

# ASX / MEDIA ANNOUNCEMENT



28 May 2020

## Definitive Feasibility Study Delivers Compelling Phase 1 Project Results

### Key Points

- Definitive Feasibility Study reveals attractive Phase 1 Project economics within 12 months of acquiring the Karibib assets, which include a 31% Internal Rate of Return and NPV<sub>8%</sub> of US\$221 million (A\$340 million<sup>1</sup>) ungeared, based on a 14 year production life
- Average output of 4,900 tonnes per annum ("tpa") lithium hydroxide (87.5% of design capacity) at a competitive C1 cost of US\$1,656/t lithium carbonate equivalent ("LCE") and an All in Sustaining Cost ("AISC") of US\$3,221/t after credits from other products
- Strategic caesium and rubidium high value by-products plus sulphate of potash ("SOP") and amorphous silica bulk by-products collectively represent 38% of total revenue, and give aggregate production on a total lithium equivalent basis of 7,060tpa LCE
- Pre-production capital for mine, concentrator and chemical plant US\$139 million with payback after just over 3 years of operation; includes contingency of 13.6% and production capability for all products from commissioning
- Competitive capital intensity of US\$17,400/t LCE on by-product basis, equivalent to US\$27,900/t LCE before credits from other products
- Project sized for attractive financial returns at moderate production levels, with 460 times scale-up from continuous pilot plant capacity
- Project is supported by the world's only known JORC Code (2012) (or NI43-101) compliant Ore Reserve estimate for the strategic alkali metals lithium, caesium and rubidium
- Product offtake and Project funding initiatives to accelerate with Study completion
- Strategic objective remains to position Lepidico as a low-cost producer of high-value critical and strategic metals by leveraging proprietary process technologies and thereby be a first mover in lithium mica mineral development and production

<sup>1</sup> US\$0.65/A\$ as at 18 May 2020

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## Summary

**Lepidico Ltd (ASX:LPD)** (“Lepidico” or “Company”) is pleased to announce that it has received the results of the vertically integrated Phase 1 Project Feasibility Study. The Study is based on a modest scale commercial L-Max<sup>®</sup> plant processing a lithium-mica concentrate feed at a rate of 6.9 tonnes per hour (tph) to produce approximately 4,900tpa of nominal battery grade lithium hydroxide monohydrate and a suite of high value and bulk by-products, over 14 years. Converting other products to lithium carbonate equivalent gives implied total production of over 7,000tpa LCE. The relatively modest size of Phase 1 for a lithium chemical project is important as project development and operating risks tend to increase exponentially with scale.

The Feasibility Study is based on an integrated mine, concentrator and chemical plant development that collectively has compelling investment fundamentals, including an NPV<sub>8%</sub> of US\$221 million (A\$340 million) and an Internal Rate of Return of 31% ungeared.

Ore Reserves at Karibib, Namibia total 6.7 million tonnes grading 0.46% Li<sub>2</sub>O, 2.26% rubidium and 320ppm caesium, a 60% conversion from Mineral Resources of 11.24 million tonnes, which highlights the potential for further Ore Reserve expansion. Karibib is understood to be the only JORC Code (2012) (or NI43-101) compliant Ore Reserve estimate for both rubidium and caesium globally and therefore represents a unique opportunity for the production of these strategic metals, of which, the United States is totally reliant on imports. Furthermore, lithium, caesium, rubidium and potash, the main Phase 1 Project products, are all on the U.S. Government list of 35 Critical Minerals, making the Project strategically significant.

Karibib is fully permitted for the re-development of two open pit mines feeding lithium mica ore to a central mineral concentrator that employs conventional flotation technology. The waste to ore ratio at Karibib is just 0.5 to 1 for the first two years and 3.8 to 1 life of mine. This brownfield development has a modest footprint that maximises the use of ground used by the historical operations. An Environment and Social Impact Assessment (“ESIA”) is being undertaken to IFC Standards and is on schedule for completion in July 2020.

Concentrate is shipped to a chemical conversion plant to be built in the Khalifa Industrial Zone Abu Dhabi (KIZAD) that employs Lepidico’s proprietary process technologies. Main products of lithium hydroxide monohydrate (“lithium hydroxide” or “LiOH”), caesium formate and rubidium sulphate are augmented by bulk by-products of SOP fertiliser and amorphous silica, with the latter used as a partial supplement for cement which attracts a significant carbon credit. Industry competitive operating costs after credits from by-products include an average C1 cost of US\$1,656/t (LCE) and an AISC of US\$3,221/t for the integrated Project.

Abu Dhabi is the world’s largest producer of sulphur, used in the manufacture of sulphuric acid, which is a key reagent in the proprietary L-Max<sup>®</sup> process. It is planned that acid will be purchased for the first three years of operation prior to a dedicated acid plant being built, which will also generate power from waste heat. L-Max<sup>®</sup> is a hydrometallurgical process that is much less power intensive than convention chemical conversion of spodumene, allowing the Phase 1 Project to have a modest carbon intensity versus the industry. An ESIA is planned to commence in July 2020, also undertaken to IFC Standards, which will run in parallel with project permitting.

Development capital of US\$139 million includes a 13.6% contingency and is split 30/70 between the mine and concentrator in Namibia, and the chemical conversion plant in Abu

Dhabi. Capital intensity is industry competitive at US\$27,900/t LCE for an integrated hard rock project and just US\$17,400/t LCE on a by-product basis.

The Capital cost estimates meet the Association of the Advancement of Cost Engineering (“AACE”) Class 3 requirements for a Feasibility Study, which forms the initial control estimate against which all actual costs and resources will be monitored. The nominal accuracy is +/-15%. The estimates for the processing plants were prepared by Lycopodium Minerals P/L (“LMPL”). Underlying engineering is informed by some six years of process development testwork including continuous pilot plant trials conducted in 2019.

In light of the COVID-19 pandemic the project timeline has been adjusted to take into account possible extended periods for product evaluation to secure binding offtake agreements and longer than normal permitting timeframes in Abu Dhabi. It is assumed that all permits, offtake agreements and a full funding package are secured in the June 2021 quarter, allowing Project implementation to commence. Lepidico has engaged London based Lion’s Head Global Partners (“LHGP”), which has offices in New York, Nairobi, Lagos, and Dubai as Project finance advisor. LHGP is seeking to leverage the Phase 1 Projects excellent Environmental Social and Governance (“ESG”) credentials to maximise the quantum of competitive Development Finance Institution debt funding.

Managing Director, Joe Walsh, commented, “The Study represents a major milestone in the advancement of the Project and enshrines six years of extensive development work across multiple disciplines. Lepidico’s Phase 1 Project represents a unique development opportunity for the production of four valuable alkali metal streams, lithium, caesium, rubidium and potassium. This is enabled by the Company’s proprietary process technology, L-Max®, coupled with lepidolite as the mineral feed source. LOH-Max® further differentiates Phase 1 from other lithium projects by providing a single process step solution for the production of lithium hydroxide without the costly and potentially problematic production of sodium sulphate. The vertically integrated Phase 1 Project has been demonstrated by the Feasibility Study to be robust technically, economically and from a sustainability perspective, with the focus now on banking the study to transition the business into development and on into production.”

## **Feasibility Study Team**

Lepidico managed the Feasibility Study with investigations, testwork, analysis and review by organisations with particular expertise in the specific areas of input to the Feasibility Study.

Lepidico would like to acknowledge the contributors to the Feasibility Study which include Lepidico personnel, Strategic Metallurgy PL, Lycopodium Minerals PL, Australian Mine Design and Development PL, Knight Piesold Consulting PL, Project Definition PL, Chris Movirongo Investment CC, Snowden Mining Consultants, BMI Ltd, Pells Sullivan Meynick PL, Antonio Mota, BT Connect PL, TAK Industrial Mineral Consultancy Ltd, BG &E PL, GHD LLC, Addiza Power Consultants CC, Risk Based Solutions CC, Lanasera Pty Ltd, Sustainable Mining Strategies PL, Formate Brines Ltd, AdvanSci Ltd, University of Waterloo, Ontario, Radiation Advice and Solutions PL, SGS, ALS, End to End Visuals PL, GiG Agri-Advice CC, Twahangana HR Consulting, Environmental Compliance Consultancy CC, and Geoscientific Mineral Resources.

## Sustainable Development

Phase 1 demonstrates strong sustainability credentials across all facets of the Project. The Feasibility Study reveals that Phase 1 is positively differentiated from other conventional lithium process technologies in the fields of sustainability, technical robustness, strategic development and economic outcomes.

### Karibib Project, Namibia

- Karibib is a brownfield site in an historical mining area that will be redeveloped on the basis of minimising any increase in land disturbance
- Sustainable closure – industry best practice closure plans that will rectify mining and processing legacy issues
- Social benefits – creation of 115 jobs to benefit local communities and the economy
- Symbiotic co-existence with local farmers and communities
- Enhancement of local community infrastructure through roads and water supply
- Community support programs developed and focussed on critical resources, health and education, diversity and sustainable micro business development
- Renewable energy – utility objective to have 80% of power generated from renewable sources within 5 years
- No tailings storage facility – co-disposal of benign dry stacked flotation plant tails with mine waste
- Small scale mining fleet – electric option will be reviewed as and when right-sized equipment becomes available
- Water sourced locally from the ground under licence with greater than 85% of process water recycled
- The Karibib Project is fully permitted with an existing Environmental Compliance Certification and Mining Licence both in place
- Lepidico is currently enhancing the existing approved documentation to meet Equator Principles and IFC Performance Standards

### Lepidolite Chemical Conversion Plant, Abu Dhabi

- Chemical plant development is within an established purpose built industrial zone that minimises overall project impacts including land disturbance, traffic, and emissions
- Relatively modest power consumption: gas fired electrical grid power to be supplemented by solar as and when planned new supply comes on-stream
- Heat recovery equipment included in design to reduce gas consumption
- Low emissions with net carbon intensity of 5-7t CO<sub>2</sub>/t lithium hydroxide after carbon credits from amorphous silica and gypsum
- Maximisation of solid waste recycling direct to the cement industry and into the well-established Abu Dhabi waste management system
- LOH-Max® eliminates the energy intensive production of potentially problematic sodium sulphate, which can't be easily disposed of due to its high solubility
- Social benefits – creation of 119 jobs

- Small footprint minimises steel and concrete in construction
- Through the UAE and Abu Dhabi Vision 2030, there is Government support for new projects and technologies in the economic diversity initiative that reduces reliance on the oil and gas industries and general commodity imports
- Project permitting is a well-defined process with a well-respected international consultant appointed to undertake the work, which after allowance for COVID-19 is scheduled to be completed in the March 2021 quarter

### **Technical Advantage**

- The L-Max<sup>®</sup> process technology has demonstrated consistent and reproducible extraction results on samples from 18 mica and phosphate mineral deposits globally
- The process has been successfully demonstrated through a continuous pilot plant with a modest scale up factor of 462 times to the Phase 1 Plant design, compared to typical continuous process industry practise for new technology
- The process flowsheet is robust and can cater for significant variations in concentrate feed lithium mineralogy; the quality of L Max<sup>®</sup> feed in terms of alkali metal grades and mineral species mix does influence project economics
- Nominal battery grade lithium hydroxide monohydrate has been produced directly from the pilot plant process
- The high value by-products of rubidium sulphate and caesium formate, and the bulk by-products of amorphous silica, SOP, and gypsum residue have all been produced from pilot plant streams, and have demonstrated specifications meeting or exceeding international standards
- Alkali metal rich mica and phosphate mineralisation types are collectively abundant
- Lepidico has developed JORC compliant Mineral Resources at Karibib in Namibia and Alvarrões in Portugal, which are understood to be the only Code compliant estimates for caesium, lithium and rubidium
- Through the 80% owned Karibib Project, sufficient Ore Reserves have been defined for a 14 year production life

### **Strategic Advantage**

- The Phase 1 Plant can be fed with multiple mica and phosphate mineral feed sources
- Lepidico has investigated multiple third party mineral feed sources that are amenable to its process technologies, which are at various stages of evaluation
- Mineral Resource extension through near mine and regional exploration programs is planned for the Karibib Project, which continues to be prospective for lithium pegmatites
- The Phase 1 Project is a stepping-stone for growth, as demonstration of the commercial viability of the process technologies should enable future larger scale projects, of up to 20,000tpa to be built at strategic locations around the world
- Potential for third party technology licensing
- The Project is unique in the combined production of alkaline metals chemical compounds including those identified as strategically important

## Key Results

Parameter	Unit	Value
Project duration	Year	18
Production life	Year	14
Total tonnes mined	'000's t	34,879
Ore tonnes processed	'000's t	6,717
Waste to ore ratio	#	3.8
Average grade of ore tonnes processed	%Li <sub>2</sub> O	0.46
Lithium recovery to concentrate	%	80.6
Lithium grade of concentrate	%Li <sub>2</sub> O	3.23
Cost of production to mine gate	\$/t ore	30.90
Cost of concentrate production FOB Walvis Bay	\$/t concentrate	315
Lithium recovery from concentrate	%	90
Total lithium hydroxide monohydrate production	LoM t / tpa	62,334 / 4,879
Total rubidium sulphate production	LoM t / tpa	19,878 / 1,542
Total caesium formate production	LoM t / tpa	3,175 / 246
Total sulphate of potash production	LoM t / tpa	162,026 / 11,500
Pre-production capital - (excludes working capital)	\$M	139.0
Sustaining capital cost inc. leased amounts	\$M	57.2
C1 cash cost <sup>1</sup> (by-product LCE basis <sup>3</sup> )	\$/t LCE	1,656
AISC <sup>2</sup> (by-product LCE basis <sup>3</sup> )	\$/t LCE	3,221
Post tax NPV <sub>8</sub>	\$M	221
Free cash flow undiscounted	\$M	521
Average free cash flow over 12 full years of production	\$M	49
Net Profit After Tax	\$M	555
Internal Rate of Return (8% discount rate)	%	31.3
Payback from start of production	Months	37

<sup>1</sup>C1 cash costs: Brook Hunt convention for the reporting of direct cash costs comprising mine site, product transportation and freight, treatment and refining charges and marketing costs.

<sup>2</sup>All-in sustaining costs (AISC): C1 cash cost plus royalties; corporate support and shared services costs; sustaining capital; lease principal and interest charges; and deferred mining and inventory adjustments capitalised.

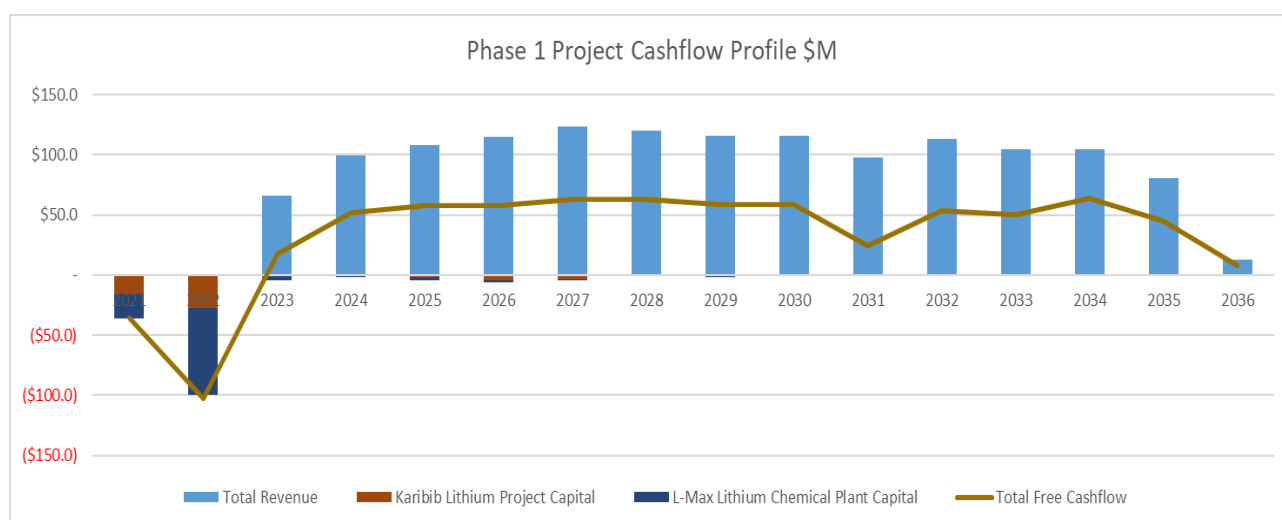
<sup>3</sup>Net of by-product credits LCE basis: costs for lithium and other products after deduction of credits for by-product revenues, per tonne of recovered lithium carbonate equivalent.



## Economic Analysis

Project economics take into account a ramp-up of throughput and recoveries to design levels over the first three years, as outlined in the cashflow chart below. Chemical plant throughput design is 56,700tpa (dry basis) of concentrate for nominal lithium hydroxide production of 4,900tpa. Design capacity is 5,600tpa, which allows for optimisation and improvements. By-product output varies with metal feed grades. Over the first ten years, the Project is expected to achieve average annual production of 1,400t rubidium sulphate, 260t (of s.g. 2.2) caesium-rich formate, 11,500t SOP and 33,000t of amorphous silica.

Phase 1 provides strong financial returns with a Net Present Value at an 8% discount rate of US\$221 million, which exceeds development capital by 59%, after allowance for a 13% contingency. The Internal Rate of Return is an attractive 31% in real terms, ungeared for project debt. Payback of development capital is estimated to be approximately 3 years, after taking into account ramp-up and subsequent capital investment in production year 2 for the dedicated sulphuric acid plant. Free cash flow over the project life is estimated at US\$521 million equivalent to US\$49 million (A\$80 million) per year post ramp-up.



Parameter	Unit	Value
Post-Tax NPV <sub>8</sub>	US\$M	221
Post-Tax NPV <sub>0</sub>	US\$M	521
Project IRR (Real terms)	%	31
Project Payback (from start of production)	Years	3
<b>Cost of production</b>		
C1 cash cost (by-product LCE basis)	US\$/t LCE	1,656
AISC (by-product LCE basis)	US\$/t LCE	3,221
Free Cash Flow undiscounted	US\$M	521
Average Annual Free Cash Flow (post ramp-up)	US\$M	49

A royalty payment on concentrate production based on 2.0% of the “unit value” of concentrate is applied. The Karibib Project is also subject to a Namibian corporate tax rate of 37.5% for its mining and concentrator operations. No corporate tax is payable in the UAE.

## Marketing & Prices

For the purposes of this Feasibility Study, Lepidico acquired the Benchmark Mineral Intelligence Ltd (“BMI”) lithium chemical supply/demand and pricing forecasts. These independent forecasts are used as the basis for Project economic evaluation. The average price forecast for lithium hydroxide over the Project life is US\$13,669/t (table below), with a long term assumption from 2031 onwards of US\$12,910/t. Lepidico has applied a price discount for the first year of commercial production to allow for production qualification.

Markets for caesium and rubidium chemicals are opaque with little data available on supply/demand and pricing. Lepidico is also limited by confidentiality agreements with third parties as to the information it can disclose pertaining to these markets. A price forecast for caesium formate brine (s.g. 2.2) of US\$42,900/t is employed, with a 10% discount applied for economic evaluation purposes. A rubidium sulphate price is derived from the caesium price adjusted for metal content, which gives a discounted price of US\$13,600/t. Lepidico has ongoing constructive engagement with multiple caesium and rubidium chemical companies in both Asia and North America, with the objective of entering into a long term supply arrangement for these strategic metals.

High Value Product Average Prices	US\$/tonne
Lithium Hydroxide Monohydrate (average LoP)	13,669 / 12,910 LT
Rubidium Sulphate	13,600
Caesium Formate	38,600
Bulk By-Product Average Prices	US\$/tonne
Sulphate of Potash	540
Amorphous Silica	100
Gypsum Residue	4

Global fertiliser demand is expected to increase greatly in the years to come due to world population growth accompanied by decreasing arable land availability per capita, changes in diet and growth in alternative fuels which use crops as feedstock. Accordingly, demand for fertilisers, in particular a premium product such as SOP is forecast to grow providing solid price support. A price forecast of US\$500/t to US\$600/t real is used for the life of the Project.

The specification of the amorphous silica by-product is compared to the American Society for Testing and Materials specification of fly ash. A price of US\$100/t has been established for the demonstrated specification of amorphous silica. However, it is noteworthy that the Phase 1 product specification is equivalent to that for fumed silica which sells for \$300/t. This represents a future opportunity for Lepidico.

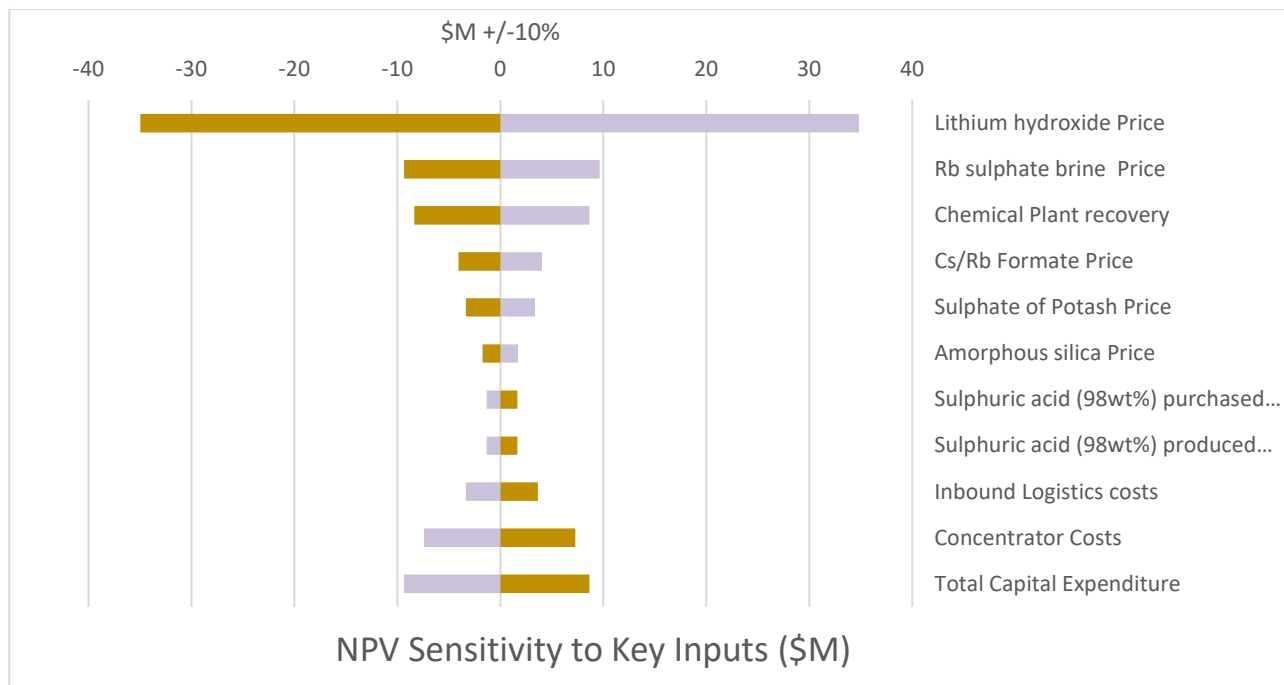
## Sensitivity Analysis

Project economics are most sensitive to changes in the lithium hydroxide price, with a 10% variance resulting in a US\$35 million change in NPV<sub>8%</sub>, as presented below. Chemical Plant operating costs are the next most significant economic sensitivity driver, causing a



US\$16 million NPV<sub>8%</sub> change, of which a US\$1-2 million is associated with a 10% change in sulphuric acid price. Rubidium pricing causes an \$11-\$12 million variance in NPV<sub>8%</sub> for 10% price change, while economics are relatively insensitive to other product price changes.

A ten percent change in the total development costs would result in a US\$9 million variance in NPV<sub>8%</sub>, while a 2 percentage point change in chemical plant recovery from the design average of 90% causes a US\$8 million change in NPV<sub>8%</sub>.



### Process Recoveries

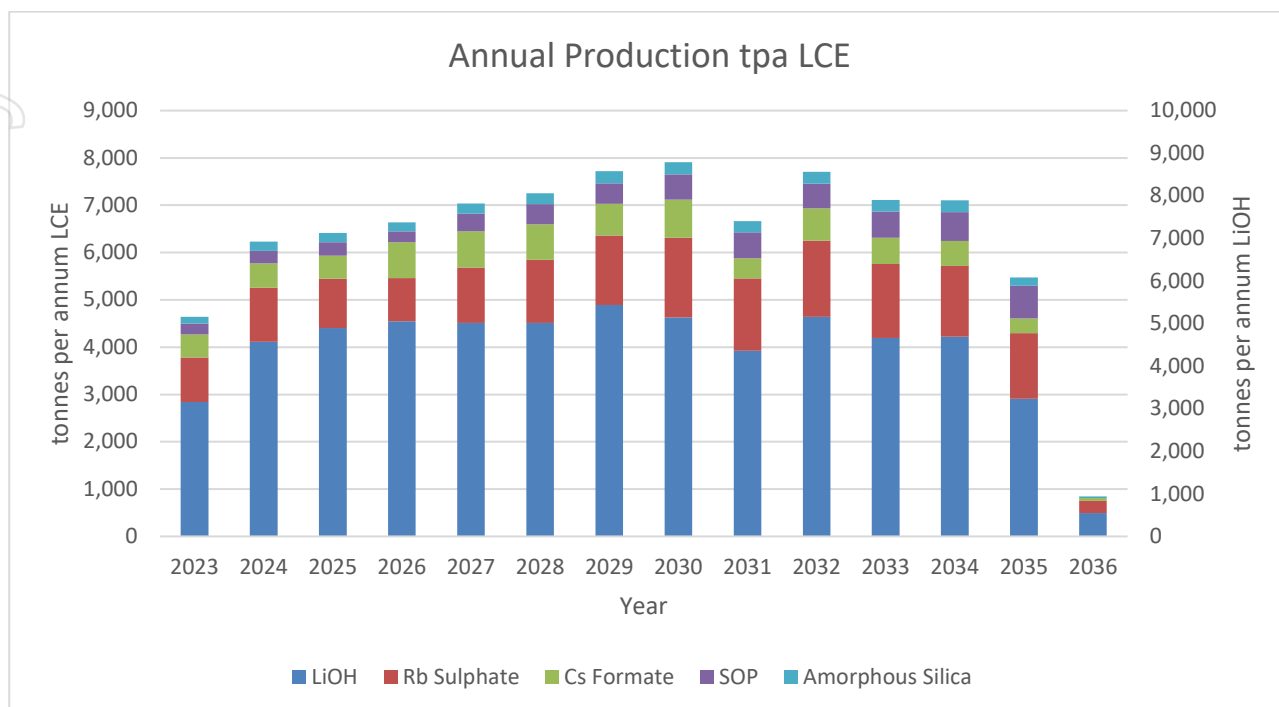
Project recoveries are optimised for lithium and caesium only, to maximise the recovery of these metals to concentrate. Further work is planned to evaluate improved recovery of caesium in the concentrator and optimisation of rubidium recovery in the chemical plant. Lithium recoveries, as presented below, are significantly higher for lithium mica minerals using the Phase 1 process technologies than for the equivalent conventional processes for spodumene concentration and chemical conversion.

Alkali Metal	Recovery to concentrate	Chemical Plant recovery to product
Lithium	80.6%	90.0%
Caesium	85.0%	51.8%
Rubidium	69.3%	89.6%
Potassium	55.0%	94.0%

### Production

A single mineral concentrate stream is produced from the concentrator. The concentrate feed to the chemical plant is then converted into six separate products, 3 high value products and three bulk by-products, as charted and tabulated below. Lithium hydroxide production averages 4,900tpa with aggregate output of all revenue products on a total lithium equivalent basis of 7,060tpa LCE.

Design capacity in the chemical plant for all products materially exceeds predicted annual production, providing capacity for material increases in output as the process is optimised during the 14 year operating phase.



Product	Total Production Life of Project tonnes	Average Production tonnes per annum <sup>1</sup>
Lithium Hydroxide Monohydrate	62,335	4,879
Rubidium Sulphate	19,878	1,542
Caesium Formate	3,175	246
SOP	162,026	12,955
Amorphous Silica	446,217	34,951
Gypsum (>70% gypsum content)	2,262,094	70,872

<sup>1</sup> Average annual production over 12-year steady state operating period

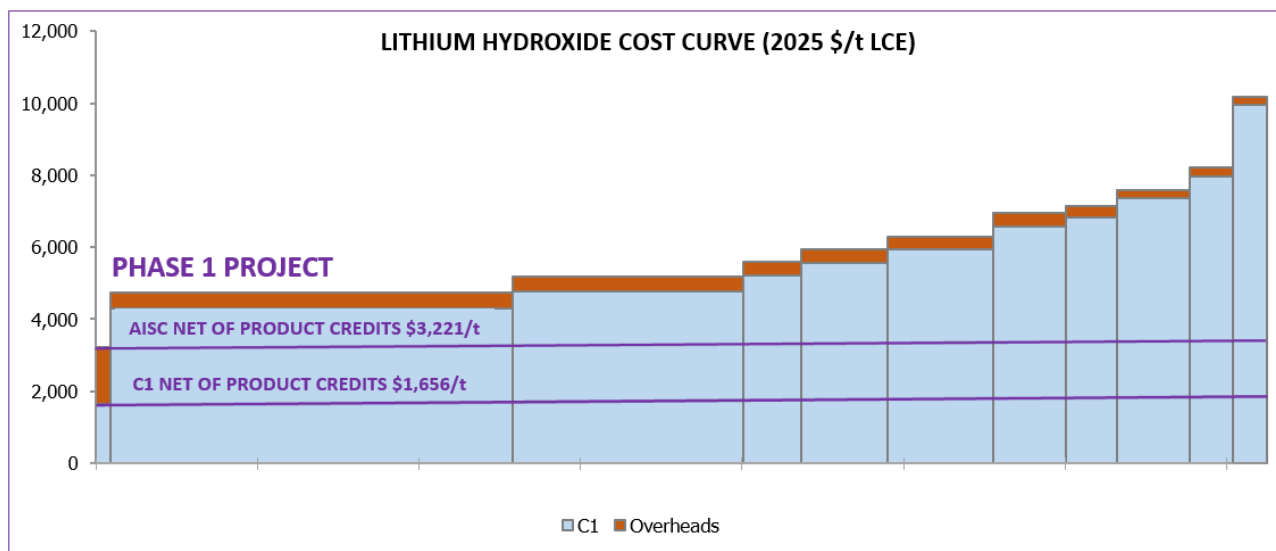
## Operating Costs

Phase 1 cash costs ("C1") and AISC as presented have been derived from first principles with vendor quotations or market rates used for major drivers such as consumables.

C1 cash costs follow the convention developed by "Brook Hunt" for the reporting of direct cash costs comprising mine site, product transportation and freight, treatment and refining charges and marketing costs. By-product unit cost accounting methodology is employed, which allocates all costs less revenues for by-products taken as a credit, per tonne of recovered primary product, in this case lithium hydroxide on an LCE basis.

AISC include C1 cash cost as outlined above plus: royalties; corporate support and shared services costs; sustaining capital; lease principal and interest charges; and deferred mining and inventory adjustments capitalised.

The integrity of industry cost data as collated and estimated by BMI is limited by the level of disclosure from each project operator, and by the benchmarking and factoring of estimates when operator data is not available. Data for projects other than Phase1 are understood not to include all of: royalties; corporate support and shared services costs; sustaining capital; lease principal and interest charges; and deferred mining and inventory adjustments capitalised. Such inconsistencies make direct cost comparison unreliable.



Source: Benchmark Mineral Intelligence for other project data; Lepidico for Phase 1 Project data

## Capital Costs

Capital costs estimates meet the AACE Class 3 requirements for a Feasibility Study, with a nominal accuracy is +/-15%. These estimates will form the basis for budget authorisation, funding and the initial control estimate against which all actual costs and resources will be monitored. All costs have been worked up from first principles and are based on vendor pricing for all major equipment. LMPL completed the engineering and cost estimates for the concentrator, chemical plant, and an estimate for Engineering Procurement and Construction Management services for the construction of both plants. Lepidico estimated owner's costs.

Since the last cost estimate for the Pre-Feasibility Study ("PFS") in February 2017 Project scope has developed significantly: with a near doubling in chemical plant throughput from 3.6tph to 6.9tph; inclusion of a caesium and rubidium circuit; substitution of a conventional lithium carbonate circuit for a proprietary LOH-Max<sup>®</sup> lithium hydroxide circuit; acquisition of the Karibib Project; and the planned plant location moving to Abu Dhabi from Ontario, which was considered in the PFS. Total pre-production capital costs for the vertically integrated Project total US\$139.0 million including contingency, as tabulated.

Capital costs in Namibia for the mine and concentrator development total US\$37.9 million before contingency of approximately US\$4.5 million. The concentrator is the largest single item in Namibia with capital of US\$26.8 million, followed by the power line at US\$3.6 million. The cost to redevelop the mines is modest at just over US\$1.0 million. It is planned that the small scale mobile mining equipment fleet will be contracted under a US\$5.5 million lease arrangement, secured against the equipment. This lease may be deferred in the event that surface mineralised stockpiles are processed in priority. Life of mine sustaining capital in Namibia is estimated at US\$14.2 million before closure costs.

The capital cost for the chemical plant in Abu Dhabi is estimated at US\$85.1 million including EPCM contract, owner's costs and all support buildings but before contingency of US\$11.6 million. The plant will have installed capacity for all revenue products at commissioning. Life of Project sustaining capital, which includes the development of a dedicated US\$15 million sulphuric acid plant in production year two for operation in year three totals US\$28.0 million.

A working capital allowance of US\$16.0 million has been estimated to fill the integrated project supply chain to commencement of free cashflow generation.

Capital Cost Item	US\$M
Karibib Concentrator	26.8
Power Supply	3.6
Owner's Costs	3.6
Other Costs	3.9
<b>Karibib Project Sub-Total</b>	<b>37.9</b>
Chemical Plant	64.8
EPCM	10.4
Owner's Costs	7.2
Support Buildings & Other Costs	2.7
<b>Chemical Plant Sub-Total</b>	<b>85.1</b>
Contingency (13%)	16.0
<b>Total Pre-production Capital</b>	<b>139.0</b>
Working Capital	16.0
Leasing Value	5.5
Sustaining Capital Namibia LoM	14.2
Sustaining Capital Abu Dhabi LoP	28.0

Few benchmarks exist for integrated hard-rock lithium projects from mine to lithium chemical production. Of those that do there are meaningful differences in mineralogy, process technology, by-product suite, final lithium chemical produced and nameplate capacity, as indicated in the table below.

The Phase 1 Project stands out as having competitive capital intensity of approximately US\$17,400/t LCE when taking by-products into account. It is noteworthy that Phase 1 has the smallest scale and is therefore arguably a lower risk project versus the comparator group. At this point it is also important to reflect on some of the Phase 1 Project's attributes: modest scale and scale-up from piloting; a hydrometallurgical process that operates at modest temperature and atmospheric pressure with no requirement for an energy intensive pyrometallurgical circuit; elimination of a costly sodium sulphate circuit and no requirement to dispose of this potentially problematic product; and competitive capital intensity despite its modest scale.

Project	Li Chemical Product	Date of reference	Nameplate tpa Li Chemical	LCE tpa	Pre-prod Capex \$M	Deferred/sustain capex \$M	Li chemical % total revenue	Capital Intensity \$/t LCE	
								LCE basis	By-product Basis
Rhyolite Ridge	LiC/Li OH	Apr-20	22,000	19,360	785	100	70%	40,500	28,350
Thacker Pass	LiC	Sep-19	30,000	30,000	581	488	90%	19,400	17,460
Nemaska	LiOH	Aug-19	37,000	32,560	1,270	297	100%	39,000	39,000
Zinnwald	LiF	May-19	5,112	7,285	188	0	88%	25,800	22,600
<b>Phase 1 Plant</b>	<b>LiOH</b>	<b>May-20</b>	<b>5,653</b>	<b>4,975</b>	<b>139</b>	<b>38</b>	<b>62%</b>	<b>27,900</b>	<b>17,400</b>
Phase 2 Plant	LiOH	May-20	20,000	17,600	297	81	62%	16,900	10,500

Source: Company websites, Phase 1 Project Feasibility Study

## Mineral Resource and Ore Reserve Estimates

### Mineral Resources

Mineralogy and internal zonation characteristics at Rubicon and Helikon 1 are similar, aiding the development by Lepidico of a simplified geological code that was used in the most recent (2019) phase of drilling to identify lepidolite and other lithium mineralisation amenable to processing by L-Max<sup>®</sup>. For consistency, all of the previous drilling since 2017 was re-logged according to the revised codes.

Snowden Mining Industry Consultants Pty Ltd ("Snowden") produced an updated JORC code (2012)-compliant Mineral Resource estimate ("MRE") for Rubicon and Helikon 1 in January 2020. This estimate is based on 5,164m of additional diamond drilling undertaken in 2019, with 51 holes completed at Rubicon and 35 holes completed at Helikon 1. Measured and Indicated Resources at Rubicon and Helikon 1 total 8.87Mt @ 0.43% Li<sub>2</sub>O as tabulated below and as reported to the ASX in January 2020. Significantly, the updated MRE also includes estimates for the accessory metals caesium ("Cs"), rubidium ("Rb") and potassium ("K"). The revised MRE for Rubicon and Helikon 1 supersedes the inaugural MRE for these deposits, prepared by The MSA Group, as initially reported to ASX by Lepidico on 16 July 2019. MREs (by The MSA Group) for Helikon 2-5, remain unchanged but do not include assay data for caesium, rubidium or potassium at this time.

Pit optimisations undertaken by Australian Mine Design and Development Pty Ltd ("AMDAD") for Rubicon and Helikon 1 demonstrate these Mineral Resources to be potentially economic at a cut-off grade of 0.15% Li<sub>2</sub>O.

Deposit	Resource Category	Tonnes (M)	Li <sub>2</sub> O (%)	Rb (%)	Cs (ppm)	Ta (ppm)	K (%)
Rubicon + Helikon 1	Measured	2.20	0.57	0.27	389	51	2.14
	Indicated	6.66	0.38	0.22	274	42	2.06
	Inferred	0.17	0.70	0.29	1100	150	2.18
	<b>Total</b>	<b>9.04</b>	<b>0.43</b>	<b>0.23</b>	<b>318</b>	<b>46</b>	<b>2.08</b>
Helikon2#	Inferred	0.216	0.56				
Helikon3#	Inferred	0.295	0.48				
Helikon4#	Inferred	1.510	0.38				
Helikon5#	Inferred	0.179	0.31				
Global	Measured	2.20	0.57	0.27	389	51	2.14
	Indicated	6.66	0.38	0.22	274	42	2.06
	Inferred	2.37	0.43				
	<b>Total</b>	<b>11.24</b>	<b>0.43</b>				

Source: Snowden, MSA Group



## Ore Reserves

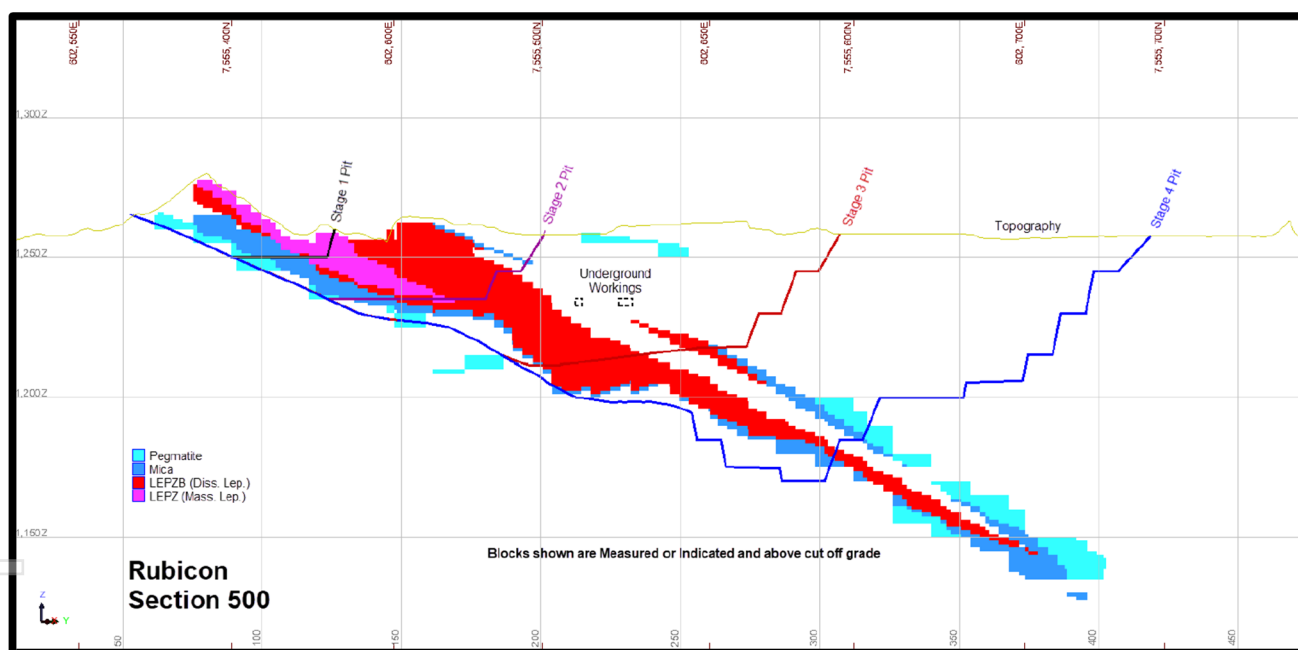
The dip, geometry and near surface location of the mineralised zones at the Karibib Project are suitable for conventional open pit truck and shovel operations with drilling and blasting required to fragment both mineralised rock and waste rock. An industry standard approach to mine planning has been undertaken.

Whittle 4X™ pit optimisation was used by AMDAD to define the location and shape of the open pit for the mine plan. The software uses stable pit wall slopes, mining, processing and administration operating costs, process recoveries and product prices to determine the highest value pit cone. It accounts for the interactions of these inputs with the deposit geometry, the depth, width and orientation of the mineralised zones and the grade distribution of the target product within those zones.

The highest value, or optimised, pit shell is then used to guide design of a practical working pit including wall slope designs and access roads.

Pit wall slopes are based on a geotechnical assessment by Pells Sullivan and Meynink engineers. The geotechnical assessment was based on dedicated geotechnical drilling in final pit walls, mapping of fault structures, core assessment and physical rock testing and failure modelling. Inter ramp angles are 55° based on 15m high benches with 8m berms.

The Rubicon pit design (see below) has been completed in four stages and Helikon 1 two stages. The stages have been selected based on value, grade, and strip ratio criteria.



Source: AMDAD

This Ore Reserves Statement has been prepared by AMDAD in accordance with the guidelines of the Australasian Code for the Reporting of Resources and Reserves 2012 Edition (the "JORC Code 2012") as tabulated below (Table 1 Appended).

The Karibib Project Ore Reserve is understood to be unique, being the only Code compliant estimate globally for both caesium and rubidium, and which also includes other valuable alkali earth metals lithium and potassium. This is a function of the metal endowment being predominantly associated with the mineral lepidolite,  $K(Li,Al,Rb,Cs)_2(Al,Si)_4O_{10}(F,OH)_2$ .

Pit	Mt	Li <sub>2</sub> O %	Rb %	Cs ppm	Ta ppm	K %
<b>Rubicon Pit</b>						
Proved	1.38	0.55	2.82	350	50	2.17
Probable	3.94	0.38	2.03	230	40	2.03
Pit Total	5.32	0.43	2.23	260	40	2.06
Waste	22.84					
Waste: Ore Ratio	4.30					
<b>Helikon 1 Pit</b>						
Proved	0.55	0.69	2.59	560	60	1.93
Probable	0.85	0.51	2.23	550	80	1.79
Pit Total	1.40	0.58	2.37	550	70	1.85
Waste	2.51					
Waste: Ore Ratio	1.80					
<b>Total Project</b>						
Proved	1.93	0.59	2.75	410	50	2.10
Probable	4.79	0.41	2.06	290	40	1.99
Total Ore	6.72	0.46	2.26	320	50	2.02
Waste	25.35					
Waste: Ore Ratio	3.80					

Source: AMDAD

## Mining & Concentration

Mining operations at the Karibib Project are characterised by hard rock materials requiring: blasting; the selective mining of a sloping orebody; operation over and around remnant underground workings; and the need for water management at depth.

Ore will be transported to run-of-mine crusher stockpiles, with various grades of ore requiring individual stockpiles. The rehandling of ore from stockpiles is required to balance ore feed to the concentrator. A fleet of one 50-tonne excavator and 35 tonne trucks can adequately support the mining schedule for the majority of the mine life. Later in the project life, as substantial quantities of waste removal is required to cut the Rubicon pit back, a local mining contractor will be employed to manage this peak material movement phase.

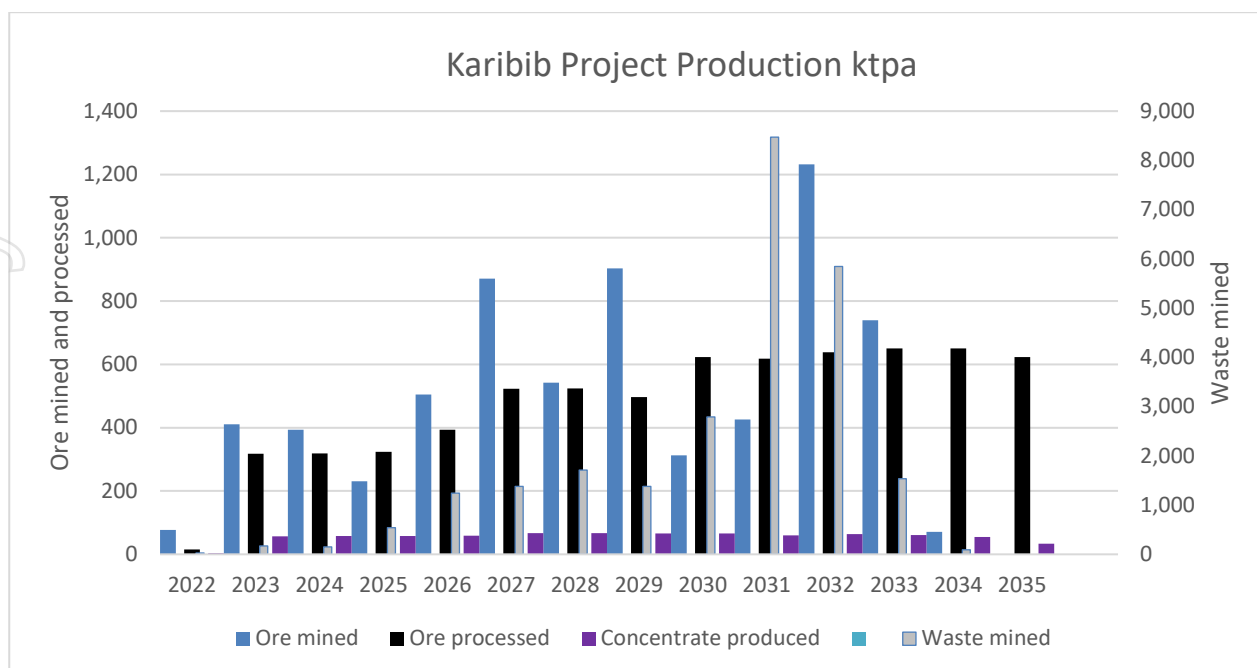
The Helikon 1 deposit is mined as a satellite pit located approximately 7km from the concentrator. The haul road from Helikon 1 to Rubicon is already developed and road trucks will be used for haulage.

Mine waste ex-Helikon 1 pit will be placed into the Helikon 1 Waste Management Area ("WMA"), constructed immediately to the south of the open pit and up dip of the pegmatite structures to avoid sterilisation of any deposit extensions.

Mine waste ex-Rubicon pit will be placed in the Rubicon WMA immediately to the east of the open pit. There it will be co-disposed with filtered tailings from the mineral concentrator and used to construct the walls and to cap the facility at closure. The benign concentrator tailings will be trucked to the WMA. The tailings are then co-disposed with waste rock from the mining and covered continuously to ensure dust mitigation and that no unstable pockets are left in the overall dump matrix. During periods when there is insufficient rock from the mining operation to co-mingle with the tailings then barren rock from later mining stages will supplement the cover requirement.

The Life of Mine schedule includes the following key features:

- Measured and Indicated Mineral Resources only are considered to estimate Proven and Probable Ore Reserves respectively
- Total material mined is 32Mt as presented in the chart below
- Ore mined is 6.7Mt at life of mine grades of 0.46% Li<sub>2</sub>O, 0.217% Rb 0.032% Cs, and 2% K, which is understood to be the only publicly quoted Code compliant Ore Reserve of lithium, caesium and rubidium globally
- The overall waste to ore strip ratio is 3.77:1, with waste to ore ratios of 0.5:1 for the first two years and 2.5:1 for the first eight years, see chart below.
- Helikon 1 contributes 1.4Mt of ore at a strip ratio of 1.8:1, starting in Year 2 and completing in Year 6
- The concentrator processes an average of 320,000tpa in the first four years, 514,000tpa in the next three years and then 637,000tpa over the remaining six years
- Production of concentrate occurs over 13 years and totals 773,000 tonnes.
- Waste mining is accelerated from Year 9 to maintain concentrate production, commensurate with depletion of the Lepidolite Zone B mineralisation and as bulk mining of lithian-muscovite mica becomes more dominant.
- A production schedule is also considered that incorporates defined surface stocks at Rubicon and the Helikon complex with a total tonnage of 657,600t at circa 0.7% Li<sub>2</sub>O together with the historical petalite tails estimated at 69,000t at c.0.95% Li<sub>2</sub>O.



Unit operating costs for the Karibib operations are estimated to average US\$268/t of concentrate, as presented below. During the early years of operation costs will be lower due to low waste stripping requirements, short haul distances and above average ore grades. Logistics costs to transport concentrate to the port of Walvis Bay and shipment on to Abu Dhabi are presented in under Chemical Plant operations.

Karibib Operating Cost Item	US\$/t Concentrate	US\$/t Ore
Mining	115	13.30
Concentration	121	13.90
General & Administration	32	3.70
Total Site Costs	268	30.90

The mineral concentrator will use conventional crushing, grinding, desliming and froth flotation processes followed by dewatering of concentrate and tailings streams.

The process design criteria and estimation of key performance parameters including concentrate grades and recoveries have been derived by testwork completed on 23 composites. Testwork programme consultants included ALS Limited, Strategic Metallurgy Pty Ltd and Outotec Ltd. The composites were selected to be representative of the mineralogy and grade of ore planned to be processed with emphasis on the first six years of production. The composites were also selected to be spatially and temporally representative of the mine plan.

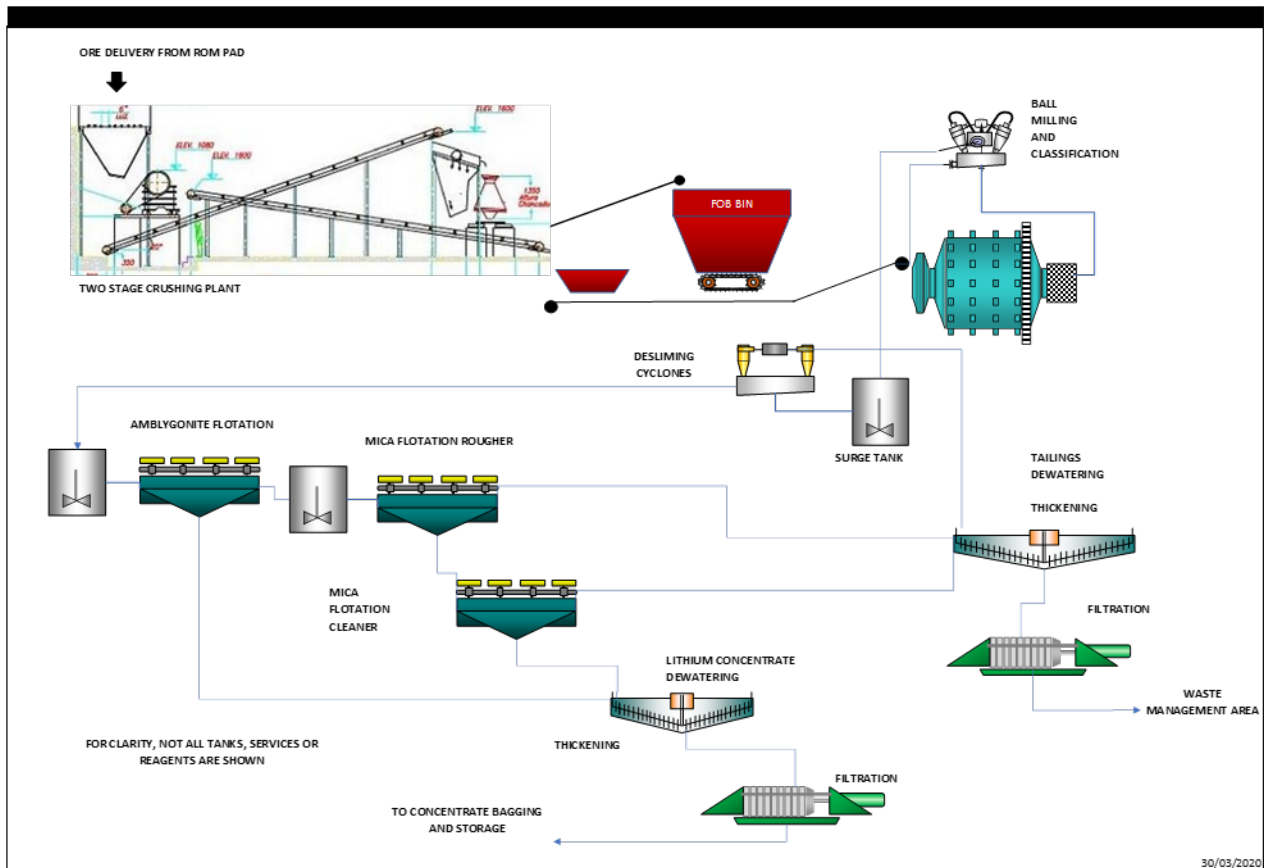
The lithium principally occurs in lepidolite, amblygonite and lithian muscovite although zinnwaldite is also recovered through the froth flotation process. The overall recovery of lithium to the lithium concentrate is 80-90%, at a concentrate grade of 2.9%-4.2% Li<sub>2</sub>O. These values vary according to the mineralogy.

The concentrator has been designed to process 333,000tpa (dry basis) of ore for the first four years ("Stage 1") and 541,000tpa (dry basis) from Year 5 of production ("Stage 2"). Stage 2 requires the addition of a second smaller ball mill, reconfiguration of the flotation

circuit and the installation of a second tailings filter. The plant will be debottlenecked in Year 7 to cater for a declining head grade.

The process plant design and engineering has been completed by LMPL, see flow sheet and site layout illustration below.

The general approach to engineering has been to utilise pre-engineered modular plant for the major sections of the plant including crushing, grinding, flotation, dewatering and services. The approach minimises the amount of project specific engineering. The equipment can be supplied pre-assembled and skid mounted or containerised, thereby reducing construction effort and commissioning time.



## Chemicals Conversion

The L-Max<sup>®</sup> process has been developed over a six year timeframe through an extensive program of laboratory, mini-plant and pilot plant programs. Coupled with extensive flowsheet modelling and vendor testwork, a robust process has evolved that produces lithium hydroxide, high value by-product chemicals of caesium and rubidium (extracted by a separate proprietary process) and a range of bulk by-products, in an efficient low energy approach.

A unique aspect of the L-Max<sup>®</sup> process is the direct leaching of the lithium bearing mineral from the feed without the need for an energy intensive thermal treatment step preceding the leach, which is employed by many other hard rock lithium conversion processes. The leach conditions are such that very little energy is required to keep the process at temperature. Optimising the leaching conditions has been an important part of the development process.

Handling of the leached slurry is a key part of the L-Max<sup>®</sup> process and the embedded intellectual property. The slurry is filtered at elevated temperature to yield a solution containing the valuable monovalent metals and a silica-rich filter cake. Effective washing of this cake is required to achieve high lithium recovery to the liquor moving downstream.

The filtered leach liquor, which is rich in aluminium, is cooled resulting in the crystallisation of an alum solid. This alum crystallisation step achieves the separation of lithium from the other monovalent cations. The monovalents, potassium, rubidium and caesium all form alums, whereas lithium does not. Filtering the alum slurry results in the potassium, rubidium and caesium, and most of the aluminium reporting to the solids, and a liquor containing the lithium and small amounts of other impurities. The alum solids are further treated to yield potassium, caesium and rubidium products.

The impure lithium-rich liquor is treated through a series of pH controlled precipitation stages, with limestone and lime, to sequentially remove the remaining impurities, namely iron, aluminium, manganese, and magnesium. The resulting lithium sulphate solution is of sufficient quality to allow the recovery of a high specification lithium product.

Production of lithium hydroxide is achieved without the co-production of sodium sulphate, using the proprietary LOH-Max<sup>®</sup> process. The unique chemistry of this process has been able to directly produce high purity lithium hydroxide monohydrate in a cost effective manner. The process takes the lithium sulphate liquor produced from the L-Max<sup>®</sup> process as feed and involves hydrometallurgical reactions to produce lithium hydroxide and a gypsum containing residue.

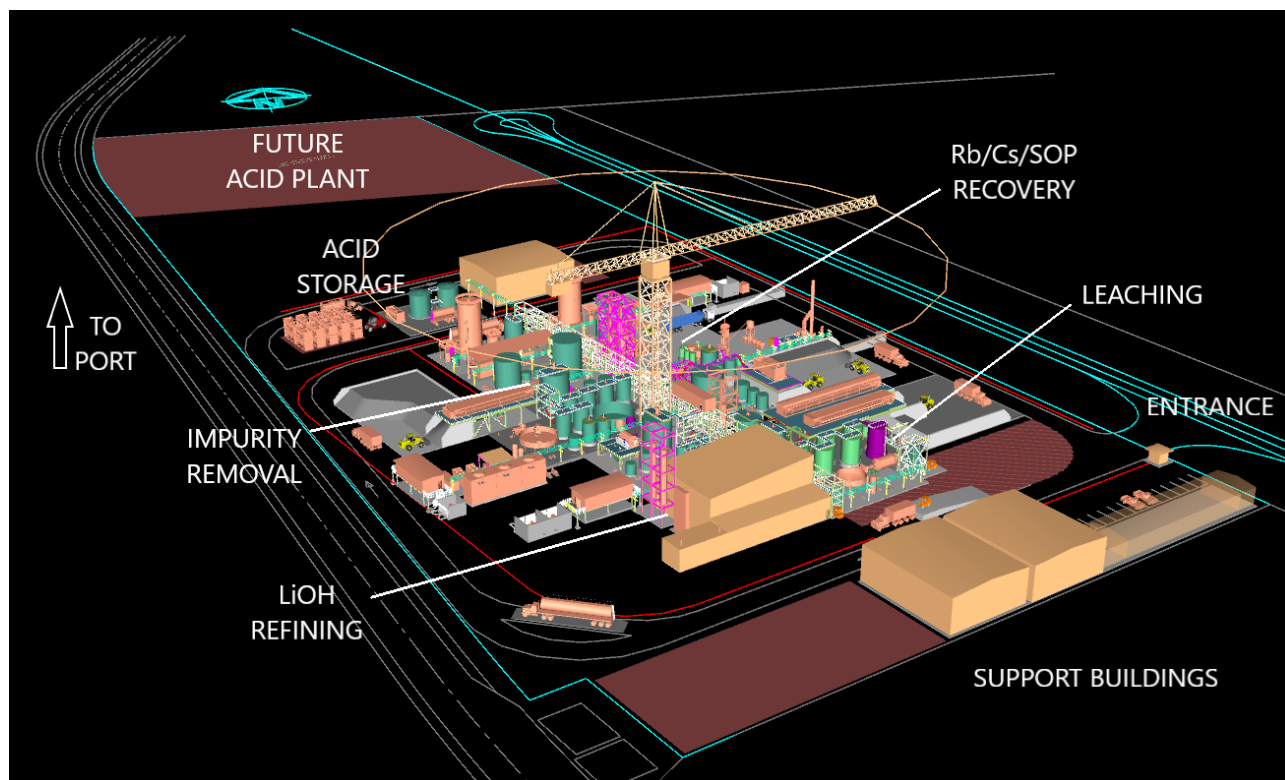
Chemical Plant Operating Cost Item	US\$/t LiOH.H <sub>2</sub> O	US\$/t Concentrate
Concentrate Logistics Namibia to FOB	579	46.70
Freight Logistics to Chemical Plant	895	72.20
Chemical Plant	5,018	404.60
Administration & Management	422	34.10
Technology Royalty to Lepidico	441	35.60
Total	7,355	593.20

The chemical plant (see schematic below) is designed to process 56,700tpa (dry basis) of lithium mica/amblygonite concentrate at a feed grade of 4.0% Li<sub>2</sub>O for production capacity of 5,600tpa of lithium hydroxide. The by-products include caesium, rubidium, amorphous



silica, SOP, and gypsum residue. The overall lithium recovery to lithium hydroxide is estimated at 90%.

The L-Max®/LOH-Max® processes consist of just five main processing steps for the recovery of lithium hydroxide: feed preparation, leaching, impurity removal, sulphate removal and lithium recovery. A further three processing steps are included for the recovery of SOP, being alum dissolution, aluminium removal and SOP crystallisation. A further three processing steps are included for the recovery of rubidium and caesium products, being rubidium-alum crystallisation and re-pulp, aluminium precipitation and rubidium crystallisation.



## Transitioning the Project to Development & Implementation

Phase 1 workstreams that will progress following completion of the Feasibility Study to transition the Project to a Final Development Decision (“FID”) by May 2021, include:

- Completion of the Environmental Compliance Certificate renewal for the Karibib Project and completion of an ESIA aligned with Equator Principles and IFC Performance Standards
- Complete the land lease agreement for the KIZAD chemical plant location
- Complete permitting in Abu Dhabi, including an ESIA aligned with Equator Principles and IFC Performance Standards
- Complete an independently audited Greenhouse Gas Assessment for the Project
- Complete co-habitation agreement for local stakeholders of the Karibib Project
- Complete a program of work to estimate an Indicated Mineral Resource for the surface stocks at Karibib for inclusion in the future Ore Reserve – existing stockpile tonnage is estimated 727,000t at a grade of 0.72% Li<sub>2</sub>O, which has the potential to increase project life by more than two years
- Finalise technical engagement, including further product sample generation, with offtake partners for binding agreements for lithium, rubidium, and caesium chemicals
- Re-engage, following COVID-19 lockdown restrictions lifting, with by-product offtakers
- Finalise full funding package with financing advisor LHGP
- Complete detailed planning for implementation
- Complete development of scopes of work for the EPCM delivery of the process plants and tender for the EPCM contracts
- Finalise agreements with acid supplier(s) and logistics providers
- Complete acid plant engineering study, to be fully integrated with the chemical plant

## Financing

Lepidico has been working with finance advisor LHGP since December 2019. LHGP has specialist capabilities in the key areas for the Phase 1 Project, being Africa, the UAE, Europe and the United States. Soft soundings of prospective debt providers have been completed, which has led to a target debt range of 60% to 70% of the total funding requirement for the integrated Project.

Engagement with commercial banks, development finance institutions (“DFIs”) and export credit agencies (“ECA”) is ongoing for the Project debt. Particular interest is being shown by organisations that lend to developing countries. Strategic investors are favoured for the equity finance component.

The integrated Project will have operations across two jurisdictions: Namibia and Abu Dhabi; and potential offtake partners across further jurisdictions resulting in various regulatory and fiscal regimes. The structure of the integrated Project therefore requires separate legal entities to be established in each operating jurisdiction, which in turn has led to a split finance structure being contemplated.

## Permitting

The Karibib Project is fully permitted. The Project is being developed under a single Mining Licence (ML 204), which covers 68.7km<sup>2</sup> that includes the Rubicon and Helikon deposits. Part of the power line for the Project will be developed outside of ML 204 and will have a dedicated servitude for its alignment.

ML 204 has a granted Environmental Clearance Certificate (“ECC”) issued by the Environmental Commissioner in the Ministry of Environment and Tourism for a period of three years, and which is valid until September 2020. The renewal process commenced in March 2020. It will include updates to the existing Environmental Impact Assessment and Environmental Management Plan, which in turn will inform the ESIA for the Namibian operations schedule for completion in July 2020. The required ESIA work has resulted in the development of a Corporate Social Responsibility (“CSR”) strategy and program.

A permit for the annual abstraction of up to 209,510m<sup>3</sup> of groundwater from 4 boreholes within the Company’s licence area was granted in 2017. The Phase 1 Project peak water requirement is expected to be 125,000m<sup>3</sup> per annum, well within the permitted amount.

Lepidico has appointed environmental consultant GHD to manage the permitting process in Abu Dhabi. This process will commence shortly with an Environmental Permit Application, which will in part be informed by the results of the Feasibility Study. Once the application is reviewed the Environmental Authority will advise whether a Preliminary Environmental Review (“PER”) or an Environmental Impact Assessment (“EIA”) is required for the Project, the lead times for which are estimated to be four months and nine months respectively. Irrespective of this it is planned to undertake an ESIA that is aligned with Equator Principles and IFC Performance Standards.

## Implementation Schedule

In developing the implementation schedule, provision has been made for potential timing delays associated with impacts on third parties from the COVID-19 pandemic.

Implementation schedules for the Abu Dhabi chemical plant and the Karibib concentrator have been completed by LMPL, along with a critical path analysis. The critical path for the Chemical Plant is the supply of the crystallisers with a lead time of 60 weeks. The critical path for the Karibib plant is the supply of the ball mill with a lead time of 40 weeks. The approach to mitigate these critical paths is to commence procurement activity prior to FID. This will involve EPCM contract tendering and appointment of an EPCM contractor prior to the end of 2020. The tender period for the long lead equipment packages will then take place from January to April 2021 with supply contracts being ready to award from May 2021.

Implementation Milestones are as follows:

- EPCM contract(s) awarded – December 2020
- Procurement of long lead packages by April 2021
- Implementation commences – May 2021
- Karibib site works commences – September 2021
- Karibib mining commences – August 2022
- Karibib process plant ore commissioning starts – November 2022
- Chemical Plant site works commences – December 2021
- Chemical Plant wet commissioning starts – February 2023
- Project fully operational – June 2023

**Further Information**  
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The information in this report that relates to the Rubicon and Helikon 1 Mineral Resource estimates is extracted from an ASX Announcement dated 30 January 2020 ("Updated Mineral Resource Estimates for Helikon 1 and Rubicon") and was completed in accordance with the guidelines of the JORC Code (2012). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the Mineral Resource estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are represented have not been materially modified from the original market announcement.

The information in this report that relates to the Helikon 2 - Helikon 5 Mineral Resource estimates is extracted from an ASX Announcement dated 16 July 2019 ("Drilling Starts at the Karibib Lithium Project") and was completed in accordance with the guidelines of the JORC Code (2012). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the Mineral Resource estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are represented have not been materially modified from the original market announcement.

The information in this report that relates to the Helikon 1 and Rubicon Ore Reserve is based on information compiled by John Wyche who is a Fellow of the Australasian Institute of Mining and Metallurgy (MAusIMM) and has sufficient experience which is relevant to the type of deposit and mining method under consideration and to the activity to 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." Mr Wyche is an employee of Australian Mine Design and Development Pty Ltd which is an independent consulting company. He consents to the inclusion in the report of the information compiled by him in the form and context in which it appears.

#### **About Lepidico Ltd**

Lepidico Ltd is an ASX-listed Company focused on exploration, development and production of lithium chemicals. Lepidico owns the technology to a metallurgical process that has successfully produced lithium carbonate from non-conventional sources, specifically lithium-rich mica minerals including lepidolite and zinnwaldite. The L-Max® Process has the potential to complement the lithium market by adding low-cost lithium carbonate supply from alternative sources. More recently Lepidico has added LOH-Max® to its technology base, which produces lithium hydroxide from lithium sulphate without by-product sodium sulphate. The Company has completed a Feasibility Study for a nominal 5,000 tonne per annum (LCE) capacity Phase 1 lithium chemical plant, targeting commercial production for 2023. The Project incorporate the Company's proprietary L-Max® and LOH-Max® technologies into the chemical conversion plant design. Feed to the Phase 1 Plant is planned to be sourced from the Karibib Lithium Project in Namibia, 80% owned by Lepidico where a predominantly Measured and Indicated Mineral Resource of 11.24 Mt grading 0.43% Li<sub>2</sub>O, (including Measured Resources of 2.20 Mt @ 0.57% Li<sub>2</sub>O, Indicated Resources of 6.66 Mt @ 0.38% Li<sub>2</sub>O and Inferred Resources of 2.37 Mt @ 0.43%, at a 0.15% Li<sub>2</sub>O cut-off) is estimated. Ore Reserves total 6.72 Mt @ 0.46% Li<sub>2</sub>O, 2.26% rubidium, 2.02% potassium and 320ppm caesium. (ASX announcement of 30 January 2020).

#### **Forward-looking Statements**

All statements other than statements of historical fact included in this release including, without limitation, statements regarding future plans and objectives of Lepidico, are forward-looking statements. Forward-looking statements can be identified by words such as "anticipate", "believe", "could", "estimate", "expect", "future", "intend", "may", "opportunity", "plan", "potential", "project", "seek", "will" and other similar words that involve risks and uncertainties. These statements are based on an assessment of present economic and operating conditions, and on a number of assumptions regarding future events and actions that are expected to take place. Such forward-looking statements are not guarantees of future performance and involve known and unknown risks, uncertainties, assumptions and other important factors, many of which are beyond the control of the Company, its directors and management of Lepidico that could cause Lepidico's actual results to differ materially from the results expressed or anticipated in these statements.

The Company cannot and does not give any assurance that the results, performance or achievements expressed or implied by the forward-looking statements contained in this release will actually occur and investors are cautioned not to place any reliance on these forward-looking statements. Lepidico does not undertake to update or revise forward-looking statements, or to publish prospective financial information in the future, regardless of whether new information, future events or any other factors affect the information contained in this release, except where required by applicable law and stock exchange listing requirements.



# Ore Reserves Statement

## Karibib Project

### Namibia

As at 27 May 2020



Prepared by Australian Mine Design and Development Pty Ltd  
for  
Lepidico Limited

Authors: John Wyche - AMDAD

Effective Date: 27 May 2020  
Submitted Date: 27 May 2020

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## **1 ORE RESERVES STATEMENT**

### **1.1 SCOPE**

The May 2020 Ore Reserves Estimate was prepared for Lepidico Limited by Australian Mine Design and Development Pty Ltd (AMDAD). It deals with the Mineral Resource for the Karibib deposit in Namibia as at 27<sup>th</sup> May 2020. It is the maiden Ore Reserves estimate for the project.

The Ore Reserves are based on extraction by open pit mining. Ore will be beneficiated on site to produce a lithium rich concentrate consisting mainly of the lithium bearing mineral lepidolite. The lepidolite concentrate will be transported to the United Arab Emirates to be treated in Lepidico's patented LOH-Max®, L-Max® and S-Max® processes to produce battery grade lithium hydroxide or lithium carbonate and saleable by-products including amorphous silica and sulphate of potash. The Feasibility Study for the chemical processing facility and the integrated Phase 1 Project inclusive of the Karibib Project was completed in May 2020.

The Ore Reserves include pits on two deposits named Rubicon and Helikon 1 which are separated by approximately 6.5km. Small scale historical mining has been conducted on both deposits. The target mineral was mainly petalite which is associated with the lepidolite but tends to occur separately in the pegmatites leaving most of the lepidolite, which is the target mineral for the current project, in place. At Rubicon there is a shallow opencut with shallow underground workings mined off the highwall. At Helikon 1 there is a shallow opencut.

### **1.2 CONTRIBUTING PERSONS**

The May 2020 Ore Reserve Statement prepared by AMDAD is supported by contributions from the persons listed in Table 2.

### **1.3 ACCORD WITH JORC CODE**

This Ore Reserves Statement has been prepared in accordance with the guidelines of the Australasian Code for the Reporting of Resources and Reserves 2012 Edition (the JORC Code 2012).

The Competent Person signing off on the overall Ore Reserves Estimate is Mr John Wyche, of Australian Mine Design and Development Pty Ltd, who is a Fellow of the Australasian Institute of Mining and Metallurgy and who has 31 years of relevant experience in operations and consulting for open pit industrial minerals and metalliferous mines.





## 1.4 ORE RESERVES SUMMARY

The Ore Reserve Estimate is summarised in Table 1.

**Table 1 Karibib Lithium Project Ore Reserves**

Pit	Mt	LiO <sub>2</sub> %	Rb %	Cs ppm	Ta ppm	K %
<b>Rubicon Pit</b>						
Proved	1.38	0.55	2.82	350	50	2.17
Probable	3.94	0.38	2.03	230	40	2.03
Pit Total	5.32	0.43	2.23	260	40	2.06
Waste	22.84					
Waste:Ore Ratio	4.30					
<b>Helikon 1 Pit</b>						
Proved	0.55	0.69	2.59	560	60	1.93
Probable	0.85	0.51	2.23	550	80	1.79
Pit Total	1.40	0.58	2.37	550	70	1.85
Waste	2.51					
Waste:Ore Ratio	1.80					
<b>Total Project</b>						
Proved	1.93	0.59	2.75	410	50	2.10
Probable	4.79	0.41	2.06	290	40	1.99
Total Ore	6.72	0.46	2.26	320	50	2.02
Waste	25.35					
Waste:Ore Ratio	3.80					

### Notes:

1. The tonnes and grades shown in the totals rows are stated to a number of significant figures reflecting the confidence of the estimate. The table may nevertheless show apparent inconsistencies between the sum of components and the corresponding rounded totals.
2. The deposit has been assessed based on lithium grades in parts per million. For consistency with of reporting with other projects the Ore Reserve grades are presented in terms of Li<sub>2</sub>O %. 1% Li<sub>2</sub>O is equal to 4645 ppm Li.



## 1.5 SUMMARY OF MINE PLAN

The target ore zones are within pegmatite sills formed in granite host rock. The Rubicon orebody dips at 20° to 30° to the north east. The Helikon 1 orebody dips at 50° to 60° to the NNE. Rubicon ore grade zones have true widths of 5 to 15 metres. Helikon 1 ore true widths are 5 to 20 metres. The Rubicon pit will mine the orebody over a strike length of 750 metres and at Helikon 1 ore will be mined over a 360 metre strike length.

Most of the target lithium mineralisation occurs as lepidolite which is contained entirely within the sills. Recoverable lithium is also present in associated micaceous lithium bearing minerals such as zinnwaldite. Four ore types are defined based on the occurrence and abundance of lithium mica minerals, principally lepidolite:

- Massive lepidolite,
- Disseminated lepidolite,
- Mica, and
- Pegmatite.

Flotation test work has demonstrated that acceptable lepidolite concentrate grades can be achieved from all four ore types down to relatively low lithium head grades.

Mining will be by a conventional excavator and truck operation with most of the ore and waste requiring drilling and blasting.

Ore from the pits will be beneficiated by flotation on site to produce a lepidolite concentrate. The concentrate will be transported from Karibib to Lepidico's proposed Phase 1 Lithium Chemical Plant at in the United Arab Emirates (UAE). The Ore Reserve is based on use of the LOH-Max® process at the chemical plant to produce battery grade lithium hydroxide monohydrate and saleable by-products including amorphous silica and sulphate of potash.

Mining rates are based on the tonnage and grade of concentrate produced by flotation as feed stock for the chemical plant. For the first four years mining focuses on high grade massive and disseminated lepidolite with target concentrate production of 57,671 tpa. Shallow high grade ore tonnes allow this to be achieved at low total mining rates of 500 to 750 ktpa ore and waste. The concentrator feed rate is 300 to 350 ktpa.

After Year 4 most of the high grade ore is depleted and the proportion of low grade mica and pegmatite increases. These ore types produce a lower lithium grade concentrate at a lower mass recovery. The chemical plant concentrate target feed rate increases to 66,577 tpa. The concentrator target feed rate to produce this increases to 500 to 650 ktpa. Deeper pits and increasing ore tonnes increase the total mining rates to 1.5 to 2.8 Mtpa in Years 4 to 8. When the final Rubicon pit pushback is commenced in Year 9 the mining rate peaks at over 8 Mtpa for two years before dropping off at the bottom of the pit in the last two years.

Mining continues for just over 11 years. Processing continues on stockpiled low grade ore until the end of Year 13.

In addition to the unmined ore tonnes in this ore reserve there are approximately 770 kt in surface stockpiles from former mining and bulk sampling. Sampling indicates that these have recoverable lithium grades sufficient for profitable processing. These are not included in the current Mineral Resource Estimate so cannot be included in the Ore Reserves.

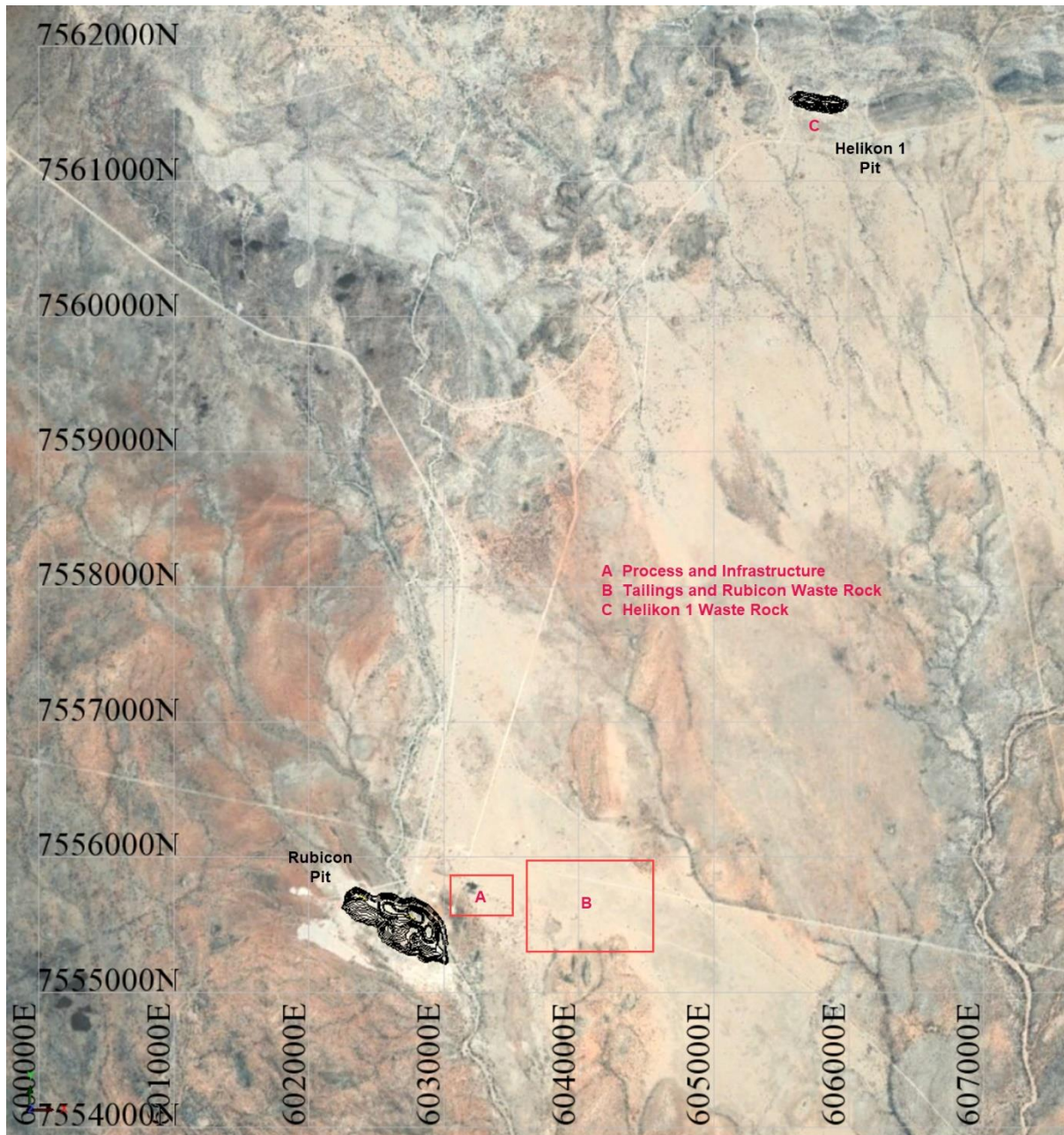


Figure 1 Current Mine Area





Figure 2 Rubicon Final Pit

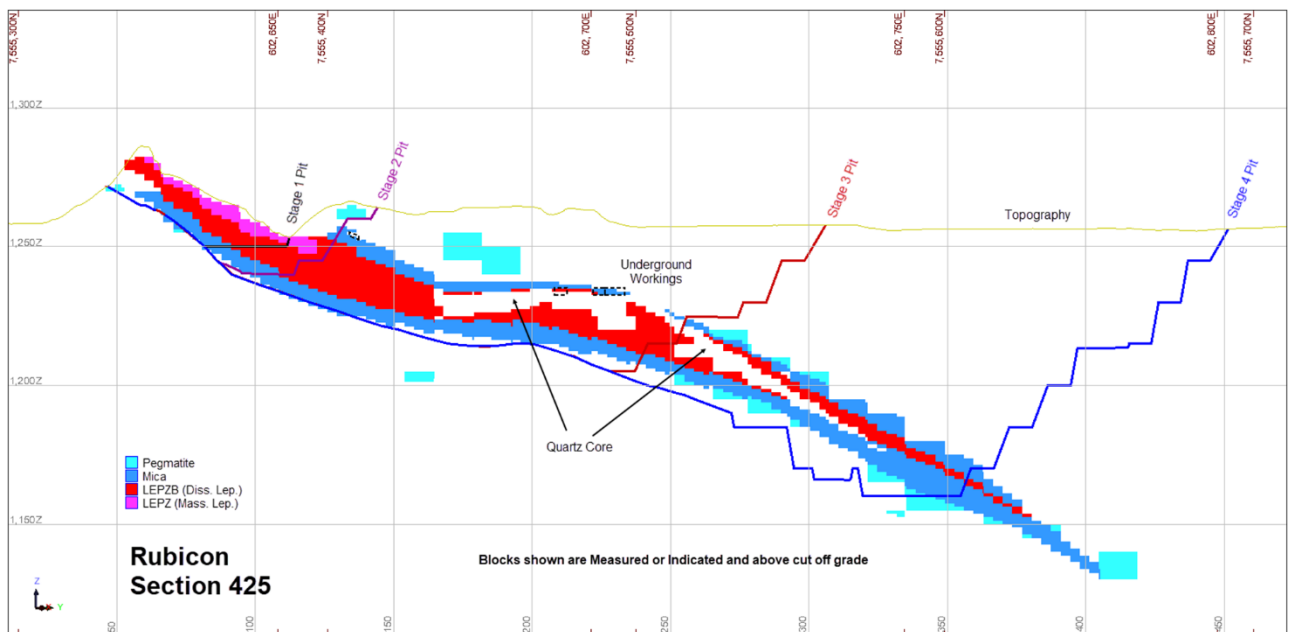


Figure 3 Rubicon Pit Cross Section



Figure 4 Helikon1 Final Pit

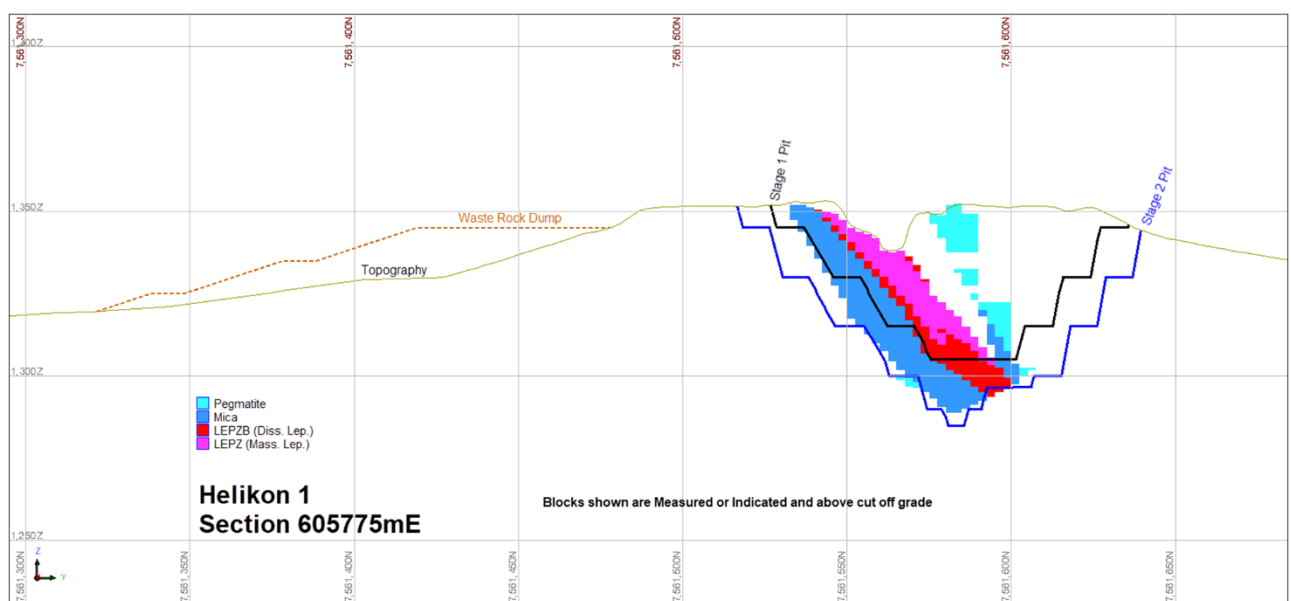


Figure 5 Helikon1 Pit Cross Section



**Table 2 Contributing Experts**

Expert Person/Company	Area of Expertise	References / Information Supplied
Vanessa O'Toole	Mineral resource estimation	Rubicon and Helikon 1 Mineral Resource Estimate, Project Number AU10317, January 2020, Snowden Mining Industry Consultants Pty Ltd
Guy Grocott Pells Sullivan Meynink Pty Ltd	Geotechnical engineering	Karibib Lithium Project, Stage 2 Open Pit Geotechnical Feasibility Assessment, PSM3930-002R, 19 March 2020
Robert Harris Project Definition Pty Ltd	Opencut mining costs Lepidolite concentrate transport costs	Opencut mining costs per tonne for ore and waste. Concentrate transport logistics and costs from Karibib to the UAE.
Peter Walker Lepidico Limited	Metallurgy	Summary of metallurgical studies and test work. L-Max® Phase 1 (Flotation) Variability Testwork report, Strategic Metallurgy, November 2018 L-Max® Pilot Plant report, Strategic Metallurgy, September 2019, (RP_ALV_L-Max Pilot_Rev_01) and subsequent progress reports to produce by-products and battery grade lithium chemicals using the LOH-Max®, L-Max® and S-Max® processes.
Peter Walker Lepidico Limited	Environmental	Summary of Karibib water and waste rock management studies by Knight Piesold. Existing Environment Impact Assessments and Environmental Management Plans Risk Based Solutions CC
Peter Walker Lepidico Limited	Karibib Project and UAE process and infrastructure engineering and operating and capital cost estimation	Karibib Mineral Concentrator Feasibility Study 2020, Lycopodium Minerals PL Concentrator and administration costs prepared by Lepidico Ltd
Peter Walker Lepidico Limited	Commercial	Lithium hydroxide, lithium carbonate and by-product price forecast. Project financial model.
John Wyche AMDAD Pty Ltd	Mining Engineering	Pit optimisation. Opencut mine design. Detailed production scheduling. Competent Person for Ore Reserves.





## 1.6 ORE RESERVE ASSESSMENT

Table 3 JORC Table 1 Section 4, Estimation and Reporting Ore Reserves

Sections 1, 2 and 3 of the following Table 1 are provided in the report “*Rubicon and Helikon 1 Mineral Resource Estimate, Project Number AU10317, January 2020*” by Snowden Mining Industry Consultants which is attached as an addendum to this maiden Ore Reserves Statement.

### JORC Code, 2012 Edition – Table 1

#### Section 4 Estimation and Reporting of Ore Reserves

(Criteria listed in section 1, and where relevant in sections 2 and 3, also apply to this section.)

Criteria	JORC Code explanation	Commentary
<i>Mineral Resource estimate for conversion to Ore Reserves</i>	<ul style="list-style-type: none"> <li><i>Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.</i></li> <li><i>Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.</i></li> </ul>	<p>The Mineral Resource Estimate was prepared by Snowden Mining Industry Consultants in January 2020. Details are as set out in Section 3 in the Mineral Resource Estimate attached as an addendum to this Ore Reserves Statement.</p> <p>The resource block models “<i>rub_mod_2001v5.dm</i>” and “<i>hel_mod_2001v4.dm</i>” were used as the basis of the pit optimisation, pit design and production schedule.</p> <p>The Mineral Resources are inclusive of the Ore Reserves.</p>
<i>Site visits</i>	<ul style="list-style-type: none"> <li><i>Comment on any site visits undertaken by the Competent Person and the outcome of those visits.</i></li> <li><i>If no site visits have been undertaken indicate why this is the case.</i></li> </ul>	<p>John Wyche visited the Karibib site on 9 and 10 August 2019. Areas inspected included the:</p> <ul style="list-style-type: none"> <li>Existing pits at Rubicon and Helikon 1,</li> <li>Accessible underground voids off Rubicon highwall,</li> <li>Potential process plant, waste rock dump and tailings storage sites, and</li> <li>Site access road from Karibib town.</li> </ul> <p>The visit confirmed that assumptions made for the mine design and operations are appropriate for the site logistics, geology and topography.</p>



Criteria	JORC Code explanation	Commentary
Study status	<ul style="list-style-type: none"> <li><i>The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.</i></li> <li><i>The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.</i></li> </ul>	<p>The Ore Reserves have been compiled as part of a Feasibility Study (FS) which covers all aspects of the project:</p> <ul style="list-style-type: none"> <li>Mineral resource estimation,</li> <li>Geotechnical assessment of pit wall slopes,</li> <li>Process definition and test work for beneficiation of the lithium mineral lepidolite by flotation at Karibib,</li> <li>Transportation of the lepidolite concentrate to the proposed lithium chemical plant in Abu Dhabi,</li> <li>Process definition and test work for the LOH-Max®, L-Max® and S-Max® processes to produce battery grade lithium hydroxide or lithium carbonate and saleable by-products,</li> <li>Opencut mine planning for two pits and the associated waste rock dumps,</li> <li>Water and waste rock management for the Karibib site,</li> <li>Marketing of the lithium battery products and by-products,</li> <li>Operating and capital cost estimates,</li> <li>Financial modelling,</li> <li>Environmental impact assessment and permitting.</li> </ul>
Cut-off parameters	<ul style="list-style-type: none"> <li><i>The basis of the cut-off grade(s) or quality parameters applied.</i></li> </ul>	<p>Cut off grades are expressed in lithium parts per million (Li ppm). They are estimated on the basis of producing battery grade lithium hydroxide mono hydrate (LiOH.H<sub>2</sub>O) with by-products of amorphous silica and sulphate of potash (SOP).</p> <p>The opencut cut mine uses a marginal cut off grade which compares the cost of processing 1 tonne of material against the revenue derived after applying process recoveries. The costs are:</p> <ul style="list-style-type: none"> <li>Any additional costs of mining the material as ore instead of waste,</li> <li>Beneficiation of the ore by flotation in the Karibib concentrator,</li> </ul>



Criteria	JORC Code explanation	Commentary
		<ul style="list-style-type: none"> <li>• General and administration costs for the Karibib Project,</li> <li>• Transport of the lepidolite concentrate to Abu Dhabi,</li> <li>• Application of the LOH-Max® process in Abu Dhabi, and</li> <li>• Payment of a Namibian royalty on the lepidolite concentrate.</li> </ul> <p>Revenues are calculated using sale prices of:</p> <ul style="list-style-type: none"> <li>• LiOH.H<sub>2</sub>O US\$13,000 per tonne (long term)</li> <li>• Amorphous silica US\$100 per tonne</li> <li>• SOP US\$650 per tonne, and</li> <li>• Rubidium/Caesium formate brine US\$8,571 per tonne.</li> </ul> <p>LiOH.H<sub>2</sub>O per tonne of ore is dependent on the lithium head grade and the ore type.</p> <p>Amorphous silica and SOP are by-products of the L-Max® and LOH-Max® processes and are produced in fixed proportions to the LiOH.H<sub>2</sub>O production.</p> <p>Rubidium/caesium brine production is dependent on the caesium head grade.</p> <p>The marginal cut-off grade is the lithium ppm where the value of the final products equals the total of the costs above. The massive lepidolite, disseminated lepidolite and mica/pegmatite ore types have different recoveries to concentrate and different concentrate grades resulting in differing cut off grades. Ore from Helikon 1 is trucked 7km to the concentrator at Rubicon and the cost of this is added to the Helikon 1 ore thereby raising its cut off grade slightly.</p>



Criteria	JORC Code explanation	Commentary																																																							
		<p>After including all the costs, recoveries and revenues the cut off grades across the deposits are:</p> <table><tr><th></th><th></th><th>Massive Lepidolite</th><th>Disseminate d Lepidolite</th><th>Mica / Pegmatite</th></tr><tr><td colspan="2"><b>Rubicon</b></td><td></td><td></td><td></td></tr><tr><td>Head Grade</td><td>Li ppm</td><td>679</td><td>760</td><td>780</td></tr><tr><td></td><td>Li2O %</td><td>0.15%</td><td>0.16%</td><td>0.17%</td></tr><tr><td>Insitu Resource Grade</td><td>Li ppm</td><td>713</td><td>798</td><td>819</td></tr><tr><td></td><td>Li2O %</td><td>0.15%</td><td>0.17%</td><td>0.18%</td></tr><tr><td colspan="2"><b>Helikon 1</b></td><td></td><td></td><td></td></tr><tr><td>Head Grade</td><td>Li ppm</td><td>702</td><td>783</td><td>809</td></tr><tr><td></td><td>Li2O %</td><td>0.15%</td><td>0.16%</td><td>0.17%</td></tr><tr><td>Insitu Resource Grade</td><td>Li ppm</td><td>737</td><td>822</td><td>850</td></tr><tr><td></td><td>Li2O %</td><td>0.15%</td><td>0.17%</td><td>0.18%</td></tr></table>			Massive Lepidolite	Disseminate d Lepidolite	Mica / Pegmatite	<b>Rubicon</b>					Head Grade	Li ppm	679	760	780		Li2O %	0.15%	0.16%	0.17%	Insitu Resource Grade	Li ppm	713	798	819		Li2O %	0.15%	0.17%	0.18%	<b>Helikon 1</b>					Head Grade	Li ppm	702	783	809		Li2O %	0.15%	0.16%	0.17%	Insitu Resource Grade	Li ppm	737	822	850		Li2O %	0.15%	0.17%	0.18%
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<i>Mining factors or assumptions</i>	<ul style="list-style-type: none"><li>• <i>The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).</i></li><li>• <i>The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.</i></li><li>• <i>The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc), grade control and pre-production drilling.</i></li><li>• <i>The major assumptions made, and Mineral Resource model used for pit and stope optimisation (if appropriate).</i></li><li>• <i>The mining dilution factors used.</i></li><li>• <i>The mining recovery factors used.</i></li><li>• <i>Any minimum mining widths used.</i></li><li>• <i>The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.</i></li><li>• <i>The infrastructure requirements of the selected mining methods.</i></li></ul>	<p><b>Opencut Mining</b></p> <p>Opencut mining will be conventional methods using hydraulic excavators and mining trucks. All material mined will require blasting. There will be areas of narrow benches during the initial months of mining around the existing pits but wider benches will be available after a few months.</p> <p>For the first half of the mine life required mining rates are relatively low so small sized excavators and trucks can be used. Small machines are well suited to the initial pit development work. Mining rates increase in the second half of the mine life as the final pushback is mined. This pushback will have broad benches many of which will be mostly waste rock. There will be a requirement for more or larger mining machines in this period.</p> <p>Pit stage designs for Rubicon and Helikon 1 accommodate ramp access between stages.</p> <p>Pit wall slopes are based on a Feasibility Study level geotechnical analysis by Pells Sullivan Meynink. Both pits tend to follow the orebody down dip so the highest walls are cut across the dip which will promote stability.</p>																																																							



Criteria	JORC Code explanation	Commentary
		<p>Grade control will be by a combination of visual control during mining and assaying of blast hole samples. The high grade massive and disseminated lepidolite zones are visually identifiable from the lower grade pegmatite and the barren quartz core and the surrounding granite host rock. Lithium grades in the lower grade mica and pegmatite ore types are gradational within the sills and will require sampling and assaying to delineate cut off grade boundaries. This is mainly required in the second half of the mine life when the massive and disseminated lepidolite is mostly depleted.</p> <p>Mining loss and dilution are modelled by application of global factors of 95% recovery and 5% dilution at zero grade.</p> <p>The Ore Reserves are derived entirely from Measured and Indicated Mineral Resources. Inferred Mineral Resources are treated as waste rock.</p> <p>The Karibib Feasibility Study includes provision of diesel fuel supply, workshops, explosives storage and other facilities required to support the opencut mining operation. For the first four years mining rates are less than 50 kbcm per month so the infrastructure to support the mining operation is minimal. Rates rise to 75 kbcm per month in Years 5 to 8 then peak for two years at around 250 kbcm per month.</p> <p>The Navachab Gold Mine has been operating in the area since 1989. This is a much larger mining operation than the Karibib Project so the supply chains, skills and resources to support mining are already well established.</p>
Metallurgical factors or assumptions	<ul style="list-style-type: none"> <li>• The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.</li> <li>• Whether the metallurgical process is well-tested technology or novel in nature.</li> <li>• The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.</li> </ul>	<p>The Ore Reserves are based on production of battery grade lithium hydroxide monohydrate (<math>\text{LiOH} \cdot \text{H}_2\text{O}</math>) with by-products of amorphous silica, sulphate of potash (SOP) and rubidium/caesium brine. The general processing path is:</p> <ul style="list-style-type: none"> <li>• Beneficiation of the ROM ore by crushing, grinding and flotation in a concentrator at the Karibib mine site. The lepidolite</li> </ul>



Criteria	JORC Code explanation	Commentary
	<ul style="list-style-type: none"> <li>Any assumptions or allowances made for deleterious elements.</li> <li>The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.</li> <li>For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?</li> </ul>	<p>concentrate will grade approximately:</p> <ul style="list-style-type: none"> <li>1.8% lithium from massive lepidolite</li> <li>1.6% lithium from disseminated lepidolite</li> <li>1.35% lithium from the mica/pegmatite ore types.</li> </ul> <ul style="list-style-type: none"> <li>The lepidolite concentrate will be transported to a chemical plant to be constructed in the UAE.</li> <li>The chemical plant will use Lepidico's patented L-Max®, LOH-Max® and S-Max® processes to produce battery grade LiOH.H<sub>2</sub>O with by-products of amorphous silica, sulphate of potash and rubidium/caesium brine.</li> </ul> <p>The L-Max® was developed by Lepidico to extract lithium from lepidolite mica concentrates and then purify leach solution for production of battery grade lithium chemicals. The LOH-Max® process was developed by Lepidico to produce battery grade LiOH.H<sub>2</sub>O from the purified leach solution. It has never been applied on a commercial scale. The recoveries, consumables and costs in Lepidico's production and financial models are derived from extensive bench scale testing and continuous pilot plant operation processing. The products from the pilot plant have subsequently being tested to demonstrate by-products at marketable qualities and battery grade lithium chemicals.</p>
Environmental	<ul style="list-style-type: none"> <li>The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.</li> </ul>	<p>The Karibib Project will be developed on an existing Mining License (ML204). An Environmental Impact Assessment (EIA) was completed in 2017 by Risk Based Solutions (RBS) CC and an Environmental Compliance Certificate (ECC) granted for a period of three years. RBS are currently updating the EIA to apply for renewal of the ECC in September 2020.</p> <p>GHD LLC, Abu Dhabi, have been engaged to complete permitting of the chemical plant in Abu Dhabi. The permitting process is expected to be completed within six months.</p>



Criteria	JORC Code explanation	Commentary
Infrastructure	<ul style="list-style-type: none"> <li><i>The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided or accessed.</i></li> </ul>	<p>Lycopodium Minerals Pty Ltd have completed design of the mineral processing plant and associated infrastructure including non-process buildings. Water supply will be from an existing borefield.</p> <p>Addiza Power Consultants have completed the design of the power supply overhead line to be connected to the national grid.</p> <p>Knight Piesold have completed design of upgrades required to the existing local road infrastructure.</p> <p>Lycopodium Minerals Pty Ltd completed the Feasibility Study of the Phase 1 Chemical Plant in May 2020.</p>
Costs	<ul style="list-style-type: none"> <li><i>The derivation of, or assumptions made, regarding projected capital costs in the study.</i></li> <li><i>The methodology used to estimate operating costs.</i></li> <li><i>Allowances made for the content of deleterious elements.</i></li> <li><i>The source of exchange rates used in the study.</i></li> <li><i>Derivation of transportation charges.</i></li> <li><i>The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.</i></li> <li><i>The allowances made for royalties payable, both Government and private.</i></li> </ul>	<p>The opencut mining costs have been estimated by Robert Harris of Project Definition Pty Ltd using local cost inputs and industry standards.</p> <p>Lycopodium Minerals Pty Ltd have estimated the capital costs of the process plant and facilities using quoted equipment prices, local installation rates and material take-off factoring.</p> <p>Lepidico have estimated the operating costs for the process plant and administration based on local unit rates.</p> <p>Concentrate transport costs were estimated by Robert Harris.</p> <p>Lycopodium Minerals Pty Ltd estimated the capital costs of the Phase 1 Chemical Plant in a Feasibility Study completed in May 2020 incorporating learnings from the Pilot Plant operation in 2019.</p> <p>Lepidico have estimated the operating costs for the Phase 1 Chemical Plant and based on local UAE unit rates.</p>
Revenue factors	<ul style="list-style-type: none"> <li><i>The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.</i></li> <li><i>The derivation of assumptions made of metal or commodity price(s),</i></li> </ul>	<p>Current basis of pricing for:</p> <ul style="list-style-type: none"> <li>Forecast pricing for lithium hydroxide has been provided by Benchmark Minerals Intelligence.</li> <li>By-product pricing in the UAE for amorphous silica and SOP was</li> </ul>





Criteria	JORC Code explanation	Commentary
	<i>for the principal metals, minerals and co-products.</i>	<p>completed by TAK Industrial Mineral Consultancy in 2018.</p> <ul style="list-style-type: none"> <li>The pricing for the caesium formate brine has been established by engagement with oil industry drilling consultants and services companies.</li> </ul>
<b>Market assessment</b>	<ul style="list-style-type: none"> <li><i>The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.</i></li> <li><i>A customer and competitor analysis along with the identification of likely market windows for the product.</i></li> <li><i>Price and volume forecasts and the basis for these forecasts.</i></li> <li><i>For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.</i></li> </ul>	<p>Market assessment for lithium chemicals supply and demand projection has been provided by Benchmark Minerals Intelligence.</p> <p>Market assessment in the UAE for amorphous silica and SOP was completed by TAK Industrial Mineral Consultancy in 2018.</p> <p>The market assessment for the caesium formate brine has been established by engagement with oil industry drilling consultants and services companies.</p>
<b>Economic</b>	<ul style="list-style-type: none"> <li><i>The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.</i></li> <li><i>NPV ranges and sensitivity to variations in the significant assumptions and inputs.</i></li> </ul>	<p>A monthly life of mine schedule was prepared for the mining operation and used by Lepidico as the basis of the project financial model. The model version assumes that Karibib is the only feed source for the UAE Phase 1 Lithium Chemical Plant so the net revenue generated from Karibib must cover the cost of developing the facilities in Namibia and the UAE.</p> <p>The Base Case model returns an after tax NPV at an 8% discount rate of US\$221 million. The project life is 13 years and the payback period is 3 years. The project is most sensitive to the lithium hydroxide price. The next most sensitive item is the Phase 1 Lithium Chemical Plant operating cost. It is not highly sensitive to the concentrator and mining costs at Karibib. Even with a 10% reduction in the lithium hydroxide price and a 10% increase in operating costs the project retains a positive value.</p> <p>The Phase 1 Chemical Plant in the UAE will be designed to process mica concentrate from multiple feed sources. This includes Lepidico's advanced Alvarrões Lithium Project in Portugal for which a Pre-feasibility Study and Ore Reserve were completed in November 2019. Additional longer life feed sources enhance the returns from the integrated project.</p>



Criteria	JORC Code explanation	Commentary
		The Karibib model returns a positive value as a standalone project based on reasonable financial assumptions.
Social	<ul style="list-style-type: none"> <li><i>The status of agreements with key stakeholders and matters leading to social licence to operate.</i></li> </ul>	<p>Lepidico has established stakeholder engagement at all levels of government in Namibia.</p> <p>Lepidico has completed socio-economic surveys of four local communities in 2020. The results will inform community and social support and communication strategy and programs.</p> <p>Lepidico is putting in a place a landowner agreement with local existing farmers and communities and the Ministry of Lands and Reform (MLR). The MLR have approved the Terms of Reference.</p>
Other	<ul style="list-style-type: none"> <li><i>To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:</i></li> <li><i>Any identified material naturally occurring risks.</i></li> <li><i>The status of material legal agreements and marketing arrangements.</i></li> <li><i>The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.</i></li> </ul>	<p>The Karibib Project has been defined at a Feasibility Level of confidence based on Measured and Indicated Mineral Resources. Ongoing work on the Namibian and UAE aspects of the project will continue to improve confidence. A large body of work has been done on processing aspects of lepidolite concentration and the Phase 1 Lithium Chemical Plant which are common to all the potential lepidolite feed sources. The following issues specific to Karibib are noted for further definition to improve overall confidence:</p> <ul style="list-style-type: none"> <li>Some areas of the historical underground workings at Rubicon are flooded and were not included in the 2019 void survey. While these workings are not likely to be extensive and their positions are approximately known, care will be required during opencut mining to avoid bench floor failures.</li> <li>Some of the historical underground workings off the Rubicon highwall have substantial height and width and can be as close as 5 to 10 metres from surface. The target lepidolite zone is generally in the floor of these workings. Care will be required when collapsing the benches above the voids.</li> </ul>



Criteria	JORC Code explanation	Commentary
<i>Classification</i>	<ul style="list-style-type: none"> <li><i>The basis for the classification of the Ore Reserves into varying confidence categories.</i></li> <li><i>Whether the result appropriately reflects the Competent Person's view of the deposit.</i></li> <li><i>The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).</i></li> </ul>	<p>Only Measured or Indicated Mineral resources are considered in the Ore Reserve Estimate.</p> <p>Proved Ore Reserves are derived only from Measured Mineral Resources. Probable Ore Reserves are derived only from Indicated Mineral Resources. No issues were identified to warrant classifying any of the Ore Reserves derived from Measured Mineral Resources as Probable.</p> <p>In the opinion of the Competent Person when taken as a whole the modifying factors have been defined to a level of confidence commensurate with a Proved or Probable Ore Reserve. While further work during project development will continue to improve confidence there are no issues currently identified which are likely to have a material impact on the viability of the project and the Ore Reserves as stated.</p>
<i>Audits or reviews</i>	<ul style="list-style-type: none"> <li><i>The results of any audits or reviews of Ore Reserve estimates.</i></li> </ul>	<p>No audits of the Ore Reserves have been undertaken.</p>
<i>Discussion of relative accuracy/confidence</i>	<ul style="list-style-type: none"> <li><i>Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.</i></li> <li><i>The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.</i></li> <li><i>Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.</i></li> </ul>	<p>Although historical mining has taken place at the Karibib Project the data available is inadequate to form meaningful reconciliations of production against the Mineral Resource model.</p> <p>From a Mineral Resource perspective confidence is commensurate with Measured and Indicated Resources with respect to the lithium grade distribution, sill thickness and structure.</p> <p>The proposed opencut mining method is conventional and well understood. Reliability of the mining models is mainly dependent on the Mineral Resource model. Required production rates are relatively small for the equipment proposed which should allow mine operators to adapt to actual conditions encountered.</p> <p>While the processing methods are new, they have been extensively tested at bench and pilot scale.</p> <p>Given the current status of the Mineral Resource model and operations</p>



Criteria	JORC Code explanation	Commentary
	<ul style="list-style-type: none"> <li><i>It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.</i></li> </ul>	<p>plan the Ore Reserve should be a very good global estimate and a good local estimate in the areas of Measured Resources. Short term variations from the tonnes and grades predicted by the resource model are likely in any new mining operation, particularly as in areas of Indicated Resources but the given the small scale of the operation and well defined geology it is reasonable to expect that operating experience will assist rapid development of reliable short term plans.</p>



## 1.7 RESOURCE AND RESERVE CATEGORIES – EXPLANATION

According to the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (The JORC Code) 2012 Edition:-

A 'Mineral Resource' is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade (or quality), and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade (or quality), continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.

An 'Inferred Mineral Resource' is that part of a Mineral Resource for which quantity and grade (or quality) are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade (or quality) continuity. It is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes.

An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to an Ore Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

An 'Indicated Mineral Resource' is that part of a Mineral Resource for which quantity, grade (or quality), densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit.

Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes, and is sufficient to assume geological and grade (or quality) continuity between points of observation where data and samples are gathered.

An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Ore Reserve.

A 'Measured Mineral Resource' is that part of a Mineral Resource for which quantity, grade (or quality), densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit.

Geological evidence is derived from detailed and reliable exploration, sampling and testing gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes, and is sufficient to confirm geological and grade (or quality) continuity between points of observation where data and samples are gathered.

A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proved Ore Reserve or under certain circumstances to a Probable Ore Reserve.

An 'Ore Reserve' is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include



application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

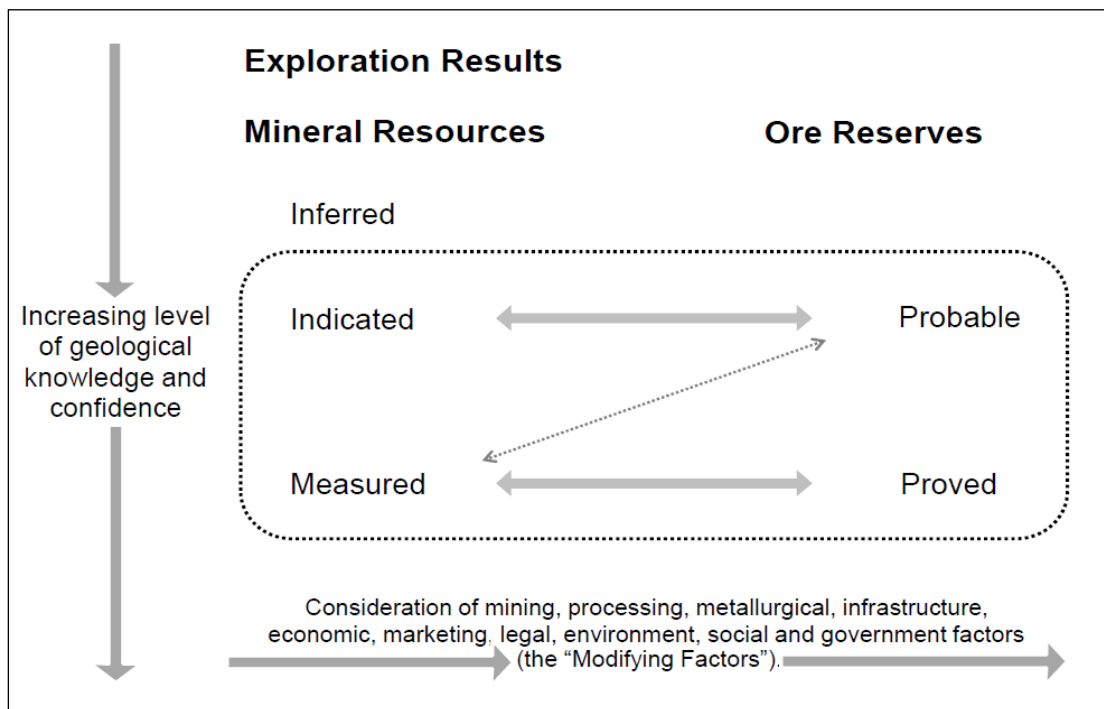
The guidelines in the JORC Code state that the term 'economically mineable' implies that extraction of the Ore Reserves has been demonstrated to be viable under reasonable financial assumptions. This will vary with the type of deposit, the level of study that has been carried out and the financial criteria of the individual company. For this reason, there can be no fixed definition for the term 'economically mineable'.

A 'Probable Ore Reserve' is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Ore Reserve is lower than that applying to a Proved Ore Reserve.

A 'Proved Ore Reserve' is the economically mineable part of a Measured Mineral Resource. A Proved Ore Reserve implies a high degree of confidence in the Modifying Factors.

The guidelines provided in the JORC Code note that "A Proved Ore Reserve represents the highest confidence category of reserve estimate and implies a high degree of confidence in geological and grade continuity, and the consideration of the Modifying Factors. The style of mineralisation or other factors could mean that Proved Ore Reserves are not achievable in some deposits."

The following figure, from the JORC Code, sets out the framework for classifying tonnage and grade estimates to reflect different levels of geological confidence and different degrees of technical and economic evaluation.



**Figure 6 General relationship between Exploration Results, Mineral Resources and Ore Reserves, from 2012 JORC Code Figure 1**

Mineral Resources can be estimated on the basis of geoscientific information with some input from other disciplines. Ore Reserves, which are a modified sub-set of the Indicated and Measured Mineral



Resources (shown within the dashed outline in the Figure above), require consideration of the Modifying Factors affecting extraction, and should in most instances be estimated with input from a range of disciplines.

Measured Mineral Resources may be converted to either Proved Ore Reserves or Probable Ore Reserves. The Competent Person may convert Measured Mineral Resources to Probable Ore Reserves because of uncertainties associated with some or all of the Modifying Factors which are taken into account in the conversion from Mineral Resources to Ore Reserves.

Inferred Resources cannot convert to Ore Reserves.





## **ADDENDUM**

### **RUBICON AND HELIKON 1 MINERAL RESOURCE ESTIMATE**

**PROJECT NUMBER AU10317**

**JANUARY 2020**

**SNOWDEN MINING INDUSTRY CONSULTANTS  
PTY LTD**

Refer: ASX Announcement dated 30 January 2020 ("Updated Mineral Resource Estimates for Helikon 1 and Rubicon")