

For personal use only



# Goschen Project DFS Refresh - Phases 1 and 1A

Securing critical and rare earth minerals for future technologies

March 2023

**ASX:VHM**

### **Acknowledgement of Country**

*VHM acknowledges the Australian Aboriginal and Torres Strait Islander peoples as the first inhabitants of the nation and the traditional custodians of the lands where we live, learn and work. We pay our respects to past, present and emerging Elders.*





# Disclaimer and forward-looking statements

## Important Information

This presentation has been prepared by VHM Limited ACN 601 004 102 (Company). It contains general background information only which is current at the date of this presentation unless otherwise specified. It is not intended to be an investor presentation. It contains selected summary information only and does not purport to be all-inclusive or to contain all the information that may be relevant to a prospective investor or stakeholder.

The Company, its affiliates, officers, directors, employees and agents do not accept responsibility or liability for this Presentation or its contents (except to the extent that such liability cannot be excluded by law). No representation or warranty is made as to the Presentation's accuracy or completeness. Recipients must satisfy themselves as to the accuracy of all such information. The presentation has been prepared based on information available at the time of preparation and is subject to change without notice. In receiving this presentation, each recipient agrees to the terms and conditions stated in this slide, including any modification to them.

This presentation does not constitute investment or financial product advice. Is not intended to be used as the basis for making an investment decision, nor is it intended to constitute legal, tax, accounting or other advice. Any references to or explanations of legislation, regulatory issues, benefits or other legal commentary (if any) are indicative only, do not summarise all relevant issues and are not intended to be a full explanation of a particular matter. The information has been obtained from and based on sources believed by the Company to be reliable. Past performance is not an indication of future performance.

This presentation may contain forward-looking statements, guidance, forecasts, estimates, prospects, projections or statements in relation to future matters that may involve risks or uncertainties and may involve significant items of subjective judgement and assumptions of future events that may or may not eventuate (Forward Statements). Forward Statements can generally be identified by the use of forward-looking words such as "anticipate", "estimates", "will", "should", "could", "may", "expects", "plans", "forecast", "target" or similar expressions. Forward Statements including indications, guidance or outlook on future revenues, distributions or financial position and performance or return or growth in underlying investments are provided as a general guide only and should not be relied upon as an indication or guarantee of future performance. To the extent that certain statements contained in this presentation may constitute 'Forward Statements' or statements about forward looking matters, then the information reflects the Company's (and no other party's) intent, belief or expectations as at the date of this presentation. No independent third party has reviewed the reasonableness of any such statements or assumptions. None of the Company, its related bodies corporate and its officers, directors, employees, advisers, partners, affiliates and agents (together, the VHM Parties) represent or warrant that such Forward Statements will be achieved or will prove to be correct or gives any warranty, express or implied, as to the accuracy, completeness, likelihood of achievement or reasonableness of any Forward Statement contained in this presentation. Except as required by law or regulation, the Company assumes no obligation to release updates or revisions to Forward

Such forward looking statements involve known and unknown risks, uncertainties and other important factors beyond VHM Limited's control that could cause actual results, performance or achievements of VHM Limited to be materially different from future results, performance, or achievements expressed or implied by such forward looking statements.

Recipients should form their own views as to these matters and any assumptions on which any of the Forward Statements are based and not place reliance on such statements.

Forward looking statements are based on numerous assumptions regarding VHM Limited's present and future business strategies and the environment in which VHM Limited will operate in the future. Among the important factors that could cause VHM Limited actual results, performance or achievements to differ materially from those in the forward-looking statements in this Presentation (without limitation) a significant change in VHM's performance (financial or otherwise) or operating environment, a material change to law or regulation (including changes to the regulatory policy or interpretation), and risks and uncertainties associated with the conflict between Russia and Ukraine, and the Australian and global economic environment and capital market conditions.

These forward-looking statements speak only as at the date of this Presentation. Save as required by applicable law or regulation the Company expressly disclaims any obligation or undertaking to disseminate any updates or revisions to any forward-looking statements contained herein to reflect any change in the Company's expectations with regard thereto or any change in events, conditions or circumstances on which any such statements are based. As a result of these factors, the events described in the forward-looking statements in this Presentation may not occur.

No party other than the Company has authorised, permitted or caused the issue, submission, dispatch or provision of this presentation, or takes any responsibility for, or makes or purports to make any statement, representation or undertaking in this presentation and there is no statement in this presentation that is based on any statement by any other party. No person, either as a director, partner or in the employment of the Company has any authority to make, imply, or give any representation or warranty whatsoever in relation to the information contained in this presentation. None of the VHM Parties take any responsibility for any information in this presentation or any action taken by you on the basis of such information.

To the maximum extent permitted by law, the VHM Parties:

- exclude and disclaim all liability, including (without limitation) any liability or negligence, for any expenses, losses, damages or costs incurred either as a result of the information in this presentation being inaccurate or incomplete in any way for any reason, or otherwise arising in connection with this presentation; and
- make no representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of information in this presentation.

## Compliance Statement

### Mineral Resources, Ore Reserves and Exploration Target

The information in this presentation regarding the Mineral Resource estimate and Exploration Target were set out in the Prospectus dated 21 November 2022. The Company confirms that it is not aware of any new information or data that materially affects the information in that Prospectus and that all material assumptions and technical parameters underpinning the Mineral Resource estimates in the Prospectus continue to apply and have not materially changed.

The information in this presentation regarding the Ore Reserve estimates were set out in the Company ASX announcement dated 28 March 2023. The Company confirms that it is not aware of any new information or data that materially affects the information in that announcement and that all material assumptions and technical parameters underpinning the Ore Reserve estimates continue to apply and have not materially changed.

### Production Target

The information in this presentation regarding the Production Target, and forecast financial information derived from that Production Target, was set out in the Prospectus dated 21 November 2022. The Company confirms that all material assumptions underpinning the Production Target and the forecast financial information derived from that Production Target continue to apply and have not materially changed, except to the extent set out in the DFS Refresh with respect to the forecast financial information.





# VHM Limited (ASX:VHM) overview

## Corporate snapshot<sup>1</sup>

For personal use only



Established in 2014 as an exploration company to support development of the world class Goschen Project

➤ Owns 100% of the Goschen Project, the advanced pre-production rare earth and mineral sands project located in Australia's premier mineral sands province

Scalable project underpinned by significant mineral inventory

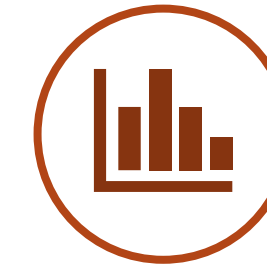
- **413,107 tonnes of TREO**
- **629 Mt Mineral Resource** accompanying world-class mineral sands resource

~87% of Goschen's rare earth minerals basket value are derived from high value rare earths that are critical for electric vehicle motors and wind turbines<sup>2</sup>

Commissioning the Project will help unlock new growth for minerals processing capabilities in Australia to supply global demand for critical rare earths



**Listed** in January 2023 (ASX:VHM)



**Issued shares** 202,801,902



**Market Capitalisation** A\$155.14M



**Top 20 shareholders** ~ 35%



**Share price (27 March 2023)** A\$0.765



**Share options** 11,405,811

Notes:

(1) Market data as at 27 March 2023 and sourced from ASX market based data.

(2) Rare Earth Market Outlook, Independent Analysis for VHM Limited (Q1 2023) Adamas intelligence.

# Investment highlights

For personal use only

## A globally significant rare earths and mineral sands project

A scalable project underpinned by significant mineral inventory and potential resource expansion. Goschen has the capability to develop into a market leading rare earth producer.



## Strategic asset in a stable, established mining jurisdiction

- Granted “**Major Project Status**” by the Australian Government given its national significance
- VHM to produce “**Critical Minerals**” (rare earths, zircon, titanium) important to the green energy transition and with strategic defence applications
- Located in a premier mining jurisdiction with existing infrastructure, a skilled workforce and **strong local, state and federal government support**

## Compelling economics underpinned by unique commodity mix

- Completion of Definitive Feasibility Study (**DFS**) to produce a rare earth mineral concentrate (**REMC**) and zircon-titania heavy mineral concentrate (**HMC**) products
- Advancing the staged development of further downstream products including a mixed rare earth carbonate (**MREC**)
- Low operating cost and capital intensity
- **Global TREO demand expected to rise** at a CAGR of 6.0%, until 2035, driven primarily by the permanent magnet sector<sup>1</sup>

## Strong early funding support

- Expedited project development activities due to **~A\$108 million raised to date**
- Actively **progressing all funding options** and VHM Board targeting funding being secured with **FID scheduled in H2 2023**

## Offtake and clear pathway to production

- Staged development approach to minimise upfront capital requirements and mitigate commercialisation risk
- Formal agreement (MOU) in place with Shenghe Resources for 60% of the REMC and zircon-titania HMC produced at Goschen (for the first three years of production)
- Decision to proceed to Phase 1 due in H2 2023 with **targeted production in H1 2025**

Source: Goschen Project DFS Refresh +/- 10-15%  
 Note: (1) Rare Earth Market Outlook, Independent Analysis for VHM Limited (Q1 2023) Adamas intelligence.



# 1

## Goschen Project DFS Refresh





# Project highlights

The DFS Refresh<sup>1</sup> on Phases 1 and 1A demonstrates the Goschen Project economics to be compelling



**A\$57**  
**Opex \$/t Ore**  
 10-year average nominal operating cost



**A\$500 million**  
**Capex**  
 Ancillary pre-production mining start-up works A\$106m



**A\$1.5 billion**  
**NPV**  
 10-year average nominal price forecast



**44%**  
**IRR**  
 Pre-tax

5Mtpa Goschen Project DFS Financial Metrics (Phase 1 and 1A)				
Pre-tax NPV10 (A\$ m)		1,525		
Pre-tax IRR		44%		
Payback from commencement of production (years)		2.8		
Ore Reserve LoM (years)		20.5		
Average ore grade (THM)		4.0%		
Average strip ration (waste : ore)		2.6 : 1		
First 10 Years of Mine	Average Production (tpa)	REMC	9,428	
		MREC	8,568	
		Zircon-titania HMC	134,500	
	Average revenue per annum (A\$ m)		564	
	Average opex per annum (A\$ m)		273	
	Average EBITDA per annum (A\$ m)		291	
	Average unlevered, pre-tax FCF per annum (A\$ m)		270	
	Average revenue A\$/t ore		118	
	Average operating costs A\$/t ore		57	
	Payback period (years)		2.8	

Notes:

- (1) The DFS Refresh reflects work completed since release of the Goschen Project Prospectus (21 November 2022), with respect to Phases 1 and 1A.
- (2) Goschen Project Financial Metrics for Phase 1 estimated to +/- 10-15% accuracy and Phase 1A completed to a Class 5 level of accuracy.



# Project highlights

The DFS Refresh on Phases 1 and 1A demonstrates the Goschen Project economics to be compelling



5Mtpa

>20 years

Conventional open cut mining methods excavation, load, and haul



8.5ktpa

MREC

Target annual production rates for Mixed Rare Earth Carbonate (MREC)



9.4ktpa

REMC

Target annual production rates for rare earth mineral concentrate (REMC)



134.5ktpa

HMC

Target annual production rates for zircon-titania heavy mineral concentrate (HMC)

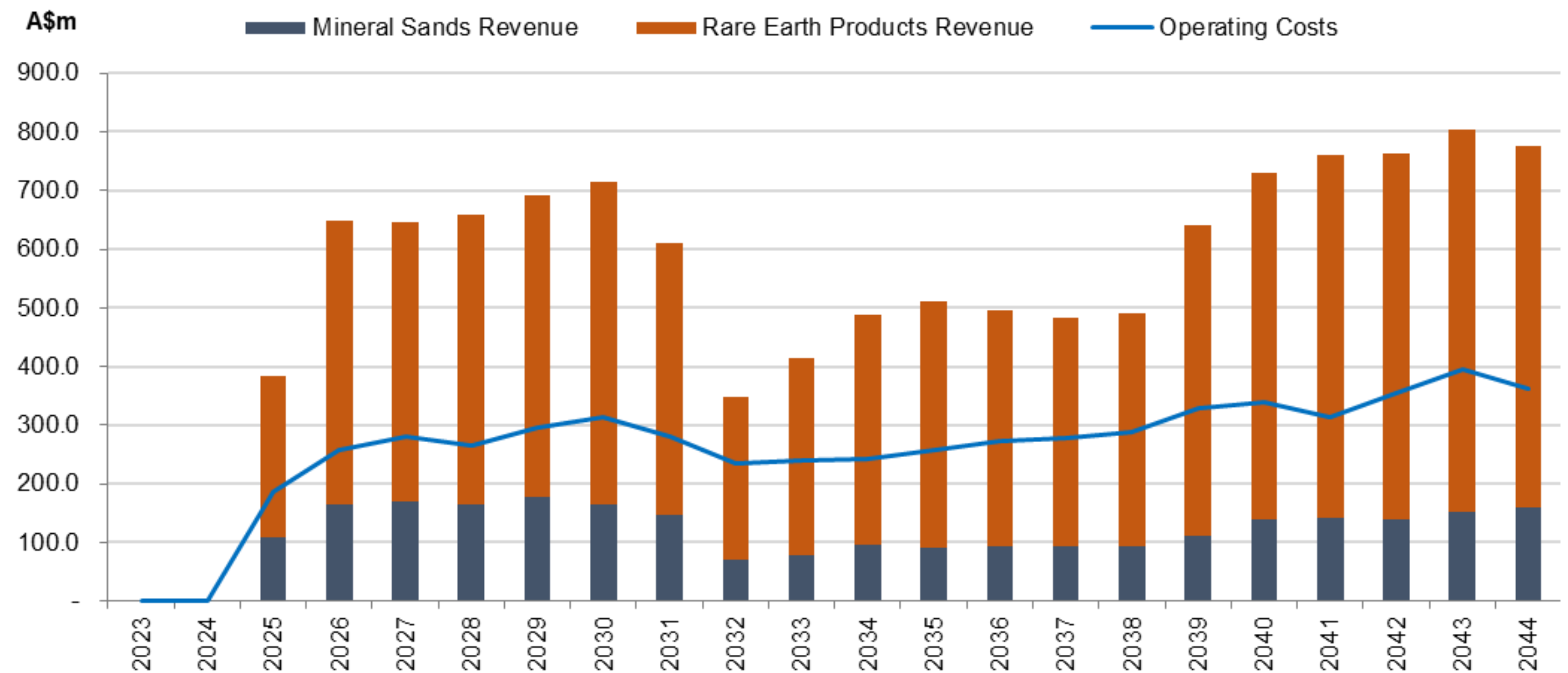




# Goschen Project overview

## Revenue, operating cost and margin<sup>1</sup>

- Substantial revenues generated A\$560 million pa for Phases 1 and 1A averaged over initial 10 years.
- Relative contributions of the rare earths and mineral sands product revenues of 76% and 24% respectively.
- The considerable EBITDA margins of 50% (average over initial 10 years) as well as the dual product stream, provide key mitigating benefits to address potential adverse product price volatility.
- The OPEX of Phases 1 and 1A of the Goschen project are materially covered by the mineral sands revenue, such that the net OPEX of VHM's rare earth production base are at proportionally industry low levels.



Note: (1) Economics for the DFS Refresh are based on the DFS Ore Reserves associated with Area 1 and Area 3 and disclosed in the Company ASX Announcement on 28 March 2023; and capital and operating cost forecasts refined during the DFS Refresh; and product price information inputs for rare earth (Adamas Intelligence) and mineral sands product (TZMI), at Q1 2023. Mineral Resource estimates and Exploration Results were set out in the Prospectus dated 21 November 2022 and remain unchanged.

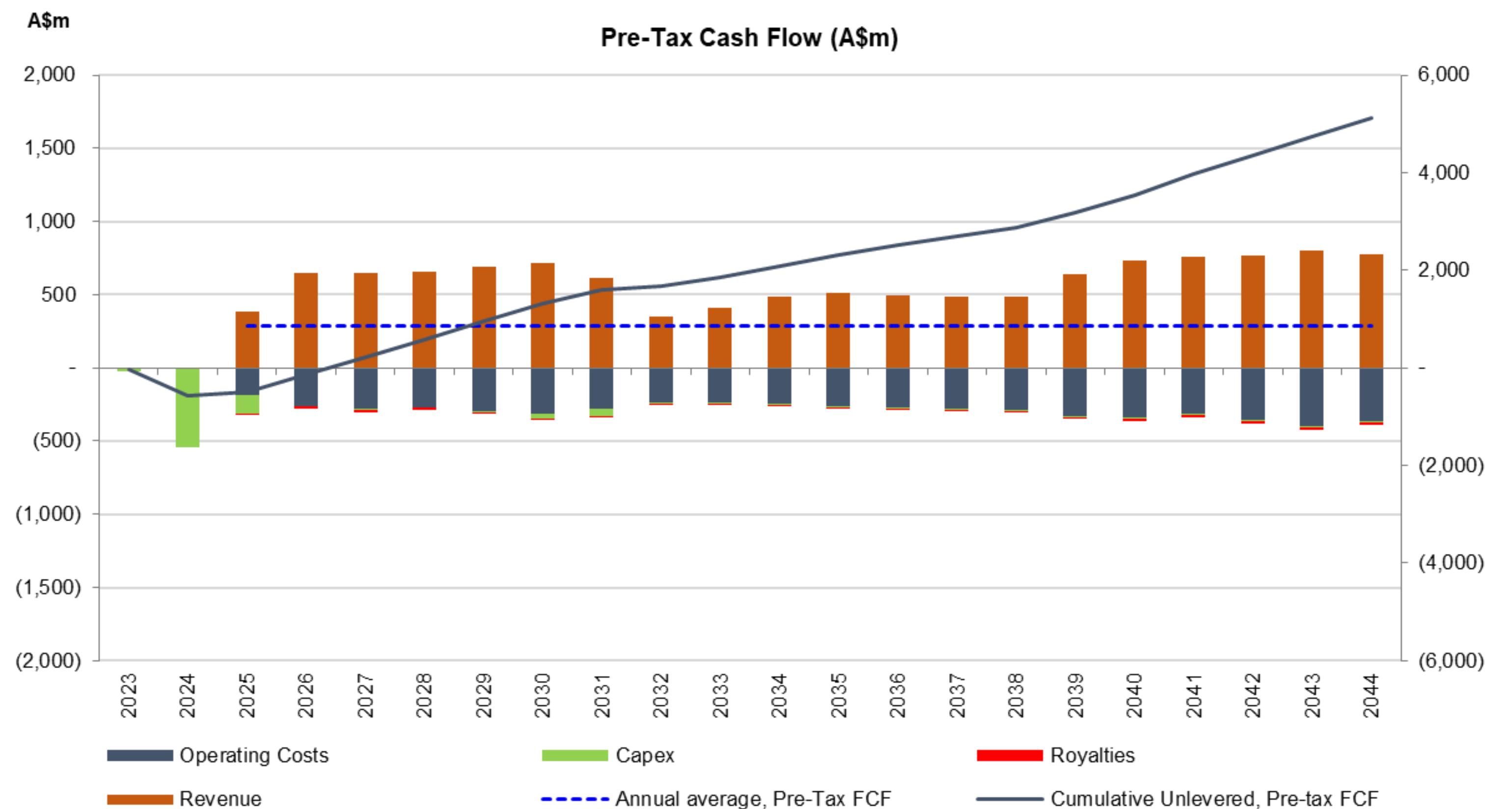


# Goschen Project overview

## Estimated cash flow

- EBITDAX for Phase 1 and Phase 1A for the initial 10 years of production is approximately A\$291 million.
- FCF for Phase 1 and Phase 1A averages A\$270 million per year for the initial 10 years once production commences, which is expected to be in H1 2025.

Goschen Project pre-tax free cash flow for combined Phase 1 and 1A



Notes:

(1) The information in this presentation regarding the Mineral Resource and Exploration Results were set out in the Prospectus dated 21 November 2022 and remain unchanged.

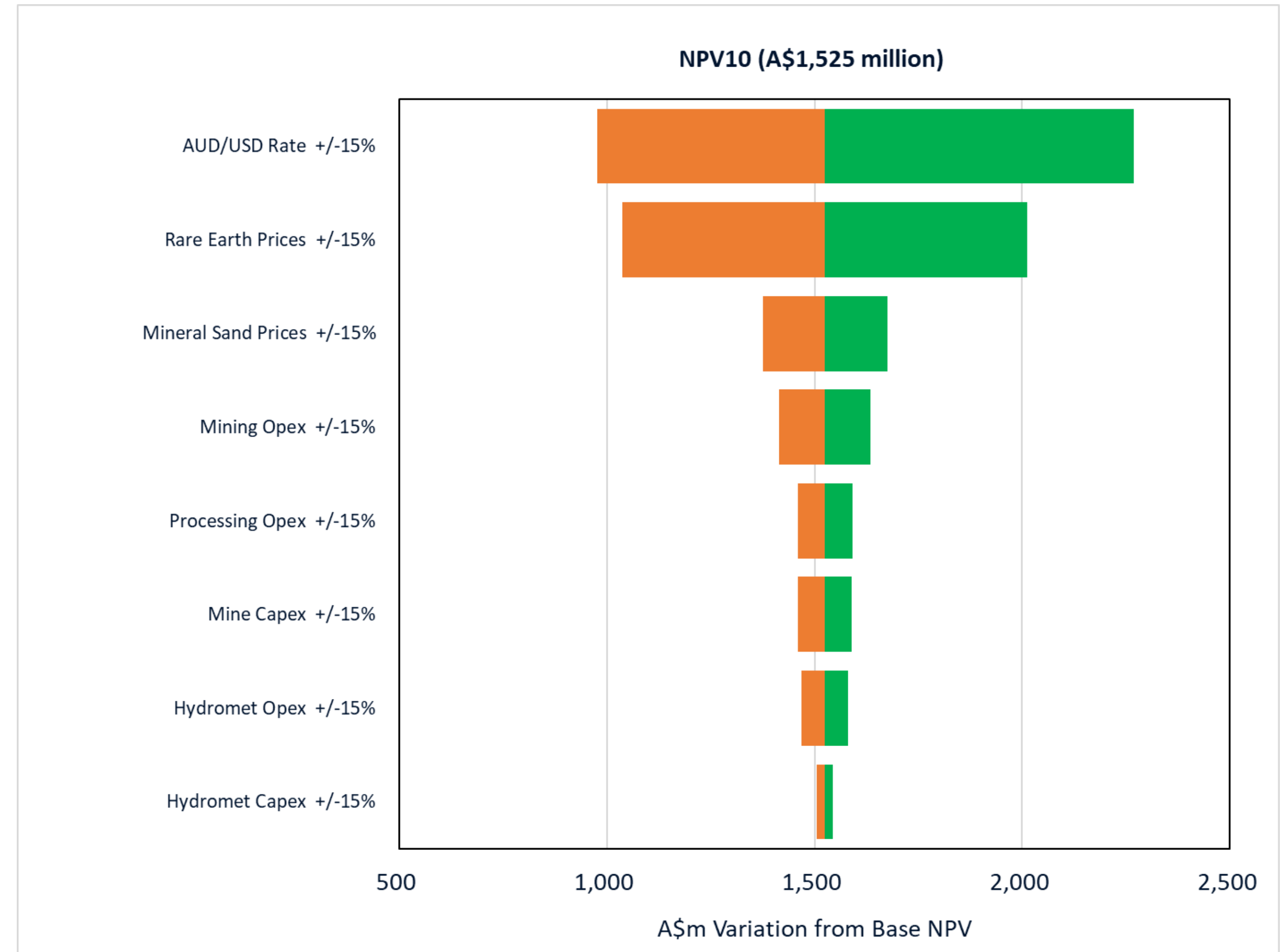
(2): Information in this presentation regarding revised Ore Reserve estimates were disclosed to ASX in the Company Announcement on 28 March 2023.



# Goschen Project overview

## Sensitivity analysis – Phase 1 and Phase 1A

- Sensitivity analysis of the Goschen Project economics have been carried out considering the forecast product prices, AUD/USD foreign exchange rates, mining, and processing opex and capex costs.
- The Project’s forecast NPV is sensitive to rare earth price movements and exchange rate movements.
- Conversely the sensitivity analysis indicate that the Project is less sensitive to variances in:
  - capital costs, operating costs largely as a result of comparatively low development capital costs and low project operating costs
- Sensitivities are applied to key project estimates and assumptions. Favourable and unfavourable movements relative to the Project’s unrisks pre-tax NPV10 value are illustrated in the figure.

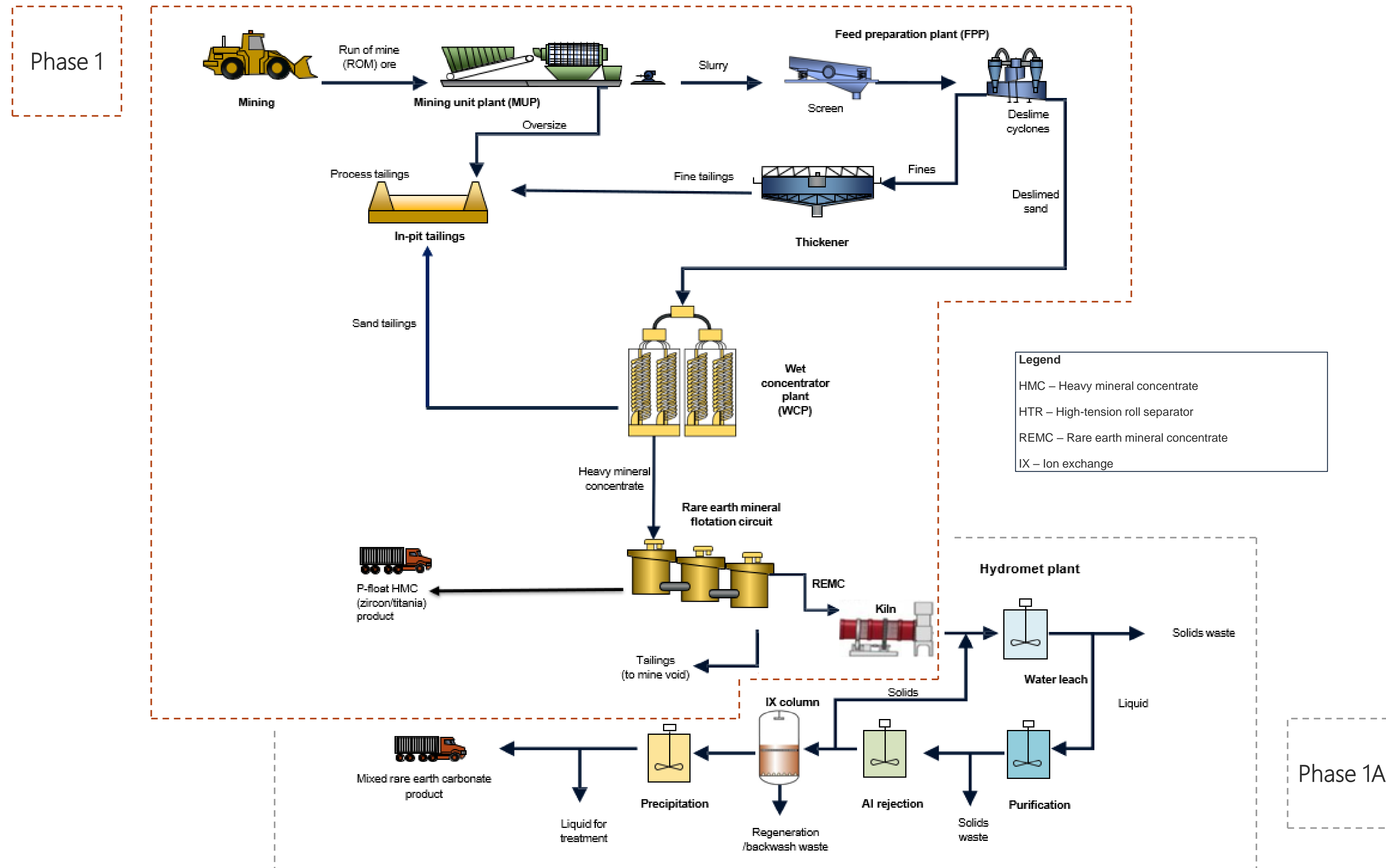




# Goschen Project overview

## Phase 1 and Phase 1A (Hydromet Circuit) process flowsheet

For personal use only



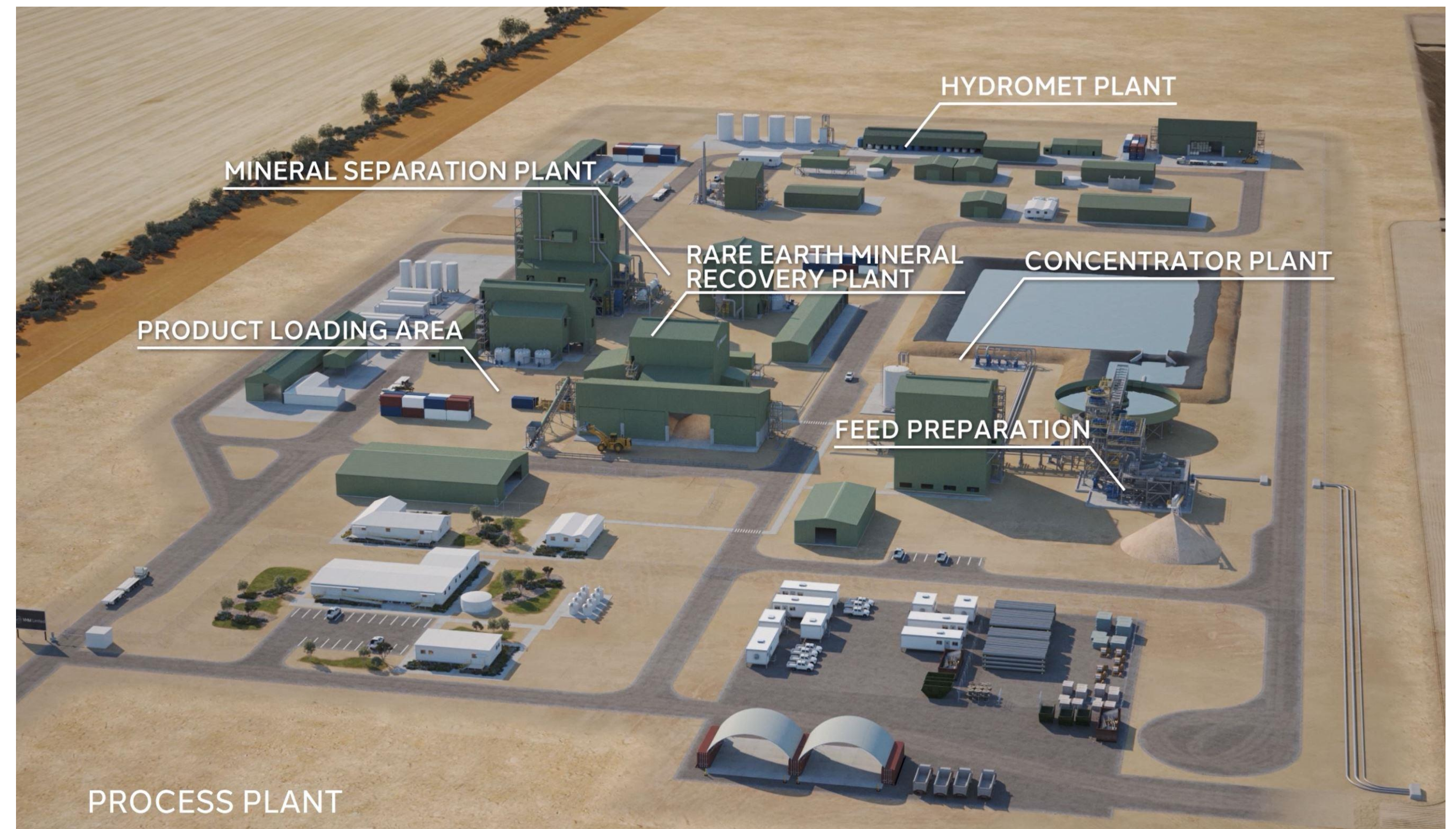
- **High recoveries likely at Goschen Mine:** Continuous improvements achieved through testwork has delivered high recoveries of valuable rare earth, zircon and titanium products
- **Final products:** Zircon and titania products, REMC and MREC will be containerised in sealed sea containers on site and exported
- **Logistics solutioning:** Ultima terminal (18km from the processing facility) will provide intermodal rail solution, to reach the shipping export ports



# Goschen Project overview

## Definitive Feasibility Study

- **Significant exploration to date delivers a JORC Resource and substantial Ore Reserve**  
+1,000 holes for 39km drilled to date at Goschen.
- **Well understood geology and mineralogy**  
Goschen ore consists of weathered sands enriched in REE-bearing minerals Monazite and Xenotime, zircon, rutile and ilmenite.
- **Rigorous testwork program conducted by reputable third parties**  
Comprehensive metallurgical testwork programs conducted by Mineral Technologies (Downer Group) and Australian Nuclear Science and Technology Organisation (ANSTO) validating the flowsheet and producing **HMC, REMC and MREC products** using Goschen ore.
- **Conventional open-pit mining methods with rehabilitation**  
Mining of ore will be undertaken at a rate of 5Mtpa using dry strip mining by conventional 'truck and shovel' bulk earthmoving equipment, with **pits maintained above the water table**. Process tailings will be returned to the pit with mined overburden and topsoil placed on top as part of rehabilitating the land.
- **Simple processing and proven conventional flowsheet**  
Limited on-site processing required: Wet Concentrator Plant (WCP), Rare Earth Flotation Circuit to produce HMC and REMC (Phase 1), and a Hydrometallurgical Circuit to produce MREC (Phase 1A).
- **Staged development approach mitigates development risks**  
VHM will implement a phased approach to the development to mitigate start-up / commercialisation risks.





# 2

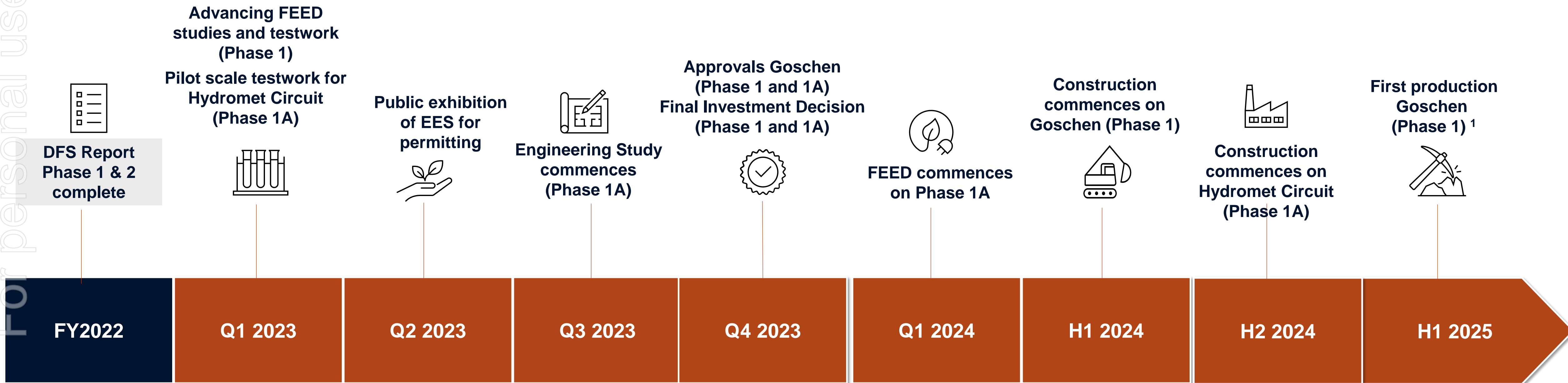
## Goschen Project Highlights





# Accelerating towards production in 2025

For personal use only



# 2 years<sup>2</sup>

## target to production

Notes:  
 (1) Indicative timeline for targeted first production H1 2025.  
 (2) Subject to all permitting being in place and funding being obtained released for commencement of work



# Staged mine development

## Clear pathway to development

For personal use only

### Current development plan



#### Phase 1 Base Project

- Near-term production
- Low capex and low opex expected
- MUP, FFP, WCP, and REM flotation circuit
- Significant testwork conducted at Mineral Technologies
- First production targeted H1 2025
- Mineral Technologies appointed for FEED
- **Capex estimate: A\$376 million (+A\$106 million ancillary costs)**

#### Annual production targets

- 9.4ktpa REMC
- 134.5ktpa Zircon-titania HMC



#### Phase 1A Hydromet

- Additional Hydromet Circuit with a throughput capacity of 2.0 tonnes per hour
- Co-located at Goschen and Included in the EES approval program
- Driven by high grade REMC from Goschen
- Pilot plant testwork to commence in April 2023 at ANSTO
- Scheduled to commence operations approx. 6 months post Phase 1
- **Capex estimate: A\$124 million**

#### Annual production targets

- 8.5ktpa MREC
- 134.5ktpa Zircon-titania HMC



#### Phase 2 MSP & HAL

- Additional MSP, HAL and chrome removal circuit
- The MSP and HAL were considered in the Goschen DFS in March 2022 and carried forward into FEED
- Zircon leach testwork confirm the level of upgrade to the raw zircon product stream
- Phase 2 will only proceed subject to prevailing market conditions
- **Capex estimate: A\$160 million**

#### Annual production targets

- 8.5ktpa MREC
- 39.8ktpa Premium zircon
- 3.5ktpa Zircon concentrate
- 13.2ktpa Rutile
- 5.9ktpa Leucoxene
- 32.8ktpa Ilmenite



#### Phase 3 AREM (Rare Earth Refinery)

- National strategic value
- Generates new industry in Australia
- Scoping Study complete and site selection commenced
- Sulphate bake selected route based on testwork at ANSTO
- Solvent extraction facility located in Australia.

#### Products based on testwork

- Mixed light and heavy rare earth carbonate
- Light and heavy rare earth oxides, including high value neodymium (Nd), praseodymium (Pr), dysprosium (Dy) and terbium (Tb)

Note:(1) Capex estimates are current nominal mid-point estimates and may change



# Offtake strategy considerations

VHM seeks to achieve the ultimate objective of its offtake strategy by aligning with its phased production development



**Near-term**

Secure an offtake partner:

- Globally recognised in processing of REMC and MREC;
- Capacity to absorb the production offtake from Phase 1 and Phase 1A;
- May consider additional funding to accelerate future Phases.



**Mid-term**

Expand offtake into European and US markets.

The maturing of the Offtake Strategy through this mid-term phase aligns with VHM's phased development.

As the Company progresses towards producing a combination of MREC and premium zircon and titania products, its universe of potential buyers expands.



**Long-term**

Complete phased production development, including construction of the Australian Rare Earth Mineral (AREM) Refinery Project.

The AREM will facilitate production of rare earth oxides locally in Australia to support demand in the permanent magnet sector.

Production of such rare earth oxides in Australia means that VHM's products can be sold to a multitude of end users worldwide.





# Offtake Memorandum of Understanding

Confirms viability of Goschen Project's product



## Key offtake terms

- Memorandum of Understanding (MOU) relates to a binding dual product take or pay offtake agreement of REMC and zircon-titania HMC.
- Subject to final documentation, Shenghe has committed to **purchase 6,400tpa of REMC and 100,000tpa of HMC** for each calendar year of the agreement term, on a take or pay basis.
- This represents approximately **60% of nominal production rate** based on the 5Mtpa Goschen Project Phase 1.
- Parties are continuing detailed contract negotiations, with the target date extended to 30 April 2023.
- **Initial three-year agreement term** commencing on the first commercial shipment.
- Conditions precedent including; final contract documentation, all required approvals for construction and operation of the Goschen Project, and requisite debt and equity funding.



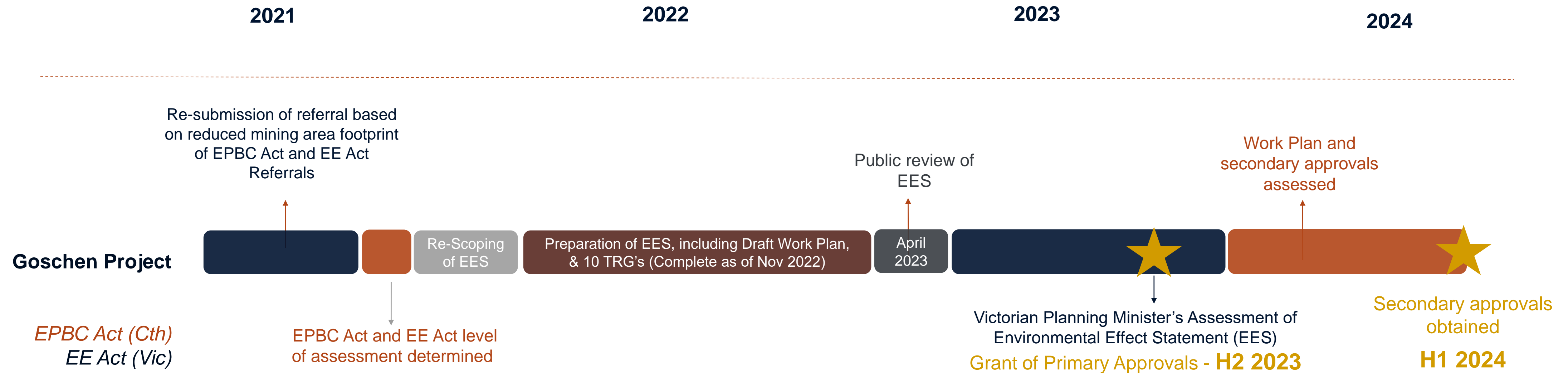
## About Shenghe Resources

- Shenghe is a world-class developer, producer, and supplier of rare earth products, including rare earth concentrate, oxidants, compounds, metals, metallurgical materials, and catalysts, as well as zircon sand, titanium concentrate and rutile.
- Shenghe's parent company is a publicly listed company on the Shanghai Stock Exchange and is headquartered in Sichuan, China.
- Shenghe distributes its products within the domestic market as well as to overseas markets.



# Approvals and permitting indicative timetable

AECOM appointed for their permitting expertise and credentials



Approvals and Permitting Status	
✓	Project has strong, demonstrable local support from Gannawarra and Swan Hill Councils and community
✓	Well advanced in major environmental and social impact assessments needed to obtain major development approvals
✓	Operational impacts are well understood, with all material risks either eliminated or minimised to the extent practicable
✓	Public review of the Environmental Effects Statement to occur in Q2 2023, with VHM expecting a decision to be received from the Minister by H2 2023

Key Outcomes of Environment Impact Assessments	
✓	Project area located on cleared farm paddocks – negligible native vegetation clearing required
✓	All mining to take place above the water table; no dewatering or drawdown impacts
✓	No aboriginal cultural heritage places or native title claims in project footprint
✓	Low rainfall, dry land cropping area – no highly sensitive agricultural receptors
✓	Radiation Measurement of background gamma radiation across the project area shows rates which are within the normal background range seen across Australia
✓	Studies indicate that the Goschen Project is low impact compared to similar projects



# Why rare earths

## Rare Earth Elements are the cornerstone for Clean Mobility and energy efficiency

87% of Goschen rare earth minerals basket value contains key rare earths - **dysprosium, neodymium, praseodymium** and **terbium**, all of which are key elements in electric vehicles.



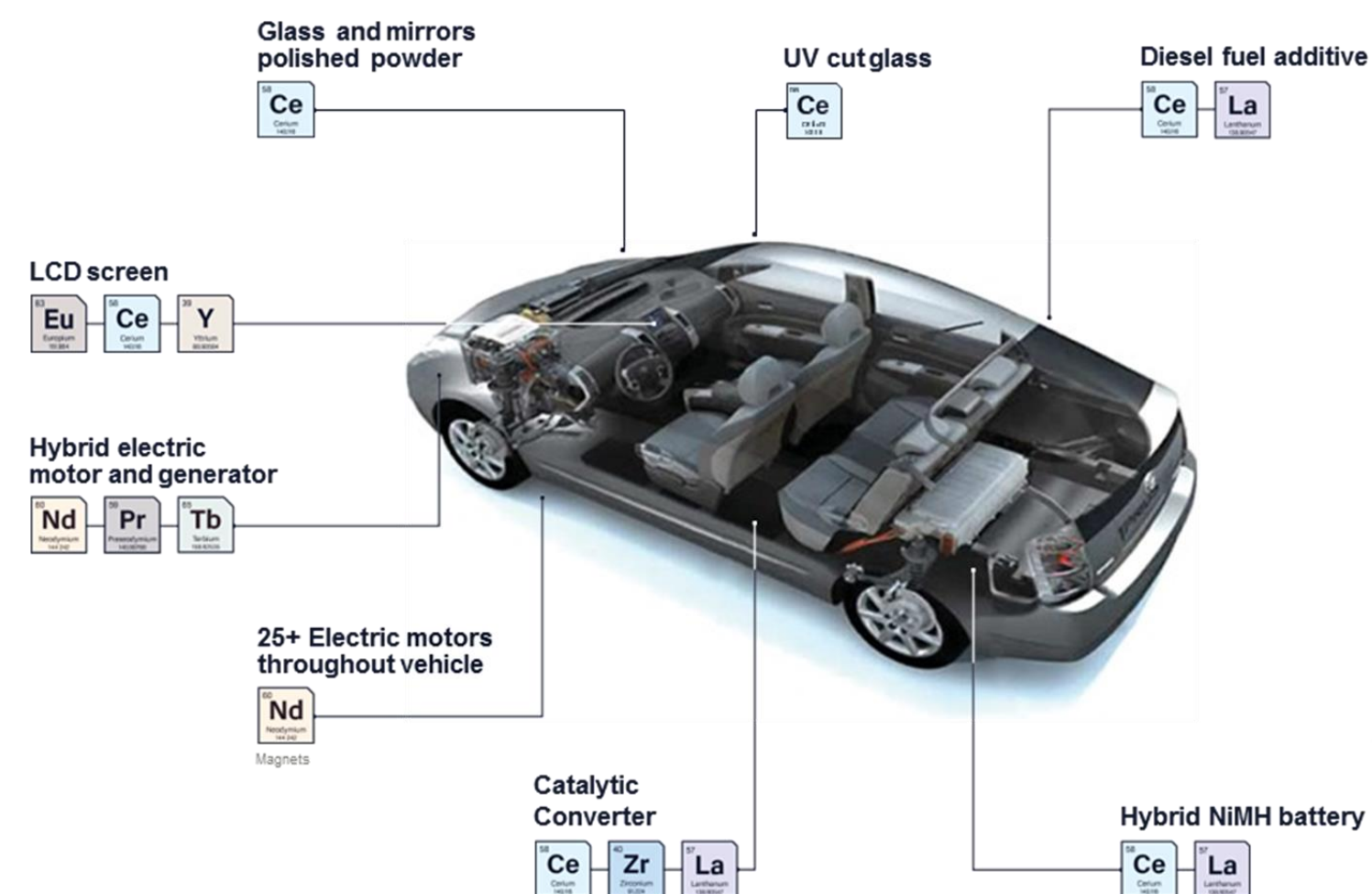
Electric vehicles will drive over 40% of Global Magnet Earth Oxide demands by 2035.



Rare earth elements are in hundreds of technologies, materials, and chemicals worldwide for commercial, industrial, social, medical, and environmental applications.



China is the world's #1 miner, processor and producer of rare earths. With global demand forecasts to reach 5x that which China can supply by 2035, other critical mineral rich countries need to produce.

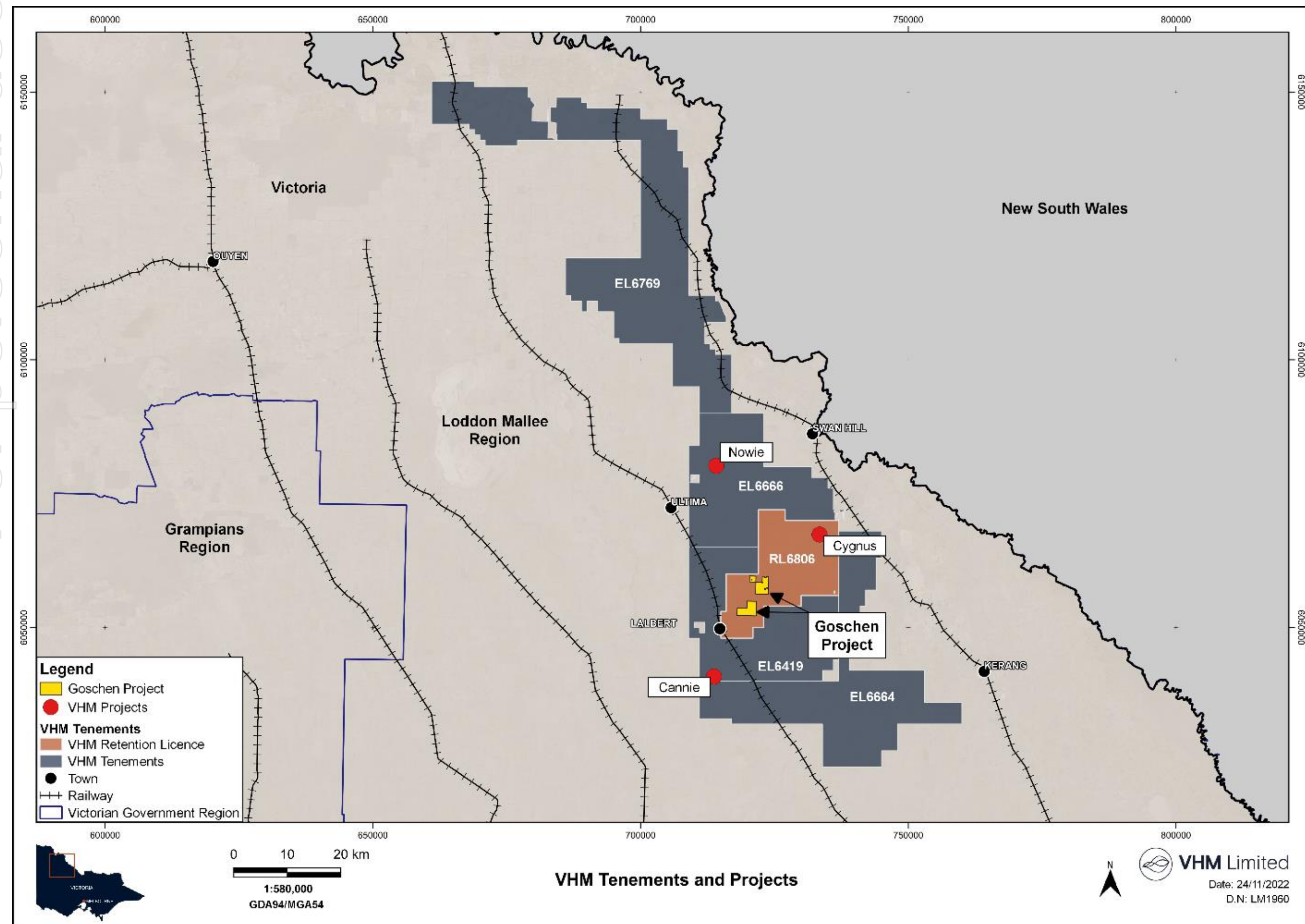


For personal use only



# Rare earth and mineral sands exploration upside

Cannie and Nowie deposits are analogous to Goschen



## Cannie Project and Nowie Prospects

- Significant number of historic drill holes indicates Cannie is of a similar scale sheet deposit to Goschen deposit
- Historic drilling indicates zircon and rare earth mineral assemblage
- Multiple targets identified from evaluation of wide spaced historic drill holes and 2021 geophysics data
- 2021 close spaced aerial geophysics program confirm strandlines and sheet deposit to north of Goschen
- LAAs with landowners are in place for advancement of drill programs
- Company to complete targeted exploration drilling program in Q1 2023 in order to gain MREs for future Retention Licenses for both Cannie and Nowie



# Summary and near-term priorities

For personal use only

- 

Exceptional economics underpinned by **low CAPEX and high value commodity mix**

---
- 

Advanced clear pathway to targeted **first production in H1, 2025**

---
- 

**Track record of successful funding** and building towards full funding of Project

---
- 

**Strategic asset** in a stable established mining jurisdiction

---
- 

**Premier mining jurisdiction** with existing infrastructure, a skilled workforce and strong government support

---
- 

**Experienced Board**, Executive team and Consultants

---

Near-term Priorities	
<b>Engineering and testwork</b>	<ul style="list-style-type: none"> <li>▪ Detailed engineering for development and implementation planning and execution (Phase 1A)</li> <li>▪ Pilot scale testwork at ANSTO for Phase 1A and advancement of engineering study and FEED</li> </ul>
<b>Approvals &amp; permitting</b>	<ul style="list-style-type: none"> <li>▪ EES decision, enabling grant of Mining License and further secondary approvals H2 2023</li> <li>▪ Obtain approval under the Environment Effects Act 1978 (Vic) for the proposed operation to proceed</li> </ul>
<b>Offtake and further validation</b>	<ul style="list-style-type: none"> <li>▪ VHM are continuing conversations with strategic western supply chain participants (USA and Europe) to complement the Shenghe Resources offtake</li> </ul>
<b>Government support</b>	<ul style="list-style-type: none"> <li>▪ Continue to seek government funding and grants through EFA and Critical Minerals Development Program</li> </ul>
<b>Final Investment Decision</b>	<ul style="list-style-type: none"> <li>▪ Upon receipt of all necessary approvals and permits, VHM is seeking to make FID for Phase 1 and 1A in H2 2023</li> </ul>



# Appendix: JORC Tables





# Company Mineral Resources

## 629Mt Mineral Resource Estimate

Area	Resource Category	Material	In-Situ THM	Bulk Density	Total Heavy Mineral (THM)	Slimes	Oversize material >2mm	THM Assemblage <sup>(2)</sup>						Rare Earth Oxides													
								Zircon	Rutile	Leucoxene	Ilmenite	Monazite	Xenotime	CeO <sub>2</sub>	Dy <sub>2</sub> O <sub>3</sub>	Er <sub>2</sub> O <sub>3</sub>	Eu <sub>2</sub> O <sub>3</sub>	Gd <sub>2</sub> O <sub>3</sub>	La <sub>2</sub> O <sub>3</sub>	Nd <sub>2</sub> O <sub>3</sub>	Pr <sub>6</sub> O <sub>11</sub>	Sm <sub>2</sub> O <sub>3</sub>	Tb <sub>4</sub> O <sub>7</sub>	Tm <sub>2</sub> O <sub>3</sub>	Y <sub>2</sub> O <sub>3</sub>	Yb <sub>2</sub> O <sub>3</sub>	TREO
								(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Area 1	Measured	30.7	1.8	1.76	5.72	15	5	29.9	10.8	9.0	24.7	4.3	0.8	0.96	0.07	0.05	0.004	0.06	0.48	0.38	0.11	0.07	0.01	0.01	0.47	0.05	2.72
	Indicated	62.2	1.4	1.72	2.31	18	2	26.6	11.5	9.2	25.0	4.6	0.9	1.11	0.07	0.05	0.004	0.07	0.53	0.46	0.12	0.08	0.02	0.01	0.48	0.05	3.04
	<b>Total<sup>(1)</sup></b>	<b>92.9</b>	<b>3.2</b>	<b>1.73</b>	<b>3.44</b>	<b>17</b>	<b>3</b>	<b>27.7</b>	<b>11.2</b>	<b>9.1</b>	<b>24.9</b>	<b>4.5</b>	<b>0.8</b>	<b>1.06</b>	<b>0.07</b>	<b>0.05</b>	<b>0.004</b>	<b>0.07</b>	<b>0.51</b>	<b>0.43</b>	<b>0.12</b>	<b>0.08</b>	<b>0.02</b>	<b>0.01</b>	<b>0.48</b>	<b>0.05</b>	<b>2.94</b>
Area 2 West	Indicated	26.0	0.7	1.72	2.80	20	8	22.0	16.0	12.0	25.0	3.0	1.0	0.66	0.06	0.04	0.003	0.05	0.31	0.28	0.07	0.05	0.01	0.01	0.39	0.04	1.97
	<b>Total<sup>(1)</sup></b>	<b>26.0</b>	<b>0.7</b>	<b>1.72</b>	<b>2.80</b>	<b>20</b>	<b>8</b>	<b>22.0</b>	<b>16.0</b>	<b>12.0</b>	<b>25.0</b>	<b>3.0</b>	<b>1.0</b>	<b>0.66</b>	<b>0.06</b>	<b>0.04</b>	<b>0.003</b>	<b>0.05</b>	<b>0.31</b>	<b>0.28</b>	<b>0.07</b>	<b>0.05</b>	<b>0.01</b>	<b>0.01</b>	<b>0.39</b>	<b>0.04</b>	<b>1.97</b>
Area 3	Indicated	204.1	6.9	1.73	3.38	19	3	19.2	9.0	8.0	25.0	3.2	0.6	0.78	0.05	0.04	0.000	0.05	0.36	0.33	0.09	0.06	0.01	0.01	0.37	0.04	2.19
	Inferred	287.7	6.7	1.72	2.32	18	3	17.2	8.7	7.5	22.7	2.9	0.5	0.76	0.05	0.03	0.003	0.05	0.35	0.31	0.08	0.06	0.01	0.01	0.36	0.03	2.10
	<b>Total<sup>(1)</sup></b>	<b>491.8</b>	<b>13.6</b>	<b>1.73</b>	<b>2.76</b>	<b>18</b>	<b>3</b>	<b>18.2</b>	<b>8.9</b>	<b>7.7</b>	<b>23.9</b>	<b>3.0</b>	<b>0.6</b>	<b>0.77</b>	<b>0.05</b>	<b>0.03</b>	<b>0.003</b>	<b>0.05</b>	<b>0.36</b>	<b>0.32</b>	<b>0.09</b>	<b>0.06</b>	<b>0.01</b>	<b>0.01</b>	<b>0.36</b>	<b>0.04</b>	<b>2.14</b>
Area 4	Indicated	18.0	0.8	1.74	4.60	20	5	19.0	11.0	10.0	24.0	3.0	1.0	0.67	0.05	0.03	0.002	0.05	0.32	0.28	0.07	0.05	0.01	0.01	0.33	0.04	1.90
	<b>Total<sup>(1)</sup></b>	<b>18.0</b>	<b>0.8</b>	<b>1.74</b>	<b>4.60</b>	<b>20</b>	<b>5</b>	<b>19.0</b>	<b>11.0</b>	<b>10.0</b>	<b>24.0</b>	<b>3.0</b>	<b>1.0</b>	<b>0.67</b>	<b>0.05</b>	<b>0.03</b>	<b>0.002</b>	<b>0.05</b>	<b>0.32</b>	<b>0.28</b>	<b>0.07</b>	<b>0.05</b>	<b>0.01</b>	<b>0.01</b>	<b>0.33</b>	<b>0.04</b>	<b>1.90</b>
Grand Total	<b>Measured</b>	30.7	1.8	1.76	5.72	15	5	29.9	10.8	9.0	24.7	4.3	0.8	0.96	0.07	0.05	0.004	0.06	0.48	0.38	0.11	0.07	0.01	0.01	0.47	0.05	2.72
	<b>Indicated</b>	310.3	9.8	1.73	3.19	19	3	20.5	10.1	8.6	24.9	3.4	0.7	0.81	0.05	0.04	0.00	0.05	0.38	0.34	0.09	0.06	0.01	0.01	0.38	0.04	2.27
	<b>Inferred</b>	287.7	6.7	1.72	2.32	18	3	17.2	8.7	7.5	22.7	2.9	0.5	0.76	0.05	0.03	0.00	0.05	0.35	0.31	0.08	0.06	0.01	0.01	0.36	0.03	2.10
	<b>TOTAL</b>	<b>628.7</b>	<b>18.3</b>	<b>1.73</b>	<b>2.92</b>	<b>18</b>	<b>3</b>	<b>20.2</b>	<b>9.6</b>	<b>8.2</b>	<b>24.1</b>	<b>3.3</b>	<b>0.6</b>	<b>0.81</b>	<b>0.05</b>	<b>0.04</b>	<b>0.00</b>	<b>0.05</b>	<b>0.38</b>	<b>0.33</b>	<b>0.09</b>	<b>0.06</b>	<b>0.01</b>	<b>0.01</b>	<b>0.38</b>	<b>0.04</b>	<b>2.25</b>

	Material	In-Situ TREO Grade <sup>(3)</sup>	In-Situ TREO
	(t)	(%)	(t)
<b>Area 1, Area 2 West, Area 3, Area 4</b>	628,703,134	0.07	413,107

Notes:

Any discrepancies in totals are a function of rounding

(1) Mineral resources reported at a cut-off grade of 1.0% THM

(2) Mineral assemblage, via QEMScan Particle Analysis, is reported as a percentage of in-situ THM content

(3) In-Situ TREO Grade is calculated by THM Grade (2.92%) multiplied by TREO Grade (2.25%)

(4) The Mineral Resource estimate was prepared and first disclosed under the JORC Code (2012) in the Prospectus dated 21 November 2022 as supplemented by the supplementary prospectus dated 5 December 2022, lodged with ASX on 5 January 2023



# Company Ore Reserves

## 198.7Mt Ore Reserve

Area	Date	Classification	Ore	THM	Zircon	Rutile	Leucoxene	Ilmenite	Monazite	Xenotime
			(Mt)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Area 1	Mar-21	Proved	24.5	5.4	29.9	10.8	9.0	24.7	4.3	0.8
Area 1	Mar-21	Probable	14.6	3.2	29.2	11.7	9.2	25.5	4.5	0.9
Area 3	Feb-21	Probable	159.6	3.5	20.3	9.4	8.1	25.8	3.4	0.6
<b>Total</b>	<b>Proved</b>		<b>24.5</b>	<b>5.4</b>	<b>29.9</b>	<b>10.8</b>	<b>9.0</b>	<b>24.7</b>	<b>4.3</b>	<b>0.8</b>
	<b>Probable</b>		<b>174.2</b>	<b>3.5</b>	<b>21.0</b>	<b>9.6</b>	<b>8.2</b>	<b>25.8</b>	<b>3.5</b>	<b>0.6</b>
<b>Grand Total</b>			<b>198.7</b>	<b>3.7</b>	<b>21.7</b>	<b>9.7</b>	<b>8.2</b>	<b>25.7</b>	<b>3.5</b>	<b>0.6</b>

Area	Date	Classification	CeO <sub>2</sub>	Dy <sub>2</sub> O <sub>3</sub>	Er <sub>2</sub> O <sub>3</sub>	Eu <sub>2</sub> O <sub>3</sub>	Gd <sub>2</sub> O <sub>3</sub>	La <sub>2</sub> O <sub>3</sub>	Nd <sub>2</sub> O <sub>3</sub>	Pr <sub>6</sub> O <sub>11</sub>	Sm <sub>2</sub> O <sub>3</sub>	Tb <sub>4</sub> O <sub>7</sub>	Tm <sub>2</sub> O <sub>3</sub>	Y <sub>2</sub> O <sub>3</sub>	Yb <sub>2</sub> O <sub>3</sub>	TREO
			(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Area 1	Mar-21	Proved	0.960	0.070	0.050	0.004	0.060	0.480	0.380	0.110	0.070	0.012	0.008	0.470	0.050	2.720
Area 1	Mar-21	Probable	0.971	0.067	0.047	0.004	0.060	0.468	0.400	0.108	0.072	0.011	0.007	0.458	0.050	2.721
Area 3	Feb-21	Probable	0.805	0.057	0.039	0.003	0.056	0.378	0.339	0.093	0.064	0.009	0.006	0.386	0.040	2.297
<b>Total</b>	<b>Proved</b>		<b>0.960</b>	<b>0.070</b>	<b>0.050</b>	<b>0.004</b>	<b>0.060</b>	<b>0.480</b>	<b>0.380</b>	<b>0.110</b>	<b>0.070</b>	<b>0.012</b>	<b>0.008</b>	<b>0.470</b>	<b>0.050</b>	<b>2.720</b>
	<b>Probable</b>		<b>0.817</b>	<b>0.058</b>	<b>0.039</b>	<b>0.003</b>	<b>0.056</b>	<b>0.385</b>	<b>0.344</b>	<b>0.094</b>	<b>0.065</b>	<b>0.009</b>	<b>0.006</b>	<b>0.391</b>	<b>0.041</b>	<b>2.328</b>
<b>Grand Total</b>			<b>0.844</b>	<b>0.060</b>	<b>0.041</b>	<b>0.003</b>	<b>0.057</b>	<b>0.402</b>	<b>0.351</b>	<b>0.097</b>	<b>0.066</b>	<b>0.010</b>	<b>0.006</b>	<b>0.406</b>	<b>0.043</b>	<b>2.401</b>

Note: (1) The Company Ore Reserve was prepared and first disclosed under the JORC Code (2012) in the Company ASX Announcement on 28 March 2023.



# Goschen Project DFS Ore Reserves

## Subset of global Company Ore Reserves 98.8Mt

Area	Date	Classification	Ore	THM	Zircon	Rutile	Leucoxene	Ilmenite	Monazite	Xenotime
			(Mt)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Area 1	Mar-21	Proved	25.5	5.6	29.6	10.8	9.1	24.7	4.3	0.8
Area 1	Mar-21	Probable	7.6	2.2	27.6	12.7	10.5	25.9	4.3	0.9
Area 3	Feb-21	Probable	65.7	3.6	19.7	9.1	7.9	25.3	3.3	0.6
<b>Total</b>		<b>Proved</b>	<b>25.5</b>	<b>5.6</b>	<b>29.6</b>	<b>10.8</b>	<b>9.1</b>	<b>24.7</b>	<b>4.3</b>	<b>0.8</b>
		<b>Probable</b>	<b>73.3</b>	<b>3.4</b>	<b>20.2</b>	<b>9.3</b>	<b>8.1</b>	<b>25.4</b>	<b>3.4</b>	<b>0.6</b>
<b>Grand Total</b>			<b>98.8</b>	<b>4.0</b>	<b>23.6</b>	<b>9.9</b>	<b>8.5</b>	<b>25.1</b>	<b>3.7</b>	<b>0.7</b>

Area	Date	Classification	CeO <sub>2</sub>	Dy <sub>2</sub> O <sub>3</sub>	Er <sub>2</sub> O <sub>3</sub>	Eu <sub>2</sub> O <sub>3</sub>	Gd <sub>2</sub> O <sub>3</sub>	La <sub>2</sub> O <sub>3</sub>	Nd <sub>2</sub> O <sub>3</sub>	Pr <sub>6</sub> O <sub>11</sub>	Sm <sub>2</sub> O <sub>3</sub>	Tb <sub>4</sub> O <sub>7</sub>	Tm <sub>2</sub> O <sub>3</sub>	Y <sub>2</sub> O <sub>3</sub>	Yb <sub>2</sub> O <sub>3</sub>	TREO
			(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Area 1	Mar-21	Proved	0.960	0.070	0.050	0.004	0.060	0.480	0.380	0.110	0.070	0.012	0.008	0.470	0.050	2.720
Area 1	Mar-21	Probable	0.957	0.065	0.045	0.003	0.059	0.454	0.398	0.104	0.071	0.012	0.007	0.456	0.050	2.682
Area 3	Feb-21	Probable	0.795	0.056	0.038	0.003	0.055	0.373	0.335	0.091	0.063	0.009	0.006	0.383	0.039	2.271
<b>Total</b>		<b>Proved</b>	<b>0.960</b>	<b>0.070</b>	<b>0.050</b>	<b>0.004</b>	<b>0.060</b>	<b>0.480</b>	<b>0.380</b>	<b>0.110</b>	<b>0.070</b>	<b>0.012</b>	<b>0.008</b>	<b>0.470</b>	<b>0.050</b>	<b>2.720</b>
		<b>Probable</b>	<b>0.806</b>	<b>0.056</b>	<b>0.039</b>	<b>0.003</b>	<b>0.055</b>	<b>0.379</b>	<b>0.339</b>	<b>0.092</b>	<b>0.064</b>	<b>0.009</b>	<b>0.006</b>	<b>0.388</b>	<b>0.040</b>	<b>2.298</b>
<b>Grand Total</b>			<b>0.862</b>	<b>0.061</b>	<b>0.043</b>	<b>0.003</b>	<b>0.057</b>	<b>0.415</b>	<b>0.354</b>	<b>0.099</b>	<b>0.066</b>	<b>0.010</b>	<b>0.007</b>	<b>0.417</b>	<b>0.044</b>	<b>2.451</b>

Note: (1) The Goschen Project DFS Ore Reserve was prepared and first disclosed under the JORC Code (2012) in the Company ASX Announcement on 28 March 2023.



For personal use only



[vhmltd.com.au](http://vhmltd.com.au)

Suite 8, 110 Hay Street Subiaco WA 6008

