21 October 2021

Revised: 40% Increase of the Cape Flattery Silica Sand Resource to 53.5Mt

Note that this ASX release has been revised primarily to include an updated Competent Person Statement & Table 1.

Highlights

- Substantial increase in high quality silica sand mineral resource
- Total resources increased by 40% from 38.3 Mt to 53.5 Mt with improved confidence
- Measured resource of 9.6Mt @ 99.29 % SiO_2 reported for the first time
- Measured and Indicated resource of 47.8 Mt @ 99.18% SiO_2
- In-situ SiO_2 grade averages 99.19%
- Expansion of the existing Cape Flattery resource possible with further in-fill and step out drilling in the Indicated resource area
- Metallurgical studies commenced on representative drill samples
- Project is adjacent to the designated Port area of Cape Flattery

Metallica Minerals Limited (**Metallica**, ASX: MLM) is pleased to announce that it has successfully upgraded the resource at its Cape Flattery Silica Sand Project in Far North Queensland to 53.5 million tonnes at an in-situ quality of 99.19% SiO_2 and 0.12% Fe_2O_3 (see Table 1 on page 5).

Utilising the assay data from the August 2021 drilling program[1] industrial mineral specialists, Ausrocks Pty Ltd, have estimated a 40% increase to the resource, which includes a significant increase in the Indicated resource and the classification of Measured resource for the first time (see Table 1 on page 5).

Metallica Executive Chairman, Theo Psaros said "we are delighted to announce a further major upgrade of the high purity silica sand resource at our Cape Flattery project. We lodged our Mining Lease Application in June of this year[2] with confidence in the project's potential. The combined Measured and Indicated components of the total resource confirms our confidence and are a major milestone as we progress the development of our high-quality silica sand project. We continue to receive positive interest from international and domestic parties for quality silica sand. This does not surprise us based on forecast growth in the global demand for premium product."

Mr Psaros added "these results were achieved with the significant support and effort of representatives of the key clans whose shared land includes the project area. A team comprising representatives from the Dingaal Clan and Nguurruumungu Clan worked tirelessly on the drilling program."

[1] First reported in ASX release dated 20th September 2021. "Latest Assay Results confirm significant intervals and extend High Purity Silica Sand a Cape Flattery Silica Sand Project".
[2] First reported in ASX release dated 15th June 2021" Cape Flattery Silica Sand Project advances as Mining Lease Application Lodged'

The Resource Area is shown in Figure 1 below.

The area that contains the Measured resource category is where initial development is planned. This area also contains the highest silica grades and lowest iron content. Samples from the 20 holes within the Measured Resource area have been composited to produce a representative sample for metallurgical test work. The average distance from the Measured resource to the preferred location of the planned jetty is 1km.

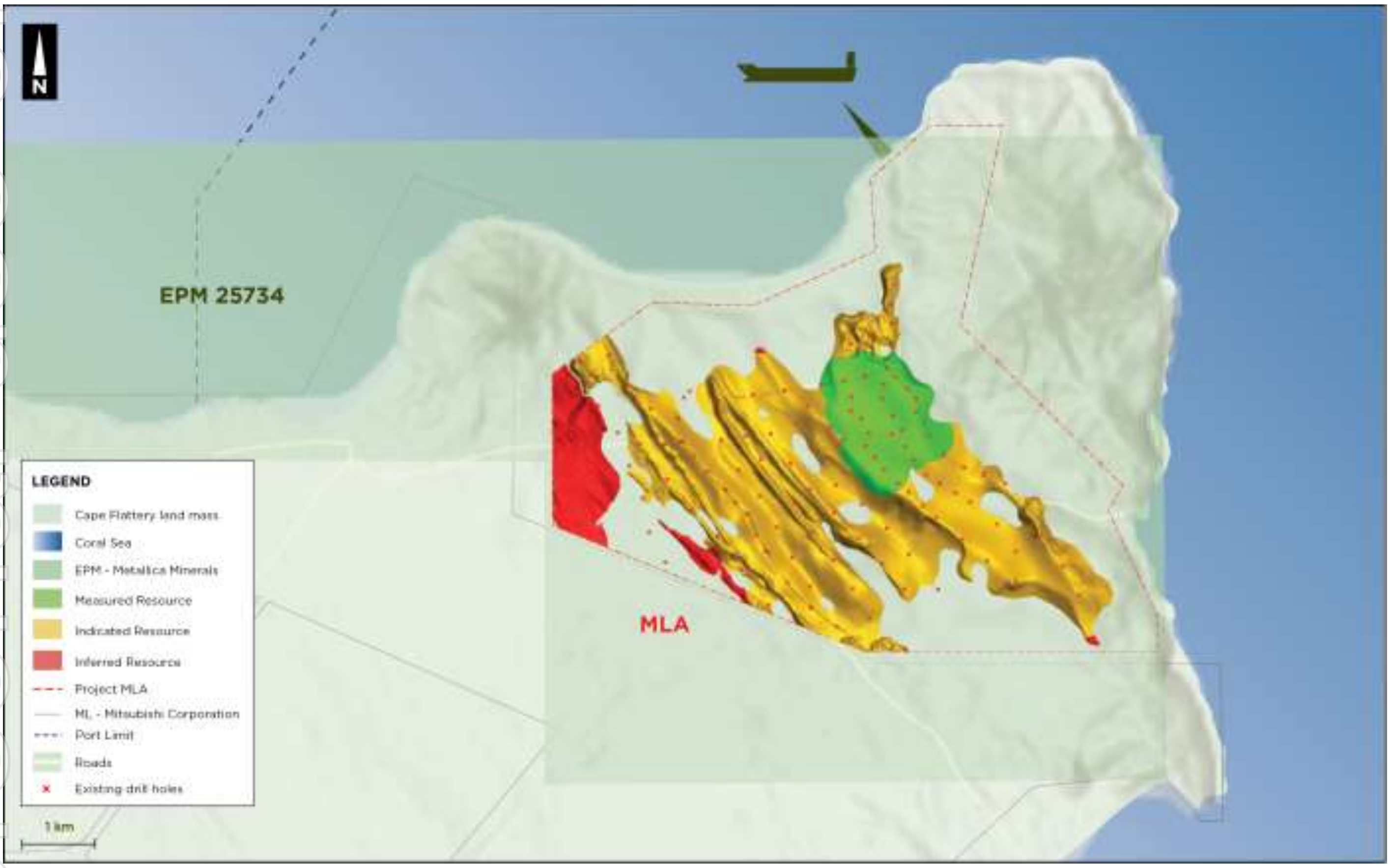


Figure 1. CFS Project Resource Areas

The combined campaigns of vacuum drilling (120 holes) and hand auger work have confirmed that high-quality white silica sand exists with SiO_2 levels greater than 98.5% and relatively low iron Fe_2O_3 < 0.12% present across the wider project area. These specifications are the key attributes that offtake partners are interested in as they provide the basis for a potential marketable product.

The Resource Estimation has been undertaken in accordance with JORC 2012 guidelines and supersedes the Resource reported in March 2021[3]. The infill and step out drilling completed in August 2021 and the observed geology supports the substantial increase in the Indicated portion of the resource and the establishment of a Measured resource component.

[3] First reported in ASX Release dated 2 March 2021: 38 MT of High Purity Silica Sand).

Three representative schematic sections of the SiO2 resource contained within the CFS area (based on the Resource Model) are shown below in figures 2 to 5.

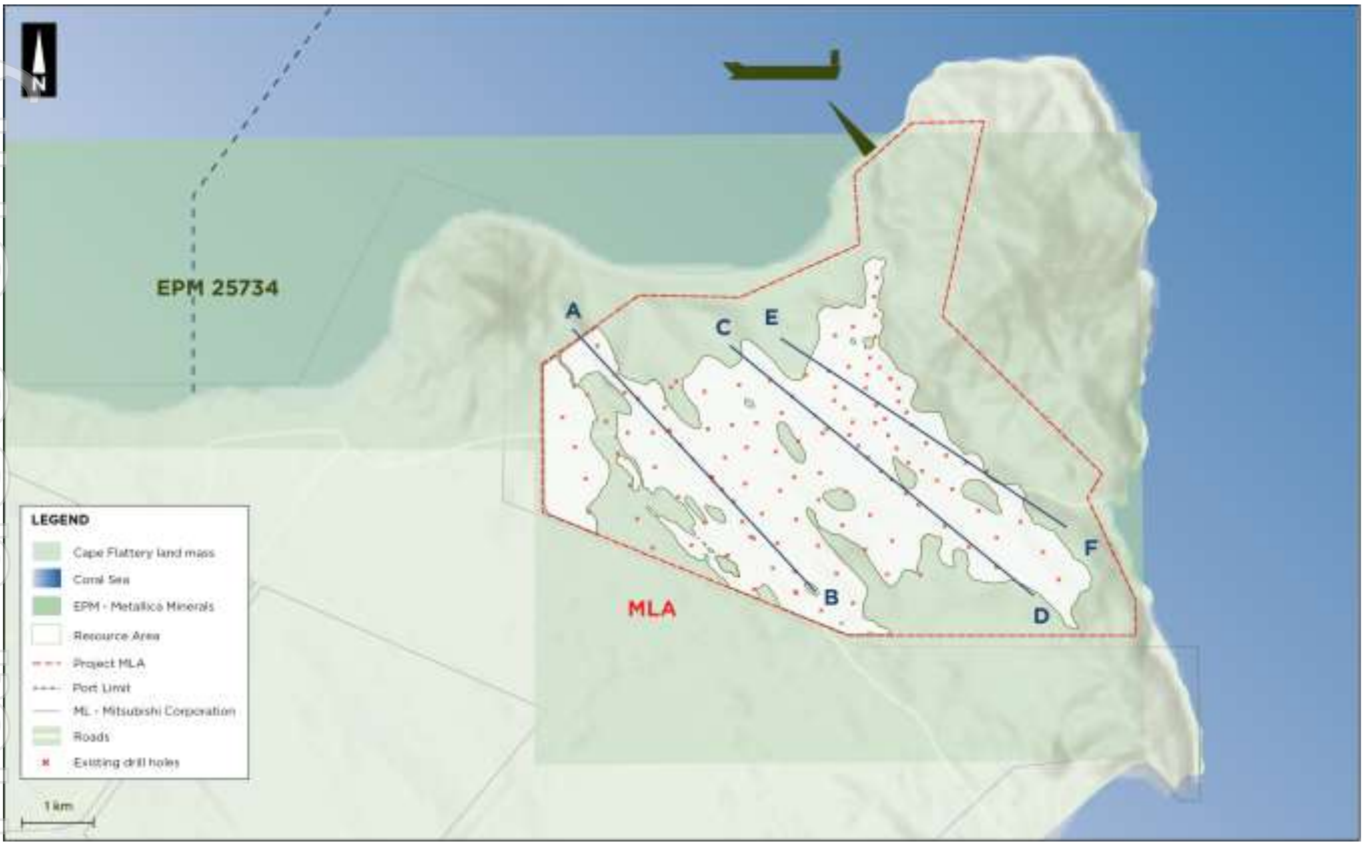
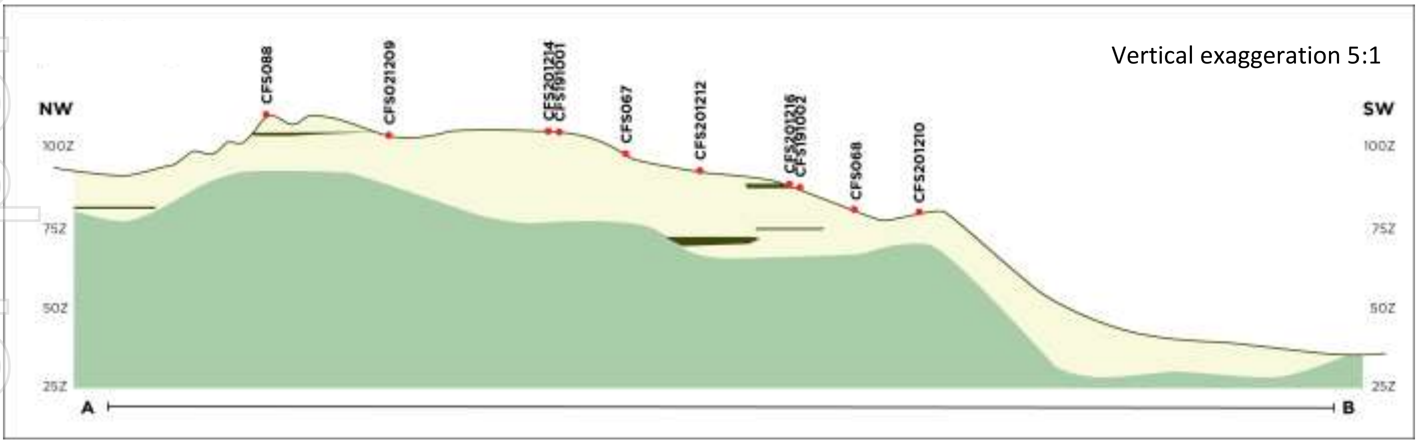
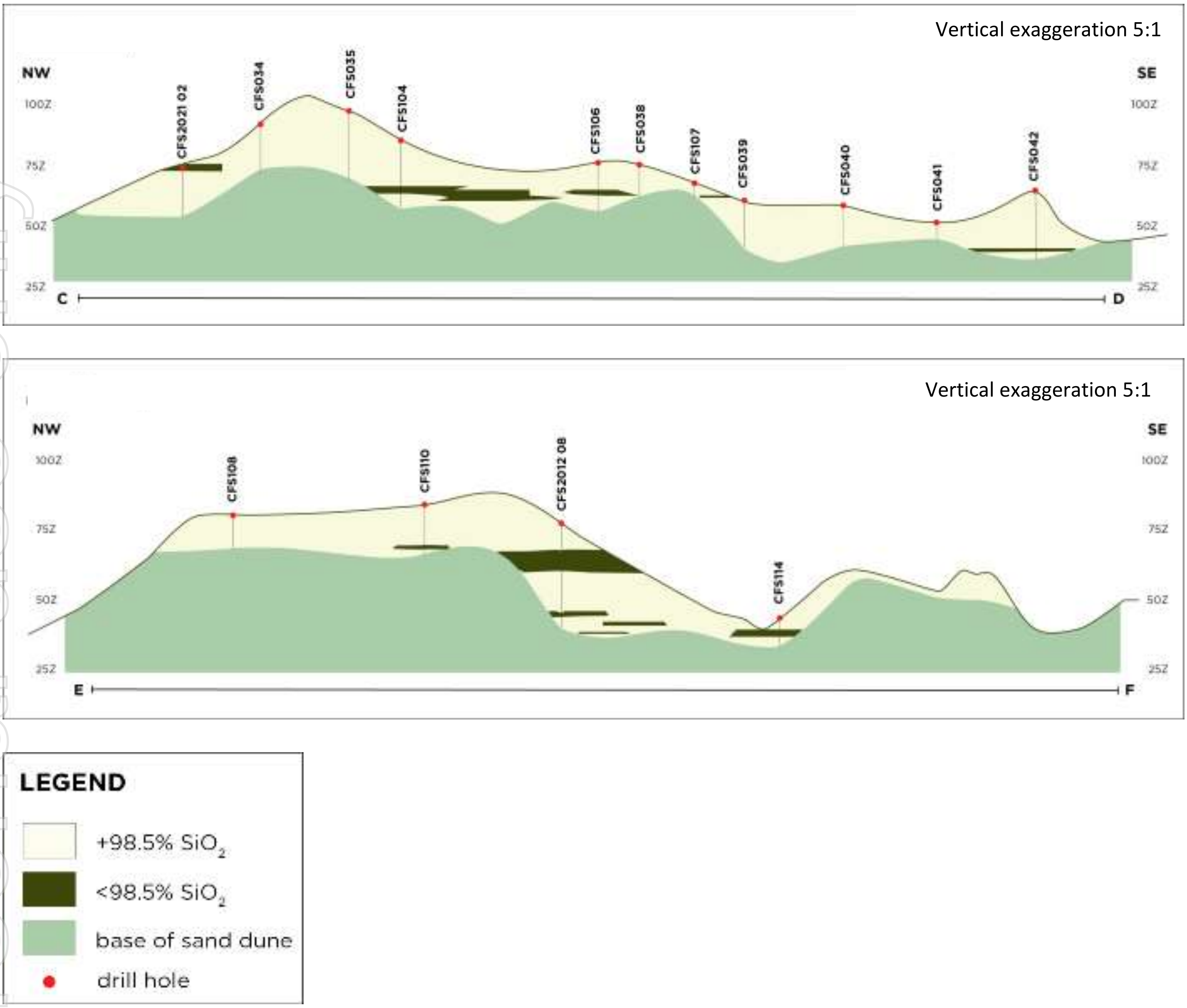


Figure 2 CFS Project – Location of sections (blue lines)





Figures 3 - 5 CFS Project Cross Sections - Schematics based on Resource Model

Resource Estimate

Modelling of the Silica sand resource was undertaken using; 10m (L) x 10m (W) x1m (H) blocks with 5m sub blocks (L) x 5m (W) x 0.5m (H) which were used to generate the block model. The blocks were constrained by the model boundaries, i.e., topography, geology, water table, base of hole and populated by the Ordinary Kriging (OK) estimation method to interpolate assay grades for each of the chosen elements (SiO_2, Fe_2O_3, Al_2O_3, LOI and TiO_2). Inverse Distance Weighting (IDW - 4:1) was used to check the model and yielded similar results.

The upgraded CFS Resource Area is summarised in Table 1, as follows:

Resource Category	Silica Sand (Mt)	SiO_2 (%)	Fe_2O_3 (%)	TiO_2 (%)	LOI (%)	Al_2O_3 (%)	Density (t/m^3)	Silica Sand (Mm^3)
Measured	9.6	99.29	0.10	0.13	0.18	0.08	1.6	5.97
Indicated	38.2	99.15	0.13	0.14	0.19	0.12	1.6	23.91
Inferred	5.7	99.26	0.11	0.11	0.18	0.16	1.6	3.54
Total	**53.5**	**99.19**	**0.12**	**0.14**	**0.19**	**0.12**	**1.6**	**33.41**

Table 1 – Resource Area Cape Flattery Silica Project

The resource has been prepared in accordance with the JORC Code 2012 – A cut-off grade 98.5% has been defined based on the surrounding data. These results show there is potential to produce a premium grade silica product using standard processing techniques.

Upcoming CFS Work Plan

There are a number of activities already initiated to advance the Cape Flattery Silica project with more planned to start in this quarter which will continue into the new year:

- Continue the Pre-Feasibility Study ("PFS") (first visit to site by the team of consultants occurring the week of 18 October 2021);
- Complete the PFS metallurgical testing and reporting in the coming months – this work is currently underway with Mineral Technologies;
- Continue environmental studies and field work, which is currently underway;
- Progress key agreements with the Traditional Landowners. Two meetings were held in Hope Vale on Wednesday, 6 October 2021. The first meeting was with representatives of Hopevale Congress Aboriginal Corporation (Hopevale Congress), as agent for the Nguurruumungu Clan, and Walmbaar Aboriginal Corporation, as agent for the Dingaal Clan. The second meeting was with members of the Hope Vale township;
- Finalise a study on options to build a barge-loading facility to tranship silica sand onto Ocean-Going Vessels to support PFS decision making;
- Continue a PFS level assessment on the silica sand market and potential for establishing customer off-take agreements, using marketing consultants with offices in Hong Kong, China and Malaysia; and
- Continue work towards lodging a site-specific Environmental Application.

About the Cape Flattery Silica (CFS) Project

Metallica's 100% owned Cape Flattery Silica Sands (CFS) project is adjacent to the world class Cape Flattery Silica Sand mining and shipping operation owned by Mitsubishi. Exploration drilling to date has now confirmed that the sand dunes within EPM 25734 contain high purity silica sands with an in-situ quality which is understood to be comparable to Mitsubishi's Cape Flattery Silica Mine.

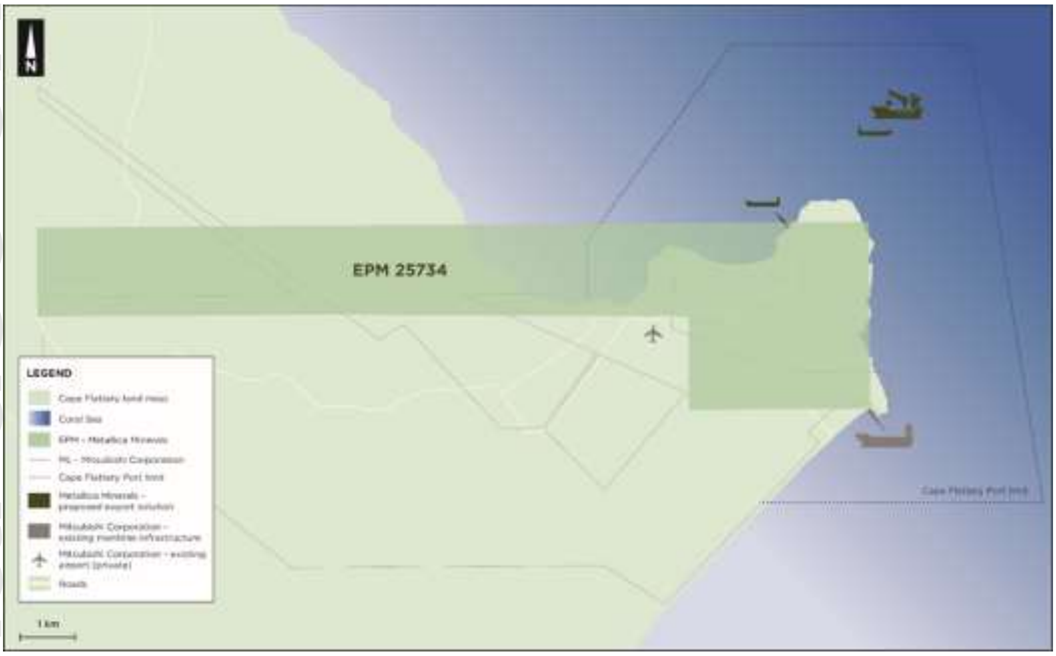


Figure 6 *EPM 25734 location and orientation at Cape Flattery and within the Cape Flattery Port limit*

On 15 June 2021 the Company announced that it had lodged a Mine Lease Application (MLA) for the project[4] , Figure 7.

[4] First Report to the ASX on the 15th June 2021"MLA Lodged for Cape Flattery Silica"

Figure 7 *Cape Flattery Silica Sand project MLA area boundary and EPM*

On 22 June 2021 the Company released the first metallurgy test results on samples taken from the December 2020 drilling program. The bulk sample metallurgical testing confirmed high quality silica sand product and demonstrated a low contaminant product with an attractive narrow particle size distribution can be produced at a high yield. The test work produced a product with 99.8% SiO_2, 170ppm Fe_2O_3 and 450ppm Al_2O_3 and further work included successful test of process to reduce Fe_2O_3 from 170ppm to 70ppm Fe_2O_3[5] .

This announcement has been approved in accordance with the Company's published continuous disclosure policy and has been approved by the Board.

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Competent Person Statement

Cape Flattery Silica Sands Exploration Results
The information in this report that relates to the Exploration Sampling and Exploration Results is based on information compiled by Mr Patrick Smith, a Competent Person who is a Member of the Australian Institute of Mining and Metallurgy.

Mr Smith is the owner and sole Director of PSGS Pty Ltd and is contracted to Metallica Minerals as their Exploration Manager. Mr Smith confirms there is no potential for a conflict of interest in acting as the Competent Person. Mr Smith has sufficient experience that is relevant to the style of mineralisation and type of deposits under consideration and to the activity being undertaken 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 Smith consents to the inclusion of this information in the form and context in which it appears in this release/report.

Cape Flattery Silica Sands Resource
The information in this report that relates to the Cape Flattery Silica Project – Eastern Resource Area is based on information and modelling carried out by Chris Ainslie, Project Engineer, who is a full-time employee of Ausrocks Pty Ltd and a Member of the Australasian Institute of Mining & Metallurgy. The work was supervised by Mr Carl Morandy, Mining Engineer who is Managing Director of Ausrocks Pty Ltd and a Member of the Australasian Institute of Mining & Metallurgy and also by Mr Brice Mutton who is a Senior Associate Geologist for Ausrocks Pty Ltd. Mr Mutton is a Fellow of the Australasian Institute of Mining & Metallurgy and a Fellow of the Australian Institute of Geoscientists. Mr Morandy and Mr Ainslie and Mr Mutton are employed by Ausrocks Pty Ltd who have been engaged by Metallica Minerals Ltd to prepare this independent report, there is no conflict of interest

[5] First reported to the ASX on the 22nd June 2021 "Excellent Metallurgical Test Results on Cape Flattery Silica" competent persons, Mr Neil Mackenzie-Forbes, Mr Chris Ainslie, Carl Morandy, Mr Brice Mutton and Mr Kruger

between the parties. Mr Morandy, Mr Ainslie and Mutton consent to the disclosure of information in the form and context in which it appears in this report.

The overall resource work for the Cape Flattery Silica Project – Eastern Resource Area is based on the direction and supervision of Mr Mutton who has sufficient experience that is relevant to the style of mineralisation and type of deposits under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves".
The corresponding JORC 2012 Table 1 is attached.

Reference to Previous Releases

Drilling, resource estimates and metallurgical results referred to in this announcement have been previously announced to the market in reports dated; 2nd March, 15th June, 22nd June and the 12th August 2021 and are available to view and download from the Company's website: ASX Announcements — Metallica Minerals Limited***https://metallicaminerals*.**

Regional aeromagnetic data used as underlays in some figures of this announcement have been previously reported to the market in the report dated 23 September 2020 and can be viewed and downloaded from the Company's website.

The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements. MLM confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcements.

Forward-looking statements

Forward-looking statements are based on assumptions regarding Metallica, business strategies, plans and objectives of the Company for future operations and development and the environment in which Metallica may operate.

Forward-looking statements are based on current views, expectations and beliefs as at the date they are expressed and which are subject to various risks and uncertainties. Actual results, performance or achievements of Metallica could be materially different from those expressed in, or implied by, these forward-looking statements. The forward-looking statements contained in this presentation are not guarantees or assurances of future performance and involve known and unknown risks, uncertainties and other factors, many of which are beyond the control of Metallica, which may cause the actual results, performance or achievements of Metallica to differ materially from those expressed or implied by the forward-looking statements. For example, the factors that are likely to affect the results of Metallica include general economic conditions in Australia and globally; ability for Metallica to funds its activities; exchange rates; production levels or rates; demand for Metallica's products, competition in the markets in which Metallica does and will operate; and the inherent regulatory risks in the businesses of Metallica. Given these uncertainties, readers are cautioned to not place undue reliance on such forward-looking statements.

JORC Code, 2012 Edition – Table 1 – Upgraded Mineral Resource Estimate – Measured, Indicated and Inferred, October 2021

Section 1 Sampling Techniques and Data for Cape Flattery Silica Project - Eastern Resource Area

(Criteria in this section apply to all succeeding sections)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.*	• Drilling was completed using a tractor mounted vacuum rig, with samples predominantly collected every one meter. Occasionally samples of less than one meter were collected (usually at the top of the hole), The drilled sand was collected from a cyclone and 100% of the sample was collected and placed into a pre-numbered sample bag, with each sample having a mass of between 2.5 to 4kg. • Seven hand auger samples from a 2020 programme were used in the resource estimate, The hand auger holes were samples were between 1-2kg in weight (~50% of drill material returned via the auger) and collected and bagged. Care was taken to remove possible contamination from the Shell Auger. • In the case of the drill samples the entire 1m sample was collected on site and dispatched to the laboratory for splitting and analysis (2021 programme), In the 2020 programme a spear sample of the 1m was taken and submitted for assay. • Samples were submitted to ALS Laboratories in Brisbane for drying, splitting and pulverization in a tungsten carbide bowl, prior to being analysed by an XRF analysis. • Sampling techniques are mineral sands “industry standard” for dry aeolian sands with low levels of induration and slime. • As the targeted mineralization is silica sand, geological logging of the drill material is a primary method for identifying mineralisation. • Samples from this drilling programme have been selected for Metallurgical testwork. These samples will be composited to form a bulk sample. Initially all the samples (above the COG) for each hole within the Measured Resource area will be composited to form a bulk sample for metallurgical testwork. Selected samples with high clay content are also being tested to determine if the purity of the SiO_2 in the sample can be upgrade by scrubbing out any clay.
Drilling techniques	• *Drill type and details.*	• Two (2) drilling techniques were used to collect samples for the resource estimate, namely hand-auger and vacuum drilling operated by Yearlong Drilling

		Contractors. All holes were drilled vertically. • Vacuum drilling was by a 4x4 tractor mounted drill rig with a blade drill bit diameter of 60mm equivalent to NQ sample size, using 1.8m rods. • Holes were terminated in a basement layer (clay/coloured sands) or when the very damp sand or water was intersected.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.*	• Visual assessment and logging of sample recovery and sample quality. • Vacuum drilling is low disturbance and low impact, minimising drill hole wall impact and contamination. • Samples are collected in a cyclone which has a clear Perspex casing allowing visual inspection of sample as they are being collected. • Regular cleaning of cyclone and drill rods was utilised to prevent sample contamination. • No sample bias occurred between sample recovery and grade. • The consistent weight of the samples indicates that recovery of between 90 to 100% was achieved, lower recoveries (less than 80%) were recorded in the top 1m of each hole due to the presence of organic matter and topsoil
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature.* • *The total length and percentage of the relevant intersections logged*	• Geological logging of the total hole by field geologist, with retention of sample in chip trays to allow subsequent re-interpretation of data if required. • The total hole was logged at 1m intervals; logging includes qualitative descriptions of colour, grain size, sorting, induration and estimates of HM, slimes and oversize utilising panning. • Photographs of each chip tray were taken so a digital visual record of each of the drill holes was obtained • Logging has been captured through field drill log sheets and transferred through to an excel spreadsheet which is then transferred to a central database and storage prior to being provided to a third-party consultant (Ausrocks) for resource estimation.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.*	• Hand-auger holes were sampled in 1m intervals with 1-2kg (~50% of drill material returned via the auger) collected and bagged. • For the August vacuum drilling programme sample for the entire 1m interval was collected from the cyclone • The entire one meter (1) samples were placed in a numbered calico bag (August

	• *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	2021), or subsamples of approximately 500g were speared and separately numbered, bagged and sealed ready for assaying (December 2020 programme) prior to being placed in a poly-weave sack for dispatch to the laboratory • Each one meter sample weighed between 2.5 to 4.0Kg. • At ALS the samples were split to 100gram samples for analysis in the laboratory under laboratory-controlled methods • The sample size is considered appropriate for the grain size of material, average grain size (87% material by weight between 0.125mm and 0.5mm • The Competent Person considers the sample preparation to be appropriate for drilling of this nature. • The Competent Person considers the sample sizes to be appropriate for the type of material being sampled. Appropriate sample sizes and pulverisation of the entire sample support good representivity
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	• All assaying has been carried out by ALS Mineral Laboratories, Brisbane. ALS is a global leader with over 71 laboratories worldwide providing laboratory testing, inspection certification and verification solutions. ALS Quality Assurance and all ALS geochemical hub laboratories are accredited to ISO/IEC 17025:2017 for specific analyses, which includes their Townsville and Brisbane laboratories. ALS is NATA Accredited, Corporate Accreditation No. 825, Corporate Site No. 818. • XRF was chosen as the most cost-effective assaying method for silica and minor elements for all exploration samples. • Analysis was undertaken by ALS Brisbane utilising a Tungsten Carbide pulverization, ME-XRF26 (whole rock by Fusion/XRF) and OA-GRA05 (H_2O/LOI by TGA furnace). • 2,229 %SiO_2 assays were completed on 1m downhole intervals over various drilling programs. • Assaying was primarily to determine the silica (SiO_2%) percentage, but as part of the method results were obtained for a range of minor elements, namely Al_2O_3, BaO, CaO, Cr_2O_3, Fe_2O_3, K_2O, MgO, MnO, Na_2O, P_2O_5, SO_3, SrO, TiO_2. • Analysis undertaken determined by a sample code which correlates to drill logs

		to ensure no sample bias. • There is an alternative ICP method which has lower detection limits for the other oxides such as Fe_2O_3 and Al_2O_3, but the SiO_2 assay is determined by calculation and not a measured quantum. • Internal laboratory QAQC checks include the analyses of standards, blanks and duplicates. • Acceptable levels of precision and accuracy were established. • QC procedures - No duplicate samples were collected in the field for the August 2021 programme as the entire sample was submitted to the laboratory. However selected duplicate samples have been selected from the coarse rejects at the laboratory, for duplication, Inter-laboratory checks will also be undertaken by Intertek in Perth.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Significant intersections validated against geological logging and local geology/ geological model. • No holes have been twinned, as the grade continuity in the holes is consistent. • All data captured and stored in both hard copy and electronic format. Assay data had to be adjusted in some locations for the 0-1m interval due to minor topsoil contamination. • All digital data is verified by the Competent Person. • No adjustments were made to assay data. • Significant intersections were independently validated by Ausrocks against geological logging and the geological model. • Four (4) holes have been twinned with vacuum and hand-auger to check repeatability of drill results. To date, there is a strong correlation between results from different type holes and different assay batches. Downhole variability is matched in different drill programs and different assay batches. • The infill drilling in 2021 validated the 2020 programme as the intercepts and grade of the silica were consistent along the various sections

Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• All holes initially located using handheld GPS with an accuracy of 5m for X, Y. • UTM coordinates, Zone 55L, GDA94 datum. • LiDAR topography and imagery with a vertical accuracy of <10cm was used as the topographic surface. Collar RL's draped against this surface verifies the accuracy of the hole locations. The Lidar imagery which was produced by Aerometrex
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Drilling was completed on existing tracks and newly cleared lines which are 100m to 200m apart, the lines are orientated approximately NW – SE • The holes were spaced approximately 200 meters apart and in some areas were infilled to 100m and 50m centres. • Drill spacing and distribution is sufficient to allow valid interpretation of geological and grade continuity for a Measured Mineral Resource, Indicated Mineral Resource and Inferred Mineral Resource where determined. Drilling has been completed at varying spacings across the Resource Area. • Drill spacing and interpreted geological continuity has allowed three resource categories to be defined which have been estimated in accordance with the JORC Code (2012) and are defined as follows: • **Measured Mineral Resource:** Area with drillholes completed at semi-gridded spacing <150m x 150m ending in basement/water table. • **Indicated Mineral Resource:** Area with drillholes at a confirmatory level spacing (150m-250m) ending in basement/water table. • **Inferred Mineral Resource:** Areas with drillholes at a scout level spacing (250m-400m). • No sample compositing was undertaken
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to*	• The dune field has ridges dominantly trending 320º - 330°. • The drill access tracks typically run along or sub-parallel to dune ridges which suggest unbiased sampling, some cross-dune tracks linking the ridges were also drilled • Silica deposition occurs as windblown with angle of rest approximately 35º. Drilling orientation is appropriate for the nature of deposition. • The orientation of the drilling undertaken is assessed to provide representative

	have introduced a sampling bias, this should be assessed and reported if material.	intersections and unbiased data for the deposit. All drilling is vertical, intersecting the dune field geology essentially normal or at 90 degrees to the dune sand formation. Drilling was undertaken along or sub-parallel to dune ridges. Some cross-dune tracks linking the ridges were also drilled.
Sample security	• *The measures taken to ensure sample security.*	• Sample collection and transport from the field was undertaken by company Personnel following company procedures. • Samples were aggregated into larger polyweave bags and sealed with plastic zip ties, Bags were labelled and put into palette-crates and sealed prior to being shipped to ALS Townsville. • Samples were delivered direct to ALS in Townsville, where they were transhipped to ALS Brisbane for sample preparation and analysis
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• A review was conducted internally by Metallica Minerals Ltd and a third-party consultant, Ausrocks Pty Ltd, who also reviewed the data prior to undertaking a resource estimate.

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.*	• The Cape Flattery Silica Sands Project is located within EPM 25734 in Queensland and is held by Metallica Minerals Ltd through subsidiary company Cape Flattery Silica Pty Ltd. • The project is located in Far North Queensland, approximately 220km north of Cairns or about 50km north of Cooktown and lies within EPM 25734. EPM 25734 is held by Cape Flattery Silica Pty Ltd, a wholly owned subsidiary of Metallica Minerals Pty Ltd and comprises 11 contiguous subblocks covering the very northern end of the extensive Cape Bedford/Cape Flattery dunefield complex. The dunefield complex is characterised by large northwest trending transgressive elongate and parabolic sand

	• *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	dunes, stretching inland from the coastline for kilometres. • A compensation and conduct agreement is in place with the landholder (Hopevale Congress) and native title party. • The tenement is in good standing and there are no impediments to conduct exploration programs on the tenements.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Previous exploration has been carried out in the area during the 1970's and 80s by Cape Flattery Silica Mines (CFSM). CFSM reported seven (7) holes drilled for 84 meters. These holes intersected sand dunes between 10 and 20 meters in thickness. • The historical exploration data is of limited use since but never assayed for SiO2 and there is poor survey control to determine exact locations of historical holes. • All current exploration programs are managed by Metallica Minerals
Geology	• *Deposit type, geological setting, and style of mineralisation.*	• The CFS Sand Project is a large surface deposit of overlying sand dunes that lies in the northern most part of the Quaternary age Cape Flattery-Cape Bedford dunefield complex. • The geology comprises variably re-worked aeolian sand (silica) dune deposits associated with Quaternary age sand-dune complex. The mineralisation is high grade quartz (silica) and it occurs as sand deposits within an aeolian dune complex. • Cape Flattery Silica Mines, which also lies at the northern end of the dune field, has been in operation since 1967 and is Queensland's largest producer of world class silica and the highest production of silica sand of any mine in the world. • The linear sand dunes developed predominantly during the dry Pleistocene glacial and interglacial periods when the sea-level receded and fluctuated approx. 100m below present. Prior to sea level rises in the Holocene (10,000 years before present) sand was blown inland by the prevailing south-easterly winds to form linear dunes and is now interspersed with numerous lakes and swamps. The land sand masses form mainly as elongate parabolic and longitudinal dunes. Multiple episodes of dune building are evident. Most dunes are stabilised by vegetation, but some active dune fronts occur. Periods of water level table fluctuations, erosion and depositional phases have occurred. • Silica sand Mineralisation occurs within aeolian dune sands

Drill hole Information	• *A summary of all information material to the understanding of the exploration results* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• A tabulation of the material drill holes used in this Mineral Resource Estimation is attached to this JORC Table 1. • Relative to the previous Mineral Resource Estimate (March 2021), an additional 98 drillholes have been added. •
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• The significant intercepts for each drill hole are calculated using a cut off grade of 98.5% SiO_2, only intercepts of greater than 3m are considered as significant. • Internal dilution of up to 3m is included in the reported intercepts • A cut-off grade of 98.5% silica has been used for the Mineral Resource Estimation. • The grade is highly consistent, and the aggregate intercepts use a simple arithmetic average • No top cuts were applied to the data. • No metal equivalents reported.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	• All drilling was vertical (-90°) intersecting undulating flat-lying aeolian dune sands. • Down hole length correlates with true width. • As the mineralisation is associated with aeolian dune sands the majority sub-horizontal, some variability will be apparent on dune edges and faces.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported. These should*	• A map of the drill collar locations is incorporated with the main body of the report.

	include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• All exploration results are reported in a balanced manner. All results are supported by clear and extensive diagrams and descriptions. No assays or other relevant information for interpreting the results have been omitted.

Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• Geological observations are consistent with aeolian dune mineralisation.
		• Groundwater was intersected during drilling at the base of holes, as expected given the dune complex is an aquifer and drilling was undertaken to a maximum depth of 35m.
		• The relationship of the groundwater to the regional groundwater table is unknown. It is likely that the true groundwater table is well below the termination depth of the current drillholes.
		• A bulk sample will be composited from the individual samples for metallurgical testwork, this work will commence in Q4
		• Iron (Fe_2O_3) in various forms may potentially act as a contaminant for very high-quality "processed" end products.
		• IHC Robbins completed a bulk laboratory sample in early 2021 to determine the processing requirements and assist in understanding the marketability of a premium sand product. Testing confirmed a product:
		  ○ between 99.8% and 99.9% SiO_2
		  ○ 450ppm Al_2O_3
		  ○ 170ppm Fe_2O_3
		  ○ 210ppm TiO_2
		  ○ 2.6% <125µm particles.
		  • Mass yield of 77.4%
		• All exploration results detailed in attached report.

Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).*	• Further metallurgical testing • A limited amount of infill drilling may be required to increase the confidence levels in the resource prior to a PFS and FS • The next stage of exploration on the EPM will be to assess the western targets on the EPM

	• *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive*	utilising Auger sampling, but this work has yet to be planned

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• The database was originally constructed, validated and electronically provided by Metallica Minerals to Ausrocks Pty Ltd. • Ausrocks reformatted the database into appropriate file formats checking the veracity of the assay results. The data was further validated and cross checked against the geological logs and the chip tray photographs. • Micromine 2021 validated the files which were used for the Mineral Resource Estimate.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• A site visit was completed by the Competent Person (B Mutton) from 13^{th} -18^{th} Dec 2021 during the previous drilling program. The visit enabled an appraisal of the dune geology and setting.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• The CFS project is dominated by several elongate dunes rising in elevation to the northwest. The deposit is by far dominated by high-grade silica (quartz) sand. The sands are mainly very fine-grained and pure white in colour and in places a slight creamy colour. Based on current exploration, the depth of clean white high-grade sand ranges up to a maximum thickness of 35m. The high-grade silica sand overly to varying depths, yellow-orange-brown (coloured) high silica sands mainly representing the podsolised B2 horizon and/or in part, the flatter heavily weathered parts of the basement Devonian and Jurassic age formations. Some drilling intersected coloured sands only and in places several holes intersected coloured interburden. Sand colouration is from surface coating on sand grains of Iron (Fe) rich clay material including Fe_2O_3. It only takes a trace percentage of Fe_2O_3 to colour the sand, with cream and orange-coloured sands being in excess of 98.5% SiO_2, several intervals below the 98.5% grade are being investigated further to determine viability. In several places these coloured sands are exposed on

Criteria	JORC Code explanation	Commentary

		surface. One hole intersected from surface, a continuous thickness of 38m of coloured silica sand.
		• The Cape Flattery Silica Sand Deposit has been well defined by drilling and the geological controls are reasonably well understood.
		• The known nature and formation of the dune sands, together with consistent high silica grades achieved in drillholes, places a high degree of confidence in the geological interpretation. Continuity of geology (chip tray photographs) and grade (assays) can be readily identified and traced between all drillholes.
		• The interpreted geology of the Cape Flattery Silica Sand Deposit is robust, and any alternative interpretation of the deposit is considered unlikely to have a significant influence on the total Mineral Resource Estimate undertaken.
		• No major factors affect continuity both of grade and geology.
		• Geological controls were applied to multiple cross and long sections to constrain the final resource wireframe.
		• Prior to interpolating and assigning assay values to each block, a solid was generated to model the overall deposit shape and volume by applying the following parameters:
		  • Top surface - defined as the base of topsoil which is 0.5m below surface topography.
		  • Bottom surface – a gridded surface based on drillhole depths and geological interpreted boundary points.
		  • Boundary – the resource boundary was defined by the following considerations:
		    ○ Surface dune extents based on imagery and interpretation.
		    ○ Geological interpretation of drillholes.
		    ○ The area where the top and bottom surfaces intersected.
		    ○ Area of influence around drillholes determined by confidence level.
		• Several iterations were run to cross check boundary sensitivities.

Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• The extent and variability of the Mineral Resource is expressed in terms of the full Resource Area
		  • **Max Length (along strike):** 2.4 km
		  • **Max Width:** 2.2km
		  • **Area:** The Mineral Resource covers an area of approximately 315ha.
		  • **Average Depth:** The average thickness of the total resource within the Resource

Criteria	JORC Code explanation	Commentary
		Area is 17m. • **Top of Resource:** The top of the resource corresponds to the topography ranging from 10mRL to 106mRL. • **Bottom of Resource:** The base of the resource corresponds to basement/water table ranging from 6mRL to 85mRL.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	• The Mineral Resource Estimate was completed in accordance with JORC 2012 guidelines with Micromine 2021 used to model and evaluate the resource. • Using Micromine 2021, Statistical and Geostatistical analyses was undertaken on silica (SiO_2) and the key impurities (Fe_2O_3, TiO_2, LOI, and Al_2O_3) of the dataset. Assay methods also returned results for Al_2O_3, BaO, CaO, Cr_2O_3, Fe_2O_3, K_2O, MgO, MnO, Na_2O, P_2O_5, SO_3, SrO, TiO_2 but they were not examined due to their very low grades (at or near detection range). • All sample intervals underwent basic statistical analysis (minimum, maximum, mean etc.). All variables showed that there were no requirements for top or bottom cutting. • The raw data distribution for silica and the key impurities (Fe_2O_3, TiO_2, LOI, and Al_2O_3) were analysed in detail and used in the block modelling. • The surface boundary was generated by a combination of the interpreted geological boundaries and Mining Lease boundaries. A topsoil or humus layer of 0.5m was excluded from the model. A 400m limit was used to guide drillhole continuity where information became sparse or non-existent. Multiple cross section iterations were used to further define and constrain the model where data was minimal. • The base of the resource model was determined from selected drillhole depths (silica cut-off), then modelled and adjustments made for intersections with surface topography and other continuity limits. The model was further controlled by cross section checks. • Parent blocks of 10mE (X direction) by 10mN (Y direction) by 1mRL (Z direction) were used with sub-blocking splitting these blocks by 5m in the X direction, 5m in the Y direction and 0.5m in the Z direction. All sub-blocks have the same interpolated values as their parent blocks. • The blocks were constrained by the model boundaries and populated by the Ordinary Kriging (OK) estimation method to interpolate assay grades for each of the chosen elements (SiO_2, Fe_2O_3, Al_2O_3, LOI and TiO_2). Inverse Distance Weighting (IDW - 4:1) was used to check the model and yielded similar results.

Criteria	JORC Code explanation	Commentary
		• The block model was validated by comparing basic statistics and histograms of modeled data (block model) against the input data (drilling data) which showed similar means, range of data and data distribution. Additionally, cross-section throughout the block model were compared with the same sections through the drillhole data showing that the modeling completed was indicative of the input data and the mineralisation. • Grade cutting or capping was not applicable as no SiO_2 values exceeded 100%.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• All samples were placed into bags and sealed so samples would be received with slightly less than in-situ moisture. • Estimations assume a moisture content of 2.5%.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• A silica (SiO_2 %) grade cut-off was used to define the in-situ resource to achieve a marketable high purity silica sand. Geological logging and returned assay grades and intersections showed an obvious grade demarcation of ore versus waste at 98.5% SiO_2. This was further supported by statistical analysis and representation. Lengthy continuous vertical intervals of >98.5% SiO_2 was the norm, and these intervals were used for the modelling and Mineral Resource Estimate. The clear in-situ grade demarcation of >98.5% SiO_2 persisted through successive exploration programs, and across the whole of the Resource Area. • The surface to one (1) metre interval, where assayed, returned a <98.5% silica assay and a higher than normal LOI. This logged interval included topsoil and organic material which caused minor contamination. This one (1) metre interval was adjusted by adopting the succeeding one metre assay (1-2m interval) grade. A topsoil layer from surface (0.0m to 0.5m) was excluded from the Mineral Resource Estimate. • A silica grade cut-off of 98.5% SiO_2 is robust and was applied as the cut-off grade for the resource modelling and Mineral Resource Estimate, for all reporting levels.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not*	• It is expected that mining will be conducted with Dozer and Wheel Loader from the face, which will load a grizzly & feed bin. Material will then be conveyed to the processing plant. This mining method is flexible and is considered suitable for the deposit and is not likely to unnecessarily constrain the Mineral Resources. • Dilution was not considered in the Mineral Resource Estimate. In some holes there was minor additional resource below the >98.5% silica floor which is slightly lower grade material and would only marginally dilute the product.

Criteria	JORC Code explanation	Commentary
	always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	• Based on the sample assays and geological logs, the top 0.5m of the deposit has been excluded from the Mineral Resource Estimate as it is assumed that this would be a soil and vegetation layer and would be scalped when mining the deposit and re-used for rehabilitation.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• Initial Metallurgical testing has been completed, returning results consistent with assumptions. Further metallurgical testing is underway to refine the processing method and to determine specifications for end-products. • No metallurgical factors were deemed required for this Resource Estimate.
Environmen-tal factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• Environmental considerations were made by referencing overlays as provided by the Queensland Government including Category A, B & C Environmentally sensitive areas as well as wetland areas. • Small zones of potential environmentally sensitive ecology have been identified within the resource area however these have yet to be excluded from any resource figures until these areas have been accurately categorized. • Due to the high-grade nature of the deposit, it is expected that there will be a small portion of tailings produced through processing and thus minimal disposal in the voids.
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.*	• Nineteen density measures have been completed over the wider resource area in Feb 2021 returning an average density of 1.6 t/m^3 which has been used to convert all volumes to tonnes.

Criteria	JORC Code explanation	Commentary
	• *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	

Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.*
	• *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).*
	• *Whether the result appropriately reflects the Competent Person's view of the deposit.*
		• Drill spacing and interpreted geological continuity has allowed three resource categories to be defined and are defined as follows:
		  ◦ **Measured Mineral Resource:** Area with drillholes completed at semi-gridded spacing <150m x 150m ending in basement/water table.
		  ◦ **Indicated Mineral Resource:** Area with drillholes at a confirmatory level spacing (150m-250m) ending in basement/water table.
		  ◦ **Inferred Mineral Resource:** Areas with drillholes at a scout level spacing (250m-400m).
		• The result appropriately reflects the Competent Persons view of the deposit.

Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• Previous Mineral Resource Estimates have been completed and reviewed internally by Ausrocks Pty Ltd.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource 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 resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *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.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• It is the opinion of the Competent Person that the relative accuracy and confidence level across the reported geological intervals is adequate, given the drill density and continuity of geochemical samples. • The Resource boundary and the reported geological confidence intervals is relatively tightly constrained based on the drill density, although some further drill definition should be undertaken to better constrain dune sides/perimeters. • No production data is available at present as this is a Greenfields project. However, Cape Flattery Silica Mine lies in the same adjoining coastal dunes immediately to the North, suggesting potential viability.