



Presentation | 16 December 2024 | ASX: AHK

Scoping Study results – Sandy Mitchell REE project

ARK MINES
— LTD. —

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Corporate Snapshot



AHK

ASX
Code



55,446,413

Shares on Issue



~\$0.16

Share Price



5,267,317

Options on Issue



ca. \$13M

Market Capitalisation



\$0.6M

Cash as at 30 September 2024



Roger Jackson - Executive Chairman

Geologist with 30+ years in exploration, development and mining operations.



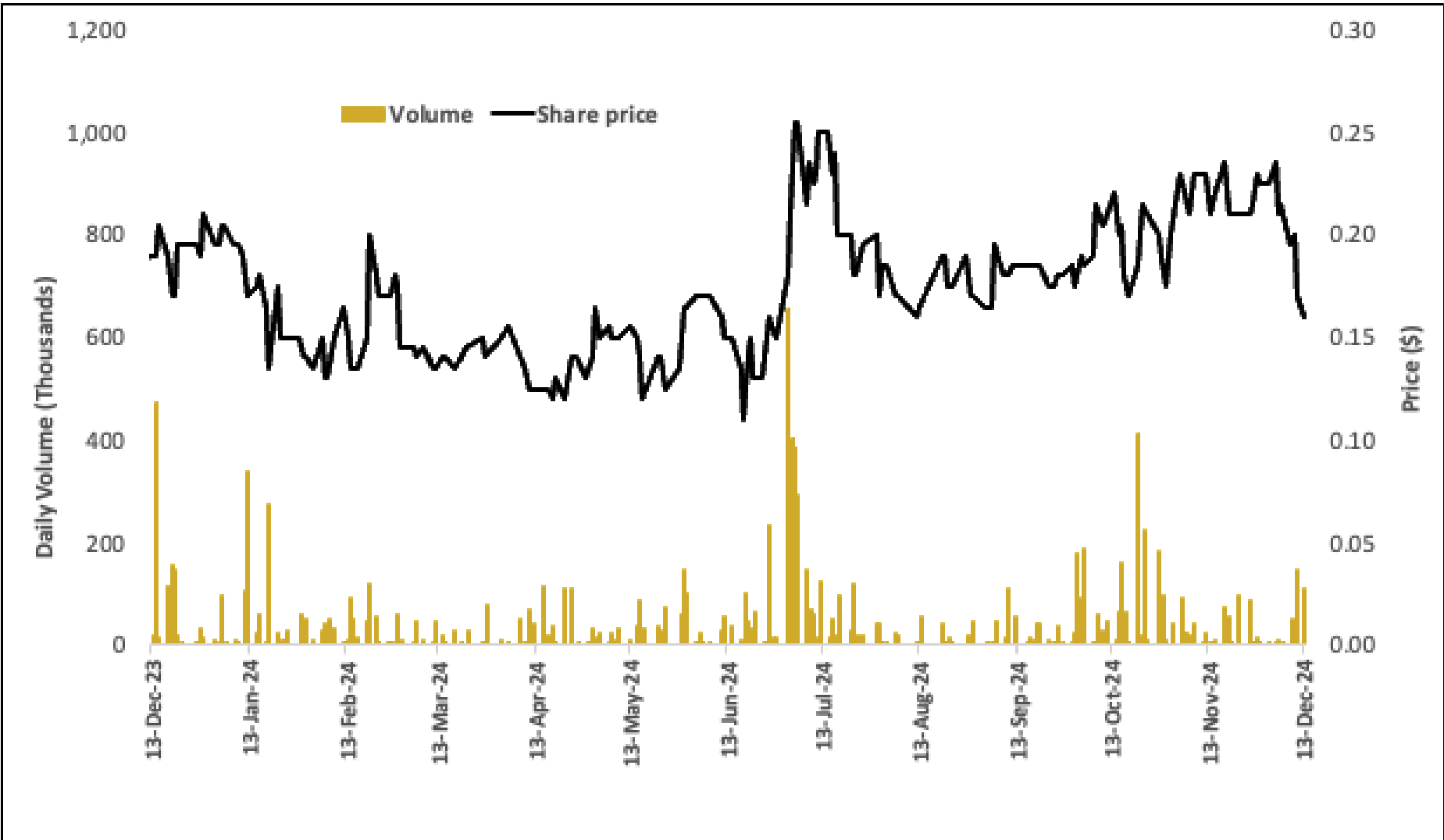
Benjamin Emery - Executive Director

25+ years in metals marketing, metals trading, exploration, development and mining operations.



Ian Mitchell - Non-Executive Director

30+ years in Legal and Corporate in the IPO and mining and exploration public company space.



**SANDY
MITCHELL**
**THE ONLY INLAND
SURFACE
EXPRESSED
PLACER DEPOSITS
TO HOST RARE
EARTHS ON THE
ASX**

**A CAPEX LITE RARE EARTH PROJECT START-UP WITH
LOW OPERATIONAL COSTS; SIGNIFICANT NEAR-TERM DEVELOPMENT
OPPORTUNITY WITH A LOW ENVIRONMENTAL IMPACT**

**HOSTS ALL THE RARE EARTHS, HEAVY MINERALS, AND
PHOSPHATE**

**THE PROJECT HAS ACCESS TO QUALITY NEARBY
INFRASTRUCTURE, FAVOURABLE REGULATORY REGIME,
SAFE JURISDICTION, EASE OF PERMITTING – NORTH
QUEENSLAND**

**UNDERPINNED BY A TEAM WITH MINE DEVELOPMENT,
COMMODITIES TRADING, AND EXPLORATION SKILLS**

SANDY MITCHELL IS A PLACER SAND RARE EARTHS DEPOSIT

Robust Measured Mineral Resource Estimate (MRE) at Sandy Mitchell Rare Earth and Heavy Mineral Project

- Measured Mineral Resource Estimate (MRE) of 71.8 Mt @ 1,732.7 ppm Monazite Equivalent calculated using a 700ppm MzEq lower cut-off grade.

Monazite equivalent calculation

MzEq = 1.000 x monazite + 1.000 x xenotime + 0.361 x zircon + 0.281 x rutile + 0.165 x hi Ti leucoxene + 0.126 x lo Ti leucoxene + 0.072 x altered ilmenite + 0.065 x ilmenite. The proportions of valuable elements in recoverable economic heavy minerals are ascertained by QEM scan deportment percentages applied to all elements

- Reported MzEq and HM grades are expected to support strong project economics through simple low-cost downstream processing, with reference to current market prices for monazite concentrate¹.
- The resource includes a basket of high value Heavy Minerals (HM), comprised of the following:
 - Monazite 1,229 ppm
 - Xenotime 115.7 ppm
 - Zircon 663 ppm
 - Ti Minerals: Rutile 105 ppm, High Ti Leucoxene 304 ppm, low Ti Leucoxene 193 ppm, Altered Ilmenite 313.8 ppm and Ilmenite 340 ppm
- High magnetic REO (Nd, Pr, Dy, Tb) element proportion of 25 % of the TREO basket, positioning Sandy Mitchell as one of Australia's most enriched MREO deposits.
- MRE developed from only 4.5 % of the available anomaly area at Sandy Mitchell, with 87.04 km² available based on an Exploration Target estimated for Sandy Mitchell of 1.3 billion tonnes to 1.5 billion tonnes @ 1250 to 1490 ppm monazite equivalent. Real and substantial potential for Mineral Resource expansion. (*The potential quantity and grade of the Exploration Target is conceptual in nature*; there has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in estimation of a Mineral Resource). See <https://arkmines.com/osx-announcement-sandy-mitchell-mine-020724/>

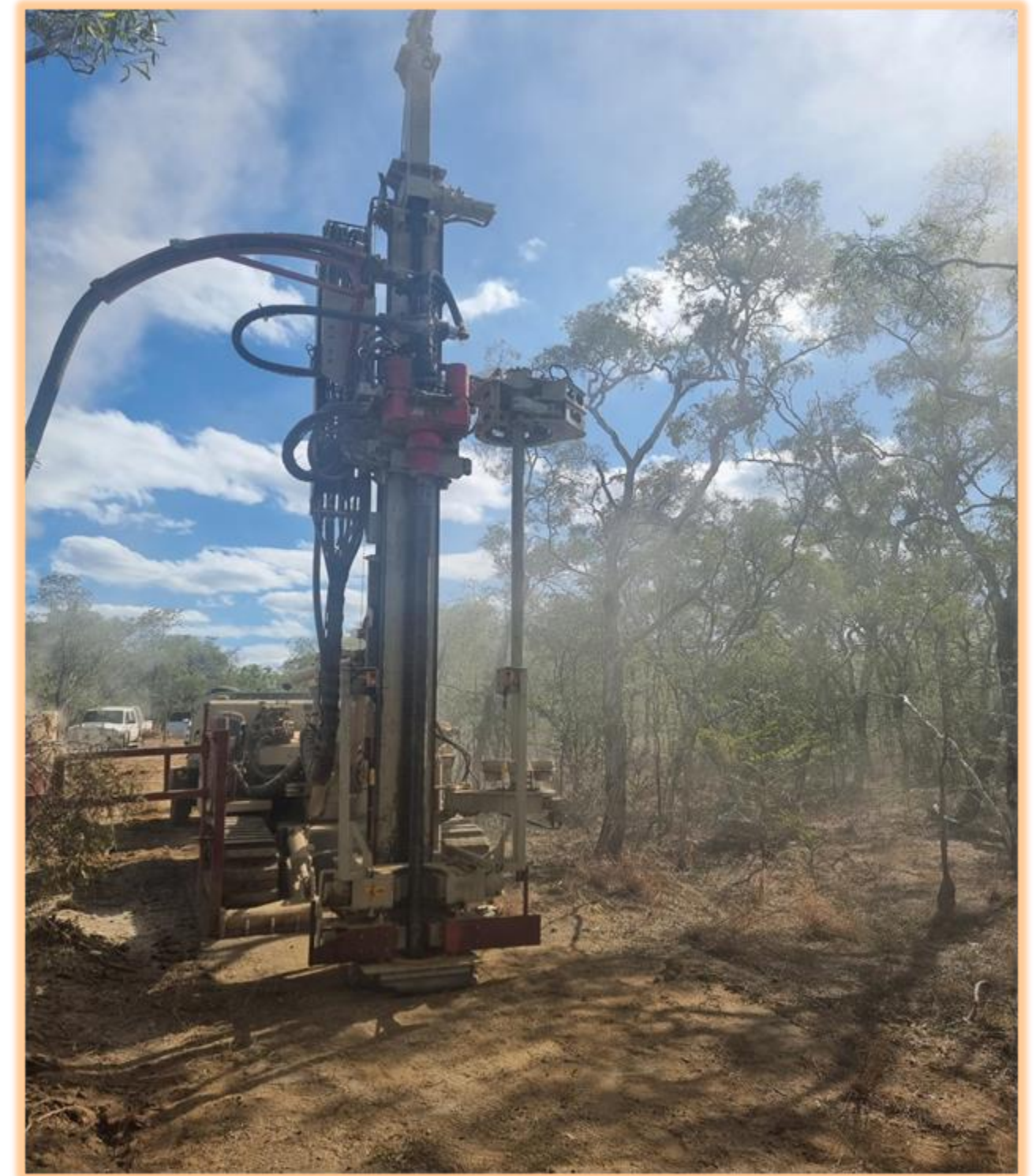
Refer to AHK ASX announcement 021024

- The Ark Mines Scoping Study is a base case report and was undertaken to gain an understanding of the economics and commercial potential of the project.
- Scoping Study does not reflect the upside from additional project optimisation and resource expansion, which will be incorporated into the PFS.
- By preparing the Scoping Study on a base case scenario, Ark has engaged extensively with regulators to ensure its compliance requirements have been met.
- Following the Scoping Study, Ark has a busy near-term works program comprising:
 - Recoveries:
 - Slimes metals ie smaller particles are not in the recovery calculations
 - Spiral processing by size ranges is yet to be tested. – optimising recoveries
 - Capex:
 - Much of the capex is mobile equipment – and will/may be financed and as such will be expensed.
 - Some plant may be rationalised
 - Converting more of the massive Exploration Target to a JORC 2012-compliant resource
 - Scoping Study was based on 71.8Mt Measured resource – just 4% of the 1.5Btn Exploration Target
 - Process efficiencies.
 - Ongoing testwork is showing there is potential for even more efficient metallurgical processing.
- Financial forecasts in the Scoping Study were also based on current spot prices, which Ark believes sit at the low end of the cycle.

The sand only Rare Earth project is simple and has a low environmental impact.

Highlights

- Potential for a large source of Australian zircon and a monazite and xenotime REMC (Rare Earth Mineral Concentrate)
- Scoping Study supports continued progression of mining and processing methods in line with stated development strategy based on low-cost beneficiation by gravity processing
- Low capex and opex, enabling fast start-up to produce critical a REE concentrate to sell to processing refineries
- Proven simple concentration and separation technology
- Return on investment within 3–4 years based on declared Measured resource of 71,789,616 dry tonnes grading 1,732ppm Monazite Equivalent
- Value of garnet content within the resource is yet to be fully quantified
- Input metallurgy and processing will be optimised with further metallurgical testwork
- Board will now progress the works program to advance project development at Sandy Mitchell, including the commencement of a Pre-Feasibility Study (PFS) expected in 2025.



On-site drill program at Sandy Mitchell

Key scoping study metrics

Capex	AUD120–150 million
Opex	AUD3–4 per mined tonne ore
Freight to Queensland port	AUD110–125 per tonne

Based on estimated zircon and rare earth mineral concentrate (REMC)	
EBITDA pre-tax	AUD\$45m – \$53m
Annual revenue	AUD\$120m - \$130m
Payback period	3-4 years

Ongoing test work is underway to evaluate additional processing of the ultra-fine material with early indications that improved recoveries are possible.

Full potential of garnet recovery and grade in progress during prefeasibility study (PFS).

Scoping Study outcomes (continued)

Mining and rehabilitation continuous advancement

Well-proven advance mining and rehabilitation methods meaning smaller operational footprint and faster return to pastoral use.

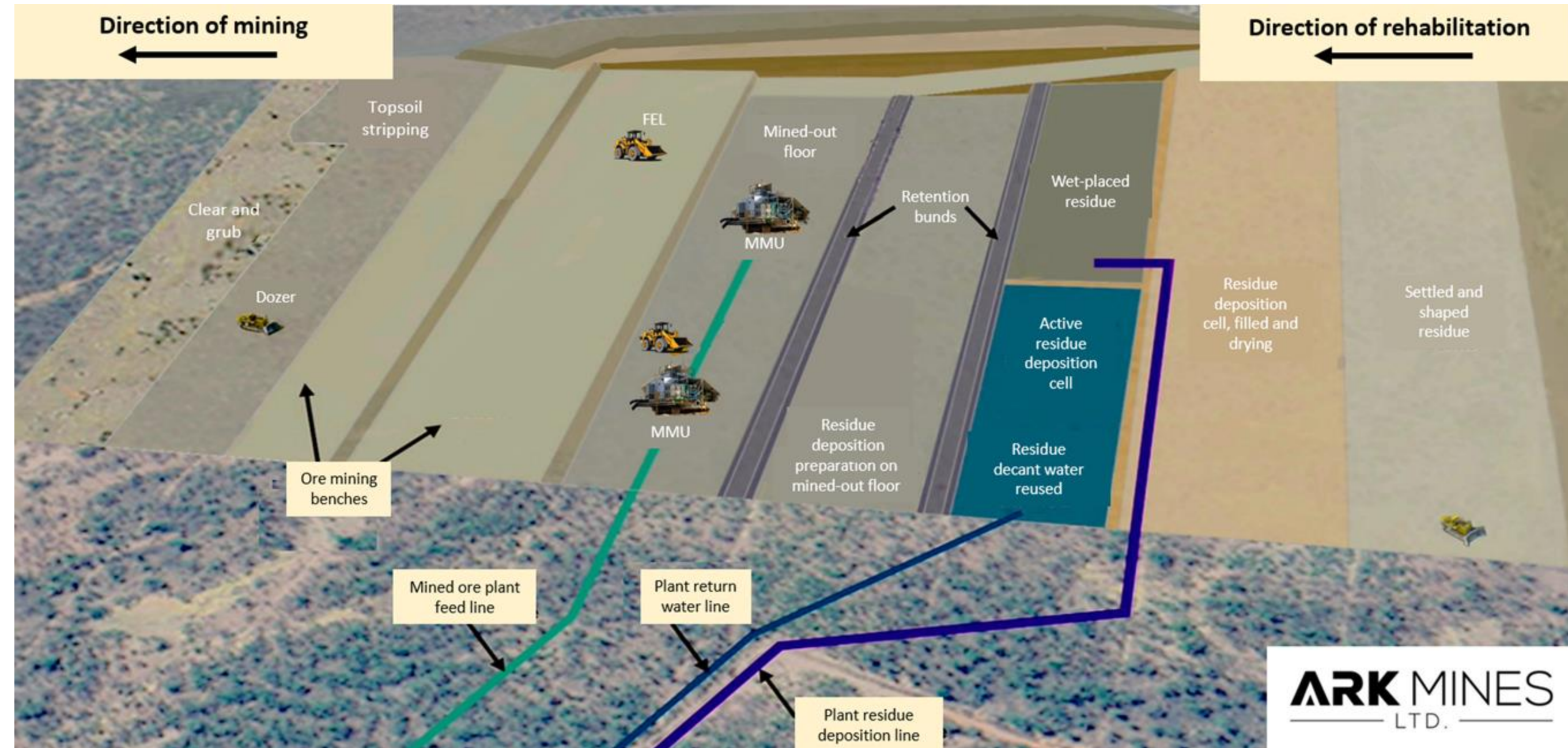
Mine rate 3000 t/h
20-22 Mt/a

Low-cost, low-risk mining
No comminution
Front-end loaders dig and load
Ore mining starts early
Fast ramp-up to saleable product via
MMU - mobile mining unit
WCP – wet concentrator plant
MSP – mineral separation plant

Simple uncomplicated mine plan

No drill and blast
No overburden
Low clay
10–15 metres maximum depth
Low noise level

Chemical-free processing
All residues returned to pit
Returned to farmland in shortest time
Rehabilitated landform to landholder requirements



Mineral recoveries (without fines)

Product basket	In situ (g/t)	Contained (%)	Recovery (%)
Zircon	686.9	0.069	55-58
Rutile	107.1	0.011	2-3
Xenotime	117.3	0.012	40-44
Monazite	1220.5	0.120	40-44
Garnet	3250.0	0.330	55-58

Recoveries are estimates based on characterisation studies and current test work phase of work. They are within Scoping Study levels of accuracy.



Straightforward beneficiation through gravity processing

Silts test work

Ongoing test work is already showing positive outcomes expected to increase recoveries of all heavy minerals from the ultra-fine material



Laboratory-scale, multi-gravity separator (MGS) testing with Sandy Mitchell HMC

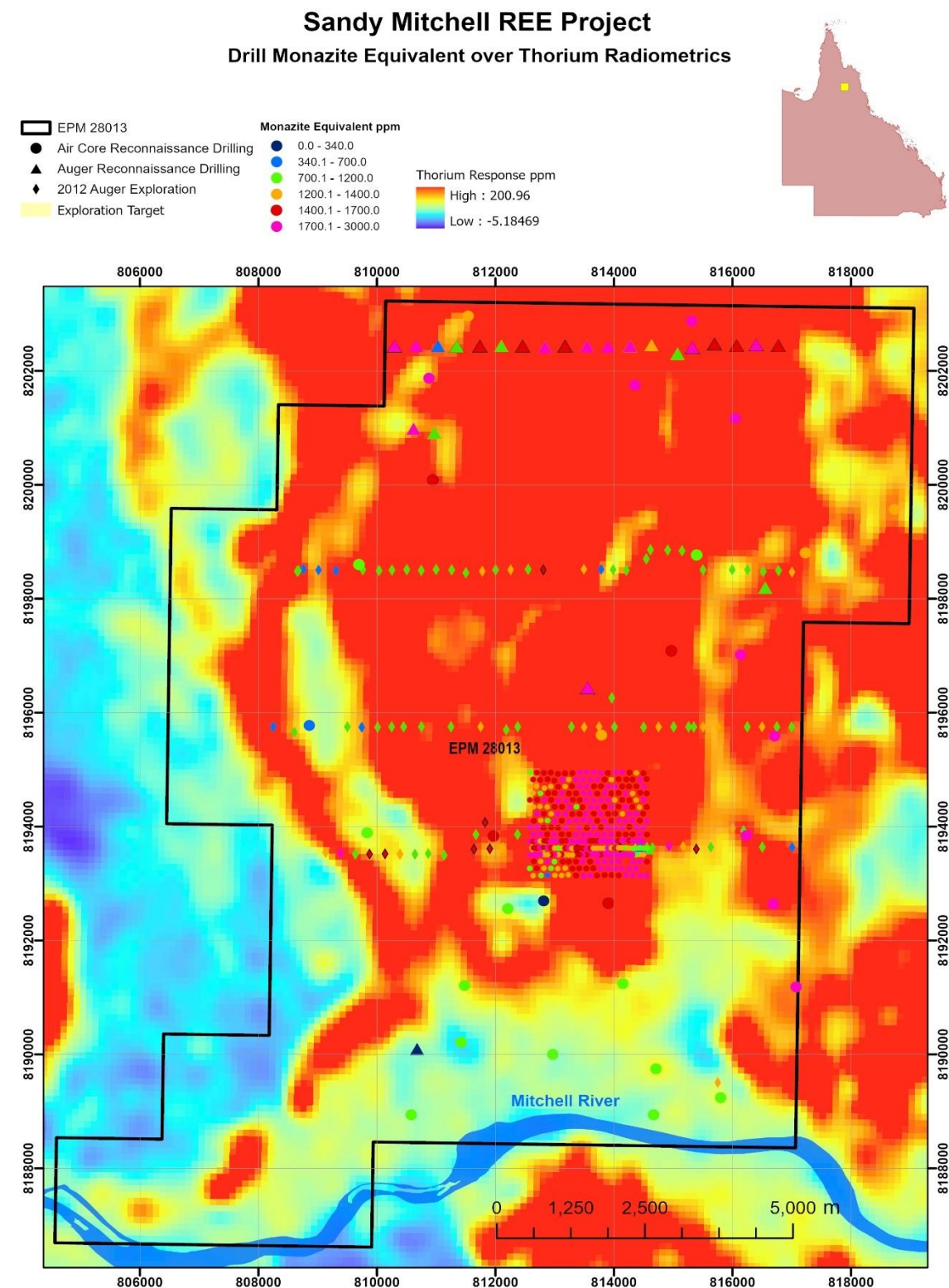


Separation in the ultra-fine fractions



Proof-of-concept testwork

Exploration target confirms world-class placer REE deposit



Stage 1 and 2 drilling; monazite equivalent shown against the thorium band radiometric anomaly.
The resource to date is less than 3% of the area drilled.
Coloured symbols representing holes used in the Exploration Target.

This is a world-class placer REE deposit in a Sandpit

- Exploration Target estimated for Sandy Mitchell: **1.3 billion tonne to 1.5 billion tonne @ 1,286 to 1,903 ppm Monazite Equivalent¹**
- The Exploration Target is summarised in the table below. Most of the Exploration Target lies immediately to the north of the project's recent drilling and maiden resource.

Exploration Target Range	Exploration Target	MzEq	Monazite	Xenotime	Zircon	Rutile	High Ti Leucoxene	Low Ti Leucoxene	Altered Ilmenite	Ilmenite
From Grade (ppm)		1,285.8	976.0	36.3	520.7	60.6	174.6	111.1	180.7	195.6
From (dry tonnes)	1,316,705,000	1,693,000	1,285,000	48,000	686,000	80,000	230,000	146,000	238,000	258,000
To Grade (ppm)		1,903.6	1,444.9	53.7	770.9	89.7	258.5	164.5	267.5	289.6
To (dry tonnes)	1,580,046,000	3,008,000	2,283,000	85,000	1,218,000	142,000	408,000	260,000	423,000	458,000

Exploration Target Range	Exploration Target	TREO	TREO+Y	LREO	HREO	CREO	MagREO
From Grade (ppm)		315.4	338.1	305.2	10.2	85.1	77.6
From (dry tonnes)	1,316,705,000	415,000	445,000	402,000	13,000	112,000	102,000
To Grade (ppm)		466.9	500.6	451.9	15.1	125.9	114.9
To (dry tonnes)	1,580,046,000	738,000	791,000	714,000	24,000	199,000	182,000

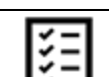
- The Exploration Target includes a basket of high value Heavy Minerals, comprised of the following:
 - ✓ Monazite from 1,285,800 tonnes to 2,283,000 tonnes, grading from 976 ppm to 1445 ppm
 - ✓ Xenotime from 48,000 tonnes to 85,000 tonnes, grading from 36 ppm to 54 ppm
 - ✓ Zircon from 686,000 tonnes to 1,218,000 tonnes, grading from 521 ppm to 771 ppm
 - ✓ Rutile from 80,000 tonnes to 142,000 tonnes, grading from 61 ppm to 88 ppm
 - ✓ Titanium heavy minerals 872,000 tonnes to 1,549,000 tonnes, grading from 111 ppm to 290 ppm

Exploration Target like the resource is based on mineralisation from surface down to an average depth of 11m. Therefore, no overburden removal, simple mining and low environmental impact. Further, development drilling is very affordable.

1. Refer to AHK ASX Announcement 6th November 2024

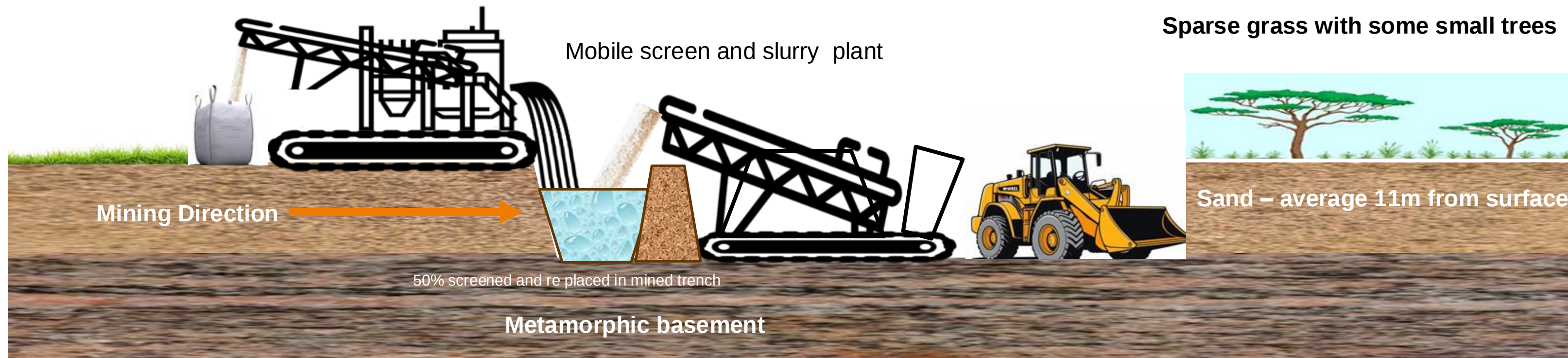
Placer REE deposits have major advantages

PLACER DEPOSITS HAVE DISTINCT GRADE ADVANTAGES AS NATURE HAS ALREADY DONE THE CRUSHING & GRINDING

	Ionic Clays	Hard Rocks	PLACER (SANDY MITCHELL)
 CAPEX	Reasonable	Capex Heavy, Overburden/strip development costs, Mining costs high	Capex lite and utilizing low-cost skid-mounted gravity plant to deliver a concentrate Mining cost and operating cost – negligible
 Scale	Typically, smaller tonnage	Typically require significant scale for economic viability	Potential to be massive tonnage
 Exploration	Resources can be defined inexpensively and rapidly given shallow drilling using aircore, auger, push-tube core	Similar to other hard rock base metals requiring substantial drilling, geochemistry, geophysics etc	Resources can be defined inexpensively and rapidly given shallow drilling using air-core, auger, push-tube core
 Mining	Stripping and progressive rehabilitation. Many have overburden and some strip ratio	Drill and blast with significant mining fleet. Higher strip ratios or expensive underground mining and development	Stripping and progressive rehabilitation. No Overburden Zero strip ratio. Mined with a wheeled loader only Ability to produce a commercially viable concentrate based on much lower head grades
 Permitting	Due to water processing and chemicals Environmental challenges will need to be met	Significant environmental impact	Simple in-situ gravity processing with the sand put back where it was moved from
 Processing	Simple metallurgy; clay is washed with a desorption agent to recover REEs	Strong acids and salts with high temperature +/- pressure. Radioactive tailings	Simple metallurgy; gravity and magnetic in-situ processing, no water, continuous rehabilitation Nature has already done our crushing and grinding Heavy mineral credits

Continuous rehabilitation and production of a high value concentrate at the unique Sandy Mitchell

Wet spiral beneficiation plant –
either mobile or semi mobile



LOW IMPACT MINING

- No drill and blast
- No overburden
- No clay to deal with
- Only 10m deep
- At 10m – you can selectively mine
- No tails dam
- No waste piles

LOW ENVIRONMENTAL IMPACT

- No chemicals
- No salts; no acids
- Simple digging
- In situ processing with gravity only
- No impact on farm country – subsidence
- The landform will be fully reformed to as-before
- Rehabilitated to the landholder liking by only seeding the ground down

Multiple near-term value drivers

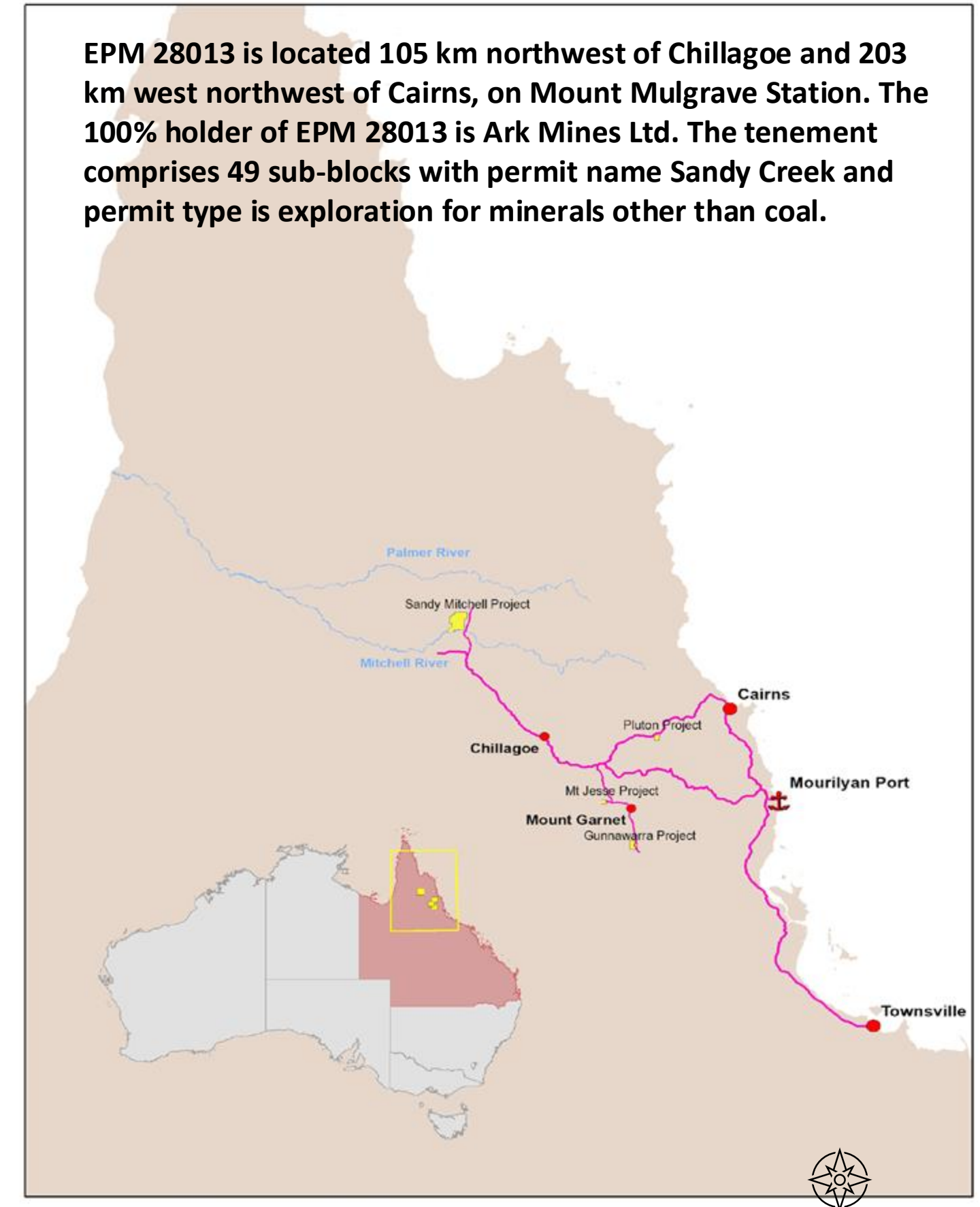


A First-Rate Location



300km west of Cairns and 100km North of Chillagoe

Sits on only one station – 750,000 acres in size



Contact Information



Ben Emery



Managing Director and CEO



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Roger Jackson



Executive Chairman



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