autoclave acid neutralisation.

Two carbonate sources are available – palaeo-channel dolomite- and magnesite-cemented gravels above the ore zone within mined waste, and dolomitic saprock immediately underlying the cobalt-nickel mineralisation. The saprock contains sufficient payable metal to cover its mining cost.

In order that neutraliser is available for processing at start-up, a "Neutraliser Starter Pit" was designed at Elsie North (effectively an early pre-strip for cobalt-nickel scheduled pit 12).

The mining schedule dominantly comprises Measured and Indicated Mineral Resources, which have been converted to Reserves (see below). To facilitate orderly mine development, minor blocks of Inferred Mineral Resource at the margins of optimised pits were included in the schedule.

Once a pit is mined to its design depth including recovery of footwall saprock neutraliser, there is no remnant value in the pit floor (since the mineralisation is entirely restricted to weathered regolith, with the underlying bedrock protolith entirely sub-grade at <0.3% nickel). The mined void is thus available to be back-filled with either mined waste from subsequent pits or de-watered tailings as appropriate.

4.2. Ore Reserves

Mineral Resource estimates were completed for the Goongarrie South, Big Four, Scotia Dam and Goongarrie Hill areas, being **215.6 Mt at 0.06% cobalt and 0.71% nickel** (Table 3-1, refer ASX announcement 14 March 2018, and Appendix 2). This overall resource includes a Cobalt Zone component for Goongarrie South, Big Four and Scotia Dam of **83 Mt at 0.10% cobalt and 0.81% nickel** (refer ASX announcement 14 March 2018, Table 2).

With mine scheduling done to PFS level on both the 1.0 Mtpa and 1.5 Mtpa scenarios, Ore Reserves were estimated on the basis of the 1.5 Mtpa mining schedule for 25-year mine life (i.e. a nominal 37.5 Mt). The 1.0 Mtpa case is therefore a subset of this reserve. The Reserve is estimated at **40.1 Mt at 0.09% cobalt and 0.82% nickel** (Table 4-1). As ongoing feasibility studies are completed for higher plant throughputs, larger components of the Mineral Resource are expected to convert to Ore Reserves.

The Ore Reserve numbers include mining dilution and recovery. Ore Reserve estimates are not precise calculations and reporting of estimated tonnage and grade reflects the relative uncertainty of the estimate by appropriate rounding. The Ore Reserve calculation is restricted to the designed pits only and does not reflect the total material in the optimisation.

For the 1.0 Mtpa case, material <1.3% Nieq[3] will be stockpiled adjacent to the pit ramp and may be processed after the 25-year initial mine life. At current sulphate pricing, processing such material is financially viable, but it is not included in the NPV model which has a base case 25-year term.

The mining schedule for the 1.0 Mtpa base case targets the areas of highest value first and is summarised in Figures 4-1 and 4-2 (numbering on pits is sequence of mining).

[3] Nickel equivalent (Nieq %) = $Ni\ grade + \frac{Co\ grade \times Co\ price}{Ni\ price}$. Prices used are US$15,120/t for nickel and US$96,600/t for cobalt. No assumption about recovery is included here. Recoveries are addressed elsewhere throughout the mining schedule and financial model.

Table 4-1 – Goongarrie Nickel Cobalt Project, Ore Reserves based on 25 year mine life at 1.5 Mtpa.

Deposits	Class	Size (Mt)	Cobalt (%)	Nickel (%)
Goongarrie South	Proven	8.95	0.10%	0.96%
	Probable	17.26	0.09%	0.79%
	Total	*26.22*	*0.10%*	*0.85%*
Big Four	Proven	—	—	—
	Probable	13.92	0.09%	0.77%
	Total	*13.92*	*0.09%*	*0.77%*
TOTAL	**Proven**	**8.95**	**0.10%**	**0.96%**
	Probable	**31.18**	**0.09%**	**0.78%**
	Total	***40.13***	***0.09%***	***0.82%***

Using a nickel equivalent cut of >0.81 %, which used inputs of A$18,900/t nickel and A$120,750/t cobalt. (US$15,120/t Ni and US$96,600/t Co, 0.8 exchange rate) as listed in the JORC Table 1. See footnote 3 page 13.

Table 4-2 – Mining Schedule Outputs

		1.0Mtpa			1.5Mtpa		
Mining schedule parameter		Total	Measured + Indicated	Inferred	Total	Measured + Indicated	Inferred
High Grade Ore	High Grade Cut-off	1.3 % Ni equivalent*			1.0 % Ni equivalent*		
	Tonnes Input to Mill	22.0	20.7	1.3	32.6	30.9	1.7
	Co grade Input to Mill	0.13%	0.13%	0.15%	0.11%	0.11%	0.13%
	Ni grade Input to Mill	1.04%	1.05%	1.00%	0.93%	0.93%	0.92%
Low Grade Ore	Low Grade Cut-off	0.81 % Ni equivalent*			0.81 % Ni equivalent*		
	Tonnes Input to Mill	2.6	2.4	0.2	4.4	4.0	0.4
	Co grade Input to Mill	0.06%	0.06%	0.06%	0.05%	0.05%	0.05%
	Ni grade Input to Mill	0.63%	0.63%	0.61%	0.57%	0.57%	0.57%
	Tonnes to Stockpile	17.8	17.0	0.8	5.9	5.3	0.7
	Co grade Input to S/pile	0.06%	0.06%	0.06%	0.06%	0.05%	0.05%
	Ni grade Input to S/pile	0.62%	0.62%	0.62%	0.56%	0.56%	0.56%
	Total LG Tonnes	20.4	19.4	1.0	10.3	9.2	1.1
	Co grade	0.06%	0.06%	0.06%	0.05%	0.05%	0.05%
	Ni grade	0.62%	0.62%	0.62%	0.56%	0.56%	0.59%
Total Mill Feed	Tonnes to Mill	24.7	23.1	1.5	37.0	34.8	2.1
	Co grade Input to Mill	0.12%	0.12%	0.14%	0.10%	0.10%	0.12%
	Ni grade Input to Mill	1.00%	1.00%	0.95%	0.89%	0.89%	0.86%
Waste Tonnes		~63.0 Mt			~63.0 Mt		
Mining Life		~23 years			23 years		
Processing Life		25 years			25 years		

** The Ore Reserve pit designs are based on the optimised Whittle shells, which used inputs of A$18,900/t Ni and A$120,750/t Co. (US$15,120/t Ni and US$96,600/t Co, 0.8 exchange rate as listed in the JORC Table 1. Note that figures are rounded to reflect degree of certainty and may not tally.*

After 25 years a low-grade stockpile of 17.8 Mt at 0.62 % nickel and 0.06 % cobalt will remain from the 1.0 Mtpa throughput scenario, and 5.9 Mt at 0.56 % nickel and 0.05 % cobalt for the 1.5 Mtpa scenario. Inferred material is a relatively minor component and is distributed relatively evenly throughout the schedule.

Waste dump designs were completed to accommodate mine waste and dry stacked tailings from the processing plant. Dry tailings in filter cake form is produced by the processing plant at a ratio of 1.29 times the plant throughput. Tailings material is transported from the processing plant by conveyor to discharge

points located close to the waste dumps, then placed in containment cells encapsulated by mine waste using mining fleet.

A listing of information used in the Ore Reserve estimation is provided in Appendix 1 (in compliance with ASX Listing Rule 5.9.1).

In summary:

Material Assumptions	All feasibility study assumptions are described in sections 5 to 10 following. Assumptions are bench-marked against current cobalt-nickel mining and processing operations. Pricing assumptions for metal sulphates were based on the average pricing for February 2018, which is below today's current spot pricing.
Criteria for Classification	Classification of Proved and Probable Reserves is based upon the Mineral Resource Measured and Indicated.
Mining Method	Mining activity is conventional open pit, with excavator and rear dump truck configurations. Mining recovery is favourable, assumed to be 98%, based on the very wide ore bodies (80-1000 m) and ease of visual recognition of ore definition zones (any loading spillage likely to be on ore, which means recovery in subsequent truck loads). Again, due to the width of ore zones, dilution is assumed to be 5%, with high grade diluted with low grade (average grade 0.06% cobalt and 0.62% nickel), and low grade diluted with 0.4% Nieq.
Processing Method	The flowsheet is a conventional PAL/MS in the style of the successful cobalt-nickel processing operations world-wide. Actual Goongarrie bench-scale testing recoveries and rheological performance are used.
Cut-off Grades	The overall cut-off grade is 0.8% Nieq, with pit scheduling predicated on optimising 1.3% Nieq ore feed. All mineralised material within 100 m vertical depth from surface will satisfy JORC modifying factor criteria relating to reasonable expectations that a part of the resource is likely to be exploitable at a given foreseeable future time. Consultant HGMC's opinion is that 0.08% cobalt or 0.5% nickel lower cut-off grades constitute adequate lower reporting cut-off for open pit exploitable mineral resources.
Estimation Methodology	Estimation used industry-accepted methodology and software, as described in Appendix 1.
Material Modifying Factors	Ore Reserves are located upon granted Mining Leases. Environmental approvals are in process under the supervision of Ardea's environmental consultant. Botanical and fauna studies were completed by previous tenement holders and are being updated through additional studies. Mining cost assumptions by consultants Auralia were based on contractor quotations for current comparable Eastern Goldfields mining operations. Potential funding options are outlined in Section 13.

5. Metallurgy, Processing and Infrastructure

The Goongarrie PFS evaluates production of **high-purity cobalt sulphate and nickel sulphate** for sale to the lithium ion battery industry, with both products playing a vital role in the manufacturing of cathodes for lithium ion batteries amongst other uses. The flowsheet is designed to deliver high-purity products to maximise Goongarrie revenue.

5.1. Metallurgy

Extensive test work was completed during the 2005-2009 Vale Inco PFS (refer Heron Resources Limited announcements 2 and 9 February 2009). The Vale Inco study focussed on the Goongarrie South deposit and used a Sherrit-style PAL flowsheet to produce a mixed sulphide product.

To implement this study, further testwork was completed by Simulus Engineers on composite drill core samples selected from Ardea's 2017 core drilling program at Goongarrie South. These samples have high iron and low magnesium content. These represent the scheduled geo-metallurgy for the first five years of mining and processing.

The PFS testwork program and engineering study investigated the strengths and weaknesses of various leach arrangements. The outcome of this assessment was the selection of Pressure Acid Leach (PAL) as the preferred leaching process.

The key outcomes from the leach selection work were:

- Very high nickel and cobalt extraction exceeding 94.5 % from both PAL sulphuric leaching and atmospheric hydrochloric leaching
- Very high, uneconomic acid consumption in atmospheric sulphuric acid leaching
- Low sulphuric acid consumption from PAL leaching
- Lower operating costs for PAL leaching compared to atmospheric hydrochloric leaching

Following the selection of the PAL as the preferred leaching arrangement, a downstream testwork program was completed to support the overall design of the process.

Mixed sulphide (MS) precipitation has been selected as a suitable intermediate step to enable the following key attributes to be realised:

- Utilisation of an established unit operation in use at commercial scale
- Decoupling of the leach and refinery plants
- Production of a high grade intermediate product and reducing the size of the refinery process equipment
- Primary rejection of manganese and magnesium to achieve battery grade sulphate products

The testwork conducted successfully confirmed the suitability of the process to achieve these objectives.

5.2. Flowsheet and processing

The Company has selected proven technology for the processing of the Goongarrie laterites. The flowsheet comprises proven 5th generation PAL process with MS precipitation, resulting in highly efficient extraction of cobalt and nickel from Goongarrie ore to produce cobalt sulphate and nickel sulphate for the battery industry.

The PFS flowsheet follows the proven PAL/MS process with production of an intermediate sulphide product. The downstream refinery produces battery-quality nickel and cobalt sulphate crystals. The process comprises four basic sequential steps, all of which are well proven and commonly used in the wider metallurgical industry to provide high recoveries of base metals.

Stage 1 is an aqueous pressure leach in an acidic sulphate medium to dissolve the base metals while minimising dissolution of the iron and silica gangue. The conditions used are typical for base metal dissolution from lateritic ore sources. The discharge from the autoclave is filtered and the solids dry stacked.

Stage 2 is primary impurity removal and nickel/cobalt sulphide recovery from the autoclave filtered solution. The filtered pregnant liquor solution proceeds to two-stage neutralisation for removal of the free acid, iron and aluminium. The iron-free solution is then exposed to sulphide precipitation to recover a high-grade nickel/cobalt sulphide product with minimal impurities.

The filtration of tailings provides an advantage over traditional flowsheets, in that the filtered solids are washed and dry stacked, negating the need for a tailings storage facility or counter current decantation that have caused operational issues and bottlenecks in earlier laterite flowsheets.

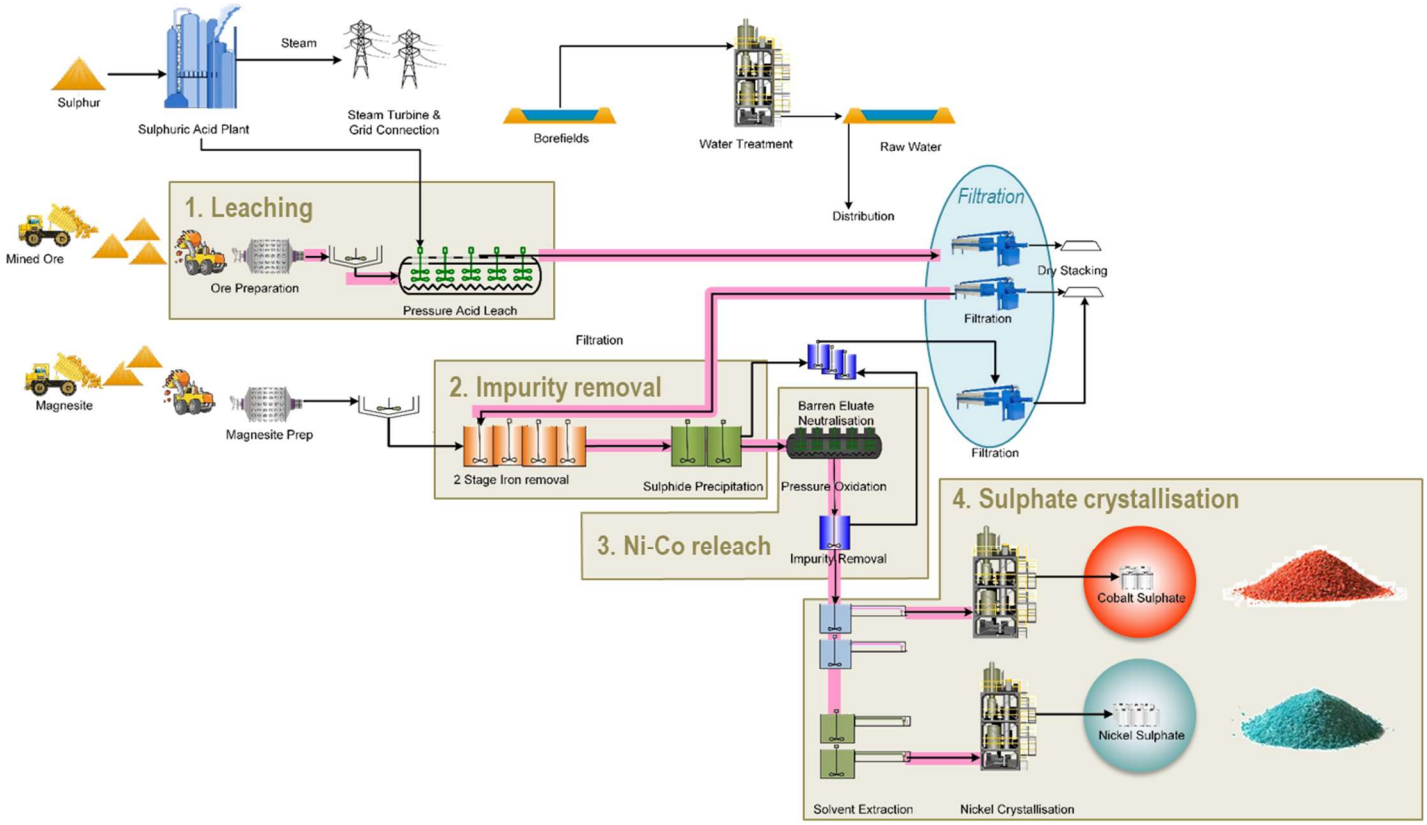

Figure 5-1 – PAL/MS flowsheet for the Goongarrie Nickel Cobalt Project PFS

Stage 3 is nickel and cobalt oxidative re-leach and secondary impurity removal. The nickel and cobalt-rich sulphide intermediate product is oxidised and re-leached under medium pressure and temperature to provide a high concentration, small volume metal stream.

Stage 4, the final stage, is the crystallisation of high-purity and separate nickel sulphate and cobalt sulphate, with solvent extraction being used to separate the nickel and cobalt. The separate nickel and cobalt sulphate streams are concentrated to saturation point via thermal and mechanical energy input. This causes the metals to begin crystallising from solution as metal

sulphate hydrates. The specific form of crystal as required by off-takers is manipulated by controlling the temperature of crystallisation.

The nickel circuit uses a falling film evaporator followed by a mechanical vapour recompression crystalliser. For cobalt crystallisation this is achieved in a single unit operation due to the relatively small scale of production.

Reagents used include sulphur, liquefied oxygen, magnesite (mined on site), caustic, and minor reagents such a selective organic extractants, ion-exchange reagents, flocculants, and water treatment chemicals.

Tailings are mostly derived from the barren solution from base metal sulphide precipitation, and the final washed filter cake from the acid leach.

5.3. Processing and design advantages

5.3.1 Design

The plant design is based on maximising the modularisation and prefabrication of structures and process units. Modules are fitted with as much equipment, piping, valving and instrumentation as possible to maximise off-site testing and to minimise on-site connections.

The neutraliser for the process is sourced from the overburden and base of the scheduled mining pits.

5.3.2 Laterite processing -benchmarks

Ardea has reviewed in detail the most recent operations globally that have the used PAL and MS precipitation flowsheet. Successful operations at Moa Bay, Coral Bay 1 & 2 and Taganito produce nickel and cobalt via the PAL and MS route. Extensive operating and design data has been collated on each of the operating plants to enable Ardea to incorporate key learnings from these projects.

Table 5-1 shows the production and the ramp up time for these operations. It can be seen from this data that the third and later generation operations improved from the first and second-generation PAL counterparts. Third and fourth generation plants have extensively documented the ramp up and operational optimisations. Goongarrie as a fifth-generation operation has minimised technical risk.

Table 5-1 – Comparison of production at various PAL-MS plants globally, showing two possible scenarios for Goongarrie.

Operation	Gen	Flowsheet	Start	Status	Design Cobalt (tpa)	Design Nickel (tpa)
Moa Bay Revitalisation *(Sherrit)*	1st	PAL-MS	1995	• Ramp up within a year, currently operating at 32,000tpa Nickel and 3,800tpa Co	3,000	25,000
Murrin Murrin *(Glencore)*	2nd	PAL-MS- Hydrogen Reduction	1999	• Currently operating at approximately 85%	5,000	45,000
Coral Bay *(Sumitomo)*	3rd	PAL-MS	2004	• Stage 1, achieved 90% capacity in 15months. Currently operating at 120% of design capacity	750	10,000
	3rd	PAL-MS	2009	• Stage 2, achieved 100% capacity in 9 months. Currently operating at 120% of design capacity	750	10,000
				Coral Bay Total	*1,500*	*20,000*
Ambatovy *(Sumitomo, KRC, Sherrit)*	4th	PAL-MS-Hydrogen reduction	2012	• Achieved 80% nameplate in 4 years	5,600	15,000
Taganito *(Sumitomo)*	4th	PAL-MS	2013	• Achieved 90%+ nameplate within 3 years.	2,600	30,000
Goongarrie ***(Ardea)***	5th	PAL-MS-Crystallisers	Early 2020s	• 1.0 Mtpa option: Ramp up to 100% in 15 months	1,180	9,300
	5th	PAL-MS-Crystallisers	Early 2020s	• 1.5 Mtpa option	1,450	12,350

5.4. Infrastructure

5.4.1 Location and Access

The plant site is situated approximately 1km east of the Goldfields Highway and Railway between the Highway and Goongarrie South deposits on granted mining lease M29/272. A sealed, highway provides access to the plant and the camp.

5.4.2 Transport and Shipping

Imported reagents are received at the Port of Kwinana and transported to site via the existing public road and rail network. The nickel sulphate and cobalt sulphate products are exported from the Port of Esperance via the existing public roads. The PFS assumes that the products are shipped to east Asia on a CIF basis. Sulphur is unloaded in bulk and stored in a dedicated storage facility at the Port of Esperance. A front-end loader is used to load bulk materials trucks for transport to site. All other reagents are received at Goongarrie in containerised form.

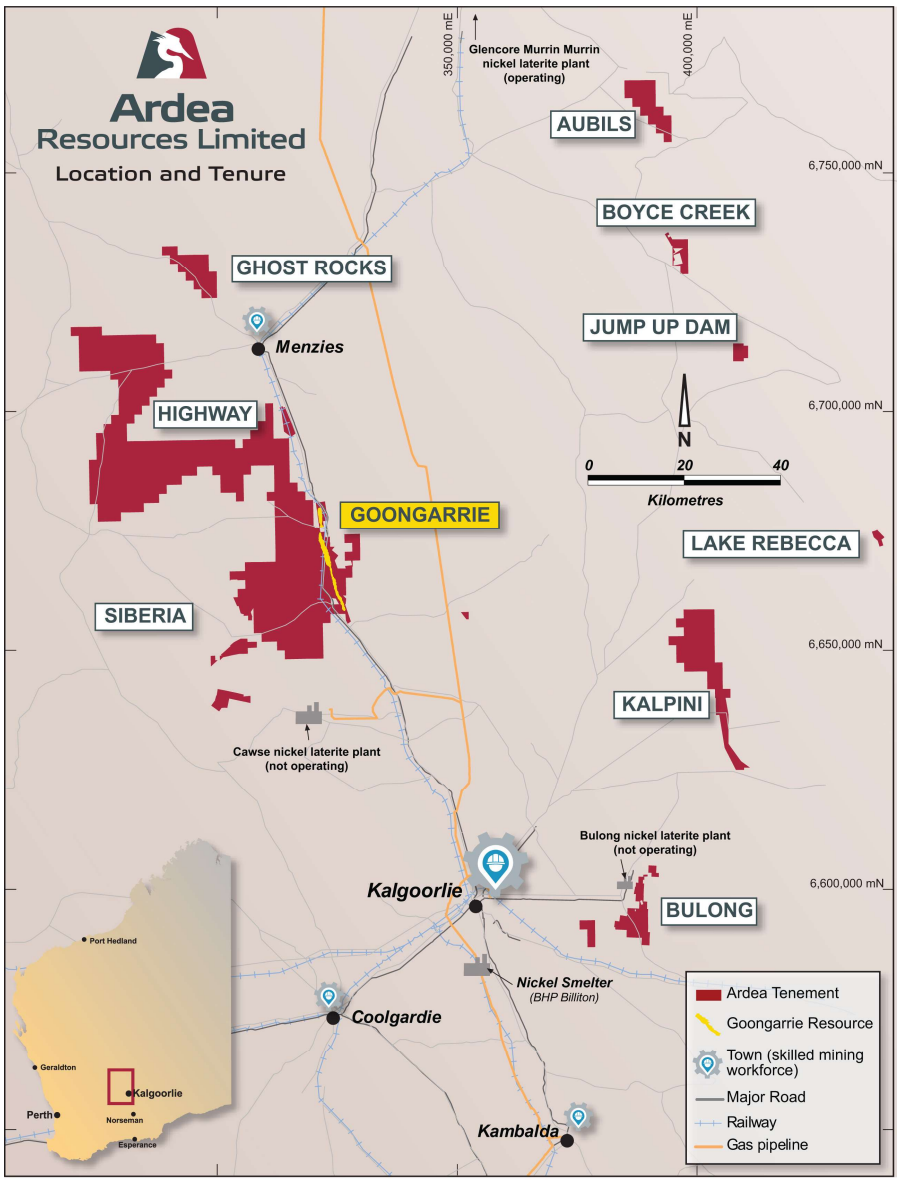

Figure 5-2 – Locaton map for the Goongarrie Nickel Cobalt Project, showing infrastructure throghout the Eastern Goldfields near Kalgoorlie.

5.4.3 Water Supply and Distribution

Raw water is to be supplied from paleochannel borefields on granted Ardea tenure at Highway, Siberia North and Big Four, and from Ardea tenement applications at Goongarrie West and Papertalk Creek. The installed field has a total of 15 active bores.

5.4.4 Power Supply and Distribution

The Goongarrie flowsheet reduces power costs by using the heat from the acid plant to generate electricity. Sulphur is burned to produce acid in the acid plant and steam is generated as a by-product which is used in the leach and crystallisation process. The remaining steam is fed into a steam turbine to generate power to run the process plant. Additional power can be taken from the local power grid running through the mining tenements. Diesel generation is used for backup power.

5.4.5 Service Buildings and Ancillaries

Service buildings are located to the southeast of the process plant to facilitate ease of access from the camp without need to enter the process plant. Camp and plant waste water are low salinity products that are re-used in the plant.

5.4.6 Site Accommodation Village

A permanent site accommodation village is to be located to the southeast of the process plant. The village will accommodate 130 personnel at any one time which is approximately half the estimated work force. It is assumed that the remaining workforce will live and commute from Kalgoorlie-Boulder on a daily basis.

A temporary construction village adjacent to the main village will cater for the construction phase and accommodate up to 500 personnel.

6. Health, Safety and Environment

6.1. Health and Safety

As Ardea transitions into the first stage of the DFS, site mobilisation, construction, commissioning, start-up, operation and maintenance phases of the project, the existing company health and safety systems framework will be utilised to ensure ongoing compliance with relevant Occupational Health and Safety legislation and to maintain a focus on developing a safety-conscious culture.

6.2. Environmental

Golder Associates have reviewed the Goongarrie environmental constraints and prepared an updated permitting strategy to support the PFS. Environmental consulting group, Integrate Sustainability Pty Ltd (ISPL) was commissioned by Ardea to undertake an independent peer review of the Golder report to further refine the requirements for project permitting and minimise risk to the project permitting schedule.

The review has taken into consideration requirements under the key environmental legislation under which Goongarrie will be assessed. A detailed schedule and budget has been developed and programs are underway.

6.3. Heritage and Community

Ardea has an active stakeholder engagement program. In the DFS phase of development, stakeholder consultation will ramp up with a particular emphasis on project permitting and engagement with the relevant government departments to ensure the environmental work is scoped to meet the permitting requirements.

An initial heritage survey has been conducted with further surveys scheduled to occur during the next phase of the project.

Ardea has a recruitment policy focussed on the local and Kalgoorlie-Boulder regions and currently operates an office in West Kalgoorlie. There are four geologists and four field technicians based from this office.

The Company has policies which aims to facilitate local Indigenous employment opportunities.

7. Capital Cost Estimates

The capital estimate for Goongarrie has an accuracy level of ±25% and includes a 15% contingency on direct and indirect costs. It includes all associated infrastructure including power and water supply and road upgrades.

Table 7-1 – A summary of the PFS Base Case 1.0 Mtpa and 1.5 Mtpa throughput capital cost estimate

Capital Expenditure Breakdown		1.0 Mtpa A$ million	1.5 Mtpa A$ million
Direct Costs	Pre-Production Mining#	11.70	10.96
	Site Preparation	23.93	27.44
	Processing Plant	298.32	380.83
	Utilities	35.16	49.63
	Services	5.88	5.88
	Contingency	76.55	95.85
Total Direct Capital		*451.53*	*570.58*
Indirect Costs	Owners Costs	23.13	23.13
	Indirect Costs	108.26	133.32
	First Fills & Spares	15.65	18.77
Total Capital Expenditure		**598.57**	**745.80**

#The mining pre-production capital includes the commencement of a starter pit to build up neutraliser stocks prior to process plant commencement. The 1.0 Mtpa case mines the starter pit for one quarter at 10,000 bcm per day for 590,000 t neutraliser. The 1.5 Mtpa case mines the same starter pit and continues to complete the full stage 1 pit design for initial ore production. This delays the pre-strip of the first production pit, and allows the starter pit to be mined slightly slower at 9,000 bcm per day. This results in the 1.5 Mtpa pre-production capital being slightly less than the 1.0 Mtpa case.

The capital cost estimates incorporate a Build Own Operate (BOO) contract option for the Refinery (being cobalt and nickel sulphate production) and the water treatment facility. BOO-style commercial agreements are commonplace for power generation, crushing and screening and some other ancillary metallurgical processes. As such the BOO Refinery Option, which is appealing on a capital basis, will be further evaluated in the Definitive Feasibility Study.

A sustaining capital cost allowance has been estimated at 1% of the total pre-production capital cost. In addition to this, individual sustaining capital items have been costed to ±25 % and scheduled over the 25 year mine life. Sustaining capital items include extension of dry stacking conveyor, technology improvements, and bore field expansion. Table 7-1 provides the breakdown of the capital estimate.

8. Operating Cost Estimates

Estimated average operating costs for the project apply to the period following the initial commissioning and ramp-up. A summary of the PFS Base Case 1.0 Mtpa throughput operating cost estimate follows.

Mining costs were estimated assuming a contractor mining model. All processing inputs are derived from mass balance and process design criteria which were established based on previous feasibility studies and adjusted for changes to the process. Main reagent costs are based on current supplier quotations. Maintenance costs were factored on capital cost. Commonwealth, state and local government charges and levies are included as appropriate in the cost estimates.

After allowing for cobalt credits, the PFS assessed the C1 cash operating cost for nickel metal equivalent at an average of US$0.42/lb (A$0.53/lb) which is presented in Table 8-1.

Table 8-1 – 1.0 Mtpa Option Average operating cost. Figures are rounded reflecting certainty and may not tally.

Unit Costs		1.0 Mtpa		1.5 Mtpa	
		A$/lb	US$/lb	A$/lb	US$/lb
Unit Cost Breakdown	Mining	**0.89**	**0.70**	0.70	0.56
	Processing	**5.17**	**4.07**	5.12	4.03
	Tails Disposal	**0.17**	**0.13**	0.19	0.15
	General & Admin	**0.52**	**0.41**	0.39	0.31
	Haulage & Port	**0.35**	**0.28**	0.35	0.28
Sub Total C1 Costs		***7.09***	***5.59***	*6.75*	*5.32*
	By-Product Credits	**(6.56)**	**(5.17)**	(6.18)	(4.87)
Total C1 Costs		***0.53***	***0.42***	*0.57*	*0.45*
	Sustaining Capital	**0.28**	**0.22**	0.25	0.20
	Royalty (NI + Co)	**0.44**	**0.35**	0.43	0.34
All In Sustaining Cost		***1.26***	***1.00***	*1.26*	*0.99*

The 1.5 Mtpa case has a lower feed grade and a different Co:Ni ratio. This results in some changes in the unit cost ($/lb Ni produced) figures.

9. Project Financial Analysis

The Goongarrie PFS examined various operational scenarios that considered capital outlay, autoclave throughput and outsourcing various operational processes. The financial results presented are based on:

- Autoclave throughputs of 1.0 Mtpa and 1.5 Mtpa.
- Build Own Operate (BOO) for the Refinery (being cobalt and nickel sulphate production) and the water treatment facility.

The 1.0 Mtpa scenario is expected to generate pre-tax real discounted cash flows totalling **A$1.43 billion** based on a discount rate of 8 % and post-tax real discounted cash flows totalling **A$1.04 billion**. The pre-tax and post-tax, ungeared Internal Rate of Return (IRR) of the project is forecast to be 29 % and 25 % respectively. This option for the project has an estimated payback period of 5.3 years.

The 1.5 Mtpa scenario is expected to generate pre-tax real discounted cash flows totalling **A$1.93 billion** based on a discount rate of 8 % and post-tax real discounted cash flows totalling **A$1.40 billion**. The pre-tax and post-tax, ungeared Internal Rate of Return (IRR) of the project is forecast to be 29 % and 25 % respectively. This option for the project has an estimated payback period of 5.6 years.

The value of construction capital for each project configuration includes a 15 % contingency, which will be scrutinised as the project progresses through the ensuing definitive feasibility study.

Assumptions used for these scenarios, and subsequent calculated results, are included in the Table 9-1 below:

Table 9-1 – Key parameters summary

Parameter		Units	Assumption	Assumption
Autoclave Throughput			**1.0 Mtpa**	1.5 Mtpa
Life Of Mine			**25 years**	25 years
Autoclave Feed Grade LOM	Nickel	%	**1.00**	0.89
	Cobalt	%	**0.12**	0.10
Production LOM average	Nickel sulphate	tpa	**41,500**	55,300
	Cobalt sulphate	tpa	**5,500**	6,900
	Contained nickel	tpa	**9,300**	12,350
	Contained cobalt	tpa	**1,180**	1,450
Recovery LOM average	Nickel	%	**94.5**	94.5
	Cobalt	%	**95.5**	95.5
Nickel sulphate price#		US$/lb	**8.84**	8.84
Cobalt sulphate price#		US$/lb	**41.63**	41.63
Exchange Rate		A$:US$	**0.788**	0.788
Initial Capital		A$ M	**599**	746
C1 Cash Cost	before Co credits	US$/lb	**5.59**	5.32
	after Co credits	US$/lb	**0.42**	0.45
AISC	after Co credits	US$/lb	**1.00**	0.99
Pre-Tax NPV @ 30 Jun 20, 8.0% (real)		A$ billion	**1.43**	1.93
Pre Tax IRR (real)		%	**29 %**	29 %
Post-Tax NPV @ 30 Jun 20, 8.0% (real)		A$ billion	**1.04**	1.40
Post-Tax IRR (real)		%	**25%**	25%
Payback		Years	**5.3 years**	5.6 years

#Nickel sulphate and cobalt sulphate prices are average recorded transaction prices for February 2018 in the People's Republic of China, the world's largest consumer of these products (Source: SMM, see Section 13). Note: production tonnages are rounded to reflect degree of certainty.

9.1. Sensitivity Analysis – Base Case 1.0 Mtpa Option (PFS level)

In addition to determining the expected financial outcomes a series of sensitivities were performed for changes in product prices, exchange rate, operating costs, capital expenditure and process plant recoveries. The sensitivity analysis results showed that the project's cash flow returns are robust and can provide a sustained future economic return. Significant positive NPV was returned even at -20 % sensitivity.

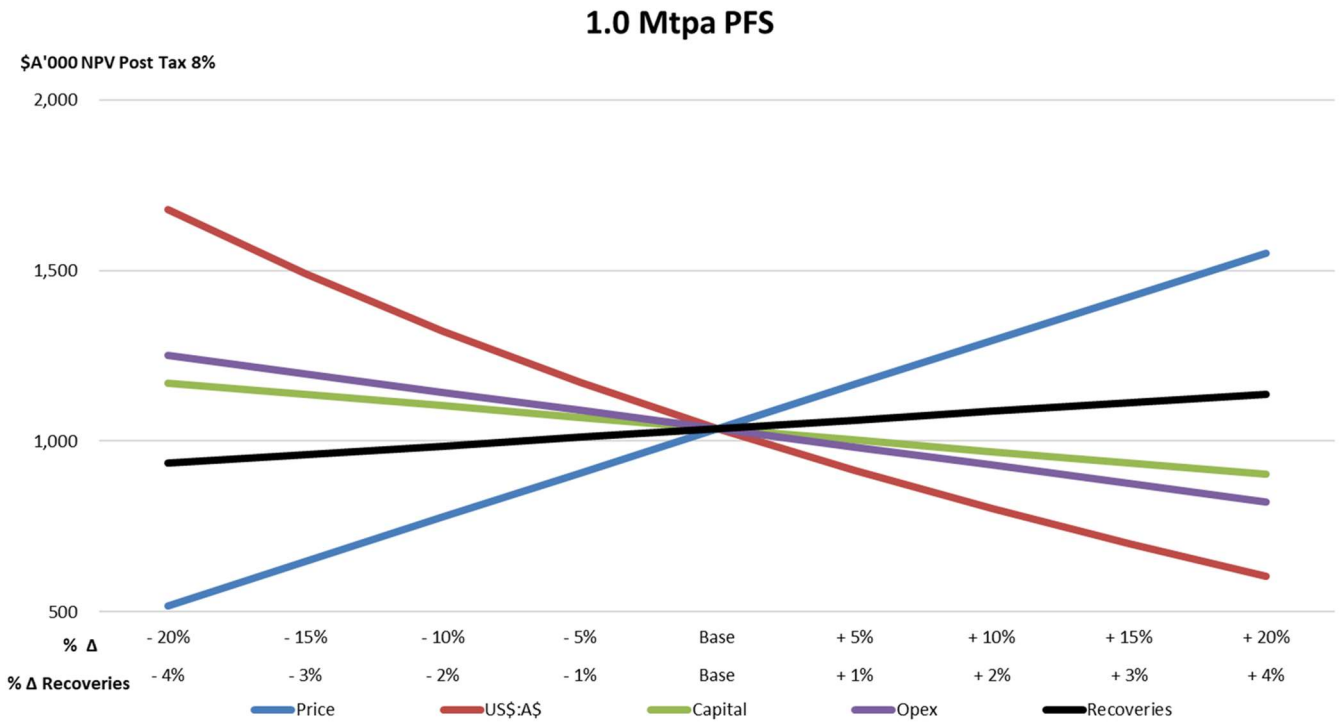

Figure 9-1 – Sensitivity analysis for the 1.0 Mtpa scenario

A sensitivity analysis for the project was carried out to determine the effects of key variables in relation to the Base Case post-tax NPV of A$1.04 billion at a discount rate of 8 %. The results of the sensitivity analysis are presented in Table 9-2 below.

Table 9-2 – Sensitivity analysis for a 1.0 Mtpa. All values in A$ millions

1.0 Mtpa – Post-Tax NPV @ 30 Jun 20, 8.0% (real)						
% Δ	Price	Exchange rate (US$:A$)	Capital	Opex	% Δ	Recoveries
- 20%	516	1,678	1,169	1,250	**- 4%**	935
- 15%	647	1,490	1,136	1,197	**- 3%**	961
- 10%	778	1,323	1,103	1,144	**- 2%**	986
- 5%	907	1,173	1,070	1,090	**- 1%**	1,011
Base	**1,037**	**1,037**	**1,037**	**1,037**	**Base**	**1,037**
+ 5%	1,166	913	1,003	983	**+ 1%**	1,062
+ 10%	1,295	801	970	929	**+ 2%**	1,087
+ 15%	1,423	698	936	876	**+ 3%**	1,113
+ 20%	1,550	604	903	822	**+ 4%**	1,138

9.2. Sensitivity Analysis – 1.5 Mtpa Expansion Case (PFS level)

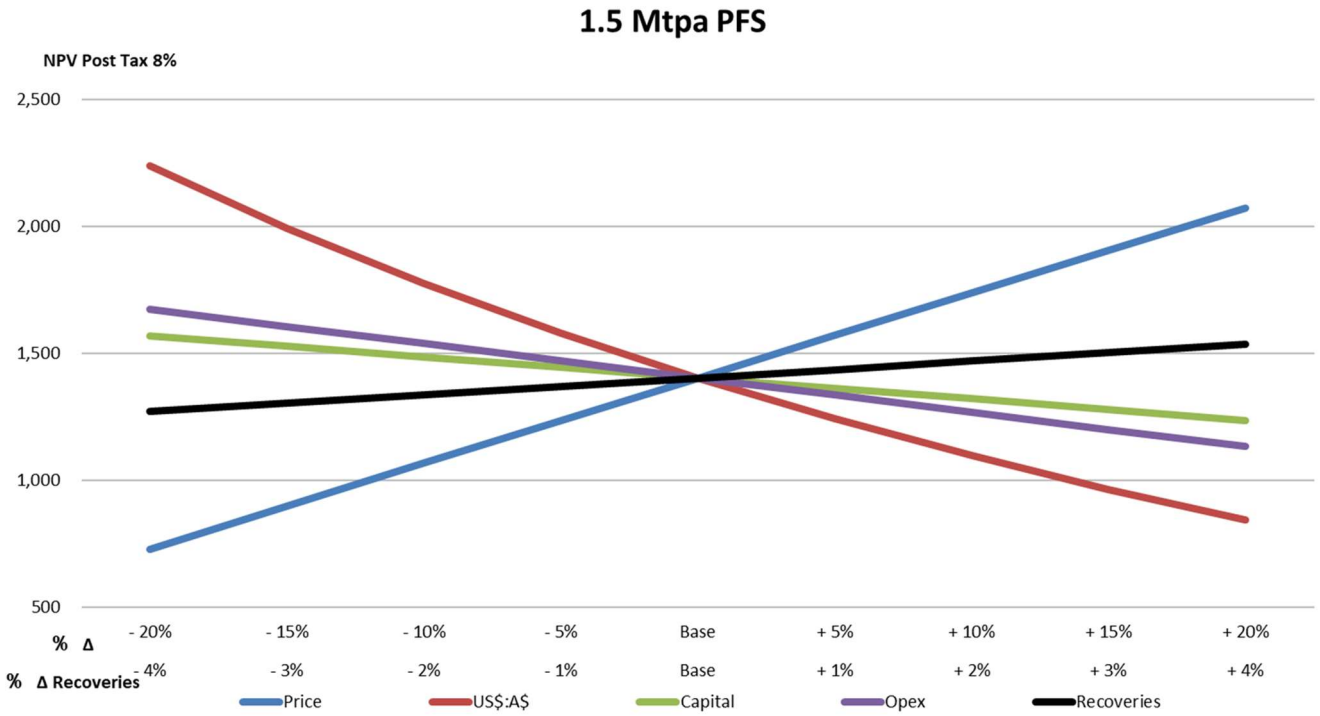

Figure 9-2 – Sensitivity analysis for the 1.5 Mtpa scenario

A sensitivity analysis for the 1.5 Mtpa throughput option was carried out to determine the effects of key variables in relation to the post-tax NPV of A$1.40 billion at a discount rate of 8 %. The results of the sensitivity analysis are presented in Table 9-3 below.

Table 9-3 – Sensitivity analysis for a 1.5 Mtpa. All values in A$ millions

1.5 Mtpa – Post-Tax NPV @ 30 Jun 20, 8.0% (real)						
% Δ	Price	Exchange rate (US$:A$)	Capital	Opex	% Δ	Recoveries
- 20%	729	2,238	1,570	1,674	**- 4%**	1,272
- 15%	899	1,994	1,528	1,607	**- 3%**	1,305
- 10%	1,068	1,776	1,487	1,539	**- 2%**	1,338
- 5%	1,236	1,580	1,445	1,471	**- 1%**	1,371
Base	1,404	1,404	1,404	1,404	**Base**	1,404
+ 5%	1,571	1,244	1,362	1,336	**+ 1%**	1,436
+ 10%	1,739	1,198	1,321	1,268	**+ 2%**	1,469
+ 15%	1,906	965	1,279	1,200	**+ 3%**	1,502
+ 20%	2,072	842	1,237	1,132	**+ 4%**	1,535

10. Revenue basis for products

Following detailed analysis of world cobalt and nickel markets, spot prices for sulphates in China were used. As the operation will produce and sell sulphates, market prices for cobalt sulphate and nickel sulphate were sourced from respected analysts Shanghai Metals Markets (www.metal.com) who have intimate knowledge of the world's largest sulphate market – China. Prices used are the average for the Chinese markets February 2018, and are as follows:

- Cobalt sulphate: **RMB 121,600/t** (equivalent to a contained cobalt pricing of US$41.63/lb metal)
- Nickel sulphate: **RMB 27,500/t** (equivalent to a contained pricing of US$8.84/lb metal)

These PFS prices represent discounts of 5.2 % for nickel sulphate and 11.9 % for cobalt sulphate compared to their spot prices recorded on 23 March 2018 (*Source*: SMM).

As with recent market movements, cobalt sulphates have shown similar increases in pricing to the metal. A significant premium opened in early 2017 which has since closed due to conversion of significant production to sulphates. Nickel sulphate prices are at a premium to nickel metal prices. They have recently increased but are not significantly above prices from 3 years ago.

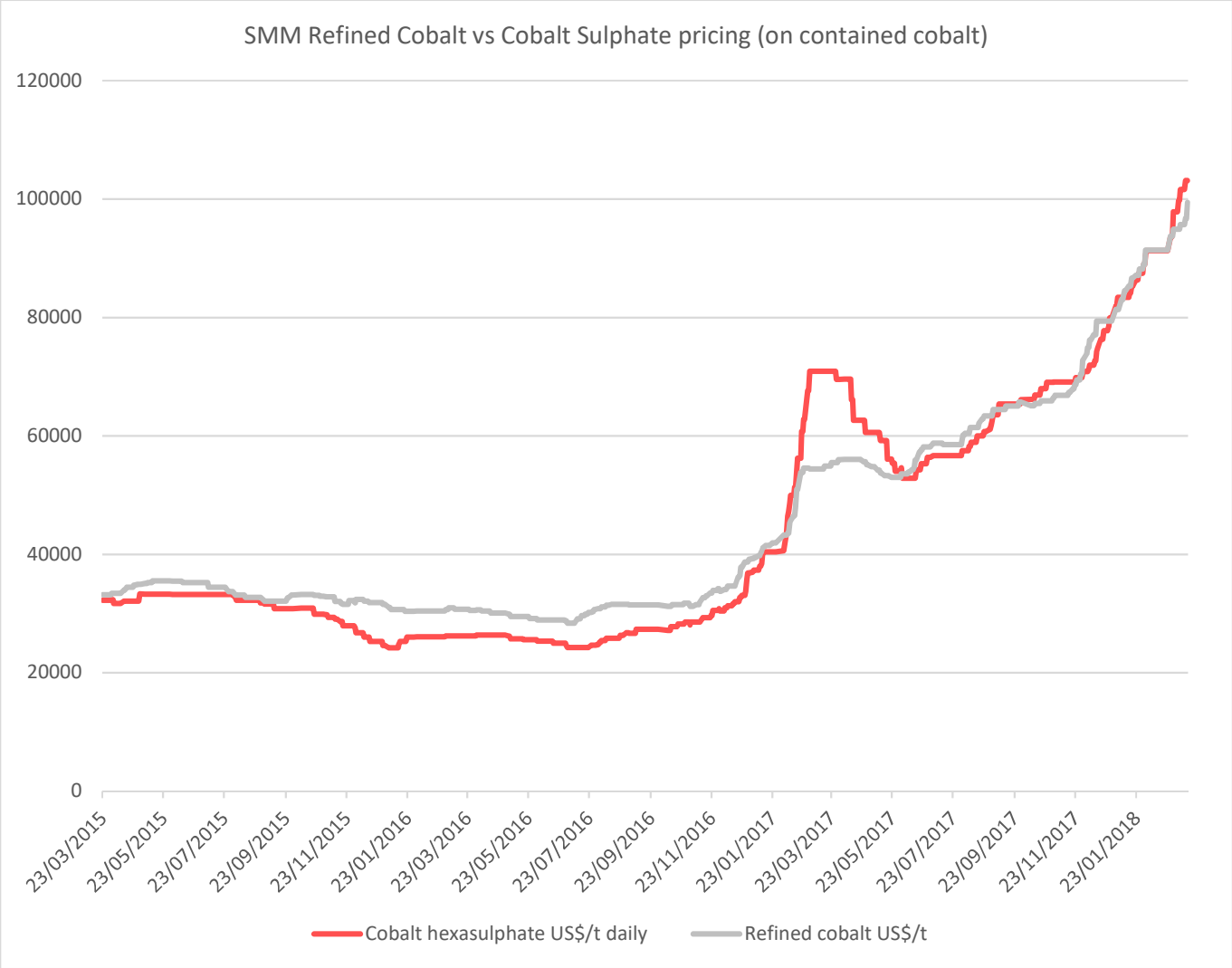

Figure 10-1 – Pricing for cobalt sulphate and cobalt metal on contained cobalt basis (cobalt hexasulphate contains 20.97 % cobalt) for the last 3 years for China, showing variable pricing around parity apart from the early 2017 excursion (Data source: SMM)

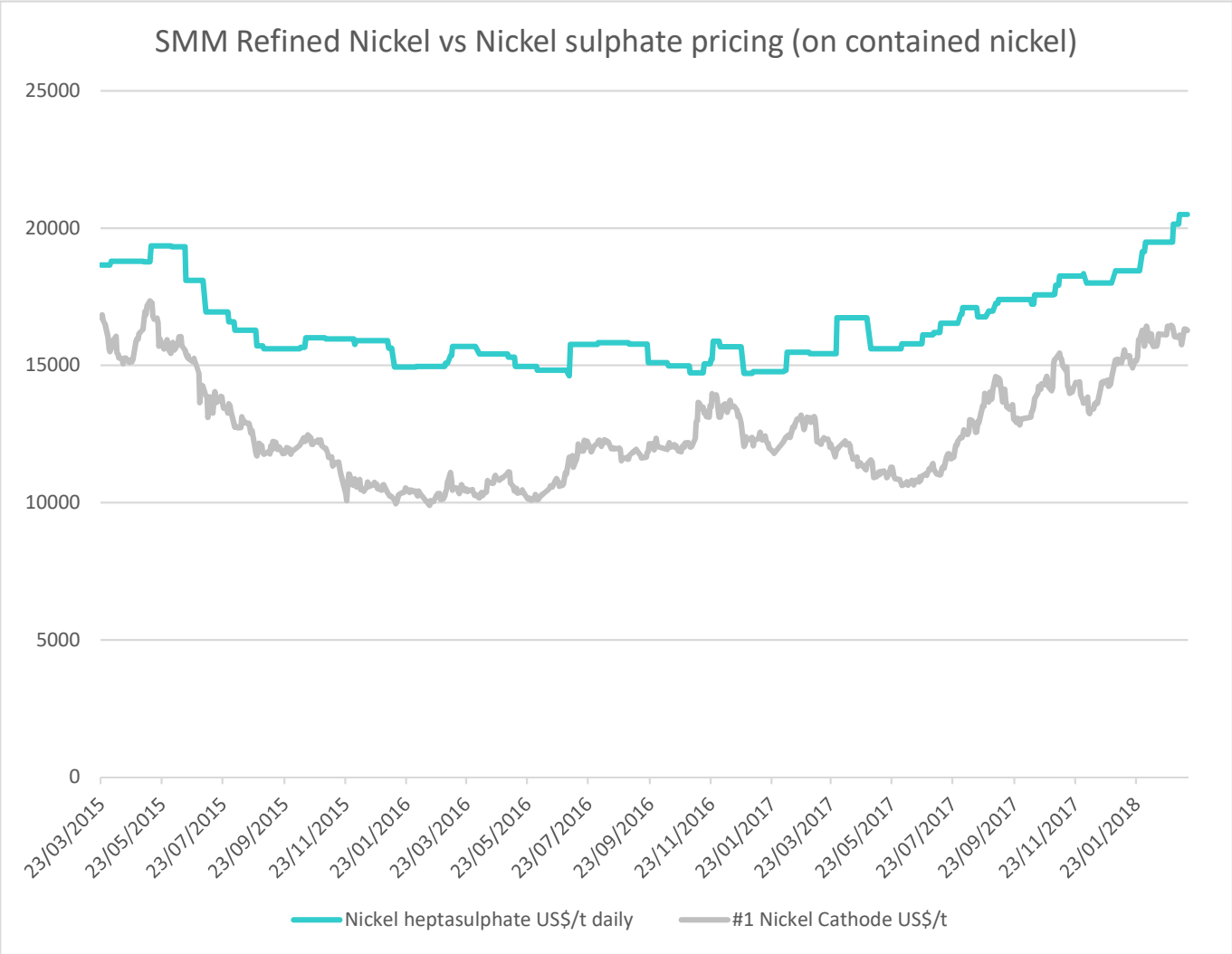

Figure 10-2 – Pricing for nickel sulphate and nickel metal on contained nickel basis (nickel heptasulphate contains 22.3 % nickel) for the last 3 years for China, showing the established premium for nickel sulphate. The nickel sulphate premium has varied from 7.9 % to 58.4 %, with a median of 29.8 % and average of 31.6 % (Data source: SMM).

10.1. Data sources for selected prices

Shanghai-based analysts SMM (Shanghai Metals Markets) are China's leading resource commodities analyst who are recognised globally for their in-depth analysis of Asian markets (www.metal.com).

Global cobalt and nickel sulphate trade figures are not compiled by any analysts at present, with many in the process of developing indices. However, with most of the world's sulphates traded in Asia, and China dominating that trade, SMM are recognised as the authority for the Chinese market, comprehensively covering their cobalt sulphate and nickel sulphate markets. SMM is in regular contact with industry players to conduct first-hand surveys that include coverage of capacity, running rate output, inventory, and costs. They provide in-depth coverage with daily price tracking through phone and on-site interviews.

- For the cobalt sulphate market, SMM covers over 90% of Chinese capacity on a daily basis. They have done so for over 10 years. In total, SMM cover 18 cobalt sulphate producers, 20 tertiary battery material precursor producers, and 20 tertiary battery producers.
- For the nickel sulphate market, SMM covers 13 Chinese nickel sulphate producers (over 90% of Chinese capacity) on a monthly basis with daily pricing updates. Their survey of nickel sulphate sales in China represents the most comprehensive listing available.

Market forecast data for these sulphates are not available. However, their pricing is tied to their respective metals prices (see Figures 10-1 and 10-2 above), so these are used as a proxy pricing. With this in mind, London-based global analysts CRU Group was consulted to provide authoritative and reliable forecasts.

The justification for the use of the average February 2018 pricing for cobalt sulphate and nickel sulphate has been defined as follows:

- Requirement to have consistently derived values for both cobalt sulphate and nickel sulphate pricing. A thorough check of global analysts showed that SMM could provide this at the time of modelling and writing.
- Market forecast pricing for cobalt sulphate and nickel sulphate is simply not available.
- All long-term forecast data consulted showed predicted pricing for these metals in 2018 to be substantially below actual current values, severely diminishing their credibility. This is a result of recent rises from historic lows and a structural change in the price of cobalt in particular.
- Consensus forecasts suffer from a similar problem to the long-term forecasts, with 6 month old forecasts showing radically lower values to recent actual prices. CRU's cobalt metal and nickel metal forecasts are very recent (February 2018 for cobalt, November 2017 for nickel) and reflect up-to-date information, and so were used as a proxy for cobalt sulphate and nickel sulphate forecasts.
- The rapidly changing (increasing) commodity prices for cobalt and, to a lesser extent, nickel reflect structural market change that is now starting to reflect their essential use in lithium ion batteries in general and in electrified vehicles in particular. EV manufacturing and sales are predicted to increase signficantly in coming years by the substantial majority of forecasters.
- The selected pricing is at a significant discount to today's spot pricing.
- The selected pricing is for the Chinese market, the most comprehensively covered for sulphates and the greatest consumer of sulphates globally.
- The selected pricing is significantly lower than the proxy forecasts for cobalt and nickel metal as predicted by respected analysts CRU Group.

11. Opportunities to Enhance Project Economics

Ardea has identified the following options to further enhance the project economics of the Goongarrie Nickel Cobalt Project.

11.1. Higher Throughput Options – Single Train

Higher throughput using the 1.5 Mtpa scenario is achieved by optimising the residence time of ore in the autoclave. A residence time as short as 40 minutes is viable with very little loss in recovery. This residence time is very short for the processing of lateritic nickel-cobalt mineralisation and reflects the high quality of ore at Goongarrie.

Throughput rates as high as 2.25 Mtpa (upgradable from the 1.5 Mtpa autoclave) may be achieved using a single train. The possibility of multiple parallel trains is also being assessed, potentially providing much greater throughput and accordingly greater cobalt and nickel sulphate production.

The higher throughput option is being modelled to a scoping study level and is nearing completion. The results will be released to market when complete.

11.2. Neutralisation Options

Neutralisation of the free acid from the autoclave requires a neutralisation source which traditionally is limestone, calcrete, magnesite or dolomite. Calcrete, magnesite and dolomite are all in abundance throughout the Goongarrie resource, and assay data shows that these commonly contain grades of 0.3 %-0.8 % nickel. Initial magnesite neutralisation tests on the PAL discharge liquors recovered 50 % nickel and 30 % cobalt from magnesite.

Without a defined neutraliser resource at Goongarrie, it is impossible to model the effect on NPV accurately, but early estimates suggest that incorporation of mineralised neutraliser would have a positive effect on NPV, although this is yet to be quantified.

It is expected that an initial neutraliser resource will be defined for Goongarrie in the coming months, with a financial model for this option to be explored thereafter.

11.3. Scandium Options

The Goongarrie study considered scandium recovery on the throughput options, with a design of a scandium refinery completed to PFS level. The scandium would be removed from the filtered tailings prior to the liquor feeding into iron removal stages. Testwork has been completed on the scandium refinery flowsheet.

The additional capital expenditure required for an appended scandium circuit is estimated to be approximately A$17 million for the 1.0 Mtpa base case, and up to A$20 million for the 1.5 Mtpa option.

As per the neutraliser option described above, effects on the NPV cannot be reasonably estimated until a scandium JORC resource is defined. This is expected to be completed in the coming months with the effects of the scandium options upon the NPV expected to be significantly positive.

Additionally, scandium pricing is difficult to establish due to the limited amounts currently traded in the world market.

12. Product and Marketing

In recent months, Ardea has met with numerous companies which operate within the lithium ion battery cathode supply chain, including traders and cathode makers through to EV auto manufacturers. The Company has received strong preliminary interest for offtake from Goongarrie for nickel and cobalt sulphate materials from a number of these parties. The Company will provide several potential off-takers with marketing samples over the coming months for their independent assessment with a view to establishing offtake agreements prior to a development decision.

13. Funding

Currently there is a very high level of market interest in the electric vehicle sector and growing industry concerns over securing long term, sustainable and non-conflict cobalt supply. This is driving a high level of corporate activity in the junior mining sector. As such the Company has been approached and had preliminary discussions with respect to potential offtake with several potential strategic partners. These include international mining companies, trading houses and automotive manufacturers capable of providing financing at the level required to fund the development of the project. The PFS financial, economic and marketing metrics are robust and the resource base at the Goongarrie Ni Co Project could

deliver a multi-decade production opportunity. In addition, the project's location within a mature, low sovereign risk mining jurisdiction is attractive to these parties.

The Company has formed the view that there are reasonable grounds to assume that a combination of offtake finance, debt and equity will likely be successfully raised and be sufficient to cover the estimated capital and working capital costs. Going forward, the Company will continue to assess all possible commercial mechanisms to determine the optimum financing solution during the DFS period.

Since listing on ASX in early 2017, the Company has experienced strong growth in investor interest and has grown its market capitalisation to approximately A$150 million. The Company has a simple ownership structure and clean capital structure and does not carry debt on its balance sheet. All of these factors are expected to be attractive to potential equity investors and provide flexibility with potential debt funding structures.

The Company will continue to explore options in relation to securing financing from one or more customer(s) for the Project, as discussions progress in relation to securing binding offtake commitments.

Given the favourable Project economics demonstrated by the PFS, and the strong demand for offtake that is currently being indicated by potential customers, the Company believes that the Project has the capacity to attract a reasonable level of debt funding. In addition, Ardea would consider additional BOO style commercial contracts with respect to key project infrastructure to reduce the overall upfront capital requirements and has had preliminary discussions with engineering groups on this basis.

The Company may also consider developing the Project in conjunction with one or more strategic partners at the project level.

14. Next Steps

The Company has defined a detailed program for a staged DFS, leading toward a development decision on the Goongarrie Nickel Cobalt Project towards late 2019. These programs include:

- **Drilling** – a series of diamond, sonic, RC, and RAB drilling programs have commenced that are designed to provide additional data and samples that will further increase confidence in the deposit and the mining studies. The drilling programs will allow upgrade of resources and reserves, and provide material for programs described below. Geotechnical drilling of construction sites and proposed pit wall locations is scheduled for later in the year.
- **Variability testwork** – programs have commenced that will demonstrate the robustness of the PAL/MS process to treat the various defined geo-metallurgical ore types present at Goongarrie.
- **Resource and reserve upgrades** – results from ongoing drill programs will allow definition of improved nickel and cobalt resources and reserves at Goongarrie. This will also include:
    - *Scandium resource* – an initial scandium resource to inform the scandium option and define the feasibility of scandium oxide production.
    - *Neutraliser resource* – an initial neutraliser resource to better define, inform, and optimise mining schedules and nickel and cobalt grades.
    - *Other resources* – resources may be defined for other by-product possibilities, such as high-purity alumina, chromium oxide, and manganese sulphate, that would allow their inclusion into the flowsheet and optimisation of the mining schedule.
- **Production of marketing samples** – nickel sulphate and cobalt sulphate marketing samples have been requested in response to enquiries from potential partners, and to further promote the exceptional sulphate production potential of the Goongarrie project.
- **Neutralisation testwork** – bench-scale variability test work on neutraliser from proposed pits.

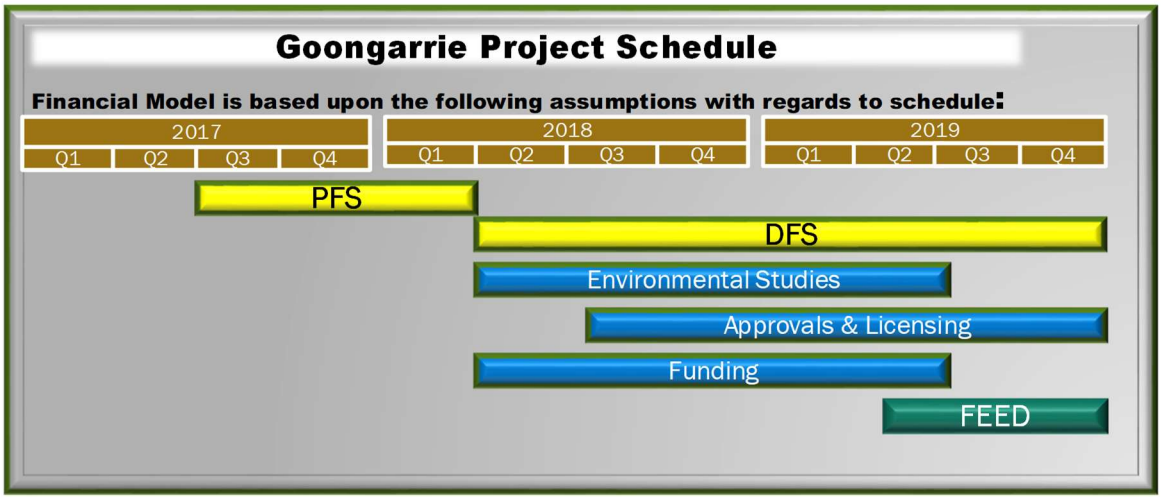

Figure 14-1 Goongarrie Project Schedule. FEED is defined as front end engineering.

Alongside work on Goongarrie, the Company is focusing on upgrading cobalt and nickel resources throughout the remainder of the KNP, with rolling resource upgrades expected to further increase resources in the KNP Cobalt Zone, the higher-grade portion of the KNP. The Company's gold and base metal projects in WA and NSW will also be evaluated. With recent recruitment of key personnel, Ardea now has the right structure and staffing to progress the projects and advance the Goongarrie Nickel Cobalt Project towards production by 2022.

For further information regarding Ardea, please visit www.ardearesources.com.au or contact:

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COMPLIANCE STATEMENT (JORC 2012)

A competent person's statement for the purposes of Listing Rule 5.22 has previously been announced by the Company for:

1. *Kalgoorlie Nickel Project on 21 October 2013 and 31 July 2014, October 2016, 2016 Heron Resources Annual Report and 6 January 2017;*
2. *KNP Cobalt Zone Study on 7 August 2017*

The Company confirms that it is not aware of any new information or data that materially affects information included in previous announcements, and all material assumptions and technical parameters underpinning the estimates continue to apply and have not materially changed. All projects are subject to new work programs, notably drilling, metallurgy and JORC Code 2012 resource estimation as applicable.

The information in this report that relates to Exploration Results for the Goongarrie Nickel Cobalt Project is based on information originally compiled by previous and current full time employees of Heron Resources Limited. The Exploration Results and data collection processes have been reviewed, verified and re-interpreted by Mr Ian Buchhorn who is a Member of the Australasian Institute of Mining and Metallurgy and currently a director of Ardea Resources Limited. Mr Buchhorn has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the exploration activities 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 Buchhorn consents to the inclusion in this report of the matters based on his information in the form and context that it appears.

The exploration and industry benchmarking summaries are based on information reviewed by Dr Matthew Painter, who is a Member of the Australian Institute of Geoscientists. Dr Painter is a full-time employee and a director of Ardea Resources Limited and has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking 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 Painter has reviewed this press release and consents to the inclusion in this report of the information in the form and context in which it appears.

The information in this report that relates to Mineral Resources for the Goongarrie Hill, Goongarrie South, Big Four and Scotia Dam deposits of the Goongarrie Nickel Cobalt Project is based on information compiled by Mr Stephen Hyland who is a Fellow of the Australasian Institute of Mining and Metallurgy and who has provided expert guidance on resource modelling and resource estimation. Mr Hyland is a Principal Consultant Geologist with Hyland Geological and Mining Consultants and has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking 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 Hyland consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.

The information in this report that relates to Ore Reserves for the Goongarrie South and Big deposits of the Goongarrie Nickel Cobalt Project is based on information compiled by Mr Steve Lampron who is a Member of the Australasian Institute of Mining and Metallurgy and who has provided expert guidance on mine planning and Ore Reserve estimation. Mr Lampron is a director of Auralia Mining Consulting and has sufficient ***experience*** *relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking 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 Lampron consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.*

ASX CHAPTER 5 COMPLIANCE AND PFS CAUTIONARY STATEMENT

The Company has concluded that it has a reasonable basis for providing the forward-looking statements and forecast financial information included in this announcement. The detailed reasons for that conclusion are outlined throughout this announcement and all material assumptions, including the JORC modifying factors, upon which the forecast financial information is based are disclosed in this announcement. This announcement has been prepared in accordance with the JORC Code (2012) and the ASX Listing Rules.

The actual results could differ materially from a conclusion, forecast or projection in the forward-looking information. Certain material factors were applied in drawing a conclusion or making a forecast or projection as reflected in the forward-looking information.

The Goongarrie Nickel Cobalt Project is at the PFS phase and although reasonable care has been taken to ensure that the facts are accurate and/or that the opinions expressed are fair and reasonable, no reliance can be placed for any purpose whatsoever on the information contained in this document or on its completeness. Actual results and developments of projects and the scandium market development may differ materially from those expressed or implied by these forward looking statements depending on a variety of factors. A key conclusion of the PFS, which is based on forward looking statements, is that the Goongarrie Project is considered to have positive economic potential.

The Mineral Resource used for the PFS was classified under JORC 2012 Guidelines and announced by the Company on 14 March 2018. The cut-off grades adapted for the PFS and reported in Table 3.1 are the basis of the production target assumed for the PFS.

The Company believes it has a reasonable basis to expect to be able to fund and further develop the Goongarrie Project. However, there is no certainty that the Company can raise funding when required.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING INFORMATION

This news release contains forward-looking statements and forward-looking information within the meaning of applicable Australian securities laws, which are based on expectations, estimates and projections as of the date of this news release.

This forward-looking information includes, or may be based upon, without limitation, estimates, forecasts and statements as to management's expectations with respect to, among other things, the timing and amount of funding required to execute the Company's programs, development and business plans, capital and exploration expenditures, the effect on the Company of any changes to existing legislation or policy, government regulation of mining operations, the length of time required to obtain permits, certifications and approvals, the success of exploration, development and mining activities, the geology of the Company's properties, environmental risks, the availability of labour, the focus of the Company in the future, demand and market outlook for precious metals and the prices thereof, progress in development of mineral properties, the Company's ability to raise funding privately or on a public market in the future, the Company's future growth, results of operations, performance, and business prospects and opportunities. Wherever possible, words such as "anticipate", "believe", "expect", "intend", "may" and similar expressions have been used to identify such forward-looking information. Forward-looking information is based on the opinions and estimates of management at the date the information is given, and on information available to management at such time. Forward-looking information involves significant risks, uncertainties, assumptions and other factors that could cause actual results, performance or achievements to differ materially from the results discussed or implied in the forward-looking information. These factors, including, but not limited to, fluctuations in currency markets, fluctuations in commodity prices, the ability of the Company to access sufficient capital on favourable terms or at all, changes in national and local government legislation, taxation, controls, regulations, political or economic developments in Australia or other countries in which the Company does business or may carry on business in the future, operational or technical difficulties in connection with exploration or development activities, employee relations, the speculative nature of mineral exploration and development, obtaining necessary licenses and permits, diminishing quantities and grades of mineral reserves, contests over title to properties, especially title to undeveloped properties, the inherent risks involved in the exploration and development of mineral properties, the uncertainties involved in interpreting drill results and other geological data, environmental hazards, industrial accidents, unusual or unexpected formations, pressures, cave-ins and flooding, limitations of insurance coverage and the possibility of project cost overruns or unanticipated costs and expenses, and should be considered carefully. Many of these uncertainties and contingencies can affect the Company's actual results and could cause actual results to differ materially from those expressed or implied in any forward-looking statements made by, or on behalf of, the Company. Prospective investors should not place undue reliance on any forward-looking information.

Although the forward-looking information contained in this news release is based upon what management believes, or believed at the time, to be reasonable assumptions, the Company cannot assure prospective purchasers that actual results will be consistent with such forward-looking information, as there may be other factors that cause results not to be as anticipated, estimated or intended, and neither the Company nor any other person assumes responsibility for the accuracy and completeness of any such forward-looking information. The Company does not undertake, and assumes no obligation, to update or revise any such forward-looking statements or forward-looking information contained herein to reflect new events or circumstances, except as may be required by law.

No stock exchange, regulation services provider, securities commission or other regulatory authority has approved or disapproved the information contained in this news release.

Appendix 1 – Summary of information required according to ASX Listing Rule 5.9.1

Goongarrie Nickel Cobalt Project Ore Reserves

Material Assumptions

- Ore Reserve project costs and parameters were either supplied by various contracting companies tendering on the project, Auralia's own internal database or by Ardea Resources.
- The following table includes the minimum mining cost by bench in each deposit. These budget costs per BCM were based on data provided to Auralia by reputable independent mining contractor tendering on the project

Bench Toe	Goongarrie South		Big Four	
	Ore Mining Cost	Waste Mining Cost	Ore Mining Cost	Waste Mining Cost
385	$7.81	$7.93	$7.70	$7.89
380	$5.35	$5.54	$5.25	$5.45
375	$5.32	$5.52	$5.32	$5.52
370	$5.38	$5.59	$5.38	$5.59
365	$5.45	$5.66	$5.45	$5.66
360	$5.52	$5.73	$5.52	$5.73
355	$5.59	$5.80	$5.59	$5.80
350	$5.66	$5.89	$5.66	$5.89
345	$5.80	$6.06	$5.80	$6.06
340	$5.87	$6.13	$5.87	$6.13
335	$5.94	$6.20	$5.94	$6.20
330	$6.00	$6.30	$6.00	$6.30
325	$6.07	$6.39	$6.07	$6.39
320	$6.14	$6.46	$6.14	$6.46
315	$6.21	$6.55	$6.21	$6.55
310	$6.28	$6.63	$6.28	$6.63
305	$6.35	$6.72	$6.44	$6.69
300	$6.51	$6.85	$6.62	$6.82
295	$6.76	$7.08	$6.69	$7.00
290	$7.01	$7.31	$6.76	$7.18
285	$7.26	$7.54	$6.83	$7.36
280	$7.51	$7.77	$7.70	$7.89

- Geotechnical design constraints during this Pre-Feasibility study were based on prior existing geotechnical investigations and recommendations resulting from a desktop review by Golders Associates Ltd in 2008.

KNP	Bench Face Angle (°)	Bench Height (m)	Bench Width (m)	Ramp Gradient (1:X)	Ramp Width (m)
Surface to Pit Floor	70	20	5	10	22

- The sell prices were based on the current values at the time. Due to the purity of the final product a 120% payability factor is expected. This payability figure was sourced from Macquarie Group research data as well as a public domain study.

Commodity	Sell Price (US$) - Inclusive of the 120% Payability
Ni	15,120 US$/t
Co	96,600 US$/t

- The processing all-inclusive operating cost varies by deposit, and is comprised of the following:
  - A$110.19/t processing cost provided by Simulus
  - A$10.91/t G&A overheads cost provided by Ardea
  - A$0.29/t grade control cost based on assumptions provided by Ardea as follows:
    - 10m x 10m RC drill pattern to 20m depth
    - Drilling cost of A$25/m
    - 2m sample intervals at A$27.50/sample
  - Rehandle and haulage costs, variable by deposit. Haulage cost (including stockpile rehandle) was assumed as A$0.12/t/km (inclusive of fuel and loading). Approximate haulage distances were calculated for each deposit, resulting in the following:
    - Goongarrie South: A$0.30/t of ore
    - Big Four: A$0.60/t of ore
    - ROM rehandle (ore blending and plant feeding): $1.64/t of ore, sourced from a first principles production analysis based on equipment manufacturer handbooks and Auralia's database of contractor supplied rates
  - Tailings disposal costs were calculated based on assumptions provided by Ardea and mining contractor budget pricing.
    - Filter cake tailings, 1.29 Mtpa produced from 1 Mpta plant throughput, plus 31.9 % moisture results in 1.89 Mt filter cake per 1 Mt of ore fed to the processing plant
    - Contractor budget pricing of A$1.90/t to rehandle and place the tailings from conveyor discharge points to waste co-disposal dumps, giving a total tailings disposal cost A$3.59/t of ore (A$1.90/t x 1.89)
- Product transport cost
  - Ardea estimated the product transport cost at A$132/t based on transport from site to the Esperance port, and shipping to east Asia
- Product specifications (sourced from a 2017 Leach Selection Study completed by Simulus):
  - nickel sulphate – 22.33 % nickel
  - cobalt sulphate – 20.96 % cobalt
- The Western Australia state government royalty of 2.5% metal product royalty was applied for both cobalt and nickel.

Criteria for Classification

Only the JORC classified Measured and Indicated Mineral Resource classified material types were used in the optimisations; while the final designs may contain Inferred material as part of the final material inventory, Inferred classified material was not utilised as an economic driver and thus is not included for consideration for any of Ore Reserve calculations.

The accuracy and confidence levels of the study are suitable for the reporting of Ore Reserves in a Pre-Feasibility Study as defined in the JORC Code 2012. The Ore Reserve is a global estimate and is based on optimisation of the entire Mineral Resource for its initial 25 year mine life model.

All Proved Ore Reserves were derived from the Measured Mineral Resources and all Probable Ore Reserves were derived from the Indicated Mineral Resources

Mining Method

Industry standard mining methods using excavator and trucks are employed. A combination of 120t excavators and 90 tonne rigid trucks are currently being considered for surface mining at Goongarrie.

A 5% mining dilution and a 98% mining recovery was used due to the nature of the deposit.

Processing Method

Processing of the ore comprises of: ore comminution, pressure acid leaching, mixed sulphide precipitation, sulphide oxidation for nickel and cobalt sulphate, and purification via solvent extraction and purification. Waste streams are neutralised and filtered prior to dry stacking in waste dumps.

Test work has been undertaken on the processing recoveries at the Goongarrie by Simulus and flat processing recoveries were applied, Nickel 94.5% and Cobalt 95.5%

Plant design considers ore mineralogy and associated deleterious elements, including acid consuming elements, manganese and chromium.

Cut-off Grades

Due to the multi-element aspect of this project, a single, overall economic cut-off grade could not be calculated. Block model reports using a range of nickel equivalent grade (NiEq) cut-offs were run to determine which best represented the outputs from the optimisations; these were then applied to the Ore Reserve designs.

A 0.81% NiEq cut-off was selected for the Goongarrie South and Big Four Mineral Resources.

Reserve Estimation Methodology

The block models as received from Ardea were processed to produce engineering models, which were subject to checks and QA/QC. Input data for the open pit optimisations were sourced from Ardea, along with previous studies on the project. Mining costs were sourced specifically for this project from independent mining contractors.

From the pit shells produced by the optimisations, a final shell for each deposit was selected with the aim of maximising the value of the project.

Pit shell development was analysed in order to target the highest value ~30Mt of ore.

18 pit designs (including interim stage pits) were completed based on these target areas and Ore Reserves were formulated from the JORC classified Measured and Indicated material within these pit designs.

Material Modifying Factors

- Environmental studies have commenced and will be continue through the Definitive Feasibility study.
- Goongarrie lies within several granted mining leases that will provide adequate availability of land for plant development.
- Water rights are secure for all mining leases. To supplement these, addition General Purpose and Miscellaneous Licences are under application to source water from defined palaeochannels to the west and northwest should the need arise.
- The site has access to excellent infrastructure, being well serviced by a sealed highway, active railway, and reticulated high-voltage power which all cross the project site. Road and rail upgrades are not required. Labour is expected to be sourced and maximised from the City of Kalgoorlie-Boulder (80 km to the south), and will be augmented by fly in-fly-out employees (via Kalgoorlie-Boulder) as required. On-site accommodation will be provided for FIFO.
- Transport of bulk commodities will be via rail or road, with direct connection between site and major ports at Esperance and Fremantle.
- Processing plant and associated infrastructure is provided for in the project capital cost, including power and water supplies, off-site road upgrades
- Ardea has long-standing granted mining leases extending the full strike length of the project area, with an additional mining licence application submitted to the east of Goongarrie South that will ensure capture of all peripheral mineralisation and allow greater flexibility in mining, processing and infrastructure planning.
- There are no known significant naturally occurring risks to the project.
- Voluntary discussions with local and state government bodies shows support for the project. Both the City of Kalgoorlie-Boulder and the Shire of Menzies (the project straddles the boundary) have expressed strong support.
- Ardea is abiding by Native Title regulations, with no issues flagged to date with a Native Title application that covers a large part of the Eastern Goldfields mining province, including the Goongarrie project area.

Appendix 2 – JORC Code, 2012 Edition, Table 1 report

Section 1 – Sampling Techniques and Data

(Criteria in this section applies to all succeeding sections)

Criteria	JORC Code explanation	Commentary

Sampling techniques
 	
Note: Due to the similarity of the deposit styles, procedures and estimations used this table represents the combined methods for all Ardea Resources (ARL) Cobalt and Nickel Laterite Resources. Where data not collected by ARL has been used in the resource calculations, variances in techniques are noted.
	• *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.*
		• The nickel and cobalt laterite resources at Goongarrie have been sampled dominantly using Reverse Circulation (RC) on various grid spacings from 10x10 metre and 80x160 metre spacing, with occasional diamond and sonic drilling (DD and SD) for QAQC verification of the RC drilling, collection of bulk density measurements and material for metallurgical testwork All holes were vertical and designed to optimally intersect the sub-horizontal mineralisation. RC drill samples were collected using a face sampling hammer over 1m intervals via cyclone into plastic bags when dry or polyweave bags when wet. Subsamples of significant mineralized material for routine assay analysis were collected by riffle or cone splitting when dry or damp or by spear when wet, over 1m or 2m intervals with the aim of collecting a 2-3kg sub-sample over each down hole sample interval.
		• Most of the sampling data used to inform the resource estimate is from RC drilling.
		• DD holes were drilled for the purposes of:
		  • Verification of geology and sampling determined from the RC drilling;
		  • collection of bulk density measurements;
		  • metallurgical test work.
		• Several large diameter (900 to 1200mm) bulk sample holes were completed at Goongarrie South and Goongarrie Hill using a Calweld well boring rig to collect material for metallurgical testwork.
		• Additional material for metallurgical test work, further verification of the RC drilling and collection of additional bulk density measurements was obatined by sonic drilling recovering 5.1 inch diameter core.
		• Most of the RC drilling informing the Mineral Resource estimates was completed by Heron Resources between 1999 and 2006 and Vale in 2007 and 2008 while most the diamond and sonic drilling was completed by Vale in 2006 to 2008 with the exception of 8 diamond holes completed by Heron at Goongarrie South in 2000.

Drilling techniques	• *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).*	• RC drilling was performed with a face sampling hammer (bit diameter between 4½ and 5 ¼ inches) and samples were collected via a cyclone into plastic bags when dry or polyweave bags when wet. • All diamond drilling used triple tube core barrels to collect PQ3 size core. • Calweld samples (not used in resource model but used for metallurgical testing) were collected in bulka bags on 1 metre down hole intervals. • Sonic drill samples were collected as whole core samples, 6 inches diameter of up to 1 metre lengths in sealed clear plastic wrap. Sonic core of longer lengths was split as it was retrieved from the drill string to facilitate handling of the heavy samples.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Recovery for the historic and current RC bulk drill samples was based on visual estimates (%) while weights of the RC bulk drill samples were measured as a proxy for recovery for the Vale samples. The overall average RC sample recovery at Goongarrie is estimated to be 75% which is considered acceptable for nickel laterite deposits. • RC sample moisture content has also routinely been recorded with approximately 80% RC samples from Goongarrie South, 40% from Big Four and 10% from Goongarrie Hill from the Heron drilling logged as being wet, as compared to approximately 10% of the samples from the Vale RC drilling at GS and GH drilling logged as wet. Statistical analysis

Criteria	JORC Code explanation	Commentary
		indicates that wet samples tend to report higher nickel grades at GS and BF where the water table is approximately 12m below surface. Plots of sample recovery versus grade also indicate a tendency for higher recoveries for samples with higher Ni grades particularly for wet samples from the Heron RC drilling. While this does not demonstrate any clear evidence of grade bias resulting from RC drilling and sampling processes, it does highlight a need for routine verification of the RC drill samples and assay data with core drilling (diamond or sonic). • Measures taken to ensure maximum RC sample recoveries included maintaining a clean cyclone and drilling equipment, using water injection at times of reduced air circulation, as well as regular communication with the drillers and slowing drill advance rates when variable to poor ground conditions are encountered. • For diamond drilling, drill runs were reduced to as little as 0.5 metre in poor ground conditions to maximise core recovery. Core recovery was excellent being over 90% for all deposits. • Recovery from Sonic drilling was excellent with very good recoveries experienced in soft goethite clays where water injection was required in RC to facilitate acceptable recoveries. • In Calweld drilling, drill bit diameter was changed to account for ground hardness to maximise sample recovery and bore hole penetration. A specialised shoot was constructed to maximise the recovery from the drill head. Samples were stored in bulka bags to prevent contamination or sample loss.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• For RC drilling, visual geological logging was completed for all RC drilling on 1 metre intervals. The logging system was developed by Heron Resources Ltd specifically for the KNP and was designed to facilitate future geo-metallurgical studies. Logging was performed at the time of drilling, and planned drill hole target lengths adjusted by the geologist during drilling. The geologist also oversaw all sampling and drilling practices. A mixture of Heron employees and contract geologists supervised all drilling. A small selection of representative chips were also collected for every 1 metre interval and stored in chip-trays for future reference. Only drilling contractors with previous nickel laterite experience and suitable rigs were used. • For DD holes, both visual geological and geotechnical logging were performed on all drill core. Core was also selectively sampled for both geological and metallurgical test work. • Calweld and Sonic holes were visually geologically logged prior to being sampled for metallurgical test work. • The geological legend used by Heron is a qualitative legend designed to capture the key physical and metallurgical features of the nickel laterite mineralisation. Logging captured the colour, regolith unit and mineralisation style, often accompanied by the logging of protolith, estimated percentage of free silica, texture, grain size and alteration. Logging correlated well with the geochemical algorithm developed by Heron for the Yerilla Nickel Project for material type prediction from multi-element assay data. • Drilling conducted by Vale / Inco was logged in similar detail to Heron's procedures, but used a slightly modified geological legend. There is a direct translation between the Vale /Inco and Heron logging legends.
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.*	• Subsamples of all 1m intervals from the Heron RC drilling completed in 1999 to 2002 were collected using a riffle splitter when dry or damp, or spear or scoop from the 1m bulk sample bag when wet. Composite spear/scoop samples for initial assay analysis were also collected, typically over 8m downhole intervals in unmineralised overburden or 4m intervals over mineralised material. The 1m sub-samples over the composite sample intervals that returned assays greater than 0.4% Ni were subsequently submitted for analysis with the resultant assays superseding the initial composite sample assays in the project database. This sampling methodology applies to most of the data used to inform the resource estimates for the southern half of the Goongarrie South deposit, the northern half of the Big Four deposit, most of the Scotia Dam deposit. • Subsamples from the Heron 2004 and 2006 RC drilling at Big Four and Goongarrie Hill were mostly collected over 2m downhole intervals using a cone splitter when dry or spear sampling when wet. Similarly, subsamples from the Vale RC drilling at Goongarrie South and Goongarrie Hill were mostly collected over 1m intervals using a cone splitter when dry or spear sampling when wet. • Heron inserted standards and/or duplicate RC sample splits into the exploration sample stream for external QAQC

Criteria	JORC Code explanation	Commentary
		monitoring at a frequency of roughly 1 per drill hole for approximately 50% of the Heron RC drilling at GS, GH, BF and SD completed in 1999 to 2002. Standards, blanks and duplicate RC sample splits were inserted into the exploration sample stream on a cyclic 1 in 10 frequency (1 in 30 frequency for each type) for the remaining RC drilling completed by Heron at GH and BF in 2004 and 2006. Vale/Inco inserted both standards and duplicate RC sample splits • A small percentage of holes were separately resampled post drilling to confirm the integrity of the different sampling techniques employed. • One metre half core samples from the Heron and Ardea diamond drilling were cut using a diamond saw when hard or spatula when soft, and submitted for assay analysis along with blanks and standards for QAQC monitoring. Core from the Inco/Vale diamond holes was sampled over variable intervals (1-1.5m) with half core samples cut with a diamond saw and submitted for head assay along with blanks and standards, and the other half for beneficiation test work.

Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*
	• *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.*
	• *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*
		• Subsamples from most of the RC drilling (Heron) at GS and GH (79% and 73%, respectively) and 36% of the drilling at BF were analysed by KAL Labs in Kalgoorlie using the following analytical methods:
		  ○ Four acid digestion (4AD) with AAS finish for Ni, Co, MgO, FeO, Al2O3, CaO, Mn, Cr, Cu, and Zn (18% of drilling at GS, 10% at BF and 32% at GH).
		  ○ Four acid digestion (4AD) with ICP_OES finish for Ni, Co, MgO, FeO, Al2O3, Mn, Cr, Cu, and Zn (33% of drilling at GS, 23% at BF and 28% at GH).
		  ○ XRF analysis of pressed powder (PP) for Ni, Co, MgO, FeO, Al2O3, SiO2, CaO, Mn, Cr, Cu, and Zn (28% of drilling at GS, 3% at BF and 13% at GH).
		• Subsamples from the Vale RC drilling and the remaining Heron RC drilling used for resource estimation (21% at GS, 52% at BF and 27% at GH) were analysed for Ni, Co, MgO, FeO, Al2O3, SiO2, CaO, Mn, Cr, Cl, Cu, Zn and As by Ultra Trace using fusion XRF analysis. Most of the Vale/Inco samples were also analysed for loss on ignition (LOI) by thermo-gravimetric analysis.
		• The fusion XRF method is widely accepted as the preferred analytical method for multi-element analysis of nickel laterite samples. Thermo-gravimetric analysis is also the leading method used to determine LOI. The 4AD AAS and 4AD ICP-OES analytical methods are unable to test for SiO2 and the digestion method often does not fully attack all minerals which can lead to the understating of the true concentration of some elements particularly Al2O3 and Cr. The pressed powder XRF method is designed to be semi-quantitative and typically suffers from poor analytical accuracy for elements that are poorly dispersed in the pressed powder pellet.
		• KAL Labs and Ultratrace routinely inserted analytical blanks, standards and duplicates into the client sample batches for laboratory QAQC performance monitoring.
		• Heron inserted standards and/or duplicate RC sample splits into the exploration sample stream for external QAQC monitoring at a frequency of roughly 1 per drill hole for approximately 50% of the Heron RC drilling at GS, GH, BF and SD completed in 1999 to 2002. Standards, blanks and duplicate RC sample splits were inserted into the exploration sample stream on a cyclic 1 in 10 frequency (1 in 30 frequency for each type) for the remaining RC drilling completed by Heron at GH and BF in 2004 and 2006. Vale/Inco inserted both standards and duplicate RC sample splits into the exploration sample stream alternating on a 1 in 20 frequency.
		• The following umpire assay programmes have also been completed:
		  ○ Representative sample pulps from RC drilling GS, GH, BF and SD covering the three analytical methods used at KAL labs were submitted for umpire assay at Ultra Trace using Fusion XRF analysis at approximately 1 in 50 frequency (Heron umpire programme).
		  ○ Amdel fusion XRF umpire analyses of Ultra Trace lab pulps (1 in 50) from the Heron 2004 drilling programme at BF (Heron umpire programme).
		  ○ Bureau Veritas Fusion XRF assays of pulps from early Heron RC drilling for holes at an 80m spacing along sections 400m apart. This provided umpire assays for 1911 RC samples originally analysed by KAL labs using 4 acid digest ICP-OES and 687 RC samples originally analysed by KAL labs using pressed powder XRF methods (Ardea umpire programme).

Criteria	JORC Code explanation	Commentary
		• All of the QAQC data has been statistically assessed and the precision and accuracy of the assay data for the important grade components (Ni and Co) has been found to be acceptable and suitable for use in resource estimation.

Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.*
	• *The use of twinned holes.*
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*
	• *Discuss any adjustment to assay data.*
		• The reliability of RC sampling which forms the majority basis of the source data used for resource estimation has been checked by collecting the following verification sample datasets:
		  ○ Routine duplicate RC sub-samples and associated multi-element fusion XRF assay data (Ultra Trace Laboratories) for the Vale/Inco drilling and the Heron RC drilling programmes completed at BF and GH in 2004 and 2006. Comparative statistics of the assay data for the Vale/Inco duplicate RC samples indicated that acceptable overall levels of precision were achieved for nickel and cobalt.
		  ○ Heron twinning of seven Heron RC holes at Goongarrie South with PQ3 diamond drill holes and multi-element analysis of duplicate splits of 1m half core samples by two labs using 4 acid digest ICP-OES and pressed powder XRF techniques (Kalgoorlie Assay Laboratories - KAL), and 4 acid digest ICP-OES and fusion XRF techniques (Ultra Trace Laboratories).
		  ○ Vale twinning of previous Heron RC holes with PQ3 diamond drill holes including two at GS, six at BF, two at SD and seven at GH, and analysis of half core samples at Ultra Trace by Fusion XRF.
		  ○ Vale twinning of three Vale RC holes and one Heron RC hole at GS and eight Vale RC holes at GH with 6 inch sonic drill holes, and analysis of half core samples at Ultra Trace by Fusion XRF.
		  ○ Vale collection of RC sample resplits (Jones riffle) from bulk sample residues from the RC holes twinned with PQ3 holes at BF, and analysis of the resplit samples by Ultra Trace using Fusion XRF.
		• Two metre composites for the twinned RC and DD or Sonic hole pairs have been statistically compared and determined to have similar unbiased chemical compositions. Whilst there was some variability in the geology of the close spaced drill holes, the short range variance is typical of nickel laterite deposits in WA.
		• Where geology agreed within the twinned holes, assays were generally similar between the different methods.
		• Despite the evidence for grade differences in some of the twined holes related to the RC drilling process, overall, the RC drilling is still considered to provide samples that adequately represent the true geochemistry of the regolith which are suitable for the purpose of resource estimation.
		• No adjustments have been made to the assay data.

Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• The majority of the drill hole collars have been surveyed using an RTK DGPS system with either a 3 or 7 digit accuracy. The coordinates are stored in the exploration database referenced to the MGA Zone 51 Datum GDA94. • All of the exploration drill holes used for resource estimation are vertical and have not down hole surveyed. The sub-horizontal orientation of the mineralisation, combined with the soft nature of host material would result in minimal deviation of vertical RC drill holes. • The grid system for all models is GDA94. Where historic data or mine grid data has been used it has been transformed into GDA94 from its original source grid via the appropriate transformation. Both original and transformed data is stored in the digital database. • Survey control for modelling of the surface topography, which is essentially flat over the GS, BF and SD deposits is based on the drill hole collars. Minor errors are expected along the deposit margins (E-W) particularly in relation to a gentle rise immediately east of GS. The more elevated and variable surface topography at GH was generated based on drillhole collars supplemented by a 20mE by 20mN grid of points derived from photogrametry around the periphery of the deposit. While the current surface topography models are adequate for the current PFS mine planning processes, more detailed and expansive topographic data (LIDAR) will be required prior to undertaking detailed mine and infrastructure planning work as part of the upcoming DFS.
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*	• The drill spacing ranges from 20mE x 20mN to 80mE x 160mN at Goongarrie South, is mostly 80mE x 80mN at Big Four and Scotia Dam , and is mostly at 80 m intervals along east-west drill traverses alternating between 40m and 120m apart at Goongarrie Hill. Some localised regions of 40mE by 40mN and 20mE by 20mN spaced drilling are also

Criteria	JORC Code explanation	Commentary
	estimation procedure(s) and classifications applied. • *Whether sample compositing has been applied.*	present at Goongarerie Hill. • All assay data for the RC drilling was composited over 2m downhole intervals to match the most common longest sample interval through the mineralisation prior to resource estimation. • Studies of the spatial continuity of nickel and cobalt grades at the Goongarrie deposits have determined that the drill spacing is sufficient to defined Measured, Indicated and Inferred resources in the project area.
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 majority of the drill holes is vertical and give true width of the regolith layers and mineralisation. • On a local scale there is some variability due to sub-vertical to vertical structures which may not be picked up with the relatively broad spaced vertical drill pattern employed. This local variability is not considered to be significant for the project overall, but will have local effects on mining and scheduling later in the project life.
Sample security	• *The measures taken to ensure sample security.*	• All samples were collected and accounted for by Heron, Vale or Ardea employees during drilling. All samples were bagged into plastic bags and closed with cable ties. Samples were transported to Kalgoorlie from site by relevant employees in sealed bulka bags. • Consignments were transported to Ultratrace Laboratories in Perth by reputable commercial transport companies. All samples were transported with a manifest of sample numbers and a sample submission form containing laboratory instructions. Any discrepancies between sample submissions and samples received were routinely followed up and accounted for.

Audits or reviews	• *The results of any Audits or reviews of sampling techniques and data.*	• Heron periodically conducted internal reviews of sampling techniques relating to resultant exploration datasets, and larger scale reviews capturing the data from multiple drilling programmes within the KNP.
		• Internal reviews of the exploration data included the following:
		  • Unsurveyed drill hole collars (less than 1% of collars).
		  • Drill Holes with overlapping intervals (0%).
		  • Drill Holes with no logging data (less than 2% of holes).
		  • Sample logging intervals beyond end of hole depths (0%).
		  • Samples with no assay data (from 0 to <5% for any given project, usually
		• related to issues with sample recovery from difficult ground conditions,
		• mechanical issues with drill rig, damage to sample in transport or sample preparation).
		  • Assay grade ranges.
		  • Collar coordinate ranges
		  • Valid hole orientation data.
		• All of the exploration and corresponding QAQC data were reviewed ad assessed again by Vale and Heron in 2008 and 2009 respectively. Both Vale and Heron concluded that the quality of the data was suitable for use in the resources estimation studies.

Section 2 – Reporting of Exploration Results

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

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• All Mineral Resources reported in this report occur within tenement holdings 100% owned by Ardea Resources.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• The Goongarrie South and Scotia Dam deposits were discovered and explored by Heron Resources Limited. • Vale Inco completed a prefeasibility study on the KNP which included extensive drilling of the Goongarrie South, Goongarrie Hill and Big Four deposits relevant to the current updated resource reporting.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The KNP nickel laterite mineralisation, including cobalt rich areas is developed from the weathering and near surface enrichment of Achaean-aged olivine-cumulate ultramafic units. The mineralisation is usually within 60 metres of surface and can be further sub divided on mineralogical and metallurgical characteristics into upper iron-rich material and lower magnesium-rich material based on the ratios of iron to magnesium. The deposits are analogous to many weathered ultramafic-hosted nickel-cobalt deposits both within Australia and world-wide. • Cobalt rich mineralisation is typically best developed in iron rich material in regions of deep weathering in close proximity to major shear zones or transfer shear structures and to a lesser extent as thin zones along the interface of ferruginous and saprolite boundaries at shallower depths proximal to shear structures. • The Cobalt Zone is associated with a distinctive geo-metallurgical type defined as "Clay Upper Pyrolusitic". Mineralogy is goethite, gibbsite and pyrolusite (strictly "asbolite" or "cobaltian wad"). The Cobalt Zones typically occur as sub-horizontal bodies at a palaeo-water table within the KNP (late stage supergene enrichment). This material is particularly well developed at Goongarrie South.

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*
	  • *hole length.*
	• *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*
		• The drill hole data relating to the resource estimates reviewed in this study are all previously reported results. No new drilling has taken place since 2008 with the exception of four diamond drill holes completed by Ardea in 2017. Ongoing studies for these prospect areas are focused on the metallurgical characteristics of the mineralisation and development of new process technology.
		• Drill hole collar, geology and assay data for each prospect area investigated in this study are provided in the Vale Inco Pre-feasibility Study, 2009 and Heron Pre-feasibility Study Update, 2010.

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*	• Most drill hole samples have been collected over 1m or 2m down hole intervals. Assay compositing completed for each deposit in preparation for statistical analysis and grade estimation was conducted using length weighted averaging of the input assay data by corresponding sample lengths. Typically a 2 compositing length was used aligned with the dominant sampling interval used for drill sample collection. • No metal equivalent calculations have been used in this assessment.

Criteria	JORC Code explanation	Commentary
	examples of such aggregations should be shown in detail. • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• The mineralisation at Ardea's nickel laterite project areas has a strong global sub-horizontal orientation. All exploration drill holes focused on the nickel – cobalt laterite mineralisation at Goongarrie are vertical. • With the exception of local offsets due to slumping, all vertical drill holes intersect the mineralisation at approximately 90 degrees to its orientation. All down hole widths approximate true widths for vertical holes.
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.*	• No new discoveries of nickel laterite mineralisation or cobalt rich areas are presented in this report.
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.*	• Not applicable to this report. All figures previously reported.
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.*	• Not applicable to this report.
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.*	• Infill drilling of the areas of the Goongarrie Ni-Co Project most likely to be mined, as determined by the Ardea PFS has been planned and is underway in preparation for producing update resource estimates with higher confidence resource classification for input into the Definitive Feasibility Study for the project.

Section 3 – Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, 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.*	• Heron, Vale and Ardea have employed robust procedures for the collection of and storage of sample data. This included auto-validation of sample data on entry, cross checking of sample batches between the laboratory and the database and regular A$iting of samples during the exploration phase. • Sample numbers were both recorded manually and entered automatically. Discrepancies within batches (samples were batched on a daily basis) were field checked at the time of data entry, and resampled if errors could not be resolved after field inspection. • HGMC reviewed the set of Microsoft Access data of the drilling information compiled for the Goongarrie South, Big Four, Goongarrie Hill and Scotia Dam deposit areas which was extracted from. Ardea's in-house Microsoft Access database. The databases supplied and used were dated July 2015, August 2015 and most recently August 2016. This is the most recent version of the database available • Data validation procedures include digital validation of the database on entry (no acceptance of overlapping intervals, duplicate hole and sample ID, incorrect legend information, out of range assay results, incorrect pattern of QAQC in sampling stream, failed QAQC, missing assays, samples and geological logging). • At the time of resource modelling all data was visually checked on screen, and manually validated against field notes. All changes to the database were verified by field checks. • Ardea undertook a program of drill hole collar survey and validation. All drill holes were surveyed using DGPS with an established base station control in the vicinity of the Goongarrie South, Big Four, Scotia Dam and Goongarrie Hill deposit areas.
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 Competent Person for Estimation and Reporting of Mineral Resources, Stephen Hyland of HGMC has conducted several visits to much of the Goongarrie general area prior to Heron and Ardea's involvement with the project area and is familiar with the regional and some of the local geology. The drilling, sampling and geological practices used for data collection were standardised for all deposits. RC drilling was generally effective, although there were some minor localised issues with sampling accuracy of wet puggy clays. Overall procedures were consistent and the results from the RC drilling were found to be valid based on comparisons with the result of verification diamond drilling. • The Competent Person for Sampling Techniques and Data, Ian Buchhorn, is a current employee of Ardea and has acquitted and visited all of the KNP prospect areas. • No comment can be made on the validity of historic work by Helix, WMC and Anaconda, except to say that infill drilling has broadly similar results to the historic data. Due diligence by Ian Buchhorn at the time of acquisition by Heron confirmed acceptable QAQC by the various vendors. • HGMC has carried out a general project and data review in April 2017.The review found that project development and management of data have been given appropriate attention. All of the previous drilling data and resource estimation work was also reviewed and found to be of a high standard
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• There is a strong correlation between the geology of adjacent drill holes in all of the resources. There is also a strong global correlation between weathering profile, lithology and mineralisation intensity. On a local scale the changes in weathering profile is often discrete, but of a complex geometry. • A combination of geological logging and assay data has been used to sub divide the mineralisation into high-iron and high-magnesium mineralisation types, within a mineralised domain. High-carbonate domains have also been defined. High-silica domains were more problematic to define, and further work is required on developing this geo-metallurgical domain. • The continuity of mineralisation is strongly controlled by bed rock alteration and palaeo water flow within the ultramafic host

Criteria	JORC Code explanation	Commentary
		units. Areas of deep fracturing and water movement within the bedrock typically had higher grade and more extensive mineralisation in the overlying regolith. In the proximity of geological contacts between the ultramafic hosts and surrounding mafic and felsic lithologies there is often a distinctive increase in grade and widths of mineralisation, including the development of mineralisation along fracture planes in the adjacent felsic and mafic units. Where the host regolith overlies olivine adcumulate lithologies there is an increase in siliceous material and a loss of the high magnesium mineralisation horizon. In areas where the host ultramafic was altered to talc, or talc-carbonate lithologies there was no development of nickel mineralisation in the regolith. These areas typically formed along shears, and sheared contacts within the bedrock. • Two sets of Mineralisation domains for both nickel and cobalt ('high and low' grade') were developed using a combination observed geological logging information and assay data. • The mineralised envelopes for Goongarrie South, Big Four and Scotia Dam deposits were based on drill intercepts of nominally >0.05% Co or >0.10% Co and >0.50% Ni or >1.00% Ni using maximum of 2m (2 samples) internal dilution. At Goongarrie Hill mineralised envelopes were developed for 'low grade' >0.05% Co and >0.50% Ni domains only. The logged geology and the local cobalt and nickel percentage (>0.05%, or >0.10% Co and >0.50%, >1.00% Ni) were used as a guide for the wireframes. The mineralised zone wireframes were extrapolated to the edges of the drilling along and perpendicular to the strike to maintain geological consistency. • The majority of detailed logging of RC drill chips and diamond core logging information from drill programs completed during the years 1999 to 2008 was transferred to geological logging database and this has provided a robust control for geology and material type interpretation and resource wireframe generation. • All mineralised envelopes where aligned with the known interpreted mineralisation trend. No obvious fault systems were interpreted to off-set mineralisation trends however they are known to exist and future work is required to determine how significant these effects may be.
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.*	• Resource dimensions vary between deposits. The total length of the main Goongarrie South nickel and cobalt mineralisation domains is approximately 7,400 metres with observed widths of approximately 400 and up to 1000 metres. Several semi-parallel mineralisation zones for the smaller cobalt domains are observed are with variable thicknesses typically ranging in the order of 5-20 metres thick with some zones being up to and exceeding 50 meters thick in the area referred to as the Pamela-Jean zone. Interpreted mineralisation has been modelled from near topographic surface (378mRL) down to approximately the 220m RL (approximately 160m vertical from surface). • The total length of the main Big Four deposit nickel and cobalt mineralisation domains is approximately 7,700 metres with observed widths of approximately 300 metres. In the cobalt domains, several semi-parallel mineralisation zones are observed with variable thicknesses typically in the order of 5-15 metres thick with some zones being in the range of 20 to 40 metres thick. Interpreted mineralisation has been modelled from near topographic surface (380mRL) down to approximately the 298m RL (approximately 80m vertical from surface). • The total length of the main Scotia Dam nickel and cobalt mineralisation domains is approximately 1,300 metres with observed widths of approximately 250 and up to 550 metres. Possibly two (2) cobalt mineralisation zones are observed with variable thicknesses typically in the order of 5-25 metres thick with some zones being up to and exceeding 35 meters thick towards the northern end of the main mineralised zone. Interpreted mineralisation has been modelled from near topographic surface (378mRL) down to approximately the 324m RL (approximately 55m vertical from surface). • At Goongarrie Hill, the nickel and cobalt mineralisation domains have an approximate strike length of 5200 metres and a width of 750 metres. The thinner cobalt mineralisation domains range in thickness from approximately 5-15 metres.
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 Goongarrie South, Big Four, Scotia Dam and Goongarrie Hill deposits were Ordinary Kriged (OK), using variography of the domained Ni and Co shells for Ni % and Co%. • Deposits were estimated using MineSight® software. • Block sizes for the Goongarrie South, Big Four, Scotia Dam and Goongarrie Hill models based on drill spacing and deposit geometry are as follows • 40 x 40 x 4 metre Goongarrie South

Criteria	JORC Code explanation	Commentary
	• *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 drill hole data, and use of reconciliation data if available.*	• 20 x 40 x 4 metre Big Four • 40 x 40 x 2 metre Scotia Dam • 30 x 60 x 2 metre Goongarrie Hill • (Uniform Block Size – No Sub-Blocks) • All models used zone codes with an associated block percentage sub-division (1% precision) to maintain accurate volume reporting. Cobalt domains were coded using items ZON1 and a corresponding ZON1%. Similarly nickel domains were coded using a ZON2 item with a corresponding ZON2% block proportion coding item. • Ni and Co are the principal economic minerals. The Ni was not interpolated in the May 2017 resource model revision but has been updated as at January 2018. Ni and Co only were the items re-interpolated. Ardea is aware Fe has the potential to be an economic mineral under some processing options being assessed. MgO, FeO, Al2O3 and SiO2 are all important minerals in the classification of the different geo-metallurgical styles of mineralisation for both materials handling and metallurgic extraction processes. All have been retained from previous modelling of Goongarrie South, Big Four, Scotia Dam and Goongarrie Hill and are incorporated into the current (January 2018) block models. • The domain boundary for mineralisation is the same for all deposits with a step change in nickel grades being modelled at the 0.05% Co and the 0.10% Co levels as well as the 0.50% Ni and the 1.00% Ni levels. • The two grade defined mineralisation domains for each on the Ni anc Co elements were geostatistically analysed and modelled separately. • Additional internal domains relating to the high-iron, and high-MgO domains were retained from previous modelling and define the upper and lower portions of the mineralised weathering profile. These domains are usually separated by a sharp (although often geometrically complex) geological boundary. (Note: for some deposits only one or other geochemical domain is present). Depending on results of the variography, the Co grades was modelled in conjunction with the ancillary and related element manganese within the cobalt wireframe shells. • The following general interpolation parameters at Goongarrie South, Big Four, Scotia Dam and Goongarrie Hill were used: a minimum and maximum number of composites of 1 and 24; no sub-blocking or discretisation (all domains). • One search passes were used for interpolation of grade into the blocks of each AREA domain. Any un-estimated blocks were filled using a large search if necessary. Block interpolated in these peripheral areas were generally classified as inferred and did not contribute to material accounting in the higher confidence measured or indicated categories. Hard boundaries were assigned between the cobalt (ZON1) and nickel (ZON2) domains. • No detailed assumptions have been made with regard to modelling of selective mining units, except future mining is expected to be using standard excavator and truck methods. The block sized utilised is expected to be in line with the general mining method assumptions including the use of standardised excavator and haul truck mining approaches. • Refer to the Data Aggregation Methods criteria in Section 2 above. A range of outlier grade restriction was applied to all mineralised wireframes within given AREA domains. • The influence of extreme grade values was examined utilising top cutting analyst tools. (grade histograms, log probably plots and coefficients of variation). • Some non-assayed intervals are present in the database. These have been interpreted as non-mineralised intervals and assigned zero grade for the purposes of block grade estimation. In situations where non-mineralised intervals are included within broader mineralised intervals these non-mineralised intervals are assumed to be mineralised, but grade level unknown. Interpolation from available from appropriately proximal data permitted in the interpreted zones concerned. • Model validation for all four of the Goongarrie South, Big Four, Scotia Dam and Goongarrie Hill deposit block models was carried out graphically and statistically to ensure that the block model grades accurately represent the input drill hole data. A number of methods were employed to validate the block model including: global mean comparison; visual comparison; trend plot comparison. The global mean comparison between drill composite grades and model grades within each of the mineralised zone wireframes shows that, globally, the estimates validate well within all well-informed domains for both deposits. Cross sections were viewed on-screen and showed a good comparison between the drill hole data and the block model grades. A volume comparison between the volume of the block model cells within each mineralised zone and the

Criteria	JORC Code explanation	Commentary
		volume of the corresponding wireframe. The results of volume checking were as in previous models within acceptable limits.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• All tonnages reported are dry tonnes for all models. Dry density was determined from drill core and down hole gamma for the Jump Up Dam, Scotia, Highway and Goongarrie deposits. This dry tonnage was applied to the other deposits on a material type basis (see Bulk Density for more details).
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• The 0.05% and 0.10% Co and the 0.50% and 1.00% Ni cut-offs used for the wireframe domains of each of the deposits was based on two observed step changes in the probability distribution of the cobalt grades across the drill holes as well as general spatial distribution of those grades. Nickel cut-offs adopted for the 'high grade' and 'low grade' domains were similarly based but with some reference to relative expected economic cut-off levels. • Previous routine Mineral Resource reporting by Heron has used a 0.5%Ni cut-off grade applied to the resource block models. Additionally, a 0.08% Co reporting lower cut-off has been adopted for reporting cobalt resources. These cut-off levels are commonly used for resource reporting for typical Nickel Laterite deposits and are continued for the new series of January 2018 block models and reporting. • HGMC has produced block model grade shells using both a 0.08% Co and 0.50% Ni cut-off and a 'Quality of Estimate' and resource category parameter (RCAT) parameter which is used to provide constraints for updated Mineral Resource with emphasis on coding regions of continuous nickel and cobalt mineralisation. These cobalt rich areas are of particular interest to Ardea as a potential source cobalt-nickel-manganese feed-stocks for the lithium ion battery industry.
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 via conventional dig and haul with minimum blasting is assumed for all deposits. Given the lateral extent of the models the selective mining unit SMU is likely to be smaller than the 40mx40mx4m blocks used to develop the new Goongarrie South and Big Four block models for example. • For the purposes of removing unlikely to be economic resources from the resource statement, Auralia Mining Consultants carried out a Whittle optimization for each of the Goongarrie South, Big Four, Scotia Dam and Goongarrie Hill deposits using an A$$37,800 per tonne nickel and a A$$241,500 per tonne cobalt price. Estimated Mining and processing costs, along with royalty and recovery factors were also updated by Auralia Mining Consultants for this process. The evaluation was carried out on the Kriged nickel and cobalt grades only. • Pit slope assumed 55 degrees. Other assumptions: Mining dilution 10%; Mining recovery 95%; Surface mining cost $7:70 to $7:81; Process recovery Co 94.5% - Ni 95.5%.
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.*	• The KNP Projects including the Goongarrie South, Big Four, Scotia Dam and Goongarrie Hill deposits are subject to ongoing metallurgical studies. • The current focus of studies into a preferred metallurgical approach is on high pressure acid leaching methods with a particular focus on improving the recovery of reagents during processing to improve unit costs.

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.*	• It is expected that waste rock material will largely be disposed of inside previously completed pits during the life of mine. Tailings disposal will consist of a mixture of conventional tailings dams and disposal in mined out pits. As all of the material mined will be of an oxidised nature and as such there is not expected to any acid generating minerals in the waste rock material. The processed tailings will need to be neutralised or recovered from the tailings stream prior to disposal in waste storage facilities. The expected land forms at the conclusion of the project will be of similar profile to the current land forms. • Environmental studies for the project have been started with base line surveys for flora and fauna. However, as the final process route is currently subject to research, the final environmental plans are yet to be developed. It is reasonable, given the existing nickel laterite operations in WA, that all environmental issues can be resolved and it will be possible to mine the resources within current environmental guidelines.
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 densities were measured for Goongarrie South and Goongarrie Hill by downhole geophysical logging and Archimedes density measurements of drill core. Both methods account for voids in the density assessment and give similar dry bulk density results after oven drying of the bulk density samples and subtraction of the downhole moisture content from the geophysical density logging data. • In situ dry density was set to between 1.3 and 2.05/m3 in the resource block model for Goongarrie South, being average bulk density values based on the available bulk density data for Goongarrie South sub-divided material types. Most of the mineralisation lies within the 'clay' material which has a dry density of between 1.30 and 1.33t/m3. Densities were assigned to material based on the geochemical material classification scheme for each of the deposits. • As insufficient bulk densities measurements are available for Big Four and Scotia Dam, average densities subdivided by material types were therefore adopted from Goongarrie South. These are considered a valid application due to the similar distribution of mineralogy and material types at these deposits. Where samples or ancillary assays were not numerically sufficient for classification, the average density for clay material was applied (1.5 t/m3 for Scotia Dam mineralisation). HGMC has reviewed all previous bulk density assignment work and preserved this for use in the new block models.
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.*	• Resource classification was approached in the same manner for the Goongarrie South, Big Four and Scotia Dam deposits and is based on a combination of drill hole spacing, the number of drill hole composites use to inform a block estimate, kriging variance and the ranges of mineralisation continuity (developed from variography studies). All these classification parameters were recorded during the ordinary kriging interpolation cobalt grades. These parameters were condensed into a 'Quality of Estimate' QLTY=1, 2 or 3) precursor reporting item. **QLTY=1** • Drill spacing of 20x40 metre or less. • Assays – Co only available for classification. • Search ellipsoid distances 0-60m. • Composite numbers 15 or greater numbers. • Kriging Variance 0 - 0.004. (Goongarrie South), and 0 - 0.005 (Big Four), **QLTY=2** • Drill spacing of 20x40 metre to 80x80 metre (depending on deposit and variography results). • Assays – Co only available for classification. • Search ellipsoid distances 60-100m. • Composite numbers 10-15. • Kriging Variance 0.004-0.008 (Goongarrie South), and 0.005-0.010 (Big Four), **QLTY=3**

Criteria	JORC Code explanation	Commentary
		• Drill spacing of 20x40 metre to 80x80 metre (depending on deposit and variography results). • Assays – Co only available for classification. • Search ellipsoid distances 100m or greater distances. • Composite numbers o to 10. • Kriging Variance 0.008 or greater (Goongarrie South), and 0.010 (Big Four), **Classification – RCAT=1(Measured), 2(Indicated) & 3(Inferred)** • These three QLTY item parameters were further condensed into an RCAT assignment describing the confidence of the localised resource base in the block model. Preliminary Resource Classification Item – (RCAT) Values 1-3 – (Nominally 'Measured', 'Indicated' and 'Inferred' [1, 2 or 3] – For Goongarrie South QLTY=1 material is designated as Indicated Resources (RCAT=2) with the remaining QLTY = 2 and 3 material being combined and reporting as Inferred Resources. (RCAT=3). A Measured Resource at Goongarrie South is also defined within a small area within AREA domains 4 and 5 where high density drilling is present on a 20mEx40mN drilling grid. • For the Big Four and Scotia Dam areas, all QLTY=1 material is designated Indicated Resources (RCAT=2) with the remaining QLTY = 2 and 3 material being combined and designated as Inferred Resources. (RCAT=3). • At Goongarrie Hill all mineralised resources were designated as RCAT=3 (inferred) reflecting the particularly high degree of short range grade variability relative to the drill hole spacing compared to the other deposits.
Audits or reviews	• *The results of any Audits or reviews of Mineral Resource estimates.*	• The new resource estimates for Goongarrie South, Big Four, Scotia Dam and Goongarrie Hill prepared by HGMC have been compared against the previous resource models prepared by Heron in 2009 and Snowden in 2004 (Scotia Dam only). All models have been reviewed by Ardea's Senior Resource Geologist and found to provide reasonable estimates aligned with the level of confidence applied to each model.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure* • *deemed appropriate by the Competent Person. For example, the* • *application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates,* • *and, if local, state the relevant tonnages, which should be relevant to* • *technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• The resource as reported from the Goongarrie South, Big Four, Scotia Dam and Goongarrie Hill block models provides robust global estimates of cobalt and nickel resources. The confidence in local estimates ranges from high in the regions of closer spaced drilling at GS to low at GH where there is much less continuity of grades.

Section 4 – Estimation and Reporting of Ore Reserves

(Criteria listed in section 1, and where relevant in sections 2 and 3, also apply to this section.)

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td>Mineral Resource estimate for conversion to Ore Reserves</td><td>• 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.</td><td>• The Mineral Resource Estimate that is used as a basis for the conversion to Ore Reserve is quoted in this document, and described extensively in an ASX announcement “Resource Update at KNP Cobalt Zone delivers over 100 million tonnes” dated 14 March 2018. The Ore Reserve estimate is reported as autoclave feed tonnes and grades.
• The Ore Reserve estimate defined in this document is a function of the modelled 25-year mine life and does not represent a limitation of the size of the deposit. Rather, should economic conditions allow, further Ore Reserves are expected to be defined upon extension of mine life.
• The Measured and Indicated Mineral Resources reported in this document are inclusive of those Mineral Resources modified to produce the Ore Reserves.
• The following tables comprise the Ore Reserves for the Goongarrie Nickel Cobalt Project. Note that numbers may not sum up due to rounding.
<table>
<tr><th colspan="5">Goongarrie South</th></tr>
<tr><th>Ni EQ Cut</th><th>Class</th><th>Tonnes '000</th><th>Co%</th><th>Ni%</th></tr>
<tr><td>>=1.3%</td><td>Proven</td><td>5,959</td><td>0.13%</td><td>1.12%</td></tr>
<tr><td></td><td>Probable</td><td>8,554</td><td>0.13%</td><td>0.98%</td></tr>
<tr><td></td><td>Total</td><td>14,513</td><td>0.13%</td><td>1.04%</td></tr>
<tr><td>>=1.0% - 1.3%</td><td>Proven</td><td>1,568</td><td>0.06%</td><td>0.72%</td></tr>
<tr><td></td><td>Probable</td><td>4,845</td><td>0.07%</td><td>0.66%</td></tr>
<tr><td></td><td>Total</td><td>6,413</td><td>0.06%</td><td>0.67%</td></tr>
<tr><td>>=0.81% - 1.0%</td><td>Proven</td><td>1,427</td><td>0.04%</td><td>0.59%</td></tr>
<tr><td></td><td>Probable</td><td>3,862</td><td>0.05%</td><td>0.53%</td></tr>
<tr><td></td><td>Total</td><td>5,289</td><td>0.05%</td><td>0.55%</td></tr>
<tr><td>Total</td><td>Proven</td><td>8,954</td><td>0.10%</td><td>0.96%</td></tr>
<tr><td></td><td>Probable</td><td>17,261</td><td>0.09%</td><td>0.79%</td></tr>
<tr><td></td><td>Total</td><td>26,216</td><td>0.10%</td><td>0.85%</td></tr>
</table>
<table>
<tr><th colspan="5">Big Four</th></tr>
<tr><th>Ni EQ Cut</th><th>Class</th><th>Tonnes '000</th><th>Co%</th><th>Ni%</th></tr>
<tr><td>>=1.3%</td><td>Proven</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Probable</td><td>6,172</td><td>0.12%</td><td>0.96%</td></tr>
<tr><td></td><td>Total</td><td>6,172</td><td>0.12%</td><td>0.96%</td></tr>
<tr><td>>=1.0% - 1.3%</td><td>Proven</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Probable</td><td>3,781</td><td>0.06%</td><td>0.66%</td></tr>
<tr><td></td><td>Total</td><td>3,781</td><td>0.06%</td><td>0.66%</td></tr>
<tr><td>>=0.81% - 1.0%</td><td>Proven</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Probable</td><td>3,962</td><td>0.05%</td><td>0.58%</td></tr>
<tr><td></td><td>Total</td><td>3,962</td><td>0.05%</td><td>0.58%</td></tr>
<tr><td>Total</td><td>Proven</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Probable</td><td>13,915</td><td>0.09%</td><td>0.77%</td></tr>
<tr><td></td><td>Total</td><td>13,915</td><td>0.09%</td><td>0.77%</td></tr>
</table>
<table>
<tr><th colspan="5">Total</th></tr>
<tr><th>Ni EQ Cut</th><th>Class</th><th>Tonnes '000</th><th>Co%</th><th>Ni%</th></tr>
<tr><td>>=1.3%</td><td>Proven</td><td>5,959</td><td>0.13%</td><td>1.12%</td></tr>
<tr><td></td><td>Probable</td><td>14,726</td><td>0.13%</td><td>0.97%</td></tr>
<tr><td></td><td>Total</td><td>20,685</td><td>0.13%</td><td>1.01%</td></tr>
<tr><td>>=1.0% - 1.3%</td><td>Proven</td><td>1,568</td><td>0.06%</td><td>0.72%</td></tr>
<tr><td></td><td>Probable</td><td>8,626</td><td>0.07%</td><td>0.66%</td></tr>
<tr><td></td><td>Total</td><td>10,194</td><td>0.06%</td><td>0.67%</td></tr>
<tr><td>>=0.81% - 1.0%</td><td>Proven</td><td>1,427</td><td>0.04%</td><td>0.59%</td></tr>
<tr><td></td><td>Probable</td><td>7,824</td><td>0.05%</td><td>0.56%</td></tr>
<tr><td></td><td>Total</td><td>9,251</td><td>0.05%</td><td>0.56%</td></tr>
<tr><td>Total</td><td>Proven</td><td>8,954</td><td>0.10%</td><td>0.96%</td></tr>
<tr><td></td><td>Probable</td><td>31,177</td><td>0.09%</td><td>0.78%</td></tr>
<tr><td></td><td>Total</td><td>40,132</td><td>0.09%</td><td>0.82%</td></tr>
</table>
</td></tr>
<tr><td>Site visits</td><td>• 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.</td><td>• Numerous site visits have been undertaken by Competent Person James Ridley.
• No site visit was undertaken by Mr Steve Lampron’s (Competent Person) due to his extensive experience around the area and the relatively flat topography surrounding the project. A site visit will be conducted once the project moves to the Definitive Feasibility Study stage.</td></tr>
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<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Study status</td><td>• 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 PreFeasibility 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.</td><td>• This Ore Reserve was completed to a Pre-Feasibility Study level.
• Project costs and parameters were either supplied by various contracting companies tendering on the project or by Ardea Resources.
• Any material classified as an Inferred Mineral Resource was not included in any of the Pre-Feasibility study Ore Reserves calculations.</td></tr>
<tr><td>Cut-off parameters</td><td>• The basis of the cut-off grade(s) or quality parameters applied.</td><td>• Due to the multi-element aspect of this project, a single, overall economic cut-off grade could not be calculated. Block model reports using a range of nickel equivalent grade (NiEq) cut-offs were run to determine which best represented the outputs from the optimisations; these were then applied to the Ore Reserve designs.
• A 0.81% NiEq cut-off was selected for the Goongarrie South and Big Four Mineral Resources.</td></tr>
<tr><td>Mining factors or assumptions</td><td>• The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).
• The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.
• The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and preproduction drilling.
• The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).
• The mining dilution factors used.
• The mining recovery factors used.
• Any minimum mining widths used.
• The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.
• The infrastructure requirements of the selected mining methods.</td><td>• Reserve project costs and parameters were either supplied by various contracting companies tendering on the project, Auralia's own internal database or by Ardea Resources.
• Technical work and data consolidation were performed by Steve Lampron and Dennis Morrison of Auralia Mining Consulting Pty Ltd.
◦ Industry standard mining methods using excavator and trucks are employed. A combination of 120t excavators and 90 tonne rigid trucks are currently being considered for the surface mining at the KNP Cobalt and Nickel Project.
◦ Optimisation and design constraints during this Pre-Feasibility study were based on prior existing geotechnical investigations and recommendations resulting from a desktop review by Golders Associates Ltd in 2008.
<table>
<tr><th>KNP</th><th>Bench Face Angle (°)</th><th>Bench Height (m)</th><th>Bench Width (m)</th><th>Ramp Gradient (1:X)</th><th>Ramp Width (m)</th></tr>
<tr><td>Surface to Pit Floor</td><td>70</td><td>20</td><td>5</td><td>10</td><td>22</td></tr>
</table>
◦ A 5% mining dilution was used.
◦ A 98% mining recovery was used.
◦ Test work has been undertaken on the processing recoveries at the KNP Project by The Simulus Group and flat processing recoveries were applied, Nickel 94.5% and Cobalt 95.5%
• The processing all-inclusive operating cost varies by deposit, and is comprised of the following:
◦ A$110.19/t processing cost provided by Ardea
◦ A$10.91/t G&A overheads cost provided by Ardea
◦ A$0.29/t grade control cost based on assumptions provided by Ardea as follows:
▪ 10m x 10m RC drill pattern to 20m depth
▪ Drilling cost of A$25/m
▪ 2m sample intervals at A$27.50/sample
◦ Rehandle and haulage costs, variable by deposit. Haulage cost (including stockpile rehandle) was assumed as A$0.12/t/km (inclusive of fuel and loading). Approximate haulage distances were calculated for each deposit, resulting in the following:
◦ Goongarrie South: A$0.30/t of ore</td></tr>
</table>

Criteria	JORC Code explanation	Commentary

- *Big Four: A$0.60/t of ore*
- *Tailings disposal costs were calculated based on assumptions provided by Ardea Resources and mining contractor budget pricing.*
  - *Filter cake tailings, 1.29Mtpa produced from 1Mpta plant throughput, plus 31.9% moisture results in 1.89Mt filter cake per 1Mt of ore fed to the processing plant*
  - *Contractor budget pricing of A$1.90/t to rehandle and place the tailings from conveyor discharge points to waste co-disposal dumps*
  - *Tailings disposal cost A$3.59/t of ore (A$1.90/t x 1.89)*
- *Product transport cost*
  - *Ardea estimated the product transport cost at A$132/t based on transport from site to the Esperance port, and shipping to China*
  - *Product specifications (sourced from a 2017 Leach Selection Study completed by The Simulus Group):*
    - *Nickel Sulphate – 22.33% Nickel*
    - *Cobalt Sulphate – 20.96% Cobalt*

The following tables include the minimum mining cost by bench in each deposit. These budget costs were based on data provided to Auralia by reputable independent mining contractor tendering on the KNP project

Bench Toe	Goongarrie South		Big Four	
	Ore Mining Cost	Waste Mining Cost	Ore Mining Cost	Waste Mining Cost
385	$7.81	$7.93	$7.70	$7.89
380	$5.35	$5.54	$5.25	$5.45
375	$5.32	$5.52	$5.32	$5.52
370	$5.38	$5.59	$5.38	$5.59
365	$5.45	$5.66	$5.45	$5.66
360	$5.52	$5.73	$5.52	$5.73
355	$5.59	$5.80	$5.59	$5.80
350	$5.66	$5.89	$5.66	$5.89
345	$5.80	$6.06	$5.80	$6.06
340	$5.87	$6.13	$5.87	$6.13
335	$5.94	$6.20	$5.94	$6.20
330	$6.00	$6.30	$6.00	$6.30
325	$6.07	$6.39	$6.07	$6.39
320	$6.14	$6.46	$6.14	$6.46
315	$6.21	$6.55	$6.21	$6.55
310	$6.28	$6.63	$6.28	$6.63
305	$6.35	$6.72	$6.44	$6.69
300	$6.51	$6.85	$6.62	$6.82
295	$6.76	$7.08	$6.69	$7.00
290	$7.01	$7.31	$6.76	$7.18
285	$7.26	$7.54	$6.83	$7.36
280	$7.51	$7.77	$7.70	$7.89

Criteria	JORC Code explanation	Commentary
		• *The Western Australia state government royalty of 2.5% metal product royalty was applied for both Cobalt and Nickel.* • *Minimum mining widths of 20m were applied as pit design constraints appropriate to the 90 tonne truck fleets.* • *Only the JORC classified Measured and Indicated Mineral Resource classified material types were used in the optimisations; while the final designs may contain Inferred material as part of the final material inventory, Inferred classified material was not utilised as an economic driver and thus is not included for consideration for any of Ore Reserve calculations.*
Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.* • *Any assumptions or allowances made for deleterious elements.* • *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*	• *Processing of the ore comprises of: ore comminution, High Pressure Acid Leaching (PAL), mixed sulphide precipitation, sulphide reduction for nickel and cobalt sulphate, and purification via solvent extraction and crystallisation. Waste streams are neutralised and filtered prior to dry stacking in waste landforms.* • *High Pressure Acid Leach (PAL) for laterite mineralisation is widely used within industry. The downstream processes are also well proven and commonly used in the wider metallurgical industry.* • *Metallurgical test work has been carried out on several ore types and composites over the Project. Variability testing was completed on mineral samples which represented the first 5 to 10 years of production.* • *Based on the results of the metallurgical testing and process modelling, final nickel and cobalt recoveries are estimated at 94.5 % and 95.5% respectively*
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.*	• *Environmental studies have commenced and will be completed upon moving to a Definitive Feasibility study.* • *The tailings will be in a dry filter cake form. The dry tailings disposal strategy involves encapsulation of the tailings in mine waste for optimal long term environmental stability.*
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.*	• *Raw water is supplied from the Papertalk paleochannel via a borefield. The installed field has a total of 15 active bores. The design borefield supply for a 1Mt/a plant is 3.0 ML/day of raw water.* • *Applications for water exploration licences have been lodged for Papertalk Upper and Halfway Bore areas 70km northwest on Goongarrie.* • *The project lies within several granted mining licences that will provide adequate availability of land for plant development. An application for a further mining licence along the eastern side of existing mining licences will allow further flexibility for mine planning in the event of higher-throughput scenarios.* • *Water rights are secure for all mining licences. To supplement these, addition General Purpose Licences are under application to source water from defined palaeochannels to the west and northwest should the need arise.* • *The site has access to excellent infrastructure, being well serviced by a sealed highway, active railway, and reticulated high-voltage power which all cross the project site. Road and rail upgrades are not required. Labour is expected to be*

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td></td><td></td><td>sourced and maximised from the City of Kalgoorlie-Boulder (80 km to the south), and will be augmented by fly in-fly-out employees (via Kalgoorlie-Boulder) as required. On-site accommodation will be provided for FIFO.
• Transport of bulk commodities will be via rail or road, with direct connection between site and major ports at Esperance and Fremantle.
• Processing plant and associated infrastructure is provided for in the project capital cost, including power and water supplies, off-site road upgrades</td></tr>
<tr><td>Costs</td><td>• 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.</td><td>• No capital costs were included in the Whittle optimisations. Capital costs have been included in the economic analysis conducted by Ardea Resources
• Operational costs were provided by contract mining companies as well as a study performed by The Simulus Group for the processing costs at a Pre-Feasibility level of accuracy, deemed to be ±25%.
• The Western Australia state government royalty of 2.5% metal product royalty was applied for both Cobalt and Nickel. (refer to above section).
• The exchange rate used by Ardea Resources was US$0.788=A$1.00.
• The additional cost of hauling the ore material from each deposit to the existing processing plant was included, and appropriately adjusted, to provide final tailored processing costs per site.</td></tr>
<tr><td>Revenue factors</td><td>• The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.
• The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.</td><td>• The head grade is derived from the Mineral Resource and Modifying Factors as described above.
• The sell prices were based on the current values at the time and they are as follows. Due to the purity of the final product a 120% payability factor is expected. This payability figure was sourced from Macquarie Group research data as well as a public domain study.
<table>
<tr><th>Commodity</th><th>Sell Price (US$) - Inclusive of the 120% Payability</th></tr>
<tr><td>Nickel</td><td>15,120 $/t</td></tr>
<tr><td>Cobalt</td><td>96,600 $/t</td></tr>
</table></td></tr>
<tr><td>Market assessment</td><td>• 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.</td><td>• The Project will produce and sell sulphates, so market prices for cobalt sulphate and nickel sulphate are sourced from respected analysts. Cobalt and nickel metal pricing is not appropriate as neither are sufficiently representative of sulphate pricing, however they are used for forecast conditions due to lack of sufficient forecast data for sulphates. For cobalt sulphate, pricing is presently around parity with equivalent metal pricing, but has fluctuated significantly in response to battery mineral demand. For nickel sulphate, long-held premiums to equivalent metal pricing are a mainstay of the industry and are a function of widespread nickel sulphate production from briquettes.
• Outlook pricing for nickel sulphate and cobalt sulphate is not readily available. However, sulphate pricing is linked to the metal pricing for each commodity. Renowned global analysts CRU show substantial growth in both metals for the foreseeable future, particularly for cobalt. Cobalt demand is predicted to outstrip supply due to widespread uptake of lithium ion batteries (contained cobalt-bearing cathodes) in the automotive sector in particular. Predicted substitution of cobalt (typically by nickel) is predicted to be more than offset by massively increased demand for these batteries. Such predictions assume projected mine expansion rates and maintaining of political stability in dominant producer, the Democratic Republic of Congo. Supply constriction below predicted increased rates due to sovereign risk in the DRC would see further positive gains in cobalt prices. For nickel sulphate, long-held premiums to equivalent metal pricing are the result of processing of suitable briquettes for nickel sulphate production, with outlook suggesting that these premiums will be either maintained or, at worst, nickel briquette pricing rising to equivalent sulphate prices. As such, prices selected for this study are expected to</td></tr>
</table>

Criteria	JORC Code explanation	Commentary
		be substantially below forecast prices for the commencement of mining should that occur in the early 2020s. • *No other projects are known to use cobalt sulphate and nickel sulphate pricing in their Pre-Feasibility Studies.* • *High-purity nickel sulphate and cobalt sulphate will be produced on site with pricing to be determined with each customer in a supply contract.*
Economic	• *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 financial model uses updated assumptions. These differ slightly to the ones applied to the Ore Reserve to better represent today's market. It assumes a discount rate of 8% for a pre-tax NPV of A$1,428M and a post-tax NPV of A$1,037M. Results were calculated for a range of discount rates. No inflation or escalation assumptions were made.* • *A company tax rate of 30% was applied. Sensitivity analysis of +20% and -20% of key variables were carried out, with NPV8 ranging from A$1,550M to A$516M. Key sensitivities include autoclave feed grade, nickel sulphate and cobalt sulphate pricing, metal sulphate recovery rates, capital and operating costs, and exchange rate.* • *Economic analysis was undertaken based solely on the Ore Reserve pit designs. A life of mine (LoM) study which included all open pit designs was used as the basis of the economic analysis. JORC classified Measured, Indicated and Inferred Material was included in the analysis; all other material was treated as waste.* • *A pre-tax NPV of A$$1.48B and an IRR of 29% was calculated from the economic analysis of the KNP Cobalt and Nickel Project LoM.* • *Inputs to the economic analysis include Modifying Factors as described above.* • *Cobalt sulphate: RMB 121,600 /t (equivalent to a contained cobalt pricing of US$41.63/lb metal)* • *Nickel sulphate: RMB 27,500 /t (equivalent to a contained pricing of US$8.84/lb metal)* • *These PFS prices represent discounts of 5.2 % for nickel sulphate and 11.9 % for cobalt sulphate compared to spot prices recorded on 23 March 2018.*
Social	• *The status of agreements with key stakeholders and matters leading to social licence to operate.*	• *Voluntary discussions with local and state government bodies shows support for the project. Both the City of Kalgoorlie-Boulder and the Shire of Menzies (the project straddles the boundary) have expressed strong support, with the City of Kalgoorlie-Boulder aiming to become a hub for battery mineral mining and processing. Ardea is developing numerous community support programs in Menzies and Kalgoorlie-Boulder* • *The Company is abiding by Native Title regulations, with no issues flagged to date with a Native Title application that covers a large part of the Eastern Goldfields mining province, including the Goongarrie project area. The Company has held voluntary discussions with indigenous stakeholders regarding establishment of an infant health care centre and secondary school bursary in Kalgoorlie-Boulder, as well as vocational education and training for mine site roles.*
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 PreFeasibility 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.*	• *The Company has long-standing granted mining licences extending the full strike length of the project area, with an additional mining licence application submitted to the east of Goongarrie South that will ensure capture of all peripheral mineralisation and allow greater flexibility in mining, processing and infrastructure planning.* • *There are no known significant naturally occurring risks to the project.*

Criteria	JORC Code explanation	Commentary
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).*	• *Ore Reserves are estimated based on the Mineral Resource estimates classified as 'Measured' and 'Indicated' after consideration of all mining, metallurgical, social, environmental and financial aspects of the project.* • *All Proved Ore Reserves were derived from the Measured Mineral Resources and all Probable Ore Reserves were derived from the Indicated Mineral Resources* • *The Ore Reserve classifications reflect the Competent Person's view of the deposit* • *Ore Reserves stated are Proven and Probable Ore Reserves* • *The estimated Ore Reserves are, in the opinion of the Competent Person, appropriate for this style of deposit.* • *The Ore Reserve estimates are based on the Mineral Resource estimates classified as 'Measured' and 'Indicated' after consideration of all mining, metallurgical, social, environmental and financial aspects of the project.* • *All Proved Ore Reserves were derived from the Measured Mineral Resources and all Probable Ore Reserves were derived from the Indicated Mineral Resources* • *The Ore Reserve classifications reflect the Competent Person's view of the deposit*
Audits or reviews	• *The results of any Audits or reviews of Ore Reserve estimates.*	• *Extensive internal reviews of Ore Reserve Estimates were completed by Ardea and contributing independent consulting groups. No external Audits of the Goongarrie Nickel Cobalt Project were undertaken prior to publication.* • *Auralia Mining Consulting has completed an internal review of the Ore Reserve estimate resulting from this Pre-Feasibility study.*
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 accuracy and confidence levels of the study are suitable for the reporting of Ore Reserves in a Pre-Feasibility Study as defined in the JORC Code 2012. The Ore Reserve is a global estimate and is based on optimisation of the entire Mineral Resource for its initial 25 year mine life model. Modifying Factors were developed individually for the appropriate inputs to the study. The use of the elevated cut-off grade reduces the impact of any potential increases in cost, reduction in recovery, or reduced productivities.* • *An Ore Reserve has been stated at KNP and a full economics analysis has been completed.* • *Other work required from a mining perspective prior to or as a part of the Feasibility Study includes, but is not limited to: further geotechnical work, a complete hydrology study and waste rock classification (potentially acid forming or non-acid forming) and the location of such waste rock types.* • *Tailings material properties and disposal processes will require further investigation in order to optimise handling and placement strategies. In-pit disposal of mine waste and/or tailings is an option worth investigating with a view to minimising mining costs and surface disturbance area.*

Appendix 4 – Definition of terms used

The KNP, the KNP Cobalt Zone and the Goongarrie Nickel Cobalt Project

With such a large portfolio of high-quality nickel and cobalt laterite deposits, the scale of Ardea's work programs can easily be underestimated.

The KNP comprises a series of nickel-cobalt camps, each containing several deposits. Definitions of some of the terms used in our announcements are as follows:

- **KNP (Kalgoorlie Nickel Project)**: contains all laterite deposits that have estimated nickel and cobalt resources. All deposits are located in the Eastern Goldfields of WA, within a radius of 100 km of each other.
- **KNP Cobalt Zone**: those deposits within the KNP with higher-grade cobalt contents. Nominally defined as greater than 0.08% cobalt, these are selectively reported resources from within the KNP. Some camps and groups of deposits that failed to meet this criterion are known to contain significant local cobalt mineralisation. These are part of a program of ongoing assessment aiming to further increase KNP Cobalt Zone resources.
- **Goongarrie Nickel Cobalt Project**: Ardea's prime future development project and the subject of the PFS, is focussing on the deposits of the Goongarrie Camp. Mining schedules defined in the PFS will focus on the cobalt-rich portions (the Cobalt Zone at Goongarrie) at Goongarrie South, Big Four, and Scotia Dam.

Table 0-1 – Tabulation and definition of Ardea's nickel and cobalt assets.

Laterite deposits		Nickel-cobalt resources		Future Development Projects
Camp	*Deposit(s)*	*KNP*	*KNP Cobalt Zone*	*Goongarrie Nickel Cobalt Project*
Goongarrie	Goongarrie Hill	✓		✓
	Goongarrie South	✓	✓	✓
	Big Four	✓	✓	✓
	Scotia Dam	✓	✓	✓
Menzies	Highway	✓		
	Ghost Rocks	✓		
Siberia	Black Range	✓	✓	
	Siberia South	✓		
	Siberia North	✓		
Bulong	Taurus	✓		
	Bulong East	✓		
Hampton	Kalpini	✓		
	Lake Rebecca	✓		
Yerilla	Aubils	✓	✓	
	Boyce Creek	✓		
	Jump Up Dam	✓		

As defined in the table above, the KNP Cobalt Zone comprises the following groups deposits:

- Goongarrie South, Big Four, and Scotia Dam (at Goongarrie).
- Black Range (at Siberia)
- Aubils (at Yerilla)

Each of the component deposits contains resources at various stages of refinement.

- At Goongarrie, detailed reassessment of resources for the PFS that has resulted in high-quality resources and revised resource reporting criteria in this announcement.
- At Black Range, nickel and cobalt resource estimates were updated by Ardea in August 2017 after drilling earlier in the year. Black Range also contains appreciable scandium and platinum group metal resources (announcement October 2017).
- Aubils at Yerilla comprises the least developed resource estimates within the KNP Cobalt Zone. This resource was last updated by Heron Resources in 2009 and has not undergone any reassessment by Ardea to date and provides further upside opportunity.

Ardea is seeking to define further resources that may be added to the KNP Cobalt Zone. Yerilla and Kalpini are broad areas that contain numerous known concentrations of cobalt and nickel mineralisation that, for various reasons such as insufficient drilling or simply overly broad grouping, need further reassessment. Of particular note is the Boyce Creek deposit at Yerilla where cobalt and nickel mineralisation is remarkably coherent, consistent, and shallow. Ardea has recently submitted a mining licence application over the deposit.

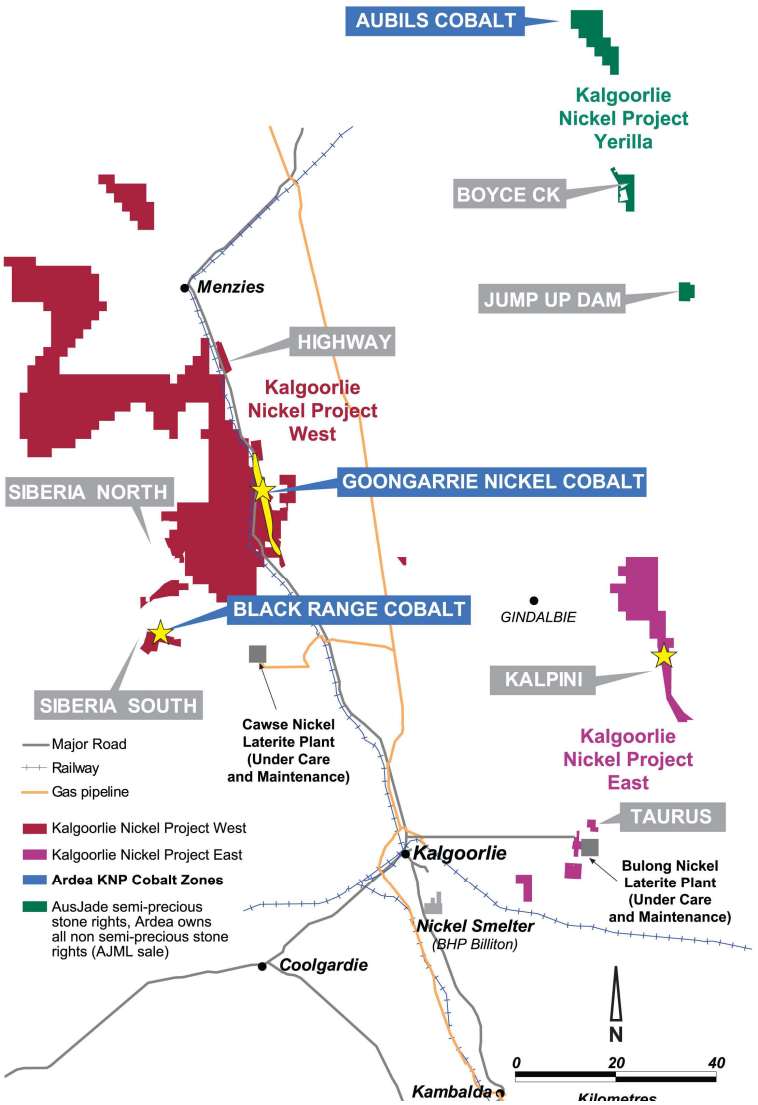

Figure 0-1 – Map of the KNP, showing the KNP Cobalt Zone with blue labels. Yellow strip marks the extent of the Goongarrie Nickel Cobalt Project. Yellow stars mark projects drilled by Ardea.