

31 July 2018

**50% INCREASE IN ORE RESERVES AT YANGIBANA PROJECT TO
7.74 MILLION TONNES**

- **Probable Ore Reserves increased to 7.74 million tonnes at 1.13%TREO including 0.43%Nd₂O₃+Pr₆O₁₁**
- **Includes the maiden Probable Ore Reserves at Yangibana West, Yangibana, Auer and Auer North deposits, estimated using JORC Code guidelines (2012 Edition)**
- **These additional Ore Reserves confirm the eight-year mine life as described in the Company's Definitive Feasibility Study (DFS) of November 2017**
- **Drilling continuing to further increase Probable Reserves at Auer and Auer North**

Introduction

Hastings Technology Metals Limited (ASX:HAS) is pleased to announce a significant increase in the Probable Ore Reserves at the Yangibana Project in the Gascoyne region of Western Australia. Total Probable Ore Reserves have increased to **7.74 million tonnes at 1.13%TREO including 0.43%Nd₂O₃+Pr₆O₁₁**, a 50% increase on the figures established in November 2017 as part of the Company's Definitive Feasibility Study (DFS) and as reported in the ASX release entitled "Successful Completion of Yangibana Definitive Feasibility Study" dated 28th November 2017.

Probable Ore Reserves

Based on Pre-Feasibility studies (PFS) for recent geological, geotechnical, metallurgical and environmental work, independent consultants Snowden Mining Industry Consultants (Snowden) has completed PFS mining studies based on Measured and Indicated Mineral Resources at the Yangibana West, Yangibana, Auer and Auer North deposits. The mining focus is high ore recovery, and conventional drill and blasting methods will be employed.

The Modifying Factors used to estimate the Ore Reserves are provided in the Table 1 Section 4 of the JORC Code (2012) at the end of this announcement. Mining at each of the deposits will encounter three main rock types:

- The upper horizon is a saprolite, this does not require blasting.
- The lower weathered and fresh granite horizons require blasting.
- Ironstone (not all of which is ore), RC grade control drilling is required.

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The ore dips at between 10-45° and varies in thickness between 1m and 20m at Fraser's and 1m and 30m at Bald Hill, with an average thickness of 4m. At Yangibana West the ore dips at 20-40° and ranges to 5m thick. Ore at Yangibana is narrower at 2-3m and dips at 40-50°, and at Auer and Auer North it is steeper (70-80°) and averages around 3m wide.

The ore zone (generally ironstone) is visually distinct from the host rock, providing some visual control for ore identification. RC grade control drilling will be done, on a 10m x 10m grid, prior to ore delineation.

Well controlled blasting and mining near and in the ore zones is planned to minimise dilution and allow selective mining of the hanging-wall to expose and selectively mine the ore. Due to the high value of the ore, a high ore recovery is the focus of mining. As such, a 50cm skin of dilution is added to the ore mined to enable a 98% ore recovery assumption. This dilution was incorporated in the estimation of reserves at each deposit.

For pit optimisation a 28° overall wall angle was applied to the saprolite, and 35-40° to weathered and fresh granite. In addition to the 50cm skin applied during the resources estimation process, Snowden established waste dilution at 19% at Bald Hill, 14% at Fraser's, 32% at Yangibana West, 26% at Yangibana and 21% at Auer and Auer North. A 2% ore loss was also applied to each deposit.

Ground water at all deposits sits at around 45m below the mining surface. Pits will be dewatered ahead of mining using bores pumping a maximum 8 litres per sec pumped from each pit to provide a dewatered rock mass. Stormwater will be managed in pit using sumps with an estimated maximum of 10 litres per sec pumped from sumps in each pit.

Waste from each pit is stored in adjacent waste dumps. Some of the Bald Hill pit is backfilled to minimise haulage distances. Ore is transferred either directly to the Run-Of-Mine (ROM) pad, or to a low-grade stockpile, by mining trucks.

Pit optimisations were completed to determine the economic mining limits for each deposit. Only Measured and Indicated Resources were considered for processing. Pits were then designed in stages to enable higher grades to be targeted and waste extraction to be deferred.

Pit optimisation studies have defined the total Probable Ore Reserves for the Yangibana Project as shown in Table 1 including these additional deposits.

Deposit	Tonnes	%TREO	%Nd₂O₃+Pr₆O₁₁
Bald Hill	4,385,000	1.03	0.41
Fraser's	780,000	1.58	0.67
Yangibana West	1,397,000	1.23	0.34
Yangibana	838,000	0.99	0.47
Auer	150,000	1.13	0.41
Auer North	192,000	1.22	0.45
TOTAL	7,742,000	1.13	0.43

Table 1 – Yangibana Project - Probable Ore Reserves July 2018

The current resources at Auer and Auer North are shown in Tables 2 and 3 as reported in the ASX release entitled “Final 2017 JORC Resource Update Including Auer and Auer North Results” dated 22nd November 2017.

All Mineral Resources shown in the tables below are inclusive of Ore Reserves

Resource Category	Tonnes	%TREO	%Nd ₂ O ₃ +Pr ₆ O ₁₁
Indicated	261,000	1.17	0.42
Inferred	978,000	1.08	0.39
TOTAL	1,219,000	1.10	0.39

Table 2 – Yangibana Project – Auer JORC Mineral Resources

Resource Category	Tonnes	%TREO	%Nd ₂ O ₃ +Pr ₆ O ₁₁
Indicated	301,000	1.24	0.45
Inferred	460,000	0.96	0.30
TOTAL	762,000	1.07	0.36

Table 3 – Yangibana Project – Auer North JORC Mineral Resources

The current resources at Yangibana are shown in Table 4 as reported in the ASX release entitled “Yangibana Project Resources Now Exceed 20.5 Million Tonnes” dated 12th October 2017.

Resource Category	Tonnes	%TREO	%Nd ₂ O ₃ +Pr ₆ O ₁₁
Indicated	1,318,000	0.86	0.41
Inferred	851,000	0.81	0.39
TOTAL	2,169,000	0.84	0.40

Table 4 – Yangibana Project – Yangibana JORC Mineral Resources

The current resources at Yangibana West are shown in Table 5 as reported in the ASX release entitled “Another Major Increase In JORC Resources From Current Yangibana Drilling” dated 24th July 2017.

Resource Category	Tonnes	%TREO	%Nd ₂ O ₃ +Pr ₆ O ₁₁
Indicated	1,686,000	1.29	0.35
Inferred	756,000	1.35	0.35
TOTAL	2,442,000	1.31	0.35

Table 5– Yangibana Project – Yangibana West JORC Mineral Resources

All Probable Ore Reserves are within tenements held 100% by Hastings, with all but those at Auer and Auer North being held under granted Mining Leases. The increased Ore Reserves support the eight-year mining and processing operation at 1.0 million tonnes per annum as described in the November 2017 DFS.

A major infill and extension drilling programme comprising both reverse circulation and diamond drilling is well advanced at Auer and Auer North aiming to increase estimates of Measured and Indicated Mineral Resources and thence reserves at these deposits.

Pre-Feasibility Study

The maiden Probable Ore Reserves at the Yangibana West, Yangibana, Auer and Auer North deposits are based on results of a supplementary Pre-Feasibility Study (PFS). Hastings undertook the PFS on these additional deposits, which are in addition to the Bald Hill and Fraser's deposits forming the Yangibana Rare Earths Project (the Project) in Western Australia.

The November 2017 Definitive Feasibility Study (DFS) detailed the Project, which will produce a Mixed Rare Earth Carbonate (MREC) rich in Neodymium (Nd) and Praseodymium (Pr), critical materials used in the manufacturing of permanent magnets. The DFS produced a maiden Ore Reserve for the Bald Hill and Fraser's deposits, which underpinned the first 5 years of mine life. The DFS also included an additional production target (APT) produced from the Yangibana West, Yangibana, Auer and Auer North deposits.

The APT satellite deposits were not included in the 2017 Ore Reserve estimate because the required geotechnical investigation had not yet been completed and consequently the mine design and mining cost estimates could not be developed to a PFS level. The required geotechnical drilling and analysis was then completed in Q2 2018 and mine designs were also completed. Metallurgical development was substantially completed in 2017, except for comminution test work and confirmation of the compatibility of the Yangibana West deposit with the DFS process plant flowsheet. This work has since been undertaken to the required pre-feasibility level.

The Project is comprised of significant deposits across the tenement holdings - Bald Hill, Fraser's, Yangibana West, Yangibana, Auer and Auer North – all 100% owned by Hastings (note that these areas mentioned herein represent approximately 50sqkm out of a total of 650sqkm of exploration tenure). In addition, Hastings holds a controlling 70% stake in other tenements held in a Joint Venture arrangement in the greater Yangibana area, although these have not been considered in this PFS study. These Joint Venture tenements may be readily developed as upside to increase the mine life of the Project in the future.

The 2017 DFS evaluated the development of the mine, process plant (incorporating beneficiation and hydrometallurgy) and supporting infrastructure. The Project is designed to mine 1 Million tpa of ore and a process plant that can produce up to 15,000t of Mixed Rare Earths Carbonate (MREC) per annum from the Bald Hill, Frasers, Yangibana West, Yangibana, Auer and Auer North deposits. The current Ore Reserves of 7.74 Million tonnes supports a mine life of 8 years.

Hastings has completed the following work on the site:

- Mapping,
- Rock chip sampling,
- Commissioned a major hyperspectral survey,
- Topographic and aerial photo surveys, and
- Aeromagnetic and radiometric survey and interpretation over the GCFC.

Seven phases of drilling - both reverse circulation and diamond drilling have been completed by Hastings, with each phase increasing the JORC resources of the various deposits and providing samples for metallurgical test work. With shallow mineralisation, mining will be conventional drill and blast and operated by a mining contractor.

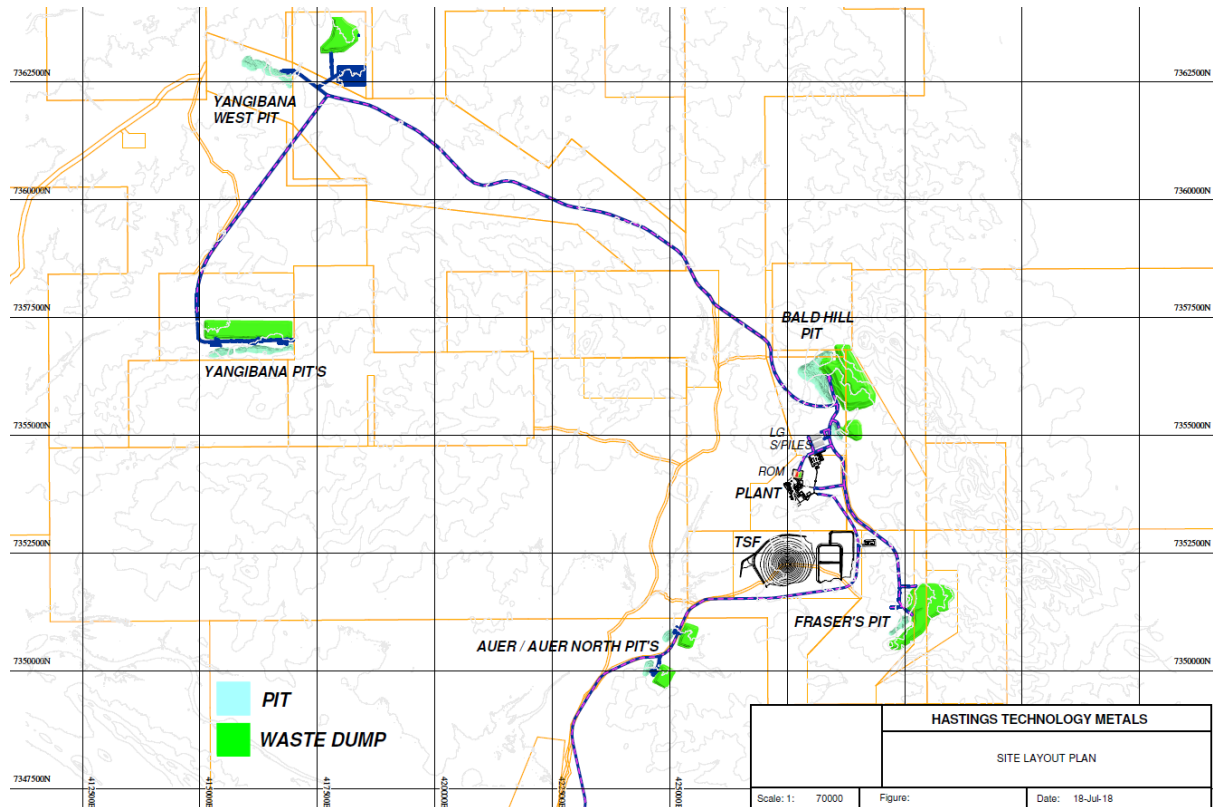


Figure 1 – Yangibana Project Layout Plan

The Company has completed extensive DFS testwork to define the metallurgy for the Yangibana project, culminating in pilot plant tests on a composite sample of material from Bald Hill and Fraser's. This testwork has defined a process route entailing crush, grind, flotation, acid bake with water leach and precipitation of a Mixed Rare Earths Carbonate. Further metallurgical PFS testwork has established that the ore from each of Yangibana West, Yangibana, Auer and Auer North is compatible with this processing route.

Approximately 1 million tonnes per annum of ore will be brought to the Run Of Mine (ROM) pad where the flowsheet process begins. Early stages of the processing of the ore comprise comminution and beneficiation. The resulting beneficiated concentrate is upgraded by 20 times from the ROM ore, as demonstrated through the DFS, to a 25% TREO concentrate. This concentrate is further processed downstream through a hydrometallurgical process that involves acid bake, water leaching, impurity removal and precipitation to produce up to 15,000 tpa of MREC. The MREC will contain up to 3,400 tpa of neodymium oxide (Nd_2O_3) + praseodymium oxide (Pr_6O_{11}) representing 41% of contained TREO.

The scope of work required for environmental approvals have been substantially completed and the Project is progressing through a Public Environmental Review (PER) level of

assessment by both the State and Commonwealth Governments. Auer and Yangibana deposits will require additional approval considerations as a formality although environmental considerations in the PFS demonstrated no significant environmental issues that would preclude a future approval being issued by State and Commonwealth Governments.

The key Ore Reserve parameters developed from the supplementary PFS are shown in Table 6 below.

Pre-Feasibility Study Parameters	Parameter
Status of JORC Resources used for financial evaluation	Measured and Indicated
Mining Method	Open Pits
Mining Dilution – 0.5m skin on HW and FW incorporated in resource estimation	variable
Mining Recovery	98%
Processing Route	Flotation, Acid Bake – Water Leach and MREC Precipitation
Overall Processing Recovery (TREO) – Ore to MREC	75.2%
Target Production Rate (Mixed Rare Earths Concentrate)	15,000 tpa
Target Contained Nd ₂ O ₃ +Pr ₆ O ₁₁	3,400 tpa
Pre-Production Capital Costs	A\$335.3m
Production Capital Costs	A\$13.1m
Operating Costs	A\$18.5/kgTREO
Basket Value of MREC product	US\$29.21/kgTREO
Exchange Rate US\$:A\$	0.75
Discount Rate	8%

Table 6– Yangibana Project – PFS Ore Reserve Parameters

This PFS financial evaluation evaluates the production targets based only on the combined Bald Hill, Fraser's, Yangibana, Yangibana West, Auer and Auer North deposits that were upgraded through the DFS and this PFS to a Probable Ore Reserve of 7,742 Mt (DFS Production Target).

A summary of the Mineral Resources and their utilisation as Production Target in the financial evaluation is provided in Table 7 below.

Deposit	Mineral Resources (t)				Production Target (t)
	Measured	Indicated	Inferred	Total	2017 DFS + 2018 PFS Production Target from Probable Ore Reserve
Bald Hill	2,700,000	2,050,000	1,340,000	6,100,000	4,385,000
Fraser's	220,000	650,000	700,000	1,580,000	780,000
Auer		260,000	960,000	1,220,000	150,000
Auer North		300,000	460,000	760,000	192,000
Yangibana		1,180,000	720,000	1,900,000	838,000
Yangibana West	110,000	1,660,000	760,000	2,540,000	1,397,000
Total	3,030,000	6,100,000	4,940,000	14,100,000	7,472,000

Table 7– Yangibana Project – PFS Production Target Resources

Resources shown do not represent the total Mineral Resources and are inclusive of Ore Reserves. Deposits not used in the economic evaluation have been excluded from Mineral Resources. Rounding errors may appear

The PFS financial model assumes an average long-term US\$/A\$ exchange rate of US\$0.75 and uses price forecasts from 2017 to 2027 for rare earths prices from Argus Media, an independent provider of price information, market data and business intelligence for the global resource industry. Financial evaluation of the Probable Ore Reserves in the PFS results in the economic outcome shown in Table 8 below.

Operating Life	8 years
Net Present Value (NPV)	A\$499m
Internal Rate of Return (IRR)	76%
Payback Period	2.3 years

Table 8– Yangibana Project – PFS Financial Evaluation Results

TERMINOLOGY USED IN THIS REPORT

Total Rare Earths Oxides, TREO, is the sum of the oxides of the light rare earth elements lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), and samarium (Sm) and the heavy rare earth elements europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb), lutetium (Lu), and yttrium (Y).

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Competent Person Statements

The information in this announcement that relates to Resources is based on information compiled by Lynn Widenbar. Mr Widenbar is a consultant to the Company and a member of the Australasian Institute of Mining and Metallurgy. The information in this announcement that relates to Exploration Results is based on information compiled by Andy Border, an employee of the Company and a member of the Australasian Institute of Mining and Metallurgy. Each has sufficient experience relevant to the styles of mineralisation and types of deposits which are covered in this announcement and to the activity which they are undertaking to qualify as a Competent Person as defined in the 2012 edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code"). Consents to include statements in this announcement have been provided in previous announcements entitled "Final 2017 JORC Resource Update Including Auer and Auer North Results" dated 22nd November 2017; "Yangibana Project Resources Now Exceed 20.5 Million Tonnes" dated 12th October 2017; and "Another Major Increase In JORC Resources From Current Yangibana Drilling" dated 24th July 2017

The information in this announcement that relates to the Ore Reserves at Bald Hill, Fraser's, Yangibana, Auer and Auer North and Yangibana West is based on information reviewed or work undertaken by Mr Frank Blanchfield, FAusIMM, and an employee of Snowden Mining Industry Consultants. Mr Blanchfield has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the preparation of mining studies to qualify as a Competent Person as defined by the JORC Code 2012. Mr Blanchfield consents to the inclusion in this announcement of the matters based on his information in the form and context in which it appears.

The scientific and technical information in this announcement and that relates to process metallurgy is based on information reviewed by Ms. Narelle Marriott (Principal Engineer – Beneficiation) and Mr Zhaobing (Robin) Zhang (Process Engineering Manager) of Hastings Technology Metals Limited. Both Ms Marriott and Mr Zhang are members of AusIMM. Each has sufficient experience 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 by the JORC Code 2012. Ms Marriott and Mr Zhang consent to the inclusion in this announcement of the matters based on their information in the form and context in which it appears.

About Hastings Technology Metals

Yangibana Project

Hastings Technology Metals (ASX:HAS, the Company) is advancing the Yangibana Rare Earths Project towards production following the completion of a positive Definitive Feasibility Study in November 2017. The Yangibana Project hosts rare earths deposits rich in neodymium and praseodymium, elements vital to permanent magnets that provide many critical components of wide ranging high-tech products, including electric vehicles, renewable energy wind turbines, robotics, medical applications and others. The Company aims to be the next significant producer of neodymium and praseodymium outside of China.

The established Yangibana reserves and resources are predominantly within tenements held 100% by Hastings, with the majority in granted Mining Leases. Lesser resources are held in a joint venture in which Hastings holds a 70% interest and has management control.

The November 2017 Yangibana Project DFS established JORC Probable Ore Reserves of 5.15 million tonnes at 1.12% total rare earths oxides (TREO) including 41% neodymium and praseodymium oxides ($\text{Nd}_2\text{O}_3 + \text{Pr}_6\text{O}_{11}$). This Ore Reserve was the basis of the initial operation at a planned production rate of up to 15,000 tonnes per annum (tpa.) MREC including 3,400 tpa. of $\text{Nd}_2\text{O}_3 + \text{Pr}_6\text{O}_{11}$. The July 2018 Yangibana Probable Ore Reserve has increased to 7.74 million tonnes at 1.13% TREO including 0.43% $\text{Nd}_2\text{O}_3 + \text{Pr}_6\text{O}_{11}$ as reported in this release. The increase in Probable Ore Reserves is demonstrated by additional Pre-Feasibility Study work that supports extension of production over the full eight-year period considered in the Company's November 2017 DFS.

Including the above Ore Reserves, the Company has JORC Measured Mineral Resources of 3.9 million tonnes at 1.19% TREO including 0.42% $\text{Nd}_2\text{O}_3 + \text{Pr}_6\text{O}_{11}$, JORC Indicated Mineral Resources of 8.6 million tonnes at 1.25% TREO including 0.42% $\text{Nd}_2\text{O}_3 + \text{Pr}_6\text{O}_{11}$, and JORC Inferred Mineral Resources of 8.4 million tonnes at 1.09% TREO including 0.36% $\text{Nd}_2\text{O}_3 + \text{Pr}_6\text{O}_{11}$, providing total JORC Measured, Indicated and Inferred Mineral Resources of 21.0 million tonnes at 1.17% TREO including 0.40% $\text{Nd}_2\text{O}_3 + \text{Pr}_6\text{O}_{11}$.

Many more areas of the Company's deposits have the potential for additional resources and exploration programmes are in place to evaluate these areas in future plus the numerous other targets identified to date.

JORC Code, 2012 Edition – Table 1

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	<ul style="list-style-type: none"> Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling. Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used. Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information. 	<ul style="list-style-type: none"> Samples used to assess the numerous deposits of the Yangibana Project have been derived from both reverse circulation (RC) and diamond drilling. Seven drilling programmes have been completed and an eighth is in progress since 2014. Samples from each metre were collected in a cyclone and split using a 3-level riffle splitter. Field duplicates, blanks and Reference Standards were inserted at a rate of approximately 1 in 20. RC and diamond drilling leading to the establishment of JORC Resources has been carried out at Bald Hill, Frasers's, Yangibana West, Auer, Auer North, Yangibana, and Simon's Find within tenements held 100% by Hastings, and at Yangibana North, Gossan, Lion's Ear, Hook and Kane's Gossan. In addition, drilling has been carried out at Hatchett, Demarcay, Mosander Terry's Find and Yangibana South prospects.
Drilling techniques	<ul style="list-style-type: none"> Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc). 	<ul style="list-style-type: none"> Reverse Circulation drilling at the various targets utilised a nominal 5 1/4 inch diameter face-sampling hammer. Diamond drilling at the various targets has been HQ diameter.
Drill sample recovery	<ul style="list-style-type: none"> Method of recording and assessing core and chip sample recoveries and results assessed. Measures taken to maximise sample recovery and ensure representative nature of the samples. Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material. 	<ul style="list-style-type: none"> Recoveries are recorded by the geologist in the field at the time of drilling/logging. If poor sample recovery is encountered during drilling, the geologist and driller have endeavoured to rectify the problem to ensure maximum sample recovery. Visual assessment is made for moisture and contamination. A cyclone and splitter were used to ensure representative samples and were routinely cleaned. Sample recoveries to date have generally been high, and moisture in samples minimal. Insufficient data is available at present to determine if a relationship exists between recovery and grade.
Logging	<ul style="list-style-type: none"> Whether core and chip samples have been geologically and geotechnically logged to a level 	<ul style="list-style-type: none"> All drill chip samples are geologically logged at 1m intervals from surface to the bottom of each

Criteria	JORC Code explanation	Commentary
	<p><i>of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.</i></p> <ul style="list-style-type: none"> <i>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.</i> <i>The total length and percentage of the relevant intersections logged.</i> 	<p>individual hole to a level that support appropriate future Mineral Resource studies.</p> <ul style="list-style-type: none"> Logging is considered to be semi-quantitative given the nature of reverse circulation drill chips. All RC drill holes in the current programme are logged in full.
Sub-sampling techniques and sample preparation	<ul style="list-style-type: none"> <i>If core, whether cut or sawn and whether quarter, half or all core taken.</i> <i>If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.</i> <i>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</i> <i>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</i> <i>Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.</i> <i>Whether sample sizes are appropriate to the grain size of the material being sampled.</i> 	<ul style="list-style-type: none"> The RC drilling rig is equipped with an in-built cyclone and triple tier riffle splitting system, which provided one bulk sample of approximately 25kg, and a sub-sample of 2-4kg per metre drilled. All samples were split using the system described above to maximise and maintain consistent representivity. Most samples were dry. For wet samples the cleanliness of the cyclone and splitter was constantly monitored by the geologist and maintained to avoid contamination. Bulk samples were placed in green plastic bags, with the sub-samples collected placed in calico sample bags. Field duplicates were collected directly from the splitter as drilling proceeded through a secondary sample chute. These duplicates were designed for lab checks as well as lab umpire analysis. A sample size of 2-4kg was collected and considered appropriate and representative for the grain size and style of mineralisation.
Quality of assay data and laboratory tests	<ul style="list-style-type: none"> <i>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</i> <i>For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.</i> <i>Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.</i> 	<ul style="list-style-type: none"> Genalysis (Perth) was used for all analysis work carried out on the 1m drill chip samples and the rock chip samples. The laboratory techniques below are for all samples submitted to Genalysis and are considered appropriate for the style of mineralisation defined at the Yangibana REE Project: FP6/MS Blind field duplicates were collected at a rate of approximately 1 duplicate for every 20 samples that are to be submitted to Genalysis for laboratory analysis. Field duplicates were split directly from the splitter as drilling proceeded at the request of the supervising geologist.
Verification of sampling and assaying	<ul style="list-style-type: none"> <i>The verification of significant intersections by either independent or alternative company personnel.</i> <i>The use of twinned holes.</i> <i>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</i> <i>Discuss any adjustment to assay data.</i> 	<ul style="list-style-type: none"> At least two company personnel verify all significant intersections. All geological logging and sampling information is completed firstly on to paper logs before being transferred to Microsoft Excel spreadsheets. Physical logs and sampling data are returned to the Hastings head office for scanning and storage. Electronic copies of all information are backed up daily. No adjustments of assay data are considered necessary.

Criteria	JORC Code explanation	Commentary
Location of data points	<ul style="list-style-type: none"> Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation. Specification of the grid system used. Quality and adequacy of topographic control. 	<ul style="list-style-type: none"> A Garmin GPSMap62 hand-held GPS is used to define the location of the drill hole collars. Standard practice is for the GPS to be left at the site of the collar for a period of 5 minutes to obtain a steady reading. Collar locations are considered to be accurate to within 5m. Collars will be picked up by DGPS in the future. Down hole surveys are conducted by the drill contractors using a Reflex electronic single-shot camera with readings for dip and magnetic azimuth nominally taken every 30m down hole, except in holes of less than 30m. The instrument is positioned within a stainless steel drill rod so as not to affect the magnetic azimuth. Grid system used is MGA 94 (Zone 50) Topographic control is based on the detailed 1m topographic survey undertaken by Hyvista Corporation in 2016.
Data spacing and distribution	<ul style="list-style-type: none"> Data spacing for reporting of Exploration Results. Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied. Whether sample compositing has been applied. 	<ul style="list-style-type: none"> Hole collars were initially laid out at 50m centres. In areas considered to have potential to increase to Measured plus Indicated resources intermediate holes have been drilled to provide 37.5m hole spacing. Collar locations were varied slightly dependent on access at a given site. No sample compositing is used in this report, all results detailed are the product of 1m downhole sample intervals.
Orientation of data in relation to geological structure	<ul style="list-style-type: none"> Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type. If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material. 	<ul style="list-style-type: none"> Most drill holes in the current programme are vertical (subject to access to the preferred collar position) or collared at -60° or -70° in steeper mineralised areas such as Auer and Auer North.
Sample security	<ul style="list-style-type: none"> The measures taken to ensure sample security. 	<ul style="list-style-type: none"> The chain of custody is managed by the project geologist who places calico sample bags in polyweave sacks. Up to 10 calico sample bags are placed in each sack. Each sack is clearly labelled with: <ul style="list-style-type: none"> Hastings Technology Metals Ltd Address of laboratory Sample range Samples were delivered by Hastings personnel to the Nexus Logistics base in order to be loaded on the next available truck for delivery to Genalysis. The freight provider delivers the samples directly to the laboratory. Detailed records are kept of all samples that are dispatched, including details of chain of custody.

Criteria	JORC Code explanation	Commentary
Audits or reviews	<ul style="list-style-type: none"> The results of any audits or reviews of sampling techniques and data. 	<ul style="list-style-type: none"> No audit of sampling data has been completed to date but a review will be conducted once all data from Genalysis (Perth) has been received. Data is validated when loading into the database and will be validated again prior to any Resource estimation studies.

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	<ul style="list-style-type: none"> Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings. The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area. 	<ul style="list-style-type: none"> Drilling has been undertaken on numerous tenements within the Yangibana Project. All Yangibana tenements are in good standing and no known impediments exist.
Exploration done by other parties	<ul style="list-style-type: none"> Acknowledgment and appraisal of exploration by other parties. 	<ul style="list-style-type: none"> Ten of the Yangibana prospects were previously drilled to a limited extent by Hurlston Pty Limited in joint venture with Challenger Pty Limited in the late 1980s. Auer and Auer North were first drilled by Hastings in 2016. Simon's Find was first drilled by Hastings in 2017.
Geology	<ul style="list-style-type: none"> Deposit type, geological setting and style of mineralisation. 	<ul style="list-style-type: none"> The Yangibana ironstones within the Yangibana Project are part of an extensive REE-mineralised system associated with the Gifford Creek Carbonatite Complex. The lenses have a total strike length of at least 12km. These ironstone lenses have been explored previously for base metals, manganese, uranium, diamonds and rare earths. The ironstones are considered by GSWA to be coeval with the numerous carbonatite sills that occur within Hastings tenements, or at least part of the same magmatic/hydrothermal system.
Drill hole Information	<ul style="list-style-type: none"> A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: <ul style="list-style-type: none"> easting and northing of the drill hole collar elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar dip and azimuth of the hole down hole length and interception depth hole length. If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the 	<ul style="list-style-type: none"> N/A

Criteria	JORC Code explanation	Commentary
	<i>understanding of the report, the Competent Person should clearly explain why this is the case.</i>	
Data aggregation methods	<ul style="list-style-type: none"> <i>In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.</i> <i>Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.</i> <i>The assumptions used for any reporting of metal equivalent values should be clearly stated.</i> 	<ul style="list-style-type: none"> All intervals reported are composed of 1m downhole intervals and as such are length weighted. A lower cut-off grade of 0.20%Nd₂O₃+Pr₆O₁₁ has been used for assessing significant intercepts, and no upper cut-off grade was applied. Maximum internal dilution of 1m was incorporated in reported significant intercepts. The basis for the metal equivalents used for reporting are provided in the body of the ASX announcement.
Relationship between mineralisation widths and intercept lengths	<ul style="list-style-type: none"> <i>These relationships are particularly important in the reporting of Exploration Results.</i> <i>If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.</i> <i>If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').</i> 	<ul style="list-style-type: none"> True widths for mineralisation have not been calculated and as such only downhole lengths have been reported. It is expected that true widths will be less than downhole widths, due to the apparent dip of the mineralisation.
Diagrams	<ul style="list-style-type: none"> <i>Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported. These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.</i> 	<ul style="list-style-type: none"> Appropriate maps and sections are available in the body of this ASX announcement.
Balanced reporting	<ul style="list-style-type: none"> <i>Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.</i> 	<ul style="list-style-type: none"> Reporting of results in this report is considered balanced.
Other substantive exploration data	<ul style="list-style-type: none"> <i>Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.</i> 	<ul style="list-style-type: none"> Geological mapping has continued in the vicinity of the drilling as the programme proceeds.
Further work	<ul style="list-style-type: none"> <i>The nature and scale of planned further work (eg tests for lateral extensions, depth extensions or large-scale step-out drilling).</i> <i>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not</i> 	<ul style="list-style-type: none"> Numerous targets exist for expansion of the current JORC Resources within the Yangibana Project, as extensions to defined deposits, new targets identified from the Company's various remote sensing surveys, and conceptual as yet untested targets at depth.

Criteria	JORC Code explanation	Commentary
		<i>commercially sensitive.</i>

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Database integrity	<ul style="list-style-type: none"> Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes. Data validation procedures used. 	<ul style="list-style-type: none"> Data was provided as a validated Access Database and was digitally imported into Micromine Mining software. Micromine validation routines were run to confirm validity of all data. Individual drill logs from site have been checked with the electronic database on a random basis to check for validity. Analytical results have all been electronically merged to avoid any transcription errors.
Site visits	<ul style="list-style-type: none"> Comment on any site visits undertaken by the Competent Person and the outcome of those visits. If no site visits have been undertaken indicate why this is the case. 	<ul style="list-style-type: none"> The Competent Person visited site from 15-16th December 2016 and reviewed geology, drilling etc.
Geological interpretation	<ul style="list-style-type: none"> Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit. Nature of the data used and of any assumptions made. The effect, if any, of alternative interpretations on Mineral Resource estimation. The use of geology in guiding and controlling Mineral Resource estimation. The factors affecting continuity both of grade and geology. 	<ul style="list-style-type: none"> Confidence in the geological interpretation is considered to be high. Detailed geological logging and surface mapping allows extrapolation of drill intersections between adjacent sections. Alternative interpretations would result in similar tonnage and grade estimation techniques. Geological boundaries are determined by the spatial locations of the various mineralised structures. Continuous ironstone units comprising iron oxides and hydroxides, minor quartz rich zones, and locally carbonate and apatite host the rare earths mineralisation and are the key factors providing continuity of geology and grade. The mineralised zones may be described as visually distinctive anastomosing iron rich veins with excellent strike and down dip continuity.
Dimensions	<ul style="list-style-type: none"> The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource. 	<ul style="list-style-type: none"> Bald Hill mineralisation dips shallowly (maximum 30°) but variably to the southwest and ranges from 1m to 10m thick. Maximum depth of the resource is to a vertical depth of 80 metres below surface. Fraser's mineralisation dips steeply (70-80°) in the western portion becoming more shallow (to 30°) in the east and ranges from 1m to 6m thick. Maximum depth of the resource is to a vertical depth of 140 metres below surface. Yangibana West mineralisation dips shallowly (maximum 30°) but variably to the south and ranges from 1m to 5m thick. Maximum depth of the resource is to a vertical depth of 100 metres below surface. Auer has three discontinuous, steeply dipping zones of mineralisation extending North-South over a total strike length of approximately 3.5 km and to a depth of 150m below surface. Auer North has two discontinuous, steeply-dipping zones of mineralisation extending north-south over a total strike length of approximately 1.4 km and has been tested to a depth of 120m below surface. Yangibana mineralisation strikes east-west over a length of approximately 2 km, dipping at 40 to 45° to the north. The zone extends to a depth of approximately 150m. The zone is relatively thin, typically 2 to 3m.



Criteria	JORC Code explanation	Commentary
		<ul style="list-style-type: none"> Simon's Find consists of 3 separate mineralisation zones over a total strike length of 2 km. The zones vary in dip from 40 to 80° to the south and west, and extend approximately 100m below surface. The zones are relatively thin, typically 2 to 5m. Yangibana North mineralisation dips shallowly (maximum 30°) but variably to the south and ranges from 1m to 5m thick. Maximum depth of the resource is to a vertical depth of 140 metres below surface. Gossan – the Inferred Resources at Gossan are based on limited drilling that has identified mineralisation over 300m of strike length, 100m down dip and ranging from 1-4m wide. Maximum depth of the resource is to a vertical depth of 80 metres below surface. Lion's Ear - the Inferred Resources at Lion's Ear are based on limited drilling that has identified mineralisation over 520m of strike length, 80m down dip and ranging from 1-4m wide. Maximum depth of the resource is to a vertical depth of 140 metres below surface. Hook - the Inferred Resources at Hook are based on limited drilling that has identified mineralisation over 380m of strike length, 100m down dip and ranging from 1-4m wide. Maximum depth of the resource is to a vertical depth of 130 metres below surface. Kane's Gossan - the Inferred Resources at Kane's Gossan are based on limited drilling that has identified mineralisation over 550m of strike length, 100m down dip and ranging from 1-4m wide. Maximum depth of the resource is to a vertical depth of 130 metres below surface.
Estimation and modelling techniques	<ul style="list-style-type: none"> <i>The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.</i> <i>The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.</i> <i>The assumptions made regarding recovery of by-products.</i> <i>Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).</i> <i>In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.</i> <i>Any assumptions behind modelling of selective mining units.</i> <i>Any assumptions about correlation between variables.</i> <i>Description of how the geological interpretation was used to control the</i> 	<ul style="list-style-type: none"> Due to the variable dip and strike of the various deposits, an "unfolding" technique has been used to simplify setup of search ellipse and modelling parameters Statistical analysis and variography has been carried out in unfolded coordinates to define parameters for an Ordinary Kriging estimation. All analysis and estimation has been constrained by the geological interpretation of the ironstone units. Separate estimation has been carried out for 0.5m thick dilution skins on the hangingwall and footwall of the mineralisation. Kriging Neighbourhood Analysis was carried out for each deposit to determine optimal search and kriging parameters All estimation was carried out using Micromine software (MM 2016 Sp5) Kriging parameters were defined using Nd₂O₃ and Pr₆O₁₁ as the primary variables. Estimation has been carried out for the following variables : Ce₂O₃_ppm, Dy₂O₃_ppm, Er₂O₃_ppm, Eu₂O₃_ppm, Gd₂O₃_ppm, Ho₂O₃_ppm, La₂O₃_ppm, Lu₂O₃_ppm, Nd₂O₃_ppm, Pr₆O₁₁_ppm, Sm₂O₃_ppm, Tb₄O₇_ppm, Tm₂O₃_ppm, Y₂O₃_ppm, Yb₂O₃_ppm, ThO₂_ppm, U₃O₈_ppm, Al_per, Ca_per, Fe_per, Mg_per, Nb_ppm, P_per, S_per, Si_per, Sr_ppm, Ta_ppm, Zr_ppm Drill hole spacing is variable, and the block sizes were chosen to reflect the best compromise between spacing and the necessity to define the geological detail of each deposit. In general, block sizes are 12.5 m along strike, 10m down dip and 2.5 across strike. As there are no extreme values no capping has been applied. Block model validation has been carried out by several

Criteria	JORC Code explanation	Commentary
	<p>resource estimates.</p> <ul style="list-style-type: none"> Discussion of basis for using or not using grade cutting or capping. The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available. 	<p>methods, including:</p> <ul style="list-style-type: none"> Drill Hole Plan and Section Review Model versus Data Statistics by Domain Easting, Northing and RL swathe plots <ul style="list-style-type: none"> All validation methods have produced acceptable results.
Moisture	<ul style="list-style-type: none"> Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content. 	<ul style="list-style-type: none"> Tonnages are estimated on a dry basis.
Cut-off parameters	<ul style="list-style-type: none"> The basis of the adopted cut-off grade(s) or quality parameters applied. 	<ul style="list-style-type: none"> A nominal downhole cut-off of 0.20% Nd₂O₃+Pr₆O₁₁ has been used in conjunction with logging of ironstone to define mineralised intersections.
Mining factors or assumptions	<ul style="list-style-type: none"> Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made. 	<ul style="list-style-type: none"> Mining is assumed to be by conventional open pit mining methods Based on previous and on-going mining studies by Snowden, a 0.5m dilution skin has been added to both the footwall and hangingwall contacts of the mineralisation. The dilution material is independently interpolated and is subsequently added to the mineralised domain to produce a diluted resource.
Metallurgical factors or assumptions	<ul style="list-style-type: none"> The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made. 	<ul style="list-style-type: none"> Beneficiation and hydrometallurgical test work has been carried out on samples from the Eastern Belt (comprising Bald Hill, Bald Hill Southeast and Fraser's deposits). Mineralisation at Auer and Auer North is considered compatible with the Eastern Belt-style mineralisation, based on variability testwork. Test work to date has shown that the rare earths mineralisation (largely monazite) can be upgraded readily using standard froth flotation techniques and readily available reagents..
Environmental factors or assumptions	<ul style="list-style-type: none"> Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made. 	<ul style="list-style-type: none"> Environmental studies have been carried out on site with Stage 1 Flora and Fauna surveys and Stage 2 Flora and Fauna surveys completed. No environmental issues have been identified. Subterranean fauna studies have located both troglofauna and stygofauna but no unique or endangered species have been encountered.



Criteria	JORC Code explanation	Commentary
Bulk density	<ul style="list-style-type: none"> Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples. The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit. Discuss assumptions for bulk density estimates used in the evaluation process of the different materials. 	<ul style="list-style-type: none"> Bulk density/specific gravity have been measured by the Company on core from Yangibana North, and at independent laboratories on core from Bald Hill South, Fraser's and Yangibana West. Samples have been taken from each of oxidised, partially oxidised and fresh mineralisation with results feeding into the resource estimations. Mineralisation at Auer and Auer North is considered to be similar to these areas. Bulk density/specific gravity measurements have also been carried out at an independent laboratory on samples of oxidised, partially oxidised and fresh host rock, granite. In situ bulk densities for the individual deposits have ranged from 2.30 to 2.80 tonnes per cubic metre and have been assigned into the models based on weathering surfaces and assigned rock types.
Classification	<ul style="list-style-type: none"> The basis for the classification of the Mineral Resources into varying confidence categories. Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data). Whether the result appropriately reflects the Competent Person's view of the deposit. 	<ul style="list-style-type: none"> The Mineral Resource has been classified in the Measured, Indicated and Inferred categories, in accordance with the 2012 Australasian Code for Reporting of Mineral Resources and Ore Reserves (JORC Code). A range of criteria has been considered in determining this classification including: <ul style="list-style-type: none"> Geological and grade continuity Data quality. Drill hole spacing. Modelling technique and kriging output parameters. The Competent Person is in agreement with this classification of the resource.
Audits or reviews	<ul style="list-style-type: none"> The results of any audits or reviews of Mineral Resource estimates. 	<ul style="list-style-type: none"> No audit of the current resources has been carried out at this time.
Discussion of relative accuracy/confidence	<ul style="list-style-type: none"> Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate. The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available. 	<ul style="list-style-type: none"> The relative accuracy of the various resource estimates is reflected in the JORC resource categories. At the Measured and Indicated Resource classification level, the resources represent local estimates that can be used for further mining studies. Inferred Resources are considered global in nature.

Section 4 Estimation and Reporting of Ore Reserves

(Criteria listed in section 1, and where relevant in sections 2 and 3 also apply to this section.)

Item	Comments																						
Mineral Resource for conversion to Mineral Reserves	<p>The resource models used for mine planning were:</p> <ul style="list-style-type: none">• Bald Hill – BH_ALL_12_07_2017.dm• Fraser’s – FR_ALL_14_07_2017.dm• Yangibana West – Y_30_10_2017.dm• Yangibana – YA_18_09_2017.dm• Auer/Auer North – AU_ALL_26_10_2017.dm. <p>Only Measured and Indicated Resources were considered for inclusion in the Ore Reserve.</p>																						
Site visits	<p>Site visits were completed by the following Competent Persons:</p> <table><tr><th>Competent Persons</th><th>Items</th><th>Date of site visit</th></tr><tr><td>Frank Blanchfield</td><td>Mining</td><td>December 2015</td></tr><tr><td>Lynn Widenbar</td><td>Resources</td><td>December 2016</td></tr><tr><td>Narelle Marriott</td><td>Metallurgy beneficiation</td><td>August 2016</td></tr><tr><td>Robin Zhang</td><td>Hydrometallurgy</td><td>N/A</td></tr></table> <p>The hydrometallurgy Competent Person did not visit the site and was comfortable relying on the report of staff who have visited the site.</p>			Competent Persons	Items	Date of site visit	Frank Blanchfield	Mining	December 2015	Lynn Widenbar	Resources	December 2016	Narelle Marriott	Metallurgy beneficiation	August 2016	Robin Zhang	Hydrometallurgy	N/A					
Competent Persons	Items	Date of site visit																					
Frank Blanchfield	Mining	December 2015																					
Lynn Widenbar	Resources	December 2016																					
Narelle Marriott	Metallurgy beneficiation	August 2016																					
Robin Zhang	Hydrometallurgy	N/A																					
Study status	<p>The Yangibana REO Project has previously had a Definitive Feasibility Study (DFS) released in November 2017, based on the Bald Hill and Fraser’s deposits only. The updated Ore Reserve includes satellite deposits for Yangibana West, Yangibana, Auer and Auer North, which have been assessed to a prefeasibility-level study. The satellite deposit metallurgical assessment has been completed using the process flowsheet developed for Bald Hill and Fraser’s, assessing each deposit’s suitability for processing through this flowsheet.</p> <p>A small amount of comminution testwork is still in progress for the satellite ore sources; results received to date have been used to determine that the comminution results are not expected to be inconsistent with the DFS ore sources.</p> <p>Some environmental assessments are ongoing; initial results indicate there are currently no encumbrances to the project from the environmental assessments.</p>																						
Cut-off parameters	<p>The cut-off grade of 0.2% Nd₂O₃+Pr₆O₁₁ for the geological resource is used as neodymium (Nd) and praseodymium (Pr) are the most important sources of potential revenue from the project. The cut-off coincides generally with the visual geology of the deposits, with target minerals being hosted by either ironstone, phoscorite or carbonate.</p> <p>The cut-off grade for the project was determined based on calculating revenue from recovered metal, selling and processing costs on a block-by-block (diluted) basis (parameters are below). Blocks with revenue greater than the sum of the processing and selling costs (approximately \$90/t ore) were considered to be above the cut-off for processing.</p>																						
Mining factors and assumptions	<p>The following Modifying Factors were considered in relation to the development of the Yangibana Ore Reserves:</p> <ul style="list-style-type: none">• Geotechnical: For pit optimisation, a 28° overall wall angle was applied for saprolite, and 35° to 40° was applied to weathered and fresh granite.• Dilution and ore loss: Dilution was applied by adding a 50 cm skin on the hangingwall and footwall sides of the orebody. A 2% ore loss was additionally applied to the deposits. <p>Bald Hill – Measured and Indicated Resources only</p> <table><tr><th>Item</th><th>Geological model</th><th>Mining model</th><th>Difference</th></tr><tr><td>Tonnes (kt)</td><td>3,924</td><td>4,670</td><td>+19%</td></tr><tr><td>TREO (%)</td><td>1.19</td><td>1.01</td><td>-15%</td></tr><tr><td>Nd₂O₃ (ppm)</td><td>3,826</td><td>3,250</td><td>-15%</td></tr><tr><td>Pr₆O₁₁ (ppm)</td><td>902</td><td>765</td><td>-15%</td></tr></table> <p>Fraser’s – Measured and Indicated Resources only</p>			Item	Geological model	Mining model	Difference	Tonnes (kt)	3,924	4,670	+19%	TREO (%)	1.19	1.01	-15%	Nd ₂ O ₃ (ppm)	3,826	3,250	-15%	Pr ₆ O ₁₁ (ppm)	902	765	-15%
Item	Geological model	Mining model	Difference																				
Tonnes (kt)	3,924	4,670	+19%																				
TREO (%)	1.19	1.01	-15%																				
Nd ₂ O ₃ (ppm)	3,826	3,250	-15%																				
Pr ₆ O ₁₁ (ppm)	902	765	-15%																				

Item	Comments			
	Item	Geological model	Mining model	Difference
	Tonnes (kt)	749	857	+14%
	TREO (%)	1.77	1.54	-13%
	Nd ₂ O ₃ (ppm)	5,975	5,185	-13%
	Pr ₆ O ₁₁ (ppm)	1,549	1,343	-13%
	Yangibana West – Measured and Indicated Resources only			
	Item	Geological model	Mining model	Difference
	Tonnes (kt)	1,165	1,543	+32%
	TREO (%)	1.57	1.23	-22%
	Nd ₂ O ₃ (ppm)	3,314	2,591	-22%
	Pr ₆ O ₁₁ (ppm)	936	745	-20%
	Yangibana – Indicated Resources only			
	Item	Geological model	Mining model	Difference
	Tonnes (kt)	921	1,162	+26%
	TREO (%)	1.11	0.89	-20%
	Nd ₂ O ₃ (ppm)	4,506	3,597	-20%
	Pr ₆ O ₁₁ (ppm)	790	630	-20%
	Auer/Auer North – Indicated Resources only			
	Item	Geological model	Mining model	Difference
	Tonnes (kt)	386	467	+21%
	TREO (%)	1.41	1.19	-16%
	Nd ₂ O ₃ (ppm)	3,994	3,347	-16%
	Pr ₆ O ₁₁ (ppm)	1,124	942	-16%
	Thickness isopachs of in-pit ore at a 0.2% Nd ₂ O ₃ +Pr ₆ O ₁₁ cut-off show that deposits' average metre true thickness. The thin ore lodes at Auer North are mostly >3 m thickness. All the ore lodes in Auer are <3 m with most lodes at Auer greater than 2 m thickness. Given Auer and Auer North are only 4.4% of tonnes, this represents a low risk to tonnes and dilution modelling results in about 30% dilution for these deposits.			
	Processing parameters, sales parameters and administration costs are detailed below. Cut-off grades are detailed above.			

Item	Comments																	
Metallurgical factors and assumptions	A DFS has been completed on the Bald Hill and Fraser’s deposits and is now progressing to detailed design. The metallurgical flowsheet developed from that study has been used for the basis of assessment for the prefeasibility studies of the satellite deposits. The metallurgical performance of samples from each satellite deposit has been assessed through the standard bench-scale flowsheet, the results of the testwork, as well as impacts on operating costs have been used for the prefeasibility-level study on each satellite deposit.																	
	Process and flowsheet																	
	The metallurgical process comprises ore beneficiation followed by hydrometallurgical (hydromet) extraction to produce a valuable Mixed Rare Earths Carbonate (MREC) product. The beneficiation unit processes include crushing, grinding, rougher flotation, regrinding and cleaner flotation.																	
	The hydromet unit processes include acid bake, water leach, impurity removal and MREC product precipitation.																	
	The simple and effective metallurgical process flowsheet developed with the best known available technology and industrial practice by the Hastings Technical Team, has been well tested in both laboratory scale and pilot scale during the Bald Hill and Fraser’s DFS. The unit processes selected for inclusion in the beneficiation and hydromet process flowsheet are based on known technologies, both in the rare earths (RE) industries and other mining applications.																	
	Ore feed chemistry tolerances																	
	Assessment of satellite deposit mineralogy has shown the main RE-bearing mineral in the ore is monazite, which is consistent with the DFS ore sources. The main gangue minerals are iron oxides and hydroxides, biotite-type minerals and apatite. Iron carbonate (siderite) has been identified in Yangibana West. The siderite boundary has been mapped and excluded from the planned mill feed ore.																	
	The ratio of RE elements contained in the monazite differs from that of Bald Hill and Fraser’s. This is reflected in the financial analysis but has no impact on the performance of the beneficiation flowsheet. Compared to DFS ore source concentrate, there may be some variation on concentrate mineralogy. This can be managed in the hydromet circuit through varying process conditions.																	
	Inputs for ore scheduling to the process included control of TREO feed grade between 1% and 1.4% TREO. Additionally, a limit on CaO content in the ore has been set at less than 1 CaO:TREO.																	
	Testwork																	
Pilot plant campaigns for both the beneficiation flowsheet and the hydromet flowsheet have proved the circuits can be run on a continuous basis and that the selected unit processes are able to selectively concentrate the RE-bearing mineral monazite and remove or control the major product impurities of manganese, iron, thorium and uranium within acceptable product range. Over 50 kg of high-purity MREC produced from the pilot plant was sent to 11 customers for evaluation. The product quality is acceptable to separation plant operators.																		
Bench-scale testwork for the satellite deposits was mostly carried out in 2017 at a number of commercial laboratories in Australia. Beneficiation testwork has been completed at KYSPY Met and ASL Metallurgy. Hydromet testwork has been completed at SGS Minerals Metallurgy and ANSTO.																		
Assessment of metallurgical processing performance of all satellite deposits was based on batch testwork, using the standard DFS comminution and flotation flowsheet, and comparison against the performance achieved with DFS ore sources. A standard acid bake and water leach test was completed for assessment of the hydromet performance. Liquor chemistry post-water leach was used to compare against DFS ore sources.																		
Assessment of comminution requirements was undertaken using a standard suite of comminution tests including SMC, Bond Ball Mill work index, Bond Crusher work index, and abrasion index.																		
	<table><tr><th rowspan="2">Deposit</th><th colspan="2">No. of comminution samples</th></tr><tr><th>Complete</th><th>In progress</th></tr><tr><td>Auer</td><td>1</td><td></td></tr><tr><td>Auer North</td><td>3</td><td></td></tr><tr><td>Yangibana</td><td></td><td>5</td></tr><tr><td>Yangibana West</td><td>1</td><td>3</td></tr></table>	Deposit	No. of comminution samples		Complete	In progress	Auer	1		Auer North	3		Yangibana		5	Yangibana West	1	3
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	Where standard comminution tests are currently in progress, a comparison of laboratory grind times required to achieve the target grind size using standard conditions have been compared between the satellite deposits and the DFS ores. All results indicate the satellite deposits are suitable for processing through the comminution circuit as designed in the DFS.																	

Item	Comments																							
Metallurgical factors and assumptions (cont'd)	Detailed mineralogy and variability testwork has been carried out on multiple samples for each deposit, as shown below.																							
	<table><tr><th rowspan="2">Deposit</th><th colspan="3">No. of samples</th></tr><tr><th>Mineralogy</th><th>Variability</th><th>Composite</th></tr><tr><td>Auer</td><td>8</td><td>8</td><td></td></tr><tr><td>Auer North</td><td>4</td><td>4</td><td></td></tr><tr><td>Yangibana</td><td>12</td><td>12</td><td>2</td></tr><tr><td>Yangibana West</td><td>6</td><td>2</td><td>1</td></tr></table>	Deposit	No. of samples			Mineralogy	Variability	Composite	Auer	8	8		Auer North	4	4		Yangibana	12	12	2	Yangibana West	6	2	1
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	A composite sample was also tested for Yangibana West in order to understand the impact of blending ore samples to achieve the planned CaO:TREO ratio limit of less than 1.																							
	Overall Metallurgical recovery																							
	The metallurgical recovery for the additional production targets is 87.4% TREO recovery in the beneficiation circuit, 86.1% TREO recovery in the hydrometallurgy circuit, giving an overall metallurgical recovery of 75.2%.																							
Environmental	<p>This feasibility study (FS) was updated for the Environmental and Social Baseline section and includes data from the 2014 prefeasibility study (PFS), but has been updated to reflect:</p> <ul style="list-style-type: none">• Baseline flora and fauna: Flora and fauna surveys have been conducted over 55,650 Ha of tenements. No significant impact will occur to conservation significant terrestrial flora or fauna. Subterranean fauna sampling has been completed at Yangibana West and is currently underway in the Auer, Auer North and Yangibana areas.• Baseline ground and surface water: A hydrology study has determined that mining and the majority of infrastructure falls outside flood impact zones. Water from fractured rock aquifers will meet approximately 20% of the project's water demands. The remaining 80% of water demands will be sourced from the paleochannel borefield. A pit dewatering assessment and post-closure pit lake modelling has been completed for Yangibana West and is planned to be undertaken for Auer, Auer North and Yangibana pit areas.• Baseline soil and radiation: Topsoil analysis was conducted and mapped over all but the Yangibana area, which is planned. Baseline radiation surveys and radiation waste characterisation studies have determined that naturally occurring radioactive materials (NORM) are associated with the orebody. Additional radiation surveys are required over Auer, Auer North and Yangibana.• Waste rock geochemical characterisation: Yangibana West pit lithologies have been characterised geochemically and classify as benign and non-acid forming. The mineralogy of the project is not associated with asbestiform minerals. Erodibility parameters were determined for waste rock and topsoil, and inform the waste rock landforms' design for Yangibana West. Waste rock geochemical characterisation for Auer, Auer North and Yangibana are initiated.• Baseline air quality: A baseline air quality assessment and greenhouse gas emissions assessment have been completed. A radiation impact assessment has determined that dust containing NORM will not pose a risk to the surrounding environment.• Cultural heritage: No impacts to known significant heritage sites will occur as a result of implementing the project. Heritage surveys are currently underway for waste rock landform areas.• Closure: A landform evolution study has identified landform design specifications that aim to ensure site landforms will maintain their integrity for 1,000 years post-closure. A landform evolution study will be revised if waste rock characterisation studies' findings in Auer, Auer North and Yangibana differ from those of the DFS ore sources.• The closure plan will be updated subject to outcomes of ongoing studies.• Permits required and status of permits: A formal environmental impact assessment is currently set at a Public Environmental Review (PER) level of assessment by both the State and Commonwealth Governments of the DFS ore sources and Yangibana West. The PER documentation is currently being assessed. Referral for Auer, Auer North and Yangibana will occur under the <i>Environmental Protection Act (WA 1986)</i>.																							

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Infrastructure	<p>The Yangibana project is located approximately 200 km north of Gascoyne Junction in the Upper Gascoyne region. The process plant is located on a greenfield site and all supporting infrastructure must be constructed. The proposed infrastructure for the project will include:</p> <ul style="list-style-type: none">• Comminution plant• Beneficiation plant• Hydrometallurgy plant• Access and site roads• Water supply borefield• Tailings storage facility (TSF) and evaporation plant• Mining buildings• Fuel storage• Security and fencing• Borefield• Employee housing and transportation• Water treatment and mine site sewage• Data and communications infrastructure• LNG fuelled power station. <p>As of July 2018 early site works include the construction of the water supply bore and pipeline, the 240 room accommodation village and the access road from the Cobra – Gifford Creek Road to the plant site. Of the above, construction has started on the bore and pipeline and off-site fabrication of the accommodation village buildings. Designs have been completed for the access road.</p>																																																
Costs	<p>Operating costs</p> <p><u>Mining</u></p> <p>A contract mining cost for mining at Bald Hill and Fraser’s of A\$3.98/DMT mined was estimated by Snowden based upon quotations received in 2017.</p> <p><u>Process</u></p> <p>Based on FS modelling, processing costs are the same for both Bald Hill and Fraser’s:</p> <ul style="list-style-type: none">• A\$75.50/t ore, made up of A\$23.42/t ore for beneficiation and \$52.08/t ore for fixed costs.• A\$16.92/t TREO in-situ for the hydromet processing, and carbonate transport. Since the TREO content of the carbonate is constant, the yield to carbonate will vary with TREO head grade and recovery. <p>Selling costs</p> <p>A royalty cost of 2.5% was applied. Additionally, a separation charge (inclusive of impurity removal) of US\$2.50/TREO in carbonate was applied, based on the November 2017 separation quote from REHT-International. For modelling purposes, this cost was applied to each RE oxide separately.</p> <p>Opex summary (LOM – unescalated)</p> <table><tr><th>Item</th><th>A\$M</th><th>Average A\$/t of ore</th></tr><tr><td>Mining costs</td><td>421</td><td>54.4</td></tr><tr><td>Labour</td><td>147</td><td>18.9</td></tr><tr><td>Flights, messing and accommodation</td><td>41</td><td>5.3</td></tr><tr><td>Power</td><td>79</td><td>10.2</td></tr><tr><td>Process fuel</td><td>44</td><td>5.7</td></tr><tr><td>Exploration programs (ongoing)</td><td>18</td><td>2.3</td></tr><tr><td>Maintenance</td><td>28</td><td>3.6</td></tr><tr><td>Consumables</td><td>18</td><td>2.3</td></tr><tr><td>Equipment hire</td><td>23</td><td>3.0</td></tr><tr><td>Product transport</td><td>23</td><td>3.0</td></tr><tr><td>Contract/General expenses</td><td>39</td><td>5.0</td></tr><tr><td>Corporate costs</td><td>18</td><td>2.3</td></tr><tr><td>Mine closure costs ¹</td><td>30</td><td>3.9</td></tr><tr><td>Reagents</td><td>308</td><td>39.8</td></tr><tr><td>Total operating costs</td><td>1238</td><td>159.91</td></tr></table>	Item	A\$M	Average A\$/t of ore	Mining costs	421	54.4	Labour	147	18.9	Flights, messing and accommodation	41	5.3	Power	79	10.2	Process fuel	44	5.7	Exploration programs (ongoing)	18	2.3	Maintenance	28	3.6	Consumables	18	2.3	Equipment hire	23	3.0	Product transport	23	3.0	Contract/General expenses	39	5.0	Corporate costs	18	2.3	Mine closure costs ¹	30	3.9	Reagents	308	39.8	Total operating costs	1238	159.91
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Item	Comments
	<p><i>Note 1: Stated closure costs are for the Bald Hill and Fraser's pits and waste dumps only. Closure cost estimate for the plant and all associated site infrastructure has been calculated as part of the FS but are not stated as part of the above LOM costs, as further Measured and Indicated Resources (excluding this Probable Reserve) are available to support additional mine life.</i></p>

Item	Comments	
Costs (cont'd)	Other operating costs (LOM – unescalated)	
	Item	A\$M
	Taxation	147.8
	Total royalties	68.1
	Capital costs summary	
	Pre-production capital costs (LOM – unescalated)	
	Description	A\$M
	Mining	4.0
	Process plant	130.1
	Non-process infrastructure	81.4
	TSF	19.8
	Total direct costs	235.3
	Indirect costs	56.3
	Subtotal – Project costs	291.6
	Contingency	43.7
	Total pre-production project costs (-5% +15%)	335.3
	Production capital costs (LOM – unescalated)	
	Item	A\$M
	Plant sustaining	-
	TSF and evaporation pond – additional cells and lifts	5.9
	Shire access road upgrade	7.2
Total LOM production costs	13.1	
Total project capital costs	348.4	
Note 2: Major plant sustaining capital costs are not predicted to occur within the first six-year mine life of the process plant. The FS has costed all light vehicle and mobile plant on a hire basis within the operating cost estimate.		
Revenue factors	The project will provide a MREC product for sale.	
	The separated oxide prices used for the economic evaluation are the Argus Media forecasts for the period 2017 to 2020. Annual year-on-year escalation was applied on an individual RE oxide basis, as supplied in the forecasts. The derived MREC basket price applied in the evaluation, using the formula stated in revenue factors, is shown below:	
TREO basket price used in evaluation (2020)		
Project (LOM)		2020 basket value (US\$/kg TREO)
All LOM deposits		29.21
The annual MREC production volume (as kg TREO) is calculated through the application of beneficiation and hydrometallurgy elemental recovery factors (derived from pilot plant and laboratory testing) to a quarterly mining schedule.		
The MREC revenue is calculated as:		
TREO Basket Price		
minus Customer Separation Quote		
minus Customer Impurity Removal Charges		
= MREC Product Price		
Hastings has previously announced that four offtake memorandums of understanding (MOUs) have been entered with Qiandong Rare Earth Group, China Rare Earth Holdings Limited, Baotou Sky Rock Rare Earth and Thyssenkrupp Raw Materials GmbH for approximately 11,000 t of the total planned 15,000 MREC annual tonnes.		

Item	Comments																																																																						
Market assessment	<p>The Yangibana project will produce a MREC that has a high neodymium (Nd) and praseodymium (Pr) content (~41% of TREO content) as the predominant value elements. It is estimated that Pr₆O₁₁, Nd₂O₃, Tb₄O₇ and Dy₂O₃ will contribute between 85% and 90% of the economic value per kilogram of production.</p> <ul style="list-style-type: none">It is particularly in the Nd₂O₃ and Pr₆O₁₁ oxides where substantial supply shortages and rapid demand growth are anticipated in the decade of the 2020s.Argus Media supplied price forecasts for RE oxides in October 2017 covering the period 2017 to 2027.Argus Media identifies an increase in demand in wind turbines and their use of Nd in permanent magnets. RE demand in permanent magnets is forecast to increase at >10% per annum between 2016 and 2021.The plant has a have a design capacity of 15,000 t of MREC per annum.The plant will have a design capacity of 8,500 t per annum TREO. <p>Hastings has previously announced that four offtake MOUs have been entered with customers covering approximately 11,000 t of the planned annual MREC production volume, with separated oxide prices used for MREC product pricing to be confirmed.</p>																																																																						
Economic	<p>The key financial metrics for the Yangibana Ore Reserves are IRR8%Nominal of 76% and NPV8%Nominal of \$499 million (A\$).</p> <ul style="list-style-type: none">A NPV discount rate of 8% was used for the financial analysis.A US\$:A\$ exchange rate of 0.75:1 was used for the financial analysis. <p>A sensitivity analysis on the NPV is provided below.</p> <p>The Ore Reserves was also evaluated on a flat growth basis (Argus 2017 prices applied without any growth, NdPr Oxide price = \$64/USD/kg) and was found to still be economically viable with a NPV8% of 151M and an IRR of 38%.</p> <p>A sensitivity analysis was undertaken on the key parameters that are ranked below, with the greatest impact on the NPV of the project.</p> <table><tr><th rowspan="2">Item</th><th rowspan="2">Units</th><th colspan="2">Low</th><th colspan="2">Mode</th><th colspan="2">High</th></tr><tr><th>Input</th><th>NPV</th><th>Input</th><th>NPV</th><th>Input</th><th>NPV</th></tr><tr><td>Nd₂O₃ price escalation</td><td>%</td><td>-9%</td><td>70</td><td>3%</td><td>499</td><td>13%</td><td>1,288</td></tr><tr><td>Nd₂O₃ oxide price</td><td>USD</td><td>40.34</td><td>198</td><td>60.00</td><td>499</td><td>80.33</td><td>810</td></tr><tr><td>Exchange rate (A\$-US\$)</td><td>A\$/US\$</td><td>0.62</td><td>795</td><td>0.75</td><td>499</td><td>0.88</td><td>292</td></tr><tr><td>P₆O₁₁ oxide price</td><td>USD</td><td>58.76</td><td>407</td><td>77.00</td><td>499</td><td>117.0</td><td>699</td></tr><tr><td>Mining costs</td><td>%</td><td>70%</td><td>566</td><td>100%</td><td>499</td><td>130%</td><td>431</td></tr><tr><td>Nd₂O₃ beneficiation recovery</td><td>%</td><td>73%</td><td>434</td><td>79%</td><td>499</td><td>82%</td><td>527</td></tr><tr><td>Pr₆O₁₁ price escalation</td><td>%</td><td>1%</td><td>512</td><td>2%</td><td>499</td><td>3%</td><td>418</td></tr></table> <p>The low-high case range was based on the following:</p> <ul style="list-style-type: none">Oxide price growth rates – The high and the low case was selected as one standard deviation lower or higher from the mean growth rate predicted by the Argus forecastsMining costs – The low and high case for mining costs were assessed on the basis of a ± 30% accuracy.Metallurgical Recovery – the low and high case for beneficiation was assessed based on the range of test results observed in laboratory test work under varying process conditions.Oxide prices were set in the low case as a equivalent \$14USD /kgTREO equivalent basket price, which is the estimated breakeven point for Chinese producers. The high case was set at a NdPr Oxide price of \$90USD / kg TREO, the estimates copper substitution price point for permanent magnets in 2017.	Item	Units	Low		Mode		High		Input	NPV	Input	NPV	Input	NPV	Nd ₂ O ₃ price escalation	%	-9%	70	3%	499	13%	1,288	Nd ₂ O ₃ oxide price	USD	40.34	198	60.00	499	80.33	810	Exchange rate (A\$-US\$)	A\$/US\$	0.62	795	0.75	499	0.88	292	P ₆ O ₁₁ oxide price	USD	58.76	407	77.00	499	117.0	699	Mining costs	%	70%	566	100%	499	130%	431	Nd ₂ O ₃ beneficiation recovery	%	73%	434	79%	499	82%	527	Pr ₆ O ₁₁ price escalation	%	1%	512	2%	499	3%	418
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Social	<p>Hastings is implementing a Stakeholder Engagement Plan. The overall response to the project has been very positive. A Land Access Agreement has been negotiated and ratified with the pastoral lessee. A Native Title Agreement has been negotiated and ratified with the Native Title claimants.</p> <p>The workforce will be recruited from the region, and where this is not possible, more broadly with most plant operations specialists sourced from Perth.</p> <p>Hastings is currently developing systems and processes to ensure it maintains its social licence to operate, to ensure its workforce are competent in their respective roles and have a culture of safety and compliance.</p>																																																																						

Item	Comments
Classification	The Mineral Reserve is classified as a Probable Ore Reserve using the guidelines of the JORC Code (2012 Edition). The conversion of Measured Resources to Probable Reserves is primarily based on the need for production reconciliation of the selective ore deposit and reconciliation of the complex processing method.
Audits or reviews	No external audits or reviews of the 2017 FS have been undertaken.
Relative accuracy/ confidence	The estimates in this study relating to mining, processing and cost performance are underpinned by an updated PFS which has a confidence range of $\pm 25\%$.