

# Vital Metals (ASX: VML)

## 2024 Exploration and Development Strategy for Nechalacho Rare Earth Project

VITAL METALS  
(ASX: VML)

Nd

Pr

January 2024

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**Compliance Statements:** This presentation contains information relating to Mineral Resource Estimates for the Nechalacho Project extracted from an ASX market announcement reported previously and published on the ASX platform on 14 February 2023, titled "Vital achieves 26% increase in Tardiff Mineral Resource Tonnes and 19% increase in contained NdPr". The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the estimates in the original market announcement continue to apply and have not materially changed.

This presentation contains information relating to Exploration Results extracted from ASX market announcements "Vital intersects up to 2.8% TREO in drilling at Tardiff" and "Vital Drilling at Tardiff returns up to 5.4% TREO" reported previously in accordance with the 2012 edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves" (**2012 JORC Code**) and published on the ASX platform on 30 May 2023 and 21 November 2023 respectively. The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements.

**Authorisation: This presentation is authorised for market release by the Board of Vital Metals.**

**All currency amounts are in Australian dollars unless specified otherwise.**

# Company Overview



## BUILDING INTO NORTH AMERICA'S RARE EARTHS SUPPLY CHAIN

- Vital is focused on developing its world-class Nechalacho Light Rare Earth Element (LREE) asset in NWT, Canada.
- Nechalacho's Tardiff Deposit is a shallow higher grade LREE deposit where we are looking to outline its capability of producing NdPr over a protracted mine-life
- Tardiff Mineral Resource Estimate stands at **119Mt @ 1.4% TREO** (@ 1% cog), including **0.35% NdPr**, for 416,000 tonnes of contained NdPr. Comprising 108.1Mt @ 1.49 TREO (inferred), 6.3Mt @ 1.45% TREO (Indicated) and 4.6Mt @ 1.59% TREO (Measured).
- Vital completed a 6,667-metre infill drilling campaign at Tardiff in 2023: 34 holes to be reported.
- Latest drill results include:
  - ✓ 31.76 meters at 2.1% TREO from 34.24 meters;
  - ✓ 23.85 meters at 2.0% TREO from 9.15 meters;
  - ✓ 33.45 meters at 2.2% TREO from 47.00 meters;
  - ✓ 15.50 meters at 2.7% TREO from 30.50 meters; and
  - ✓ 20.45 meters at 2.2% TREO from 6.25 meters
- **MRE update due:** Mar Qtr 2024
- **Drill results:** Mar Qtr 2024 onwards
- **Maiden economic study** (Scoping Study) with anticipated completion on Tardiff later in 2024 flow of drilling results and technical reports to come over the next year:
  - Incorporate *new MRE in H2 2024* with updated geological model
  - Incorporate integrated mineralogical and chemical department analysis (geometallurgical domain model generation)
  - Incorporate integrated mechanical and chemical processing studies

## CAPITAL STRUCTURE

ASX Code	VML
Shares on Issue	5,895.1m
Options on Issue	795.5m
Market Capitalisation	A\$35.4m
Cash (as at 30 Sep 2023)	A\$2.6m



***Vital is well positioned with a strong balance sheet, a significant rare earths deposit, and a renewed development strategy, backed by a highly experienced partner with the aim of building a strategically important North American rare earths business.***

<b>Strategic Asset</b>	<p><b>Tardiff represents a higher grade, globally-significant rare earths asset</b></p> <ul style="list-style-type: none"><li>• Tardiff Upper Zone has a global MRE of 119Mt at 1.4% TREO</li><li>• Future target aims to test extensions to shallow high-grade REE mineralization</li><li>• Maiden Economic Study (Scoping Study) to high system grade and scale</li><li>• Study to induce detailed mineral characterization and chemical deport analysis for the construction of a geometallurgical domain model integrated with mechanical and chemical flowsheet studies</li></ul>
<b>Tier-1 Jurisdiction</b>	<p><b>Tardiff has the potential to be a cornerstone asset in the North American rare earth supply chain</b></p> <ul style="list-style-type: none"><li>• Governments in North America have voiced extreme urgency in reshaping supply chains and achieving clean energy<sup>1</sup></li><li>• Leverage the focus on critical minerals along with government policies and funding mechanisms</li></ul>
<b>Board &amp; Management refresh</b>	<p><b>Board &amp; management has been refreshed to complement existing expertise</b></p> <ul style="list-style-type: none"><li>• New MD &amp; CEO, Geordie Mark, brings mining systems analysis and capital markets experience in Canada</li><li>• New VP Exploration, Dr Natalie Pietrzak-Renaud, brings expertise in Rare Earth geological systems and processing analysis</li><li>• Management renewal heightens Canadian-based skills set</li><li>• Renewed management team with technical, financial and operational experience in the rare earths industry</li></ul>
<b>Other Value Propositions</b>	<p><b>Additional value drivers to provide catalysts in 2024</b></p> <ul style="list-style-type: none"><li>• Vital to examine lithium and HREE potential at the Nechalacho Project</li><li>• Compelling long-term rare earth market outlook – global decarbonization efforts driving growth in EV's and wind turbines</li></ul>

1. Bloomberg, 7 June 2023 – *The Supply Crisis for Rare Earth Elements Intensifies*

## *Leveraging asset qualities, jurisdiction and capability to develop a North American rare earth supply chain*

### Asset qualities: grade, size and mineral composition



- **Tardiff** provides a differentiated value proposition given grade, size and rare earth composition (NdPr:TREO ratio of ~25%)
- Focusing on grade and product differentiation to achieve higher unit values with lower risk
- Drilling to increase grade and system extension – building sustainable long-term supply of magnet rare earths

### Jurisdictional premium: combining asset surety with drivers for North American integration



- **Tier-1 mining jurisdiction:** asset ownership, financial stability and well-established mining framework
- Government funding and regulatory priorities to enable capability for fully integrated North American rare earth supply chain
- Disciplined and thorough approach to project development
- Foster Stakeholder Engagement with Renewed Development Pathway

### Skill Set Advantages: leveraging technical skill sets to guide and de-risk scoping study



- **Leveraging** advances in instrumental and method integration to help optimize material characterization and mineral separations
- **Integration** of front-end capability with rare earths market product expertise to optimize revenue and cost factors

## 2023 - 2024

## 2024 onwards



### 2023 developments

- **Shenghe investment:** Vital and Shenghe to benefit from combined technical and market expertise
- **Tardiff Mineral Resource Estimate:** 119Mt @ 1.4% TREO including 0.35% NdPr for 416 kt of contained NdPr
  - Completed a 6,664m drill program for 74 holes at Tardiff: 40 holes announced to-date
  - Commenced scoping-level studies for Tardiff deposit

### Nechalacho Rare Earth Project – Upcoming Catalysts

- **2023 MRE Update** (targeting Q1 2024)
- **2024 Drilling Results:** Q1-Q3/24
- **Updates on Nechalacho project optimisation including:**
  - *Product saleability informed by key partners and networks targeting a low-cost path to market*
  - *Early processing flow sheet optimisation informed by partner expertise*
  - *Focus on margin maximisation vs. control of end-product*
  - *Mine plan grade optimization*
- **North American Supply Chain:** investigate partnerships to accelerate the development of a North American rare earth supply chain
- **2024 MRE Update** (targeting late 2024) – focus on high-grade extensions to existing orebody
- **2024: Scoping Study** (targeting Q4 2024)

### Lithium Potential – Upcoming Catalysts

- **Drilling Lithium Targets in Q1 2024:** to test the known occurrences of outcropping pegmatites across the Nechalacho Project area
- **Immediate re-interpretation of historical lithium exploration work ongoing**

# Board of Directors

Vital is led by an exceptional team with experience in mining, resources development and capital markets



**RICHARD CROOKES**  
Non-Executive Chairman

Mr Crookes is managing partner of Lionhead Resources (LHR) and chairman of the Investment Committee. He has more than 35 years of experience as both a mine operator and investor. Mr Crookes holds a BSc in Geology.



**PAUL QUIRK**  
Non-Executive Director

Mr Quirk is a partner at Lionhead Resources and is responsible for originating new investment opportunities. He holds a B.Comm from the Northeastern University in Accounting and Finance.



**JAMES HENDERSON**  
Non-Executive Director

Mr Henderson has more than 35 years' experience in advising emerging companies relating to corporate transactions and strategies, including corporate advice, financial and corporate structuring, capital raisings and commercial negotiations.



**LISA RILEY**  
Non-Executive Director

Ms Riley has nearly 30 years of experience in global capital markets, finance, mining advisory and government relations in Canada and Latin America.



**GEORDIE MARK**  
CEO & Managing Director

Dr Mark has a PhD in Geology and 25 years of diversified global experience across the resources sector, including as an industry-leading resources analyst, VP Exploration, as well as other consultancy-related positions.



# Vital's Management Team



**GEORDIE MARK**  
CEO & Managing Director

Dr Mark has a PhD in Geology and 25 years of diversified global experience across the resources sector, including as an industry-leading resources analyst, VP Exploration, as well as other consultancy-related positions.

Canada

**STEVE WOOLFENDEN**  
VP, Sustainability

Mr. Woolfenden brings over 25 years of mining industry experience. Previously, Steven held positions as Vice President of Environment and Community Affairs for McEwen Mining and IAMGOLD's corporate Environment Director.

**NATALIE PIETRZAK-RENAUD**  
VP, Exploration

Dr Natalie Pietrzak-Renaud brings more than 20 years of diversified geological expertise in the resources sector. History of detailed rare earth system's analysis, and experience in geological modelling, as well as metallurgical domain and material sorting analysis. She adds corporate from within Canada and elsewhere across a range of commodities.

Australia

**LARA IACUSSO**  
CFO

Ms Iacusso is an experienced CFO with +25 years' providing financial advisory services in Australia and overseas across a wide range of industries including healthcare and medical devices, aged care, and natural resources.

**LOUISA MARTINO**  
Company Secretary

Ms. Martino has provided company secretarial and accounting services to ASX-listed companies for ~10 years. Previously she assisted with company compliance (ASIC and ASX) and capital raising for a corporate finance company.

## *Vital has recently undergone management renewal to build out leadership team: Commitment to Canada*

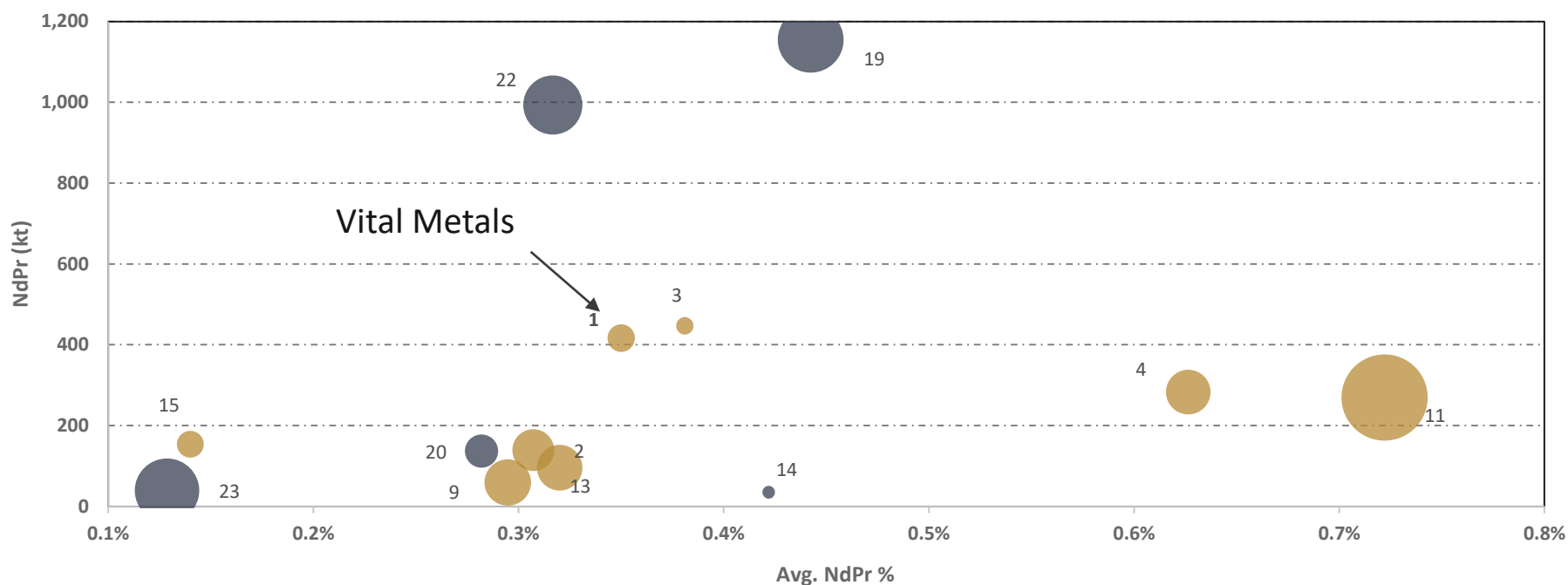
<b>Management Renewal</b>	<p><b>Dr Geordie Mark (Managing Director and Chief Executive Officer) – Appointed October 2023</b></p> <ul style="list-style-type: none"><li>• Highly experienced mining professional, bringing more than 25 years of diversified global experience across the resources sector</li><li>• Previously the Head of Mining for Haywood Securities Inc., where he held different roles and sub-sector coverages from 2008</li></ul>
	<p><b>Ms Lara Lacusso (Chief Financial Officer) – Appointed October 2023</b></p> <ul style="list-style-type: none"><li>• Experienced CFO with more than 30 years’ experience in financial advisory services in Australia and overseas, across a wide range of industries including mining and exploration</li><li>• Specialises in corporate transactions and strategies, including due diligence, financial structuring, feasibility studies, capital raisings, financial governance and commercial matters</li></ul> <p><b>Dr Natalie Pietrzak-Renaud (VP Exploration) – Appointed December 2023</b></p> <ul style="list-style-type: none"><li>• Rare earth systems specialist and professional geologist Dr Natalie Pietrzak-Renaud bringing &gt;20 years of diversified geological and mineralogical expertise in the resources sector</li><li>• She has a background in detailed rare earth system analysis and geological modelling, as well as metallurgical domain and material sorting analysis</li><li>• Dr. Pietrzak-Renaud has acted in Vice President Exploration and leadership roles in both publicly-listed and private exploration and development companies within Canada and elsewhere across a range of commodities including rare earth elements</li></ul>

# Nechalacho Qualities and Differentiation

***Nechalacho is a large, scalable project that benefits from elevated NdPr grades***

- ✓ Differentiated masses of elevated grade within the Nechalacho project area (ie. North T)
- ✓ Proximity to other rare earth developers and downstream players

**NdPr Grade (wt%) vs MRE NdPr (kt)** (contained)



Bubble size: Market Cap. (Brown: Low risk jurisdiction, blue: other)  
 Numerical data points for labelling in sector data in Appendices

Source: ASX data, company announcements with detailed sector data in the appendices.

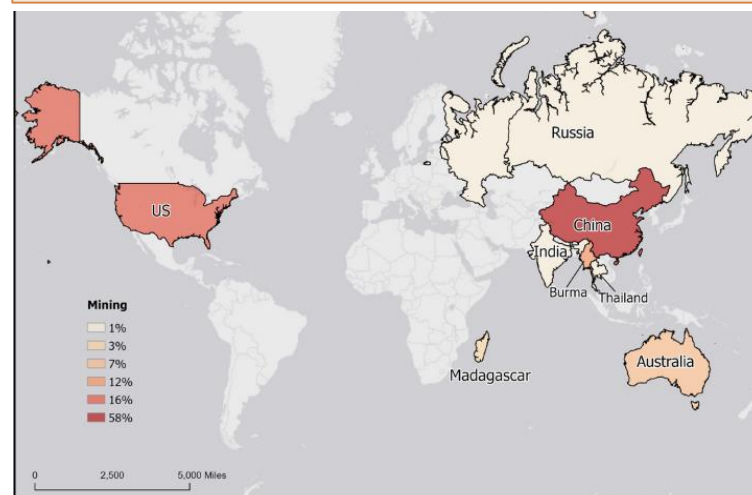
# A Driving Need for Vertical Integration

## *Project located in tier-1 jurisdiction*

### Shift in the global rare earths supply chain

- Rising geopolitical tension, demand & supply factors, and government policy drive diversification in production and refining capability
- Demand growth is expected to be diverse and sustainable
- There are critical ex-China supply constraints
- Downstream expertise is concentrated in Asia
- Opportunity for Vital to capitalise on the shifting global rare earths supply chain
  - ✓ Established higher-grade resource in tier-1 jurisdiction
  - ✓ Robust balance sheet
  - ✓ Renewed management team with technical, financial and operational experience
  - ✓ Opportunities to integrate rigour and new approaches to optimizing flowsheet design and mineral separation for the concentration of LREE on Tardiff

### Mine Supply (2020)



### Rare Earth Refining (2020)



# Jurisdiction: Vertical Integration is a Key Driver

## Tardiff's scale, grade and location offer attractive qualities to the North American market

### World Looking to Integrate Vertically (Production-Refining)

- Tier-1 Jurisdiction brings:
  - ✓ Asset ownership and fiscal regime stability
  - ✓ Critical minerals focus of governments
  - ✓ Potential funding and regulatory advantages to project maturation and funding



Jonathan Wilkinson  
Minister of Natural Resources

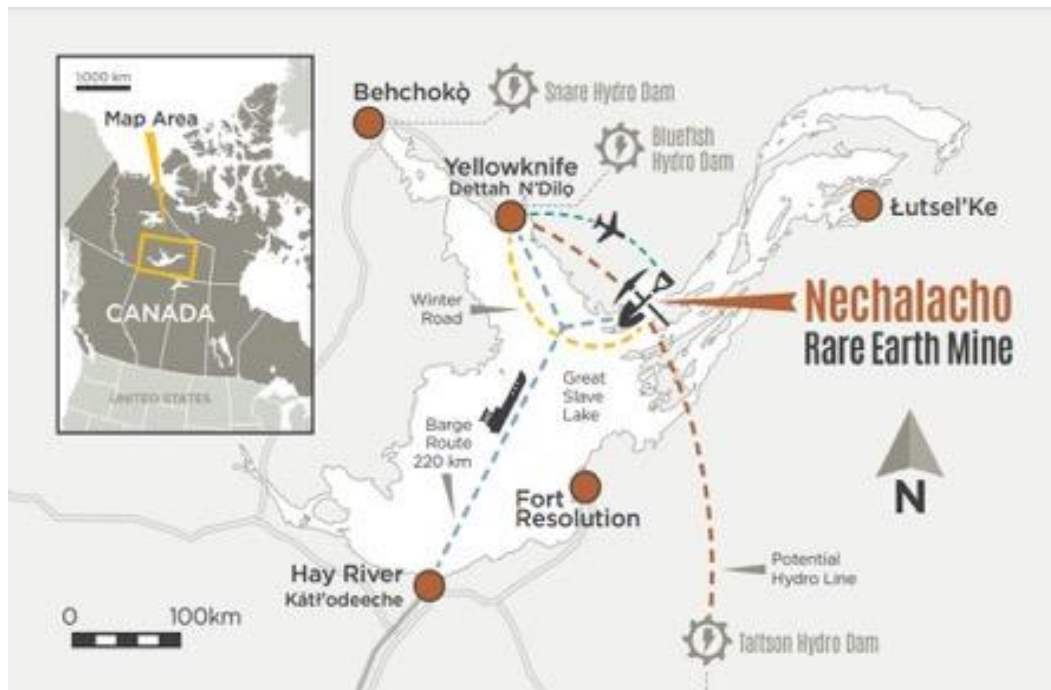
*"I am pleased to release Canada's Critical Minerals Strategy. This Strategy, backed by nearly \$4 billion in Budget 2022, sets out a course for Canada to become a global supplier of choice for critical minerals and the clean digital technologies they enable."<sup>1</sup>*



Government of Canada

Government of Canada to Enhance Critical Minerals Sector With Launch of \$1.5 Billion Infrastructure Fund

From: [Natural Resources Canada](#)



*"Of Canada's 31 critical minerals, six are initially prioritized in this Strategy for their distinct potential to spur Canadian economic growth and their necessity as inputs for priority supply chains. These six minerals are lithium, graphite, nickel, cobalt, copper, and rare earth element"*

*(The Canadian Critical Minerals Strategy, December 2022)<sup>1</sup>*

1. The Canadian Critical Minerals Strategy – From Exploration to Recycling: Powering the Green and Digital Economy for Canada and the world (December, 2022)



# North American Production: MP Materials Example

## Shenghe was one of the key partners for the restart of the Mountain Pass Mine by MP Materials

### Overview

- Shenghe has a 7.7% holding in NYSE listed MP Materials
- MP Materials owns and operates the Mountain Pass Rare Earths Mine and Processing Facility in CA
- Largest rare earth producer in North America
- Mission is to support the development of a diverse ex-China supply chain for rare earth materials
- MP Materials supported by the U.S Department of Defense with a US\$35m investment - despite Shenghe shareholding in company<sup>1</sup>

### Shenghe Involvement

- Shenghe was a key investor for the restart of mine via equity ownership position and product prepayment
- Offtake agreement with Shenghe de-risked the restart of the mine for MP Materials
- Shenghe provided assistance to MP Materials in the development and operation of Mountain Pass



Source: MP Materials Corp public releases.

1. U.S Department of Defense – DoD Awards \$35 Million to MP Materials to Build U.S Heavy Rare Earth Separation Facility

## Tardiff Deposit: Large REE-rich Alkaline System

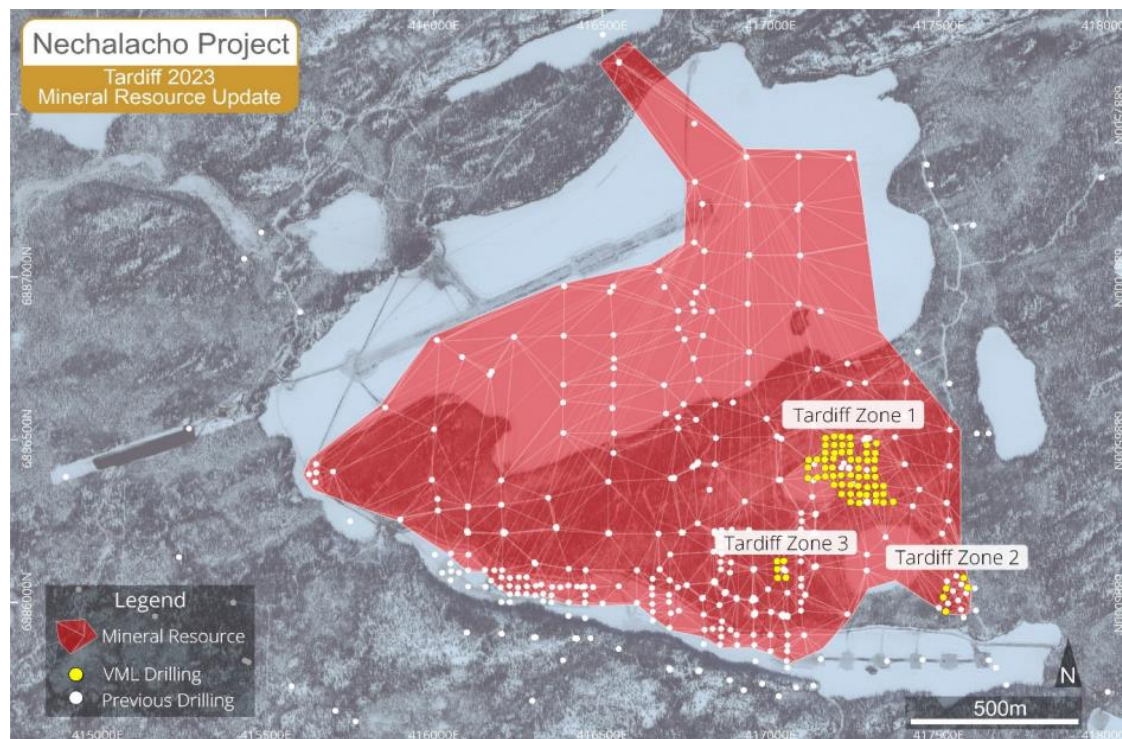
### Tardiff Deposit: 2023 Resource MRE

Cut-off Grade % TREO	Category	Tonnage (Mt)	TREO Grade (%)	NdPrO:TREO Ratio	Nd <sub>2</sub> O <sub>3</sub> (%)	Pr <sub>6</sub> O <sub>11</sub> (%)
1.0	Inferred	108.1	1.39	25.1%	0.28	0.07
1.0	Indicated	6.3	1.45	24.8%	0.28	0.08
1.0	Measured	4.6	1.59	24.6%	0.31	0.08
<b>1.0</b>	<b>Total</b>	<b>119.0</b>	<b>1.40</b>	<b>25.1%</b>	<b>0.28</b>	<b>0.07</b>

TREO = Total Rare Earth Oxides – La<sub>2</sub>O<sub>3</sub>, CeO<sub>2</sub>, Pr<sub>6</sub>O<sub>11</sub>, Nd<sub>2</sub>O<sub>3</sub>, Sm<sub>2</sub>O<sub>3</sub>, Eu<sub>2</sub>O<sub>3</sub>, Gd<sub>2</sub>O<sub>3</sub>, Tb<sub>4</sub>O<sub>7</sub>, Dy<sub>2</sub>O<sub>3</sub>,

Ho<sub>2</sub>O<sub>3</sub>, Er<sub>2</sub>O<sub>3</sub>, Tm<sub>2</sub>O<sub>3</sub>, Yb<sub>2</sub>O<sub>3</sub>, Lu<sub>2</sub>O<sub>3</sub>, Y<sub>2</sub>O<sub>3</sub>

NdPrO = Neodymium oxide and Praseodymium oxide: Nd<sub>2</sub>O<sub>3</sub>+Pr<sub>6</sub>O<sub>11</sub>



1. Source: Vital Metals ASX announcement dated 14 February 2023

2. Source: Vital Metals ASX announcement dated 15 April 2020

3. "The Nature and Origin of the Nechalacho Rare Metal Deposit (REE, Nb,Zr), Northwest Territories, Canada." Volker Möller Department of Earth and Planetary Sciences, McGill University, Montreal, April 2016

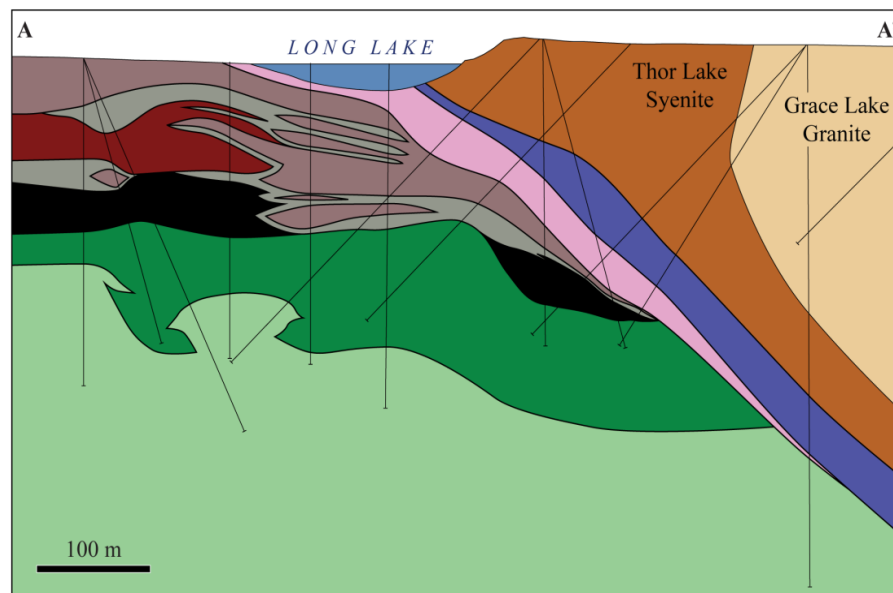
# Asset: Nechalacho a Differentiated Igneous Complex

## Magmatic and Hydrothermal Processes Generated REE Enrichment and Differentiation

### Enrichment REE! Products of a Single or Multiple Phases? What else could there be?

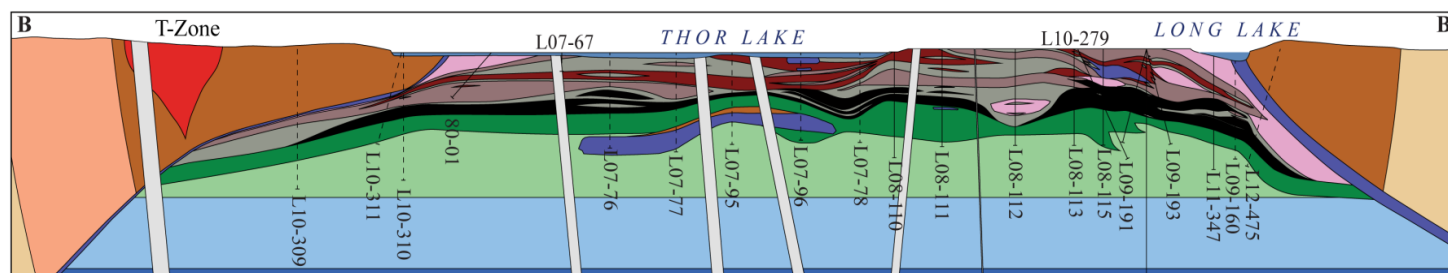
Assessing potential through detailed geological and mineralogical department studies

- Primary cumulate processes drive LREE enrich in upper Tardiff
- Main REE hosts: carbonates. little HREE content as shown by wholerock data and zircon analysis



NLS-1	Roof Sodalite Syenite
NLS-2	Pegmatitic Leucosyenite
NLS-3	Subporphyritic Leucosyenite
NLS-4	Foyaite
NLS-5	Upper Zone
NLS-6	Basal Zone
NLS-7	Sodalite Foyaite
NLS-8	Microlayered Aegirine-Nepheline Syenite
NLS-9	Rhythmically Layered Syenite
NLS-10	Interlayered sodalite-rich and spotted aegirine-syenite
NLS-11	Microlayered Annite-K-feldspar-Sodalite-Aegirine syenite
NLS-12	Trachytoidal Annite-Sodalite Syenite
NLS-13	Aegirine-Sodalite Foyaite
NLS-14	Pegmatitic K-feldspar-sodalite-aegirine syenite

Units  
Geological  
and  
Economic Interest



Source: Volker, 2016

## Nechalacho: Large REE-rich system showing high grades at surface

### Taking a Systems Approach

#### Nechalacho Hosts

A Large Differentiate Igneous Complex (see Tardiff deposit)

REE mineralization hosted in highly altered cumulate phases

Several pegmatoidal intrusive masses cut main body

#### Vital Metals Holds

Tardiff Upper Zone – 119 Mt grading 1.4% TREO, comprising 25.1% NdPr<sup>1</sup>

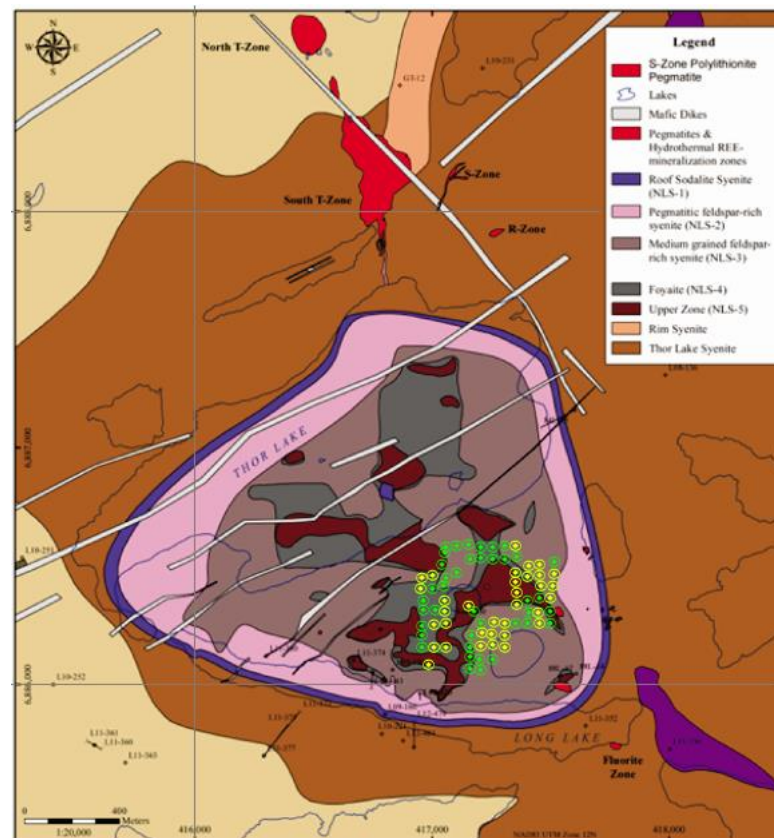
- Exhibits Internal grade variation across the altered syenite
- Exploration to focus on:
  - zones of high-grade differentiation<sup>1</sup>
  - higher grade pegmatoidal zones<sup>2</sup>

#### Outcomes

Improved geological models:

1. Enhanced delineation of high-grade zones
2. Predictability of models for generation of new targets
3. Enhanced resource estimation approaches (improved geological wireframes etc)

### Geological map of Nechalacho Layered Suite<sup>3</sup>



Note: Geological map after Volker (2016) of the NLS (overburden removed), based on outcrop mapping, core from 550 drill holes and the maps of Davidson (1982) and Johnson and Senkiw (1977).

1. Source: Vital Metals ASX announcement dated 14 February 2023, and 23 November 2023

2. Source: Vital Metals ASX announcement dated 15 April 2020

3. "The Nature and Origin of the Nechalacho Rare Metal Deposit (REE, Nb,Zr), Northwest Territories, Canada." Volker Möller Department of Earth and Planetary Sciences, McGill University, Montreal, April 2016



# Asset: Scoping for Scale and Grade

## Drilling: Pathway for Value Creation via targeted grade profiling

### Asset Grade and Growth: Focus on optimizing value and de-risking development

2023 Drilling: 74 holes (40 reported) comprising 6,664 meters, including:

- 31.76 meters at 2.1% TREO from 34.24 meters;
- 23.85 meters at 2.0% TREO from 9.15 meters;
- 33.45 meters at 2.2% TREO from 47.00 meters;
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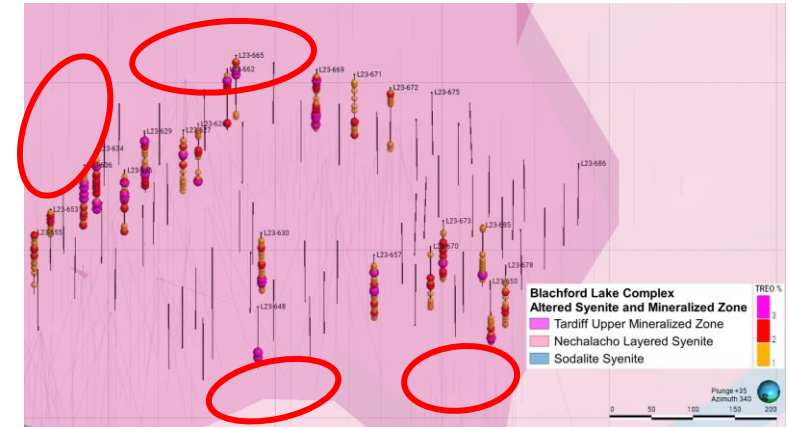
### An Augmented Scoping Study Approach

#### Project Economics: Coupling Value and De-risking

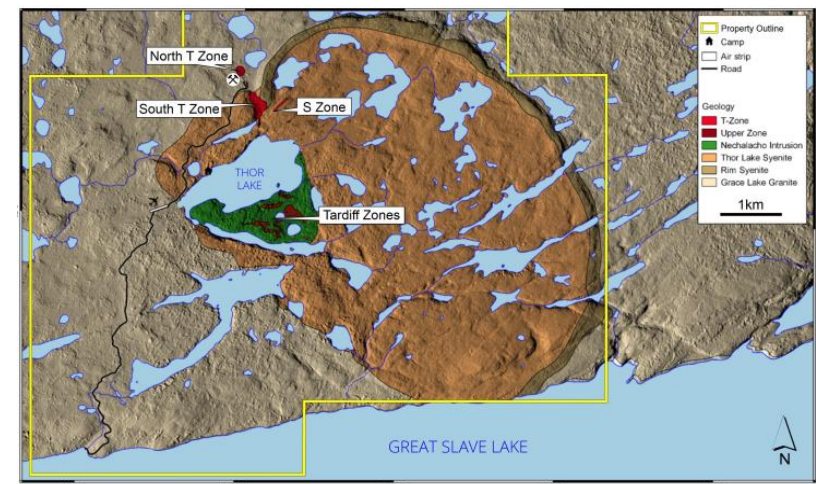
**Value:** aim to maximize project potential value by testing for areas of high-grade footprint expansion to inform future mine plan (e.g., Northwest, West and South in 2023 grid pattern, and zones of internal and external higher grade REE mineralization)

**De-risk:** lower scoping study outcome risks by

Conducting integrated geometallurgical domaining via mineralogical and chemical department analysis, mechanical and chemical flowsheet studies to best determine and optimize REE recovery and cost characterization for projects of different scales



Source: Vital Metals ASX Announcement 23 November 2023



Source: Vital Metals ASX announcement dated 14 February 2023



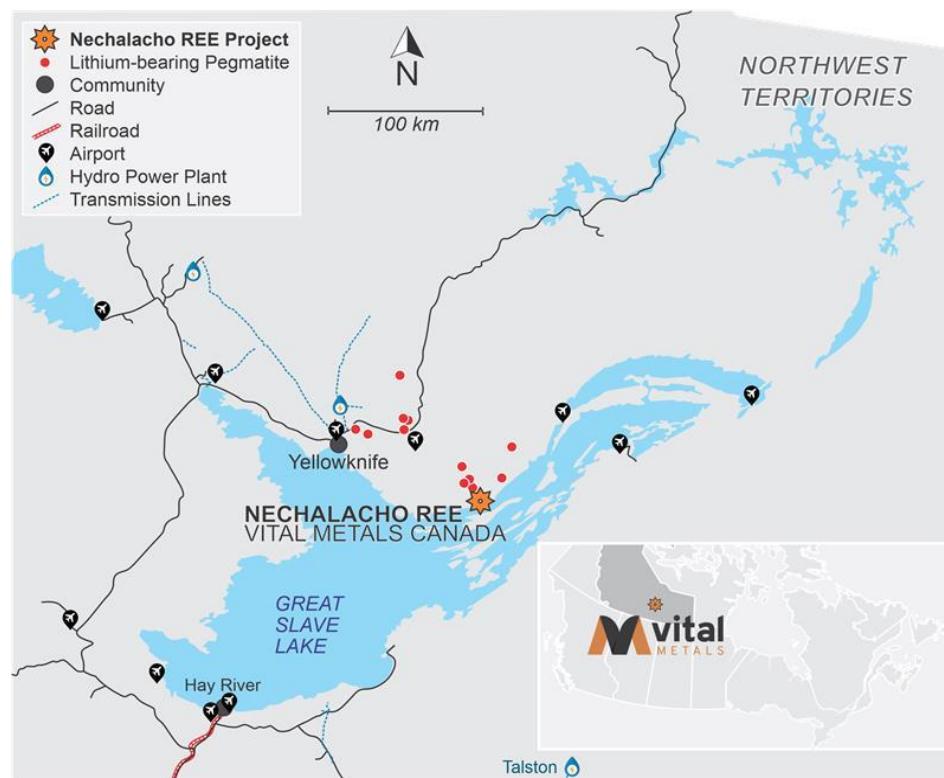
# Nechalacho: a Region of Lithium Growing Potential

*Vital has a >5,000ha landholding adjacent to recent regional pegmatite exploration and discoveries*

## Lithium at Nechalacho?

- Limited historical exploration for lithium despite significant potential
- Nechalacho Project is proximal to many Li-bearing pegmatites that are the focus of recent exploration
- Regional analysis of the characterization of Li-bearing pegmatites ongoing (mainly N-NE trending)
- Known occurrences of outcropping pegmatites across the Nechalacho Project area

## Region Scale Potential



***Vital is well positioned with a strong balance sheet, a significant rare earths deposit, and a renewed development strategy, backed by a highly experienced partner with the aim of building a strategically important North American rare earths business.***

<b>Strategic Asset</b>	<p><b>Tardiff represents a higher grade, globally-significant rare earths asset</b></p> <ul style="list-style-type: none"><li>• Tardiff Upper Zone has a global MRE of 119Mt at 1.4% TREO</li><li>• Future target aims to test extensions to shallow high-grade REE mineralization</li><li>• Maiden Economic Study (Scoping Study) to high system grade and scale</li><li>• Study to induce detailed mineral characterization and chemical deport analysis for the construction of a geometallurgical domain model integrated with mechanical and chemical flowsheet studies</li></ul>
<b>Tier-1 Jurisdiction</b>	<p><b>Tardiff has the potential to be a cornerstone asset in the North American rare earth supply chain</b></p> <ul style="list-style-type: none"><li>• Governments in North America have voiced extreme urgency in reshaping supply chains and achieving clean energy<sup>1</sup></li><li>• Leverage the focus on critical minerals along with government policies and funding mechanisms</li></ul>
<b>Board &amp; Management refresh</b>	<p><b>Board &amp; management has been refreshed to complement existing expertise</b></p> <ul style="list-style-type: none"><li>• New MD &amp; CEO, Geordie Mark, brings mining systems analysis and capital markets experience in Canada</li><li>• New VP Exploration, Dr Natalie Pietrak-Renaud, brings expertise in Rare Earth geological systems and processing analysis</li><li>• Management renewal heightens Canadian-based skills set</li><li>• Renewed management team with technical, financial and operational experience in the rare earths industry</li></ul>
<b>Other Value Propositions</b>	<p><b>Additional value drivers to provide catalysts in 2024</b></p> <ul style="list-style-type: none"><li>• Vital to examine lithium and HREE potential at the Nechalacho Project</li><li>• Compelling long-term rare earth market outlook – global decarbonization efforts driving growth in EV's and wind turbines</li></ul>

1. Bloomberg, 7 June 2023 – *The Supply Crisis for Rare Earth Elements Intensifies*

## 2023 - 2024

## 2024 onwards



### 2023 developments

- **Equity investment:** Rebuilding balance sheet to facilitate project advancement
- **Tardiff Mineral Resource Estimate:** 119Mt @ 1.4% TREO including 0.35% NdPr for 416 kt of contained NdPr
- **Tardiff Exploration and Development:**
  - Completed a 6,664m drill program for 74 holes at Tardiff: 40 holes announced to-date
  - Commenced scoping-level studies for Tardiff deposit

### Nechalacho Rare Earth Project – Upcoming Catalysts

- **2023 MRE Update** (targeting Q1 2024)
- **2024 Drilling Results:** Q1-Q3/24
- **Updates on Nechalacho project optimisation including:**
  - *Product saleability informed by key partners and networks*
  - *Targeting a low-cost path to market*
  - *Early processing flow sheet optimisation informed by partner expertise*
  - *Focus on margin maximisation vs control of end-product*
  - *Mine plan grade optimization*
- **North American Supply Chain:** investigate partnerships to accelerate the development of a North American rare earth supply chain
- **2024 MRE Update** (targeting H2 2024) – focus on high-grade extensions to existing orebody
- **2024: Scoping Study** (targeting Q4 2024)

### Lithium Potential – Other Future Catalysts

- **Review lithium potential**
- **Examine Lithium Targets:** aim to test the known occurrences of outcropping pegmatites across the Nechalacho Project area

# Appendices

# Sector Data

Project	Company	Exchange	M/Cap <sup>1</sup> (US\$m)	Location	Equity	Type	Resources (Total) Mt	Grade %	Calc. NdPr(kt)	GRade % NdPr
Nechalacho	Vital Metals	ASX	19	Canada	100%	Hardrock	119	1.40%	417	0.35%
Wicheeda	Defense Metals	CA	45	Canada	100%	Hardrock	45.3	1.78%	139	0.31%
Ashram	Commerce Res.	CCE	8	Canada	100%	Hardrock	117.3	1.74%	447	0.38%
Bear Lodge	Rare Element Res.	OTCQB	51	USA	100%	Hardrock	45.2	2.75%	283	0.63%
Halleck Creek	American Rare Earths	ASX	41	USA	100%	Hardrock	1429	0.33%	1,050	0.07%
Koppamurra	Australia Rare Earths	ASX	15	Australia	100%	Ionic Clay	186.8	0.07%	29	0.02%
Browns Range	Northern Minerals	ASX	105	Australia	100%	Hardrock	6.43	0.96%	2	0.04%
Goschen	VHM Limited	ASX	80	Australia	100%	Sands	628.7	2.21%	2,607	0.41%
Mangaroon	Dreadnought Res.	ASX	55	Australia	100%	Hardrock	20.06	1.03%	59	0.29%
Splinter Rock	OD6 Metals	ASX	10	Australia	100%	Hardrock	344	0.13%	97	0.03%
Nolans	Arafura Rare Earths	ASX	190	Australia	100%	Hardrock	37.36	2.74%	270	0.72%
Cummins Range	RareX Resources	ASX	10	Australia	100%	Hardrock	519.3	0.32%	358	0.07%
Yangibana	Hastings Tech. Metals	ASX	53	Australia	100%	Hardrock	29.93	0.93%	96	0.32%
Sarfartoq	Hudson Resources	CVE	4	Greenland	100%	Hardrock	8.343	1.72%	35	0.42%
Norra Karr	Leading Edge Mat.	TSX-V	18	Sweden	100%	Hardrock	110	0.50%	154	0.14%
Carina Project	Aclara Resources	TSX-V	65	Chile	100%	Ionic Clay	168.1	0.15%	50	0.03%
Caldiera	Meteoric Resources	ASX	268	Brazil	100%	Ionic Clay	409	0.26%	246	0.06%
Makuutu	Ionic Rare Earths	ASX	53	Uganda	60%	Ionic Clay	532	0.06%	72	0.01%
Kangankunde	Lindian Resources	ASX	110	Malawi	100%	Hardrock	261	2.19%	1,155	0.44%
Songwe Hill	Mkango Resources	TSX-V	28	Malawi	100%	Hardrock	48.6	1.37%	137	0.28%
Ngualla	Peak Rare Earths	ASX	47	Tanzania	84%	Hardrock	214.4	2.15%	2,280	1.06%
Longonjo	Pensana	LON	89	Angola	84%	Hardrock	313.7	1.43%	993	0.32%
Phalaborwa	Rainbow Rare Earths	LON	105	South Africa	100%	Gypsum	30.4	0.44%	39	0.13%

1. As at 26 January 2024. AUD:USD- 0.6575; CAD:USD: 0.7429; and GBP:USD: 1.2709.



# Sector Data

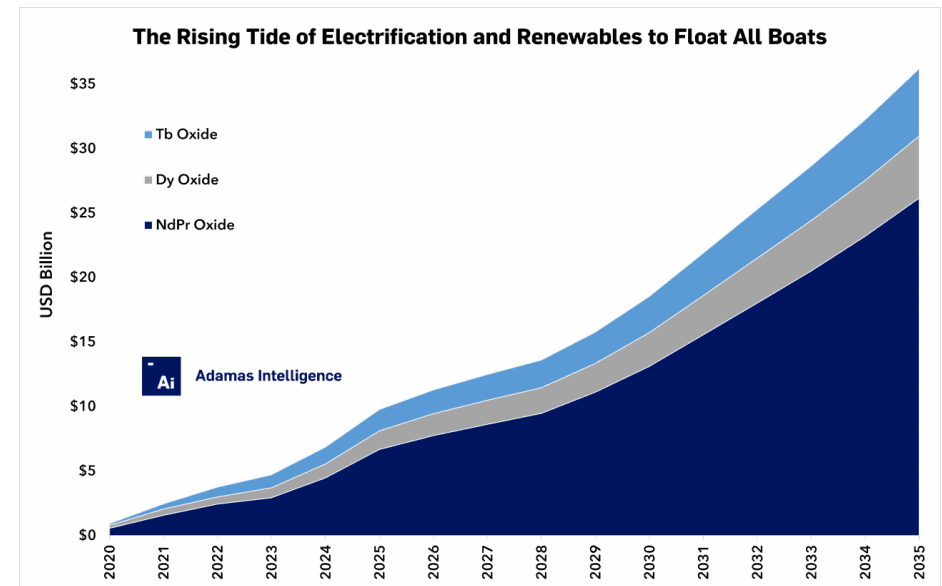
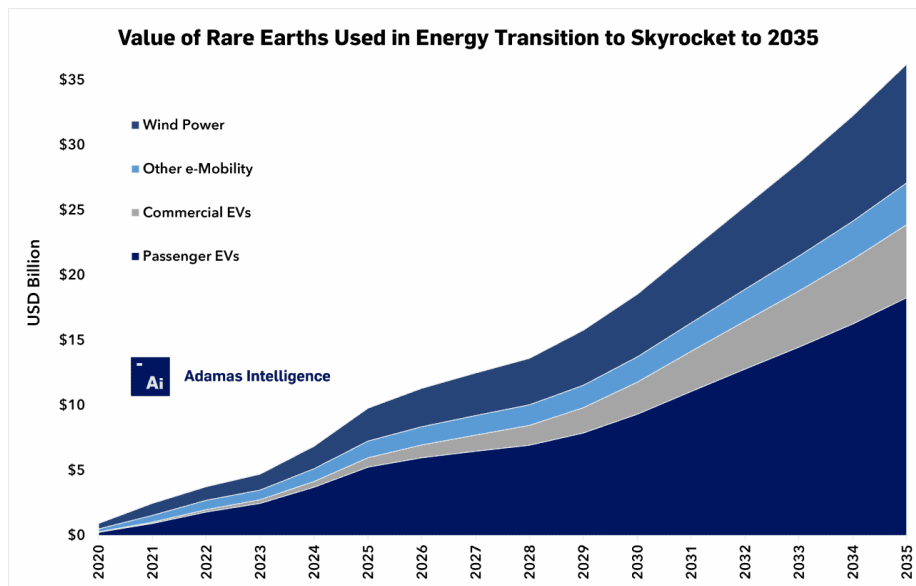
Project	Study	Resource	Grade	Grade	Resource	Grade	Grade	Resource	Grade	Grade	Resource	Grade	Grade	References
		Mt	% TREO	%NdPr	Mt	% TREO	%NdPr	Mt	% TREO	%NdPr	Mt	% TREO	%NdPr	
		Measured			Indicated			Inferred			Total			
Nechalacho		4.6	1.59%	0.39%	6.3	1.45%	0.36%	108.1	1.39%	0.35%	119	1.40%	0.35%	<a href="https://wcsecure.weblink.com.au/pdf/VML/02631023.pdf">https://wcsecure.weblink.com.au/pdf/VML/02631023.pdf</a>
Wicheeda	PEA	6.4	2.86%	0.42%	27.8	1.84%	0.28%	11.1	1.02%	0.31%	45.3	1.78%	0.31%	<a href="https://www.defensemets.com/_files/ugd/1b0da6_e53b275d78df4606b20515db355004.pdf">https://www.defensemets.com/_files/ugd/1b0da6_e53b275d78df4606b20515db355004.pdf</a>
Ashram	PEA							117.34	1.74%	0.38%	117.3	1.74%	0.38%	<a href="https://commerceresources.com/commerce-resources-ashram-rare-earth-element-deposit-confirmed-as-a-large-inferred-resource-tdor-project-quebec/">https://commerceresources.com/commerce-resources-ashram-rare-earth-element-deposit-confirmed-as-a-large-inferred-resource-tdor-project-quebec/</a>
Bear Lodge	PFS	2.7	3.77%	0.86%	13.6	2.91%	0.66%	28.9	2.58%	0.59%	45.2	2.75%	0.63%	<a href="https://www.rareelementresources.com/investor-information/news-releases/2014/08/26/rare-element-resources-announces-2014-pre-feasibility-study-on-the-bear-lodge-project">https://www.rareelementresources.com/investor-information/news-releases/2014/08/26/rare-element-resources-announces-2014-pre-feasibility-study-on-the-bear-lodge-project</a>
Halleck Creek					622	0.34%	0.08%	807	0.32%	0.07%	1429	0.33%	0.07%	<a href="https://americanrareearths.com/wp-content/uploads/2023/03/Halleck_Creek_Technical_Report_Appendices19.pdf">https://americanrareearths.com/wp-content/uploads/2023/03/Halleck_Creek_Technical_Report_Appendices19.pdf</a>
Koppamurra		0.8	0.07%	0.02%	98.0	0.07%	0.02%	88	0.07%	0.02%	187	0.07%	0.02%	<a href="https://www.marketindex.com.au/ass/ar3/announcements/84-increase-in-resource-for-koppamurra-ree-project-2A1474698">https://www.marketindex.com.au/ass/ar3/announcements/84-increase-in-resource-for-koppamurra-ree-project-2A1474698</a>
Browns Range	FS	0.14	0.70%	0.03%	3.2	0.95%	0.04%	3.1	0.98%	0.04%	6.4	0.96%	0.04%	<a href="https://wcsecure.weblink.com.au/pdf/NTU/02580068.pdf">https://wcsecure.weblink.com.au/pdf/NTU/02580068.pdf</a>
Goschen	FS	30.7	2.72%	0.49%	310	2.27%	0.43%	288	2.10%	0.39%	629	2.21%	0.41%	<a href="https://wcsecure.weblink.com.au/pdf/VHM/02648405.pdf">https://wcsecure.weblink.com.au/pdf/VHM/02648405.pdf</a>
Mangaroon					5.5	1.23%	0.34%	14.6	0.95%	0.28%	20.1	1.03%	0.29%	<a href="https://investorhub.dreadnoughtresources.com.au/announcements/43784">https://investorhub.dreadnoughtresources.com.au/announcements/43784</a>
Splinter Rock								344	0.13%	0.03%	344	0.13%	0.03%	<a href="https://www.od6metals.com.au/wp-content/uploads/2023/07/61158738.pdf">https://www.od6metals.com.au/wp-content/uploads/2023/07/61158738.pdf</a>
Nolans	FS	4.9	3.20%	0.84%	30.0	2.70%	0.71%	2.5	2.30%	0.61%	37.4	2.74%	0.72%	<a href="https://wcsecure.weblink.com.au/pdf/ARU/02373345.pdf">https://wcsecure.weblink.com.au/pdf/ARU/02373345.pdf</a>
Cummins Range					66.6	0.50%	0.11%	453	0.29%	0.06%	519	0.32%	0.07%	<a href="https://investors.rarex.com.au/announcements/4353905">https://investors.rarex.com.au/announcements/4353905</a>
Yangibana	FS	5.0	0.96%	0.37%	19.5	0.88%	0.32%	5.5	1.05%	0.31%	29.9	0.93%	0.32%	<a href="https://www.investi.com.au/api/announcements/has/cb4101d8-37c.pdf">https://www.investi.com.au/api/announcements/has/cb4101d8-37c.pdf</a>
Sarfartoq	PEA				5.9	1.77%	0.43%	2.5	1.59%	0.40%	8.3	1.72%	0.42%	<a href="https://hudsonresourcesinc.com/wp-content/uploads/2018/02/NR2011-01">https://hudsonresourcesinc.com/wp-content/uploads/2018/02/NR2011-01</a>
Norra Karr	PEA							110	0.50%	0.14%	110.0	0.50%	0.14%	<a href="https://wp-leadinggematerials-2023.s3.ca-central-1.amazonaws.com/media/2021/08/NorraKarr_PEA_43-101.pdf">https://wp-leadinggematerials-2023.s3.ca-central-1.amazonaws.com/media/2021/08/NorraKarr_PEA_43-101.pdf</a>
Carina Project	PEA							168	0.15%	0.03%	168	0.15%	0.03%	<a href="https://assets-global.website-files.com/6267a587bc1507747a1c8b665/Suabbed8b366c49794c1f9_CARINA%20Module_PEA%20VFM_clean_2.pdf">https://assets-global.website-files.com/6267a587bc1507747a1c8b665/Suabbed8b366c49794c1f9_CARINA%20Module_PEA%20VFM_clean_2.pdf</a>
Caldiera								409	0.26%	0.06%	409	0.26%	0.06%	<a href="https://wcsecure.weblink.com.au/pdf/MEI/02660657.pdf">https://wcsecure.weblink.com.au/pdf/MEI/02660657.pdf</a>
Makuutu	FS				404	0.07%	0.01%	127	0.05%	0.01%	532	0.06%	0.01%	<a href="https://wcsecure.weblink.com.au/pdf/IXR/02517527.pdf">https://wcsecure.weblink.com.au/pdf/IXR/02517527.pdf</a>
Kangankunde								261	2.19%	0.44%	261	2.19%	0.44%	<a href="https://static1.squarespace.com/static/58a516a85cc89ad8303d4c4b64caef7cc34d100852423051691021186759/Mineral_Resource_Estimate.pdf">https://static1.squarespace.com/static/58a516a85cc89ad8303d4c4b64caef7cc34d100852423051691021186759/Mineral_Resource_Estimate.pdf</a>
Songwe Hill	FS	8.81	1.50%	0.31%	12.2	1.35%	0.27%	27.5	1.33%	0.28%	49	1.37%	0.28%	<a href="https://mkango.ca/news/mkango-announces-60-per-cent-increase-in-measured-and-indicated-resources-including-the-first-measured-resource-for-the-songwe/">https://mkango.ca/news/mkango-announces-60-per-cent-increase-in-measured-and-indicated-resources-including-the-first-measured-resource-for-the-songwe/</a>
Ngualla	FS	86.1	2.61%	1.04%	113	1.81%	1.09%	15.7	2.15%	1.05%	214	2.15%	1.06%	<a href="https://wcsecure.weblink.com.au/pdf/PEK/02586372.pdf">https://wcsecure.weblink.com.au/pdf/PEK/02586372.pdf</a>
Longonjo	FS	25.7	2.58%	0.55%	165	1.51%	0.33%	123	1.08%	0.25%	314	1.43%	0.32%	<a href="https://pensana.co.uk/wp-content/uploads/2020/09/longonjo-mineral-resource-estimate-upgraded-14-Sept-2020.pdf">https://pensana.co.uk/wp-content/uploads/2020/09/longonjo-mineral-resource-estimate-upgraded-14-Sept-2020.pdf</a>
Phalaborwa	PEA	7.3	0.47%	0.14%	16.1	0.44%	0.13%	7	0.42%	0.12%	30	0.44%	0.13%	<a href="https://tools.eurolandir.com/tools/Pressreleases/GetPressRelease?ID=42610378&amp;lang=en-GB&amp;companycode=uk-rbw&amp;v=2022">https://tools.eurolandir.com/tools/Pressreleases/GetPressRelease?ID=42610378&amp;lang=en-GB&amp;companycode=uk-rbw&amp;v=2022</a>

PEA = Preliminary Economic Assessment  
PFS = Pre-Feasibility Study  
FS = Feasibility Study

# Compelling Long-Term Rare Earth Market Outlook

## A new paradigm for rare earths demand

- China's dominance in the REE supply chain could threaten global supply<sup>1</sup>:** In September 2020, President Xi Jinping announced that China will "aim to have CO2 emissions peak before 2030 and achieve carbon neutrality before 2060." Against this backdrop, the surge in domestic demand is expected to outpace the country's REE production, leading to a **potential supply crunch that will affect the globe under the current supply chain structure**
  - If China persists with export restrictions, as it has with commodities like germanium and graphite, supply could be further compromise<sup>2</sup>
- Potential bifurcation of commodity prices ex-China:** A handful of **Canadian**, German and Australian critical mineral explorers plan to command premium prices for key metals used in EV's, promising quality and consistency in exchange for shifting reliance away from China, the dominant producer and price-setter<sup>2</sup>
- NdPr oxide is key to the manufacture of permanent magnets used in EV's and Offshore Wind turbines**
  - Neodymium demand is projected to increase by 48% by 2050<sup>3</sup>
  - Adamas Intelligence has doubled its NdPr oxide price forecast to 8.3% CAGR to 2035<sup>4</sup>

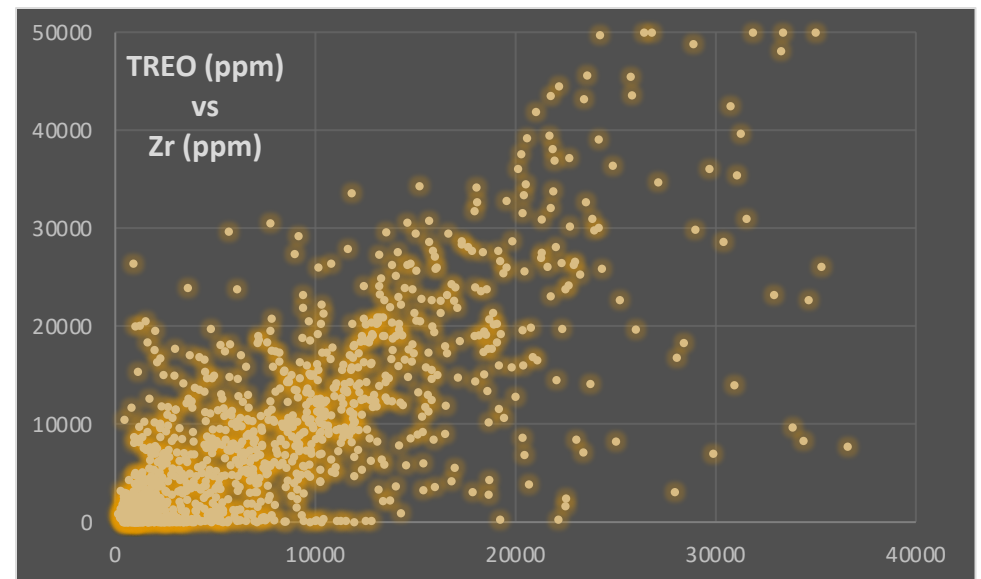
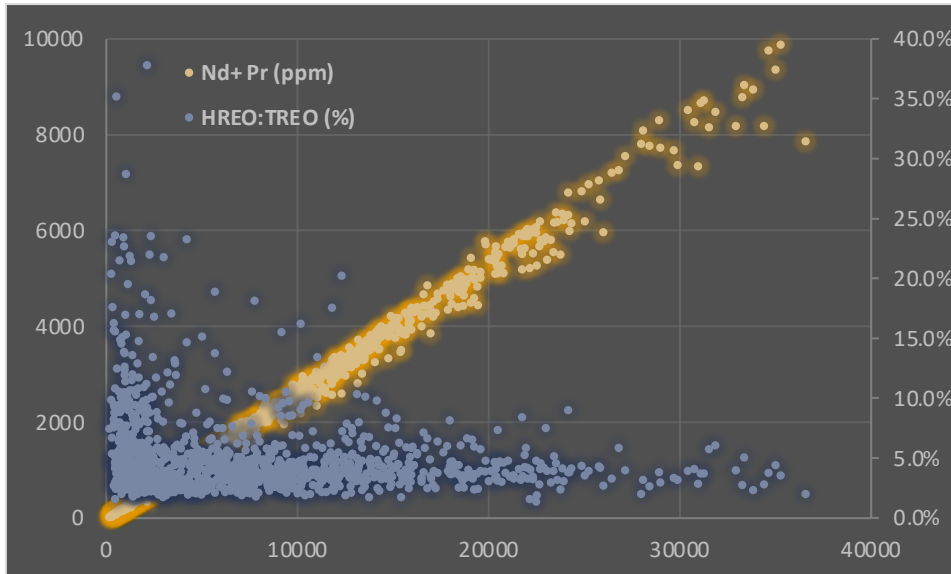
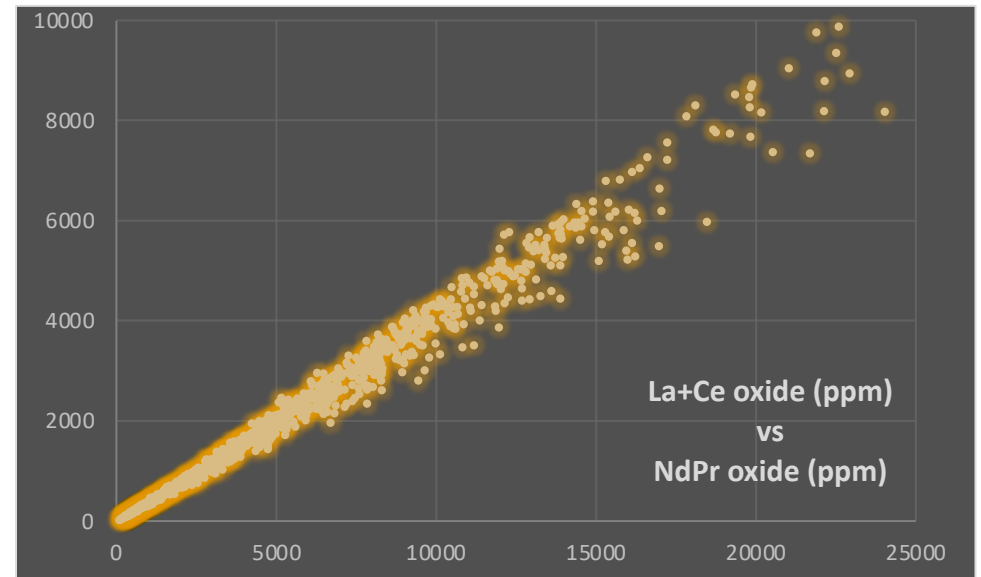
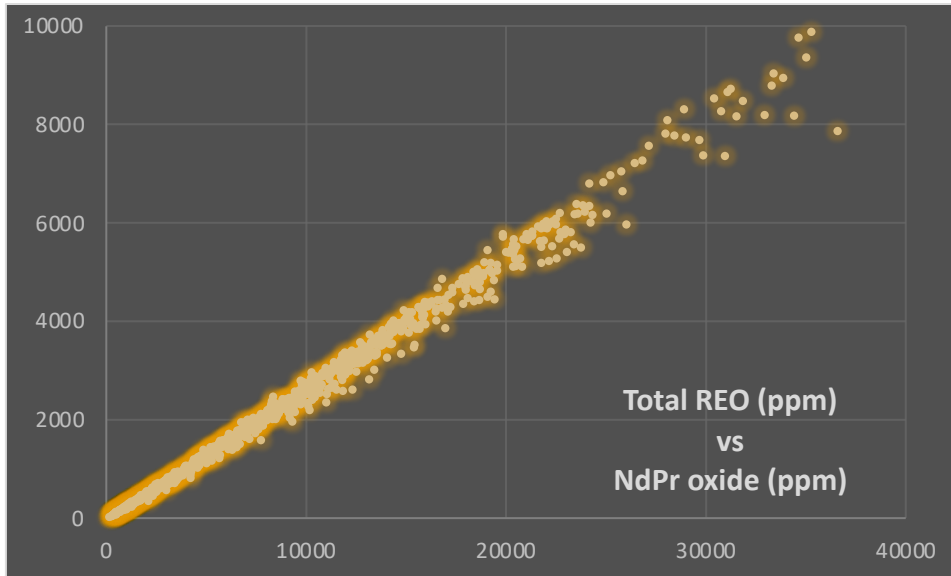


Source: Adamas Intelligence, *The Skyrocketing Value of Rare Earths Powering the Energy Transition*. 3 Feb, 2023.

Source: Adamas Intelligence, *The Skyrocketing Value of Rare Earths Powering the Energy Transition*. 3 Feb, 2023.

- Bloomberg, 7 June 2023 – *The Supply Crisis for Rare Earth Elements Intensifies*
- Reuters, 8 November 2023 – *Western miners target China's rare earth metals grip with premium prices*
- Columbia Climate School
- Adamas Intelligence - Rare Earth Magnet Market Outlook to 2030 KU Leuven University

# Wholerock Data Trends



1. Wholerock data tabled are from dataset informing drill results release on 21st November 2023

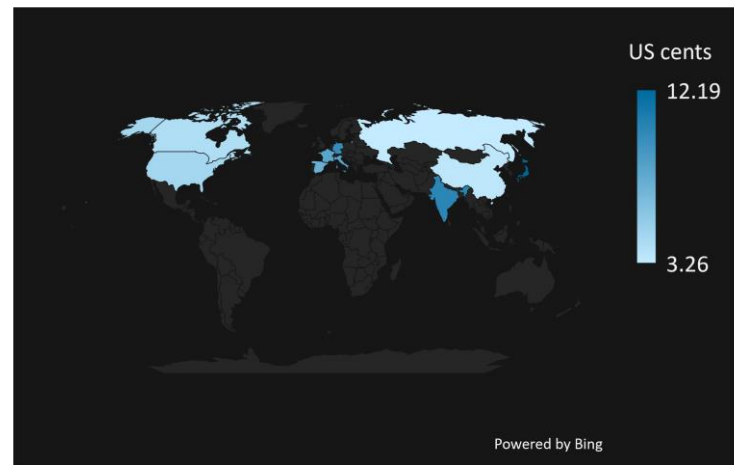
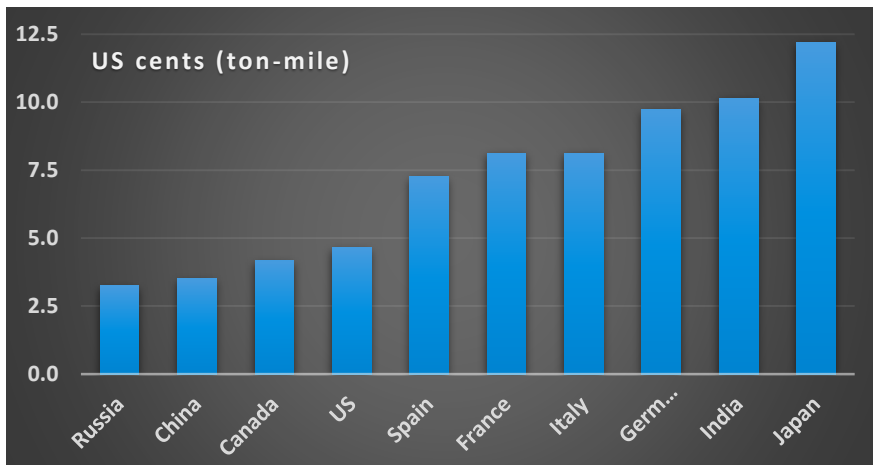
# Canadian Rail Network & International Rail Freight Rates

## Western Canada Railway Map<sup>1</sup>



1. Railway association of Canada, Rail Trends 2022

## Comparison of International Rail Rates, by Country<sup>2</sup>



2. International Comparison of Railway Freight Rates, Railway Association of Canada, 2021