



SheffieldResources
LIMITED

Thunderbird

The Emerging Force in Mineral Sands

Diggers & Dealers - BFS
August 2017
ASX : SFX

sheffieldresources.com.au

COMPLIANCE AND DISCLAIMER

PREVIOUSLY REPORTED INFORMATION

This presentation includes information that relates to Exploration Results, Mineral Resources and Ore Reserves prepared and first disclosed under the JORC Code (2012) and a Bankable Feasibility Study. The information was extracted from Sheffield Resources Limited's (ACN 125 811 083 , the "Company" or "Sheffield") previous ASX announcements which are available on Sheffield's web site www.sheffieldresources.com.au as follows:

"QUARTERLY ACTIVITIES REPORT FOR THE PERIOD ENDED 30 JUNE 2017", 27 July 2017

"SHEFFIELD SIGNS CORNERSTONE ILMENITE MOU" 29 May, 2017

"SHEFFIELD SECURES FURTHER ZIRCON OFFTAKE MOUs" 26 April, 2017

"ADDITIONAL ZIRCON OFFTAKE MOU SIGNED" 10 April, 2017

"SHEFFIELD SIGNS OFFTAKE MOUs" 04 April, 2017

"THUNDERBIRD BFS DELIVERS OUTSTANDING RESULTS" 24 March, 2017

"THUNDERBIRD ORE RESERVE UPDATE" 16 March 2017

"THUNDERBIRD ILMENITE EXCEEDS PREMIUM SPECIFICATION" 13 March 2017

"OUTSTANDING IMPROVEMENTS IN RECOVERIES AND PRODUCT SPECIFICATIONS FROM THUNDERBIRD BFS" 12 October 2016

"SHEFFIELD DOUBLES MEASURED MINERAL RESOURCE AT THUNDERBIRD" 5 July, 2016

These announcements are available to view on Sheffield Resources Ltd's website: www.sheffieldresources.com.au

The Company confirms that it is not aware of any new information or data that materially affects the information included in the relevant market announcements and, in the case of estimates of Mineral Resources, Ore Reserves and Bankable Feasibility Study results, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcements.

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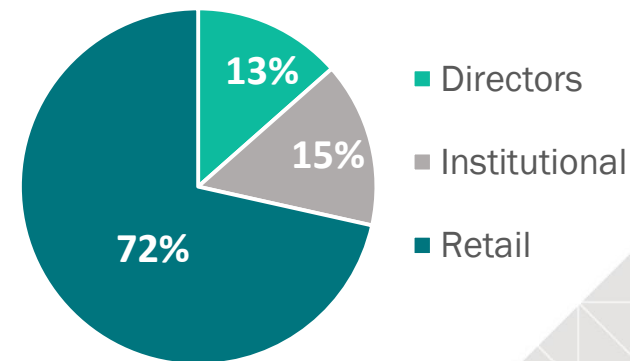
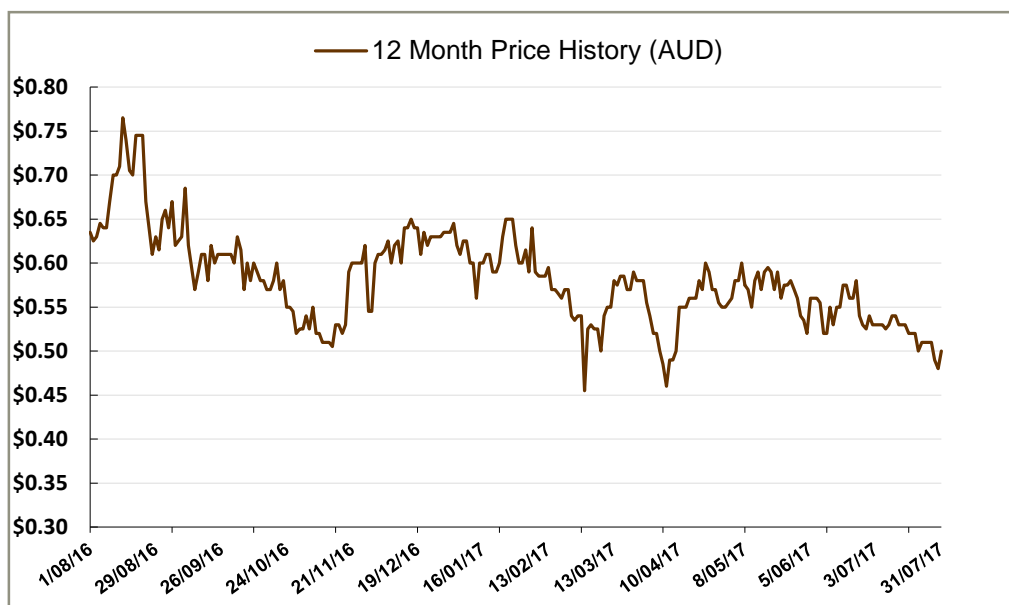
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CORPORATE SNAPSHOT

ASX CODE	ISSUED SHARES	SHARE OPTIONS	SHARE PRICE (1 Aug 2017)	MARKET CAP	CASH (UNAUDITED)¹	ENTERPRISE VALUE	TOP TWENTY SHAREHOLDERS²
SFX	181.4M	14.6M ²	A\$0.52	A\$94M	A\$8.3M	A\$86M	~49%

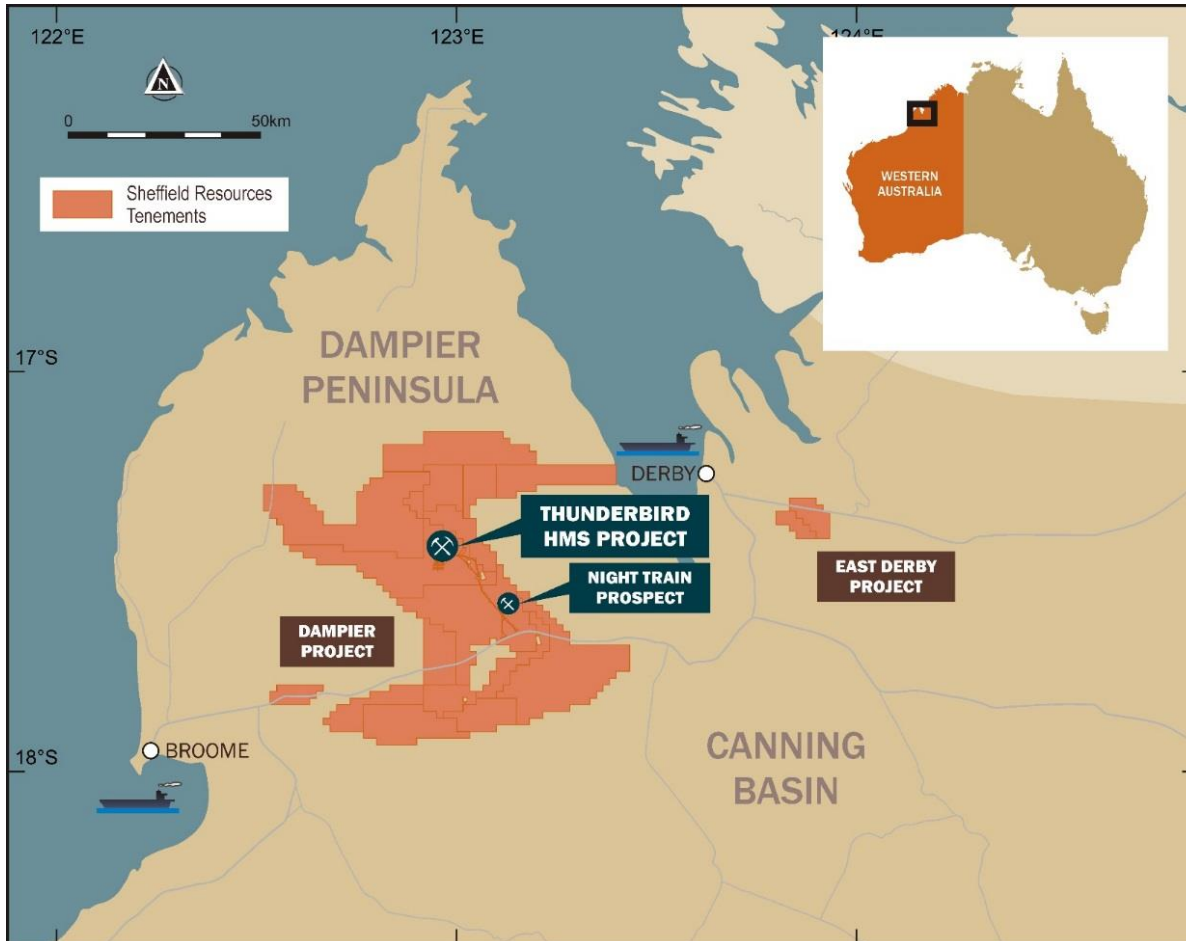


Major Shareholders

BlackRock	9%
Walter Yovich	6%
Sprott	2%
Other Institutions	4%

¹unaudited as at 30 June 2017
²average exercise price A\$0.43c

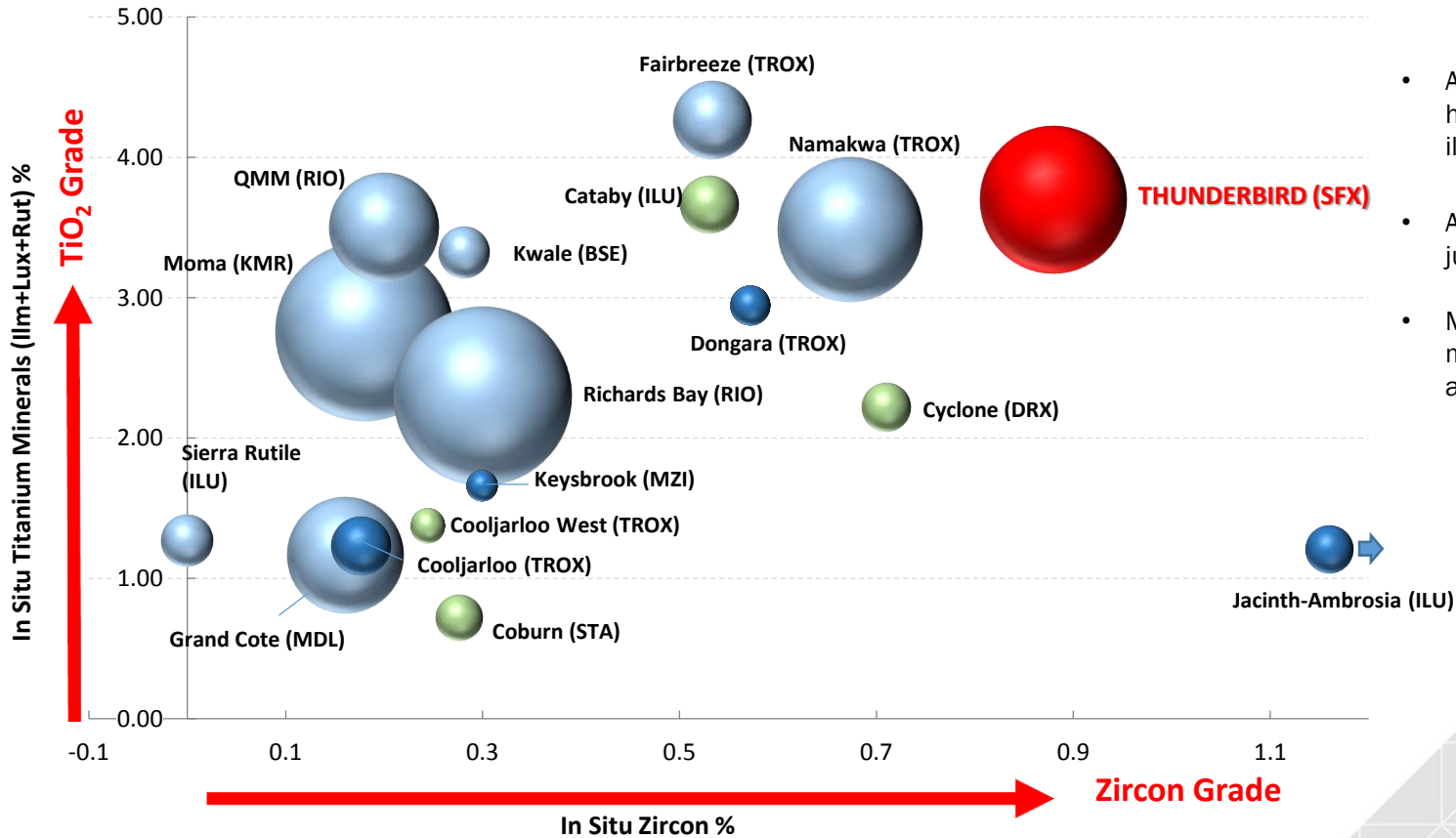
WORLD CLASS PROJECT



- Low risk mining jurisdiction
- Robust, high grade and consistent Ore Reserve¹
- 42 year mine life²
- Close to Asian markets than other supply
- Simple and low cost project logistics
- High quality zircon and ilmenite products
- Favorable zircon and ilmenite market
- Superior financial return
- Dominant and reliable market supplier

1. Thunderbird Ore Reserve as published on the ASX on 16 March 2017
2. Subject to permitting, offtake and financing

WORLD CLASS, HIGH GRADE ORE RESERVE



- Amongst the largest and highest grade zircon and ilmenite rich Ore Reserves
- Australia, the best mining jurisdictions in the world¹
- Most of the world's largest minerals sands Ore Reserves are in high risk jurisdictions

Thunderbird Ore Reserve as published on the ASX on 16 March 2017
 Thunderbird Ore Reserves ranked against Ore Reserves of current mineral sands operations and projects under investigation globally
 Blue bubbles are operating mines, green bubbles are Ore Reserves reported but project is not operating. Light blue bubbles represent operating African mines' Ore Reserves
 Bubble size proportional to tonnes of contained VHM. Only Ore Reserves > 1.2Mt contained VHM shown.
 Data compiled by Sheffield from public sources
 This analysis does not illustrate the variance in product value between rutile, leucocoxene and ilmenite
 1. Fraser Institute survey of mining companies 2016

OUR TEAM – EXPERIENCED AND SKILLED



BOARD

Will Burbury

Non-Executive Chairman

Bruce McFadzean

Managing Director

David Archer

Technical Director

Bruce McQuitty

Non-Executive Director

MANAGEMENT

Bruce McFadzean – Managing Director

Mining engineer with over 35 years experience leading the financing, development and operation of mines in Australia and overseas, including roles with BHP Billiton and Rio Tinto. Previously Managing Director of Catalpa Resources Limited prior to its merger with Evolution Mining and Mawson West.

David Archer – Technical Director

Geologist with over 27 years experience Australian resources sector. Has held senior positions with major Australian mining companies, including RGC Ltd, and as consultant to Atlas Iron Limited and Warwick Resources Limited, was responsible for significant iron ore discoveries.

Stuart Pether – Chief Operating Officer

Qualified mining engineer with over 25 years' experience in the resources industry, both in Australia and overseas. Stuart has extensive experience in project development, technical studies, mine operations and corporate management; including executive engagements as CEO of Kula Gold Limited, VP Project Development - Evolution Mining and COO at Catalpa Resources.

Mark Di Silvio – CFO/Company Secretary

CPA with over 25 years experience in the resources sector working across Africa and Australia. Has led financing and restructuring initiatives, holding senior finance and executive positions with RGC/Goldfields, Woodside Energy, Centamin and Mawson West.

Jim Netterfield – Project Manager

Mechanical engineer with a proven track record in successfully managing mineral development projects through to production. Professional career includes roles with BHP Billiton and Rio Tinto, and most recently four years as acting CEO and Operations Director at Oakajee Port & Rail.

Neil Patten-Williams – Marketing Manager

Experienced marketing and operations manager with over 18 years experience in the mineral sands industry, having held a number of management roles with Doral. Solid background in marketing and logistics of both zircon and titanium mineral products.

MINERAL SANDS – EVERYONE, EVERYDAY



2 Distinct Product Streams



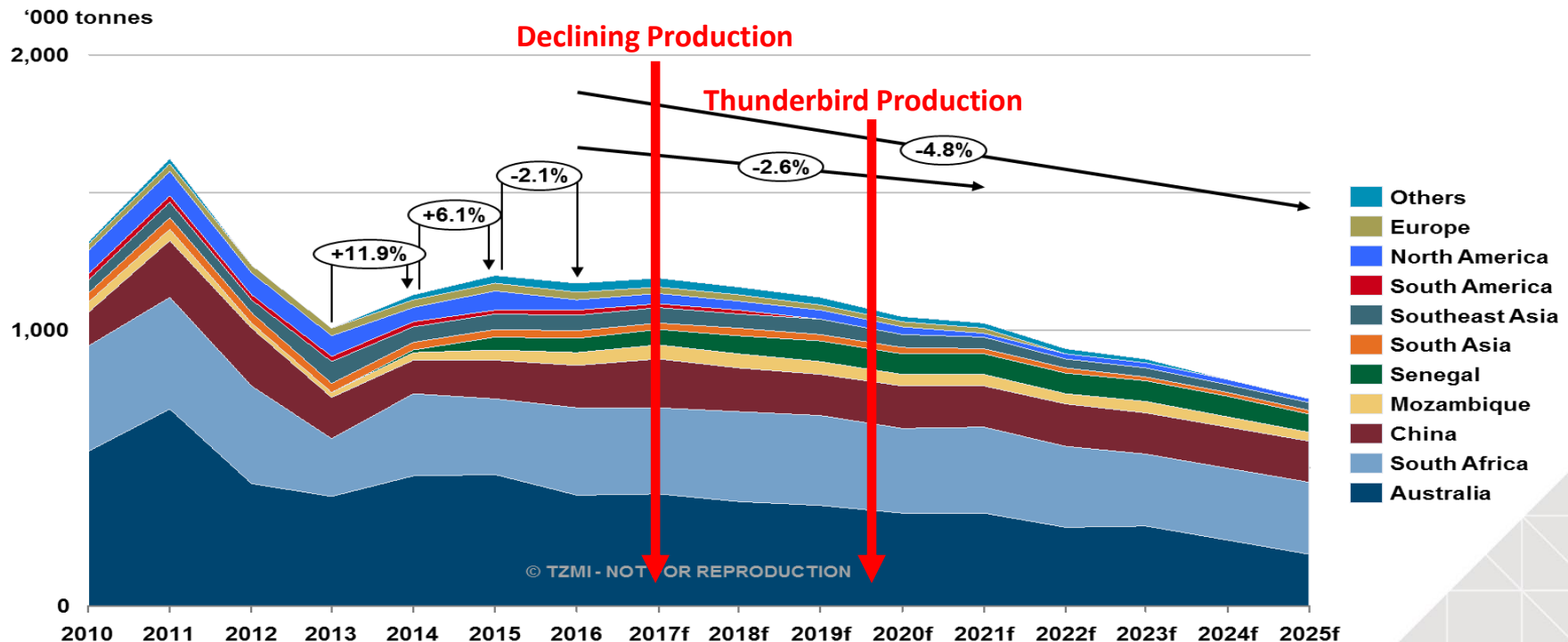
ZIRCON BFS 62% Revenue

- 1.1 million tonne global p.a.
- >50% is used in the ceramics industry (tiles, crockery, etc.)
- Flat demand from 2012-2016
- 5 year growth demand 3% per annum in line with global GDP
- China now represents 45%, Europe around 20% of global demand
- Supply dominated by Australia (~50%) and Southern Africa (35-40%)
- Global production is predicted to decline from 2018
- Mature mines and jurisdiction risk impacts to production
- Industry consultants TZMI forecast a supply deficit from 2019

TITANIUM FEEDSTOCKS BFS 35% Revenue

- 6.5-7.0 million tonne p.a. global market (TiO₂ units)
- Global ilmenite 52-58% TiO₂, rutile 95-97% TiO₂ and slag 85-95% TiO₂
- ~90% of TiO₂ feedstocks are used in the manufacture of TiO₂ pigment
- TiO₂ pigment imparts whiteness, brightness and opacity to paper, plastics, sunscreen, etc.
- TiO₂ pigment is manufactured by either the sulfate or chloride processing route, each with specific feed requirements
- Demand forecast to grow at 3% p.a. in line with global GDP
- Sulfatable ilmenite predicted to be in deficit as strong demand emerged from China in 2016

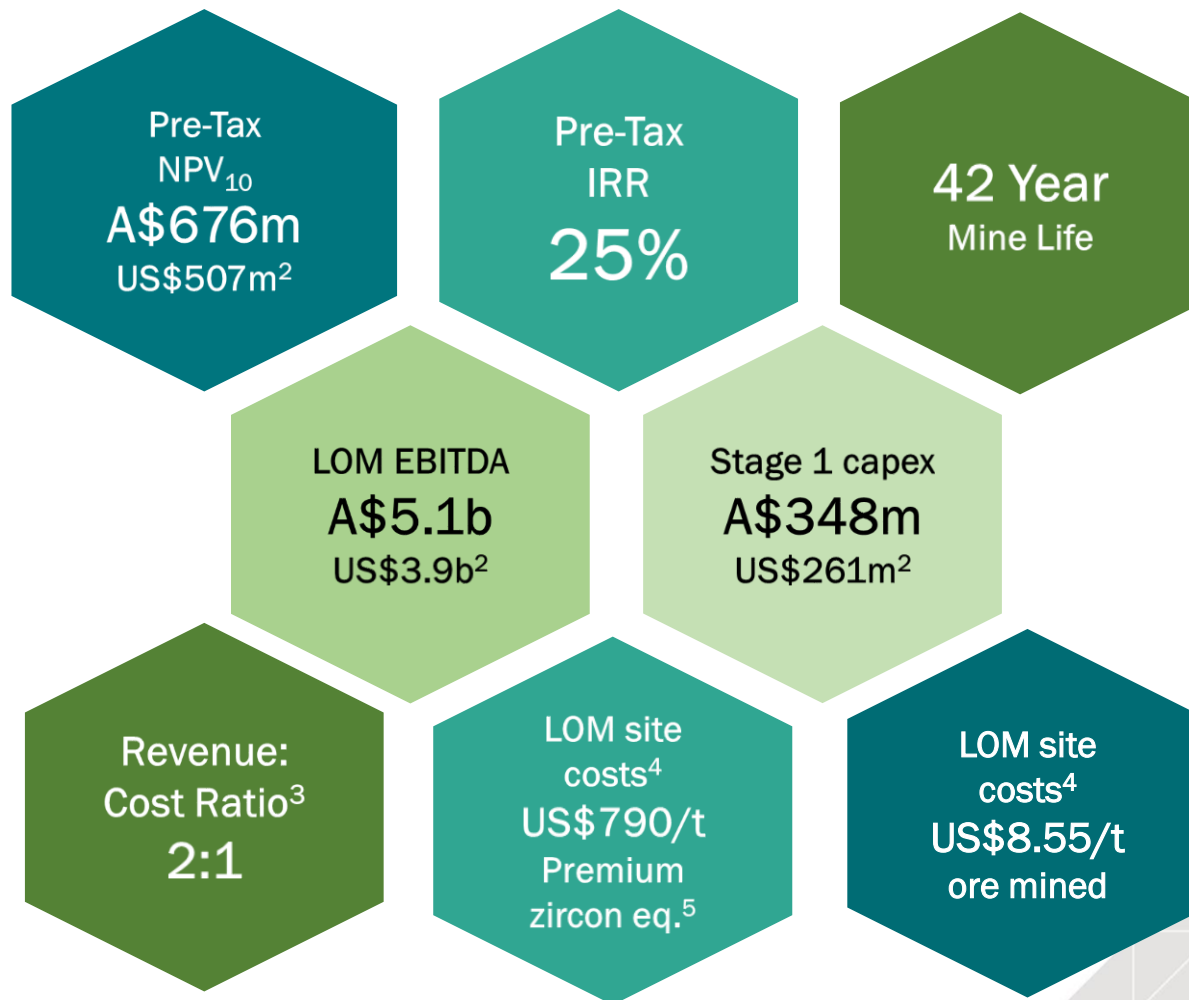
SIGNIFICANT ZIRCON SUPPLY SHORTFALL PREDICTED



- Without new projects, global zircon supply is expected to decline significantly over the coming years, 2017-2025
- Key drivers include;
 - Closure of existing mines (North Stradbroke, Mataraca, Iluka Murray Basin, Eneabba, Capel, Old Hickory, Chemours)
 - Declining grades and maturing ore bodies (Namakwa, Zulti North, Jacinth, Cooljarloo, Kwale).
- Supply levels expected to drop to 0.75 million tonnes per annum by 2025

¹ Sourced from TZMI.

BFS KEY HIGHLIGHTS¹



1. Actual results may differ from these estimates. Please refer to the assumptions, sensitivities, risk factors and cautionary statements disclosed respectively on pages 7, 9, 10 and 56 of the Company's announcement "THUNDERBIRD BFS DELIVERS OUTSTANDING RESULTS" of 24 March, 2017, which may adversely impact upon the information and forecasts in this presentation.

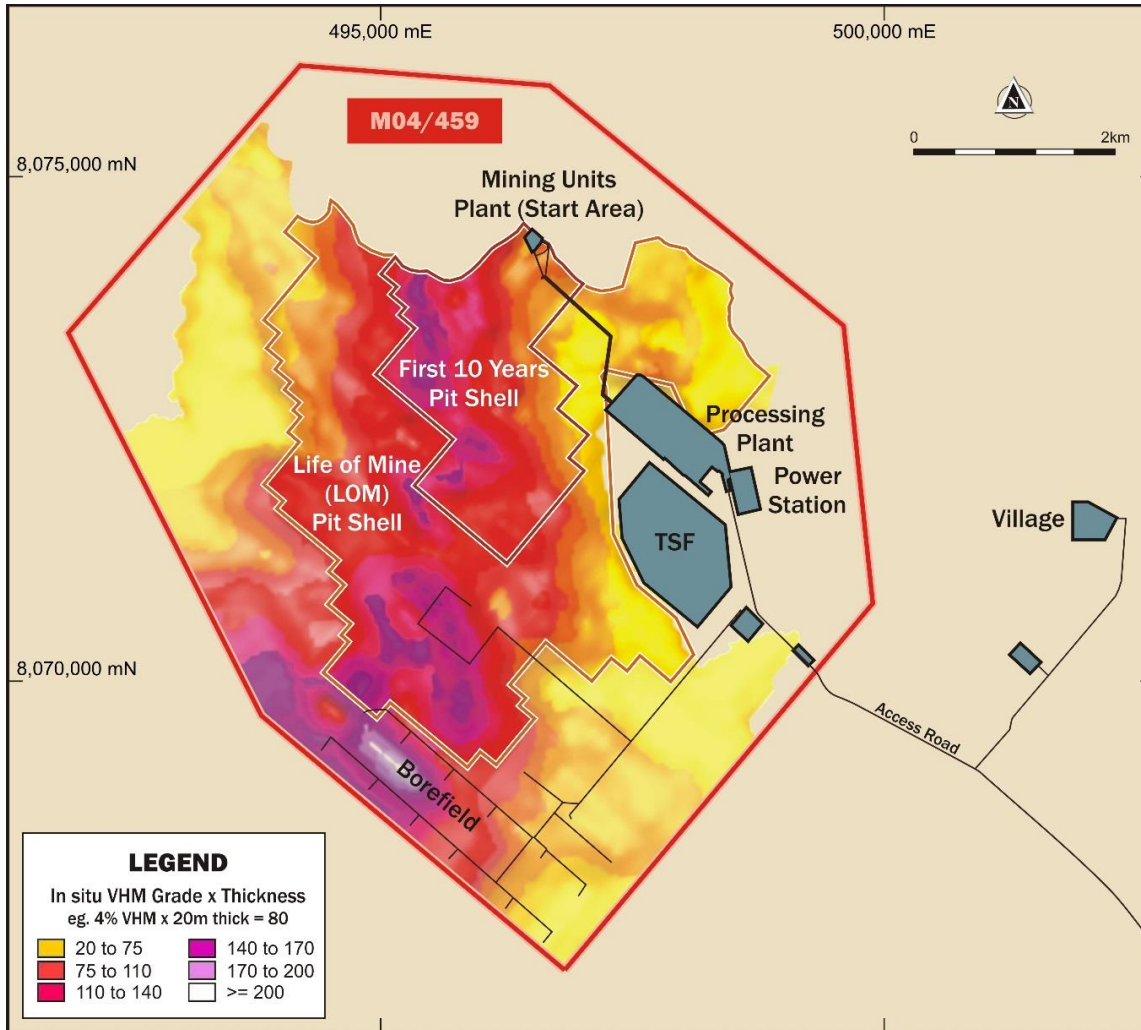
2. USD:AUD 75c

3. 4 year production period following Stage 1 ramp-up (i.e. Year 3 to Year 7 of operation)

4. Site costs include sustaining capex, excludes corporate overheads and royalties

5. Premium zircon equivalent tonnes is calculated as total revenue from all products divided by premium zircon price

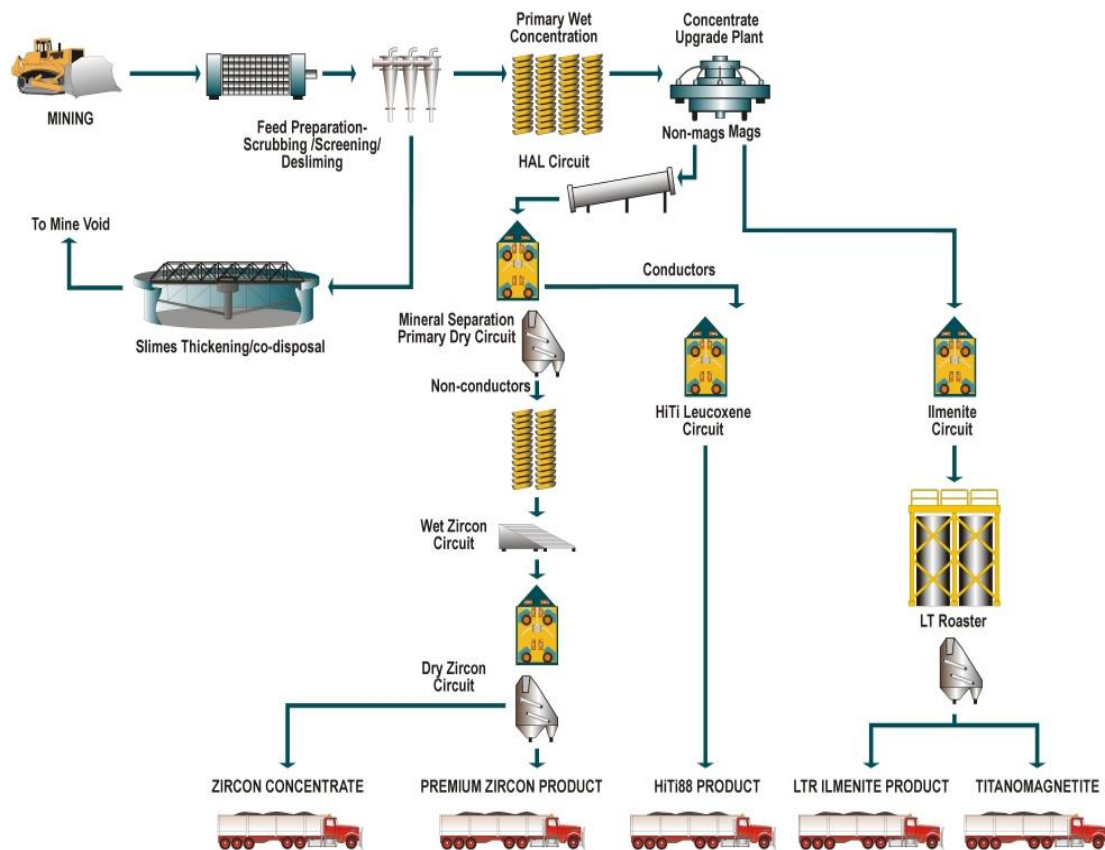
VHM GRADE AND DEPOSIT THICKNESS = VALUE



- Thunderbird has a continuous High Grade Zone of up to 46m thickness: the “GT Zone”
- Project economics are based on GT Zone’s strong continuity and very high Valuable HM grades
- Near-surface, high value areas targeted in early years of production
- GT Zone remains open: ongoing expansion potential
- Process plant proposed to be located adjacent to the deposit
- WCP remains in one location over the mine life

1. VHM = Ilmenite, zircon, rutile and Leucosene
2. Mine schedule derived from Ore Reserve ASX release 16 March 2017

CONVENTIONAL PROCESSING – HIGH QUALITY PRODUCTS



Conventional heavy mineral sands processing circuit¹

Includes an ilmenite upgrade step using a low temperature roast (“LTR”)

LTR upgrades the primary ilmenite to 56.1% TiO₂ sulfate ilmenite with ability to control to higher grades

LTR ilmenite is low in chrome and alkalis with market-leading acid solubility

BFS illustrates premium zircon product and a secondary zircon concentrate

Recoveries ³	BFS Test work
LTR Ilmenite	71.0%
Zircon Premium (66% ZrO ₂)	56.1%
Zircon Concentrate (44% ZrO ₂)	33.0%
Hi-Ti88 Leucoxene	35.3%

Total recovery to products from BFS metallurgical test work.³

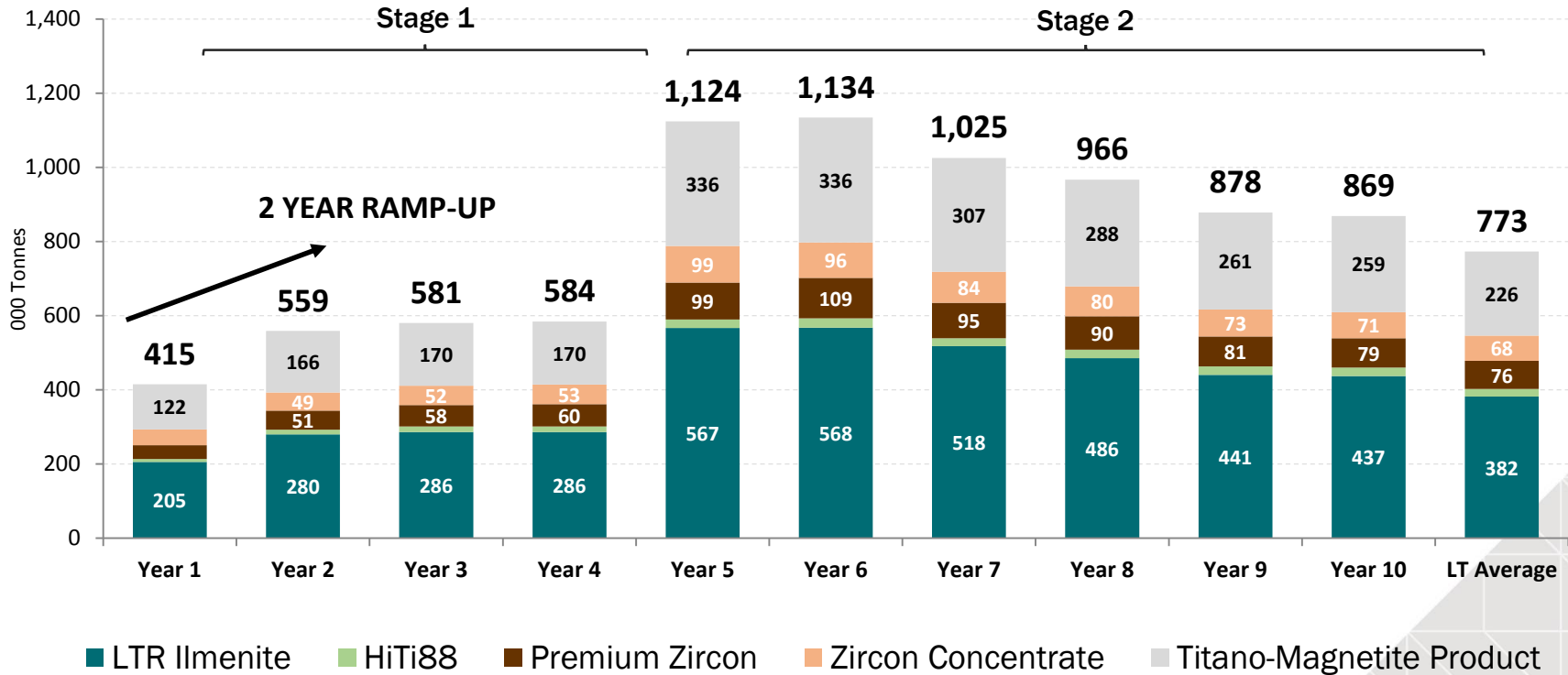
Delivers 5 quality products

¹ Process design by Hatch and Robbins Engineering, based on metallurgical testwork carried out on a 40t bulk sample using full scale & scalable equipment

² Estimated from preliminary modelling to be finalised at BFS completion in early 2017

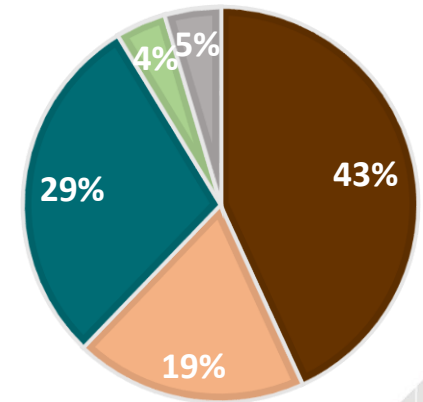
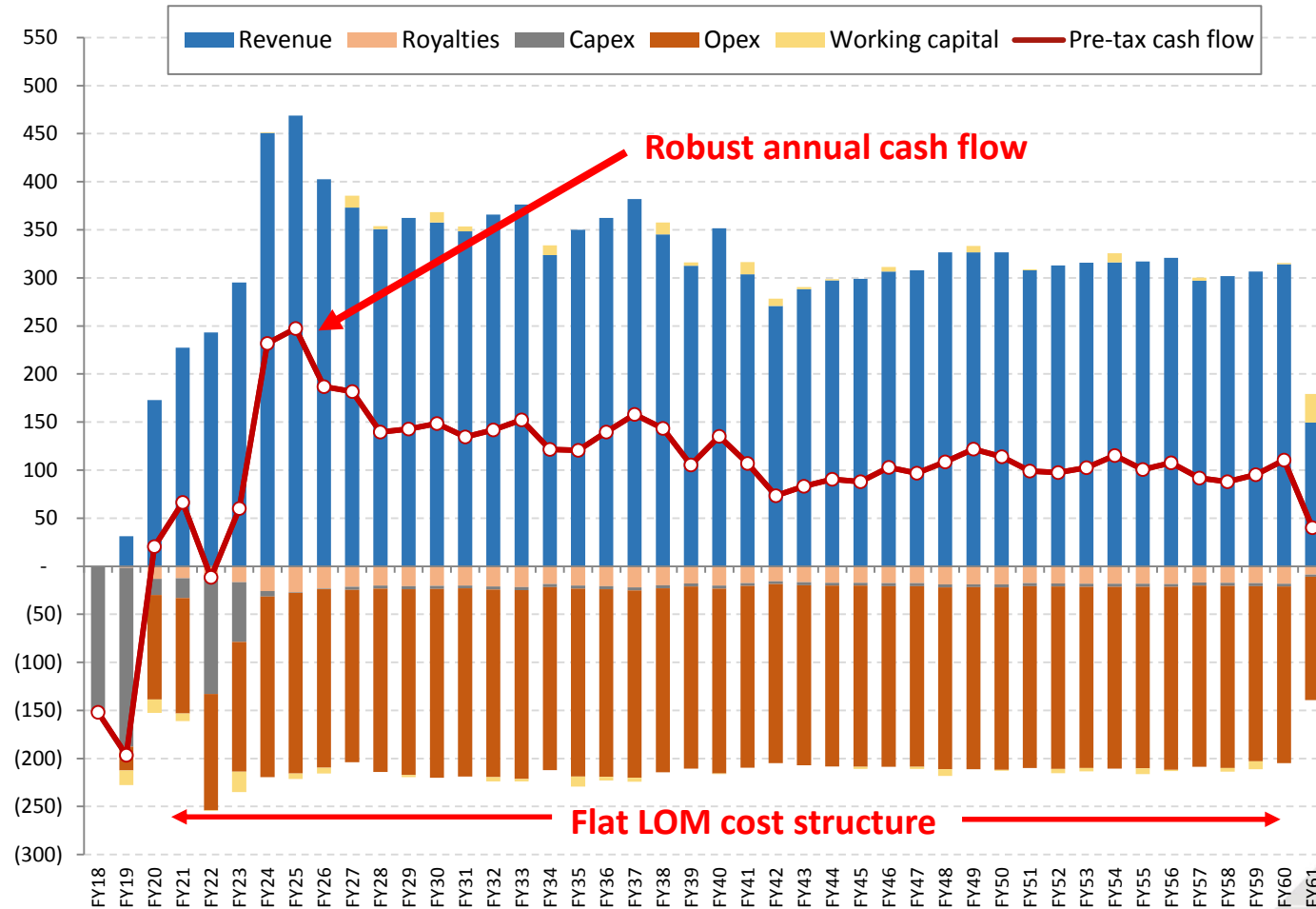
³ Refer ASX announcement 12 October 2016

PRODUCT VOLUMES



- Stage 1 produces moderate product volumes to manage market entry at a time when consensus indicates supply shortfalls
- Stage 2 expected to deliver Thunderbird as a globally significant zircon and ilmenite producer

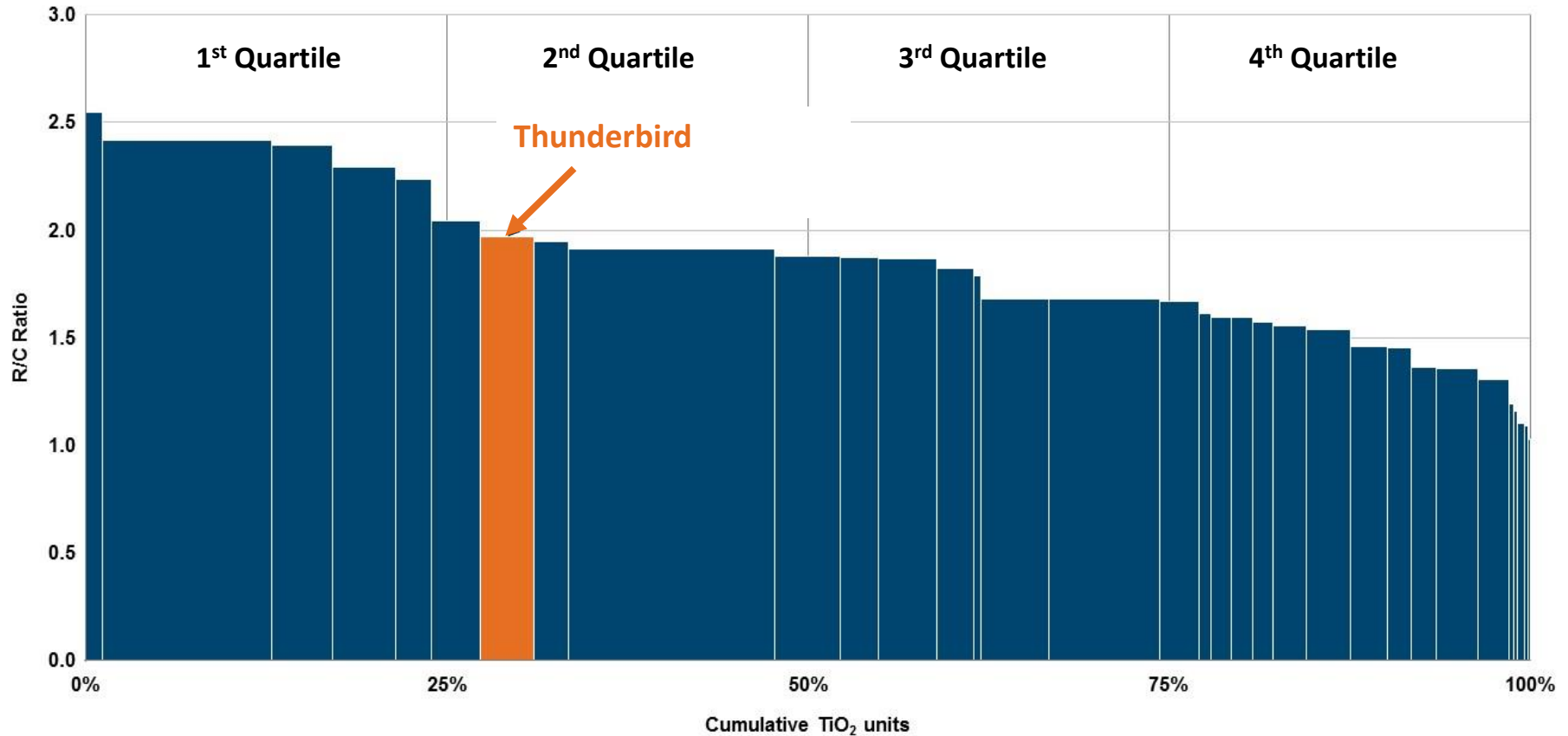
STRONG REVENUE A\$ – FLAT COST STRUCTURE



REVENUE SPLIT

- Premium Zircon
- Zircon Concentrate
- LTR Ilmenite
- Hi-Ti88
- Titano-magnetite

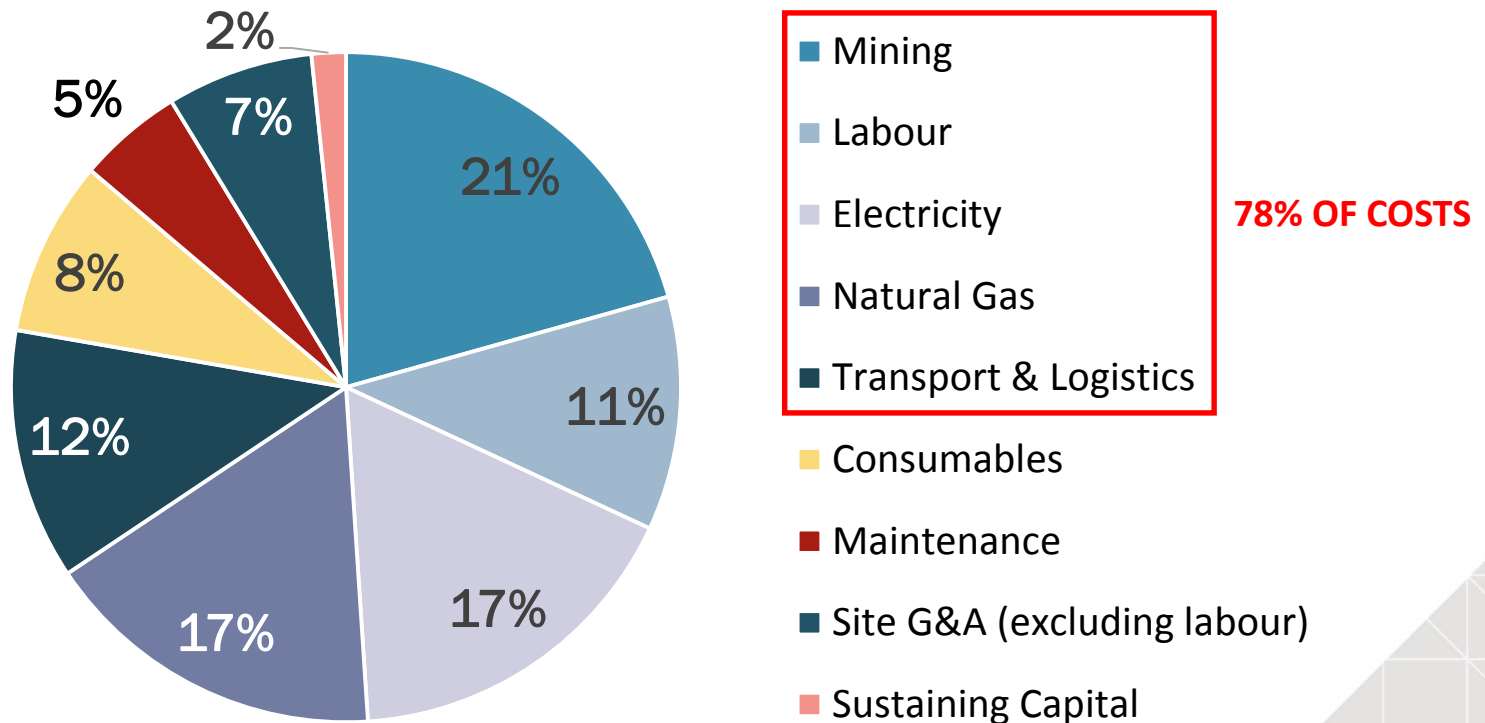
COMPETITIVE REVENUE TO COST RATIO



- High margin producer
- Thunderbird represented adjacent to first quartile producers, several of whom are vertically integrated with beneficiation plants
- Independently derived margin curve

1. 4 Year production period following Stage 1 ramp-up (Year 3 to Year 7 of operation)
2. 2020 Cost Curve as presented by TZMI
3. Note that several of the competitors presented here are integrated producers of downstream feedstock and associated by products
Source: TZMI

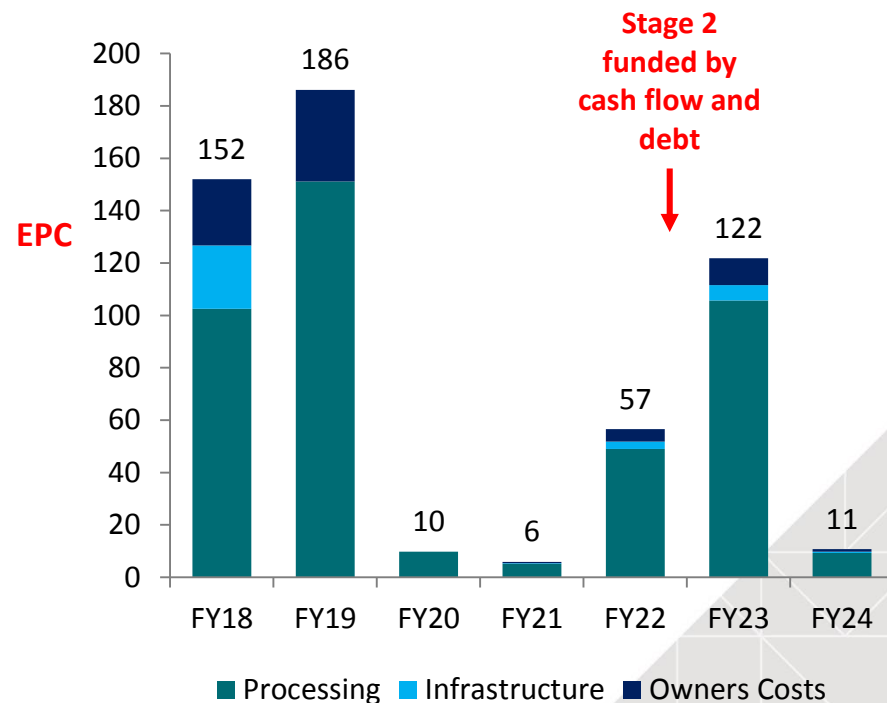
STAGE 1 ANNUAL OPERATING EXPENDITURE



- Mining, power, logistics and gas costs consistent over 42 year mine life
- Local labour numbers do not change over mine life, no FIFO costs
- Moderate sustaining capital costs as WCP remains stationary for mine life
- Operating cost reduction opportunities exist with BOO contract balloon payments

CAPITAL EXPENDITURE

Description	US\$M	A\$M
Processing – Stage 1		
Plant Area Civils & Process Water Systems	19.0	25.3
Wet Concentrator Plant	43.5	58.0
Concentrate Upgrade Plant	25.7	34.3
Zircon Processing Plant	59.2	78.9
Ilmenite Processing Plant	22.7	30.2
Low Temperature Roast	32.6	43.4
Sub-Total	202.6	270.1
Infrastructure / Owners – Stage 1		
Site Preparation, Roads & Access	5.0	6.7
Dams, Bore field & HV Infrastructure	12.0	16.0
Derby Port	5.0	6.6
Labour & Operational Readiness	6.7	8.9
Mining Services & Infrastructure	4.6	6.1
Accommodation Village	3.9	5.2
Administration & Services	3.2	4.2
Sub-Total	40.3	53.7
Contingency	18.0	24.2
Total Stage 1 Capital Cost	260.9	347.9



- EPC-based process plant capital for Stage 1
- Stage 1 contingency 7.5%
- Stage 2 capital A\$195m (US\$146m) excluding contingency
- Our expectation is that Stage 2 capital will be funded from cash flow and debt

1. EPC capital cost derived from tendered costs to be finalised in present negotiations
 2. Stage 2 capital timing to be finalised during production ramp-up
 Source: BFS model, refer ASX announcement 24 March 2017

LOGISTICS – SIMPLE AND CLOSE TO MARKET

- Products to be trucked 140km from mine to ports at Derby and Broome, including 110km on major National Highway
- Road haulage fleet and marine barging based in Derby
- Access agreement in place for port storage, wharf and bulk handling facility at Derby
- Option for packaged products through Port of Broome
- Barging & transhipment of bulk products demonstrated success over 5-7 years
- Existing shiploader and conveyor requires minimal commissioning costs
- Close proximity to potential markets



A PROJECT FOR THE COMMUNITY

- **Lead Agency** status demonstrates State and Regional importance
- ~300 construction jobs, then up to 200 direct full time local jobs for 42 years
- Business opportunities with focus on Aboriginal participation
- Commitment to transparent Aboriginal employment, business and training
- Overwhelming community support
- Intergenerational job and training opportunities from 42 year mine life
- Public Environmental Review (PER) environmental approvals targeted September quarter 2017
- Native Title approvals and Mining Licence targeted September quarter 2017



OFFTAKE AND MARKET STATUS

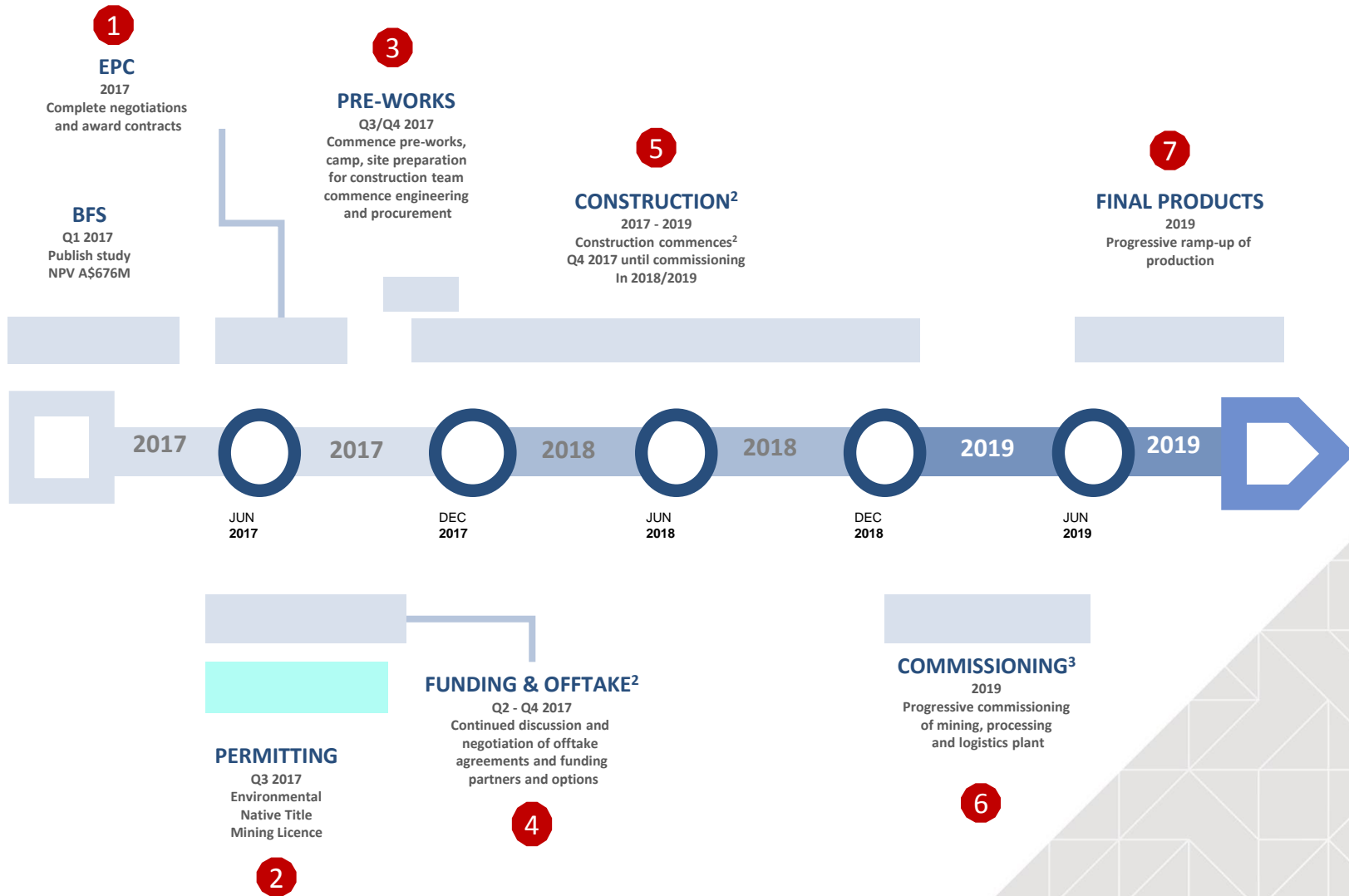
- Off-take discussions continue with a number of non-binding agreements signed with key groups in Europe, China and India.
 - Premium zircon current MoU commitment at 70%.
 - Zircon concentrate current MoU commitment at 47%.
 - Ilmenite current MoU commitment at 45%.
- Off-take discussions for the remaining volumes are well advanced.
- Binding off-take agreements continue in parallel with the funding process
- Thunderbird will deliver secure supply of products from a low risk jurisdiction
- The Thunderbird flowsheet will deliver high quality zircon and ilmenite products over a 42 year mine life, with the ability to displace lower quality products in the market



- Sheffield focuses on a funding solution that delivers at least A\$355 million¹ in new capital via debt, equity and/or JV options
- Sheffield has appointed leading Australian advisory firm, Azure Capital, to co-ordinate and lead funding and Joint Venture discussions for the Thunderbird project
- The Company has received significant interest from strategic investors and lenders regarding participation in the funding of Thunderbird
- This interest has related to a range of funding structures and instruments, with detailed discussions now in progress
- Sheffield will consider other value realisation strategies (e.g. a partial sale and JV) that reduce Sheffield's ownership and lessen the funding burden for existing shareholders

¹ Modelled peak cash draw, excluding corporate overheads and financing costs.

TIMELINE – KEY TARGETS TO PRODUCTION¹



1 There is no guarantee that these targets and steps will be achieved
 2 Subject to permitting, offtake and funding
 3 Commissioning is anticipated to commence in 2019

100% CARAWINE RESOURCES Pty Ltd – EXPLORATION DNA



Gold-Copper Focus

- High-value deposits
- Proven mineral provinces
- 100% owned
- In Australia
- Added value from associated commodities

Delivering

- Value for shareholders
- Uplift through exploration success
- Successful team with a proven track record of discovery and commercial dealing

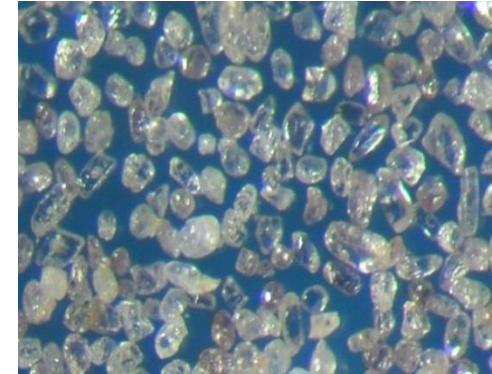
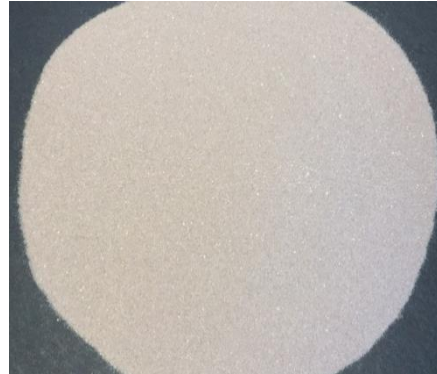
THUNDERBIRD: A WORLD CLASS MINERAL SANDS PROJECT

- 42 year mine life
- 100% owned
- World's best mining jurisdiction
- Permitting finalised Q3 2017
- Pre-tax NPV₁₀ of A\$676 million, IRR of 25%
- Stage 1 capex of US\$261m, A\$348m
- EBITDA of US\$3.8, A\$5.1 billion over LOM, average A\$123 million per annum
- Globally significant annual production of zircon and ilmenite
- Azure Capital leading discussions with project financiers and strategic investors
- Targeting initial production in 2019

Appendix 1

ZIRCON - PREMIUM PRODUCT

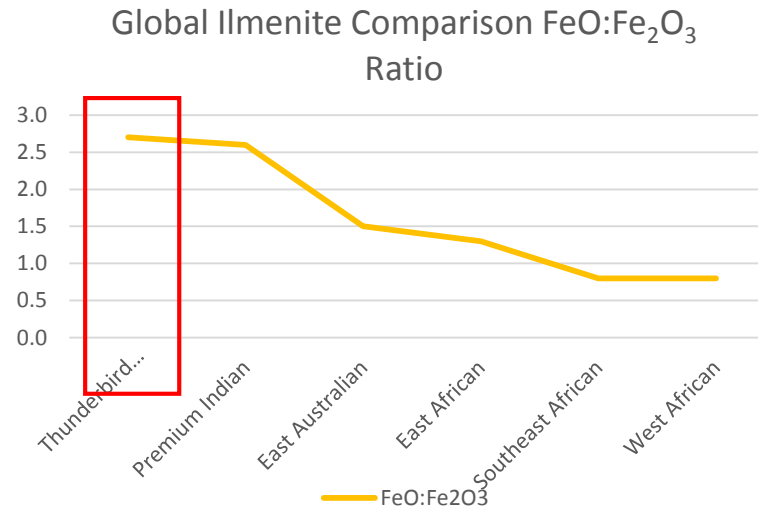
- Ceramic Grade Zircon
- > 66% ZrO₂
- Low Fe₂O₃
- Low TiO₂
- Very Low Al₂O₃
- Moderate U+Th
- Good Opacity
- Off-take Discussions in Progress



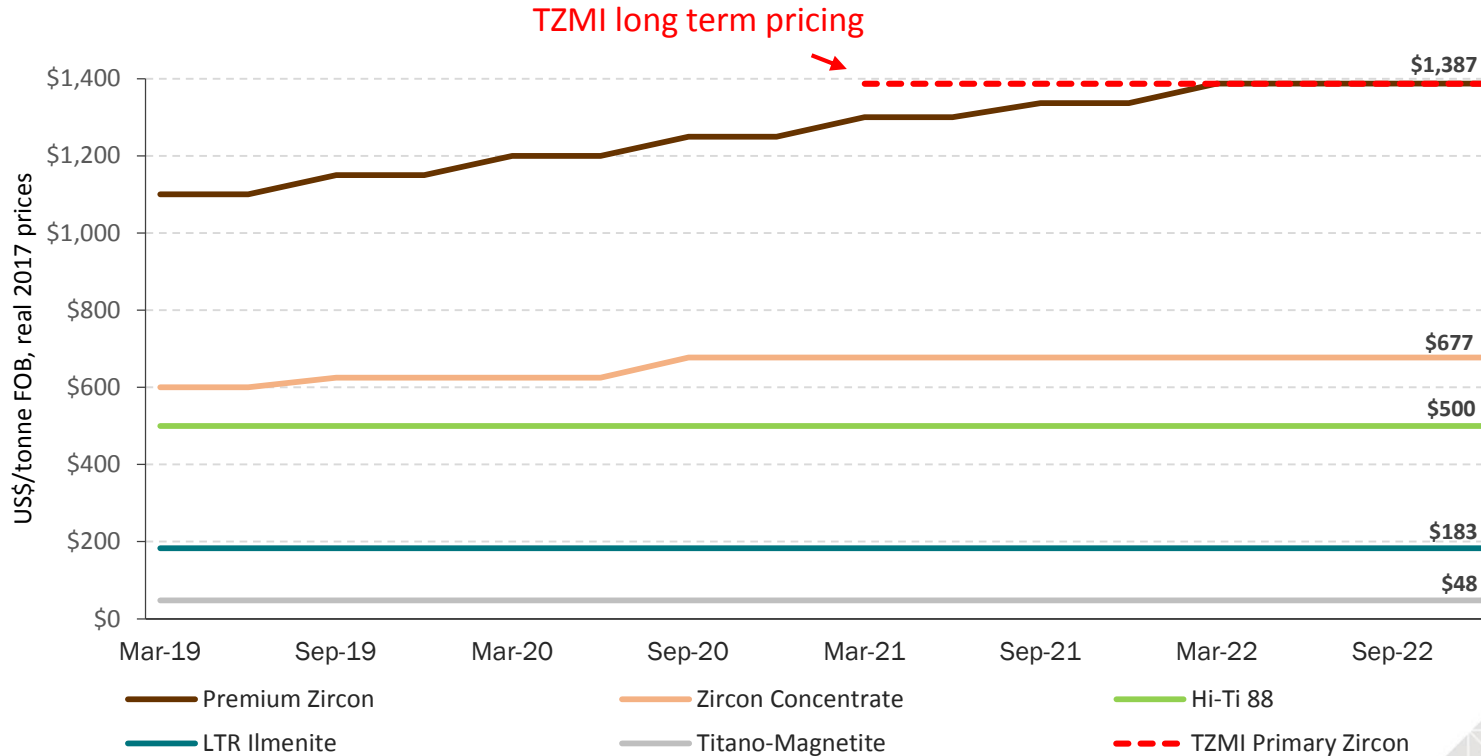
Composition (%)		Premium Zircon	Typical ¹
ZrO ₂ +HfO ₂	%	66.2 – 66.6	66.30
TiO ₂	%	0.09 – 0.18	0.14
Fe ₂ O ₃	%	0.06 – 0.08	0.08
SiO ₂	%	32.5 – 33.5	32.5
Al ₂ O ₃	%	0.10 - 0.15	0.15

¹ Refer ASX announcement 12 October 2016

- Exceptional Grade
- 56 – 58% TiO_2
- Outstanding $FeO:Fe_2O_3$
- Low Fe_2O_3 (<13%)
- Low Levels of Cr_2O_3
- High Acid Solubility
- Good reactivity rate
- Market Leading quality



Composition (%)	Thunderbird Optimise 3 ilmenite	Premium Indian ilmenite	East Australian ilmenite	East African ilmenite	Southeast African ilmenite	West African ilmenite
TiO_2	57.9	51.5	50.7	48.2	52.4	53.2
FeO	28.1	33.5	25-29	25.5	21.4	18.9
Fe_2O_3	10.3	13.0	16-19	20.0	27.9	23.3
$FeO:Fe_2O_3$	2.7	2.6	1.5	1.3	0.8	0.8
Cr_2O_3	0.05	0.04	0.30	0.09	0.09	0.16



- Sheffield has conservatively applied independent industry experts TZMI and Ruidow long-term US\$ pricing recommendations for the life of mine
 - From first production for Ilmenite, Hi-Ti88 and Titano-magnetite,
 - From 2020 and 2022 for Zircon Concentrate and Premium Zircon respectively

1. Real 2017 prices and FOB.

SUMMARY BFS OUTPUTS

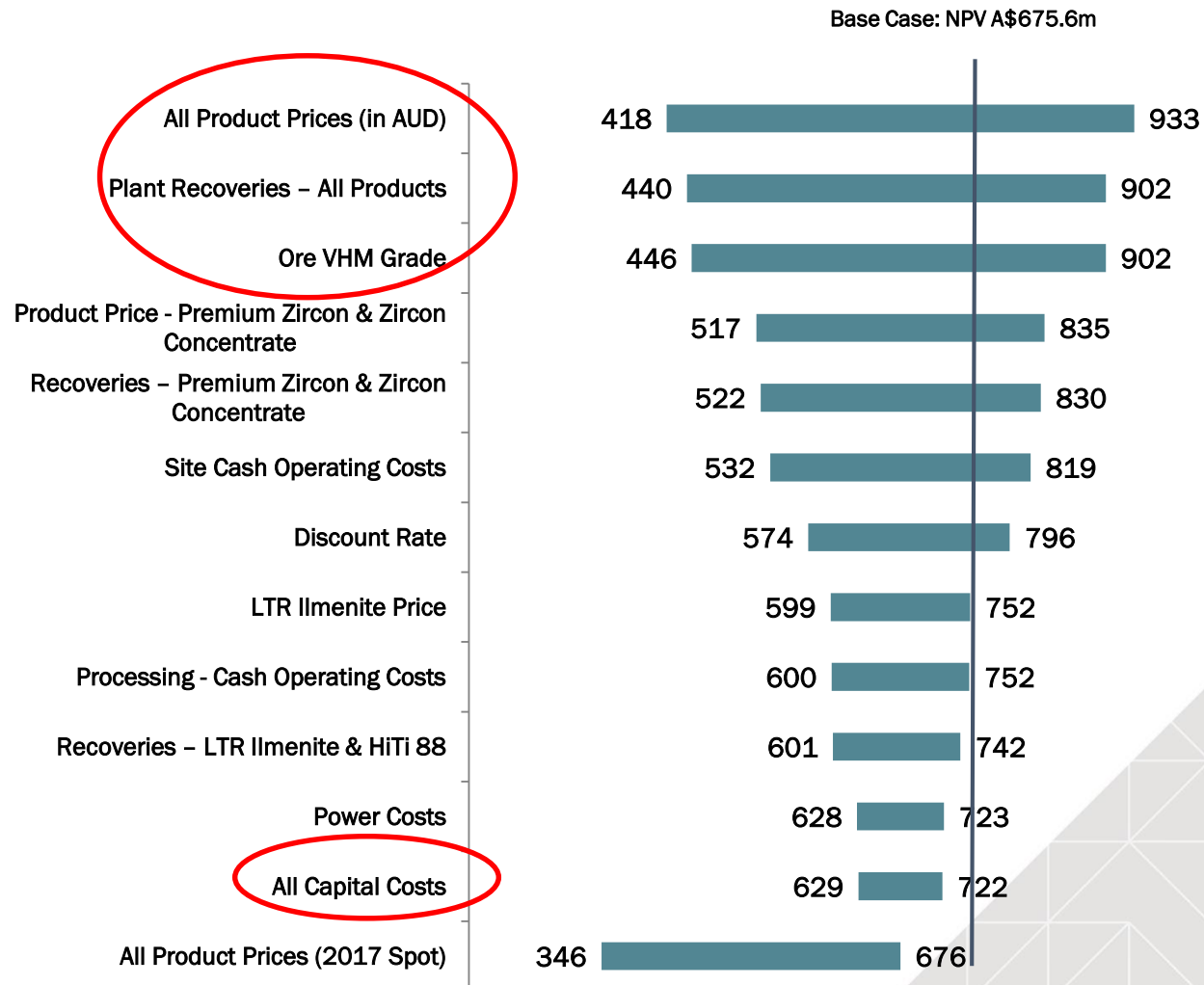
A\$m, Real 2017 Prices	STAGE 1	STAGE 2	LOM
	Financial Year 2019 – 2023 ⁵ (4 years)	Financial Year 2024 – 2033 ⁶ (10 years)	LOM ⁷ (42 years)
Ore Mined (Mt)	32.8	173.8	680.6
Strip Ratio (W:O)	0.52	0.58	0.77
VHM Grade (%)	6.41	5.10	4.49
Revenue	854	3,875	13,560
Royalties	(50)	(223)	(781)
Net Revenue	803	3,652	12,779
Opex: Mining	(104)	(421)	(1,828)
Opex: Processing	(228)	(1,024)	(4,093)
Opex: Logistics	(73)	(288)	(1,005)
Opex: Site G&A	(59)	(172)	(707)
Total Opex¹	(464)	(1,905)	(7,633)
EBITDA	339	1,746	5,146
A\$ site costs ² / tonne ore mined	14.65	11.11	11.40
A\$ revenue / tonne ore mined	25.99	22.29	19.92
US\$ site costs ² / tonne Premium Zircon eq. ^{3,4}	721	692	790
US\$ revenue / tonne Premium Zircon eq. ^{3,4}	1,278	1,387	1,381

Low LOM strip ratio supports consistent and predictable LOM cost structure

Equates to an average EBITDA of A\$175/yr for 1st 10 yrs of stage 2

1. Excludes corporate overheads.
2. Includes sustaining capex, excludes corporate overheads and royalties.
3. Premium zircon equivalent tonnes calculated as total revenues across all products/premium zircon price
4. AUD:USD = 0.75:1.00
5. Stage 1 time period depicted as Q4 FY2019 to Q3 FY2023 inclusive
6. Stage 2 first 10 years depicted as Q4 FY2023 to Q3 FY2033 inclusive
7. LOM (Life of Mine) describes the period 2018 to 2061.

Product prices, recoveries and ore grade are key sensitivity drivers



Appendix 6

SUMMARY BFS METRICS

Thunderbird Project Assumed Product Prices

Average Product Prices (US\$) ²	Financial Year 2019 – 2023 ³	Financial Year 2024 – 2033 ⁴	LOM ⁵
Premium Zircon	1,282	1,387	1,381
Zircon Concentrate	659	677	676
LTR Ilmenite	183	183	183
Hi-Ti88	500	500	500
Titano-magnetite	48	48	48

Thunderbird Project Estimated Production Outputs

Average Production per annum	Financial Year 2019 – 2023 ³	Financial Year 2024 – 2033 ⁴	LOM ⁵
Premium Zircon	51,500	88,700	76,100
Zircon Concentrate	49,100	80,100	68,500
LTR Ilmenite	264,500	481,600	387,800
Hi-Ti88	12,800	23,000	20,300
Titano-magnetite	156,600	285,300	229,800

Thunderbird Project Estimated Capital Expenditure and Financial Metrics

	A\$m
Capex – Stage 1	348
Capex – Stage 2	195
Total Capex	543⁶
Pre-Tax Project NPV (10% WACC)¹	676
Pre-Tax IRR %	24.9%
Post-Tax Project NPV (8% WACC) ¹	620
Post-Tax IRR %	20.6%

1. Excludes corporate overheads.
2. USD commodity prices are quoted as FOB terms.
3. Stage 1 time period depicted as Q4 FY2019 to Q3 FY2023 inclusive
4. Stage 2 first 10 years depicted as Q4 FY2023 to Q3 FY2033 inclusive
5. LOM (Life of Mine) describes the period 2018 to 2061.
6. Excludes sustaining capital

Appendix 7

ORE RESERVES

THUNDERBIRD DEPOSIT ORE RESERVES^{1,4}

Valuable Heavy Mineral (VHM) in-situ grade

Ore Reserve Category	Ore Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Valuable HM Grade (In-situ) ²				Slimes (%)	Osize (%)
				Zircon %	HiTi Leuc %	Leuc %	Ilmenite %		
Proved	235.8	31.4	13.3	1.00	0.29	0.26	3.55	16.5	13.7
Probable	444.8	45.4	10.2	0.80	0.26	0.26	2.85	15.2	11.0
Total	680.5	76.8	11.3	0.87	0.27	0.26	3.10	15.7	12.0

Mineral assemblage as percentage of HM grade

Ore Reserve Category	Ore Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Mineral Assemblage ³				Slimes (%)	Osize (%)
				Zircon (%)	HiTi Leuc (%)	Leuc (%)	Ilmenite (%)		
Proved	235.8	31.4	13.3	7.5	2.2	1.9	26.7	16.5	13.7
Probable	444.8	45.4	10.2	7.8	2.5	2.6	28.0	15.2	11.0
Total	680.5	76.8	11.3	7.7	2.4	2.3	27.4	15.7	12.0

1) Ore Reserves are presented both in terms of in-situ VHM grade, and HM assemblage. Tonnes and grades have been rounded to reflect the relative accuracy and confidence level of the estimate, thus the sum of columns may not equal. Ore Reserve is reported to a design overburden surface with appropriate consideration of modifying factors, costs, mineral assemblage, process recoveries and product pricing.

2) The in-situ grade is determined by multiplying the HM Grade by the percentage of each valuable heavy mineral within the heavy mineral assemblage.

3) Mineral Assemblage is reported as a percentage of HM Grade, it is derived by dividing the in-situ grade by the HM grade.

4) Ore Reserves reported for the Dampier Project were prepared and first disclosed under the JORC Code (2012), refer to Sheffield's ASX announcement dated 16 March 2017 for further detail.

THUNDERBIRD DEPOSIT MINERAL RESOURCE^{1,2,7}

Cut-off (HM%)	Mineral Resource Category	Material Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade ³ (%)	Valuable HM Grade (In-situ) ⁴				Slimes (%)	Osize (%)
					Zircon (%)	HiTi Leuc (%)	Leuc (%)	Ilmenite (%)		
> 3% HM	Measured	510	45	8.9	0.71	0.20	0.19	2.4	18	12
	Indicated	2,120	140	6.6	0.55	0.18	0.20	1.8	16	9
	Inferred	600	38	6.3	0.53	0.17	0.20	1.7	15	8
	Total	3,230	223	6.9	0.57	0.18	0.20	1.9	16	9
>7.5% HM	Measured	220	32	14.5	1.07	0.31	0.27	3.9	16	15
	Indicated	640	76	11.8	0.90	0.28	0.25	3.3	14	11
	Inferred	180	20	10.8	0.87	0.27	0.26	3.0	13	9
	Total	1,050	127	12.2	0.93	0.28	0.26	3.3	15	11
Cut-off (HM%)	Mineral Resource Category	Material Tonnes (millions)	In-situ HM Tonnes (millions)	HM Grade (%)	Mineral Assemblage ⁵				Slimes (%)	Osize (%)
					Zircon (%)	HiTi Leuc (%)	Leuc (%)	Ilmenite (%)		
> 3% HM	Measured	510	45	8.9	8.0	2.3	2.2	27	18	12
	Indicated	2,120	140	6.6	8.4	2.7	3.1	28	16	9
	Inferred	600	38	6.3	8.4	2.6	3.2	28	15	8
	Total	3,230	223	6.9	8.3	2.6	2.9	28	16	9
>7.5% HM	Measured	220	32	14.5	7.4	2.1	1.9	27	16	15
	Indicated	640	76	11.8	7.6	2.4	2.1	28	14	11
	Inferred	180	20	10.8	8.0	2.5	2.4	28	13	9
	Total	1,050	127	12.2	7.6	2.3	2.1	27	15	11

THUNDERBIRD DEPOSIT CONTAINED VALUABLE HM (VHM) IN MINERAL RESOURCES^{1,2,6}

Cut-off (HM%)	Mineral Resource Category	Zircon Tonnes (thousands)	HiTi Leucoxene Tonnes (thousands)	Leucoxene Tonnes (thousands)	Ilmenite Tonnes (thousands)	Total VHM Tonnes (thousands)
>3% HM	Measured	3,600	1,000	1,000	12,000	17,700
	Indicated	11,800	3,800	4,300	39,100	59,000
	Inferred	3,200	1,000	1,200	10,500	15,900
	Total	18,600	5,900	6,500	61,700	92,600
>7.5% HM	Measured	2,300	700	600	8,400	12,000
	Indicated	5,800	1,800	1,600	21,000	30,200
	Inferred	1,600	500	500	5,600	8,200
	Total	9,700	3,000	2,700	35,000	50,400

1) The Thunderbird Mineral Resources are reported inclusive of (not additional to) Ore Reserves. The Mineral Resource reported above 3% HM cut-off is inclusive of (not additional to) the Mineral Resource reported above 7.5% HM cut-off. 2) All tonnages and grades have been rounded to reflect the relative accuracy and confidence level of the estimate and to maintain consistency throughout the table, therefore the sum of columns may not equal. 3) Total heavy minerals (HM) is within the 38µm to 1mm size fraction and has been reported as a percentage of the total material quantity. 4) The Valuable HM in-situ grade is reported as a percentage of the total material quantity and is determined by multiplying the percentage of total HM by the percentage of each valuable heavy mineral within the HM assemblage at the resource block model scale. 5) The Mineral Assemblage is represented as the percentage of HM grade. Estimates of mineral assemblage are determined by screening and magnetic separation. Magnetic fractions were analysed by QEMSCAN for mineral determination as follows: >90% liberation and; Ilmenite 40-70% TiO₂; Leucoxene 70-94% TiO₂; High Titanium Leucoxene (HiTi Leucoxene) >94% TiO₂ and Zircon 66.7% ZrO₂+HfO₂. The non-magnetic fraction was analysed by XRF and minerals determined as follows: Zircon ZrO₂+HfO₂/0.667 and HiTi Leucoxene TiO₂/0.94. 6) The VHM inventory is derived from information in the Mineral Resource tables. 7) The Mineral Resource estimate was prepared and first disclosed under the JORC Code (2012), refer to Sheffield's ASX announcement dated 5 July 2016 for further detail.