



Orion Minerals

ASX Code: ORN

JSE Code: ORN

# *BFS & Intense Regional Exploration underway, delivering results in a Proven Minerals Belt*

Investor Presentation  
February 2018



***“Expediting development at Prieska while seeking to unlock the minerals potential of the extensive land package through advanced exploration”***

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# Orion: Corporate Summary



- Orion's primary listing is on the ASX.
- Secondary listing of its Shares on the Main Board of the Johannesburg Stock Exchange since September 2017.

Capital Structure Summary	
Shares on Issue	1,290M
Options on Issue	221M
Market Capitalisation (3.8cps (ASX)) <sup>(1)</sup>	\$49M
Bridge Loan (12% interest, 31 May '18 term) <sup>(2)</sup>	\$6.0M
Convertible Notes (2.6cps convert, 12% coupon, Mar'19 maturity) <sup>(3)</sup>	\$6.0M
AASMF Loan <sup>(3)</sup>	\$1.4M
AASMF Preference Shares <sup>(3)</sup>	\$1.6M
Cash on Hand (at 31 December '17)	\$4.6M

Significant Holder Name	%
Tembo Capital	19.99%
Tarney Holdings	7.98%
Hargreave Hale Ltd	6.46%
Silja Investment & Alexander Haller <sup>(4)</sup>	5.36%
Significant Holder Total	39.80%

Board	
Denis Waddell	Non Executive Chairman (chartered accountant)
Errol Smart	CEO, Managing Director (geologist)
Bill Oliver	Non Executive Director (geologist)
Alexander Haller	Non Executive Director (economist)
Mark Palmer	Non Executive Director (mining geologist)

Key Management	
Martin Bouwmeester	CFO, Company Secretary (FCPA)
Michelle Jenkins	Executive: Finance and Admin (CA & geologist)
Walter Shamu	Executive: Mining & Development (engineering & law)
Louw van Schalkwyk	Executive: Exploration (geology)
Nelson Mosiapoa	Social Responsibility Advisor (chemical engineering, government policy)

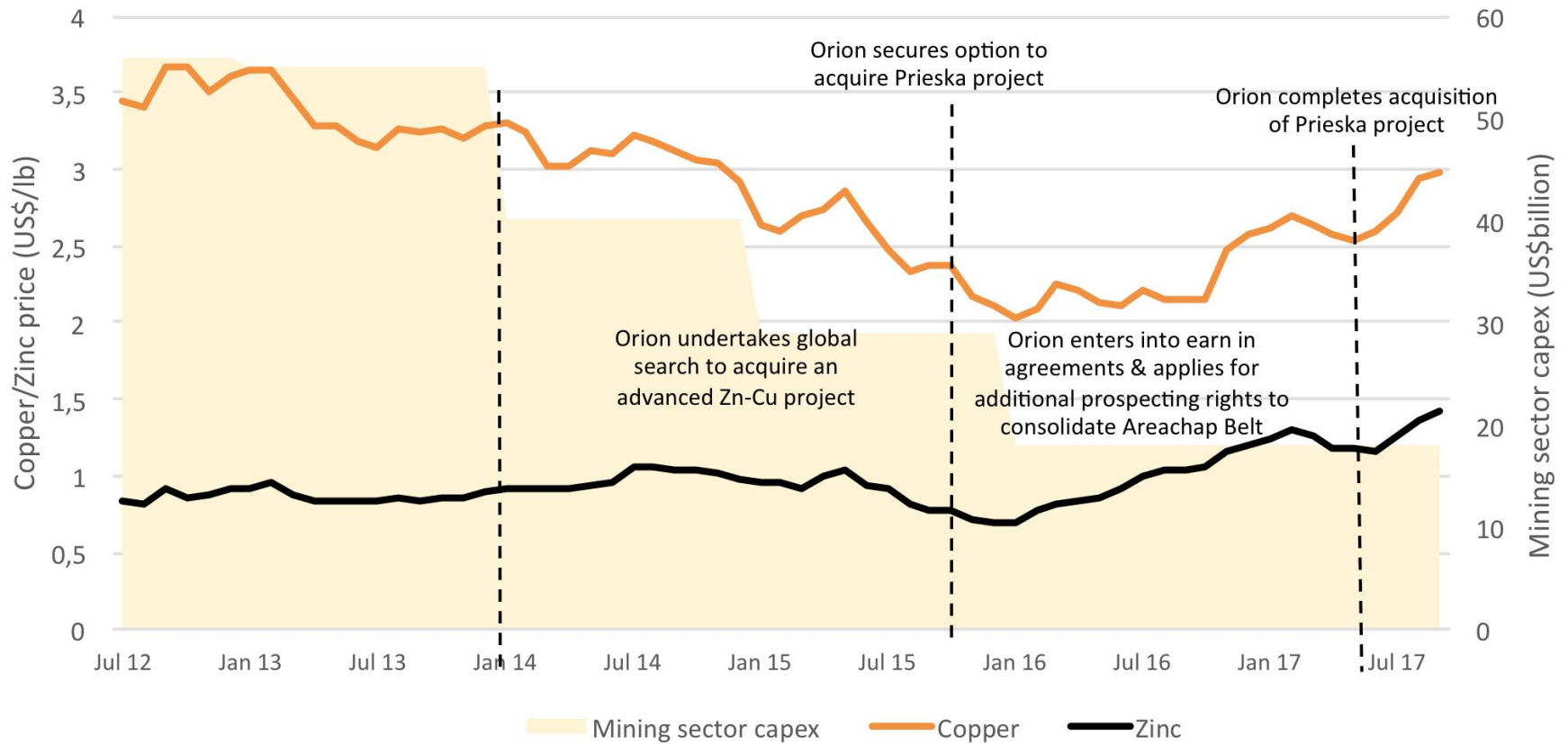
(1) Closing price of ORN Shares on the ASX on 2 February 2018. Closing price of ORN Shares on the JSE on 2 February 2018 was ZAR 0.44

(2) Refer to ASX releases 18 August '17 and 15 November '17 for additional information. As at 31 December 2017, \$3.56M has been drawn down against the Bridge Loan.

(3) Refer to the Company's June '17 Annual Financial Report for information related to the Convertible Notes, along with the Redeemable Preference Shares Agreement (ZAR15.75M) and a Loan Agreement (ZAR14.25M) that Repli Trading No 27 (Pty) Ltd (a 73.33% owned subsidiary of Agama Exploration & Mining (Pty) Ltd) has entered into with Anglo American Sefa Mining Fund.

(4) Mr Alexander Haller is deemed to have a relevant interest in securities held by Silja Investment Ltd.

# Executing a well timed counter cyclic growth strategy



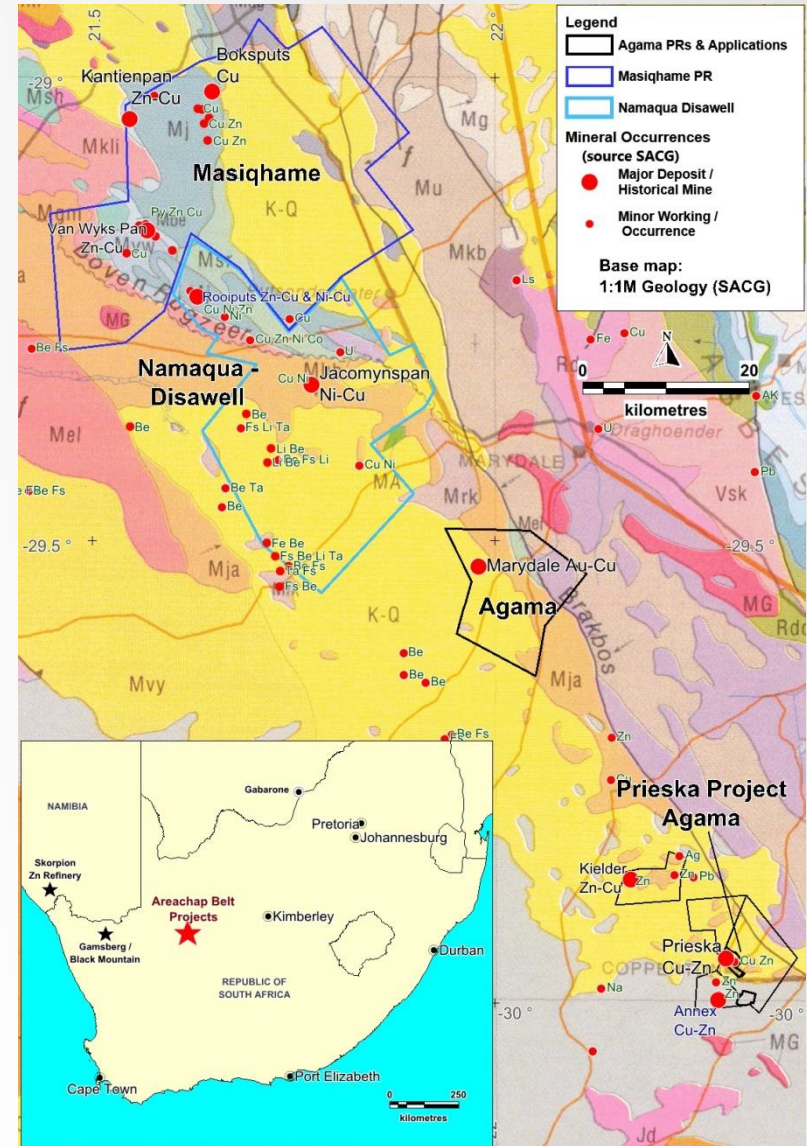
Source: Barclays Research, Federal Reserve Price Data

**PCM is an Advanced Stage, Large Scale, High Grade, Zinc – Copper Project With Superb Exploration Upside**

# Major consolidation play in a proven mineralised district



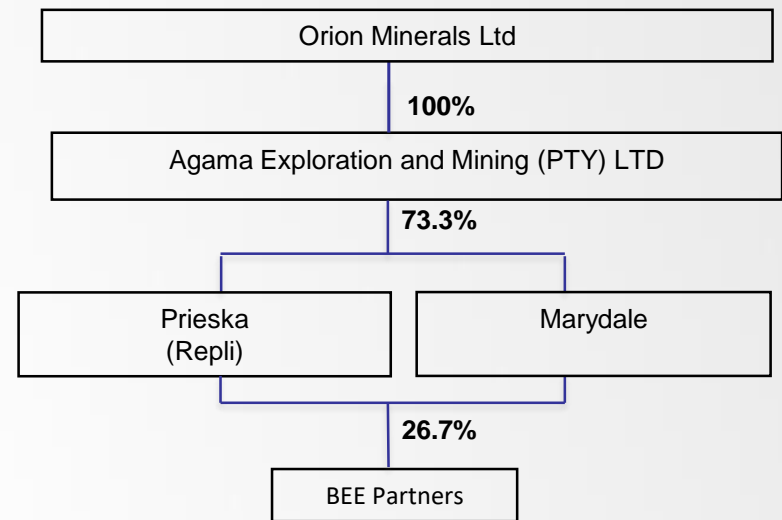
- Orion acted at bottom of cycle in 2015 and secured a large consolidated land package (1,790 km<sup>2</sup>)
  - Secured a potential company making project in Prieska
  - First time this highly prospective region has been consolidated under a single owner
- No major exploration activity over the past 30 years
  - Application of modern exploration techniques presents a significant opportunity in target generation and testing
  - Many identified mineral occurrences not drilled and most targets remain open down dip and along strike
- Three superimposed geological events produce an exceptional metals province
  - Prieska deposit recorded as one of world's 30 largest VMS deposits with 22 other occurrences on Orion's prospecting rights
  - Mafic intrusive analogous in tectonic and time to the Fraser Range, WA with Ni-Cu deposits intruding pre existing VMS & VHMS
  - Late stage granites and pegmatites intrude, with Li and REE deposits



# Prieska ownership structure



- Orion acquired option to purchase Agama Exploration & Mining in July 2015
  - Extensive DD process completion, including technical, regulatory and economic work streams
  - Transaction consideration A\$8.9m\*, completed in March 2017
- Orion has a 73.3% economic interest in the Prieska and Marydale VMS project
- Full compliance with prevailing South African Black Economic Empowerment legislation
- BEE partner is empowered at the asset level
- BEE partners are the Mosiapo Family and Power Matla



**Prieska BEE compliant ownership structure**

\* Acquisition consideration comprised Cash A\$3.3m, ORN shares A\$2.2m (each share having one attaching option), shareholder loan settlement A\$3.4m, refer to ASX release 29 March 2017.

# Prieska – A mining success story with lots remaining



Mine Manager's planning proposal to Anglovaal corporate office (June 1987)\*

PAGE 2

MINING & MILLING	MONTH: - MAY 1987								
	PLAN			ACTUAL			TOTAL FOR PREVIOUS YEAR		
A. Tonnage Mined & Killed	TONS	Cu %	Zn %	TONS	Cu %	Zn %	TONS	Cu %	Zn %
Drilled Mining Reserve				808766	1.458	4.38	23765496	1.569	4.259
Broken from Ore Reserves				82270	2.388	6.572	1978253	1.679	4.896

\*This is an historical estimate and is not reported in accordance with the 2012 Edition of the JORC Code. A Competent Person has not completed sufficient work to classify the historical estimate as Mineral Resources or Ore Reserves as defined in the JORC Code. It is uncertain whether Mineral Resources or Ore Reserves will be able to be reported until the current drilling program is completed  
Source: Mine Archive, refer ASX release 9 May 2017.

- Operated by Anglovaal from 1971-1991, employed 4,000 people
  - Infrastructure rich with all key services remaining on site
- Milled 46.8mt producing >430kt copper and >1mt zinc in concentrate
- Post May 1987, no more than 2mt of ore was blasted (milling of surface stockpiles from 1989)
- Mine closed and site rehabilitated 1991
- Historic resource estimation practices conformed to “Industry Best Practice” of the time
  - Extensive historic drill hole data
  - Mine survey and geology plans show un-mined extensions and support last reported mine planning reports

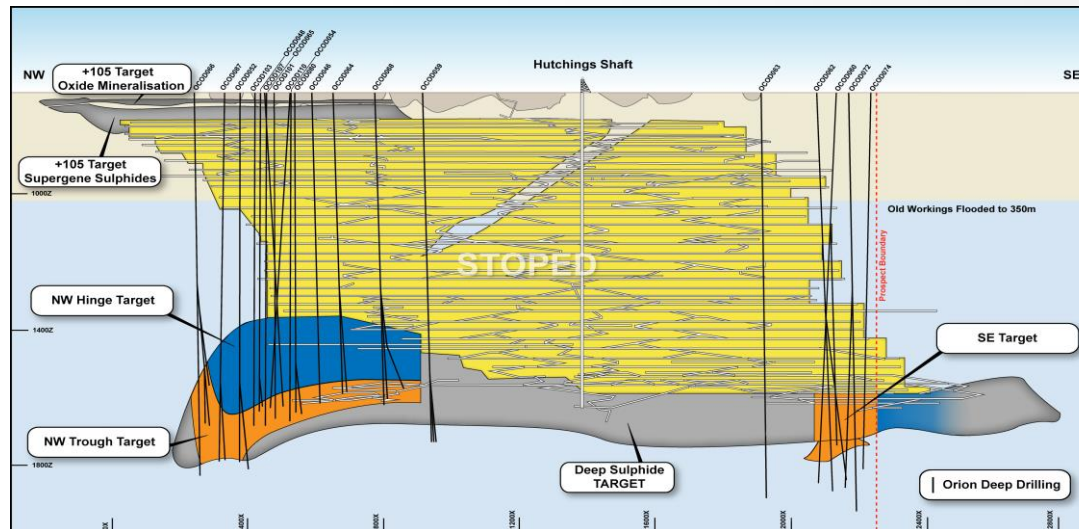
# Maiden JORC Resource - February 2018



Global Mineral Resource For Prieska Project - Repli Trading No 27 (PTY) Ltd

Classification		Zn			Cu		Au		Ag	
		Tonnes	Metal Tonnes	Grade (%)	Metal Tonnes	Grade (%)	Metal Ounces	Grade (g/t)	Metal Ounces	Grade (g/t)
<b>Deep Sulphide</b>	Inferred	22,649,216	839,355	3.71	265,929	1.17	153,040	0.21	6,903,792	9.48
<b>+105 Supergene</b>	Indicated	1,240,600	31,900	2.57	29,500	2.37	9,200	0.23	348,100	8.73
<b>+ 105 Oxide</b>	Inferred	271,600	2,400	0.86	1,700	0.63	1,100	0.12	16,900	1.82
<b>Total Global</b>		24,161,416	873,655	3.47	297,129	1.23	163,340	0.21	7,268,792	9.36

Note All Resources Stated at Zero Cut-Off





# Deep Sulphides present a high value mining target



## Inferred Mineral Resource for Prieska Project Deep Sulphides

Cutoff % <sub>calc</sub> *	Volume (m <sup>3</sup> )	Tonnes	Zn		Cu		Au		Ag	
			Tonnes	Grade (%)	Tonnes	Grade (%)	Ounces	Grade (g/t)	Ounces	Grade (g/t)
0.0	6,560,156	22,649,216	839,355	3.71%	265,929	1.17%	153,040	0.21	6,903,792	9.48
2.0	6,511,141	22,485,285	838,239	3.73%	265,154	1.18%	151,934	0.21	6,853,622	9.48
4.0	5,919,156	20,553,610	801,255	3.90%	251,343	1.22%	139,077	0.21	6,245,975	9.45
6.0	3,214,047	11,268,678	508,581	4.51%	158,157	1.40%	76,832	0.21	3,449,103	9.52

Cutoff % <sub>calc</sub> *	Volume (m <sup>3</sup> )	Tonnes	Zn		Cu			Total
			Metal Tonnes	Grade (%)	Metal Tonnes	Grade (%)	Cu=Zn_eq	Zn_eq%
0.0	6,560,156	22,649,216	839,355	3.71%	265,929	1.17%	2.61%	6.32%
2.0	6,511,141	22,485,285	838,239	3.73%	265,154	1.18%	2.62%	6.35%
4.0	5,919,156	20,553,610	801,255	3.90%	251,343	1.22%	2.72%	6.62%
6.0	3,214,047	11,268,678	508,581	4.51%	158,157	1.40%	3.12%	7.63%

\* Cutoff %<sub>calc</sub> = ( Zn% + ( 2 X Cu% ) )

### Summary Table for Zinc Equivalent Calculations

Parameter	Units	Zinc	Copper	Comments
Copper selling price	USD/t	3,549	7,011	Kitco.com 31 Jan 2018 NYSE 20h00
Exchange rate USD:ZAR	USD:ZAR	11.9	11.9	exchange rate obtained from XE.com 31 Jan 2018
Metal selling price	ZAR/t	42,225	83,400	Calculated
Metal recovery - Hypogene material	%	85%	85%	Historical performance and recent testwork
Metal in conc sales costs	%	18%	8%	Concentrate traders' estimate
State Royalty	%	0.50%	0.50%	Calculated
<b>Effective Revenue per t of metal</b>	<b>ZAR/t</b>	<b>29,108</b>	<b>64,881</b>	<b>Calculated</b>

<b>Copper Equivalent</b>	%	1.00%	<b>0.45%</b>
<b>Zinc Equivalent</b>	%	<b>2.23%</b>	1.00%

### Notes

\* Copper and Zinc Sales Costs include all concentrate transport, metal treatment and refining charges, and the benchmark discount to spot prices paid by smelters, all expressed as an aggregate percentage of the contained metal value at prevailing spot prices.

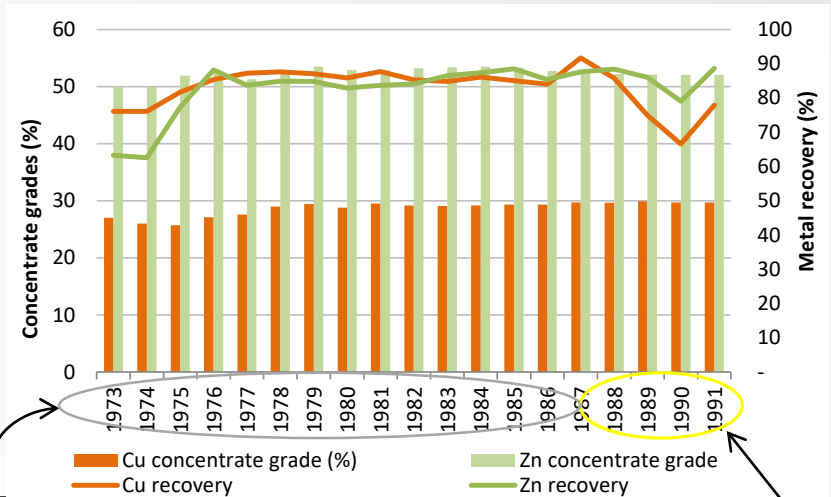
Possible by-product credits for Au, Ag and Pb are uncertain, subject to negotiation and are excluded from this metal equivalent estimate

# Extended history of metallurgical success



- Proven metallurgical process flowsheet at operational scale to handle variable ore feed
- Mill feed grade decline post 1987 reflects the cessation of underground development
- Historical production demonstrates consistent concentrate grades and recoveries despite variable ore feed over LOM
- BFS will optimise plant design and match proposed mining sequence
  - Initial open pit mining with a mixed oxide/transitional feed
  - Transitioning to sulphide feed from underground
- 3.5t of samples submitted to MINTEK for metallurgical test work to confirm previous results for +105 Target material

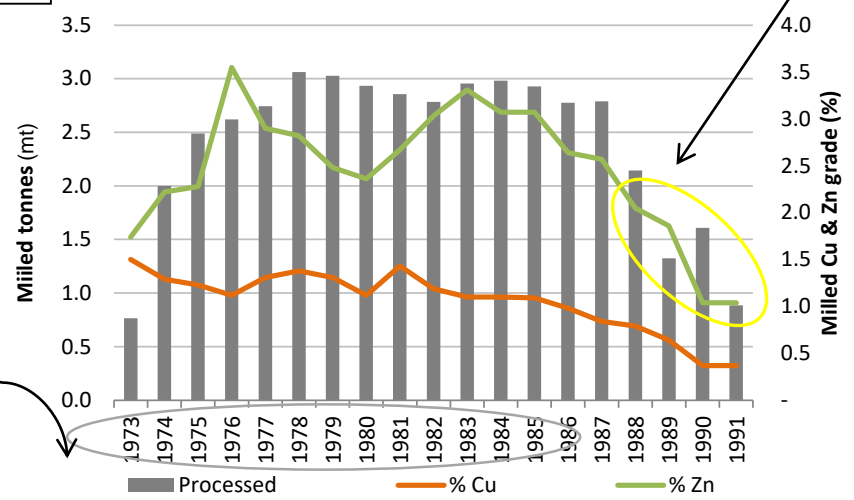
Consistent concentrate grades and recoveries despite change in feed<sup>1</sup>



Treatment of predominantly sulphide material

Treatment of mixed oxide, intermediate, sulphide ore and low grade stockpiles

Prieska milled tonnes and Cu & Zn grades<sup>1</sup>



1. Historical production data from 1973 to 1991 under Anglovaal ownership

# Orion's metallurgical test work confirming expectations



## Summary of Recent Metallurgical Test Work Results

Test Description		Test Head Grade		Total Recovered to Concentrate			Combined Tails		
		Cu (%)	Zn(%)	Mass (%)	Cu Rec. (%)	Zn Rec. (%)	Mass (%)	Cu (%)	Zn(%)
Cu Rich Deeps	Rougher	2.41	2.79	37	93.5	93.4	63	0.25	0.29
Zn-Rich Deep	Rougher	1.47	6.48	34	94.1	96.9	66	0.13	0.30
Zn-Rich Supergene	Rougher-Cleaner	1.53	8.87	17	92.0	92.8	83	0.19	0.94

Test Description		Copper Concentrate				Zinc Concentrate			
		Cu Rec. (%)	Cu Grade (%)	Zn Rec. (%)	Zn Grade (%)	Cu Rec. (%)	Cu Grade (%)	Zn Rec. (%)	Zn Grade (%)
Cu Rich Deeps	Rougher	89.5	12.0	22.2	3.4	4.0	0.5	71.2	10.3
Zn-Rich Deep	Rougher	88.9	8.6	10.4	4.4	5.2	0.4	86.6	30.5
Zn-Rich Supergene	Rougher-Cleaner	-	-	-	-	89.7	8.0	91.2	47.2

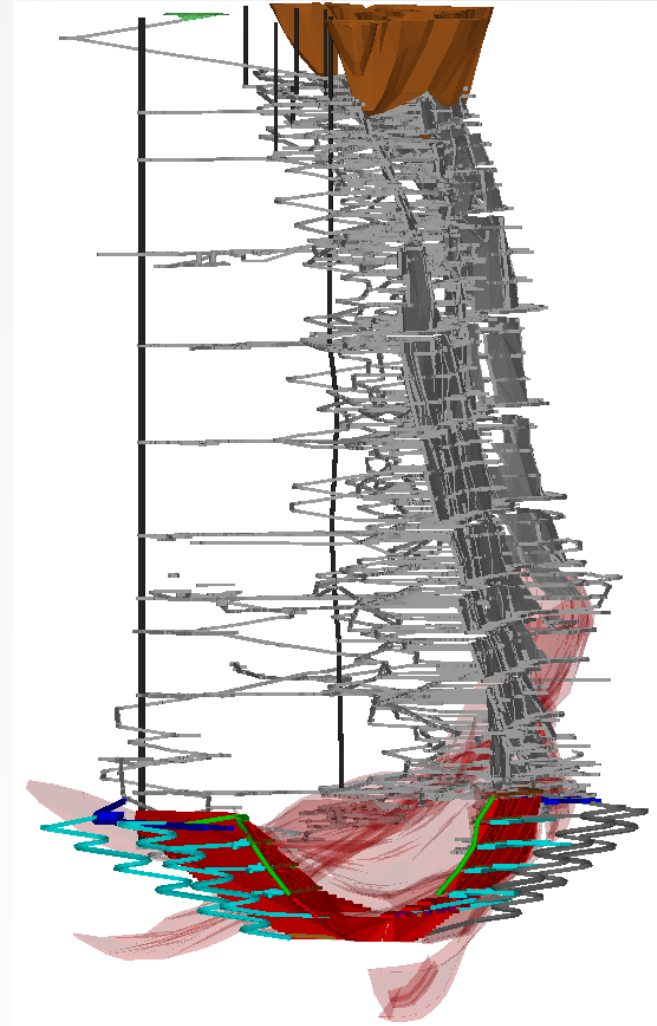
Current test work on Orion drill core is confirming performance expectations based on production history.

- \* The above test work confirms ability to achieve high recoveries with froth flotation
- \* Test work continues to determine optimized recoveries and re-cleaner flotation to produce high grade concentrates

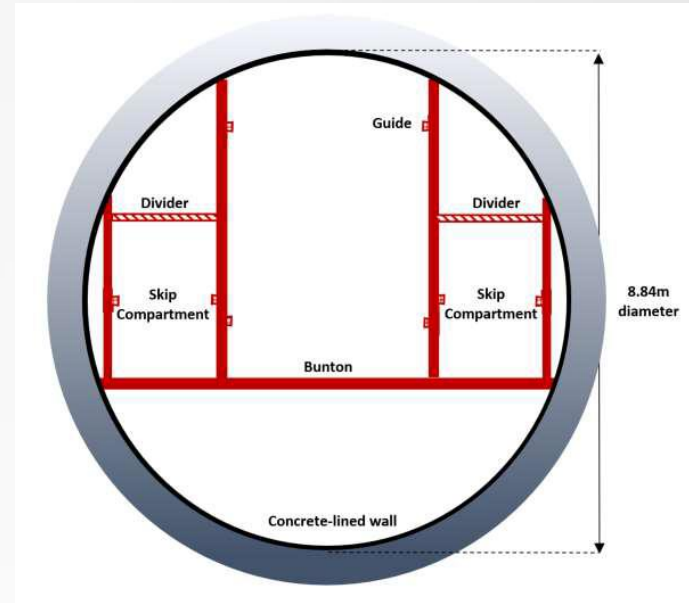
# Significant infrastructure footprint



- Sealed access roads to project site
- 48km via bitumen road to existing rail siding
- 75MW operational solar power plant
  - 4 HV regional lines linked to national electricity grid
- 800km rail link to major, bulk commodity and deep water port at Saldanha Bay
- Bulk water pipeline supplies site
  - Sourced from Orange River with all year pumping capacity
- Good contractors accommodation available in the private village of Copperton, ~3km from project site
- Low regional environmental sensitivity
  - Existing disturbed/rehabilitated mine footprint
- **Primary shafts and decline roadways in place to reach deepest remaining targets**



# Detailed shaft inspection completed



Most Shaft Steelwork Structurally Sound

refer ASX release 2 February 2018

# Generating significant momentum on the ground



- Orion Board approval to commence BFS in July 2017 with target completion in Q4 2018
  - +105 Target, maiden JORC compliant Mineral Resource completed
  - Deep Sulphide Resource upgrade targeted Q2 2018
- In parallel to BFS, Orion will progress key commercial work streams
  - Concentrate marketing
  - Project finance capacity and optimal structure
- Regional exploration and targeting work to ramp up in 2018
- Mining Right and Environmental Impact Assessment to be submitted in Q1 CY18

**Prieska aspirational project timeline**

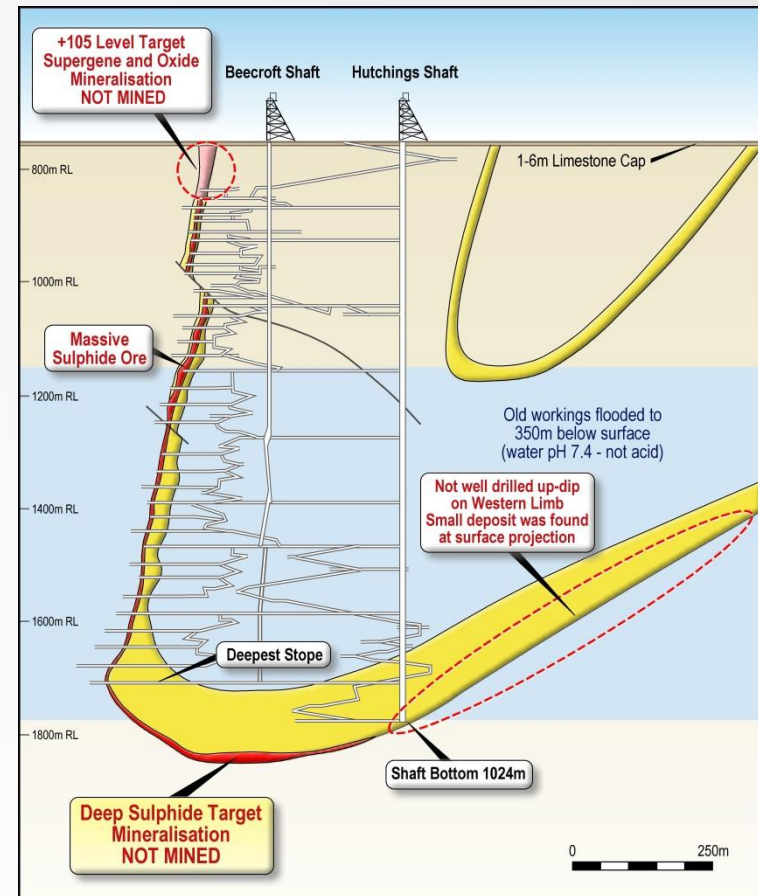
Milestone Activities	Q3 CY17	Q4 CY17	Q1 CY18	Q2 CY18	Q3 CY18	Q4 CY18	Project Approval	Q1 CY19	Q2 CY19	Q3 CY19	Q4 CY19	Q1 CY20	Q2 CY20	Q3 CY20	Q4 CY20	CY 2021	CY 2022	
Resources Estimate (+105 Level Target)	Yellow	Yellow																
Resources Estimate (Deep Sulphide Target)																		
Environmental Impact Assessment	Yellow	Yellow	Yellow															
Mining Right Application																		
Bankable Feasibility Studies	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow												
Project Construction									Grey	Grey	Grey	Grey	Grey	Grey	Grey			
Ore Production - Open Pit															Yellow	Yellow	Yellow	Yellow
Ore Production - Underground																		Grey

# Systematic and low risk path to advancing Prieska



## Prieska target mineralisation and existing mine infrastructure

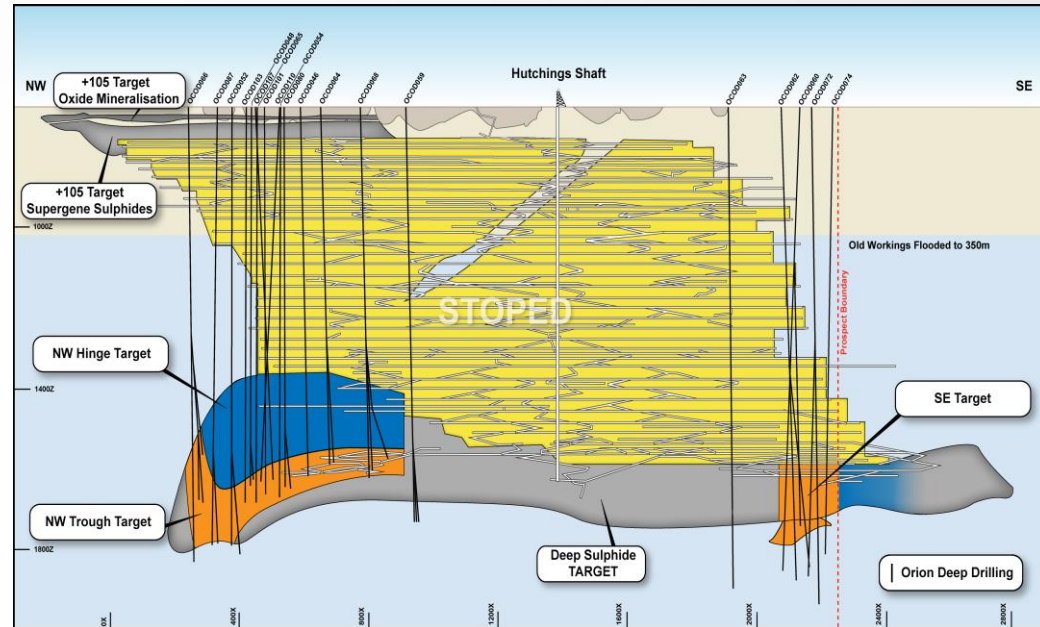
- **BFS scheduled for completion by Q4 2018**
  - DRA appointed as lead BFS consultants
- **Key BFS technical project parameters include**
  - Construction of 1.2mtpa throughput flotation plant to produce Zn and Cu concentrates
  - Confirm optimal sequence of open pit feed for consistency in ore presentation through oxide and high grade supergene zones
  - Confirm suitability of using a drift-and-fill and longhole stoping for the mining of deep sulphide mineralisation to minimise dilution
  - Use of underground water for process & dust suppression dewatering underground while mining open pit
  - Closed, Zero-Discharge environmental strategy
- **ABS Africa will manage the EIA studies to comply with leading international standards to support project finance**
- **Mining Right and Environmental Authorisation applications to be submitted in Q1 2018**



# Deep Sulphide Target drilling to continue



Long section with current drilling and historical development



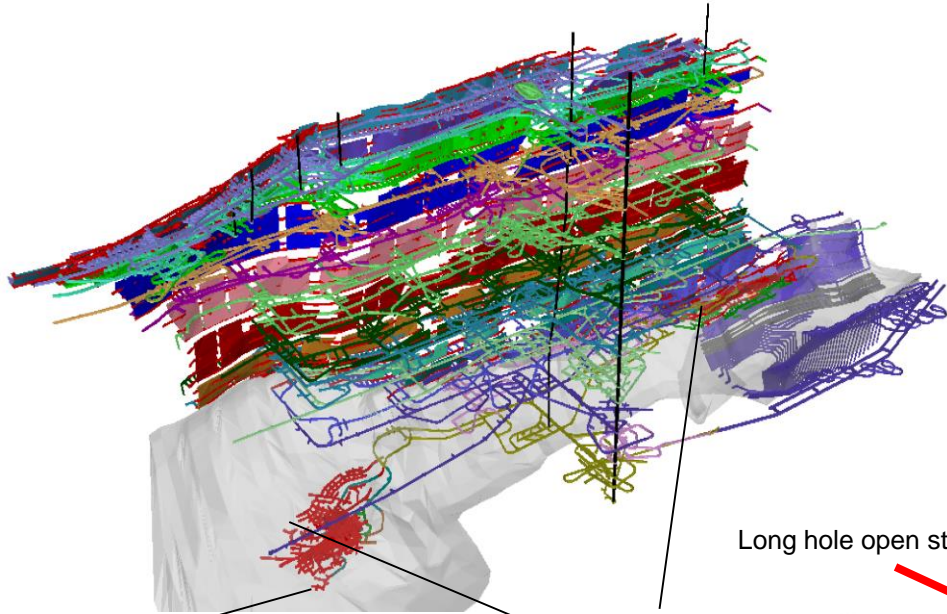
refer ASX release 1 February 2018.

## 5 Drilling rigs remain active on surface

- Dual focused drilling program
  - Continue with infill drilling to achieve drill density for resource category upgrade
  - Targeting dip and strike extensions of historically identified mineralisation



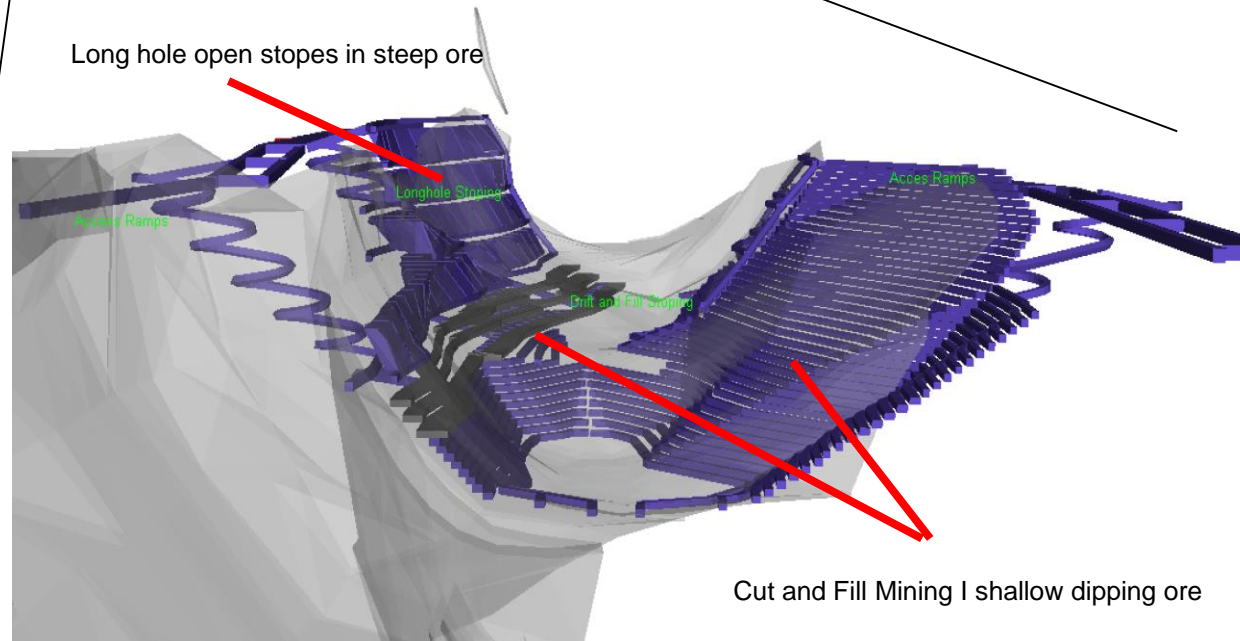
# Mine planning for BFS progressing well



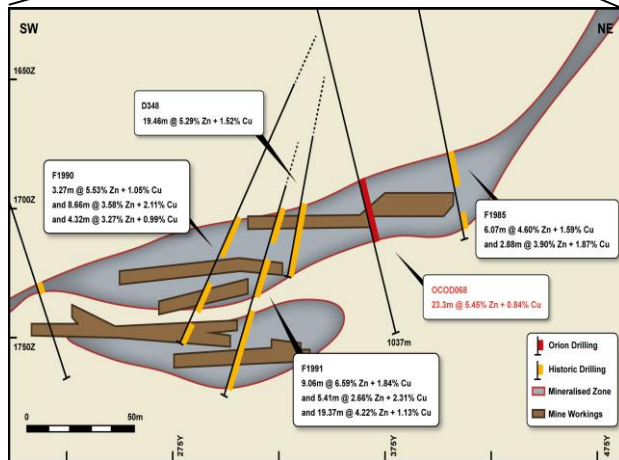
Digital mine model completed from historic survey & geology plans

Drilling has confirmed accuracy and confidence in historic data

Long hole open stopes in steep ore



Cut and Fill Mining in shallow dipping ore





## ■ Orion is a catalyst for socio-economic development.

*We strive for : \* Sustainability \* Focus \* Entrepreneurship \*Impact*

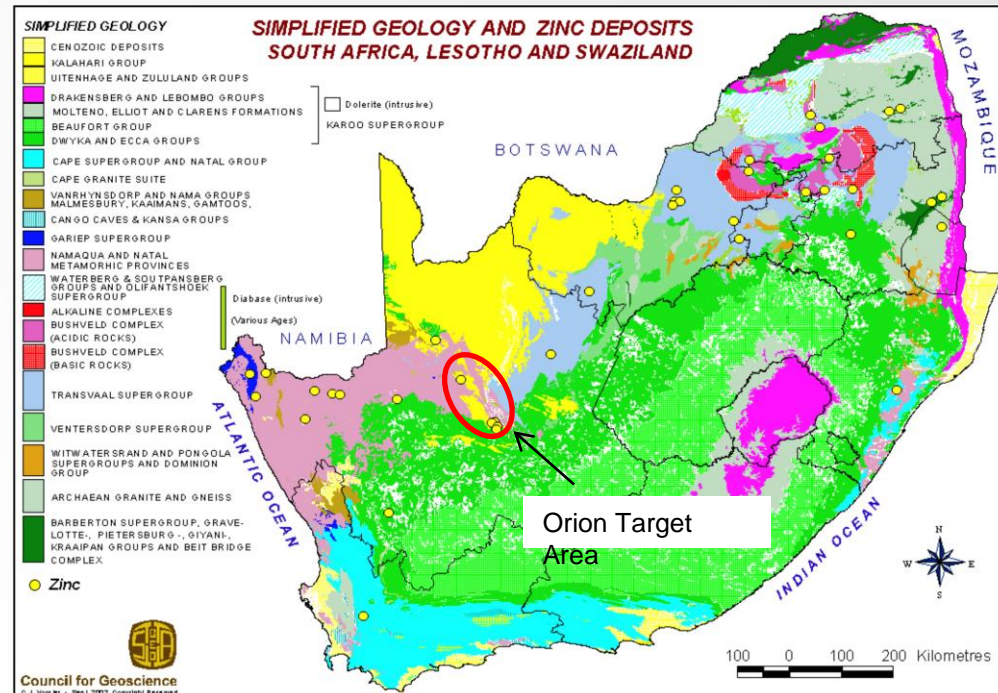
- Community Liaison office opened in Prieska
- MoU signed with Siyathemba Municipality to cooperate with Orion on development initiatives
- Internet café established to give disadvantaged people access to internet and supply chain training.





# The regional potential of the Northern Cape district

- Established mining region without the social challenges common in the South African gold, coal and platinum mining regions
  - Supportive and engaged local stakeholders
- Presence of leading global mining houses and robust institutions
- Vedanta Resources is established and is growing its globally significant zinc business in Southern Africa
  - Gamsberg and Black Mountain mines and Skorpion refinery are the cornerstone assets which underpin Vedanta's regional operations
- Region has the highest concentration of zinc on the African continent<sup>1</sup>
  - Large-scale sediment hosted deposits classified as Broken-Hill, Sedex and VMS types
  - >40mt of contained zinc
  - Vedanta has flagged a belief that significant potential exists in the region
- Orion has established a commanding landholding and exploration position in the Areachap belt and is set to play a major role this emerging minerals district



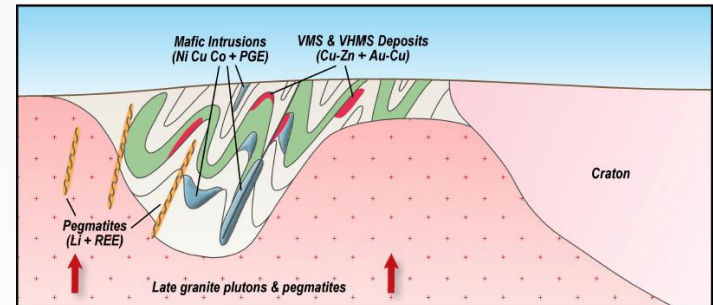
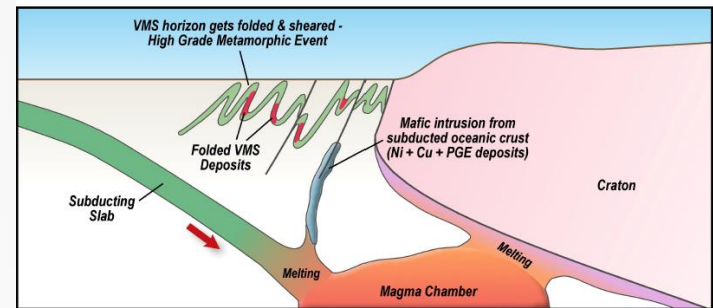
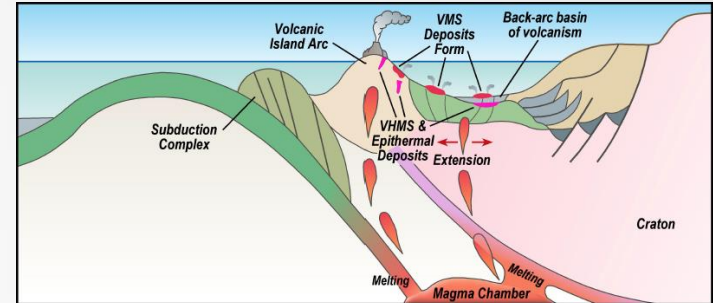
1. Vedanta Capital Markets Day presentation, March 2015



# Areachap - a highly prospective base metals belt

- The Areachap terrain is within a tectonic/mobile belt on western margin of Kaapvaal Craton and has subsequently been intensely altered & tectonised
  - The Areachap Group is a heterogeneous assemblage of metavolcanic and metasedimentary gneisses exposed intermittently for 280km on the easternmost margin of the Namaqua Province
  - It represents a Proterozoic volcanic island arc resulting from the subduction of oceanic crust underneath the Kaapvaal Craton
  - **Important recognition of Prieska as a “giant VMS”**
  - **Geological conditions to allow formation of giants are of regional scale**
  - **Giant VMS deposits almost always have several large satellites**
- 22 identified VMS occurrences confirmed within the prospective Areachap sequence by major mining houses
- Several known intrusive Ni-Cu-PGE occurrences with limited further exploration for this style of mineralisation
  - Discovery of large low grade Ni-Cu deposit previously subject to feasibility study
  - Significant advances in technology has resulted in improved target generation methodology

## Three superimposed geological events produce exceptional exploration potential



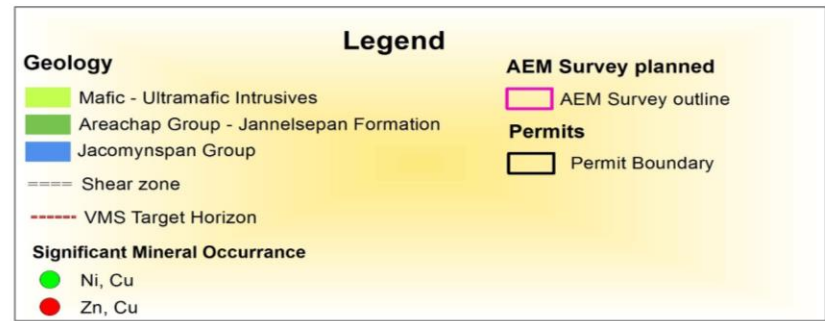
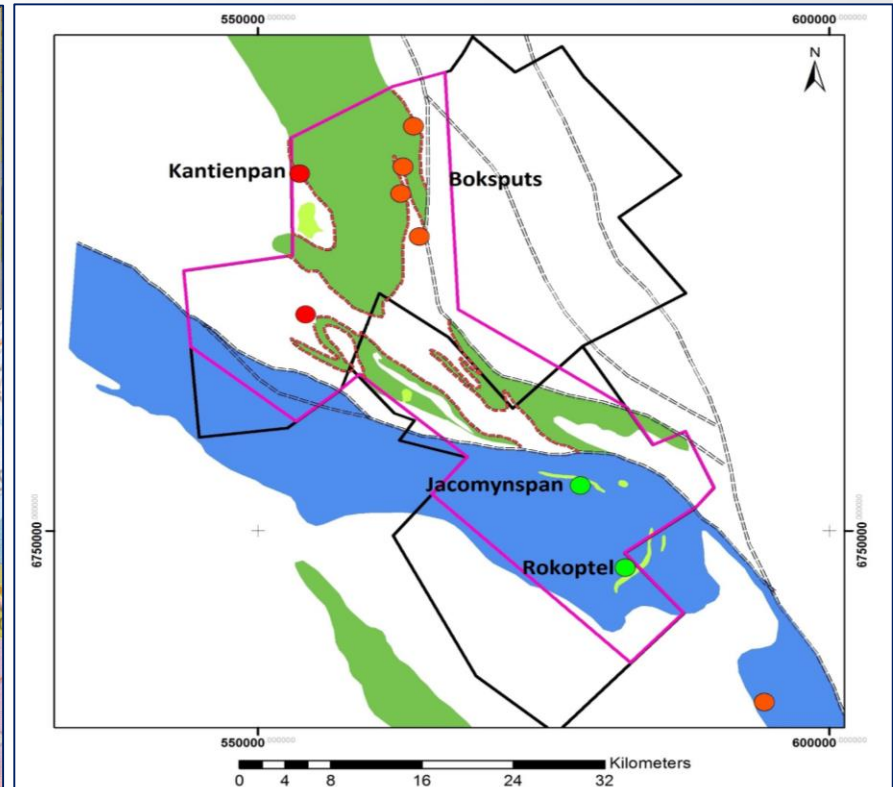
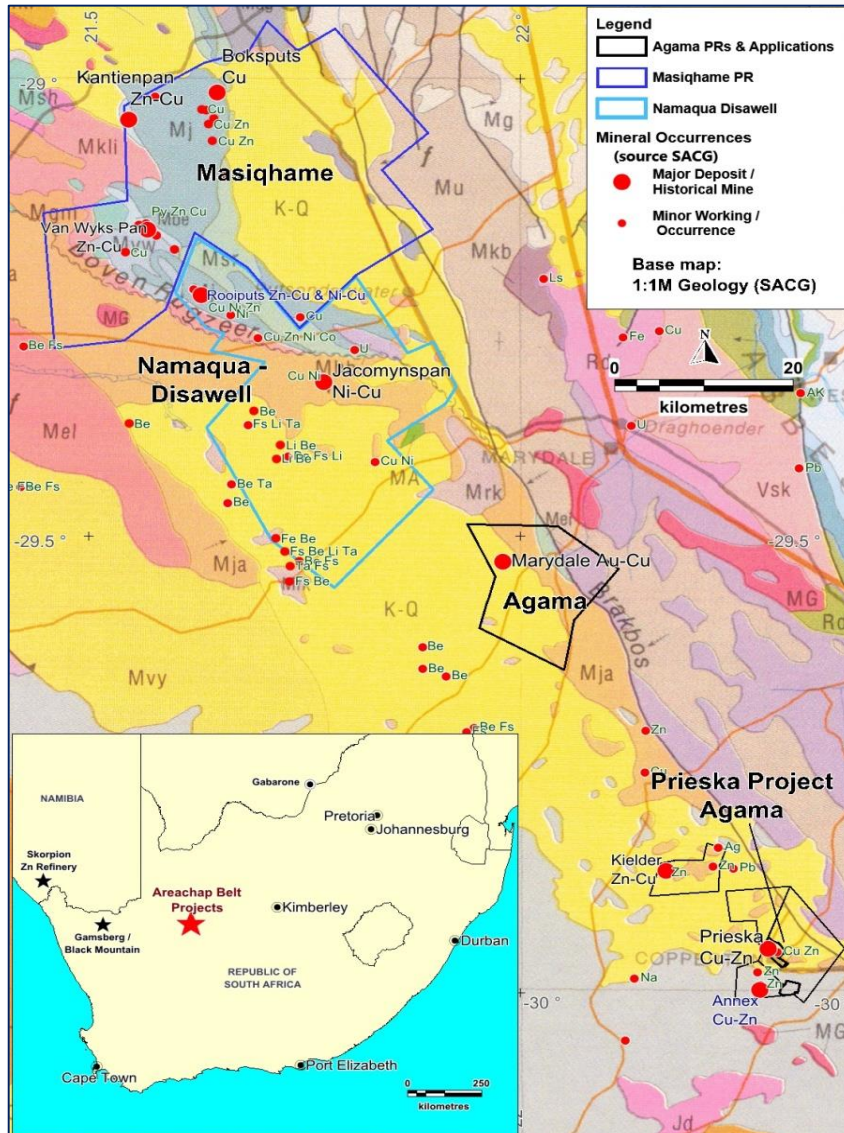


- The Prieska Zn-Cu deposit is of exceptional scale – it's ranked as a “giant”
- VMS's tend to form in clusters or camps
- To form exhalative deposit of this quality requires a long quiescent period in a marine, volcanogenic environment.
- This quiescence is likely to be of regional scale
- The sea floor unconformity is a key stratigraphic target horizon
  
- Exploration is driven by stratigraphic mapping
- Litho-geochemistry provides key alteration mapping
- Geophysics to trace massive sulphides is the primary exploration tool
  - *Electromagnetics*
  - *Magnetics*
  - *Gravity*

# Increasing intensity on regional exploration



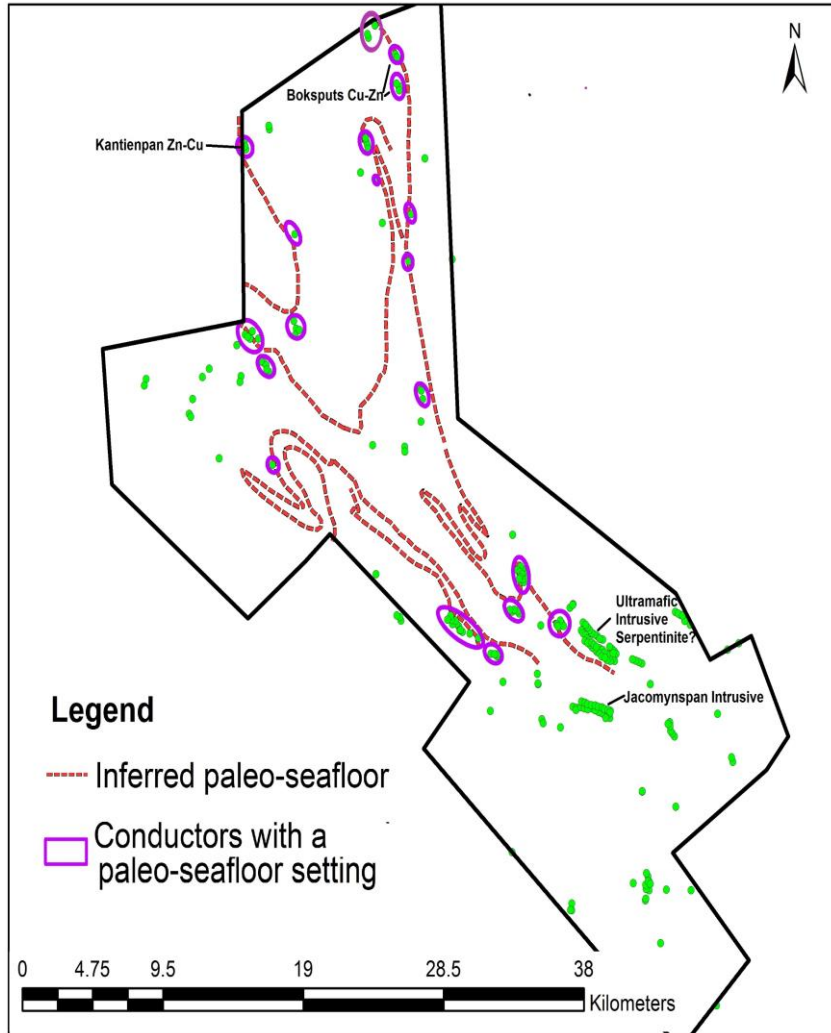
962km<sup>2</sup> SkyTEM survey completed January 2018



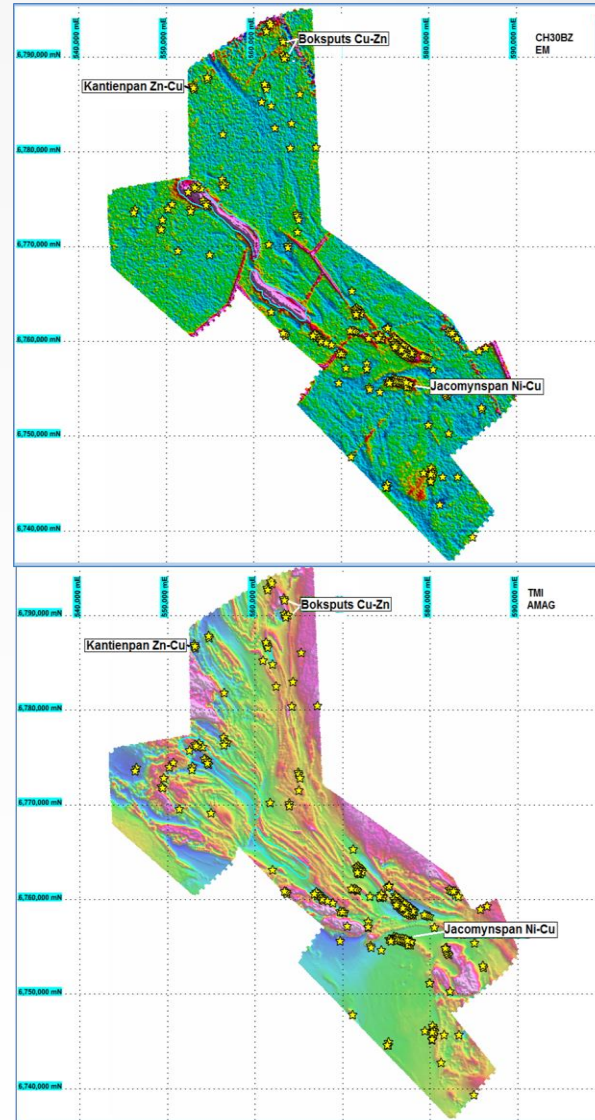
# 19 High Priority VMS targets



Follow up on SkyTEM helicopter electromagnetic survey underway

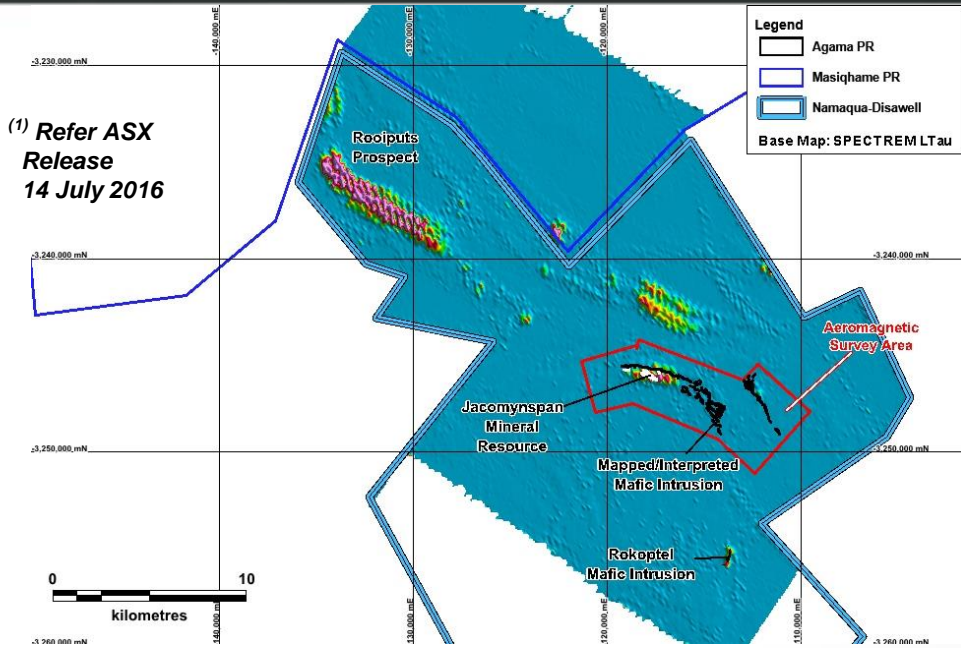


19 High Priority Targets



refer ASX release 1 February 2018

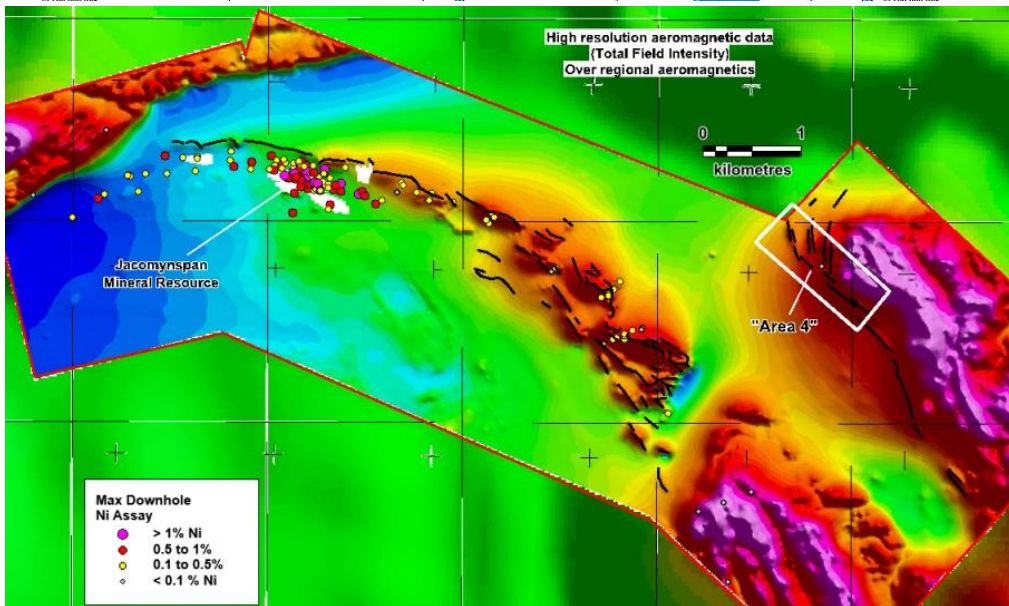
# Areachap Project – Namaqua-Disawell



- Interaction of mafic intrusives and VHMS horizon adjacent to Masiqame PR.

## Fraser Range analogue

- Most significant is the Jacomynspan Deposit:
  - **SAMREC resource 78Mt at 0.26% Ni + 0.18% Cu<sup>(1)</sup>**
- Significant potential outside resource area:
  - **High quality aeromagnetic survey identified numerous harzburgite targets**
  - **“Area 4” 62.5m at 0.26% Ni, 0.17% Cu & 0.018% Co<sup>(1)</sup>**
- Airborne and ground EM used techniques largely superseded in recent years.
- ORN plans to use recent advances in technology and thinking to drive exploration for massive sulphides within the project area.



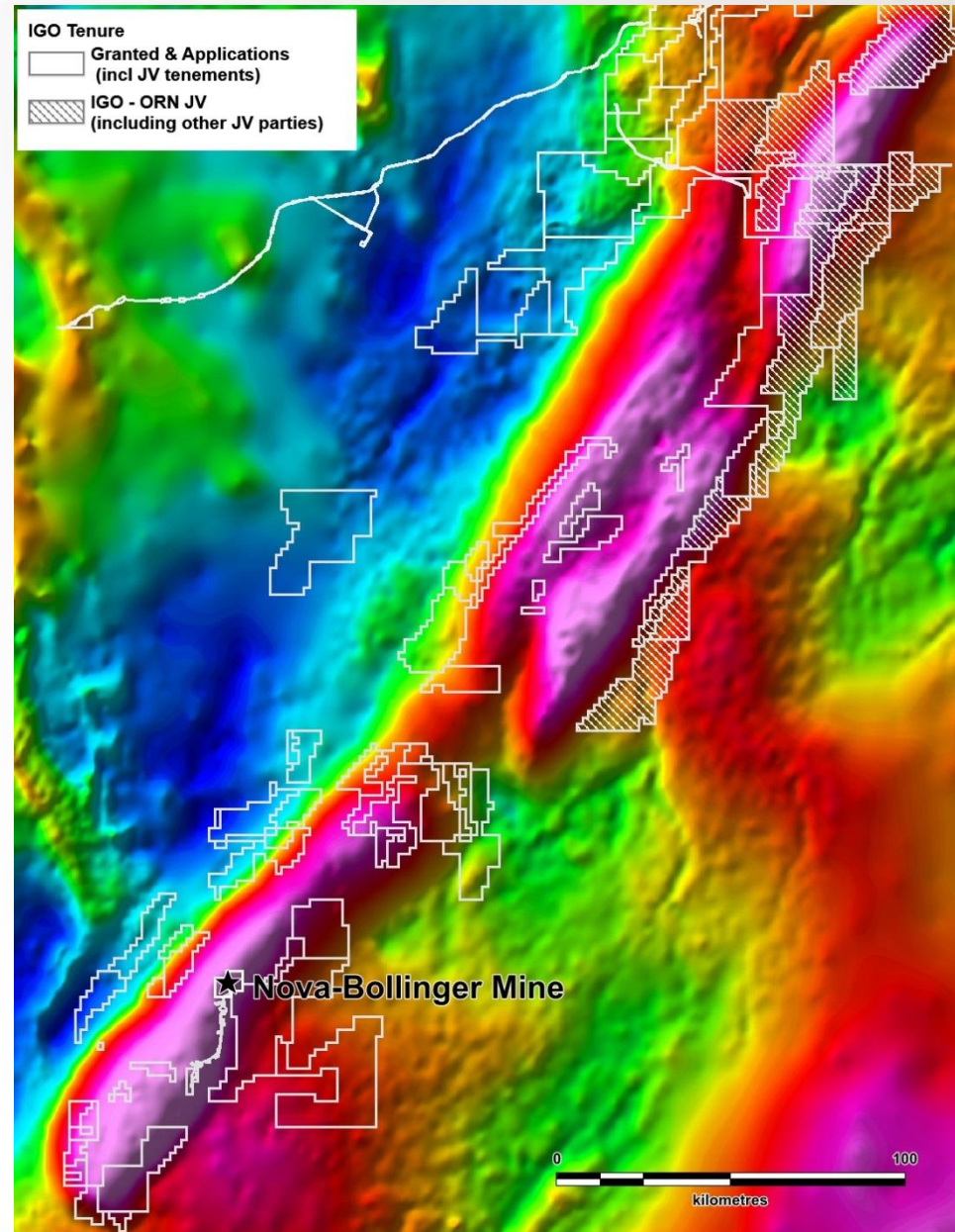




# Australia – continued valuable Fraser Range exposure

- ORN's 3 830 km<sup>2</sup> Fraser Range Project in JV with Independence Group (IGO)
- ORN's 10-30% equity in tenements free carried to Pre-Feasibility Study
- ORN tenements have drilled, confirmed sulphide nickel- copper bearing mafic intrusive bodies
- IGO has become the dominant regional landholder with Nova Mine (Ni-Cu) in production
- IGO spending \$21M on Fraser Range exploration in 2018\*
- Drilling currently underway by IGO on ORN tenements
- When Sirius Resources discovered Nova in 2012, Sirius's market capitalisation increased from circa \$6million\* to over \$600million\* within 6 months
- Sirius was acquired by IGO in 2015 for \$1.057billion\*

- IGO ASX announcements 27 Nov 2015 and 17 Oct 2017
- SIR ASX announcements June 2012 and Nov 2012

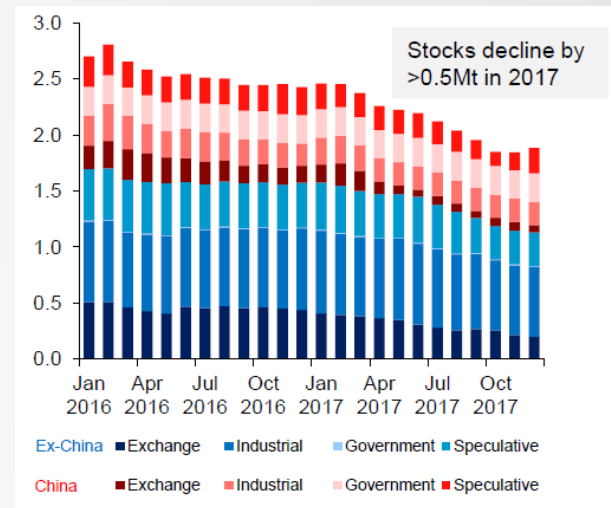


# Zinc: Raw materials constraints to drive sustained period of high prices



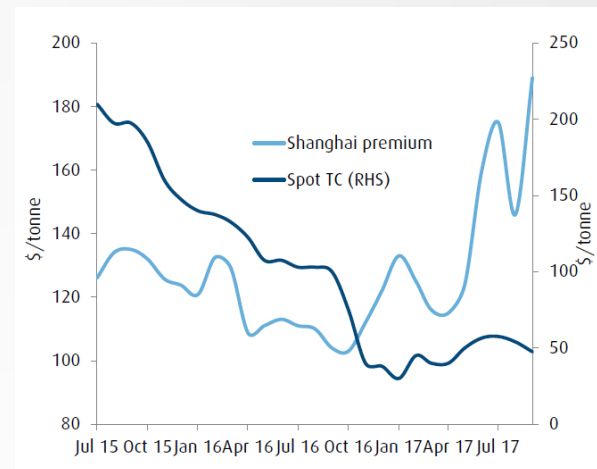
- Supply discipline maintained in 2017 post major mine closures at Century and Lisheen
  - Comments from Glencore indicate a sustained period of higher prices is required prior to a restart
  - Ramp up of Chinese production hampered by increasing environmental regulations
- Global zinc exchange stocks have experienced a significant drawdown and under 500t for the first time since 2010
- Spot TC/RC and metal premiums are at multi year lows
- Large scale uncommitted project pipeline dominated by projects with technical or geo-political challenges
  - Availability of “clean” concentrates to become an issue as supply responds
- Demand dominated by galvanized steel production for use in the construction industry (infrastructure and property)
  - China accounts for 50% of zinc demand
  - Galvanizing of crude steel in China of ~5% compared to United States at 18-20%

## Significant global stock drawdown in 2017



Source: Macquarie Research, January 2018

## Concentrate and refined markets are tight



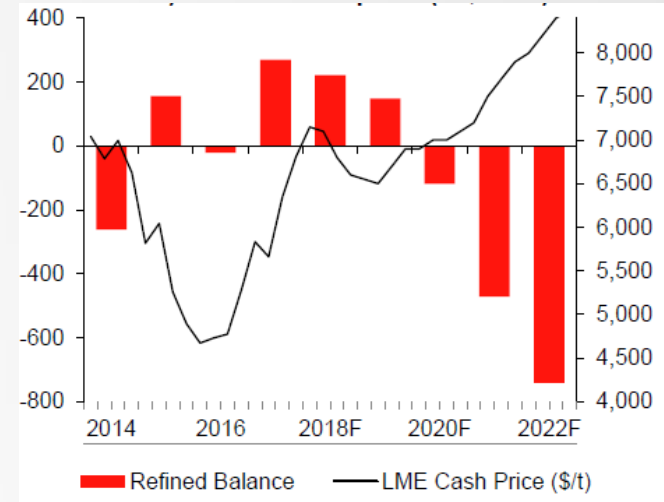
Source: BMO, January 2018

# Copper: Growing demand with supply challenges



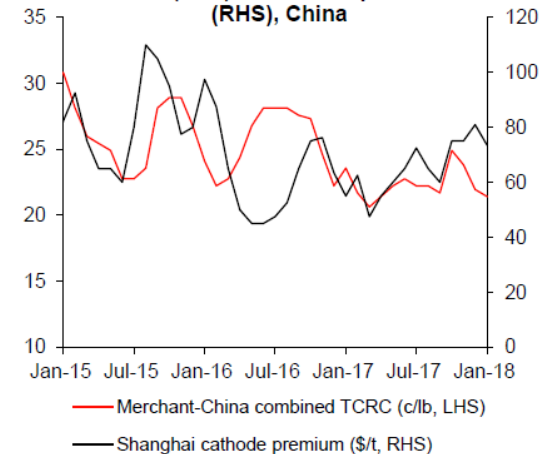
- Mine supply will continue to face pressures in 2018
  - ~32% of global copper mines see labour contracts expire in 2018
- Large supply projects carry technical and/or geo-political challenges in emerging and frontier markets
  - Cobre Panama commissioning in late 2018 is the last of the “boom” projects committed to by copper majors
  - Power and water challenges increase cost pressures for future Chilean production
  - Sustained period of high copper prices required to incentivise new supply to balance the market going forward
- TC/RC’s continue to trade at relatively low levels supported by continued concentrate supply challenges and robust demand
- Megatrend momentum towards electric vehicles has potential to be a material positive demand driver
  - Transportation demand is currently 8% of global demand, a 25% EV penetration rate would double transportation demand
  - Chinese accelerated build out of EV charging stations highlights the copper intensive nature of Chinese growth

**Strong fundamental driven outlook**



Source: Macquarie Research, January 2018

**TCRCs (LHS) vs cathode premiums (RHS), China**



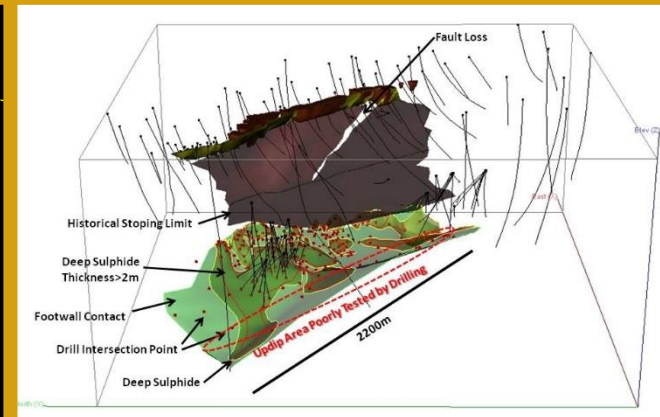
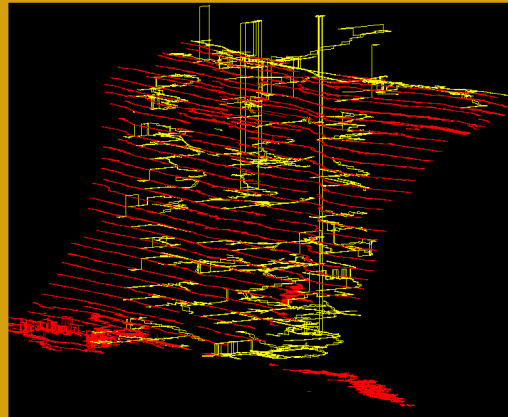
Source: Macquarie Research, January 2018

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The information in this report that relates to Exploration Results at the Areachap Belt projects complies with the JORC Code and is based on information compiled by and for Mr Errol Smart, Orion Minerals Ltd's Managing Director. Mr Smart (PrSciNat) is registered with the South African Council for Natural Scientific Professionals, a ROPO for JORC purposes, and 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 JORC Code. Mr Smart consents to the inclusion in this announcement of the matters based on his information in the form and context in which it appears. The Exploration Results and Resource Statement are based on standard industry practises for drilling, logging, sampling, assay methods including quality assurance and quality control measures as detailed in the ASX releases referred to in the text.