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October 2018

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# Ardmore Phosphate Rock Project Definitive Feasibility Study



# Definitive Feasibility Study Results



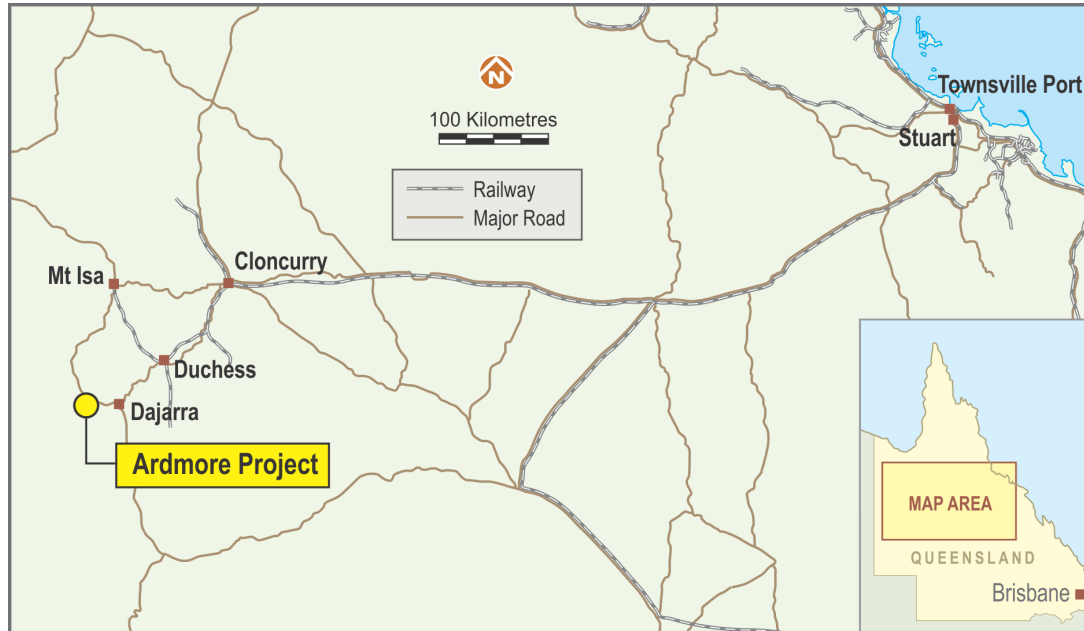
- Maiden Ore Reserve of 10.1Mt at 30.2%  $P_2O_5$
- 800,000 wet tonnes per annum of premium grade phosphate rock concentrate over 10 year life
- Significant upside with the Ore Reserve derived from existing 16 million tonne Mineral Resource plus additional 339km<sup>2</sup> of prospective exploration tenements adjacent to the project
- Low A\$ 77 million pre-production capital project with a short 4 year payback period
- Unleveraged nominal pre-tax NPV<sub>10</sub> of A\$172 million and internal rate of return of 40%
- Initial start-up plant presently being fabricated, with first operations scheduled to commence in mid-2019 to provide circa 30,000 tonnes of concentrate to numerous potential long-term offtake customers
- Start-up plant is readily upgradeable to achieve full-scale production, representing a major step in technically and commercially de-risking the project

# DFS Contributors



- Mineral Resources
- Ore Reserves & Mining
- Process & Mine Site Infrastructure, Study Compilation
- Roads & Rail Siding Infrastructure
- Market Review & Pricing
- Environment, Hydrology & Hydrogeology

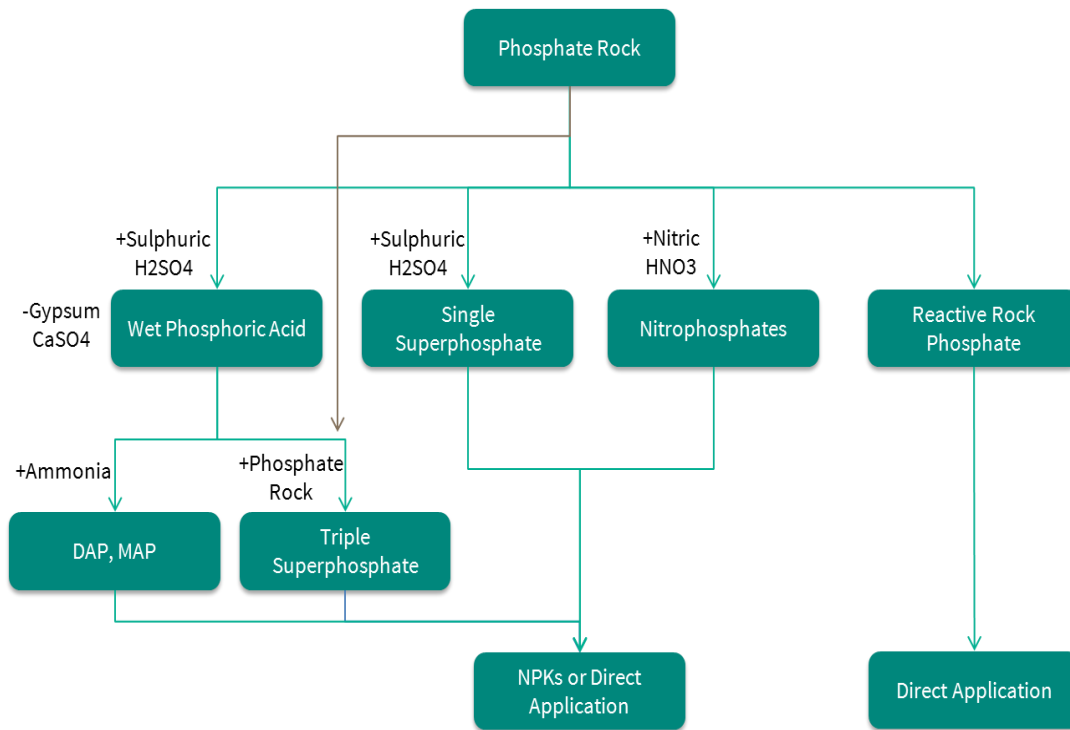
# Ardmore Phosphate Rock Project



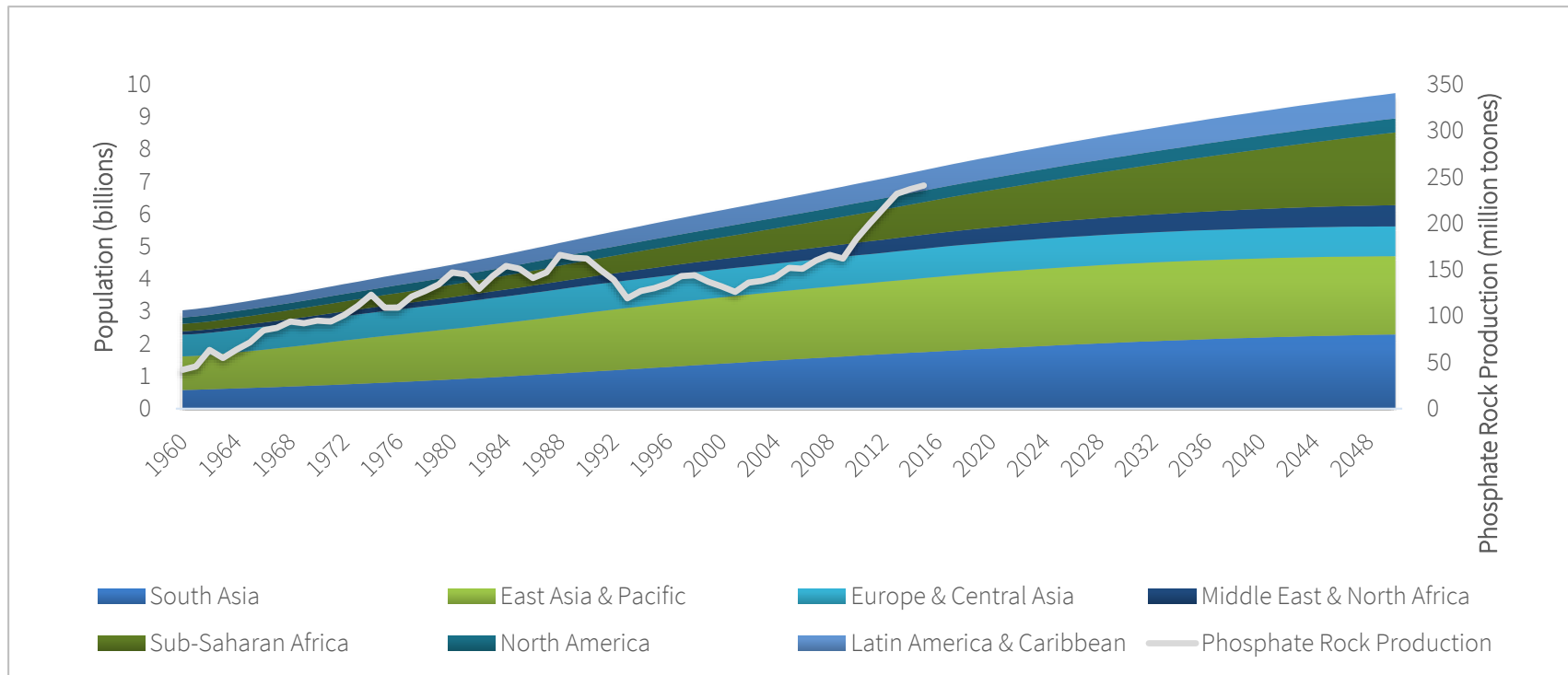
- One of the few remaining undeveloped high-grade phosphate rock projects in the world
- Shallow mining and very simple processing
- Ability to produce a “clean” premium grade phosphate rock concentrate with ultra-low cadmium levels
- Access to existing road, rail and port infrastructure
- Strategically positioned for supply domestically and throughout Asia-Pacific

# Phosphate Rock Uses

- Phosphorous is one of three essential elements for plant nutrition, the other two being potassium and nitrogen
- 75% of phosphate rock is used in the production of phosphoric acid which in turn is used for making nitrophosphates such as DAP
- Another major use is in the production of lower phosphorous grade single superphosphate (SSP)
- Direct application use is growing but still a minor market



# Phosphate Rock Use Grows With Population



# Traded Phosphate Rock Market

- In 2017 total phosphate rock demand was 203 million tonnes with China accounting for 40% of the demand
- Globally most phosphate rock production is for captive use in integrated fertiliser plants, with only 28 million tonnes traded in 2017
- The key importing countries in the Asia Pacific account for 12 million tonnes with imports in the region forecast to grow by 7 million over the next 5 years
- Ardmore has a major freight advantage over the current suppliers to this region who are located in North Africa, the Middle East and South America

Country	2017 ('000 t)
India	7,855
USA	2,571
Indonesia	2,390
Brazil	1,935
Canada	940
New Zealand	546
Malaysia	410
Pakistan	405
Australia	431
South Korea	298
Japan	260
China	122
Taiwan	118
Others	9,889
<b>Total</b>	<b>28,011</b>

Asia Pacific Target Markets



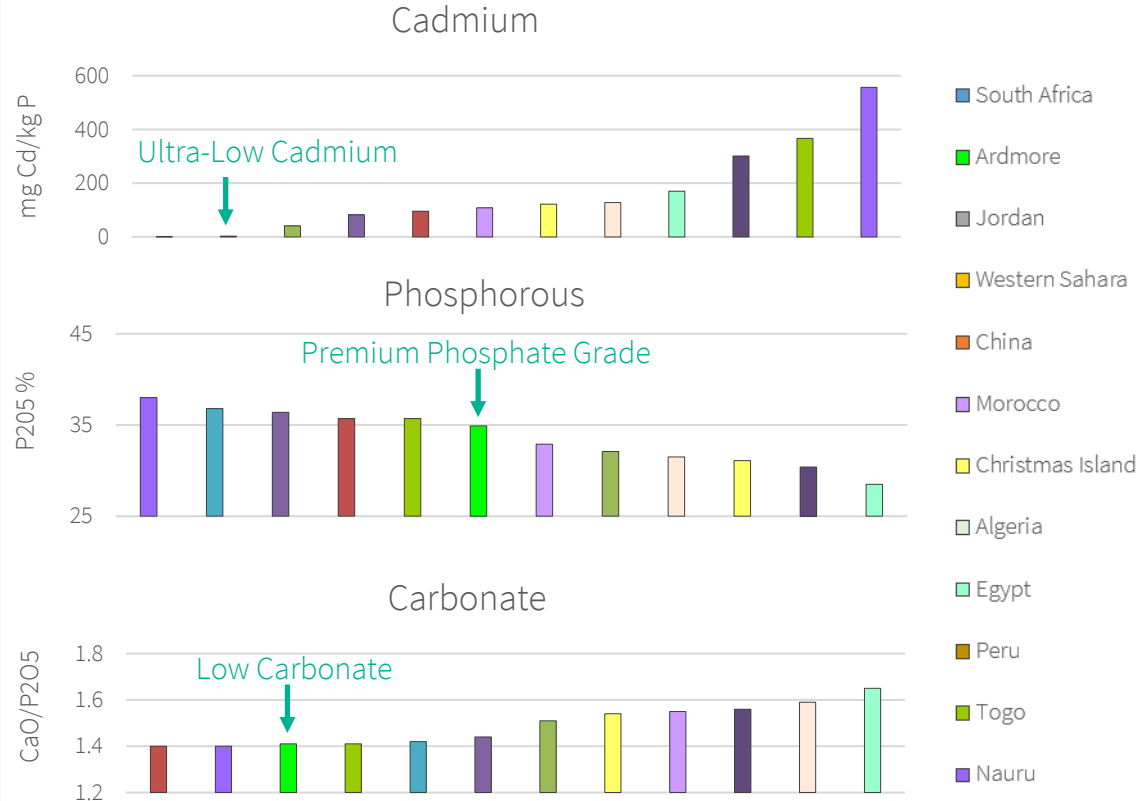
# Ardmore Target Markets



-  Target Markets
-  Current Major Suppliers

- Traded phosphate rock benchmarks range from 27% to 34%  $P_2O_5$
- Ardmore concentrate is at the top end of this range
- Toxic cadmium is a major issue for the industry
- Ardmore concentrate has almost no cadmium
- High carbonate consumes more sulphuric acid in processing
- Ardmore concentrate has low carbonate levels

# Ardmore Phosphate Rock Concentrate



- Australian and New Zealand SSP require a 34% P<sub>2</sub>O<sub>5</sub> phosphate rock blend with enough iron and alumina to provide effective granulation
- Ardmore will be one of the few products on the market capable of producing SSP in Australia and New Zealand without the need for blending with other rocks
- Ardmore would reduce Australia and New Zealand's currently high cadmium levels

# Marketing

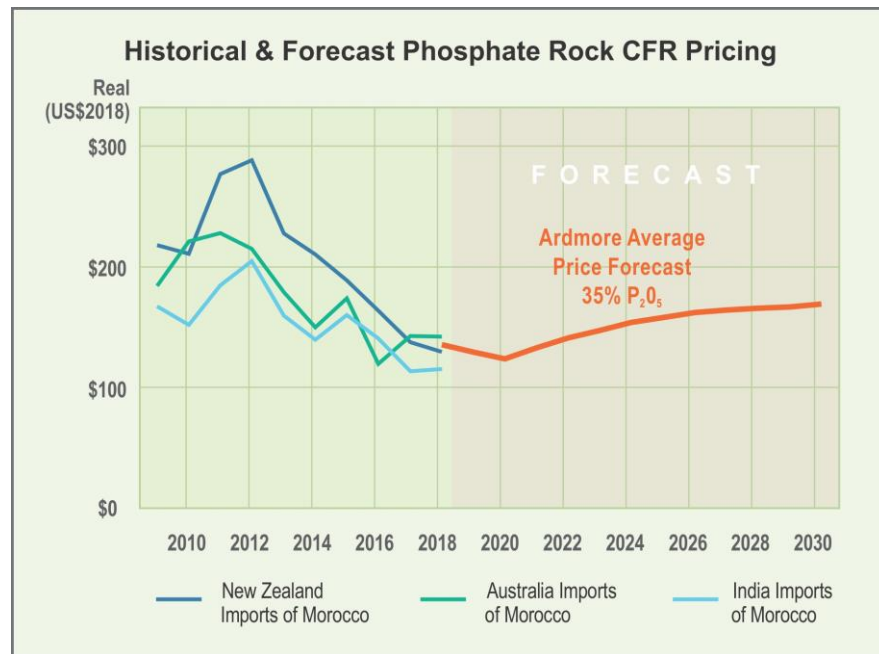
- Two 400 tonne paid run of mine shipments of Ardmore tested by two regional SSP producers with a longer term view to buying premium grade concentrate
- Positive feedback from both trials
- Australia's largest phosphate rock importer Incitec Pivot hold a 20% right of first refusal over off-take from the project
- Centrex signed a non-binding MOU with Indian major Gujarat State Fertilizers & Chemical Limited for 40% of the off-take from the project with both parties currently negotiating a binding agreement
- Start-up plant to provide 5,000 to 6,000 tonne Ardmore phosphate rock concentrate shipments to customers in 2019 to underpin long-term offtakes



Ardmore run of mine ore SSP trial

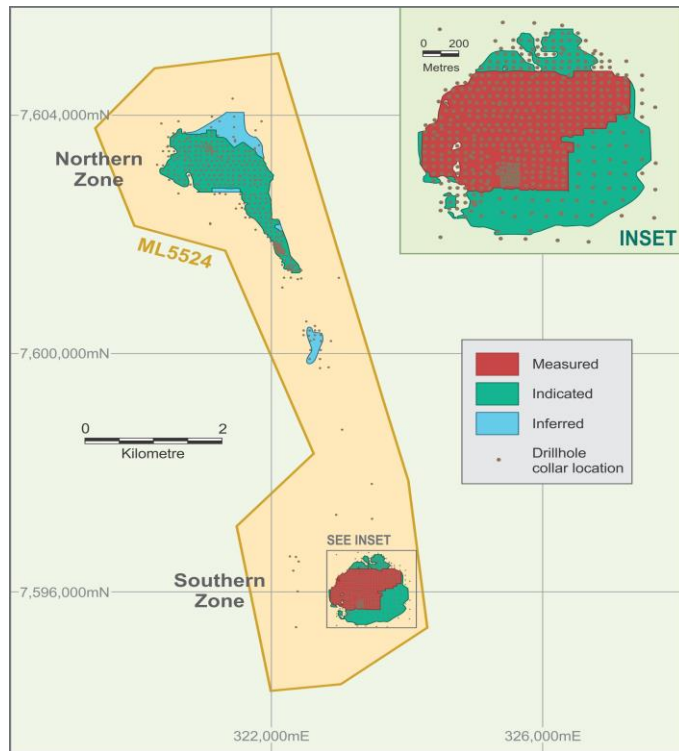
# Forecast CFR Pricing for Ardmore

- Centrex engaged Integer to provide forecast CFR pricing over the life of mine to each of its individual target customers
- Integer utilised its forecast of the Morocco FOB 32%  $P_2O_5$  benchmark as the basis of its future pricing trend, comparing to current main suppliers quality and freight, with adjustments made for Ardmore's high quality
- This provided an average CFR price in 2018 real terms for the anticipated mix of Ardmore customers of US\$ 133/t at the commencement of operations in 2021, and an average of US\$ 156/t over the life of mine
- Phosphate rock pricing has steadily increased by 10% since the start of 2018 according to World Bank



# Mineral Resource

- Outcropping and shallow dipping 2m to 5m sedimentary phosphorite
- A total of 1,006 drill holes across the deposit
- Mineral Resource estimated by RPM Advisory Services Limited (“RPM”) in 2018



## 16% P<sub>2</sub>O<sub>5</sub> Grade Cut-Off

Category	Million Tonne	P <sub>2</sub> O <sub>5</sub> %
Measured	3.3	29.8
Indicated	11.1	27.4
Inferred	1.7	26.8
<b>Total</b>	<b>16.2</b>	<b>27.8</b>

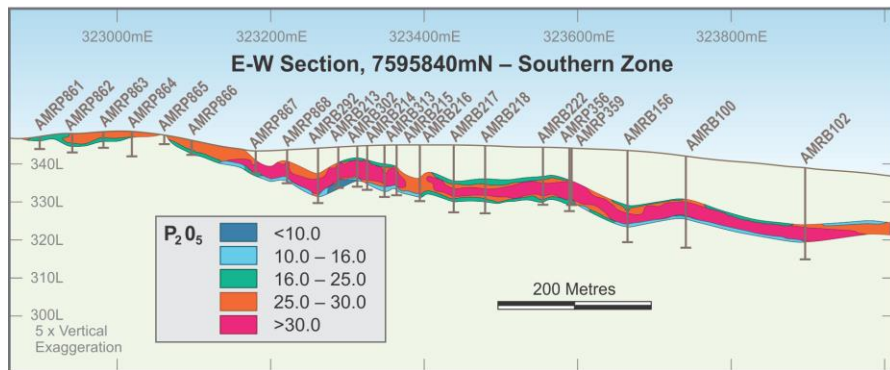
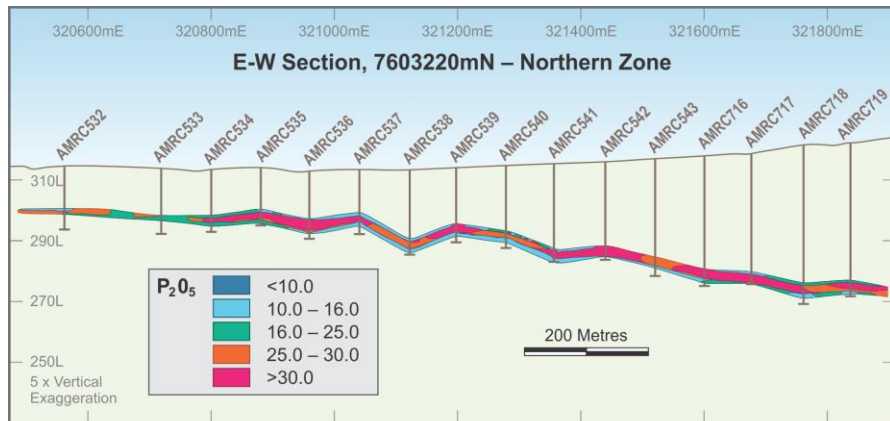
The announcement in relation to the Mineral Resource was made on 1<sup>st</sup> June 2018 and can be found at:

<https://www.asx.com.au/asxpdf/20180601/pdf/43vgxdljpsgcwb.pdf>

The results were reported under JORC 2012 and Centrex is not aware of any new information or data that materially affects the information contained within the release. All material assumptions and technical parameters underpinning the estimates in the announcement continue to apply and have not materially changed.

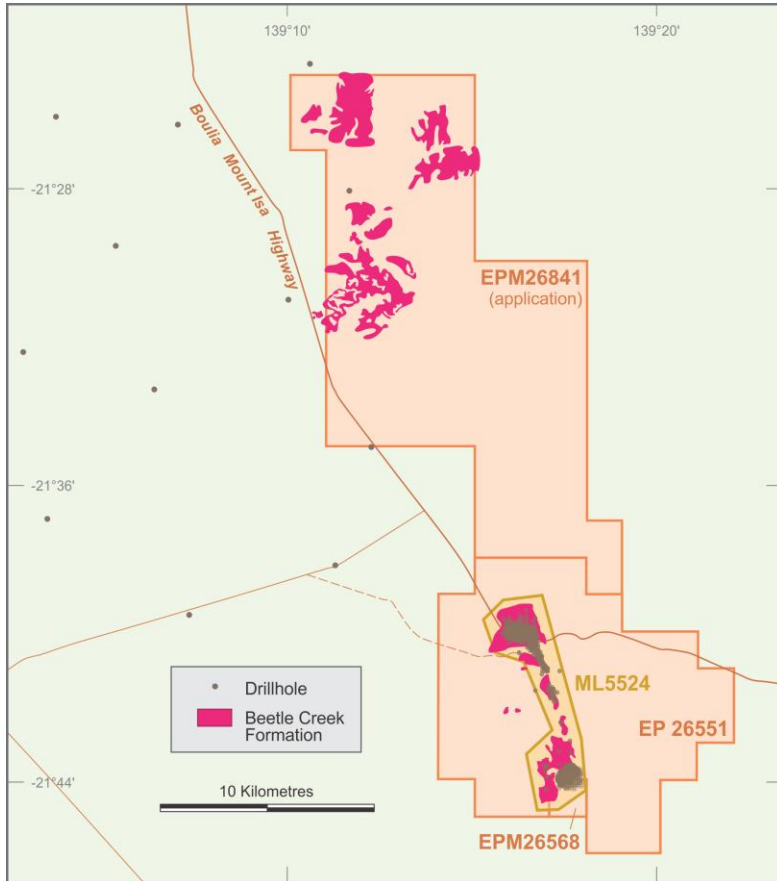


# Mineral Resource



Free digging shallow phosphate rock at Ardmore

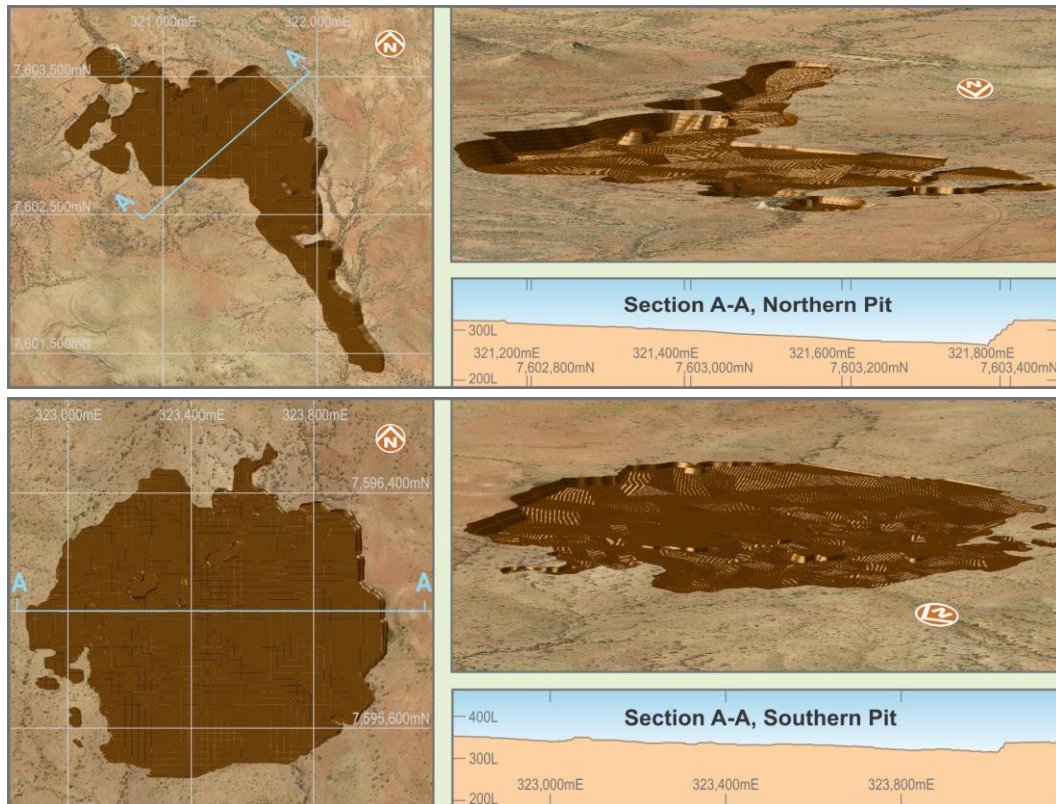
# Exploration Upside



- Centrex holds two granted exploration licenses surrounding its Ardmore Mining Lease
- Further application for exploration license to the north containing a number of mapped locations with outcropping Beetle Creek Formation, the host to Ardmore phosphate mineralization
- Wide spaced (circa 5km) historic drilling identified intersections of phosphorite at varying depths
- Centrex will explore for fault block uplifts similar to Ardmore between the wide spaced drilling

# Mining

- Numerous mining trials using excavators and dozers completed at the site by Centrex showing the overburden and ore to be free-dig (no need for blasting)
- Optima Contracting & Consulting completed mining studies for the Northern and Southern Zones
- Strip mining to be employed with waste deposited in-situ as mining progresses
- Truck & shovel selected but dozer stripping still being evaluated
- Undercutting applied to concede some ore at the seam contacts in order to ensure no dilution from waste material

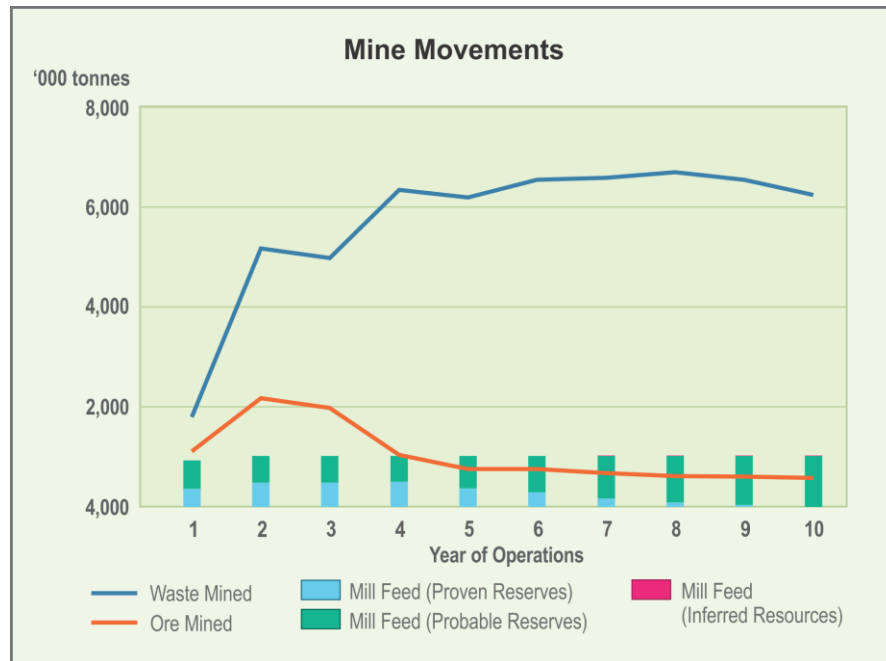




# Ore Reserves

27.5% P <sub>2</sub> O <sub>5</sub> Grade Cut-Off		
Category	Million Tonne	P <sub>2</sub> O <sub>5</sub> %
Probable	7.3	30.2
Proven	2.8	30.3
<b>Total</b>	<b>10.1</b>	<b>30.2</b>

- 1 million dry tonnes per annum processing rate to produce 800,000 wet tonnes of premium grade concentrate
- 10 year mine life from current Ore Reserves

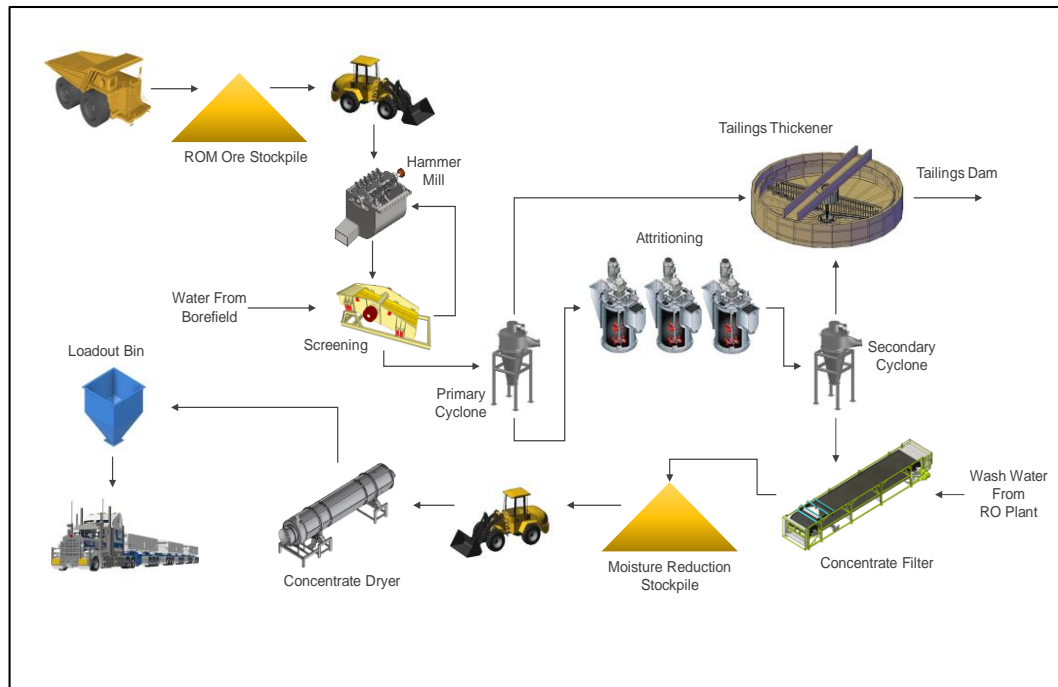


The announcement in relation to the Ore Reserves was made on 8<sup>th</sup> October 2018 and can be found at: <https://www.asx.com.au/asxpdf/20181008/pdf/43z1q8nvm95k58.pdf>

The results were reported under JORC 2012 and Centrex is not aware of any new information or data that materially affects the information contained within the release. All material assumptions and technical parameters underpinning the estimates in the announcement continue to apply and have not materially changed.

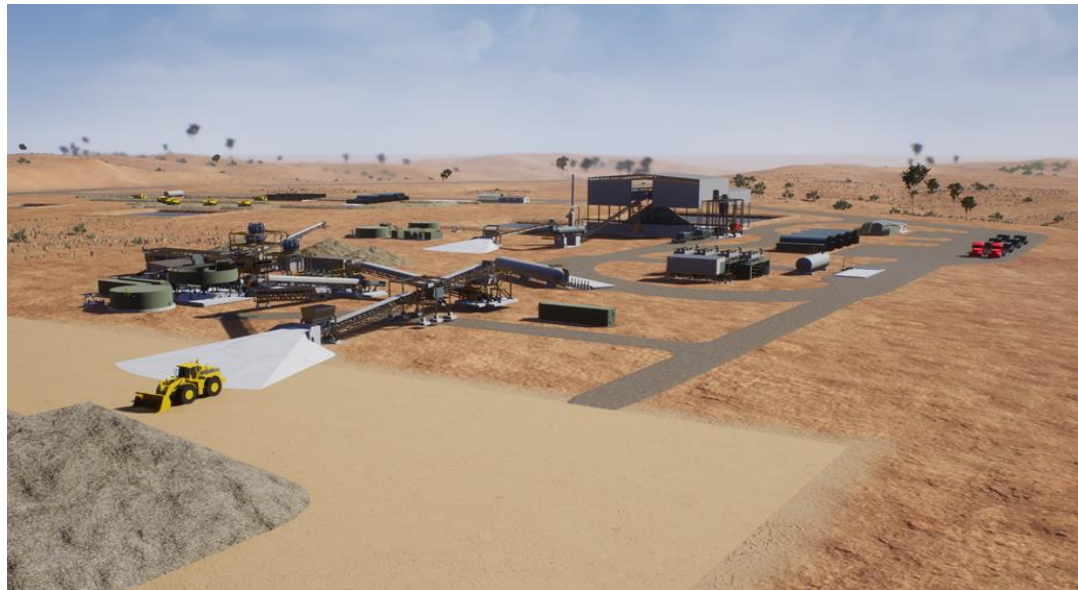
# Mineral Processing

- Centrex completed crushing and beneficiation piloting using PQ diamond drilling and trench excavation bulk samples
- Additional feasibility level test work for materials handling, filtration & thickening and tailings characterization
- GR Engineering Services (“GRES”) designed a circuit capable of producing 800,000 wet tonnes per annum of concentrate at 3% moisture
- Nominal plant feed rate of 133 tonne per hour

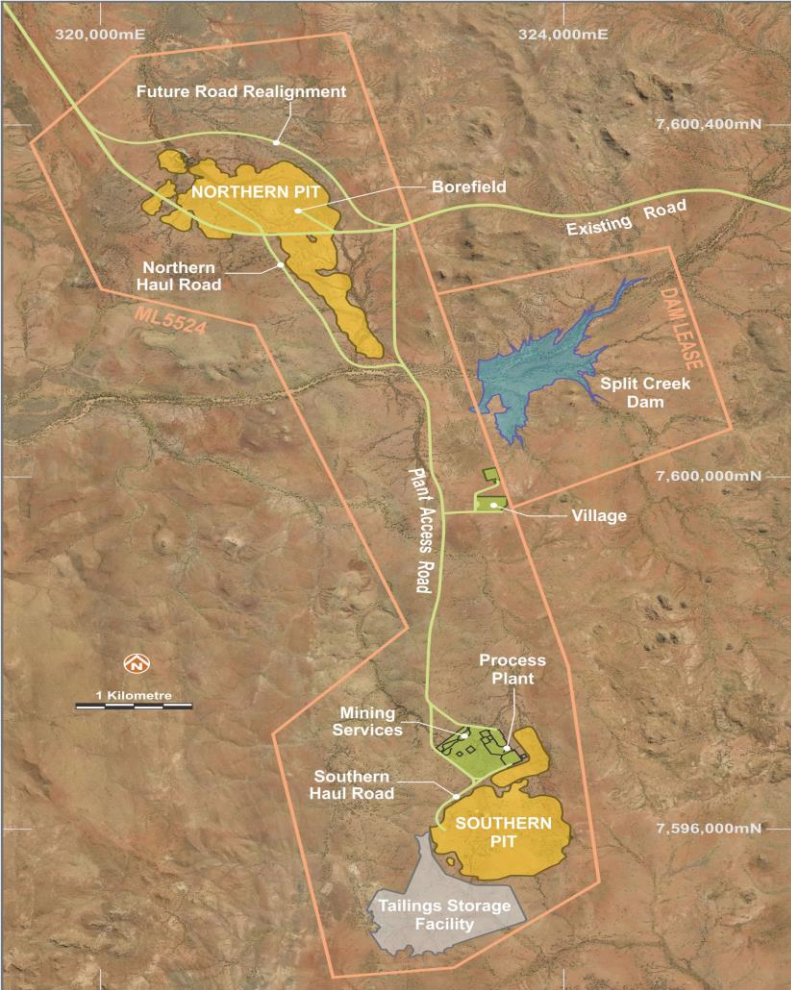


# Process Plant & Mine Site Infrastructure

- GRES completed engineering design for the processing plant and mine site infrastructure including;
- 6km mine access road to existing highway
- Diesel generator power plant
- Northern Zone deposit aquifer borefield, pipeline & RO plant supplemented by a new water capture dam
- 86 man accommodation village
- Other buildings, maintenance facilities etc.



3D design of Ardmore processing plant



# Site Layout



- Process plant located near Southern Zone of the deposit which represents the first years of mining
- Conventional tailings dam adjacent to Southern Zone pit
- New Mining Lease to be applied for around proposed water capture dam
- Pipeline and access road links process plant to Northern Zone aquifer borefield and highway
- Haul road follows access road for ore haulage to plant from Northern Zone pit
- Diversion of the existing highway required in Year 3 of operations

# Logistics

- Product trucked in containers 92km from the mine to a new rail siding at Duchess
- Minor road upgrades planned on existing State controlled roads to improve haulage efficiency
- Rail haul in containers from Duchess to either Stuart or the Port of Townsville at any of several third party siding options
- Containers trucked to new third party 70,000 tonne shed or existing third part container yards at the port
- Product reclaimed and loaded onto vessels (up to 55,000 tonne) with either existing third party container bulk discharge cranes or mobile bulk shiploader
- Numerous third party logistics proposals received and Centrex working towards contracting the preferred solution



# Environment & Approvals



- Mining Lease recently renewed for 21 year term
- Baseline environmental and social studies have largely been completed for the project by Golder Associates Pty Ltd and Northern Resource Consultants with impact assessment studies continuing
- Studies included flora & fauna, heritage, soils, dust & noise
- Centrex major amendment of the existing Environmental Authority to allow the start-up operation to proceed is currently being assessed
- Major amendment application is also being prepared for the proposed full-scale production operation
- All studies to date show no impediments to mining
- Other approvals include mining lease for the proposed water capture dam, water capture and extraction permits, road haulage and road diversion approvals



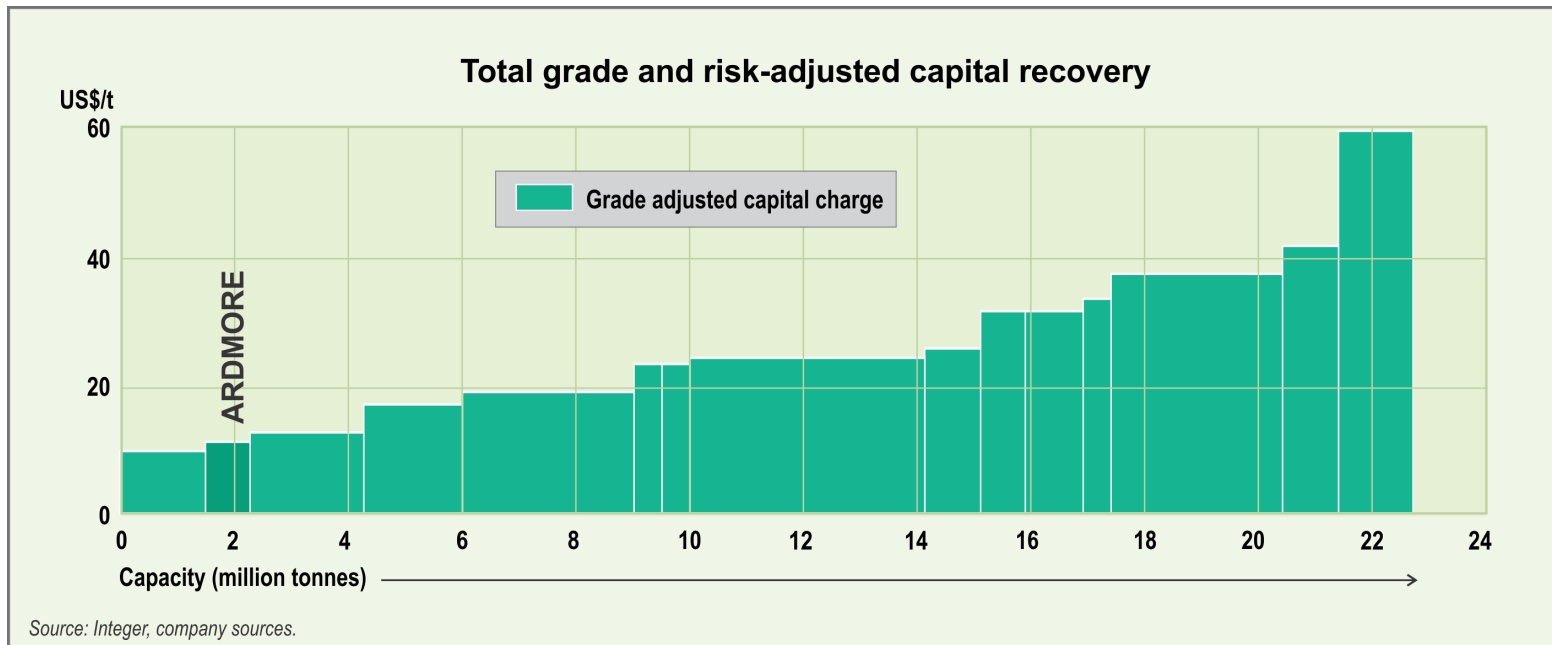
## Capital Cost

- Low capital project – US\$ 50.6m excluding growth & contingency
- Estimate in real terms as at Q3 2018
- 0.74 A\$:US\$ exchange rate assumed based on average of the major four Australian banks most recent medium-term forecasts

	Result	
Overall estimate accuracy	+/- 15%	
Pre-production capital costs		
Area	A\$ million	US\$ million
Mining	4.0	3.0
Process plant	15.4	11.4
Mine site infrastructure	13.2	9.8
Road haulage	2.1	1.6
Rail siding	9.5	7.0
General (camp, borefield etc.)	7.0	5.2
<i>Sub-total directs</i>	<b>51.2</b>	<b>37.9</b>
EPCM	6.2	4.6
Other in-directs	5.9	4.4
Owners	5.0	3.7
<i>Sub-total in-directs</i>	<b>17.1</b>	<b>12.7</b>
Sub-total pre-production capital	<b>68.3</b>	<b>50.6</b>
Growth & contingency – 12%	8.3	6.1
Total pre-production capital	<b>76.6</b>	<b>56.7</b>
Life of mine sustaining capital	11.5	8.5

# Capital Intensity

- Ardmore is particularly competitive when benchmarked against other prospective phosphate rock projects based on capital recovery - ranking in the top 10% at approx. US\$10/t of product produced





# Average CFR Operating Costs

- Life of mine average costs  
US\$ 111 per dry tonne of concentrate
- Estimate in real terms as at Q3 2018
- 0.74 A\$:US\$ exchange rate assumed  
based on average of the major four  
Australian banks most recent  
medium-term forecasts

	Result	
Overall estimate accuracy	+/- 15%	
Average LOM operating costs per dry tonne of concentrate		
Area	A\$/DMT	US\$/DMT
Mining	17	13
Processing	16	12
Road haulage & siding	12	9
Rail & port	68	50
Sea Freight	29	22
Owners	7	5
Total CFR	149	111
Royalties	8	6

# DFS Financial Analysis Summary



Parameter		Result	
Study accuracy		+/- 15%	
Mine life		10 years	
Annual production		800,000 wet tonnes	
Life of mine CFR sales price (2018 real terms) <sup>(1)</sup>		A\$ 211/t	US\$ 156/t
A\$:US\$ exchange rate assumption <sup>(2)</sup>		0.74	
Pre-tax results (nominal) <sup>(3)</sup>			
	Unleveraged NPV <sub>10</sub>	A\$ 172 million	US\$ 127 million
	Unleveraged IRR	40 %	
	Net cash flow	A\$ 392 million	US\$ 290 million
Post-tax results (nominal) <sup>(3)</sup>			
	Unleveraged NPV <sub>10</sub>	A\$ 109 million	US\$ 81 million
	Unleveraged IRR	30 %	
	Net cash flow	A\$ 274 million	US\$ 203 million
	Payback period	4.0 years	

1. Life of mine average CFR sales price derived from Integer Research market analysis and target customer pricing forecasts

2. Flat exchange rate for life of mine based on the average recent forecasts from the major four Australian banks

3. Net Present Value is on a nominal basis with a 2.5% escalator applied to revenue and costs using a 10% discount rate

- Project returns have been calculated on a nominal unleveraged basis
- Low capital project with a short 4 year payback period
- Unleveraged nominal pre-tax NPV<sub>10</sub> of A\$172 million and internal rate of return of 40%

# Funding & Next Steps

- Fabrication has commenced on modular wet plant that will produce circa 30,000 tonnes of concentrate to supply potential customers with 5,000 to 6,000 tonne shipments in mid-2019
- Initial shipments will underpin binding long-term off-take agreements
- The start-up operation will significantly de-risk the project technically and commercially
- The start-up plant is readily upgradable for full-scale operations
- Project financing is targeted in the second half of 2019 inline with securing off-take agreements
- Financing is anticipated to come from a mix of equity and debt instruments
- 12 to 15 month construction period from financing with target full-scale production at the start of 2021



## COMPETANT PERSON STATEMENT



The information in this report relating to Mineral Resources is based on and accurately reflects information compiled by Mr Jeremy Clark of RPM, who is a consultant and adviser to Centrex Metals Limited and who is a Member of the Australian Institute of Geoscientists. Mr Clark has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity 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 Clark consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.

The information in this report that relates to Ore Reserves is based on information compiled by Ben Brown, a Competent Person who is a Member of The Australasian Institute of Mining and Metallurgy. Ben Brown is employed by Optima Consulting and Contracting Pty Ltd, an external independent consultancy. Ben Brown has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the ‘Australian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves’. Ben Brown consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

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