



# Savannah Feasibility Study Optimisation

## Robust economics at spot commodity prices

20 July 2017

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# Disclaimer

## Cautionary Statements and Important Information

This presentation includes information extracted from Panoramic Resources Limited ASX announcement dated 20 July 2017 entitled “Savannah Feasibility Study Optimisation – Robust Economics at Spot Commodity Prices”. The Savannah optimisation includes approximately 1.1% of material on a contained nickel basis classified as Inferred Resource. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised.

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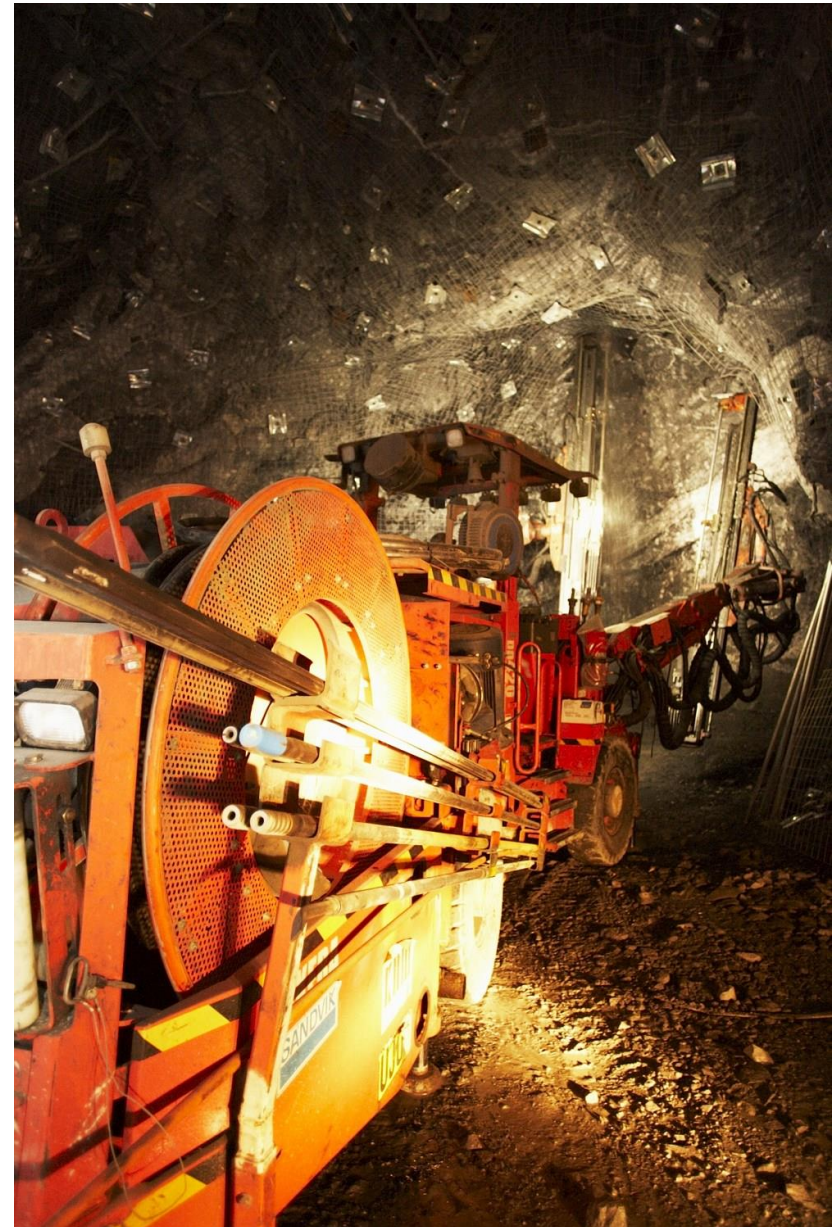
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# OVERVIEW



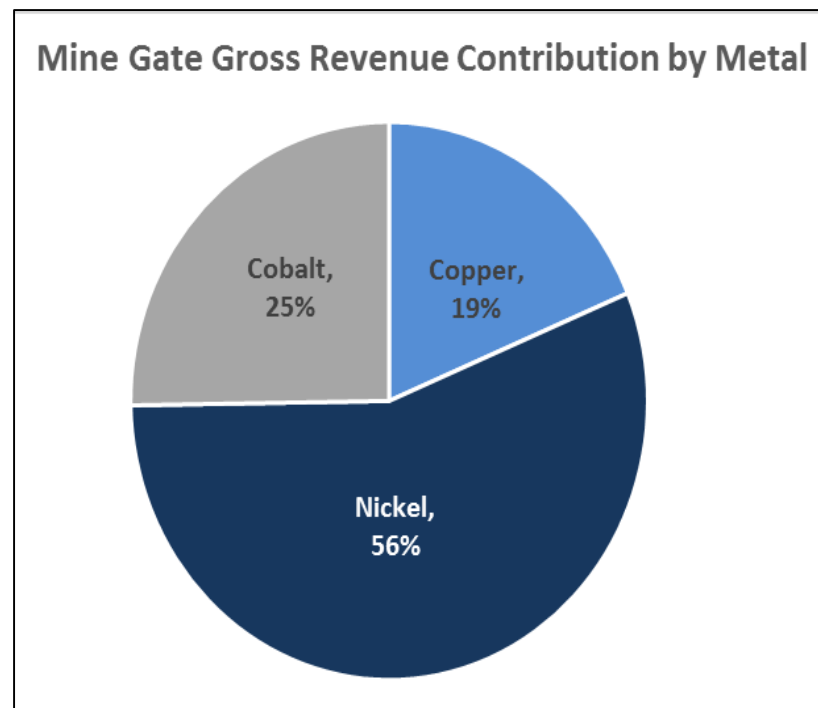
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# Optimisation demonstrates robust economics at spot prices

July 2017 Savannah Feasibility Study Optimisation Highlights (*comparison with Feb 2017 FS*)

- **Substantially lower cash costs** - US\$2.40/lb payable Ni after by-product credits (*FS - US\$3.30/lb*)
- **Maximum funding requirement** - less than \$40M
- **Low pre-production capital** - A\$20M (*no change from FS*)
- **Long mine life** - 8.5 years (*FS – 10 years*)
- **Increased average annual production forecast\***
  - 11,000t Ni (*FS - 9,700t*)
  - 5,800t Cu (*FS - 5,000t*)
  - 760t Co (*FS - 670t*)
- **Significant cobalt revenue stream**
- **Financing and marketing well advanced**
- **Additional innovations being investigated, with potential for step-change improvements in productivity and costs**



## \*Cautionary Statement

Approximately 1.1% of nickel in the Production Target is from material classified as Inferred Resource. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised.

# Key changes - February 2017 Feasibility Study to July 2017 optimisation

Initiative	Change	Result
Mining Productivity	<ul style="list-style-type: none"> <li>Vertical pillar in upper part of Savannah North (additional mining front)</li> <li>Increased loading rates</li> <li>Lower grade stopes omitted</li> </ul>	<ul style="list-style-type: none"> <li>Increase in average annual ore mined from 0.8Mtpa to 0.9Mtpa</li> <li>Improved grades</li> <li>Lower unit costs due to improved mining rates and plant utilisation</li> </ul>
Product Optimisation	<ul style="list-style-type: none"> <li>Increase in target concentrate Ni grade to 9%</li> </ul>	<ul style="list-style-type: none"> <li>Reduced concentrate transport costs</li> <li>Improved offtake terms</li> </ul>
Cost Reduction Initiatives	<ul style="list-style-type: none"> <li>Hybrid solar-diesel power generation</li> <li>Owner concentrate haulage</li> <li>Village services</li> </ul>	<ul style="list-style-type: none"> <li>~15% reduction in site-based operating costs over LOM</li> </ul>
Commodity prices	<ul style="list-style-type: none"> <li>Spot prices as at 30 June 2017                             <ul style="list-style-type: none"> <li>Nickel US\$4.21/lb (FS - \$US6.00/lb)</li> <li>Copper US\$2.68/lb (FS - \$US2.57/lb)</li> <li>Cobalt US\$27.50/lb (FS - \$US14.42/lb)</li> <li>US\$:A\$ US\$0.769 (FS - \$US0.736)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Cobalt by-product credits comprise ~25% of gross (mine gate) revenue</li> </ul>

# Key statistics

Operating Metric	Details
Mineral Resources	<b>13.9Mt @ 1.63%Ni, 0.75% Cu, 0.11% Co</b> containing <b>226,400t Ni 104,700t Cu 15,300t Co</b>
Mine Production	<b>7.59Mt @ 1.42% Ni, 0.68% Cu, 0.10% Co</b> containing <b>108,100t Ni 51,300t Cu 7,200t Co</b>
Mine Life	8.5 years
LOM production <i>(metal in concentrate)</i>	<b>93,800t Ni 49,100t Cu 6,500t Co</b>
Annual production <i>(metal in concentrate)</i>	<b>11,000t Ni 5,800t Cu 760t Co</b>

- **Long mine life ~8.5 years** (excluding future Resource to Reserve conversion and exploration upside potential)
- **Significant nickel production**
  - averaging 11,000t nickel in concentrate over LOM
- **Significant by-product credits**
  - 44% of gross mine-gate revenue from copper and cobalt

The Mineral Resources and Ore Reserves underpinning the above production target have been prepared by a competent person or persons in accordance with the requirements of the JORC Code – refer to PAN's ASX announcements of 24 August 2016, 30 September 2016 and 2 February 2017.

# Optimisation financials compared with February 2017 Feasibility Study

Financial Metric	Units	Feb-17 Savannah FS	Jul-17 Savannah FS Optimisation	Jul-17 Savannah FS Optimisation (Feb-17 price deck)
Nickel price assumption	US\$/lb	6.00	4.21	6.00
Revenue	A\$M	1,500	1,200	1,600
Initial Capital ( <i>Pre-production</i> )	A\$M	20	20	20
LOM Capital ( <i>incl. initial capital</i> )	A\$M	230	220	220
Operating costs plus royalties	A\$M	960	830	860
Pre-tax cashflow	A\$M	300	120	480
Pre-tax NPV ( <i>8% discount rate</i> )	A\$M	190	60	310
IRR	%	115	40	240
C1 cash cost ( <i>Ni in concentrate basis</i> )	A\$/lb Ni	2.70	1.80	2.30
	US\$/lb	2.00	1.40	1.70
Operating cash costs ( <i>payable Ni basis</i> )	A\$/lb Ni	4.50	3.10	3.60
	<b>US\$/lb</b>	<b>3.30</b>	<b>2.40</b>	2.60
Sustaining cash costs ( <i>payable Ni basis</i> )	A\$/lb Ni	6.00	4.50	4.90
	<b>US\$/lb</b>	<b>4.40</b>	<b>3.40</b>	3.60

- Improved opex and cash costs due to improved productivity and cost reduction initiatives
- Higher metal payabilities
- Cobalt contributes 25% of gross (mine gate) revenue

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# MINING

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# Material in optimised mine plan

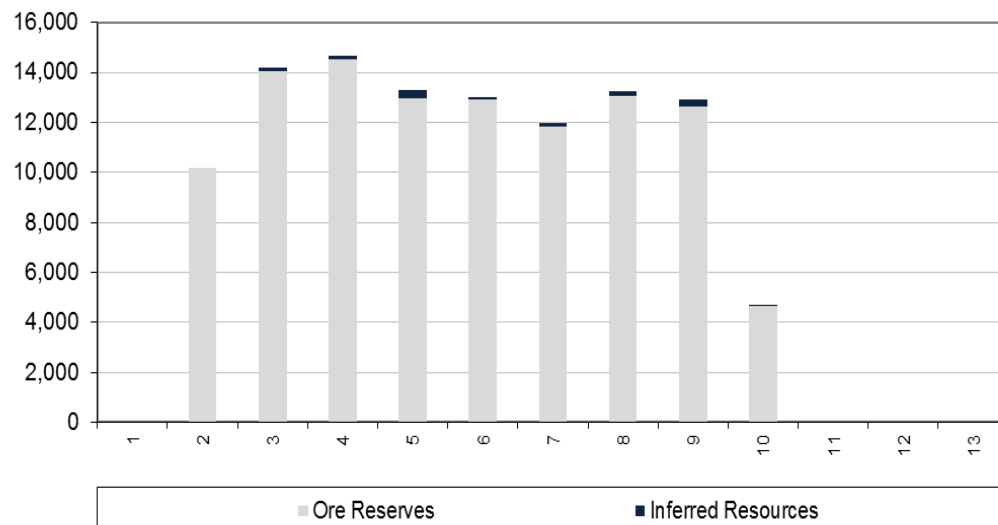
Classification	Tonnage Mt	Grade Ni %	Grade Cu %	Grade Co %	Contained Ni t	Contained Cu t	Contained Co t
Ore Reserves	7.53	1.42	0.68	0.09	106,900	50,900	7,100
Inferred Resource	0.06	1.91	0.69	0.13	1,200	400	100
<b>Total</b>	<b>7.59</b>	<b>1.42</b>	<b>0.68</b>	<b>0.10</b>	<b>108,100</b>	<b>51,300</b>	<b>7,200</b>

- The optimised mine plan has only ~1.1% material classified as Inferred Resource

## Cautionary Statement

There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised.

Contained Nickel in Mining Plan by JORC Category (tonnes per year)



# Key changes to optimised mine plan

## ■ Vertical pillar

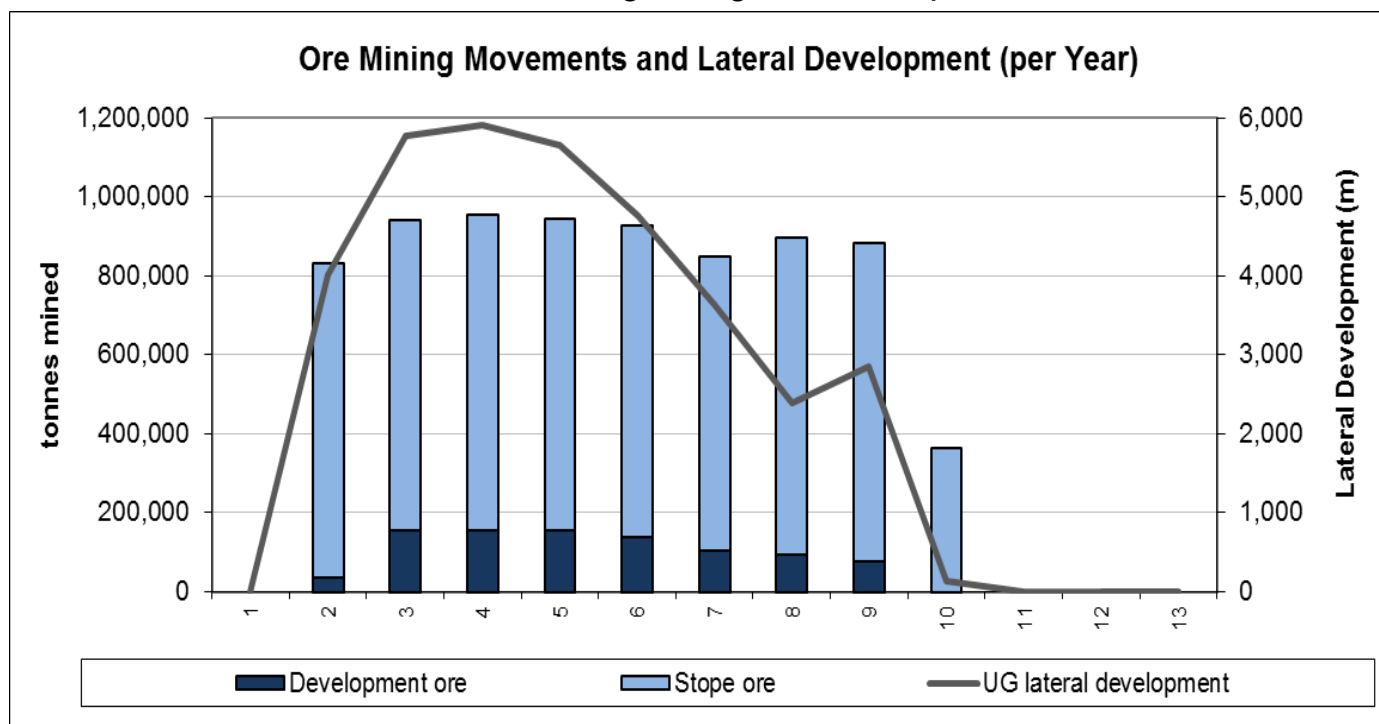
- Accelerates early production by opening 2<sup>nd</sup> mining front in Savannah North

## ■ Loading rates

- Increased from 1,000tpd to 1,200tpd
- Utilise remote bogging technology

## ■ Lower grade stopes removed

- Western side of Savannah North Upper Zone removed from optimised mine plan (750kt @ 0.9% Ni)
- This material remains accessible for mining at higher nickel prices



# PROCESSING



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# Savannah North 2017 metallurgical program

## ■ Mineralogy (QEMSCAN™)

- similar mineralogy to Savannah ore (i.e. pyrrhotite-dominant sulphides with sub-ordinate pentlandite & chalcopyrite)
- 85% of elemental nickel occurs as pentlandite. 7% of nickel occurs as non-sulphide
- 60-75% of pentlandite is liberated, with P<sub>80</sub> grainsize between 59um and 78um

## ■ Comminution

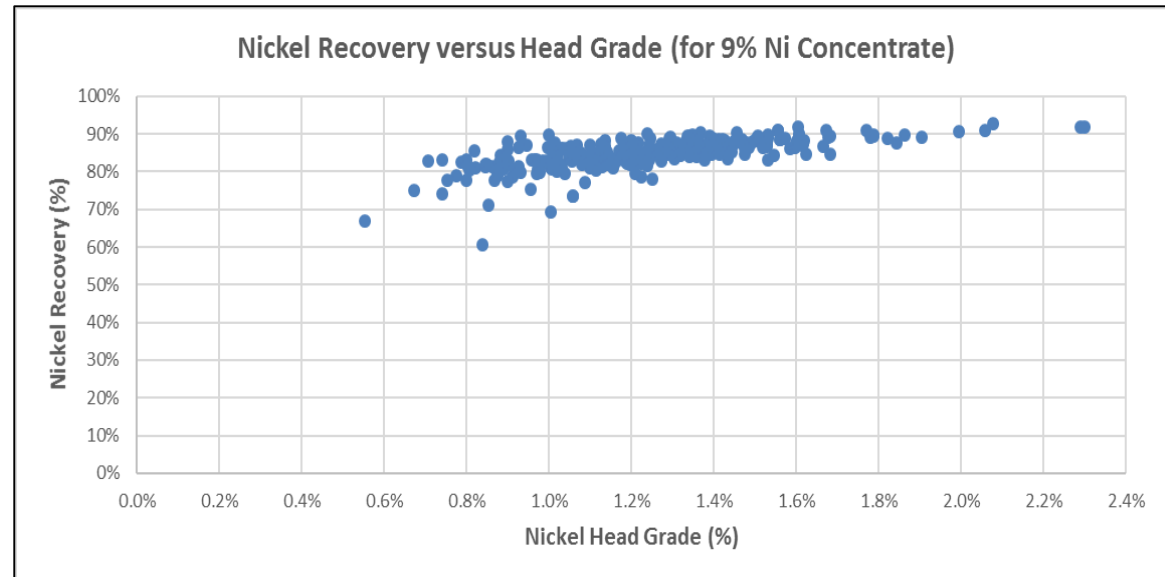
- Bond Work Index - ranges from 9.5 to 12.5 (“medium”)
- SAG mill comminution (SMC) test – “very soft” to “soft”
- Opportunity to increase mill throughput at same grind size or maintain throughput at finer grind

## ■ Flotation testwork

- Upper and Lower Zones expected to perform within the range of typical Savannah ore
- Bulk concentrate grades of +9% are achievable
- Testwork continues at ALS on alternative reagent schemes, dosages and pH levels

## ■ Analysis of historical Savannah production data

- Data collected over 12 years demonstrates consistent relationship between nickel recovery, head grade and concentrate grade
- Best-fit recovery equation developed for the range of expected nickel head grades and targeted concentrate grade of 9% Ni



# Processing

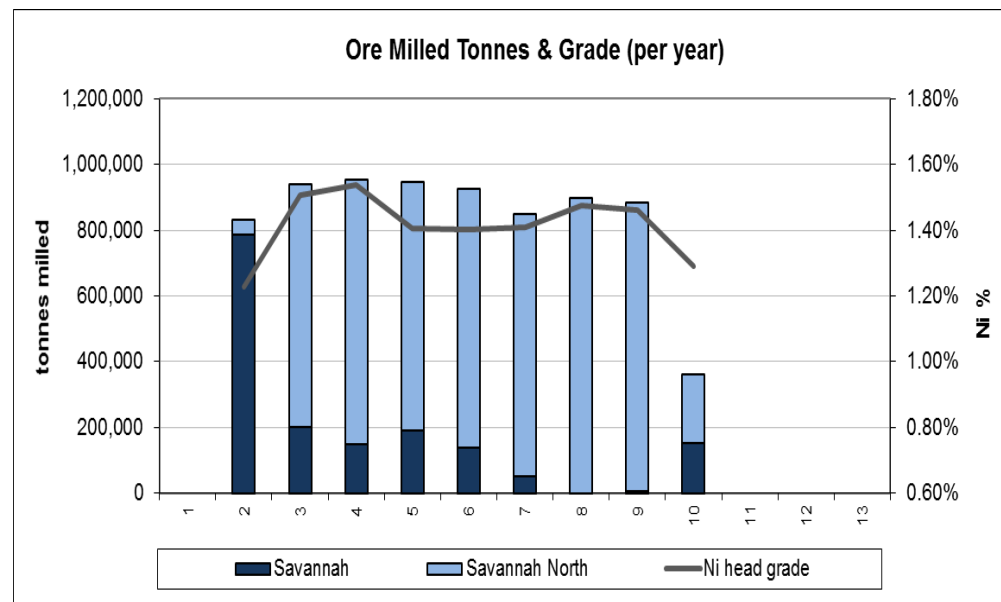
- **Utilise existing Savannah processing plant**
  - Conventional crushing, grinding, flotation
  - Nominal throughput capacity 1.0Mtpa
  - Operated continuously for 12 years
  - Feb-May 2016 sustainably operated at 130tph

- **Forecast mill throughput**

- Conservative three-month ramp-up to full production on restart
- Life-of-mine average 0.9Mtpa (120tph)
- **Life-of-mine head grade averages 1.42% Ni**
- Lower grades in first year of production, associated with the remnant Ore Reserves at Savannah

- **Processing recoveries used in optimisation**

- 87% nickel
- 96% copper
- 90% cobalt
- Targeting 9% nickel concentrate grade and based on historic Savannah plant performance



# Concentrate production

## ■ Product

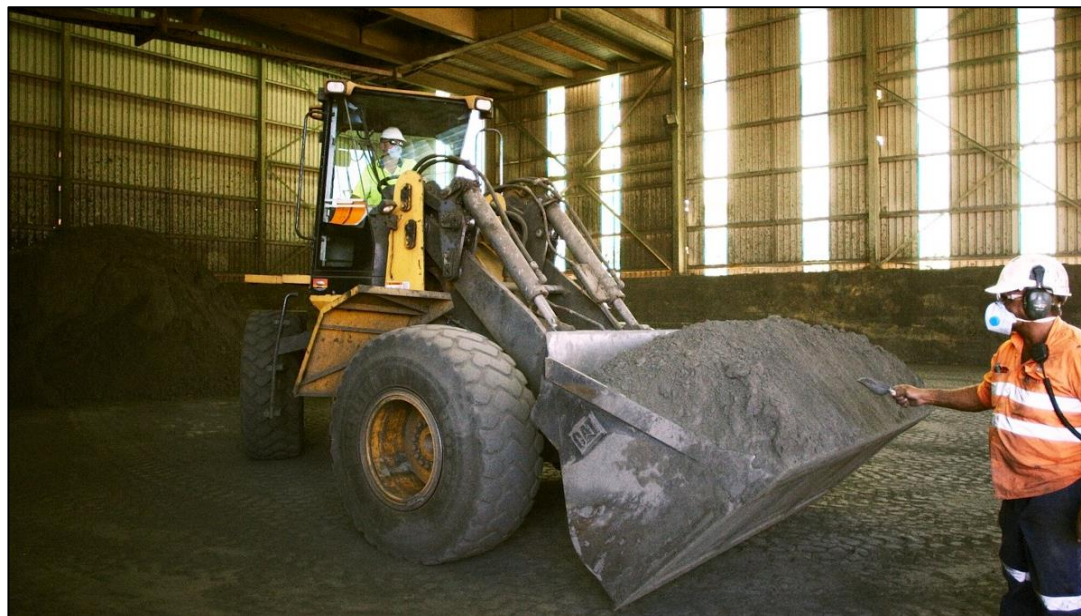
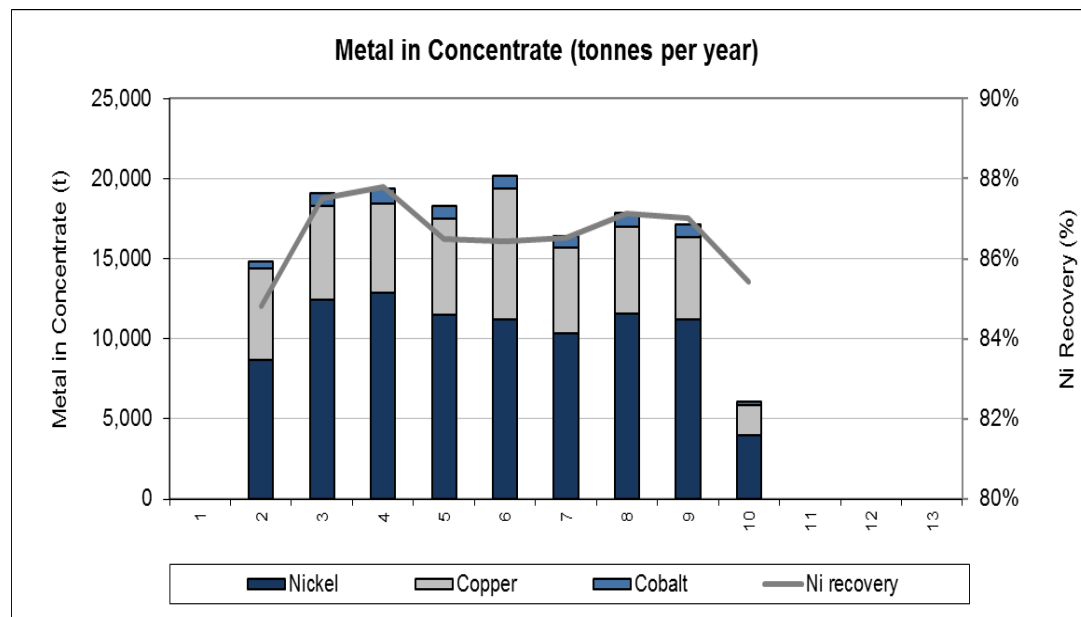
- Bulk Ni-Cu-Co concentrate
- Target grade of 9% nickel

## ■ Annual metal in concentrate production

- 11,000t nickel
- 5,800t copper
- 760t cobalt

## ■ LOM metal in concentrate production

- 93,800t nickel
- 49,100t copper
- 6,500t cobalt



# ESTIMATED COSTS & PROJECT ECONOMICS



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# Capital costs - details

## Major Capital Items (over LOM)

- \$29M - Underground mobile equipment (model assumes assets leased)
- \$20M - Savannah North primary ventilation (raise bore hole and fan purchase/installation)
- \$9M - future tailings storage facilities (TSF)
- \$7M - capping of tailings dam and reshaping the waste dump
- \$7M - solar power plant
- \$5M - concentrate haulage fleet (leased)

Description	Pre-production & Ramp-up	Sustaining	Life of Mine
	\$M	\$M	\$M
Refurbishment & Restart Capex	10	-	10
Initial Store Inventory	2	-	2
Capitalised Pre-Production & Ramp-up OPEX	23	-	23
Capitalised Development	3	95	98
Mining - Mobile Equipment	-	29	29
Savannah North primary ventilation	4	16	20
Tailings facilities construction	1	8	9
TSF 1 capping	-	7	7
Solar power plant		7	7
Concentrate haulage fleet (leased)		5	5
Other sustaining capital	2	30	32
Capitalised revenue during ramp-up	(20)	-	(20)
<b>TOTAL</b>	<b>25</b>	<b>197</b>	<b>223</b>

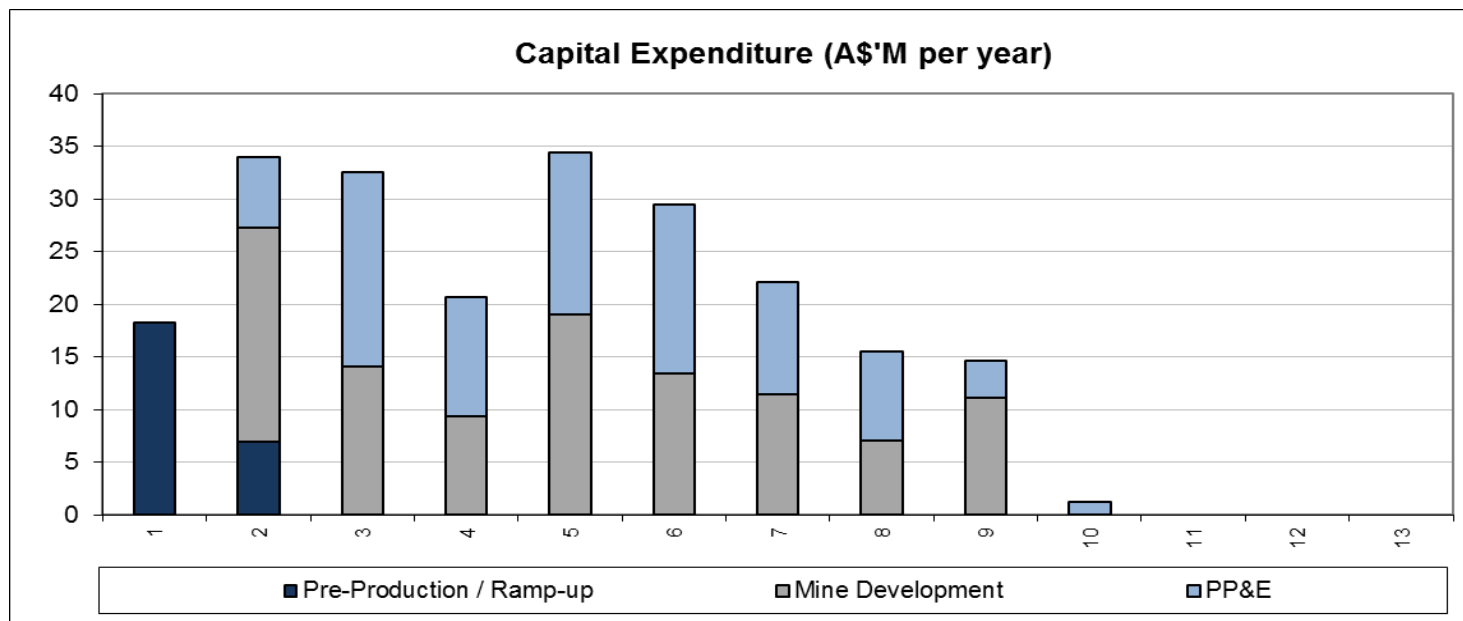
# Capital expenditure timing

- Low pre-production capex of A\$18M due to
  - Substantial existing equipment & infrastructure
  - Short lead time to production



## Ramp-up costs

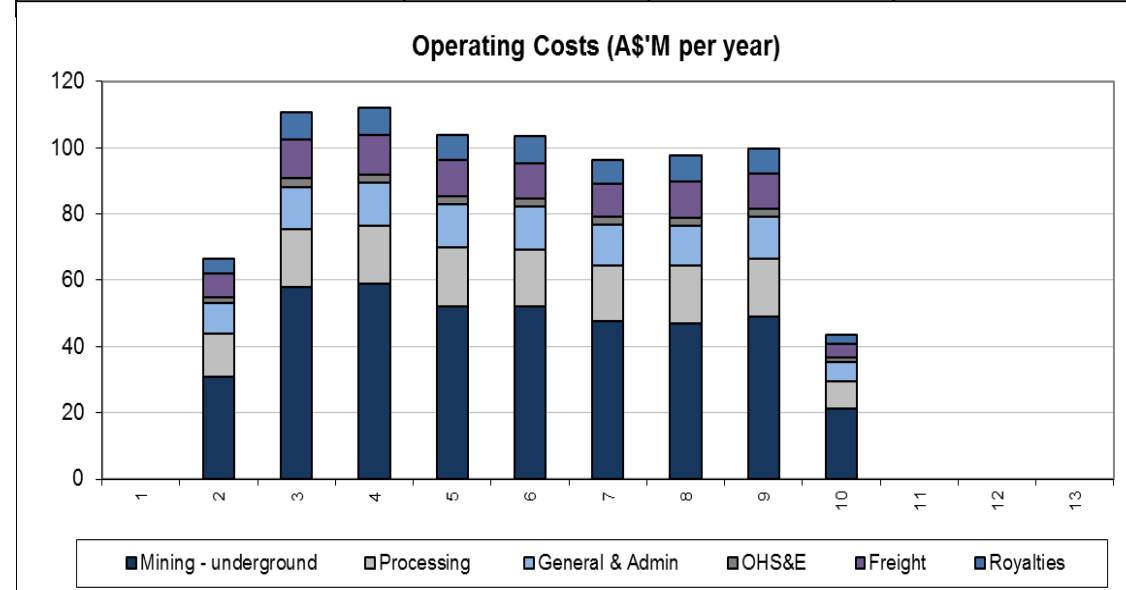
- 3 month ramp-up period
- \$7M capitalised ramp-up costs (net of capitalised revenue)



# Operating costs

- Unit costs 7% lower than in February 2017 Feasibility Study
- Major cost savings
  - \$2.4Mpa in mining costs due to increased mining rate
  - \$1.0Mpa in milling costs due to better plant utilisation
  - \$2.1Mpa in power costs due to solar
  - \$1.3Mpa in concentrate road haulage due to owner operated haulage fleet
  - \$0.4Mpa in village services due to more competitive contract pricing

Description	Average cost per tonne milled (A\$/t)	Average cost per year (A\$'M)	Total over LOM (A\$'M)
Mining (incl. Geology)	56	50	420
Processing	19	17	140
Other site costs	17	15	120
<b>Total</b>	<b>92</b>	<b>83</b>	<b>680</b>



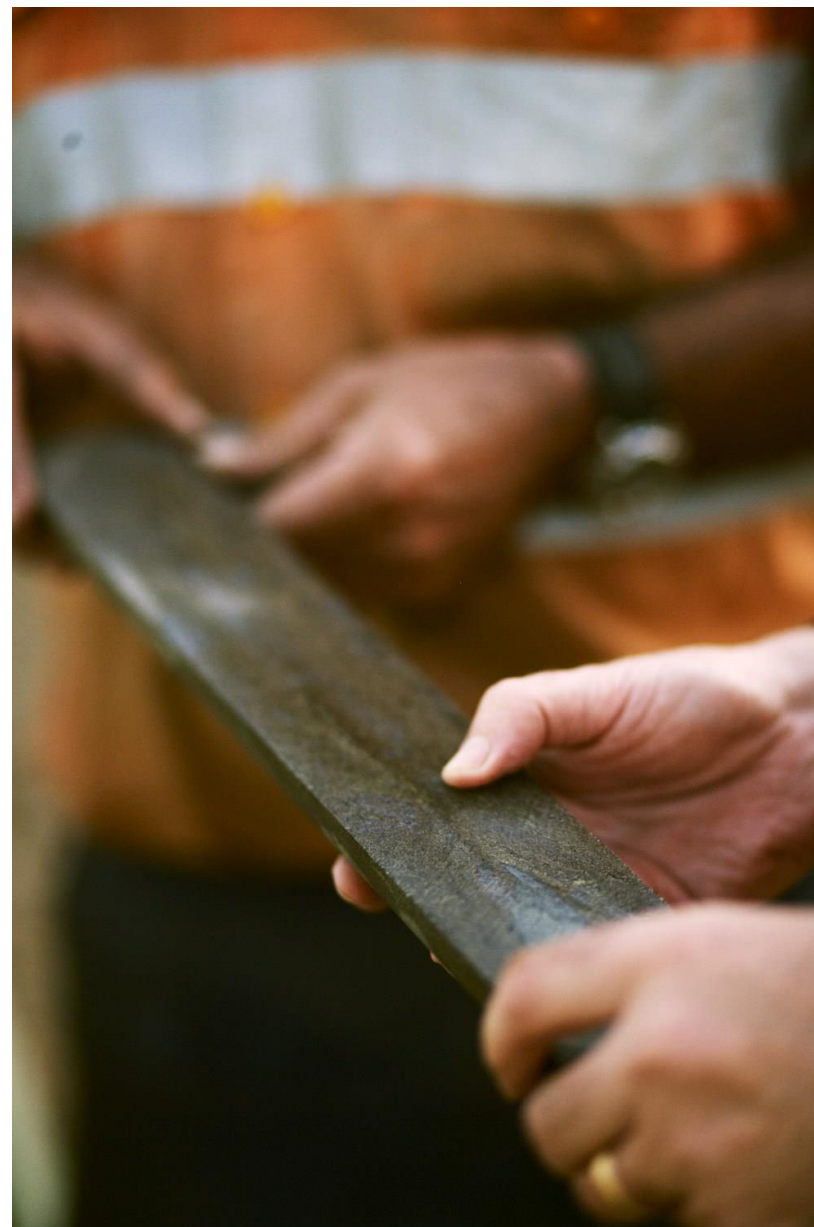
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# Financial assumptions

- Revenue assumptions based on indicative sales terms received from various interested parties
- Commodity and FX forecasts (and comparison with February 2017 Feasibility Study)

Commodity	Feb-17 FS	Jul-17 OS
Nickel	US\$6.00/lb	<b>US\$4.21/lb</b>
Copper	US\$2.57/lb	<b>US\$2.68/lb</b>
Cobalt	US\$14.42/lb	<b>US\$27.50/lb</b>
US\$:A\$	0.736	<b>0.769</b>
Discount rate	8%	<b>8%</b>

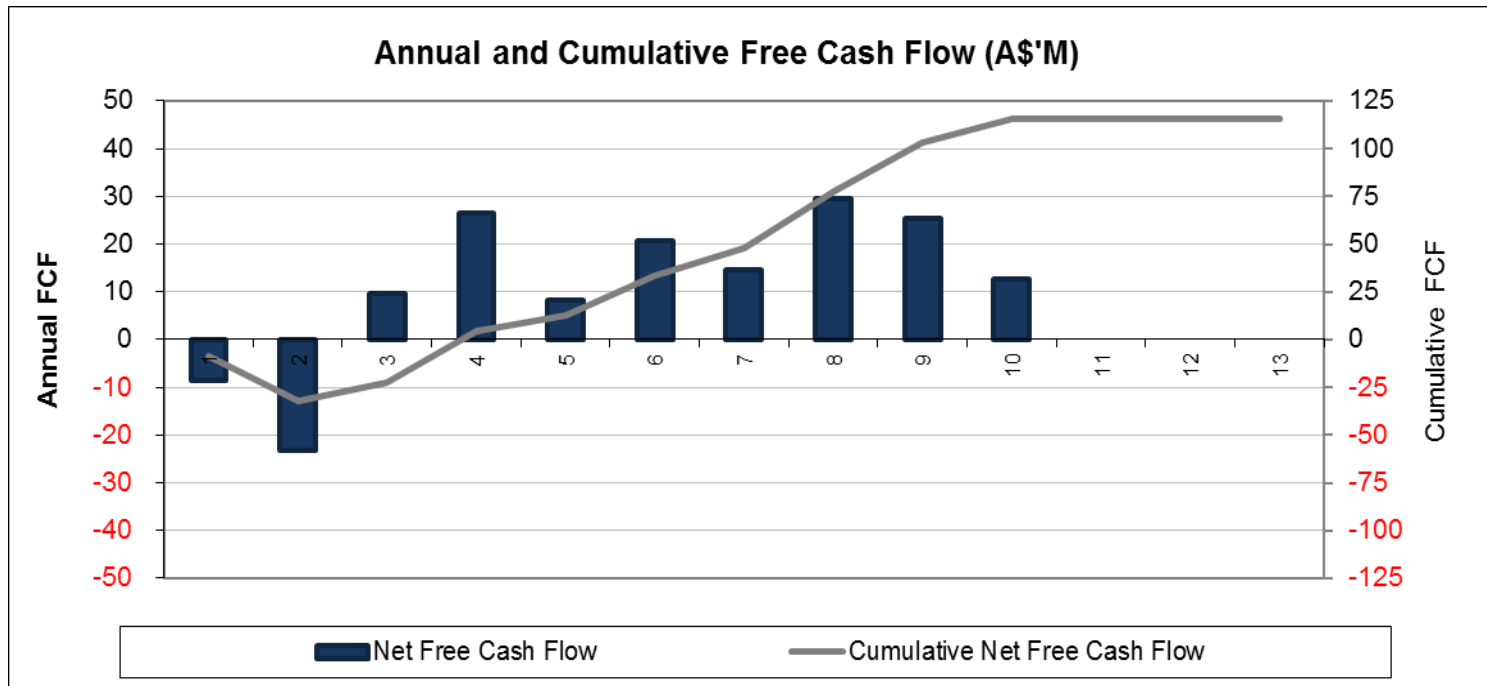
- Modelling is pre-tax
- **Tax losses of \$65M** - at 31 December 2016 PAN had domestic CF revenue tax losses of approximately \$65M (not included in modelling)



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# Cashflow forecast

- LOM Revenue - \$1,200M (\$150M per year)
- LOM pre-tax cashflow - \$120M
- Up-front capex - \$20M
- Maximum funding drawdown - less than \$40M
- Payback period - less than 3 years after recommencement of production
- Cash breakeven Ni price - US\$3.65/lb



# Financial results – viable at spot, highly leveraged to nickel recovery

Financial Metrics	Units	US\$4.21/lb	US\$5.00/lb	US\$6.00/lb
Revenue	A\$M	1,200	1,400	1,600
Initial Capital <i>(Pre-production)</i>	A\$M	20	20	20
LOM Capital <i>(inclusive of initial capital)</i>	A\$M	220	220	220
Operating costs plus royalties	A\$M	830	840	850
Pre-tax cashflow	A\$M	120	310	530
Pre-tax NPV <i>(8% discount rate)</i>	A\$M	60	190	340
IRR	%	40	130	270
C1 cash costs <i>(Ni in concentrate basis)</i>	A\$/lb	1.80	1.80	1.80
	US\$/lb	1.40	1.40	1.40
Operating cash costs <i>(payable Ni basis)</i>	A\$/lb	3.10	2.90	2.90
	US\$/lb	2.40	2.30	2.30
Sustaining cash costs <i>(operating cash costs plus sustaining capital, payable Ni basis)</i>	A\$/lb	4.50	4.30	4.20
	US\$/lb	3.40	3.30	3.30

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# Leveraged to commodity prices and currency

- **Strongly leveraged to the US\$ nickel price and US\$:A\$ FX rate**
  - US\$1.00/lb increase in nickel price adds ~**A\$160M** to pre-tax NPV
  - US\$0.05 cent decrease in the US\$:A\$ FX rate adds ~**A\$60M** to pre-tax NPV
- **RBC forecasts\***
  - 2018 - US\$4.50/lb
  - 2019 - US\$5.00/lb
  - 2020 - US\$6.00/lb
  - 2021 - US\$7.00/lb
  - Long-term - US\$8.00/lb (2017\$)

Pre-tax NPV <sub>8</sub> (\$'M)		Nickel Price (US\$/lb)				
		4.00	4.50	5.00	5.50	6.00
US\$:A\$ FX Rate (US\$)	0.60	186	280	403	509	592
	0.65	129	217	329	427	504
	0.70	81	162	266	357	429
	0.75	38	114	212	297	363
	0.80	2	73	164	244	306

\* Source: RBC Capital Markets Global Metals & Mining Q3/17 Outlook, dated 28 June 2017

# NEXT STEPS



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# Further Productivity Improvements

Panoramic has identified a number of opportunities, involving the adoption of new and emerging technologies, with potential to provide step-changes in productivity and cost reduction

- **Ore passes** – shorter loader tramming distances to increase productivity
- **Battery loaders** – reduces heat generation and diesel particulate emissions, resulting in lower ventilation and cooling requirements
- **Surface-operated remote bogging** – reduces manning requirements, continuous bogging
- **Alternative truck technology** – smaller, lighter units, faster travel times, lower capital and operating costs
- **Small drive sizes** – reduces waste moved, therefore lower development costs
- **Drilling automation** – increases utilisation, improved quality resulting in less rework

These opportunities to be more fully assessed as part of the next phase of work



# METAL PRICE OUTLOOK



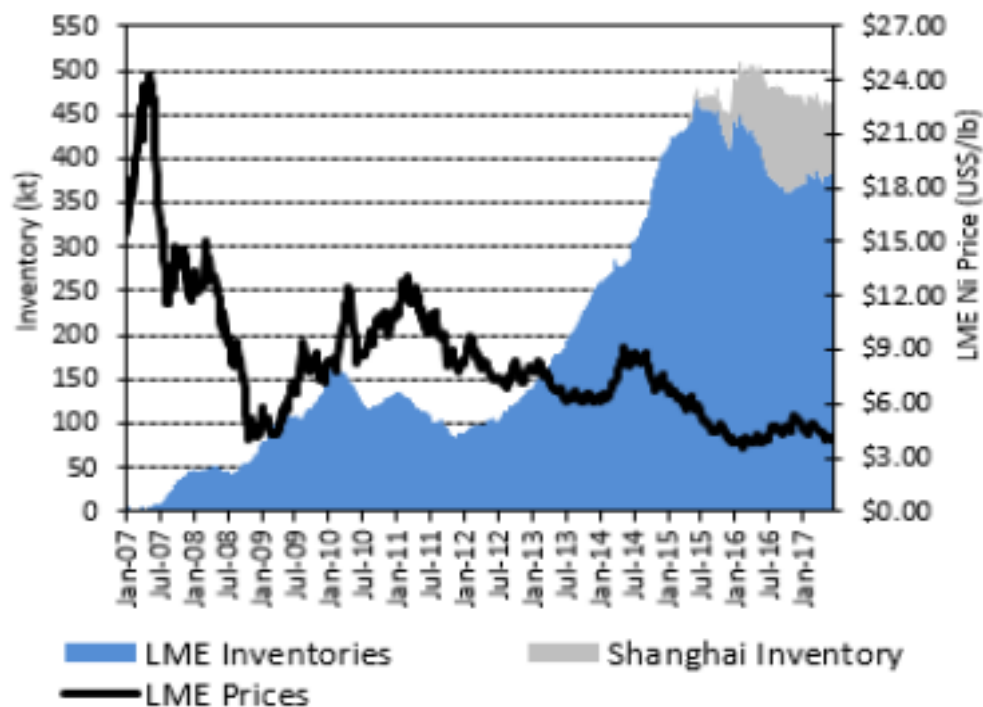
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# Nickel supply/demand moving into deficit

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Inventory falling after a seasonal high in February



## RBC Outlook\*

### ■ Demand

- Strong rebound to 6.6% in 2016
- Stainless steel demand has softened recently

### ■ Supply

- Relaxation of export rules in Indonesia and removal of Environmental Minister in Philippines

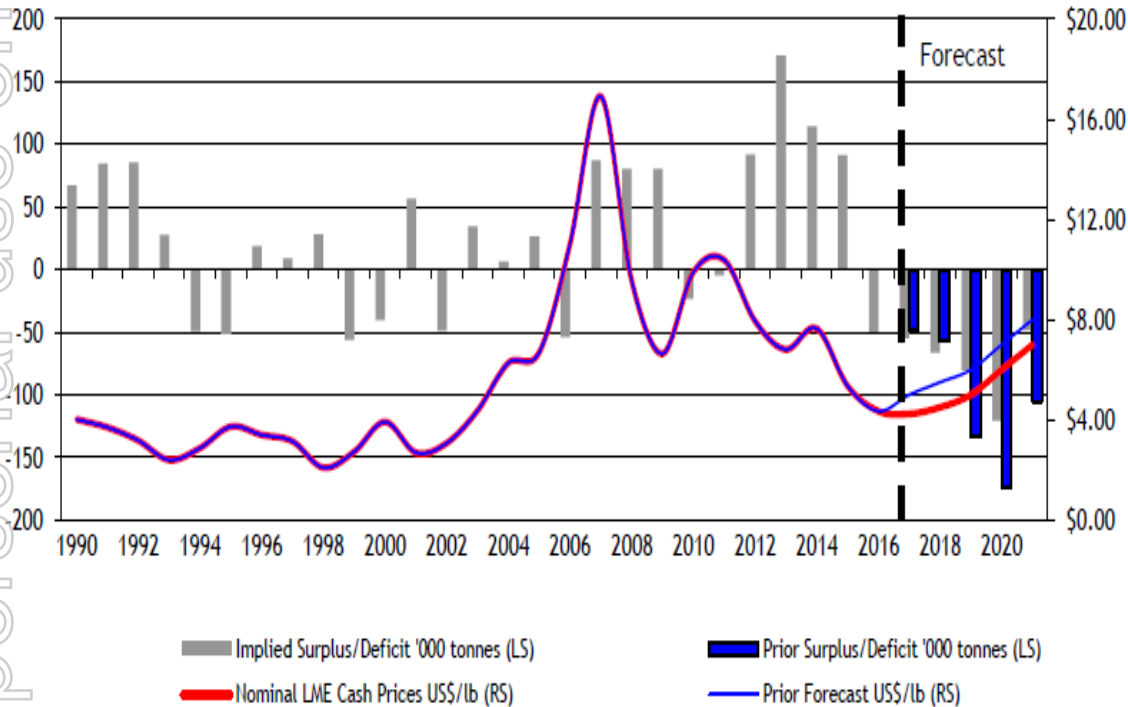
### ■ Supply/Demand balance

- Total inventories fallen by 45kt since the start of 2016
- Market in deficit after four years of surplus

\*Source document: RBC Capital Markets Global Metals & Mining Q3/2017 Outlook – 28 June 2017

# Nickel price outlook improving

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Source: Wood Mackenzie, RBC Capital Markets estimates

## ■ RBC Price Forecasts (US\$/lb)\*

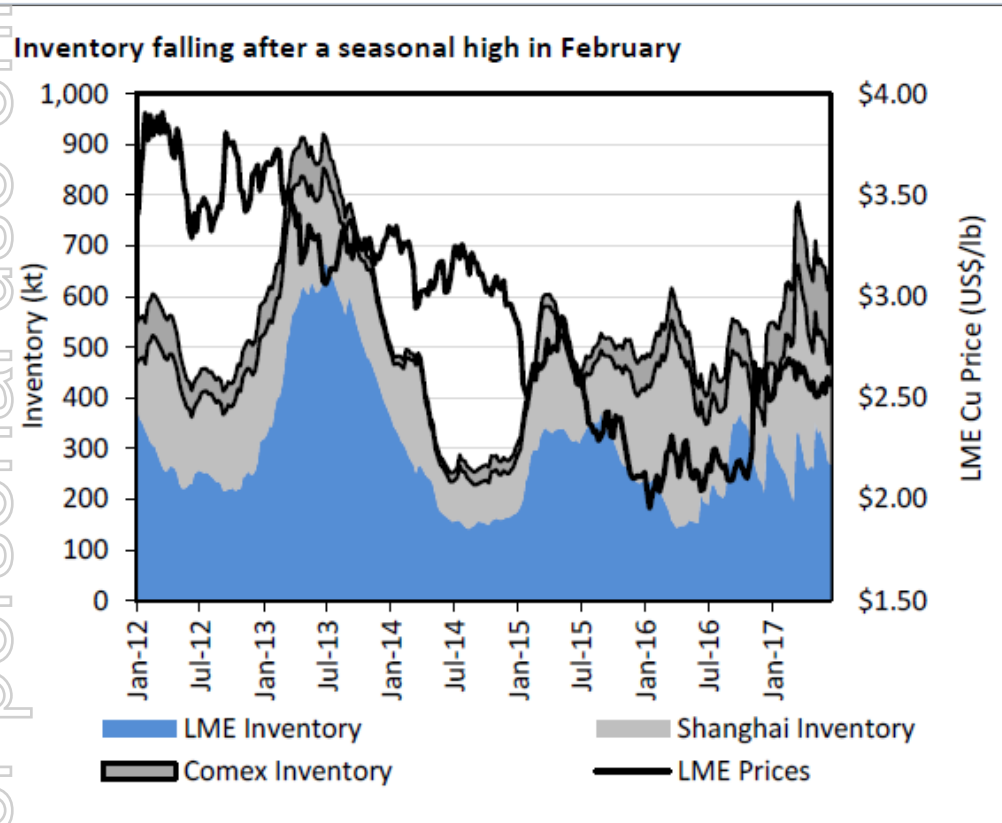
2018	\$4.50
2019	\$5.00
2020	\$6.00
2021	\$7.00

**Long Term (Real 2017 \$) \$8.00  
2022 and beyond**

\*Source document: RBC Capital Markets Global Metals & Mining Q3/2017 Outlook – 28 June 2017

# Copper supply/demand

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## RBC Outlook\*

### ■ Demand

- Steady demand growth forecast
- Annual consumption to increase ~2%

### ■ Supply

- Mine supply begins to fade in 2020 due to lack of new investment

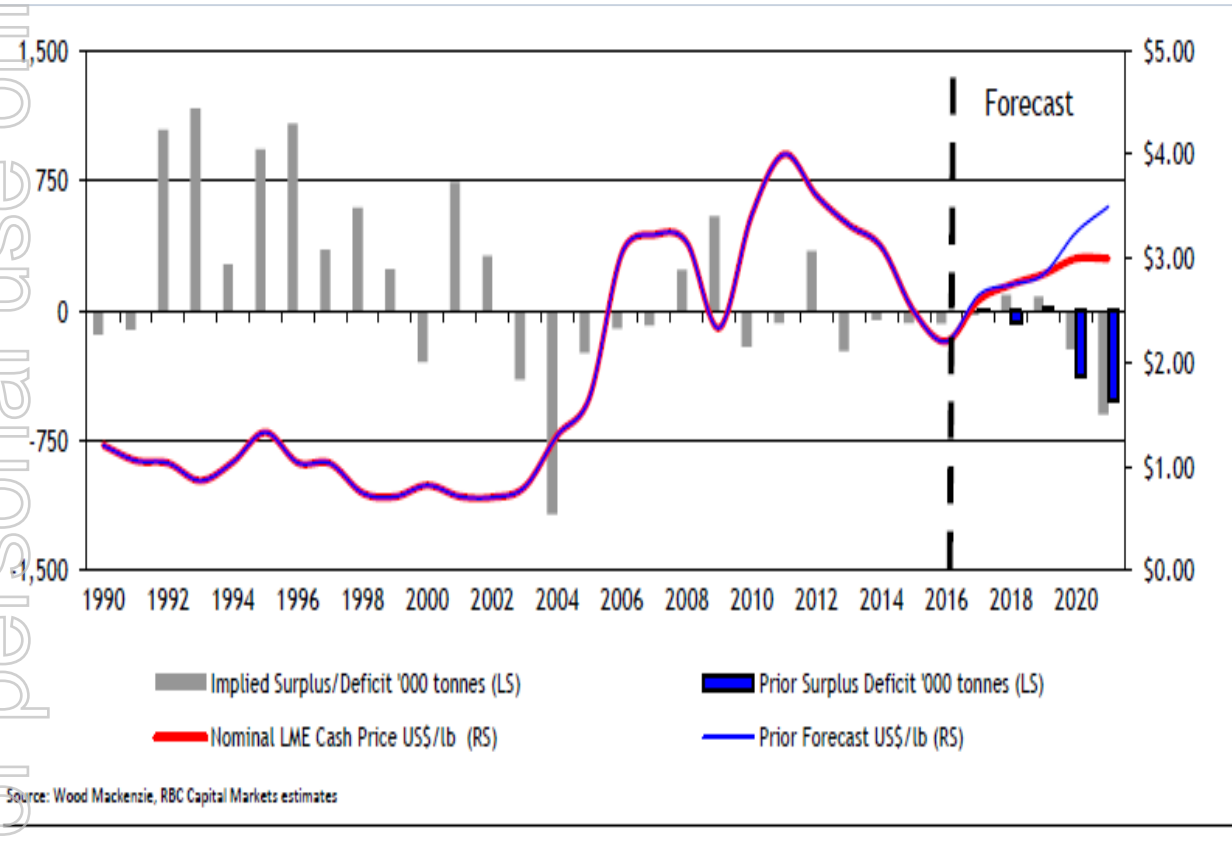
### ■ Supply/Demand balance

- Inventories declining following peak in April 2017
- Balanced market through 2020
- Deficits in 2020 and beyond due to lack of new investment

\*Source: RBC Capital Markets Global Metals & Mining Q3/17 Outlook – 28 June 2017

# Copper price outlook

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## ■ RBC Price Forecasts (US\$/lb)\*

2018 \$2.75

2019 \$2.85

2020 \$3.00

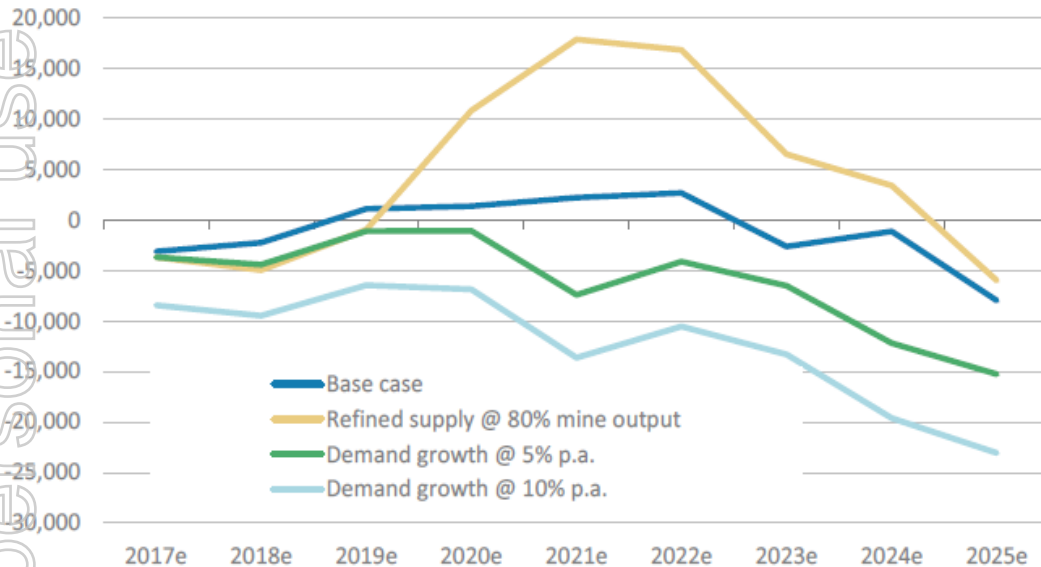
2021 \$3.00

**Long Term (Real 2017 \$) \$2.85  
2022 and beyond**

\*Source: RBC Capital Markets Global Metals & Mining Q3/17 Outlook – 28 June 2017

# Cobalt supply/demand

Cobalt market balance under various supply/demand scenarios (tonnes)



Source: Morgan Stanley Research

## Morgan Stanley Outlook\*

### ■ Demand

- 2016 – only 7% (7kt) of world's cobalt supply went into electric vehicles (EV) and 40% (40kt) into electronics
- 2025 – forecast 9.4M EV sales which translates to **63ktpa additional Co** demand
- Global demand growth forecast to be 6.7%pa compounded annual growth rate (CAGR) out to 2025

### ■ Supply

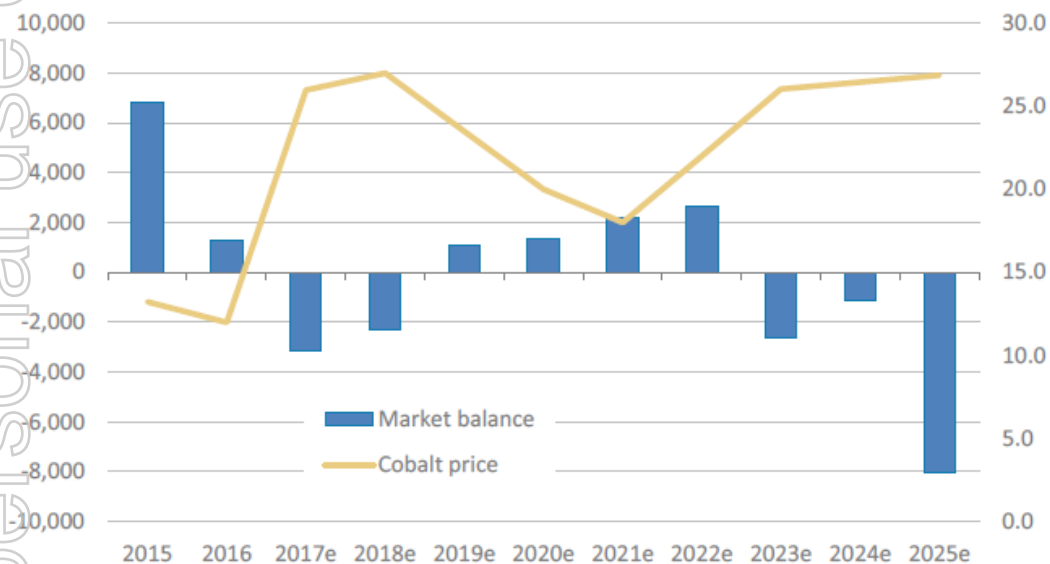
- Most Co is a by-product of Cu and Ni mining
- 62% of 2016 of mined Co output from the Democratic Republic of the Congo (DRC)
- Forecast mine supply growth to underperform demand, at 6.6%pa CAGR to 2025

\*Source: Morgan Stanley Research "Commodity Matters, Cobalt, Measured" – 28 June 2017

# Cobalt price outlook

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Cobalt supply-demand balance + price forecast (tonnes, \$/t)



Source: Morgan Stanley Research

## ■ Co Price as at 14 July 2017

- US\$27/lb (99.3% Co)

## Morgan Stanley\*

- Since 2000, Co price has averaged US\$20/lb (real 2017\$).
- Demand growth from EV's positive price pressure
- Constraints to price are:
  - Battery industry's response to cost inputs
  - Recycling
- Long term forecast US\$23/lb (real 2017\$)

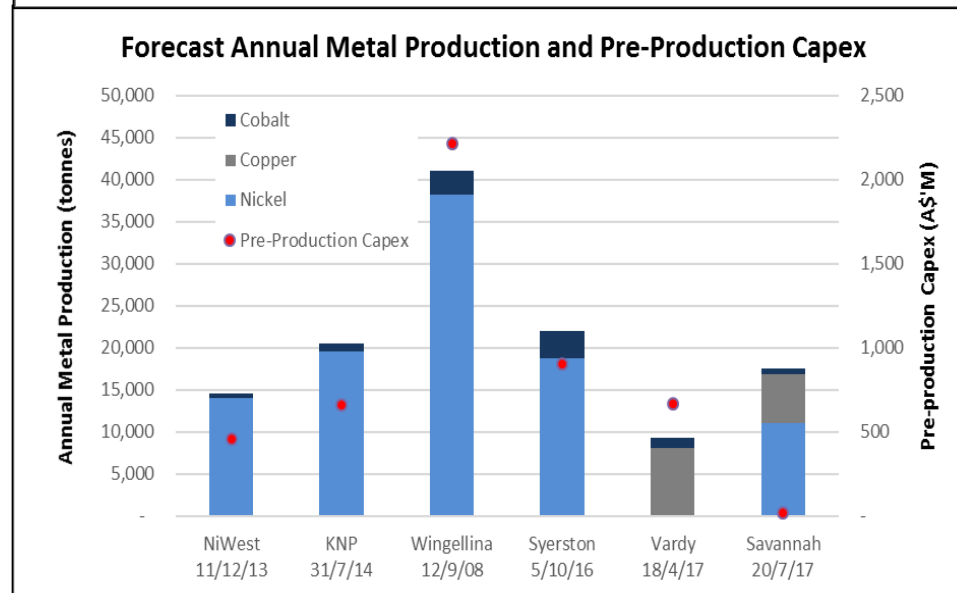
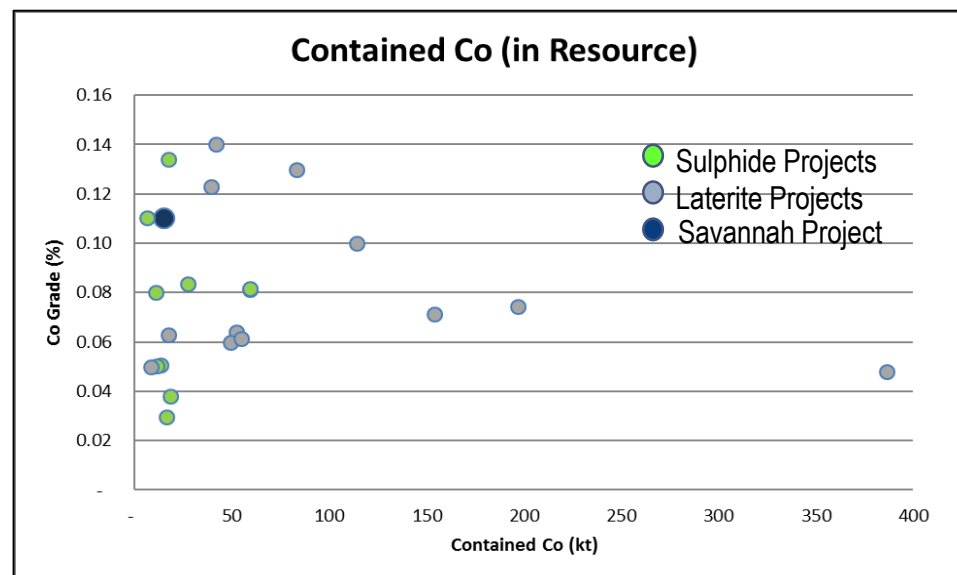
\*Source: Morgan Stanley Research "Commodity Matters, Cobalt, Measured" – 28 June 2017



# Panoramic's cobalt exposure

Savannah is well placed to leverage off strong cobalt price outlook

- Savannah has over 15,000t contained cobalt in Resources
- Under the optimised mine plan Savannah could produce 760tpa of cobalt in concentrate (6,500t over LOM)
- Laterite projects have larger cobalt resources, but
  - Laterite projects have high capital intensity
  - Savannah is both high grade and low capital intensity



Data obtained from various Company ASX Announcements

# SUMMARY



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# Summary

✓ Savannah is a significant Australian base metal project containing

- 226,000t contained nickel
- 105,000t contained copper
- 15,300t contained cobalt

## ✓ Optimisation Study confirms

- **financially robust project even at current historically low nickel prices**
- **+8 year mine life**
- **Globally competitive cash costs of US\$2.40/lb payable Ni**
- **Low re-start capex only \$20M**
- **Maximum cash negative less than \$40M**
- **Short timeframe to production leveraging off existing Savannah infrastructure**
- **Significant leverage to nickel, copper and cobalt prices**

✓ Further improvements identified that have the potential to drive step changes in mining productivity and cost reduction

✓ Excellent potential for further exploration success and mine life extension

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**ASX: PAN**

**[www.panoramicresources.com](http://www.panoramicresources.com)**

**Mission Statement**

We strive to achieve excellence in all aspects of our business to provide long term capital growth and dividend return to our shareholders, a safe and rewarding work environment for our employees, and opportunities and benefits to the people in the communities we operate in.

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# APPENDICES



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*Note: further 2012 Edition JORC compliance tables are referenced in the PAN ASX announcement of 30 September 2016*

# SAVANNAH PROJECT - MINERAL RESOURCES AS AT 24 AUGUST 2016\*

\*Refer to the Company's ASX Announcement of 24 August 2016

Resource	Metal	Resource Date	JORC	Measured		Indicated		Inferred		Total		Metal Tonnes
				Tonnes	(%)	Tonnes	(%)	Tonnes	(%)	Tonnes	(%)	
<b>Savannah</b>												
Above 900F	Nickel	Jun-16	2012	1,275,000	1.51	759,000	1.20			2,034,000	1.39	28,300
	Copper				0.87		0.90				0.88	17,900
	Cobalt					0.07		0.07			0.07	1,400
Below 900F	Nickel	Jun-15	2012			780,000	1.64	125,000	1.72	905,000	1.65	14,900
	Copper				0.76		0.75				0.76	6,900
	Cobalt				0.10		0.09				0.10	900
Savannah North	Nickel	Aug-16	2012			<b>7,168,000</b>	<b>1.78</b>	<b>3,104,000</b>	<b>1.53</b>	<b>10,272,000</b>	<b>1.70</b>	<b>175,100</b>
	Copper						<b>0.77</b>		<b>0.62</b>		<b>0.72</b>	<b>74,400</b>
	Cobalt						<b>0.13</b>		<b>0.11</b>		<b>0.12</b>	<b>12,700</b>
<b>Copernicus</b>												
Open Pit	Nickel	Jun-16	2004	132,000	0.97					132,000	0.97	1,300
	Copper				0.52						0.52	700
	Cobalt				0.03						0.03	-
Underground	Nickel	Jul-10	2004			508,000	1.30	25,000	0.98	532,000	1.29	6,800
	Copper						0.91		0.69		0.90	4,800
	Cobalt						0.05		0.02		0.05	300
<b>Total Savannah Project</b>	Nickel											<b>226,400</b>
	Copper											<b>104,700</b>
	Cobalt											<b>15,300</b>

## Notes:

- Figures have been rounded and therefore may not add up exactly to the reported totals
- All resources are inclusive of reserves
- Resource cut-off grade is 0.50% Ni

# SAVANNAH PROJECT - ORE RESERVE AS AT 2 FEBRUARY 2017\*

\*Refer to the Company's ASX Announcements of 30 September 2016 and 2 February 2017

Reserve	Metal	Date of Reserve	JORC Compliance	Proven		Probable		Total		Metal Tonnes
				Tonnes	(%)	Tonnes	(%)	Tonnes	(%)	
Above 900 Fault	Nickel	Jun-16	2012	1,365,000	1.15	194,000	1.24	1,558,000	1.16	18,100
	Copper				0.66		1.28		0.74	11,500
	Cobalt				0.06		0.07		0.06	900
Savannah North	Nickel	Jan-17	2012			6,650,000	1.42	6,650,000	1.42	94,500
	Copper						0.61		0.61	40,900
	Cobalt						0.10		0.10	6,700
<b>Total</b>	<b>Nickel</b>							<b>8,208,000</b>	<b>1.37</b>	<b>112,600</b>
	<b>Copper</b>								<b>0.64</b>	<b>52,400</b>
	<b>Cobalt</b>								<b>0.09</b>	<b>7,600</b>

## Notes:

- Figures have been rounded and therefore may not add up exactly to the reported totals
- Cut-off grade is 0.8% Ni

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