

**ASX & Media Release**

29 November 2018

**ASX Symbol**

ARL

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**Issued Capital**

*Fully Paid Ordinary Shares*

104,990,413

*Unlisted options*

*exercisable at \$0.25*

12,310,022

*Directors/Employee*

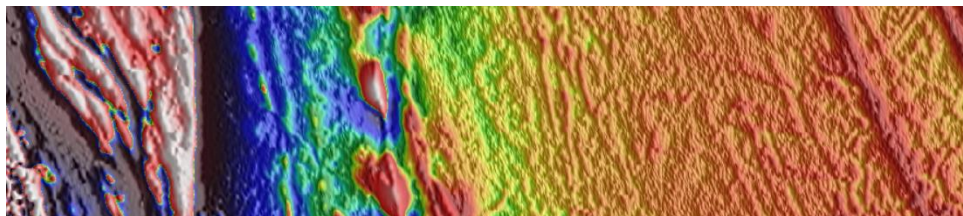
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3,240,000

**ABN 30 614 289 342**

## WA Gold Exploration – Update

Ardea's gold exploration programs for 2019 aim to realise potential of the Company's high-quality tenement package



*An extract of treated data from the Goongarrie high-resolution aeromagnetic survey.*

- Newly acquired high-resolution geophysical datasets over the Goongarrie Nickel Cobalt Project define new gold targets across the highly prospective Bardoc Tectonic Zone
- A new geological interpretation for the entire Mount Zephyr greenstone belt significantly enhances the understanding of the region and provides a new targeting tool
  - Numerous new targets defined and initial field assessments completed.
- Drill permitting advancing:
  - At Mount Zephyr – drilling permits received for Jones Area A and Pauls Find. Applications submitted for Dunn's Line, Dunn's North and Gale following recent Aboriginal heritage surveys.
  - At Goongarrie / Bardoc Tectonic Zone – permits in place in preparation for drilling.
- Initial gold and base metal drill programs aimed at the highest priority targets at Goongarrie and Mount Zephyr in WA.

With the recent completion of drilling at the Goongarrie Nickel Cobalt Project (GNCP), drill programs to test the highest priority gold and nickel sulphide targets in Ardea's extensive portfolio of Western Australian assets can commence shortly.

Target generation programs covering Ardea's WA gold projects, particularly at Mount Zephyr and the Bardoc Tectonic Zone (within and adjacent to the GNCP) has highlighted numerous high-quality, gold prospects that require evaluation. These targets can now be advanced and if exploration is successful could add significant value to the Company's asset base.

## The Bardoc Tectonic Zone (BTZ) at Goongarrie, WA

The BTZ is an 80 km long regional shear / fault system of the Eastern Goldfields province of Western Australia. It is a significant gold-producing structure that hosts the Paddington gold mine and the Goongarrie, Comet Vale, and Menzies gold mining centres. Around 20 km of the structure is located on Ardea's tenure at and around the GNCP. The fault system interconnects with the other major faults of the region, including the Boulder-Lefroy Fault to the south that hosts the Kalgoorlie mining centre (Figure 1).

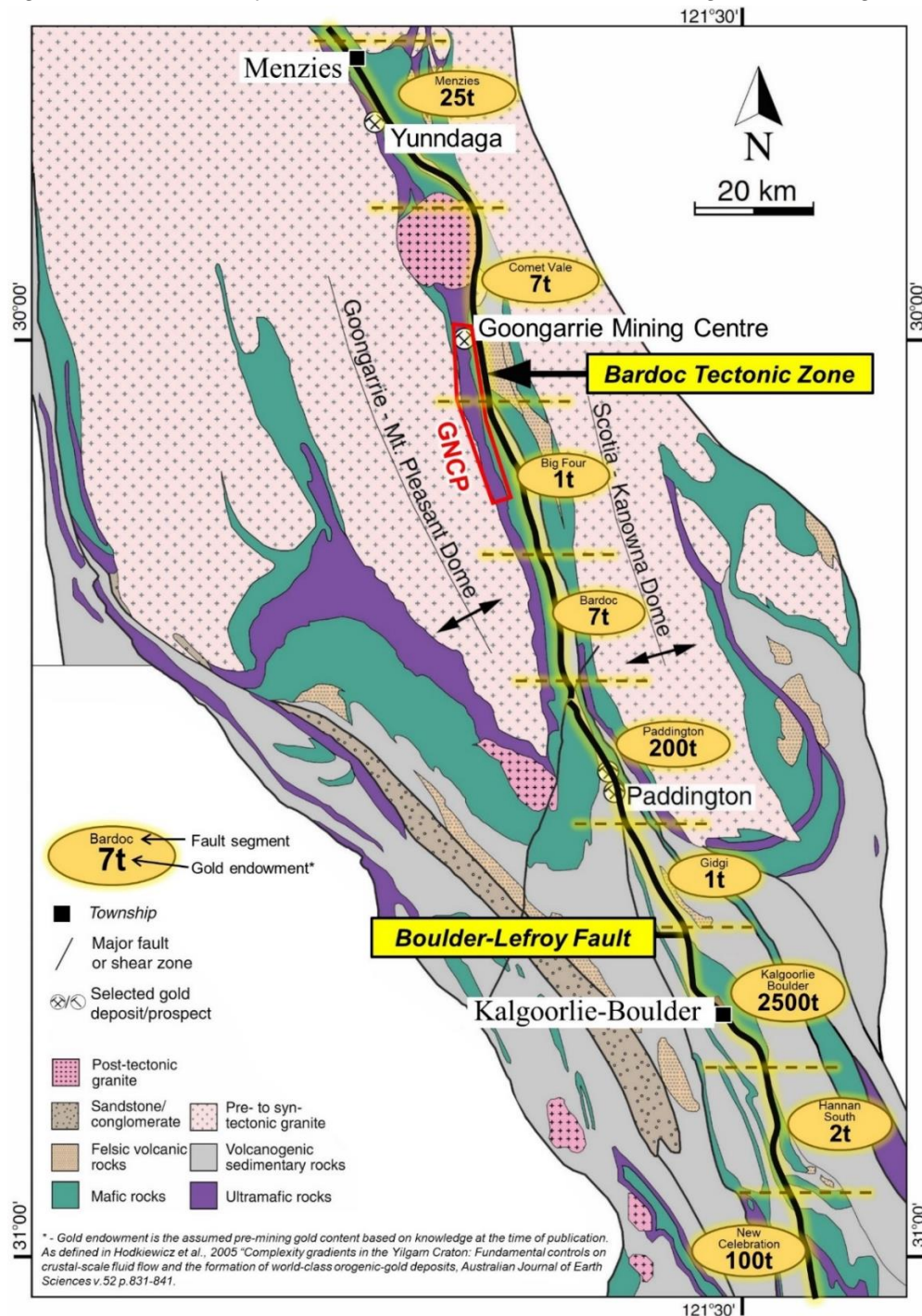


Figure 1 – Gold endowment along the Bardoc Tectonic Zone and the contiguous Boulder-Lefroy Fault, after Hodkiewicz et al. 2005. Gold endowment is based on historical production and known resources and reserves at the time of publication, so numbers would be expected to be higher now. Thick lateritic cover has impeded historic gold discovery over the Big Four and the Comet Vale fault segments (which fall within Ardea's tenure). This diagram suggests that significant gold mineralisation should be expected for these areas to show gold endowment similar to elsewhere along the fault system.



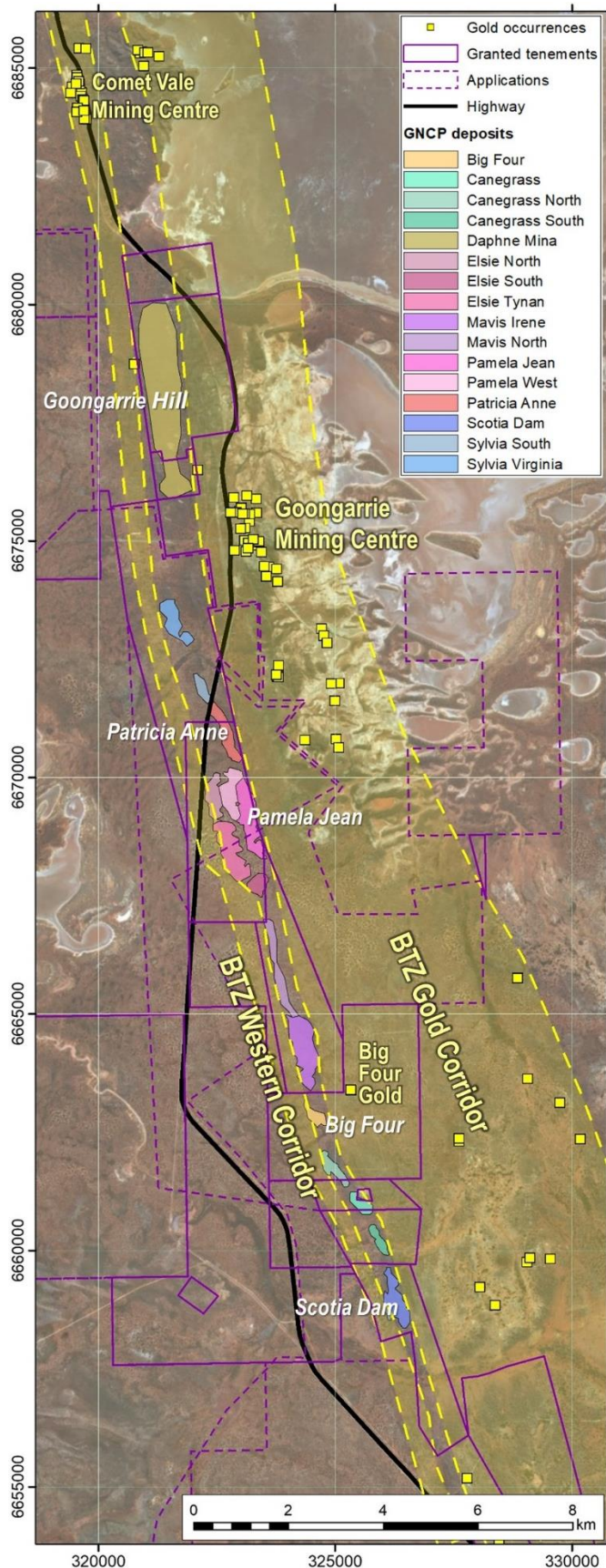


Figure 2 – The Gold Corridors of the Bardoc Tectonic Zone and its relationship to the Goongarrie Nickel Cobalt Project. Yellow dots represent historic gold occurrences and workings (from the state Minedex database).

At Goongarrie, the BTZ underlies the entirety of the extensive lateritic nickel-cobalt deposits. It is host to the numerous historic gold mining operations that are exposed in bedrock at the Goongarrie gold mining centre and historic town site. That same sequence is almost completely buried beneath laterite cover adjacent to the nickel-cobalt orebodies of the GNCP. As such, surface geochemistry is not effective, so geophysical target definition and drill sampling is required.

Gold mines and occurrences within the BTZ are located within distinct corridors (Figure 2). The main corridor lies east of the GNCP deposits and contains the Goongarrie mining centre and Ardea's Big Four gold mine. The thinner western corridor incorporates the Comet Vale mining centre as well as numerous gold occurrences detected during drilling of the GNCP.

Gold endowment varies significantly along the strike extent of the BTZ / Boulder-Lefroy fault system (Figure 1). Centres such as Kalgoorlie, Paddington and New Celebration host significantly greater gold endowment than other segments of the fault system. Ardea considers that the low historic production on the Comet Vale and Big Four fault segments is in part a function of the lack of exposure in these areas. The Company therefore considers that there is potential for significant gold deposits beneath cover in the BTZ at the GNCP, considering the gold-bearing nature of the BTZ and Boulder-Lefroy Fault to the south. As such, this area is considered highly prospective.

## New datasets acquired to assist in detailed target generation

Preliminary high resolution aeromagnetic, hyperspectral and digital elevation datasets have recently been acquired over the entire GNCP.

Final datasets are expected shortly. A substantial increase in resolution will significantly enhance Ardea's capability to define new gold targets throughout the area (Figure 3).

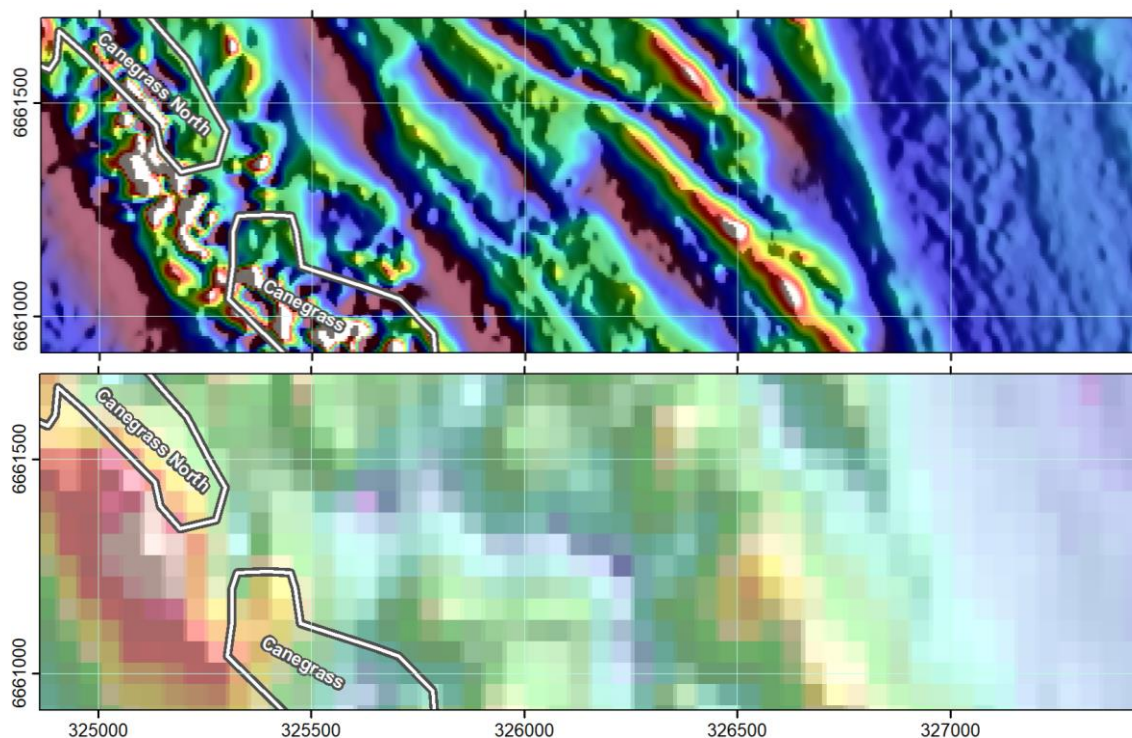


Figure 3 – Comparison of the new preliminary high-resolution aeromagnetic imagery (top) with the previous best dataset over a small portion of the southern part of the GNCP. The new datasets are being finalised and are expected to be a game-changer for definition and appraisal of gold targets at and around Goongarrie. Grid is 500 m

Full processing and manipulation of the new data is presently underway with definition and appraisal of targets within and adjacent to the BTZ at Goongarrie to be carried out upon receipt of the final treated aeromagnetic datasets. A fully ranked target generation program will then be undertaken to ensure that full systematic testing of the highest quality targets is performed in 2019.

The historic Big Four Gold Mine is located on Ardea's GNCP tenure. First pass characterisation of its aeromagnetic signature shows that there are multiple similar style targets throughout the Company's ground for the entire strike length of the GNCP within what is termed the "Gold Corridor" (Figure 2). All targets on Ardea's tenure are blind, being located beneath at least 20 m of lateritic and alluvial overburden, so will require drill testing.

Other styles of gold mineralisation are suggested by gold occurrences throughout the drilled areas of the GNCP. Significant gold anomalism within the laterite profile appears to be associated with various structure sets in saprock below the laterite, many well outside of the defined Gold Corridor. Such gold-in-laterite occurrences will be used to identify gold mineralisation targets in the bedrock below.

Geological appraisal of available outcrops and historic workings at Goongarrie and along strike is underway. The intent is to define in detail the geological controls on gold mineralisation in what is one of the less studied gold-hosting structures of the Eastern Goldfields.



## About Ardea's Big Four gold deposit, BTZ

The Big Four gold project (Figure 2) contains several old mine shafts which were worked in the early 1900s. Gold mineralisation is hosted by a brittle, fractured intermediate porphyry intrusive unit within the ultramafic Siberia Komatiite. The mineralisation is associated with quartz veining and pyrite/carbonate alteration. High-grade zones commonly contain coarse visible gold. The same porphyry rock type is commonly intersected in GNCP drilling, often with anomalous gold.

Most recently, mineralisation at the Big Four gold mine was drilled by Heron Resources in 2012. Heron defined significant gold hits (Figure 4).

Ardea considers the gold mineralisation intercepted to date at Big Four to be indicative of only one of the styles of gold mineralisation expected to be encountered within the BTZ. It is proof-of-concept that will be used to justify extensive drill programs adjacent to the GNCP.

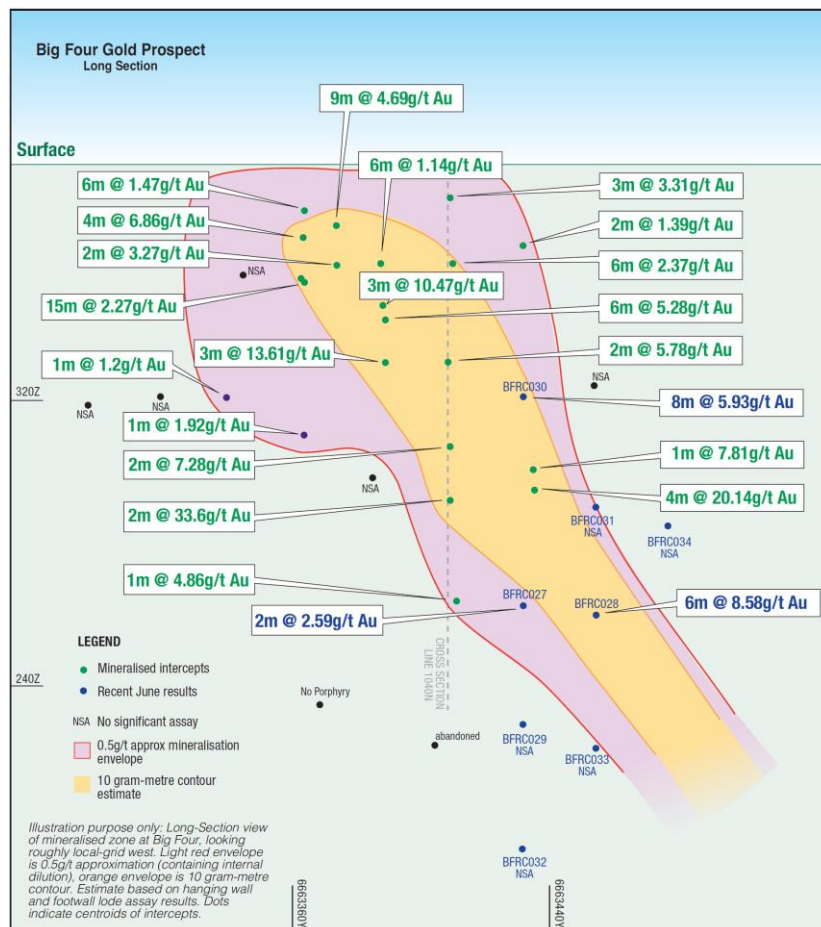


Figure 4 – Long section of the Big Four gold deposit, which is located around 800 m east of the nearest nickel-cobalt laterite mineralisation at Big Four. This diagram was first published by Heron Resources in June 2012.

Significantly, the Big Four fault segment is a major resource outlier within the BTZ, with only 1 tonne of historic gold endowment compared to 7–200 tonnes in other mining centres between Paddington in the south to Menzies in the north (Figure 1).

## Forthcoming 2019 drill programs at Mount Zephyr, WA

The Mount Zephyr greenstone belt represents a prime exploration opportunity for Ardea. The belt has been largely overlooked over past decades, and only now (under Ardea's management) is a systematic regional targeting exercise to define the region's most prospective gold and nickel sulphide projects being undertaken.

The regional geology has never before been defined consistently in such detail across the entire greenstone belt. Only now are parallels in the geology being drawn, between areas such as the Mount Windarra area and Yamarna regions to the east, and the Kalgoorlie area to the south, highlighting target areas that have previously gone unrecognised. Multiple potential gold and base metal target areas are in the process of being defined, ranked and assessed.

Active Ardea programs are shown in Figure 5 in bright yellow, with other gazetted, historically documented prospects and areas of interest shown in pale yellow. Newly generated targets presently under assessment are not shown.

First-pass drill programs at Jones Area A and Paul's Find are pegged out and ready to go. Recent access clearing and track rejuvenation was halted after the loader was bogged following very heavy rains across the Eastern Goldfields. The Company is also awaiting statutory DMIRS tenement approvals.

DMIRS Programs of Work (PoW) have been submitted for drill programs at Gale and Northern Dunn's. Both areas have undergone thorough Aboriginal heritage surveys recently. Whilst some heritage locations have been identified, both programs have been designed so that they can proceed without hindrance.

### 2019 RC drill program at Gale

A two-phase program of RC drilling is planned for the Gale gold prospect. The Company will commence drilling upon receipt of all necessary drill permits which are presently being assessed by DMIRS.

The first phase of drilling will comprise 21 RC drill holes spaced at approximately 160 x 160 m (thick black crosses, Figure 6). Holes will mostly be to a 50 m depth, with several to penetrate to 100 m. The footprint of the program is approximately that of the surface outcrop gold anomaly. The program is expected to confirm historic results and provide a precursor to a second expanded phase of drilling.

Contingent upon the results of Phase 1, Phase 2 will extend the drill program to cover more of the interpreted extent of the mineralised granite under cover. This program will comprise an additional 42 RC drill holes beyond the defined surface footprint of the outcrop-limited gold anomaly. Full implementation of the program will cover an area measuring approximately 1,400 m x 1,050 m.

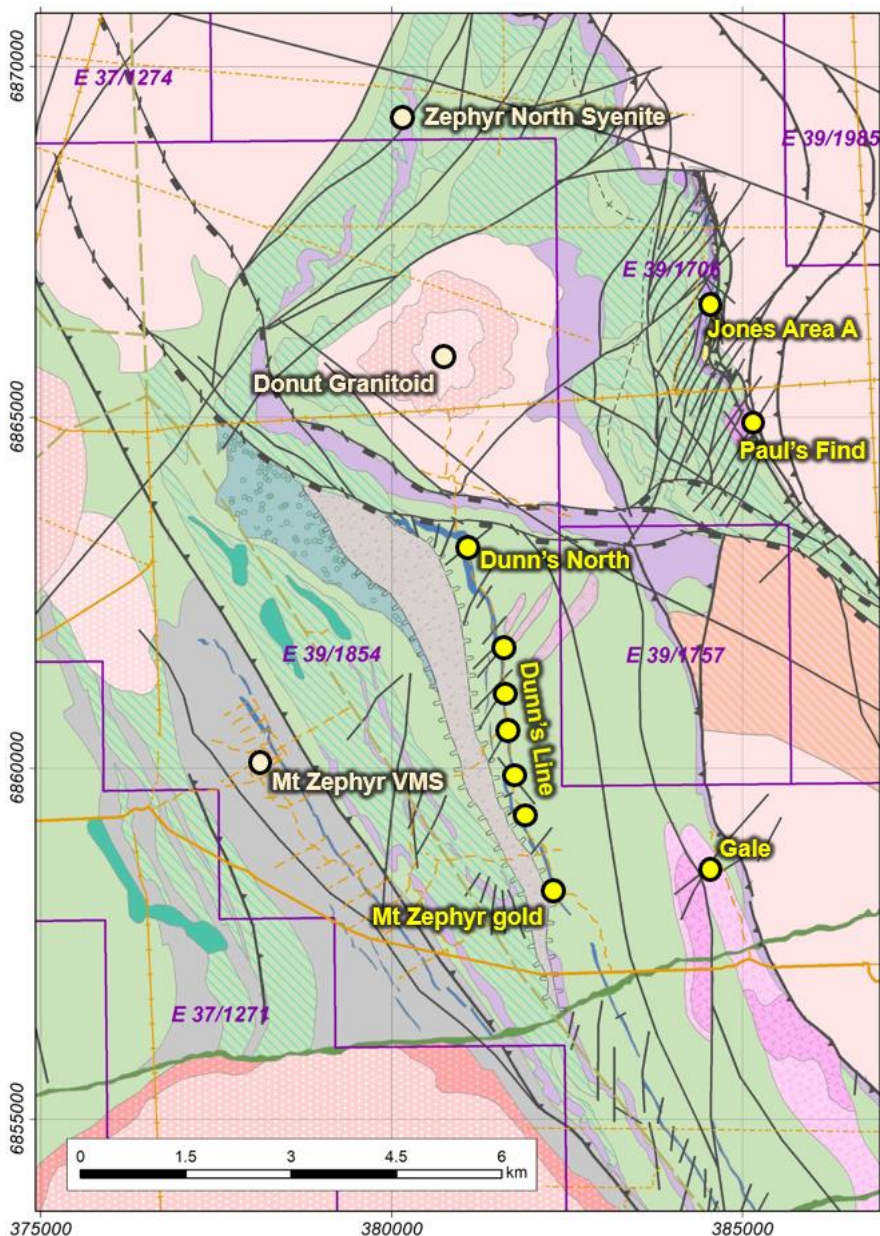


Figure 5 – Ardea's active programs (bright yellow) in the Mount Zephyr project area and other gazetted project areas (pale yellow). Solid geology is Ardea's all new dataset from regional geophysical interpretation (greens = mafic rocks, purples = ultramafic rocks, greys = sedimentary rocks, blue = banded iron-formation, pinks = granites).



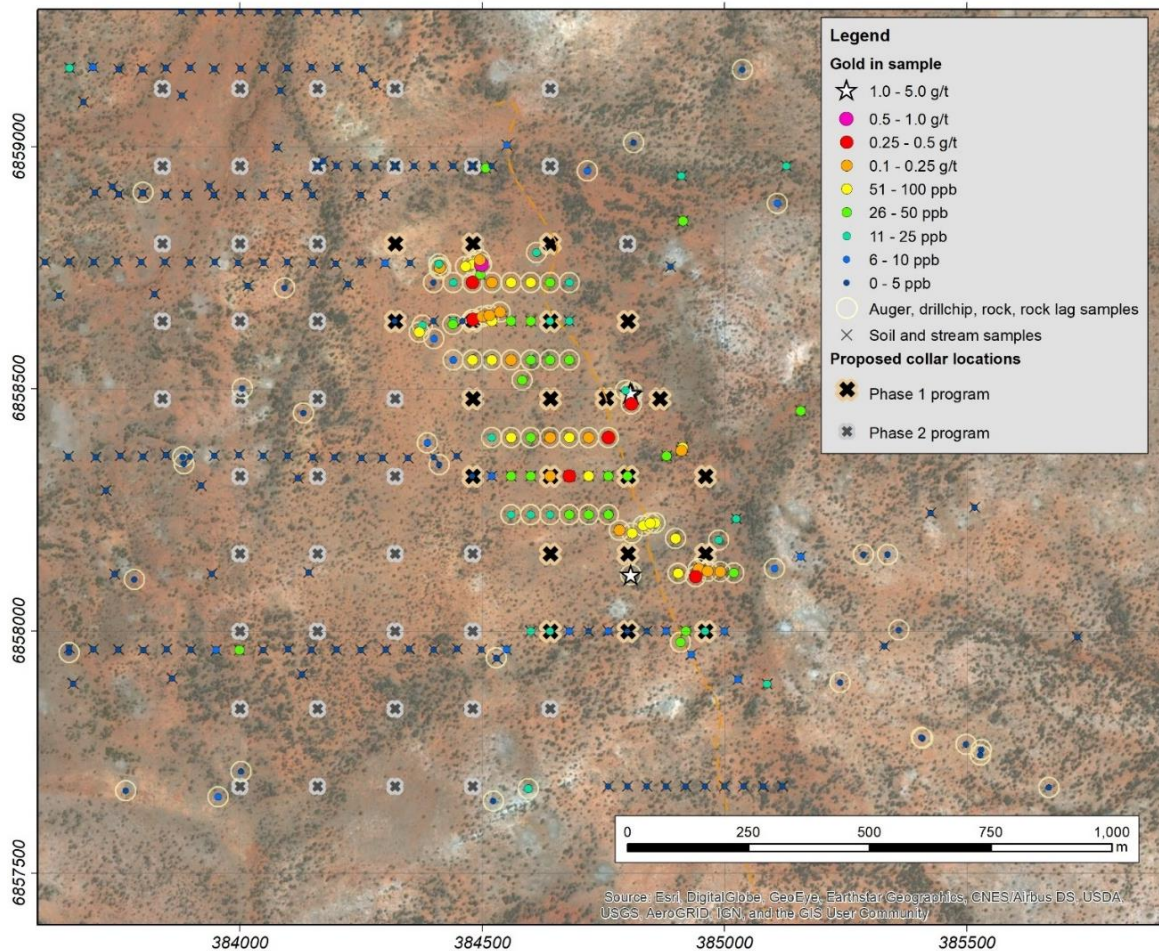


Figure 6 – Proposed two-phase RC drill program at Gale, showing very strong soil and rock-chip geochemistry anomalism

## About the Gale prospect

The Gale gold prospect is defined by surface anomalism in gold, arsenic, copper and barium. The gold anomaly in surface sampling demarcates a footprint limited by outcrop extent of 900 x 300 m defined by 25 samples of various types each exceeding 0.1 g/t Au (Figure 6). These values peak at 1.49 g/t gold. In the well explored Eastern Goldfields Province, such a surface anomaly is exceptional. Gold in soil values peak at a very high 273 ppb.

Mineralisation at Gale is hosted by granites and is associated with sericitic, pyritic, and hematitic alteration reminiscent of Dacian's Jupiter gold mine along strike to the south. Historic 1990s shallow RAB drilling returned anomalous geochemical results including:

- MZR004, 18 m at 0.51 g/t Au from surface
- MZR019, 18 m at 0.48 g/t Au from surface
- MZR020, 2 m at 3.12 g/t Au from 8 m
- MZR024, 2 m at 1.64 g/t Au from 2 m
- MZR049, 6 m at 1.26 g/t Au from surface



Figure 7 – Poorly exposed, altered, gold-mineralised granite is examined by the Ardea team at Gale.



Attempts at the time to correlate intercepts vertically failed and the project was abandoned. However, Ardea's reappraisal of historic data using a sub-horizontal Jupiter-style model shows promise. More data is required, and this will be addressed with the forthcoming program.

## 2019 aircore program at Dunn's North

An initial aircore drill program at Dunn's North is designed to appraise deformed and altered banded iron-formation (BIF) units interpreted beneath cover adjacent to the newly defined E-W suture. The suture appears to be a south-dipping feature over which the BIF appears to have undergone significant deformation, re-orienting from a north-south strike to a roughly east-west strike.

Further south on Dunn's Line, historic gold workings are associated with faults in the banded iron-formation. In aeromagnetic data, such locations correspond to demagnetisation of the BIF units. Similar but more extensive and intense demagnetisation is recognised in aeromagnetic data at Dunn's North, which is overlain and completely obscured by alluvial and sheetwash sediments. The geochemical response of these transported sediments is not considered to be indicative of underlying potential. No historic drilling was found in Ardea field checking.

Dunn's North is a virgin target defined by Ardea, with no historic work of any kind apart from sparse, non-representative surface sampling. The target was identified and prioritised as a result of Ardea's regional appraisal and reinterpretation of the Mount Zephyr greenstone belt. As such, inexpensive aircore drilling is planned for first-pass testing of the target.

The Dunn's North area also comprises an extensive series of targets hosted by ultramafic rocks within the E-W suture. Intense demagnetisation is interpreted over an area measuring approximately 3.2 km by 1.4 km. If correct, such a demagnetisation zone would likely represent a very large hydrothermal event that, based on the Dunns Line to the immediate south, could possibly be gold-bearing. This area will be a target of forthcoming work.

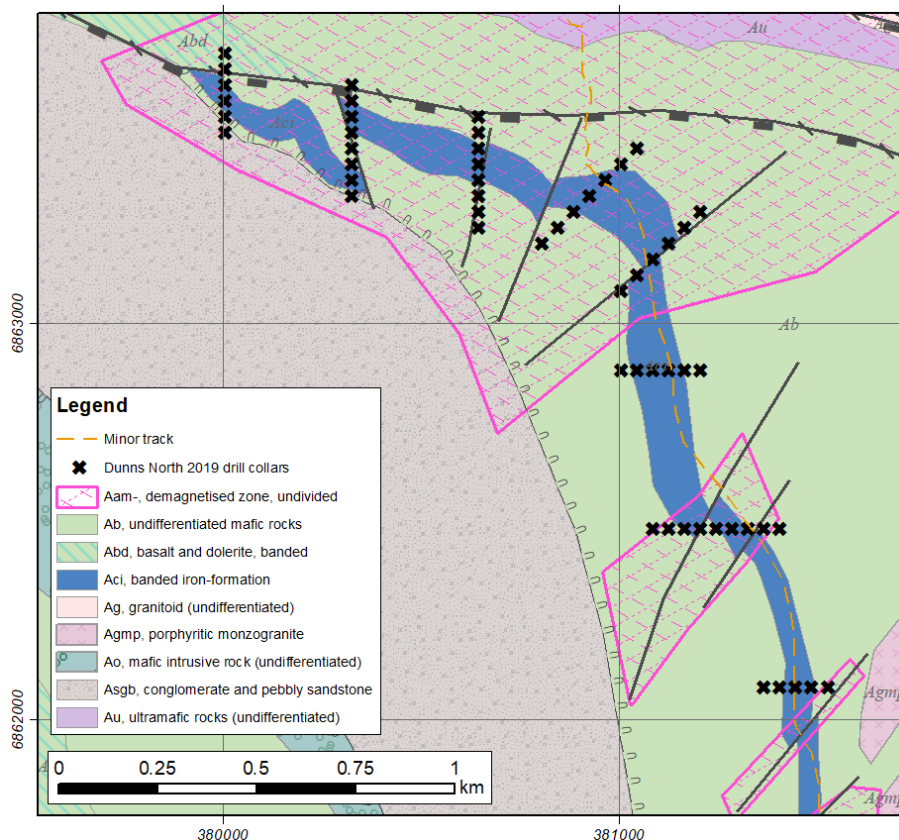


Figure 8 – Proposed drill holes over demagnetised banded iron-formation at Dunn's North. Geology is Ardea's new interpreted solid geology in an area of no outcrop.



## Other Mount Zephyr drill programs

Programs are also ready to go at Jones Area A and Paul's Find on the eastern margin of the Mount Zephyr greenstone belt (Figure 5).

- **Jones Area A** – outcropping base metal (nickel-copper sulphide) gossans adjacent to a banded iron-formation show similarities to the highly mineralised Mount Windarra stratigraphy on the opposite side of the Mount Margaret Anticline to the east. As on Dunn's Line, the BIF ridge is cross-cut by numerous faults showing local demagnetisation, suggesting hydrothermal alteration and the potential for gold.
- **Paul's Find** – recent gold prospecting activity in alluvials requires location of the bedrock gold source. Newly discovered, poorly exposed altered porphyries which deflect the greenstone-bounding fault system may be that source and require drill testing.

PoWs have been approved for these areas. They are likely to be drilled pending favourable final internal assessment.

In addition to these, numerous other targets are under assessment and will be ranked and, where appropriate, explored in due course.

## A golden 2019

Ardea's gold exploration program will be systematic and extend to all project areas in 2019. Historic gold workings at Taurus (east of Kalgoorlie), Bedonia (east of Norseman) and Ghost Rocks (NW of Menzies on a probable extension of the BTZ) will be assessed and are all likely to be drilled. Secondary NSW gold projects will also be assessed, with Black Bullock, Ophir, Mount Aubrey, Yeoval and others being ranked and prioritised.

**For further information regarding Ardea, please visit [www.ardearesources.com.au](http://www.ardearesources.com.au) or contact:**

**Ardea Resources:**

Ms Katina Law

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### **Compliance Statement (JORC 2012)**

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

1. *Kalgoorlie Nickel Project including gold-prospective zones on 21 October 2013 and 31 June 2014, October 2016, 2016 Heron Resources Annual Report and 6 January 2017;*
2. *KNP Cobalt Zone Study and Big Four Gold in Ardea supplementary Prospectus 6 January 2017*

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

*The information in this report that relates to KNP Exploration Results is based on information originally compiled by previous and current full-time employees of Heron Resources Limited and after February 2017 employees of Ardea Resource Limited. The Exploration Results and data collection processes have been reviewed, verified and re-interpreted by Mr Ian Buchhorn who is a Member of the Australasian Institute of Mining and Metallurgy and currently a director of Ardea Resources Limited. Mr Buchhorn has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the exploration activities undertaken to qualify as a Competent Person*

as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Buchhorn consents to the inclusion in this report of the matters based on his information in the form and context that it appears.

The exploration and gold targeting summaries are based on information reviewed by Dr Matthew Painter, who is a Member of the Australian Institute of Geoscientists. Dr Painter is a full-time employee and a director of Ardea Resources Limited and has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Dr Painter has reviewed this press release and consents to the inclusion in this report of the information in the form and context in which it appears.

#### **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 ability to complete the Ardea spin-out, 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 complete the Ardea spin-out on the basis of the proposed terms and timing or at all, fluctuations in currency markets, fluctuations in commodity prices, the ability of the Company to access sufficient capital on favourable terms or at all, changes in national and local government legislation, taxation, controls, regulations, political or economic developments in Australia or other countries in which the Company does business or may carry on business in the future, operational or technical difficulties in connection with exploration or development activities, employee relations, the speculative nature of mineral exploration and development, obtaining necessary licenses and permits, diminishing quantities and grades of mineral reserves, contests over title to properties, especially title to undeveloped properties, the inherent risks involved in the exploration and development of mineral properties, the uncertainties involved in interpreting drill results and other geological data, environmental hazards, industrial accidents, unusual or unexpected formations, pressures, cave-ins and flooding, limitations of insurance coverage and the possibility of project cost overruns or unanticipated costs and expenses, and should be considered carefully. Many of these uncertainties and contingencies can affect the Company's actual results and could cause actual results to differ materially from those expressed or implied in any forward-looking statements made by, or on behalf of, the Company. Prospective investors should not place undue reliance on any forward-looking information. Although the forward-looking information contained in this news release is based upon what management believes, or believed at the time, to be reasonable assumptions, the Company cannot assure prospective purchasers that actual results will be consistent with such forward-looking information, as there may be other factors that cause results not to be as anticipated, estimated or intended, and neither the Company nor any other person assumes responsibility for the accuracy and completeness of any such forward-looking information. The Company does not undertake, and assumes no obligation, to update or revise any such forward-looking statements or forward-looking information contained herein to reflect new events or circumstances, except as may be required by law.

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



# Appendix 6 – JORC Code, 2012 Edition, Table 1 report

## Section 1 Sampling Techniques and Data

(Criteria in this section applies to all succeeding sections)

### Big Four Prospect

Criteria	JORC Code explanation	Commentary
<b>Sampling techniques</b>  <i>Note: Due to the similarity of the deposit styles, procedures and estimations used this table represents the combined methods for all Ardea Resources (ARL) Nickel and cobalt Laterite Resources. Where data not collected by ARL has been used in the resource calculations, variances in techniques are noted.</i>	<ul style="list-style-type: none"> <li>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.</li> <li>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</li> <li>Aspects of the determination of mineralisation that are Material to the Public Report.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>All holes were sampled "in-principle" on a 2 metre down hole interval basis, with exceptions being made due to visual geological/mineralogical breaks, and end of hole final-lengths. All sampling lengths were recorded in ARL's standard core-sampling record spreadsheets. Sample condition, sample recovery and sample size were recorded for all drill-core samples collected by ARL.</li> <li>The drill spacing was designed to augment historic drilling, bringing drill densities down from 80mE x 80mN to 40mE x 80mN. The drilling will also contribute to provide material for the purpose of metallurgical sampling and production of production of pilot marketing samples of cobalt sulphate and nickel sulphate.</li> <li>Industry standard practice was used in the processing of samples for assay, with 2m intervals of RC chips collected in green plastic bags. As the drilling was within a 2012 JORC-compliant Indicated Ni-Co resource, prior knowledge of the resource peculiarities contributes and assists significantly to current interpretation of mineralisation.</li> <li>Assay of samples utilised standard laboratory techniques with standard ICP-AES undertaken on 50 gram samples for Au, Pt and Pd, and lithium borate fused-bead XRF analysis used for the remaining multi-element suite. Further details of lab processing techniques are found in Quality of assay data and laboratory tests below.</li> </ul>
<b>Drilling techniques</b>	<ul style="list-style-type: none"> <li>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).</li> </ul>	<ul style="list-style-type: none"> <li>In this most recent program, Ardea drilled the Goongarrie South deposit with 43 diamond drill holes on a varying MGA94 z51 northing grid-spacing of 80m at several localities (see Figure 2). Holes were vertical (-90 degree dip), designed to optimally intersect the sub-horizontal mineralisation. RC drilling was performed with a face sampling hammer (bit diameter between 4½ and 5 ¼ inches) and samples were collected by either a cone (majority) or riffle splitter using 2 metre composites. Sample condition, sample recovery and sample size were recorded for all drill samples collected by ARL.</li> </ul>
<b>Drill sample recovery</b>	<ul style="list-style-type: none"> <li>Method of recording and assessing core and chip sample recoveries and results assessed.</li> <li>Measures taken to maximise sample recovery and ensure representative nature of the samples.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>RC chip sample recovery was recorded by visual estimation of the reject sample, expressed as a percentage recovery. Overall estimated recovery was approximately 80%, which is considered to be acceptable for nickel-cobalt laterite deposits. RC Chip sample condition recorded using a three code system, D=Dry, M=Moist, W=Wet. A small proportion of samples were moist or wet (11.5%), with the majority of these being associated with soft goethite clays, where water injection has been used to improve drill recovery.</li> <li>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.</li> </ul>
<b>Logging</b>	<ul style="list-style-type: none"> <li>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.</li> <li>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.</li> <li>The total length and percentage of the relevant intersections logged.</li> </ul>	<ul style="list-style-type: none"> <li>Drilling was undertaken for metallurgical purposes, and twinning comparison with previous historic RC holes. The level of logging detail utilised supports this type of review and was as follows: Visual geological logging was completed for all drilling both at the time of drilling (using standard Ardea laterite logging codes), and later over relevant met-sample intervals with a metallurgical-logging perspective. Geochemistry from historic data was used together with logging data to validate logged geological horizons. Nickel laterite profiles contain geochemically very distinct horizons and represent a sound validation tool against visual logging. The major part of the logging system was developed by Heron Resources Limited specifically for the KNP and was designed to facilitate future geo-metallurgical studies. It has been customised by Ardea Resources Limited as considered appropriate for recent developments. Planned drill hole target lengths were adjusted by the geologist during drilling. The geologist also oversaw all sampling and drilling practices. A mixture of ARL employees and contract geologists supervised all drilling. Quarter core of all drilling has been retained for reference.</li> <li>Visual geological logging was completed for all RC drilling on 1 metre intervals. The logging system was developed by Heron Resources Limited specifically for the KNP and was designed to facilitate future geo-metallurgical studies. Logging was performed at the time of drilling, and planned drill hole target lengths adjusted by the</li> </ul>

Criteria	JORC Code explanation	Commentary
		<p>geologist during drilling. The geologist also oversaw all sampling and drilling practices. A mixture of ARL employees and contract geologists supervised all drilling. A small selection of representative chips were also collected for every 1 metre interval and stored in chip-trays for future reference. Only drilling contractors with previous nickel laterite experience and suitable rigs were used.</p> <ul style="list-style-type: none"> <li>The geological legend used by ARL is a qualitative legend designed to capture the key physical and metallurgical features of the nickel-cobalt laterite mineralisation. Logging captured the colour, regolith unit and mineralisation style, often accompanied by the logging of protolith, estimated percentage of free silica, texture, grain size and alteration. Logging correlated well with the geochemical algorithm developed by Heron Resources Limited for the Yerilla Nickel Project for material type prediction from multi-element assay data.</li> <li></li> </ul>
<b>Sub-sampling techniques and sample preparation</b>	<ul style="list-style-type: none"> <li>If core, whether cut or sawn and whether quarter, half or all core taken.</li> <li>If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.</li> <li>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</li> <li>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</li> <li>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.</li> <li>Whether sample sizes are appropriate to the grain size of the material being sampled.</li> </ul>	<ul style="list-style-type: none"> <li>2 metre (and rarely 1 metre) composite samples were recovered using a 15:1 rig mounted cone splitter or trailer mounted riffle splitter during drilling into a calico sample bag. Sample target weight was between 2 and 3kg. In the case of wet clay samples, grab samples taken from sample return pile, initially into a calico sample bag. Wet samples stored separately from other samples in plastic bags and riffle split once dry.</li> <li>QAQC was employed. A standard, blank or duplicate sample was inserted into the sample stream 10 metres on a rotating basis. Standards were either quantified industry standards, or standards made from homogenised bulk samples of the mineralisation being drilled (in the case of the Yerilla project). Every 30th sample a duplicate sample was taken using the same sample sub sample technique as the original sub sample. Sample sizes are appropriate for the nature of mineralisation.</li> </ul>
<b>Quality of assay data and laboratory tests</b>	<ul style="list-style-type: none"> <li>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</li> <li>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.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>All Ardea samples were submitted to Kalgoorlie ALS laboratories and transported to ALS Perth, where they were pulverised. Analysis at ALS Perth was by ICP utilising a 50g charge (lab method PGM-ICP24) for PGM suite elements (Au, Pt, Pd). Additional analysis was undertaken by sending subsamples to ALS Brisbane where analysis by silicate fusion / XRF analysis (lab method ME-XRF12n) for multiple grade attributes for laterite ores (Al<sub>2</sub>O<sub>3</sub>, As, BaO, CaO, Cl, Co, Cr<sub>2</sub>O<sub>3</sub>, Cu, Fe<sub>2</sub>O<sub>3</sub>, Ga, K<sub>2</sub>O, MgO, MnO, Na<sub>2</sub>O, Ni, P<sub>2</sub>O<sub>5</sub>, Pb, Sc, SiO<sub>2</sub>, SO<sub>3</sub>, SrO, TiO<sub>2</sub>, V<sub>2</sub>O<sub>5</sub>, Zn, ZrO<sub>2</sub>). Fusion / XRF analysis is an industry standard method used to analyse nickel laterite ores and ALS is a reputable commercial laboratory with extensive experience in assaying nickel laterite samples from numerous Western Australian nickel laterite deposits.</li> <li>ALS routinely inserts analytical blanks, standards and duplicates into the client sample batches for laboratory QAQC performance monitoring.</li> <li>Ardea also inserted QAQC samples into the sample stream at a 1 in 10 frequency, alternating between blanks (industrial sands) and standard reference materials. Additionally, a review was conducted for geochemical consistency between historically expected data, recent data, and geochemical values that would be expected in a nickel laterite profile.</li> <li>All of the QAQC data has been statistically assessed. There were rare but explainable inconsistencies in the returning results from standards submitted, and it has been determined that levels of accuracy and precision relating to the samples are acceptable.</li> </ul>
<b>Verification of sampling and assaying</b>	<ul style="list-style-type: none"> <li>The verification of significant intersections by either independent or alternative company personnel.</li> <li>The use of twinned holes.</li> <li>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</li> <li>Discuss any adjustment to assay data.</li> </ul>	<ul style="list-style-type: none"> <li>All Ardea samples were submitted to Kalgoorlie ALS laboratories and transported to ALS Perth, where they were pulverised. Analysis at ALS Perth was by ICP utilising a 50g charge (lab method PGM-ICP24) for PGM suite elements (Au, Pt, Pd). Additional analysis was undertaken by sending subsamples to ALS Brisbane where analysis by silicate fusion / XRF analysis (lab method ME-XRF12n) for multiple grade attributes for laterite ores (Al<sub>2</sub>O<sub>3</sub>, As, BaO, CaO, Cl, Co, Cr<sub>2</sub>O<sub>3</sub>, Cu, Fe<sub>2</sub>O<sub>3</sub>, Ga, K<sub>2</sub>O, MgO, MnO, Na<sub>2</sub>O, Ni, P<sub>2</sub>O<sub>5</sub>, Pb, Sc, SiO<sub>2</sub>, SO<sub>3</sub>, SrO, TiO<sub>2</sub>, V<sub>2</sub>O<sub>5</sub>, Zn, ZrO<sub>2</sub>). Fusion / XRF analysis is an industry standard method used to analyse nickel laterite ores and ALS is a reputable commercial laboratory with extensive experience in assaying nickel laterite samples from numerous Western Australian nickel laterite deposits.</li> <li>ALS routinely inserts analytical blanks, standards and duplicates into the client sample batches for laboratory QAQC performance monitoring.</li> <li>Ardea also inserted QAQC samples into the sample stream at a 1 in 20 frequency, alternating between duplicates splits, blanks (industrial sands) and standard reference materials.</li> <li>Additionally, a review was conducted for geochemical consistency between historically expected data, recent data, and geochemical values that would be expected in a nickel laterite profile.</li> <li>All of the QAQC data has been statistically assessed. There were some inconsistencies in the returning results from standards submitted, relating to the XRF analysis suite. This has been thoroughly investigated with the conclusion that either</li> </ul>



Criteria	JORC Code explanation	Commentary
		some standards were not correctly identified and recorded on submission, or time/external influence has had an impact on some of the quality of the values standards, as figures reported for the relevant errant standards were significantly different to the normal recognisable standard values. Ardea has undertaken its own further in-house review of QAQC results of the ALS routine standards, 100% of which returned within acceptable QAQC limits. This fact combined with the fact that the data is demonstrably consistent and repeated for expected Ni/Co values within the lateritic ore profiles of both reported areas and is also consistent with nearby abundant historic drilling data, has meant that the results are considered to be acceptable and suitable for reporting.
<b>Location of data points</b>	<ul style="list-style-type: none"> <li>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.</li> <li>Specification of the grid system used.</li> <li>Quality and adequacy of topographic control.</li> </ul>	<ul style="list-style-type: none"> <li>All drill holes are to be surveyed using an RTK DGPS system with either a 3 or 7 digit accuracy. The coordinates are stored in the exploration database referenced to the MGA Zone 51 Datum GDA94.</li> <li>All holes drilled as part of the Goongarrie South program were vertical. No holes were down-hole surveyed except at EOH. The sub-horizontal orientation of the mineralisation, combined with the soft nature of host material resulted in minimal deviation of vertical diamond drill holes.</li> <li>The grid system for all models is GDA94. Where historic data or mine grid data has been used it has been transformed into GDA94 from its original source grid via the appropriate transformation. Both original and transformed data is stored in the digital database.</li> <li>A DGPS pickup up of drill collar locations is considered sufficiently accurate for reporting of resources, but is not suitable for mine planning and reserves.</li> </ul>
<b>Data spacing and distribution</b>	<ul style="list-style-type: none"> <li>Data spacing for reporting of Exploration Results.</li> <li>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.</li> <li>Whether sample compositing has been applied.</li> </ul>	<ul style="list-style-type: none"> <li>The drill spacing was designed to augment historic drilling, bringing drill densities down from 80mE x 80mN to 40mE x 80mN. The program to date is part of a broader program. All proposed drilling has been completed at Elsie South only. Drilling continues at all other deposits.</li> <li>Given the homogeneity of this style of orebody, the spacing is, for bulk-scale metallurgical work and probable mining techniques, considered sufficient.</li> <li>Sample compositing has not been applied to the newly collected data.</li> </ul>
<b>Orientation of data in relation to geological structure</b>	<ul style="list-style-type: none"> <li>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>All drill holes in this program were vertical and give a true width of the regolith layers and mineralisation within the modelled resource.</li> <li>On a local scale, there is some geological variability in the northern most drill line (6669600mN) due to a probable shear structure. However, this local variability is not considered to be significant for the project overall, but will have local effects on mining and scheduling later in the project life. As the detailed shape of the orebody has already been well defined by an abundance of nearby resource drill holes (including the northern section) it is no bias is expected to be introduced from data pertaining to these drill holes with reference to mineralised structures.</li> </ul>
<b>Sample security</b>	<ul style="list-style-type: none"> <li>The measures taken to ensure sample security.</li> </ul>	<ul style="list-style-type: none"> <li>All samples were collected and accounted for by ARL employees/consultants during drilling. All samples were bagged into calico plastic bags and closed with cable ties. Samples were transported to Kalgoorlie from logging site by ARL employees/consultants and submitted directly to ALS Kalgoorlie.</li> <li>The appropriate manifest of sample numbers and a sample submission form containing laboratory instructions were submitted to the laboratory. Any discrepancies between sample submissions and samples received were routinely followed up and accounted for.</li> </ul>
<b>Audits or reviews</b>	<ul style="list-style-type: none"> <li>The results of any audits or reviews of sampling techniques and data.</li> </ul>	<ul style="list-style-type: none"> <li>ARL has periodically conducted internal reviews of sampling techniques relating to resultant exploration datasets, and larger scale reviews capturing the data from multiple drilling programmes within the KNP.</li> <li>Internal reviews of the exploration data included the following: <ul style="list-style-type: none"> <li>Unsurveyed drill hole collars (less than 1% of collars).</li> <li>Drill Holes with overlapping intervals (0%).</li> <li>Drill Holes with no logging data (less than 2% of holes).</li> <li>Sample logging intervals beyond end of hole depths (0%).</li> <li>Samples with no assay data (from 0 to &lt;5% for any given project, usually related to issues with sample recovery from difficult ground conditions,</li> <li>mechanical issues with drill rig, damage to sample in transport or sample preparation). <ul style="list-style-type: none"> <li>Assay grade ranges.</li> <li>Collar coordinate ranges</li> <li>Valid hole orientation data.</li> </ul> </li> <li>The ALS Laboratory was visited by ARL staff in 2016, and the laboratory processes and procedures were reviewed at this time and determined to be robust.</li> </ul> </li> </ul>

## Section 2 - Reporting of Exploration Results

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

### Big Four Prospect

Criteria	JORC Code explanation	Commentary
<b>Mineral tenement and land tenure status</b>	<ul style="list-style-type: none"> <li>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.</li> <li>The security of the tenure held at the time of reporting along with any known impediments.</li> </ul>	<ul style="list-style-type: none"> <li>The tenement on which the Goongarrie South drilling was undertaken is M29/272.</li> <li>The tenement and land tenure status for the KNP prospect areas containing continuous cobalt rich laterite mineralisation is summarised in Table 3 following and in the Ardea Prospectus, section 9 "Solicitor's Report on Tenements".</li> </ul>
<b>Exploration done by other parties</b>	<ul style="list-style-type: none"> <li>Acknowledgment and appraisal of exploration by other parties.</li> </ul>	<ul style="list-style-type: none"> <li>The Goongarrie South deposit was initially discovered by Heron Resources Ltd and subsequently drilled by Vale Inco Limited in a Joint Venture. Much historic assessment of the Black Range Project was undertaken by Heron Resources Limited.</li> </ul>
<b>Geology</b>	<ul style="list-style-type: none"> <li>Deposit type, geological setting and style of mineralisation.</li> </ul>	<ul style="list-style-type: none"> <li>The KNP nickel-cobalt laterite mineralisation developed during the weathering and near surface enrichment of Archaean-aged olivine-cumulate ultramafic units. The mineralisation is usually within 60 metres of surface and can be further subdivided on mineralogical and metallurgical characteristics into upper iron-rich material and lower magnesium-rich material based on the ratios of iron to magnesium. The deposits are analogous to many weathered ultramafic-hosted nickel-cobalt deposits both within Australia and world-wide.</li> <li>Cobalt-rich mineralisation is typically best developed in iron-rich material in regions of deep weathering in close proximity to major shear zones or transfer shear structures and to a lesser extent as thin zones along the interface of ferruginous and saprolite boundaries at shallower depths proximal to shear structures.</li> <li>The Cobalt Zone is associated with a distinctive geo-metallurgical type defined as "Clay Upper Pyrolusitic". Mineralogy is goethite, gibbsite and pyrolusite (strictly "asbolite" or "cobaltian wad"). The Cobalt Zones typically occur as sub-horizontal bodies at a palaeo-water table within the KNP (late stage supergene enrichment). This material is particularly well developed at Goongarrie South.</li> </ul>
<b>Drill hole Information</b>	<ul style="list-style-type: none"> <li>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: <ul style="list-style-type: none"> <li>easting and northing of the drill hole collar</li> <li>elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</li> <li>dip and azimuth of the hole</li> <li>down hole length and interception depth</li> <li>hole length.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>All holes drilled in this most recent program are listed in "Appendix 1 – Collar location data".</li> </ul>
<b>Drill hole Information</b>	<ul style="list-style-type: none"> <li>If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.</li> </ul>	<ul style="list-style-type: none"> <li>All assay data relating to the metals of interest at Goongarrie South, namely cobalt, nickel, Sc, and chromium, are listed in "Appendix 2 – Assay results". Other elements were assayed but have not been reported here. They are of use and of interest from a scientific and metallurgical perspective, but are not considered material and their exclusion does not detract from the understanding of this report.</li> </ul>
<b>Data aggregation methods</b>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>The assumptions used for any reporting of metal equivalent values should be clearly stated.</li> </ul>	<ul style="list-style-type: none"> <li>Most drill hole samples have been collected over 2m down hole intervals.</li> <li>All newly defined nickel and cobalt intercepts at Goongarrie South were calculated using the following parameters: <ul style="list-style-type: none"> <li>Intercepts based on nickel distributions were first calculated using 0.50 % nickel minimum cut-off, 2 m minimum intercept, and 4 m internal waste. Such parameters define broad intercepts that may be cobalt bearing or cobalt poor. Intercepts are considered of interest where cobalt values exceed 0.08%.</li> <li>Intercepts based on cobalt distributions are then calculated using a 0.10 % cobalt minimum cut-off, 2 m minimum intercept, and 4 m internal waste. All significant cobalt intercepts are hosted within the broader nickel-based intercepts and tend to define higher-grade, shorter intercepts.</li> <li>Where core loss was an issue, and where the thickness of core loss was less than the internal waste thickness, grades in zones of core loss were taken as the weighted average of the intervals immediately above and below the core loss interval in question. This provides grade distributions downhole that are consistent with mineralised zones, where nickel and cobalt grades are observed to change gradually rather than randomly downhole. By defining zones of core loss as being of a value between the interval above and the interval below, a similarly smooth transition in grades downhole is achieved. This method of estimated grade in zones of core loss is therefore considered the most suitable means of defining grade in such zones at Goongarrie South.</li> </ul> </li> </ul>



Criteria	JORC Code explanation	Commentary
		<ul style="list-style-type: none"> <li>Where an interval of core loss, through calculation, marked the beginning or end of a mineralised interval, this core loss interval was not included in that mineralisation interval.</li> <li>Sc intercepts were defined by using a 50g/t Sc minimum cut-off, a 2 m minimum intercept, and a 4 m internal waste. Sc intercept distributions do not show a consistent relationship to nickel and cobalt mineralisation and are usually in the shallow subsurface.</li> <li>Assay compositing techniques were not used in this assessment.</li> <li>No metal equivalent calculations have been used in this assessment.</li> </ul>
<b>Relationship between mineralisation widths and intercept lengths</b>	<ul style="list-style-type: none"> <li>These relationships are particularly important in the reporting of Exploration Results.</li> <li>If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.</li> <li>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').</li> </ul>	<ul style="list-style-type: none"> <li>The nickel-cobalt laterite mineralisation at Goongarrie South has a strong global sub-horizontal orientation.</li> <li>All drill holes are vertical.</li> <li>All drill holes intersect the mineralisation at approximately 90° to its orientation</li> </ul>
<b>Diagrams</b>	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Maps and sections of the nickel and cobalt mineralisation are shown within the report. Every drill hole on every section drilled is shown.</li> </ul>
<b>Balanced reporting</b>	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable to this report. All results are reported either in the text or in the associated appendices. Examples of high-grade mineralisation are labelled as such.</li> </ul>
<b>Other substantive exploration data</b>	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>No other data are, at this stage, known to be either beneficial or deleterious to recovery of the metals reported. Uncertainties surrounding the possibility of recovery of the metals of interest are noted prominently in the report.</li> </ul>
<b>Further work</b>	<ul style="list-style-type: none"> <li>The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).</li> <li>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</li> </ul>	<ul style="list-style-type: none"> <li>Further drilling is likely to be undertaken at Goongarrie South but has not yet been defined. Further drilling could include infill drilling as well as extension of lines to the north and south as appropriate.</li> <li>Metallurgical assessment of all metals of interest at Goongarrie South will be undertaken during the Pre-Feasibility Study (PFS) which has commenced on the KNP Cobalt Zone.</li> </ul>