ASX Announcement
21 March 2022

MAGNETITE MINES CONFIRMS BENEFITS OF EXPANSION AT RAZORBACK

Highlights:

- Magnetite Mines announces successful Expansion Study demonstrating the business case for further, staged expansions of the Razorback Iron Ore Project from initial production capacity of 3Mtpa[1] of iron ore concentrate to 7Mtpa.

- The Expansion Study highlights the benefits of increased scale at Razorback and the inherent optionality of the Company's large resource base with access to established power and transport infrastructure.

- The major scope elements of the Definitive Feasibility Study (DFS) are unchanged and the DFS work will continue based on 3Mtpa of production capacity and minimum upfront capital. The significant potential of the Project to support higher production rates will be factored into Project design to ensure optionality for future expansion is preserved. DFS progress will be routinely updated in the quarterly reports.

- The Expansion Study assessed the addition of two processing plant modules to the first stage of development, taking the plant to three modules based on the current DFS engineering design parameters for the first stage. The expanded production capacity at the resource average grade is 7Mtpa of high-grade iron ore concentrate at a nominal 68% Fe specification, well above the 62% reference grade in the iron ore market.

- The Single-Step Expansion case produced an overall post-tax IRR of 27% and NPV-8 of A$2,455 million on total development capex of A$1,985 million at an iron ore 62% Fe reference price of US$110/t, and AUD:USD exchange rate of 0.71. The incremental post-tax IRR of the expansion stage is 33%. At a reference price of US$150/t, these overall figures increased to an IRR of 42% and NPV-8 of A$4,598 million, and an incremental IRR of 54%.

- The all-in 62% Fe iron ore breakeven price[2] for the Single-Step Expansion case is US$40/t compared to US$58/t in the PFS's Plant Optimised Case. The payback on the incremental expansion is approximately 2 years.

- The attractive financial outcomes reflect economies of scale in operating and capital expenditure, and a material reduction in transportation costs by substituting road haulage with rail.

- The expansions are based on extensive, well-defined resources. The expansion scenarios are generated from run-of-mine (ROM) ore of some 1.4 billion tonnes covering approximately 30 years of operation, of which 83% is in the Indicated Resource category and 17% is Inferred[3,4]. In the first 10 years of operation, which includes the payback of all capital, 87% of the contributing material is within the currently declared Probable Ore Reserves[5].

- ROM ore represents just 32% of the JORC Indicated and Inferred Mineral Resources attributed to the Razorback tenements and 24% of current company-wide resources across the Braemar Iron Province, with these additional resources supporting further expansion or extended operating life.

- Key ESG considerations in the Expansion Study included minimising Scope 1, 2 and 3 greenhouse gas emissions, the use of public wastewater to support additional water demand, and long-term, mutually-beneficial relationships with stakeholders including First Nations, suppliers and employees. Low scope 2 emission intensity can be realised, as additional electricity required for expansion is expected to be sourced via the main Southeast Australian grid which has a significant renewable energy component, estimated to be 70% today and forecast to be 97% by 2025[6].

Magnetite Mines Limited Executive Chairman and CEO Peter Schubert said:

"The DFS currently underway has provided us the confidence to formalise our options for the first stages of expansion at our Razorback Iron Ore Project. We are very excited by the results of this study work which underpin our belief in the outstanding returns available from leveraging the benefits of scaling up our large resource in a tier 1 mining jurisdiction with a supportive state government, access to abundant infrastructure and, importantly, low-cost renewable energy.

Magnetite Mines has an inter-generational resource and it was important to ensure our initial path to expansion was supported by robust data that could effectively inform and support stage 1 of our development plans.

The Expansion Study demonstrates the Company's commitment to its long-term development strategy for the Razorback Iron Ore Project and provides further confidence in the significant and valuable optionality realised from progressive expansions of the Company's extensive Braemar resources.

The expansion scenarios are extremely encouraging and confirm the potential for a very long-life mining operation supporting higher production rates and point to substantive increases in both IRR and NPV8 coupled with an equally substantive decrease to the projects all-in 62% Fe iron ore breakeven price for the Single-Step Expansion case to US$40/t.

We remain focused on completing the DFS and moving to stage 1 of our mining operation with minimum upfront capital and continue to follow a systematic, staged approach to the development of Razorback.

We continue to advance discussions with potential project partners and financiers and note the project's sustainability credentials are a critical factor for many industry participants. Through Magnetite Mines' emerging ESG framework, we are well-positioned to deliver a premium high-grade product increasingly sought for low-carbon steelmaking globally with premiums for higher-grade ores continuing to reflect this position.

We thank shareholders for their continued support and look forward to further updating the market on our progress as we continue to advance the DFS programme, ensuring expansion optionality is preserved for the benefit of all stakeholders."

Acknowledgement of Country

Magnetite Mines, our shareholders and our stakeholders acknowledge the Ngadjuri People as the Traditional Owners of the lands on which the Razorback Iron Ore Project is located.

We respect their continuing custodianship of this Country, and their spiritual and cultural beliefs and practices.

Cautionary Statement

In accordance with the ASX Interim Guidance on reporting studies, the Expansion Study referred to in this announcement is a preliminary technical and economic study of the potential viability of the Razorback Iron Ore Project to proceed with more definitive studies. It is based on low level technical and economic assessment that are not sufficient to support the estimation of Ore Reserves beyond the Probable Ore Reserves referred to in the Company's ASX Announcement dated 5 July 2021. Further evaluation work and appropriate studies are required before the Company will be in a position to provide any assurance of an economic development case.

The Expansion Study is based on the material assumptions outlined elsewhere in this announcement and those set out in the Company's ASX Announcement dated 21 March 2021. While the Company considers all material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the Expansion Study will be achieved.

To achieve the range of proposed feasibility studies and potential mine development outcomes indicated in the Expansion Study, additional funding will be required. Investors should note there is no certainty that the Company will be able to raise funding when needed. It is also likely that such funding may only be available on terms that may be dilutive or otherwise affect the value of the Company's existing shares. It is also possible that the Company could pursue other value realisation studies such as sale, partial sale, or joint venture of the Project. If it does, this could materially reduce the Company's proportional ownership of the project.

Given the uncertainties involved, investors should not make any investment decisions based solely on the result of the Expansion Study.

Disclaimer

This announcement contains "forward-looking information" that is based on the Company's expectations, estimates and projections as of the date on which the statements were made. This forward-looking information includes, among other things, statements with respect to this Expansion Study, the Pre-Feasibility Study (PFS)[7], the Company's business strategy, plan, development, objectives, performance, outlook, growth, cashflow, projections, targets and expectations, mineral resources, ore reserves, results of exploration and related expenses. Generally, this forward-looking information can be identified by the use of forward-looking terminology such as, 'anticipate', 'project', 'target', 'likely', 'believe', 'estimate', 'expect', 'intend',

'may', 'would', 'could', 'should', 'scheduled', 'will', 'plan', 'forecast', 'evolve' and similar expressions. Persons reading this announcement are cautioned that such statements are only predictions, and that the Company's actual future results or performance may be materially different.

The Company believes the forward-looking information in this announcement is based on reasonable grounds having regard to the fact all production targets and forecast financial information are underpinned by 100% Indicated (83%) and Inferred (17%) JORC (2012) Mineral Resource Estimates[3,4,5]. However, neither the Company nor any other person makes or gives any representation, assurance or guarantee that the production targets or expected outcomes in this announcement will ultimately be achieved. The forward-looking information in this announcement is subject to known and unknown risks, uncertainties and other factors that may cause the Company's actual results, level of activity, performance or achievements to be materially different from those expressed or implied by such forward-looking information. Such risks include but are not limited to future prices and demand of iron and other metals; foreign exchange rates; availability of funding; results of further optimisation activities (including further exploration and metallurgical work); changes in project parameters as plans continue to be refined; failure of plant; equipment or processes to operate as anticipated; possible variations of ore grade or recovery rates; accident, labour disputes and other risks of the mining industry; delays in obtaining governmental approvals or financing or in the completion of development or construction activities and general business, economic, competitive, political and social uncertainties.

A number of key steps need to be completed in order to achieve the expansion scenarios detailed in this Expansion Study. Investors should note that if there are delays associated with completing these steps, or completion of the steps does not yield the anticipated results, the actual estimated production and forecast financial information may differ materially from the Expansion Study results presented in this announcement.

These risks are not exhaustive of the factors that may affect or impact future results. These and other factors should be considered carefully, and readers should not place undue reliance on such forward-looking information. The Company disclaims any intent or obligations to revise any forward-looking statements whether as a result of new information, estimates, options, events or results or otherwise, unless required to do so by law.

Production Targets

The production targets and the forecast financial information derived from those production targets referred to in this announcement are based on 100% Indicated (83%) and Inferred (17%) JORC (2012) Mineral Resource Estimates[3,4,5]. A significant proportion of the production was based on previously defined Probable Ore Reserves[5]. No new Ore Reserves have been declared as part of this Expansion Study. The Mineral Resource Estimates underpinning the production targets were previously prepared by a Competent Person in accordance with the JORC Code 2012[3,5,7].

Executive Summary

Magnetite Mines Limited ("Magnetite Mines" or the "Company") today announces the successful completion of an Expansion Study assessing staged expansion options for the Company's flagship Razorback Iron Ore Project ("Project" or "Razorback Project").

The Expansion Study was undertaken in parallel with the currently underway Definitive Feasibility Study (DFS)[7], which is aimed at construction of the initial production module at Razorback and builds upon the successful Pre-Feasibility Study (PFS) released in July 2021[7]. The Expansion Study explored pathways to increase production from the Razorback Iron Ore Mine following start-up of the first module. The Expansion Study was not intended to alter the Project's current scope or timing, which is the basis of the DFS and remains a low-capital, high-return development producing up to 3Mtpa of concentrate over a long mine life. The objectives of the Expansion Study were to assess the business case for subsequent project expansion, demonstrate the inherent optionality of a large resource base with access to established power and transport infrastructure and ensure that optionality is maintained in the initial development.

The Expansion Study assumed the same modular layout of the current DFS (Stage 1) scope, with a 15.5Mtpa ore feed processing plant design designed by Hatch[7]. For the expansion stages, it was assumed that up to two additional modules would be constructed, with the expanded scope costed to an AACE Class 5 standard. Various expansion scenarios were framed in terms of varying timing and number of modules constructed. In all cases, the initial stage ("Stage 1"), is the current scope (it is derived from the configuration of the PFS Plant Optimised Case, which is the scope currently being engineered for construction in the DFS). That is, all expansion cases were assumed to start from the same Stage 1 ore feed of 15.5Mtpa of processing capacity to target 3Mtpa concentrate production. Other elements of the Project, such as site infrastructure, were also based on PFS designs and scaled accordingly.

Two expansion cases were analysed in depth:

Staged Expansion

Stages	Approximate time period (years)[a]	Nameplate feed processing capacity (Mtpa)	Concentrate production capacity (Mtpa)[b]
Stage 1	2025-2027	15.5	3
Stage 2	2028-2031	31.0	5
Stage 3	2032-2057	46.5	7

a. First production of the Razorback Iron Ore Project is currently targeted for the start of 2025. The Expansion Study assumes a three-year interval between each production stage.
b. Concentrate production capacities represent maximum throughput the plant is designed to achieve, but output will depend on the ore body characteristics in any given year.

Single-Step Expansion

Stages	Approximate time period (years)[a]	Nameplate feed processing capacity (Mtpa)	Concentrate production capacity (Mtpa)[b]
Stage 1	2025-2027	15.5	3
Stage 3	2028-2056	46.5	7

a. First production of the Razorback Iron Ore Project is currently targeted for the start of 2025. The Expansion Study assumes a three-year interval between each production stage.
b. Concentrate production capacities represent maximum throughput the plant is designed to achieve, but output will depend on the ore body characteristics in any given year.

The Razorback Iron Ore Project, which comprises the Razorback Ridge, Iron Peak and Ironback Hill deposits, includes 4.2 billion tonnes of Indicated and Inferred Resources (JORC 2012). The expansion scenarios are generated from run-of-mine (ROM) ore of some 1.4 billion tonnes covering approximately 30 years of operation, of which 83% is in the Indicated Resource category and 17% is Inferred[3,4,5]. For the first ten years of production, 87% of the contributing ROM material is currently categorised at Probable Ore Reserves, based on the outcomes of the 2021 PFS[7]. For the Expansion Study, ROM ore represents just 32% of the JORC Indicated and Inferred Mineral Resources attributed to the Razorback tenements and 24% of company-wide resources across the Braemar Iron Province[3,4,5].

All financial analysis in the Expansion Study was predicated on verifiable, data-driven assumptions. Capital and operating costs were based on standard estimation techniques and included contingencies where appropriate. Over 90% of the capital estimates were derived from work completed by Hatch and GHD during the PFS, with the balance assessed by the Magnetite Mines technical team using PFS data[7]. All capital estimates met the requirements of AACE Class 5[7].

The financial returns of the two expansion cases were attractive across a range of macroeconomic assumptions. At the Expansion Study's base assumptions of a $110/t 62% Fe iron ore reference price, (the long term average price of iron ore over 20 years in real terms is $116[8]), a US$25/t quality-adjustment premium, and 0.71 AUD:USD exchange rate (the average for the three months to the end of February 2022 is 0.7165), the Staged Expansion case generated a post-tax IRR of 25% and NPV-8 of A$2,239 million. In the Single-Step Expansion case, these metrics were 27% and A$2,455 million.

Stage 1 in each expansion scenario was derived from the first three years of the PFS's Plant Optimised Case[7]. Subsequent expansion stages developed from this base, with the Project's configuration remaining relatively unchanged at higher production levels. This was possible given the Project's access to established, high-quality infrastructure, such as the National Electricity Market and Whyalla Port, which are expected to be capable of supporting higher throughput levels. The key change to the Project's configuration was the construction of a railway loop from the Crystal Brook-Broken Hill railway to a Train Load Out (TLO) facility at site, enabling direct mine-to-port delivery. The business case for a railway loop becomes stronger once concentrate production reaches 4Mtpa – the capital costs of the rail loop and TLO are recouped within an estimated five years from savings in logistics operating cost.

The Expansion Study cases significantly outperformed the PFS Stage 1 cases[7]. The main drivers of this performance were the substitution of combined road and rail haulage with rail-only haulage at larger scales, economies of scale in processing and other operating costs, and savings in the capital cost of constructing additional processing capacity.

Since inception, the Razorback Iron Ore Project has been designed as a sustainable mining operation producing high-grade iron ore concentrates targeting the lowest net-embodied carbon levels globally. The Expansion Study was undertaken on the same basis and in line with the Company's evolving ESG framework. The additional electricity required for expansion is expected to be sourced via the South Australian grid from Belalie or Robertstown. In FY2021, 62% of power generation in South Australia was from renewable sources, which is forecast to reach 97% by 2025[6] when the Project is due to commence production. Water supply is expected to be sourced from a combination of local ground aquifers and saline wastewater offtake options within the South Australian Murray Basin.

Project Configuration

Component	Stage 1	Stage 2	Stage 3
Concentrate production	3Mtpa	5Mtpa	7Mtpa
Mining	Truck/shovel	Truck/shovel	Truck/shovel
Processing	15.5Mtpa feed processing module	2 x 15.5Mtpa feed processing modules (31.0Mtpa capacity)	3 x 15.5Mtpa feed processing modules (46.5Mtpa capacity)
Logistics	1. Road haulage to rail siding 2. Rail freight to Whyalla Port 3. Transhipping to Capesize vessels 4. Shipping on Capesize vessels to customers	1. Rail freight to Whyalla Port (direct from mine) 2. Transhipping to Capesize vessels 3. Shipping on Capesize vessels to customers	1. Rail freight to Whyalla Port (direct from mine) 2. Transhipping to Capesize vessels 3. Shipping on Capesize vessels to customers
Power	132kv transmission line	132kv transmission line plus additional power from new line	132kv transmission line plus additional power from Stage 2 line
Water	Regional borefield	Regional bore field plus Murray Basin saline wastewater offtake	Regional bore field plus Murray Basin saline wastewater offtake

Geology

The mining and production scenarios for all Expansion Study cases are based the Company's current JORC resources and geological modelling[3,4,5]. For the first 10 years of production, 93% of production is derived from ore material that is classified as Probable Ore Reserves as per JORC 2012 guidelines[5]. The Probable Ore Reserves are in turn derived from a part of the Indicated classified Mineral Resources at the Razorback Iron Ore Project[5].

The Mineral Resource information as given in Table 1 and 2 was disclosed under the 2012 JORC code and guidelines on the 24 May 2021[5] and 30 June 2021[7] respectively. No changes to the historical Mineral Resource estimate have been made on the basis that Magnetite Mines is not aware of new information or data that materially affects the information included in the Resource announcement date 24 May 2021[5] and all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. No changes to the existing Probable Ore Reserve[5] are declared as part of this Expansion Study economic appraisal. No changes to the existing Probable Ore Reserve are declared as part of this Expansion Study economic appraisal.

The Razorback Project covers sedimentary lithologies of the Adelaide Geosyncline, a linear north-south to north-east trending tectonic rift basin comprising sediments deposited during the late Proterozoic and early Cambrian Eras. The host rock to the magnetite at the Razorback Project Neoproterozoic glaciogenic meta-sediment of the Braemar Iron Formation.

The mineralisation within the Braemar Iron Formation forms a simple dipping tabular body with only minor faulting, folding and intrusives. Grades, thickness, dip, and outcropping geometry remain very consistent over kilometres of strike. While the bedded magnetite has the highest in-situ iron content, typically 19-35% Fe, the tillitic unit, at typically 15-26% Fe is diluted by the inclusion of lithic fragments, such as granite and metasedimentary dropstones.

A Summary of the Company Ore Reserves and Mineral Resource Estimates is outlined below:

Table 1. Razorback Iron Ore Project May 2021 Mineral Resource Estimate at 11% eDTR cut-off grade, Widenbar and Associates[3]

Classification	Million Tonnes (Mt, dry)	Mass Rec (eDTR%)	Fe%	SiO_2%	Al_2O_3%	P%	LOI%	Magnetite %
INDICATED	1,500	15.6	18.5	47.9	8.0	0.18	5.4	15.0
INFERRED	1,500	16.0	18.0	48.3	8.2	0.18	5.5	15.9
TOTAL	**3,000**	**15.8**	**18.2**	**48.1**	**8.1**	**0.18**	**5.5**	**15.5**

All figures quoted at an 11% eDTR cut-off. Magnetite Mines Limited is not aware of any new information or data that materially affects the information included in the resource announcement dated 24 May 2021 and all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed.

Table 2. Razorback Iron Ore Project Ore Reserve estimate[5]

Reserve Classification	Tonnes (Million)	Mass Recovery (%)	Tonnes of Concentrate (Million)
Probable[a]	472.7	14.5	68.5

a. Ore Reserves are a subset of Mineral Resources

Mining

The mining strategy for the Razorback Iron Ore Project is consistent with the overall approach of a low capital expenditure and low risk operation to maximise returns. This is achieved through a simple, small scale mining operation, using mining contractors at start-up to simplify development and leverage the inherent advantage of an outcropping resource that provides a low strip ratio and short, flat hauls. Expansion Study mining analysis included the optimisation of:

1. Pit Shells
2. Mining Rates
3. Plant Cut-off Grades

The mining pit shell was based on WHITTLE optimisations using estimated costs and realised pricing to target a 30 year mine-life for the increased tonnages of the expansion stages. The optimisation generated three distinct pits within the Razorback deposit: Razorback West, Razorback Central and Razorback East, in a similar fashion to previous PFS studies (see Figure 1).

The Iron Peak deposit represents potential future upside. It is located close to the Razorback pits and has recently been the subject of a drilling campaign, for which the results are presently being assessed. Iron Peak features higher grades and mass recoveries but was not included in the Expansion Study (or the PFS) as it was not fully defined to JORC measured or indicated classification. The Company expects that the Iron Peak deposit will feature in future mining studies and has the potential to significantly enhance grades, mass recoveries and financial outcomes in the early years of operation.

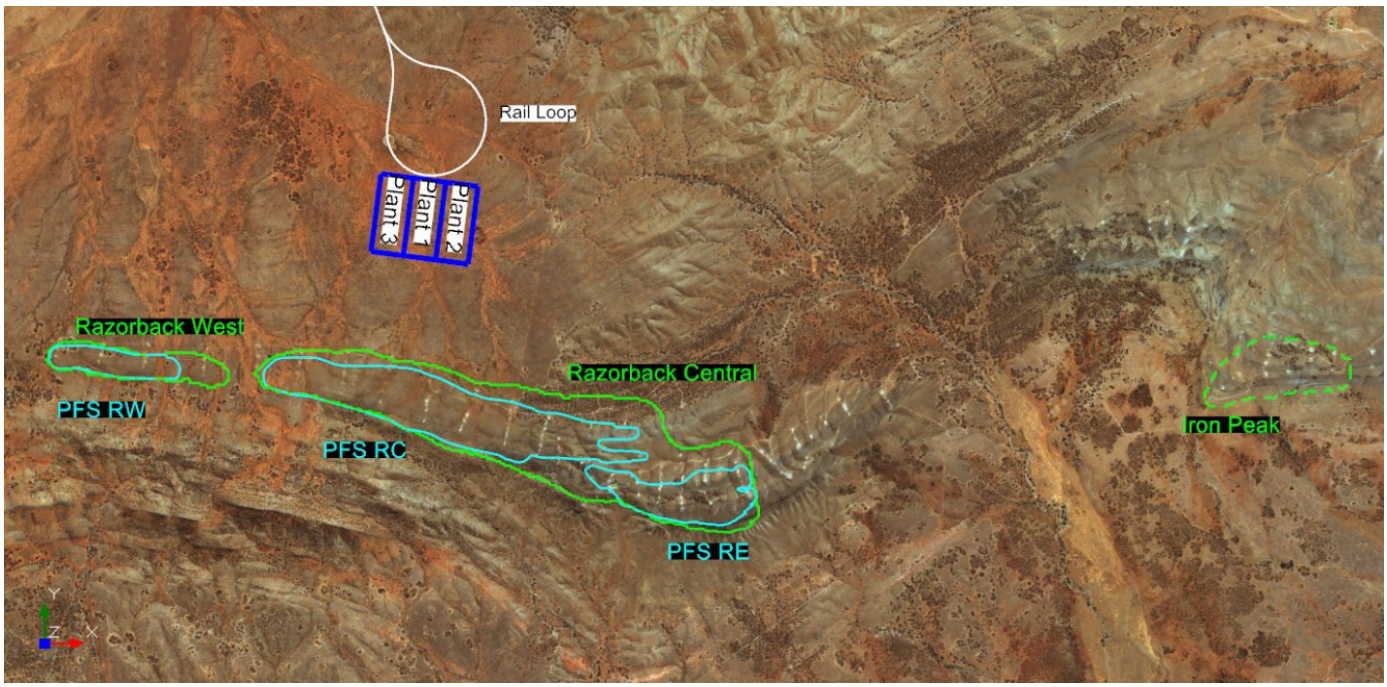

Figure 1: Increased mining targets joins Razorback East and Central pits and extends Razorback West pit

All the Expansion Study mining schedules used Indicated and Inferred Ore in the optimisation process with no unclassified material or mineralised inventory. The final schedule used 83% Indicated Ore and

17% Inferred Ore for the 31-year life of mine. This included 93% of the material mined during the first 10 years classified as Probable Ore Reserves, as defined in previous PFS mining studies[3,5,7].

The mine schedule has a low life of mine strip ratio of 0.16. Mining costs for the Expansion Study were the same as the PFS Plant Optimised and Headgrade Improved cases. Thus, a mining cost (including drill and blast) of A$3.0/t and an ore rehandle cost of A$2.0/t was used (rehandle is low priority ore that is fed to the plant from low grade stockpiles by truck and shovel). These mining costs were based on mining contractor quotes for the optimised mining schedules and haul modelling. During the PFS, these costs were verified by mine operating models developed internally and by consultants that used third party quotes for input costs such as labour and machinery maintenance.

The life of mine mass recovery used for the Expansion Study was 14.4% on fresh ore based on a low cut-off grade of 9%. This is similar to the 14.7% used in the Plant Optimised PFS case and compares to a resource average of 15.6% at a higher cut-off grade of 11%. The scheduled mass recovery is a result of trade-offs between pit shells (with the potential inclusion in future of Iron Peak), mining rate, cut-off grade, selective mining approach and plant configuration. The Company expects that the DFS mining schedules will reflect significantly higher mass recoveries for the initial years of operation, as suggested by the inclusion of the Headgrade Improved cases in the July 2021 PFS.

Processing

The Expansion Study incorporated the results of detailed geometallurgical and textural studies conducted by Hatch during the PFS[7]. All capital and operating estimates for the expansion scenarios used the AACE class 5 estimates developed by Hatch for the PFS Plant Optimised Case.

The selected processing flow sheet for each of the processing plant staged modules was unchanged following PFS studies[7] and includes:

- Crushing Circuit: Consisting of primary gyratory and secondary cone crushers
- Grinding and air separation through the use of High Pressure Grinding Rolls (HPGRs) with ore reporting to static/dynamic air classification.
- Primary (rougher) and secondary magnetic separation
- Rougher flotation and LFCU: To facilitate the rejection of non-Fe minerals
- Fine grinding for silica rich flotation concentrate
- Cleaner Magnetic separation

A final product of P80 40 microns is estimated and is unchanged from the PFS with confirmation of particle size distribution pending current DFS metallurgical and processing testwork[7].

Table 3. Razorback Iron Ore Project indicative product specifications

	Recovery	Fe%	SiO_2%	Al_2O_3%	P%	S%
Magnetite product	16%	67.5-68.5%	3.9-4.6%	0.4-0.5%	0.02%	0.003%

Indicative concentrate specifications are based on prior metallurgical testwork and Davis Tube Recovery testwork[7]. Metallurgical and process design studies as completed by Hatch have assumed a 67.5% Fe concentrate product for the AACE Class 4 and 5 process designs[7]. A 68.5% Fe product has been demonstrated in previous bulk metallurgical testwork and may be achievable at processing plant scales pending further testwork.

Optimisations to support the staged increases in production included:

1. Plant location update to optimise haulage and logistics assumptions
2. Assessment of plant location for all three stages
3. Operating costs for Stage 2 and Stage 3 and the effect of plant location on these costs
4. Capital costs for Stage 2 and Stage 3 and the effect of plant location and a modular design philosophy on these costs

Plant operating costs used the estimates from the PFS as the basis for all calculations. These calculations included water and processing energy consumption costs as well. These estimates were based on Hatch estimates that were refined by with input from Dr. Richard Peck.

Tailings

The TSF strategy was designed and costed during the PFS to an AACE Class 4 estimate and designed to meet 2019 ANCOLD standards[7]. The storage of tailings will utilise both mining waste rock and coarse tailings to construct the embankment. Given the increase in ROM produced in the staged expansion, tailings produced by the mine plan of the Expansion Study is roughly three times that which was produced by the PFS mine plan requiring an increase in the footprint for the tailings storage facility (TSF) that was costed for the Expansion Study. The initial capital expenditure and schedule was derived from the PFS[7] covering the starter embankment and otherwise remaining TSF construction costs were included in operating expenditure.

Site Infrastructure

Capital and operating cost estimates for site infrastructure were based on updates of the PFS template provided by GHD[7]. This template was a ground up estimate that used per person factors and square metre factors for electricity, water and maintenance costs. The template was adjusted for the increase in site personnel required for Stage 2 and Stage 3. The adjustment in personnel was by process of ground up estimates.

For camp capital costs, a process similar to that for operating costs was followed. That is, ground up estimates were used for accommodation and administration buildings, including the camp catering facility.

Power

The peak power usage for each module of the Razorback Iron Ore Project is approximately 34MW with a total site demand of 40MVA[7]. Total site demand for Stage 2 and Stage 3 has been factored to 80MVA and 120MVA, respectively. The effect of the load on the substation has been considered at each stage of the expansion.

GHD conducted an options assessment to an AACE Class 5 estimate standard for the Stage 2 and Stage 3 transmission line configurations. The options assessment was followed by a financial analysis of the line configurations that accounted for capital costs, operating costs and line losses. Line losses were modelled at the same cost as those used in the PFS[7].

The chosen solution was to build a new 275kV power line for the Stage 2 expansion from a substation separate to the Robertstown substation (there is not enough capacity to support an expansion at Robertstown without significant investment and the higher voltage allows for significant reduction in line losses). This new line provided enough capacity for Stage 3 at a fraction of the line losses that the capital efficient Stage 1 line from Robertstown incurs.

Water

Water is required for processing and mining activities at the Razorback Iron Ore Project. Studies assessing the availability of water near or adjacent to proposed mining activities at the Project have been previously undertaken by Eco Logical Australia and Water Technology during the PFS[7].

Water requirements for the Stage 1 production scenario is estimated at 5.5GL/year. To support the Expansion Stages 2 and 3 additional water sources were identified from the aforementioned studies.

Three key options were identified for the Expansion Study to support Stages 2 and 3.

1. Eastern bore field – inferred supply 4GL/yr
2. Murray Basin saline wastewater offtake – inferred supply 5 to 15GL/yr
3. Murray Basin groundwater – inferred supply 5GL/yr

Based on initial technical feasibility investigations, the Murray Basin saline wastewater offtake option has demonstrated consistent, long-term productivity with a reliable supply profile. This option provides sufficient water to supply Stages 2 and 3 with a single investment and may leverage latent in-situ capacity/storage to further de-risk or enhance water supply. Therefore, the Murray Basin saline wastewater offtake provides optimal volume and reliability factors for the provision of process water for expansion stages.

Logistics

A key focus of the Expansion Study was understanding the viability of building a rail loop to the mine site to replace road haulage, which is expected to occur at Stage 2 in the Staged Expansion case and

Stage 3 in the Single-Step Expansion case. In all other respects, outbound logistics remained unchanged from the assumptions detailed in the July 2021 PFS. Accordingly, the transport and delivery of magnetite concentrate from the mine gate to customers under the expansion cases was as follows:

	Stage 1	Stage 2	Stage 3
Road	Road haulage to rail a siding connecting to the Crystal Brook-Broken Hill railway	*Haul road used as access road only*	
Rail	Rail haulage from rail siding to Whyalla Port	Rail freight directly from site to the Whyalla Port via a newly-constructed balloon loop linking into the Crystal Brook-Broken Hill railway	
Port	Transhipment to Capesize vessels		
Shipping	Shipment on Capesize vessels to customer-designated ports		

The above logistics strategy consists of tried-and-tested methods of haulage, transhipment and shipment, and makes use of existing infrastructure that is likely to have spare capacity to support the proposed expansions. Internal analysis utilising consultant data supplied during the PFS was used to estimate the operating costs of increased rail, port and shipping throughput. The cost of building a rail loop to site from a connection point along the Crystal Brook-Broken Hill railway is discussed below. The haul road constructed at Stage 1 is intended to serve as the primary mine access road and therefore would not become redundant infrastructure in later stages.

Construction of rail loop

The investment case for replacing road and rail haulage with rail haulage only, by building a rail connection directly to the mine site, becomes attractive at higher production rates. The capital expenditure of constructing a rail or balloon loop to site from the Crystal Brook-Broken Hill railway as well as a Train Load Out facility adjacent to the processing complex is significant at over $100 million. However, the investment is readily justifiable at production levels of 4Mpta or more as the initial outlay is estimated to have less than a five-year payback due to lower operating costs, exemplifying potential scale economies.

Following the PFS, GHD prepared a report on the feasibility of a rail spur line to the mine plant. The Expansion Study capex estimates were based on the estimates in this report. Compared to the report, the location of the rail loop was optimised by the Company to reduce earthworks and track length. The effect of the reduced earthworks and track length was calculated and then deducted from the GHD estimates at the original report rates.

Environment, Social and Governance (ESG)

The Expansion Study upholds the Company's corporate sustainability agenda to deliver projects that are sustainable, inclusive and valued by our stakeholders. Our objective is to develop a sustainable magnetite sector and improve the sustainability of the global steelmaking sector, with the Expansion Study delivering material outcomes in this regard.

- Scope 1 emissions associated with the expansion project are likely to be lower per unit of production compared to the Stage 1 emissions profile; productivity enhancements, such substituting road haulage with direct rail freight and lower rates of removal of naturally sequestered carbon, provide potential material benefits.
- Power required for the expansion project is anticipated to be sourced from the South Australian grid, which is forecast to be 97% renewables-powered by 2025[6], delivering an expected low Scope 2 emissions profile.
- The high-grade product (estimated to be 68% Fe grade) will be at the highest end of products available from Australia and is expected to support the steelmaking subsector targeting low Scope 3 emissions profiles.
- The preferred water supply for the expansion project is a wastewater source with no current productive use; this approach maximises the value of a waste stream and reduces any risks associated with competitive use of other water sources.
- Increased opportunities for greater local participation within the project (including procurement and workforce development) by leveraging capability and capacity improvements generated through Stage 1 construction and operational phases.
- Maximising value to First Nations stakeholders under relevant Native Title agreement terms.

Financial Returns

A comprehensive financial analysis was undertaken using a discounted cash flow model and other analytical tools. The capital and operating cost estimates used to model the expansion cases were based on data and analysis undertaken by Hatch and GHD during the PFS, with appropriate adjustments for the larger scale and the scope differences set out above. Contingencies of 20% were applied to the capital costs of the additional power and rail infrastructure built to support the first capacity expansion. 25% contingencies were applied to the cost of each processing module, the tailings storage facility, and water-supply infrastructure, and a 20% contingency was applied to site infrastructure costs.

Table 4. Estimate of development capital – all A$M

	Plant Optimised Case (PFS)	Headgrade Improvement Case (PFS)	Staged Expansion Stages 1,2 & 3	Single-Step Expansion Stages 1 & 3
Direct costs				
Contractor mobilisation	9	9	9	9
Mining fleet	5	5	5 (Stage 1)	5 (Stage 1)
Plant	327	327	982	982
Ore sorter	N.a.	5	N.a.	N.a.
Tailings Storage Facility	38	38	38	38
Non-Process Infrastructure	13	16	23	23
Power	-	-	115	115
Water borefield	30	30	115	115
Haul road	18	18	18	18
Rail and port	6	6	131	131
Land acquisition & environmental offsets	7	7	7	7
Sub-Total	**453**	**461**	**1,443**	**1,443**
Indirect costs				
EPCM & other indirect costs	89	89	167	167
Contingency	123	125	375	375
Contingency as % of direct costs	27%	27%	26%	26%
Total	**665**	**675**	**1,985**	**1,985**

The Staged Expansion and Single-Step Expansion cases both demonstrated strong financial returns across a range of assumptions including the 62% Fe iron ore reference price and the AUD:USD exchange rate. Furthermore, they outperformed the single-module PFS cases.

Operating and financial life-of-mine metrics are shown in Table 5 for the PFS Plant Optimised case and the Single-Step Expansion case and are based on an AUD:USD exchange rate of 0.71 (the average for the three months to the end of February 2022 is 0.7165). An expanded version of the table is provided in the Appendix for comparison, with cases at both 0.71 and 0.75 AUD:USD exchange rates, and with the PFS Headgrade Improvement case. The Plant Optimised case provided the basis of design for Stage 1 of the Expansion Study cases; therefore, it is the most logical reference case for the Expansion Study. The results highlight the improved returns from increasing Razorback's scale, resulting from capital scale economies, operating productivity and logistics.

The iron ore reference price used in calculating the financial metrics represents the price received for the delivery of 62% Fe iron ore on a cost and freight (CFR) basis into China, the assumed market for the company's product. A quality adjustment premium of US$25/t was added to reflect the Razorback Project's higher-grade product (as for the July 2021 PFS study).

Table 5. Key Life-of-Mine Metrics – 2021 PFS Plant Optimised case and the Single-Step Expansion case at an AUD:USD exchange rate of 0.71, and 62% Fe iron ore reference prices of $110/t and $150/t

Key Financial and Production Metrics	Unit	PFS Plant Optimised	Single-Step Expansion	PFS Plant Optimised	Single-Step Expansion
Reference iron ore price (62% Fe)	US$/t	110	110	150	150
LOM Ore mined	Mt	461	1,365	461	1,365
LOM Concentrate produced	Mt	67.6	193.3	67.6	193.3
LOM Strip ratio	t:t	0.10	0.13	0.10	0.13
Mining rate at scale	Mtpa	18	51	18	51
Model duration	Years	30	32	30	32
Nominal plant feed at scale	Mtpa	15.5	46.5	15.5	46.5
LOM yield	%	14.7%	14.4%	14.7%	14.4%
Average product at scale[a]	Mtpa	2.2	6.8	2.2	6.8
Development capital	A$M	665	1,985 (all Stages)	665	1,985 (all Stages)
Post-tax NPV-8[b]	A$M	660	2,455 (all Stages)	1,510	4,598 (all Stages)
Post-tax IRR	%	19%	27% (all Stages)	31%	42% (all Stages)
Average net cash flow (post-tax)[c]	A$M p.a.	117	491	198	749
All-in breakeven price (62%)[d]	U$/t	53	40	53	40

a. Calculated as average production of concentrate in the first ten years following Stage 3 expansion
b. NPVs in real terms as at 30 June 2022 using 8% post-tax real discount rate, ungeared basis
c. Calculated as average annual post-tax net cash flow in the first ten years following Stage 3 expansion
d. The 62% Fe iron ore price at which the NPV-8 of post-construction net cash flows equals zero, calculated at the commencement of Stage 3 production

Stage results

In the Single-Step Expansion Case, the Project is progressed from Stage 1 to Stage 3, or from 3Mtpa of production capacity to 7Mtpa, three years after production commences. The capital expenditure required to achieve this capacity uplift is estimated at A$1,315 million, equivalent to the combined expenditure of Stages 2 and 3 in the Staged Expansion case. The payback on the incremental capital required for Stage 3 from the incremental cash flows it produces is approximately 2 years.

In the Staged Expansion case, plant capacity upgrades are commissioned three and six years after the start of production, enabling production rates of 5Mtpa and 7Mtpa. Stage 2 capital expenditure of A$850 million includes the construction of the rail loop, a 275kV transmission line, additional water sourcing infrastructure and a second processing module. Stage 3 capital expenditure of $465m is primarily for a third processing module.

The Key Metrics in Table 6 show key financial and operational metrics for the two cases both on a life-of-mine basis and for individual stages.

Table 6. Key Metrics – Single-Step Expansion and Staged Expansion

		Single-Step Expansion		Staged Expansion		
Iron ore reference price	US$/t	110		110		
AUD:USD exchange rate	:	0.71		0.71		
Average product at scale[a]	Mtpa	6.8		6.7		
Construction capital	A$M	1,985		1,985		
All-in breakeven iron ore price[b]	US$/t	40		41		
Post-tax NPV-8[c] **– all stages**	**A$M**	**2,455**		**2,239**		
Post-tax IRR – all stages	**%**	**27%**		**25%**		
		Stage 1	Stage 3	Stage 1	Stage 2	Stage 3
Nominal plant feed	Mtpa	15.5	46.5	15.5	31.0	46.5
Average product in 3 years after construction	Mtpa	2.7	7.1	2.7	4.8	6.8
Development capital	A$M	671	1,315	671	850	465
Incremental post-tax NPV-8[d]**, each stage**	**A$M**	**660**	**1,794**	**660**	**894**	**685**
Incremental post-tax IRR[d]**, each stage**	**%**	**19%**	**33%**	**19%**	**28%**	**38%**

a. Calculated as average annual production of concentrate in the first ten years following Stage 3 expansion
b. The 62% Fe iron ore price at which the NPV-8 of post-construction net cash flows equals zero, calculated at the commencement of Stage 3 production
c. NPVs in real terms as at 30 June 2022 using 8% post-tax real discount rate, ungeared basis
d. IRR of the expansion capital and marginal net cash flows reasonably attributable to each stage. Stage 1 net cash flows were taken to equal those of the PFS's Plant Optimised case – therefore, the Stage 1 incremental IRR of 19% represents the IRR of the Plant Optimised case at an AUD:USD exchange rate of 0.71.

Key Risks and Opportunities

Processing

The design of the processing plant is currently being optimised and metallurgical testing is underway as part of the Razorback Iron Ore Project DFS. Increasing the scale of the Project may present opportunities to improve plant efficiency and expand the plant's scope to include haematite recovery. However, all metallurgical parameters are subject to change as a result of the DFS work

Tailings

Tailings at Razorback present a relatively low technical risk due to the geography and benign nature of the tailings. The Project TFS as outlined in this Expansion Study have been designed to ANCOLD (2019) standards and to AACE Class 4 capital estimates. Work is underway to optimise storage locations around embankment construction and pumping costs. Stakeholder consultation and environmental impact studies continue in-line with current DFS objectives.

Power

Expanding the project will require greater power supply to the site, especially the process plant. Various power supply options will be considered in further studies including those that may become technically feasible between now and Project close. There are several renewable energy generation projects currently planned in South Australia that the Company is closely tracking.

Water

Each 15.5Mtpa processing module will require approximately 5GL of water per year to operate. Although no technical constraints were identified during the Expansion Study, further work would be required to assess and ensure security of supply and establish engineering requirements for necessary infrastructure. Past/historical flows may not necessarily represent future flow volumes from schemes and additionally flow rates and volumes may be impacted by operational decisions, planned maintenance activities, among other things. Future studies are expected to prioritise sustainable sources.

Logistics

Replacing combined road and rail haulage with rail haulage is a key driver of the improved returns in the Expansion Study cases relative to the PFS cases. While capital estimates for a rail spur to site have been included, detailed rail modelling would be required to confirm arrangements for shipping the higher concentrate throughput contemplated in this Expansion Study on the Crystal Brook-Broken Hill Railway.

Environmental, Social and Governance (ESG)

Through the company's ESG initiatives, the environmental and social impacts of its operations will be baselined against global best practice, with a drive to outperform peer iron ore suppliers on Scope 1, 2 and 3 emissions profiles. This will be a key area of focus in future studies.

Approvals

It is anticipated that the mine and processing expansion elements will be contained within the Mining Lease area granted for Stage 1, thus only requiring amendments to the operating permits under the SA Mining Act 1971 and other secondary statutes. Additional developments, such as new electrical transmission, water supply and rail infrastructure, will require new consents, licensing and operating approvals. These new consents and licences will likely be secured pursuant to the SA Mining Act 1971 as ancillary development to the existing Mining Lease, while other regulatory approvals and consents (State and/or Commonwealth) may also be required.

Next Steps

The Expansion Study demonstrated the technical viability of increased production at Razorback and the potential to deliver attractive economies of scale, additional cash flow and enhanced shareholder value.

While the Company is encouraged by the positive outcomes of the Expansion Study, highlighting the inherent optionality of the large Razorback resource, it remains committed to its strategy of a low-capital, carefully-managed, staged development of its resources without expansion pre-investment. Further study work on the expansions will only occur after the Stage 1 DFS and construction is funded. The DFS will continue to be developed based on 3Mtpa of production capacity with the focus on minimum upfront capital, however the significant potential of the Project to support higher production rates will be factored into Project design to ensure compatibility with future expansion.

References

1. Based on the PFS Headgrade Improvement Case as described in the July 2021 PFS ASX Announcement
2. The 62% Fe iron ore price at which the NPV-8 of post-construction net cash flows equals zero, calculated at the commencement of Stage 3 production
3. 24/05/2021 – ASX Announcement – Razorback High Grade Iron Ore Concentrate Project Mineral Resource Upgrade
4. 20/11/2018 – ASX Announcement - Ironback Hill Deposit - JORC 2012 Resource Update
5. 30/06/2021 – ASX Announcement – Maiden Ore Reserve for the Razorback Iron Project
6. Australia's emissions projections 2021, Australian Government Department of Industry, Science, Energy and Resources, October 2021
7. 05/07/2021 – ASX Announcement – Positive PFS Results for Razorback Iron Ore Project
8. Based on data from Federal Reserve Bank of St Louis and the World Bank

This report has been authorised for release to the market by the Board.

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Appendix

Table 7. Key Metrics – Plant Optimised (PFS), Headgrade Improvement (PFS), Single-Step Expansion and Staged Expansion cases at AUD:USD exchange rates of 0.75 and 0.71, and a 62% Fe iron ore reference prices of $110/t

Key Financial and Production Metrics	Unit	Plant Optimised	Headgrade Improvement	Single-Step Expansion	Staged Expansion
Iron ore price (62% Fe)	US$/t	110	110	110	110
LOM Ore mined	Mt	461	473	1,365	1,365
LOM Concentrate produced	Mt	67.6	63.2	193.3	193.3
LOM Strip ratio	t:t	0.10	0.16	0.13	0.13
Mining rate at scale	Mtpa	18	25	51	49
Model duration	Years	30	23	32	33
Nominal plant feed at scale	Mtpa	15.5	15.5	46.5	46.5
LOM yield	%	14.7%	18.2%	14.4%	14.4%
Average product at scale[a]	Mtpa	2.2	2.7	6.8	6.7
Development capital	A$M	665	675	1,985 (all Stages)	1,985 (all Stages)
Post-tax NPV[b] **@ AUD:USD rate of 0.75**	A$M	520	669	2,069	1,876
@ AUD:USD rate of 0.71		660	822	2,455	2,239
Post-tax IRR @ AUD:USD rate of 0.75	%	17%	20%	24%	22%
@AUD:USD rate of 0.71		19%	22%	27%	25%
Avg. net CF[c] **@ AUD:USD rate of 0.75**	A$M	105	141	444	414
@AUD:USD rate of 0.71		127	168	491	459

a. Calculated as average annual production of concentrate in the first ten years following Stage 3 expansion
b. NPVs in real terms as at 30 June 2022 using 8% post-tax real discount rate, ungeared basis
c. Calculated as average annual post-tax net cash flow in the first ten years following Stage 3 expansion

Table 8. Key Metrics – Plant Optimised (PFS), Headgrade Improvement (PFS), Single-Step Expansion and Staged Expansion cases at AUD:USD exchange rates of 0.75 and 0.71, and a 62% Fe iron ore reference prices of $150/t

Key Financial and Production Metrics	Unit	Plant Optimised	Headgrade Improvement	Single-Step Expansion	Staged Expansion
Iron ore price (62% Fe)	US$/t	150	150	150	150
LOM Ore mined	Mt	461	473	1,365	1,365
LOM Concentrate produced	Mt	67.6	63.2	193.3	193.3
LOM Strip ratio	t:t	0.10	0.16	0.13	0.13
Mining rate at scale	Mtpa	18	25	51	49
Model duration	Years	30	23	32	33
Nominal plant feed at scale	Mtpa	15.5	15.5	46.5	46.5
LOM yield	%	14.7%	18.2%	14.4%	14.4%
Average product at scale[a]	Mtpa	2.2	2.7	6.8	6.7
Development capital	A$M	665	675	1,985 (all Stages)	1,985 (all Stages)
Post-tax NPV[b] @ AUD:USD rate of 0.75	A$M	1,233	1,544	4,098	3,786
@ AUD:USD rate of 0.71		1,510	1,747	4,598	4,256
Post-tax IRR @ AUD:USD rate of 0.75	%	27%	33%	39%	37%
@AUD:USD rate of 0.71		31%	36%	42%	40%
Avg. net CF[c] @ AUD:USD rate of 0.75	A$M	184	237	689	651
@AUD:USD rate of 0.71		211	274	749	710

a. Calculated as average annual production of concentrate in the first ten years following Stage 3 expansion
b. NPVs in real terms as at 30 June 2022 using 8% post tax real discount rate, ungeared basis
c. Calculated as average annual post-tax net cash flow in the first ten years following Stage 3 expansion

Table 9. NPV Sensitivity Analysis – Single-Step Expansion case

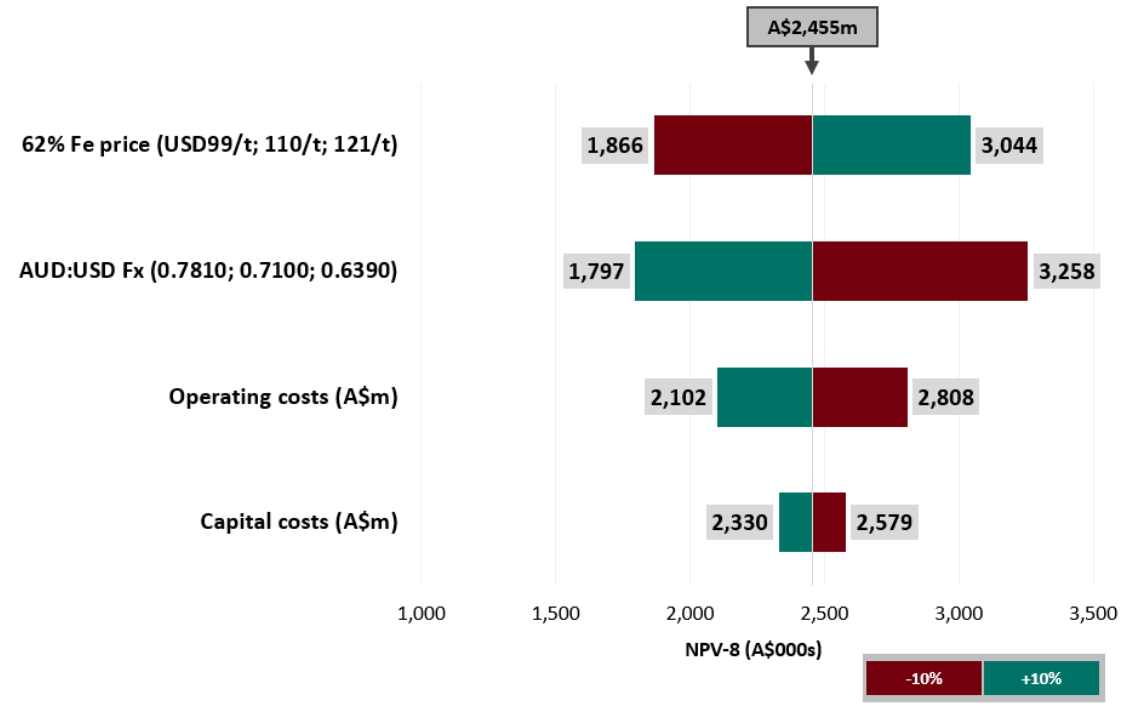

Table 10. NPV Sensitivity Analysis – Staged Expansion case