Ardea Resources Limited

ASX & Media Release

5 July 2023

ASX Symbol

ARL

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Project Director

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General Manager Land Access & Compliance

Mike Miller
General Manager Technical Services

Matthew McCarthy
General Manager Exploration

Issued Capital

Fully Paid Ordinary Shares
171,894,772

Performance Rights
6,690,000

Options
4,000,000

ABN 30 614 289 342

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KNP Goongarrie Hub Ore Reserve & Feasibility Study Defines +40 Year Operation with Strong Financial Metrics

Ardea Resources Limited (**Ardea** or the **Company**) is pleased to present the summary outcomes of the Pre-Feasibility Study (**PFS**) completed on its 100%-owned Kalgoorlie Nickel Project (**KNP**) Goongarrie Hub, located 70km northwest of the mining capital of Australia, the City of Kalgoorlie-Boulder (figure 1). The KNP was awarded Major Project Status by the Federal Government in March 2022[1].

The PFS presents a high-quality evaluation of the Project and defines a compelling investment case to advance the Goongarrie Hub through to Definitive Feasibility Study (**DFS**). The PFS has also identified clear project enhancement opportunities which will be quantified during the DFS. The PFS should be regarded as being comprised of conservative assumptions and outcomes.

PFS Highlights include:

- Ore Reserve – 194.1Mt at 0.70% Ni and 0.05% Co for 1.36Mt of contained nickel and 99,000t of contained cobalt[2]
- Mining optimisation studies have projected production of approximately 30,000t of nickel and 2,000t of cobalt per year for more than 40 years. Year 1 to 5 (post ramp up) production >34ktpa nickel and >3ktpa cobalt[2]
- Conventional low-cost open pit mining methods result in mining costs comprising less than 12% of total operating cost with a very low strip ratio at an average of 1.5 for the first 35 years of mine life[2]
- The project generates[3]:
    - Pre-tax NPV_7 of A$7,625M and IRR of 30%
    - Post-tax NPV_7 of A$4,980M and IRR of 23%
    - Average Annual EBITA of A$800M
    - Project pay back within 3.1 years
- Direct cash cost after Co by products of US$3,763/t Ni in MHP during the first five years of operation, and US$5,763/t Ni in MHP over life of mine[3]
- Total capital cost of A$3,117m, including process plant and infrastructure cost of A$2,264M and sulphuric acid, steam, and power plant cost of $574M[3]
- Life Cycle Assessment (LCA) is expected to be 11.9 kg CO_2 eq. per kg nickel in MHP based on Ardea's Scope 1, 2 and upstream Scope 3 emissions[4]
- In-pit tailings disposal minimises environmental footprint and enables mine site rehabilitation, concurrent with steady-state mine operation

A detailed summary of the outcomes of the PFS is provided in the following sections of this announcement which should be read in their entirety.

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[1] ASX Release 21 March 2022.
[2] See Section 5 of this announcement for detailed Ore Reserve table and Appendix 1.
[3] See Section 14 of this announcement for detailed notes on the financial metrics which include inputs of US$25,000/t nickel price, US$60,000/t cobalt price and exchange rate of 0.67 AUD:USD. Direct cash cost excludes royalties and includes third party freight charges and cobalt credit.
[4] See Section 13 of this announcement for detailed notes on the LCA.

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Managing Director and CEO Andrew Penkethman said:

"I would like to acknowledge the efforts of the Ardea Team, business partners and stakeholders in delivering a high-quality study with outstanding financial results.

The Ore Reserve defined for the KNP Goongarrie Hub is 194.1Mt at 0.70% Ni and 0.05% Co for 1.36Mt of contained nickel and 99,000t of contained cobalt to sustain a minimum 40-year mine-life.

However, the PFS did not include the adjoining Mineral Resources at Ghost Rocks, Siberia South and Black Range that are expected to provide the opportunity to further expand the mine life or facilitate increased production rates.

Projects of the scale of the KNP Goongarrie Hub, with a mine life measured in decades, located within a premier resource development and operating jurisdiction, are rare and are therefore globally significant, strategic assets which must be developed to help provide the essential Battery and Critical Minerals required to underpin the required energy transition, accelerate the move to Electric Vehicles and achieve global climate targets.

*There has never been a better time for a mega project, such as the KNP Goongarrie Hub, to advance financing discussions, as governments around the world continue to expand their commitment to providing long tenor, low interest rate Export Credit Agency debt to accelerate the development of Battery and Critical Minerals projects that meet the highest Environmental Social and Governance (**ESG**) standards in low country risk jurisdictions.*

This PFS provides the ideal platform to move forthwith into the DFS phase to continue to advance this world-significant asset toward development and multi-decade production."

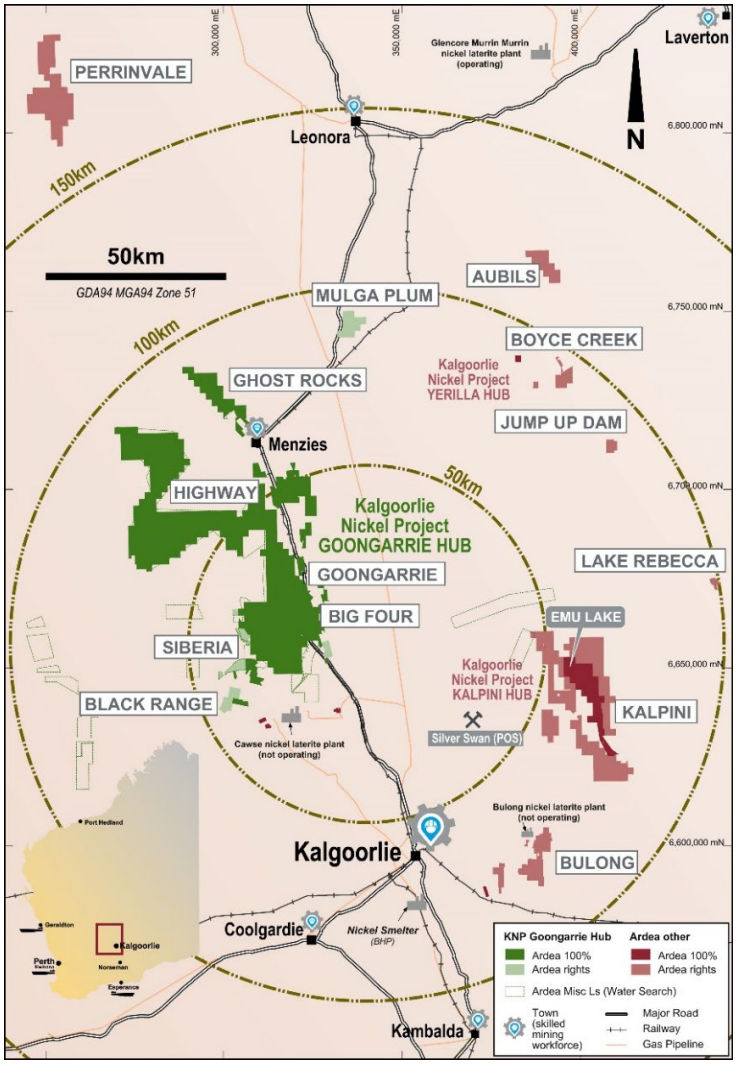

Figure 1: Kalgoorlie Nickel Project Goongarrie Hub location plan. Projection: GDA94 MGA Zone 51.

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This announcement is authorised for release by the Board of Ardea Resources Limited.

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

Andrew Penkethman
Managing Director and Chief Executive Officer
Tel +61 8 6244 5136

About Ardea Resources

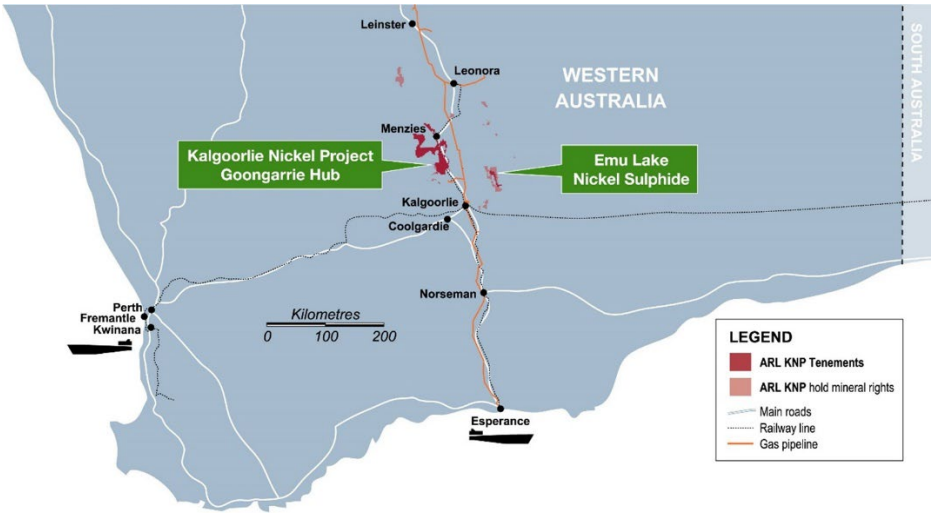
Ardea Resources Limited (ASX:ARL) is an ASX-listed nickel resources company, with a large portfolio of 100%-controlled West Australian-based projects, focussed on:

- Development of the Kalgoorlie Nickel Project (**KNP**) including its flagship Goongarrie Hub deposits, a globally significant series of Critical Mineral deposits which host one of the world's largest nickel-cobalt resources, at **854Mt at 0.71% Ni and 0.045% Co for 6.1Mt of contained nickel and 386kt of contained cobalt** (Ardea ASX release 30 June 2023), located in a jurisdiction with exemplary **ESG** credentials.
- Advanced-stage exploration at compelling nickel sulphide targets, such as Emu Lake, and Critical Minerals targets including scandium and rare earth elements throughout the KNP Eastern Goldfields world-class nickel-gold province, with all exploration targets aimed at complementing the KNP nickel development strategy.

Ardea's KNP development with its 6.1 million tonnes of contained nickel is the foundation of the Company, with its other exploration assets, such as the Emu Lake nickel sulphide prospect, as an evolving contribution to Ardea's building of a green, forward-facing integrated nickel company.

Electric Vehicle and Energy Storage System lithium-ion battery customers demand an ESG-compliant, sustainable, and ethical supply chain for nickel and other inputs. Unlike the wet tropics, where HPAL submarine tailings disposal and rain forest habitat destruction are problematic, the semi-arid, temperate KNP is located in the Great Western Woodlands that is an environment amenable to best practice progressive disposal of tailings in open pit voids.

The KNP is located in one of the world's premier mining jurisdiction with unquestionable geopolitical acceptance (WA ranked 2nd in the Fraser Institute Investment Attractiveness index) and none of the land-use and societal conflicts that commonly characterise nickel laterite proposals elsewhere. All KNP Goongarrie Hub production tenure is on granted Mining Leases with Native Title Agreement in place.



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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 exploration, 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 commodities 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 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 Ore 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.

The Pre-Feasibility Study referred to in this announcement is based on technical and economic assessments to support the estimation of Ore Reserves. Ardea believes it has reasonable grounds to support the results of the Pre-Feasibility Study, however, there is no assurance that the intended development referred to will proceed as described. The production targets and forward-looking statements referred to are based on information available to the Company at the time of release and should not be solely relied upon by investors when making investment decisions. Material assumptions and other important information are contained in this release. Ardea cautions that mining and exploration are high risk, and subject to change based on new information or interpretation, commodity prices or foreign exchange rates. Actual results may differ materially from the results or production targets contained in this release. Further evaluation is required prior to a decision to conduct mining being made.

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

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Competent Persons Statement

Resource Estimation, Exploration Results, and Industry Benchmarking

The Resource Estimation, Exploration Results and Industry Benchmarking summaries are based on information reviewed or compiled by Mr. Ian Buchhorn, and Mr Andrew Penkethman. Mr Buchhorn is a Member of the Australasian Institute of Mining and Metallurgy and Mr Penkethman is a Fellow of the Australasian Institute of Mining and Metallurgy and a Member of the Australian Institute of Geoscientists. Both Mr Buchhorn and Mr Penkethman are full-time employees of Ardea Resources Limited and have sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which they are 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 Buchhorn and Mr Penkethman have reviewed this press release and consent to the inclusion in this report of the information in the form and context in which it appears. Mr Buchhorn and Mr Penkethman own Ardea shares.

Ardea wishes to clarify that its current Kalgoorlie Nickel Project (KNP) Mineral Resource Estimate (MRE) following JORC Code (2012) guidelines is:

Camp	Resource Category	Size (Mt)	Ni (%)	Co (%)	Contained Metal Ni (kt)	Co (kt)
KNP TOTAL	Measured	22	0.94	0.079	207	17
	Indicated	361	0.73	0.047	2,622	169
	Inferred	471	0.70	0.043	3,272	200
GRAND TOTAL	***Combined***	***854***	***0.71***	***0.045***	***6,101***	***386***

Note: 0.5% nickel cutoff grade used to report resources. Minor discrepancies may occur due to rounding of appropriate significant figures.

The Mineral Resource Estimate information shown in this ASX release has been previously released on the ASX platform by Ardea in ASX release 30 June 2023, in accordance with Listing Rule 5.8.

The Company confirms that it is not aware of any new information or data that materially affects the information included in the previous market announcement noted above and that all material assumptions and technical parameters underpinning the Mineral Resource Estimate in the previous market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Persons' findings are presented have not been materially modified from the original market announcements.

Ore Reserves

Information in this announcement that relates to Ore Reserves at the Kalgoorlie Nickel Project Goongarrie Hub is based on and fairly represents information and supporting documentation compiled by Mr Jake Fitzsimons, a Competent Person who is a full-time employee of Orelogy Mine Consulting, a company engaged by Ardea. Mr Fitzsimons is a Fellow of the Australasian Institute of Mining and Metallurgy. Mr Fitzsimons has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (2012 JORC Code). Mr Fitzsimons does not hold securities in Ardea and consents to the inclusion in this announcement of all technical statements based on his information in the form and context in which they appear.

Ardea wishes to clarify that its current Kalgoorlie Nickel Project (KNP) Goongarrie Hub Ore Reserve following JORC Code (2012) guidelines, based on the contents of this ASX announcement, is:

Goongarrie Hub	Ore Reserve Category	Size (Mt)	Ni (%)	Co (%)	Total Ore Ni (kt)	Co (kt)
Ore Reserve	Proven	16.7	0.96	0.09	160	15
	Probable	177.4	0.68	0.05	1,204	84
GRAND TOTAL	***Combined***	***194.1***	***0.70***	***0.05***	***1,365***	***99***

Note: Minor discrepancies may occur due to rounding of appropriate significant figures.

Full details on the Ore Reserve are available in subsequent sections of this announcement, see Section 5 and Appendix 1.

Metallurgy

Information in this announcement that relates to metallurgical test results is based on extensive metallurgical testwork and supporting documentation compiled or reviewed by Mr Michael Miller, a Competent Person who is a full-time employee of Ardea. Mr Miller is a Member of the Australasian Institute of Mining and Metallurgy. Mr Miller has sufficient experience which is relevant to the metallurgy of this style of mineralisation and type of deposit under consideration and to the activity which being undertaken to qualify as a Competent Person as defined in the 2012 JORC Code. Mr Miller consents to the inclusion in this announcement of all technical statements based on his information in the form and context in which they appear. Mr Miller owns Ardea shares.

There are no material changes in the metallurgical testwork results as the physical properties, and reagent consumption results from earlier testwork programs have either been validated by, or improved upon, in the PFS testwork programs.

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Ardea
Resources Limited

PRE-FEASIBILITY STUDY

KALGOORLIE NICKEL PROJECT
Goongarrie Hub

WESTERN AUSTRALIA

June 2023

Australian Federal Government
- Major Project Status

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Technical Advisors
Wood PLC
Orelogy Mine Consulting
Ockham Consulting
Minviro
Rockwater Pty Ltd
Minetek

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Resource Estimation, Exploration Results, and Industry Benchmarking (pages 17-18)

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KNP	**Combined**	**854**	**0.71**	**0.045**	**6,101**	**386**

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Metallurgy (pages 25-27)

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There are no material changes in the metallurgical testwork results as the physical properties, and reagent consumption results from earlier testwork programs have either been validated by, or improved upon, in the PFS testwork programs.

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1. Investment Highlights

The Kalgoorlie Nickel Project - Goongarrie Hub PFS demonstrates Ardea's globally significant nickel-cobalt resource, premier location, proven flowsheet and robust economics over a 40 year mine life.

KNP was awarded Major Project Status by the Australian Federal Government in March 2022

Investment Highlights

The Kalgoorlie Nickel Project - Goongarrie Hub shows positive economics under the Base Case, and indicates repayment of the initial capital expenditure within 3.1 years of the start of operation

1.

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The Base Case:

The Goongarrie Hub PFS Base Case (Base Case) features two x 1.5Mtpa Goethite High Pressure Acid Leach (HPAL) autoclaves. Acid, heat and energy balance is facilitated with the Atmospheric Leach (AL) circuit with 0.3Mtpa Mineralised Neutraliser Fines, 0.15Mtpa Grind Atmospheric Leach and 0.05Mtpa Bene Atmospheric Leach feed. Of critical note the 3.5Mtpa Base Case incorporates proven hydrometallurgical technologies successfully utilised at several existing nickel laterite operations world-wide.

The PFS Base Case end-product is Mixed Hydroxide Precipitate (MHP), which is the new Class 1 nickel for Lithium Ion Batteries (LIB).

Financial Metrics

The project shows positive economics under the Base Case and indicates repayment of the initial capital expenditure within 3.1 years of the start of operation.

- The project generates **pre-tax NPV7 of A$7,625M** and **IRR of 30%**, **post- tax NPV7 of A$4,980M** and **IRR of 23%**.
- The financial model indicates a direct cash cost after cobalt by-products of Ni US$3,763/t in MHP during the first five years of operation, and Ni US$5,763/t in MHP over life of mine.

Geology and Mineral Resources

- The KNP global **Mineral Resource Estimate** (using a 0.5% Ni cut-off grade) is **854Mt at 0.71% Ni and 0.045% Co for 6.1Mt contained nickel and 386kt contained cobalt** (ASX release 30 June 2023).
- A key component of the PFS for the KNP has been focused on Material Types to allow the nickel-cobalt mineralisation to be variously matched to the High-Pressure Acid Leach (HPAL), Atmospheric Leach (AL) and MN circuits.

Key Financial Metrics

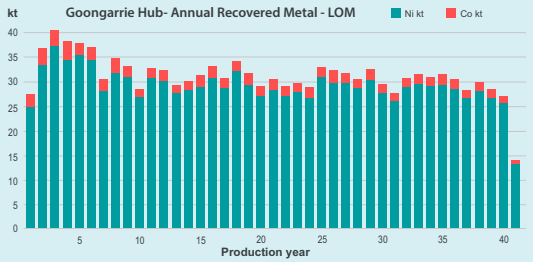
Financials		
Nickel Revenue	A$ M	44,429
Cobalt Revenue	A$ M	7,880
Freight parity	A$ M	-1,337
Revenue - combined	A$ M	52,309
EBITDA LOM	A$ M	34,217
EBITDA Annual (average)	A$ M	800
EBITDA margin	%	65%
Net Cash Flow (Pre-tax)	A$ M	31,100
Valuation		
Net Present Value (NPV7)[1]	A$ M	4,980
Internal Rate of Return (IRR)[1]	%	23%
Total Capital Payback[2]	years	3.1
Assumptions		
Exchange rate	AUD:USD	0.67
Nickel Price	US$/t	25,000
Cobalt Price	US$/t	60,000

1. *post tax*
2. *from start of operation*
3. *Detailed information on Mineral Resource Estimate, Ore Reserve Estimate and Financial Metrics is contained in subsequent chapters of this document*

Ore Reserve and Mining

- Goongarrie Hub updated **Ore Reserve of 194.1Mt at 0.70% Ni and 0.05% Co for 1.36Mt of nickel and 99,000t of cobalt** to sustain greater than **40-year mine life**.
- Mining optimisation studies have projected production of approximately **30,000t of nickel and 2,000t of cobalt per year for more than 40 years**.
- During the first five years of operation, average annual production of approximately >34ktpa of nickel and >3ktpa of cobalt have been defined.

Projected Nickel and Cobalt Metal Production



- The Mineralised Neutraliser (MN) material sourced from within the optimised open pits provides a low-cost neutralisation alternative to limestone from third-party suppliers, and contributes 16% additional nickel metal-to-leach from the combined MN Fines in the AL circuit and MN Scats in the Neutralisation circuits.
- Simple low-cost mining methods result in mining costs comprising less than 12% of total operating cost with a very low strip ratio at an average of 1.5 for the first 35 years of mine life.

Investment Highlights

Current producers of nickel will not meet demand forecasts and higher nickel prices will be required to enable new investments to come to fruition

1.

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Outstanding Growth Potential

- A number of additional opportunities exist with substantial benefits to the financial metrics to the project; including;
  - Addition of a scandium recovery circuit
  - Further optimisation of existing processing circuit
  - Staged development of additional processing capacity

Market Analysis

- Current producers of nickel will not meet demand forecasts and higher nickel prices will be required to enable new investments to come online.
- Global cobalt demand is set to double by the end of the decade, driven by battery applications and exacerbated by geopolitical avoidance of PRC cobalt by the US Inflation Reduction Act (IRA) 2022 and EU policy.
- The scarcity of nickel-cobalt resources compared to other Battery Minerals, such as lithium and graphite, is of note.

Project History

- The origin of KNP Goongarrie Hub began 1997 and has undergone significant resource definition, metallurgical and feasibility study work. This PFS has built upon this extensive knowledge base to deliver a quality study which aligns the project with the rapidly growing demand for nickel-cobalt for the LIB sector.

ESG

- Following an evaluation of the Kalgoorlie Nickel Project – Goongarrie Hub by Life Cycle Assessment (LCA) consultancy and technology company Minviro, an ISO 14040 and 14044 compliant Life Cycle Assessment (LCA) is expected to be 11.9 kg CO_2 eq. per kg nickel in MHP based on Ardea's Scope 1, 2 and upstream Scope 3 emissions.
- Ardea has expanded its baseline environmental surveys to meet current standards and guidelines, and these are planned to be finalised in early 2024 for subsequent EPA referral.

Metallurgical Processing

- Proven technology has formed the design basis for a 3.5Mtpa operation utilising 2 x 1.5Mtpa HPAL autoclaves, supported by a 0.5Mtpa AL circuit producing MHP.

Transport and Logistics

- KNP has access to high quality infrastructure with the Goldfields Highway, rail line and power infrastructure passing through the granted mining leases upon which the Ore Reserve is located.
- There are three port options (Esperance, Fremantle and Kwinana) that are well connected to the KNP.
- Proximity to the City of Kalgoorlie-Boulder provides ready access to a supportive community, skilled work force and specialist resources sector service providers.

Project Development

- A phased approach to the study and project execution is being applied to further de-risk the project, with the Definitive Feasibility Study (DFS) planning for the early involvement of key contractors and equipment vendors before commencing project construction.
- Construction workforce of approximately 3,000 personnel with opportunities being provided locally and throughout Australia.

Tailings

- Tailings generated from the processing operation will be disposed of within open pit voids. This eliminates the need for an elevated tailings storage of an estimated 600 hectare footprint and an external evaporation facility, with a 230 hectare footprint. Adoption of this strategy (subject to regulatory approvals) would enable rehabilitation with the regrowth of vegetation after covering with waste rock and stockpiled topsoil.

Hydrogeology

- Water exploration drilling has identified a large resource of fresh to saline groundwater which will be an important component of overall water supply.
- A base case supply option has been defined to supply the three groundwater streams required for the project - Raw Water Stream (1.6 GL/a at <70,000 mg/L), Process Water Stream (3.1 GL/a at <100,000 mg/L) and Camp Water Stream (0.3 GL/a at <40,000 mg/L).

Non-Process Infrastructure

- The non process infrastructure is planned to be built early for use by the project then handed over to the KNP operations team to optimise cost and provide adequate facilities for the on-going KNP requirements, which includes a camp for 1,500 construction personnel.

Ardea Resources Limited

Australian Federal Government - Major Project Status

2. Project History

Ardea's 100%-owned Kalgoorlie Nickel Project was acquired by Ardea through an ASX IPO with in-specie share distribution by former owner ASX-listed Heron Resources Limited. The project came with a comprehensive database along with extensive bench-scale metallurgical studies.

This immensely valuable Pre-feasibility Study work by Vale Inco and Heron in 2005 to 2009 and Ardea since 2017 are the foundations for the current Pre-feasibility Study

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Background

Ardea Resources Limited (Ardea or the Company) is the 100%-owner of the Kalgoorlie Nickel Project (KNP). The KNP is a world-significant resource of nickel-cobalt occurring as a typical tropical surface weathering metal enrichment dominantly within the minerals goethite and magnesian clays as dependant on position within the regolith profile (Nickel Laterite). The KNP Mineral Resource Estimate (MRE) is **854Mt at 0.71% Ni and 0.045% Co** with contained metal of **6.1Mt Ni and 386kt Co** (ASX release 30 June 2023).

The Kalgoorlie Nickel Project is sub-divided into three geographic /material type Hubs:

Goongarrie Hub *Goethite host*	584Mt at 0.69% Ni and 0.043% Co 4.044Mt Ni, 250kt Co
Kalpini Hub *Mg Clay host*	130Mt at 0.79% Ni and 0.048% Co 1.028Mt Ni, 62kt Co
Yerilla Hub *Mg Clay host*	140Mt at 0.73% Ni and 0.053% Co 1.028Mt Ni, 74kt Co

The KNP concept was first developed in late 1997 by Australian Securities Exchange (ASX)-listed junior mineral explorer Heron Resources NL, later Heron Resources Limited (Heron). The KNP tenements were spun out by Heron into Ardea Resources Limited in February 2017.

KNP 1997 to 2017 (Heron)

Heron listed in 1996 and uniquely for an ASX-listed company, Heron was solely Kalgoorlie-Boulder based. This location and the local management expertise, facilitated an aggressive campaign to acquire tenure prospective for ultramafic-hosted nickel sulphide mineralisation. This quickly morphed into a Nickel Laterite focus in 1998 with the discovery of the world-significant Goongarrie South nickel deposit.

During this time, the foundations and ethos of the KNP were developed:

- The KNP tenement suite was built over a number of years through tenement application and acquisition.
- Local Kalgoorlie-Boulder base and management translated to efficient exploration, strong community connections and access to local knowledge and expertise.
- A strong connection and respect of First Nations rights and connections to their Land. Facilitating a sharing of minerals knowledge, as well as facilitating expeditious grant of tenure through the Native Title process.
- Early adoption of the principles of Environment, Social and Governance (ESG) by Heron continuously from 1997 remain with Ardea today. Ardea is accepted as an active and contributing member of the Eastern Goldfields Community.
- Strong in-house technical work in partnership with expert consultants, resulting in the largest nickel-cobalt resource in Australia (GSWA Feb 2022 and 2023).

There were many KNP milestones during Heron ownership, which have provided the Ardea Team with a knowledge base platform to build on for the 2023 PFS.

Heron in-house work to drill and evaluate the KNP during 1997 to 2004, including metallurgical and other studies, along with commencement of Strategic Partner process led to a Joint Venture Agreement with Vale Inco on 30 July 2005. From 2006 to 2009 the focus of Heron senior staff and all Heron facilities was the Vale Inco KNP Joint Venture. The two parties had an exceptional working relationship with well-defined management structure delivering a KNP Pre-feasibility Study (PFS) which focussed on the Goongarrie Hub deposits, Highway, Goongarrie Hill, Goongarrie South, Big Four /Scotia Dam and Siberia North.

The Vale Inco PFS was the culmination of some 170,000 hours of work and cost A$34.5M in approved funding, and represented the end product of the Kalgoorlie Nickel Project Laterite Farm-in and Joint Venture Agreement (Heron ASX Release 9 February 2009).

The PFS report stated that Heron owned one of the most prospective Nickel Laterite tenement packages in the world, containing a potential resource of 7Mt of nickel metal in tenements held by Heron in 2009.

The project had multiple strategic aspects that made it attractive to Vale Inco:

- Good local Infrastructure
- Low sovereign risk
- Access to a skilled labour pool
- Low environmental risk for tailings disposal
- Supportive government, environment agencies and Community

More than 90,000m of RC drilling and 5,000m of sonic drilling was completed from 2005 to 2008 to test the assumptions presented by Heron in 2004. The priority targets within the KNP tenements during the PFS were Highway, Goongarrie Hill, Goongarrie South, Big Four and Siberia North with additional work completed on several other prospects.

1. Heron early adopters of ESG. Consulting Geoffrey Stokes (Ethnographic Advisor)
2. Ian Buchhorn pegging P29/1636, 1637, January 1998, start of the Goongarrie Hub
3. Heron supported many community groups and Ardea have continued this ethos. Pam Buchhorn (of Pamela Jean fame) with Ngunytju Tjitji Pirni Aboriginal Corporation, an infant health centre championed by Professor Fiona Stanley AC

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Mineral resources were defined for the Vale Inco priority targets. The Vale Inco study only considered five of the 14 KNP deposits, estimating a mine life of 34 years and production peaking at 36,000tpa nickel in a mixed hydroxide intermediate product. The predicted production profile peaked early in mine life at 36,000tpa before dropping to 23,000tpa. A review by Heron of the mining pit optimisations suggested the production profile could be improved by stabilising production at a higher rate with the inclusion of further KNP resources inventory.

Due to the Global Financial Crisis (GFC) in 2008, Vale Inco was re-assessing its nickel operations around the world and in May 2009 Vale Inco elected not to proceed to a KNP Bankable Feasibility Study and thus withdrew from the Joint Venture (Heron ASX release, Annual Report dated 29 September 2009).

Heron completed a full review and revision of the Vale Inco PFS. The revision resulted in a larger project with lower operating costs and lower capital intensity per tonne of nickel production, better resource utilisation and a more even production profile.

Heron completed further metallurgical studies and a detailed mining study. The mining study looked at optimising individual pits and mining sequence. This study evaluated the project performance over three production rate scenarios of 2.5Mtpa (Vale Inco Base Case), 3.75Mtpa and 5Mtpa leach feed. The 3.75Mtpa leach feed scale was preferred as it provided the best project performance.

With further geo-metallurgical studies advanced in 2011, Heron entered key research agreements aimed at advancing the KNP (Heron ASX release, Annual Report dated 29 September 2011).

Heron completed further metallurgical studies based on HPAL and a detailed mining study optimising individual pits and the mining sequence. The studies concluded an optimised production rate was 3.75Mtpa producing 36,700tpa nickel in intermediate product, at an operating cost of US$4.17 per pound and capital cost of A$2,834M. This study has guided the current Ardea PFS.

KNP 2017-2022 (Ardea)

Ardea listed on ASX in February 2017, with Heron shareholders receiving Ardea shares at nil cost, and all key technical personnel transferring from Heron to Ardea. Heron totally divested its KNP interests to Ardea with no retained rights. The project came with a comprehensive database including 5,126 drill holes for a total of 252,375m of drilling, as well as systematic and extensive bench-scale metallurgical studies in 2005 to 2009 by world-leading nickel laterite developer Vale Inco in their joint venture with Heron.

Ardea recognised the value cobalt and other Critical Minerals can add to the KNP and focussed initial work on metallurgical test work to define the ability and the mechanisms by which cobalt, nickel and scandium could be extracted from the KNP Cobalt Zone. The KNP Cobalt Zone MRE was upgraded to 64.4Mt at 0.13% Co & 0.77% Ni (81kt Co and 495kt Ni contained metal) at a 0.08% Co cut-off.

In addition to the cobalt, Ardea's discovery of scandium from re-assay of historic drill assay pulps at several deposits opened the possibility of payable accessory metals.

In 2018 the global significance of the KNP was confirmed by the results of the March 2018 1.5Mtpa PFS and July 2018 2.25Mtpa Expansion Study for the KNP Goongarrie Hub which delivered strong financial metrics from an operation utilising a single autoclave. A pilot plant produced quality on-specification MSP which was further refined to produce on-specification nickel and cobalt sulphate.

Through strategic divestment of non nickel non core assets, Ardea focussed on progressing the KNP. In 2021 Ardea upgraded the total KNP Mineral Resource Estimate (MRE) to 830Mt at 0.71% Ni and 0.046% Co at a 0.5% Ni cut-off for a contained 5.879Mt nickel and 384kt cobalt (Ardea ASX release 16 June 2021).

Updates for the Goongarrie and Highway deposits defined a high-grade core of **78Mt at 1.0% Ni and 0.069% Co** at a 0.8% Ni cut-off (Ardea ASX releases 15 February 2021 and 16 June 2021).

After discussions with potential Strategic Partners following the 2018 PFS, the flowsheet concept was progressively reworked to two 1.5Mtpa autoclaves for 3.0Mtpa HPAL feed. In mining the increased Goethite Grind HPAL feed from optimised pits, it was apparent that sufficient Mg Clay feed was recovered to support a 0.5Mtpa AL circuit.

During 2022 the focus was advancing the KNP PFS 3.5Mtpa Base Case work streams plus engagement with potential Strategic Partners. Ardea's KNP was awarded Major Project Status by the Australian Federal Government. Development of Ardea's ESG framework and policies culminated in independent ESG Accreditation.

Metallurgical drilling at the KNP Goongarrie Hub in 2021 provided material for test work confirming the KNP resource model, along with test work which confirmed the viability of the Mineralised Neutraliser (MN) concept (international patent application lodged 15 June 2023).

The 2023 KNP PFS has been based upon and utilised the significant historical data available, including the extensive database of drilling, metallurgical test work and advanced PFS and Expansion studies completed in the past. Having this level of information available has contributed to the high quality of the 2023 KNP Goongarrie Hub PFS.

1. Heron offices and shed in West Kalgoorlie. Ardea have maintained the strong local presence which Heron initiated in 1996 and Ardea still occupy these offices
2. The artwork of local schoolgirl adorned Heron 2000 Annual Report
3. Goongarrie Nickel Sulphate crystals, on-spec - Pilot Plant 2018

3. Market Analysis

Current producers of nickel will not meet demand forecasts and higher nickel prices will be required to enable new investments to come online.

These demand fundamentals underpin the global significance of the Kalgoorlie Nickel Project and the quest for new supply

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Nickel Market

Nickel Price Fundamentals

The outlook for nickel remains compelling and the investment fundamentals continue to strengthen.

Expectation for continued robust steel demand augmented by unprecedented battery/automotive demand from the electric transition. There is also a growing trend towards higher nickel content batteries (e.g. NMC811), further increasing the demand for nickel. The future market tightness has seen auto OEMs moving to secure their upstream supplies.

Governments and private investment into Critical Minerals projects via the green energy movement continue to accelerate with the EU Commission noting that the energy transition is set to triple in 2023 from US$1 trillion last year. The US Inflation Reduction Act (IRA) 2022 is providing US$500 billion into new spending and tax concessions. This forecast spend will see an increased demand for Critical Minerals, including nickel.

A nickel pricing assumption of US$25,000/t has been used in the PFS, which may be viewed as conservative considering the green energy movement and the increase in demand for nickel in the Electric Vehicle (EV) and battery storage sector.

Nickel supply/demand forecast

	2022	2023	2024	2025	2026	2027
Supply (kt)	3,031	3,383	3,698	3,853	4,057	4,198
Demand (kt)	2,926	3,162	3,524	3,781	4,041	4,271
Balance (kt)	105	221	174	72	16	-73

Source: S&P Global Market Intelligence; London Metal Exchange

S&P, Nickel CBS May 2023 – LME price falls on weak China trade data

2 year nickel price history & ARL pricing projection

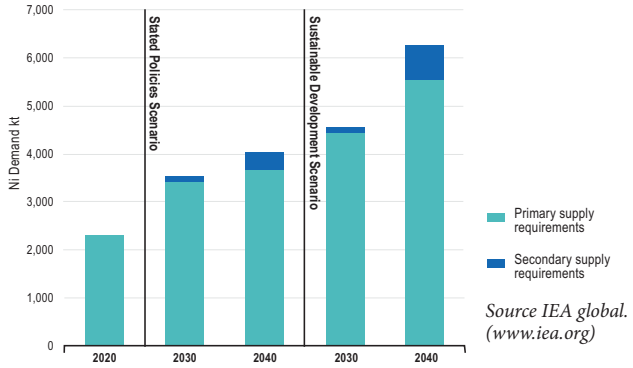
Supply Factors:

- Current producers of nickel will not meet demand forecasts and higher nickel prices will be required to enable new investments to come online.
- These fundamentals underpin the global significance of the KNP and its international recognition, given the strategic scale of the resource, industry leading low-carbon flow sheet and location in one of the top two mineral resources operating jurisdictions in the World.

Demand Factors:

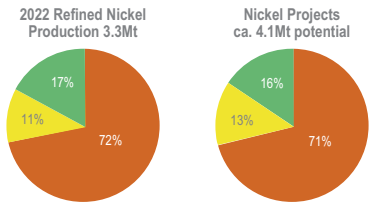
- Mineral demand for use in EVs and battery storage is expected to grow at least thirty times to 2040. Lithium sees the fastest growth, with demand growing by over 40 times in the Sustainable Development Scenario by 2040, followed by graphite, cobalt and nickel (around 20-25 times) (figure below). Of note is the scarcity of nickel-cobalt resources compared to other Battery Minerals, such as lithium and graphite.

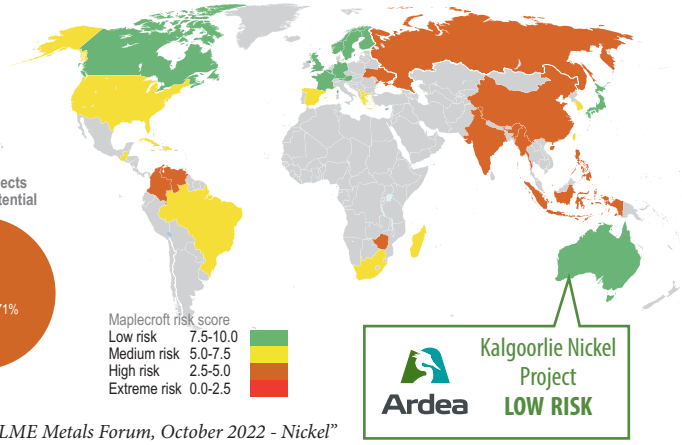
Primary supply requirements for nickel by scenario, 2020-2040



Source IEA global. (www.iea.org)

84% of nickel projects are in medium / high risk countries





Source WoodMac "LME Metals Forum, October 2022 - Nickel"

The important mineral responsible for lithium-ion batteries used in laptops, electric vehicles, and smartphones is cobalt

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Cobalt Market

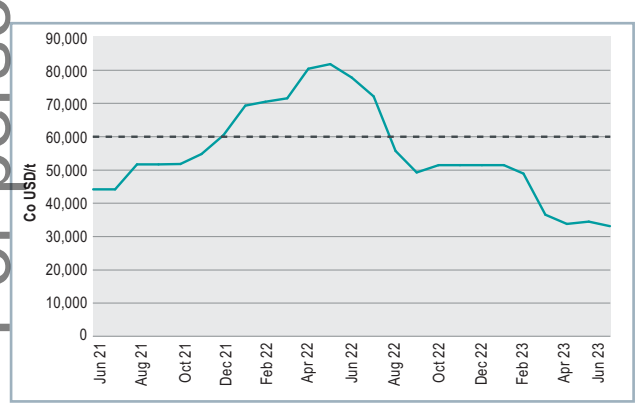
Cobalt Price Fundamentals

The primary mineral responsible for lithium-ion batteries used in laptops, electric vehicles and smartphones is cobalt.

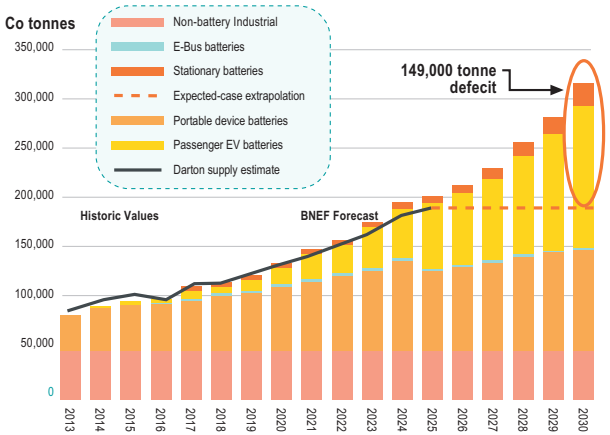
The cobalt market has fluctuated significantly over the past year from a high of US$71,406/t to a low of US$29,525/t.

$US7B investment will be required for additional cobalt feedstocks over the next 10 years.

2 year cobalt price history & ARL pricing projection

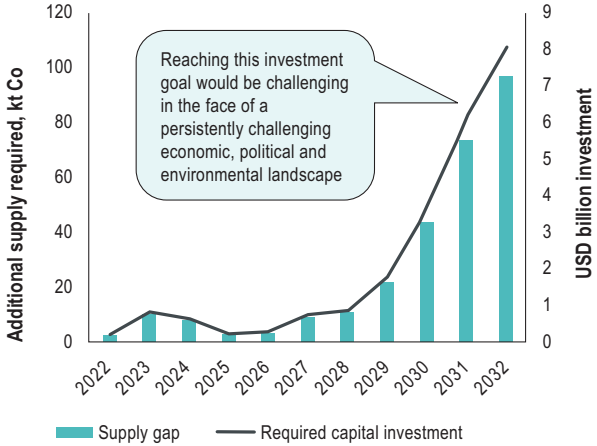


Global Refined Cobalt Supply and Demand
Forecast supply Deficit [1]



Sources: Bloomberg New Energy Finance, assisted by Darton commodities

Future cobalt investment needs for feedstock supply



WoodMac "Global Cobalt Investment Horizon Outlook – Q4 2022" dated December 2022

Demand Factors:

- Global cobalt demand is set to double by the end of the decade, driven by battery applications in EV.
- Demand from the EV sector reached 74,000 tonnes in 2022, an increase of 33% year-on-year[2]

Supply Factors:

- Despite the forecast supply, the cobalt market is expected to enter a structural deficit by 2027 due to increased uptake in the EV market and ongoing electrification.

  A cobalt pricing assumption of US$60,000/t has been used in the PFS after taking into account the outlook for cobalt supply and demand, and the consensus LME cobalt pricing forecasts by market analysis.

1. *https://www.marketresearchfuture.com/news/global-trends-of-growing-demands-for-cobalt-in-2023*
2. *https://source.benchmarkminerals.com/article/cobalt-market-may-need-new-pricing-mechanisms-for-ev-era*

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4. Geology and Mineral Resources

Ardea's 100%-owned, world class, nationally recognised resource of 6.1Mt contained nickel, 386kt contained cobalt KNP Mineral Resource JORC Code (2012) (ASX 30 release June 2023), is the largest nickel-cobalt resource in Australia (GSWA Feb 2022, 2023).

KNP was awarded Major Project Status by the Australian Federal Government in March 2022

KNP Mineral Resource JORC Code (2012) reported 30 June 2023 is 854Mt at 0.71% Ni and 0.045% Co for 6.1Mt contained nickel and 386kt contained cobalt

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Regional Geology

The Yilgarn Craton consists of over 70% granitic rocks by surface area and has been divided into structural zones known as terranes. The youngest greenstone sequences (2.8–2.6 Ga) occur in the eastern half of the Yilgarn Craton termed the Eastern Goldfields Superterrane (EGST) which hosts the Kalgoorlie Nickel Project – Goongarrie Hub.

The KNP – Goongarrie Hub is located within the Kalgoorlie Terrane of the EGST upon a NNW trending, craton-scale structure termed the Bardoc Tectonic Zone (BTZ) which separates the Ora Banda Domain in the west from the Boorara Domain in the east (the same crustal structure hosts the famous City of Kalgoorlie-Boulder Golden Mile gold mines).

Goongarrie Hub Geology

The KNP – Goongarrie Hub mineralised Nickel Laterite regolith has developed from intense Tertiary-aged tropical weathering of a single distinctive protolith unit, the Walter Williams Formation (WWF), an olivine(-pyroxene) cumulate ultramafic volcanic rock.

The Goongarrie Hub deposits within the Goongarrie South-Big Four-Scotia Dam (Goongarrie Line) protolith have been subject to intense deformation in association with the BTZ. The deformation has resulted in a deeply recessive weathering profile, permitting within the Eocene geological period the incursion of the ancestral Lake Goongarrie onto the Goongarrie Line WWF/BTZ.

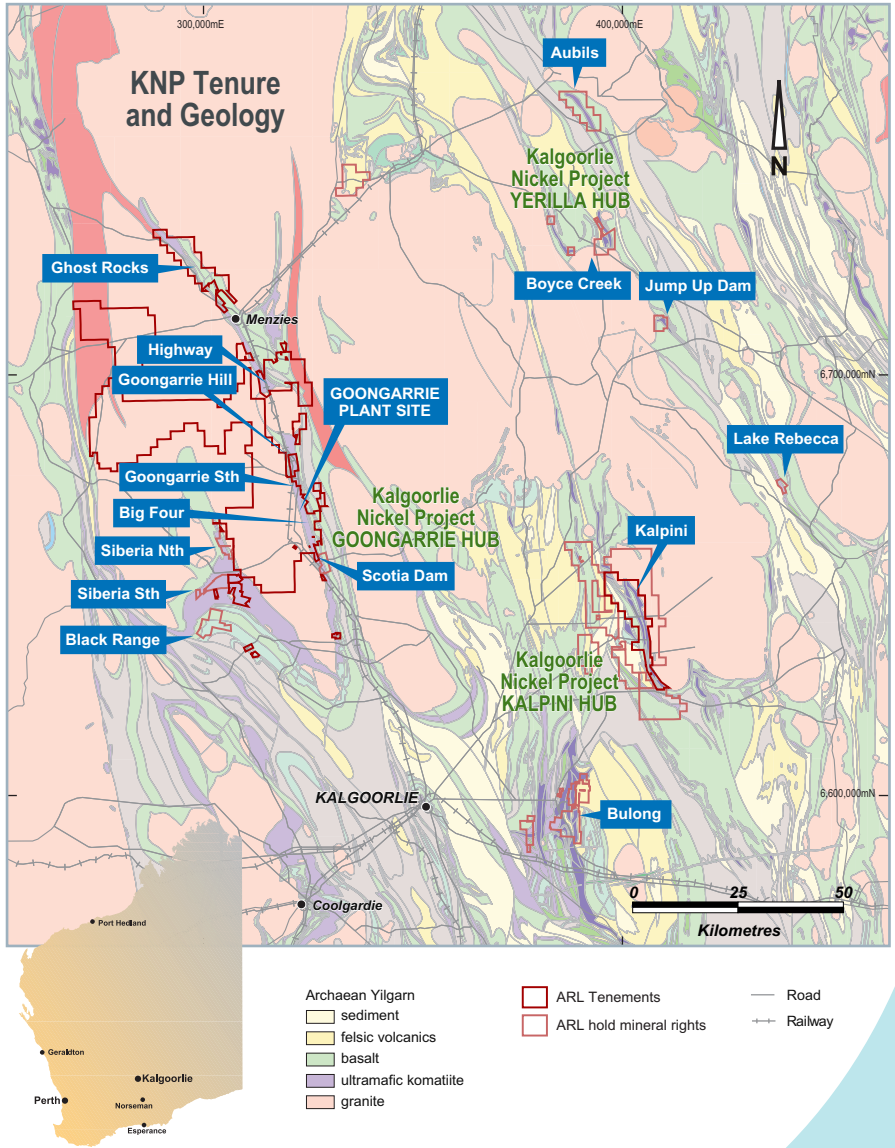
The Goongarrie Eocene climate was comparable to a wet tropical climate such as modern-day Indonesia, with aggressive weathering conditions and with intense groundwater leaching and removal of silica and magnesia minerals in particular.

This led to very strong hydrated iron oxide enrichment, being the premium Goongarrie Goethite HPAL feed.

The mineralised regolith profile resulting from the weathering:

- Pedogenic, Late Cainozoic (Pleistocene), aridity, quartz sand with carbonate cement (*Regolith Cycle 3*).
- Laterite, Mid Cainozoic (Oligocene to Pliocene), red haematite-clay residual erosion surface hard cap (*Regolith Cycle 2*).
- Alluvial, Early Cainozoic (Eocene), fluviatile quartz sands and lacustrine clays, basal sands (Ni-)Co-Mn.
- Clay Void-fill, (Eocene), "perched carbonate" magnesite clasts "floating" in goethite, Ni-Co-Mn (*Regolith Cycle 1a*) – Mineralised Neutraliser.
- Clay Upper, (Eocene), dark yellow goethite, ferruginous Ni-Co (*Regolith Cycle 1*).
- Enrichment Zone, (Eocene), black Mn oxide-goethite, ferruginous Ni-Co-Mn (*Regolith Cycle 1*).
- Clay Lower, (Eocene), light brown/green magnesian clay Ni(-Co) (*Regolith Cycle 1*).
- Clay Void-fill, (Eocene), saprock magnesite clasts "floating" in goethite, Ni-Co-Mn (*Regolith Cycle 1b*) – Mineralised Neutraliser.
- Saprock, (Palaeocene to Eocene), dark green/grey/brown weathered Mg-Ca carbonate Ni(-Co), – Mineralised Neutraliser (*Regolith Cycle 1*)
- Bedrock (Archaean to Mesozoic), serpentinised olivine(-pyroxene) cumulate
- Bedrock (Archaean), olivine(-pyroxene) cumulate.

Ardea's Kalgoorlie Nickel Project tenure on GSWA geology



The KNP Goongarrie Hub geometallurgy facilitates the optimum utilisation of the full Mineral Resource, with ore feed focus on Clay Upper Grind/HPAL

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Material Type Geometallurgical Definitions

As the KNP has evolved over the last 25 years with active managers Heron, then Vale Inco, then Heron again and now Ardea, the terminology has similarly evolved within the geoscientific disciplines.

Kalgoorlie Nickel Project - Technical Terminology

Regolith Stratigraphy Drill Hole Logging	Resource Estimation Domain Naming	Metallurgy Material Type Naming	Plant Destination	Defining Mineralogy
Pedogenic	Pedogenic			quartz-calcite-dolomite-hematite
Laterite	Laterite		Grind/HPAL	hematite-kaolinite-alunite
Alluvial	Alluvial		Grind/HPAL	quartz(-kaolinite)
Clay Void-fill/"Perched" Carbonate	Perched Carbonate	Saprolite(Magnesite)	Mineralised Neutraliser	magnesite-goethite
Clay Upper	Clay	Goethite	Grind/HPAL	goethite-kaolinite-gibbsite
Clay Upper	Clay	Goethite	Bene/HPAL	silica-goethite-kaolinite
Enrichment Zone	Clay	Goethite	Bene/HPAL	goethite-asbolite
Clay Lower	Clay	Saprolite(Mg Clay)	Grind/AL	chlorite-serpentine-nontronite-goethite
Clay Lower	Clay	Saprolite(Mg Clay)	Bene/AL	silica-chlorite-serpentine-nontronite-goethite
Clay Void-fill/Carbonate	Clay	Saprolite(Magnesite)	Mineralised Neutraliser	magnesite-serpentine-goethite
SapRock Magnesite	SapRock	Saprolite(Magnesite)	Mineralised Neutraliser	magnesite-serpentine-goethite
SapRock Serpentine	SapRock	Saprolite (Serpentine)	Grind/AL	serpentine-goethite
BedRock				serpentine-magnesite-silica
BedRock				serpentine-olivine

Plant Destination of Material Type

The average life-of-project crusher feed ranked by tonnage is:

- Grind/HPAL 2.423Mtpa
- Bene/HPAL 1.323Mtpa
- Mineralised Neutraliser 1.320Mtpa

The scheduling was estimated around Grind/HPAL, Mineralised Neutraliser and void-fill tailings disposal.

The pit optimisations have very low contributions of AL feed, meaning dedicated ore preparation circuits were not warranted:

- Grind/AL 0.148Mtpa
- Bene/AL 0.098Mtpa

The dominant AL feed source is the Mineralised Neutraliser Fines at 0.300Mtpa.

The Grind/AL will be campaign processed through the Mineralised Neutraliser circuit with the comminution discharge pumped to the thickener circuit for blending with MN Fines and then to the AL leaching circuit.

The Bene/AL can be campaign processed through either the Bene/HPAL or MN circuits with beneficiated fines discharged to thickener and then AL circuit. The Bene/AL feed is erratic, with five years of minimal feed at 0-7,000tpa.

For the DFS scope of work, and subject to bench-scale metallurgical test work, the Bene/AL feed will be blended with Bene/HPAL (1 loader bucket of Bene/AL per 10 loader buckets of Bene/HPAL). The proposed blending has no material change to the feed chemistry.

Goongarrie Goethite is an HPAL feed and is part of the mineralised Nickel Laterite regolith which has developed from the intense weathering of an olivine(-pyroxene) cumulate ultramafic volcanic

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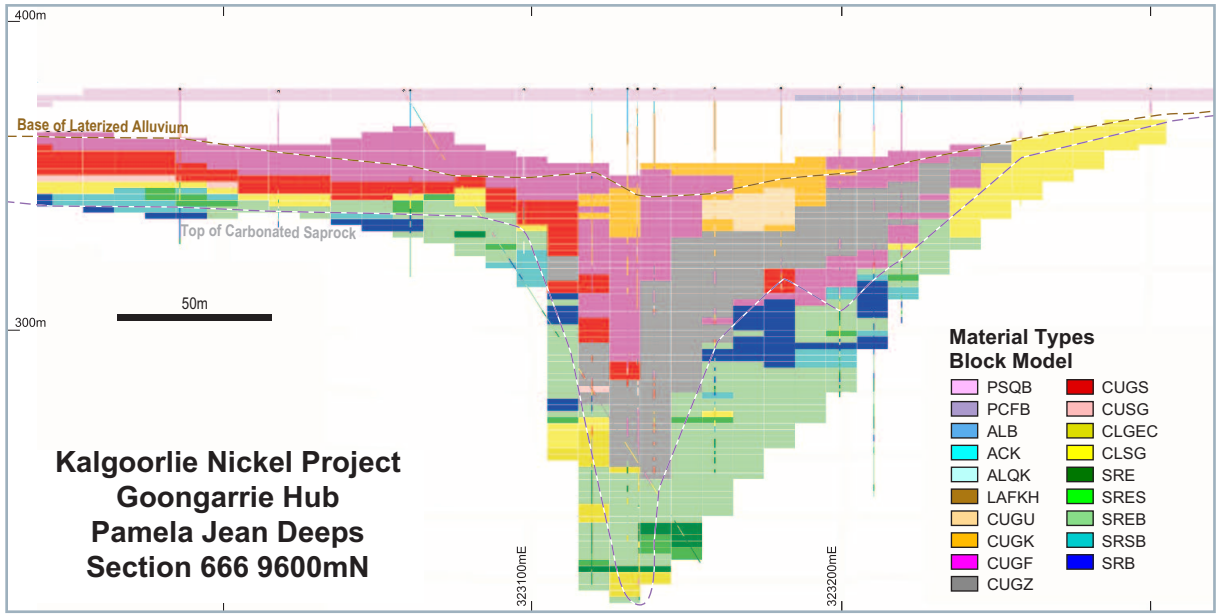
Section 666 9600N Material Types

(excluding Pedogenic and Alluvial host regolith)

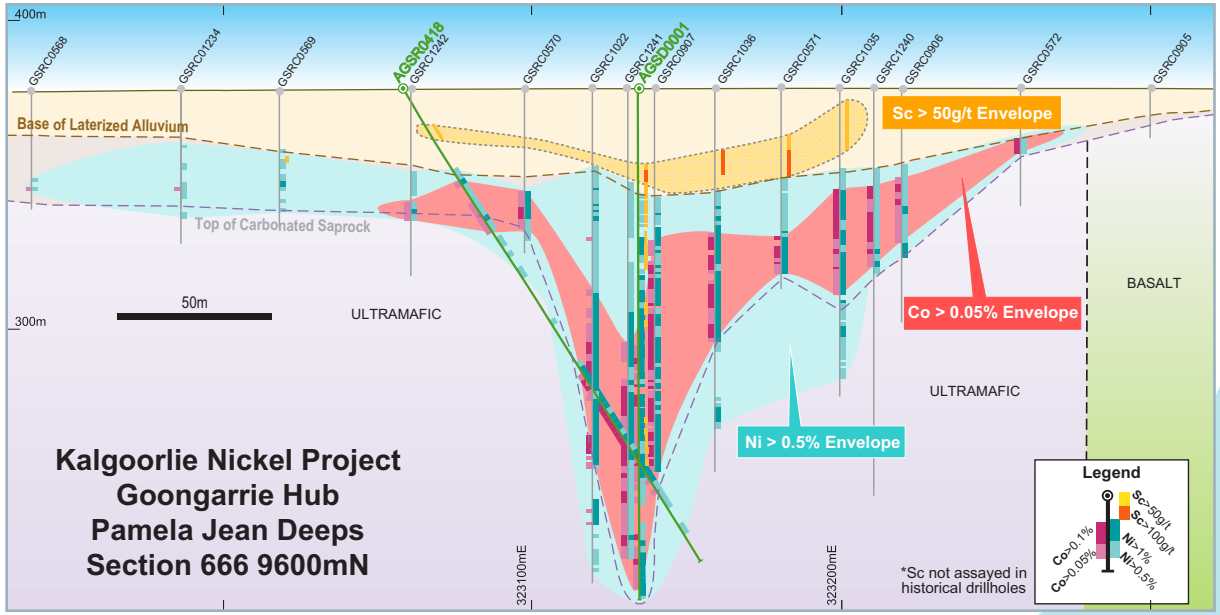
HPAL feed		
LAFKH	Laterite Ferruginous-Kaolinite-Hematite	Grind Ore
CUGU	Clay Upper Goethite-Gibbsite	Grind Ore
CUGK	Clay Upper Goethite-Kaolinite	Grind Ore
CUGF	Clay Upper Goethite-Maghemite	Grind Ore
CUGZ	Clay Upper Goethite-Asbolite Enrichment Zone	Grind Ore
GUGS	Clay Upper Goethite-Silica	Bene Ore
CUSG	Clay Upper Silica-Goethite	Bene Ore
AL feed		
CLGEC	Clay Lower Goethite-Serpentine-Goethite	Grind Ore
SRE	SapRock Serpentine	Grind Ore
CLSG	Clay Lower Silica-Goethite	Bene Ore
SRES	SapRock Serpentine-Silica	Bene Ore
Mineralised Neutraliser		
SREB	SapRock Serpentine-Carbonate	Scats to Neutraliser, Fines to AL
SRSB	SapRock Silica-Carbonate	Scats to Neutraliser, Fines to AL
SRB	SapRock Carbonate	Scats to Neutraliser, Fines to AL

Structural Control

Section 666 9600N demonstrates the control of protolith structure on regolith geometry. Bedrock shearing in association with the Bardoc Tectonic Zone has facilitated Nickel Laterite development to depths down to 160m. The weathering profile, being the "Deep Vee", mimics open cut pit batters, so allowing deep mining without prohibitive increase to the strip ratio. Additionally the ore geometry allows the pit walls to be located in competent saprock and bedrock allowing safe mining recovery of the deep clay mineralisation.



Goongarrie South Material Type classification – Section 666 9600mN (looking north)



Goongarrie South (Pamela Jean Deeps) – Section 666 9600mN (looking north)

A key component of the PFS for the KNP Goongarrie Hub has been focussed on Material Types to optimise the nickel-cobalt mineralisation processing path

Mineral Resource Estimate

The KNP global Mineral Resource Estimate (using a 0.5% Ni cut-off grade) is **854Mt at 0.71% Ni and 0.045% Co for 6.1Mt of contained nickel and 386kt of contained cobalt**. (ASX release 30 June 2023) This is a world-significant nickel-cobalt asset within an infrastructure-rich location, within one of the best mine operating jurisdiction in the world.

The Goongarrie Hub is a subset within the KNP. The deposits within the Goongarrie Hub which are the subject of this PFS comprise from south to north on the Goongarrie Line the Scotia Dam (SD), Big Four (BF), Goongarrie South (GS), and Goongarrie Hill (GH) deposits, as well as the satellite deposits Highway (HW) and Siberia North (SN). Other Goongarrie Hub deposits (Ghost Rocks, Siberia South and Black Range) have at this stage not been included in this PFS, reflecting greater distance from the plant.

The Goongarrie Hub MRE has been re-evaluated to consider the Mineralised Neutraliser (MN) that is captured in optimised open pits, including MN with a grade of less than the 0.5% nickel MRE reporting grade. As once this material has been screened, the coarse magnesium-rich magnesite saprock has been demonstrated to be a viable source of neutraliser and the fine magnesian clay-goethite rich fraction a viable source of AL feed (ASX releases 16 November 2022 and 15 June 2023).

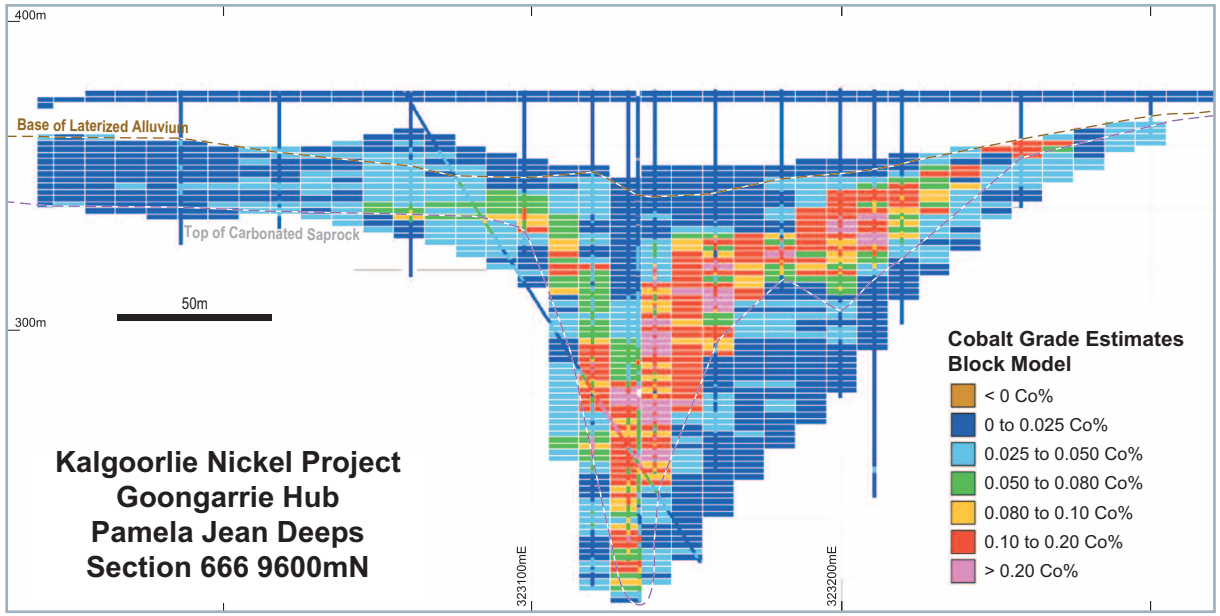
A key component of the PFS for the KNP Goongarrie Hub has been the focus on Material Types to allow the nickel-cobalt mineralisation to be variously matched to the High-Pressure Acid Leach (HPAL), Atmospheric Leach (AL) and MN circuits, maximising resource utilisation for a well understood and proven flowsheet.

Key specifications for the MN are:

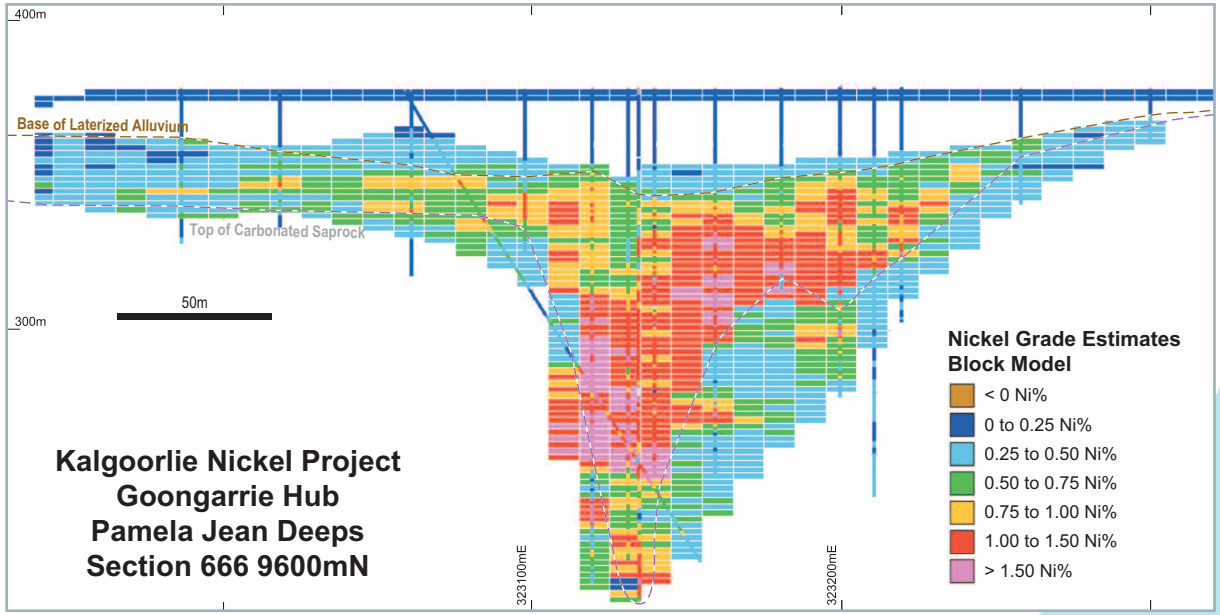
- Loss on ignition (LOI) >25% and Ni >0.3%, or
- LOI >25% and Ni >0.2% and Si <= 23%

As this specification was based on the characteristics of the material that demonstrated acid neutralising capacity and not nickel economics, each deposit contained surplus MN requirements. The preferred source of MN has been defined as a subset of this material type using pit optimisation and scheduling analysis undertaken as part of the PFS.

Compared to traditional nickel laterite operations that transport limestone from the Nullarbor Plains or from Esperance lime sands, the MN cost per tonne reduction benefits have a significant influence on pit optimisations.



Goongarrie South (Pamela Jean Deeps), Cobalt Block Model – Section 666 9600mN (looking north)



Goongarrie South (Pamela Jean Deeps), Nickel Block Model – Section 666 9600mN (looking north)

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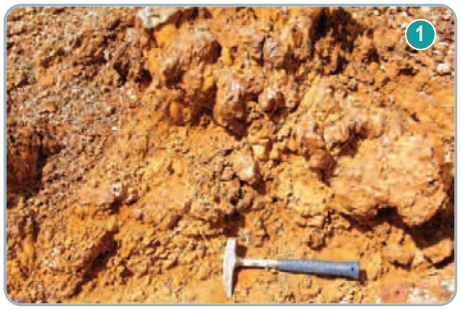

Kalgoorlie Nickel Project - Mineral Resource Estimate (MRE) JORC Code (2012)

KNP Hub	Resource Category	Size (Tonnes)	Ni (%)	Co (%)	Contained Ni (kt)	Contained Co (kt)
Goongarrie Hub	Measured	18,200,000	0.94	0.085	171	15
	Indicated	276,500,000	0.70	0.046	1,923	127
	Inferred	289,300,000	0.67	0.037	1,951	108
	Sub Total	584,000,000	0.69	0.043	4,044	250
Kalpini Hub	Indicated	15,900,000	1.06	0.055	169	9
	Inferred	113,600,000	0.76	0.047	859	53
	Sub Total	129,500,000	0.79	0.048	1,028	62
Yerilla Hub	Measured	3,800,000	0.94	0.048	36	2
	Indicated	68,400,000	0.78	0.049	531	33
	Inferred	67,800,000	0.68	0.057	462	39
	Sub Total	140,000,000	0.73	0.053	1,028	74
KNP Total	Measured	22,000,000	0.94	0.079	207	17
	Indicated	360,800,000	0.73	0.047	2,622	169
	Inferred	470,700,000	0.70	0.043	3,272	200
KNP	**Grand Total**	**853,500,000**	**0.71**	**0.045**	**6,101**	**386**

Notes to Mineral Resource Estimate table

1. *0.5% nickel cutoff grade used to report resources.*
2. *Figures are rounded to reflect degree of certainty and may not tally. The information shown on this slide has been previously released on the ASX platform by Ardea in ASX release 30 June 2023.*
3. *Note the KNP Goongarrie Hub PFS only considered the Goongarrie Hub deposits.*
4. *The Resource Estimation, data collection processes and industry benchmarking summaries for the KNP Goongarrie Hub deposits are based on information reviewed or compiled by Mr Ian Buchhorn, and Mr Andrew Penkethman. Mr Buchhorn is a Member of the Australasian Institute of Mining and Metallurgy and Mr Penkethman is a Fellow of the Australasian Institute of Mining and Metallurgy and a Member of the Australian Institute of Geoscientists. Both Mr Buchhorn and Mr Penkethman are full-time employees of Ardea Resources Limited and have sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which they are 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 Buchhorn and Mr Penkethman have reviewed this press release and consent to the inclusion in this report of the information in the form and context in which it appears. Mr Buchhorn and Mr Penkethman own Ardea shares.*

   The information in this report that relates to Resource Estimates for the KNP non Goongarrie Hub deposits is based on information originally compiled by previous employees of Heron Resources Limited and current full-time employees of Ardea Resources Limited. The Exploration Results, Resource Estimates and data collection processes have been reviewed and verified 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. Mr Buchhorn owns Ardea shares.

   The Mineral Resource Estimate for the KNP non Goongarrie Hub deposits information shown in this ASX release have been previously released on the ASX platform by Ardea in ASX release 16 June 2021, in accordance with Listing Rule 5.8.

   The Company confirms that it is not aware of any new information or data that materially affects the information included in the previous market announcement noted above and that all material assumptions and technical parameters underpinning the Mineral Resource Estimate in the previous market announcement continue to apply and have not materially changed.

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1. Goethite, Big Four
2. High grade cobalt ore at Goongarrie, black absolite host mineral
3. AHID0012 core showing Mineralised Neutraliser
4. AHID0002 core showing Goethite

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5. Ore Reserve and Mining

KNP Goongarrie Hub Ore Reserve of 1.36Mt contained nickel and 99kt contained cobalt to give projected production of approximately 30,000t of nickel and 2,000t of cobalt per year for more than 40 years

Goongarrie Hub 2023 updated Ore Reserve of 194.1Mt at 0.70% Ni and 0.05% Co for contained 1.36Mt of nickel and 99,000t of cobalt to sustain greater than 40 year mine life

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Overview

Ardea appointed Orelogy Mine Consulting (Orelogy) to undertake the mining component of an updated PFS for the KNP centred around the Goongarrie Hub assets. The process plant will be located at Goongarrie South which is situated in the Eastern Goldfields region of Western Australia, approximately 70km northwest of the City of Kalgoorlie-Boulder mining centre.

The **KNP Mineral Resource Estimate** JORC Code (2012) reported ASX release 30 June 2023 and summarised in Chapter 4 of this document, is **854Mt at 0.71% Ni and 0.045% Co for 6.1Mt contained nickel and 386kt contained cobalt**. The Goongarrie Hub is a subset within the KNP and is the subject of this PFS. More specifically, only the following deposits within the Hub have been considered in this Ore Reserve estimate: Goongarrie South (GS), Goongarrie Hill (GH) and Big Four (BF) / Scotia Dam (SD) covering an overall strike length of 21km, and satellite deposits at Highway (HW) approximately 30 km to the north and Siberia North (SN) approximately 30 km to the west for a total MRE of **437Mt at 0.71% Ni and 0.042% Co** (ASX release 30 June 2023).

Orelogy has defined an **Ore Reserve estimate** of **194.1Mt at 0.70% Ni and 0.05% Co for 1.36Mt contained nickel and 99kt contained cobalt** (see full table next page) for **GS**, **GH**, **BF/SD**, **HW** and **SN** deposits.

Other Goongarrie Hub deposits (Ghost Rocks, Siberia South and Black Range), the Kalpini Hub deposits and Yerilla Hub deposits have not been included in the current Ore Reserve.

The Ore Reserve was produced in accordance with the guidelines of the JORC Code (2012).

All deposits are located on granted mining leases with a general purpose lease at Goongarrie South for plant and other infrastructure.

Orelogy completed mining optimisation studies for the **KNP Goongarrie Hub** project and projected production of **approximately 30,000t of nickel and 2,000t of cobalt per year for more than 40 years**. This projection comprises:

- the Ore Reserve
- the inclusion of a small amount of Inferred Mineral Resource (20Mt or 9%) spread over the Life of Mine

Enhancing previous studies, the updated mine plan uses a selective approach to maximise economic extraction of the KNP Goongarrie Hub mineral resource by defining ore types to leverage the variability of the mineralisation. This was achieved by maximising higher value ore streams through the HPAL circuit and diverting to the AL circuit lower value streams that would otherwise be stockpiled for end-project processing.

In terms of contributions over project life to leach ore feed from the three ore preparation circuits:

HPAL	**Grind**	**97.3Mt at 0.83% Ni and 0.07% Co**
	Bene	**53.0Mt screening to 23.3Mt at 1.10% Ni and 0.05% Co**
AL	**MN Fines/Grind/Bene**	**63.7Mt screening to 20.2Mt at 0.73% Ni and 0.03% Co**
MN	**Magnesite Scats**	**31.6Mt at 0.43% Ni and 0.02% Co**

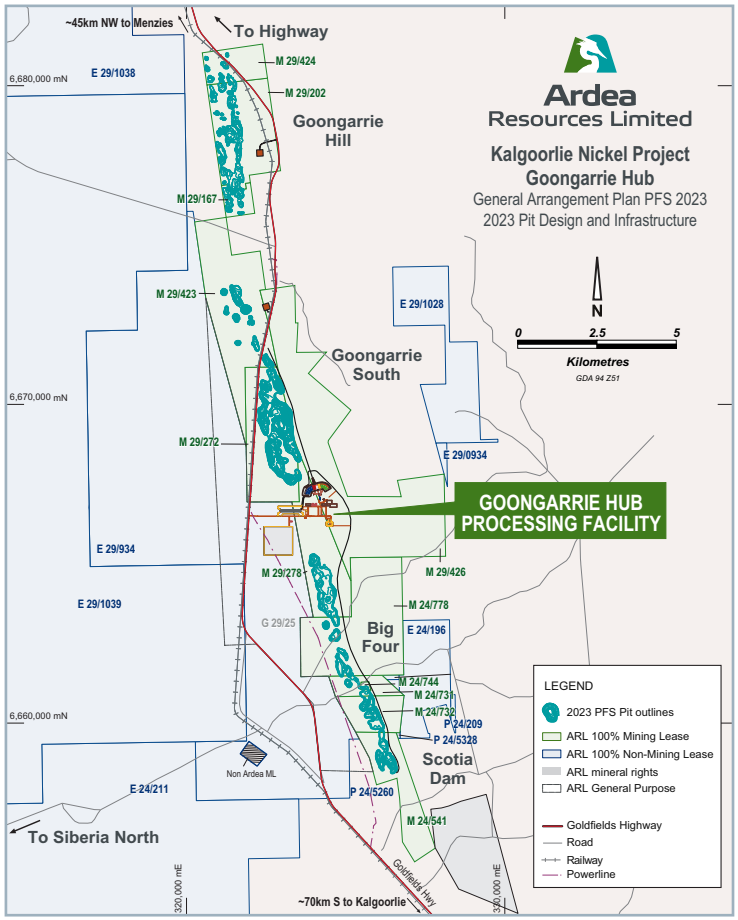
In terms of contributions to leach circuit over project life:

HPAL	**120.6Mt at 0.88% Ni and 0.07% Co for 1,059kt Ni and 83kt Co**
AL	**20.2Mt at 0.73% Ni and 0.03% Co for 147kt Ni and 7kt Co**
MN Magnesite	**31.6Mt at 0.43% Ni and 0.02% Co for 135kt Ni and 5kt Co**

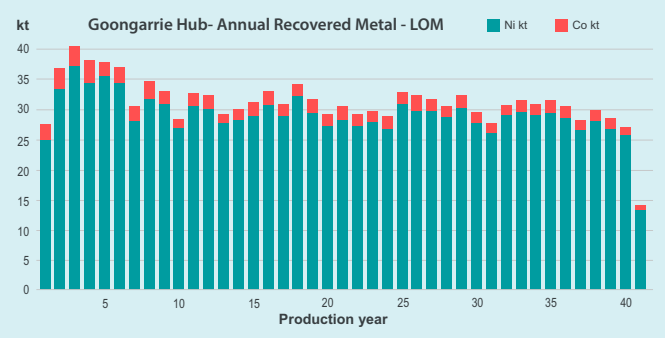
In terms of nickel metal to leach, contributions are HPAL 79%, AL 11% and MN Magnesite neutraliser 10%.

Simple low-cost mining methods result in mining costs comprising less than 12% of total operating cost. This is further enhanced by:

- A very low strip ratio, which can be maintained at an average of 1.5 for the first 35 years of mine life.
- The Mineralised Neutraliser (MN) material sourced from within the optimised open pits provides a low-cost neutralisation alternative to limestone from third-party suppliers, and contributes 16% additional nickel metal to leach from the combined MN Scat and MN Fines in the AL circuit and Neutralisation circuits.



Goongarrie Hub general arrangement plan showing 2023 pit designs and infrastructure



Projected Nickel and Cobalt Metal Production
Orelogy - Mining PFS report to Ardea

This Ore Reserve estimate is for a subset of the KNP Goongarrie Hub deposits being Goongarrie South, Big Four, Scotia Dam, Goongarrie Hill, Highway and Siberia North

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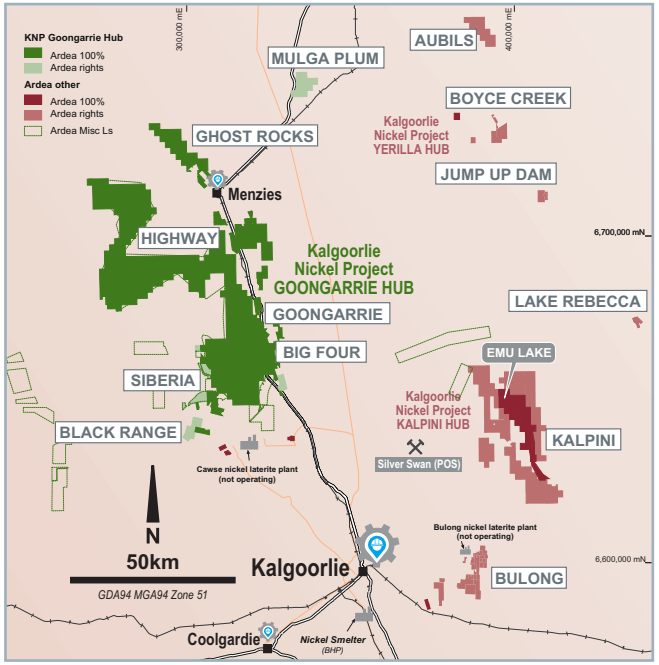
Ore Reserve

The KNP Goongarrie Hub PFS Ore Reserve, (Orelogy - Mining PFS Report to Ardea) (summarised below, consists of ore above 0.5% Ni as the feed stock for the KNP processing facility, and ore as Mineralised Neutraliser above 0.5% Ni equivalent and Loss on Ignition (LOI) is above 25%.

Ore Reserve Summary JORC CODE (2012)

Deposit	Ore >= 0.5% Ni					Ore > 0.5% NiEq and LOI > 25%					Total Ore				
	Mt	Ni (%)	Co (%)	Ni (kt)	Co (kt)	Mt	Ni (%)	Co (%)	Ni (kt)	Co (kt)	Mt	Ni (%)	Co (%)	Ni (kt)	Co (kt)
Proven															
Goongarrie South	16.7	0.96	0.09	160	15	0.05	0.43	0.03	0.20	0.01	16.7	0.96	0.09	160	15
Sub-total	**16.7**	**0.96**	**0.09**	**160**	**15**	**0.05**	**0.43**	**0.03**	**0.20**	**0.01**	**16.7**	**0.96**	**0.09**	**160**	**15**
Probable															
Big Four / Scotia Dam	34.9	0.76	0.07	265	23	0.8	0.38	0.04	3	0	35.7	0.75	0.06	268	23
Goongarrie South	33.6	0.79	0.07	265	23	1.8	0.40	0.03	7	1	35.4	0.77	0.07	272	24
Goongarrie Hill	15.8	0.70	0.04	110	7	0.1	0.44	0.02	0	0	15.9	0.70	0.04	111	7
Highway	54.0	0.70	0.04	380	22	27.2	0.39	0.01	106	4	81.2	0.60	0.03	486	26
Siberia North	9.2	0.74	0.05	68	4	-	-	-	-	-	9.2	0.74	0.05	68	4
Sub-total	**147.4**	**0.74**	**0.05**	**1,087**	**79**	**29.9**	**0.39**	**0.02**	**117**	**5**	**177.4**	**0.68**	**0.05**	**1,204**	**84**
Proven + Probable Total															
Big Four / Scotia Dam	34.9	0.76	0.07	265	23	0.8	0.38	0.04	3	0	35.7	0.75	0.06	268	23
Goongarrie South	50.2	0.85	0.08	425	38	1.9	0.40	0.03	7	1	52.1	0.83	0.07	432	39
Goongarrie Hill	15.8	0.70	0.04	110	7	0.1	0.44	0.02	0	0	15.9	0.70	0.04	111	7
Highway	54.0	0.70	0.04	380	22	27.2	0.39	0.01	106	4	81.2	0.60	0.03	486	26
Siberia North	9.2	0.74	0.05	68	4	-	-	-	-	-	9.2	0.74	0.05	68	4
TOTAL	**164.1**	**0.76**	**0.06**	**1,247**	**94**	**30.0**	**0.39**	**0.02**	**117**	**5**	**194.1**	**0.70**	**0.05**	**1,365**	**99**



Kalgoorlie Nickel Project - Goongarrie Hub (green)

Notes to Ore Reserve table

1. *The Ore Reserve is reported in accordance with JORC Code (2012).*
2. *Ore Reserves are reported at a cut-off of 0.5% Ni for primary feed stock to the processing facility, plus Mineralised Neutraliser as ore at a cut-off of 0.5% NiEq and Loss on Ignition (LOI) above 25%.*
3. *NiEq defined using Ni + 2.32 x Co.*
4. *The Ore Reserve was evaluated using a base price of US$22,000/t for Ni and US$51,000/t for Co at 85% payable for a Mixed Hydroxide Precipitate (MHP) product, and an exchange rate 0.69 USD/AUD. In view of forward metal price projections averaging US$25,000/t Ni, the Ore Reserve can be considered conservative.*
5. *Ore Reserves account for mining dilution and mining ore loss.*
6. *Ore Reserves are reported on a Dry Tonnage Basis.*
7. *Proven Ore Reserves are based on Measured Mineral Resources only and Probable Ore Reserves are based on Indicated Mineral Resources only.*
8. *The sum of individual amounts may not equal due to rounding.*
9. *This Ore Reserve estimate is for a subset of the KNP Goongarrie Hub deposits being Goongarrie South, Big Four / Scotia Dam, Goongarrie Hill, Highway and Siberia North.*

Material Type geometallurgical definition of the ore has been an important parameter in the pit optimisations

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Design Criteria

This PFS expands upon previous work with a revised operating strategy based on:

- The production of a mixed hydroxide precipitate product (MHP) for the battery industry.
- An increase from the 2.25Mtpa 2018 Expansion Study to 3.0Mtpa processing via two high pressure acid leach (HPAL) autoclave trains, each rated at 1.5Mtpa.
- The addition of 0.5Mtpa processing via atmospheric leaching (AL).
- The replacement of limestone sourced from third parties with Mineralised Neutraliser (MN) sourced within the nickel laterite deposits. The coarse MN fraction will be used to neutralise free acid in the leach discharge whilst the fines fraction will be processed via the AL circuit.
- Disposal of mine tailings within pit voids from 3km north of the processing plant at Tricia Anne to 3km south at Big Four.
- Disposal of hypersaline decant water within pit voids, mainly at Canegrass South 7km south of the plant.
- Mining at Goongarrie South during pre-production to provide a water storage solution for the bore field supplying water to the processing plant.

The HPAL circuit is the primary economic driver of the project providing more than 85% of the revenue. The AL circuit, although adding ore management requirements, provides additional cashflow for material that would otherwise be stockpiled for later processing. It also provides operational flexibility in being able to process higher acid consuming ore, burn more sulphur and generate additional power, as required from the on-site acid plant.

Mining Considerations

Ore Definition

Ore types based on pre-process and leach process paths are:

- Grind – directly through the crushing and grinding circuit to either HPAL (GH) or AL (GA).
- Bene – through crushing and beneficiation and grinding fines to HPAL (BH) and on a minor scale to AL (BA).
- Mineralised Neutraliser (MN) – Ni and Co mineralisation with acid neutralising capacity; this material is beneficiated with the fines component as feed to the AL circuit and the scat component used as neutraliser of free acid in the discharge stream.

Dilution and Mine Recovery

The Mineral Resource block models were converted to Mining Models with dilution applied vertically to the 2m block height on the basis of floor control using a 130t excavator.

In-pit Tailings and Evaporation Cells

Tailings generated from the processing operation will be disposed of within open pit voids. This eliminates the need to clear more than 6km^2 of woodland for a surface Tails Storage Facility (TSF) and reduces the initial capital and ongoing cost of constructing downstream embankments.

Geotechnical and Hydrogeological Parameters

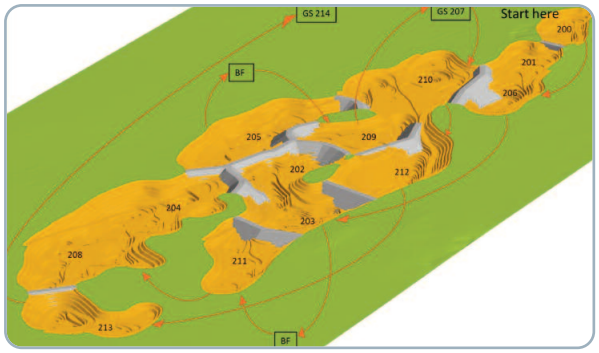
Potential geotechnical failure mechanisms identified by the geotechnical consultant, PSM, have been accounted for in the pit design criteria.

Mining Method

The mining method and grade control practises to be employed at site are aimed at mining the ore zones selectively using backhoe configured excavators on a 2m flitch to minimise dilution and ore loss. Balancing the five ore types and dual process paths requires multiple pit stages to be opened at all times with the operation at a given time potentially spread across several deposits.

The mine plan has been developed on the basis of conventional mining methods using three to four 130t class excavators matched to 90t class rear dump trucks.

As each pit stage at Goongarrie South and Big Four is completed, the void will be converted to a tailings storage facility. Internal embankments will be constructed to separate the tailings void from active mining areas.



Example of mining sequence at Goongarrie South, which has been optimised for the in-pit tailing storage plan

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6. Hydrogeology

A large resource of fresh to saline groundwater has been delineated within the KNP and will be an important component of overall water supply to the Goongarrie Hub

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Exploration - Drilling

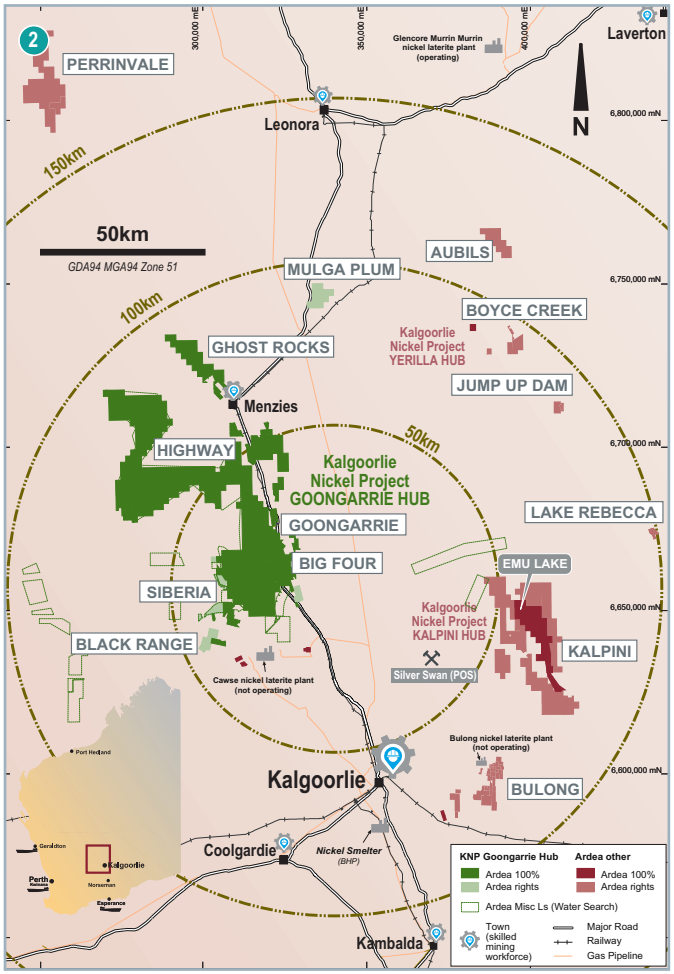
- Water drilling completed since 2018 includes 52 aircore holes and 74 RC/hammer exploration holes at multiple targets within the KNP
- Targets drill tested in 2022/23 include Siberia North, Siberia South, Goongarrie South, Black Range and Papertalk
- Significant results were achieved within the Goongarrie Hub, where a large resource of fresh to saline groundwater has been delineated with 34 holes for 2,138m and two production bores and a monitoring bore drilled in 2022/23.

Exploration – Passive seismic surveys

- Since 2018 passive seismic surveys have been completed over 13 target areas in and around the Goongarrie Hub to assist targeting Tertiary aged paleochannel aquifers
- Results have been of high quality and delineated multiple paleochannel bedrock profiles which may also be an important future water source for the project

PFS

- Three groundwater streams are needed for the KNP – Goongarrie Hub. These are a Raw Water Stream (1.6 GL/a at <70,000 mg/L), which will be treated using thermal desalination primarily for use in the autoclaves; a Process Water Stream (3.1 GL/a at <100,000 mg/L) to be treated by nanofiltration and is primarily for ore preparation; and Camp Water Supply (0.3 GL/a at <40,000 mg/L) for mine construction and camp supply which will be treated using reverse osmosis. As part of the PFS a Base Case Supply Option has been defined.
- Ardea has two water abstraction licences granted over the central Goongarrie Hub and multiple search for water miscellaneous licences granted to provide sufficient optionality to source all water requirements for future production
- Ardea will continue the water supply reviews at the concept level stage to find the best water supply options and then undertake more detailed engineering and cost estimates post-PFS
- Further exploration drilling and seismic surveys may continue including on the multiple regional paleovalley targets



1. Large water sump from Goongarrie Hub production bore drilled in July 2022
2. Ardea Resources - Project Tenure including Miscellaneous Licenses for water search
3. Harrington Drill rig used in 2022/23 Ardea water exploration drill programs

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7. Metallurgical Processing

Ardea's metallurgical design is based on internal and external technological developments and on sound engineering design discipline

Ardea's metallurgical design has taken advantage of existing knowledge, developments and innovations, both in-house for two decades and external to the organisation for six decades

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Overview

Ardea's metallurgical design is based on internal and external technological developments and on sound engineering design discipline. Much of this has employed a "bottom-up" approach to achieving overall project value.

The Goongarrie Hub PFS Base Case (Base Case) features two x 1.5Mtpa Goethite High Pressure Acid Leach (HPAL) autoclaves. Acid, heat and energy balance is facilitated with the Atmospheric Leach (AL) circuit with 0.3Mtpa Mineralised Neutraliser Fines, 0.15Mtpa Grind Atmospheric Leach and 0.05Mtpa Bene Atmospheric Leach feed. Of critical note the 3.5Mtpa Base Case incorporates proven hydrometallurgical technologies successfully utilised at several existing nickel laterite operations world-wide.

The PFS Base Case end-product is Mixed Hydroxide Precipitate (MHP), which is the new Class 1 nickel for Lithium Ion Batteries (LIB).

Industry Experience

Although the High Pressure Acid Leaching (HPAL) chemistry has been applied commercially since the 1960's, its modern incarnation has only been operational since the late 1990's. These developments involved significant changes to equipment design, which highlighted challenges associated with the severe service applications. As part of this present study, Ardea conducted a review of the modern HPAL systems, which revealed a significant number of improvements to process capacity, reliability and efficiency. Many of these advances were owing to improvements by equipment suppliers in areas such as valving, pumping, fabrication, seals, process control and materials. A conscious decision was made to lock these advances into the Ardea design by partnering with those suppliers with a quality record.

Other HPAL improvements have arisen from use of appropriate equipment sizing and circuit configuration. These features have also been included in the Ardea design.

Process Selection

The broader process selection was made on the basis of general industry experience and the regional, technical, economic and marketing contexts. Examples of these are:

- The project locality lends itself to good logistical connections and infrastructural support from the Goldfields region; less emphasis is placed on a mining camp philosophy.
- The orebody genesis is variable, and incorporates both beneficiable and non-beneficiable mineralogies.
- A feature of the resource is presence of Mineralised Neutraliser, which reduces the cost of imported reagents and expands the nickel and cobalt production capacity.
- Twin autoclaves, backed by a vat-style atmospheric leach (AL) helps to stabilise production and the site acid and energy balance.
- Nanofiltration of local groundwater was capable of producing a "soft" process water that would be much less susceptible to scaling in the HPAL autoclave heating circuit.
- Production of a MHP is a viable flowsheet option that also provides a generic base case for further option studies.
- Modifications to the residue washing and solution purification circuits have been included to redress inefficiencies in the conventional hydrometallurgical flowsheet.
- By-product energy and waste heat streams have been utilised to reduce overall energy costs and reliance on fossil fuel energy sources.
- Where possible, process designs are based on successful operational precedents, except in cases where changes address a known process issue and do not introduce undue risk to the flowsheet reliability.

Ardea's Goethite ore undergoes batch high pressure acid leach autoclave test work

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Previous Investigations

Ardea has retained technical knowledge obtained from previous investigations undertaken since 2000, which has provided a broader basis for ongoing developments. When Ardea listed on ASX in February 2017, Heron divested all its KNP interests to Ardea with no retained rights. The project came with a comprehensive database including 5,126 drill holes for a total of 252,375m of drilling, as well as Heron metallurgical test work from 2000 including bench-scale metallurgical studies in 2005 to 2009 by nickel laterite developer Vale Inco in their joint venture with Heron. The project history is summarised in Chapter 2 of this PFS document.

These studies have identified what works (and, in some cases, what doesn't), which has enabled Ardea to focus activities on the most productive alternatives.

Use of atmospheric leach as a stand-alone nickel and cobalt extraction technique from goethite ore was intrinsically inefficient because the leaching chemistry did not selectively extract nickel. Instead, a large portion of the iron in the goethite went into solution with the nickel and cobalt. Together with the high residual acid concentrations required for efficient metals recovery, this increased the neutralising agent consumption, and the volume of slurry that had to be washed to recover the entrained nickel content from the neutralised slurry.

Like atmospheric leaching, heap leaching also suffered from high acid consumptions and non-selective leach extractions. These issues were compounded by degradation of the mineral structure, which caused inefficient leach extractions due to plugging and channeling in the heap. Attempts to control this by pelletisation of the feed were unsuccessful, but the use of saprolite ore as a neutralising agent was successful. Later work used HPAL leaching for the goethite ore, which selectively recovered nickel and cobalt at low acid consumption rates.

Downstream work focused on neutralisation and purification of the leach solution to produce intermediates for downstream processing. Both the sulphide (MSP) and hydroxide (MHP) intermediates were investigated, with capital and operating cost estimates concluding that the MSP option was approximately 10% more costly than the MHP option.

Piloting work in 2018 by Ardea confirmed the efficiency of the HPAL route for metal extractions, and progressed to the production of nickel and cobalt sulphate intermediates.

Test work is continuing as part of the current process development process.

Design Discipline and Support Studies

Engineering aspects of the metallurgical process were developed in parallel with the process chemistry. These were required to provide structure to the process design, its calculations and structure. Elements included battery limits, work breakdown structures, process descriptions, block flow diagrams, process flow diagrams, mechanical equipment lists, process design criteria, naming conventions and metallurgical model outputs.

Prior to commencing the PFS, the following studies were conducted by Ardea:

- Process gap analysis study
- Land-based logistics desktop study for autoclave delivery from Esperance to Kalgoorlie
- Hydrogeology exploration
- Materials of construction scoping study
- Tailings storage options review
- Mineralised Neutraliser beneficiation and neutralising capacity
- Indicative capital cost estimates and delivery schedules for critical plant equipment
- Lessons learned review

Ardea's Saprolite ore undergoes batch atmospheric leach test work

Conclusion

Ardea's metallurgical design has taken advantage of existing knowledge, both in-house and external to the organisation. This knowledge base will continue to grow as a consequence of ongoing studies and contribute to successful project development and steady state operation.

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8. Transport and Logistics

The Kalgoorlie Nickel Project is 70km NW of the City of Kalgoorlie-Boulder and has access to:

- *high-quality infrastructure including Goldfields Highway, rail line and power infrastructure passing through the project area*
- *Shipping ports at Esperance, Fremantle and Kwinana*
- *Skilled work force, specialist resources sector service providers, supportive community and airport at Kalgoorlie-Boulder*

Transport and Logistics

KNP has access to high-quality infrastructure with the Goldfields Highway, rail line and power infrastructure passing through the project area. There are three port options, these being Esperance, Fremantle and Kwinana, that are well connected to KNP by road and rail network

8.

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Transport

The KNP mineral resource development, includes construction of a new process plant facility to be located at the Goongarrie Hub, situated in the Eastern Goldfields region of Western Australia, approximately 70km northwest of the City of Kalgoorlie-Boulder mining centre.

The project is well serviced by existing infrastructure including:

- **Road Transport**

  Road access between Perth and Kalgoorlie-Boulder via the Great Eastern Highway and between Kalgoorlie-Boulder and Esperance via the Esperance Highway.

  From Kalgoorlie-Boulder, the site is accessed by the Goldfields Highway, which extends from Kalgoorlie-Boulder to Menzies and then to Wiluna to the north. The road is bituminised, single lanes in each direction. and carries both light and heavy vehicle traffic. The plant site will be connected to the Goldfields Highway via a 3km private road.

- **Airport**

  Kalgoorlie-Boulder Airport is serviced by Qantas, QantasLink, Virgin Australia, and Alliance Airlines. The airport is a major hub for FIFO service due to the mining boom in the region. The airport accommodates up to B787-9/A330-300.

- **Rail Transport**

  The Western Australian Railway network extends from Kalgoorlie-Boulder to Leonora and runs along the western side of the Goldfields Highway.

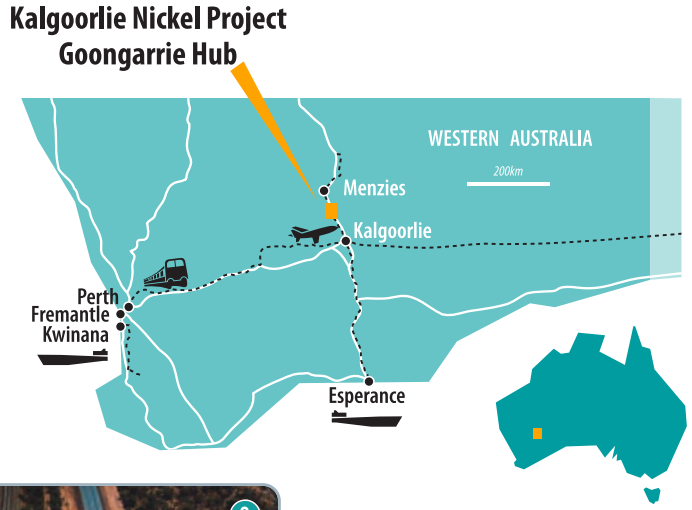
  A new intermodal logistics facility is being proposed for the City of Kalgoorlie-Boulder to upgrade the existing logistics capabilities from Perth, Esperance, and the eastern states.

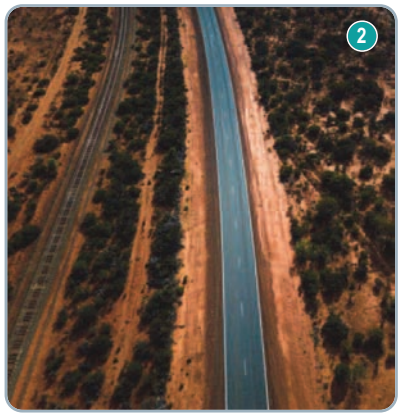
- **Shipping Ports**

  Port facilities are operated by the Southern Ports Authority at Esperance. The Fremantle and Kwinana ports are operated by the Fremantle Ports Authority.

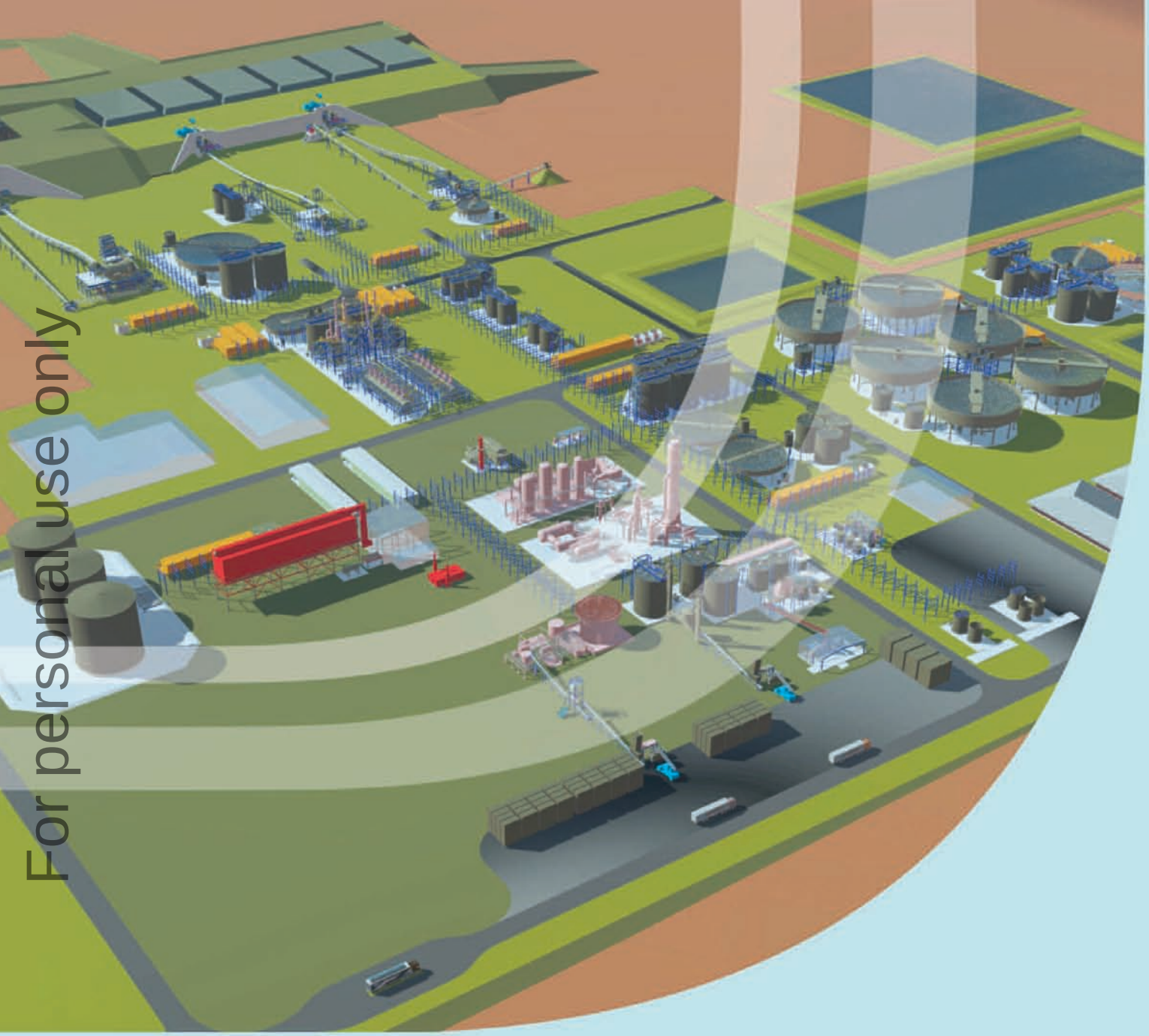
Logistics

QUBE conducted a high-level scoping study addressing a supply chain model of a mine to port solution for the export/import of MHP, Magnesia, Sulphur and Lime. This study identified three potential ports (Kwinana, Fremantle or Esperance ports) to import sulphur, bulk lime, magnesia and other reagents and two potential ports (Esperance and Fremantle) for the export of MHP using 20' General Purpose containers. Haulage options reviewed road trains and rail options and combinations between the port and site.





1. Southern Ports Authority (SPA)-Esperance port has the capacity to meet Ardea's operational needs (photo courtesy of SPA)
2. The Goldfields Highway and rail network runs through KNP
3. Ardea's goal is to maximise residential Kalgoorlie-Boulder workforce in conjunction with FIFO personnel. The workforce will be transported via bus to Goongarrie site from the Kalgoorlie-Boulder operations base
4. Kalgoorlie-Boulder is well serviced by daily air and rail passenger services (photo CKB)



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9. Engineering Development

At 3.5Mtpa the plant has been right-sized to provide a scale of operation commensurate with such a significant resource base

Desirable flowsheet with proven technology refined for industry leading low carbon emissions

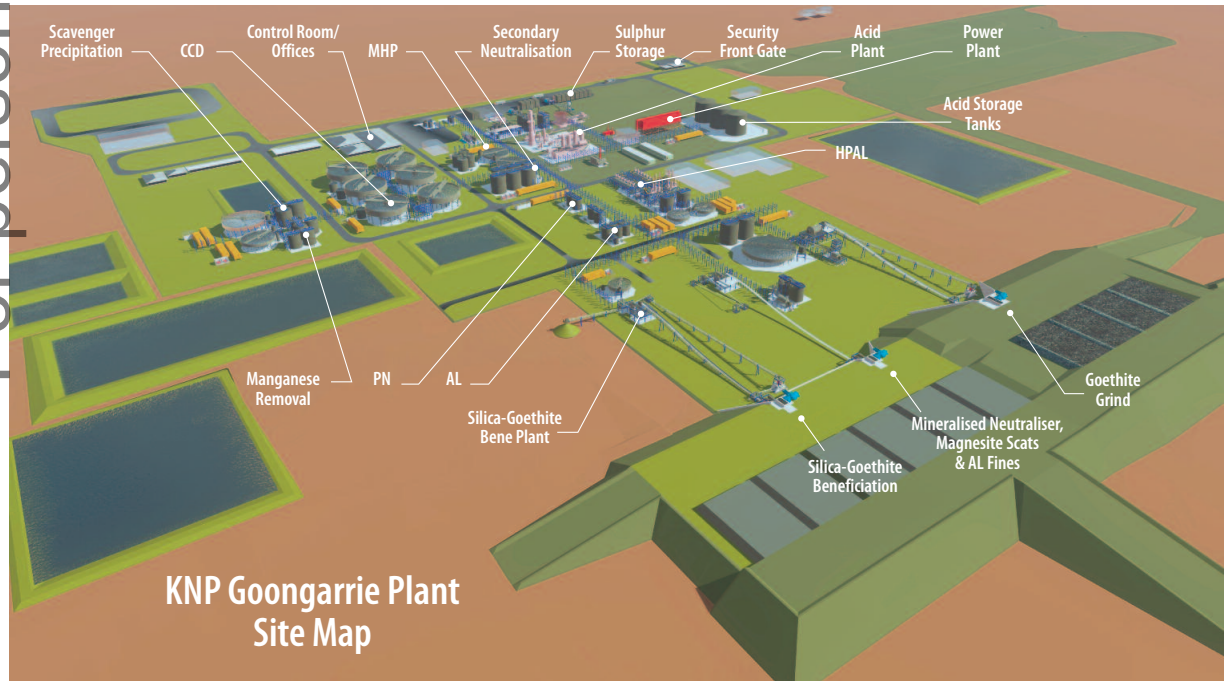
Process Flowsheet

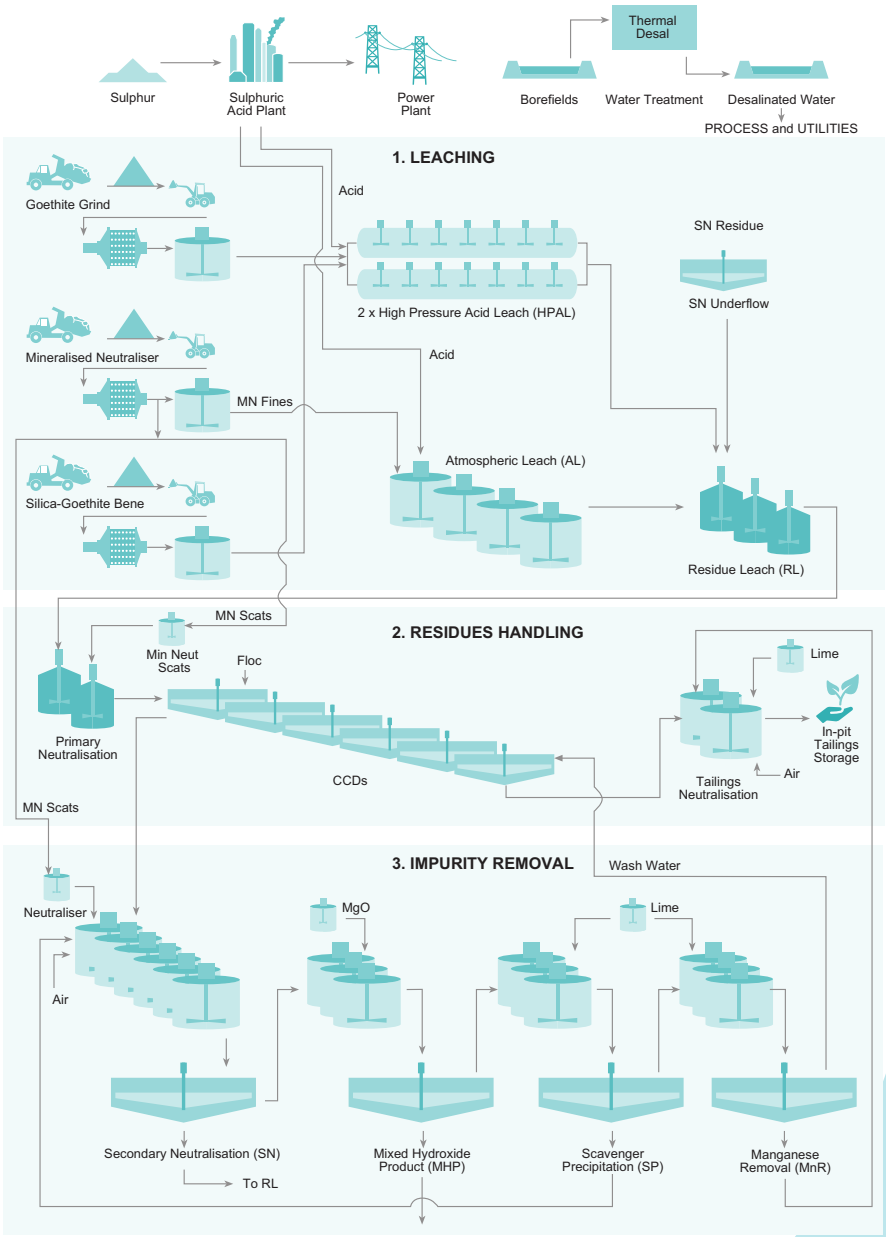
The PFS developed the engineering and design definition for the KNP to an expected accuracy of +/-25%. Base Case features two x 1.5Mtpa Goethite High Pressure Acid Leach (HPAL) autoclaves. Acid, heat and energy balance is facilitated with the Atmospheric Leach (AL) circuit with 0.3Mtpa Mineralised Neutraliser Fines, 0.15Mtpa Grind Atmospheric Leach and 0.05Mtpa Bene Atmospheric Leach feed.

The KNP flowsheet follows a proven hydrometallurgical route for treating nickel and/or cobalt ore. It produces mixed nickel-cobalt hydroxide precipitate (MHP) filter cake, from goethite and minor saprolite ores. The process flow diagram is represented opposite and in the 3D rendering of plant below.

The KNP Goongarrie Plant Site Map below includes the steps listed below and illustrated in the flowsheet opposite:

- Ore comminution and beneficiation circuits
- High pressure acid leaching (HPAL) in a titanium lined horizontal autoclave
- Atmospheric leaching (AL) in a series of agitated titanium tanks
- Residue leaching to redissolve nickel and cobalt recycled from downstream processes
- Primary neutralisation (PN) to neutralise excess free acid and precipitate mostly iron and aluminum impurities from solution.
- Counter current decantation (CCD) thickeners to separate the pregnant leach solution (PLS) from the leached solids
- Secondary neutralisation (SN) to neutralise the remaining free acid and precipitate more of the impurity metals by an air-sparged
- Mixed hydroxide precipitate occurs when PLS is treated with caustic-calcined magnesia and slurry is filtered on a continuous vacuum belt filter
- The barren liquor is treated with slaked lime in aerated agitated tanks to oxidise and precipitate manganese from solution
- The manganese residue is thickened and pumped to tailings neutralisation
- The process plant includes a sulphur-burning acid plant which produces sulphuric acid, high pressure steam and medium pressure steam to be used for HPAL heating and power generation.





Sustainable Ni & Co Products for Battery / EV Market

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Magnesite sourced from Goongarrie Hub Mineral Resources will be used as the main neutralising agent

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Reagents

In addition to the sulphur for the sulphuric acid plant the other main reagents for the process plant are:

- The main neutralising agent for the process plant is magnesite, which is uniquely sourced from the KNP ore deposits (photo right).
- Quicklime, which is slaked on-site to produce a slaked lime slurry for use as a neutralising agent.
- Magnesia powder, which is used to precipitate the MHP.
- Flocculants.
- Oxalic acid, which is used to prevent scale formation in the HPAL heaters.
- Miscellaneous minor reagents.

Neutralising reagent is co-mined with the nickel-cobalt mineralisation

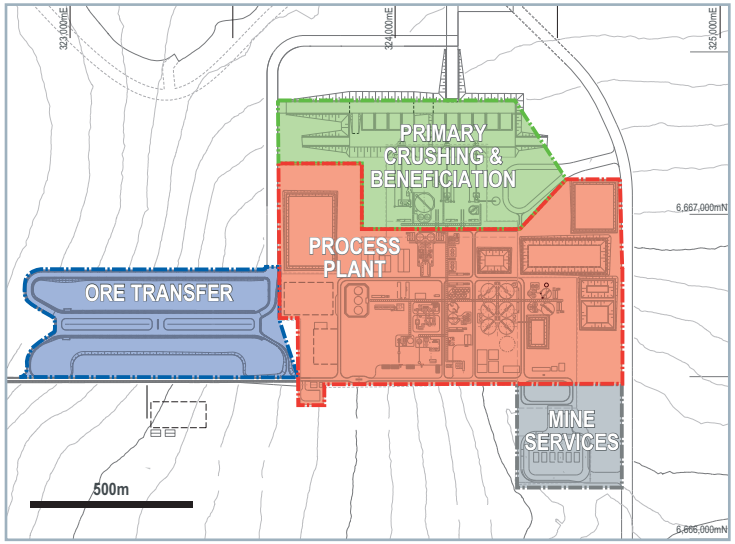
Plant Arrangement

The plant general arrangement consists of the following key areas as shown below:

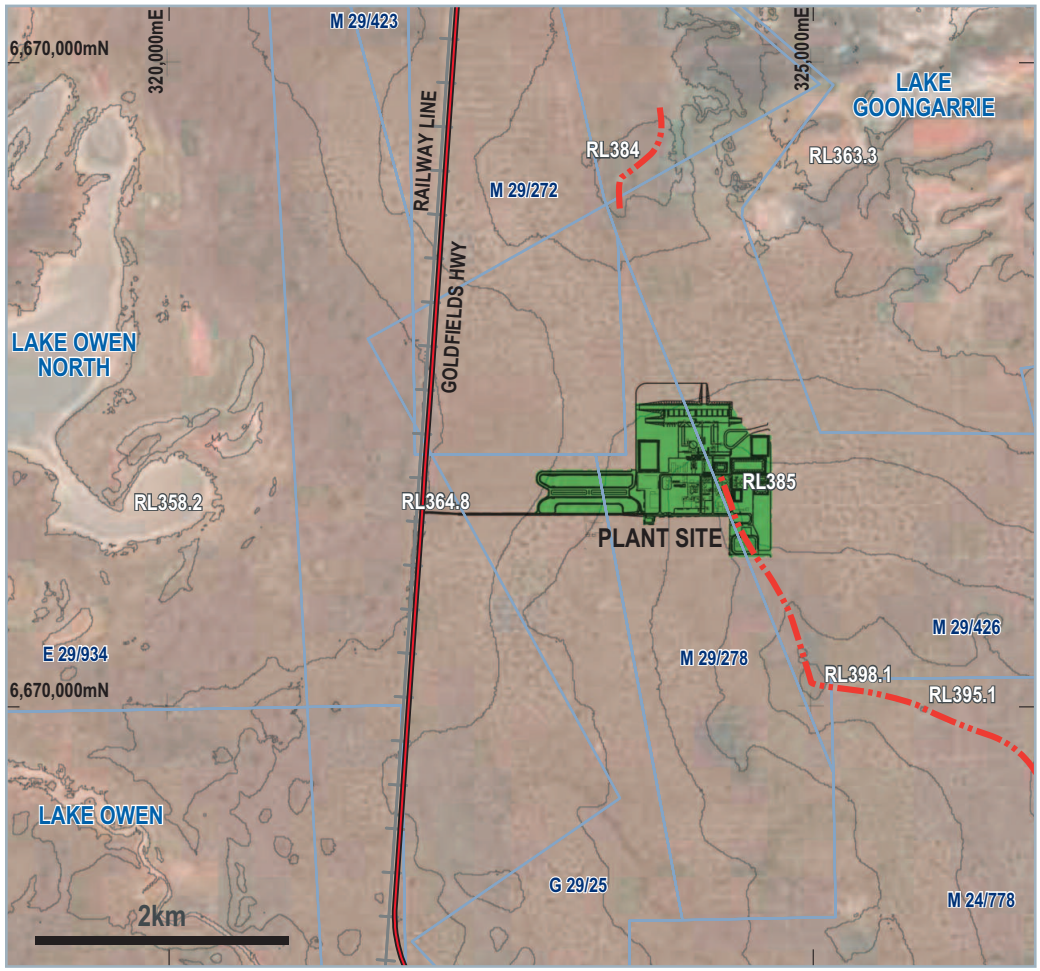
- Primary crushing and beneficiation
- Process plant
- Ore transfer
- Mine services

Site sterilisation drill data located structures with favourable load bearing capacity within 7m of ground level.

Plant location has been designed to minimise the need for cut-and-fill earth movements. It is expected that further opportunities will arise during detailed site geotechnical studies.



Functional areas within the process site



KNP Goongarrie Hub - Plant Site Location

Site Map

The plant is to be located approximately 2km east of Goldfields Highway on elevated and gently sloping terrain between two distinct ridges to the north and south of the plant area. The key topographic features surrounding the plant area include Lake Owen to the southwest, Lake Owen North to the west and Lake Goongarrie to the northeast of the plant site as shown in the figure above.

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10. Tailings Management

Back-filling of mined-out pit voids to minimise the site footprint, will allow the landform to be returned to its original profile, which is consistent with Ardea's long-term strategy to return the Great Western Woodlands to its natural state

Options for tailings management were identified and strategies for successful implementation were developed during the PFS

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Overview

As part of the PFS, options for tailings management were identified and strategies for successful implementation were developed.

Tailings Management Scope

Goongarrie Hub operations are projected to produce approximately 3.8 million tonnes of barren residue solids for relocation within the operational leases. Management of this process has been studied from a number of perspectives:

1. Metallurgical production rates and tailings specification
2. Tailings storage methodology alternatives
3. Integration of tailings storage with production schedules
4. Environmental impact and
5. Risk mitigation requirements

Metallurgical Production Rates and Tailings Specification

The current process mass balance projects that annualised tailings production is to be 3.8 million dry tonnes per year. The chemistry of the solids and its entrained liquor is similar to that of the local environment, the major difference being the diminished nickel, cobalt and manganese content in the solids and the elevated magnesium sulphate levels in the liquid.

The tailings morphology is dominated by its fine particle size distribution. Solids mineralogy is a mixture of generic mineralogies such as silica, hematite, gypsum and metal oxides.

Tailings Storage Methodologies

In earlier studies, a conventional above-ground tailings storage facility and an evaporation pond for the supernatant liquor were proposed, which required a significant overall footprint. However, this PFS adopted an in-pit tailings storage strategy, which removes the need for an elevated tailings storage of an estimated 6km^2 footprint and an external evaporation facility, with a 230-hectare footprint. Adoption of this strategy (subject to regulatory approvals), enables rehabilitation through the regrowth of vegetation after covering with waste rock and stockpiled topsoil.

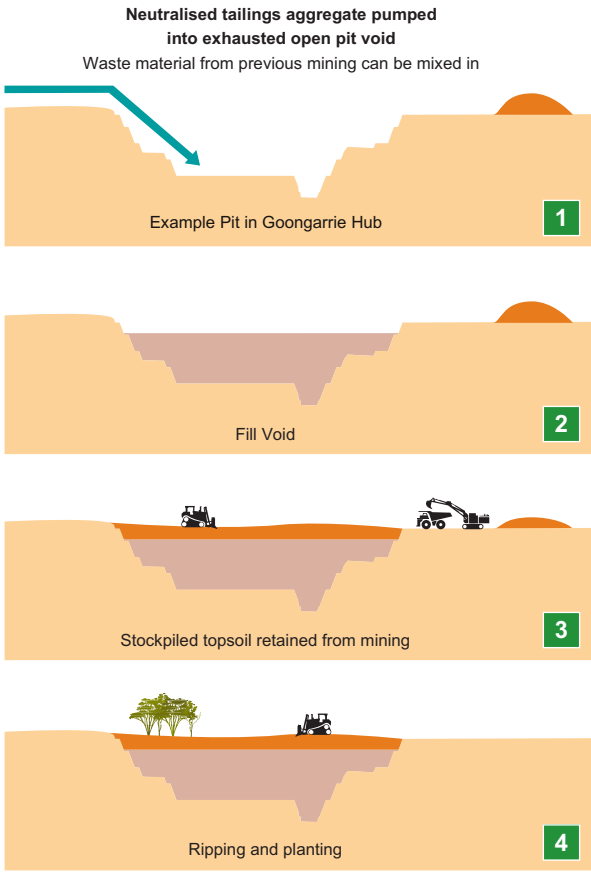
In view of the material's poor beaching characteristics and following the failures of above-ground tailings dam overseas, Ardea conducted further studies into tails storage options. These studies indicated that below-ground tails storage (as conducted elsewhere within the WA Goldfields region) would be more secure and present less disruption to the local environment. Back-filling of mined-out pit voids would allow the landform to be returned to its original profile, which is consistent with Ardea's long-term strategy to return the area to the community as a conservation estate.

The anticipated tailings facility life cycle is depicted in figure opposite.

Dry-stacking of tailings was considered in these studies, but rejected because it provided no water savings (water loss with tailings is essential for the water balance) and because the anticipated tailings volume would be the same in either case. The capital and operating costs due to the tailings filtration and handling systems were also a significant factor.

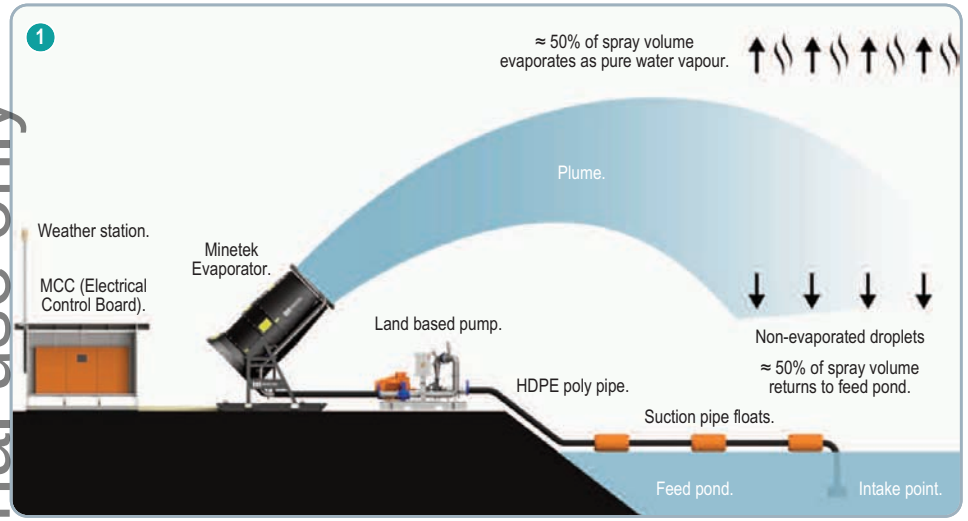
It has also been proposed that evaporation of decant water occur within the pit void area itself, by a combination of natural and forced evaporation. Fogging sprays are expected to be highly efficient under the local conditions.

Manufacturer's information indicates that up to 50% of the water fed to the foggers could be evaporated in a single pass, with the remainder returning to the pond.



In-pit tailings storage schematic showing the progressive backfill and rehabilitation of mining voids which is planned to occur concurrently with nickel-cobalt production at KNP Goongarrie Hub

Fogging sprays are expected to be highly efficient under the local conditions



Photos courtesy of MINETEK

1. Fogging sprays eliminate or drastically reduce land required for evaporation ponds

2.-4. Fogging sprays in action

Integration with Production Schedules

Mine production schedules presented by Orelogy (Mining PFS 2023) included mine void availability as part of the mine and production plan. The mining sequence and schedule were adjusted to provide sufficient space to accommodate the tailings production volume.

Tailings Environmental Aspects

An environmental review of the proposed tailings storage strategy noted the aesthetic and environmental issues associated with conventional above-ground facilities, but also proposed that any below-ground storage design consider the following factors:

- Impact on local groundwater
- Pit wall stability
- Potential for contamination of root-level soil
- Closure strategy

The environmental report concluded that below ground tails storage has been used successfully elsewhere, but that confirmatory work and regulatory approval would still be required.

Risk Mitigation

The following activities have been proposed to provide design and regulatory information.

- Field tests at existing in-pit storage facilities in the Eastern Goldfields
- Botanical surveys of disturbed ground, especially around hydrogeological exploration sites
- Monitoring of new hydrogeological sites
- Monitoring of wind-blown solute dispersion

Conclusion

Ardea have evaluated the options for tailings management and selected in-pit storage as the most environmentally and economically feasible option. Further work is required to verify this selection and to obtain regulatory ratification.

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11. Non-Process Infrastructure

The KNP construction phase is expected to have a peak on-site workforce of 3,000 personnel, sourced from Kalgoorlie-Boulder, Perth and throughout Australia

Non-Process Infrastructure

Non process infrastructure (NPI) is to be built early for use by construction then handed over to KNP operations to optimise cost and provide adequate facilities for on-going KNP Goongarrie Hub requirements

11.

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Site Village

The construction phase is expected to have a peak on-site workforce of 3,000 personnel. It is anticipated that site construction personnel will be sourced from Kalgoorlie-Boulder, Perth and throughout Australia. Of those personnel it is planned that 1,500 personnel will reside in a village adjacent to the KNP site while the other personnel will be based in Kalgoorlie-Boulder and bussed to and from site.

At the end of the construction phase, the construction village will be migrated into an operational village to house approximately 350 site operations personnel, with most of the remainder of the village retained for contractor and campaign shutdown/maintenance requirements.

The overall area of the construction village is approximately 80 ha, with block dimensions nominally 900 x 900 m. Facilities within the construction village consist of the following:

- Accommodation
- Laundry facilities
- Kitchen and mess
- Camp office
- Wet mess
- Gymnasium
- Sporting and recreational facilities
- Bus Stop for FIFO and BIBO
- CCTV and personnel security systems
- Internet connectivity
- Telecoms

Accommodation buildings will be ensuite and fitted with bedding, wardrobes and other amenities. There will be laundry buildings fitted with washing machines and dryers. Individual accommodation buildings are to be serviced by intranet and entertainment systems. Security and monitoring systems are to be installed for personal security.

Road Access

The plant is nominally 2km east of the Goldfields Highway, therefore a site access road running from the highway to the plant site and to the accommodation village will be installed as part of the early works.

Site Buildings

The site buildings and supporting infrastructure include:

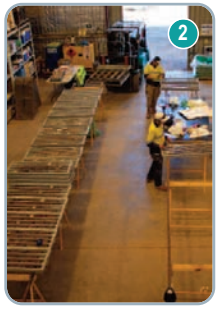
- Gatehouse
- Emergency Response & First Aid
- Administration Building
- Mining Administration and Geology
- Mining Workshop
- Mining Office
- Control Room & Operations Office
- Operations Crib
- Workshops
- Warehouses
- Oil & Lubricants Store
- Laboratory Complex (Wet and Sample Prep)
- Ore Prep Office & Workshop
- Explosives Magazine
- Sewage treatment plant
- Weather Station

There will be extensive use of the Ardea West Kalgoorlie Office. Where operations personnel do not need to be at the site each workday then they will be based in a Kalgoorlie-Boulder office and make day trips to the KNP site on an as-required basis.

A Perth office will also be maintained for Ardea corporate personnel.

Construction Facilities

As detailed in the Project Execution summary, the NPI is to be built early for use by construction then handed over to operations to optimise cost and provide adequate facilities to run the project.



Kalgoorlie Nickel Project Goongarrie Hub 3

CONSTRUCTION WORKFORCE		OPERATIONAL WORKFORCE	
3,000 estimated		Production	550
		Maintenance	170
		Admin	100
		Total Projected	820

1. A well appointed and comfortable accommodation village for up to 1,500 personnel will be constructed 2km east of the Goldfields Highway (example only shown)
2. The Ardea West Kalgoorlie Office will be used extensively, in conjunction with proposed onsite buildings and facilities
3. The estimates presented on this table are based on past and current studies, and other industry examples. The estimates do not include indirect employment from local industries (e.g. site services, equipment maintenance & logistics)

Photo courtesy of Southern Port Authority - Esperance

12. Project Execution

Ardea's phased approach provides for further optimisation of the project which will then transition to the DFS phase. Front end engineering studies will then form a transition from DFS to execution phase

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Study Phase Strategy

Following completion of the PFS a phased approach will be adopted, initially completing a series of optimisation studies before proceeding into a Definitive Feasibility Study (DFS) phase. Transition to the execution phase of the project will be preceded by a front-end engineering and design (FEED) phase.

Execution Phase Strategy

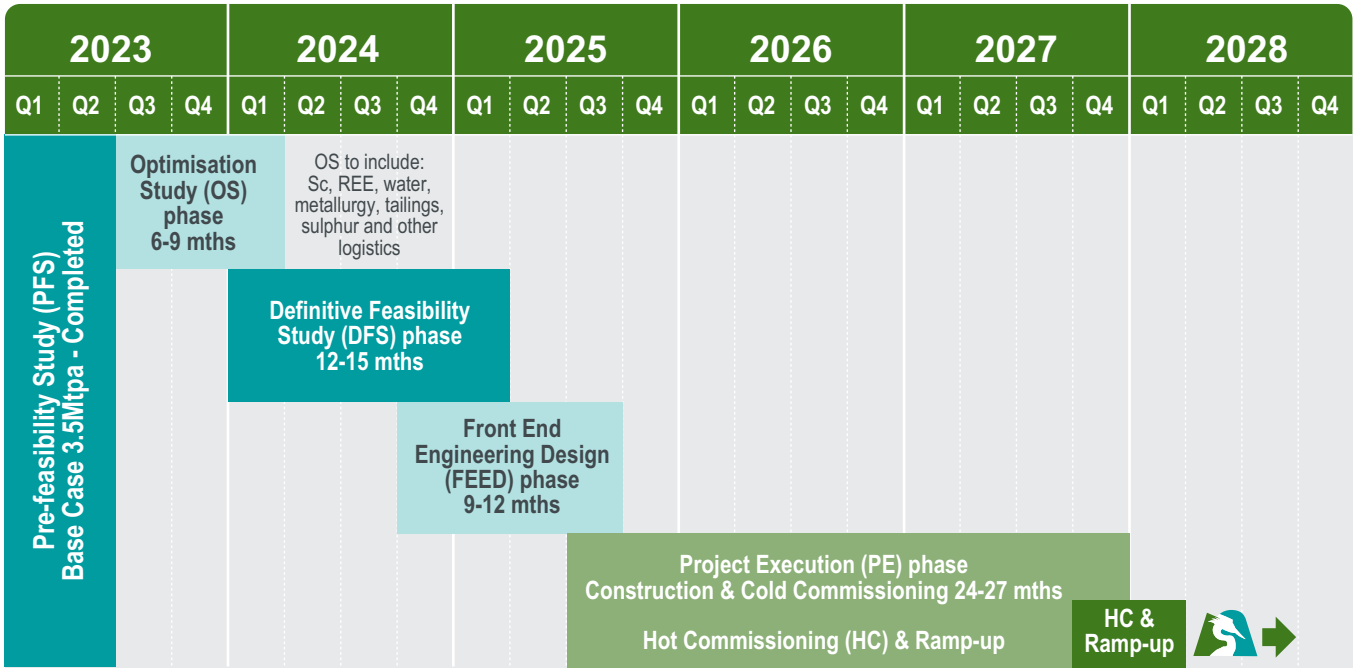
The project is to be offered to the engineering market in the form of:

- A series of D&C (design & construct) or construction packages for the supporting infrastructure (e.g. construction camp, buildings, utilities and communications connections, site earthworks).
- An Engineering, Procurement and Construction (EPC) package for the main process plant (run of mine (ROM) feed to mixed hydroxide precipitate (MHP) packaging).

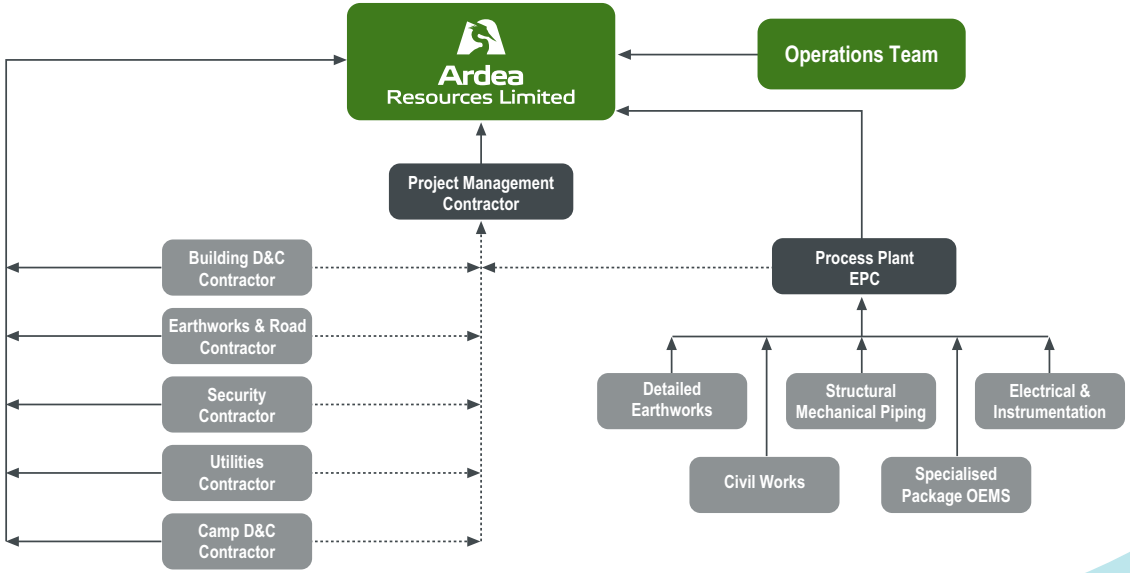
The success of the above strategy is based on:

- A high-level of engineering development to be targeted in the DFS.
- Engagement of key equipment package vendors during the DFS to provide initial engineering and input to the DFS.
- The design and construction of the supporting infrastructure prior to the main process plant construction.
- Ardea intend to appoint a Project Management Contractor to provide oversight of the Early Works Contractors and the Process Plant EPC Contractor.

Kalgoorlie Nickel Project High-Level Timeline



Kalgoorlie Nickel Project Contracting Strategy



13. Environmental, Social and Governance

Ardea's early stage embracement of ESG, the commitment to minimise greenhouse gas emissions per tonne of nickel equivalent produced and the transparency for continuous improvement demonstrates a positive culture towards delivering a mine of the future

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Goongarrie Hub LCA reported 11.9 kg CO_2 eq. per kg nickel based on Ardea's Scope 1, 2 and upstream Scope 3 emissions

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ESG

In 2022, Ardea commissioned the services of Digbee ESG™ who are considered the mining sector's foremost independent assessment platform for ESG disclosure, to assess and report on Ardea Resources and the KNP. Digbee awarded Ardea an overall score of "BBB". This maiden review by Digbee demonstrates Ardea's continued strong commitment to ESG integration, reporting transparency and continuous improvement. Ardea is focused on establishing a sustainable business that is a significant contributor to a de-carbonised future helping to solve complex global problems by:

- supplying global customers with an alternative, sustainable supply of nickel-cobalt and other critical minerals essential to driving a Net-Zero Carbon future;
- using sustainable mining practices notably site land rehabilitation; and
- maintaining high business integrity, ethics and transparency.

Mr Jamie Strauss, the founder and CEO of Digbee commented:

"The leadership team of Ardea has shown, throughout their submission, clear incorporation of ESG principles and sustainability priorities as part of the Company's vision and value. This early stage embracement of ESG, the commitment to minimise greenhouse gas emissions per tonne of nickel equivalent produced and the transparency to address areas of remediation identified in the Report, demonstrates a positive culture towards delivering a mine of the future."

Life Cycle Assessment (LCA)

All project development is predicated on minimising carbon emissions and being able to contribute towards achieving the State of Western Australia's aspiration of net zero emissions by 2050. The proposed Goongarrie Hub process has been modified for CO_2 mitigation in the neutralisation process through introducing an Atmospheric Leach (AL) circuit.

Life cycle assessment consultancy and technology company Minviro were retained to provide a cradle-to-gate life cycle assessment of the Goongarrie Hub. Using the KNP — Goongarrie Hub's mass and energy data produced for the 2023 PFS, the expected environmental impacts of Ardea's nickel and cobalt-containing MHP product have been quantified. The LCA has undergone third party critical review and is published in accordance with ISO 14040:2006 and 14044:2006 standards.

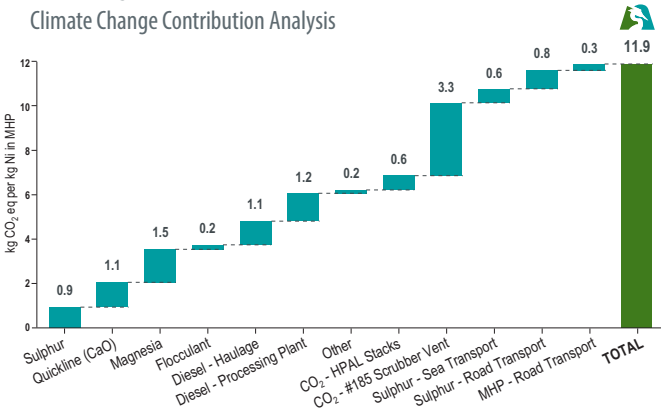
Minviro reported that KNP's climate change impact is expected to be 11.9 kg CO_2 eq. per kg nickel in MHP based on Ardea's Scope 1, 2 and upstream Scope 3 emissions.

Ardea's maiden LCA result is deemed to be relatively low for an HPAL operation primarily due to the use of Mineralised Neutraliser rather than importing and using nickel-barren calcrete to neutralise acid waste streams and the generation of on-site electricity from steam generated as a by-product of burning sulphur within the sulphuric acid plant.

Results Summary of Life Cycle Assessment Study

Impact Category	kg nickel in MHP	units
Climate Change	11.9	kg CO_2 eq.
Acidification	0.11	mol H+ eq.
Fossils Resource Use	74.4	MJ
Ozone Depletion	9.7E-08	kg CFC-11 eq.

KNP- Goongarrie Hub - LCA
Climate Change Contribution Analysis



Source: Minviro 2023 LCA Assessment for Ardea Resources

From the inception of the KNP in 1997, the project proponents have maintained exemplary ESG commitment

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Environment

The KNP – Goongarrie Hub lies within the infrastructure-rich Eastern Goldfields region of Western Australia, which is the premier global destination for the discovery and development of mineral operations. The region has over 125 years of mining and strong stake holder support, with access to skilled professionals including First Nations people. The semi-arid Great Western Woodlands environment, within which the KNP is located, is both favourable to the development of KNP and to subsequent rehabilitation.

Ardea maintains close relationships with Department of Mines, Industry Regulation and Safety (DMIRS) and Department of Biodiversity, Conservation and Attractions (DBCA). The Goongarrie Hub is partly located over the ex Goongarrie pastoral lease which is managed by DBCA. The Goongarrie Hub Mining Proposal and Closure Plan is planned to be lodged with DMIRS during DFS from 2024.

Ardea has greatly expanded its baseline environmental surveys to meet current standards and guidelines and these are planned to be finalised in early 2024 for subsequent EPA referral.

This work involves:

- Flora and Vegetation Survey Autumn and Spring
- Terrestial Fauna Survey Autumn and Spring
- Short Range Endemic Fauna Survey Autumn and Spring
- Targeted Conservation Significant Butterfly
- Subterranean Fauna
- Soils and Landform
- Material Characterisation
- Social Surrounds Assessment (excluding Aboriginal Heritage)
- Inland Waters (surface, groundwater and lake water discharge)
- Aboriginal Heritage
- Air Quality

Social and Community

The City of Kalgoorlie-Boulder which lies 70km to the southeast of the Goongarrie Hub along the Goldfields Highway is the prime global resource development and operating destination with:

- Very strong mining support from Local Government and the Community
- Multitude of world-class mining operations serviced from the City
- Ardea maintains a local operations office and active stakeholder engagement

Ardea has sought to strengthen close relationships with Indigenous Communities interested in the Project through an Indigenous participation program. Here, Ardea has established the Eastern Goldfields Education Grant Programme which offers funding for a range of activities including education and sporting activities.

Ardea has also sponsored the Leonora Drug Action Group basketball team's participation in regional tournaments covering team uniform and travelling funds.

Ardea aims to build on these relationships to benefit all communities and the Goongarrie Hub.

Governance

Ardea's business is underpinned by a structured set of policies which reflect its ESG principles that are at the core of Ardea's governance. The governance pillars for Ardea include ethics and conduct, human rights and tax transparency; risk management, cyber-security; and supply chain management.

As a result, Ardea has established policies that underpin their governance structure. Amongst them are our Code of Conduct, Anti-bribery and Corruption, Health and Safety, Environment and Community, Risk Management, Diversity, Whistleblower and External Communications Policies.

1. The semi-arid Great Western Woodlands environment is favourable to KNP development and subsequent rehabilitation
2. Ardea sponsored the Leonora Drug Action Group basketball team's participation in regional tournaments covering team uniform and travelling funds
3. Local Noah Hinkley benefits from the Education Trust implemented by Ardea and independently managed
4. Respected Eastern Goldfields Aboriginal Elder, Aubrey Lynch, providing Cultural Awareness training, for the Ardea team, at the West Kalgoorlie Office

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14. Financial Analysis and Evaluation

Robust economics are achieved through a project scale matching Ardea's globally significant long-life nickel-cobalt resource in a location with extensive existing infrastructure and technical expertise

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Capital Cost

The mining capital cost estimate was produced by Orelogy. Process plant, sulphuric acid, steam and power, plant and non-process infrastructure and borefield costs were prepared by Wood PLC (Wood). Contingency considered appropriate to the level of the capital cost estimate has been included.

Capital cost assumptions

Cost Category	Cost Sub-Category	Capital Cost (A$ M)
Mining	Overheads, mobilisation and other	30
	Pre strip	68
	Sub-total	**98**
Process Plant & Infrastructure	Direct	1,211
	Indirect	789
	Contingency	264
	Sub Total	**2,264**
Sulphuric acid, steam & power plant	Direct	357
	Indirect	146
	Contingency	70
	Sub Total	**574**
Borefield	Direct	116
	Indirect	42
	Contingency	22
	Sub Total	**181**
Total		**3,117**

Base date March 2023

Refer Reasonable Basis Statement, page 48

Operating Cost

The mining operating cost estimate has been prepared by Orelogy. The process operating cost estimate has been derived from the operating cost estimate prepared by Wood, applied in each year to the forecast ore tonnes, acid consumption, and nickel and MHP production. Export costs including transport to port have been estimated by Qube. An estimate of third party sea freight cost has been included in the model as a deduction from revenue.

Operating cost assumptions

	LoM Total A$ M	A$/t leach feed	A$/t Ni	LoM Total US$ M	US$/t leach feed	US$/t Ni
Mining	4,089	29.0	3,441	2,734	19.4	2,301
Processing	11,609	82.5	9,769	7,763	55.1	6,532
General & Admin	710	5.0	598	475	3.4	400
Net exc. Co credit	16,408	116.6	13,807	10,972	77.9	9,233
Freight parity	1,337	9.5	1,125	894	6.4	752
Export cost	377	2.7	317	252	1.8	212
Co credit	(7,880)	(56.0)	(6,631)	(5,269)	(37.4)	(4,434)
Direct cash cost inc Co credit	10,242	72.8	8,618	6,849	48.7	5,763

"Direct Cash Costs" means cash costs incurred in mining, processing and site-based G&A activities, and costs of delivery to market, excluding allocation of corporate overheads, exploration and royalties. Direct cash cost is shown net of cobalt by-product credits.

Refer Reasonable Basis Statement, page 48

The project shows positive economics under the Base Case, and indicates repayment of the initial capital expenditure within 3.1 years of the start of operation

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Financial Analysis

An economic model has been developed for the life of mine. The model forecasts economic performance on an annual basis in real 2023 AUD terms. The model is used to provide financial projections, and summary project metrics including return on invested capital, Net Present Value and unit operating costs, under Base Case and alternative scenarios.

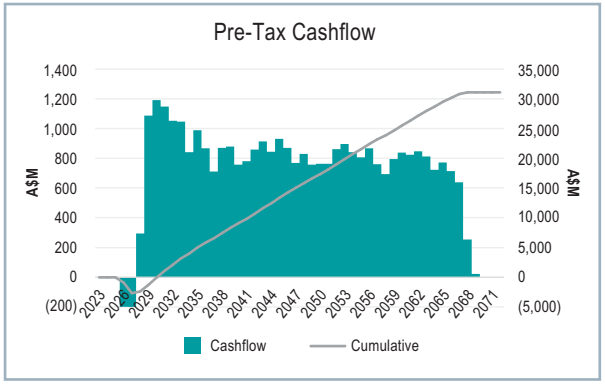
The project shows positive economics under the Base Case, and indicates repayment of the initial capital expenditure within 3.1 years of the start of operation.

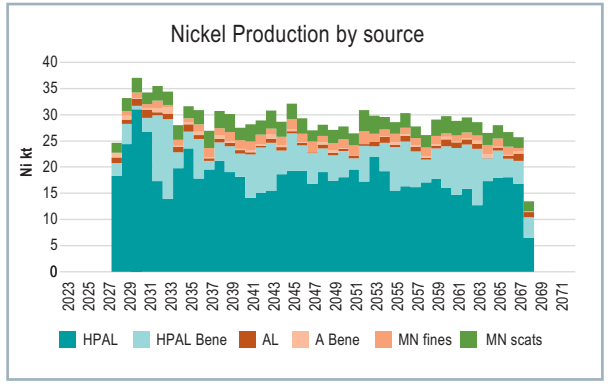
Key Financial Metrics

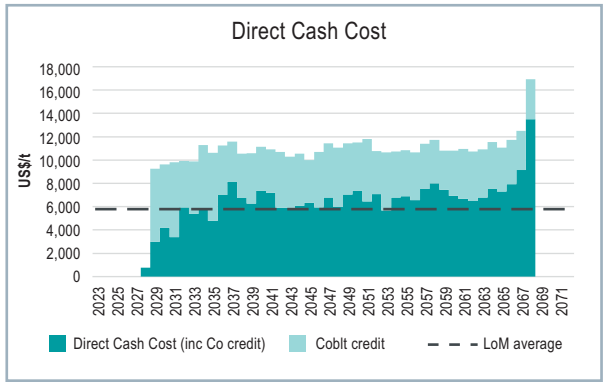
Financials		
Nickel Revenue	A$ M	44,429
Cobalt Revenue	A$ M	7,880
Freight parity	A$ M	-1,337
Revenue - combined	A$ M	52,309
EBITDA LOM	A$ M	34,217
EBITDA Annual (average)	A$ M	800
EBITDA margin	%	65%
Net Cash Flow (Pre-tax)	A$ M	31,100
Valuation		
Net Present Value (NPV7)[1]	A$ M	4,980
Internal Rate of Return (IRR)[1]	%	23%
Total Capital Payback[2]	years	3.1

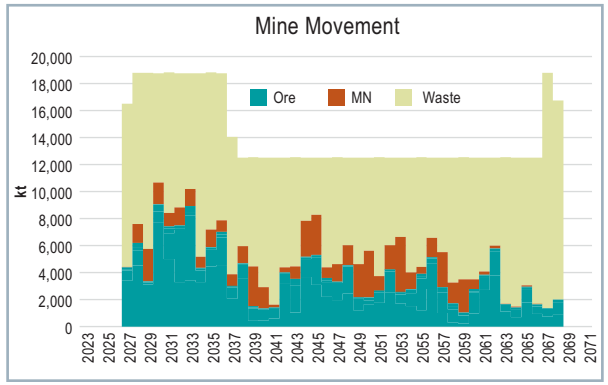
1. *post tax*
2. *from start of operation*

Graphical representation of key outputs









The PFS has returned robust financial metrics for a long life, highly strategic nickel-cobalt project development

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Assumptions

The model is based on inputs for parameters likely to affect the economic performance of the project, listed in the tables below.

Mine plan & production assumptions

			Assumption	Note
Mining	Life of Mine	Years	40+	1
	Waste	kt	384,580	2
	Ore	kt	160,606	3
	Ore + MN	kt	214,044	4
	Leach feed	kt	140,762	
Processing	**HPAL**			
	Feed	kt	120,573	5
	Grade Ni / Co	%	0.88% / 0.07%	5
	Acid consumption	kg/t	260	
	Leach recovery	Ni % / Co %	97.0% / 97.4%	
	AL			
	Feed	kt	20,189	6
	Grade Ni / Co	%	0.73% / 0.03%	7
	Acid consumption	kg/t	498	
	AL leach recovery	Ni % / Co %	72.0% / 72.0%	
	Combined HPAL & AL			
	Feed	kt pa	140,762	
	Grade Ni / Co	%	0.86% / 0.06%	
	Acid consumption	kg/t	294	
	CCD wash & precipitation recovery	Ni % / Co %	95.1% / 98.2%	
	Overall recovery	Ni % / Co %	88.6% / 92.8%	8
Production	MHP	wet ktpa	145.4	
	MHP grade Ni/Co	Ni % / Co %	39.9% / 2.9%	
	LoM production	kt Ni	1,188	
	Annual production	kt Ni / a	29.0	9
	LoM production	kt Co	88	
	Annual production	kt Co / a	2.1	
	Scandium	Na	Not included	
	Manganese	Na	Not included	
	REE	Na	Not included	

Marketing assumptions

		Assumption	Note
Nickel price	US$/t	25,000	
Payable	%	100%	10
Cobalt price	US$/t	50,000	
Payable	%	100%	10
Freight parity	US$/t	150	
Sulphur incl delivery	A$/t	262	
Tax rate	%	30%	
Royalties	%	2.5%	
Discount rate	%	7.0%	

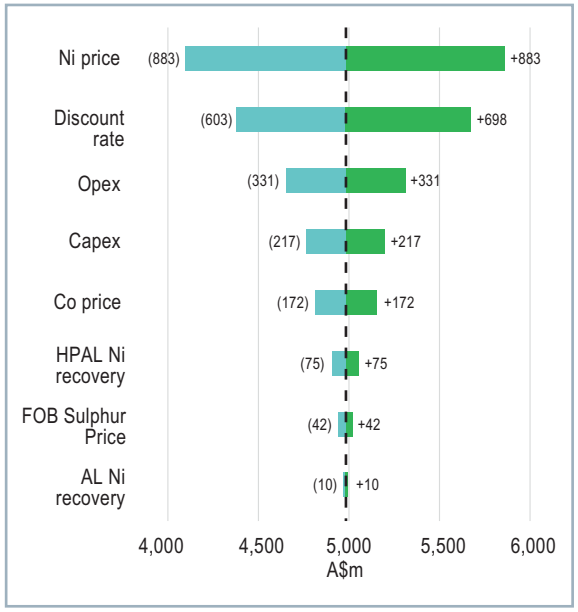
Assumptions notes:

1. *Based on current mine plan*
2. *including neutraliser*
3. *HPAL and AL feed before beneficiation; excluding fines component of Mineralised Neutraliser*
4. *as above including MN Fines*
5. *After beneficiation, LoM average*
6. *After beneficiation*
7. *After beneficiation, inc MN Fines*
8. *Production / Contained in ore (inc MN Scats)*
9. *LoM average; higher in initial years*
10. *Payability within current PRC markets is opaque. It is assumed to be 100% on the basis of burgeoning LIB demand and restricted ESG-compliant supply*

Key model sensitivities

The sensitivity of the future financial performance of the project to a 10% change in input values of certain of the parameters described is shown in the graph below. Recovery sensitivity is shown for +/-1% point recovery.

Key model sensitivities



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Risks

The future financial performance of the project is subject not only to the achieved values of the input parameters described above, but also to other known and unknown risks not included in the model.

Principal known risks to achievement of the financial projections include:

- Outturn results for input economic parameters, in particular market commodity and reagent prices and exchange rates, and those achieved by the project in accordance with its contracting strategy
- Achievement of the forecast production schedule from the mine and achievement of forecast process operating parameters, including recovery rates and reagent consumption
- Achievement of the forecast operating costs, including operating in line with the forecast staffing requirement, labour productivity and employee costs
- Achievement of the forecast capital costs and proposed project schedule

Opportunities

The PFS has identified a number of potentially value-enhancing opportunities. Such opportunities include, but are not limited to, increases in the rate of production, reduction of capital cost (and consequent increase in return on capital), and specification of the final products in accordance with market demand. These opportunities will be investigated further in due course.

List of opportunities and enhancements

Acid plant / power generation
Opportunity: Consideration of ownership models / Build Own Operate Transfer (BOOT) for modular components of the plant; eg sulphuric acid plant, accommodation camp and power generation
Enhancement: Possible reduction of own-scope capital cost; supplier lower capital cost

Mine plan
Opportunity: Modification of the mine plan to accelerate further production from high-margin, high grade and low acid consuming areas
Enhancement: IRR / NPV enhancement

Feed optimisation
Opportunity: Subject to bench-scale metallurgical test work, the Bene/AL feed will be blended with Bene/HPAL
Enhancement: Lower opex and simpler operation; higher metal recovery through HPAL

Increase throughput
Opportunity: Optimisation of the rate of throughput vs residence time (within existing processing capacity and capital cost)
Enhancement: Trade off likely reduction in recovery vs increased rate of production

Phased development
Opportunity: Subsequent development of additional processing capacity with associated additional capex and increased operating expense to increase the production rate
Enhancement: NPV benefit

Beneficiation
Opportunity: Optimisation of beneficiation vs nickel recovery
Enhancement: Optimisation vs input commodity prices and process recovery

Cobalt end product
Opportunity: Separation of cobalt for sale as a separate product stream
Enhancement: Revenue uplift, offset by capital & operating costs

Nickel end product
Opportunity: Production of nickel sulphate or Precursor Cathode Active Material (PCAM) according to customer preference, with potential for incremental premium
Enhancement: Revenue uplift

Scandium recovery
Opportunity: Addition of a scandium recovery circuit, and sale of resulting scandium as a by-product revenue stream
Enhancement: Revenue increase, incremental capex and opex

Remote Operations Centre
Opportunity: Evaluation of feasibility of Remote Operations Centre (ROC), most likely in Perth
Enhancement: Reduction in onsite labour and increase in productivity

There has never been a better time to fund development of the KNP Goongarrie Hub, as the world needs increased nickel-cobalt production that guarantees supply chain security, diversity and high ESG standards

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Reasonable Basis for Funding Assumption

The KNP Goongarrie Hub technical and economic fundamentals provide a strong platform for Ardea to source traditional financing through debt and equity markets, in addition to pursuing other financing strategies should this be to the benefit of shareholders. There is, however, no certainty that Ardea will be able to source funding as and when required.

Whilst no formal funding discussions have commenced, the Company has engaged with financial institutions, including Export Credit Agencies from Australia and abroad, and these financial institutions have expressed a high level of interest in being involved in funding the KNP Goongarrie Hub.

To achieve the range of outcomes indicated in the PFS, pre-production funding of approximately A$3,117M may be required. Typical project development financing would involve a combination of debt and equity. Initial indications from financiers are that the debt component of the funding requirement would be greater than the equity funding requirement. Ardea has formed the view that there is a reasonable basis to believe that requisite future funding for development of the KNP Goongarrie Hub will be available when required.

There are grounds on which this reasonable basis is established including:

- Global debt and equity finance availability for high-quality Battery and Critical Minerals projects remains robust.
- The KNP Goongarrie Hub is world-class by scale and quality parameters. Release of these PFS results provides a platform for Ardea to discuss the outcomes with potential financiers in more detail
- Ardea has no debt. The Company has an uncomplicated, clean corporate and capital structure. Ardea also owns 100% of the KNP Goongarrie Hub. These are all factors expected to be highly attractive to potential financiers
- The Ardea Board and management team has extensive experience in mine development, financing and production in the resources sector

The Company has a strong track record of raising equity funds as and when required to further the exploration and evaluation of the KNP Goongarrie Hub.

The Company is running a Strategic Partner process to select a preferred partner or consortium of partners to provide input into the DFS scope of work, fund this undertaking and also to work with Ardea on securing project development funding. Interest in this process is at an all-time high, as multiple companies express strong interest in securing nickel-cobalt off-take from the KNP Goongarrie Hub. Project offtake rights will only be awarded to selected Strategic Partner(s) that commit to making a substantial equity investment in the KNP Goongarrie Hub Project.

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Appendix 1 – JORC Code, 2012 Edition

Table 1 report

(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 in this table represents the combined methods for all Ardea Nickel and Cobalt Laterite Resources at the Goongarrie Hub deposits considered in the current PFS (PFS subset). Where data not collected by Ardea has been used in the resource estimates, 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) drilling, with occasional diamond drilling (DD) and sonic drilling (SH) for QAQC verification of the RC drilling, collection of bulk density measurements and material for metallurgical testwork. Some large diameter Calweld drilling (CW) was completed for metallurgical work. Most holes were vertical and designed to optimally intersect the sub-horizontal mineralisation. A total of 5,124 drillholes were completed for a total of 252,087m of drilling at the Goongarrie Hub deposits. • Most of the sampling data used to inform the resource estimate is from RC drilling which is 94% of the drilling database meters. • 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. Sub-samples of significant mineralised 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 downhole sample interval. • Diamond drilling (DD) was used to collect PQ3 and HQ3 size core. Typically 1m to 1.5m intervals of core were cut to half core using a diamond saw and samples submitted for assay analysis. • Sonic drilling (SD) was completed mostly in 1m runs and the entire sample submitted for analysis. • Downhole geophysical density measurements were collected for selected Vale Inco RC and sonic drillholes. Caliper (hole diameter), short space density and long space density values were recorded at 10cm downhole increments in each hole, using a gamma-gamma downhole survey tool. The resulting data were composited to 1m downhole intervals coinciding with the dominant sub-sampling interval used by Vale Inco during their RC drilling. This data provided a check against conventional Archimedes bulk density measurements collected by Heron, Vale Inco and Ardea on billets of diamond and sonic drill core.
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 and HQ3 size core. Most of the Vale Inco drilling used 1m long core barrels, and Ardea drilling used 3m core barrels. • Sonic drill samples were collected as whole core samples either 3.75 or 5.1 inches diameter of up to 1m lengths. Sonic core of longer lengths was cut to shorter lengths 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 Inco samples. • 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. • The overall average RC sample recovery at Goongarrie is estimated to be 75% which is considered acceptable for nickel laterite deposits. There is no evidence of grade bias based on the analyses of RC sample moisture logging data, estimated sample recovery data and sample weight data. • Multiple diamond and sonic drilling programs have been undertaken twinning selected RC drillholes from all the prior explorers of the Goongarrie Hub deposits to provide verification of the assay results. • Core recoveries from the diamond drilling were maximised by reducing drill penetration rates and run lengths in variable or poor ground conditions. Most of the poorer recoveries occurred in soft goethitic clay mineralisation, hard laterite cap and in transported material. Overall, acceptable core recoveries have been achieved from the diamond drilling completed at the Goongarrie Hub deposits.

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Criteria	JORC Code explanation	Commentary
		• All sonic drilling was completed without drilling fluids and all the recovered core was reported to be dry. Recovery results were good for almost all runs.

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.*
		• Visual geological logging was carried out on all samples. The logging system was developed by Heron specifically for the KNP, and is a qualitative legend designed to capture the key physical and metallurgical features of the nickel laterite mineralisation. Drilling conducted by Vale Inco and Ardea has been logged in similar detail to Heron's procedures but using slightly modified geological logging legends.
		• All the RC, diamond and sonic drill samples have been logged to a level suitable for reference in resource modelling with the following types of information routinely recorded:
		  ○ Date dataset (deposit), holeID, drilling method, collar location (DGPS to + 0.5m accuracy), planned hole orientation (azimuth and dip), and drilled end of hole depth.
		  ○ Sub-sampling details including downhole sample interval (depths), sampleID, sampling method, and inserted QAQC sample details.
		  ○ Drill sample quality attributes including moisture content classification and estimated visual sample recovery or the weights of the bulk drill samples and sub-samples.
		  ○ Geological attributes including colour, hardness, regolith, laterite ore style and lithology.
		  ○ Core recovery for all diamond drilling.
		  ○ Geotechnical logging of core from diamond drilling.
		• Geological logging of the RC samples by Heron was conducted based on a wet sieved reference sample collected from each bulk sample and transferred to a plastic chip tray. Two sets of chip trays were prepared for much of the Vale/Inco RC drilling, one tray containing dry samples and the other containing washed samples.
		• 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 testwork.
		• Sonic holes were geologically logged prior to being sampled for metallurgical testwork.
		• Most of the Heron logging was recorded on paper logging sheets and subsequently entered into Excel spreadsheets prior to importing into the Heron exploration database. Most Vale Inco logging was completed digitally using either Excel spreadsheets or AcQuire based data capture forms. All logging for Ardea drilling programs has been undertaken using either MS Excel spreadsheet templates or Log Chief, which has a direct interface to the commercial exploration database software package Datashed, used by Ardea.
		• Core tray and chip tray photography has been used for monitoring logging consistency.

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.*
		• Approximately 2.5kg to 3kg sub-samples were collected over 1m or 2m sample intervals for most of the RC drilling.
		• Different sub-sampling methods have been used by different explorers across the Goongarrie deposits.
		• **Highway (HW)** RC sub-sampling methods:
		  ○ Vale Inco collected sub-samples by riffle splitting when dry or spear/scoop sub-samples when wet over 1m or 2m intervals.
		  ○ Golden State and Heron collected sub-samples by cone split when dry or scoop when wet over 1m or 2m intervals.
		  ○ Golden State and Heron collected composite spear or scoop sub-samples over mostly 4m or 5m downhole intervals in predominantly unmineralised or low-grade material grading less than 0.5% Ni.
		• **Goongarrie Hill (GH)**, **Goongarrie South (GS)**, **Big Four (BF)** and **Scotia Dam (SD)** RC sub-sampling methods:
		  ○ Anaconda collected 2m composite sub-samples using a riffle splitter when dry or as grab samples when wet during their initial larger scale program at BF in 2000. Sub-samples from the subsequent short range variability drilling were collected for 1m downhole intervals using a riffle splitter.
		  ○ Heron collected sub-samples for 1m downhole intervals by riffle splitting when dry or damp or by spear/scoop from 1m bulk sample bag when wet during their 1999 to 2002 programs. Spear/scoop samples for initial assay analysis were also collected, typically over 8m downhole intervals in unmineralised overburden or 4m intervals in mineralised material. When composite sample intervals returned assays greater than 0.4% Ni, the corresponding 1m sub-sample splits were subsequently submitted for analysis with the resultant assays superseding the initial composite sample assays in the project database.
		  ○ Heron collected sub-samples mostly over 2m downhole intervals during their 2004 and 2006 programs using a cone splitter when dry or by spear sampling when wet.

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Criteria	JORC Code explanation	Commentary
		○ Vale Inco collected sub-samples for 1m downhole intervals of non-transported material and composite sub-samples to a maximum of 4m downhole in transported material by riffle splitting during their 2008 program. ○ Ardea collected composite sub-samples over 2m downhole intervals using a cone splitter throughout their 2017 and 2018 RC drilling programs in both wet and dry drilling conditions. • **Siberia North (SN)** RC sub-sampling methods: ○ Anaconda collected sub-samples for 1m downhole intervals from their 1997 and 1998 RC programs using a riffle splitter when dry or mostly as grab samples when damp or wet. ○ In the Anaconda 2000 program, 2m composite sub-samples were collected using a riffle splitter when dry or as grab samples when wet. ○ 2m composite sub-samples were collected during the Heron 2004 and 2005 program using a cone splitter when dry or damp or by scoop or spear sampling when wet. ○ Vale Inco collected sub-samples for 1m downhole intervals of non-transported material and composite sub-samples to a maximum of 4m downhole in transported material by riffle splitting during their 2008 program. • The riffle and cone splitting techniques are industry accepted methods for collecting sub-samples for assay analysis and resource estimation in nickel laterite deposits. • Ideally, none of the assay data for the composite spear or scoop sub-samples over the longer downhole intervals (>2m) should be used for resource estimation. However, these make up a relatively small proportion of the sample assay data (approximately 20% within the resource envelope) and are of mostly of low-grade material and have been included in order to avoid overestimation of nickel grades in lower grade regions inside the resource envelope. • Diamond drill core sub-sampling methods: ○ 1m half core samples from the Heron and Ardea diamond drilling were cut using a diamond saw when hard or a spatula when soft, and submitted for laboratory sample preparation and assay analysis along with blanks, standards and duplicates for QAQC monitoring. ○ Core from the Vale Inco diamond holes was sampled over variable intervals (1m to 1.5 m) with half core samples cut with a diamond saw and submitted for assay along with blanks and standards, and the other half retained for beneficiation testwork. All fines generated or washed from the Vale Inco core in 2006 were collected, press filtered and dried and returned in equal half proportions to the two half core samples produced from sawing. • Sonic drill core was collected by Vale Inco and Ardea, primarily for the purpose of metallurgical sample retrieval. The Vale sonic drilling was completed mostly in 1m runs and the entire sample dispatched for crushing and splitting at the laboratory. Due to the swelling of clays within the sample material and the nature of the lateritic regolith the 1m run samples were split into two or sometimes three sample bags. All sampling was conducted according to the Vale Inco Twin Sonic and SG Procedure. • Most of the sub-samples from the Goongarrie deposits have been submitted for sample preparation and chemical analysis to either Kalgoorlie Assay Labs (KAL) in Kalgoorlie (by Heron in 1999 through 2002) and Ultratrace, now Bureau Veritas (BV) in Perth by Heron, Vale Inco and Ardea from 2004 to present. Blanks, standards and duplicates are inserted for QAQC monitoring. • Industry standard sample preparation procedures were used by both laboratories, typically involving: log samples received (both laboratories), weigh samples as received (BV), dry samples at 105° C (both laboratories), weigh dried samples (BV), jaw crush samples when required e.g. core samples to -3mm; (both laboratories), riffle split RC chips/crushed core samples to produce -3kg sub-sample for pulverisation (both laboratories), pulverise to 90% passing -75 µm, take 150-200g of bulk pulp as laboratory pulp.
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.*	• Sub-samples from the much of the historical RC drilling of the Goongarrie Hub by Heron were analysed by KAL Labs in Kalgoorlie using the following analytical methods (percentages are relative to all the analyses to date for each deposit): ○ Four acid digestion (4AD) with AAS finish for Ni, Co, MgO, FeO, Al2O3, CaO, Mn, Cr, Cu, and Zn (8% of drilling at GS, 6% at BF, 13% at SD and 9% at GH). ○ Four acid digestion (4AD) with ICP_OES finish for Ni, Co, MgO, FeO, Al2O3, Mn, Cr, Cu, and Zn (14% of drilling at GS, 15% at BF, 30% at SD and 9% at GH). ○ XRF analysis of pressed powder (PP) for Ni, Co, MgO, FeO, Al2O3, SiO2, CaO, Mn, Cr, Cu, and Zn (25% of drilling at GS, 2% at BF, 4% at SD and 4% at GH). • Sub-samples from most of the Anaconda RC drilling at Big Four, all the Vale Inco and Ardea RC, diamond and sonic drilling and the remaining Heron RC drilling used for resource estimation (53% at GS, 76% at BF, 53% at SD and 77%

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Criteria	JORC Code explanation	Commentary
		at GH) were analysed for Ni, Co, MgO, FeO, Al2O3, SiO2, CaO, Mn, Cr, Cl, Cu, Zn and As by Ultra Trace or Bureau Veritas using fusion XRF analysis. Most of the Vale Inco and Ardea samples were also analysed for loss on ignition (LOI) by thermo-gravimetric analysis. A small percentage of the samples from Big Four (1.5%) were analysed at UltraTrace for the same grade attributes as fusion XRF, but by ICP-OES except SiO2, which was not measured. • The fused discs from all the Ardea samples were also analysed at BV for a suite of 50 additional elements including REE's by laser ablation mass spectrometry. The resulting assays for scandium were used to inform scandium resource estimates for all the Goongarrie Hub GNCP deposits. • Quantitative mineralogy analysis has been undertaken at BV to improve understanding of the relationships between the mineralogy and multi-element geochemistry and develop material type classification schemes reflecting the spatial distribution of the dominant mineral groups present within the laterite profile at each deposit. Sample pulp suites from HW, GH, GS and SN were selected geographically spread across the deposits covering the full vertical extent of the weathering profile in multiple drillholes and submitted to BV in Adelaide for quantitative XRD analysis of contained minerals. Part of the BV analysis involved validation of the mineralogy stoichiometry against the multielement geochemistry also determined by BV using fusion XRF analysis, including percentages of amorphous (non-crystalline) material present in the samples. • 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 loss on ignition (LOI). The 4AD ICP-OES analytical method is 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 not well dispersed in the pressed powder pellet. • Heron inserted analytical standards and/or duplicate RC sample splits at a frequency of roughly 1 per drillhole for approximately 50% of the Heron RC drilling at GS, GH, BF and SD completed in 1999 to 2002. Subsequently, 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 Heron RC drilling at HW, GH and BF in 2004 to 2006. • Vale inserted analytical standards, duplicate RC sample splits and blanks at a frequency of 1 in 20 cycling between the QC sample types effectively resulting in a 1 in 60 frequency across the monitoring sample types during their drilling programs at HW, GH, GS and SN in 2005 to 2008. • Ardea used the same distribution and frequency of QC samples in their 2017 to 2018 RC drilling programs at GS and BFSD as used by Heron in 2004 to 2006 as noted above. • A number of check assay programs have been carried out since 1999 using UltraTrace laboratories in Perth (Cannington), primarily for verification of early KAL assay data. Ardea carried out selective pulp re-assay programs for HW, GH and SN to collect verification assay data for samples from previous Heron and Vale Inco drilling programs (both DD and RC) by Fusion XRF analysis and to collect broad multi-element assay data by Laser Ablation ICP-MS analysis for Ardea formalised R&D Critical Minerals studies. • UltraTrace / BV and KAL Labs routinely inserted analytical blanks, standards and duplicates into client sample batches for laboratory QAQC performance monitoring.
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.*	• Twin drilling was completed for multiple purposes including the verification of RC sampling and assay results, bulk density testing and metallurgical test work at the Goongarrie Hub deposits. A total of 143 diamond and sonic drillholes for a total of 8,285 m were completed by Vale Inco and Ardea from 2000 to 2021. An additional 86 diamond and sonic twin drillholes for 4,479 m were drilled mostly by Vale Inco (3/4) in 2006 through 2008, followed by Ardea (1/4) in 2018, which provided material exclusively for metallurgical test work. • The twin drillhole data was statistically compared by means of graphical downhole plots of grade versus depth for each twin drillhole pair, and comparative tabulated statistics and cumulative frequency plots of data for appropriately grouped twin holes (most by deposit and operating company). All the assay datasets were composited to 2m downhole intervals prior to assessment to ensure uniform sample support in the comparisons. • Where geology agreed between the twinned holes, assays were generally similar between the different methods. • Despite the evidence for grade differences in some of the twinned holes related to the RC drilling process, overall, the RC drilling is considered to provide samples that adequately represent the true geochemistry of the Goongarrie deposits, and are suitable for the purpose of resource estimation. • The reliability of RC sampling which forms the majority basis of the source data used for resource estimation has been

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		checked by collecting and statistically assessing routine duplicate RC sub-samples. Comparative statistics of the duplicate RC sample datasets indicates that acceptable overall levels of precision were achieved for Ni, Co and more recently for Sc. • Pulps from early Heron RC drilling were re-assayed by fusion XRF to provide 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). • 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 drillhole collars have been surveyed using an RTK DGPS system with either a 3 or 7 digit accuracy. The coordinates are stored in the Ardea exploration database referenced to the MGA Zone 51 Datum GDA94. • Most of the exploration drillholes used for resource estimation are vertical and have not been downhole surveyed. However, minimal deviation of vertical RC drillholes is expected due to the sub-horizontal orientation of the mineralisation and the relatively soft nature of host material. • Verification downhole surveying with gyro instrumentation has been undertaken on 9 of the vertical RC holes averaging 95m deep, and an additional 9 angled RC holes averaging 140m downhole depth completed in the Ardea 2018 drilling programme. There was 2 degrees or less dip deviation from vertical in 7 of the 9 vertical RC holes and maximum 3 and 4 degree dip deviations from vertical in the remaining two holes. This indicates that significant dip deviations are unlikely to have occurred in the other vertical drillholes within the Goongarrie Hub. Dip deviations were mostly within 3 degrees of -60 towards the east and azimuth deviations typically up to 5 degrees in the angled drillholes. • The surface topography over the HW, GS, GH and BFSD deposits has been modelled based on drillhole collars supplemented by a 50mE by 50mN grid of points derived from photogrammetry around the periphery of the deposit. • The surface topography over the SN deposit has been modelled based on drillhole collars only. • The accuracy of the resultant topography model is considered acceptable for mine planning purposes. • The topographic control over the Goongarrie deposits is based on high resolution aerial photography flown by Arvista in March 2018 with subsequent photogrammetric processing to a vertical accuracy of 1 Sigma = 0.1 m completed by Aerometrex. The resulting 30cm contour data has been used to generate high-definition wireframe models of the surface topography over the areas from which more manageable lower resolution grid models were generated (10mE x 10mN over GH and 20mE x 20mN over GS, BF and SD) for use in resource modelling.

Data spacing and distribution	• *Data spacing for reporting of Exploration Results.*
	• *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.*
	• *Whether sample compositing has been applied.*
		• Drill spacing varies widely across the Goongarrie deposits, ranging from 5mE x 5mN to 100mE x 400mN.
		  ○ HW - predominantly 80mE x 80mN
		  ○ GH - predominantly 80mE x 40mN and 80mE x 120mN.
		  ○ GS - ranges from 20mE x 20mN to 80mE x 160mN.
		  ○ BF - ranges from 40mE x 80mN to 80mE x 400mN.
		  ○ SD - predominantly 40mE x 80mN, ranges up to 160mE x 640mN.
		  ○ SN - ranges from 20mE x 20mN to 100mE x 400mN.
		• All assay data for the RC drilling was composited over 2m downhole intervals to match the longest of the most common sample intervals (1m or 2m) 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 define 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.*	• Most of the drillholes are 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 vertical drilling. This local variability is not considered to be significant but may have local effects on mining and scheduling later in the project life, particularly mineralisation along more deeply weathered narrow structures that may enable localised deeper pit developments along such structures.
Sample security	• *The measures taken to ensure sample security.*	• Most of the exploration samples from the Goongarrie deposits were collected and accounted for by Heron, Vale Inco or Ardea employees during drilling. All sub-samples in calico bags were packaged into large plastic bags and closed with cable ties. Samples were transported to Kalgoorlie from site by relevant employees in sealed bulk 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

Criteria	JORC Code explanation	Commentary
		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 Goongarrie Hub deposits. • All the exploration and corresponding QAQC data were reviewed and assessed again by Vale Inco in 2008, Heron in 2009 and Ardea in 2019 and 2020. Vale Inco, Heron and Ardea all concluded that the quality of the data was suitable for use in resource estimation studies.

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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.*	• Previous exploration at **Highway (HW)**: ○ Nickel laterite mineralisation in the southern third to half the 5.7km strike extents of the HW deposit was initially drilled by Helix Resources in 2003 with vertical RC holes on a 40mE by 200mN grid. A total of 4,389m of RC drilling was completed amongst 108 RC holes. ○ In 2004 and 2005, Heron extended the initial Helix drill section lines to the edges of the Walter Williams formation with RC holes at 80mE intervals and extended the RC drilling coverage to the north with holes on a combination of 80mE by 80mN and 80mE by 160mN grid spacings. Heron completed a total of 333 holes for a total of 15,749m of RC drilling. ○ Upon the forming of a joint venture between Heron and Vale Inco in 2005, Vale completed 944m of diamond drilling across 21 PQ3 and HQ3 holes at HW in 2006. The drilling twinned various Heron RC holes spread geographically across the deposit to assess the reliability (QAQC) of the geology and sampling data from the Heron and Helix RC drilling and to collect samples for bulk density determinations and material for metallurgical testwork. ○ Vale Inco subsequently completed 16,597m of infill RC drilling amongst 344 holes at HW in 2007 and 2008 resulting in an 80mE x 80mN dominant drill spacing across the deposit. ○ Vale Inco also completed 1,109m of sonic drilling across 23 holes to collect additional samples for verification of the historical RC drilling, samples for bulk density determinations and additional material for metallurgical testwork. • Previous exploration at **Goongarrie Hill (GH)**, **Goongarrie South (GS)**, **Big Four (BF)** and **Scotia Dam (SD)**: ○ Nickel laterite mineralisation at GH, GS, SD and the northern half of BF was initially discovered by Heron Resources Limited with RC drilling in 1999 and 2000, while Anaconda Nickel was the first to drill test (RC) the southern half of BF in 2000. ○ Heron's typical drilling strategy was to complete initial RC drilling of weathered ultramafic rocks of the Walter Williams Formation on an 80mE x 800mN grid, followed by infill drilling resulting in 80mE x 400mN drillhole spacing. Subsequent infill drilling was undertaken on an 80mE by 80mN grid in regions where well-developed nickel laterite mineralisation was intersected by earlier drilling. ○ In 2001 Heron undertook closer spaced infill drilling of deep high grade laterite mineralisation along the eastern side of GS (Pamela Jean zone) initially on a 40mE by 40mN grid, then further infilling to a 20mE x 40mN hole spacing. ○ After acquiring BF South from receivers of Anaconda Nickel, Heron undertook broad spaced infill drilling of BF South in 2004, followed by further infill drilling to 80mE by 80mN spacing in 2006. ○ Drilling of GH has been less systematic than at the other Goongarrie deposits. While Heron began drilling GH initially on 80mE x 400mN grid followed by commencement of 80mE by 80mN infill drilling at the south end of the deposit, the 80mE x 80mN infill drilling was abandoned in favour of drilling a number of small areas with 20mE by 20mN spaced holes in mid-2000 and two small drilling programmes in 2001 and 2002. This was followed by broad infill drilling on an 80mE x 800mN grid offset from the initial 80mE x 400mN spaced drilling 160mN in 2004 and 2006. ○ Heron also completed 8 PQ3 size diamond drillholes at GS in 2000 to gain improved understanding of the deposit insitu structure, material types and solid samples for bulk density determinations. ○ A joint venture between Heron and Vale Inco from 2005 to 2009 saw Vale Inco complete significant diamond and sonic drilling as twins to earlier Heron RC holes at the Goongarrie deposits. This previously enabled

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Criteria	JORC Code explanation	Commentary
		verification of the geology and assay data from the Heron RC drilling and collection of samples/material for bulk density measurements and metallurgical testwork. ○ Vale Inco also undertook infill RC drilling in the northern half of GS and throughout GH for input to updated resource estimates completed by Vale Inco in 2009 and revised estimates by Heron in 2010. • Previous exploration at **Siberia North (SN)**: ○ Anaconda drilled 10 RC holes in 1997 with collars at 100m intervals on two E–W oriented section lines spaced 1,125mN apart. This was followed by a program of RAB drilling at 200mE x 200mN spacing to further test the continuity of the nickel laterite mineralisation. ○ In 1998 Anaconda drilled 177 RC holes, collared at 50m intervals along drill traverses spaced 100m apart, confirming significant laterite Ni-Co anomalism. ○ In 2000 Anaconda completed 28 RC holes, collared at 100m intervals along drill traverses 400m apart, followed by an additional 22 Anaconda RC holes which infilled the earlier drilling to a 100mE by 200mN hole spacing. Another 158 RC holes infilled mineralisation highlighted during earlier RAB and RC drilling programs with the collars at 50m intervals along east-west drill traverses 100m or 200m apart. In 2000 Anaconda also drilled a vertical 0.93m diameter 28m deep Calweld hole to provide bulk sample material for metallurgical testwork. ○ A Ni-Co laterite resource estimate was undertaken for SN using data from all the RAB and RC drillholes completed to date, and ordinary kriging to complete the grade estimates. • All the exploration datasets collected by previous explorers have been assessed by Ardea technical staff and most of the data found to be suitable for use in resource estimation.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• Nickel laterite mineralisation within the Goongarrie Hub is developed from the weathering of Achaean-aged olivine-cumulate ultramafic units within the Walter Williams Formation (**WWF**) with resultant near surface metal enrichment. The mineralisation typically occurs within 80m of surface (but can extend to 160m depth) and can be subdivided based on mineralogical and metallurgical characteristics into upper iron-rich ("Clay Upper") and lower magnesium-rich ("Clay Lower/Saprock") materials based on the ratios of iron to magnesium. These upper and lower layers can be further subdivided into additional mineralogy groups or material types based on ratios of the other major grade attributes. The deposits are analogous to many weathered ultramafic-hosted nickel-cobalt deposits both within Australia and world-wide. • The continuity of mineralisation is strongly controlled by variations in the ultramafic protolith, fracturing and palaeo water flow within the ultramafic host rocks. Areas of deep fracturing and water movement within the bedrock typically have higher grade and more extensive mineralisation in the overlying regolith. There is also often a distinctive increase in grade, widths and depth of mineralisation coinciding with olivine mesocumulate facies and increased structural deformation proximal to more competent thinner orthocumulate facies and mafic rocks immediately to the east and west of the WWF. Where the host regolith overlies olivine adcumulate lithologies there is typically an increase in siliceous material, coinciding with mostly lower nickel and cobalt grades along the central axis of the WWF. Deeper fracturing occurs along cross cutting structures which often coincides with narrow higher grade nickel and cobalt mineralisation within the adcumulate facies. • The carbonated saprock variant of adcumulate commonly has a palaeo-karst speleothem development, being coarse residual silicified fragments of light-coloured adcumulate "floating" in a matrix of dark red goethite. The open-space within the breccia constitutes a favourable borefield reservoir rock. • Thin layers of transported colluvial, alluvial and lacustrine sediments overlie much of the insitu nickel laterite mineralisation at the Goongarrie Hub, with mostly colluvial sediments approximately 4m thick at GH. All sediment types present at GS range from less than 5m to over 40m thick. At BF and SD and colluvial and alluvial sediments range from less than 5m to 40m thick. Much of the high-grade mineralisation at GS, BF and SD is under 10-20m of transported cover.
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*	• Data from in excess of 4,000 drillholes with significant intersections have been used to generate the updated resource estimates for the Goongarrie deposits. Most of the drilling is vertical and represents the true thickness of the sub-horizontal mineralisation. • All the exploration drilling activities undertaken in the Goongarrie Hub and representative results for 'Material' drillholes have previously been reported to the public by Heron and Ardea.

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Criteria	JORC Code explanation	Commentary
	• *dip and azimuth of the hole* • *down hole length and interception depth* • *hole length.*	
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• Most drillhole samples have been collected over 1m or 2m downhole 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. A 2m compositing length was used aligned with the longest dominant sampling interval used for drill sub-sample collection. • No metal equivalent calculations have been used in this assessment.
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 within the Goongarrie deposits has a strong global sub-horizontal orientation. The majority of the drillholes focused on the nickel and cobalt laterite mineralisation at Goongarrie are therefore vertical and represent the true thickness of the mineralisation. The only exceptions to this are 9 angled drillholes (-60° towards the east) that test the precise location and width of mineralisation resulting from deep weathering along steep westerly dipping structures along the eastern side of GS (Pamela Jean Zone – PJZ or Pamela Jean Deeps – PJD), which could not adequately be determined based on the earlier vertical RC 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.*	• The additional MN estimates discussed in this report represent the MN within lower grade material (below 0.5% Ni cut-off grade) and are not included in the Mineral Resources inventory, which is reported at a 0.05% Ni cut-off grade. Results for the MN are based on previously reported resource models at Goongarrie Hub. • The updated Mineral Resources inventory for the Goongarrie Hub reflects the change from OK model to UC model at Siberia North, and estimates are based on previously reported resource models. Ardea is currently completing an updated resource model for the Siberia North deposit aimed at aligning the estimation methodology with the other five Goongarrie Hub deposits.
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.*	• No further drilling is currently planned to further evaluate the nickel laterite resources at Goongarrie Hub. However, further drilling may be required to collect more material for metallurgical testwork as the project advances.

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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 Inco and Ardea have employed robust procedures for the collection of and storage of sample data. This includes auto-validation of sample data on entry, cross-checking of sample batches between the laboratory and the database and regular auditing of samples during the exploration phase. • Sample numbers were both recorded manually and entered automatically. Discrepancies within batches (samples were batched daily) were field checked at the time of data entry, and resampled if errors could not be resolved after field inspection. • 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 has been visually checked on screen, and manually validated against field notes. Any changes to the database were verified by field checks. • Ardea has undertaken a program of drillhole collar survey and validation. All drillholes in the program were surveyed using DGPS with an established base station control in the vicinity of the GH, GS, BF and SD 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.*	• Competent Person, Ian Buchhorn has conducted numerous visits to all of the Goongarrie deposits and has been intimately involved in the KNP since 1997. Competent Person, Andrew Penkethman, has been involved with the Company since April 2019 and has completed multiple site visits to the KNP Goongarrie Hub deposits.
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 and predictable correlation in the geology between adjacent drillholes in all of the Goongarrie Hub deposits. There is also a strong global correlation between the weathering profile, lithology and mineralisation intensity. On a local scale the changes in the weathering profile are often discrete, but of a complex geometry influenced to a large degree by faulting and fracturing in the ultramafic protolith. • Nickel and cobalt mineralisation domains were interpreted in cross section using a combination of assay data and observed geological logging data. The outlines were extended variable distances laterally from marginal mineralised drill intersections to adjacent subgrade or barren drillholes with consideration of the lateral extents evident on the current and adjacent drillhole traverses. The resulting outlines were then used to create wireframe solids of the mineralised domains to constrain resource estimation. • The mineralisation envelopes were subdivided into area domains, reflecting either changes in the dominant local drillhole spacing, or trend in the nickel and cobalt mineralisation based on the interpreted orientation of the host protolith and structures influencing variations in both the tenor of grades and depth of the regolith profile. • **Nickel Domains**: Nickel envelopes were defined using a notional 0.25% Ni cut-off grade applied to the drillhole assay data incorporating internal dilution where necessary to maintain reasonable 3-D continuity of the mineralised domain geometry. While Mineral Resources were ultimately reported using a 0.5% Ni cut-off grade, the nickel envelopes include lower grade material, primarily in saprock, which is often rich in carbonate minerals that could be used as Mineralised Neutraliser (MN). • **Cobalt Domains**: Cobalt envelopes were defined using a notional 0.05% Co cut-off grade for GH, GS, BF, SD and SN applied to the drillhole assay data, also incorporating internal dilution where necessary to maintain reasonable 3-D continuity of the mineralised domain geometry as well as being constrained within the nickel envelopes. A notional cut-off grade of 0.03% Co was used for the HW deposit. These envelopes were used to subdivide the nickel domains into cobalt-rich and cobalt-poor domains. • **Scandium Domains**: As scandium assays were not available across the entirety of any of the Goongarrie Hub deposits, additional boundaries were defined isolating the regions of the modelled nickel mineralisation envelopes informed with scandium assay data, in order to apply corresponding domaining in the resource block models to constrain the spatial extents of scandium grade estimates to the same regions informed with scandium assay data. As scandium assay data was only available for selected downhole intervals for an irregular pattern of historical drillholes, REE resource envelopes were modelled based on the drillhole intervals over which pulp re-assaying was undertaken by Ardea to enable estimation of scandium resources and provide data for gold and nickel sulphide

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		exploration targeting. Cross sectional outlines were interpreted based on 15ppm cut-off applied to the sum of the scandium, cerium, neodymium and praseodymium assay data, with the resulting outlines used to construct wireframe solids to constrain estimation of scandium resources. • **Paleochannel and Surficial Calcrete Domains**: Paleochannel and surficial calcrete/pedogenic sediments domains rich in carbonate minerals were modelled to constrain estimation of carbonate mineral quantities for consideration as acid neutralisation materials in the proposed ore processing flowsheet in future mining studies. A threshold of 5% CaO+MgO (equating to a minimum of 10% contained carbonate mineralogy), elevated Loss on Ignition (LOI) assays, and drillhole logging data was used to interpret cross-sectional paleochannel carbonate outlines from which wireframe solid models were generated. Cross sectional profiles defining the base of combined surficial calcrete and carbonate rich pedogenic soils were also interpreted based on similar assay and geological data considerations. Envelopes constraining paleochannel material particularly high in kaolinite (with Al2O3 >25%), but also low in iron (FeO <5%) were also modelled to allow quantification of material that could potentially be a future source of High Purity Alumina. • **Overburden and Regolith Domains**: A combination of geological logging and assay data was used to sub divide the mineralisation into high iron (goethite rich) domains of more intensely weathered insitu material, and underlying high magnesium (saprock) mineralisation within the mineralised domains. These were interpreted as cross sectional profiles from which 'top of saprock' wireframe surface models were generated. The interface between insitu nickel bearing clays derived from ultramafic protolith, and overlying transported sediments comprised of alluvium, colluvium, and pedogenic surficial material has also been modelled for each of the Goongarrie Hub deposits mostly based on drillhole geological logging data. Occasionally elevated nickel and cobalt grades in the transported material are interpreted to be colluvial material derived from nickel laterite mineralisation exposed at surface in the past. The base of transported sediments was also interpreted as cross-sectional profiles from which wireframe surface models were generated. • The domaining approach is robust and provides suitable constraints for resource estimation accounting for variations in the complexity of the geology. Potential for bias is minimised in the interpretation by incorporating subgrade drill intercepts and sample intervals into the resource envelopes where the local drillhole spacing is too broad to assume connectivity of higher grades. • The Competent Persons (CP) considers the geological interpretation of the Goongarrie deposits to be robust and to provide suitable constraints for resource estimation.
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. • **Goongarrie Hill (GH)**: The total strike length of the nickel and cobalt mineralisation domains is 5.2km with the nickel envelope averaging 750m wide and 50m thick. The main cobalt domain is approximately 700m wide extending 2.2km south from the northern end of GH, bifurcating into a 500m wide western zone extending another 1.1km south before tapering to 140m wide and extending a further 1km south. The 150m wide eastern zone extends 3km south from the bifurcation to the south end of the deposit. The cobalt domains range from 2m to 30m thick and average approximately 15m thick. Interpreted depth of the mineralisation averages from approximately 8m below surface down to approximately 55m below surface. • **Goongarrie South (GS)**: The total strike length of the main nickel and cobalt mineralisation domains is approximately 7.4km with observed widths of approximately 400m and up to 1km.. Several semi-parallel mineralisation zones for the smaller cobalt domains are observed are with variable thicknesses typically ranging in the order of 5m to 20m thick with some zones being up to and exceeding 50m thick in the area referred to as the Pamela-Jean zone. Mineralisation has been modelled from near surface down to approximately 160m below surface. • **Big Four (BF)**: The total strike length of the main nickel and cobalt mineralisation domains is approximately 7.7km with observed widths of approximately 300m. In the cobalt domains, several semi-parallel mineralisation zones are observed with variable thicknesses typically in the order of 5m to 15m thick with some zones being in the range of 20m to 40m thick. Mineralisation has been modelled from near surface down to approximately 80m below surface. • **Scotia Dam (SD)**: The total strike length of the nickel and cobalt mineralisation domains is approximately 1.3km with observed widths of approximately 250m and up to 550m. Possibly two cobalt mineralisation zones are observed with variable thicknesses typically in the order of 5m to 25m thick with some zones being up to and exceeding 35m thick towards the northern end of the main mineralised zone. Mineralisation has been modelled from near surface down to approximately 55m below surface.

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		• **Highway (HW)**: The nickel mineralisation occurs within a single zone that extends over a strike length of 5.7km averages approximately 50m thick and is 1.2km wide at the south end, gradually tapering to 300m wide at the north end. The interpreted top of mineralisation ranges from surface to 25m below surface, averaging 10m below surface. The interpreted base of mineralisation ranges from 6m to 80m below surface, averaging 60m below surface. • **Siberia North (SN)**: The mineralisation occurs in a single zone that extends over a 7km strike length and averages approximately 1.5km wide over 4km (central region) and 500m wide over 3km (combined north and south ends). Mineralisation has been modelled from near surface down to approximately 70m below surface.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	• Resource modelling processes were undertaken using Maptek Vulcan software for all Goongarrie deposits with the exception of Siberia North (SN) where Datamine/Isatis was used. • Based on the drill sub-sample length analysis, the domain coded sub-sample assay data were composited to 2m intervals in preparation for statistical analysis, variography and grade estimation. Various statistical tests were completed to determine the optimal composite length of 2m. • While Ni and Co are the primary focus of the resource estimate, statistical analysis, variography and grade estimation were also undertaken for FeO, MgO, Al2O3, SiO2, CaO, Mn, Cr, Sc and Loss On Ignition (LOI) which are relevant to assignment of geo-metallurgical material types and dry bulk density values to the resource model. • Classical statistical analysis for each deposit was undertaken with cell declustering applied and scaled typically to the greatest drillhole spacing of significant coverage at each deposit, and a 2m cell height. The data for Ni and all the other grade attributes except Co and Mn were subdivided by the clay (high FeO and low MgO) and saprock (low FeO and high MgO) domains. Conversely, the Co and Mn data, which are moderate to strongly correlated, were subdivided by inside versus outside the Co resource envelopes within the Ni resource envelope. Elevated coefficients of variation (CV) greater than 1.0 but less than 2.0 were reported for Al2O3, CaO, and Cr in the saprock domains, and MgO in clay domains, while similar range CV values were reported for Co in the high Co domains and Mn in the low Co domains. The highest CVs greater than 2.0 but mostly less than 3.0 were reported for CaO in the clay domains. • Suitable upper and lower cuts were determined for any grade variables showing anomalously high or low outlier grades. The application of the cuts only had local influences on the corresponding grade estimates with no material effects on the domain global mean grades. A similar approach to grade cutting was adopted for the paleochannel carbonate and high alumina domains. • Continuity analysis (variography) was undertaken for all grade attributes subdivided by the clay and saprock domains and grouped area domains with similar grade trends and mineralisation characteristics. Co and Mn were subdivided by the grouped high grade and low-grade cobalt domains. 3-D variography was generated as semi-variograms normalised to an overall sill of 1.0 based on the non-declustered composite grades or normal score transform of the grades for each domain or domain group. The variography was modelled with a nugget effect and up to three spherical structures. The continuity analysis determined that the drillhole spacing within all the deposits is considered sufficient for the estimation of Ni, Co and Sc mineral resource grades, and support grade attributes. • A 3-D regular block model was constructed of each of the Goongarrie Hub deposits (combined for BF and SD) with nickel, cobalt, rare earth, regolith (including transported) and area (orientation and data spacing) domain coding assigned based on the geological interpretation. Grouped domain coding based on the initial domain assignments was also defined to facilitate running of resource modelling processes, where appropriate, for similar trending regions and/or styles of mineralisation. All the block models were constructed using regular block dimensions of 10mE by 10mN by 2mRL. • Mineral Resource nickel and cobalt grades were estimated by ordinary kriging (OK) into panels ranging in size from 20mE x 20mN x 4mRL to 40mE by 80mN x 4mRL mostly based on half the dominant drillhole spacing in the area domain or area domain group. The ordinary kriged panel estimation was followed by Local Uniform Conditioning (LUC) to produce final nickel and cobalt resource grade estimates for 10mE by 10mN by 2mRL selective mining unit blocks reflecting recoverable volume and grade estimates expected upon mining based on a 10mE by 10mN by 2mRL grade control spacing or less. • To account for variations in the drillhole spacing, which often systematically changes between regions of higher and lower grade mineralisation, the ellipsoidal search neighbourhood for each estimation domain was divided into octants with a maximum of 4 composites selected from any one octant, and usually, a minimum of 8 and a maximum of 24 composites used to estimate each panel. In addition, the maximum number of composites selected from each

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		drillhole was restricted to 4. • Hard boundaries between the clay and saprock domains was used for the estimation of nickel grades and similarly between the high- and low-grade cobalt domains when estimating cobalt grades. However, soft boundaries with no restrictions other than the search neighbourhood parameters noted above were used between the mineralisation orientation/drillhole spacing domains within the clay and saprock domains. • Validation of the ordinary kriged panel and LUC SMU estimates for each deposit was undertaken by detailed visual review of the block model estimates relative to the input drillhole composite grade data, global mean grade comparisons between the input composites data and the block model grade estimates subdivided by the estimation domains, and grade-volume curve comparisons between the block model estimates and gaussian global change of support (GSOS) data generated for the panel and SMU dimensions subdivided by the clay and saprock domains and the deposit area domains based on the declustered composite grade datasets for each deposit. The validation indicated that the ordinary kriged panel and LUC SMU nickel and cobalt estimates are with acceptable ranges considering the influences of soft estimation boundaries between adjacent area domains, the large vertical sample searches and geostatistical considerations, particularly, Information Effect (relating to the local exploration drillhole spacing). In addition, for both OK and LUC swath plots in different orientations were constructed for comparison between input composites and block grade. Detailed internal peer review was completed. • The supporting grade attributes including, MgO, FeO, Al2O3, and Cr with similar drillhole sample assay availability as Ni and Co were estimated by ordinary kriging into 10mE by 10mN by 2mRL size blocks using the same search neighbourhood parameters and domain control used for estimation of nickel grades. Estimation of Mn used the same constraints used for Co (high- and low-grade cobalt domains). Visual and global mean grade comparisons between the resultant grade estimates compared to the input composites data subdivided by the estimation domains were considered acceptable. • Ordinary kriging of SiO2, CaO, and LOI grades, was undertaken using larger search neighbourhoods to account for the absence of assay data for 20-30% of the samples. Similar validation processes were completed as for the other support grade attributes followed by adjustment of the initial SiO2, CaO, and LOI grade estimates on a relative ratio basis forcing the sum of all the estimated grade attributes (as oxides) to range between 95% and 105%. This was required for robust application of the material type classification scheme discussed below. • Ordinary kriging of scandium grades into 10mE by 10mN by 2mRL size blocks was also undertaken using larger search neighbourhoods to account for the broad data spacing (up to 80mE by 400mN at GS) outside the areas of Ardea infill drilling in the southern half of GS (effectively 80mE by 80mN spacing), the areas of Ardea infill drilling at BF and SD (also effectively 80mE by 80mN spacing), and a crude 80mE by 160mN spacing over selected regions and drillhole intervals at GH. These estimates were further constrained by the regions and drillhole intervals informed with scandium assay data. No adjustments were made to the ordinary kriged scandium estimates. Validation of the scandium grade estimates was undertaken in a similar manner to the support grade attributes with reasonable correlation evident between the input data and the block model grade estimates. • Quantitative XRD mineralogy data for 164 samples from the Ardea 2017 and 2018 diamond drilling at GS and 96 pulps from historical RC and diamond drillholes at GH was merged with the multi-element geochemical data for the samples, and detailed analysis undertaken of the mineralogy data subdivided by the geological interpretation and a combination of grade and grade ratio thresholds based on the major geochemical attributes in the samples (MgO/FeO, Al2O3/SiO2 and SiO2/(MgO+FeO+Al2O3). The analysis resulted in the development of material type classification schemes for GS and GH based on geological and geochemical classification criteria relating to natural mineral groupings present in the Goongarrie Hub weathering profile. Algorithms were developed in MS Excel and Vulcan block model scripts to assign material type codes to the drillhole samples for control in the statistical analysis of the bulk density data, and to control the assignment of determined bulk density values to the resource models.
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 are reported as dry tonnes for all models. Wet and dry bulk density and moisture measurements were determined for a comprehensive suite of diamond and sonic drill core samples from each of the Goongarrie deposits. • Density measurements including moisture were initially collected using the Archimedes method with the samples sealed in wax or a vacuum bag prior to weighing submerged in water. The wax was then removed and the sample re-weighed before and after oven drying. • Sample volumes were calculated based on the sample dimensions (length and diameter) measured for each sample. The moisture content of each sample was determined by weighing the sample when wet (as recovered from the

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		drillhole) and then weighing it again after thorough oven drying and calculation of moisture by (wet_wt – dry_wt) / wet_wt * 100. Wet and dry bulk density measurements were determined by dividing the respective sample weight by the volume determined based on the core sample dimension measurements.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• Cut-off grades of 0.25% Ni and 0.05% or 0.03% Co were used to interpret and model the nickel and cobalt mineralisation envelopes used to constrain the Goongarrie Hub resource estimates. These thresholds were chosen based on geological observation of the continuity of the nickel and cobalt grades within various regions of the weathering profile that could be of potential economic value to the project. Ardea has undertaken internal mining studies since the Ardea 2018 PFS that indicate the potential for significant nickel credits from saprock material rich in dolomite and magnesite (carbonate minerals), typically containing an average of 0.25% Ni, that could be used as a neutraliser in the proposed pressure acid leach processing flow sheet and contribute additional nickel units to production (Mineralised Neutraliser). • Mineral Resource reporting has been undertaken using a 0.5% Ni cut-off grade which is the common industry threshold used for resource reporting for typical nickel laterite deposits. While cobalt and scandium contribute to the project value, the grades and associated value are much less than nickel and therefore are not incorporated into the resource reporting cut-off grade criteria. The 0.5% Ni cut-off has also consistently been used by Heron, Vale Inco and Ardea since 2004 for reporting the overall Mineral Resources in the KNP which have been updated in this report to include the updated resource estimates for the Goongarrie Hub. All the other Mineral Resources outside the Goongarrie Hub, stated in this report, have previously been reported in the public domain. • Ardea notes that while scandium would inherently be taken into solution with nickel-cobalt in the proposed pressure acid leach processing flowsheet, it would unlikely be economic to recover scandium from solution when present in low concentrations. Scandium was also noted within the Goongarrie Hub assay suite in higher grade concentrations above the 0.25% nickel grade shell envelope. None of this material has been domained or included in the resource estimate. On this basis, Ardea has also reported scandium resources using a 20 ppm Sc cut-off grade applied to the Ni and Co resources based on a 0.5% Ni cut-off grade.

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 is assumed for all the Goongarrie Hub deposits. The need for blasting is likely to be limited to pedogenic calcrete at surface, a layer of indurated ferruginous laterite that often overlies the nickel and cobalt mineralisation at GS, BF and SD, and underlying saprock rich in serpentine and the carbonate minerals dolomite and magnesite, should saprock be mined for use as acid neutralising material for ore processing.
		• For the purposes of removing unlikely to be economic resources from the resource statement, TME Mine Consulting (TME) carried out a pit optimization for each of the Goongarrie Hub deposits using a "blue sky" US$27,558 per tonne nickel price (consistent with the price used for similar pit optimisation work as part of the Ardea PFS in 2018, and Heron in 2013 when converting earlier JORC 2004 compliant resource estimates to JORC 2012 compliant estimates). A "blue sky" US$64,485 per tonne cobalt price was also applied in the resource pit optimisation work undertaken by TME. Mining and processing costs and other appropriate costs were also used to complete the resource optimisation work.
		• All the Goongarrie Hub resource model blocks based on a 0.5% Ni cut-off were deemed potentially economic based on the resource optimisation parameters and therefore have been reported as Mineral Resources in this report.
		• The Goongarrie Hub deposits have been the subject of detailed metallurgical studies. The preferred metallurgical approach is based on an "off-the-shelf" HPAL flow sheet with a particular focus on improving the recovery of reagents during processing to improve unit costs.
		• A key component of the PFS was replacement of limestone sourced from third parties with mineralised neutralising (MN) material sourced from within the deposits mined. The PFS identified that the quantity of MN required for neutralisation could not be supplied using the 0.5% Ni cut-off used for estimating the Mineral Resource. Therefore, it was necessary to consider lower grade material to meet supply requirements for the Goongarrie Hub. Whilst ostensibly used for neutralisation of free acid from the discharge stream of the leaching circuits, both high pressure and atmospheric pressure, the material identified as MN also contributes to the nickel and cobalt production of the Goongarrie Hub. Key specifications for the MN were:
		  ○ LOI >25% and Ni >0.3%., or
		  ○ LOI >25% and Ni >0.2% and Si <= 23%
		• As this specification was based on the characteristics of the material that demonstrated acid neutralising capacity

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		and not economics, each deposit contained surplus requirements. The preferred source of MN was defined as a subset of this material type using pit optimisation and scheduling analysis undertaken as part of the PFS.
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 Goongarrie deposits have been the subject of detailed metallurgical studies. • The current focus of studies and the preferred metallurgical approach is high pressure acid and atmospheric leaching methods with a particular focus on improving the recovery of reagents during processing to improve unit costs.
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. All of the material mined will be of an oxidised nature and as such there is not expected to be 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 landforms at the conclusion of the project will be of similar profile to the current landforms. • Environmental studies for the project have commenced 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.*	• Wet and dry bulk density and moisture measurements were determined for a representative suite of diamond and sonic drill core samples from the Goongarrie deposits, including 105 samples from 3 diamond and 8 sonic drillholes at GH, 828 samples from 36 diamond holes at GS, 402 samples from 21 diamond drillholes at BF and SD and 261 diamond and sonic drill core samples at HW. All the material types (mineralised and waste) in the weathering profile were targeted for density determinations. • Core Sample Density Measurements: Wet density values of the Vale Inco diamond and sonic core samples were measured using the Archimedes method including either coating the samples with wax or vacuum sealing them in plastic bags prior to weighing them submerged in water. Wet sample weights were recorded pre–wax coating or vacuum sealing, after coating or sealing, and after removal of the coating or sealing (after weighing submerged in water). The samples were thoroughly oven dried after removing the coating or sealing, and subsequently re-weighed to determine the dry sample weight and moisture content. The dry bulk density was then calculated by multiplying the wet density by (1 – moisture) with percentage moisture in the wet sample expressed as a proportion value between 0 and 1. Also, for Heron and Ardea density sample volumes were calculated based on the sample dimensions (length and diameter) measured for each sample. • Downhole Geophysical Density Measurements: Downhole geophysical density logging was also undertaken by Vale Inco of 14 sonic and 8 RC drillholes at GS, and 11 sonic and 13 RC holes at GH. Caliper (hole diameter), short space density and long space density values were recorded at 10cm downhole increments in each hole. The resulting data were composited to 1m downhole intervals coinciding with the dominant sub-sampling interval used by Vale Inco during their RC drilling. • The manually determined bulk density and moisture data for the core samples and 1m composites of the geophysical density data were merged with the corresponding assay data (if available) for the samples or sample intervals and material types assigned based on the geochemical criteria derived from the analysis of the XRD mineralogy data. The holes were drilled primarily to collect bulk material for metallurgical testwork and therefore no detailed downhole sampling and assaying was undertaken, and typically twinned earlier Heron RC holes. If assay data for sufficient grade attributes (including SiO2 and CaO) were available for the twinned RC hole, material type assignments were calculated and assigned to the same downhole interval in the more recent sonic or diamond drillhole for which downhole geophysical density logging had been undertaken. Assays were available for all the grade attributes required to calculate material type assignments for the following bulk density datasets: ○ 828 manual bulk density measurements for GS, and 402 manual bulk density measurements for BF and SD based on assays of samples from the same diamond drillholes.

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		○ 105 manual bulk density measurements for GH based on assays of samples from the twinned RC holes. ○ 349 x 1m composites of the geophysical density data for GS, and 500 x 1m composites of the geophysical density data for GH based on assays of samples from the twinned RC holes. ○ 261 manual bulk density measurements and 971 sample intervals coinciding with downhole geophysical density logging for HW. • Average wet and dry bulk density and moisture were calculated subdivided by the material type classification scheme based on the density and moisture measurements of the core samples. • Composites of the long and short spaced geophysical density data (matching the corresponding downhole subsample intervals and assay data) were assessed in a similar manner subdivided by the respective material type classification schemes. The long space density averages were found to reconcile closely with the wet density averages based on the manual measurements and therefore, were treated as the preferred geophysical wet density average values. This is well justified as the short space geophysical density values are highly susceptible to low bias in drillholes with significant variations in diameter over short downhole intervals, which is expected within the very soft earthy goethite rich material and local variations in material type hardness within the weathering profile. • Given the close overall agreement between the wet density averages based on the manual density measurements of core samples and geophysical density measurements, the average moisture values determined based on the core samples subdivided by the material type classification were used to convert the average wet bulk density values based on the geophysical density dataset, to dry bulk density values and weighted average dry bulk density values were calculated based on a combination manual and geophysical bulk density datasets subdivided by the material type classification scheme. • The resulting average dry bulk density values range from 1.4 t/m3 to 2.1 t/m3 and were assigned to the resource models for the GS, GH, BF, SD and HW deposits. • Material types and density values for the SN were assigned to each block based on algorithms supplied by Ardea. This was based on statistical analysis of bulk SN deposit. Estimated carbonate mineral content and total assay have been calculated and used for these assignments rather than using the kriged values. In addition, several ratios as well as the estimated magnesia in silicate minerals are calculated. Values range from 1.51 t/m3 to 1.88 t/m3. • The magnitude and variation of the average dry bulk density values are aligned with expectations of the variations in bulk density observed in the core samples collected from the extensive diamond and sonic drilling completed at the Goongarrie deposits.
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.*	• The Mineral Resource Estimates for the Goongarrie Hub have been classified in accordance with the JORC Code (2012 Edition) guidelines. • With consideration of all the classification criteria in JORC Table 1 and the dominance of nickel in the overall value of the Goongarrie Hub, slope of regression and kriging efficiency statistics recorded for the ordinary kriged panel nickel estimates were reviewed and suitable confidence thresholds selected as a guide to subdividing the combined nickel, cobalt and scandium estimates for the Goongarrie Hub deposits into Measured, Indicated and Inferred Mineral Resources. A slope of regression threshold of 0.7 was used to define boundaries between Indicated Resources (> 0.7) and Inferred Resources (< 0.7) within the insitu regolith domains of all the Goongarrie Hub deposits, while a kriging efficiency threshold of 0.6 was used to define boundaries between Measured Resources (> 0.6) and Indicated Resources (< 0.6) at the GS deposit. • Initial resource classification assignments based on these criteria were applied to the resource models and used as a basis for defining 3-D envelopes constraining the resource model blocks showing strong continuity of blocks with the same classification assignments and downgrading the confidence of blocks showing poor continuity in terms of the initial classification. • Wireframe solids of the modified resource classification boundaries were used to assign final resource classification codes to all blocks within the nickel mineralisation domains, with any mineralised blocks in transported material classified as Inferred Resources. • It must be emphasised that the resource classification is based on the nickel estimates, which Ardea considers to be equally applicable to the cobalt estimates. However, the confidence in the scandium resource estimates is less due to the variable broader data spacing reflecting the assay data based only on the Ardea drilling and pulp re-assay programmes. • The Competent Person (CP) considers the resource classification applied to the Goongarrie Hub resource models

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Criteria	JORC Code explanation	Commentary
		to reflect appropriate confidence in the input exploration data, geological interpretation and resource grade and tonnage estimates.
Audits or reviews	• *The results of any Audits or reviews of Mineral Resource estimates.*	• In December 2020 Ardea commissioned consultants, Optiro Pty Ltd, to undertake a high-level independent review of Ardea's new resource estimate for Goongarrie South (GS) in order to provide comment on the exploration input data, resource modelling processes and results for the largest Goongarrie deposit. Optiro concluded there are no material issues with the GS Mineral Resource Estimate. • Snowden completed an internal peer review of the Siberia North (SN) estimate upon completion in 2009.
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 classification of Mineral Resources in the Goongarrie Hub is based on consistent criteria determined according to measures of estimation confidence and accuracy (slope of regression and kriging efficiency) relating to the ordinary kriging of panel nickel grades that form the basis of the recoverable resource estimates for nickel based on LUC. The slope of regression and kriging efficiency thresholds used to guide definition of the resource classification boundaries are similar to those used throughout the mining industry when developing resource classification criteria based on these measures. • These geostatistical criteria and overall approach to the classification of the Goongarrie Mineral Resources is considered appropriate by the CPs and has recently been endorsed by Optiro in their high-level review of Ardea's resource estimate for GS. On the basis on uniformity of estimation methodology, the GS conclusion should be applicable to the greater Goongarrie Hub.

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Ore Reserve Estimate

The Ore Reserve estimate was prepared by Orelogy Consulting Pty Ltd (Orelogy) based on the diluted resource block models. The Ore Reserve for the Kalgoorlie Nickle Project – Goongarrie Hub is estimated at 194 Mt at an average grade of 0.70% Ni and 0.05% Co as presented in Table 1.

Table 1 Ore Reserves – Kalgoorlie Nickel Project – Goongarrie Hub

	Ore >= 0.5% Ni					Ore > 0.5% NiEq and LOI > 25%					Total Ore				
Deposit	Mt	% Ni	% Co	Ni (kt)	Co (kt)	Mt	% Ni	% Co	Ni (kt)	Co (kt)	Mt	% Ni	% Co	Ni (kt)	Co (kt)
Proven															
Goongarrie South	16.7	0.96	0.09	160	15	0.05	0.43	0.03	0.2	0.01	16.7	0.96	0.09	160	15
Sub-total	**16.7**	**0.96**	**0.09**	**160**	**15**	**0.0**	**0.43**	**0.03**	**0.2**	**0.01**	**16.7**	**0.96**	**0.09**	**160**	**15**
Probable															
Big Four/SD	34.9	0.76	0.07	265	23	0.8	0.38	0.04	3.1	0.3	35.7	0.75	0.06	268	23
Goongarrie South	33.6	0.79	0.07	265	23	1.8	0.40	0.03	7.3	0.5	35.4	0.77	0.07	272	24
Goongarrie Hill	15.8	0.70	0.04	110	7	0.1	0.44	0.02	0.4	0.02	15.9	0.70	0.04	111	7
Highway	54.0	0.70	0.04	380	22	27.2	0.39	0.01	106	4.0	81.2	0.60	0.03	486	26
Siberia North	9.2	0.74	0.05	68	4						9.2	0.74	0.05	68	4
Sub-total	**147.4**	**0.74**	**0.05**	**1,087**	**79**	**29.9**	**0.39**	**0.02**	**117**	4.8	**177.4**	**0.68**	**0.05**	**1,204**	**84**
TOTAL															
Big Four/SD	34.9	0.76	0.07	265	23	0.8	0.38	0.04	3.1	0.3	35.7	0.75	0.06	268	23
Goongarrie South	50.2	0.85	0.08	425	38	1.9	0.40	0.03	7.3	0.5	52.1	0.83	0.07	432	39
Goongarrie Hill	15.8	0.70	0.04	110	7	0.1	0.44	0.02	0.4	0.02	15.9	0.70	0.04	111	7
Highway	54.0	0.70	0.04	380	22	27.2	0.39	0.01	106	4.0	81.2	0.60	0.03	486	26
Siberia North	9.2	0.74	0.05	68	4						9.2	0.74	0.05	68	4
TOTAL	**164.1**	**0.76**	**0.06**	**1,247**	**94**	**30.0**	**0.39**	**0.02**	**117**	4.8	**194.1**	**0.70**	**0.05**	**1,365**	**99**

Notes:

1. SD – Scotia Dam.
2. The Ore Reserve is reported in accordance with JORC Code (2012).
3. Ore reserves are reported at a cut-off of 0.5% Ni for primary feed stock to the processing facility, plus mineralised neutraliser as ore at a cut-off of 0.5% NiEq and LOI above 25%.
4. NiEq defined using Ni + 2.32 x Co.
5. The Ore Reserve was evaluated using a base price of US$22,000/t for Ni and US$51,000/t for Co at 85% payable for a Mixed Hydroxide Precipitate (MHP) product, and an exchange rate 0.69 USD/AUD.
6. Ore Reserves account for mining dilution and mining ore loss.
7. Ore Reserves are reported on a Dry Tonnage Basis.
8. Proven Ore Reserves are based on Measured Mineral Resources only and Probable Ore Reserves are based on Indicated Mineral Resources only.
9. The sum of individual amounts may not equal due to rounding.

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Section 4 – Estimation and Reporting of Ore Reserves

Criteria	JORC Code Explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	*Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.*	The Mineral Resource Estimates used as a basis for the conversion to the Ore Reserve were prepared by Mr. James Ridley, a full-time employee of Ardea Resources Limited, and signed off by Mr. Ian Buchhorn and Mr. Andrew Penkethman, as the Competent Persons in ASX Release 30 June 2023. The total Mineral Resource for the Kalgoorlie Nickel Project (KNP) deposits, reported above 0.5% Ni, includes: • Measured of 18.2 Mt at 0.94% Ni & 0.08% Co. • Indicated of 252.9 Mt at 0.70% Ni & 0.01% Co. • Inferred of 79.2 Mt at 0.65% Ni & 0.03% Co. • MN Measured of 0.1 Mt at 0.42% Ni & 0.03% Co. • MN Indicated of 35.2 Mt at 0.38% Ni & 0.02% Co. • MN Inferred of 3.1 Mt at 0.37% Ni & 0.02% Co. The Goongarrie Hub deposits included in the Mineral Resource conversion to Ore Reserve were: Siberia North containing: • Indicated of 14.2 Mt at 0.72% Ni. • Inferred of 72.2 Mt at 0.74% Ni. Big Four/Scotia Dam containing: • Indicated of 60.2 Mt at 0.71% Ni & 0.05% Co. • Inferred of 19.2 Mt at 0.69% Ni & 0.04% Co. • MN Indicated of 1.1 Mt at 0.36% Ni & 0.04 Co. • MN Inferred of 0.9 Mt at 0.36% Ni & 0.03% Co. Goongarrie South containing: • Measured of 18.2 Mt at 0.94% Ni & 0.08% Co. • Indicated of 82.3 Mt at 0.71% Ni & 0.05% Co. • Inferred of 9.6 Mt at 0.64% Ni & 0.03% Co. • MN Measured of 0.1Mt at 0.42% Ni & 0.03% Co. • MN Indicated of 2.2 Mt at 0.38% Ni & 0.03% Co. • Mn Inferred of 0.6 Mt at 0.35% Ni & 0.04% Co. Goongarrie Hill containing: • Indicated of 39.9 Mt at 0.65% Ni & 0.04% Co. • Inferred of 29.3 Mt at 0.60% Ni & 0.02% Co. • MN Indicated of 0.1 Mt at 0.2% Ni & 0.02% Co. • MN Inferred of 1.1 Mt at 0.39% Ni & 0.02% Co. Highway containing: • Indicated of 70.6 Mt at 0.70% Ni & 0.04% Co. • Inferred of 21.1 Mt at 0.67% Ni & 0.04% Co. • MN Indicated of 31.8 Mt at 0.38% Ni & 0.01% Co. • MN Inferred of 0.5 Mt at 0.39% Ni & 0.02% Co. The estimation and reporting of Mineral Resources are outlined in Section 3 of this Table.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	Mineral Resources are reported inclusive of Ore Reserves.

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Criteria	JORC Code Explanation	Commentary
Site visits	*Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	Mr. Jake Fitzsimons, the Competent Person for this Ore Reserve statement is a full-time employee of Orelogy Consulting Pty Ltd (Orelogy). A site visit to the KNP Goongarrie Hub was untaken on 7 Oct 2022 accompanied by Darren Howe (Ardea Geological Superintendent). The site visit confirmed that: • The site is easily accessed via the sealed Goldfields Highway from Kalgoorlie. • The terrain is gently sloping and lightly covered in low density shrubs and small trees of the Great Western Woodlands. • All drill core examined was totally to moderately weathered. The "yellow" goethitic material has a clear visual characterisation that distinguishes it from "red" haematitic alluvial overburden waste and hard "grey /green" Saprock. • Both the alluvial and goethitic clay were noted as very weak and easily broken. • The magnesite discontinuity was clearly evident in the saprolite and saprock zones. Most material can be mined without pre-conditioning; however, light blasting will be needed to mine the saprock efficiently.
	If no site visits have been undertaken indicate why this is the case.	A site visit was undertaken as described above.
Study status	*The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.*	The Ore Reserve estimate is based on a Pre-feasibility Study (PFS) for the Siberia North, Big Four/Scotia Dam, Goongarrie South, Goongarrie Hill and Highway deposits. The objective of this PFS was to develop an integrated Life of Mine plan for mining and processing the laterite nickel and cobalt ore via High Pressure Acid Leach (HPAL) at 3.0 Mt/year plus 0.5 Mt/year of Atmospheric Leach (AL). The mine plan also included: • expansion of pits at the Highway deposit to supply Mineralised Neutraliser to replace limestone for acid neutralisation, and • disposal of neutralised tailings and hypersaline water into mined out pit voids. The PFS study was compiled by Wood PLC with input from: • Ardea (Geology, Mineral Resources, Project Execution Strategy & Operations Management) • Pells Sullivan and Meynink (Geotechnical) • Orelogy Consulting (Mine Planning and Ore Reserve) • Wood (metallurgical test work, process design and non-process infrastructure) • Rockwater (hydrology and hydrogeology) • Integrated Sustainability and Ardea (Environment) • Wood Mackenzie TBD (marketing) • Ockham Group (financial analysis) • Qube (logistics)
Cut-off parameters	*The basis of the cut-off grade(s) or quality parameters applied.*	Revenues for nickel and cobalt ore are based on tonnes of mixed hydroxide precipitate (MHP) for the battery market. The MHP product specification for the KNP Goongarrie Hub was: • 39.9% Ni • 2.84% Co • 50% moisture content A cut-off grade of 0.5% Ni was used for primary ore definition and reporting after applying dilution to the block model. A cut-off of 0.5% NiEq and LOI greater than 25% was used for MN ore. The cut-off grades were based on block value calculations using variable costs dependent on acid consumption, and recoveries for each process steam.

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Criteria	JORC Code Explanation	Commentary
Mining factors or assumptions	*The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).*	The Open Pit Ore Reserve Estimate is underpinned by mine plans that deliver ore for processing on site to produce a concentrate for export. The mine planning activities included to derive the Ore Reserve were: • Detailed dilution modelling for a selective mining operation. • Open pit optimisation and selection of a viable economic shell as the basis for design plus, additional pit optimisation to identify expanded shells for supply of mineralised neutraliser. • Development of ultimate pit designs split into practical internal stages suitable for the size of the mining equipment and batter-berm parameters based on recommendations from PSM. • Mine scheduling using blending of ore types to provide consistent ore feed to the HPAL and AL circuits for processing including the fines fraction of the mineralised neutraliser. • Mine scheduling included balancing value objectives with practical considerations for in-pit disposal of tailings and hypersaline water. • Haulage simulations based on rim-pull curves and fuel burn factors were used to develop haulage cycle times and fuel consumption for each source and destination. • Mining costs derived from first principals for a contract mining operation.
	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.	Conventional open pit mining method using excavators and rigid dump trucks was selected as the most appropriate mining method. The bench heights were reviewed in parallel with the dilution modelling and 2 m flitch height selected. Blasting in the Saprock was assessed on 6 m benches. Final pits were each designed with access using dual lane ramps except for the final two benches where single lanes were adopted. Internal stages were not designed. Stage shells were iteratively developed during the study to optimise extraction sequence and management of tailings disposal with practical consideration for mining widths and access applied. Overlying alluvial material (to a depth of 5-25 m) will be pre-stripped in each stage prior to commencement of grade control drilling and ore mining procedures.
	The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.	A geotechnical assessment of the slope design was undertaken by Pells Sullivan Meynink (PSM) with batter / berm configurations provided for design of the final walls based on weathering profiles and footwall / hanging wall conditions. Grade control drilling is proposed using a 10 m by 10 m pattern angled vertically using RC drilling to minimise contamination. Drilling will be campaigned at 20 m vertical intervals in advance of mining.

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Criteria	JORC Code Explanation	Commentary
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	The Mineral Resource model created to estimate the Mineral Resources was used as the basis for pit optimisation and scheduling. To establish mineable quantities, open pit optimisation and sensitivities were completed on the diluted Mineral Resource model. Waste mining costs and an ore mining premium were applied at the block level in the diluted model. The base case optimisations considered Measured and Indicated materials only, and applied grade control, ore handling, processing, G&A, road transport, rail, and port costs to the tonnes processed or the concentrate produced. The net revenue used in the optimisation was derived using a base price of US$22,000/t for Ni and US$51,000/t for Co as supplied by Ardea adjusted to 85% payable for the MHP product, with 2.5% royalties and 0.69 USD/AUD exchange rate. Only diluted blocks with a positive value were identified as Ore during pit optimisation. The shell selection was based on the shell that matched the average discounted cash flow of the best and worst cases. This resulted in shells that captured more than 97% of the overall value with shells that were 7% to 37% smaller than the best-case shells.
	The mining dilution factors used.	The Mineral Resource block models were converted to Mining Models with dilution applied vertically to the 2 m block height on the basis that floor control using a 130 t excavator is expected to have a tolerance of +/- 200 mm. Grades were diluted based on the grade of the neighbouring block with the equivalent volume transferred between blocks. Mine recovery (ore loss) was assigned where diluted material falls below cut-off grade of 0.5% Ni for the primary. Equivalent zero dilution grade and ore losses reported by deposit were: • Big Four/Scotia Dam– 0.8% dilution and 1.7% ore loss. • Goon South – 0.6% dilution and 1.6% ore loss. • Goon Hill – 0.6% dilution and 3.0% ore loss. • Highway – 0.6% dilution and 1.3% ore loss. This was not applied to the Siberia North block model which was modelled at 20 m by 20 m by 4 m using Uniform Conditioning (UC) which already accounts for dilution.
	The mining recovery factors used.	No additional recovery factors were applied.
	Any minimum mining widths used.	The mine design used minimum mining width of 20 m for the base of pits. The stage designs targeted a minimum mining width of 200 m as a practical mining limit without compromising operability.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Only Measured and Indicated Mineral Resources were used to develop the pit optimisations on which the Ore Reserve pit designs were based. The reported Ore Reserve consist of Measured Resources converted to Proven Reserves and Indicated Resources converted to Probable Reserves inclusive of appropriate modifying factors in line with the JORC (2012) guidelines. The production targets developed for the PFS included the Inferred Resources captured within the pit designs, also with the modifying factors applied. This amounts to approximately 9% of the ore production target quoted or 8.5% of the LOM leach feed. Consequently, the Inferred material only contributes 3.4 years to the total mine life of 40.4 years and therefore removal of this material from the production target will have insignificant impact on the project NPV.

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Criteria	JORC Code Explanation	Commentary
	The infrastructure requirements of the selected mining methods.	The Project contains no site facilities with all mining infrastructure to be supplied and constructed by the Mining Contractor including: • Mine haul roads to pits and waste dumps. • Magazine and bulk explosives storage. • Heavy and light vehicle maintenance workshops and wash bays. • Mine administration facilities, ablutions, crib rooms and training rooms. • Water storage dams for dust suppression and dewatering. The mining contractor will be supplied power, water, accommodation, flights, fuel and fuel storage facilities by the Company. Such facilities have been considered in the PFS and incorporated by Wood.
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?*	Conventional comminution practices are to be used. High Pressure Acid Leach (HPAL) and Atmospheric Leach (AL) for nickel-cobalt laterite mineralisation are widely used within industry, are well understood and mature processes. The downstream processes are also well proven and commonly used in the wider metallurgical industry. Detailed geometallurgical data is collected and interpreted by Ardea. Metallurgical test work has been carried out on several ore types and composites over the Goongarrie Hub deposits. Variability testing has been completed on mineral samples which represent the first 5 to 10 years of production. Based on the results of the metallurgical testing and process modelling, final nickel and cobalt recoveries to MHP product are estimated at 88.6% and 92.8% of total metal inputs respectively. “Total metal inputs" includes nickel and cobalt contained in the mineralised neutraliser but does not include metal losses to mining waste or ore processing reject streams. No penalties were applied for any deleterious elements as the Company advised the product specification expected to be achieved is of saleable grade and no price penalty should apply. This is to be ratified in detailed discussions with consumers.
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.*	Significant environmental baseline studies have been completed and will continue in order to incorporate the 2023 expanded development footprint. The primary approvals requirements are expected to be completed as part of the DFS process. The tailings will be neutralised and disposed of in exhausted open pit voids as a slurry that once dry, will be dressed with a layer of waste rock and finally stock piled top soil that will be revegetated concurrent with ongoing mining activities for optimal long term environmental stability. Given the oxidised nature of the laterite nickel-cobalt mineralisation, no acid forming minerals are known to exist in the waste rock, so there is no potential for acid mine drainage.

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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.*	No infrastructure currently exists at the proposed mining area. The project is located in close proximity (70 km) to the regional mining town of Kalgoorlie which is easily accessible from the main capital of Perth. The Project is located within less that 1 km of an existing heavy haulage rail line with direct access to the Port of Fremantle and Port of Esperance. Both ports are deep-water facilities accessible by Cape class vessels and have ship loading infrastructure for iron ore export and sulphur handling. Land tenure for the mining area is held by the Company as described in section 2 of this table. Mining Leases are granted and provide adequate access to mine the deposit.
Costs	*The derivation of, or assumptions made, regarding projected capital costs in the study.* *The methodology used to estimate operating costs.* *Allowances made for the content of deleterious elements.* *The source of exchange rates used in the study.* *Derivation of transportation charges.* *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.* *The allowances made for royalties payable, both Government and private.*	The PFS mining cost estimate in 2022 AUD prices is supported by: • Budget pricing for equipment supply and life cycle maintenance cost provided by OEM distributors in Western Australia. • Minor servicing, oils and wear parts assigned using factors from the Orelogy database. • Diesel fuel consumption based on estimated equipment hours at a price of A$1.18/L after GST and off-highway rebates. • Operating and maintenance labour based on 2022 labour market estimates plus site based allowances, flights, accommodation, and oncosts. The PFS level capital cost estimate in 2022 AUD prices has been developed by Wood based on a mechanical equipment list and material take-offs with vendor pricing for large mechanical items and in-house Engineering estimates for process and non-process infrastructure in accordance with AACE Class 4 estimate. Wood developed capital cost estimates for: • Bulk earthworks • Water supply, storage, and treatment facilities • Major equipment including crushing, beneficiation, HPAL, AL and associated process service infrastructure. • Access roads and civils • Major electrical services Operating costs in 2022 AUD prices for the processing plant, mining, and site administration for a production rate of 3.5 Mtpa of ore have been estimated by appropriately experienced industry consultants. PFS level Operating costs were developed by Wood in accordance with the level of engineering for a AACE Class 4 estimate for mineral processing and associated services. Mine closure and rehabilitation liability costs have been included in the financial model based on areas of disturbance. These commitments are in line with the DMIRS cost estimates. Process operating and capital costs were estimated using the following Reserve Bank of Australia 24 March 2023 exchange rate assumption of USD 0.6687 to AUD 1.0. Concentrate transport charges have been applied on a contractor-based solution for haulage to the rail head, rail charges to Fremantle. No penalties for deleterious elements including have been applied in the financial model on the basis of the test work product specification and Company engagement with various end users. Government royalties have been applied at the rate of 2.5%.

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Criteria	JORC Code Explanation	Commentary
Revenue factors	*The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.* *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	Price forecasts supplied by Ardea for 38% Ni in MHP concentrate were applied in the pit optimisation, development of the mine schedule and financial model. Metal prices used to estimate the Ore Reserve were: • US$22,000/t for Ni with 85% payable for MHP concentrate • US$51,000/t for Co with 85% payable for MHP concentrate • 0.69 USD/AUD exchange rate Selling cost used to estimate the Ore Reserve were: • State Royalty of 2.5% • Product handling and road transport of A$133.46/t dry MHP concentrate. • Port and shipping charges of A$330.83/t dry
Market assessment	*The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.* *A customer and competitor analysis along with the identification of likely market windows for the product.* *Price and volume forecasts and the basis for these forecasts.* *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	Current and forecast demand for nickel is expected to continue to appreciate significantly due to a combination of traditional uses such as stainless steel and the rapidly growing Electric Vehicle (EV) sector. Nickel rich cathode chemistries for EVs continue to rise in popularity due to their higher energy density and greater range. Nickel Cobalt Manganese (NCM) 811 cathode chemistries are becoming increasingly common, and the nickel content continues to be increased in new batteries under development. High-purity MHP 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.*	A discount rate of 8% (using industry standard assumptions in calculating WACC) has been utilised to determine NPV for the KNP Goongarrie Hub Ore Reserve. Orelogy was provided with confidential financial information demonstrating the economic viability of the project based on this Ore Reserve Estimate. A range of sensitivities was produced for the pit optimisation which showed that the project was: • only slightly sensitive to mining costs and slope changes, • moderately sensitive to overhead and processing cost inputs, and • highly sensitive to changes in commodity price. The Ore Reserve Estimate is based on a PFS level of accuracy with inputs from open pit mining, processing, sustaining capital and contingencies scheduled and costed to generate the Ore Reserve cost estimate and cashflows. The Ore Reserve returns a positive NPV based on the PFS and associated modifying factors.

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Criteria	JORC Code Explanation	Commentary
Social	*The status of agreements with key stakeholders and matters leading to social licence to operate.*	Ardea engages with and enjoys strong stakeholder support from both the City of Kalgoorlie-Boulder and Shire of Menzies, with Goongarrie Hub tenements located in both local government areas. Ardea has executed a Native Title Agreement with the Maduwongga Claimant over the Project area; the Maduwongga are an Aboriginal Australian people of the Goldfields-Esperance region of Western Australia. The Company is abiding by Native Title regulations, with no issues flagged and voluntary discussions with indigenous stakeholders ongoing. Ardea has established an independently managed "The Eastern Goldfields Education Grant Program", designed to provide educational and increased lifestyle opportunities to young people who live in the Eastern Goldfields. Ardea was awarded Federal Government Major Project Status in March 2022, which is expected to assist with primary and secondary approvals in a timely and efficient manner.
Other	*To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:* *Any identified material naturally occurring risks.* *The status of material legal agreements and marketing arrangements.* *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.*	The Company has long-standing granted mining licences extending over all Goongarrie Hub deposits where Ore Reserves have been defined. There are no known significant naturally occurring risks to the project. Ardea requires standard resources sector environmental and final development and mining approvals. This work is ongoing and is to be completed as part of the upcoming Definitive Feasibility Study. No impediments to the grant of necessary approvals are expected.
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).*	Open Pit Ore Reserves have been derived from a mine plan that is based on extracting the nickel laterite mineralisation defined in the 2021 Mineral Resource Estimate. Proven and Probable Ore Reserves were determined from Measured and Indicated material respectively after applying appropriate modifying factors as per the JORC Code (2012) guidelines. These results 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 have been completed by Ardea and independent consultants contributing to the PFS. No external Audits of the Ore Reserve were undertaken prior to publication.

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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 Mineral Resource Estimate and hence the Ore Reserve Estimate relate to global estimates. The Ore Reserve Estimate is an outcome of the 2023 Mining PFS with geological, mining, metallurgical, processing, engineering, marketing, and financial considerations to allow for the cost of finance and tax. Engineering and cost estimations have been completed to a ±25% level of accuracy, consistent with a study of this nature. There has been an appropriate level of consideration given to all modifying factors to support the declaration and classification of the Ore Reserves. No production or reconciliation data is yet available for comparison.

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