**INITIATION: WAKING UP THE DONALD!** 

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SHARE TARGET IMPLIED PRICE PRICE RETURN

\$0.55 \$3.94 616%

#### **SHARE PRICE CHART**



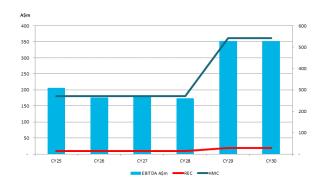
#### **COMPANY DATA & RATIOS**

Share Price (\$ per share)	\$0.55
Risk Adjusted NAV (\$ per share	e) \$3.94
Implied Return (%)	616%
Enterprise Value (\$m)	\$70m
Diluted MCap (\$m)	\$75m
Diluted Shares (m)	136m
Avg Daily Value (\$m)	\$0.0m
Free Float (%)	24%
GICS	Materials
Commodity	Rare Earths, HMS

### **MAJOR SHAREHOLDERS**

Kobe Investments	73%
FSC Investment Holdings	6%
Board & Management	78%

#### PRODUCTION AND COST PROFILE



#### STRATEGIC, TIER-1 VHM & RARE EARTHS PROJECT

The Donald Project is the largest undeveloped premium zircon resource globally (~5 years of global demand based on reserves = small fraction of total resource!) and represents a globally significant source of ex-China rare earths.

Astron is at an advanced stage of de-risking its 100% Donald Project with a simplified flowsheet (vs 2013 DFS) seeking to fast-track production (MIN & EES secured), extensive met test work (pilot scale) provide confidence around recoveries of fine minerals (incl. rare earths), strong community support, key approvals in place and a development timeline within favourable macro conditions.

Donald is well located with access to utilities, road, other existing infrastructure and near rail, ports and four towns. Astron also has established trading, processing and R&D capabilities through its operations in China and has, over 35 years, developed deep relationships with key industry participants. Astron's Board is chaired by George Lloyd, instrumental in the formation of Iluka Resources, and Management is gearing up for project development.

#### WIM DEPOSITS: LOW-COST NEW SOURCE OF RARE EARTHS

Donald is a WIM-style deposit and represents a substantially large, long life, near-surface, homogenous, scalable and globally significant source of rare earths.

Phase 1 development targets mining of 7.5Mtpa ore to produce 9ktpa of REC (in addition to 270ktpa of HMC) over +35 year mine life, representing only 13% of the Resource!

#### STRONG MACRO OUTLOOK

At US\$11k/t REC, the rare earth value of Donald's production represents  $\sim 50\%$  of project revenue. Driven by clean energy and electro mobility, demand for key rare earths (NdPr) is expected to double by 2030. Zircon and rutile prices are expected to remain strong, driven by decline in key sources of supply (Iluka's Jacinth-Ambrosia) and demand growth.

We expect the value of Donald's rare earths to trend towards 60% of revenue as rare earths prices react to market deficits.

### SITE VISIT

In August 2022, BOEQ undertook a site visit to meet with management, key community representatives and gain a deep understanding of Donald's scale and infrastructure.

### INITIATE WITH BUY RATING, \$3.94 PRICE TARGET

We initiate on ATR with a BUY rating and a \$3.94 Price Target, an implied potential return of 616%. We consider that the material disconnect between ATR's market value and the fundamental value of the Donald Project represents an opportunity to generate extraordinary long-term returns. Our investment thesis is supported by the quality of the project, advanced feasibility and approvals, ATR's capabilities, social licence and development strategy. To value ATR, we adopted a DCF approach (EES development case plus expansion in Year 5) and applied a 50% discount to reflect key risks at this stage. We have also assessed and incorporated expected material upside (increase in VHMs resource/reserves, lower strip and scale expansion). On a fully diluted basis, the base case represents a NAV/share of \$3.94. Following funding and development, a NAV/share of +\$5.00 could be expected.





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### **INVESTMENT THESIS**

### MACRO: RARE EARTHS, ZIRCON AND RUTILE

- The Rare Earths market is undergoing major structural change, driven by:
  - o Key rare earths (NdPr) are essential components employed by two of the fastest growing industries driven by de-carbonisation: clean energy (wind power) and electric vehicles
  - o There is a global push by multiple governments seeking to reduce carbon emissions (and achieve net zero by 2050) which is driving policy that strongly supports rare earth demand growth over the next two decades
  - o China has an 80% global market share and Western countries are pushing to diversify sources of supply away from China. Western countries are supporting and providing a wide range of incentives to develop and source supply of key materials ex-China (i.e. the US Government's Inflation Reduction Act provides a US\$7,500 credit for new EVs and for OEMs to qualify key materials have to be sourced from FTA countries like Australia)
  - O Current EV penetration of just over 10% is expected to reach 30-40% by 2030 which indicates that supply of key rare earths (Nd and Pr) needs to double by 2030
  - o Rare Earths prices vary across the 17 elements, however due to growing supply/demand deficits for NdPr from 2023 through to 2035, we expect current NdPr prices of circa US\$100/kg to materially increase as deficits increase to incentivise new supply
  - o If history serves as a guide, most rare earth projects will take longer than expected to be developed due to technical and regulatory considerations
- Attractive zircon supply/demand dynamics, particularly for premium zircon, driven by:
  - o The global supply of zircon is highly concentrated with top 6 producers representing 80% of production
  - o Zircon demand expected to continue growing driven by urban population and GDP growth
  - o This market is currently in deficit with demand exceeding key producers' ability to supply and new supply sources not considered sufficient to balance the market
  - o Iluka's Jacinth Ambrosia mine (largest zircon supply source) is expected to close by 2027 (Balranald in NSW and Wimmera in Victoria under feasibility to replace)
  - o Chinese zircon supply is primarily sourced from Australia and Africa
  - o TZMI, a leading industry expert, thinks new supply beyond identified projects are required to prevent the industry from operating in a prolonged state of supply/demand deficits
  - O Current prices of US\$2,100/t above US\$1,700/t LT incentive price for new mines to get into production. However, near-term expected market deficits point to higher pricing
- Attractive titanium supply/demand dynamics driven by:
  - o Disruptions to global supply due to the Ukraine war
  - o TiO2 demand growth driven by urban population and GDP growth (TiO2 pigments)
  - o China is the largest supply source at 40% of global demand (next 5 producers at 40%)

# BLUE OCEAN

### ASTRON CORPORATION LIMITED (ATR)

- o Iluka's share of global supply of titanium reducing following the spin-off of SRX and the anticipated end of mine life of Cataby and Eucla Basin (2027-28)
- o Current prices (chloride ilmenite) of US\$320/t are expected to increase further driven by tight supply and increasing demand

### STOCK SPECIFIC: WHY ASTRON?

Astron Corporation Limited (Astron or the Company) (ASX:ATR) is a A\$70m market cap rare earths and mineral sands developer through its flagship 100%-owned Donald Project located 300km North West of Melbourne in Victoria. As at 30 Sept 2022, ATR had A\$0.4m cash, a \$5m convertible note with Collins Street Value Fund and no debt. It has since completed a \$4m placement and is undertaking a \$3m SPP.

Our investment thesis for ATR is summarized below:

- WORLD CLASS SCALE, HIGH GRADE, LOW COST: The Donald Project contains the world's largest undeveloped zircon deposit and a globally significant quantity of rare earths with high concentration of Nd, Pr, Tb and Dy. Its heavy mineral sands assemblage also reflects the highest grade zircon and titanium dioxide combination. It is on track to become a leading source of heavy mineral and rare earths concentrate, from a safe jurisdiction (ex-China), with a long mine life (+35 years only from MIN comprising 13% of the total resource), at low cost with significant scope to materially increase scale.
- VALUABLE AND POTENTIALLY STRATEGIC RARE EARTHS REVENUE STREAM: Donald's mineral sands contain a high NdPr proportion within the Monazite (in addition to Tb and Dy within the Xenotime). At current prices, the value of the REC revenue stream is nearly 50%. The Phase 1 production rate of 9ktpa REC is globally significant and is likely to attract strong strategic interest from a range of strategic users (i.e. EV OEMs) seeking to secure a long term, ex-China source of supply.
- **KEY APPROVALS IN PLACE, STRONG SOCIAL LICENCE:** The Donald Project has a granted Mining Licence and EES. The final approval for development is its Work Program, which Astron expects to submit following finalisation of an updated Feasibility Study for Phase 1 (within the EES parameters). Astron's test pit demonstrated the mine rehabilitation concept to local stakeholders, which combined with its community consultation programs and government engagement is expected to result in straight forward development path.
- ATTRACTIVE ECONOMICS: Project economics appear very attractive and have the potential to be materially enhanced by an expansion of scale/processing operations post-development. We have factored conservative assumptions around the anticipated upside from the 2022 drilling program: increase in VHM resource/reserves (incl. +20-38 micron fraction and xenotime) as well as potential impacts on production (lower strip, lower mining costs, longer mine life).
- MATERIAL DISCONNECT BETWEEN MARKET & PROJECT VALUES: Astron holds 100% of a relatively advanced and valuable project. The disconnect between the market value of ATR and the fundamental value of the Donald Project is one of the highest we have encountered recently. We see the risked upside potential over 350% (700% un-risked).
- **CATALYST RICH:** Astron is approaching a defining moment from a de-risking perspective through the update of its MRE, completion of its feasibility study, offtakes and financing.
- INDUSTRY LEADING EXPERTISE: ATR's founders and management have been in the mineral sands market for over 35 years with strong existing networks with customers. ATR's Board is chaired by George Lloyd, who was instrumental in the formation of Iluka Resources (merger of RGC and Westralian Sands in 1998), and Management has grown its project development capabilities.





### WHAT ARE WIM-STYLE DEPOSITS?

Astron's Donald and Jackson deposits, located in Victoria, are fine-grained WIM-style heavy mineral sand accumulations. The Donald Project will likely be the first commercial development of such deposits, amenable to a staged, long-life, low-cost mining operation. Other WIM deposits include Iluka's Wimmera and WIM Resources Avonbank.

### Geological background

Mineral sands are a group of minerals such as ilmenite, rutile and zircon commonly found together as coarse and fine grain sands.

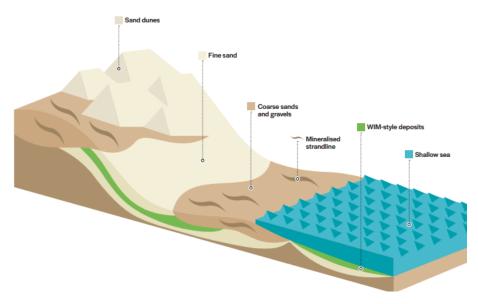
Originally formed as crystals in igneous rocks such as granite or basalt and some metamorphic rocks, these minerals were eroded by wind, rain and rivers over millions of years. The resulting grains washed down to the sea to become part of the coastal sands of ancient beaches. Tidal movements washed away the lighter mineral sand grains, such as quartz sands, leaving the heavier mineral sands on beachlines.

As the world's oceans subsided these deposits were left exposed which is why they are now often found more than 100 kilometres from today's beaches.

This natural weathering process formed the two main types of mineral sands deposits that exist today. Coarser sands that remained on shorelines due to their larger size are often referred to as strandline deposits whereas finer mineral sands which typically settled in the basin of the ocean are referred to as WIM-style (originally Wimmera Industrial Minerals) or offshore deposits. WIM-style deposits are generally larger overall than strandline deposits. WIM-style deposits are typically flat, shallow and extensive. They usually contain greater tonnages and are more consistent in VHM characteristics compared to coarse grained strandline deposits. This allows for greater economies of scale and longer mine life.

The Murray Basin (covering parts of Victoria, New South Wales and South Australia) demonstrates this weathering process. Home to an ancient sea during the Cenozoic Era (up to 66 million years ago), large deposits of heavy mineral sands formed late in its history in the Pilocene time, 6 million to 2 million years ago, when heavy minerals entered the marine environment of the Murray Basin through river systems.

### WIM style deposit

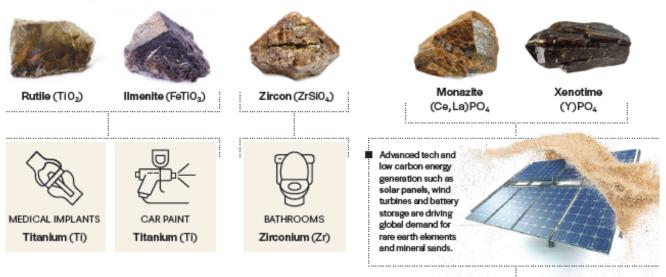


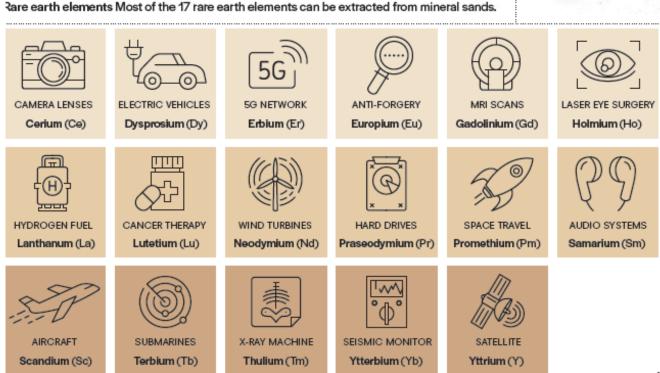
Source: Minerals Council of Australia



The Donald Project contains the full range of valuable minerals and will initially target the production of a heavy mineral concentrate (HMC) containing rutile, ilmenite and zircon, as well as a rare earth concentrate (REC) containing monazite and xenotime.

#### One Mine, Multiple Products





Source: Minerals Council of Australia



### **COMPANY OVERVIEW**

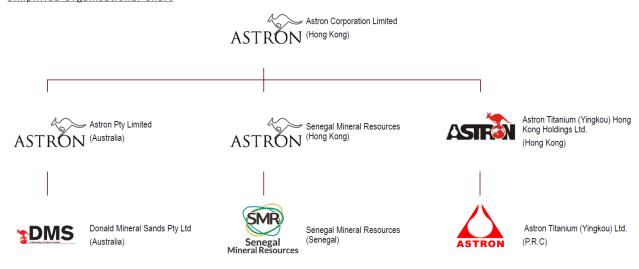
Astron Corporation is a HK domiciled and ASX-listed mining and processing company. It has an established presence in the mineral sands sector and has +35 years of experience in mineral sands processing, technology and downstream product development as well as the marketing and sale of zircon and titania products.

In 2004, Astron acquired the Donald Mineral Sands Project. Astron is focused on de-risking and developing the Donald Project and since its acquisition it has:

- Secured a Mining Licence and Project Environmental Effects Statement (EES)
- Completed a Definitive Feasibility Study (2013)
- Acquired water rights and freehold property (1,423 Ha)
- Updated mineral resource (2016) and ore reserves (2021)
- Completed a test pit, fully rehabilitated the soil, and undertook wet concentrator pilot plant works (1,000 tonnes of ore produced 24 tonnes of heavy mineral concentrate, subsequently run through a pilot scale flotation plant continuously over 24-hour periods to produce a rare earth concentrate)
- Tested product samples to confirm product quality and market acceptance
- Undertaken extensive community and stakeholder consultation

Astron has also undertaken additional drilling and met test work to refine the development scope (within EES parameters) which will inform an updated Feasibility Study due for completion in 2023.

### Simplified Organisational Chart



Source: Company

In China, Astron conducts a mineral sands trading operation based in Shenyang, China. It also owns and operates a zircon and titanium chemicals and metals R&D facility in Yingkou, China, which includes a mineral separation facility processing titanium feedstock into a high-grade agglomerated product sold to both Chinese and Western chloride pigment producers. Astron Titanium has nearly four decades of operational experience in China, including:

- Close connections with a range of mineral sands customers, within China and internationally
- Capability to produce nuclear grade zirconia (hafnium-free zirconia)
- One of the largest rutile mineral separation facilities in China, commissioned late 2019.



- Mineral separation plant with a design capacity of 300 ktpa of feedstock
- Phase 1 capacity of 150 ktpa of feedstock, production of ~50 ktpa of rutile

#### Separation Plant Flowsheet



Source: Company

Astron's specialty R&D lab operates within the Yingkou Mineral Separation Plant. Astron has a history of specialty research and development in the mineral sands industry and various downstream product application industries. By way of example, Astron holds patents for nuclear zirconium sponge technology (nuclear grade zirconia), impurity removal from zircon (improve quality and colour) and microagglomeration technology (micro agglomerate fine rutile and ilmenite materials to improve product suitability for downstream users). The Company has made efforts to diversify the current MSP to be able to process zircon middlings in addition to Rutile.

Astron also owns a high-grade coastal mineral sands deposit, the Niafarang Mineral Sands Project, in Senegal.



### **DONALD MINERAL SANDS & RARE EARTHS PROJECT**

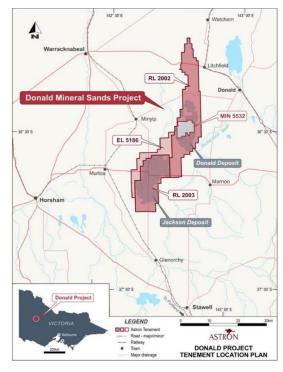
### **PROJECT OVERVIEW**

Astron's 100%-owned Donald Project is a tier-1 mineral sands and rare earths project located approximately 300 kilometres north-west of Melbourne and 70 kilometres from the regional centre of Horsham, in Victoria. The project site has readily accessible water, roads and other existing infrastructure, including office and storage space. It is 14km from the town of Minyip, where Astron has a local office (population 524) and is in close proximity to the townships of Donald (population 1,498), Mamoo (population 122) and Rupanyup (population 536). In addition, the city of Horsham (population of +20,000 people) is located circa 40 minutes by road to the mine site.

One of the key features of the Donald Project is its sheer scale (total licenced area of 50,636 Ha and total area under the MIN of 2,784 Ha) which combined with the homogenous nature of the deposits is expected to result in a very long-life, consistent and scalable operations representing a globally significant new source of supply of the critical mineral elements of zirconium, titanium, neodymium and praseodymium.

The Donald Project comprises the Donald deposit (RL2002 and MIN 5532) and the Jackson deposit (RL 2003) as illustrated below. The resource under MIN 5532 only represents 13% of the total MRE.

#### Location of the Donald Project



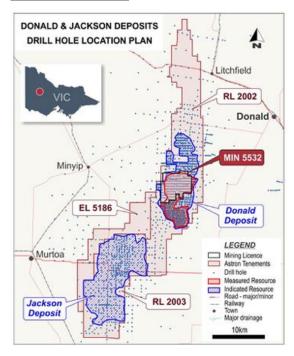
Source: Company

### **PROJECT HISTORY**

The Donald Project was discovered by CRA in the 1980s and the tenement area and geology has been extensively evaluated. The project area has had a total of 2,789 drill holes over several drilling campaigns. The mining leases consists of 387 drill holes spaced from 125mE by 200mN to 250mE by 450mN. An Ore Reserve Statement was issued on 18 February 2021 based on the 2016 Mineral Resource estimate (both prepared by AMC consultants).



### <u>Location of Drill Hol</u>es



Source: Company

The Donald Project is at an advanced feasibility and permitting stage. Astron is undertaking a comprehensive review of project parameters of the Donald Project as part of defining the final parameters to complete an updated Feasibility Study, due for completion Q1 CY2023. The review was undertaken with a view to establishing the least risk path towards the commercialisation of the Phase 1 development of the Project on Mineral Licence 5532 (MIN5532), while maintaining flexibility to deliver the value that the development of the broader tenement resources is expected to represent. Key objectives, included:

- aligning the Phase 1 project configuration, including physical infrastructure and site services, with the requirements of the Environmental Effects Statement (EES), to minimise the risks and time involved in securing the outstanding regulatory approval (the Work Plan)
- identifying opportunities to improve the capital-efficiency of the project
- mitigating project execution risks, particularly in terms of the sourcing and procuring of long lead time items
- maintaining the flexibility for subsequent phases of the Project to recover the remaining resource base and/or enable higher production output, including by consideration of the onsite production of final mineral sands products (subject to further regulatory approvals at a later stage).

### **RESOURCE**

RL2002 and RL2003 contain a combined Mineral Resources of 2.4 billion tonnes at a heavy mineral grade of 4.8%. The Project represents the largest undeveloped zircon resource globally with 22.1 million tonnes (Mt) of in-situ zircon resource, as well as a major rare earth resource, with 2.32 Mt of in-situ monazite resource. The scale of the monazite resource in the deposit, as demonstrated through metallurgical test work, provides the potential for the Project to be a major source of critical mineral elements, such as neodymium and praseodymium. The presence of xenotime in the deposit (of circa 0.6%, consistent with other WIM deposits) and its expected recovery would provide a new source of terbium and dysprosium.



It is expected that the total monazite and xenotime will be in the order of 2.5% as % of HM.

### Mineral Resource Estimate, 1% cut off grade

### Mineral Resource Estimate, VHM at 1% cut off grade

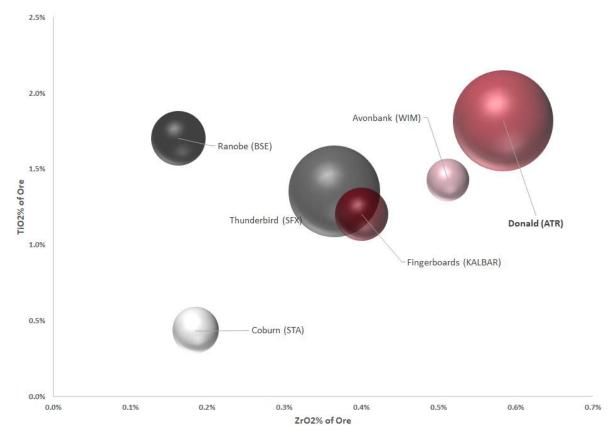
01 '6' ''	Tonnes	НМ	Slimes	Oversize		Tonnes	Slimes	Oversize	НМ
Classification	(mt)	(%)	(%)	(%)	Classification	(mt)	(%)	(%)	(%)
Within ML5532					Within ML5532				
Measured	372	4.5	14.4	12.8	Measured	264	14.2	12.2	5.4
Indicated	75	4.0	13.8	13.1	Indicated	49	13.6	12.1	4.9
Inferred	7	3.5	13.5	10.6	Inferred	5	13.5	10.2	4.2
Subtotal	454	4.4	14.2	12.8	Total	317	14.1	12.1	5.3
With RL2002 Outside of M	IL5532				Within RL2002 Outs	ide of ML553	2		
Measured	343	3.9	19.8	8.1	Measured	185	19.1	7.3	5.5
Indicated	833	3.3	16.2	13.5	Indicated	454	15.9	13.2	4.2
Inferred	1,595	3.3	15.7	6.0	Inferred	647	15.2	5.8	4.9
Subtotal	2,771	3.4	16.4	8.5	Total	1,286	16.0	8.6	4.8
Total within Donald Depos	sit (RL2002)				Total within Donald	Deposit (RL2	002)		
Measured	715	4.2	17.0	10.6	Measured	448	16.2	10.2	5.4
Indicated	907	3.4	16.0	13.4	Indicated	503	15.7	13.1	4.3
Inferred	1,603	3.4	15.7	6.0	Inferred	652	15.2	5.8	4.9
Subtotal	3,225	3.6	16.1	9.1	Total	1,604	15.6	9.3	4.9
Total within Jackson Depo	osit (RL2003)				Total within Jackson	Deposit (RL	2003)		
Measured	0	0.0	0.0	0.0	Measured				
Indicated	1,903	2.8	19.0	5.8	Indicated	668	18.1	5.4	4.9
Inferred	584	2.9	16.7	3.3	Inferred	155	15.1	3.1	4.0
Subtotal	2,497	2.9	18.5	5.2	Total	823	17.6	5.0	4.8
Total Donald Project					Total Donald Project				
Measured	715	4.3	18.1	11.1	Measured	448	16.2	10.2	5.4
Indicated	2,811	3.0	17.9	8.2	Indicated	1,171	17.1	8.7	4.6
Inferred	2,187	3.3	16.4	5.5	Inferred	807	15.2	5.3	4.7
Total	5,712	3.2	16.9	7.3	Total	2,427	16.3	7.0	4.8

Ilmenite Leucoxene (%HM) Rutile (%HM) (%HM) (%HM) 31 19 22 33 36 32 20 22 19 22 33 33 19 31 21 20 17 32 32 32 33

Source: Company

The scale of Donald's resource as a globally significant premium zircon and titanium project is well understood. RL2002 and RL2003 contain a combined Mineral Resources of 2.4 billion tonnes at a heavy mineral grade of 4.8%. At a zircon assemblage of 19%, the Donald Project contains in-situ zircon resources of 22.1 Mt, representing the largest undeveloped zircon deposit globally.

Donald - large scale & high-grade premium zircon/titania project



Source: Company



In addition, recent improvements in gravity separation and flotation processing technologies have enabled the recovery of fine grain materials, making the Donald Project a globally significant ex-China rare earths resource.

1,600 40% 1,400 35% 1,200 30% 1 000 25% 800 20% 600 15% 400 10% 200 5% Browne Range Influi Donald upside (ATR) 0% Wedtalkho Whi on weathing Donald InTRA ■ Contained NdPr, kt (LHS) NdPr % (RHS)

Donald - Potentially the ASX 2nd largest contained NdPr resource

Source: Company reports, BOEQ estimates

#### **RESERVES**

From an ore reserve perspective, the Donald Project has premium zircon reserves equivalent to 5 years of global demand based on a small proportion of the total resource and is expected to become a pivotal source of long-term supply to this market (+35 year mine life). As with the MRE, we expect that Astron will likely add 0.6% xenotime to its 1.9% monazite assemblage. These heavy and light rare earths reserves are expected to be an important source of new supply of Nd, Pr, Tb and Dy to this growing market.

Donald Mineral Sands Ore Reserve, RL 2002

Classification	Tonnes (mt)	Slimes (%)	Oversize (%)	HM (%)	Ilmenite (%HM)	Leucoxene (%HM)	Rutile (%HM)	Zircon (%HM)	Monazite (%HM)
Within ML5532									
Proved	170	14.2	11.9	5.3	31.4	22.1	7.1	18.8	1.9
Probable	24	13.4	12.5	4.9	33.2	21.3	6.7	20.2	2.0
Total	194	14.1	12.0	5.3	31.6	22.0	7.0	19.0	1.9
Within RL2002 Outside	of ML5532	2							
Proved	140	19.1	7.1	5.6	31.0	18.4	9.6	21.2	1.8
Probable	268	15.8	14.4	4.0	32.3	19.5	7.5	17.0	1.6
Total	408	16.9	11.9	4.5	31.8	19.0	8.4	18.8	1.8
Total within Donald Dep	posit (RL2	002)							
Proved	310	16.4	9.8	5.4	31.2	20.4	8.2	19.9	1.8
Probable	292	15.6	14.2	4.1	32.4	19.7	7.4	17.3	1.6
Total	602	16.0	11.9	4.8	31.7	20.1	7.9	18.8	1.7

Source: Company

#### TEST PIT AND PILOT TESTING: KEY DERISKING MILESTONES

Astron's strategy is focused on developing the world class Donald deposit. A key de-risking milestone prior to updating the project's feasibility was the successful delivery of the test pit and the subsequent pilot scale metallurgical test work and testing of product attributes. The spirals used in the plant were



full-size production spirals, as well as the hydro cyclones, both currently used commercially across the world to minimize the risk of scale up.

Key technical and commercial outcomes from this phase included:

- 1. Excavation of a test pit to extract 1,000t ore sample
- Engaged Mineral Technologies to undertake the pilot test works which
  confirmed commercial recoveries of key minerals from Donald's ore body and
  together with testing at Yingkou's facilities confirmed final product quality:
  - 1,000t ROM ore material from the Donald Project was treated in a purpose built 4 stage pilot gravity separation plant in Southern Queensland
  - Production hydrocyclons and spirals used in test plant enables low risk scale up: test plant was a 1:121 scale plant constructed in accordance with designs of the WCP from Astron's previous feasibility studies
  - o feed preparation process liberated the Heavy Minerals contained in the ROM material with minimal loss of mineral to waste streams
  - o gravity separation works confirmed optimal equipment selection
  - o recoverability of the finer materials compared favourably against historical challenges with the finer grained resources recoveries were maintained at both 85% and 95% HMC grade
  - o the pilot process produced approximately 24 tonnes of HMC formed the basis of subsequent metallurgical test work including lock-cycled mineral separation test work running HMC through a pilot scale flotation plant continuously over 24-hour periods to produce a rare earth concentrate
  - o 75.0%, 88.9%, 85.5% of titania, zircon and rare earths were recovered to HMC and REC
  - o metallurgical recoveries were 62.9% of HM into the HMC product and 85.8% of monazite into the REC product
- 3. HMC and REC product samples were also prepared for marketing purposes
- 4. Astron undertook comparative testing of samples of three different competitor premium zircon products: results demonstrate that the Donald zircon displayed the highest brightness/whiteness characteristics as well as favourable on other criteria used to differentiate premium zircon
- 5. Astron confirmed that Donald titania is desirable as a feed source in the production of slag (feedstock for the production of chloride and sulphate pigments). As a 66% TiO 2 product with low calcium content, it has an application as a 'sweetener' (higher titanium dioxide content feed) to existing slag feeds









Project Competitor 1 Competitor 2 Competitor 3



Source: Company

From an external stakeholder's perspective, the successful outcomes of the pit trial included:



### Test pit: before and after

- Excavation of a test pit to extract 1,000t ore sample without major disturbance
- 2. Tested pit wall stability of material in dry and wet zones
- 3. Demonstrated proof of concept in respect of backfill of overburden material and topsoil as well as full rehabilitation process to pre-mining status (land suitable for farming) following the extraction of the sample ore body (in the order of 5%, representing the % of HMC in the resource)



Source: Company

We highlight the importance of this milestone not only to de-risk the Donald Project from a technical perspective but also from a license to operate perspective securing support from the community and local government.

### STAGED DEVELOPMENT APPROACH

Astron's approach is based on the staged development of the mineral resources contained within the retention licences RL2002 and RL2003. Phase 1 of the Project will be undertaken on the Mining Licence MIN5532 which is contained wholly within RL2002.

MIN5532 contains VHM Resources of 317 Mt at an average HM grade of 5.3%. At the initial ore production rate of 7.5 Mtpa, the existing mining licence supports a mine-life of 35 years.

Phase 1 development will access approximately 13% of the total Ore Resources for the Donald and Jackson tenements within the total licence areas.

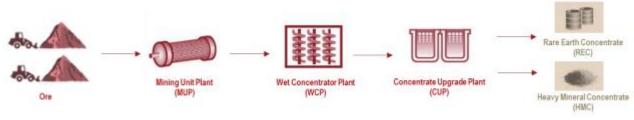
Future potential phases of mine development on RL2002 and RL2003, include increase in mining/processing scale and the on-site separation of HMC into its constituent zircon and titania products.

Astron's management has indicated that decisions to progress further production outcomes will be taken after Phase 1 operations are underway and will be subject to further regulatory approvals.

### MINING, PROCESSING AND LOGISTICS

Astron has simplified the mining and processing operations at the Donald Project for Phase 1 to be compliant with its EES and to get into production ASAP via a simple mining operation with simple beneficiation to produce two concentrate products.

### Donald - Simplified Phase 1 Mining and Process Flowsheet



Source: Company



Mining schematic and sequence

### Phase 1 operations comprise:

- Conventional truck and shovel mining by an independent contractor to produce 7.5 Mtpa of ore fed to a Mining Unit Plant (MUP) located adjacent to the open pit
- Separate stockpiling of topsoil and overburden for return to mined areas, as part of progressive mine rehabilitation
- Combining tailings with sand (modified co-disposal) and initially pumping to an ex-pit tailings storage facility and then subsequent pumping to the mine pit for disposal, as part of progressive rehabilitation of mined areas
- Replacing topsoil and overburden according to the original soil configuration, followed by revegetation and return to farmland

# Concentration of ore using gravitational separation via a wet

### HMC processing in a concentrate upgrade plant (CUP), where the rare earth elements will be separated from the titanium

- Concentrates to be trucked to Doeen intermodal freight terminal, near Horsham:
  - REC to be sold to third parties

and zircon concentrate by flotation

concentration plant (WCP)

HMC transported in containers to a Victorian port for bulk export

### Doeen intermodal freight terminal

**Process Recoveries** 



Source: Company

### **PHASE 1 PRODUCTION PROFILE**

The production profile based on the current flow sheet is illustrated below:

### Indicative Production Profile: Phase 1

	Average first 5 years	Average over life of Phase 1
On site Products		
REC	~9ktpa	~8ktpa
НМС	~285ktpa	~250ktpa

Source: Company

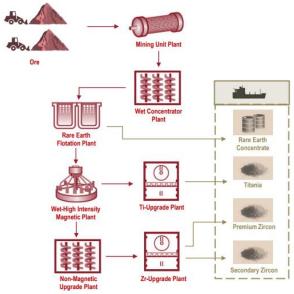
This indicative production profile is subject to change following the incorporation of the results of the 2022 Mineral Resource update due Q4 CY22.

Based on this production profile and current pricing (REC at around US\$ 11,000/t and HMC at US\$ 425/t - see Mineral Sands and Rare Earths Market Update section for further background), the REC production stream represents close to 50% of Phase 1 Revenues. The value of the HMC revenue stream is mainly driven by zircon at 80% with titania representing 20%.



In addition, the potential on-site separation of HMC into final products will be evaluated during the early stage of Phase 1. If feasible, on-site separation into final mineral sands products will require investment in a dry mineral separation plant, involving magnetic and electrostatic separation, and be subject to additional regulatory approvals.

### <u>Donald - Simplified Flowsheet for Potential On-site Separation post-Phase 1</u>



Source: Company

### MATERIAL UPSIDE ANTICIPATED FROM 2022 DRILLING PROGRAM

The proposed project configuration and associated production profile is based upon the current Ore Reserves and Mineral Resource estimate for MIN5532.

The MRE, prepared in 2016, was based on a range of historical exploration programs and is expected to be materially upgraded by Q4 CY22 following from the results of the 2022 drilling program. In 2022, Astron undertook an air core drilling programme (245 holes at 250 meter (East-West) x 500 meter (north-south) drill pattern, total of 6,349 meters) followed by a sonic drilling program (15 geotechnical drill holes, 10 holes of bulk sample core and two water monitoring holes) on MIN5532 designed to:

Key Objectives	Rationale
1- Delineate the +20- 38micron fraction of the valuable heavy mineral (VHM) component of the deposit.	<ul> <li>The +20-38 micron fraction of VHM is not included in the current geological model of the Resource as it was assumed not to be recoverable in previous estimates.</li> <li>Astron's recent metallurgical test work, including pilot plant recovery of bulk samples, provides confidence in the recovery of this material.</li> <li>It is expected that the incorporation of this material will increase the size of the VHM resource in MIN5532.</li> </ul>
2- Provide a more detailed analysis of the rare earth minerals in the deposit, including the xenotime component.	<ul> <li>Astron's metallurgical test work demonstrated that the rare earth mineral xenotime was recoverable in commercial quantities.</li> <li>At present, the rare earth product stream is valued on a monazite, light-rare earth only basis. The recovery of xenotime will make a valuable contribution to the rare earth product by the addition of the heavy rare</li> </ul>

earth minerals of dysprosium and terbium.



- Other fine-grained WIM-styled deposits with similar geological characteristics to the Donald deposit are reported to have approximately 0.6% xenotime in the HM.
- 3- Establish VHM
  assemblage data for
  portions of the resource
  for which this data is
  not currently available.
- It is expected that this may lead to an increase in the estimate of VHM Mineral Resources and Ore Reserves contained within the orebody, with a consequent potential increase in the VHM and rare earth production levels from the Phase 1 mining and ore processing. In addition, it is expected to lead to a lower stripping ratio over the entire resource, with an attendant reduction in mining costs per tonne of ore.

Following completion of the analysis of the results of the 2022 drilling programme, revised Mineral Resources and Ore Reserves estimates will be prepared for MIN5532, which will be incorporated into a revised mine plan for inclusion in the Feasibility Study.

It is expected that the results of this analysis will make a material contribution to the ultimate production and cost profile of Phase 1 of the Project, without any significant effect upon the project configuration or capital costs.

### **ADVANCED STAGE OF REGULATORY APPROVALS**

One of Donald's key advantages compared to other rare earths or mineral sands pre-development projects is its advanced stage of permitting. Astron's strategy of sticking to the EES development concept is also envisaged to be a very low risk strategy to get into production without major hurdles.

**TABLE 1: OVERVIEW OF APPROVALS** 

Approval Requirement	Status	Date	Expiry
Environmental Effects Summary	$\sqrt{}$	2008	N/A
Environmental protection & bio-diversity conservation approval	$\sqrt{}$	2009	2034
Cultural Heritage & Management Plan	$\sqrt{}$	2014	Life of Mine
Water Rights	$\sqrt{}$	2012	2041
Radiation Licence	$\sqrt{}$	2020	Dec 2023*
Work Plan	Pending	Pending	Life of Mine

<sup>\*</sup>Radiation Licence and Export Permits were initially issued 2014 and 2016, with follow up periodic renewals. Transport and export of monazite and xenotime are based on Class 7 radioactive material standards.

Source: Company

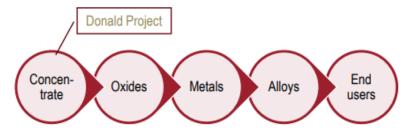
### **ASTRON'S MARKET AND FINANCING STRATEGIES**

Donald's Phase 1 development will produce two concentrates that could be sold to a wide range of processors and/or intermediate users.

For its REC, Astron has positioned itself at the start of the value chain as it allows it to adapt to the growth of the global rare earths metals and permanent magnets markets.



### Overview of rare earths value chain



Source: Company

Donald's typical rare earths basket is heavily weighted towards Neodymium and Praseodymium (Monazite - 21% of total and 57% of value) and to some extent to Terbium and Dysprosium (Xenotime - at 2.1% of total and 32% of value).

TABLE 2: OVERVIEW OF DONALD TYPICAL RARE EARTHS PRODUCT

Mineral type Location	Monazite + Xenotime Victoria			
REO	REO Price (USD/kg)	% total	Basket Value	% value
Lanthanum	1.1	19.1%	0.20	0.6%
Cerium	1.1	40.0%	0.45	1.3%
Praseodymium	98.1	4.6%	4.51	12.8%
Neodymium	97.4	16.4%	15.97	45.3%
Samarium	2.8	3.1%	0.09	0.2%
Europium	0.0	0.1%	0.00	0.0%
Gadolinium	41.4	2.3%	0.95	2.7%
Terbium	1,889.0	0.3%	5.67	16.1%
Dysprosium	316.9	1.8%	5.70	16.2%
Holmium	90.0	0.4%	0.36	1.0%
Erbium	40.0	1.0%	0.40	1.1%
Thulium	-	0.1%	-	0.0%
Ytterbium	10.0	0.7%	0.07	0.2%
Lutetium	415.0	0.1%	0.42	1.2%
Yttrium	4.4	10.0%	0.44	1.2%
Total		100.0%	35.23	

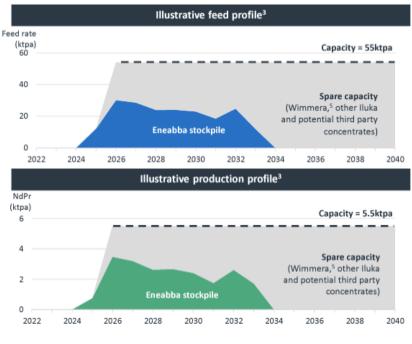
Source: Company, Shanghai Metals Exchange (30 August 2022)

While Astron's management has strong networks in China and could potentially sell its REC into this market, it is important to note that the strategy to sell Donald's REC will likely focus on supplying feedstock into one of the new refineries being developed by Iluka (or Lynas) due to the following reasons:

- 1. Iluka is considering developing its Wimmera deposit (comparable and near Donald), however we believe Donald is likely to be developed before Wimmera due to its advanced approval status;
- 2. Iluka plans to build its rare earths refinery with material surplus capacity (vs Eneabba stockpile) to process its concentrates and potentially third-party concentrates as illustrated by its recent strategic and offtake agreement with Northern Minerals.







Source: Iluka

In respect of its HMC product, pricing reflects the zircon and titania assemblages. Astron, through its Chinese networks, is well positioned to maximise the value of this concentrate. Furthermore, as the market and financing strategies typically work together for industrial minerals and Astron will most likely seek to secure senior debt to support development financing, Astron is likely to require long term offtakes, with credit-worthy counterparties, to support long term debt.

Astron has a range of funding alternatives to develop the Donald Project. However, the Donald project is sufficiently robust to be developed by Astron on its own, subject to support from debt providers and end users (i.e. long term offtakes and prepayments). Donald's indicative Phase 1 funding requirements are illustrated below:

TABLE 3: INDICATIVE DEVELOPMENT USES AND SOURCES OF FUNDS

Uses of Funds	A\$M
Phase 1 Development Capex	350
Working Capital	50
Other	0
Total	400

Sources of Funds	A\$M
Existing Cash	0
Proceeds from Sale of Minority Interest	0
Strategic Partner Equity	0
Prepayment	50
ATR Development Equity Raise	130
Senior Debt	220
Total	400

Source: Company, Blue Ocean Estimates

For Astron to minimise dilution to its shareholders, we consider that the maximum amount of senior debt that could reasonably be expected is in the order of \$220m (63% gearing on development capex). To achieve this, in addition to a prepayment to cover the project's working capital requirements, senior debt providers would expect a material amount of product to be contracted over a period that more than covers the loan repayment profile and term.



From an offtake perspective, Astron has strong networks within the mineral sands industry to secure the requisite offtake and we expect strong interest for an ex-China source of long-term REC supply.

In addition to commercial sources of funding available to a Tier-1 Project, the Australian Government has a number of grants and funding support initiatives for critical minerals developers, including:

- Critical Minerals Strategy implemented by the Critical Minerals Facilitation Office which supports the development of resources, downstream processing and global supply chains
- Modern Manufacturing Initiative dispending \$1.3B in grants to build scale in manufacturing and supply chain opportunities Priorities in critical mineral processing and clean energy

We believe that Astron may be able to apply and access funding from the Critical Minerals Facility, a \$2Bn facility, managed by Export Finance Australia on behalf of the Commonwealth Government under a 10-year program.

Finally, while the Donald Project is currently under the radar of most REC end users, we have not discounted potential strong interest from strategic partners (i.e. EV OEMs) and discuss the strategic rationale in the Investment Proposition section.

### **KEY MILESTONES AND DEVELOPMENT TIMELINE**

Astron is well advanced in de-risking and updating key feasibility work for the Donald Project. The next 12 months will be critical for Astron to finalise feasibility work, approvals, commercial and financing arrangements to support project development.

Astron's key milestones for the Donald Project include:

•	Revised Mineral Resource Statement for MIN5532	Q4 2022
•	Ore Reserve and Mineral Resource Statement	Q1 2023
•	Feasibility Study completion	Q1 2023
•	Work Plan for Victorian Regulatory Submission	Q4 2023
•	FID and construction commencement	Q1 2024
•	Commissioning	Q3 2025
•	Production	Q4 2025

Astron has recently completed a placement and is undertaking a \$3m share purchase plan to advance achieve these key milestones.

Following completion of the updated feasibility study, approval of Work Plan, offtakes and financing in CY23, we expect a Final Investment Decision by early CY24 followed by a 24-month construction, commissioning and ramp-up period.





### SITE VISIT - KEY HIGHLIGHTS

In August 2022, Blue Ocean Equities undertook a site visit to:

- Gain a deeper understanding of the Donald Project
- Meet with community representatives to confirm support for project development and
- Observe firsthand the project site and key infrastructure requirements

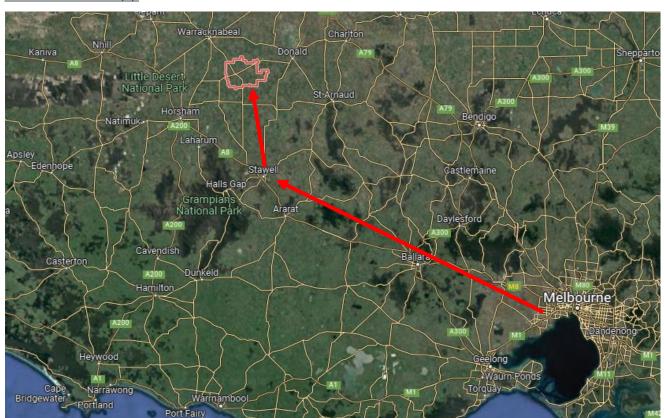
During the site visit, we met with key members of the Management team, including Tiger Brown (Managing Director), Sean Chelius (Project Director) and Paul Atherton (Community Liaison Officer) for a detailed Q&A session. We also had the opportunity to meet with:

- one of the local Councillors at Yarriambiack Shire Council, who outlined the Council's position with respect to the Project along with community sentiment and
- one of the farmers, who is also a landowner and lives next to the Phase 1 development site, who openly shared his views in respect of support of project development

Following from our site visit, we strongly believe that the market may be missing or underestimating the material scale of the Donald Project, its advanced stage of feasibility and approvals as well as the strong local support to get this world class project into production.

To reach the project site, we drove +300km from Melbourne to Minyip, via Ballarat and Stawell. The Project Site is circa 70 km from the Horsham regional centre where the intermodal freight terminal facility, with rail link to multiple ports, is located.

#### Melbourne to Minyip



Source: Blue Ocean Equities



At Minyip's DMS office, we met with Cr Corinne Heintze, who lives in Minyip and is a Councillor at Yarriambiack Shire Council. We noted that Cr Heintze was fully across the history and details of the project as well as community expectations. Due to local Government conflict of interest policies, no discussion was held in relation to council planning permitting, however Cr Heintze conveyed that there is strong local support for the project in no uncertain terms. We understand that Astron has also received strong interest from the community consultation events in respect of project timing and the new employment opportunities that will be available for locals.



Source: Blue Ocean Equities

Following from our visit to Minyip, we headed towards the Donald Project site. We stopped at the North-West corner of the MIN at the road where the 66kV power line and water pipeline will be installed. We also had the opportunity to meet and greet one of the farmers who lives on the opposite side of the road.

### Donald Project Site: at the edge of the Mining Licence





Source: Blue Ocean Equities





We drove around the ML, viewed the area and stopped at the office site (where the wet concentrator plant will be located) to see some core samples.



Source: Blue Ocean Equities

### Sheds outside of the project site office, soil and zircon samples



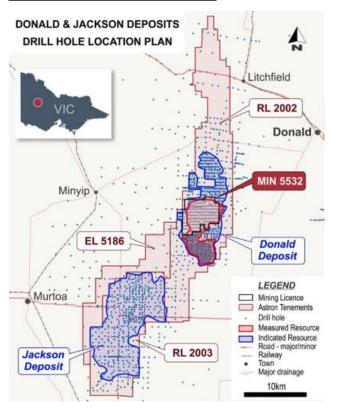
Source: Blue Ocean Equities

We were impressed by the large scale of the Project area, including the MIN as well as the relative simplicity of the mining and rehabilitation operations. We are aware that, being primarily an agricultural region, the trial pit and full rehabilitation has provided proof to the community that mining operations at the Donald Project will be done based on high ESG standards.

Astron has acquired total land holdings of 1,451.8 Ha within the Donald Project Area. These landholdings include 831.3 Ha within the MIN and include the area where the Project Site Office is located and where the plant will be located. An illustration of the permits and Project scale is provided overleaf.



### Permit overview - key highlights



- 1. MIN 5532, the mining licence, has a total area of 2,784 Ha (28km2), representing 13% of ATR's total area of 42,636 Ha (426km2)
- The land to be used for mining and concentrating activities is freehold land, mainly cleared of native vegetation and used for cropping and livestock production
- Astron owns several properties with a total area of 1,451.8 hectares, including 831.3 Ha within the MIN

Source: Company

Mining operations at the Donald Project will be conducted on mixed use pastoral land so minimal impact on native vegetation, flora and fauna will be done through mine planning and progressive rehabilitation.



The sample to the left illustrates (from top to bottom):

- 1. Topsoil
- 2. Subsoil
- Overburden
- To be stockpiled and stored separately to ensure best rehabilitation outcomes
- 4. Ore containing high grade heavy mineral sands

Source: Blue Ocean Equities



### RARE EARTHS AND MINERAL SANDS MARKET UPDATE

Astron's Donald Project initial development targets the production of two type of concentrates: rare earths concentrate and a heavy minerals concentrate. We think both markets currently have favourable macro conditions for the development of the Donald Project.

### RARE EARTHS: KEY STRATEGIC MINERALS

Rare earths are a group of 17 elements that have a range of diverse applications in electrical and electronic components (including high-tech consumer products such as mobile phones, tablets, LED TVs), lasers, glass, magnetic components and a range of industrial and defence applications. The four most valuable rare earths are illustrated below.

### Overview of key REOs Pricing

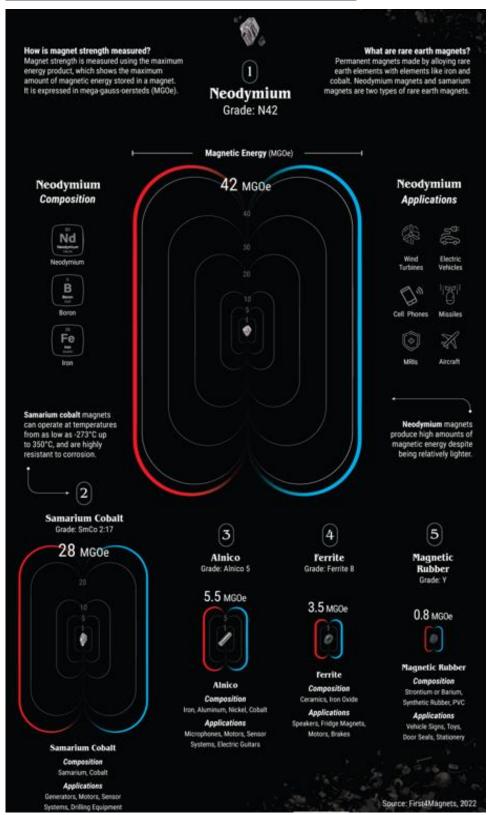
Overview of key REOs Pricing								
Metal	Chemical symbol	Bid USD/kg	Ask USD/kg	Change	Change (%)	Last update (ET)		
<u>Dysprosium Oxide</u>	Dy	432.00	540.00	0.00	0.00%	Aug 25, 2022 08:32		
	Form of deliv Purity: min. 9			Used in:     Permanent and electric     Phosphors     Lasers     Metal halide	vehicles	wer generators		
Terbium Oxide	Tb	2,891.20	3,614.00	0.00	0.00%	Aug 25, 2022 08:32		
	Form of deliv Purity: min. 9	•		Used in: Doping ager Crystal stabi Actuators an Permanent r	lizer in fuel ce id sensors	lls		
Neodymium Oxide	Nd	140.40	175.50	0.00	0.00%	Aug 25, 2022 08:32		
	Form of deliv Purity: min. 9			Used in:  Permanent i  Dyeing of gl  Lasers, infra  Permanent i	ass ired lasers	vind turbines		
Praseodymium Oxide	Pr	142.60	178.20	0.00	0.00%	Aug 25, 2022 08:32		
	Form of deliv Purity: min. 9	<b>/ery:</b> Praseodymiu 19.5%	m Oxide	etc.) • Colorant for	sed in electric glass and pig conductive cer			

Source: Kitco



Neodium and Praseodymium (NdPr) are key components of permanent magnets, which are the world's strongest magnets. These magnets, also known as rare earth magnets, are critical to manufacture wind energy turbines and EV drivetrains.

### Rare Earth Magnets: 12x Stronger than Fridge Magnets

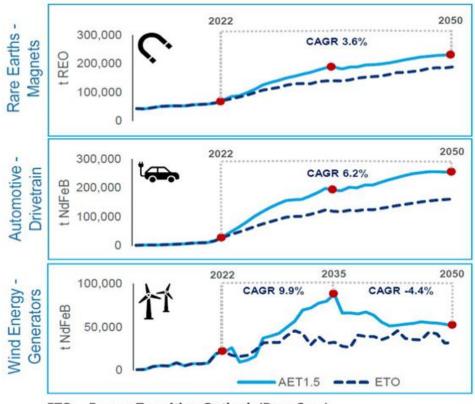


Source: Elements



Demand for these critical minerals is expected to double over the next decade driven by the growth in the clean energy sector and the transition to electro mobility.

### Rare Earth Magnets Growth by Application and Energy Transition Scenario

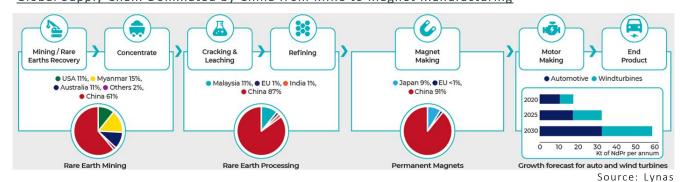


ETO = Energy Transition Outlook (Base Case)
AET1.5 = Accelerated Energy Transition 1.5°c (Scenario)

Source: Wood Mackenzie, Arafura

Rare earth elements always occur in a composite with other rare earth elements and the separation process is painstaking and complicated. Furthermore, they are subject to strict environmental regulations, for example, because the ore typically contains low concentrations of radioactive thorium. The global supply chain is heavily dominated by China and many Western Countries are now seeking to decrease their reliance on this supply chain.

### Global Supply Chain Dominated by China from Mine to Magnet Manufacturing



Rare earth oxide global demand is expected to double from 250ktpa to 500ktpa by 2030.

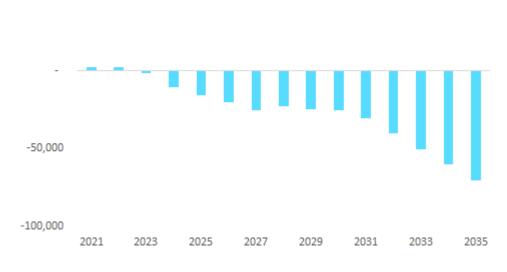
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The combination of supply constraints with high expected demand growth results in growing supply/demand deficits, particularly for magnet metals, over the next decade.

### Supply / Demand imbalance from 2023 (NdPr)

50,000

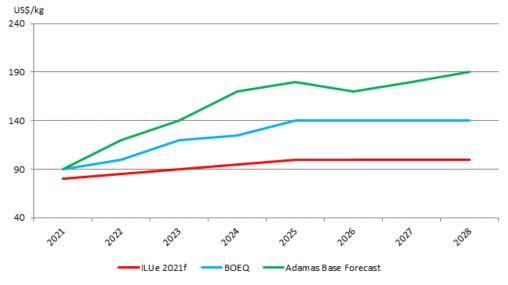


Source: Pensana, Adamas Intelligence

More importantly, while there are a number of potential new projects at advanced stages of feasibility, if history serves as a guide, the technical complexity of most rare earths projects combined with long approval timeframes (i.e. Lynas Mt Weld took nearly 30 years to be studied, developed and become profitable as one of the two current operating rare earths mines ex-China) will likely result in supply being significantly more inelastic than expected. These features are likely to be favourable to less capital intensive and less technically complex projects and would support development of the most advanced WIM deposits (i.e. Donald and Wimmera) at the time of growing supply/demand deficits. Furthermore, the large scale of these deposits makes it more likely to be expanded prior to some of the more complex, risky and costly type of rare earth deposits.

In respect of pricing, we expect Donald's REC pricing to primarily track the underlying price of NdPr, which we expect to reflect the supply/demand outlook.

### NdPr prices: near term forecast



Source: Pensana, Adamas Intelligence, Lynas, BOEQ estimates

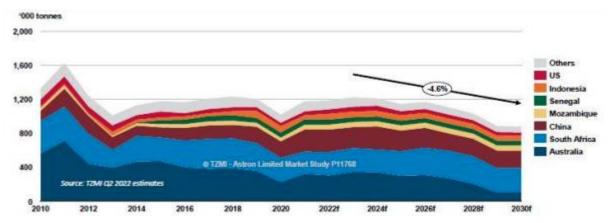


Having reviewed a range of price forecast, we consider that we have been extremely conservative in our assumption (i.e. Adamas upside price scenario is around US\$ 250/kg by 2030). We envisage that if there is limited supply response by 2026, we are likely to see strong price upside to our forecast.

### MINERAL SANDS: STRONG OUTLOOK

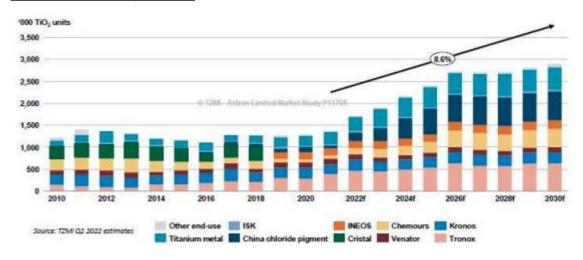
The key minerals within Astron's targeted HMC are zircon (80% of value of HMC) and titania (20% of value of HMC). The underlying prices in these key markets is strong and with a positive medium and long term outlook. This outlook is driven by the expected depletion of operations representing nearly 40% of historic supply (including Iluka's Jacinth-Ambrosia). Donald is expected to commence production when market conditions are favourable.

### **Global Zircon Supply Outlook**



Source: Company, TZMI

### Global Chloride Slag Demand

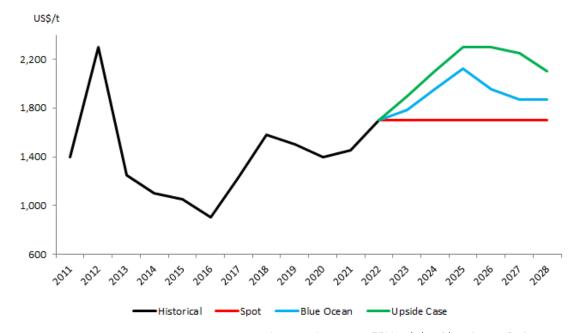


Source: Company, TZMI

Donald is one of the few large, well-delineated and advanced new sources of supply at a time when traditional production sources (Australia and South Africa) are mature or operationally challenged. In respect of pricing, we expect Donald's HMC pricing to primarily track the underlying price of premium zircon and titanium dioxide, which we expect to reflect the supply/demand outlook.

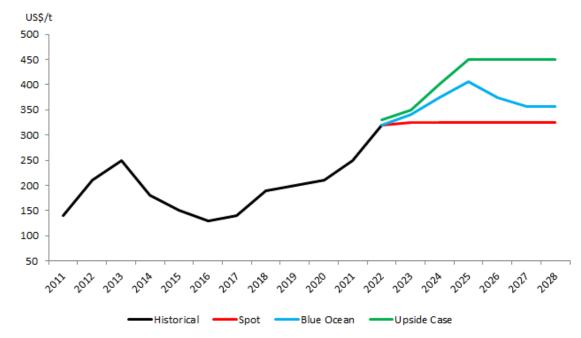


### Premium Zircon Price



Source: Company, TZMI, Iluka, Blue Ocean Estimates

### Chloride Ilmenite (Titanium Dioxide) Price



Source: Company, TZMI, Iluka, Blue Ocean Estimates





### **INVESTMENT PROPOSITION**

### **VALUATION**

The table below summarizes our key valuation assumptions based on Astron's Phase 1 development concept (within EES parameters) and our expectation that, at a minimum, Astron will double the scale of production by year 5. Our Base Case material assumptions incorporate conservative estimates of the expected MRE and Ore Reserve increase, xenotime recoveries and the correspondent reduction in strip ratios and mining costs.

Project Metric	Phase 1	BOEQ's Phase 2	BOEQ's Comments
			35-year mine life on Phase 1 - based only on MIN = 13% of Resource
Mine life	years +35	years +35	Mine Life extension beyond MIN expected to be straight forward proposition
			Q1CY23 expected Resource & Reserve upgrade of +15%
Initial Capex	A\$350m	A\$300m	Phase 2 Capex to double production rate proportional to increase from 2013 DFS
Working Capital	A\$50m	A\$25m	Funded via pre-payments
Mining rate	7.5mtpa	15mtpa	
Strip ratio	1.62	1.87	We assume a 15% improvement from ATR's 1.9 and 2.2 from increase in VHM resource
Production volumes HMS	271ktpa	543ktpa	Within ATR's range of 250-300ktpa
			Within ATR's range of 7-10ktpa,
Production volumes REC	9.5ktpa	19ktpa	We assume 0.6% Xenotime plus 1.9% Monazite as % of HM
Prices	2025 HMC: US\$531/t trending down to LT average of US\$425/t	US\$425/t	Same profile to forecast prices under Market Section
	2025 REC: US\$14,300/t	US\$14,300/t	
Revenue (\$/t ore)	A\$41.86/t	A\$41.86/t	HMC 52%, REC 48%
Costs + royalties +	∧¢2.C ∧+	∧¢240/±	Unit costs (mining, processing, logistics and other) adopted from 2013 DFS plus 40% inflation, 1% sustaining capex added
sustaining	A\$26.4t	A\$24.9/t	We assume a 15% reduction on mining unit costs from increase in VHM resource & lower strip
Operating Cash Margin	50%	48%	



Ave Operating Cash Margin A\$205m p.a. A\$351m p.a.

Royalties 2.8% 2.8% VIC state. No Native Title

Financial Metric	Phase 1	Phase 2	BOEQ's Comments
IRR, post tax	31%	33%	
Project NPV, post tax	A\$897m	A\$1,624m	Compare to current MCap of A\$85m
Discount rate	8%	8%	8% real, 10% nominal

Source: Company data, Blue Ocean Equities

- For the equity analysis, we arrive at an un-risked, geared, post-tax equity, Phase 1 NPV of A\$884m and a risked NAV of A\$442m (Phase 2 NPV A\$1,071m, risked NAV of A\$537m) by assuming:
  - O ATR "goes alone" in funding its development equity share and to minimize dilution seeks to maximise non-dilutive funding:
    - \$220m of capex is funded by debt, representing 63% gearing
    - The \$50m working capital requirement is funded by a pre-payment
  - O We apply a 50% discount to our valuation to account for development risks and potential future dilution. We note that while ATR is well advanced with its updated feasibility studies and approvals, many of our opex assumptions are derived from adjusted DFS figures (July 2013) and based on a slightly different process flowsheet
  - We assume a Phase 2 capex of \$300m to double production scale, funded from Phase 1 cash flows and debt refinance
  - o To arrive to a risked NAV, we have deducted to the risked equity NPV the NPV of corporate overheads, assumed a nominal value for NRZ's other assets (i.e. Donald outside of MIN, Niafarang Mineral Sands Project, Astron Tianium Yingkou) and deducted net debt
  - o To estimate the NAV per share we have estimated the level of dilution at key de-risking stages, including:

NAV/share	Phase 1	Phase 2 - Expansion	Basis
Current	3.25	3.94	136m shares on issue, 50% risking
At Financial Close	3.67	4.48	168m shares on issue, 30% risking
Post Construction	4.09	4.87	303m shares on issue, 0% risking

- Funding requirements to FID in the order of \$20m raising 1H CY23, done at a 15% premium to current share price (re-rating post FS update)
- Development equity raising of \$130m assumed share price re-rating following key de-risking and favourable macro environment done at premium to current share price (circa \$1.1 per share)

Given the substantial upfront capex requirement of A\$350m compared to the Company's current market cap of ~A\$70m, we have also done a sensitivity analysis to compare the effects of dilution vs the impact of selling down a minority interest in Donald to fund development (and minimise dilution).

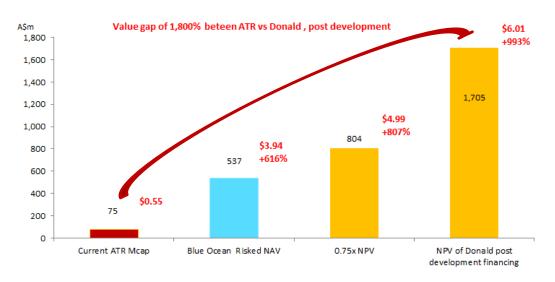
We consider that due to the unique features of the Donald Project, including its large scale, product mix, attractive margins, favourable location (in a safe, stable jurisdiction) and the strong price environment



driven by current & expected higher mineral sands and rare earths prices our assumptions may be conservative. We also note that, given the structure of the corporate register and embedded expertise and contact base within Astron HK, it is unlikely that an offer for control emerges prior to development.

There is significant upside to our valuation from the potential de-risking of the Donald Project following completion of the FS and development workstreams. If Astron delivers project construction and commissioning on time and on budget ATR shareholders will benefit from the value re-rating process and could also realistically expect further upside from the Project's expansion, subject to requisite approvals. We consider that once the Donald Project is in production, the growth options (scale and value-added processing) should provide investors with a very favourable risk/return profile. The chart below illustrates a summary of the material gap in value currently reflected by the market capitalisation of Astron and the intrinsic value of the Donald Project pre and post development.

### ATR market value vs Donald Project Value



ATR share prices adjusted for dilution pre and post development

Source: Blue Ocean Equities

### **SENSITIVITIES**

The table below illustrates Base Case sensitivities to Donald's valuation:

### Donald sensitivity to HMC Prices and A\$/US\$

NPV post-tax (A\$m)			НМС		(US\$/t)	
		225	325	425	525	625
Discount	4%	1,620	2,455	3,290	4,125	4,959
Rate	6%	1,060	1,672	2,283	2,894	3,505
(nominal)	8%	698	1,161	1,624	2,088	2,551
	10%	456	818	1,179	1,541	1,903

**Donald IRR sensitivity to HMC Prices** 

IRR post-tax (100%)		НМС		(US\$/t)		
	225	325	425	525	625	
	19%	26%	33%	39%	45%	

Source: Blue Ocean Equities





### POTENTIAL SALE OF MINORITY INTEREST - PROJECT LEVEL

While Astron is not contemplating a project sell down as part of its funding strategy at this stage, as with most undervalued project developers, Astron's management will face a range of choices to fund the development capex, bring this Tier-1 Project into production and close the valuation gap between its market value and the Project's underlying value.

The table below provides at a high-level some perspective:

Rationale for selling a 20% project interest to a strategic partner

Post-tax NPV <sub>10</sub>	A\$m	1,624
ATR Market cap	A\$m	73
ATR Shares on issue	m	132.0
ATR Share Price	A\$/sh	0.55

Source: IRESS, Blue Ocean Equities

Rationale for ATR			
	A\$m	A\$/sh	%
25% discount to NPV	243.7	1.85	236%
35% discount to NPV	211.2	1.60	191%
50% discount to NPV	162.4	1.23	124%

#### Rationale for Acquirer\*

Sale Pricing Scenario	Proceeds	Gain on Acquisition	Gain on Acquisition
	A\$m	A\$m	%
25% discount to NPV	243.7	81.2	33%
35% discount to NPV	211.2	113.7	54%
50% discount to NPV	162.4	162.4	100%

<sup>\*</sup>Refers to financial rationale, which could be of secondary importance to a strategic group seeking to secure long-term ex-China supply of rare earths (i.e. an EV OEM incentivised by the Inflation Reduction Act via a US FTA partner such as Australia).

Source: Blue Ocean Equities

This analysis indicates that even at a material discount to the project's fundamental value, due to the gap between market value of ATR and Donald's fundamental value, a minority interest sale could potentially be value accretive to Astron shareholders (unless there is a material re-rating of ATR's share price pre-development funding), as the sell down would minimises dilution from the development equity raising (\$130 m). For shareholders in an emerging mining company, one of the most important value events is the price at which the development equity raising is done due to the dilutionary impact as illustrated below.

Development equity raising considerations

Price of Development Raising (A\$/sh)	0.80	0.90	1.00	1.10	1.20
NAV (A\$/sh)	5.35	5.66	5.94	6.18	6.41
Implied potential return from today (%)	972%	1,029%	1,079%	1,124%	1,165%
Implied potential return from development raise (%)	682%	669%	629%	594%	562%

Source: Blue Ocean estimates





### **KEY RISKS**

Astron is exposed to all the normal risks associated with developing and operating mining projects, including approvals, funding, construction, commissioning and ramp up risks.

Assuming Astron makes the transition into production, its revenues will be derived from the sale of heavy mineral concentrates (50% of revenue on updated assumptions) and rare earth concentrates (50% of revenue). Fluctuations in the prices of these products as well as the Australian dollar could impact the company's reported cash flow (in A\$), profitability and share price.

As Astron's Donald project is based in Victoria, an investment in Astron also carries Australian sovereign risk. However, it is worth noting that Australia is considered materially lower sovereign risk than many of the other jurisdictions which host rare earth mines (China) and mineral sands mines like South Africa (Rio Tinto), Mozambique (Kenmare), Kenya (Base Resources) and Sierra Leone (Sierra Rutile).





### **MODEL SUMMARY: FINANCIALS & VALUATION**



### **Astron Corporation**

Code: ATR

Stock Details				Enterprise Value	\$70m
Recommendation:	BUY			Diluted MCap	\$75m
Target	\$3.94	Share Price	\$0.55	Diluted Shares	136m
NAV	\$3.94	52 Week High	\$0.95	Free Float	24%
Implied Peturn	616%	52 Week Low	\$0.28	Ava Daily Value	\$0.0m

Macro Assumptions	70 OI NEV	FIZZ	FIZSE	F1Z4L	FIZDE	FIZUE
Exchange Rate (A\$/US\$)		0.70	0.70	0.70	0.70	0.70
HMC (US\$/t)	46%	400	425	531	531	531
REC (US\$/t)	100%	11,000	12,200	12,800	14,300	14,300
Profit & Loss (A\$m)		FY22	FY23E	FY24E	FY25E	FY26E
Revenue		-	-	-	-	300
Operating Costs		_	_	_	_	(146)

Profit & Loss (A\$m)	FY22	FY23E	FY24E	FY25E	FY26E
Revenue	-	-	-	-	300
Operating Costs	-	-	-	-	(146)
Operating Profit	-	-	-	-	154
Corporate & Other	(2)	(2)	(2)	(3)	(4)
Exploration Expense	-	-	-	-	-
EBITDA	(2)	(2)	(2)	(3)	150
D&A	(0)	(0)	(0)	(0)	(4)
EBIT	(2)	(2)	(2)	(3)	146
Net Interest Expense	0	0	0	2	(16)
Pre-Tax Profit	(2)	(2)	(2)	(2)	130
Tax Expense	(3)	-	-	-	(39)
Underlying Profit	(4)	(2)	(2)	(2)	91
Signficant Items (post tax)	(1)	(2)	1	-	-
Reported Profit	(5)	(3)	(1)	(2)	91

Cash Flow (A\$m)	FY22	FY23E	FY24E	FY25E	FY26E
Operating Cashflow	(4)	(3)	(2)	(3)	150
Tax	-	-	-	-	(39)
Net Interest	(0)	0	0	2	(16)
Net Operating Cash Flow	(5)	(3)	(2)	(1)	95
Exploration	-	-	-	-	-
Capex	(4)	(15)	(175)	(175)	(2)
Acquisitions / Disposals	-	-	-	-	-
Other	-	-	-	-	-
Net Investing Cash Flow	(4)	(15)	(175)	(175)	(2)
Equity Issue	5	27	130	2	0
Borrowing / Repayments	2	-	110	110	(31)
Dividends	-	-	-	-	-
Other	(0)	-	-	-	-
Net Financing Cash Flow	7	27	240	112	(31)
Change in Cash Position	(0)	9	63	(64)	62
FX Adjustments	0	-	-	-	-
Cash Balance	2	12	75	11	73

Balance Sheet (A\$m)	FY22	FY23E	FY24E	FY25E	FY26E
Cash	2	12	75	11	73
Other Current Assets	14	14	14	14	14
PP&E	24	39	214	389	386
Exploration & Development	82	82	82	82	82
Other Non Current Assets	3	3	3	3	3
Total Assets	126	150	388	499	558
Debt	16	16	126	236	204
Other Liabilities	19	18	18	18	18
Net Assets	91	116	244	245	336

Ratio Analysis		FY22	FY23E	FY24E	FY25E	FY26E
Diluted Shares	m	119	168	298	302	303
EPS - Diluted	Ac	(3.7)	(1.3)	(0.7)	(0.6)	29.9
P/E	x	n.m.	n.m.	n.m.	n.m.	1.8x
CFPS - Diluted	Ac	2.2	(2.1)	(1.1)	(0.5)	(0.5)
P/CF	x	24.7x	n.m.	n.m.	n.m.	n.m.
FCF - Diluted	Ac	(7.1)	(10.6)	(59.3)	(58.9)	36.1
P/FCF	x	n.m.	n.m.	n.m.	n.m.	1.5x
Dividends	Ac	-	-	-	-	-
Dividend yield	%	-	-	-	-	-
Payout Ratio	%	-	-	-	-	-
Franking	%	-	-	-	-	-
Enterprise Value	A\$m	88	79	126	300	206
EV/EBITDA	x	(48.8x)	(42.3x)	(62.8x)	(100.0x)	1.4x
ROE	%	(5%)	(2%)	(1%)	(1%)	27%
ROA	%	(3%)	(1%)	(0%)	(0%)	16%
Net Debt / (Cash)		13	4	51	225	131
Gearing (ND/(ND+E))	%	13%	3%	17%	48%	28%
Gearing (ND/E)	%	15%	3%	21%	92%	39%

Reserves & Resources Valuable HM Grade								
<b>Donald Project</b>		нм	Ilmenite	Leucox.	Rutile	Zircon	Monozite	
	mt	%	%	%	%	%	%	
Proved	310	5.4	31.2	20.4	8.2	19.9	1.8	
Probable	292	4.1	32.4	19.7	7.4	17.3	1.6	
Reserve	602	4.8	31.7	20.1	7.9	18.8	1.7	
Measured	448	5.4	31	21	8	20	2	
Indicated	1,171	4.6	32	18	8	18	2	
Inferred	807	4.7	33	17	9	19	2	
VHM Resource	2,427	4.8	32	18	8	19	2	

Earnings Sensitivity		F	Y25E	FY26E	FY25E	FY26E
			A\$m	A\$m	%	%
HMC Price			11	11	13%	12%
REEC Price		10%	10	10	12%	11%
Exchange Rate	A\$/US\$ -1	.0%	21	21	24%	24%

Valuation	Discount	Stake	A\$m	A\$/sh	
Donald (unrisked)		100%	1,071	7.85	
Donald (risk-adjusted)	50%	100%	536	3.93	
Jackson		100%	30	0.22	
Other Projects			10	0.07	
Corporate			(44)	(0.32)	
Debt			-	-	
Cash			5	0.04	
Option Strikes			0	0.00	P/NAV
Risk adjusted NAV			537	3.94	0.14



Source: Company data, Blue Ocean Equities

Code: ATR

### **MODEL SUMMARY: OPERATIONAL INPUTS & FREE CASH FLOW**



### **Astron Corporation**

Macro Assumption	ons		FY22e	FY23E	FY24E	FY25E	FY26E
A\$/US\$ FX		x	0.70	0.70	0.70	0.70	0.70
	% of reve	nue					
HMC - 60% Ti	46%	US\$/t	400	425	531	531	531
REC	54%	US\$/t	11,000	12,200	12,800	14,300	14,300

Operational Summary		FY22	FY23E	FY24E	FY25E	FY26E	FCF Contribution	A\$m	FY22	FY23E	FY24E	FY25E	FY26E
Mining													
Ore Mined	mt	-	-	-	-	5.6							
Strip Ratio	X	-	-	-	-	1.6							
Recoveries													
HMC	%	-	-	-	-	62.9%							
REC	%	-	-	-	-	85.8%							
<u>Production</u>							Revenue						
HMC	kt	-	-	-	-	204	HMC		-	-	-	-	154
	kt						Zircon Concentrate		-	-	-	-	-
REC	kt	-	-	-	-	7	REC		-	-	-	-	145
							Hi-Ti90 Rutile		-	-	-	-	-
							Titano-Magnetite		-	-	-	-	-
Total Production Volume	kt	_	-	-	-	211	Total Revenue	A\$m	-	-	-	-	300
							Revenue per tonne ore	A\$/t	-	-	-	-	-
Costs													
Opex incl royalties	A\$/t ore	-	-	-	-	25.9	Opex incl royalties		-	-	-	-	146
Sustaining capex	A\$/t ore	-	-	-	-	0.5	Sustaining Capex		-	-	-	-	3
Opex+Royalties+Sustaining	g A\$/t ore	_	-	_	-	26.4	Opex+Royalties+Sustaining	A\$m	-	-	-	-	149
Operating Cash Margins	A\$/t ore	-	-	-	-	26.9	Operating Cash Margins	A\$m	-	-	-	-	151
Operating Cash Margins	%	-	-	-	-	50%	Operating Cash Margins		-	-	-	-	50%
							Growth Capex		4	15	175	175	2
							Exploration		-	-	-	-	-
							Corporate Overheads		2	2	2	3	4
							All-in Cash Margin	A\$m	(6)	(17)	(177)	(178)	146
							All-in Cash Margins		-	-	-	n.m.	49%
							Corporate	A\$m	FY22	FY23E	FY24E	FY25E	FY26E
							Cash Tax		-	-	-	-	39
							Other Items		1	0	(1)	(3)	(3)
							FCF pre Debt Service		(7)	(17)	(176)	(175)	109
							Net Interest		0	0	0	2	(16)
							Debt Drawdown / (Repaymen	t)	2	-	110	110	(31)
							FCF post Debt Service		(5)	(18)	(67)	(66)	62
							New Equity/Dividends	A\$m	FY22	FY23E	FY24E	FY25E	FY26E
							Proceeds from Shares/Option	is/CNs	5	27	130	2	0
							Dividends Paid		-	-	-	-	-
							Change in Cash		(0)	9	63	(64)	62

Cash Balance

Source: Company data, Blue Ocean Equities

2 12 75 11 73



### **BOARD & MANAGEMENT**

#### GEORGE LLOYD, CHAIRMAN

George has over 30 years of resource industry, corporate business development and finance experience including with RCG Limited as well as serving as a senior executive and director of a range of companies with interests in industrial minerals, base and precious metals. George was instrumental in the merger of RCG Limited with Westralian Sands Limited to form Iluka Resources Limited in 1998.



### TIGER BROWN, CHIEF EXECUTIVE OFFICER AND MANAGING DIRECTOR

Tiger commenced working with Astron in 2018, holding a range of business development planning and executive roles in Australia and China. He was appointed Executive Director in 2019 and Managing Director in 2021 to drive the Donald Project to commercialisation.



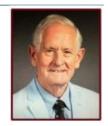
### KANG RONG, EXECUTIVE DIRECTOR, CHIEF MARKETING OFFICER AND HEAD OF CHINA

Mme Kang Rong joined Astron in 1995 and has been a key contributor to the establishment of Astron's downstream processing, global marketing and sales activities. She has a deep knowledge of the mineral sands product market and its key participants.



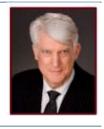
### **GERARD KING, NON EXECUTIVE DIRECTOR**

Gerard is a former partner of Lavan & Walsh, which became Phillips Fox Perth. He is experienced in commercial contracting, mining law, corporate and ASX compliance. He is also a member of the Australian Mining & Petroleum Lawyers Association and has served as a NED for several companies.



### DR MARK ELLIOT, NON EXECUTIVE DIRECTOR

Mark has over twenty seven years of experience in corporate roles, both as Chairman or Managing Director of ASX-listed and private companies. He has been involved in identifying and securing projects, capital raisings, marketing and completing commercial agreements, feasibility studies, mine development and execution.







### Key Management Team

### SEAN CHELIUS, PROJECT DIRECTOR

Sean jointed Astron in January 2022 as the Project Director for the Donald Mineral Sands and Rare Earth project. Sean has over 30 years international experience in mining project planning and implementation, including full responsibility for taking projects from concept through to commissioning and production. His experience involves project management and engineering roles in Australia, South Africa, Zimbabwe, Papua New Guinea and Fiji with BHP, Anglo American, Newcrest, Ausenco and Worley Parsons.



#### **GREG BELL, CHIEF FINANCIAL OFFICER**

Greg starts with Astron in October 2022. He has finance and accounting experience spanning more than 21 years, working initially in corporate advisory and assurance services with Deloitte Touche Tohmatsu, followed by 8 years with Mineral Deposits Limited (MDL) as Accounting Manager and then Chief Financial Officer. Subsequent to MDL, Greg held both consulting and executive roles with international mineral sands and resource companies, including in the critical minerals sector



### TIM CHASE, HEAD OF GLOBAL OPERATIONS

Tim joined Astron in 2015 as General Manager of Operations. He has over 25 years of experience within the mining industry, including extensive experience in mineral sands in project design and planning, project management and execution and operational roles. Tim was involved in the design and commissioning of several mineral sands projects in the Murray Basin, including the Gingo and Snapper mineral sands deposits in roles including Senior Production Co-ordinator, Bemax Resources and Mine Manager, Cristal Global.



### DR JOHN YEATS, SENIOR ENVIRONMENTAL & APPROVALS MANAGER

John has over 50 years' experience in mining, agriculture, environmental research, policy development, and project management within the mining sector, Government agencies and environmental engineering consultancies across the Asia-Pacific region. John has worked with greenfield & brownfield base metals, gold, and mineral sands projects in Australia managing project approvals, stakeholder engagement, environmental compliance, regulatory requirements and sustainability initiatives.





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Blue Ocean Equities Pty Limited has acted for the Company in capital raisings over the last twelve

The Analyst of this report owns shares in Astron Corporation Limited.



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