

Vermelho – Preliminary Feasibility Study Results
October 2019





TSX:HZM / AIM:HZM / horizonteminerals.com

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Due to the uncertainty that may be attached to inferred mineral resource estimates, it cannot be assumed that all or any part of an inferred mineral resource estimate will be upgraded to an indicated or measured mineral resource estimate as a result of continued exploration. Confidence in an inferred mineral resource estimate is insufficient to allow meaningful application of the technical and economic parameters to enable an evaluation of economic viability sufficient for public disclosure, except in certain limited circumstances set out in National Instrument 43-101 – Standards of Disclosure for Mineral Projects. The economic analysis contained in the Company's technical report is based on probable mineral reserve estimates.

Unless otherwise indicated, the scientific and technical information contained in this investor presentation has been prepared by or under the supervision of Anthony Finch P. Eng. MAUSIMM (CP Min), Andrew Ross FAUSIMM of Snowden Mining Industry Consultants, Simon Walsh MAUSIMM (CP Met) of Simulus Engineers. All are Qualified Persons within the meaning of Canadian National Instrument 43-101 and have acted as consultants to the Company.

For further details on the Araguaia mineral resource, please refer to the press release dated 29 October 2018, which is available on the Company's website at www.horizonteminerals.com and on SEDAR at www.sedar.com. Mineral resources that are not reserves do not have demonstrated economic viability.





# Developing Critical Nickel Products To Market

#### Electric Vehicle (EV) Battery Market

The market will require approximately 0.5 - 1.3 million tonnes of new nickel by 2030, up to 50% increase on current global nickel consumption (~2.2Mt).

#### Strategic Acquisition of Vermelho Project

Acquisition from Vale (estimated US\$200 million of spend). Tier 1 project in size and grade. Located near Carajás mining district - excellent infrastructure.

#### Compelling Economics for Vermelho

Vermelho Pre-Feasibility Study released October 2019. NPV<sub>8</sub> **US\$1.7 billion** and IRR 26%, generates over **US\$7.3 billion** in free cash flow over LOM<sup>1</sup>.

#### **Significant Inventory**

Combined metal in the ground (M&I) of over 4Mt contained Ni and 94kt Co<sup>2</sup>. Production potential of over 50,000 tpa nickel.

#### **Development Ready Araguaia Project**

Araguaia NPV<sub>8</sub> US\$1.2 billion and IRR 30.7%, generates over US\$3.8 billion in free cash flow over LOM<sup>3.</sup> FS complete, permitted, royalty announced.

#### Multi Asset Nickel Company

Nickel demand growing, limited new projects. Horizonte's projects target both EV battery and stainless markets.

<sup>3</sup>Source: Horizonte Minerals Araguaia Nickel Feasibility Study, figures presented above consider consensus nickel price of US\$16,400/t Ni and expansion case economics (29,000 tpa ni)



<sup>&</sup>lt;sup>1</sup>Source: Horizonte Minerals Vermelho Nickel Cobalt Pre-Feasibility Study, figures presented above consider consensus nickel price of US\$16,400/t Ni

<sup>&</sup>lt;sup>2</sup>Araguaia and Serra do Tapa values at 0.90% Ni Cut-Off, Vermelho values at 0.90% NiEq Cut-Off

## Horizonte on Pathway to Become Global Nickel Player

Total district production potential ~50,000 tpa nickel (EV battery market + stainless steel market)

Consolidation of a nickel/cobalt district: two Tier 1, 100% owned, scalable, high-grade nickel deposits in one of Brazil's premier base metals mining districts.



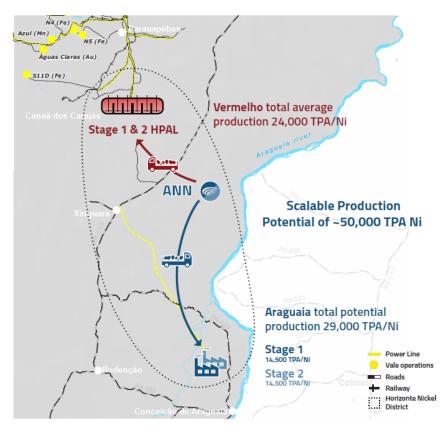
Vermelho average production 24,000 tpa nickel contained in sulphate for EV battery market

Staged production



Araguaia potential production 29,000 tpa nickel for stainless market

- Stage 1 RKEF plant 14,500 tpa
- Stage 2 doubling capacity.







## Vermelho PFS Highlights

Significant cash generation around US\$7.3B net cash flow<sup>1</sup>

 $\mbox{NPV}_{8}$  of US\$1.7B at US\$16,400/t Ni, US\$2.4B at long-term incentive price of US\$19,800/t Ni

Rapid payback period of 4.2 years<sup>1</sup>

IRR over 26% at Nickel Price of US\$16,400/tonne

Low Capital Intensity US\$652M upfront capital cost \$27k/t Ni pa

Low cost C1 Cost (Brook Hunt) US\$7,286/t Ni <sup>2</sup>

Long life of mine - 38 years

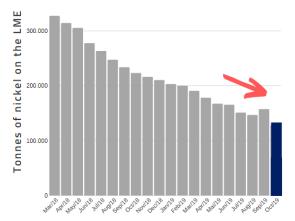
<sup>&</sup>lt;sup>1</sup> Net cash flow and Payback period results based on nickel price of \$16,400/tonne. Additional results for bank Long-Term price of \$19,800/t provided in Slide 13.

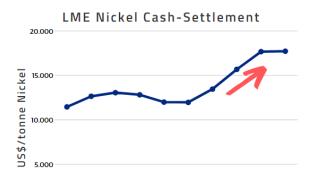
<sup>&</sup>lt;sup>2</sup> C1 cost based on years 1-10 of Vermelho production.



## Why Nickel Now







O Jan/19 Feb/19 Mar/19 Apr/19 May/19 Jun/19 Jul/19 Aug/19 Sep/19 Oct/19

#### Stocks at lowest levels in over 7 years

Nickel stocks have reduced, from 470,000 tonnes to below 100,000 tonnes - the lowest level since April 2012. First week of October had the sharpest inventory drop in nickel's 40 year LME history.

#### Demand outstripping supply

Nickel key for EV battery chemistry – the market requires 0.5Mt~1.3Mt of new nickel by 2030. Significant new supply is required for the stainless-steel market, which continues to grow ~5% year on year globally.

#### Limited new supply available to come online quickly

UBS Research estimates that only 26 of 41 nickel projects that are at an advanced stage (FS/restart/expansion) deliver a 15% IRR at a long term nickel price of US\$20,000/t. Price lows have deterred new investments.

#### Long lead time

On average new nickel mines take 8-10 years to come into production from early-stage exploration.



## Recent Developments: Supply Tightening

- In April 2017, Indonesia relaxed the ban on export of unprocessed nickel ore for 5 years until 2022.
- Indonesian government has confirmed that it will bring forward the ban to January 2020.
- In the long-term, up to 200kt of Ni or nearly 10% of global supply could be at risk.
- EV battery market expansion in 2019 is tightening supply on Class 1 nickel.
- China's Tsingshan Holding Group Co. the world's largest stainless steel producer, was believed to be one of the main forces behind the record drawdown in LME nickel inventories in October<sup>1</sup>

## Indonesia to ban nickel exports from January 2020

News Desk The Jakarta Post Nickel is surging after Indonesia said it will ban exports of the metal from January

#### fastFT Commodities

Nickel prices hit four-year high on Indonesia export ban

Fears of shortages as top producing country brings forward export restrictions

Markets

Indonesia's Nickel Ban Shows Resource Nationalism on the March

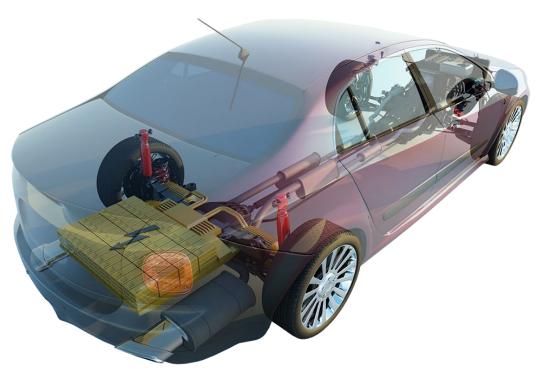
Indonesian nickel ore export ban – implications for nickel supply

Wood Mackenzie | September 4, 2019 | 2.07 pm Intelligence Asia Nicke

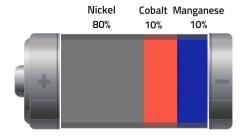


## Nickel the Fastest Growing Battery Raw Material

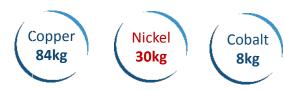
"Nickel's use in lithium ion batteries accounted for 85,000 tonnes in 2018 yet this was only 4% of total nickel demand. However, nickel demand from EV batteries is set to grow by between 30-40% a year, making it the fastest growing battery raw material." 1



NMC Battery New Market Standard – 80% Ni



Each EV requires 30kg of Nickel<sup>2</sup>



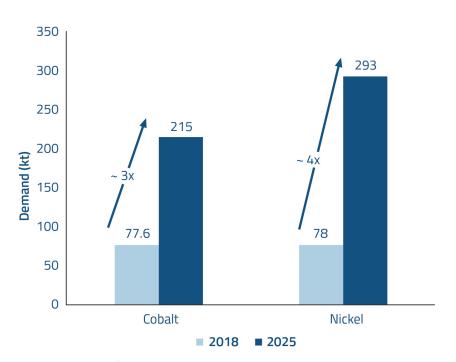
- Benchmark Mineral Intelligence
- <sup>2</sup> Glencore



## Nickel Sulphate Key to Electrification

"Nickel sulphate in the chemistry of cathode active materials for use in batteries of electric vehicles has more than tripled production in the past eight years, with demand expected to grow exponentially in the next decade." 1

#### EVs Driving Huge Growth in Nickel & Cobalt<sup>2</sup>



#### Nickel Sulphate in High Demand



- Market moving towards 80% nickel battery chemistry, EVs rely on nickel in sulphate form
- Few advanced large-scale projects available to develop in this cycle
- Less than 50% of global nickel production is
   Class 1 nickel, i.e. not suitable for batteries
- Nickel sulphate attracts a set premium on top of the LME nickel spot price<sup>3</sup>.

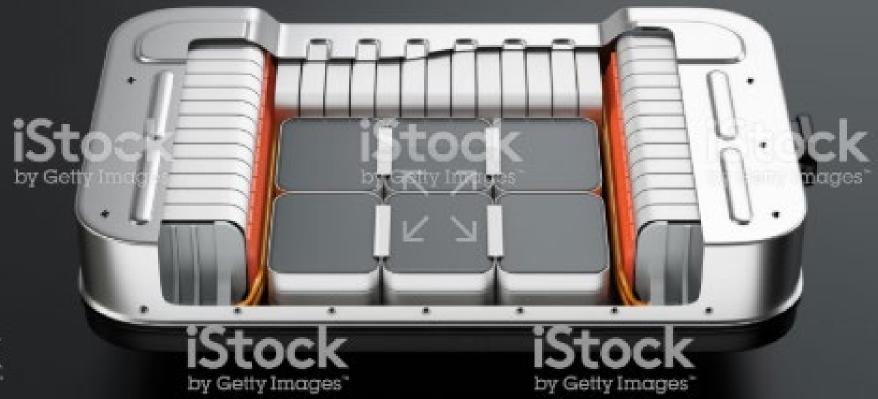
Mining Journal

<sup>2</sup> Wood Mackenzie

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## Vermelho Pre Feasibility Study (PFS)

#### **Capital Cost Estimate:**

US\$652M (\$97.7M Contingency)



## Low Capital Intensity

(per tonne nickel)

US\$ 27k/t

#### **Post-Tax IRR:**

26.3% (at \$16,400/t nickel)



#### **Post-Tax NPV:**

US\$1.7B (at 8% discount)



## Average Annual Production

24,000t nickel; 1,300t cobalt



#### **Dry Stack Waste**

No wet tailings dams required



#### **Additional Revenue**

By-product (kieserite)



#### **Long Mine Life:**

38 years with \$7.3B Cashflow













## Vermelho PFS in Numbers

	CONSENSUS PRICE US\$16,400/tonne Ni	LONG-TERM PRICE US\$19,800/tonne Ni
Capital Cost	US\$652M	US\$652M
Net Cash Flow	US\$7.3B	US\$9.5B
Post-Tax IRR	26.3%	31.5%
Post-Tax NPV <sub>8</sub>	US\$1,722M	US\$2,373M
Production Payback	4.2 years	3.6 years
Lowest quartile C1 Cash	<b>US\$8,029</b> /t Ni	<b>US\$8,029</b> /t Ni

#### Notes



<sup>-</sup> Market Consensus: Canadian Imperial Bank of Commerce ("CIBC") Capital Markets consensus forecast long term Nickel price compiled by 21 international banks as of September 2019 \$16,400 t/Ni

<sup>-</sup> Long term price Wood Mackenzie Long term incentive price \$19,800/t Ni

<sup>-</sup> PFS to AACE Class 4 costs combined accuracy of - 25% to +20%

<sup>-</sup> Brazilian Real to US \$ exchange rate applied = 3.8:1



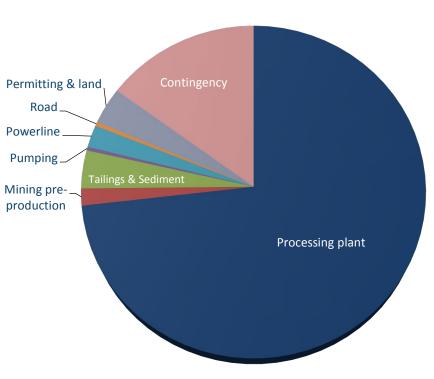
## Vermelho Capital Funding Requirement\*

#### **Capital Cost Estimates\***

Initial capital cost of US\$652 million is estimated for Vermelho

Area Name	Costs (US\$'M)
Processing plant	477.3
Mining pre-production	10.8
Tailings & Sediment	24.1
Pumping	2.3
Powerline	14.1
Road	2.6
Permitting & Land	23.3
Contingency	97.7
Total	652.2

#### Capital Cost Breakdown



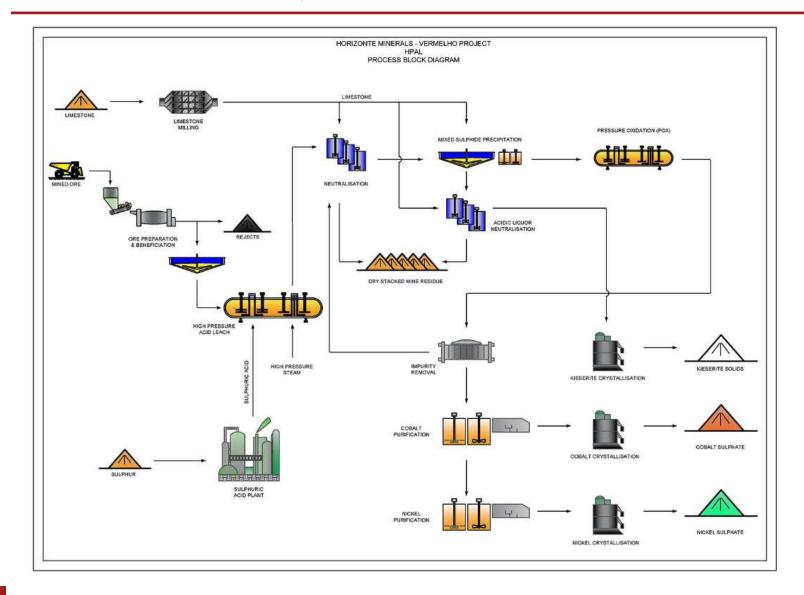
Stage 2 expansion capital \$447m funded out of cash flows commencing year2, sustaining capital of US\$52 million is spread over LOM



<sup>\*</sup>Undertaken to AACE class 4 standard with combined accuracy of - 25% to +20%. The capital and operating costs are as of Q2 2019.



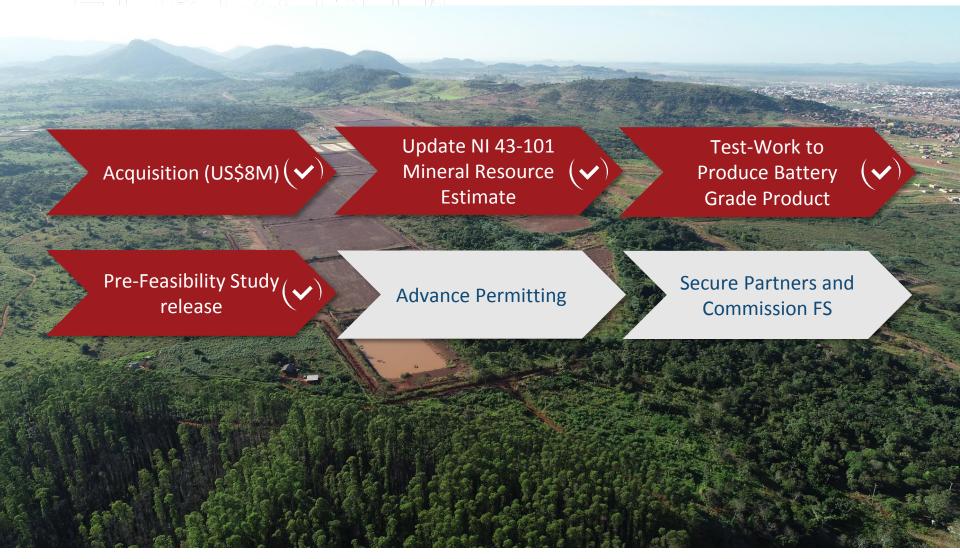
## **HPAL Process (Simplified)**







## Vermelho Advanced Along Development Pathway







### Vermelho Highlights

#### Location

- Located in the Carajás mining district.
- Favourable infrastructure, skilled worforce.
- Synergies with Horizonte's Araguaia ferronickel project.

#### Grade

- One of the highest grade nickel laterite deposits globally, suitable for nickel sulphate production.
- Beneficiation process (JM)

#### Well Advanced

- Over 152,000m of drilling completed.
- Estimated US\$200M spend by previous owners, Vale.
- Horizonte's own Pre Feasibility Study demonstrates compelling economics 26% IRR.

#### Location

- Both projects located in a mining district, well developed infrastructure.
- Proactive government support, nickel and cobalt materials to be responsibly mined.

#### **Best in Class**

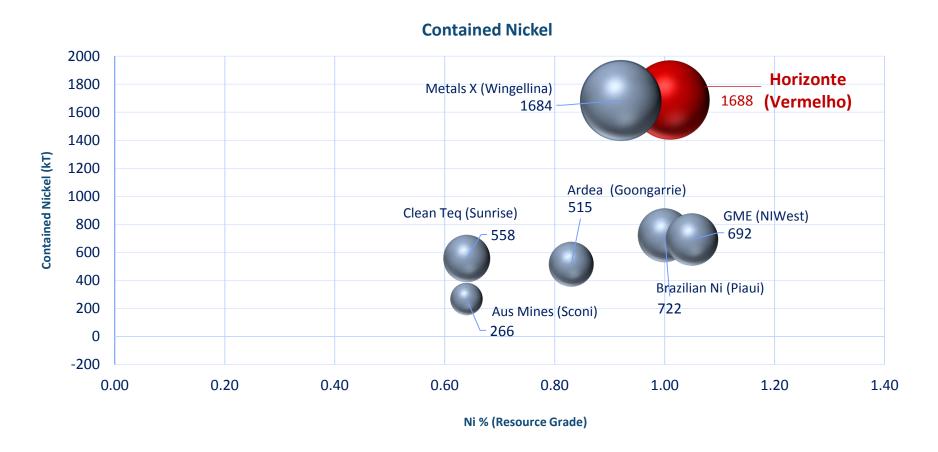
- Low upfront capital investment compared with peers.
- Low capital intensity per tonne of annual nickel production.
- Lowest quarter of the C1 cost curve for nickel laterite projects.







## Vermelho – Tier 1 Project



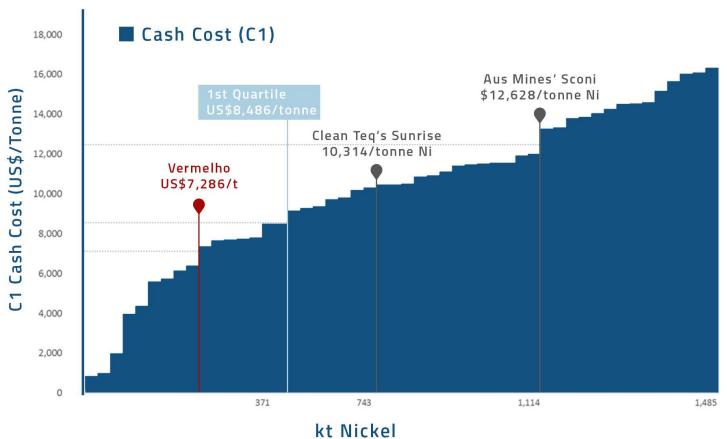
Note: Resources based on published reports in 2018, for Measured and Indicated resources. The category(s) of the MRE for Metals X Limited - Wingellina Project has not been presented in Measured, Indicated and Inferred categories so is unknown if includes Inferred resources. Sources include: Snowden NI 43-101 - June 2018 (Vermelho); Clean TeQ SRK NI 43-101 - June 2018 (Sunrise Project); Ardea Resources MRE report to ASX March 2018 (Goongarrie Project); Australian Mines Ltd Press Release for Sconi BFS (Sconi Project); Brazilian Nickel - Piaui fact sheet 2018 (Piaui Project); Metals X Limited Annual Report June 2018 (Wingellina Project); GME Resources Press Release on NiWest PFS August 2018 (NiWest Project).





## Lower quartile of C1 cost curve

Vermelho positioned in the lower quartile for nickel laterite production C1 (Brook Hunt) Cash Cost



Source: Cost curve from Wood Mackenzie 2018 data

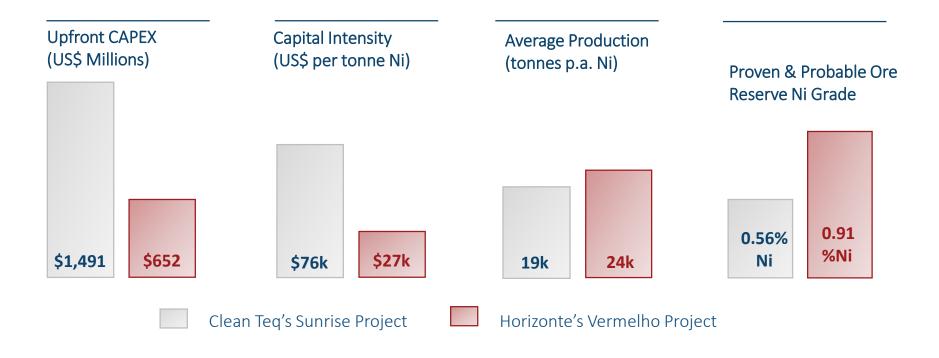
Horizonte's Vermelho Project C1 cost based on October 2019 Pre Feasibility Study, years 1 – 10 of production Clean Teg's Sunrise Project C1 cost extrapolated from published Bankable Feasibility Study 2018, credits excluded Aus Mines' Sconi Project C1 cost extrapolated from published Bankable Feasibility Study 2018, credits excluded





# Horizonte's Vermelho project compared with Clean Teq's Sunrise project

Vermelho's superior grade and location in an established mining hub means lower upfront CAPEX and a lower capital intensity per tonne of Nickel produced.











### Araguaia FS Stage 1 & 2 Economics

## STAGE 1 NICKEL PRICE US\$16,400/tonne Ni

**Capital Cost** 

US\$443M

**Net Cash Flow** 

**US\$2.4Bn** 

Post-Tax IRR

27.0%

Post-Tax NPV<sub>8</sub>

**US\$691 M** 

**Production Payback** 

~3 years

Lowest quartile C1 Cash Yr 1-10 (Ni Laterite)

**US\$6,794**/t Ni

## STAGE 2 NICKEL PRICE US\$16,400/tonne Ni

**Capital Cost** 

**US\$443M** 

**Net Cash Flow** 

**US\$3.8Bn** 

Post-Tax IRR

30.7%

Post-Tax NPV<sub>8</sub>

**US\$1.2B** 

**Production Payback** 

~4 years

Lowest quartile C1 Cash Yr 1-10 (Ni Laterite)

**US\$6,613**/t Ni

#### Notes

- Market Consensus: Canadian Imperial Bank of Commerce ("CIBC") Capital Markets consensus forecast long term Nickel price compiled by 21 international banks as of September 2019 \$16,400 t/Ni
- FS to AACE Class 3 costs combined accuracy of 10%+15%
- Brazilian Real to US \$ exchange rate applied = 3.5:1





# Next Steps for Funding Process for Araguaia



#### Royalty – Complete US\$25 million with Orion

 Orion Mine Finance (Orion) will provide upfront cash payment of US\$25 million in exchange for a 2.25% royalty on the Araguaia Project;



#### **Project Development**

- Pre-Production Capital of US\$443million to commence Stage 1 Construction
- Endeavour Financial engaged, target Project
   Finance package of 60-65% debt with the
   balance in equity

#### **Status Project Finance**

- Discussions underway with 7 international banks (inc Brazilian) regarding PF syndicate
- Discussions underway with export credit agencies to originate government backed credit line leading to lower interest rate and longer tenner – Germany and China

#### Offtake Agreement

 Part of wider finance package, interest from traders and stainless steel producers



### Horizonte Investment Proposition

#### **Direct Exposure to Nickel**

- Nickel the best performing base metal of 2019 and fundamentals continue improving.
- At consensus nickel price of \$16,400/t, estimated Vermelho IRR is 26.3% with an NPV of \$1.7B; Araguaia Stage 2 (expansion case) IRR is 30.7% with an NPV of \$1.2B.

#### **Diversified Nickel Portfolio**

- Two Tier 1 nickel projects, both 100% owned. Significant inventory with over 4Mt contained nickel.
- Vermelho targeting the EV battery market and Araguaia aimed at the stainless steel market.

#### Well Funded

- Company cash position ~US\$30M, looking for strategic Vermelho partner.
- Royalty with Orion, well placed to advanced full finance package for Araguaia.

#### Location

- Both projects located in a mining district, well developed infrastructure.
- Proactive government support, nickel and cobalt materials to be responsibly mined.

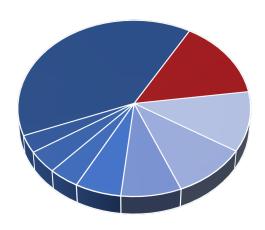
#### Scalability

- Vermelho average 24,000 t/a nickel and ~1,300 t/a cobalt.
- Araguaia designed for Stage 2 expansion potential to increase production to 29,000t/a nickel.



## Corporate Snapshot

#### **Key Shareholders**



- Teck Resources 14.5%
- Canaccord Genuity Group 9.9%
- Glencore 6.1%
- Lombard Odier 4.1%
- Other 39.2%

- Hargreaves Lansdown 11.0%
- JP Morgan 8.0%
- Richard Griffiths 4.0%
- HSDL 3.2%

#### HZM AIM share price/volume



Ticker	AIM: HZM	TSX: HZM
Share price	4.42p	C\$0.07
Shares in issue (M)	1,446	1,446
Market Cap	£65.6M	C\$108.4M
Cash + Equivalents	£24M	C\$40M
52 week trading	AIM: 1.73p – 6.97p	(C\$0.03 - C\$0.085)
Nomad & Broker	Numis	n/a
Analyst coverage	Numis/Shard	Paradigm Capital

(Share price data as of 10 September 2019)







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