



**ASX RELEASE**  
**24 MAY 2016**

## **HIGH PURITY AND RECOVERY FROM TESTWORK ON THE ESMERALDA GRAPHITE PROJECT IN NORTH QLD**

### **Highlights**

- High grade concentrate of 97.8% Total Carbon (TC) produced
- Standard floatation delivers 91.5% TC concentrate with a 91% recovery
- Potential to increase concentrate grade via optimization of conventional processing methods

Metallica Minerals Limited (“Metallica”) ([ASX:MLM](#)) is pleased to advise the delivery of high purity and high recovery rates in the first metallurgical tests on the Company’s wholly-owned and unique hydrothermal-style Esmeralda graphite project located south of Croydon in north Queensland.

The tests follow completion of the maiden graphite exploration drill program in late 2015 at Esmeralda, with assays returning thick graphite drill intersections from the deposit – a style unique because of its rarity and general high purity in either flake or crystalline form.

Results, including those from the Mineral Liberation Analysis, show that 97.8% TC purity product can potentially be even further improved by removing impurities via conventional processing methods, including additional purification stages.

The test work followed standard procedures that involved crushing and preparation of representative drill core samples for bench scale floatation testwork. With the addition of standard floatation reagents, a concentrate grade of 91.5% TC (90.6 % Graphitic Carbon – Cg) was able to be produced at a 91% recovery.

The floatation concentrate underwent purification to produce a concentrate grade of 97.8% TC. Purification involved a single stage caustic bake and wash.



**97.8% TC concentrate following purification**



**Metallica's CEO, Mr Simon Slesarewich:**

*"The test work has clearly delivered on our goal of demonstrating the ability to produce a high purity graphite concentrate from Esmeralda, that may be valuable in high end applications. With the knowledge that a high purity product can be produced, work will now focus on the large graphitic granite contained within the Esmeralda tenement package to identify areas of likely high concentrations of graphite that are near to surface. Following on from the spectacular drill intercept of 95.0 m @ 6.5%<sup>1</sup> Cg from 71 meters in late 2015."*

**Table 1 – Results**

	Weighted Average		Composite Analysis		Results		Recovery
	TC %	Cg %	TC %	Cg %	TC %	Cg %	%
<b>WD001 composite</b> <i>(65.1 to 189.4m)</i>	<b>6.0</b>	<b>5.6</b>	<b>5.8</b>	<b>5.4</b>			
<b>Flotation F7</b>					<b>91.5</b>	<b>90.6</b>	<b>90.53</b>
<b>Caustic Bake</b>					<b>97.8</b>	<b>NA*</b>	

\*Not available due to insufficient sample for check Cg analysis

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### Competent Person's statement

The technical information contained in this report of a mineral exploration and evaluation nature, has been compiled and/or supervised by Mr Andrew Gillies B.Sci (Geology) M.AusIMM (Director of Metallica Minerals Ltd) who is a Competent Person and a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM). Mr Gillies has relevant experience in the exploration for this style of mineralisation and exploration results being reported on to qualify as Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Gillies consents to the inclusion of this information in the form and context in which it appears in this release.

The Company has relied on independent consultants Nagrom Brisbane Labs Pty Ltd who are specialists in mineral processing, metallurgical testwork and analysis. Nagrom laboratory Manager Mr Chris Bucknell of Nagrom Brisbane Labs Pty Ltd has consented to the inclusion of this information in the form and context in which it appears in this release.

### Caution regarding forward-looking statements

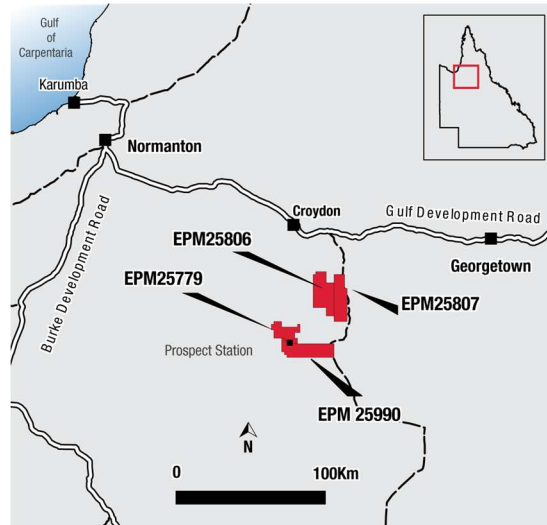
Certain statements made in this announcement contain or comprise certain forward-looking statements. Although Metallica believes that the visual interpretation and other estimates and expectations reflected in such forward-looking statements are reasonable, no assurance can be given that such expectations will prove to have been correct. Accordingly, results could differ materially from those set out in the forward-looking statements in this release.

<sup>1</sup> Using a cut off grade of 3% Cg

## Background on the Esmeralda Graphite Project

In July 2015, Metallica Minerals Ltd (“Metallica”) was granted Exploration Permits for Minerals (EPMs) 25779, 25806, 25807 and 25990, which make up the Esmeralda Graphite Project. The project, located near Croydon in north Queensland, covers a combined area of over 750 km<sup>2</sup> and is held 100% by Metallica’s subsidiary, Touchstone Resources Pty Ltd.

Metallica has identified significant graphite occurrences within the Esmeralda granites in the project area. These occurrences were first identified in 2006 by Metallica during a drilling program that targeted precious and base metals within well-defined airborne and ground-defined intense electromagnetic (EM) anomalies.



Igneous or hydrothermal-style graphite deposits, such as Esmeralda, are rare. The more common metamorphic-style graphite deposits make up about 95% of the world’s known graphite deposits. Hydrothermal-style graphite deposits are typically of high purity graphite in either flake or crystalline form. Examples of this style of mineralisation include the high-grade, narrow-vein Sri Lankan deposits and the granite hosted Albany graphite deposit in Canada.

Metallica has developed a predominantly hydrothermal and assimilated meta-sediment mineralisation model for the Esmeralda granite based on work completed by the Bureau of Mineral Resources (BMR) in 1988 and the recent (2013) discovery of the Albany graphite deposit.

The Company completed its maiden graphite exploration program in December 2015. The assay results confirm thick graphite (Cg) mineralised intervals in the first two exploration holes. The core was assayed for graphite content and total carbon. In summary, both drill holes (in a vertical two-hole drilling program) intersected significant broad graphite mineralisation with continuous intercepts of:

- WD001 – 95.0 m @ 6.5%<sup>2</sup> Cg from 71 m
- WD002 – 29.1 m @ 7.8%<sup>2</sup> Cg from 72 m

An independent petrology study has also been completed on six representative samples from the mineralised zones.

The petrology study identified the same distinctive alteration and mineralisation style present in both holes which is associated with consistent grades indicating that the graphite mineralisation may be continuous for 1.2 km or more.

These results add strong support to the Company’s belief that the Esmeralda deposit is very large and would be uniquely amenable to large-scale bulk mining. WD001 ended in significant graphite mineralisation (4.1% Cg), with mineralisation open in all directions.

<sup>2</sup> Using a cut off grade of 3% Cg



## Section 2 Reporting of Exploration Results

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

Criteria	JORC Code explanation	Commentary
<i>Mineral tenement and land tenure status</i>	<ul style="list-style-type: none"> <li>• <i>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.</i></li> <li>• <i>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.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Exploration has been completed within EPM 25779 Warrior and it held by 100% owned subsidiary company Touchstone Resources Pty Ltd.</li> <li>• The tenement was granted by the Queensland Government in 2015 and is in good standing.</li> </ul>
<i>Exploration done by other parties</i>	<ul style="list-style-type: none"> <li>• <i>Acknowledgment and appraisal of exploration by other parties.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Historic exploration has been completed by various explorers since 1970 in the area. The 2015 program was designed to confirm historic reporting of graphite with drill core and quantify historically described graphite. Previous explorers didn't target graphite mineralisation and subsequently reported very little detail on the graphite.</li> </ul>
<i>Geology</i>	<ul style="list-style-type: none"> <li>• <i>Deposit type, geological setting and style of mineralisation.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Initially interpreted to be a granite hosted graphite deposit. The granite maybe part of the Proterozoic Esmeralda Supersuite. Locally, the Carpentaria Basin sediments cover the granite and make the geology highly interpretive.</li> </ul>
<i>Drill hole Information</i>	<ul style="list-style-type: none"> <li>• <i>A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:</i> <ul style="list-style-type: none"> <li>○ <i>easting and northing of the drill hole collar</i></li> <li>○ <i>elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</i></li> <li>○ <i>dip and azimuth of the hole</i></li> <li>○ <i>down hole length and interception depth</i></li> <li>○ <i>hole length.</i></li> </ul> </li> <li>• <i>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.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Detailed Drill hole information was previously reported on 10 December 2015 “Assays strongly support potential for large graphite deposit”.</li> </ul>



Criteria	JORC Code explanation	Commentary
Data aggregation methods	<ul style="list-style-type: none"> <li><i>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.</i></li> <li><i>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.</i></li> <li><i>The assumptions used for any reporting of metal equivalent values should be clearly stated.</i></li> </ul>	<ul style="list-style-type: none"> <li>The metallurgical sample was a composite of mineralised interval of 124.3m (65.1m to 189.4) in core hole WD001.</li> <li>The composited core sample with an weighted average grade of 5.6% Total Graphitic Carbon (Cg) &amp; 6.0% Total Carbon (TC) based on individual 1m samples.</li> <li>An assay of the composite had a grade of 5.4% Cg &amp; 5.8% TC.</li> <li>There was no lower or upper cut-off applied for the composite.</li> <li>The complete graphitic interval tested was composited evenly, and representative of the entire mineralised interval.</li> <li>Where available results have been reported in both Total Carbon (TC) and Total Graphitic Carbon (Cg).</li> <li>Metallurgical testing used TC analysis for efficiency and the final results are reported in both Cg and TC where available.</li> <li>The difference between TC and Cg upon upgrading is negligible and analytical error is more significant.</li> </ul>
Relationship between mineralisation widths and intercept lengths	<ul style="list-style-type: none"> <li><i>These relationships are particularly important in the reporting of Exploration Results.</i></li> <li><i>If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.</i></li> <li><i>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').</i></li> </ul>	<ul style="list-style-type: none"> <li>Not enough information is available to confirm the relationship between mineralisation and width at this initial stage of exploration</li> <li>Historic explorers using EM surveys including air, ground and down hole techniques interpreted a flat lying structure.</li> <li>Both drill holes were drilled vertically based on the information available.</li> </ul>
Diagrams	<ul style="list-style-type: none"> <li><i>Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.</i></li> </ul>	<ul style="list-style-type: none"> <li>Detailed Drill hole information was previously reported to the ASX on 10 December 2015 "Assays strongly support potential for large graphite deposit"</li> </ul>
Balanced reporting	<ul style="list-style-type: none"> <li><i>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.</i></li> </ul>	<ul style="list-style-type: none"> <li>Comprehensive reporting has been completed with all individual Cg and TC results as reported to ASX 10 December 2015 "Assays strongly support potential for large graphite deposit."</li> </ul>
Other substantive	<ul style="list-style-type: none"> <li><i>Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical</i></li> </ul>	<ul style="list-style-type: none"> <li>Preliminary metallurgical investigations of recovery by flotation and purification by caustic leach have been completed on composite HQ3</li> </ul>



Criteria	JORC Code explanation	Commentary
<i>exploration data</i>	<i>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.</i>	core sample from hole WD001. <ul style="list-style-type: none"> <li>• XRD – XRD indicates that some of the graphite is rhombohedral (3R) indicating hydrothermal origin.</li> <li>• Mineral Liberation Analysis (MLA) analysis of gangue material indicated phyllosilicates (Sericite &amp; Chlorites), quartz, feldspars and oxides/hydroxides.</li> </ul>
<i>Further work</i>	<ul style="list-style-type: none"> <li>• <i>The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).</i></li> <li>• <i>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</i></li> </ul>	<ul style="list-style-type: none"> <li>• An exploration program targeting graphitic granites similar to those at the Warrior Prospect is being planned where they sub-crop or outcrop.</li> <li>• Additional exploration is contingent on metallurgical results.</li> </ul>