

ASX Announcement

30 September 2019

**Andromeda Metals Limited**

ABN: 75 061 503 375

Corporate details:

ASX Code: ADN

Cash: \$1.669 million
(as at 30 June 2019)

Issued Capital:
1,356,485,250 ordinary shares
703,602,124 ADNOB options
20,000,000 unlisted options

Directors:**Rhod Grivas**

Non-Executive Chairman

James Marsh

Managing Director

Nick Harding

Executive Director and
Company Secretary

Andrew Shearer

Non-Executive Director

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Scoping Study Delivers Robust Economics for Poochera Halloysite-Kaolin Project

Scoping Study Highlights

- **Positive Scoping Study supports the proposed Poochera Halloysite-Kaolin Project as a technically sound and financially robust venture with the potential to generate significant cash flows.**
- **Life of Mine (LOM) key financial metrics¹ comprise the following:**
 - **All In Sustaining Cost² (AISC) averages A\$396/tonne of fully refined kaolin with an anticipated selling price³ of A\$700/tonne;**
 - **Project Cashflow is approximately A\$800M;**
 - **Net Present Value (Pre-Tax using an 8% discount rate) is A\$413M;**
 - **Internal Rate of Return of 174%.**
- **Pre-production capital cost is estimated at A\$9M with a maximum cash requirement of A\$25M prior to initial revenues being received.**
- **Payback estimated at 15 months from start of mining with the projected A\$28M dry-processing plant funded from cashflow generated from raw material shipping and toll wet-refining operations.**
- **An initial mine life of 15 years producing premium grade refined kaolin to meet the large and growing supply shortfall in high value bright-white halloysite-kaolin product for ceramics applications.**
- **The mine plan Production Target⁴ is based on the 2019 Mineral Resource⁵ and involves shallow open-cut mining of kaolinised granite at 500ktpa, 7.6 Mt over the LOM, which after processing and refining yields a LOM 2.8 Mt of premium product.**
- **Toll wet-refining facilities in Asia will be used, fed initially by Direct Shipping Ore (DSO) material until dry-processed material becomes available from a plant to be commissioned at site during the second year of operation.**
- **Both the initial bulk DSO material and bags of dry-processed product will be shipped through existing, or under development, port facilities.**
- **Anticipated workforce of 30-40 people to reside locally or at Streaky Bay.**
- **Time-line for Project development is to conduct environmental and prefeasibility studies through to mid-2020 and subject to obtaining all necessary regulatory approvals, commencement of operations are targeted for mid 2021.**

Cautionary Statement

The Scoping Study referred to in this announcement has been undertaken to determine the potential viability of a direct shipping and dry-processing operation to produce high-quality halloysite-kaolin product from the Kaolin Resource at Poochera in South Australia to provide Andromeda Metals with the confidence to undertake further and more detailed Feasibility Studies for the Project. It is a preliminary technical and economic study of the potential viability of the Poochera Halloysite-Kaolin Project. It is based on low level technical and economic assessments that are not sufficient to support the estimation of ore reserves. Further exploration and evaluation work and appropriate studies are required before Andromeda Metals is in a position to estimate any ore reserves or to provide any assurance of an economic development case.

The Production Target referred to in this announcement is based on Measured and Indicated Resources for the mine life. Andromeda Metals has concluded that it has reasonable grounds for disclosing a Production Target, however there is no certainty that the Production Target or preliminary economic assessment will be realised.

The Scoping Study is based on the material assumptions outlined elsewhere in this announcement. These include assumptions about the availability of funding. While Andromeda Metals considers all of the 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 Scoping Study will be achieved.

To achieve the range of outcomes indicated in the Scoping Study, funding in the order of A\$25M, inclusive of working capital, is likely to be required. Investors should note that there is no certainty that Andromeda Metals will be able to raise that amount of funding when needed. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Andromeda Metals' existing shares. It is also possible that Andromeda Metals could pursue other 'value realisation' strategies to provide alternative funding options.

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

This announcement includes forward looking statements. For further information on forward looking statements please refer to the end of this release.

Summary

Andromeda Metals Limited (ASX: ADN, Andromeda, the Company) is pleased to announce the results of a Scoping Study undertaken for a proposed open-cut mine and dry-processing plant for the Carey's Well deposit located on the Poochera Halloysite-Kaolin Project on the Eyre Peninsula of South Australia.

The Study confirms the potential for the Poochera Halloysite-Kaolin Project to be a long-term supplier of high-quality halloysite-kaolin product to meet a growing demand from ceramics industry manufacturers and thus provide significant cash flows for Andromeda and its joint venture partner Minotaur Exploration Limited (ASX: MEP, Minotaur). (Refer section 3 for a summary of the joint venture terms).

The Study adopts an approach of initially shipping raw material and toll wet-refining in Asia to generate early cash flows to fund the majority of costs associated with construction of an onsite dry-processing facility during the second year of operation. Production is then scheduled to convert to site dry-processing of mined

kaolinised granite to remove the majority of the contained quartz sand in the material, which will generate significant transport and shipping savings, with the concentrated product shipped in bulk bags to Asia for toll wet-refining in order to produce a premium bright-white halloysite-kaolin product.

Additional other kaolin market areas, including supplying the High Purity Alumina (HPA) sector and halloysite nanotechnology research, have not been considered as part of the Scoping Study and represent potential future opportunities to be evaluated.

A summary of the key physical and financial statistics associated with the Scoping Study is shown in Table 1 below.

Table 1 – Key Project Statistics

Mine Plan – Production Target	
From Measured Resources	4.2 Mt
From Indicated Resources	3.4 Mt
From Inferred Resources	0.0 Mt
Total Production Target	7.6 Mt
Capital Costs	
Initial Capital Costs, Year 0	\$9M
Working Capital to Month 3, Year 1	\$16M
Maximum Cash Requirement	\$25M
Processing Plant, funded by internal cash flow, Year 2	\$28M
Sustaining Capital Costs (Years 3-15 @ \$600K/yr)	\$9M
Production Summary	
Mine life	15 years
Dry-processing rate of kaolinised granite	500ktpa
Stripping Ratio (Waste:Ore)	2.3
Premium Refined Kaolin Produced	187ktpa
Average Yield of Refined Kaolin (LOM average)	37%
Project Economics	
Kaolin Price – Premium Wet-Refined (A\$/tonne ex Asian works)	\$700/t
Revenue	\$1,953M
AISC equivalent (AUD/tonne Wet-Refined Premium Kaolin)	\$396/t
EBITDA LOM	\$844M
Cashflow	\$798M
NPV (8% pre-tax)	\$413M
IRR	174%
Payback from start of site works	15 months

Note – all figures are on a 100% project basis and rounded to reflect appropriate levels of confidence

After consideration of a number of potential annual mining and production scenarios, focus was directed towards a mining rate of 500ktpa of raw material for the 7.6 Mt Production Target over a 15 year mine life, producing on average 187ktpa of premium refined kaolin product.

The Project will create approximately 30-40 jobs once the dry-processing plant is operating with most employees to be sourced locally and reside in the Streaky Bay district.

At an assumed selling price of A\$700/tonne, total LOM revenues of A\$1,957M are estimated to be generated by the Project. Total All In Sustaining Cost (AISC) averages A\$396/tonne over the LOM and this presents a significant cash margin to be generated by the Project given LOM capital expenditure totals A\$62M which includes initial start-up and working capital expenditure of A\$25M and the cost of construction of a dry-processing plant of a further A\$28M in year 2. Total cumulative cash flow generated over the LOM is approximately A\$800M. At an assumed discount rate of 8%, the Project has an NPV of \$413M, an IRR of 174% and payback of initial capital and operating expenditures within 15 months from commencement of operations.

The anticipated timeline for Project development is to conduct environmental and Pre-Feasibility Studies from October 2019 to mid 2020. Subject to satisfactory progress on a subsequent Definitive Feasibility Study and the obtaining of all necessary regulatory approvals and agreements, commencement of operations is targeted for mid 2021.

Andromeda has commenced studies on a wet-processing option utilising a low cost, highly efficient and commercially available facility to potentially be based on site that has the advantage in that it produces a fully wet-processed product that allows the Company to capture the maximum product price without selling an intermediate product.

Key Components of Scoping Study

1. Scoping Study Project Team

MinEcoTech Pty Ltd acted as the Study Manager and compiled the Scoping Study based on studies and reports from historical and recent sources including employees of the two joint venture partner companies and specialist consultants. Contributors to the main aspects of the study included the following:

Table 2 – Scoping Study consultants used

Consultant	Scope of Work	Work Performed
H&SC Consultants (Simon Tear)	Resource estimation	2018-9
Golder Associates	Mine geotechnical review	2018
Groundwater Science (Ben Jeuken)	Hydrogeology review	2018
Mark Pitt (Andromeda employee)	Mine design and schedule	2019
Bureau Veritas	Metallurgical testing	2018-19
CSIRO	Halloysite testing	2018-19
RSG (USA)	Dry-process pilot tests	2019
CPC Project Design	Dry-process plant design	2019
Cultivise (Adam Chilcott)	Transport and Logistics review	2019
Ian Wilson Consultancy (Ian Wilson UK)	Market study	2019
First Test Minerals (Frank Hart UK)	Market study	2019
Rural Solutions	Preliminary flora survey	2011
Envirocom (Andrew Minns)	Permitting and environmental	2018-9
MinEcoTech (Paul Griffin)	Project management	2019

2. Project Location

The Poochera Halloysite-Kaolin Project is located on the western part of the Eyre Peninsula of South Australia approximately 660 kms west by road from Adelaide and 70 kms east from Streaky Bay.

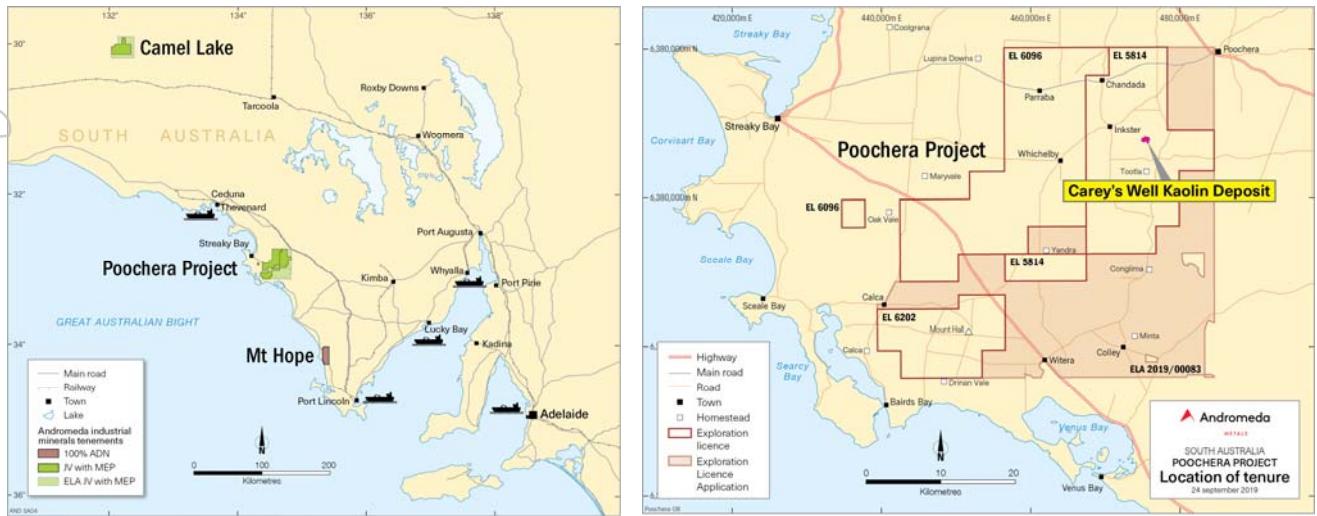


Figure 1 – Project Location Map

The Poochera Project comprises 3 tenements covering an area of 1,576 kms² with a new tenement application of 648 kms² for ground adjacent to the Project area considered prospective for high-quality halloysite-kaolin currently lodged with the SA Department of Energy and Mining and pending approval.

The Carey's Well deposit is situated on the Tootla tenement EL 5814 within the Poochera Halloysite-Kaolin Project. The area is flat to gently undulating with much of the land cleared for sheep grazing and cereal crops, with remnant patches of mallee open scrub vegetation.

The local government authority is the District Council of Streaky Bay, with the main population and service centre being the township of Streaky Bay (c. 1,400 people). Streaky Bay has a range of community services including police station, medical centre, high school, emergency services, recreation centre (opened in 2016), hotel, and numerous sporting clubs and community organisations.

3. Project Ownership

The Poochera Halloysite-Kaolin Project is a joint venture between Andromeda and Minotaur Exploration Limited (ASX: MEP, Minotaur) executed in April 2018. Under the terms of the joint venture, Andromeda can earn up to a 75% equity interest in the Project by either sole funding \$6.0M over 5 years or alternatively a decision to mine is made by the joint venture partners, with an initial 51% interest earned by the Company through the expenditure of \$3.0M on advancing the Project by April 2020. On Andromeda reaching a 75% interest, each party will then contribute to the Project budget as per their equity interest or otherwise be reduced as per the standard industry dilution formula. If an equity interest falls below 5%, that party's interest will convert to a 2% net smelter royalty over the Project.

The tenement package is secure and compliant with the requirements of the SA Department of Energy and Mining as at the date of this announcement.

4. Mineral Resources

An updated Mineral Resource estimate reported in accordance with the 2012 JORC Code and Guidelines for the Carey's Well kaolin deposit was released to the market in February 2019 (refer ADN ASX announcement dated 12 February 2019 – "Poochera Project Halloysite Kaolin Mineral Resource"). The resource estimate was completed by independent geological consultancy group H&S Consultants Pty Ltd. A summary of the kaolin Mineral Resource is shown in Table 3.

Table 3 – Kaolin Mineral Resource

Halloysite Zone	Category	Volume Mm ³	Mt	Reflectance
	Measured	0.8	1.1	83.7
SE Area	Indicated	0.9	1.3	83.5
	Inferred	0.3	0.5	84.7
Sub Total		2.0	2.8	83.8
	Measured	2.8	4.1	82.5
North	Indicated	1.8	2.5	82.4
	Inferred	0.2	0.3	84.0
Sub Total		4.8	6.9	82.5
Total		6.8	9.7	82.9

The estimate total is 9.7Mt of kaolinised granite in the halloysite zone, with minimum raw kaolin ISO brightness (R457) of 75. The kaolinised granite is primarily coarse sand in the +45 micron fraction with predominantly kaolinite and halloysite in the -45 micron fraction. The -45 micron fraction contains an average halloysite grade of 18.4%.

A bulk sample program was undertaken in October 2018 which included designing and implementing an appropriate method to determine bulk rock density on the unconsolidated, porous kaolinite-halloysite material. The average in-situ bulk rock density measured for the material sampled was 1.83 tonnes/m³, whilst the average dry bulk rock density was 1.44 tonnes/m³. The average moisture content of the bulk sample material was measured to be 21.6 wt.%. The average dry bulk rock density of 1.44 tonnes/m³ was used in the February 2019 Mineral Resource.

No ore reserves have been delineated to date.

5. Geotechnical

A preliminary geotechnical study has been undertaken by Golder Associates. Auger drilling samples were logged on site and samples tested in a geotechnical laboratory.

The preliminary guidance on typical batter slopes for the material types encountered during the investigation was:

- Calcrete, Clayey sand and Silty calcareous sand: Slope 1V:1.5H
- Sandy Clay, Sandy calcareous clay, and Silcrete: Slope 1V:1H to 1.5V:1H

Note that these typical batter slopes are indicative only at this stage and will require to be assessed during further investigation stages.

6. Hydrogeology

A preliminary hydrogeology assessment was completed by Groundwater Science in 2019 which included the installation of three groundwater monitor bores over the resource area. The groundwater level was found to vary between 18-24 metres below the surface, with an apparent step change between the west side and the east side of the resource area. The groundwater on the west side was saline (36,000 TDS) as is typical for the region, while that water on the east side was less saline than expected (1,300 TDS).

Transmissivity was found to be very low, indicating that bore yields would be practically unpumpable (approximately 0.05 L/s) and that groundwater flow in the pits would be low seepage. Consequently, most pit water management would involve rainwater and be managed with normal pit sumps and small submersible pumps and small diameter pipelines.

Further hydrogeology work is planned in the next stage of the Project to seek near site groundwater supplies and to generate further data for mine closure planning and to support environmental approval applications.

7. Mining and Mine Design

The Project is proposed to comprise two shallow open pits, located close to the processing plant, to be mined sequentially in 11 stages with overburden and reject sand from the process plant to be backfilled into the previous voids.

Production is envisaged to be managed by Andromeda and undertaken by an earthmoving contractor using excavators and trucks to haul ore and waste to respective stockpiles, though in practice much of the overburden earthmoving may be more cheaply done by dozers and scrapers.

It is envisaged that the in-situ material can be easily excavated because it is predominantly soft and easy digging, except for thin bands of harder calcrete rock near the surface and silcrete rock just above the kaolinized granite that may both require limited blasting.

Mining is planned to commence at the shallower western end of the northern pit and proceed in eight further ~200m cutback stages over 11 years to the eastern end of the pit, and then proceed to the south pit.

Overburden from the initial starter pit is planned to be deposited into the overburden dump and subsequent overburden placed into the previous mined-out area.

Pit optimisation was not needed due to the very simple and shallow resource geometry being amenable to a manual interactive pit design based on the two higher halloysite zones of the resource. The slope angles in the pit design are based on an interberm face angle of 45° with 7m wide berms at 15m intervals and allowances made for pit access ramps, which are in line with the geotechnical assessment. Pit optimisation and new pit re-design are planned to be done during the next feasibility study phase.

An allowance for ore loss is included in the Production Target estimate. All inventories have been reported based on the 0% global dilution and 10% ore loss. The assumed dilution is 0% because it must be avoided for product quality, and to achieve this a low mining recovery of 90% is assumed which is lower than normal for a free digging thick mineralisation ore body.

The Scoping Study Mine Plan results in a Production Target to mine for processing 4.2Mt of the 5.2Mt Measured Resources, 3.4Mt of the 3.8Mt Indicated Resources and none of the 0.8Mt Inferred Mineral Resources. The Mineral Resources underpinning the Production Target published by the Company on 12 February 2019 have been prepared by a Competent Person in accordance with the requirements of the 2012 JORC Code as noted in the Compliance Statement in section 19 of this announcement.

The mining schedule has been developed to permit plant throughput rates of 500ktpa (dry basis), giving over 15 years operating life. The Production Target has total material movement of approximately 16.9M bank m³ (BCM) of total earth moved and 7.6 Mt of kaolinized granite delivered to the ROM stockpile. Pre-stripping of starter pit overburden is scheduled to start three months before the commencement of shipping. The Scoping Study pit design layout is shown Figure 2.

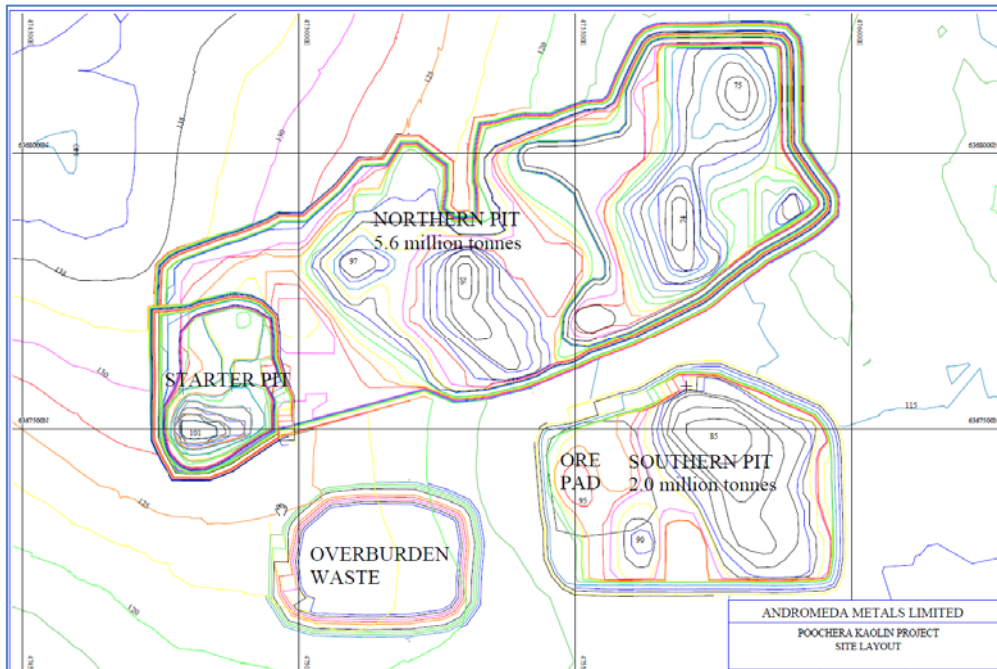


Figure 2 – Carey’s Well Open Pits

8. Metallurgy and Processing



Figure 3 – Carey’s Well raw kaolinized granite, after auger sampling. The visible intact lumps are easily broken by hand.

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Metallurgical test work has been undertaken historically, and more recently at laboratory and pilot scales, to assess the response of the Carey's Well kaolinized granite to various processing approaches. Dry-process pilot trials recently completed in the USA have shown approximately 40% yield of kaolin clay at less than 5% contained sand, which is suitable as feed for wet-process refining that has previously been shown to be effective at producing kaolin with low levels of impurities.

The pilot scale testwork done to date has shown consistent results for both wet and dry-processing performance, but this may be because the samples used in this work have come from a restricted area, in the eastern part of the resource. To address the remote possibility that markedly different pilot scale results would be obtained in the western part of the orebody, work on "variability testing" is desirable. This work can be scheduled for the Definitive Feasibility Study phase after a choice between wet and dry-processing is made during the Pre-Feasibility phase.

CPC Process Engineering (CPC) were retained to carry out a site process plant design and capital and operating cost estimates.

The process design has been developed from the metallurgical testwork to meet the design objective of 500ktpa throughput using the dry processing approach and the plant design includes the following areas:

- Front end loader feed from the ROM stockpiles
- A hopper, apron feeder and single drum toothed oversize breaker
- Power station heat supply, LPG gas heater, and heat recovery equipment
- Dryer
- Classifier
- Bag house
- Bagging plant
- Reject sand handling
- Product warehouse
- Road train loading area

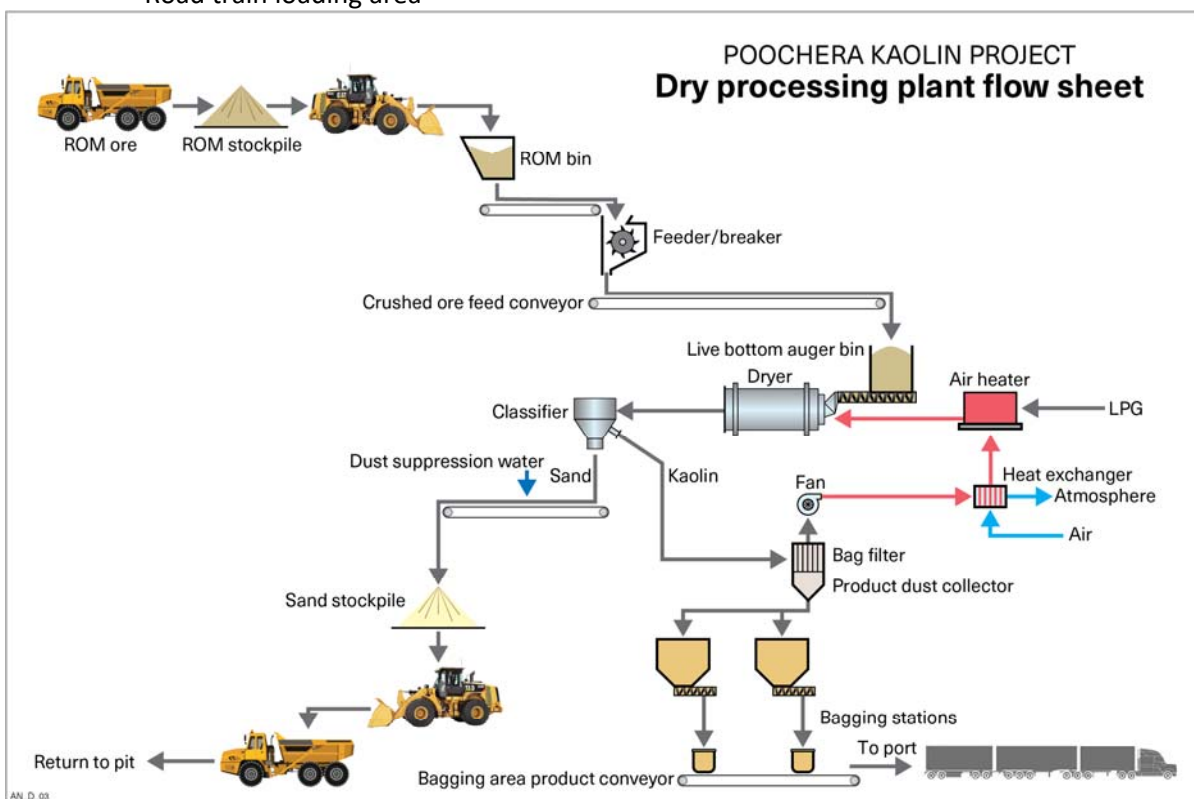


Figure 4 - Dry Process Design Flow Sheet

The feeder breaker is sized to match the combined drier capacity, which is nominally 75 tonnes per hour. The dryer/classifier product collection and bagging systems are based on two parallel independent trains of nominally 40 tonnes per hour each. The plant will operate continuously, with an assumed operating time of 8,000 hours per year, for 91.3% utilisation.

The plant is proposed to be located close to the pits, and the plant and site infrastructure will be designed and built on an engineering, procurement and construction management (EPCM) basis.

Wet-processing was not used as an option in the Scoping Study, but it shows good promise and will also be evaluated in the next Feasibility Study phase.

The Project area is a greenfield development with the following site infrastructure items proposed to be constructed:

- Site and internal access roads
- Water control drains
- Area for run of mine (ROM) ore stockpiles
- Administration office complex and emergency response building
- Mining operations and maintenance facilities
- Process plant workshop and store and reagent store
- Assay laboratory
- Infrastructure
 - Diesel fuel storage
 - LPG storage
 - Water supply pipeline
 - Power station

9. Infrastructure, Transport and Services

Access to the site from Adelaide is excellent via the Eyre Highway with most fuel and operational supplies likely to be freighted to site via this route. Within the Project area, access is available by a network of well-maintained District Council bitumen and gravel roads. The mine and plant can be accessed by a planned mine road from the Poochera-Port Kenny Road several kms to the east, via a route to be determined by environmental, land ownership, terrain, and haul distance considerations.

Project site personnel, anticipated to be approximately 30-40 people, are likely to be housed in Streaky Bay, or alternatively could reside at other localities within self-driving distance from the mine. Overflow and shutdown motel accommodation is available in Streaky Bay. A bus service from Streaky Bay is intended for shift changes.

The power supply adopted is provided by LPG fuelled generation on site to be supplied on a Build-Own-Operate (BOO) basis by an independent power producer under a price per kWhr contract, with the generator waste heat able to be used on the process plant driers. Grid power may be considered in the longer term.

It is proposed that LPG will be supplied and delivered under an all inclusive \$/L or \$/GJ contract and water supplied from the nearby SA Water supply pipeline.

10. Shipping

The site is well serviced by roads and regional ports with transport to the shipping port options under consideration envisaged to be by truck. The bulk DSO would be transported in tipper trailers while the dry-processed product would be transported in bulk bags on flat deck trailers.

Of the five existing ports in the region that are potentially capable of handling bulk or bagged kaolin product, Port Adelaide and Lucky Bay were evaluated in the Scoping Study. All port options are likely to be reviewed in the next Study phase.

The port of Lucky Bay is currently being developed and can be expected to be fully operational when the Poochera Project commences shipping. Budget purpose costing has been received for this option and incorporated in the Scoping Study.

The Port Adelaide option has higher road freight costs but lower ship loading costs and can be considered as a contingency option.

11. Refining

The Company has been in discussions with the management of several wet-processing facilities in China and Japan. Many of these facilities are experiencing a shortfall in available supply of suitable quality raw material and so have spare capacity for toll processing to manufacture final saleable product to Andromeda's specifications. The technical parameters of the wet-process refineries are in line with or, because of enhanced equipment such as centrifuges and magnetic separators, superior to the basic pilot plant conditions under which the Poochera kaolin has been assessed. The Company therefore expects the technical specifications of the wet-refinery product to meet and possibly exceed those of the pilot plant test product upon which potential customers have based their written letters of intent. It is therefore intended in the next stage of the Project studies to assess in detail the technical performance, as well as the costs, of the candidate wet-refineries.

The indicative available capacity and refining fees of several wet-refining facilities have been received and are used in the Scoping Study financial model. Ongoing negotiations towards toll refining agreements are planned to be part of the next stage of studies.

12. Marketing and Sales

Whilst the international market for kaolin is based on individual supplier vendor negotiations, Andromeda staff and its industry specialist advisors have a good understanding of market volumes and prices, and this information has been used in the Scoping Study.

The Poochera halloysite-kaolin is suitable for sale into high value ceramics markets globally. Refining by conventional dry or wet processes has proven to yield desirable products with low levels of impurities that give excellent properties in ceramic applications.

Market demand for this type of mineral is extremely high and growing, and importantly global production is reducing due to the closure of several significant high-quality sources. The 15 year mine and supply life proposed in the Study is considered by the Company to make Poochera kaolin a valuable long-life strategic source to currently suffering customers.

Because it offers both superior quality and reliable strategic supply, eight potential ceramic companies have signed Letters of Intent (LOI's) for approximately 210,000tpa of the premium wet-refined grade of Poochera halloysite-kaolin, and this market volume is the basis of the Scoping Study. The LOI's were based on ceramic testing of the premium wet refined product produced at the Streaky Bay pilot plant facility and additional testing will form part of the next Study stage

Based on advice from industry advisors, and Andromeda's own discussions with its agents and customers, the prices applicable to this grade of product are in the range of US\$500-800/t on an ex-works basis for sources in China and other countries. Based on the lower end of this range, US\$500/t (A\$714/t), an ex-refinery price of A\$700/t, packaged in bulk bags, has been adopted for the Study.

The Scoping Study assumes the wet-refining process is used to make premium, world-class product, allowing the full market value to be captured. Direct Shipping Ore is planned to be initially shipped for wet-refining in Asia to give early cashflow, and to fund construction of a dry-process plant on site. The dry-process would produce a 'concentrate', with a maximum of approximately 5% quartz sand, to be shipped to Asia for toll wet-refining.

A dry-process concentration stage also results in a saleable product, but with a relatively smaller margin than the wet-refined option. As determined in the dry-process pilot plant work, the major benefit of dry-processing is removal of approximately 60% waste (sand and moisture), which dramatically reduces transport and handling costs, reduces the wet-refining cost and gives high refinery recovery.

12.1. Other Kaolin Market Areas Not Considered in the Scoping Study

Conventional Grades

The wet-refined grade of product could also be packaged and sold into higher value export markets outside China to further increase margins and volumes.

In addition to the wet-refined product, other potential customers in China and Japan have given technical approval and signed offtake Letters of Intent (LOI) for 760,000tpa of unprocessed Direct Shipping Ore (DSO), and Dry-Processed product. While these are lower priced markets, they also have much lower production costs.

High Purity Alumina (HPA)

HPA metallurgical testing of Poochera halloysite-kaolin has indicated that 4N purity could be achieved with only one stage of purification, and this result was confirmed by additional rounds of testing. Opportunities for collaboration are being considered by Andromeda to realise the full potential of supplying this rapidly growing sector.

High Purity Halloysite

Global occurrences of high purity halloysite are extremely rare, and yet demand is growing significantly due to its use in a large range of new high-tech applications. The current market price for suitable grade is approximately US\$ 3,000/t, but it is not commercially available in any significant amounts in the required form. Exploration drilling in the Poochera area and at Camel Lake has shown the existence of high purity halloysite on the joint venture exploration tenements, and more extensive drilling is being planned to quantify these occurrences.

Halloysite Nanotechnology Research

Application research commenced in 2017 and is ongoing on the natural nano-properties of Poochera halloysite by researchers at the Global Innovative Centre for Advanced Nanomaterials (GICAN), based at the University of Newcastle. This world-leading work includes carbon capture, energy storage potential and the manufacture of carbon nanostructures using halloysite nanotubes (HNT). A separate 50/50 joint venture has been formed between Andromeda and Minotaur to work with GICAN to develop intellectual property associated with halloysite nanotechnology research for potential future commercialisation.

13. Capital Costs

13.1. Initial Capital Cost

The estimated initial capital cost is A\$9M ($\pm 35\%$), which includes a contingency estimate of 20%, for construction of an access road, mining mobilisation and site establishment, and general site

costs. The capital cost estimate does not include the cost of any mining equipment as this is incorporated in the budget earthmoving contract rates.

13.2. Working Capital

A working capital allowance of A\$16M is assumed for pre-stripping overburden, mining, administration, shipping and toll processing operations which occur before these are offset by receipt of revenues from sales.

13.3. Dry-Processing Plant Capital Cost

The cost estimate for the deferred plant construction has been developed with input primarily from CPC Process Engineering and Andromeda staff.

The plant capital cost estimate of A\$28M includes:

- Direct costs of the Project development;
- Indirect costs associated with the design, construction and commissioning of the new facilities;
- Insurance, operating spares and first fills;
- Contingency on Project scope definition and risks.

The estimate is based upon preliminary engineering, quantity take-offs, tendered price quotations for vendor supplied components and budget price tendered quotations for major equipment and bulk commodities. Unit rates for installation are based on market enquiries specific to the Project and benchmarked to those achieved on similar projects undertaken recently within the Australian context.

The capital costs associated with the gas supply facilities and the gas-fired power station are not included in the estimate as these are both to be provided under a Build-Own-Operate (BOO) style contract and are captured in the gas supply and power unit cost used in the operating cost estimates.

A maximum of approximately \$10M is estimated to be directly exposed to possible foreign exchange variation.

The Project execution strategy assumes a 12-month process for off-site construction, on-site construction and commissioning and orders on long lead items to be placed shortly after the first product sales.

13.4. Sustaining Capital Cost

The sustaining capital expenditure estimate represents the cost necessary to sustain or maintain the capital assets to perform to the Project design criteria through the LOM. The Study assumes these will be 2% per year of the relevant initial capital costs.

A summary of the capital cost is presented in Table 4.

Table 4 - Total Capital Cost Estimate

Area	Year 0 A\$M	Year 1 A\$M	Year 2 A\$M	Years 3-15 A\$M	Total Capital A\$M
General Site Costs	6				
Access Road	2				
Mining Mob & Establish	1				
Initial Capital	9				9
Working Capital		16			16
Processing Plant			26		
First Fills and Spares			2		
Processing Plant			28		28
Sustaining				9	9
Total	9	16	28	9	62

At the date of this announcement there has not been an audit of the capital cost estimates undertaken, and this would be scheduled to occur just before financial commitment to commence the Project.

14. Operating Costs

Cash operating costs can be subdivided into mining, processing, site general & administration (G&A), shipping, refining, and marketing. Additional costs are royalties and the overhead costs of marketing, corporate overheads, and ore depletion reserve replacement. Table 5 is a summary of all operating costs by key area.

Table 5 - Operating Cost Summary (LOM)

Area	LOM A\$M	A\$ / t Ore mined & processed	A\$ / t Product sold
Mining	155	20.34	55.30
Processing	217	28.51	77.51
Administration	30	3.98	10.81
Total Site Costs	402	52.83	143.62
Shipping	289	37.97	103.25
Refining	320	41.97	114.12
Marketing	16	2.10	5.71
Royalties	58	7.65	20.79
Corporate Overheads	16	2.13	5.80
Reserve Replacement	8	1.05	2.86
Total (AISC)	1,109	145.70	396.16

Note: All \$/t on an equivalent contained dry tonnes basis

14.1. Mine Operating Costs

The Scoping Study cost model assumes an earth moving contract with a mining contractor and excavation and minor blasting costs for the Project have been based on estimated prices from reputable mining contractors. Allowances have been made for dewatering, site rehabilitation and supervisory staff. The mining support equipment is planned to include a highway legal water truck and grader to maintain the gravel sections of the access roads in a dust free condition until the roads are sealed.

14.2. Processing and Administration Operating Costs

An operating cost estimate for the dry-process plant was estimated by CPC as part of the plant design costing study. This includes common site overheads as General and Administration (G&A) costs.

The operating cost estimate was developed for the Project and is presented in A\$ using prices obtained in, or escalated to, Q3 2019. The estimate has an accuracy of +/-35% and was developed by CPC using inputs sourced from local suppliers, similar projects and CPC's in-house database where appropriate.

The estimate includes costs for:

- Processing labour;
- Power;
- Gas;
- Diesel consumption;
- Process maintenance;
- Mobile vehicles for the process operations;
- Other direct general and administrative costs relative to the process plant and non-processing infrastructure.

Power costs are based on industry standard rates, and gas and water costs are based on quoted budget prices.

14.3. Shipping Costs

A budget purposes quote has been received for shipping through the port of Lucky Bay from its developer. This has been adjusted where necessary for Andromeda's own anticipated supervisory and coordination costs.

An allowance for transport by road from the mine to the port has also been made, based on truck loading at the mine and applying industry standard bulk commodity long distance highway haulage costs (\$/t/km basis).

14.4. Refinery Operating Costs

The LOM operating cost estimate for the toll treatment wet process refinery plant is based on budget purpose quotes received from large and small wet-refining plants in China and Japan. A tonnage capacity weighted-average of these proposals was used as the cost basis in the Study.

14.5. Other Costs

A South Australian State government royalty of 3.5% on net sales (after reducing for shipping costs) has been incorporated in the financial model.

Corporate overhead and head office costs have been allowed for by an annual charge of \$1M.

Marketing and sales support costs have also been provided for by an annual cost of \$1M.

Reserve replacement is covered by a provision of \$0.50/t of ore mined for drilling and geology services to replace depleted reserves beyond 15 years by resource extensions of the original pits, or by the development of new resources on the Company's exploration tenements in the Poochera District.

15. Financial Modelling and Evaluation

The operating costs highlight a conventional technology, low cost and high margin operation with LOM average "All In Sustaining Costs" (AISC) of A\$396/tonne of refined premium kaolin. The AISC is applied to the Poochera Project to indicate the full cost of maintaining an enduring long-life business and includes the following costs: mining, processing, site administration, shipping, offshore refining, marketing, sustaining capital, royalties, site rehabilitation, corporate overheads, and reserve replacement exploration.

At a price of A\$700/dry tonne for premium refined kaolin, and using an 8% discount rate, the Project generates a pre-tax NPV of A\$413M, an IRR of 174% with a payback of 15 months after commencement of site activities. Refer to Table 1.

15.1. Sensitivity Analysis

Under the assumed forecast revenues and costs presented above, the financial analysis completed as part of the Scoping Study indicates that the Project is viable in this estimate.

The investment case was subjected to a sensitivity analysis on the Net Present Value (NPV) and Internal Rate of Return (IRR) against the key variable parameters of refined premium kaolin price, product yield, operating costs and capital costs. In the sensitivity analysis, the operating costs include all direct, indirect and overhead costs except royalties and the capital costs include all initial deferred and sustainable costs except working capital. Each parameter was estimated for a +30% to -30% variation on the base case assumption. Refer to Tables 6 and 7.

Table 6 - Sensitivity Analysis of pre-tax NPV_{8%} for ± 30% variation of parameters (A\$M)

Parameter	(Low/Med/High)	70%	85%	100%	115%	130%
Product Price (A\$/t)	(490-700-910)	96	254	413	571	729
Product Yield (%)	(25-36-47)	13	193	413	671	968
Operating Costs (\$/t mined)	(97-138-179)	597	505	413	320	227
Capital Costs (\$M)	(32-46-60)	423	418	413	407	401

Table 7 - Sensitivity Analysis of pre-tax IRR for ± 30% variation of parameters (%)

Parameter	(Low/Med/High)	70%	85%	100%	115%	130%
Product Price (A\$/t)	(490-700-910)	30	84	174	289	415
Product Yield (%)	(25-36-47)	14	93	174	255	335
Operating Costs (\$/t mined)	(97-138-179)	405	278	174	101	57
Capital Costs (\$M)	(32-46-60)	225	197	174	155	140

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These relationships are illustrated graphically in the “spider charts” shown in Figure 5 for NPV and Figure 6 for IRR:

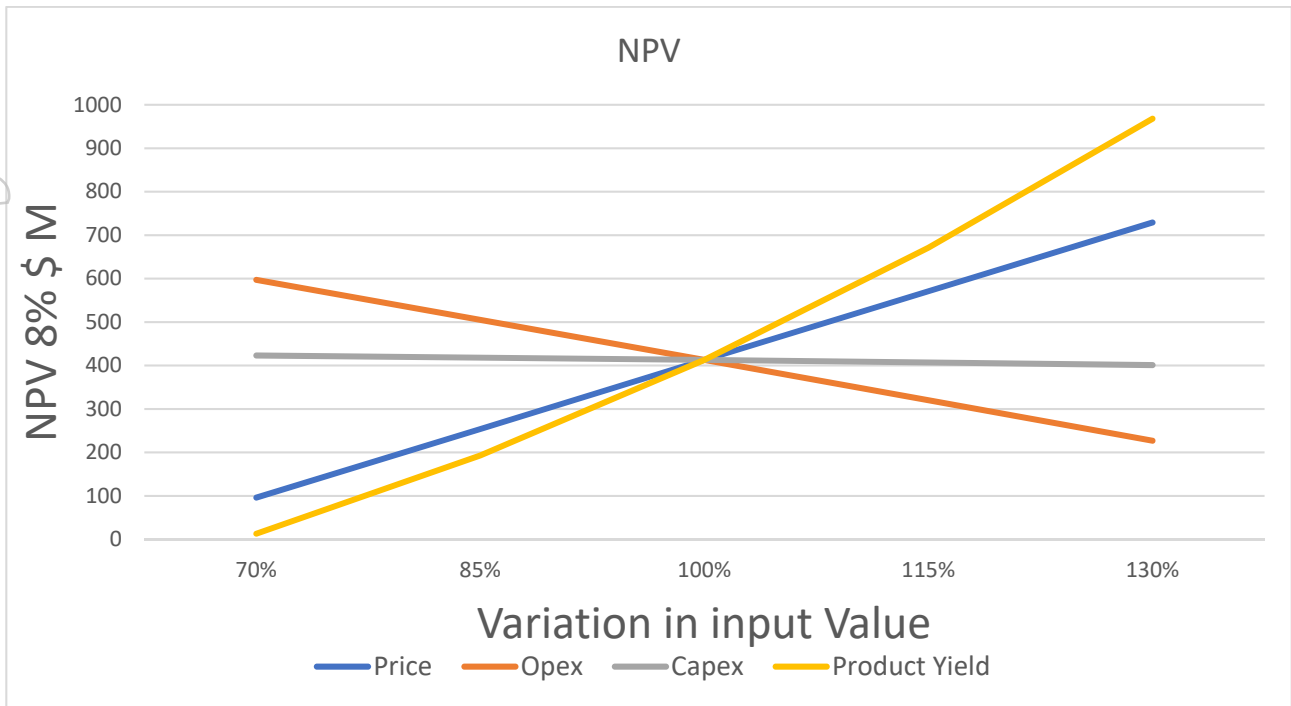


Figure 5 - Sensitivity Analysis of the pre-tax NPV_{8%} for ± 30% variation of key parameters

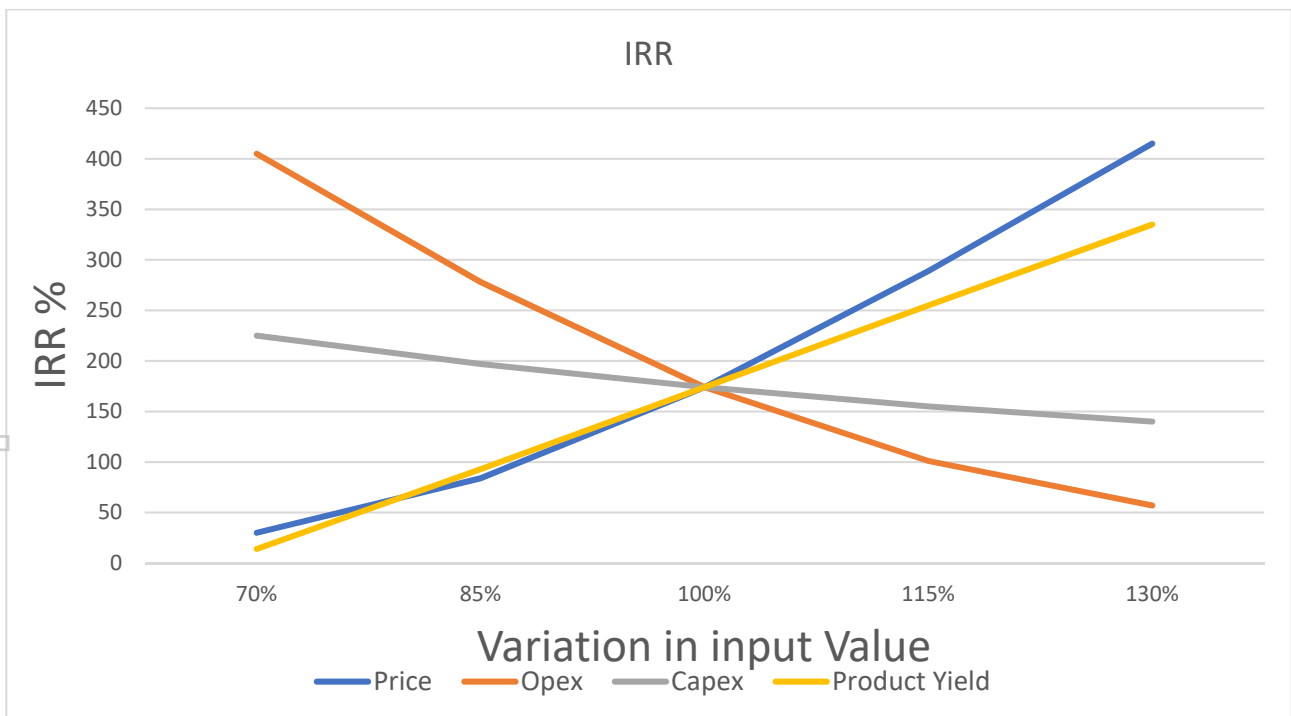


Figure 6 - Sensitivity Analysis of the Pre-Tax IRR for ± 30% variation of key parameters

The sensitivity analysis shows that the Project is remarkably robust. The capital cost has a very small effect on the NPV and indeed the Project NPV is practically immune to 30% changes in the capital cost. The operating cost has a greater but still small influence on the NPV whilst the price and processing yield, which have a direct correlation with revenue, have the strongest influence.

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Noticeably even a 30% reduction to what is for practical purposes an impossibly low yield of Poochera kaolin still produces a viable project.

An unlikely reduction in the product price of 30% still produces a positive NPV.

16. Planned Activity and Approvals

The anticipated work program through the remainder of 2019 and early 2020 is to advance a Pre-Feasibility Study (PFS) and to carry out baseline surveys, studies and planning work, including:

- Spring season flora and fauna surveys;
- Soil surveys;
- Surface water hydrology;
- Detailed ground water hydrogeology;
- Baseline noise and dust surveys;
- Passive-seismic exploration;
- Aircore exploration and sterilisation drilling;
- Geotechnical core drilling;
- Detailed geotechnical report;
- Road traffic studies;
- European and aboriginal cultural heritage surveys (although Native Title for the Project is deemed to be extinguished because all tenure is on freehold land, an aboriginal cultural heritage survey is required);
- Land access negotiations.

Separately from the Poochera Kaolin Project studies, work is planned to be continued in developing the HPA, high purity halloysite and halloysite nanotube technologies.

The longer-term work program is being planned from mid-2020 to advance a Definitive Feasibility Study (DFS) and prepare necessary application documents for regulatory approvals and licences, including:

- Ongoing baseline measurements;
- Airborne LIDAR topography and photography;
- Pilot scale test work to confirm advanced processing plant design for the selected site processing option;
- Drafting all necessary regulatory approval applications.

Based on the preliminary studies to date and the anticipated project impacts, it is expected the main environmental approval will be via a Mining Proposal submitted to the Department for Energy and Mines. Preparation of approvals documentation for submission to various regulatory agencies is being planned to occur though mid to late 2020, and the approval process is currently anticipated to be completed by mid 2021.

17. Project Funding

To achieve the range of outcomes indicated in the Scoping Study, funding of approximately A\$25M is expected be required for capital works (including contingency), pre-production operating costs, and working capital. It is anticipated that most of the required finance will be sourced through a combination of equity and debt instruments from existing shareholders, new equity investment and debt providers from Australia and overseas. In addition, the Company has received signed Letters of Intent from a number of potentially large Chinese customers that may enable Andromeda to negotiate early receipt of sale proceeds, while also there are currently on issue approximately 700 million listed options (ASX: ADNOB) having an exercise price of 1.2 cents and expiry date of 30 November 2020 which

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are significantly “in the money” and would provide the Company with funds in the order of \$8.4 million should they all be exercised prior to the expiry date.

The Company has enough cash on hand at the date of this announcement to undertake the next stage of planned work surveys and studies including the geotechnical and aircore drilling program.

Andromeda believes that there is a reasonable basis to assume that funding will be available to complete all feasibility studies and finance the pre-production activities necessary to commence production on the following basis:

- The Board and executive team of Andromeda have a strong financing track record in developing resources projects;
- The Company has a proven ability to attract new capital;
- The Board believes the Scoping Study demonstrates the Project’s strong potential to deliver favourable economic return; and
- Other companies at a similar stage in development have been able to raise similar amounts of capital in recent capital raisings.

18. Material Assumptions

Material assumptions used in the Scoping Study which determined the Production Target and financial outcomes presented in this announcement are summarised below:

Criteria	Commentary
Mineral Resources	The recent Mineral Resource estimate dated 12 February 2019 was used for the Study. These Mineral Resources have been prepared by a Competent Person in accordance with the requirements of the 2012 JORC Code as noted in the Compliance Statement in section 19 below.
Site visits	The site has been visited by the Scoping Study Report Author, the Resource Competent Person, and at least one of the authors of the Hydrogeology, Geotechnical, Flora, and Mining contributing technical report.
Study status	This announcement is based upon the September 2019 Scoping Study. Financial modelling completed as part of the Scoping Study shows that the Project is economically viable under current assumptions. Modifying Factors (mining, processing, infrastructure, environmental, legal, social and commercial) have been considered in the Scoping Study.
Cut-off parameters	A mining cut-off was not applied and all kaolinized granite contained within the pit design is scheduled to be mined as ore and processed. The pit design was limited to contained kaolin clay classed as bright white and with a halloysite/kaolinite ratio above 10%.
Mining factors or assumptions	To ensure there is no contamination of the kaolinized granite, a 10% mining ore loss factor and 0% mining dilution is assumed. Pit optimisations were not done for the Scoping Study, and a detailed manual and interactive pit design constrained to bright white and halloysite rich zone was completed. Detailed staged pit designs were done with due consideration of geotechnical, geometric, and access constraints. These pit designs were used as the basis for production scheduling and economic evaluation. Conventional mining methods (diesel powered truck and excavator and supporting equipment), and costs were used in the Study. The geotechnical parameters applied in the pit designs were compliant with those suggested in the preliminary geotechnical study.

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Criteria	Commentary
	<p>Inferred Mineral Resources are not included in the calculation of the Production Target. The Scoping Study Mine Plan is based on a Production Target of the following LOM quantities:</p> <p style="padding-left: 40px;">Measured : 4.2Mt of the 5.2Mt in Mineral Resources Indicated : 3.4Mt of the 3.8Mt in Mineral Resources Inferred : none of the 0.8Mt in Mineral Resources</p> <p>The Mineral Resources, published on 12 February 2012, underpin the Production Target.</p>
<p>Metallurgical and mineral processing factors or assumptions</p>	<p>Site based dry-process concentration and high specification wet refining are considered in the Scoping Study. These processes have been successfully tested multiple times at both laboratory and pilot scale, and the techniques are widely and routinely used at full plant scale in the kaolin industry.</p> <p>Representative samples of mineralisation types suited to the two processing approaches above have been obtained by RC or air core drilling and tested in kaolin processing laboratories and by bulk auger drilling and testing in pilot plants. Bulk auger drilling was focussed at an accessible portion of the orebody and further drilling and testing is required across the orebody.</p> <p>Metallurgical parameters applied to the resource model were 40% yield for dry processing, 45% yield for wet processing of kaolinized granite and 99% recovery of wet refining of the dry processed kaolin concentrate.</p> <p>Steady plant throughputs of 500ktpa are assumed after the pre-stripping phase for the LOM.</p>
<p>Environmental</p>	<p>All primary environmental, heritage and tenure approvals required under State and Commonwealth legislation are being progressed.</p>
<p>Infrastructure</p>	<p>Mine site is readily accessible from Adelaide by multiple sealed highways and local gravel roads. The workforce will be housed in either Streaky Bay or localities within 30 minutes' drive of the mine. Infrastructure is plentiful and readily available in the region.</p> <p>The mine development will be on private land to be acquired by the Company. Appropriate power and water supplies have been identified and costed.</p>
<p>Capital Costs</p>	<p>Capital estimates have been based on lump sum quoted budget prices or known factors and industry standard unit costs. Projected capital costs have been provided predominantly by CPC based on quoted budget estimates by specialist suppliers as well as current knowledge and industry experience where applicable.</p>
<p>Operating Costs</p>	<p>Mining costs are based on industry standard unit rates and checked by contractor budget prices. Processing operating cost estimates were developed by CPC from vendor budget quotes, and first principles. Transport and shipping costs are based on quoted budget prices.</p> <p>Power costs are based on industry standard rates, and gas and water costs are based on quoted budget prices.</p> <p>Toll basis wet refining charges at plants in China and Japan have been used in the Study, based on budget purpose quotes.</p> <p>The SA Government retains a 3.5% net royalty on product sales, less shipping costs, and this is accounted for in the Study financial assessment.</p>
<p>Deleterious elements</p>	<p>Deleterious elements or product characteristics were assessed in the assay process, and subgrade materials were excluded from the mineral resource.</p>

Criteria	Commentary
<i>Currency and Exchange rates</i>	Cost estimates are made in September 2019 Australian dollars, using an exchange rates of USD: AUD = 0.70, and CNY:AUD of 4.8 where applicable.
<i>Revenue factors</i>	<p>The mined ore head grades (as kaolin clay content in the kaolinized granite) are estimated utilising industry accepted geostatistical techniques with the application of relevant modifying Factors.</p> <p>The kaolin price assumed for LOM operations on an ex-refinery basis is A\$700 /dry tonne for the premium specification wet-refined kaolin clay being produced, based on expert advice and discussions with potential customers, with CNY or USD conversions to AUD.</p>
<i>Market assessment</i>	Whilst the international market for kaolin is based on individual supplier vendor negotiations, Andromeda staff and its industry specialist advisors have a good understanding of market volumes and prices and this information has been used in the Scoping Study.
<i>Economic</i>	<p>A financial model of the Project has been prepared by Andromeda using input factors as outlined above.</p> <p>The model shows the Project is comfortably economically viable with a low initial capex, short payback, high NPV and high IRR. A discount rate of 8% has been used in the financial analysis, and the inflation rate has been assumed at 0%, with fixed costs and product prices through the LOM.</p> <p>Sensitivity of the Project to changes in the key drivers of sales price, operating cost (mining and processing cost) was carried out and showed the Project NPV to be most sensitive to significant changes in sales price.</p> <p>The Study is based on Pre-tax and on a 100% Project basis for the financial assessment.</p>
<i>Social</i>	<p>Andromeda is negotiating a range of commitments with private landowners for land access.</p> <p>Further negotiation is required with the affected landowners, as well as regulatory approvals from the Shire Council and state authorities to enable operations.</p> <p>The Company has occupied the site for the last 2 years and engaged with the local community extensively over that period. The community supports the mine development and the contribution it will make both economically and socially.</p>
<i>Naturally Occurring Risks</i>	Thus far, there are no identified material naturally occurring risks affecting the Project.
<i>Other</i>	<p>This Scoping Study has confined itself to determining the economic viability of developing the Project, and its potential material impacts on the environment and community.</p> <p>The Company holds current Exploration Leases over the resource and surrounding areas. Access to the site is subject to the approval of the immediate landowners, and an agreement with them is required to enable approval of the Project and grant of the mining lease to enable operations of the Project to proceed.</p> <p>Arranging finance to develop the Project is required and would occur after completion of the final Feasibility Study, along with tendering for suitable contractors to construct the process plant and associated infrastructure.</p> <p>A range of governmental agreements and licences are required prior to the decision to commence construction can be made, in particular the Mining Proposal and Mining Lease Application.</p>

Criteria	Commentary
	It is expected all necessary approvals and licences will be forthcoming when applied for progressively over the ensuing phases of the Project.
Classification	The underlying Mineral Resource classification consists of Measured, Indicated and Inferred Mineral Resources, but only Measured Mineral Resources and Indicated Mineral Resources are included in the Production Target.
Audits or reviews	The various elements of the contributing reports have been internally reviewed, but no external audits or independent peer reviews have been done.
Study Accuracy	The estimates in this Study are based on a $\pm 35\%$ level of accuracy in technical studies and costings.

19. Competent Person's Statement – Mineral Resources

The data in this announcement that relates to the Minotaur Exploration Results for the Poochera Kaolin Project is based on information evaluated by Dr Antonio Belperio who is a Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM), an executive director of Minotaur and part-time consultant to Andromeda. Dr Belperio has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the "JORC Code"). Dr Belperio consents to inclusion in this document of the information in the form and context in which it appears.

The data in this report that relates to Mineral Resource Estimates for the Poochera Kaolin Project is based on information evaluated by Mr Simon Tear who is a Member of The Australasian Institute of Mining and Metallurgy (MAusIMM) and who has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the "JORC Code"). Mr Tear is a Director of H&S Consultants Pty Ltd and he consents to the inclusion in the report of the Mineral Resource in the form and context in which they appear.

Forward Looking Statements

Some of the statements contained in this announcement are forward looking statements. Forward looking statements include, but are not limited to, statements concerning estimates of tonnages, expected costs, statements relating to the continued advancement of Andromeda's projects and other statements that are not historical facts. When used in this announcement, and on other published information of Andromeda, the words such as "will", "planned", "expected", "projected", "estimated", "may", "scheduled", "intends", "anticipates", "believes", "potential", "nominal", "conceptual" 'aim', 'could', 'intend', 'should' and similar expressions are forward looking statements. Although Andromeda believes that its expectations reflected in the forward-looking statements are reasonable, such statements involve risks and uncertainties and no assurance can be given that actual results will be consistent with these forward-looking statements. Various factors could cause actual results to differ from these forward-looking statements include the potential that Andromeda's Project may experience technical, geological, metallurgical and mechanical problems, changes in market prices and other risks not anticipated by Andromeda.

Andromeda is pleased to report this summary of the Study in a fair and balanced way and believes that it has a reasonable basis for making the forward-looking statements in this announcement, including with respect to any mining of mineralised material, modifying factors, production targets and operating cost estimates.

This announcement has been compiled by Andromeda from the information provided by the various contributors to the Study. All financial assumptions and estimates are quoted in Australian Dollars ('A\$' or 'AUD') only, unless indicated otherwise.

Footnotes

1. Pre-tax, 100% Project basis, Q3 2019 Australian Dollars (A\$), 8% discount rate
2. All In Sustaining Costs (ASIC) include mining, processing, site admin, shipping, offshore refining, marketing, sustaining capital, royalties, site rehabilitation, corporate overheads and reserve replacement exploration costs
3. Price for premium grade wet-refined bright white halloysite-kaolin for ceramics, in bulk bags, ex works
4. All the material in the Production Target is sourced from only Measured and Indicated resources
5. Resource announced 12 February 2019