

21 November 2022

## Mineral Assemblage Testwork Demonstrates High Value Heavy Mineral Content for Jack Track Deposit, Governor Broome Project, WA

*Results highlight commercial potential of the project and support Astro's development plan*

### Key Highlights

- > Heavy Mineral Assemblage for the Jack Track Deposit contains 96.5% valuable Heavy Minerals, including 10.5% zircon and 85.5% titanium minerals.
- > Testwork to be undertaken on a Bulk Sample of Jack Track Deposit mineralisation.
- > In-fill drilling planned to commence in February 2023 across the remaining areas of the deposit (Jack Track Northwest, Jack Track West and the remaining parts of Jack Track Southwest and Jack Track deposits) to fully upgrade their resource categories from Inferred to Indicated.
- > The updated Mineral Resource, together with the testwork results, will underpin a Scoping Study to be carried out into the mining of both the Governor Broome deposits (Indicated Resources of 52Mt at 4.7% HM and the Jack Track deposits (26Mt at 4% HM).

Astro Resources NL (ASX: **ARO** or the Company) is pleased to advise that it has taken another important step towards confirming the commercial potential of its 100%-owned **Governor Broome Mineral Sands Project** in the south-west of Western Australia after receiving positive results from mineral assemblage testwork on one of the Project's key deposits.

The testwork was undertaken on the mineral assemblage of the Jack Track Deposit as part of Astro's ongoing strategy to progress the Governor Broome Project towards commercial development.

The Jack Track Deposit is one of the key deposits within the Governor Broome Heavy Mineral Project, which is located in the south-west of Western Australia on the Scott River Coastal Plain (see Figure 1).

The Project is located approximately 95km by sealed road south of Busselton, 105km south of Iluka's processing plant at Capel, and 135km from Bunbury Port and from Picton, where Doral has a heavy mineral separation plant. A 132kV power line is located just 5km to the north and a three-phase power line passes through the Governor Broome Project, giving it significant strategic advantages from an infrastructure and access perspective.

Astro Chairman, Tony Leibowitz, commented: “Receiving confirmation of the high value mineral assemblage within the cornerstone Jack Track Deposit gives us further encouragement for advancing the Governor Broome Project towards our ultimate end goal of development and production. The Project has a number of significant attributes including its location close to the major mineral sands mines in the south-west of WA and Doral’s heavy mineral separation plant at Picton.

“We are looking forward to progressing the project to the next stage, with the next phase of in-fill drilling commencing in February next year, followed by an updated Mineral Resource estimate and metallurgical testwork, which will allow us to commence a Scoping Study shortly thereafter.”



Figure 1. Project Location

### Jack Track Mineral Assemblage

Composite samples of the heavy mineral concentrate (“HMC”) from Astro’s drilling programme undertaken in April and May 2022 were processed by Allied Mineral Laboratories in Perth (“AML”) to assess the heavy mineral (HM) assemblages of the Jack Track Deposit and of the in-fill-drilled portion of the Jack Track Southwest Deposit.

The **heavy mineral assemblage of the Jack Track Deposit comprises approximately 66.5% primary ilmenite (58%  $\text{TiO}_2$ ), 14.5% secondary ilmenite (including approx. 8.5% leucoxene), 4.5% rutile, 10.5% zircon, and 0.8% monazite – for an overall 96.5% valuable heavy mineral (“VHM”) content.** The titanium minerals have an average composition of 63%  $\text{TiO}_2$ .

A comparison of the HM assemblage of the in-fill-drilled portion of the Jack Track Southwest Deposit indicates that it is similar to that of the Jack Track Deposit – with the Jack Track Southwest Deposit containing approximately 70% primary ilmenite, 12% secondary ilmenite (including approx. 7% leucoxene), 3.5% rutile, 9.5% zircon, and 0.8% monazite, for an overall 96% VHM content.

The other heavy minerals in the assemblage include garnet, kyanite, and iron oxides. Apart from very minor pyrite detected (less than 0.03%), no deleterious or potentially deleterious or contaminating substances were detected.

AML carried out the mineralogical testwork on 11 composite samples of HM sinks from Astro's 2022 drilling to determine the mineral assemblage and the indicative mineral quality. The locations of the samples are listed in Appendix 2. The samples underwent magnetic separation, after which XRF analyses were carried out on the various magnetic and non-magnetic fractions.

Iluka had previously carried out mineralogical testwork on 12 composite samples of HM sinks from its 2015 drilling of the Jack Track Deposit. Its results were similar to those reported here. Iluka reported that the HM assemblage of the deposit was 75% ilmenite, 10.8% zircon, 6.8% leucosene, and 2.4% rutile – for an overall 94% VHM content and 59.4% TiO<sub>2</sub> (ASX Announcement: ARO 26 April 2016).

## Geology and Mineralisation

The Jack Track deposits are hosted in unconsolidated aeolian dune and underlying beach sands occurring on the Scott River Coastal Plain. The geological character of the mineralisation is like that of other heavy mineral deposits occurring along the Swan Coastal Plain, which have a long history of mining and processing.

The mineralisation is hosted in beach placer facies sediments of the Pleistocene aged Barlee Shore line on the southward facing Scott Coastal Plain.

Locally, the host to the Jack Track Deposit mineralisation is the Warren Sands, which does not contain significant clay or rock. Most of the mineralisation within the other three Jack Track tenement deposits is also within the Warren Sands, but its lower portions are within the immediately unconformably underlying Beenup Beds of the Cretaceous Warnbro Group.

The Beenup Beds sediments are of two main facies in the area: clayey sands and organic clays. The clayey sands contain medium- to coarse-grained, angular to sub-angular, unconsolidated quartz and minor feldspar grains. The clay content, which is variable, tends to increase downward. Generally, it contains between 1% and 8% of valuable HM.

## Resources

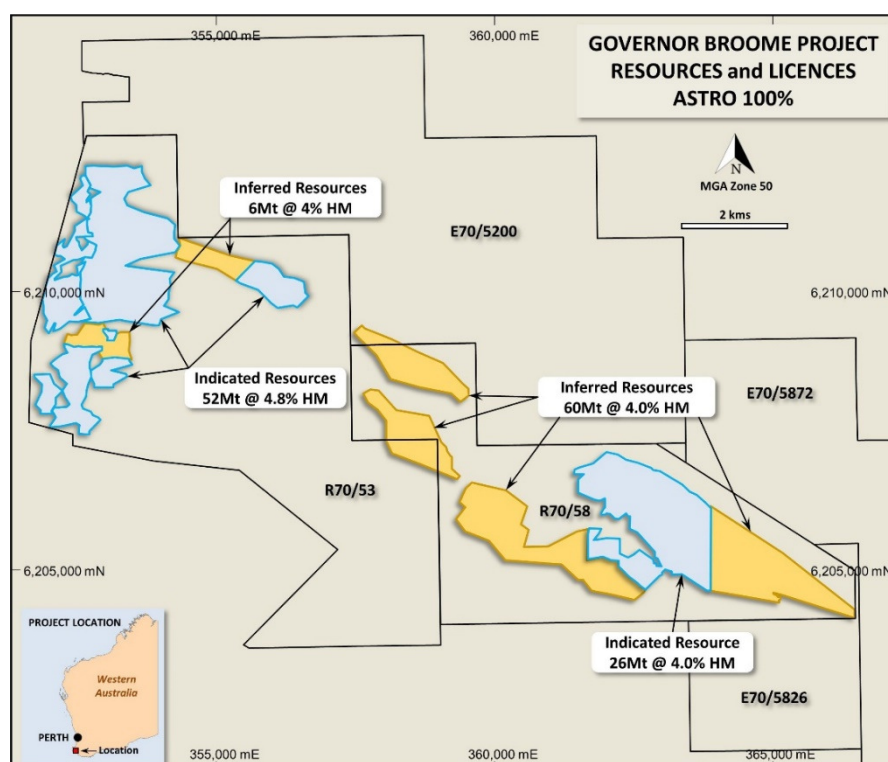
The Governor Broome Project heavy mineral resources are summarised in Table 1. These recently updated resources were reported in detail to the ASX on 19<sup>th</sup> September (ASX: ARO).

**Table 1. Governor Broome Project Resources – at 2% HM lower block-cut-off grade**

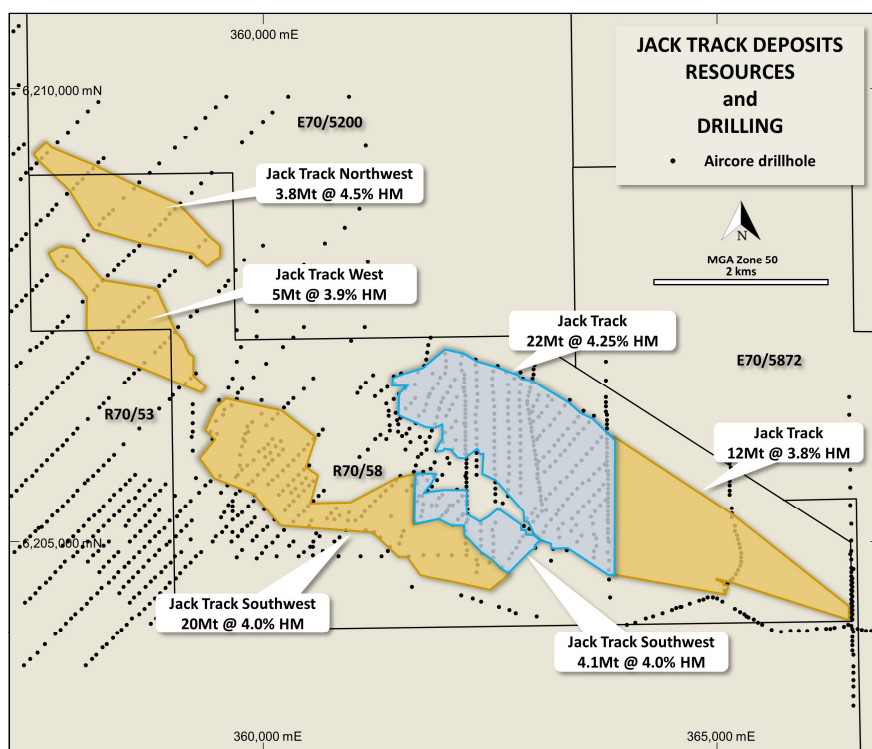
Tenement	Category	Tonnage (Mt)	HM (%)	Slimes (%)	Oversize (%)
<b>R70/58 - Jack Track</b>	<b>Indicated</b>	<b>26</b>	<b>4.0</b>	<b>8.6</b>	<b>7.1</b>
	<b>Inferred</b>	<b>43</b>	<b>4</b>	<b>9</b>	<b>3</b>
<b>R70/53 - Governor Broome</b>	<b>Indicated</b>	<b>52</b>	<b>4.8</b>	<b>13</b>	<b>8.5</b>
	<b>Inferred</b>	<b>6</b>	<b>4</b>	<b>15</b>	<b>6</b>
<b>Project</b>	<b>Indicated</b>	<b>78</b>	<b>4.5</b>	<b>11</b>	<b>8.0</b>
	<b>Inferred</b>	<b>48</b>	<b>4</b>	<b>10</b>	<b>4</b>
<b>Project</b>	<b>Total Resources</b>	<b>126</b>	<b>4.3</b>	<b>11</b>	<b>6.5</b>

Note that the above figures have been appropriately rounded

The Governor Broome Project tenements and resources are shown on Figure 2, with the resources and drilling within the Jack Track tenement, R70/58, shown on Figure 3.



**Figure 2. Governor Broome Project Resources and Licences**



**Figure 3. Resources in Jack Track area - Blue Indicated, Orange Inferred**

## Exploration

The Jack Track Tenement, R70/58, has been explored with air-core drilling by Metal Sands in 2007, Astro in 2012, by Iluka in 2015, and by Astro in 2022.

Those holes within R70/58, or marginal to it and within the vicinity of the modelled mineralisation, are summarised in Table 2. Hole locations are shown on Figure 3.

**Table 2 Significant drill-holes**

Company	Years	Air-core Holes	Metres Drilled
Metal Sands	2007	265	2600
Astro	2012	176	3208
Iluka	2015	159	2409
Astro	2022	314	3520
<b>Total</b>		<b>914</b>	<b>11,737</b>

### *Drilling and sampling*

All drilling was by NQ air-core. Samples were taken of one metre intervals, after which they were selected for HM separation on the basis of the presence of visual HM.

The Iluka holes were drilled on five near north-south lines, with holes mostly 50m apart. Along strike, however, the lines were spaced between 800m and 1700m apart.

The 2022 drilling was designed to infill the earlier broad-spaced lines with lines spaced up to 160m apart. As the drilling was within blue-gum plantations, the orientation of the lines was dependent upon the orientations of the tree rows.

### *Overburden*

The overburden has an average depth of 5.1m over the area of the Jack Track Indicated Resource, which has an average thickness of 4.4m, for an overburden to mineralisation ratio of 1.15 :1.

### **Jack Track Bulk Testwork**

A bulk sample was collected during the recent in-fill drill program across the central portion of the Jack Track Deposit by combining approximately 8kg samples from each metre drilled within the mineralisation. These samples have been delivered to Allied Mineral Laboratories, Perth.

Those samples that are within the Indicated Resource are being combined into a bulk sample that is to be treated to enable the preliminary development of a process flowsheet and to evaluate the grades and recoveries of the target HM products.



## Proposed Work Program

### *Jack Track Tenement Drilling*

The Company intends to complete the in-fill drilling of the remaining areas (Jack Track Northwest, Jack Track West and the remaining parts of Jack Track Southwest and Jack Track deposits) in February 2023, the next available opportunity to complete the program.

### *Governor Broome Project Scoping Study*

The upgrade of the deposits to Indicated Resource status and the scheduled testwork will enable a Scoping Study to be carried out into the mining of both the Governor Broome deposits within R70/53 (total Indicated Resources of 52Mt @ 4.7% HM) and of the Jack Track deposits (current Indicated Resources of 26Mt @ 4.0% HM).

## Authorisation

This announcement has been authorised for release by the board of ARO.

## More Information

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## Competent Person

The information in this report as it relates to Mineral Resources and Exploration Results for the Governor Broome Project is based on information compiled by John Doepel, a Director of Continental Resource Management Pty Ltd (CRM), who is a member of the Australasian Institute of Mining and Metallurgy. Mr Doepel has sufficient experience in mineral resource estimation relevant to the style of mineralisation and type of deposit under consideration 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 Doepel consents to the inclusion in this announcement of the information in the form and context in which it appears.

# APPENDIX 1 - JORC Code, 2012 Edition – Table 1

## Section 1 Sampling Techniques and Data

Criteria	Commentary
<b>Sampling techniques</b>	<ul style="list-style-type: none"> <li>Air-core drilling was used to obtain 1m samples from target horizons;</li> <li>Approximately 1 to 1.5 kg sub-samples were split by scoop from 1m samples.</li> </ul>
<b>Drilling techniques</b>	<ul style="list-style-type: none"> <li>Vertical NQ Air-core.</li> </ul>
<b>Drill sample recovery</b>	<ul style="list-style-type: none"> <li>Good recovery and retention of all size fractions;</li> <li>Holes cleaned at completion of each two-metre rod;</li> <li>Cyclone cleaned after each hole</li> </ul>
<b>Logging</b>	<ul style="list-style-type: none"> <li>All intervals geologically logged by Competent Person during drilling.</li> </ul>
<b>Sub-sampling techniques and sample preparation</b>	<ul style="list-style-type: none"> <li>Sample preparation via drying and manual pulverisation before removal of +3.3mm material; 100g sub- samples riffle split from remaining sample.</li> </ul>
<b>Quality of assay data and laboratory tests</b>	<ul style="list-style-type: none"> <li>Analysis by Western Geolabs Pty Ltd by its standard HM analytical procedures for HM%, Slimes % (-53µ), and Oversize % (+710 µ); Repeat laboratory sub-sample splits analysed at 1:12 ratio.</li> </ul>
<b>Verification of sampling and assaying</b>	<ul style="list-style-type: none"> <li>Sampling and logging carried out by or under supervision of Competent Person.</li> <li>Assay entry by digital capture of laboratory files, with later verification of significant intervals against geological logging.</li> </ul>
<b>Location of data points</b>	<ul style="list-style-type: none"> <li>Holes located by hand-held GPS for Astro holes.</li> <li>Grid MGA_GDA94, Zone 50;</li> <li>Elevation data interpolated from elevation data on Google Earth.</li> </ul>
<b>Data spacing and distribution</b>	<ul style="list-style-type: none"> <li>1m samples collected and analysed throughout mineralized horizons;</li> <li>Holes drilled on approximate 80m spacing along lines approximately 160m apart.</li> <li>Duplicate samples collected at 1:20 ratio</li> <li>Twinned holes drilled at 1:20 ratio.</li> <li>No sample compositing applied.</li> </ul>
<b>Orientation of data in relation to geological structure</b>	<ul style="list-style-type: none"> <li>Vertical drilling through horizontal stratigraphy resulted in intersected thickness equivalent to true thickness.</li> </ul>
<b>Sample security</b>	<ul style="list-style-type: none"> <li>Samples transported from site to laboratory by drill company personnel.</li> </ul>
<b>Audits or reviews</b>	<ul style="list-style-type: none"> <li>Review will be carried out by Competent Person.</li> </ul>

## Section 2 Reporting of Exploration Results

Criteria	Commentary
<b>Mineral tenement and land tenure status</b>	<ul style="list-style-type: none"> <li>The Jack Track resources are within Retention Licence R70/58.</li> <li>The Governor Broome resources are within Retention Licence R70/53.</li> <li>Both R70/53 and R70/58 are held by Governor Broome Sands Pty Ltd, a wholly owned subsidiary of Astro Resources NL.</li> <li>R70/53 has an expiry date of 3/07/2026 and R70/58 has an expiry date of 24/07/2024.</li> </ul>
<b>Exploration done by other parties</b>	<ul style="list-style-type: none"> <li>Metals Sands Australia Ltd carried out an air-core drilling campaign over the ground in 2007.</li> <li>Iluka carried out an air-core drilling campaign over the ground in 2015.</li> </ul>

	<ul style="list-style-type: none"> <li>• These explorations are summarised in this announcement.</li> </ul>
<b>Geology</b>	<ul style="list-style-type: none"> <li>• The deposits are located in the Scott Coastal Plain, within the Perth Basin. They consists of beach deposited HM strands. The host beach sand facies (Warren Sands) is overlain by sand and soil at surface. The poorly sorted and arkosic (fluvial) Beenup Beds forms the basement.</li> </ul>
<b>Drill hole Information</b>	<ul style="list-style-type: none"> <li>• Appendix 2 lists Metal Sands, Astro, and Iluka air-core drill-holes drilled into the Jack Track Deposit.</li> <li>• Appendix 3 lists HM intercepts for each hole within the resource areas.</li> </ul>
<b>Data aggregation methods</b>	<ul style="list-style-type: none"> <li>• No data aggregation was carried out for the resource estimation.</li> <li>• Only intersections averaging &gt;2% HM and &lt;20% Slimes were incorporated into wireframed mineralisation.</li> <li>• No metal equivalents employed.</li> </ul>
<b>Relationship between mineralisation widths and intercept lengths</b>	<ul style="list-style-type: none"> <li>• Vertical drilling through virtually horizontal stratigraphy resulted in intersected thickness equivalent to true thickness.</li> </ul>
<b>Diagrams</b>	<ul style="list-style-type: none"> <li>• See Figures.</li> </ul>
<b>Balanced reporting</b>	<ul style="list-style-type: none"> <li>• Report gives balanced view of the deposits.</li> </ul>
<b>Other substantive exploration data</b>	<ul style="list-style-type: none"> <li>• Iluka carried out mineralogical testwork on 12 composite samples of HM sinks from its 2015 drilling to determine the mineral assemblage and indicative mineral quality. These samples underwent a magnetic separation using a permanent magnetic roll separator set up. The magnetic and non-magnetic fractions (that come out of the magnetic separator) then had an XRF analysis completed. A small portion (~10grams) was sent for Specific Gravity (SG) separation using Thallium Malonate Solution (TMF). This separation technique was used to determine grain size and indicative chemistry for Zircon and Rutile.</li> <li>• AML carried out mineralogical testwork on 11 composite samples of HM sinks from its 2022 drilling to determine the mineral assemblage and indicative mineral quality. These samples underwent a magnetic separation. The various magnetic and non-magnetic fractions had XRF analyses completed.</li> <li>• Apart from very minor pyrite detected (less than 0.03%), no deleterious or potentially deleterious or contaminating substances were identified within the Jack Track Deposit.</li> </ul>

### Section 3 Estimation and Reporting of Mineral Resources

Criteria	Commentary
<b>Database integrity</b>	<ul style="list-style-type: none"> <li>• Assay and drill-hole data entered by Competent Person.</li> <li>• Assay data copied digitally from Astro database and from files obtained from Iluka.</li> <li>• Micromine drill-hole verification performed.</li> <li>• Anomalous intersections checked.</li> <li>• Drill-hole collar elevations checked, and if necessary, adjusted.</li> </ul>
<b>Site visits</b>	<ul style="list-style-type: none"> <li>• Competent person drilled the Jack Track Deposit in 2022 and the West Deposit in 2020.</li> <li>• Competent person visited the project during Metal Sands drilling in 2007.</li> </ul>
<b>Geological interpretation</b>	<ul style="list-style-type: none"> <li>• High degree of confidence in geological interpretation as stratigraphy is both visually and analytically distinct and continuous.</li> <li>• Mineralisation &gt;2% HM and &lt;20% Slimes wireframed. Area limited by ratio &gt;1 for "<i>mineralisation thickness times HM% divided by depth of base of mineralisation</i>".</li> </ul>



<b>Dimensions</b>	<ul style="list-style-type: none"> <li>The Jack Track Deposit has an along strike length of 5.5km and an across-strike width of 1.25km.</li> <li>The Indicated Resource within the Jack Track Deposit has an average overburden thickness of 5.2m and an average mineralisation thickness of 4.4m; for an overburden to mineralisation ratio of 1.2:1.</li> <li>The Inferred Resource within the Jack Track Deposit has an average overburden thickness of 4.7m and an average mineralisation thickness of 4.3m; for an overburden to mineralisation ratio of 1.1:1.</li> </ul>
<b>Estimation and modelling techniques</b>	<ul style="list-style-type: none"> <li>Estimation of HM, Slimes, and Oversize ore block grades by IS2 within &gt;2% adjusted HM and &lt;20% Slimes wireframes using Micromine software;</li> <li>Block size 50m E-W x 50m N-S x 1m vertical.</li> <li>For area drilled in 2022 average hole spacing along lines 80m and average line spacing 160m.</li> <li>For area drilled in 2015, average hole spacing along lines 50m and line spacing but up to 1700m along strike.</li> <li>Grade boundaries form hard upper and lower boundaries;</li> <li>No assumptions made re correlation between variables;</li> <li>No upper cuts, as virtually no outlying values;</li> <li>No estimation of deleterious elements, as no data available;</li> <li>No assumptions made re recovery of by-products;</li> <li>OBM grades validated by comparison with assay values.</li> </ul>
<b>Moisture</b>	<ul style="list-style-type: none"> <li>Tonnages estimated on dry basis.</li> </ul>
<b>Cut-off parameters</b>	<ul style="list-style-type: none"> <li>Estimate initially reported above a range of grades. Final report grade of above 2% HM selected on basis of grade continuity of mineralisation.</li> </ul>
<b>Mining factors or assumptions</b>	<ul style="list-style-type: none"> <li>Topsoil and overburden to be removed by scrapers and mineralisation to be mined by bulldozer feeding in-pit slurry unit.</li> </ul>
<b>Metallurgical factors or assumptions</b>	<ul style="list-style-type: none"> <li>Slurry pumped to wet concentrator to produce HM concentrate.</li> </ul>
<b>Environmental factors or assumptions</b>	<ul style="list-style-type: none"> <li>Waste to be returned to mine void and covered with stored topsoil;</li> <li>There is potential for the creation of acidic soils that would need to be managed.</li> </ul>
<b>Bulk density</b>	<ul style="list-style-type: none"> <li>SG calculated for each ore block on the basis of its interpolated HM content according to the standard formula <math>SG = 1.686 + (0.0108 \times HM\%)</math>;</li> <li>Average SG = 1.73;</li> </ul>
<b>Classification</b>	<ul style="list-style-type: none"> <li>The resources within the area drilled in 2022 were classified as Indicated, as the drilling has shown both geological and mineralisation continuity throughout the area and the drilling density has been such to enable the verification of grade continuity.</li> <li>The resources within the area only drilled in 2015 were classified as Inferred as, although the drilling has shown both geological and mineralisation continuity throughout the area, the drilling density has not been such to enable the verification of grade continuity</li> <li>The resource estimate appropriately reflects the Competent Person's impression of the deposit.</li> </ul>
<b>Audits or reviews</b>	<ul style="list-style-type: none"> <li>No audit or review has been carried out on this resource estimate.</li> </ul>
<b>Discussion of relative accuracy / confidence</b>	<ul style="list-style-type: none"> <li>The relative accuracy of the Mineral Resource estimate is reflected in the reporting of the Mineral Resource as per the guidelines of the 2012 JORC Code.</li> <li>The global resources reported are the total of the local estimates reported for each of the areas.</li> </ul>

## APPENDIX 2 – DRILL-HOLE DETAILS

The table below details the air-core drill-holes used for the mineral assemblage determination. The down-hole intervals from which the samples were taken are given. The holes were drilled vertically by Astro in 2022.

Hole ID	E MGA Z50 (GDA94)	N MGA Z50 (GDA94)	RL (m)	Depth From (m)	Depth To (m)
GB2297	362209	6206707	44.0	6	7
GB2320	362358	6206717	44.1	4	8
GB2322	362353	6206875	45.8	3	6
GB2323	362346	6206953	46.7	3	5
GB2342	361817	6206595	42.7	2	6
GB2343	361801	6206518	41.8	4	7
GB2344	361780	6206444	41.0	6	7
GB2345	361717	6206383	40.3	6	8
GB2409	363300	6205204	34.9	8	12
GB2410	363255	6205137	34.8	10	13
GB2411	363407	6205251	34.9	7	11
GB2424	363177	6205247	34.9	9	14
GB2426	363091	6205103	34.7	11	15
GB2436	362128	6206596	42.7	7	9
GB2440	362122	6206336	39.8	9	12
GB2456	362710	6206000	36.0	5	7
GB2458	362712	6205828	35.8	5	9
GB2459	362706	6205750	35.6	6	10
GB2460	362701	6205667	35.5	8	11
GB2461	362701	6205584	35.4	9	12
GB2465	362825	6206562	42.3	3	10
GB2466	362826	6206490	41.5	4	5
GB2467	362825	6206406	40.6	5	10
GB2471	362832	6206170	37.9	6	11
GB2472	362834	6206091	37.0	6	10
GB2473	362836	6206006	36.1	9	11
GB2474	362836	6205930	35.9	9	11
GB2482	362406	6204874	33.0	8	14
GB2483	362404	6204950	33.0	7	13
GB2484	362404	6205029	33.0	10	12
GB2485	362403	6205117	34.0	5	11
GB2489	361708	6205740	35.0	5	8
GB2493	361693	6205644	35.0	6	9
GB2494	361720	6205514	35.0	4	8
GB2495	361766	6205412	34.5	7	9
GB2502	361742	6305279	34.5	8	10
GB2521	363531	6206249	38.8	1	6
GB2524	363378	6206072	36.8	2	7
GB2527	363220	6205894	35.8	4	9

GB2533	363669	6204958	34.5	10	16
GB2539	362833	6205622	35.5	8	9
GB2555	362840	6206735	44.3	3	6
GB2580	363533	6205390	35.1	3	6
GB2581	363479	6205328	35.0	5	9
GB2588	363465	6205596	35.4	7	12
GB2591	363298	6205409	35.2	8	12
GB2594	363716	6205404	35.1	8	12