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# RESEARCH

INDEPENDENT INVESTMENT RESEARCH

## Hastings Technology Metals Ltd (ASX: HAS)

Activities Update May 2018

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**Note:** This report is based on information provided by the company as at May 1, 2018

Investment Profile	
Share Price as at May 1, 2018	\$0.26
Share Price Target	\$0.60
Issued Capital:	
Ordinary Shares (M)	711.5m
Options (M)	0.00m
Performance Rights	14.11m
Fully Diluted (M)	725.6m
Market Capitalisation (M)	\$184.9m
12 month L/H (\$)	\$0.075/\$0.375
Cash as at March 31, 2018	A\$24.50

Board and Management	
Mr Charles Lew: Executive Chairman	
Mr Jean Claude Steinmetz: Commercial Non-Executive Director	
Mr Guy Robertson: Finance Director and Company Secretary	
Mr Andy Border: General Manager - Exploration	
Mr Stefan Wolmarans - Chief Operating Officer	
Ms Pit Wah Chung: Chief Financial Officer	
Mr Hannes Zandberg: Project Director	
Mr Robin Zhang: Process Engineering Manager	

Major Shareholders	
HSBS Custody Nominees Aust Ltd	29.90%
Citicorp Nominees Pty Ltd	14.91%
Mr Charles Lew*	13.70%
J P Morgan Nominees Aust Ltd	12.33%
Top 20	86.46%
Board and Management	13.88%

\*Includes direct and indirect holdings



The investment opinion in this report is current as at the date of publication. Investors and advisers should be aware that over time the circumstances of the issuer and/or product may change which may affect our investment opinion.

Senior Analyst – Mark Gordon

### MOVING TOWARDS DEVELOPMENT

Hastings Technology Metals ("Hastings" or "the Company"), in which we initiated coverage in April 2017, continues to make substantial progress on its Yangibana Rare Earths Project ("Yangibana" or "the Project") in the Gascoyne region of Western Australia. Yangibana is characterised by a very high proportion of the high value neodymium and praseodymium rare earth oxides, elements vital for the growing permanent magnets market, as used extensively in electric motors and generators.

The Company, which is looking towards first production from Yangibana in early 2020, completed, through its independent consultants Wave International and Snowden, a robust Definitive Feasibility Study ("DFS") in late 2017. This returned an after tax NPV<sub>8</sub> of A\$466 million and an IRR of 78% for an up-front capital cost of A\$335 million and operating costs of A\$17.06/kg or US\$12.80/kg total rare earth oxides ("TREO") - this should provide a high operating margin with forecast basket prices in the order of US\$35/kg TREO. In addition, given that the planned eight year operation treats only ~35% of the current 21Mt resource base, there is significant scope for production upside with further conversion of Resources to Reserves.

Key steps now include financing and the completion of permitting. On the financing side Hastings has now signed four offtake memorandums of understanding ("MoUs") for ~73% of planned mixed rare earth carbonate ("MREC") production with a view to negotiating commercial offtake agreements which are a critical step in obtaining project financing. The Company is also currently negotiating with potential lenders.

Permitting is well advanced, and expected to be completed by Q1, 2019, with elements already in place including the Native Title Agreement ("NTA"), Mining Leases ("MLs") and the assignment of Lead Agency Permitting with the WA authorities. The Company has been given approval to commence early works, including construction of the accommodation village (for which a contract has been signed) and access road - work on these is expected to commence in May.

We now expect a period of intense activity for Hastings with, in addition to the project development and financing activities, a drill programme as recently commenced to upgrade additional Resources to Reserves, with a target of increasing these to at least 7.5Mt from the current 5.1Mt by early Q3, 2018 and to 10Mt by Q1, 2019, with the aim to increase mine life.

### KEY POINTS

**High value resource:** A key characteristic of Yangibana is the high 40% relative content of the high value neodymium oxide (Nd<sub>2</sub>O<sub>3</sub>) and praseodymium oxide (Pr<sub>6</sub>O<sub>11</sub>) in the total rare earth oxide ("TREO") Probable Reserve grade of 1.12% - this is one of the highest ratios globally and hence results in one of the highest basket prices globally.

**Forecast strong rare earths markets:** Many commentators forecast that rare earths, and particularly the "magnet" oxides will perform strongly over coming years with the expected growth in the use of "green" technologies - we have seen basket prices increase over 50% since our initiation report.

**Low sovereign risk destination:** Western Australia is a premier global mining destination, ranked 5th globally and 1st in Australia in the 2017 Fraser Institute survey of mining companies. The state is served by excellent infrastructure and ready access to skilled labour and services. In addition it has a well developed and transparent mining law and permitting process.

**Permitting well advanced:** A number of key permits have now been granted, with finalisation of permitting expected in early 2019.

**Offtake MoUs signed:** This is a key step towards project financing, with the Company confident that these will result in binding agreements; another key feature is that these include potential offtake partners from both Europe and China.

**Ongoing news flow:** We expect continuing positive news flow as the Project moves towards development.

### VALUATION - \$0.60/SHARE

We have carried out a funded after tax valuation for Hastings, with this including an NPV valuation for Yangibana at current rare earth prices, a nominal value for Brockman and cash.

This gives a base case valuation of A\$556 million, equivalent to a per share valuation of A\$0.60 based on a share base of 933 million diluted for planned equity raisings.

We see upside with further advancing of Yangibana (particularly with material advances in offtake agreements, financing and development), as well as increases in Reserves.

## ACTIVITIES UPDATE

- ◆ This note presents an update on activities that have been completed by Hastings subsequent to our April, 2017 initiation report - a full overview of the Company is presented in the 2017 note.
- ◆ Work carried out by the Company over the past 12 months has been targeted at progressing Yangibana to development, with key advances amongst others including:
  - Completion of the DFS (November 2017) - this incorporated updated Mineral Resources, initial Ore Reserves and the positive results from ongoing metallurgical testwork;
  - Signing of an NTA with Traditional Owners amongst other permitting advances; and,
  - Signing of four offtake MoUs covering ~73% of planned MREC production from the Project.
- ◆ In addition there have been some Board changes, with Mr Guy Robertson joining as Finance Director and Company Secretary (he was formerly the CFO and Company Secretary); Mr Anthony Ho and Mr Aris Stamoulis both resigned as Directors of the Company during this period.
- ◆ On the Management side Mr Stefan Wolmarans was recently appointed as Chief Operating Officer, having been, since 2016, the study leader responsible for delivering the Yangibana DFS.

## STRATEGY AND PROJECT OVERVIEW

- ◆ Hastings' activities are concentrated on the Yangibana Rare Earths Project, located in the Gascoyne region of Western Australia in which first production is targeted for Q1/Q2 2020, with development commencing in 2018 - the majority of the Project is held 100% by Hastings, with some areas also held in a 70/30 JV with AIM listed Cadence plc.
- ◆ In late 2017 the Company completed a positive DFS on 100% owned areas of the Project, with development now ready to commence - upcoming activities, expected to commence in May, and which are funded, include the construction of a site access road and accommodation village, with long lead time items, including the rotary kiln and sulphuric acid plant now being tendered for.

Figure 1: Project location map



Source: Hastings

- ◆ Hastings also holds a 100% interest in the Brockman Project near Halls Creek in the Kimberley region of Western Australia (for which the Company is now applying for an ML); however this is of a secondary priority, and will not be covered in detail.
  - Brockman has a JORC compliant resource of 41.4Mt @ 0.21% TREO, including 0.18% heavy rare earth oxides (“HREO”), comprised largely of Dy and Y
  - It is in a region that hosts a number of gold and REE occurrences.

## CAPITAL RAISED

- ◆ Subsequent to our April 2017 initiation note the Company has raised a total of A\$34.18 million before costs in three main capital raisings:
  - July 2017 - fully underwritten SPP that raised A\$5 million at A\$0.086/share;
  - July 2017 - placement that raised A\$16.25 million before costs at A\$0.20/share with an additional A\$170k subscribed for by directors; and,
  - March 2018 - fully underwritten 1 for 17 rights issue that raised A\$12.24 million before costs at A\$0.31/share.
- ◆ This has resulted in a cash balance of A\$24.495 million as of March 31, 2018, with this to be largely used in construction of the access road, accommodation village and downpayments on the rotary kiln and sulphuric acid plant.

## DEFINITIVE FEASIBILITY STUDY COMPLETED

### Overview

- ◆ In November 2017 the Company released the results of the DFS, with key parameters and outcomes presented in Table 1.
- ◆ Key outcomes of the DFS over the 2016 PFS include a 30% reduction in forecast operating costs and a 20% decrease in expected pre-production capital costs; a large part of these savings have come about due to ongoing optimisation of the processing route.

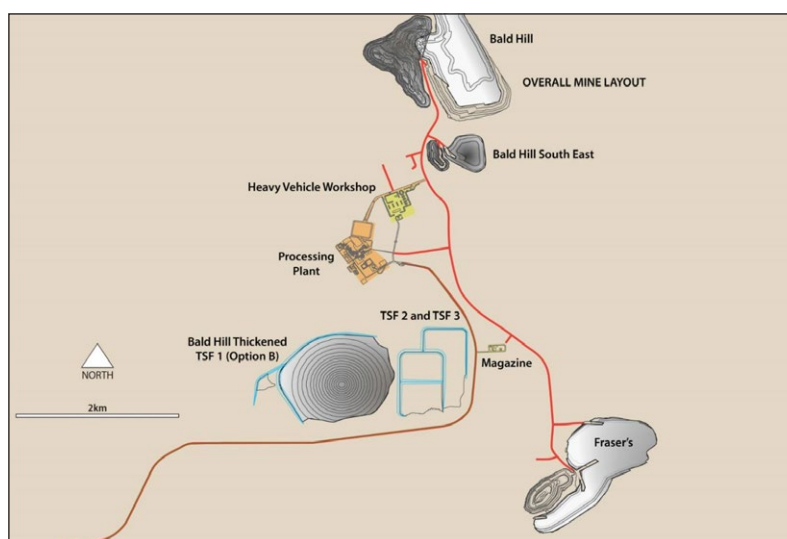
**Table 1: Parameters and values, Yangibana 2017 DFS**

Parameters and values, Yangibana 2017 DFS	
Parameter	Value
Mine Operating Life	8 years
Ore Mining/Processing Rate	Ramp up over 6 months to 1 mtpa, followed by six years production at 1 mtpa
After Tax Net Present Value (8% DR)	A\$466 million
Internal Rate of Return	78%
Payback Period	2.3 years
Bald Hill and Fraser's Reserves (First Six Years Production)	5.16Mt @ 1.12% TREO, including 0.45% Nd <sub>2</sub> O <sub>3</sub> + Pr <sub>6</sub> O <sub>11</sub> . Bald Hill and Fraser's Pits
Years Seven and Eight Production	Measured and Indicated Resources - 2.1Mt @ 1.02% TREO, including 0.34% Nd <sub>2</sub> O <sub>3</sub> + Pr <sub>6</sub> O <sub>11</sub>
Mining Method	Open Pits, with a LoM strip ratio of 12.1:1
Mining Dilution – 0.5m skin on HW and FW incorporated in resource estimation	Variable over LoM, but averaging ~25% - designed to maximise mining recovery
Mining Recovery	98%
Processing Route	Flotation, acid bake – water leach and MREC precipitation
Overall Processing Recovery (TREO) – Ore to MREC	74.9%
Target Production Rate (MREC)	15,000 tpa
Target Contained Nd <sub>2</sub> O <sub>3</sub> +Pr <sub>6</sub> O <sub>11</sub>	3,400 tpa
Pre-Production Capital Costs	A\$335.3m
Production Capital Costs	A\$13.1m
Operating Costs	A\$17/kg TREO
Basket Value Used in Reserve Estimation (less US\$2.50/kg TREO separation charge)	Bald Hill US\$31.70/kg Fraser's US\$32.15/kg
2020 Basket Price Used in Revenue Calculations (less US\$2.50/kg TREO separation charge)	Bald Hill US\$36.06/kg Fraser's US\$36.67/kg
Exchange Rate US\$:A\$	0.75

Source: Hastings

- ◆ The DFS is predicated on the production over eight years of ~15,000tpa of a mixed rare earth carbonate containing ~8,500tpa of TREO through the on-site concentration and hydrometallurgical treatment of ore from two open pits, Fraser's and Bald Hill, with the planned site layout shown in Figure 2.
- ◆ Ore from Fraser's and Bald Hill will be supplemented from material from Yangibana, Yangibana West, Auer and Auer North late in the mining schedule - all areas are on tenements 100% held by Hastings.
- ◆ Planned production includes 5.16Mt of Ore Reserves from Bald Hill and Fraser's, with the balance being a Production Target sourced from Measured and Indicated Resources only - no Inferred Resources have been included in the proposed schedule.
- ◆ The MREC will then be trucked to Fremantle for shipping to customers - the DFS numbers assume sales and costs on a CFR basis.
- ◆ Potential revenue also takes into account a US\$2.50/kg TREO charge for separation of the oxides from the concentrate and removal of impurities.

**Figure 2: Yangibana site layout**



Source: Hastings

## Capital and Operating Costs

- ◆ Expected capital costs are presented in Table 2 and operating costs in Table 3.
- ◆ As mentioned earlier, the DFS has delivered significant costs savings when compared with the PFS, including a reduction 20% in capital costs and 30% in operating costs.
- ◆ The main gains in the operating costs have been with regards to reagents, with ongoing metallurgical optimisation refining the simple processing route.

**Table 2: Capital cost estimate, Yangibana 2017 DFS**

Capital cost estimate, Yangibana 2017 DFS	
Capital Cost Centre	Total A\$m
Mining	\$4.0
Process Plant	\$130.1
Non-Process Infrastructure	\$81.4
Tailings Facility	\$19.8
Indirect Costs	\$56.3
<b>Subtotal - Project Costs</b>	<b>\$291.6</b>
Contingency	\$43.7
<b>Total Pre-Production Project Costs</b>	<b>\$335.3</b>
Plant Sustaining	-
TSF and Evaporation Pond Sustaining	\$5.9
Shire Access Road Upgrade	\$7.2
Total Sustaining Capital Costs	\$13.1
<b>Total LoM Capex</b>	<b>\$348.4</b>

Source: Hastings

**Table 4: Operating cost estimate, Yangibana 2017 DFS**

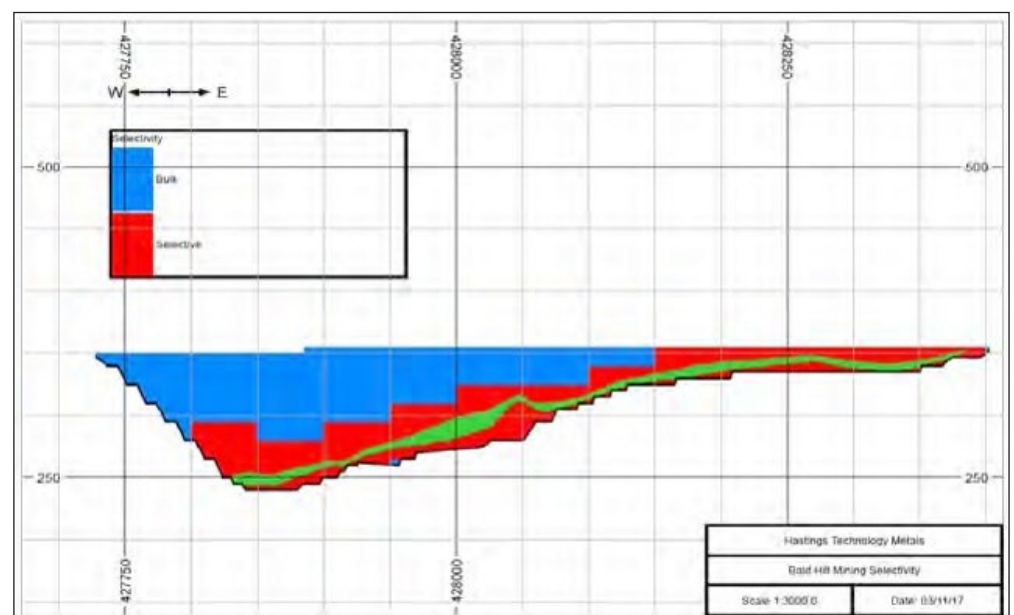
Operating cost estimate, Yangibana 2017 DFS		
Operating Cost Centre	Average A\$/ROM tonne	Average A\$/kg TREO
Mining costs	\$53.15	\$5.5
- A\$4.09 per tonne moved at a 12.1:1 strip ratio		
Labour	\$19.01	\$2.0
Flights, messing and accommodation	\$5.24	\$0.5
Power	\$10.09	\$1.1
Process fuel	\$5.82	\$0.6
Mining fuel (incl. in mining costs)	\$2.33	\$0.2
Maintenance	\$3.69	\$0.4
Consumables	\$2.33	\$0.2
Equipment hire	\$3.10	\$0.3
Product transport	\$3.10	\$0.3
Contract/General expenses	\$5.04	\$0.5
Corporate costs	\$2.33	\$0.2
Mine closure costs	\$5.82	\$0.6
Reagents	\$43.84	\$4.5
<b>Total operating costs</b>	<b>\$164.69</b>	<b>\$17.0</b>

Source: Hastings

- ◆ Our view is that these costs appear to be realistic and reasonable.

## Mining

- ◆ Mining, to be carried out by contract miners, will be from open pits, with the majority from Fraser's and Bald Hill, and with this supplemented by material from Yangibana, Yangibana West, Auer and Auer North late in the mining schedule.
- ◆ Mining methods will include free dig in the oxide material, and drill and blast in the transition and fresh ore - given the high value of the mineralisation selective mining methods will be used (Figure 3).

**Figure 3: Bald Hill pit section, showing selective mining areas (red)**

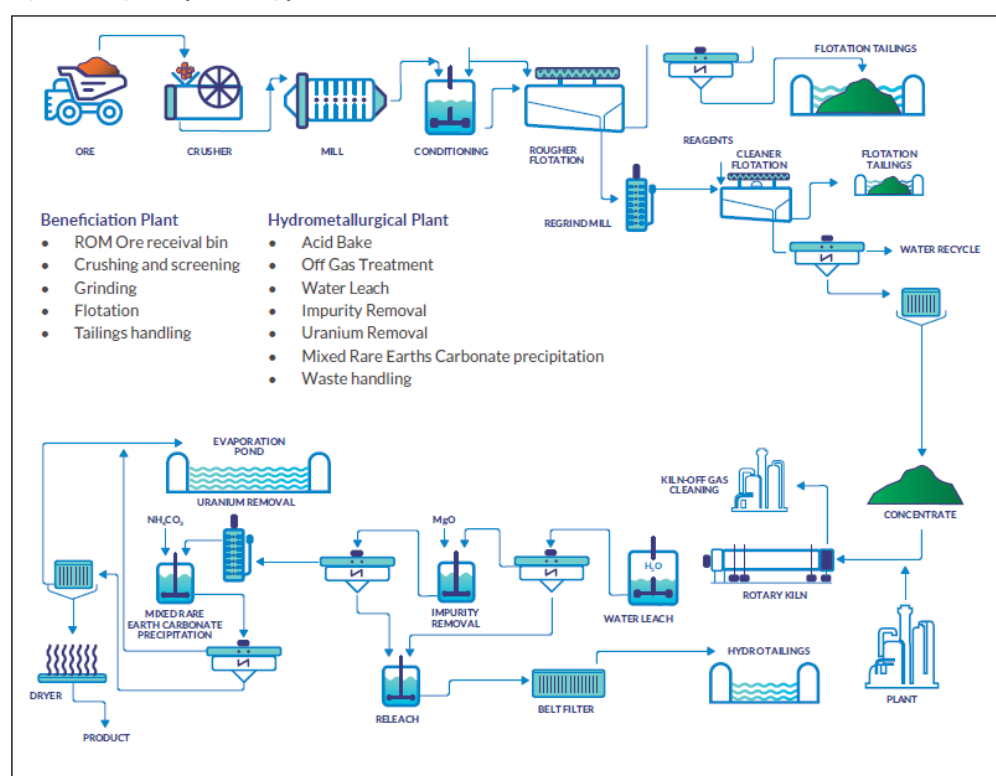
Source: Hastings



## Processing

- ◆ The planned processing circuit is shown in Figure 4.
- ◆ This will include crushing, grinding and then flotation to a concentrate, with post pilot plant optimisation highlighting the potential to recover 85% of the TREO to a 26% concentrate prior to the hydrometallurgical processing.
- ◆ Following concentration, it is planned to produce the MREC through hydrometallurgical processing, including acid bake, water leach and precipitation of the MREC, with pilot plant work achieving overall recoveries of up to 75.6% to the MREC.
- ◆ The DFS has been based on overall recoveries of 74.9% to a ~56% TREO MREC.
- ◆ Concentrate will then be containerised, trucked, shipped and sold.

Figure 4: Yangibana processing plant schematic



Source: Hastings

## Non-Process Infrastructure

- ◆ Transport infrastructure will include a new 28km access road connecting the site to the State road network as well as access by the existing Gifford Creek airfield, which is located 30km from site and will only require minor upgrades to allow for the use by up to 30 seat turboprop aircraft.
- ◆ The DFS has been costed on a 100% FIFO basis, however there is the opportunity to utilise labour from nearby towns - the DFS includes a 240 bed accommodation village with provision for an extra 60 rooms during construction.
- ◆ Power will be provided by two LNG-fired stations on site; a 11MW peak load station for the mine and processing plant and a 1.4MW plant to supply the accommodation village.
- ◆ Water will be sourced from a planned borefield 26km NW from the process plant; work to date has confirmed that this has the capacity to supply the estimated 1.7GL per annum long term requirements.

## Resources and Reserves

- ◆ Updated Mineral Resources are presented in Tables 5 to 7, with these divided between the 100% and 70% held tenements.
- ◆ Drilling during 2017 intersected high grade down dip extensions at a number of the zones of mineralisation, with this then being included in the MRE upgrades which have increased total Resources by 57% over the past year from 13.4Mt @ 1.18% TREO to the current 21Mt @ 1.17% TREO.

- ◆ These Resources are diluted, and incorporate a 0.5m skin on both the hanging wall and footwall - average dilution is in the order of 25%
- ◆ One key feature of the Yangibana deposits is the relatively high grade of the high value neodymium and praseodymium oxides; these are key components in permanent magnets as used in electrical generation and motor applications.
- ◆ The total Ore Reserves (Table 7) include a high value of 40% neodymium/praseodymium, however other less well advanced projects exhibit even higher ratios, including Simon's Find (53%) and Yangibana (48%).
- ◆ The Reserves are from the 100% held tenements only and provide the first six years of mill feed for the proposed operation; the subsequent two years Production Target is sourced from Measured and Indicated Resources only, likewise wholly within the 100% held tenements.

**Table 5: Yangibana Mineral Resource Estimate**

Yangibana Mineral Resource Estimate					
Category	Tonnes	Nd <sub>2</sub> O <sub>3</sub> +Pr <sub>6</sub> O <sub>11</sub> %	TREO %	Nd <sub>2</sub> O <sub>3</sub> ppm	Pr <sub>6</sub> O <sub>11</sub> ppm
Measured	3,900,000	0.42	1.19	3,372	851
Indicated	8,600,000	0.42	1.25	3,368	858
Inferred	8,400,000	0.36	1.09	2,829	740
TOTAL	21,000,000	0.4	1.17	3,152	809

**Table 6: Yangibana Mineral Resource Estimate – 100% held tenements**

Yangibana Mineral Resource Estimate – 100% held tenements					
Category	Tonnes	Nd <sub>2</sub> O <sub>3</sub> +Pr <sub>6</sub> O <sub>11</sub> %	TREO %	Nd <sub>2</sub> O <sub>3</sub> ppm	Pr <sub>6</sub> O <sub>11</sub> ppm
Measured	3,000,000	0.42	1.06	3,404	809
Indicated	6,600,000	0.41	1.09	3,324	794
Inferred	5,800,000	0.35	0.93	2.84	684
TOTAL	15,400,000	0.39	1.03	3,158	756

**Table 7: Yangibana Mineral Resource Estimate – 70% held tenements**

Yangibana Mineral Resource Estimate – 70% held tenements					
Category	Tonnes	Nd <sub>2</sub> O <sub>3</sub> +Pr <sub>6</sub> O <sub>11</sub> %	TREO %	Nd <sub>2</sub> O <sub>3</sub> ppm	Pr <sub>6</sub> O <sub>11</sub> ppm
Measured	900,000	0.43	1.64	3,258	997
Indicated	2,100,000	0.46	1.76	3,507	1,061
Inferred	2,700,000	0.37	1.42	2,806	860
TOTAL	5,600,000	0.41	1.58	3,134	955

Source: Hastings

**Table 8: Yangibana Probable Ore Reserves**

Yangibana Ore Probable Reserves			
Item	Bald Hill	Fraser's	Total
Tonnes (kt)	4,380	780	5,160
TREO (%)	1.04	1.58	1.12
Nd <sub>2</sub> O <sub>3</sub> (ppm)	3,330	5,320	3,630
Pr <sub>6</sub> O <sub>11</sub> (ppm)	783	1,380	873
Eu <sub>2</sub> O <sub>3</sub> (ppm)	79	83	79
Gd <sub>2</sub> O <sub>3</sub> (ppm)	189	197	190
Sm <sub>2</sub> O <sub>3</sub> (ppm)	376	436	385
CeO <sub>2</sub> (ppm)	4,150	6,900	4,560
La <sub>2</sub> O <sub>3</sub> (ppm)	1,200	1,200	1,200
Dy <sub>2</sub> O <sub>3</sub> (ppm)	62	68	63
Tb <sub>4</sub> O <sub>7</sub> (ppm)	19	21	19
Ho <sub>2</sub> O <sub>3</sub> (ppm)	7	7	7
Er <sub>2</sub> O <sub>3</sub> (ppm)	10	11	10
Tm <sub>2</sub> O <sub>3</sub> (ppm)	1	1	1
Yb <sub>2</sub> O <sub>3</sub> (ppm)	5	5	5
Lu <sub>2</sub> O <sub>3</sub> (ppm)	1	1	1
Y <sub>2</sub> O <sub>3</sub> (ppm)	158	169	160

Source: Hastings

## PERMITTING ADVANCING

- ◆ Hastings has made considerable advances in the permitting of Yangibana over the past twelve months, with this expected to be completed in Q1, 2019.
- ◆ A key event was the November 2017 signing of the NTA with the Thiin-Mah Warriyangka, Tharrkari and Jiwarli People (TMWTJ), the Traditional Owners of the land - this agreement covers the complete 650km<sup>2</sup> tenement package, and includes all rare earth minerals.
- ◆ The Project has also been assigned as a Lead Agency Permitting project by the Western Australian Government - this provides an experienced project approvals coordinator within the Department of Mines, Industry Regulation and Safety ("DMIRS", ex-DMR) who will aid in the coordination of the approvals process across the relevant agencies and also identify any potential bottlenecks in the approvals process.
- ◆ The Company has also received an approval by the Environmental Protection Agency ("EPA") to commence Stage 1 works, including the access road and accommodation village.
- ◆ It is expected that the final Public Environmental Review ("PER") documentation for the Mine Development Plan ("MDP") will be lodged with the EPA in Q2, 2018.

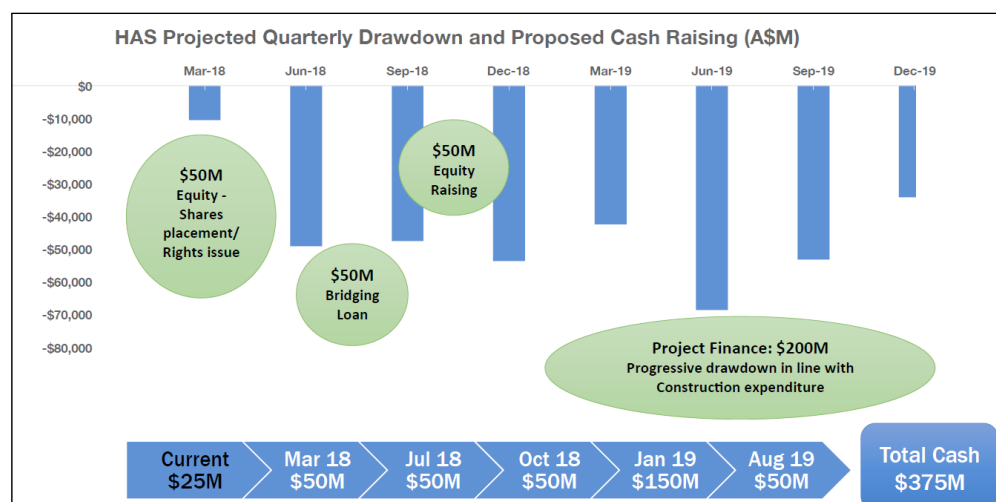
## OFFTAKE AGREEMENTS SIGNED

- ◆ The Company has thus far signed four offtake MoUs covering ~73% of the expected 15,000tpa MREC production.
- ◆ These include:
  - August 2017 - Bautou Sky Rock Rare Earth New Material Co Ltd - 2,500tpa MREC;
  - September 2017 - China Rare Earth Holdings Limited - 2,000tpa MREC;
  - September 2017 - Qiandong Rare Earth Group - 1,500tpa MREC; and,
  - February 2018 - Thyssenkrup Raw Materials Group - 5,000tpa MREC for 10 years.
- ◆ With the MoUs the parties have outlined their intent to enter into binding commercial offtake agreements within twelve months of signing of the MoUs, with the parties to negotiate in good faith.
- ◆ The signing of final offtake agreements will be critical in securing debt financing for the Project, with the signing of the MoUs being a key step towards this.

## FUNDING OPTIONS BEING CONSIDERED

- ◆ The Company will be looking at overall funding requirements in the order of A\$350 million, in addition to the ~A\$25 million currently in the bank - a potential funding programme is presented in Figure 5.
- ◆ Hastings aims for a 65:35 debt to equity mix for the project finance funding, and extra sources for working capital.
- ◆ A number of sources will be considered for the senior and subordinated debt, including export credit agencies, Australian Government funded loan agencies and offtaker financing.

Figure 5: Potential funding programme



Source: Hastings

## CURRENT AND PLANNED ACTIVITIES

- ◆ Activities are targeted at commercial production commencing in Q1/Q2, 2020, with an indicative time line shown in Figure 6.
- ◆ In addition to the activities shown in Figure 6, resource upgrade drilling has recently commenced with the aim to increase reserves to ~7.5Mt in Q3, 2018 and ~10Mt by Q1, 2019, which will lead to an extension in planned mine life.

Figure 6: Indicative project implementation time line

Activities	2017		2018												2019												2020			
	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
Definitive Feasibility Study (DFS)																														
Permitting & Approvals																														
Design for Access Road & Bulk Earthwork for Accom Camp																														
Construct Access Road & Accommodation Camp																														
Basic Engineering Design (BED)																														
Detailed Engineering																														
Procure Long Lead Equipment - Rotary Kiln																														
Procure Long Lead Equipment - Sulphuric Acid Plant																														
Procurement (other equipment & bulk material)																														
Production Plant Construction																														
Commissioning																														
Commercial Production Start																														

Above shows only the main Tender Packages  
■ Critical Path

Source: Hastings

## VALUATION

- ◆ We have completed both funded and unfunded valuations for Hastings using a discount rate of 8% and an AUD/USD exchange rate of 0.75, with the results shown in Table 9.
- ◆ Both result in similar values per share, with the unfunded scenario returning A\$0.65/share and the funded A\$0.60/share.
- ◆ We have used the funding strategy as released by the Company (Figure 5), however we are aware that this may change.
- ◆ Our preferred valuation is the funded scenario, as it takes into account, amongst other things, the effects of dilution due to planned capital raisings.
- ◆ We note that the unrisks NPV for the funded eight year life scenario is A\$138 million more than the unfunded scenario; this is due to the equity capital (A\$100 million) and the discount effect on the relative timing of the debt draw down and loan repayments (also partially offset by the after tax value of interest payments).

Table 9: HAS valuation

HAS valuation				
	Funded, Post Tax Valuation			
	Full NPV	Risk Weighting	Risk Value	Value/Share
DFS Eight Year Project	A\$584 m	70%	A\$409 m	A\$0.44
Other Resources - 12 Years	A\$405 m	27%	A\$111 m	A\$0.12
Brockman	A\$10 m	100%	A\$10 m	A\$0.01
Cash - March 31, 2018	A\$25 m	100%	A\$26 m	A\$0.03
<b>Total</b>	<b>A\$1,025 m</b>	<b>54%</b>	<b>A\$556 m</b>	<b>A\$0.60</b>
Shares on Issue	933,084,897			
	Unfunded, Post Tax Valuation			
DFS Eight Year Project	A\$446 m	70%	A\$312 m	A\$0.44
Other Resources - 12 Years	A\$405 m	27%	A\$111 m	A\$0.16
Brockman	A\$10 m	100%	A\$10 m	A\$0.01
Cash - March 31, 2018	A\$25 m	100%	A\$26 m	A\$0.04
<b>Total</b>	<b>A\$887 m</b>	<b>52%</b>	<b>A\$460 m</b>	<b>A\$0.65</b>
Shares on Issue	710,862,675			

Source: IIR analysis

- ◆ We have used capital and operating cost figures and the production profile as used in the November 2017 DFS - we consider these to be reasonable.
- ◆ The funded case assumes total equity raisings of A\$100 million at A\$0.45/share, with debt totalling A\$250 million borrowed at an interest rate of 5%pa.
- ◆ We consider the risk weighting for the eight year DFS Project, at 70%, to be suitable for the confidence level of the Resources and Reserves.
- ◆ The "Other Resources - 12 Years" line is based on indicative production from years nine to twenty, using the resources remaining after years one to eight.
- ◆ The un-discounted cash flows for this time period are based on the after tax free cash flow for the final full year of operation of the DFS case, with these then discounted back to the present.
- ◆ The risk weighting for these cash flows is based on the resource confidence weighted average of the following risk factors:
  - Measured Resources are weighted at 65%.
  - Indicated Resources are weighted at 45%.
  - Inferred Resources are weighted at 15%.
- ◆ In addition the value has been multiplied by the effective Hastings equity share of the resources, which our calculations indicate is 87%.
- ◆ As part of our analysis we have completed a sensitivity analysis for the Company, with this indicating that the share price is most sensitive to revenue and operating costs – these are compared in the table below.
- ◆ Although this sensitivity is on the overall Company share price, it can be seen as a proxy for Yangibana given that non-Yangibana items only make up some 6% of the total valuation.
- ◆ Revenue will be affected by changes in US-denominated rare earths prices and the AUD/USD exchange rate as well as by grade and recoveries.

**Table 10: Company un-risked sensitivity analysis - funded**

		Change in Revenue				
		-20%	-10%	0	10%	20%
Change in Opex	-20%	A\$0.56	A\$0.68	A\$0.80	A\$0.92	A\$1.05
	-10%	A\$0.46	A\$0.58	A\$0.71	A\$0.83	A\$0.95
	0%	A\$0.35	A\$0.47	A\$0.60	A\$0.72	A\$0.84
	10%	A\$0.23	A\$0.35	A\$0.48	A\$0.60	A\$0.72
	20%	A\$0.09	A\$0.22	A\$0.34	A\$0.47	A\$0.59

Source: IIR analysis

## RISKS

- ◆ **Rare earths prices** – Our view is that this is the key risk facing Hastings – the market is opaque and largely controlled by China, with this bringing uncertainty into prices and price forecasting. On the other hand we have seen considerable improvements in rare earth prices over recent months, particularly in the high value magnet oxides. Also, potential customers will be looking to diversification of supply, with Western Australia being a stable jurisdiction which should allow for reliable supply from any successful operation.
- ◆ **Funding** – Given the above, there may be some difficulty in obtaining traditional project development funding, even if offtake agreements are put in place – debt financiers need certainty in revenue forecasts, else an operation that can absorb large negative changes in prices whilst continuing to service any debt.
- ◆ **Permitting** – This is a risk facing any potential developer, however being located in Western Australia should help things – there will be issues with the presence of thorium in leach residues, however the Company is of the view that these are not insurmountable, and thorium is a common constituent of mineral sands tails. Given the approvals already in place our view is that any issues will not be in a failure to permit, but delays in permitting.
- ◆ **Mining** – Should Yangibana progress, given the generally narrow nature of the mineralisation, care will be needed in mining to avoid excessive dilution above that already allowed for in the mining inventory.

- ◆ **Processing** - New start-ups commonly exhibit some teething issues through commissioning and initial production. This will be a risk for Hastings, however the successful pilot scale test work and "off the shelf" technology go a fair way to mitigating this risk.
- ◆ **Costs** - Although a Company cannot affect prices, it can affect operational costs – given the relatively high price of rare earth processing the Company will need to actively control costs – however the high value of the mineralisation somewhat offsets this, and the Company has successfully lowered forecast costs from the PFS to the DFS.

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