



ASX & Media Release

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ASX Symbol

ARL

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Issued Capital

Fully Paid Ordinary Shares
171,894,772

Performance Rights
6,690,000

Options
4,000,000

ABN 30 614 289 342

Kalgoorlie Nickel Project Mineralised Neutraliser International Patent Application Lodged

Ardea Resources Limited (**Ardea** or the **Company**) is pleased to report that an international patent application has been lodged for the Kalgoorlie Nickel Project (**KNP**) Goongarrie Hub, Mineralised Neutraliser (**MN**) to protect the Company's Intellectual Property.

MN represents carbonate-bearing saprock which occurs within and most commonly at the base of the nickel-cobalt laterite profile. It contains low-grade nickel-cobalt mineralisation and will be mined as part of a conventional open pit mining operation.

Following mining, the target carbonate neutraliser is sourced from the MN by simple wet screen separation of magnesite-goethite-serpentine clay saprock into its constituent Serpentine-Goethite clay (termed "Fines") and Magnesite Neutraliser oversize (termed "Scats").

MN has the added benefits of:

- Contributing additional nickel-cobalt production from Neutraliser.
- Replacing imported limestone as process neutraliser which represents a cost saving from reduced consumable import and reduced carbon emissions by not having to rely on a conventional calcium carbonate neutraliser and transporting this material to site.

MN is a significant Research and Development (**R&D**) breakthrough¹ that is being incorporated into an updated KNP Goongarrie Hub Mineral Resource Estimate (**MRE**) and will also feature in the upcoming Prefeasibility Study (**PFS**) Ore Reserve.

Ardea's Managing Director and CEO, Andrew Penkethman said:

*"The Feasibility Study for the Kalgoorlie Nickel Project – Goongarrie Hub is nearing completion and has included matching the metallurgy of the Material Types to the High Pressure Acid Leach (**HPAL**), Atmospheric Leach (**AL**) and Mineralised Neutraliser (**MN**) circuits.*

For the Mineralised Neutraliser circuit, the separation of nickel-cobalt bearing Serpentine-Goethite clay from Magnesite neutraliser by simple low-cost screening is a significant processing breakthrough. The Serpentine-Goethite clay is geochemically suited as an Atmospheric Leach feed with the PFS mine schedule confirming MN Fines to be the dominant feed to the planned 0.5Mtpa AL. This generates additional nickel-cobalt production from an on-site material that is in any event essential to the flow sheet.

*The MN reduces operating costs by not having to import limestone as a neutraliser. The imported limestone alternatives generally have higher Acid Neutralisation Capacity (**ANC**) than the MN, but the additional nickel-cobalt units and avoidance of remote limestone mining, pit rehabilitation and transport costs far outweigh the lower ANC.*

By lodging a global patent application covering Ardea's Mineralised Neutraliser breakthrough, the Company is protecting its hard-won Research and Development Intellectual Property."

¹ Ardea ASX release 16 November 2022



1. LOCATION & BACKGROUND

The Goongarrie Hub is located 70km northwest from the world-renowned mining centre, the City of Kalgoorlie-Boulder, along established road and rail infrastructure. Goongarrie is Ardea's most advanced project within the broader KNP. The Goongarrie Hub includes the Goongarrie deposits from south to north, Scotia Dam, Big Four, Goongarrie South and Goongarrie Hill, along with Highway some 30km to the north and Siberia North, approximately 30km to the southwest (Figure 1). These six deposits are the main source of ore feed for the PFS currently being finalised.

Additional future Goongarrie plant feed is expected to also be sourced from Ghost Rocks and Black Range (Figure 1), but these deposits were not required to complete the PFS, given the very large proximal resource base already available.

The Mineralised Neutraliser (**MN**) concept was finalised during planning of the Highway metallurgical core drilling in 2021 and holes in the program were positioned to test the concept over the full MN target strike length.

Metallurgical laboratory results from a Mineralised Neutraliser bulk core sample assaying 0.8% Ni had a screen beneficiation at 75 microns generating 23% Fines, assaying 1.2% Ni and 77% Magnesite Neutraliser assaying 0.6% Ni.

Good Acid Neutralisation Capacity (**ANC**) of the magnesite Scats was confirmed (ASX release 16 November 2022).

2. ROLE OF MINERALISED NEUTRALISER

The PFS for the KNP Goongarrie Hub has been focussing 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.

The current PFS optimisation is based on two 1.5Mtpa HPAL autoclaves, along with 0.5Mtpa AL plant feed. The majority of the AL feed will be generated from MN Fines, so pit designs are now essentially agnostic to AL Material Type requirements.

The PFS assumes a feed allocation ranking approximately as follows:

- 69% Grind/HPAL.
- 17% Beneficiation/HPAL.
- 8% Mineralised Neutraliser Fines (to Grind/AL circuit).
- 4% Grind/AL
- 2% Beneficiation/AL (which being volumetrically minor can be blended with the Beneficiation/HPAL circuit).

The MN is the third largest source of nickel units to the Pregnant Liquor Solution (**PLS**).

Compared to traditional Nickel Laterite operations that transport limestone from the Nullarbor Plains or from Esperance lime sands, the MN cost per tonne benefits have a significant influence on pit optimisations, such that pits are driven deeper in order to access the saprock MN.

R&D undertaken by Ardea subsequent to the 2018 Ardea PFS and Expansion Study (ASX releases, 28 March 2018 and 24 July 2018) has demonstrated the benefits through AL being able to regulate acid production, utilise the excess heat and steam from the acid plant and generate power off grid without fossil fuels, which in particular were not key benchmarks in any of the earlier KNP feasibility study programs.

Since the Australian provisional patent application covering Ardea's MN R&D was filed at IP Australia (AU2022903389 entitled "Acid Neutraliser Composition" filed 11 November 2022), mineralogical and ANC studies have continued.

Ardea have now filed an International PCT Patent Application entitled "Acid Neutraliser Composition" on 13 June 2023 at the World Intellectual Property Office (**WIPO**). The international application, PCT/AU2023/050520, covers Ardea's MN R&D from their earlier Australian provisional patent application (see ASX announcement of 16 November 2022), along with the results from the more recent mineralogical and ANC studies. The filing of this International PCT Patent Application at WIPO gives Ardea the option to pursue patent protection for its MN technology in over 150 countries, including Australia, and represents a significant step towards gaining patent protection in countries around the world for this major flowsheet refinement.

Ardea acknowledges the support of the Federal Government for R&D in the Lithium Ion Battery (**LIB**) and renewable energy sectors, with this support contributing to breakthroughs such as those for the Goongarrie MN R&D. The guidance of Patent Attorneys FB Rice is particularly acknowledged.



3. MINING AND ENGINEERING STUDY TO DEFINE UPDATED ORE RESERVE

Perth-based mining and resource consultancy, Orelogy have completed detailed open pit resource optimisations and a mining study on the Goongarrie Hub Mineral Resource Estimate (MRE) to convert the Indicated and Measured JORC Code (2012) MRE to a Proven and Probable Ore Reserve that supports the 3.5Mtpa flowsheet by considering relevant modifying factors.

Details on the updated Ore Reserve will be included in the upcoming PFS summary ASX release in the coming weeks.

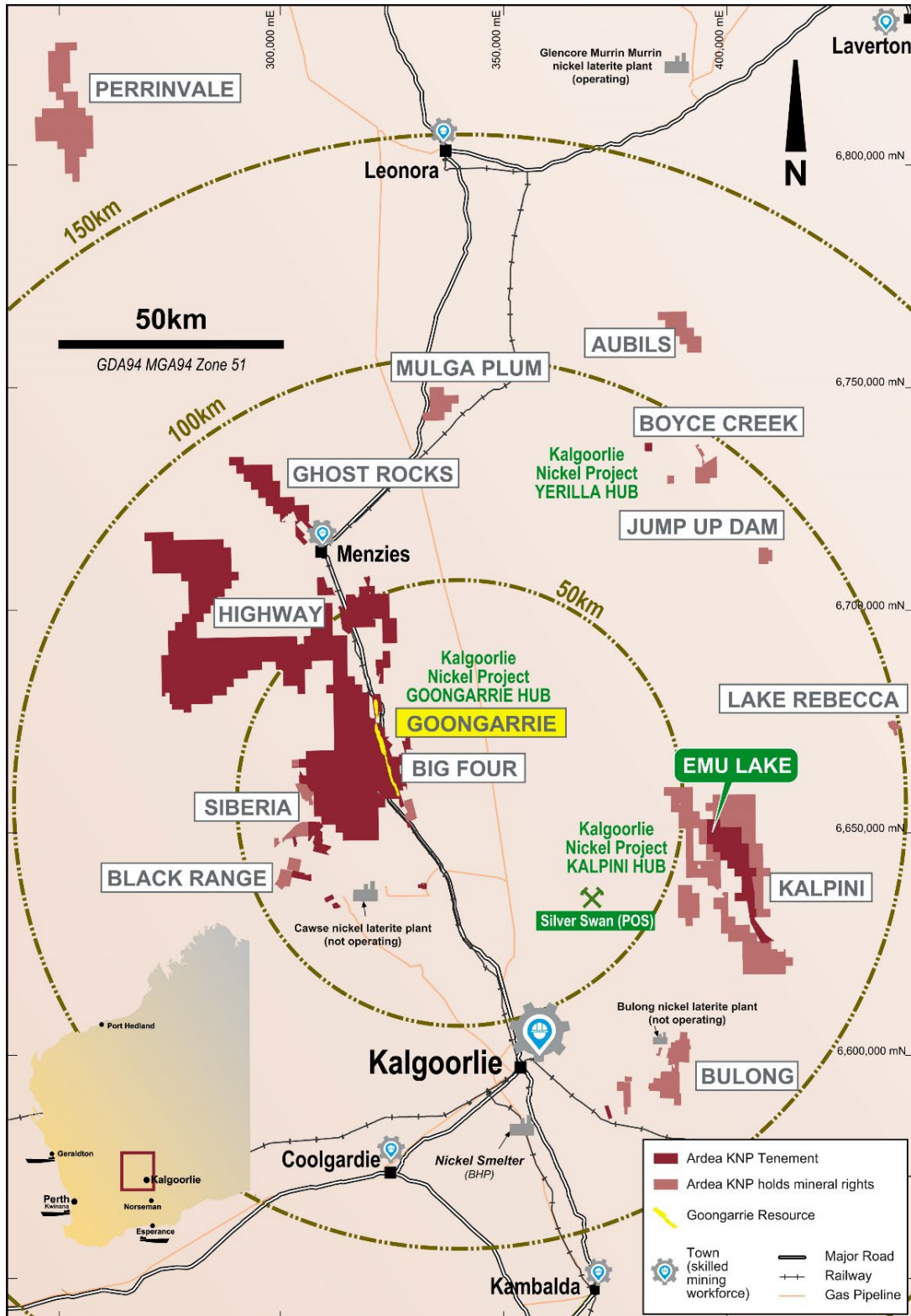


Figure 1: KNP location and infrastructure plan centred around the Goongarrie Hub. Projection GDA94 MGA94 Zone 51.



4. PROCESS DESIGN AND NON-PROCESS INFRASTRUCTURE STUDIES

Wood Engineers have been retained to complete detailed design and Capital and Operating Cost estimates for the process plant and non-process infrastructure. This information is currently being finalised and will be included in a detailed PFS summary of results.

During the course of the PFS, a number of value enhancements have been identified, that could not be incorporated without delaying the PFS completion date. These enhancements will be detailed in the upcoming PFS report and finalised prior to being incorporated in the Definitive Feasibility Study (**DFS**) scope.

In particular, the allocation of comminution infrastructure between MN and AL feed can be further optimised.

The consulting engineers are well advanced with completing study documents, including \pm 25% Capital and Operating Cost estimates.

5. PREFEASIBILITY STUDY WORK STREAMS

Ardea's PFS production base case is two x1.5Mtpa HPAL autoclaves combined with a 0.5Mtpa AL circuit using technology successfully deployed at existing nickel laterite operations to produce a Mixed Hydroxide Precipitate (**MHP**) intermediate product.

The PFS is nearing completion and is on track to be completed in the June Quarter, with results reported shortly thereafter. Major PFS workstreams have included:

- Open pit optimisations and detailed mine design completed which includes MN in the Ore Reserve and will be reported in the PFS. The lower operating cost from onsite MN effectively drives pits deeper, resulting in more simplified, less staged mining schedules. Pits are more often mined to final design depth in a single campaign.
- Deeper single campaign pits simplify scheduling of In-pit tailings disposal, confirmed as the base case to minimise the Goongarrie site environmental footprint.
- Deeper pits also drive pits wider and out of Walter Williams Formation clays into more competent Siberia Formation Komatiite, simplifying site geotechnical management.
- Flowsheet and supporting SysCAD model completed, now incorporating the expanded MN.
- Life Cycle Assessment (**LCA**) completed and to be reported as part of the PFS. The on-site Neutraliser obviates the need for rehabilitating remote limestone quarries on the Nullarbor Plain or at Esperance.
- Environmental surveys continuing in preparation for lodgement of EPA submissions.
- Process water options have been clearly defined with significant supporting work completed as part of the PFS.
- Significant value enhancements identified that will be carried forward into the DFS.

6. STRATEGIC PARTNER PROCESS AND PROJECT DEVELOPMENT FUNDING

Ardea continues to retain 100% of the nickel-cobalt off-take from the KNP and is continuing to engage with a range of companies who wish to secure nickel-cobalt off-take from the Goongarrie Hub. These organisations include LIB manufacturers, Electric Vehicle manufacturers, mining houses and commodities traders.

The majority of potential partners with whom Ardea is engaged are waiting for the detailed PFS report, updated Ore Reserve, and financial model to assist with completing their due diligence.

It is Ardea's aim to conclude the Strategic Partner process in H2, 2023, to select a Strategic Partner or Consortium of partners, who will work with Ardea to define the DFS scope of work, fund the DFS, reach a Final Investment Decision and work together to jointly secure project development funding.

Off-take is linked to the Strategic Partner/s playing a key role in securing project development funding.

To advance the project development funding process, Ardea continues to engage with Australian Export Credit Agency (**ECA**), Export Finance Australia and a number of overseas ECAs. These discussions will be accelerated once a Strategic Partner or Consortium of partners have been selected and binding Agreements formalised.

Discussions undertaken thus far indicate strong interest in securing offtake and funding the development of a major nickel-cobalt operation at the KNP Goongarrie Hub.



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:

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About Ardea Resources

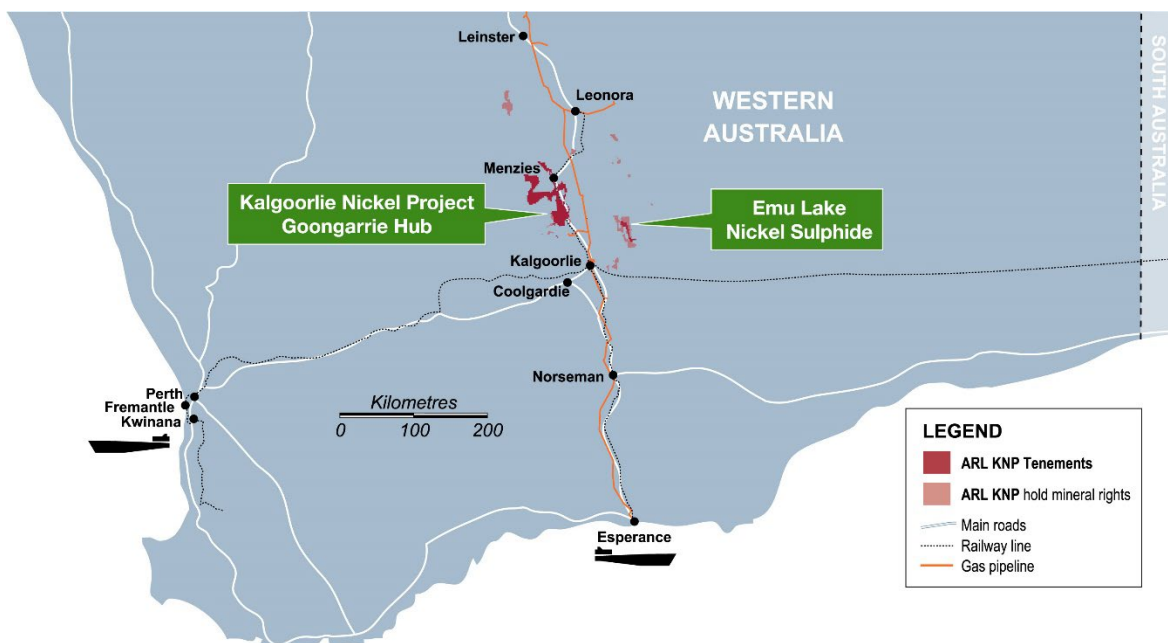
Ardea Resources (ASX:ARL) is an ASX-listed nickel resources company, with a large portfolio of 100%-controlled West Australian-based projects, focussed on:

- Development of the Kalgoorlie Nickel Project (**KNP**) and its sub-set the Goongarrie Hub, a globally significant series of nickel-cobalt and Critical Mineral deposits which host the largest nickel-cobalt resource in the developed world at **830Mt at 0.71% nickel and 0.046% cobalt for 5.9Mt of contained nickel and 380kt of contained cobalt** (Ardea ASX releases 15 February, 16 June 2021), located in a jurisdiction with exemplary Environmental Social and Governance (**ESG**) credentials, notably environment.
- 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 complementing the KNP nickel development strategy.

Ardea's KNP development with its 5.9 million tonnes of contained nickel is the foundation of the Company, with the nickel sulphide exploration, such as Emu Lake, as an evolving contribution to Ardea's building of a green, forward-facing integrated nickel company.

Put simply, in the Lithium Ion Battery (**LIB**) sector, the Electric Vehicle and Energy Storage System battery customers demand an ESG-compliant, sustainable, and ethical supply chain for nickel and other inputs. In the wet tropics, with their signature HPAL submarine tailings disposal and rain forest habitat destruction, an acceptable ESG regime is problematic. In contrast, the world-class semi-arid, temperate KNP Great Western Woodlands with its benign environmental setting is likely the single greatest asset of the KNP.

The KNP is located in a well-established mining jurisdiction with absolute geopolitical acceptance 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 precious metals and the prices thereof, progress in development of mineral properties, the Company's ability to raise funding privately or on a public market in the future, the Company's future growth, results of operations, performance, and business prospects and opportunities. Wherever possible, words such as "anticipate", "believe", "expect", "intend", "may" and similar expressions have been used to identify such forward-looking information. Forward-looking information is based on the opinions and estimates of management at the date the information is given, and on information available to management at such time.

Forward-looking information involves significant risks, uncertainties, assumptions, and other factors that could cause actual results, performance, or achievements to differ materially from the results discussed or implied in the forward-looking information. These factors, including, but not limited to, the ability to create and spin-out a gold focussed Company, fluctuations in currency markets, fluctuations in commodity prices, the ability of the Company to access sufficient capital on favourable terms or at all, changes in national and local government legislation, taxation, controls, regulations, political or economic developments in Australia or other countries in which the Company does business or may carry on business in the future, operational or technical difficulties in connection with exploration or development activities, employee relations, the speculative nature of mineral exploration and development, obtaining necessary licenses and permits, diminishing quantities and grades of mineral reserves, contests over title to properties, especially title to undeveloped properties, the inherent risks involved in the exploration and development of mineral properties, the uncertainties involved in interpreting drill results and other geological data, environmental hazards, industrial accidents, unusual or unexpected formations, pressures, cave-ins and flooding, limitations of insurance coverage and the possibility of project cost overruns or unanticipated costs and expenses, and should be considered carefully. Many of these uncertainties and contingencies can affect the Company's actual results and could cause actual results to differ materially from those expressed or implied in any forward-looking statements made by, or on behalf of, the Company. Prospective investors should not place undue reliance on any forward-looking information.

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

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

Compliance Statement (JORC Code 2012)

The resource estimation, metallurgy 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.

The Mineral Resource Estimate information shown in this ASX release has 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.