

## ANSTO METALLURGICAL

### EXTRACTIONS UP TO 70% OF MAGNET RARE EARTHS

#### HIGHLIGHTS

- The first batch of metallurgical samples from Morgans Creek clay-hosted REE prospect have been evaluated at ANSTO Minerals (ANSTO)
- Initial results show that extractions of up to **70% of the Magnet Rare Earth Oxides (MREO)<sup>1</sup> (Nd + Pr + Dy + Tb)**, **60% of the Heavy Rare Earths Oxides (HREO)<sup>2</sup>** and 59% of the Total Rare Earth Oxides (TREO)<sup>3</sup> were achieved in a sulphuric acid leach<sup>4</sup>
- Samples were intentionally selected to represent variability across the prospect, with best extractions coming from the target unit, the Yednalue Formation
- **Average 52% of Magnet Rare Earth Oxides extraction in Yednalue Formation**, with promising extractions in the upper, middle and lower portions of the unit suggesting metallurgical continuity, and that **REE mineralisation is easily leachable** with moderate acid addition:
  - **58% MREO extraction in the upper portion** of the unit between 3-4 metres depth
  - **70% MREO extraction in the middle portion** of the unit between 17-18m depth
  - **59% MREO extraction in the lower portion** of the unit between 35-36m depth
- The results provide confidence to proceed with further optimisation testwork and drilling at Morgans Creek in Q1 2023
- Highly experienced rare earth specialist, Mr. Gavin Beer, has been retained by Taruga to assist with ongoing flowsheet optimisation



**CEO Thomas Line commented:** "These initial metallurgical results have confirmed the presence of easily leachable rare earths in the target unit at Morgans Creek, and provided us with confidence to continue with further optimisation and drilling in Q1 2023. We know that rare earth deposits hold considerable variation in mineralogy, and as such, each potential deposit requires unique consideration when it comes to commercial viability. TAR continues to pursue excellence in its field by conducting open and transparent metallurgical testwork to investigate the value of this discovery for our shareholders. Morgans Creek holds a unique assemblage of highly valuable magnet and heavy rare earths, and thus far, our partnership with ANSTO continues to affirm our confidence in the potential development of a commercially viable process flowsheet for these materials. We are very pleased to be working with Mr. Gavin Beer, who is a highly regarded and experienced metallurgist with over 15 years global experience working on rare earth processing."

Figure 1. Taruga CEO Thomas Line visiting the ANSTO Minerals Division REE-clay leaching facility.

#### CAPITAL STRUCTURE

578,048,240  
Shares on Issue

46,750,000  
Options on issue  
(various ex. prices  
and dates)

#### BOARD & MANAGEMENT

Thomas Line  
CEO

Paul Cronin  
Non-Executive Director

Gary Steinepreis  
Non-Executive Director

Eric De Mori  
Non-Executive Director

David Chapman  
Non-Executive Director

Dan Smith  
Company Secretary

#### CONTACT US

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<sup>1</sup>Magnet Rare Earth Elements (MREE) (Dy + Tb + Nd + Pr)

<sup>2</sup>Heavy rare earth elements (HREE) (Eu, Gd + Tb + Dy + Ho + Er + Tm + Yb + Lu + Y)

<sup>3</sup>Total Rare Earth Elements (TREE) 15 rare earth elements including Y (Ce, La, Lu, Nd, Pr, Sm, Dy, Er, Eu, Gd, Ho, Tb, Tm, Yb, Y)

<sup>4</sup>50g/L sulphuric acid at atmospheric pressure and 50 degrees Celsius.

**Table 1.** Initial metallurgical leach results from Morgans Creek (50g/L sulphuric acid leach).

<b>Yednalue Fm -Hydrothermal Hill</b>				
Sample ID	33265	29926	33249	21413
Depth (m)	18	36	4	3
TRE+Y (ppm)	1025	2137	5739	1023
TRE-Ce (ppm)	997	1606	5662	902
<b>Element</b>	<b>Extraction %</b>	<b>Extraction %</b>	<b>Extraction %</b>	<b>Extraction %</b>
La	57	34	51	15
Ce	30	4	46	11
<b>Pr</b>	<b>70</b>	<b>52</b>	<b>58</b>	<b>20</b>
<b>Nd</b>	<b>73</b>	<b>60</b>	<b>62</b>	<b>21</b>
Sm	71	63	56	21
Eu	71	67	53	22
Gd	63	64	46	19
<b>Tb</b>	<b>64</b>	<b>64</b>	<b>45</b>	<b>20</b>
<b>Dy</b>	<b>55</b>	<b>57</b>	<b>39</b>	<b>16</b>
Ho	52	52	35	17
Er	48	45	31	14
Tm	48	41	32	12
Yb	45	36	30	12
Lu	43	36	26	13
Y	45	47	29	14
<b>LREO (%)</b>	<b>66</b>	<b>35</b>	<b>59</b>	<b>17</b>
<b>HREO (%)</b>	<b>60</b>	<b>60</b>	<b>44</b>	<b>17</b>
<b>MREO (%)</b>	<b>70</b>	<b>59</b>	<b>58</b>	<b>20</b>
<b>TOTAL REE (+Y) (%)</b>	<b>59</b>	<b>42</b>	<b>46</b>	<b>16</b>

## Summary

Taruga Minerals Limited (ASX: **TAR**, **Taruga** or the **Company**) is pleased to announce the initial metallurgical test results from acid leach trials conducted by leading rare earth research and testwork facility ANSTO Minerals (ANSTO). The results have confirmed the presence of easily leachable REEs within the deposit and shown that extractions of up to 70% of the magnet REE oxides (MREO) and 60% of the heavy REE oxides (HREO) is achievable with moderate sulphuric acid addition.

Further optimisation work will now be undertaken under the guidance of ANSTO, and Gavin Beer (consultant to the Company). This work will focus on optimising the flowsheet in alignment with commercially viable reagent and processing costs, and will include variations in leaching conditions such as reagent concentration and leach times, and beneficiation. Beneficiation work will include processes such as sizing, ore-sorting and desliming.

All priority drill samples from the 2022 RAB drilling program have been returned and reported. Additional samples were submitted in order to complete the geological database and confirm the technical teams sample selection methodology was sufficient in identifying mineralisation. The technical team now have a high level of confidence that the existing sampling methodology is capturing all significant mineralisation. This allows accurate identification of mineralisation during drilling to support efficiency and cost saving.

## Metallurgical Test Results

### Summary

Taruga Minerals has discovered clay-hosted rare earths (REEs) at Morgans Creek within the Mt Craig project in South Australia. Features of the prospect are low levels of cerium, uranium and thorium, and a high proportion of the heavy and magnet rare earths. "Weak" acid leach test work conducted in early 2022 indicated that the REE mineralisation has a very high proportion of readily soluble REEs, and as such may be amenable to a low-cost simplistic metallurgical flow sheet.

Over the last few years, there have been numerous reports of elevated concentrations of REEs associated with clays (clay-hosted REE deposits), but in many cases the deposits have not proven to be classic ionic clay deposits, and a lower pH has been found to be necessary to dissolve the REEs. Under these circumstances, the economics of the process depends on REE extraction, acid consumption and the concentrations of dissolved gangue elements. An initial indication of potential economic viability of any such deposit can be obtained by leaching over a range of acidities to determine RE extraction versus gangue dissolution.

The individual REE extractions were calculated using the measured head and the final leach liquor and residue solids compositions (for final sample only).

Gangue dissolution was recorded and will be reported once the calculations become available from ANSTO.

### Acid Leach Response

Acid leach tests were carried out at a lower pH to determine if the REE extraction can be increased under mild to moderate acidity. These test conditions are summarised below:

Acid leach condition 1:

- pH 1 leach (sulphuric acid)
- 2h duration;
- 22° C

Acid leach condition 2:

- 50 g/L leach (sulphuric acid)
- 6 h duration
- 50 °C;

### Results

**Table 1** shows the 50g/L sulphuric acid leach results from the target Yednalue Formation. The results show extractions of up to 70% of the MREO, 60% of the HREO and 59% of the TREO is possible under these conditions, indicating the REE mineralisation is dominated by easily leachable REE phases. Low-value cerium and lanthanum extractions are low compared to MREO and HREO extraction, which is desirable for production of a higher purity MREO concentrate. **Table 2** shows the gangue dissolution associated with the 50g/L acid leach test.

The Desorption test reported extractions of up to 13% of the Magnet Rare Earths with a short 0.5-hour leach time. The best desorption results were from the target Yednalue Formation.

The pH1 test showed a significant increase in extractions compared to the desorption test, with extractions of up to 26% of the MREO and 25% of the HREO.

The combined results show that significant increase in extractions is possible with the addition of low-moderate amounts of sulphuric acid. Further optimisation work will use these results as a baseline and focus on commercial development of a REE concentrate using standard techniques.

Samples were selected from other mineralised units (i.e. not the Yednalue Formation) to assess metallurgical variability throughout the Morgans Creek project area. The River Wakefield unit and an unknown unit at Hydro Hill far North returned maximum extractions of 28% of the MREO. The initial test indicate that the Yednalue Formation contains the best metallurgical properties for commercial acid leaching, however the extractions in the alternate units are still encouraging.

**Table 2.** Initial metallurgical leach results from Morgans Creek (50g/L sulphuric acid leach).

<b>Yednalue Fm -Hydrothermal Hill</b>				
Sample ID	33265	29926	33249	21413
Depth (m)	18	36	4	3
TRE+Y (ppm)	1025	2137	5739	1023
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<b>MREO (%)</b>	<b>70</b>	<b>59</b>	<b>58</b>	<b>20</b>
<b>TOTAL REE (+Y) (%)</b>	<b>59</b>	<b>42</b>	<b>46</b>	<b>16</b>

## REE Market Outlook

Morgans Creek represents a rare source of magnet and heavy rare earths, having a very high proportion of both (34% and 35% respectively). Sources of heavy rare earths are becoming

increasingly rare and commercially important due to the depleting unsustainable primary sources in China. Chinese REE production over the last 5 years (**Figure 2**) shows that total REE production has increased by over 200%, however China has been unable to increase HREE production over the period. This indicates that sources of heavy REEs are depleting and as a result China are now processing more light REE dominant resources.

Production Quotas	LREE (Tonnes)	HREE (Tonnes)	Total (Tonnes)
2022	190,850	19,150	210,000
2021	148,850	19,150	168,000
2020	120,850	19,150	140,000
2019	112,850	19,150	132,000
2018	100,850	19,150	120,000
2017	87,150	17,850	105,000
2016	87,150	17,850	105,000
2015	87,150	17,850	105,000
2014	87,150	17,850	105,000
2013	75,950	17,850	93,800
<b>CAGR</b>	<b>9.7%</b>	<b>0.7%</b>	<b>8.4%</b>

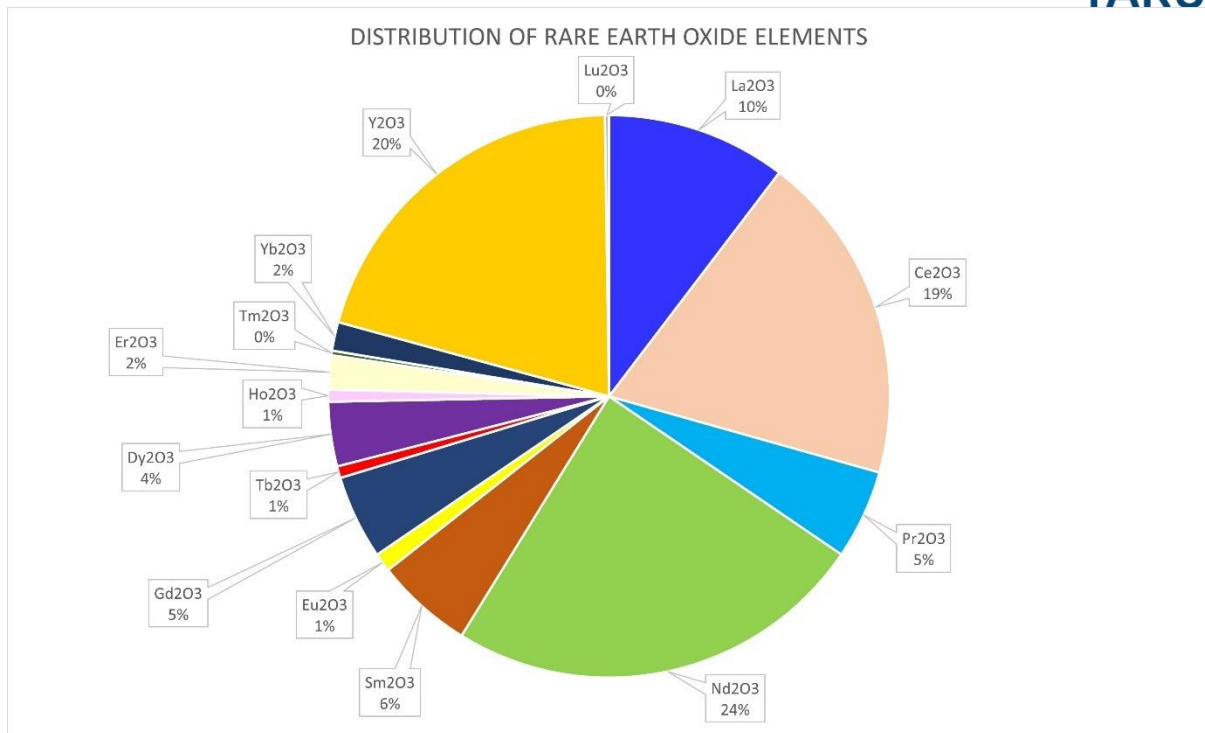
**Figure 2.** Chinese REE production data over the past 10 years, broken up into light REEs v.s. heavy REEs. Source: Ministry of Land Resources (MLR) of China (1)As of 2021; Includes Myanmar (2)Per United States Geological Survey

## Exploration Plan

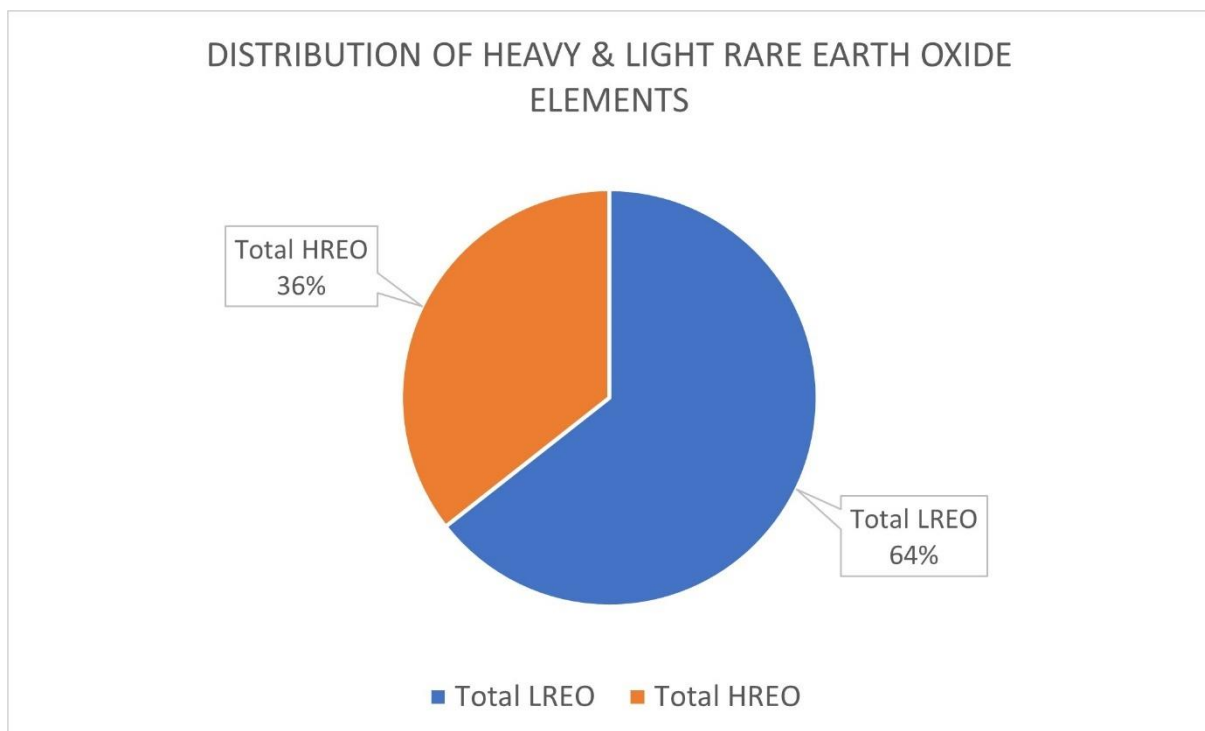
- Mapping of the Yednalue formation (complete)
- Systematic RAB drill testing over the shallow weathered layers of Yednalue formation strike extensions from Hydrothermal Hill (Phase 1 complete)
- Review of drill results against radiometrics and magnetics from the recent airborne geophysics survey for regional targeting over 34km of project strike (underway)
- Phase 1 acid leach metallurgy with ANSTO (complete)
- Phase 2 acid leach variation metallurgy with ANSTO and beneficiation trials (Q1 2023)
- Phase 2 Aircore/RC drilling (Q1 2023):
  - Drill to base of mineralisation
  - Infill and extensional drilling of Yednalue formation and peripheral units
- Reconnaissance exploration for additional Yednalue formation and its REE mineralised analogues at Morgans Creek and across the 34km of prospective strike at the Mt Craig Project (underway)
- Investigate and target REE source rock
- Phase 3 Aircore/RC drilling Morgans Creek (Q2-Q3 2023)
- Drill testing new regional REE targets at Mt Craig (Q2-Q3 2023)
- Report maiden JORC Resource at Morgans Creek (Q4 2023)

## Morgans Creek Basket Summary

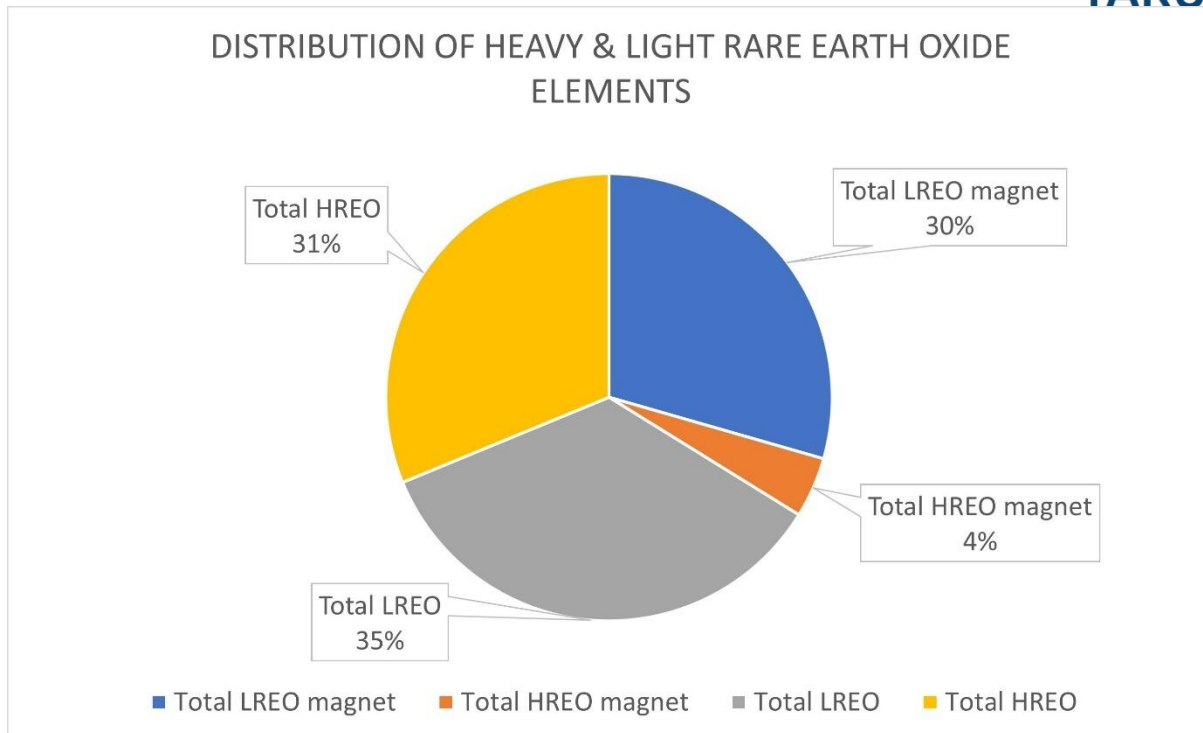
Figures 3 to 6 show the key distribution metrics of the REE basket at Morgans Creek, for all samples over 250ppm TREO. These key metrics highlight the unusually high proportion of heavy REEs and magnet REEs are present at Morgans Creek. Morgans Creek also has the unique quality of being ultra-low cerium.



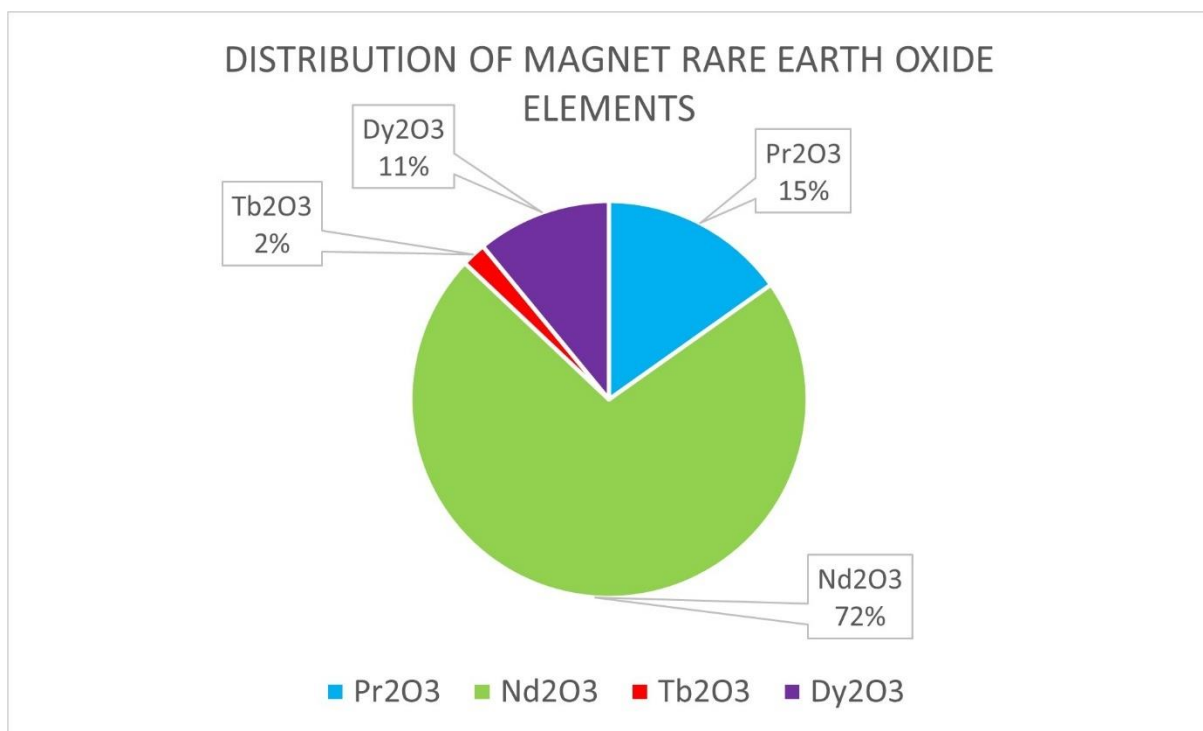
**Figure 3.** Pie chart showing percentages of individual rare earth element oxides for all 2022 RAB drilling over 250ppm TREO.



**Figure 4.** Pie chart showing percentages of heavy and light rare earth element oxides for all 2022 RAB drilling over 250ppm TREO.



**Figure 5.** Pie chart showing percentages of heavy and light rare earth element oxides, along with the percentages of heavy and light magnet rare earth element oxides for all 2022 RAB drilling over 250ppm TREO.



**Figure 6.** Pie chart showing percentages of each of the four-magnet rare earth element oxides (Nd + Pr + Dy + Tb) for all 2022 RAB drilling over 250ppm TREO.

**Significant intercepts from 2022 RAB drilling (previously reported)**

**MCRB044**

- **43m @ 1,687ppm TREO from surface to EOH** (40% MREO; 39% HREO; 57% CREO) including:
  - **5m @ 3,343ppm TREO** from 12m, with **1m @ 9,082ppm TREO** from 13m (44% MREO; 45% HREO; 64% CREO)
  - **14m @ 2,979ppm TREO** from 29m to EOH, with **2m @ 7,052ppm TREO** from 29m (42% MREO; 45% HREO; 63% CREO)

**MCRB045**

- **40m @ 1,582ppm TREO from surface to EOH** (41% MREO; 44% HREO; 62% CREO) including:
  - **17m @ 2,636 TREO** from 11m, including:
    - **5m @ 4,930ppm TREO** from 19m with **1m @ 6,234ppm TREO** from 21m

**MCRB053**

- **31m @ 1,444ppm TREO from surface to EOH** (44% MREO; 33% HREO; 55% CREO) including:
  - **2m @ 2,656ppm TREO** from 16m, and
  - **6m @ 3,903ppm TREO** from 22m with **2m @ 5,760ppm TREO** from 24m

**MCRB040**

- **55m @ 678ppm TREO from surface to EOH** (23% MREO;) including:
  - **14m @ 1,230ppm TREO** from 41m to EOH with **4m @ 2,190ppm TREO**

**MCRB052**

- **30m @ 650ppm TREO from surface** (37% MREO), including
  - **4m @ 1,916ppm TREO** from 16m (47% MREO)

**MCRB057**

- **45m @ 720ppm TREO from surface** (32% MREO; 29% HREO; 43% CREO), including
  - **5m @ 1,855ppm TREO** from 17m (36% MREO; 30% HREO; 48% CREO)

**MCRB033**

- **24m @ 886ppm TREO from surface** (35% MREO; 42% HREO; 56% CREO)
  - Includes **5m @ 2,378ppm TREO** from 2m, with **1m @ 6,068ppm TREO** from 3m, and
- **3m @ 1,101ppm TREO** from 17m



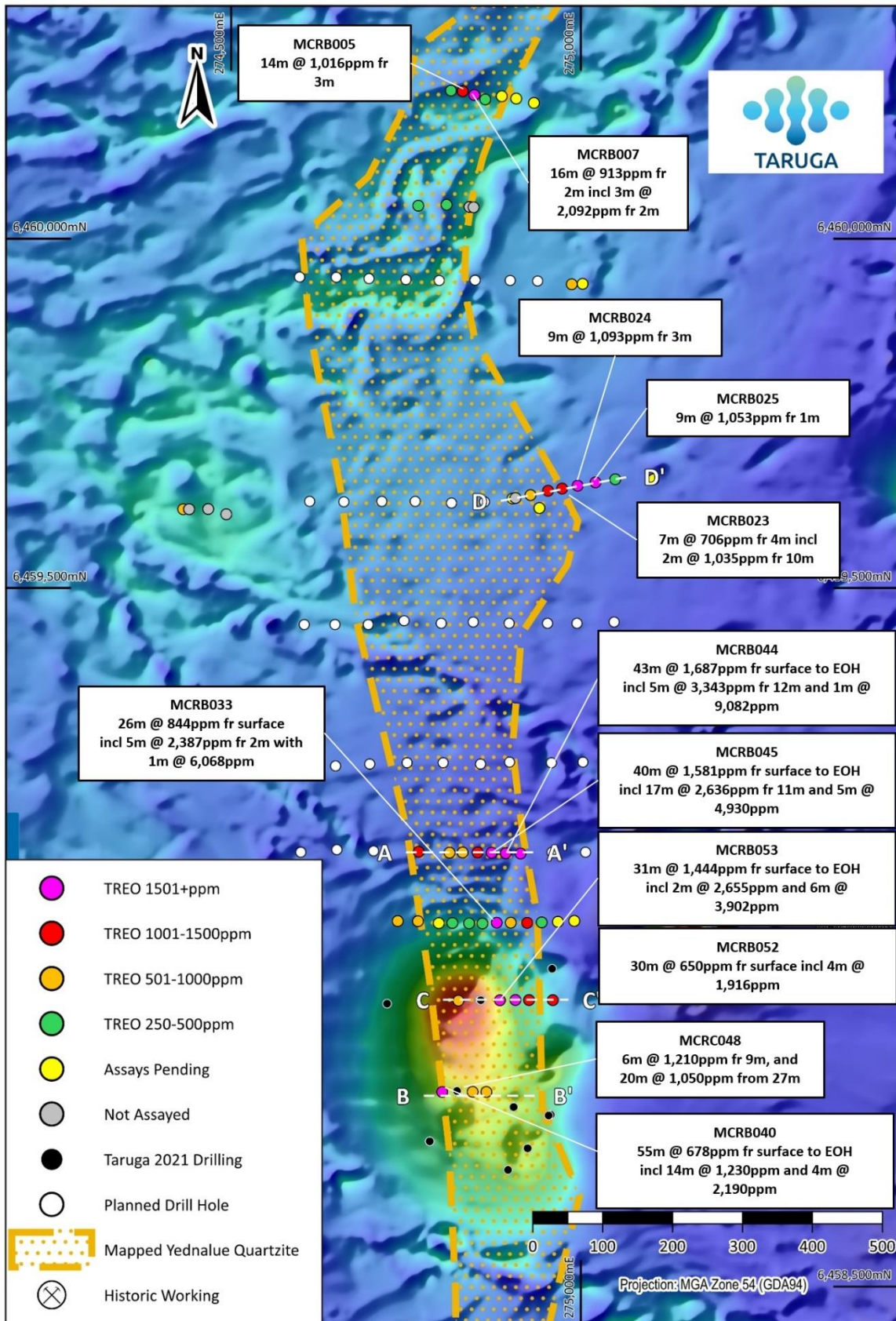
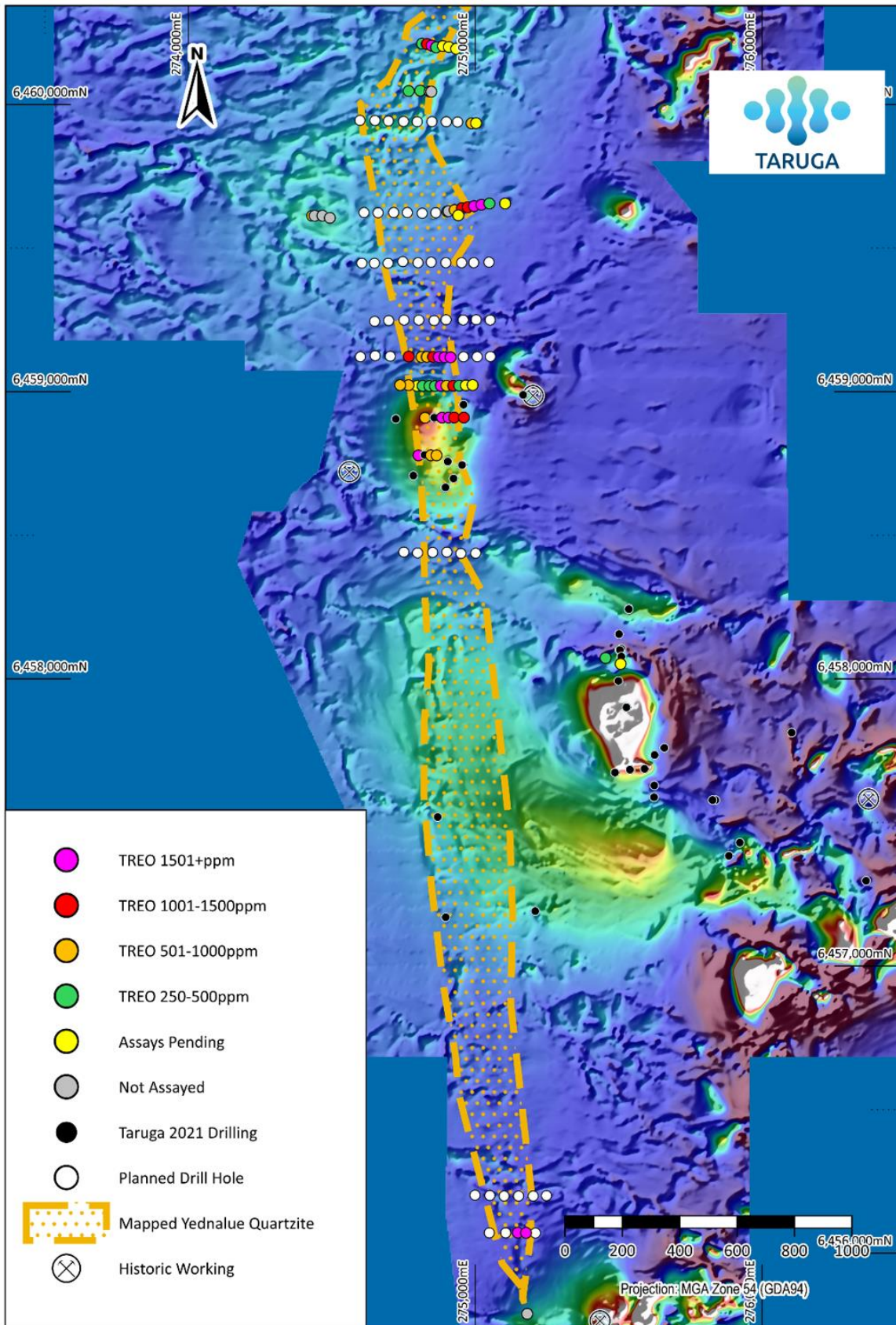


Figure 7. Morgans Creek RAB drilling showing significant intercepts and max TREO grades. Also, lab assay status, the mapped Yednalue quartzite unit, previous Taruga 2021 drilling, and high-resolution ground magnetics TMI image.



**Figure 8.** Regional Morgans Creek RAB drilling showing significant intercepts and max TREO grades. Also, lab assay status, the mapped Yednalue quartzite unit, previous Taruga 2021 drilling, and high-resolution ground magnetics TMI image.



Figure 9. Examples of clays intercepted in the deep weathering profile in multiple RAB drillholes during the recent drilling at Morgans Creek.

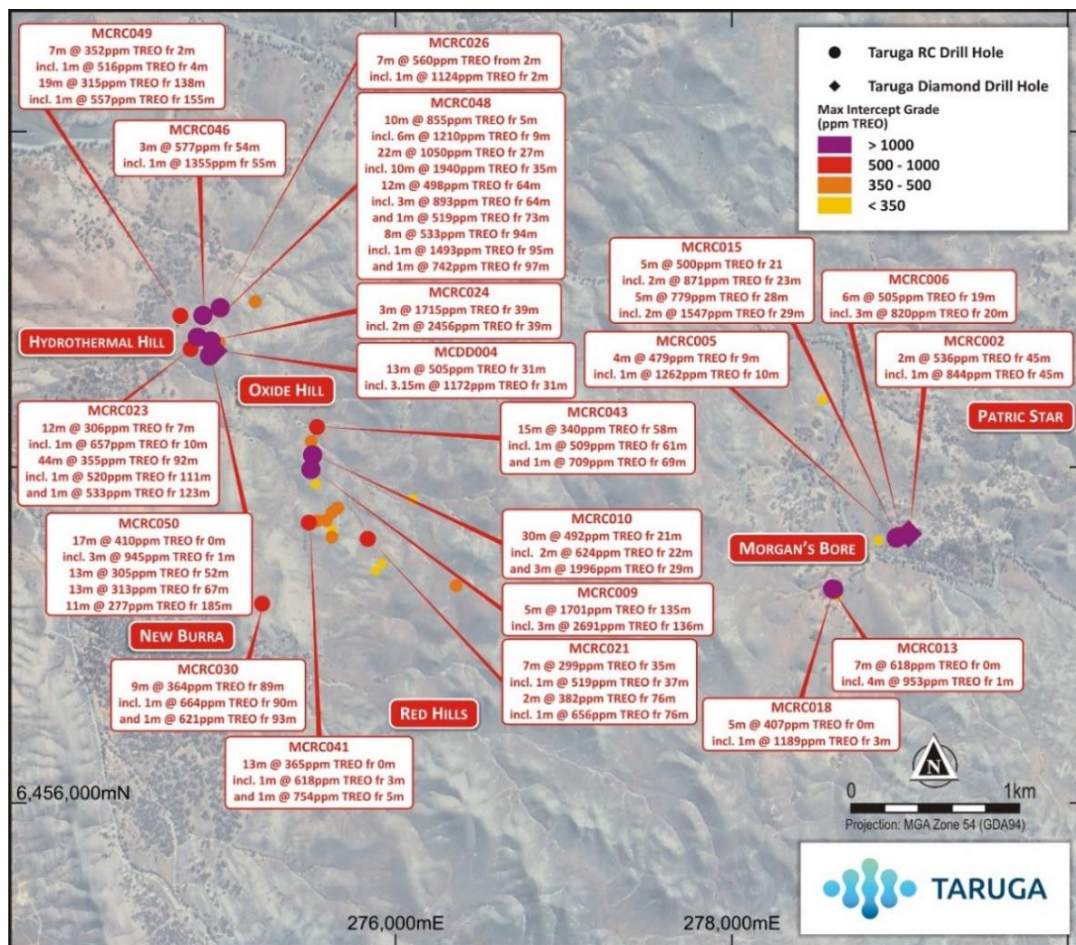


Figure 10. REE Drill results from Taruga's 2021 drilling at Morgans Creek with collars colour coded by maximum TREO grade (purple represents >1,000ppm TREO). Note this excludes current 2022 RAB drilling results.



This announcement was approved by the Board of Taruga Minerals Limited.

**For more information contact:**

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CEO  
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**Competent person's statement**

*The information in this report that relates to exploration results is based on, and fairly represents information and supporting documentation prepared by Mr Brent Laws, a Competent Person who is a Member of The Australasian Institute of Mining and Metallurgy. Mr Laws is the Exploration Manager of Taruga Minerals Limited. Mr Laws has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resource and Ore Reserves". Mr Laws consents to the inclusion in this report of the matters based on their information in the form and context in which it appears.*

*The information in this announcement that relates to metallurgical testwork is based on, and fairly represents, information and supporting documents, reviewed by Mr Gavin Beer who is a consultant to Taruga Minerals Limited and is a Chartered Professional (Metallurgy) and Member of The Australasian Institute of Mining and Metallurgy. Mr Beer has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the JORC Code (2012). Mr Beer consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.*

*\* Taruga confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements. Taruga confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcements.*

**Forward looking statements**

*This announcement contains certain forward-looking statements and comments about future events, including the Company's expectations about the proposed transaction, the proposed tenements and the performance of its businesses. Forward looking statements can generally be identified by the use of forward-looking words such as 'expect', 'anticipate', 'likely', 'intend', 'should', 'could', 'may', 'predict', 'plan', 'propose', 'will', 'believe', 'forecast', 'estimate', 'target' and other similar expressions within the meaning of securities laws of applicable jurisdictions. Indications of, and guidance on, future earnings or financial position or performance are also forward-looking statements.*

*Forward looking statements involve inherent risks and uncertainties, both general and specific, and there is a risk that such predictions, forecasts, projections and other forward-looking statements will not be achieved. Forward looking statements are provided as a general guide only and should not be relied on as an indication or guarantee of future performance. Forward looking statements involve known and unknown risks, uncertainty and other factors which can cause the Company's actual results to differ materially from the plans, objectives, expectations, estimates and intentions expressed in such forward-looking statements and many of these factors are outside the control of the Company. As such, undue reliance should not be placed on any forward-looking statement. Past performance is not necessarily a guide to future performance and no representation or warranty is made by any person as to the likelihood of achievement or reasonableness of any forward-looking statements, forecast financial information or other forecast. Nothing contained in this announcement nor any information made available to you is, or shall be relied upon as, a promise, representation, warranty or guarantee as to the past, present or the future performance of the Company.*

*Except as required by law or the ASX Listing Rules, the Company assumes no obligation to provide any additional or updated information or to update any forward-looking statements, whether as a result of new information, future events or results, or otherwise.*

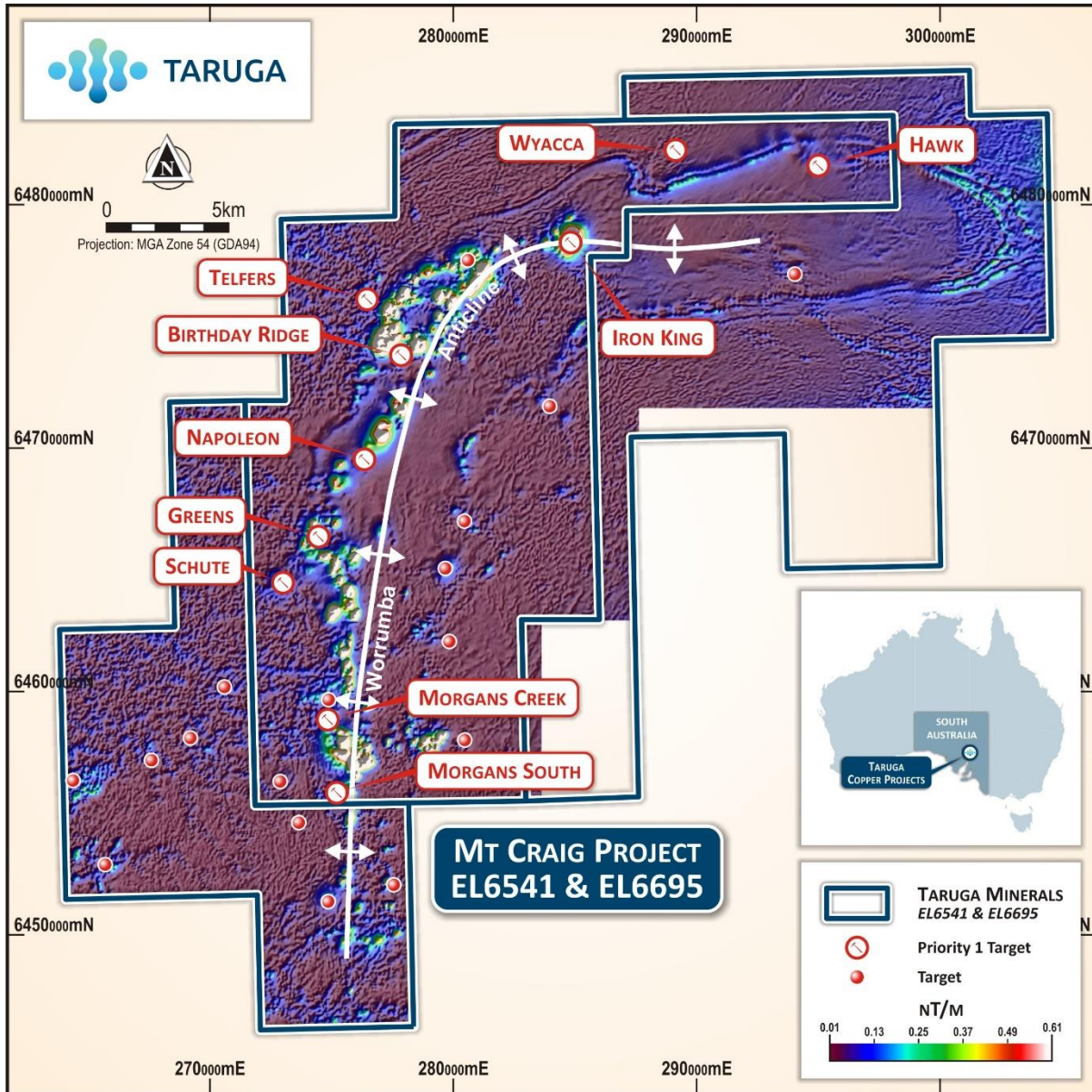


Figure 11. MCP Project outline showing priority exploration targets, the main structural feature being the Worrumba Anticline, and the Analytical Signal magnetics image.

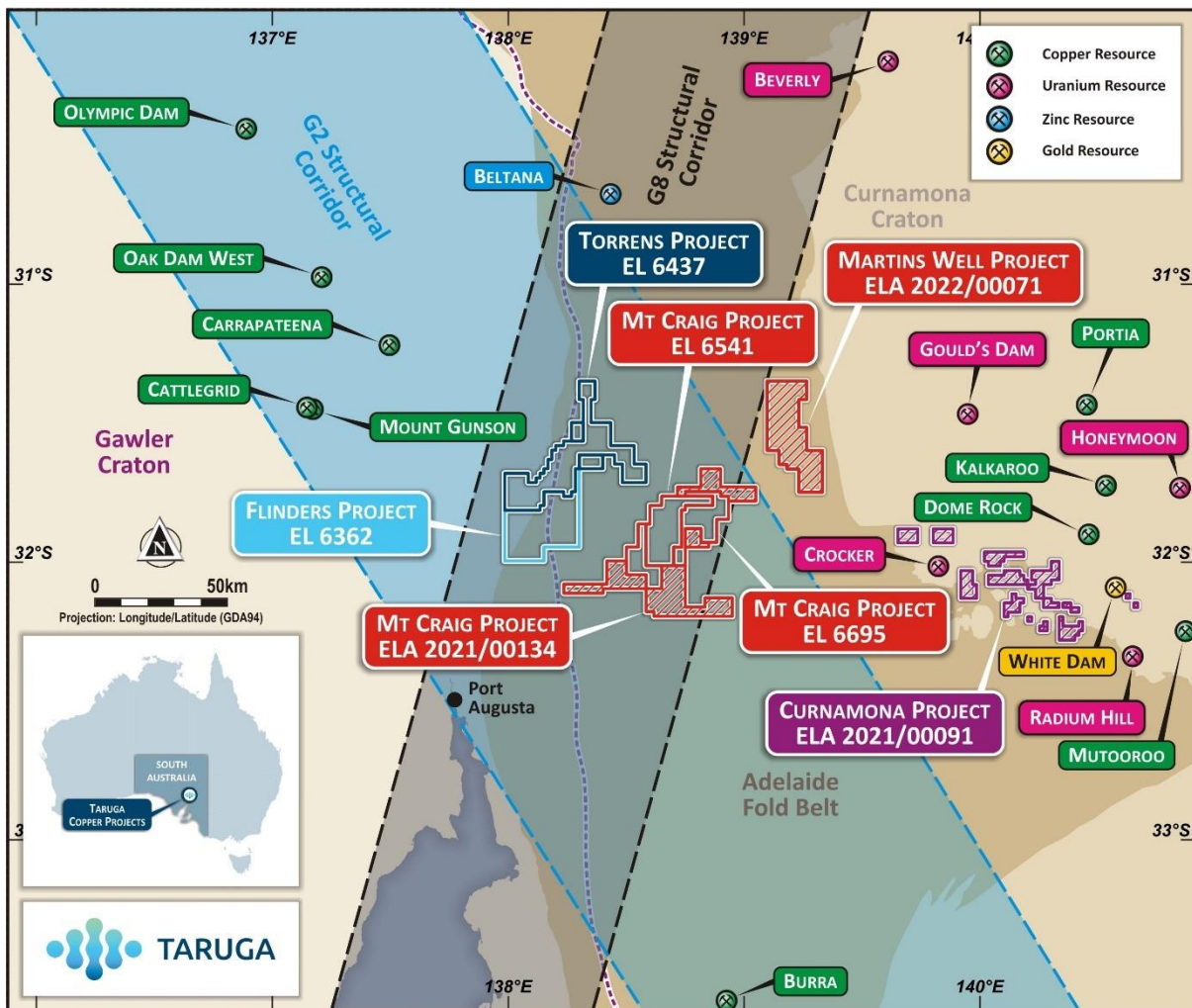


Figure 12. Tenement Map showing Taruga's South Australian projects.