

ASX Release: 8 November 2017

## **Calingiri Project Update**

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### **BULK ORE SORTING RESULTS EXCEED EXPECTATIONS**

#### **SUCCESSFUL PROOF OF CONCEPT**

#### **POTENTIAL FOR MAJOR PROJECT UPGRADE**

- Calingiri's representative bulk ore sorted material copper grades were beneficated by an average of 81%. The highest sample product increase in overall grade of 139% resulted in an encouraging 71% reduction in feed with only a 34% deferral or loss of contained copper
- Molybdenum and silver were also upgraded by 111% in the high grade product
- Potential to materially reduce plant size and related Capex, decrease cash costs and maintain annual production that could result in vastly improved project economics
- Significant potential for higher feed grades from sorted ore in the early years of production
- Further bulk ore sorting testwork with larger bulk samples of approximately 1-2 tonnes is planned to commence shortly
- Potential to replace reduced ore feed from:
  - re-optimisations of the existing Bindi, Dasher and Opie JORC Resources
  - exploration for extensions of the existing JORC resources and
  - exploration of recently discovered targets within the Calingiri trend
- Additional physical testwork indicated lower than expected crushing work indices
- Studies to support the next technical report are ongoing and on schedule
- Continued utilisation of environmentally innovative technologies going forward

Caravel Chief Executive, Marcel Hilmer, said "the results of the sorting testwork went well beyond our expectations. The Calingiri Project is fortunate to have a style of mineralisation that is amenable to the sorting technology that was applied to the bulk samples. There is every expectation that we will not only confirm the benefits of the results from testing larger samples early in 2018 but improve on them when optimisations are completed. The Company will then progress to an advanced technical study."

"Furthermore, the ability to create significant higher grade stockpiles utilising bulk ore sorting prior to feeding the mill, should significantly improve project economics in the early years. Lastly, physical testwork indicates the potential for lower than expected crushing costs, including power usage and labour requirements" said Mr Hilmer.

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## BENEFICATION TESTWORK

### A. Ore Sorting

Following the selection of 36 metres of representative mineralisation from each of the Bindi and Dasher HQ diameter diamond core holes (see ASX release 31 August 2017) the core was sampled by cutting a filet of 1/3<sup>rd</sup> of the core and sent for analysis. The average grade of the samples across the core holes was 0.28% copper. There were two separate bulk samples grading 0.22% and 0.33% copper from Bindi and Dasher respectively with an average grade of 0.28%. This average grade was only 7% higher than the optimised resource grade and therefore, provides a suitable benchmark for the ore sorting testwork and no further sub sampling was required.

The remaining 2/3rds of the core from each of the holes was then crushed to -40mm/+15mm with the -15mm fines being separately collected. The respective weights of the +15mm and -15mm splits were Bindi 73.40kg (+15mm), 9.86kg (-15mm) and Dasher 78.04kg (+15mm), 10.60kg (-15mm). The Bindi and Dasher +15mm bulk samples were sent for ore sorting testwork and the -15mm samples were separately subjected to gravity separation testwork at ALS Global (see Section B).

The DE-XRT ore sorting methodology is described in Appendix 2. The testwork on the Bindi and Dasher samples consisted of the following procedure:

1. Visually identified samples in the range of -40mm/+15mm of relatively high and low grade mineralisation together with unmineralised samples from both Bindi and Dasher were subjected to 'static' tests to determine their response to the XRT system. The system works on the basis of discriminating relatively high atomic weight/density minerals (e.g. sulphides) from relatively low atomic weight/density minerals (e.g. silicates). The tests provide digital images of the responses for each 2mm pixel, with the relatively high density minerals shown in blue and the relatively low density minerals shown in red.

The desired outcome is for high-grade sample images to show significant sulphides (blue), low-grade to show some sulphides and for unmineralised to be predominately silicates (red). Results of these static tests are shown in Figures 1 – 6.

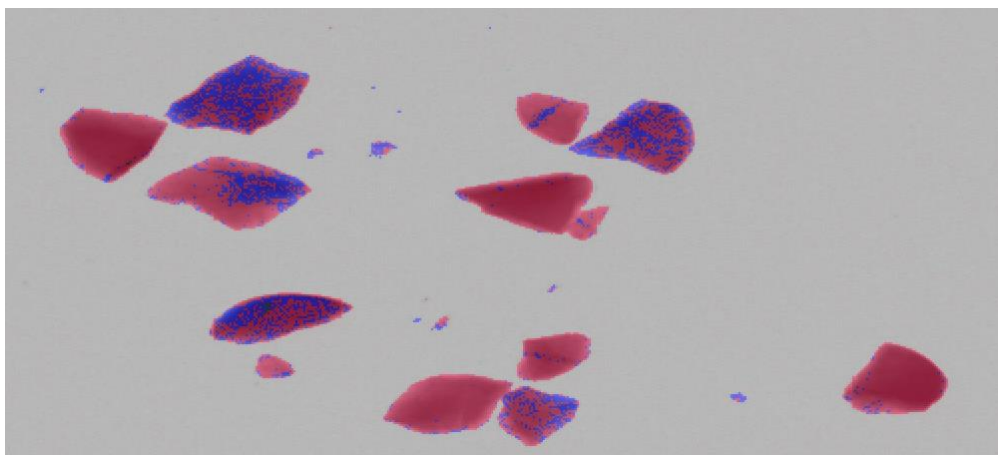
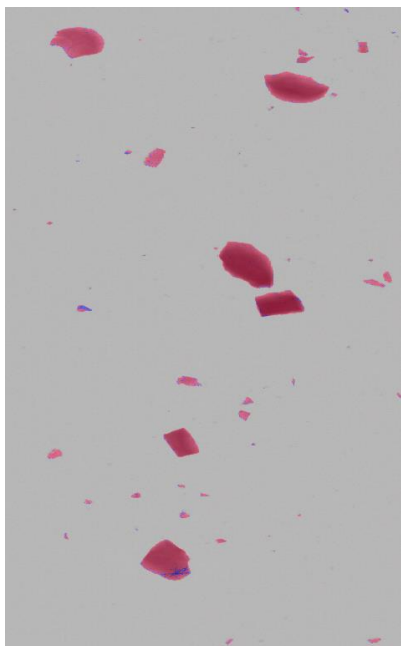
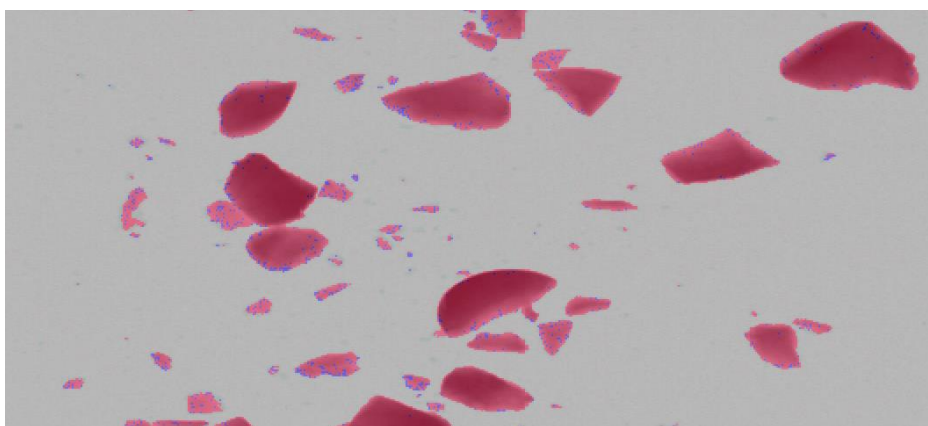


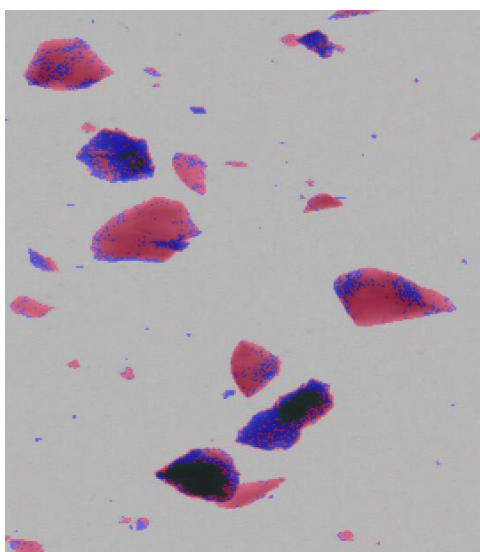
Figure 1: Bindi High-Grade Sample



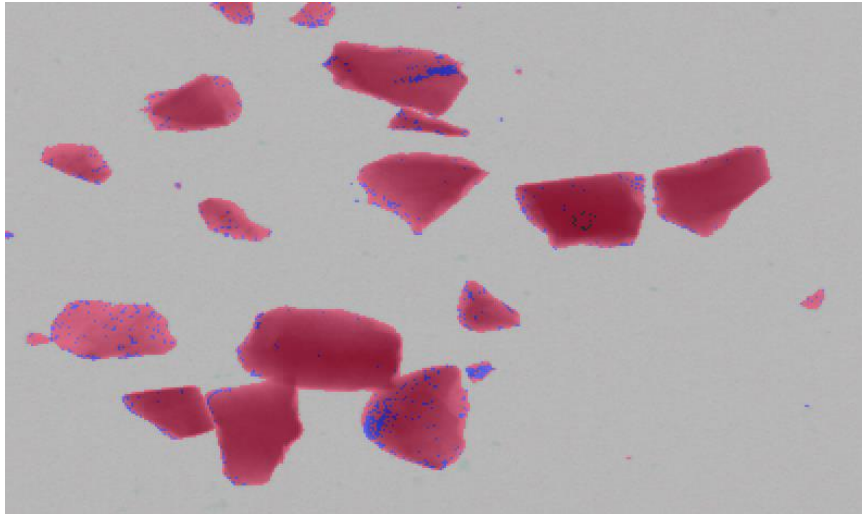
*Figure 2: Bindi Low-Grade Sample*



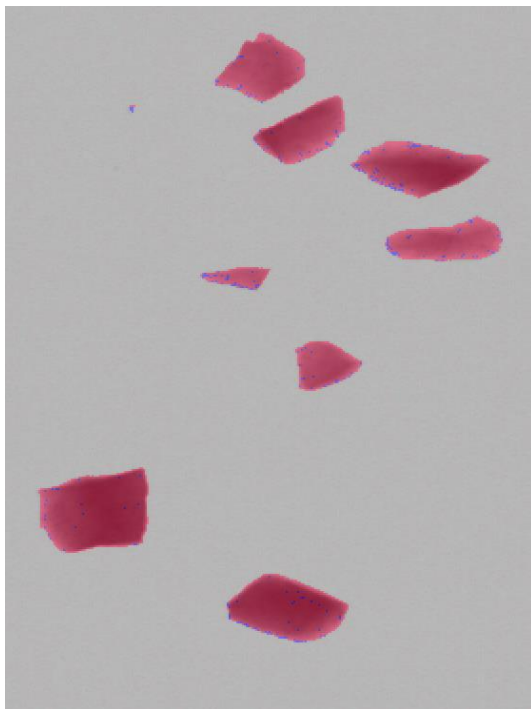
*Figure 3: Bindi Unmineralised Sample*



*Figure 4: Dasher High-Grade Sample*



*Figure 5: Dasher Low-Grade Sample*



*Figure 6: Dasher Unmineralised Sample*

The laboratory reported that the results of this static testwork demonstrated excellent amenability to DE-XRT sorting.

2. The next stage required bulk sample tests involving a belt feeding system in which the feed particles are stabilised on the belt before they are scanned. The sensor X-ray technology can be set at a range of sensitivities depending on the proportion of relatively high density minerals (as discriminated in 2mm pixels) selected. The selected particles are ejected (diverted upwards) by a series of air jets and collected on a separate belt stream to the non-selected particles. The Bindi and Dasher samples were tested with 3 runs for each at a series of sensitivities (5%, 7% and 10%) to produce 4 separate end products from each sample. The

bagged products were designed to represent highest grade, lowest grade, with 2 intermediate grades.

- These 8 bagged sample products, 4 each from Bindi and Dasher, were then weighed and sent for analysis.

## B. Gravity Separation

Fine grained (<15mm) material generated from the crushed bulk samples were subjected to gravity separation techniques by ALS Global. This technique also showed the potential for pre-milling upgrading.

## C. Beneficiation Results

From an analysis of the weights and grades of all the ore sorting and gravity separation samples the following ore sorting results by hole, gravity separation and an optimised consolidation are summarised in Tables 1, 2 and 3. The results were prorated on the basis of the mine optimisations as reported in the Scoping Study. It is noted that the contribution to the overall feed in the study was in the ratio of Bindi 82% and Dasher 18% and Tables 1 and 3 reflect this apportionment. See also Section A Ore Sorting - point 2.

Table 1: Outcomes of Consolidated ore sorting for Copper by Grade and Reduction in Ore Feed

Sorted Samples	Consolidated Pro-Rata Contribution		
	Beneficiated Cu Grade	Increase in Cu Grade	Reduction in Ore Feed
5% product sensitivity	0.44%	83%	58%
10% product " "	0.53%	139%	71%
5% and 7% product " "	0.39%	42%	39%
7% and 10% product " "	0.40%	61%	52%

Table 2: Outcomes of ore sorting by Deposit for Copper by Grade and Reduction in Ore Feed

Sorted Samples	Bindi			Dasher		
	Beneficiated Cu Grade	Increase in Cu Grade	Reduction in Ore Feed	Beneficiated Cu Grade	Increase in Cu Grade	Reduction in Ore Feed
5% product sensitivity	0.42%	94%	61%	0.43%	35%	43%
10% product " "	0.55%	155%	74%	0.53%	66%	59%
5% and 7% product " "	0.31%	46%	41%	0.39%	22%	28%
7% and 10% product " "	0.36%	69%	54%	0.40%	26%	43%

Table 3: Outcomes of Consolidated ore sorting for Mo and Ag by highest grade samples

High-Grade Sorted Samples	Beneficiated Grade PPM	Increase in Grade
Molybdenum	88.3	111%
Silver	1.9	112%

## PHYSICAL TESTWORK

In parallel with the ore sorting testwork the Bindi and Dasher core were subjected to the following physical testwork by ALS Global:

### 1. Bond Impact Crushing Work Index (CWI)

10 representative core samples were selected from each of the Bindi and Dasher unweathered mineralised zones. The Bindi samples had an average CWI of 9.1 kWh/tonne which was in the range expected for the granite-gneiss lithology while the Dasher samples averaged only 4.9 kWh/tonne. It is thought that this unexpectedly low result is due to the stronger foliation fabric in the Dasher host rock. A lower index indicates potential for lower crushing costs. Samples from an upper, more weathered zone, at Bindi averaged 5.3 kWh/tonne.

### 2. Unconfirmed Compressive Strength (UCS) Determinations

UCS determinations were carried out on 3 representative core samples from both Bindi and Dasher. The Bindi samples average UCS at 116.6, and the Dasher samples average at 101.3, are both within the lower range for granite-gneiss lithologies.

### 3. SG Determinations

In situ bulk density determinations were also carried out on 3 representative core samples from both Bindi and Dasher. The combined average SG of 2.71 is in line with the SG used in the estimation of the Calingiri JORC Resources.

## Forward Work Programs (Q4 2017 and 2018)

The Company has plans to progress the Calingiri Project to a development decision and will undertake a number of programs that will support an advanced study.

It is believed that further ore sorting testwork has the potential to improve the results from this initial 'proof of concept' program. Approximately 1.5 tonnes of representative drill core mineralisation is available from the recently drilled Bindi and Dasher holes. Additional holes may also be drilled to add to this material.

The beneficiated material generated by this planned bulk ore sorting testwork will also provide suitable representative mill feed material for metallurgical floatation testwork to confirm metal recoveries and concentrate grades. This is regarded as critical to confirming project feasibility study inputs.

Drilling programs have also been planned to explore both for extensions to the current JORC resources at Bindi, Dasher and Opie and also to test several priority exploration targets within the Calingiri Trend.

Programs to evaluate project water requirements, including initial exploratory drilling, are also planned. Revised resource optimisation and mining studies will also be undertaken to include the upgrading inputs of the ore sorting process.

Further testwork utilising green technologies will evaluate and reduce environmental footprints and methods to reduce water requirements.



**Calingiri Update November 2017** (ASX:CVV)

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## Calingiri Project Overview

The bulk ore sorting testwork results support the case for improved project economics as well as a reduced project environmental footprint. This will likely lead to updated technical studies in 2018.

The Company previously released a Scoping Study for Calingiri on 28 June 2016. The study determined that Calingiri demonstrates robust project fundamentals with low technical risk. It contemplates the co-development of three open pits, located 120km to the northeast of Perth in Western Australia (Figure 2). The Company considers the project is economically viable based on its ability to pay back project start-up capital and provide ongoing positive operational cash flows. The study was completed by CSA Global in conjunction with Caravel and indicated an initial 20 year LOM for 710,000 tonnes (1.6B/lbs) of copper produced. Existing infrastructure within and adjacent to the project, coupled with industry-standard mining and treatment options available to Caravel, make the project a standout new Australian undeveloped copper project.

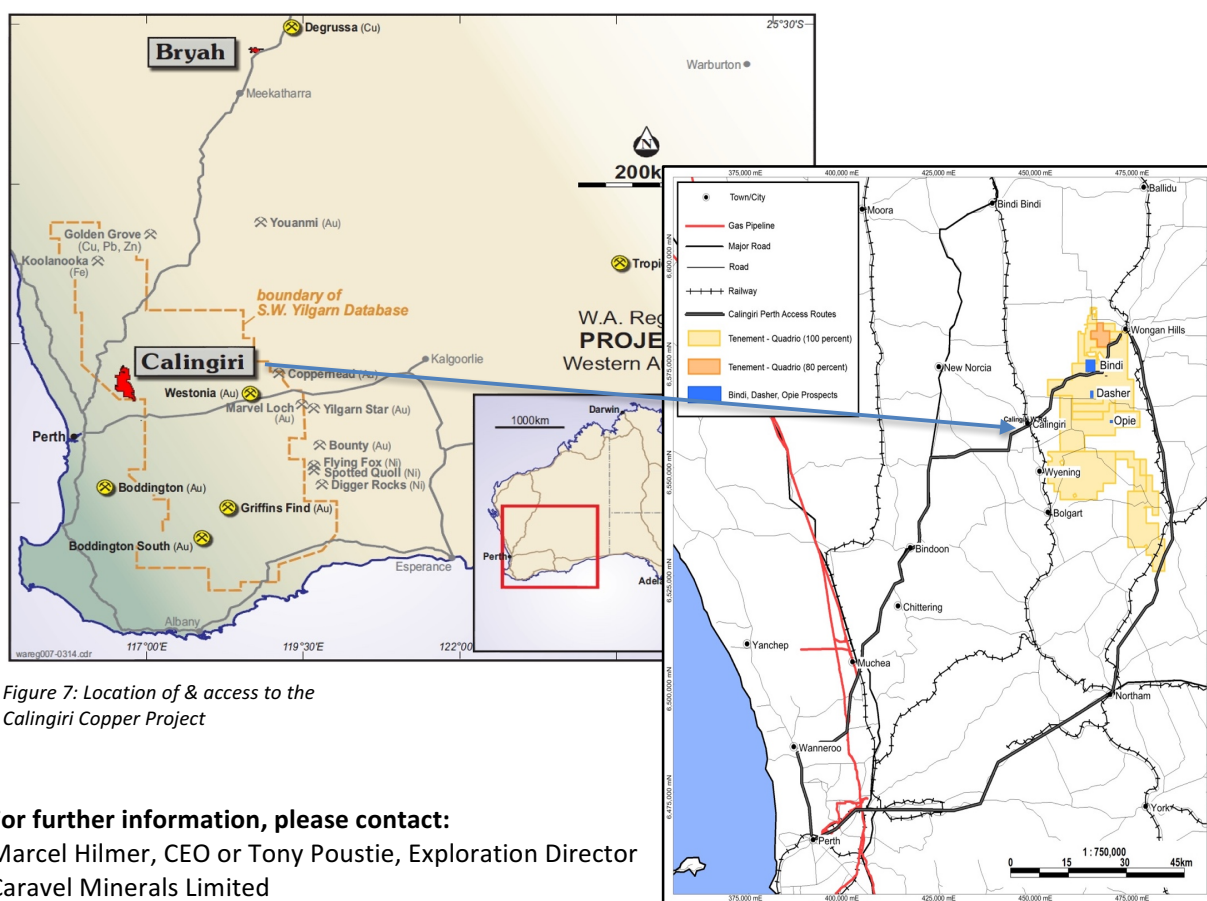


Figure 7: Location of & access to the Calingiri Copper Project

### For further information, please contact:

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### About Caravel Minerals Limited

Caravel Minerals is a gold, copper and base metals exploration and resource development company with projects located in Western Australia. Caravel has a technically strong and well established exploration and mine development team.



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### **Competent Person's Statement**

The information in this report that relates to the Calingiri Mineral Resource estimates is extracted from an ASX Announcement dated 4 April 2016, (see ASX Announcement – 4 April 2016 “Calingiri Maiden JORC Resource”, [www.caravelminerals.com.au](http://www.caravelminerals.com.au) and [www.asx.com.au](http://www.asx.com.au) ). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the Mineral Resource estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are represented have not been materially modified from the original market announcement.

### **Production Targets and Financial Information**

Information in relation to the Calingiri Project Scoping Study, including production targets and financial information, included in this report is extracted from an ASX Announcement dated 28 June 2016, (see ASX Announcement – 28 June 2016, “Scoping Study Confirms Outstanding WA Copper Project”, [www.caravelminerals.com.au](http://www.caravelminerals.com.au) and [www.asx.com.au](http://www.asx.com.au)). The Company confirms that all material assumptions underpinning the production target and financial information set out in the announcement released on 28 June 2016 continue to apply and have not materially changed.

### **Forward Looking Statements.**

This document may include forward looking statements. Forward looking statements include, but are not necessarily limited to, statements concerning Caravel Minerals planned exploration program, studies and other statements that are not historic facts. When used in this document, the words such as “could”, “indicates”, “plan”, “estimate”, “expect”, “intend”, “may”, “potential”, “should” and similar expressions are forward looking statements. Such statements involve risks and uncertainties, and no assurances can be provided that actual results or work completed will be consistent with these forward looking statements.

### **Disclaimer**

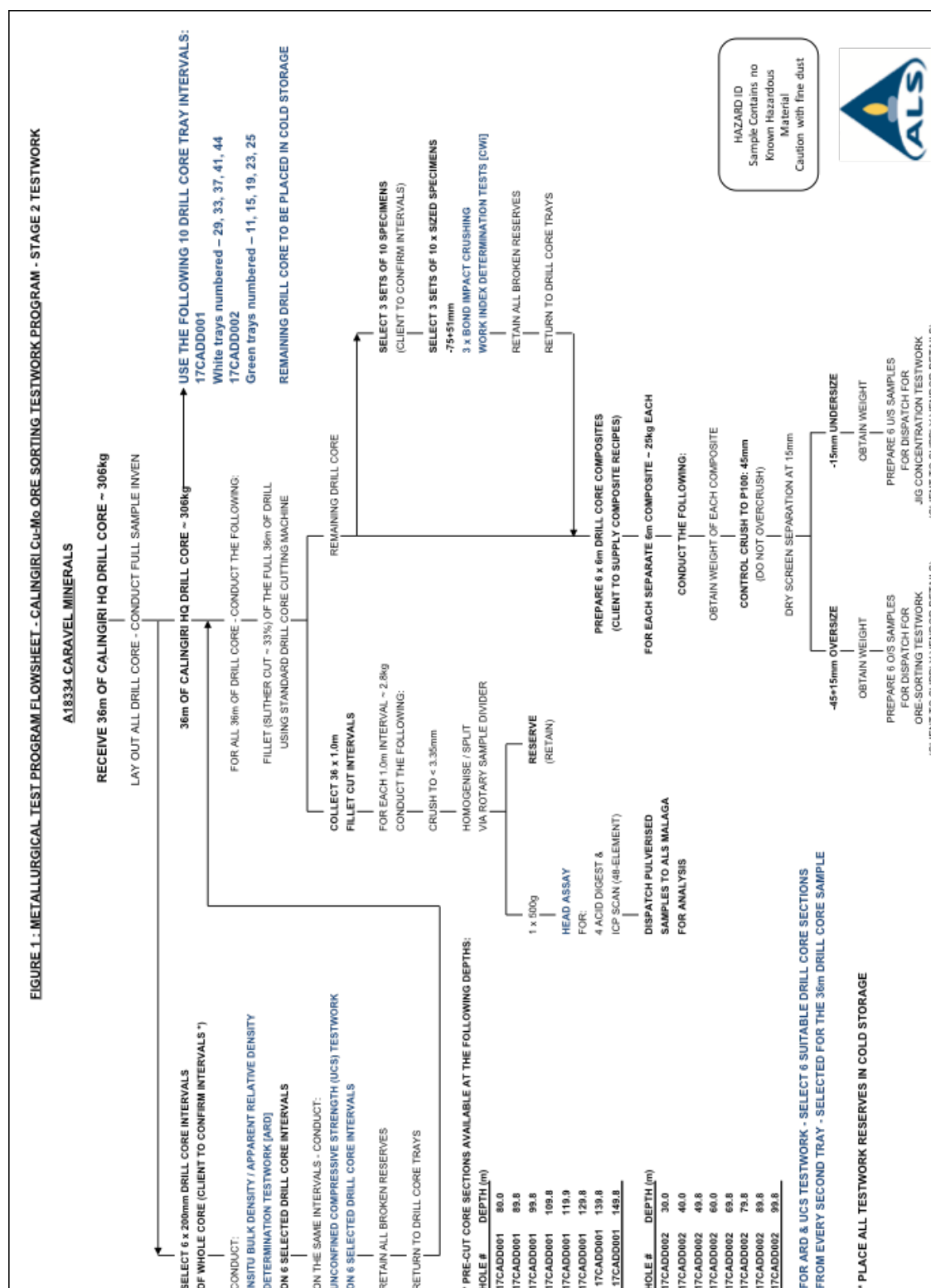
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# Appendix 1

## Metallurgical Test Program Flowsheet



## Appendix 2

### Technology and Benefits of Ore Sorting

Bulk ore sorting is a proven pre-concentration technology in which barren gangue is separated from mineralisation based on the grade as measured or inferred from a sensor measurement. With bulk ore sorting, ore that previously didn't qualify for processing may be upgraded, making it economic to treat and improving the resource utilization. More valuable metal may be extracted from the resource while the processing plant treats less tonnes at higher feed grade, reducing consumption of water and power as well as lower tailings output. Significant capital reductions may also be achieved through smaller back end milling and processing requirements.

The technology is based on industry proven, high capacity industrial sorting machines from major international equipment suppliers, with well established businesses in industrial minerals, material recycling and food processing. .



Figure 9: Ore Sorting Equipment

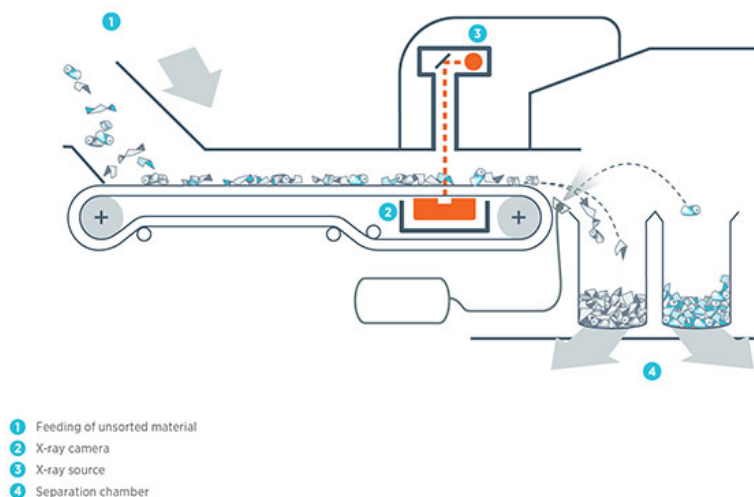


Figure 8: Ore Sorting Flow Diagram