AUSTRALIAN MINES LIMITED

15 March 2017

Flemington Scoping Study advances project to Pre-Feasibility Study phase

- **Generates after-tax cash flow to Australian Mines of A$677 million over the first 18 years of the project's life**
- **Long operating life estimated at up to 45 years of production**
- **Requires modest capital cost of A$74 million to build processing plant**
- **Demonstrated NPV of up to A$255 million (8% discount rate) and IRR of 37.3%, classifying Flemington as a 'world class' asset**
- **Confirms project capable of producing cobalt sulphate and nickel sulphate in addition to high quality scandium oxide**
- **Benefits from conventional processing flowsheet using proven technology; no novel or proprietary systems required**
- **Provides full-time employment for 66 people, to be sourced primarily from the local community**
- **Review finds no environmental or social considerations likely to significantly compromise permitting and implementation**

In addition, Australian Mines is;

- **Finalising its Mining Lease application over the Flemington ore body submission this month**
- **Securing a water licence from appropriate authority**
- **Finalising the planning of a resource extension drill program targeting the expected continuation of the high grade cobalt and scandium ore body**

Managing Director, Benjamin Bell commented, *"The results of scoping study represent another step forward in our strategy to establish a dominant position in the global supply of scandium and in doing so meet growing demand, particularly the expected surge in demand from the electric vehicle market."*

"This scoping study also highlighted that there is enormous potential for the Company to increase both the overall tonnage as well as the head grade of its cobalt mineralisation at Flemington. This can only further cement Australian Mines' status as a superior cobalt company – our Sconi deposit has already been ranked second only to Clean TeQ's Syerston deposit according to Macquarie Bank[1]".

"Modelling of the scandium and cobalt resource clearly showed that the Flemington ore body is the continuation of the neighboring Syerston mineralisation, with SRK's pit shell being cut abruptly by Australian Mines' and Clean TeQ's common tenement boundary. It's not surprising therefore that the mining and processing costs determined by SRK for the Flemington scandium – cobalt deposit is almost identical to that at Syerston[2]".

"Our next priority is to proceed with a pre-feasibility study and completion of a significant drill program at Flemington to better define the cobalt resource and upgrade and extend the existing scandium resource, as well as begin working through the follow-up recommendations made in the Scoping Study.

"Australian Mines is currently on a three-week road show in Europe, where it will advance its promising initial discussions with off-take partners for its scandium and cobalt products, to provide greater certainty in regard to end-customer demand."

"The company has also opened dialogue with potential project financiers on the back of the strength of both the Flemington Scoping Study and Sconi Pre-Feasibility Study".

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[1] In March 2017, Macquarie Research, the equity arm of Macquarie Bank, initiated coverage on Clean TeQ Holdings with an Outperform rating (meaning they expect the share price to move 60 -100% over the coming 12 months). Key to their 'buy' recommendation was the low nickel to cobalt ratio of the Syerston deposit. In this same report, Macquarie Research ranked Australian Mines' Sconi cobalt project as the second most favourable nickel to cobalt ratio in Australia.
The Sconi project is a joint venture between Australian Mines and Metallica Minerals, with the terms of this joint venture announced by Australian Mines on 10 October 2016.

[2] Clean TeQ Holding, Completion of Syerston Scandium Project Feasibility Study, release 30 August 2016

Australian Mines Limited ("Australian Mines" or "the Company") is pleased to announce that the results of a scoping study completed for the Flemington scandium-cobalt project in New South Wales confirmed its status as a 'world class' deposit[3], which has the potential to generate an after-tax undiscounted cash flow to Australian Mines of A$677 million over the first 18 years of the project's mine life[4].

With an expected total mine life of up to 45 years based on the current Mineral Resource alone, the Flemington project therefore has the potential to deliver dividends to shareholders well into the middle part of this century should the demand for scandium and cobalt continue to grow in line with market analysist's projections.

This growth is anticipated to come primarily from the automotive and aerospace sectors where leading investment houses like Goldman Sachs[5] have noted that the push for increased fuel efficiency in conventional vehicles and greater range in electric vehicles is leading to a significant demand for aluminum alloys, including aluminum scandium alloy[6].

Underpinning the projected strong financial position of the Flemington project are SRK's calculations that the average cash operating cost of mining and producing a high-quality scandium oxide product for this project is only A$500 per kilogram (current spot contract price for scandium oxide is A$3,500 per kilogram[7]) and an estimated capital cost for the processing plant of A$74 million.

Anticipating these very favorable project economics, a range of international financiers have already opened dialogue with Australian Mines regarding potentially funding the Flemington project into production. Whilst the company emphasises that these discussions are at a very early stage and there is no guarantee that they will result in a funding agreement being finalized, it does serve to illustrate the growing global interest in high-quality scandium and cobalt assets located in safe, low-risk mining jurisdictions like Australia.

As noted by SRK throughout their scoping study report, the Flemington project is a lateritic scandium + cobalt + nickel deposit not dissimilar to Clean TeQ's adjoining Syerston project or Australian Mines' Sconi project in Queensland.

A future mining operation at Flemington may therefore produce a nickel sulphate and cobalt sulphate product in addition to the high-grade scandium oxide product complemented in SRK's study. The current weighting of the scoping study towards the scandium resources, and to a

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[3] BHP Billiton define a 'world-class' deposit as one which has an NPV of at least $250 million. (www.bhpbilliton.com/-/media/bhp/documents/investors/reports/2006/amecconference.pdf). The scoping study of Australian Mines' Flemington project indicates that this project satisfies this requirement and thus qualifies as a 'world class' asset.
[4] See Appendix 1
[5] http://www.goldmansachs.com/our-thinking/technology-driving-innovation/cars-2025/
[6] Clean TeQ Holding, Completion of Syerston Scandium Project Feasibility Study, release 30 August 2016
[7] Contract price offered by Chinese-based Prichem Technology Limited to Australian Mines on 15 December 2016 (US$2,650 at the exchange rate A$ / US$ 0.75)

lesser extent the cobalt ore body is purely an artifact of the incomplete nature of the project's database, which the company acquired at the time of the option and sales agreement in October 2016 and is not representative of the Flemington longer term potential.

Since October 2016, Australian Mines has sourced the validated cobalt assay database, which enabled SRK to develop a corresponding cobalt pit shell for Flemington (see Figure 3).

The company is presently bringing the nickel and platinum resources into JORC 2012 compliance to enable a complete multi-commodity resource to be considered in the project's subsequent Pre-Feasibility Study (PFS).

SRK's scoping study also revealed that the high-grade cobalt mineralisation continues further north beyond the current Mineral Resource.

Historic drilling intersection zones including 4 metres @ 0.56% cobalt from 5 metres below the surface (drill hole SY66)[8], which ended in a cobalt grade of 0.40% remaining open both at depth and along strike.

Australian Mines has therefore designed a resource extension drill program specifically targeting the high-grade cobalt zone to the north of the present resource (see Figure 3), following which the company will release an updated Mineral Resource for the Flemington project.

With SRK stating that it did not identify any environmental or social considerations likely to significantly compromise project permitting and implementation, nor any technical or processing issues that may adversely affect a mining and processing operation at Flemington, Australian Mines is proposing to commence the Pre-Feasibility Study of this multi-commodity ore body in the coming quarter.

Moreover, in light of the very strong business case to develop a mining operation at Flemington based on the preliminary results from SRK's scoping study, Australian Mines is presently preparing a Mining Lease over the Flemington ore body, which it intends to submit to the New South Wales Government in April 2017. As part of this process, the company is also presently securing a water allocation and associated water licences for the Flemington Project from the relevant New South Wales Government Authority.

The Flemington Scandium-Cobalt Project, like the company's complementary Sconi Scandium-Cobalt-Nickel Project, is expected to successfully position Australian Mines as a key future supplier of these technology metals to the bourgeoning electric vehicle and aerospace sectors.

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[8] Jerviois Mining Limited, EL7805 scandium project – May 2015 drill results, released 17 June 2015

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The company therefore reminds those shareholders who wish to increase their exposure to the emerging scandium and cobalt market that, to participate in the fully underwritten non-renounceable entitlement offer, completed applications need to be received by Advanced Share Registry by 5:00pm Melbourne Time on Friday 31 March 2017.

Australian Mines would also encourage shareholders to attend its General Meeting which is being held at 10.30am on Tuesday 11 April at the Royal South Yarra Lawn Tennis Club in Toorak, Victoria.

ENDS

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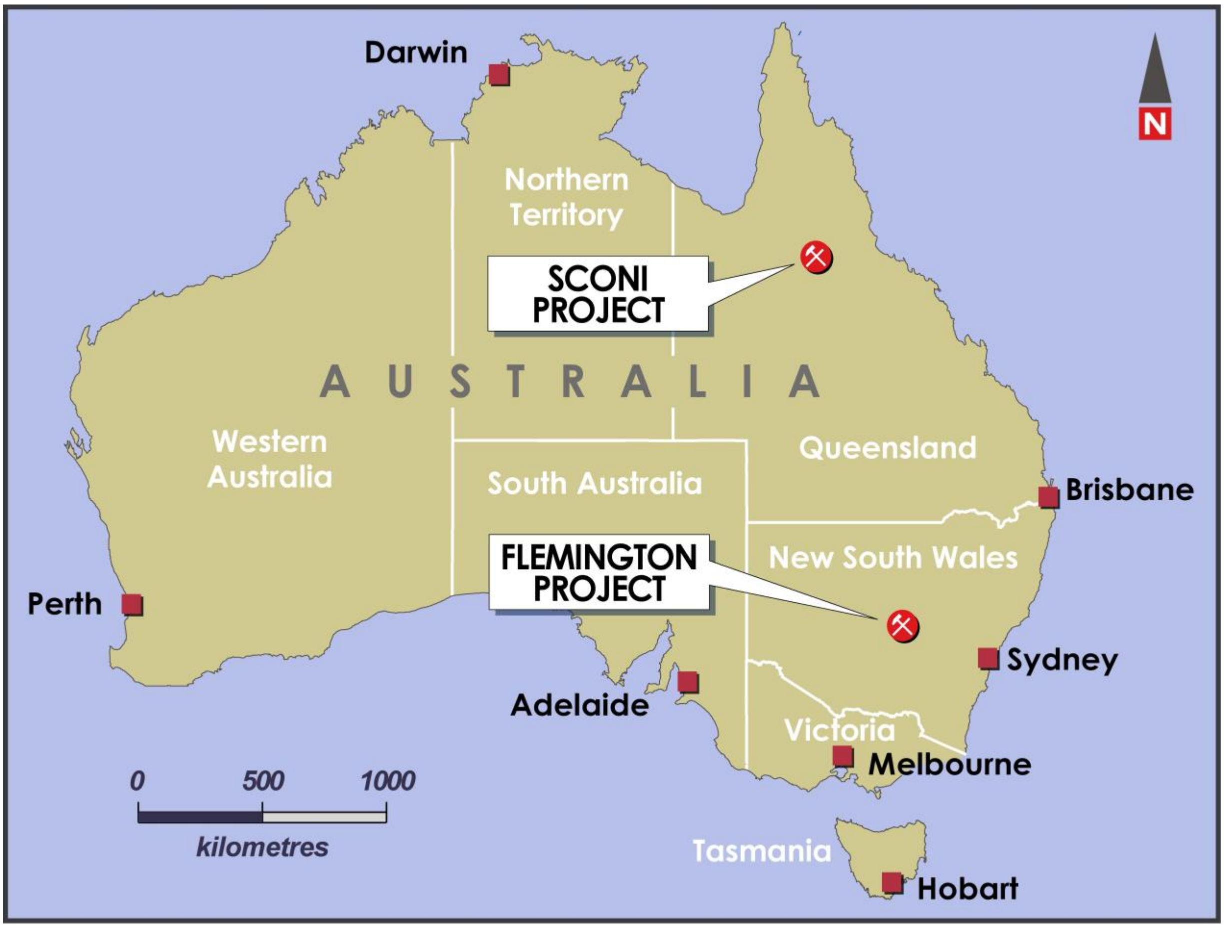

Location map of Australian Mines' Flemington Scandium - Cobalt Project in central New South Wales and the Sconi Scandium - Cobalt Project located in northern Queensland.

Figure 1: Proposed design of the open pit mine at Flemington. Indicative location of the processing plant shown to the west of the proposed mine. The area shaded in green to the immediate north of the proposed pit represents the area to be drilled at part of the Australian Mines' upcoming resource extension drill program targeting high grade cobalt and scandium mineralisation.

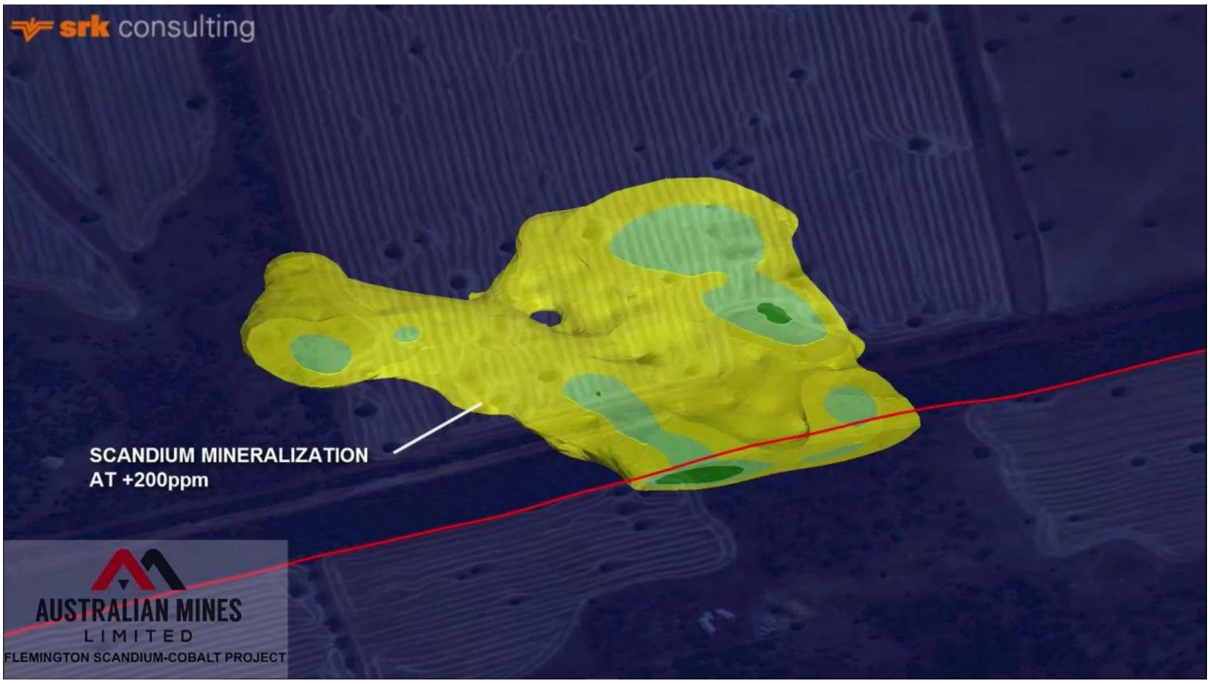

Figure 2: Outline of the scandium ore body at Flemington using a 200 ppm (grams per tonne) lower cut. For scale, the ore body is approximately 500 metres wide and 600 metres long, and terminates to the south at the tenement boundary with Clean TeQ. (Tenement boundary shown as red line)

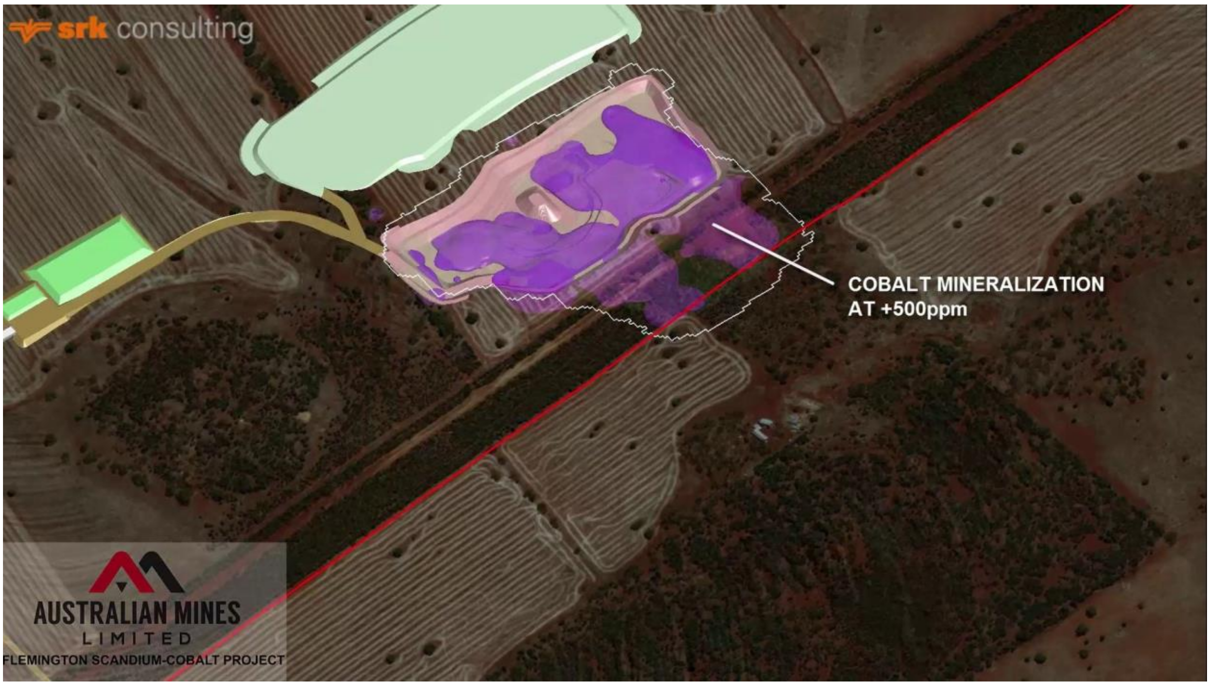

Figure 3: Outline of the cobalt ore body at Flemington using a 500 ppm lower cut. For scale, the ore body is approximately 500 metres wide and 600 metres long, and terminates to the south at the tenement boundary with Clean TeQ. (Tenement boundary shown as red line). The area shaded in green to the immediate north of the proposed pit represents the area of being drilled at part of the Australian Mines' upcoming resource extension drill program targeting high-grade cobalt and scandium mineralisation.

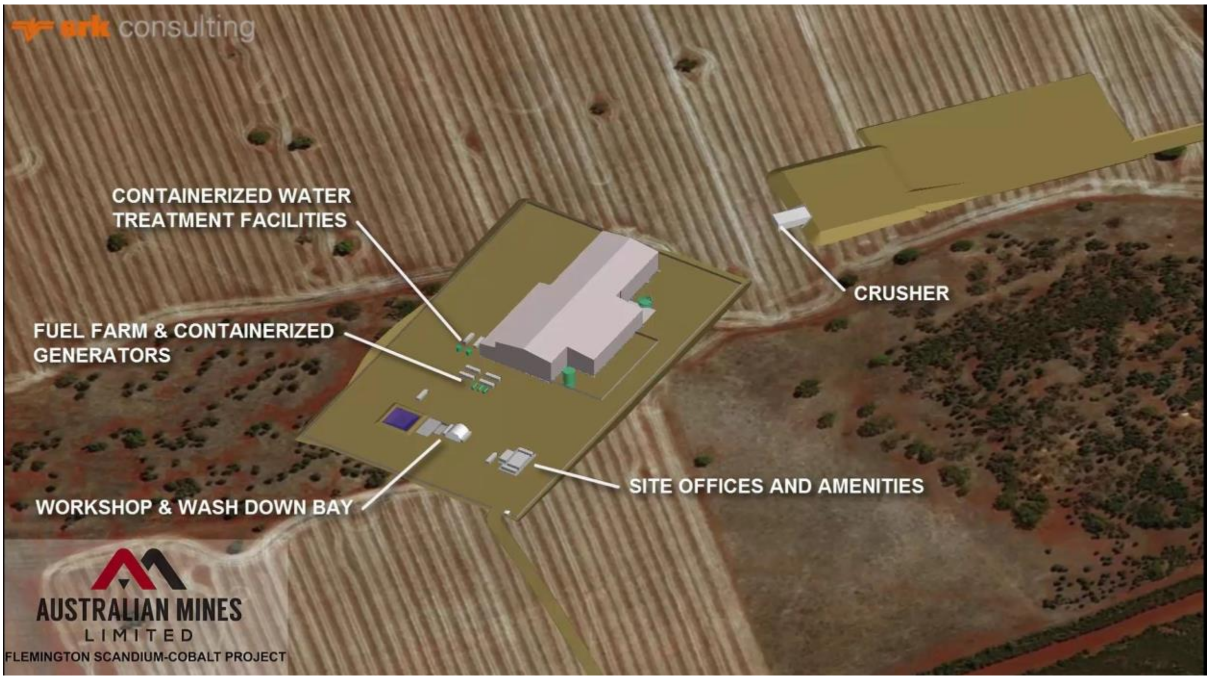

Figure 4: Schematic image showing the proposed footprint of the infrastructure at the Flemington mining operation.

Figure 5: Schematic image of the proposed processing plant footprint at Flemington. Note that the entire processing operation is housed within a modest sized building, which is designed to minimize any potential impacts of visual amenity, noise and dust.

Appendix 1: Flemington scoping study – prepared by SRK Consulting

Flemington Scandium Scoping Study

Report Prepared for

Australian Mines

Report Prepared by

SRK Consulting (Australasia) Pty Ltd
March 2017

(Abridged report)

AUSTRALIAN MINES LIMITED

Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (Australasia) Pty Ltd (SRK) by Australian Mines Ltd (AUZ). SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this Report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

List of Abbreviations

A$	Australian dollar(s)
AL	atmospheric leach
AUZ	Australian Mines Limited (ASX code: AUZ)
BOM	Bureau of Meteorology
Co	cobalt
CSIRO	Commonwealth Scientific and Industrial Research Organisation
EIS	Environmental Impact Statement
EP&A	Environmental Planning and Assessment
EPBC	Environment Protection and Biodiversity Conservation
FS	feasibility study
HDPE	high density polyethylene
HP	high pressure
HPAL	high-pressure acid leach
IFD	intensity-frequency-duration
Jervois	Jervois Mining Limited (ASX Code: JRV)
JORC	Joint Ore Reserves Committee
kg/t	kilograms per tonne
ktpa	kilotonnes per annum
kW	kilowatt
kWh	kilowatt hour
L	litre
L/kWh	litres per kilowatt hour
L/s	litres per second
LNG	liquefied natural gas
LOM	life of mine
LP	low pressure
LSL	loaded strip liquor
mg/L	milligrams per litre
MHP	mixed hydroxide precipitation
Mt	million tonnes
Ni	nickel
NPV	net present value

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ORP	oxidation reduction potential
PAR	population at risk
PFS	pre-feasibility study
PLS	pregnant leach solution
ppm	parts per million
RME	Rangott Mineral Exploration Pty Ltd
ROM	run of mine
Sc_2O_3	scandium oxide
SRK	SRK Consulting (Australasia) Pty Ltd
SX	solvent extraction
t	tonnes
TDS	total dissolved solids
tpa	tonnes per annum
TSF	tailings storage facility
XRF	X-ray fluorescence

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1 Introduction and Scope of Report

Jervois Mining Limited (Jervois) commenced defining the Flemington scandium - cobalt deposit through drilling campaigns in 2013, and in 2014 delineated a Mineral Resource (JORC Code, 2012) of 3.1 million tonnes of ore grading at 434 grams per tonne of scandium.

Despite cobalt regularly being intersected throughout the scandium ore zone, Jervois did not seek to calculate a cobalt (or nickel) resource at that time.

Australian Mines Limited (AUZ) has entered an option agreement with Jervois in which AUZ is to acquire 100% interest in the Project.

The Project is at an early stage of development. Supporting technical studies prior to SRK Consulting (Australia) Pty Ltd's (SRK's) engagement are limited in number.

In 2016, AUZ commissioned SRK to develop a scoping study to evaluate the technical feasibility of the Project. SRK's scoping study includes technical consideration of project infrastructure, mining, metallurgy, hydrogeology, tailings, environmental and social aspects, and project economics.

1.1 Project team

The SRK project team was headed up by Scott McEwing in the role of Project Manager and Lead Engineer. Scott was supported by the following consultants:

- Michael Cunningham (SRK): Grade model preparation
- Michael Pendlebury (SRK): Mining engineering
- Pepe Moreno (SRK): Tailings
- Simon Walsh and Simon Willis, Simulus Engineers (Simulus): Processing
- Lisa Chandler (Aethos): Social and environmental
- Brian Luinstra (SRK): Water management.

1.2 Statement of SRK independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK's prior association with the Flemington Project has been limited to a fatal flaw review undertaken in 2016 prior to AUZ reaching commercial arrangements with Jervois. SRK has no beneficial interest in the outcome of the technical assessment being capable of affecting its independence.

SRK's fee for completing this Report is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the Report.

2 Project Location and Site Description

The Flemington Project consists of a proposed mining operation, including a mine, processing site and supporting infrastructure.

The Project is located in central New South Wales, approximately 400 kilometres inland from Newcastle, and the nearest town is Fifield, 15 kilometres to the southeast.

The Project is well situated in terms of existing infrastructure. It is close to the major regional centres of Parkes and Dubbo, existing roads and is in close proximity to rail that passes through Fifield.

Access is via 15 kilometres of minor sealed public roads from Fifield and then by public gravel road for the last few kilometres.

The site location is shown below in Figure 2-1.

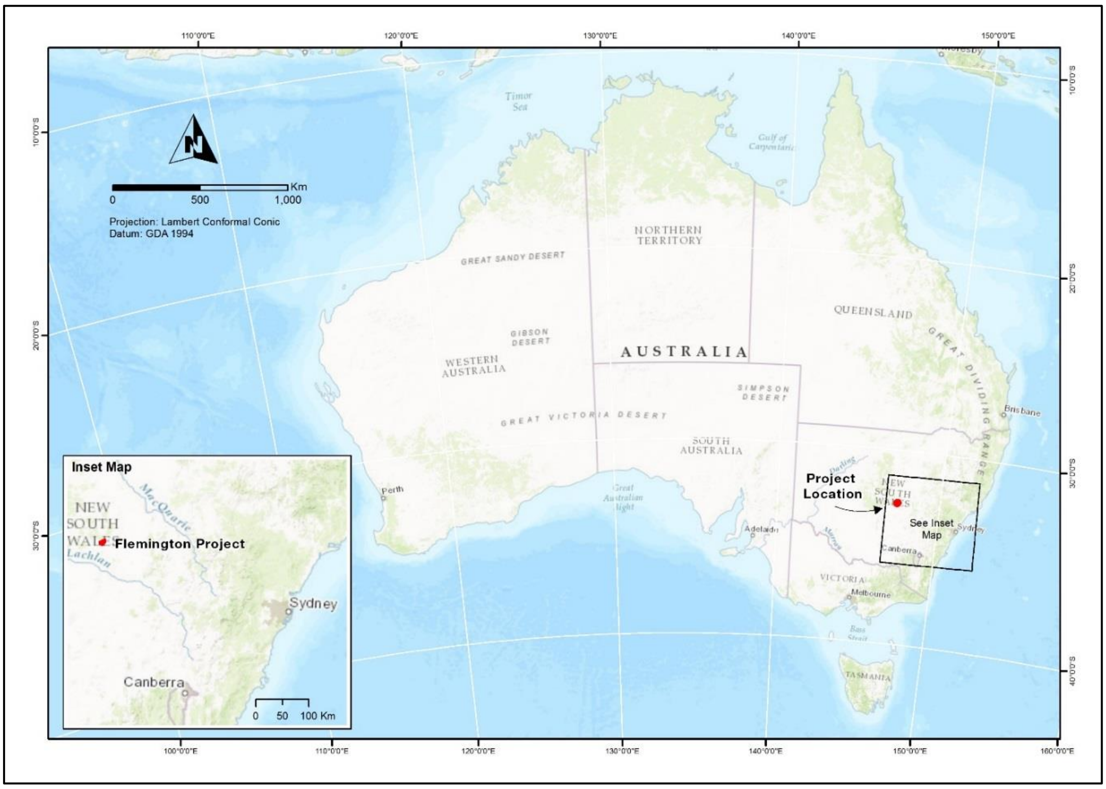

Figure 2-1: Project locality map

2.1 Topography

SRK has used Shuttle Radar Topography Mission (SRTM) survey data (30 metre grid) to develop the topographic base for terrain modelling and design of the earthwork structures. There are likely to be inconsistencies in this base surface due to accuracy limitations of satellite surveying. SRK recommends that a detailed LiDAR survey be undertaken prior to the next design phase to improve confidence in the design works.

The topography at the project site is generally relatively flat, with gently undulating slopes.

2.2 Climate

The Project is located within the Lachlan River watershed of the Murray–Darling Basin.

The climate is characterised as temperate, with no distinct dry season. The area receives an annual average (mean) of 499 mm of precipitation, with average rainfall distributed evenly through the year (Figure 2-2). Median daily temperatures indicate warm summers, with moderate winters.

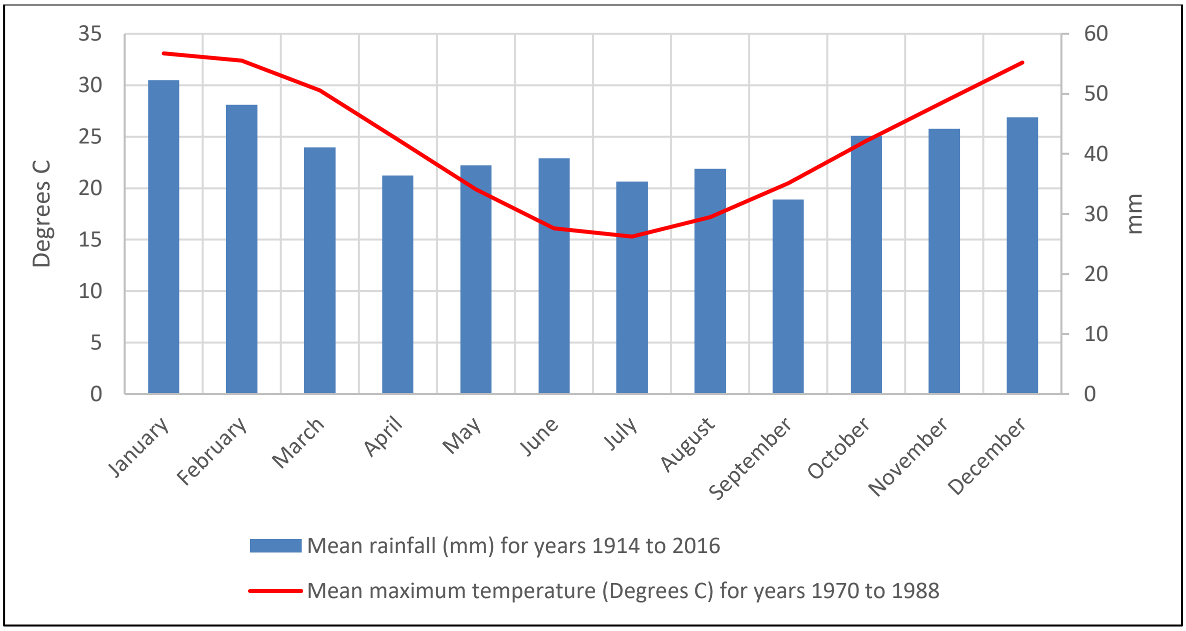

Figure 2-2: Climate statistics for Tullamore (# 050037) weather station

Climate statistics for the Tullamore Bureau of Meteorology (BOM) weather station (# 050037) are shown in Figure 2-2. The mean annual evaporation is 1,526 mm – approximately three times higher than the mean annual precipitation.

Class A pan evaporation data are not available for any of the stations close to site. SRK used BOM isopleths to calculate monthly average evaporation over the tenement area. The isopleths use monthly evaporation data between 1975 and 2005 (29 years) from different stations to provide Australia-wide maps of evaporation. The evaporation values are corrected using a coefficient of 0.75 to convert pan evaporation to lake evaporation.

3 Mining

The chapter describes the development of the mining model, the open pit optimisation process, sensitivity to changes in key inputs, conceptual production schedule for ore and waste for the preferred option, and recommendations for equipment and strategy to execute the target production schedule.

The Flemington deposit is very shallow and contiguous in shape, presently containing approximately 3.1 million tonnes of scandium and cobalt ore.

The pits are similarly expected to be shallow, with a maximum final mine depth of less than 50 metres.

Both ore and waste materials are predicted to be free-dig, hence drilling and blasting has not been considered. Tight materials can be subject to dozer ripping, if required.

The proposed mining operation will deliver a planned production rate of 100,000 tonnes per annum of ore to the processing plant. SRK has investigated maximising the Project's net present value (NPV) by applying an elevated cut-off grade to the run of mine (ROM) ore and lifting the average grade of the ROM ore to 450 grams per tonnes of scandium for the first for 18 years of project life.

After the first 18 years, the remaining 1.5 million tonnes of current known resource is available to be mined at the lower grade of 347 grams per tonne scandium.

The project therefore has a long projected operating life, estimated at up to 45 years of production

As the study focuses specially on the first 18 years of mine life and the cut-off used is elevated, the stockpiled lower-grade ore needs to be consider as waste for the purposes of this study. Thus, the average stated stripping ratio of 0.9 t waste: 1 t of ore is artificially elevated as the bulk of this 'waste' is ore, which will be subsequently processed by the processing plant.

Any non-mineralised pre-stripping waste is proposed to be used in the construction of site facilities, including the tailings dam, ROM pad and site roads.

The deposit is planned to be mined using conventional small-scale, open pit truck and excavator mining equipment. The scale of the operation does not warrant having a dedicated mining fleet on site. As a result, the Project is proposed to be campaign mined by a mining contractor who will mobilise equipment to site for campaign mining annually. The mining equipment proposed for the campaign mining operation is conventional, of low capital cost, small scale and carries low risk.

3.1 Mining Model

The Mineral Resource estimate for the Project was developed by Rangott Mineral Exploration Pty Ltd (RME) in August 2014 as a polygonal model. This resource was reported to JORC Code 2012 standards. SRK reviewed this model as part the fatal flaw review conducted for AUZ in 2016.

SRK required a 3D resource model to support the mine planning work for this scoping study. SRK developed this conceptual 3D block model supported by the data from RME's original Mineral Resource model.

SRK's 3D model reports greater tonnages than the Flemington Mineral Resource stated in Jervois' public releases. This is due to the different modelling approaches used, including the extrapolation distance from the drill holes where SRK has extended the model 30 - 50 metres beyond last drill hole. Ongoing project development should include re-estimation of the resource model using 3D tools to support a future pre-feasibility study (PFS) or feasibility study (FS).

SRK's 3D resource model was converted to a mining model by simplifying the data and converting to the MineSight software format.

The model was then prepared for use in open pit optimisation software. Adjustments used in the creation of the optimisation model include the following:

- The block model was simplified by agglomerating the proportions of Limonite, Hematite Transitional and Transported mineralisation containing either scandium or cobalt into a single ore proportion. The Saprolite proportions of the ore were treated as waste for this Study.
- The density and grades assigned to the proportion of ore were averaged depending on their relevant portions of Limonite, Hematite Transitional and Transported material.
- The original resource model contained portions for Measured, Indicated and Inferred mineralisation; these were converted to implicit fields that are assigned by majority owner.
- The 25 x 25 x 2 metre blocks were re-blocked to a smaller 5 x 5 x 2 metre size. There was no diluting effect as mining block size was smaller than its parent block size. The smaller block size allows for accurate calculation of slopes using the Whittle™ software package.

3.2 Open pit optimisation

Open pit optimisation is used to identify the optimum economic pit shape based on the highest cash flow. The pit optimisation process seeks a solution to a complex 3D mathematical relationship involving the mineral resource model, geotechnical slope guidelines, product revenue, project constraints, modifying factors and costs. The key output of the open pit optimisation is the pit geometry and identification of the project economic drivers.

3.2.1 Optimisation parameters

The Flemington deposit was optimised using Whittle™ software. The value of each block within the model was calculating using the following assumptions:

- Price of scandium oxide (Sc_2O_3): US$1,500/kg
- Price of cobalt: US$29,750/t
- Royalties: 4% of Revenue
- Mining cost A$3.50/t
- Exchange rate: A$0.74/US$1
- Discount rate: 15%
- 1 tonne of pure scandium equates to 1.53 t Sc_2O_3
- Overall pit slope: 30°
- Mine recovery: 95%
- Mine dilution: 5%
- Constrained to 50 metres stand-off from the south end of the lease boundary.

The Sc_2O_3 product price used in the study is consistent with the pricing used by Clean TeQ Holding Limited in their study of the adjoining Syerston project. This was considered appropriate given that Flemington ore body appears to be the continuation of the Syerston mineralisation.

The cobalt price, royalty rate and exchange rate have been taken from public sources as of December 2016.

The estimated mining is supported by SRK's experience and project benchmarking at A$3.50 per tonne. This cost estimate is based on the following considerations:

- Free-dig material, no drill and blast required
- Campaign contractor mining
- Small-scale equipment
- Shallow pits and short hauls.

SRK recommends that mining contractor quotations be sought ahead of future studies.

SRK has made assumptions for the pit slope angles, mining recovery and dilution. Future technical work should include geotechnical investigations and mining studies to determine suitable pit slopes and enable modelling of the dilution to higher confidence levels.

3.3 Sensitivity

The economic risks and opportunities to the Project have been examined by performing sensitivity analyses on the major inputs to the optimisation. The sensitivity analyses were developed by varying a single input parameter by +/- 30% and re-running the optimisation to record the change in ore tonnes and cashflow.

3.4 Mine production schedule

The mine production schedule was developed to demonstrate the production and delivery of ore to the processing plant. The production schedule determines the quantities and quality of the metal or products the plant will produce over time. The main aim of the production schedule is to produce sufficient ore of the required grade to keep the plant working at full capacity, while maintaining regular total material movements.

The conceptual mine schedule was developed in Whittle™ software. The mining sequence was developed based on optimisation results. The sequence has been developed to produce a series of cutbacks providing sufficient ore for approximately 18 years. The schedule aims to take the ore of highest value first to produce 50 tonnes per annum of Sc_2O_3 from 100,000 tonnes per annum plant. To achieve this, the mine produces between 90,000 – 100,000 tonnes per annum of ROM feed, depending on grade, for 17 years. In Year 18, the cut-off grade will be reduced and feeding of lower grade ore from the pit or reclaiming from the low-grade stockpile will commence. The 18-year mine plan schedule mines 1.68 million tonnes of the 3.3 million tonnes available.

The total material movement peaks at 500,000 tonnes per annum in the first year of production, and then drops to approximately 130,000 tonnes per annum. A mining ramp-up has not been considered, as 500,000 tonnes per annum is very easily achievable using a small production fleet.

No effort has been made to smooth the total material movements per year, as the mine will be mined in short campaigns by contractors; balancing the size of the production fleet is therefore not required.

The mine production schedule and grades of the ore delivered to the ROM pad are shown in Figure 3-1.

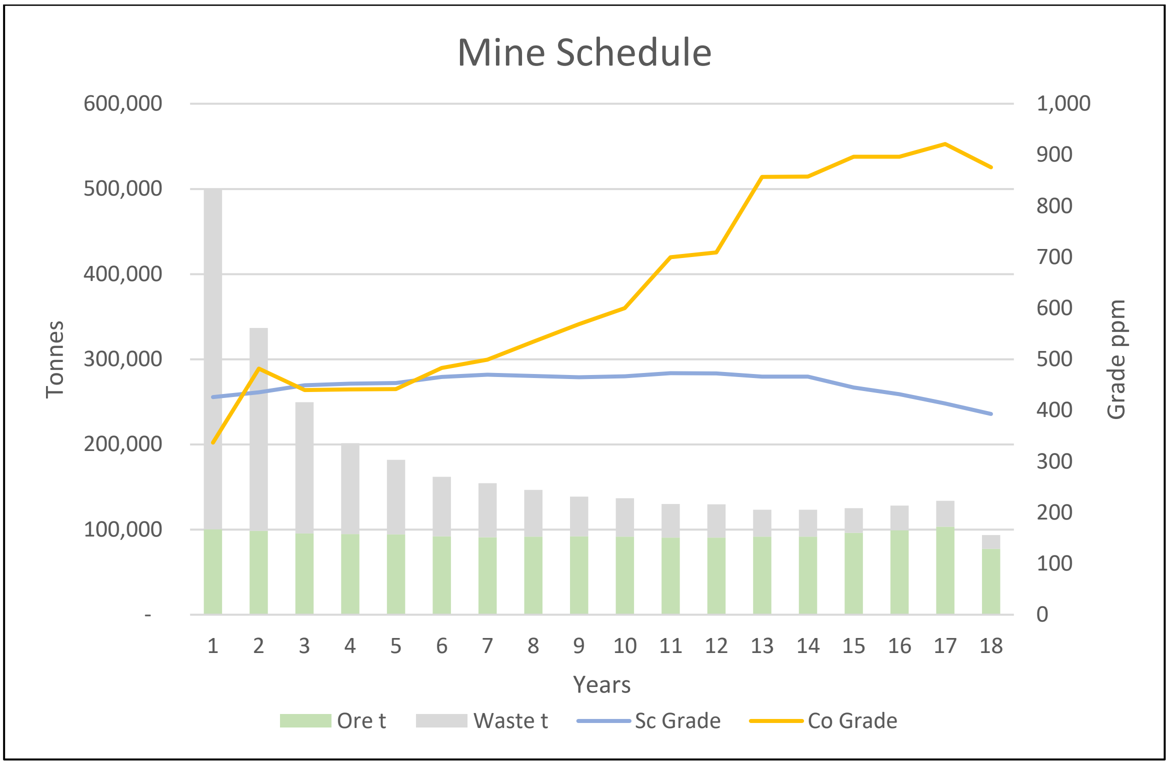

Figure 3-1: Production schedule - Base case

3.5 Mining method and equipment selection

There are several key considerations driving the equipment selection for the Project's primary production fleet. The mining rate is low and almost any combination of equipment suitable to do the work will be grossly over capacity for a full-time mining operation.

Whilst the material is expected to be free-dig, the selected excavator should be large enough to provide sufficient breakout force to rip through localised areas of tight ground that may be encountered during mining.

The Project is insensitive to mining cost and will not be materially affected by slightly higher mining costs.

These factors drive the Project to be mined in short campaigns, using mining or earthworks contractors. Contractors can be mobilised to the mine site for short mining campaigns to stockpile the required ore to feed the mill for a period of year or longer.

3.5.1 Mining equipment

SRK anticipates a suitable equipment fleet would be similar in terms of fleet size and scale to the following.

- 3 x CAT 730C articulated truck – 23 tonnes (capacity 28 tonnes)
- 1 x CAT349E hydraulic excavator – 50 tonnes
- 1 x CATD8 tracked dozer – 40 tonnes

- 1 x 120K motor grader – 13 tonnes
- 1 x water cart

The expected cost of production based on SRK's experience and benchmarking is A$3.50 per tonne for all material mined. This cost is underpinned by the follow key factors:

- Free-dig material, no drill and blast required
- Small-scale equipment
- Contractor campaign mining
- Shallow pits and short hauls.

In addition to this cost, the anticipate mobilisation costs are in order of A$20,000 per campaign.

As the mine will not have full-time technical support, an allowance of A$50,000 per annum for contracted support for geologists, mining engineers, surveyors etc. has been included.

3.5.2 Process plant ROM feed equipment

In addition to the primary production fleet, a front-end loader will be required to feed the primary crusher with stockpiled ore, manage stockpiles and blend ores. SRK anticipates a small front-end loader such as the CAT 924K will suffice.

An operating cost allowance of A$1 per tonne has been added to processing costs to account for operating the front-end loader, based on the following assumptions:

- Short tramming distances
- Loose material
- Small-scale operation
- Good operating conditions on the ROM pad and stockpiles.

The capital cost of the front-end loader has been included in cost estimate, assuming the owner has purchased the equipment. However, this equipment could also be operated by the mining contractor to avoid the requirement for maintenance capabilities to service and maintain a single heavy vehicle.

4 Metallurgy

4.1 Testwork

Testwork for the Project had previously been undertaken by CSIRO for Jervois. Results from the testwork were used where applicable to assist in the process design. No additional metallurgical testwork was undertaken as part of this scoping study.

The CSIRO testwork was completed on a single composite sample that was prepared by drying, crushing, screening and blending of drill core samples of limonitic and altered saprolitic laterite ore.

Drill core samples were individually dried in an oven at 75°C - 80°C for two weeks prior to size reduction. The individual samples were crushed to <1 mm in a jaw crusher, with closed circuit screening. The crushed and screened ore was then blended, and riffled into 19 x 1 kg sub-samples. An additional 8 kg of crushed and screened ore was retained for future use.

The work undertaken by CSIRO included a series of small-scale batch atmospheric leach (AL) and high-pressure acid leach (HPAL) tests under a range of operating conditions. Bulk pregnant leach solution (PLS) was produced from a single larger batch AL test. A solvent extraction (SX) and scandium purification testwork program was completed using the bulk PLS as feed liquor.

The sighter level metallurgical testwork has shown the HPAL process to leach the scandium, nickel and cobalt from their ores, and not to be highly acid consuming. In addition, viscosity was not excessive as is the case with some high clay content lateritic ores.

The CSIRO testwork demonstrated that HPAL performed better than AL due to:

- Higher scandium extraction
- Lower iron extraction
- Less acid consumption
- Higher pulp solids attainable
- No acid regeneration or recycling required
- No ore pre-reduction or roasting steps required.

The HPAL batch testwork results relevant to the design selected for this scoping study are summarised in Table 4-1. These metal extraction values have been used as inputs to the process design criteria (PDC).

Table 4-1: Summary of selected CSIRO HPAL batch testwork results

Description	Value
Test identification	Auto 5-4
Acid dose	300 kg/t
Extractions:	
Al	14.1%
Co	90.6%
Cr	16.5%
Fe	8.7%
Mg	92.1%
Mn	61.4%
Ni	93.3%
Sc	86.0%
Si	9.3%
Ti	8.6%

SRK does not consider the HPAL testing completed to date to be fully optimised. The scandium extraction is lower than anticipated, at 86.0%, when compared to the nickel and cobalt extractions and when benchmarked against other scandium projects.

SRK considers the scandium extraction to be conservative and with further optimisation testwork, expects scandium extractions to increase to over 90%.

4.2 Future testwork

The Project is at a scoping level of design. The testwork to date supports this level of study, and further work is required in subsequent stages of the development to increase the confidence in the metallurgical behaviour and process design. Particularly, this work should focus on HPAL testwork of the Flemington ores and solvent extraction of the HPAL discharge liquors.

This testwork would need to be undertaken:

- On variability samples as well as larger composite samples
- On different lithology types
- On ore representative of the preliminary mine schedules
- At different grades to develop grade vs extraction relationships
- Using a geometallurgical approach.

The Project is able to leverage off testing undertaken for the Sconi Project, in which AUZ has commercial interest. A large amount of testing has been undertaken on the SCONI ores, including multiple piloting campaigns. While testwork is required to confirm the specific behaviour of the Flemington ores, this information provides some support for the process design of the Project.

5 Processing

The process flowsheet for the Project is based on a conventional lateritic HPAL circuit, including MHP to recover the modest, but not insignificant, amount of nickel and cobalt contained in the ore.

Whilst a MHP is the stated nickel and cobalt by-product in this study, the Project can equally produce a nickel sulphate and cobalt sulphate end product should that be the intention of AUZ.

The scandium is recovered from the HPAL PLS by SX, followed by oxalate precipitation and calcination.

No novel equipment or flowsheet steps have been considered; it is a conventional scandium flowsheet.

A key consideration of this study is keeping the capital cost low in order to finance the Project. However, the project economics are largely driven by the operating cost of a small-scale operation. Scalability of the Project to allow for deferred capital investment in the Project, potentially using cashflow from the early production to help future expansions, is also a consideration.

At this level of study, with the limited project-specific testwork undertaken to date, knowledge gained from prior experience with nickel laterite HPAL flowsheets, and process simulation modelling has been used, in addition to benchmarking against other similar sized, hydrometallurgical projects.

5.1 Process Design Basis

Atmospheric and HPAL testwork has been completed on the Flemington ores. While the bulk of testing was done under atmospheric conditions, SRK has selected the HPAL route after a high-level assessment of both options, for the following reasons:

- Superior scandium (as well as nickel and cobalt) leach extraction
- Significantly lower iron leach extractions (a critical economic driver and solvent extractant contaminant)
- Acid consumption was approximately a third lower than atmospheric leaching (driven by iron dissolution)
- The formation of scaling during HPAL is well understood in the laterite industry and is effectively designed for and managed at many operating sites – it is not considered an issue.

The small plant size also supports the importation of sulphuric acid as it is more cost effective than the construction of a sulphuric acid plant.

5.2 Process description

A block flow diagram that summarises the Project process flowsheet is shown in Figure 5-1.

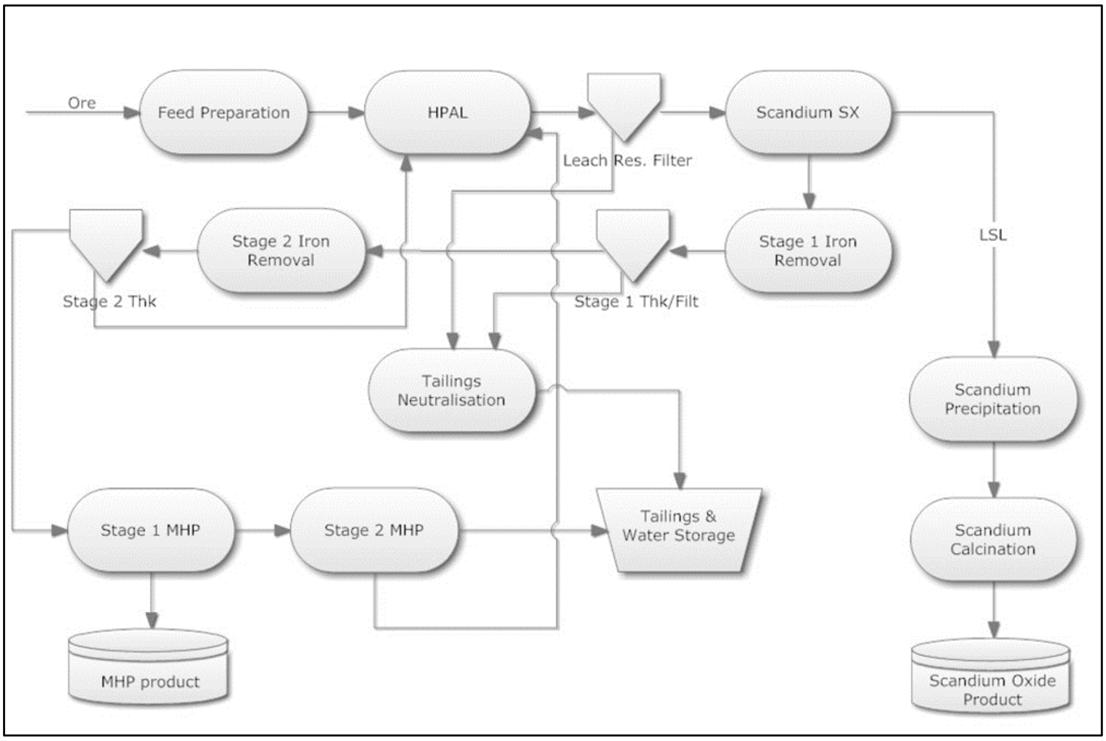

Figure 5-1: Process block flow diagram

The processing plant proposed for the Project is a small-scale hydrometallurgical facility that uses sulphuric acid under high temperature and pressure to leach scandium, nickel and cobalt from the feed. It produces a primary Sc_2O_3 product by solvent extraction, precipitation and calcination, as well as a saleable nickel and cobalt hydroxide by-product by pH adjustment with limestone, magnesia and lime.

As noted above, whilst a MHP is the stated nickel and cobalt by-product in this study, the Project can equally produce a nickel sulphate and cobalt sulphate end-product should that be the intention of AUZ.

5.3 Process design criteria

The design plant feed grade used for the process plant equipment sizing and costing is based on the average of the X-ray fluorescence (XRF) assays from drill core composites prepared in 2015 by CSIRO.

The scandium head grade is 619 grams per tonne w/w.

The gangue minerals consist mostly of goethite and clay aluminosilicates, such as kaolinite and montmorillonite.

5.3.1 Plant throughput

The plant utilisation of 85% has been selected to reflect the hydrometallurgical operation using HPAL and a series of downstream refining steps.

5.3.2 Plant ramp-up

Project scheduling and economic evaluation did not include consideration of a plant ramp-up. Future studies should factor in a 12-month ramp-up period to nameplate production rates.

5.3.3 Plant recovery

The plant recovery is based on the metal extractions achieved by HPAL metallurgical testwork undertaken by CSIRO on the Flemington composite sample. Downstream recoveries from liquor are based on mass and energy modelling undertaken in SysCAD® process simulation software and using Simulus' previous laterite testwork, process simulation, design and operational experience.

The HPAL testing on Flemington ores is limited, the majority of it being undertaken under atmospheric conditions in order to generate sufficient bulk liquors for downstream SX testing. In Simulus' opinion, there are opportunities in the future to increase the leach extraction through leach condition optimisation.

The HPAL scandium leach extraction for the scoping study design was based on the composite sample feed grade tested (610 grams per tonne). Subsequent preliminary mine scheduling used the derived recovery values for pit optimisation, generating a lower average scandium feed grade of 464 grams per tonne over the LOM. The revised feed grades generated in the mine scheduling have not been reiterated in the process design and modelling as engineering had already been completed.

The recovery for scandium, nickel and cobalt is fixed, irrespective of grade. During the next phase of metallurgical testwork and engineering design, feed grade versus recovery relationships should be developed for scandium, nickel and cobalt and key impurities such as iron, to account for any potential drop in recovery at lower feed grade or increases in reagent consumption.

5.3.4 Product quality

Downstream testwork has not been undertaken on HPAL discharge slurry on the Flemington composite sample tested. Product specifications are based on process simulation on the testwork discharge liquors, integrating solubility equilibrium modelling and previous experience on many HPAL laterite plants and projects. It has been assumed that a Sc_2O_3 product of 99.9% can be achieved. This is supported by the sighter level SX testwork undertaken on atmospheric leach samples, with measured product purity at 99.81% and testwork undertaken on associated scandium projects.

The Sc_2O_3 product specification generated from modelling is shown in Table 5-1. The Ni/Co MHP specification generated from modelling is shown in Table 5-2. Additional testing will be undertaken to demonstrate the final product specifications, with emphasis on producing a higher grade Sc_2O_3 product of 99.9% in order to achieve a premium product price.

Table 5-1: Scandium oxide product composition

	Moisture	Sc_2O_3	Fe
Unit	%	% w/w	% w/w
Value	0	>99.9	0.02

Table 5-2: Ni/Co mixed hydroxide product composition

	Moisture	Ni	Co	Al	Cr	Fe	Mg	Mn	S
Unit	%	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w	% w/w
Value	40	25.2	17.2	0.02	0.19	0.00	3.36	1.03	4.00

5.4 Ore preparation

Ore is delivered from the mine to the ROM pad. Due to the small footprint, this is not a conventional ROM pad. It is a small, dedicated ore storage area, cleared and compacted at ground level. Individual stockpiles will allow for blending of different feed grades and lithology types. The ore is reclaimed by an owner-operated front-end loader and fed to the ROM bin via a small earthen ramp. Oversize material is rejected by a grizzly screen and stockpiled separately where it can be broken up with a mobile rock-breaker on a campaign basis to allow it to be fed to the plant.

The ore is fed to an MMD mineral sizer crusher by belt feeder. The same model of sizer has been specified for each different plant throughput, as it is the smallest model available.

Crushed ore is conveyed to a drum scrubber via a short sacrificial conveyor equipped with a belt weightometer and magnet, then by a second conveyor. Crushed ore discharges into the drum scrubber feed chute, where it mixes with process water from the beneficiation water pond to a target solids pulp density. The scrubber discharges over an integrated trommel screen to a discharge hopper. The slurry is pumped from the hopper to a hydrocyclone. Fines overflow from the hydrocyclone to the leach feed thickener. The oversize flows by gravity to the ball mill feed chute.

The coarse ore from the drum scrubber cyclone is diluted with additional water in a rubber-lined ball mill where it is ground to the target grind size. Slurry is discharged from the mill to a discharge hopper and pumped to a hydrocyclone for classification. Fines overflow from the hydrocyclone to the leach feed thickener. The oversize underflow is in closed circuit to the ball mill feed chute.

The fine ore slurry is flocculated and thickened in a high-rate thickener in order to maximise the solids to the autoclave, in order to minimise its size. The thickener underflow is pumped to the leach feed tank in a duty/ standby slurry pump arrangement. This provides surge volume ahead of the autoclave, decoupling the beneficiation circuit from the downstream leach circuit. The thickener overflows to a needle tank. The water is pumped from the needle tank to the beneficiation water pond, for re-use in the feed preparation circuit.

5.5 High pressure acid leach

The feed slurry from the leach feed thickener underflow is mixed with recycle streams from Stage 2 Iron Removal and Stage 2 Mixed Hydroxide Precipitation. The two recycle streams contain readily leachable metal hydroxides and some unreacted limestone. A small amount of sulphuric acid is dosed into the leach feed tank to minimise the amount of carbonate introduced into the autoclave. The carbonates would otherwise react with the acid in the autoclave, producing CO_2 which would need to be vented. The result of this is more steam being consumed and a larger vent gas scrubber being required.

Steam from the atmospheric flash letdown stage is used to preheat the slurry in the leach feed tank. The preheated slurry is pumped by centrifugal pump to a pressurised preheater vessel constructed of duplex 2205 stainless steel. The slurry is pumped from the bottom of the preheater by duty/ standby piston hose diaphragm pumps, fitted with nitrile rubber (NBR) elastomer hoses and a duplex stainless steel wetted parts.

5.6 Engineering deliverables

A number of engineering deliverables have been developed as part of the scoping study.

- Process design criteria (mass and energy model inputs)
- Process flow diagrams (process simulation model flowsheets only)
- Mass and energy balance at three throughputs (process simulation model outputs)
- Mechanical equipment
- Electrical load list
- Operating cost estimate
- Indicative layout/ footprint of process plant sheds and buildings.

5.7 Leach residue filtration

The hot slurry from the HPAL atmospheric flash vessel is stored in the leach residue filter feed tank. The feed tank serves the dual purpose of providing surge to allow HPAL to continue operating during short filter maintenance periods, and to allow the slurry to cool enough not to damage the polypropylene filter plates.

The slurry is pumped from the filter feed tank to a vertical plate and frame filter, that has been sized with a 100% design margin to allow for lower than anticipated filtration flux, lower filter availability or periods of high flow.

The filter cake is washed with process water, and the filtrate and wash liquor are collected in a single tank. The washed filter cake discharges onto a conveyor that transfers the cake into a repulp tank, where it mixes with barren liquor from Stage 2 MHP before being pumped as a slurry to tailings neutralisation.

The filtrate and wash liquor are pumped to a pressure leaf filter to improve clarity before being pumped to scandium SX, which reduces crud formation. Solids collected in the leaf filter are periodically backwashed using feed liquor. The backwashed slurry is collected in a dedicated agitated tank, and continuously pumped back to the leach residue filter feed tank.

5.8 Scandium solvent extraction and recovery

The PLS from the leach residue filter is cooled to 40°C, by two plate heat exchangers. The first recovers heat by reheating the SX raffinate; the second heat exchanger uses cooling water. The solvent extraction circuit uses a 2 x extraction stage, 1 x scrubbing stage, 2 x stripping stage configuration.

The strip liquor is assumed to be a 2M HCl solution, which is prepared in a dedicated tank by mixing concentrated HCl and demineralised water. The loaded strip liquor (LSL) is filtered in a multimedia filter to remove entrained organic materials. A dedicated pump feeds filtrate back to the filter during the backwashing cycle, and the backwash is returned to the strip circuit.

The LSL is pumped to the first of two agitated scandium precipitation reactors (gravity overflow in series). The scandium is precipitated from solution as oxalate, with oxalic acid solution. Due to the small volumes involved in this circuit and the low slurry solids content (the largest option treats ~500 L/h of liquor at ~4% w/w solids), the liquor is filtered directly in a pressure candle filter without thickening. Slurry is pumped to the filter continuously, until a maximum pressure is reached, at which point the filter cake is washed with demineralised water in a timed wash cycle. The filtrate, which contains excess HCl and oxalic acid, is neutralised in an agitated tank with slaked lime slurry, before being pumped to the evaporation pond.

The washed scandium oxalate is discharged as moist cake into a screw feeder that supplies a continuous feed to a small, indirect, electrically heated rotary kiln to remove the oxalate. The scandium oxide calcine is collected in a discharge drum where it cools naturally. Depending on customer requirements, it is packaged manually in 25 kg bags or in lined 200 L metal drums, and stored for sale.

5.9 Iron removal

There are two iron removal stages incorporated in the Project flowsheet. In the first stage, limestone is added to the liquor in two reactors in series to neutralise free acid and precipitate most of the Fe(III), aluminium and chromium in the Ni/Co liquor from the SX stage, as hydroxides. A low-pressure air blower supplies air into the precipitation tanks to oxidise any residual Fe(II) iron in solution to Fe(III), which then precipitates as hydroxide as the pH increases. CO_2 gas is evolved by the neutralisation and precipitation reactions. The pH is limited to ~2.5 to limit the co-precipitation of nickel and cobalt with the iron residues.

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The neutralised slurry is thickened; the underflow is split, with half returned to the precipitation tanks as a seed recycle to improve the settling and filterability of the neutralised product, and the other half pumped to a pressure filter to separate the solid gypsum/ hydroxide tailings from the Ni/Co PLS. The PLS is pumped to a second iron removal stage, which increases the pH further to ~4.2, with limestone to precipitate almost all the remaining iron while minimising nickel and cobalt precipitation. The slurry discharges to a thickener with the underflow also split, half as seed recycle and half returned to the HPAL feed tank to redissolve any co-precipitated nickel and cobalt. The clear thickener overflow liquor from this second stage is pumped to the MHP circuit for nickel and cobalt recovery.

5.10 Mixed hydroxide precipitation

Nickel and cobalt are recovered from solution by precipitating them as hydroxides and basic oxy-sulphates through the addition of magnesia slurry in two agitated precipitation tanks (gravity overflow in series). The pH of the slurry is controlled by adjusting the magnesia dose. The MHP slurry is thickened; the underflow is split, with half returned to the precipitation tanks as a seed recycle to improve the settling, filterability and recovery of the MHP product, and the other half pumped to a vertical plate and frame pressure filter to separate the MHP from the barren liquor. The Stage 1 MHP barren liquor is pumped to a second MHP stage, which increases the pH further to ~8.8 with slaked lime slurry to precipitate all the remaining nickel and cobalt, while minimising the precipitation of manganese and magnesium. The slurry discharges to a thickener with the underflow also split, half as seed recycle and half returned to the HPAL feed tank to redissolve the nickel and cobalt. The thickener overflow from this second stage is pumped to the tailings neutralisation circuit, via the HPAL leach residue filter cake repulp tank.

5.11 Tailings

The Project generates three main effluent streams:

- Washed HPAL residue filter tailings
- Stage 1 iron removal filter cake
- Barren liquor from Stage 2 MHP.

All three streams are combined and treated together in two agitated tailings neutralisation tanks (gravity overflow in series). A low-pressure air blower supplies air into the tanks to assist in removing manganese from solution by oxidising Mn(II) to Mn(IV), which precipitates as the stable MnO_2 phase. The slurry pH is also increased by adding slaked lime slurry. This ensures that all base metals have been precipitated, and precipitates residual Mn(II) as $Mn(OH)_2$.

5.12 Reagents

The following three main reagents account for ~90% of the total reagent costs:

- Sulphuric acid
- Limestone
- Natural gas.

Sulphuric acid is used as lixiviant in HPAL and is critical to extracting the scandium, nickel and cobalt from the ore.

While sulphuric acid makes up a large percentage of the overall operating cost, the ores are not high acid consuming, which is economically beneficial to the Project.

Limestone is used as a neutralising agent in the two iron removal stages. Natural gas is used as the primary energy source for the steam boiler, to produce high pressure (HP) steam to heat the HPAL autoclave, and low pressure (LP) steam to heat the iron removal and MHP circuits.

High purity (~ 98.5%) sulphuric acid is supplied to site by road tanker. Two weeks' worth of storage is provided in a single carbon-steel tank. An additional day-tank is included in the HPAL area for short-term storage.

Limestone is supplied to site pre-crushed from a nearby quarry (not yet identified) or another equivalent source. A closed-circuit limestone ball mill wet-grinds the limestone to a P_{80} of 150 µm in raw water. The milled limestone slurry is stored in a single agitated storage tank. The duty/ standby limestone distribution pumps supply limestone slurry to the two stages of iron removal, via a ring-main designed to prevent the slurry from settling in the line during periods of low flow.

Lime is supplied to site in bulk bags. The lime is hydrated and slurried in raw water in the lime slaker vendor package. The package includes a storage tank and distribution pumps, to feed slaked lime slurry to the process consumers.

Magnesia powder is supplied to site in bulk bags. For the smallest plant size, it may be supplied in 25 kg bags (typical average consumption is two bags per day). Otherwise, larger bulk bags may be purchased.

The following minor reagents are used for the Project process plant:

- Hydrochloric acid
- Oxalic acid
- Flocculant
- Sodium hydroxide
- Solvent extract and diluent
- Scale inhibitor
- Corrosion inhibitor.

Hydrochloric acid is delivered to site either by tanker or in bulk boxes. A polyvinylidene difluoride (PVDF) lined FRP storage tank provides two weeks of storage.

Oxalic acid solution is supplied to site in 25 kg bags. The bags are manually emptied into a batch mixing tank and pumped to a storage tank following dissolution of the powder.

Flocculant is supplied to site in 25 kg bags. The flocculant preparation plant is supplied as a vendor package.

Sodium hydroxide is supplied to site in bulk boxes as 50% NaOH solution. Dilute solution is prepared by loading the contents of a bulk box into a mixing tank, where it is mixed in a fixed proportion of raw water to the desired solution strength.

5.13 Reagent consumptions

The reagent consumptions will generally be low. The key reagents are sulphuric acid, natural gas, diesel (consumption for power generation in operating cost estimate accounted for in unit power cost allowance), limestone, lime and hydrochloric acid.

The volumes of these are not at levels that are expected to have any notable difference on the main road system, even at the maximum production case.

5.14 Utilities

Typically, a large-scale HPAL plant would incorporate a sulphuric acid plant, converting elemental sulphur to acid with associated HP steam production and steam-turbine generator power. This Project is not of the size to justify the high capital costs associated with an acid plant. The power requirements for the process plant and mine must therefore be met either by grid electricity or an alternative energy source.

Liquefied natural gas (LNG), supplied by tanker delivery, is the fuel source selected HP and LP steam demand and small diesel-fired generator sets for electrical power requirements, as the basis for this scoping study.

An HP natural gas fired Babcock & Wilcox steam-tube boiler supplies both the HP steam required in the HPAL area and the LP steam needed to supply heat to the iron removal and MHP areas. The boiler is supplied as a vendor package that includes a de-aerator drum, an HP steam superheater, and a boiler feed water reagent dosing system.

The electrical power supply to the process plant is provided entirely from small diesel-fired generator sets. The power plant is sized to have two duty and one standby generator under normal operating conditions. This provides additional capacity during peak load and allows one generator to be taken offline during periods of low power demand, to keep the generator efficiency high and reduce fuel costs.

5.15 Process plant layout

For illustrative purposes and to provide a scale reference for the Project, SRK has developed an indicative 3D layout of the processing facility (Figure 5-2). This layout represents the largest of the production scenarios. It is based on similarly sized hydrometallurgical projects in Simulus' database.

The entire process plant is housed in buildings.

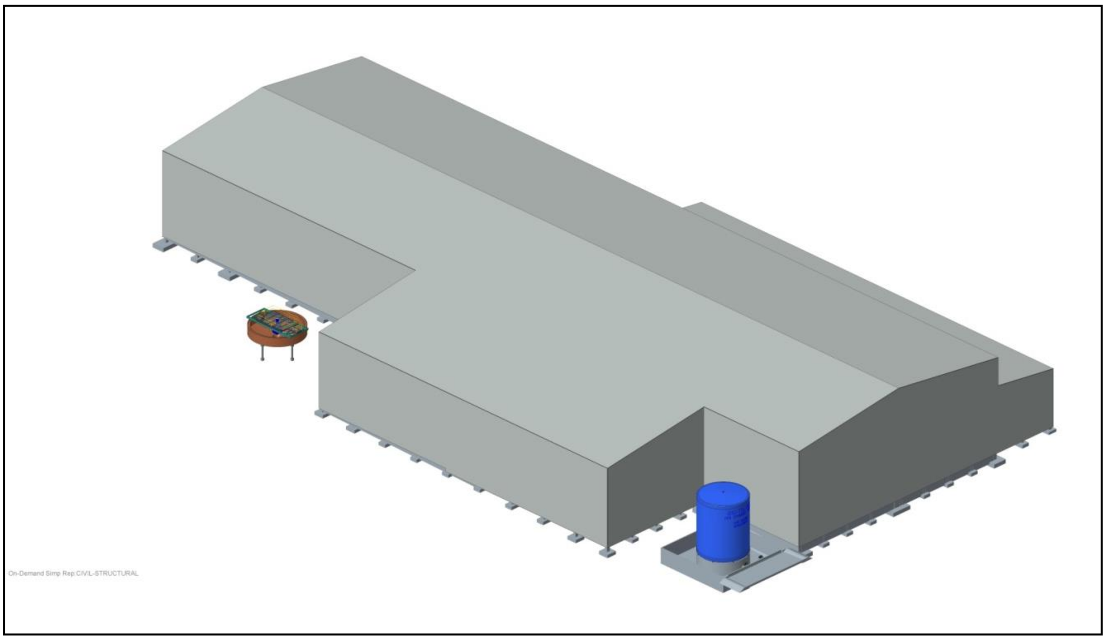

Figure 5-2: Indicative 3D model of process plant

6 Project Infrastructure

Due to the relatively small electrical demand, it is proposed that the Project will be powered by diesel-fired generators.

Water supply is supplemented by recovery from the TSF. The design includes an evaporation pond to reduce excess water requirements due to the positive water balance and the need to bleed liquor to maintain several elements below their solubility limit. Other infrastructure required to maintain operations, such as administration buildings, workshops, warehouse, roads, information technology (IT) and communications, would be located on site.

There is no site accommodation village proposed by AUZ. Employees and contractors would be sourced locally wherever possible, resulting in most being accommodated in the local towns.

The mining workforce is likely to be sourced mainly from the local towns of Condobolin, Fifield and Parkes. Other key technical staff will be brought in from regional centres, as required.

Regional public airstrips at Dubbo and Parkes connect with multiple flights daily from Sydney, Brisbane, Melbourne and a number of other regional centres.

The supporting infrastructure and facilities are representative of a modern hydrometallurgical and open pit mining operation, and comprise the following:

- Access road and internal roads
- Haul roads
- Power station
- High pressure steam boiler
- Site buildings - office and administration complex

- Laydown facilities
- Ore stockpiles and waste stockpile area
- Processing plant and associated facilities
- Raw water storage to manage rainfall runoff
- Process plant
- Tailings storage facilities
- Evaporation ponds
- Borefield and associated infrastructure
- Reverse osmosis plant
- IT and communications systems
- Core farm and core processing facility
- Analytical and metallurgical laboratory
- Mine and plant workshops
- Diesel fuel storage and refuelling facility
- Washdown bay
- Standpipe for water carts.

These are discussed in further detail in the following sections.

The location of infrastructure relative to the processing plant is shown in Figure 6-1.

Figure 6-1: Indicative location of infrastructure relative to the processing plant

6.1 Accommodation

The closest population centre to the Project is the small town of Fifield; however, a number of larger towns and regional centres that enjoy excellent infrastructure, services and communications are within commutable distance. They serve as mining hubs for other mineral operations.

The operation's labour force requirements will be based in these areas on a drive-in/ drive-out (DIDO) basis from nearby local communities.

For operating cost estimation purposes, the total number of personnel, inclusive of staff in Administration, Processing Plant, Maintenance and Laboratory, is 66.

Owner's team geology and mining departments comprise 8 - 10 persons.

Contract mining and other support services would be contracted to third parties.

6.2 Access, internal and haul roads

There are three major road sections to consider for the Project:

- Site access and main site access road
- Mining haul road
- Other internal roads.

The site is accessed through a series of public sealed roads. Initially running east from Parkes on the major road link, the Henry Parkes Road (State Route 90), before turning north onto The Bogan Way, west onto the Fifield–Trundle Road and through Fifield on the Fifield Road. The final proposed access is off Melrose Plains Road. These roads are not major routes; however, they are sufficient to service the proposed scale of the Project and the expected increase in traffic, although AUZ has stated that it will upgrade some parts of the roads to a heavy vehicle standard at its own cost.

Due to the low level of traffic for this small-scale operation, and as the current study is at a scoping level, these upgrades have not been costed. The adjacent Syerston Project applied to modify the Development Consent, included Voluntary Planning Agreements (VPAs) with the local shires, outlining contributions the Syerston Project owners would make to road upgrades, road maintenance and contributions to community-based activities.

The internal plant roads will be sized to suit traffic associated with plant maintenance and vehicles used to transport products from site, and consumables and reagents for plant consumption. The all-weather site roads will be unsealed, dual-lane roads, with surface drainage on one side of the road. Turning circles at the warehouse and reagent areas will be set to suit semi-trailer traffic delivering consumables and reagents. Concentrate production is small and does not require vehicles larger than semi-trailers.

All site roads will be formed and compacted, with formation generally making use of suitable material that is locally available (proximal to the Project), where available. Where possible, the heavy vehicle and light vehicle roads' vertical alignment design is based on a cut-and-fill approach.

6.3 Airstrip

The Project workforce largely would be based in local towns and surrounding areas as is usual practice for similar mining operations in the area. The workforce may be supplemented from further afield by specialist technical and management roles required for a hydrometallurgical operation.

The major regional public airports at Dubbo and Parkes connect with multiple flights daily from Sydney, Brisbane, Melbourne and a number of other regional centres.

6.4 Site buildings

A series of site buildings, stores and workshops will be constructed adjacent to the processing facility. An allowance for these buildings and their fit-out has been included in the capital cost estimate. Site buildings will comprise the following:

- Administration, mining and processing office complex
- Combined gatehouse, security office and first-aid clinic
- Control room
- Training facility/ emergency response room
- Communications/ meeting rooms
- Crib rooms
- Analytical and metallurgical laboratory (suited to a hydrometallurgical operation)
- Stores, warehouse, maintenance workshops and laydown area
- Core yard.

In addition, training and meeting facilities and equipment allowances for a mine rescue team will be made available.

6.5 Mining facilities

The mine will require the following supporting infrastructure:

- Mobile fleet workshop and warehousing
- Refuelling facility
- Heavy vehicle park-up
- Hydrocarbon separator.

The contractor's mobile fleet requires maintenance facilities, which SRK assumes will be provided by AUZ. SRK has proposed a relocatable 12 metre long x 15 metre wide domed workshop supported by a containerised workshop and lube unit. The workshop will require reinforced concrete flooring. Spares and storage will be provided by means of a separate container adjacent to the workshop. These facilities offer protection against sun and rain in a simple, low-cost solution.

The workshop facility will be located near the mine to service and maintain the open pit mining fleet, and ancillary mining equipment. A typical containerised workshop is shown in Figure 6-2.

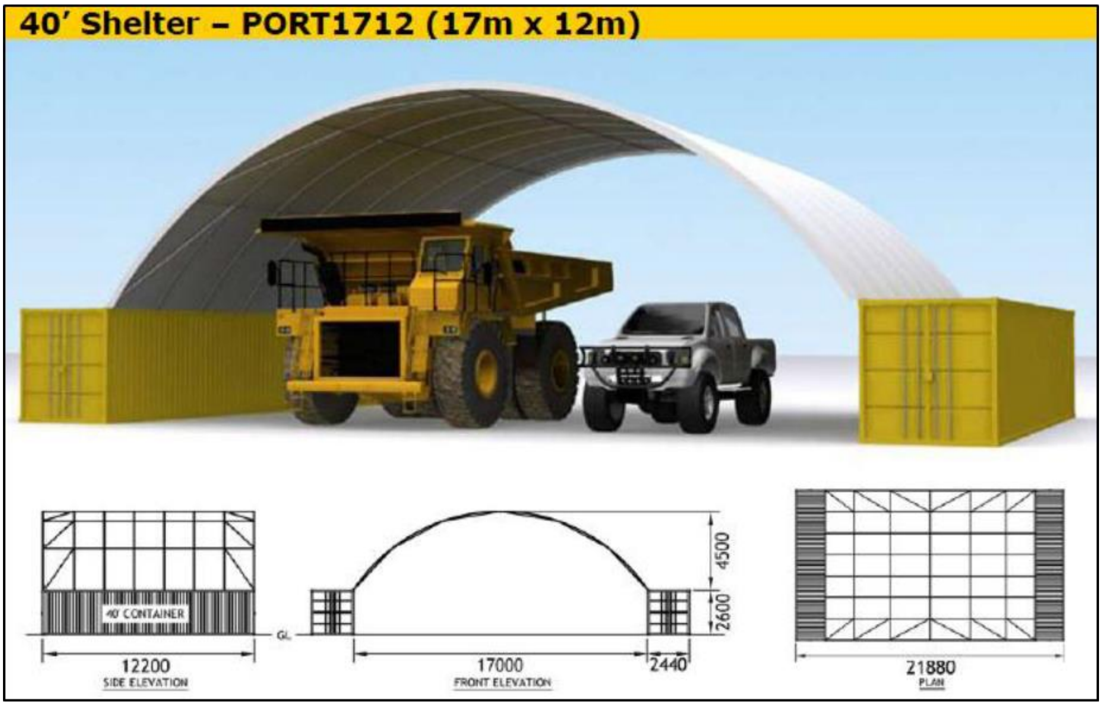

Figure 6-2: Example of mine vehicle workshop

All servicing and basic maintenance activities are undertaken on site, with the exception of items requiring specialised servicing skills. The workshop is located 200 metres away from the mill.

Both critical and maintenance spares will be housed on site and an allowance for a small warehouse facility and a fenced laydown yard for items that can be stored outside, has been made.

As the operation is expected to be free dig, provision for explosive magazines is not required

The ROM pad has been located 300 metres away from the final pit extents.

The mill is to be located as close to the primary crusher as practically possible to reduce conveyor length and the associated capital expenditure. The mill and primary crushers are to be located at a distance of at least 250 metres from the public road to minimize any potential impacts of visual amenity, noise and dust.

The workshop's washdown bay, fuel farm and heavy vehicle go-line are clustered together; this is practical for carrying out work and allows sediment and water recovery systems to be shared.

The mine buildings consist of an office building and a crib room. The mine buildings will be located at least 250 metres away from the public road.

The mine site is close to public access and in the interests of public safety and mine security, a security fence is has been placed around the mine perimeter. However, AUZ has indicated that mine visits will be offered to the public at regular intervals throughout each year.

A self-bunded 6,000 litre fuel tank will provide the necessary fuel storage; it is easily transportable and presents a low-cost option requiring only minimum construction.

A reinforced concrete washdown bay with high pressure pumps and an oil recovery system will be required.

6.6 Mobile equipment

Most of the mining vehicles will be provided by the mining contractor. Plant and general administration mobile equipment allowances cover vehicles, including plant and maintenance vehicles, managers' vehicles, modified fire service and ambulance vehicles, ROM loader, skid steer loaders (2), store forklift, flatbed maintenance truck with hoists, small mobile crane and other miscellaneous vehicles.

An allowance for this equipment has been included in the capital and operating costs.

6.7 ROM pad and stockpiles

While the length or size of the mining campaigns will ultimately determine the size of the stockpiles, an allowance for storing 16 months of production has been made. These stockpiles should be located on the ROM pad or directly adjacent to it, to minimise the tramming distance for the front-end loader to the crusher.

The ROM pad is a flat, level pad located next to the crusher where the ROM production is dumped. Typically, ore is blended on these live stockpiles before being fed to the crusher. The stockpile on the ROM pad allows the mine production to decouple for the plant feed for short periods. The ROM pad is usually sized to accommodate the size of equipment operating safely, and the expected level of stockpiling and ROM pad height is selected to suit the crusher. The ROM pad will be constructed from truck-compacted material sourced from mine waste during project construction and pre-stripping.

6.8 Metallurgical laboratory

Due to the hydrometallurgical nature of the plant, an analytical and metallurgical laboratory is required for process control purposes and metallurgical accounting. Operating costs are covered in the labour component, as well as laboratory consumables. Capital costs are a function of factored mechanical costs.

The current philosophy for the analytical and metallurgical laboratory is for it to be owned and operated by AUZ. Costs are based on laboratory labour and allowances for testing. This work must be undertaken on site for control purposes, but future consideration may be given to outsourcing this function to one of the main laboratory service providers.

6.9 Power station

Most of the Project's electrical power is required for operating the processing plant; the remaining demand is from mining activities and infrastructure facilities. Three main power supply options were considered, all at a preliminary level only:

- Mains (grid) power
- Site-generated power (diesel)
- Site-generated power (natural gas).

Power requirements for the processing plant was estimated based on the processing plant's motor list (preliminary) and assumed power draw and utilisation. This includes an allowance for administration buildings, workshops, mining facilities and lighting.

The power demand is relatively low. At the maximum Sc_2O_3 production rate of 50 tonnes per annum, power demand is only 500 kW. Installed capacity is approximately double that consumed.

This low electrical power demand does not justify the capital cost of running overhead mains power to site, nor does it justify the large capital cost of installing a natural gas pipeline spur and booster station approximately 90 kilometres from the Moomba to the Sydney Gas Pipeline.

Reliable power can be supplied by a small number of diesel-fired generator sets that would be owned and operated by AUZ. The quantum of the power demand would not justify this service being provided by an independent power provider (IPP). Three CAT15 (50 Hz) generator sets, with a maximum rating of 550 kVa, have been selected. Distribution would be via 415 V switchgear and control system, which allows for two duty and one standby units, with additional power available to operate buildings, offices and other minor support services.

AUZ has indicated that it will cost a solar array farm for the Project during the PFS as the company's objective is to power the mining operation via renewal energy sources as much as practicable.

During periods of power outages, standby diesel-fired generator set can be used to provide sufficient power for emergency lighting and critical processing equipment drives such as thickeners, controlled autoclave depressurisation and agitation, and tank agitation.

The unit cost of the power has been estimated to be A$0.20/kWh. This calculation is based on an assumed efficiency of the proposed generators (assumed at 0.30 L/kWh) and the cost of diesel – accounting for the diesel fuel rebate.

A more detailed assessment of onsite power generation will be undertaken in the next stage of the project.

6.10 Power reticulation

The medium voltage 415 V generators will feed into a common switchgear arrangement and all power will be supplied from this substation.

Power will be distributed to substations/ kiosks throughout the plant and stepped down as required for use by mechanical equipment components. Distribution between the substations and the processing facilities will be undertaken in pipe racks using cable trays.

At the next level of design, a more detailed scheme for the distribution of power will be developed in order to obtain market pricing on substations, switch rooms and other electrical infrastructure.

6.11 High pressure steam boiler and natural gas

The high-pressure acid leach (HPAL) autoclave operates at an elevated pressure of 4,500 kPa and elevated temperature of 250°C. To achieve this temperature, high pressure steam, produced by a gas-fired boiler, is added directly to the autoclave. The natural gas demand is low at 372.7 kg/h.

The low demand in both cases does not justify the capital cost of a natural gas pipeline. Instead, LNG will be supplied in bullets. As is usual practice, these bullets will be owned by the gas provider. A rental allowance for the hire of these bullets has been included in the operating cost estimate.

6.12 Water supply

The water demand for the processing facility is relatively low. Based on a plant utilisation rate of 85%, the water requirement is 319,750 m^3/year.

SRK is presently acquiring this water allocation from the New South Wales Authorities on behalf of AUZ.

6.13 Diesel storage

AUZ proposes to install self-bunded diesel storage tanks on site, to cater for all diesel requirements, inclusive of the processing plant, light vehicles, mining fleet and the diesel-powered generators.

The diesel storage tanks will be placed on level, compacted, drained ground, which alleviates the need for concrete bunding and slab areas. An example of a self-bunded fuel tank in shown in Figure 6-3. The fuel tanker unloading and pumping system, overfill protection, tank gauging, safe tank top access, lighting, electrical requirements, alarms and a remote monitoring facility will be included, as well as a fast-fill fuel dispenser for each of the light and heavy vehicles.

Concrete aprons will be provided for fuel unloading and refuelling areas. The pads will be sloped towards a sump equipped with a coalescing plate oil-water separator to enable hydrocarbon spillages to be captured. Hydrocarbon from the separator will be collected and discharged into the waste oil tank. Water from the separator will be pumped to the evaporation pond. Oil will be removed by vacuum truck.

The diesel generators will be located adjacent to the diesel storage area and within allowable required distances to minimise any requirement for pumping between the storage area and generators, and to avoid the need to install a day tank.

Figure 6-3: Self-bunded diesel tank

7 Tailings

7.1 Project scope and objectives

The objective of this design is to prepare a conceptual level design for a ring dyke TSF for the Project. The concept TSF is designed to align to the initial 18 years of production and a capacity increase will be required to consider the period beyond 18 years. The TSF is proposed to store a maximum of approximately 1.7 Mt of tailings over the 18-year period. The TSF layout will be developed, with the facility likely to be built to its final raise in a single construction period.

SRK has identified the preferred location of the TSF, taking the following into consideration:

- Minimisation of tailings pumping energy requirements due to distance or elevation (head) difference
- Minimisation of construction capital expenditure due to topography.

The scope of this study includes:

- Design criteria and data review
- Layout and capacity assessment
- Facility design and operational methodology

- Water balance
- Surface and reclaim water management
- Schematic drawings
- Material take-offs and cost estimate.

7.2 Design criteria

The engineering for the Project will comply with the design standards listed in Table 7-1.

Table 7-1: Design standards

Document number	Document title
ANCOLD (2012)	Guidelines on Tailings Dams: Planning, Design, Construction, Operation and Closure
ANCOLD (2012)	Guidelines on the Consequence Categories for Dams
ANCOLD (2003)	Guidelines on Risk Assessment
DSC3A (2010)	NSW Dam Safety Committee Guidance Sheet on Consequence Categories for Dams
DSC3B (2010)	NSW Dam Safety Committee Guidance Sheet on Acceptable Flood Capacity for Dams
DSC3F (2012)	NSW Dam Safety Committee Guidance Sheet on Tailings Dams

The design criteria applicable to the TSF conceptual study are summarised in Table 7-2.

The availability of input data is limited at this stage of the Project's evolution, and therefore any gaps in the information have been covered using engineering judgment and SRK's experience in similar operations. A geotechnical investigation has yet to be completed.

Information derived from the investigations will need to be incorporated in the future TSF design stages.

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Table 7-2: TSF design criteria

Criteria	Value	Source/ Comment
LOM and storage requirements		
Life of TSF	18 years	AUZ
TSF total capacity/ tonnage	1.7 Mt	AUZ
Tailings specific gravity	2.85	Assumed; typical value
Tailings solids content	25%	AUZ
Tailings stored dry density	0.9 t/m^3	Assumed; typical value
TSF storage volume required	1.9 Mm^3	Calculated
TSF geometry and design assumptions		
Supernatant pond operating depth	1 m	Assumed; typical value
Freeboard allowance (above pond)	1 m	Assumed; typical value
Spillway depth allowance	0.5 m	Assumed; typical value
Tailings beach slope	0%	Assumed; typical value
Embankment crest width	5 m	Assumed; typical value for one-way traffic and safety bunds
Embankment upstream slope	1V: 2.5H	Assumed; typical value
Embankment downstream slope	1V: 3H	Assumed; typical value
Design features	HDPE lined	Conservatively assumed to require lining

7.3 Layout and capacity assessment

SRK defined the proposed location of the Flemington TSF within the tenement boundary. The site is generally flat to gently sloping (1% - 2%) to the north.

Due to the relatively flat topography, the TSF will require containment by perimeter embankments on all sides (ring dyke). The proposed TSF will provide storage for the 1.7 Mt tailings production.

8 Environment, Heritage and Land Access

8.1 Statutory approvals

A number of statutory approvals have been identified as relevant for the Project. These are expanded upon in the following sections.

8.1.1 Environmental Planning and Assessment Act 1979

All new mining projects (including expansions or modifications of existing projects) require development consent under the *Environmental Planning and Assessment Act 1979 (EP&A* Act).

Projects with a capital investment exceeding A$30 million are classified as "State Significant Development" and must be formally approved by the Minister for Planning & Infrastructure.

An additional process (the "Gateway" process) is required for State significant mining developments on land classified as "strategic agricultural land". The Gateway assessment occurs prior to lodgement of a development application. The Project appears unlikely to have an impact on strategic agricultural land, however. Once it has been confirmed that none of the project land is likely to affect strategic agricultural land, the project proponent can lodge a development application

The assessment process under the *EP&A* Act includes a structured system of technical assessments. The process also requires substantial stakeholder engagement.

Project proponents are required to prepare and submit a detailed Environmental Impact Statement (EIS) that addresses a range of environmental and other issues identified by the Secretary of the Department of Planning. The matters specified in the Secretary's Environmental Assessment Requirements (SEAR) vary from project to project.

The EIS for the Flemington Project would most likely be required to include assessments of potential project impacts on:

- Soils and land capability
- Land forms and land stability (including after project completion)
- Biodiversity (flora and fauna)
- Surface hydrology and surface water quality
- Groundwater availability and groundwater quality
- Environmental quality (i.e. risk of pollution associated with mine wastes, especially tailings and waste rock)
- Air quality
- Noise
- Visual amenity and compatibility with nearby land uses
- Traffic and transport
- Heritage (both Aboriginal and non-Aboriginal)
- Social and economic factors (for example, impact on local housing prices and availability)
- Public health and safety.

The proponent will generally be required to develop and fund a biodiversity offset strategy to compensate for unavoidable project impacts on biodiversity values. AUZ will be required to enter into a VPA with the local planning authority and, through the VPA, to commit to ongoing contributions to public benefits throughout the operational life of the Project.

8.1.2 Mining Act 1992

Environmental aspects of mineral exploration and mining (including mine rehabilitation and closure) in New South Wales are generally administered under the *Mining Act* 1992.

Once a development consent has been issued under the *EP&A* Act, the project proponent would be required a Mine Operations Plan (including a mine rehabilitation plan) to the Department of Industry Resources & Energy.

Documentation required by Resources and Energy has a strong focus on mine rehabilitation. Proponents are required provide an estimate of mine rehabilitation costs and to lodge a security deposit covering the full estimated cost of rehabilitation. Annual reporting on environmental performance (including rehabilitation progress) will be required as part of authorisations issued under the *Mining Act*.

8.1.3 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act* (*POEO* Act) is the instrument through which certain specified activities are regulated by the Environment Protection Authority (EPA). Activities listed in Schedule 1 of the *POEO* Act are administered by means of environmental protection licences issued to owners or operators of the premises on which the activities occur. he Flemington Project would require a licence authorising mining and mineral processing, as well as some other regulated activities (potentially including road construction, waste disposal, sewage treatment, quarrying of borrow material, hazardous chemical storage and the like).

9 Project Economics

SRK has undertaken a preliminary estimate of the project economics to a scoping study level of accuracy, i.e. +/-30%. Table 9-1 shows the LOM Mining and Processing physicals applicable to the Project.

Table 9-1: LOM Mining and Processing physicals

Category	Description	Units	LOM Totals
Mining physicals	ROM Ore Mined	t	1,682,397
	Waste	t	1,512,413
	Strip	ratio	0.90
	Total Material Movement	t	
	ROM Sc Grade	ppm	450.4
	ROM Co Grade	ppm	639.3
	SC Metal - ROM	t	758
	Co Metal - ROM	t	1,076
Processing physicals	ROM Ore Processed	t	1,682,397
	Sc Grade Processed	ppm	450.4
	Co Grade Processed	ppm	639.3
	Sc Metallurgical Recovery	%	76.2%
	Co Metallurgical Recovery	%	80.6%
	Sc Metal Recovered	t	577
	Co Metal Recovered	t	867
	Scandium to Sc_2O_3	Factor	1.533
	Sc_2O_3 Produced	t	885

Figure 9-1 shows the physical production from the Project.

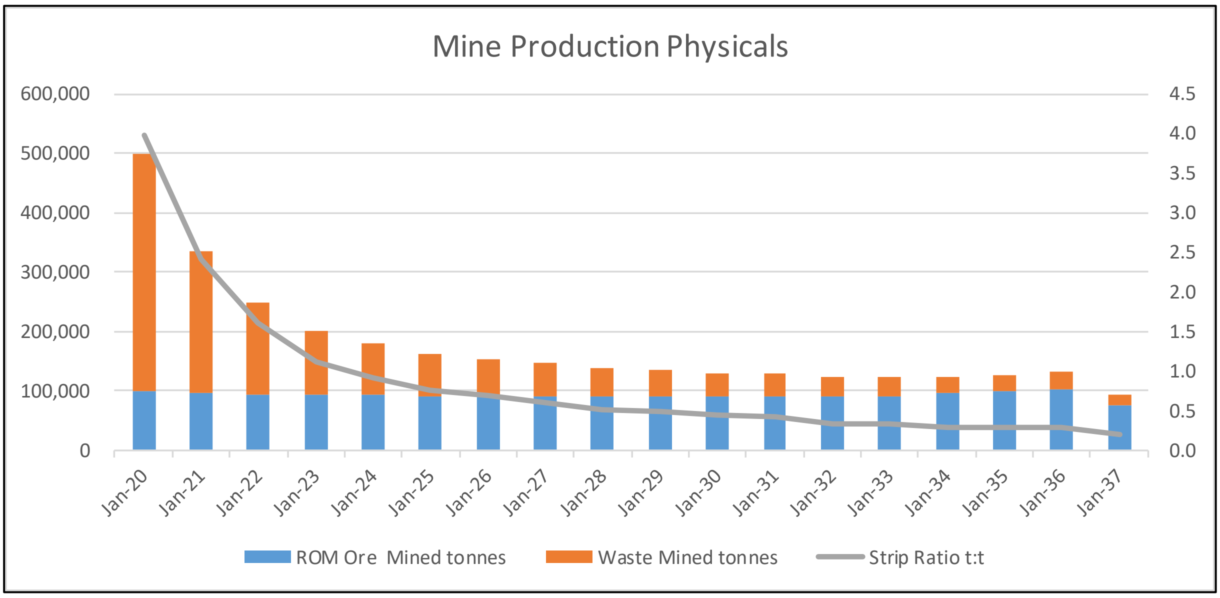

Figure 9-1: **Mine production**

Figure 9-2 shows the ROM production and ROM grades from the Project.

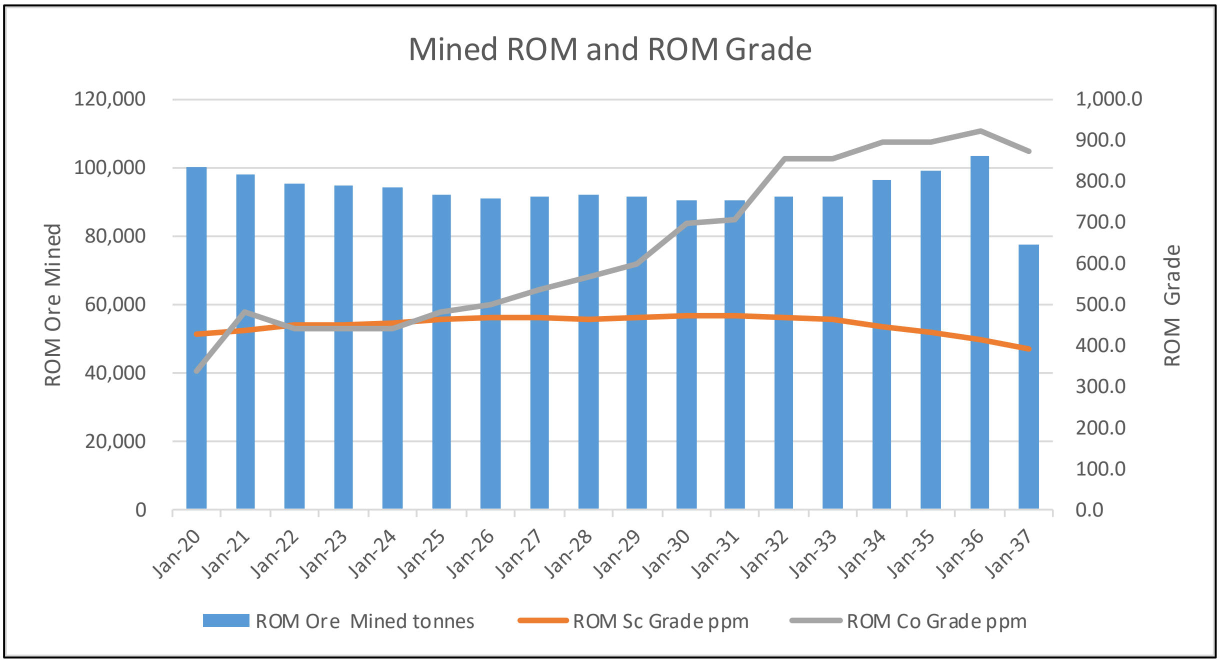

Figure9-2: **ROM production and grade**

Figure 9-3 and Figure 9-4 show the proportions of Measured and Indicated Resources in the proposed Scoping Study Mine Plan, by tonnages and percentages, respectively.

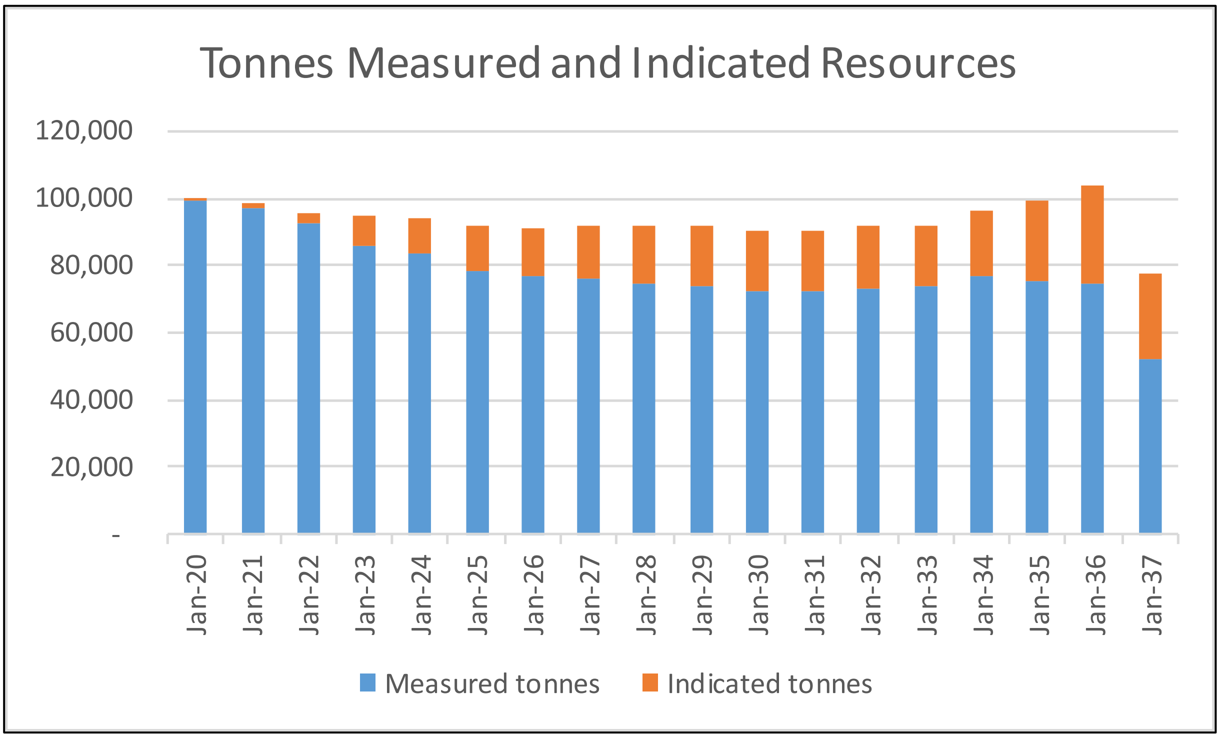

Figure 9-3: Measured & Indicated Resource tonnages

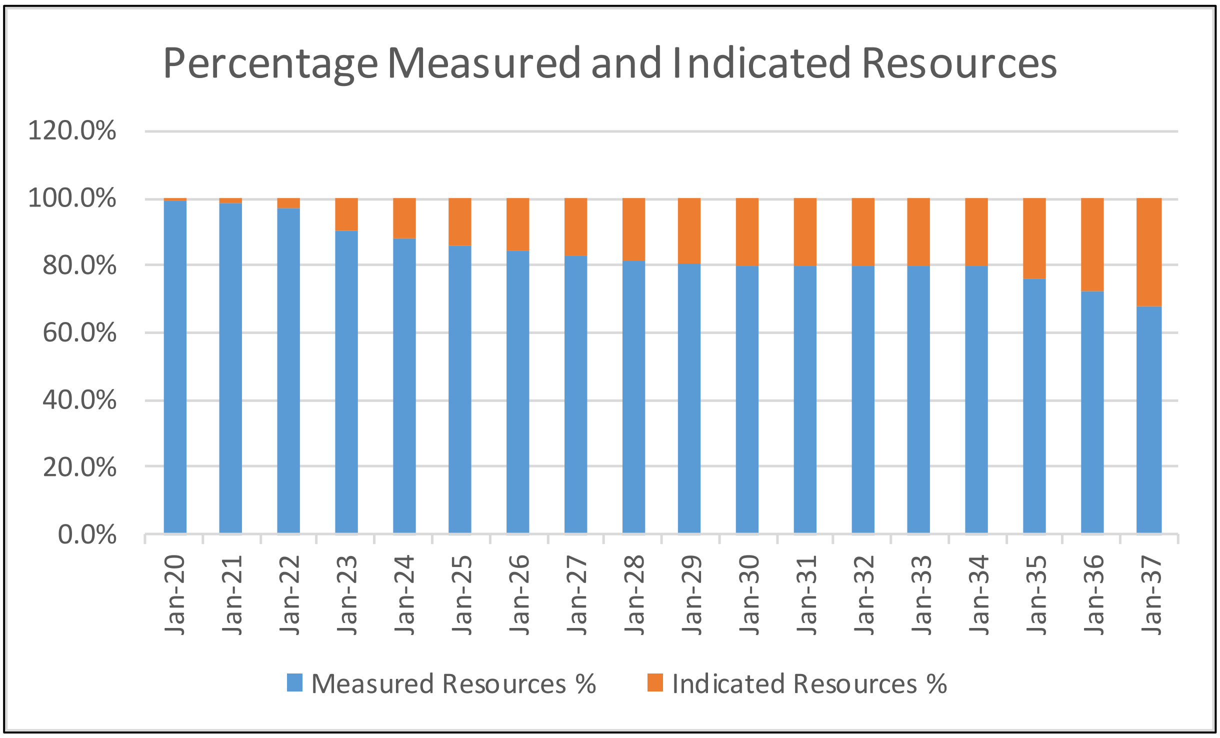

Figure 9-4: Percentage of Measured & Indicated Resources

9.1 Operating costs

Table *9-2* shows the LOM operating costs of the Project.

Table 9-2: LOM operating costs

Unit Operating Costs	Unit	LOM Totals
Mining Cost	A$/t TMM	3.50
Processing Cost	A$/t ROM	193.75
G&A Cost	A$M	5.00
Sales Cost	A$/t Product	6,500.00
Operating Costs		
Mining Cost	A$M	11
Mobilisation & Tech Services	A$M	3
Environment Opex	A$M	2
Water Opex	A$M	4
Processing Cost	A$M	326
G&A Cost	A$M	90
Sales Cost	A$M	6
Total Opex Estimate	**A$M**	**443**
Opex with Contingency (20%)	**A$M**	**531**

9.2 Capital costs

The capital costs of the processing plant is estimated at A$74 million.

Sustaining capex is estimated at A$33 million over the life of the mining operation at Flemington.

9.3 Revenue

Figure 9-5 shows the estimated revenue of the Project.

The Sc_2O_3 product price of US$1.5 million used in the study is consistent with the pricing used by Clean TeQ Holding Limited in their study of the adjoining Syerston project. This was considered appropriate given that Flemington ore body appears to be the continuation of the Syerston mineralisation. SRK understands that AUZ is presently in discussions with a number of potential off-take partners, and the outcome of the discussions may influence the price used in any subsequent PFS.

9.4 Economic analysis

5 shows the forecast net profit after tax (NPAT) for the Project.

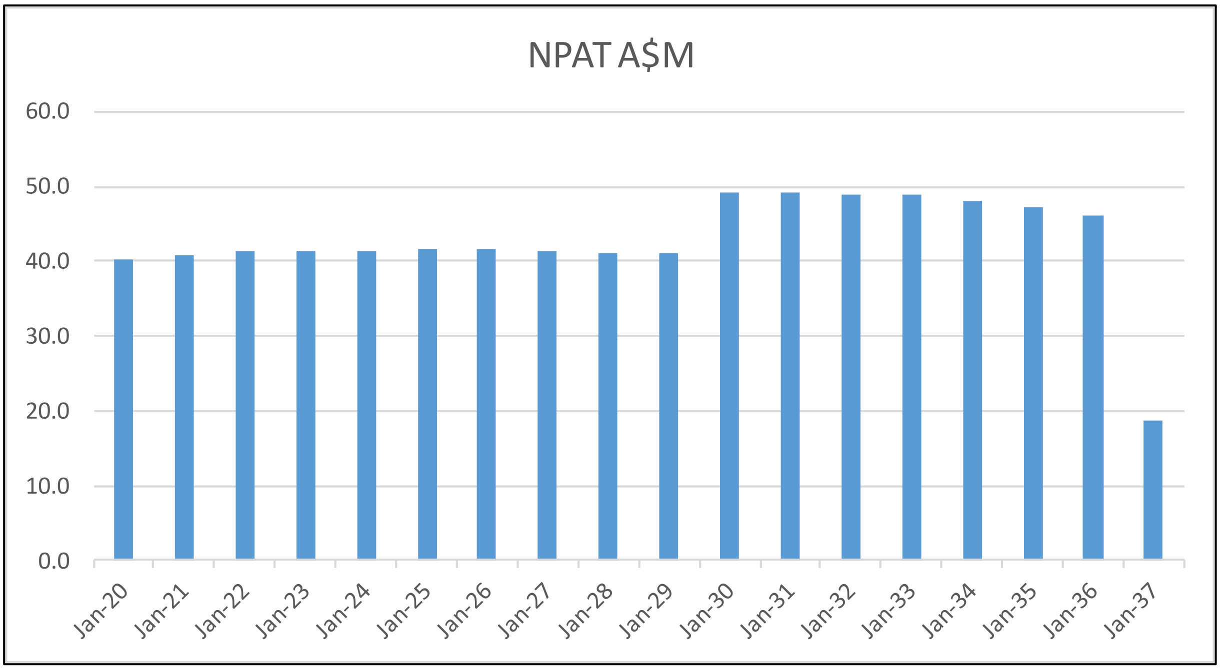

Figure 9-5: Net profit after tax

Figure 9-6 and Figure 9-7 show the after-tax cash flow for the Project, on an annual and cumulative basis, respectively.

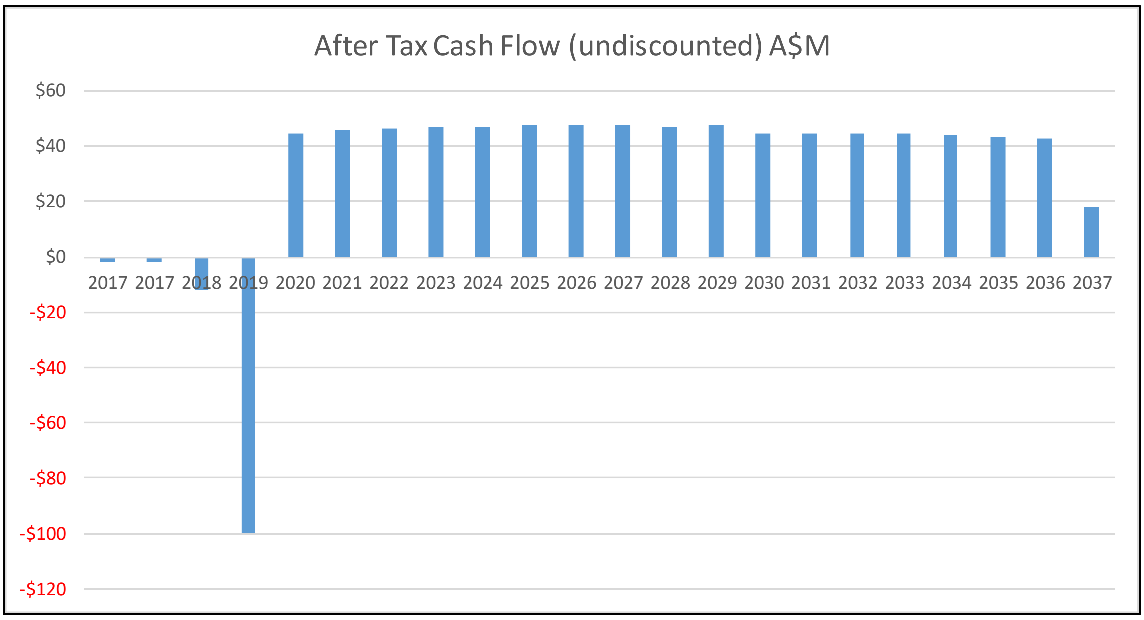

Figure 9-6: After-tax cash flow

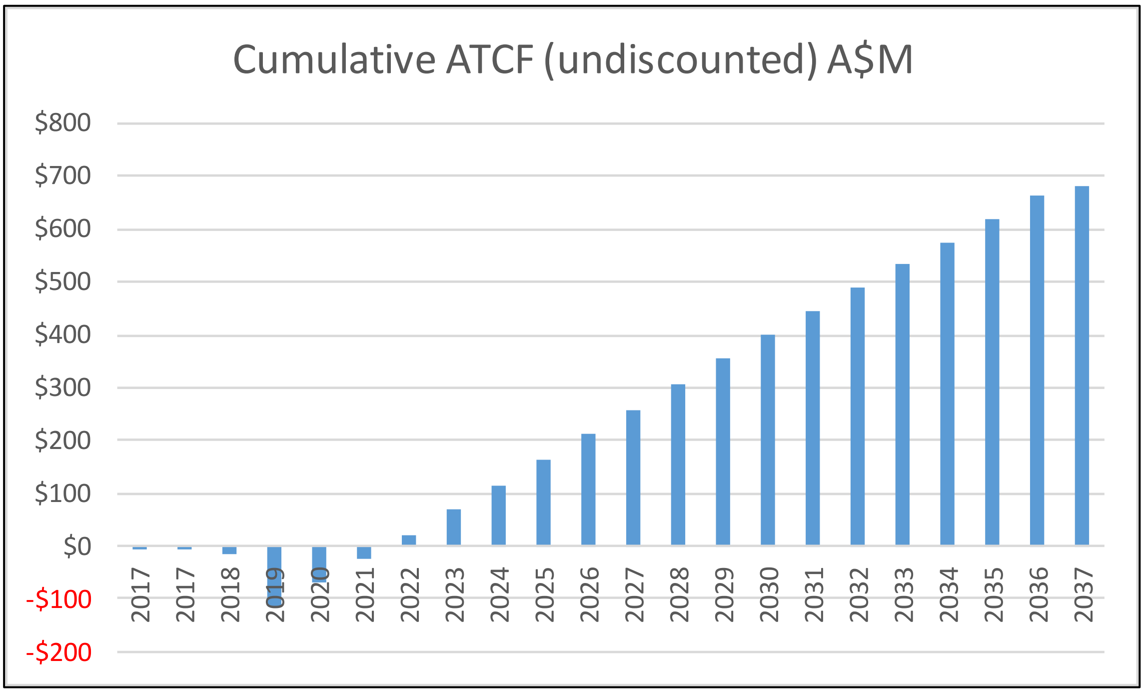

Figure 9-7: Cumulative after tax cash flow

Table 9-3 shows the result of SRK's economic analysis.

Table 9-3: Result of economic analysis

Discount Rate	NPV (A$M)
4%	409.6
8%	255.5
12%	162.5
Internal Rate of Return	37.3%

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9.5 Sensitivity analysis

SRK has undertaken a sensitivity analysis on the economic model, the results of which are shown in Table 9-4 and Figure 9-8.

Table 9-4: Sensitivity analysis

Variance (%)	Opex (A$)	Sc_2O_3 Price (A$)	Exchange rate
25	197.2	385.9	151.2
20	208.9	359.9	168.6
15	220.5	333.8	187.5
10	232.2	307.7	208.1
5	243.9	281.6	230.7
0	255.5	255.5	255.5
-5	267.2	229.4	283.0
-10	278.8	203.4	313.5
-15	290.5	177.3	347.6
-20	302.2	151.2	385.9
-25	313.8	125.1	429.4

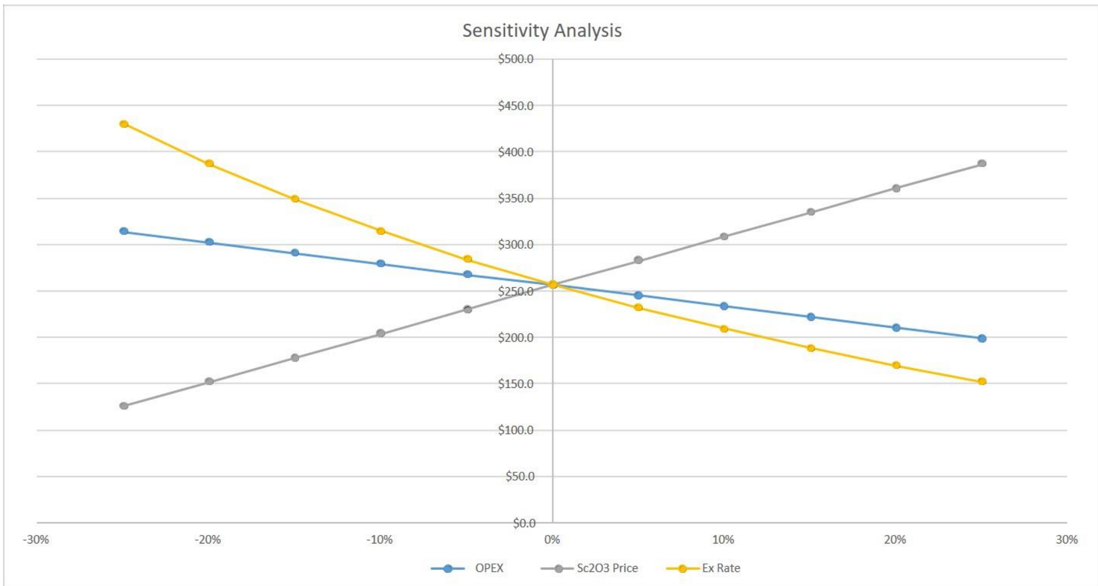

Figure 9-8: Sensitivity analysis

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10 Conclusions and Recommendations

The scoping study has defined a small-scale mining and processing operation with a base case production rate target of 50 tonnes per annual of Sc_2O_3. The study is focused on the first 18 years of the operation, although the total project life is estimated to be over 30 years. The grades presented to the plant in the first 18 years are higher than average deposit grades, improving the project payback.

In SRK's opinion, the economic results of this scoping study are promising and SRK recommends that AUZ considers proceeding to a pre-feasibility level of study for the Project.

The Project generates an after-tax cash flow of A$677 million for the first 18 years of the LOM.

The global market for Sc_2O_3 is small and the revenue of US$1.5M/t Sc_2O_3 has been found to be a key project driver. SRK does note that AUZ is presently in discussions with a number of potential off-take partners, and the outcome of the discussions may influence the price used in any subsequent PFS.

The mining operation at Flemington is proposed to be small scale, contract based, campaign mining. The Project has been found to be insensitive to mining costs.

A hydrometallurgical plant with a conventional processing flowsheet was selected with a processing rate up to 100,000 tonnes per annum of ore to produce 50 tonnes per annum of Sc_2O_3 as well as nickel and cobalt by-products.

Metallurgical testwork undertaken by the CSIRO on Flemington ore has demonstrated high metal extractions at relatively low acid consumptions, both of which are critical drivers of the project economics. The testwork has not highlighted any likely processing issues, based on the samples tested.

SRK's review did not identify any environmental or social considerations likely to significantly compromise project permitting and implementation.

SRK is presently acquiring this water allocation from the New South Wales Authorities on behalf of AUZ.

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Appendix 2: Information notes

Flemington Scandium-Cobalt Project

The Mineral Resource for the Flemington Scandium-Cobalt Project contained within this document is reported under JORC 2012 Guidelines. This Mineral Resource was first reported by Jervois Mining Limited on 20 August 2015. There has been no Material Change or Re-estimation of the Mineral Resource since this 20 August 2015 announcement by Jervois Mining Limited.

Company Disclaimer

This release contains forward-looking statements. The actual results could differ materially from a conclusion, forecast or projection in the forward-looking information. Certain material factors were applied in drawing a conclusion or making a forecast or projection as reflected in the forward-looking information.

The Flemington Scandium-Cobalt project is at the Scoping Study phase and although reasonable care has been taken to ensure that the facts are accurate and/or that the opinions expressed are fair and reasonable, no reliance can be placed for any purpose whatsoever on the information contained in this document or on its completeness. Any results can developments of the project and the scandium market development may differ materially from those expressed or implied by these forward-looking statements depending on a variety of factors. A key conclusion of the Scoping Study, which is based on forward-looking statements, is that the Flemington Scandium-Cobalt Project is considered to have positive economic potential. Further detailed studies are required to increase the confidence in the project parameters, economics and scandium market.