



# Ardea Resources Limited

*Bringing the Developed World's Largest Cobalt Resource Online*

**Investor Presentation  
September 2017**

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

Application for securities under the Company's public offer can only be made under the prospectus, a copy of which is available from the Company. Investors should consider the prospectus in deciding whether to acquire Ardea shares and will need to complete the application form that accompanies the prospectus.

## Competent Person Statement

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

- Lewis Ponds on 27 August 2015, 2016 Heron Annual Report, Heron's announcement on 6 January 2017;
- Kalgoorlie Nickel Project on 21 October 2013 and 31 July 2014, 27 August 2015, 2016 Heron Annual Report;
- Big Four-Goongarrie on 13 March 2012, 26 June 2012 and 24 July 2012.
- KNP Cobalt Heron's announcement on 6 January 2017

The Company 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.



# Investment Highlights

**Ardea Resources Limited** (ASX:ARL) is a cobalt exploration and development company focussed on developing its 100% owned flagship Kalgoorlie Nickel Project (KNP)

## **Largest Cobalt Resource in the Developed World**

- 773Mt at 0.05% Co including high-grade Cobalt Zone of 64.4Mt at 0.13% Co
- \$50m spent on historical drilling and metallurgy work by previous owners with circa 400,000 metres of historical drilling

## **Excellent Liquidity**

\$76m of shares trading year to date equating to 1.26 times current market cap of \$60m

## **Optionality Play**

Ardea provides more leverage to the price of Cobalt than any other public vehicle globally, offering significant relative value compared to nickel-laterite peers\*.

## **Clear Path to Production**

PFS completion Q1 2018 (\$5 million), DFS completion 2019 (~\$20 million) and commencement of Stage 1 Development in 2020 with relatively low CAPEX

## **Exceptional Exploration Upside**

Plan to expedite drill programs with a view accelerate gold mining cash flow, or possibly to spin-out non-core assets into separate listed vehicle(s)



*\* Palisade Research (San Francisco) 4 August 2017*

# Corporate Snapshot

Share price performance and volume since listing (9 February 2017)



## Capital Structure

Shares on Issue	73,207,885
Share Price (11 September 2017)	\$0.88
52 week high / low	\$1.035 / \$0.17
Cash	\$6.6 million
Enterprise Value	\$57.4 million
Unlisted Options	\$0.25 (IPO) 12.31 million
	\$0.77 (Loyalty) 25.22 million

## Top Shareholders

	%
Board	14.8%
Merrill Lynch Nominees	8.3%
Greenstone Heron Holdings	7.4%
Josco Pty Ltd	6.7%
Citicorp Nominees	5.1%

## Board and Management

Katina Law	Chair
Matt Painter	Managing Director
Ian Buchhorn	Non-Executive Director
Sam Middlemas	Chief Financial Officer



# Corporate History

- Ardea listed in February 2017 as a spin out of Heron Resources Limited, after raising \$5.1m at \$0.20 per share
- At the time of the Prospectus (Nov 2016) gold was the focus but such have been developments in cobalt Ardea has transformed to focus on cobalt
- In August 2017 a further \$4.4m was raised at \$0.725 per share under Share Purchase Plan with 16% uptake at an average of \$8,900 per shareholder
- As a consequence liquidity has been excellent with \$76m in shares trading year to date equating to circa 1.26 times current market capitalisation of \$60m

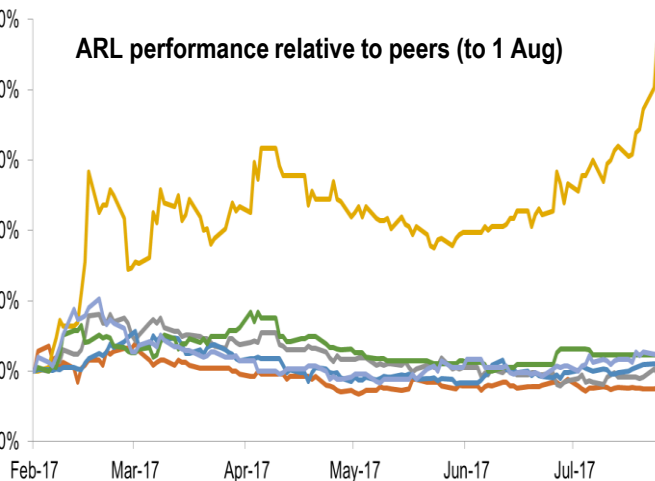


# Peer Comparison



— PGM - 75% — COB - 97% — ARL - 572% — CLQ - 110% — GME - 123% — CNJ - 124%

ARL performance relative to peers (to 1 Aug)



Project	KNP, WA	Cobalt Zone	Syerston, NSW	Sconi, Qld	Flemington NSW
Commodities	Co, Ni, Sc	Co, Ni, Sc	Co, Ni, Sc	Sc, Co, Ni	Sc
Ownership	100% unencumbered		100%	75% earn-in	100% earn-in
Proposed products	Cobalt + nickel sulphate		Cobalt + nickel sulphate	Scandium oxide, cobalt + nickel sulphate	Scandium oxide
Proposed by-products	Scandium oxide, PGE?, chromium?, high-purity alumina?		Scandium oxide	?	?
Tonnage (Mt)	773 Mt	64.4 Mt	109 Mt	89 Mt	3.1 Mt
Co grade (%)	0.05%	0.13%	0.10%	0.06%	-
Ni grade (%)	0.71%	0.77%	0.65%	0.58%	-
Contained cobalt (t)	405,000	81,000	114,000	54,000	?
Contained nickel (t)	5,458,400	495,000	700,000	514,000	?
Co:Ni ratio	1:13.5	1:6.1	1:6.1	1:9.5	?
Mining leases	M and E	All granted	Applications ('98-'99)	Granted	Application Mar '17
PFS (Co, Ni)	Q1 2018		October 2016		April 2018
DFS	2019		Due Q4 2017	April 2018	?

SP (11 Sept)

Market Cap (11 Sept)

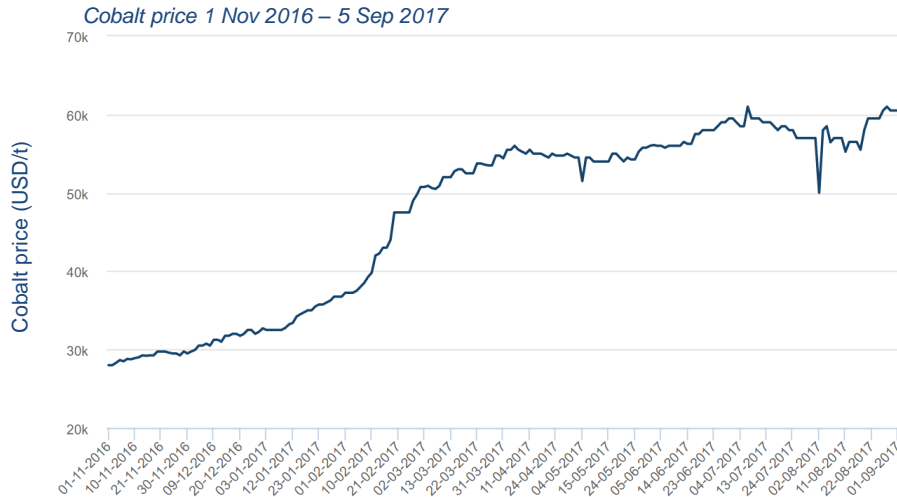
\$0.88  
\$64 million

\$1.00  
\$572 million

\$0.018  
\$39 million

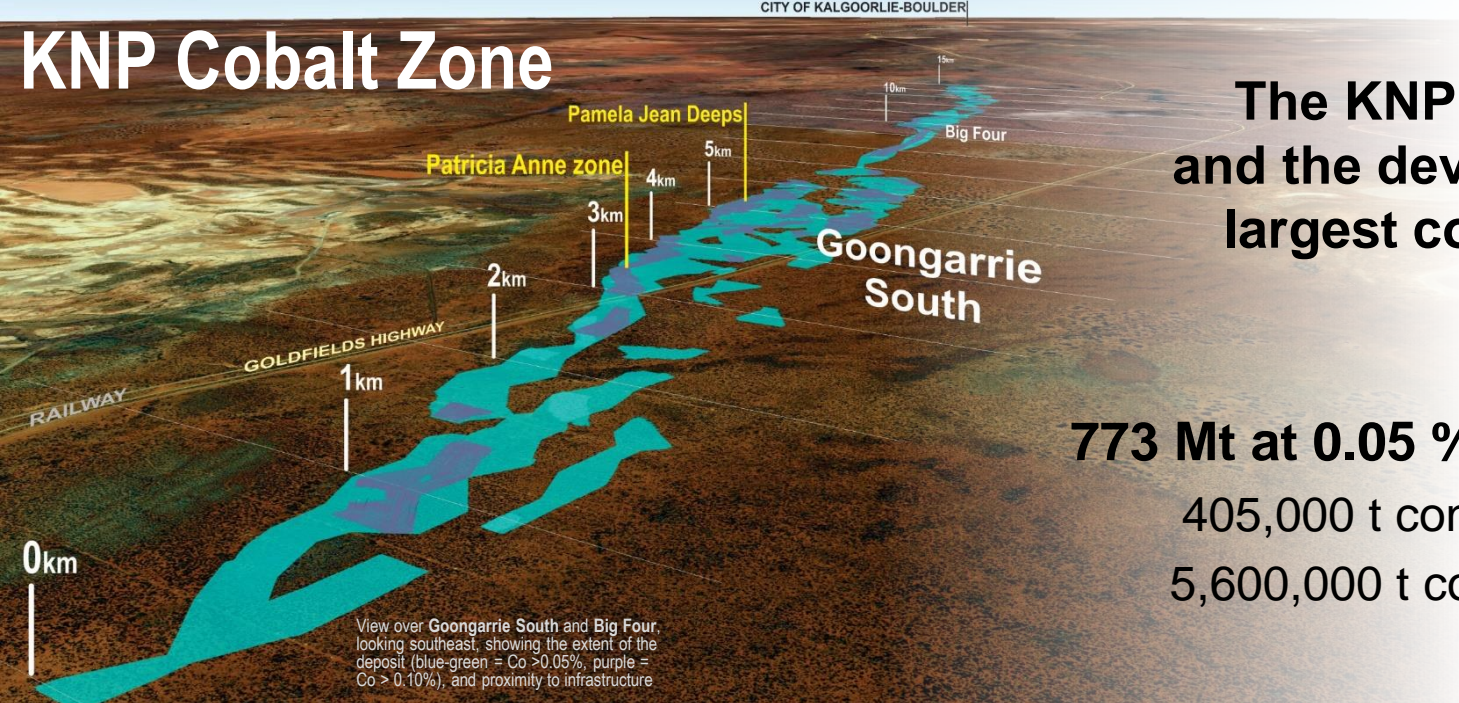
**Note:** This comparison assumes all of ARL's value is in the KNP. Here, no value is attributed to Lewis Ponds nor to the exploration projects.

# Cobalt Market 2017 and Beyond



- Global cobalt production is currently circa 100,000tpa with prices at US\$61,000/t well below 2008 levels of more than US\$110,000/t
- Politically unstable DRC accounts for circa 60% of global Cobalt supply
- Past producing mines in safe jurisdictions such as Ontario offer higher grades but much lower tonnes, and lack critical mass due to recent staking rush resulting in fragmentation of ownership amongst many companies
- Cobalt demand is forecast to outstrip supply with future supply bottlenecks likely as electrified vehicles will require Li-ion batteries with **cobalt cathodes**

# KNP Cobalt Zone



**The KNP is Australia's and the developed world's\* largest cobalt resource**

**773 Mt at 0.05 % Co and 0.7 % Ni\*\***

405,000 t contained Co metal

5,600,000 t contained Ni metal

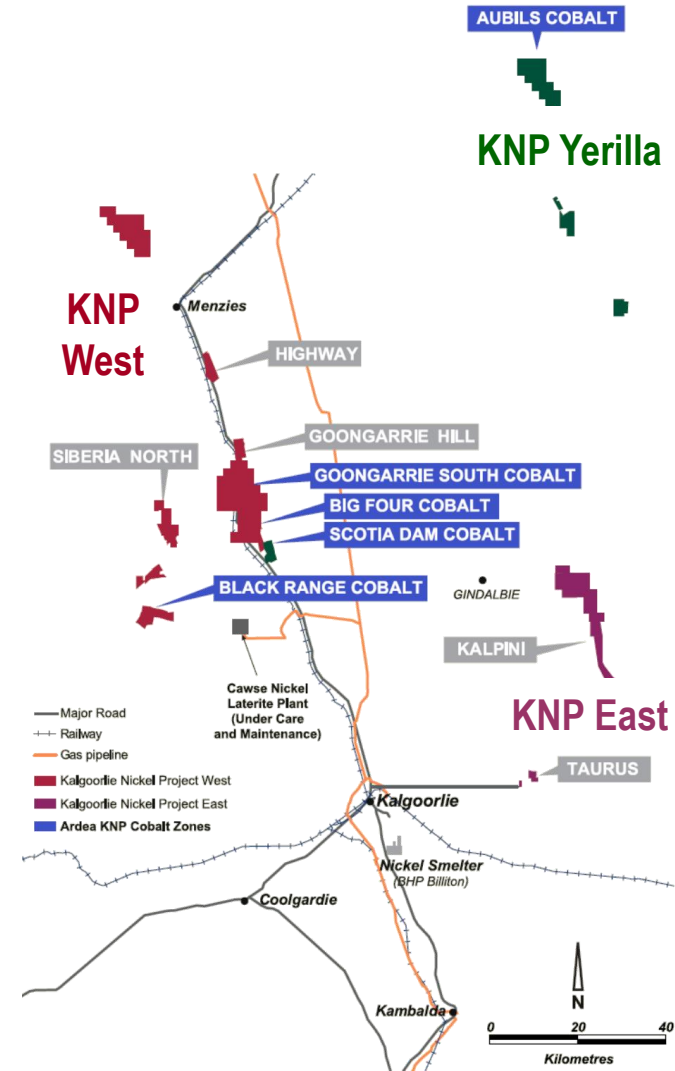
**Focus on the high-grade Cobalt Zone,  
64.4 Mt at 0.13 % Co & 0.77 % Ni\*\*  
81,000 t contained cobalt metal**



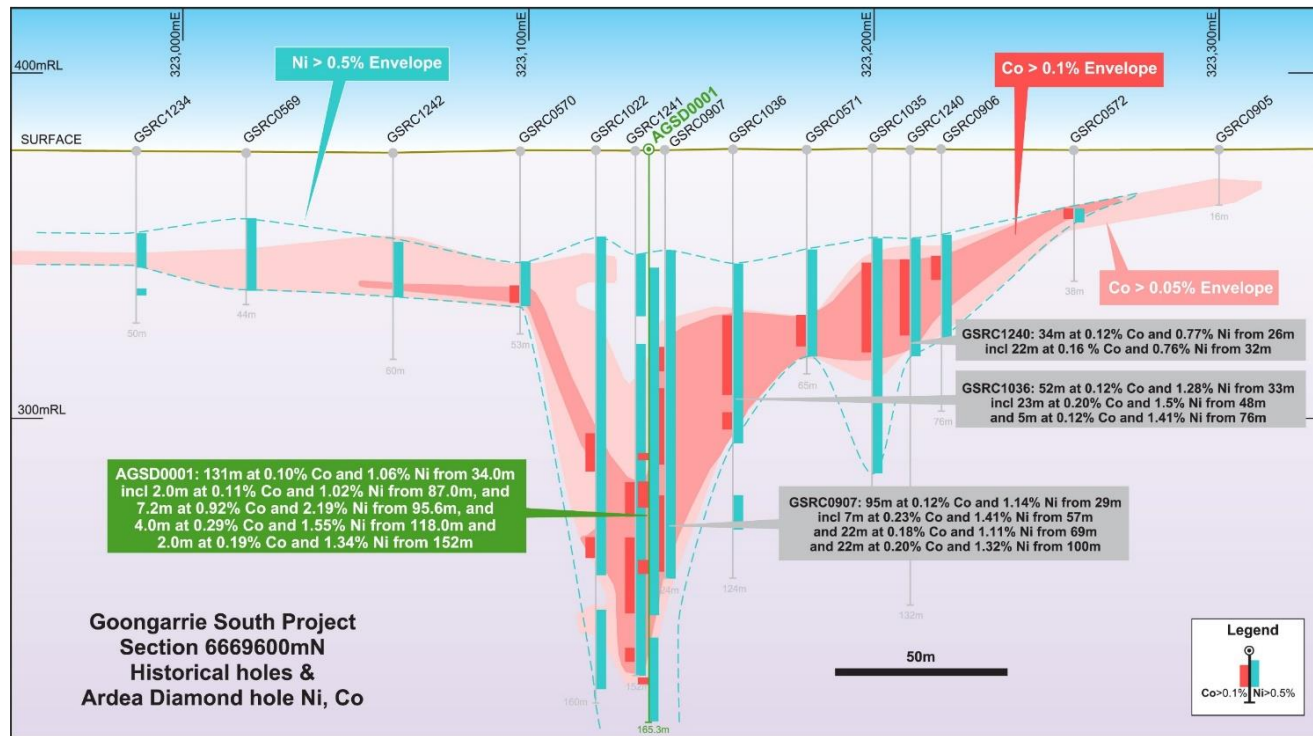


# KNP Cobalt Zone

- More than \$50 million spent historically Vale-Inco and Heron with circa 400,000 metres of drilling and detailed metallurgical work available
- Excellent location, within 150 km of Kalgoorlie, WA
- Scandium, PGE, high-purity alumina, chromium by-product potential
- On active granted mining leases
- 100% ownership of project, unencumbered

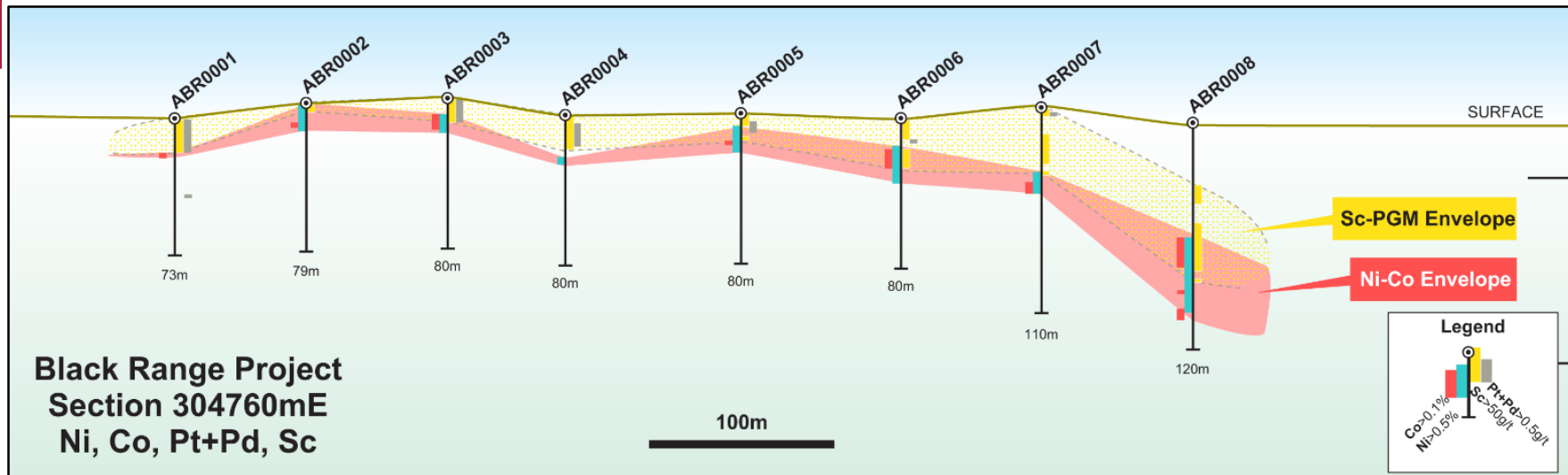


# KNP Cobalt Zone



- Shallow, lateritic cobalt-nickel deposits within 120m of surface
- Open-pit mining provides low strip ratio
- Cobalt and nickel in soft, iron-rich clay, free digging
- Flat-lying cobalt-nickel mineralisation usually within 50m of surface

# Scandium Oxide By-Product



- Scandium discovered by Ardea at Goongarrie South, Black Range, Kalpini
- Systematic scandium resampling of KNP Cobalt Zone commencing September
- Tabular, near-surface bodies grading between 45 and 500 g/t scandium will be mined to access the cobalt and nickel below
- Potential for scandium oxide by-product

# Plan to Fast-Track Development and Add Value

- Extra funds will allow streamlining of projects and drilling to upgrade resources and reserves
- Expedite DFS by commencing drilling programs now as part of the PFS
- Graduation of deposits from Kalpini-Rebecca, Highway, Yerilla camps to KNP Cobalt Zone through strategic drilling
  - Around 40,000 m RC drill programs
  - Metallurgical testing, resource definition and modelling



- Drilling at Goongarrie, Black Range, Siberia, Aubils camps
  - Resource upgrades for Co, Ni, Sc, Pt, Pd as appropriate (at least 25,000 m RC drilling)
  - Reserve definition at Patricia Anne, Goongarrie South (around 45,000 m RC drilling)
  - Metallurgical variability sampling in preparation for DFS (~4,500m diamond drilling)
- Evaluation of gold and base metal exploration projects with view to consider spinning out once sufficient value has been added through new drilling programs



# Encouraging Flow Sheet Development



Co



Ni



Sc

**AIM: to directly supply cobalt sulphate and nickel sulphate to battery manufacturers**

- Open pit, free digging, initial focus on high-grade zones
- Compatible processes yield several products for the automotive sector
- Acid digestion of cobalt-nickel ore (>98% metal extraction from Run-of-Mine samples)
- Solution extraction of cobalt sulphate and nickel sulphate
- Assessment of potential scandium oxide, high-purity alumina, PGE, chromium by-products
- Financial modelling – up to 2 Mtpa, producing 2,500 tpa cobalt, 15,000 tpa nickel

# Upcoming Catalysts

<b>Ongoing</b>	Upgrading of the KNP Cobalt Zone resources Incorporation of additional resources from Kalpini and other outlying areas
<b>October 2017</b>	Definition of scandium and platinoid resources at Black Range <ul style="list-style-type: none"><li>• Scandium and platinoid assessment elsewhere ongoing</li></ul>
<b>Q1 2018</b>	Completion of the KNP Cobalt Zone PreFeasibility Study <ul style="list-style-type: none"><li>• Selection of flow sheet and CAPEX requirements</li></ul>
<b>Q2 2018</b>	Definition of high-grade reserves at Goongarrie South
<b>End 2019</b>	DFS completion
<b>2020</b>	Commence stage 1 development of KNP Cobalt Zone
<b>TBD</b>	Potential spin-off or development of gold, base metal and gemstone projects in WA and NSW



# Why Ardea?

- Considerable leverage to increasing cobalt and nickel prices
- Exceptional liquidity with \$76m of shares trading year to date equating to 1.26 times current market cap of \$60m
- Significant relative value compared to Australian nickel-cobalt-laterite peers
- Clear strategy to become a near term cobalt producer
- Excellent exploration upside with plan to undertake comprehensive drilling and metallurgical programs



# Appendix 1: Resource breakdowns

## KNP nickel-cobalt mineral resource (JORC 2012)

Resource Category	Quantity (Mt)	Cobalt (%)	Nickel (%)	Contained cobalt (t)	Contained nickel (t)
Measured	9.6	0.10	1.02	9,700	98,800
Indicated	232.9	0.06	0.75	141,200	1,759,700
Inferred	530.5	0.05	0.68	254,400	3,600,000
<b>KNP Total Resources</b>	<b>773.0</b>	<b>0.05</b>	<b>0.70</b>	<b>405,400</b>	<b>5,458,400</b>

In accordance with the Australian Securities Exchange Limited Listing Rules Appendix 5A:

The information in this report that relates to Mineral Resources for the Highway, Goongarrie Hill, Goongarrie South, Big Four, Aubils and Boyce Creek Prospects is based on information originally compiled in-house and validated by Steve Jones in 2013. Steve Jones is a member of the Australasian Institute of Mining and Metallurgy. Steve Jones is a full time employee of Heron Resources Limited and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the resource estimation activity that 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'. Steve Jones consents to the inclusion in this report of the matters based on his information in the form and context that it appears. Note that Mineral Resources that are not Ore Reserves do not have demonstrated viability.

The information in this report that relates to Mineral Resources for the Siberia North, Bulong East, Siberia, Black Range, Taurus and Jump Up Dam Prospects is based on information compiled by Snowden Mining Industry Consultants by members of the Australian Institute of Mining and Metallurgy. Snowden Mining Industry Consultants had sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the resource estimation activity. All resources were internally audited by Snowden and signed off by a person of sufficient experience 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'. Steve Jones validated the Snowden Mining Siberia North estimate in 2013. Note that Mineral Resources that are not Ore Reserves do not have demonstrated viability.



# App 1: Resource breakdowns (continued)

## KNP Cobalt Zone nickel-cobalt mineral resource (JORC 2012)

Area	Prospect	Resource category	Cut-off (% Co)	Size (Mt)	Co (%)	Ni (%)	Cobalt remodel status
Goongarrie	Goongarrie South	Total	0.08	25.3	0.14	0.83	Upgraded
	Big Four	Total	0.08	11.4	0.13	0.71	Upgraded
	Scotia	Inferred	0.08	2.5	0.17	0.82	Upgraded
	<i>Goongarrie subtotal</i>			39.6	0.14	0.80	
Siberia	Black Range	Inferred	0.50(Ni)	19.2	0.09	0.68	Upgraded
Yerilla	Aubils	Inferred	0.08	6.0	0.15	0.90	Scheduled
<b>KNP TOTAL</b>				<b>64.4</b>	<b>0.13</b>	<b>0.77</b>	

See overleaf for JORC 2012 and NI43-101 compliance statement.

# App 1: Resource breakdowns (continued)

## KNP Cobalt Zone nickel-cobalt mineral resource (JORC 2012) – Compliance Statement

COMPLIANCE STATEMENT (JORC 2012 and NI43-101)

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

1. Kalgoorlie Nickel Project on 21 October 2013 and 31 July 2014, 27 August 2015, 2015 Heron Annual Report;
2. Big Four-Goongarrie on 13 March 2012, 26 June 2012 and 24 July 2012.

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 Exploration Results is based on information originally compiled by previous and current full time employees of Heron Resources Limited. The Exploration Results and data collection processes have been reviewed and verified by Mr Ian Buchhorn who is a Member of the Australasian Institute of Mining and Metallurgy and currently a full-time employee of Heron 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 information in this report that relates to Mineral Resources for the Goongarrie South, Big Four and Aubils Prospects is based on information originally compiled by Mr James Ridley in 2008 and 2009 when employed as a Senior Resource Geologist with Heron Resources Limited. The information in this report that relates to Mineral Resources for the Scotia and Black Range Prospects is based on information originally compiled by Snowden Mining Industry Consultants on behalf of Heron in 2004. The Mineral Resource estimates for all five prospect areas have been reviewed and validated by James Ridley who is a Member of the Australasian Institute of Mining and Metallurgy. Mr Ridley is now a full-time employee of Ridley Mineral Resource Consulting Pty Limited and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the resource estimation activity that he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Ridley consents to the inclusion in this report of the matters based on his information in the form and context that it appears. Note that Mineral Resources that are not Ore Reserves do not have demonstrated viability.

The exploration and industry benchmarking summaries are based on information reviewed by Mr Ian Buchhorn, who is a Member of the Australian Institute of Mining and Metallurgy. Mr Buchhorn is a full-time employee of Heron 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'. Mr Buchhorn 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.

# App 1: Resource breakdowns (continued)

## Lewis Ponds mineral resource (JORC 2012)

Resource Category	Quantity (Mt)	Zn (%)	Cu (%)	Pb (%)	Au (g/t)	Ag (g/t)
<b>Indicated</b>						
Main Zone	5.82	2.1	0.1	1.1	1.5	59
Tom's Zone	0.54	5.5	0.3	3.8	1.7	172
Total Indicated	6.35	2.4	0.2	1.4	1.5	68
<b>Inferred</b>						
Main Zone	0.17	1.7	0.1	0.8	0.9	47
Tom's Zone	0.10	5.0	0.2	3.6	1.4	174
Total Inferred	0.27	3.0	0.1	1.9	1.1	96
<b>Total Mineral Resource</b>	<b>6.62</b>	<b>2.4</b>	<b>0.2</b>	<b>1.4</b>	<b>1.5</b>	<b>69</b>

In accordance with the Australian Security Exchange Limited Listing Rules Appendix 5A:

The information in this report that relates to Mineral Resources for the Lewis Ponds Project has been reviewed, and verified by Mr Robert Cotton who is a full time employee of Mineral Appraisals Pty Ltd. Mr Cotton who is a Fellow of the AusIMM, takes responsibility for the integrity of Data that have been used to prepare the resource estimates, and for the Geological Model. Mr Cotton has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the resource estimation activity that he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the JORC Code: Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Cotton consents to the inclusion in this report of the matters based on his information in the form and context that it appears.

# Lewis Ponds Bulk Mining Development

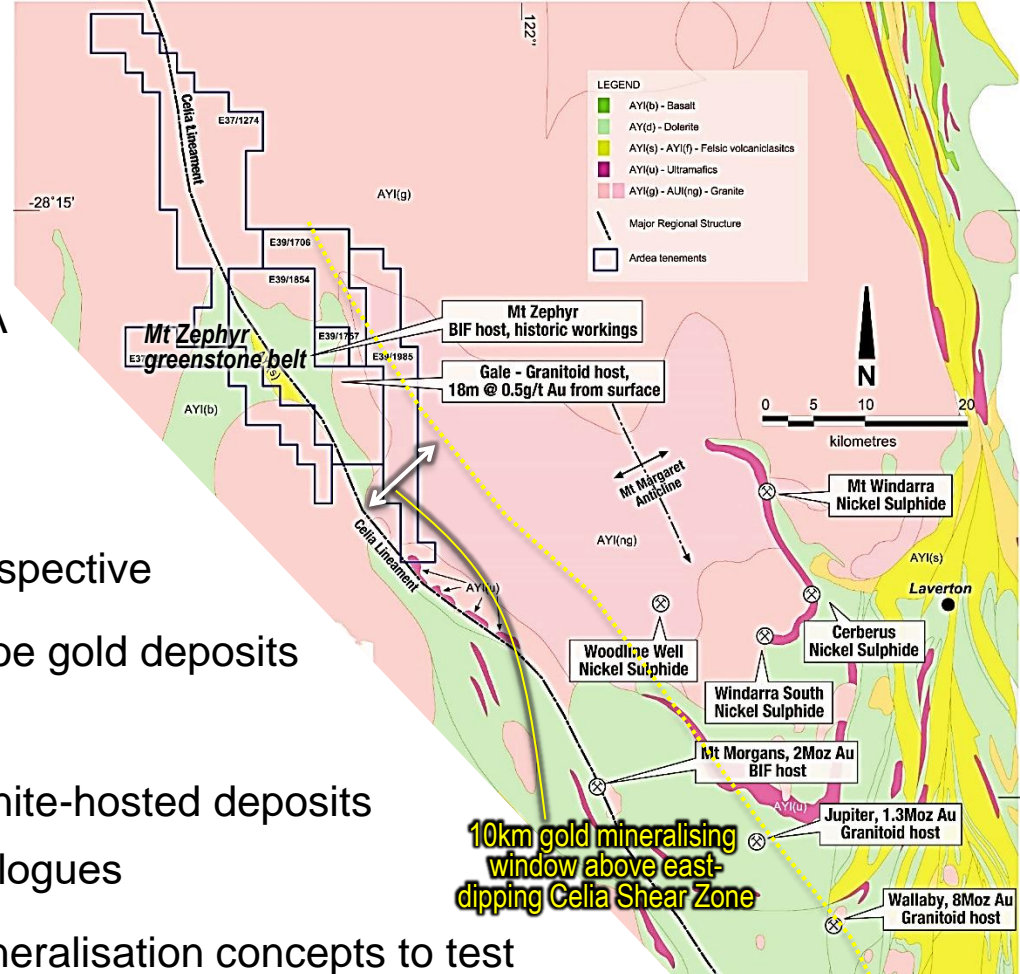
- Major zinc-gold-silver development project with enormous potential in NSW
- Historic resources: 6.62 Mt @ 2.4 % Zn, 1.4 % Pb, 0.2 % Cu, 1.5 g/t Au, and 69 g/t Ag
- Bulk mining open pit exploration target:  
**15-25 Mt @ 2.2-3.7 % Zn equiv\***  
**or 1.0-1.5 g/t Au equiv\***
- Main resource on freehold land owned by Ardea
- Metallurgical testwork currently underway with excellent results to-date





# Mt Zephyr Gold Project

- Exceptional gold exploration ground in WA
- Greenstone-hosted gold deposits
- No gold exploration for over 20 years
- Area east of Celia Lineament is highly prospective
- Along structure from Mt Morgans, Lake Roe gold deposits
  - Dunn's Line analogues
- Along strike from Jupiter and Wallaby syenite-hosted deposits
  - Gale, Easter Well and Paul's Find analogues
- Ardea will have first application of new mineralisation concepts to test



# Mt Zephyr Drill Targets

## Mt Zephyr / Dunns Line Gold

- 4km strike of mineralised BIF with old workings
- Historic grades of 5-90 g/t Au
- Mt Morgan's analogue, same host rocks
- Mt Magnet Hill 50 "Boogardie Breaks" model

## Gale Gold

- High-grade, extensive, shallow anomaly
- Shallow RAB intercepts 18m @ 0.5 g/t gold from surface
- 273 ppb gold in soils
- Broad anomalism coincides with granite
- Jupiter/Wallaby analogue

