HILLGROVE RESOURCES

ASX RELEASE

18 October 2016

# KANMANTOO COPPER MINE
# UPDATED MINERAL RESOURCE AND ORE RESERVE ESTIMATE

Hillgrove Resources Limited (ASX:HGO) advises that a new Mineral Resource Estimate and Ore Reserve Estimate has been prepared for the Kanmantoo Copper Mine in accordance with The JORC Code 2012 Edition. Highlights include:

- Increase in Ore Reserves of 7.4kt copper metal (14%) before mining depletion predominantly driven by classification upgrade of Inferred Mineral Resources within the Giant Pit design following infill drilling campaign.
- Net of mining depletion since 30 June 2016, the Ore Reserve Estimate increased by 5.4kt copper metal (10%).

Tables 1 and 2 summarise the Mineral Resource Estimate for the Giant copper deposits and all copper deposits respectively. Table 3 summarises the Ore Reserve Estimate.

**Table 1 Mineral Resource Estimate for Giant Area only at 30September 2016**

| Mine | JORC 2012 Classification | Tonnage (Mt) | Cu (%) | Au (g/t) | Ag (g/t) | Cu Metal (kt) |
|---|---|---|---|---|---|---|
| Kanmantoo Copper Mine, Giant Area | Measured | 8.9 | 0.6 | 0.1 | 1.1 | 55 |
| | Indicated | 5.3 | 0.6 | 0.1 | 0.9 | 30 |
| | Inferred | 11.1 | 0.6 | 0.1 | 0.8 | 62 |
| | **Total** | **25.4** | **0.6** | **0.1** | **1.0** | **147** |

Note: Economic Cut Off Grade is 0.20% Cu.

**Table 2 Mineral Resource Estimate for All Deposits at 30September 2016**

| Mine | JORC 2012 Classification | Tonnage (Mt) | Cu (%) | Au (g/t) | Ag (g/t) | Cu Metal (kt) |
|---|---|---|---|---|---|---|
| Kanmantoo Copper Mine, All Deposits | Measured | 10.3 | 0.6 | 0.1 | 1.2 | 66 |
| | Indicated | 10.8 | 0.6 | 0.1 | 1.4 | 70 |
| | Inferred | 13.4 | 0.6 | 0.1 | 1.0 | 75 |
| | **Total** | **34.5** | **0.6** | **0.1** | **1.2** | **211** |

Note: Economic Cut Off Grade is 0.20% Cu.

**Table 3 Ore Reserve Estimate at 30September 2016**

| Mine | JORC 2012 Classification | Tonnage (Mt) | Cu (%) | Au (g/t) | Ag (g/t) | Cu Metal (kt) |
|---|---|---|---|---|---|---|
| Kanmantoo Copper Mine | Proved | 7.1 | 0.6 | 0.08 | 1.1 | 44 |
| | Probable | 2.3 | 0.5 | 0.05 | 0.8 | 12 |
| | **Total** | **9.5** | **0.6** | **0.07** | **1.0** | **57** |

Note: Economic Cut Off Grade is 0.20% Cu.

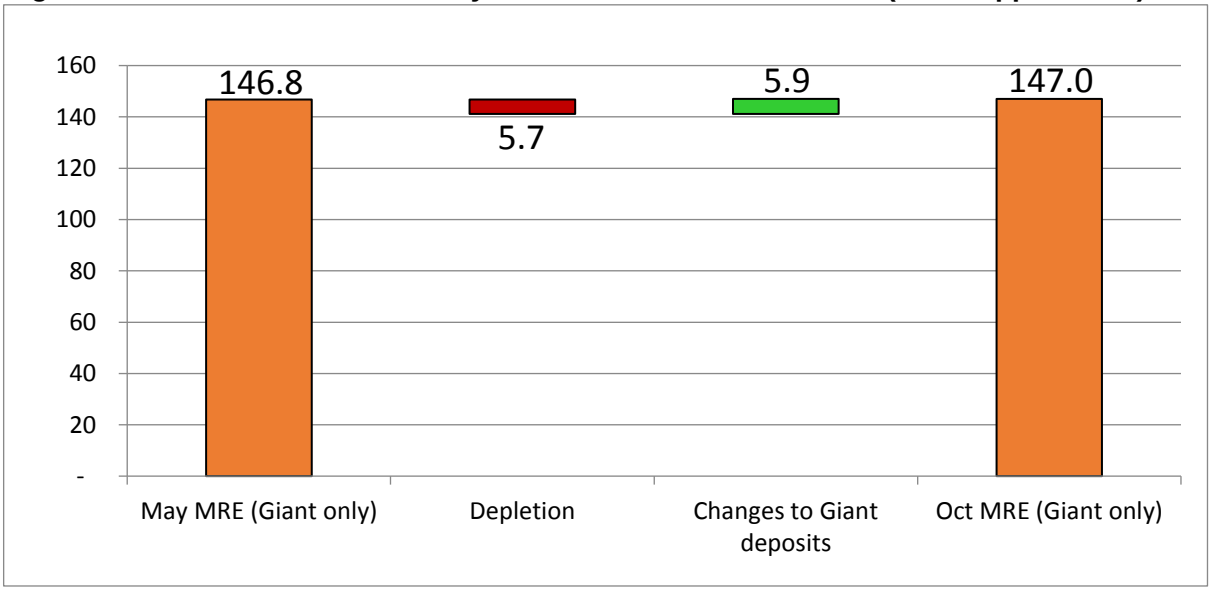
## Mineral Resource Estimate

The updated resource estimate has incorporated the 2016 RC drilling results. Overall, the Mineral Resource Estimate completed in October 2016 ("Oct 2016 MRE") for the Giant copper deposits[1] has added 5.9kt tonnes of copper metal (4% increase in copper metal after mining depletion) compared to the previous May 2016 resource model[2] for the same deposits, from the same surface and to the same depths.

Reconciliation of the Oct 2016 MRE against historic production in Kavanagh indicates that the model over-reports by 3% on tonnes and under-estimates by 1% on copper grade for a combined variance of 2% in copper metal tonnes, and will be useful for mine planning and forecasting.

The Total Mineral Resources for all of the 11 copper deposits at Kanmantoo (the Oct 2016 MRE plus the 2013 depleted resources) at 0.2% Cu cut-off grade and from the 1 October 2016 surface are represented in Table 2.

**Figure 1 Reconciliation of May 2016 MRE and Oct 2016 MRE (kt of copper metal)**




**Summary of major changes in the Mineral Resource Estimate**

**Depletion**

- Mined areas have been depleted to the end of month survey surface as at 30 September 2016.

**Changes to Giant deposits (Kavanagh plus Spitfire deposits)**

- A total of ten RC drill holes have been drilled in the western and central mineralised areas of the Giant pit to infill gaps in the HGO drilling coverage. These results were reported to the ASX on 1 September 2016.
- The additional RC results have resulted in local changes to the domain shapes and volumes, and to the domain statistics.
- There are no other changes to search strategies, classification criteria, modelling method or software. A more complete description of the geology and modelling method can be read with the ASX release of 26 May 2016.

[1] only includes the previously termed Kavanagh and Spitfire copper domains
[2] May 2016 Mineral Resource Estimate released to ASX on 26 May 2016

The Kanmantoo drill hole database comprises three datasets; Historic drilling (pre-2004), Hillgrove drilling (2004-2013), and Hillgrove's blast hole dataset.

As previously disclosed, the Historic drilling has all been discarded. The Blast Hole data has been used to assist with geologic domaining, but is not used in any univariate or bivariate statistical analysis. All the 2016 RC drilling has been included into the October 2016 Mineral Resource update.

**Table 4 Hillgrove drill holes**

| Period | Hole Type | Hole ID | Total Holes | Holes in MRE |
|---|---|---|---|---|
| July 2004 to March 2010 | Diamond | KTDD001 to KTDD180 | 173 | 123 |
| July 2006 to Feb 2007 | RC/Diamond | various KTRCD | 20 | 12 |
| March 2004 to Aug 2007 | RC | KTRC001 to KTRC631 | 613 | 74 |
| Dec 2007 to Nov 2013 | RC | KTRC632 to KTRC992 | 359 | 41 |
| September 2013 | Diamond | KTDD181 to KTDD186 | 4 | 0 |
| March 2015 | RC | KTRC993 to KTRC995 | 3 | 0 |
| June & August 2016 | RC | KTRC1001 to KTRC1010 | 10 | 10 |
| **Total** | | | **1182** | **260** |

Drilling by Hillgrove has identified 12 separate copper deposits (Figure 2). This October 2016 Mineral Resource Estimate only updates the Mineral Resources for the area of the Giant Pit, which only includes the Kavanagh (formerly called Main) and the Spitfire copper deposits. The Mineral Resources for the remaining copper deposits were reported to the ASX on 30 August 2013.

**Geologic Domains**

Several geologic entities within the Kavanagh and Spitfire deposits have been wireframed based on alteration codes as logged by the exploration staff, in particular chlorite intensity, and the lithology code "Biotite-garnet-chlorite schist", in conjunction with a generalised 0.5% sulphur envelope.

There are a total of seven domains interpreted for the area of the Mineral Resource Estimate. Six alteration domains and one domain covering all the weakly altered material within the resource area and wholly encompassing the six mineralised domains.

**Estimation Method**

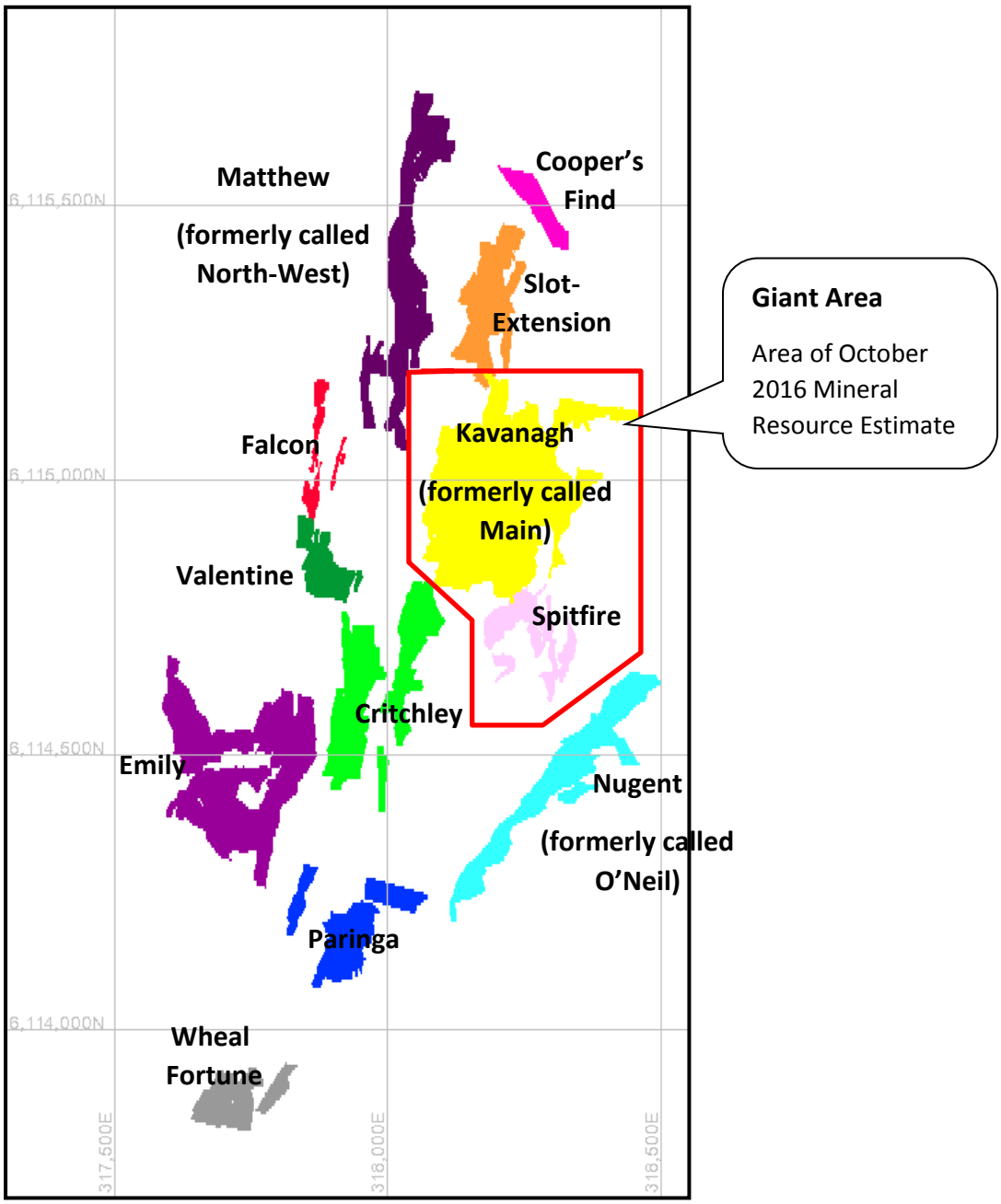
Multiple Indicator Kriging has been used to estimate the proportion of each panel that is mineralised above a range of copper cut-off grades. The histograms of estimated copper grades within 10m (east) by 20m (north) by 12m (elevation) panel were corrected for an SMU of 4m by 10m by 4m (assuming a lognormal distribution) and corrected for the Information Effect of a 4m by 4m x 6m grade control sampling pattern.

The resultant Recoverable Resource Estimate includes recoverable estimates for Cu, and panel average estimates for Ag, Au, and S.

**Resource Classification**

Three estimation passes were used, with each pass providing an increase to the search strategy from 12m x 42m x 42m to a maximum of 20m x 70m x 70m. Measured and Indicated were coded by the smaller search strategies. Panels were classified Inferred if they were estimated with the largest search strategy or if more than 50% of the panel is waste.

**Figure 2 Copper deposits at Kanmantoo**




**Validation**

Comparison of the Oct 2016 MRE and drill hole data, both spatially and statistically indicates a reasonable correlation and mapping of the mineralisation.

For the period 1 February 2016 to 1 October 2016 the May 2016 MRE understated the actual mill reconciled production by 10% in tonnes and 16% in copper grade. This is a result of the lack of Hillgrove drilling in this area (see ASX Releases 26 May 2016 and 1 September 2016) and the short scale spatial continuity of the peripheral mineralisation currently being mined.

The Oct 2016 MRE has been updated with the ten RC holes drilled in 2016 and the assay statistics to better estimate the recoverable resource in this area of the open pit.

Validation of the Oct 2016 MRE against production indicates that the new estimate is a significant

improvement on the May 2016 MRE, albeit continuing to understate the actual mill-reconciled production (~1.6Mt of ore) by 5% for tonnes and 10% for copper grade in the same area and time period.

The charts in Figures 3 to 5 compare the production from the Kavanagh pit, mined in 2013 to 2014 by Hillgrove. The Kavanagh pit is the first stage of the Giant Pit and mined ore from all geologic domains. The reconciliation is therefore considered indicative of the mineralisation to be encountered in the remaining mine life of the Giant Pit. The Oct 2016 MRE maps the production tonnes and grade reasonably well, to within 2% copper metal for most benches mined.

These reconciliations against production statistics support the efficacy of the Oct 2016 MRE for forecasting production, and confirm the validity of the classification scheme.

**Figure 3 Reconciliation Oct 2016 MRE to Actual – Kavanagh Pit (bench by bench)**

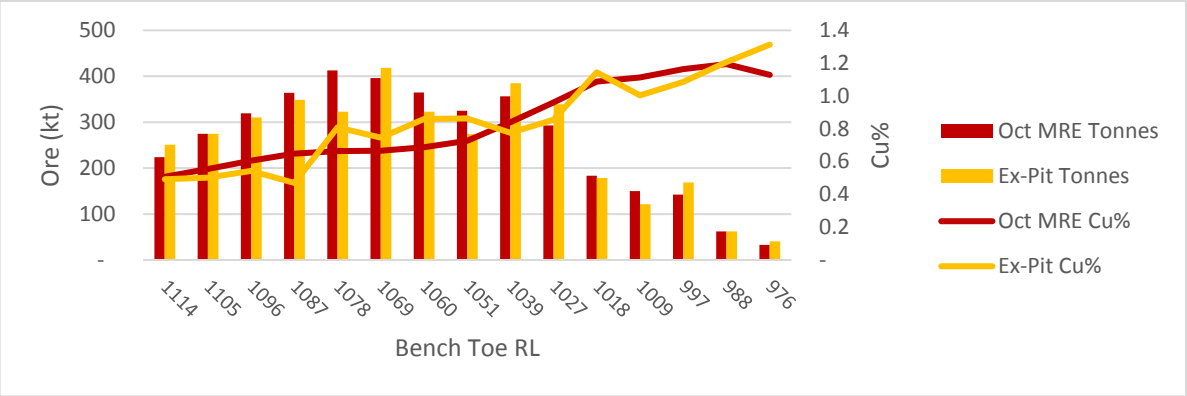



**Figure 4 Reconciliation Oct 2016 MRE to Actual – Kavanagh Pit (bench by bench)**

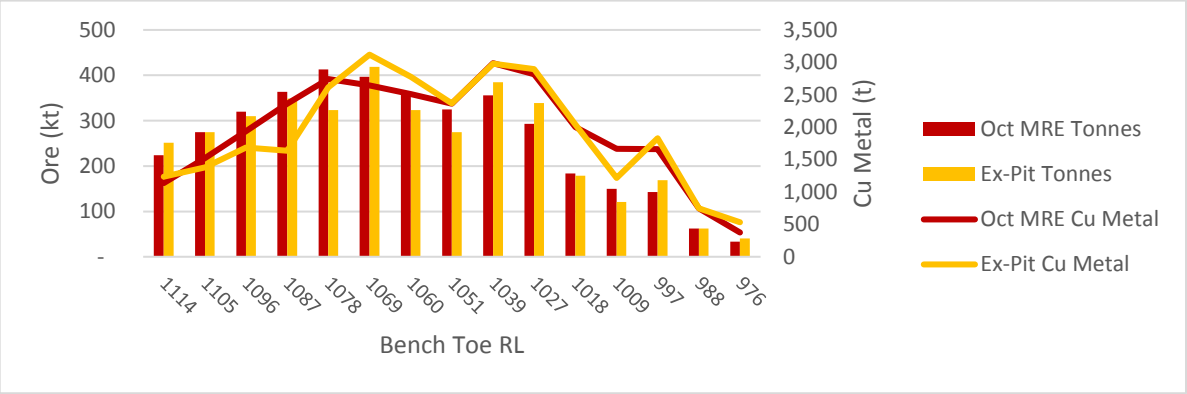
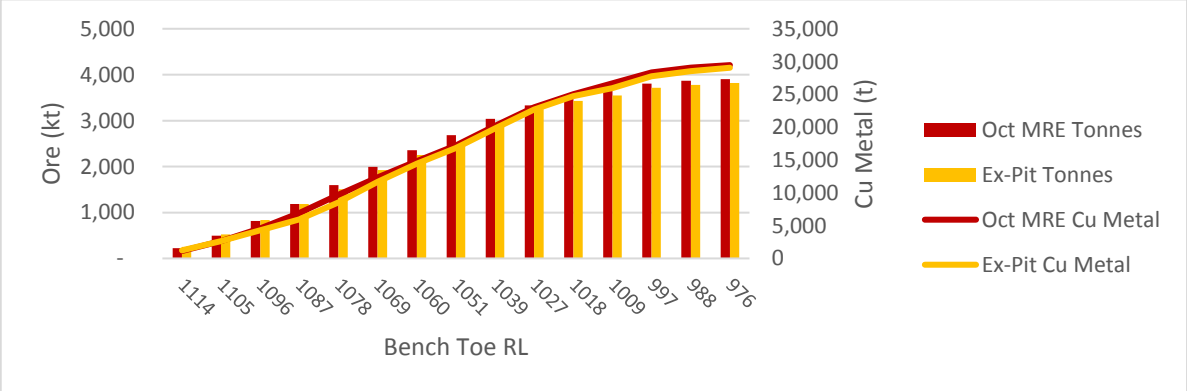



**Figure 5 Reconciliation Oct 2016 MRE to Actual – Kavanagh Pit (cumulative by bench)**



**Satellite Copper resources at Kanmantoo**

The 2016 Mineral Resource Estimate has only re-estimated the Mineral Resources for the area covered by the Giant Pit operation, and only includes the Kavanagh and Spitfire deposits. The remaining deposits were estimated in 2013 and remain as reported in the ASX release of 30 August 2013 except as depleted by mining from 1 March 2013 to 1 October 2016. There is no further drilling within these deposit areas. Table 5 reports the 2013 Mineral Resources after mining depletion to 1 October 2016 for all deposits, not including the Giant area.

**Table 5 Depleted 2013 Mineral Resource Estimates to end 30 September 2016 not including Kavanagh (formerly Main) or Spitfire[3]**

| Deposit | Classification | Tonnage (kt) | Cu (%) | Au (g/t) | Ag (g/t) |
|---|---|---|---|---|---|
| Paringa | Indicated | 560 | 1.0 | 0.2 | 1.3 |
| | Inferred | 50 | 1 | 0.2 | 1 |
| Nugent (O'Neil) | Indicated | 1,160 | 0.9 | 0.4 | 2.1 |
| | Inferred | 500 | 0.6 | 0.3 | 2 |
| Emily | Measured | 1,340 | 0.8 | 0.1 | 1.8 |
| | Indicated | 580 | 0.9 | 0.1 | 1.6 |
| | Inferred | 200 | 1 | 0.2 | 1 |
| Critchley | Indicated | 810 | 0.5 | 0.1 | 1.2 |
| | Inferred | 850 | 0.4 | 0.1 | 1 |
| Valentine | Indicated | 140 | 0.8 | 0.1 | 1.6 |
| | Inferred | 50 | 0.8 | 0.1 | 2 |
| Falcon | Indicated | 100 | 0.6 | 0.1 | 1.1 |
| | Inferred | 0 | 0.0 | 0.0 | 0 |
| Norh-West (Mathew) | Indicated | 940 | 0.6 | 0.1 | 2.3 |
| | Inferred | 350 | 0.6 | 0.2 | 3 |
| Slot-Extension | Indicated | 1,190 | 0.6 | 0.1 | 2.5 |
| | Inferred | 50 | 0.4 | 0.1 | 2 |
| Coopers Find | Inferred | 250 | 0.6 | 0.1 | 3 |
| **Depleted 2013 Mineral Resource Estimate** | Measured | 1,340 | 0.8 | 0.1 | 1.8 |
| | Indicated | 5,480 | 0.7 | 0.2 | 1.9 |
| | Inferred | 2,300 | 0.6 | 0.2 | 2.0 |
| | **TOTAL** | **9,120** | **0.7** | **0.2** | **1.9** |

Note: Economic Cut Off Grade is 0.20% Cu.

[3] Measured tonnes rounded to 5,000, Indicated tonnes rounded to 10,000, Inferred tonnes rounded to 50,000

## Ore Reserve Estimate

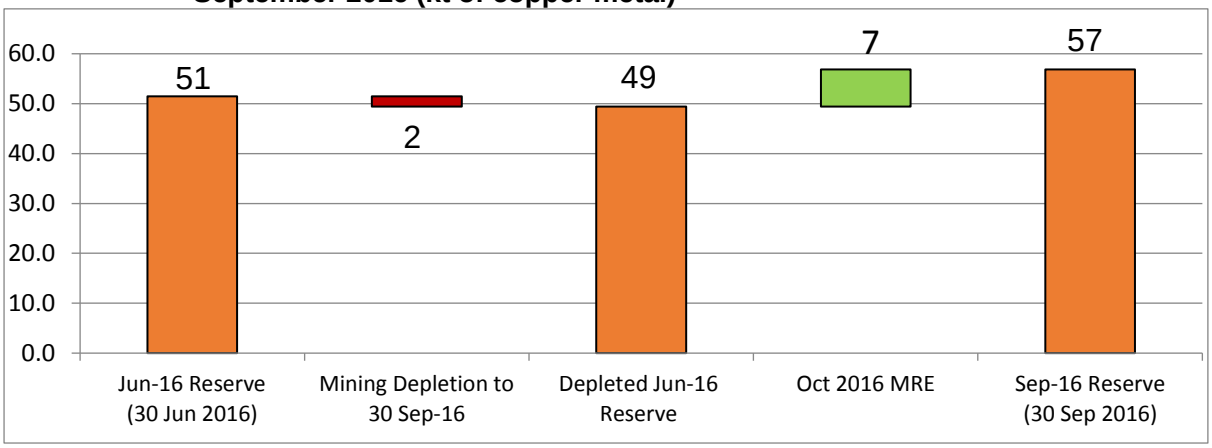
The Ore Reserve Estimate has been updated to reflect the impact of the Oct 2016 MRE. Table 6 summarises the Ore Reserve Estimate at 30 September 2016. After mining depletion, the revised Ore Reserve Estimate increases copper metal by 5.4kt (approximately 10%) from the previous estimate which was based on the topographic surface at end 30 June 2016[4]. The increase to the Ore Reserve Estimate is predominantly driven by classification upgrade of Inferred Mineral Resources within the Giant Pit design following infill drilling campaign. Remaining within the Giant Pit mine design and below the 30 September 2016 topographic surface there is approximately 15kt copper metal classified as Inferred Mineral Resources above 0.2% Cu cut-off which does not form part of the Ore Reserve Estimate.

**Table 6 Ore Reserve Estimate at 30September 2016**

| Mine | JORC 2012 Classification | Tonnage (Mt) | Cu (%) | Au (g/t) | Ag (g/t) | Cu Metal (kt) |
|---|---|---|---|---|---|---|
| Kanmantoo Copper Mine | Proved | 7.1 | 0.6 | 0.08 | 1.1 | 44 |
| | Probable | 2.3 | 0.5 | 0.05 | 0.8 | 12 |
| | **Total** | **9.5** | **0.6** | **0.07** | **1.0** | **57** |

Note: Economic Cut Off Grade is 0.20% Cu.

**Figure 6 Reconciliation of Ore Reserve Estimates at end 30 June 2016 and at end 30 September 2016 (kt of copper metal)**




**Summary of major changes in the Ore Reserve Estimate**

**Depletion**

- Mined areas have been depleted from 30 June 2016 to the end of month survey surface as at 30 September 2016.

**Oct 2016 MRE**

- The Oct 2016 MRE discussed in this ASX release has been used as the geological model for the Ore Reserve Estimate.
- The Ore Reserve Estimate 2016 is spatially constrained to the disturbance area approved within the Program for Environmental Protection and Rehabilitation (PEPR), which considers only the open pit extraction of the Giant Pit. This constraint is consistent with the Ore Reserve Estimate released to the ASX on 1 September 2016 in that it does not include any mineral inventory from Rodda, Critchley and Paringa and Kavanagh North open pits as they are not considered viable to extract at this time.

[4] Released to ASX on 1 September 2016

For detailed assumptions please refer to *Appendix A: JORC Table 1*.

## ABOUT HILLGROVE

Hillgrove is an Australian mining company listed on the Australian Securities Exchange (ASX: HGO) focused on the operation of the Kanmantoo Copper Mine in South Australia, and with exploration projects on its Indonesian tenements. The Kanmantoo Copper Mine is located less than 55 kilometres from Adelaide in South Australia. With construction completed in late 2011, Kanmantoo is an open-cut mine with a throughput of 3.0 - 3.5Mt p.a., to produce up to 100,000 dry metric tonnes of copper concentrate per annum, containing approximately 20,000t copper and associated gold and silver per annum over the current life of mine.

### Competent Person's Statement

The information in this release that relates to Mineral Reserves is based upon information compiled by Mr Lachlan Wallace, who is a Member of The Australasian Institute of Mining and Metallurgy. Mr Wallace is a fulltime employee of Hillgrove Resources Limited and has sufficient experience relevant to the styles 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 (JORC Code)'. Mr Wallace has consented to the inclusion in the release of the matters based on their information in the form and context in which it appears.

The information in this release that relates to the October 2016 Mineral Resource for Giant is based upon information compiled by Mr Peter Rolley, who is a Member of The Australian Institute of Geoscientists. Mr Rolley is a full-time employee of Hillgrove Resources Limited and has sufficient experience relevant to the styles 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 (JORC Code)'. Mr Rolley has consented to the inclusion in the release of the matters based on their information in the form and context in which it appears.

The information in this release that relates to the 2013 Mineral Resource not including Giant is based upon information compiled by Ms Michaela Wright, who is a Member of The Australasian Institute of Mining and Metallurgy. Ms Wright is a full-time employee of Hillgrove Resources Limited and has sufficient experience relevant to the styles 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 (JORC Code)'. Ms Wright has consented to the inclusion in the release of the matters based on their information in the form and context in which it appears.

## For more information contact:

Mr Steven McClare
CEO & Managing Director
Tel: +61 (0)8 7070 1698

Mr Paul Kiley
CFO & Company Secretary
Tel: +61 (0)8 7070 1698

## APPENDIX A – JORC Table 1

### Section 1 Sampling Techniques and Data

| Criteria | Commentary |
|---|---|
| *Sampling techniques* | • Reverse circulation (RC) and diamond drill hole (DD) samples collected by Hillgrove Resources personnel have been used for the geological interpretation and estimation. No historic samples have been used in this mineral resource estimate.<br>• Drill hole sampling was conducted as per the Hillgrove Resources procedures and QAQC protocols.<br>RC Drilling:<br>• 2004 to 2007 drilling:<br>  • A rig mounted 75/25 splitter was used to collect a bulk sample and smaller split sample (3-4kg) directly off the drill rig at 1m intervals. The split sample was then split down manually if required using a cone or riffle splitter to generate a sample of ~3kg.<br>  • 1m intervals were assayed with samples being prepared by Genalysis Laboratories in Adelaide. Each sample was pulverised to ~95% passing -75µm and the remaining pulp shipped to Genalysis Perth for analysis.<br>• 2011 – 2012 drilling:<br>  • 1m bulk samples were collected during drilling with smaller split samples (3-4kg) for assay being collected primarily using a cone or riffle splitter directly off the rig.<br>  • Specific target intervals and/or samples exhibiting visible mineralisation were assayed at 1m intervals. All other sample intervals were composited (using spear sampling) to 4m intervals for assaying. On return of assay results, the 4m composite results were examined and any 4m composites returning an economic copper grade (>0.2%) were re-assayed using the original 1m samples (collected from original bulk sample using spear sampling to produce a representative 1.5kg to 3kg sample).<br>  • Samples were prepared by ALS Adelaide with each sample being riffle split to a maximum size of 3kg then pulverised split to 85% passing 75µm or better and then shipped to ALS Perth for assay.<br>• 2016 RC Drilling<br>  • 1m bulk samples were collected during drilling with smaller split samples (3-4kg) for assay being collected using a riffle splitter directly off the rig.<br>  • Samples were prepared by ALS Adelaide with each sample being riffle split to a maximum size of 3kg then pulverised split to 85% passing 75µm or better and then shipped to ALS Perth for assay.<br><br>Diamond core:<br>  • Core samples were sawn in half using a diamond core saw. A small percentage of core samples were sawn in quarters. Sampling was undertaken at 1m intervals or to geological boundaries as determined by the supervising geologist. Half or quarter core samples were sent for assay and the remaining core kept in core trays for future reference.<br>  • Samples were prepared by Genalysis Laboratories in Adelaide using a jaw crusher to ~2mm. Each sample was then pulverised to ~95% passing -75 µm and the remaining pulp shipped to Genalysis Perth for assaying. |

<table>
<tr><th>Criteria</th><th>Commentary</th></tr>
<tr><td>Drilling techniques</td><td>
<table>
<tr><th>Drillhole Type</th><th>Drill Date</th><th>Bit Size</th><th>% Oriented</th><th>Orientation Method</th></tr>
<tr><td>Diamond</td><td>All</td><td>HQ from surface to fresh then NQ2 to end of hole</td><td>97%</td><td>Spear</td></tr>
<tr><td rowspan="2">RC</td><td>2004 to 2007</td><td>145mm</td><td>NA</td><td>NA</td></tr>
<tr><td>2011 to 2016</td><td>115mm</td><td>NA</td><td>NA</td></tr>
</table>
</td></tr>
<tr><td>Drill sample recovery</td><td>RC<ul><li>Sample recovery or the occurrence of wet samples is not recorded in the drillhole database for pre-2016 drilling although communications with Exploration Personnel and field observations indicate that sample recovery or wet samples were rarely a problem.</li><li>Sample weights were recorded for all sample intervals in 2016 RC drilling. Sample recovery was >80% on average, with no correlation between Cu grade and sample recovery. All samples were dry.</li></ul>Diamond<ul><li>Diamond core recovery is recorded by Hillgrove Field Technicians during metre marking and orientation of all holes. Results demonstrate good recoveries with an average recovery rate of 97%. Core loss generally occurs in the upper sections of holes throughout the oxidised and transitional material. Core loss at depth is generally associated with a low Rock Quality Designation (RQD) value, suggesting the interval represents a shear or fault zone.</li></ul></td></tr>
<tr><td>Logging</td><td><ul><li>All RC chips and diamond core were logged for lithology, alteration, weathering and mineralisation by Hillgrove Geologists in accordance with Hillgrove's Core Logging Procedure. Colour and any additional qualitative comments were also recorded.</li><li>99% of all diamond holes have been geotechnically logged and the majority also have magnetic susceptibility readings at 1m intervals.</li><li>All diamond core trays were photographed before sampling and these photographs are stored on the Hillgrove server.</li><li>Both drill core and RC chip trays area stored on site in a core yard facility.</li><li>All geological logging and magnetic susceptibility readings are recorded in the field manually using a paper-based system and then manually entered into Excel spread sheet templates and visually validated before being imported into the Hillgrove drillhole database. Additional validation is conducted automatically on import.</li></ul></td></tr>
<tr><td>Sub-sampling techniques and sample preparation</td><td>RC holes<ul><li>Sub-sampling as described in the "Sampling Techniques" section above.</li></ul>Diamond holes<ul><li>Sub-sampling as described in the "Sampling Techniques" section above.</li></ul><ul><li>Field Duplicates were collected via manual splitting of the bulk sample with a riffle or cone splitter if available or by spear sampling. All field duplicates for drilling from 2011 onwards were collected using spear sampling. Analysis of the field duplicate results indicates that this method of duplicate sample collection is satisfactory.</li><li>Hillgrove have detailed sampling and QAQC procedures in place to ensure sample collection is carried out to maximise representivity of the samples and minimise contamination.</li></ul></td></tr>
</table>

| Criteria | Commentary |
|---|---|
| *Quality of assay data and laboratory tests* | • Pre 2011, all samples were submitted to Genalysis for analysis. Gold was determined by fire assay by flame AAS (FA50) and copper analysed via a mixed acid digest (method AT) with determination by Optical Emission Spectrometry (OES). If the copper result was greater than 1%, the analysis was repeated using a slightly modified mixed acid digestion technique (method AX).<br>• Post 2011 samples were submitted to ALS Perth for assaying by four acid digest with Atomic Absorption Spectroscopy (AAS) and gold was analysed via fire assay and Atomic Absorption Spectroscopy (AAS).<br>• Approximately 20% of the total samples used for this estimation were assayed using a double acid aqua regia digest with an ICPOES finish (a method which does not guarantee complete dissolution of sample). A re-assay program was undertaken in 2011 which detected no bias between the results of the double acid aqua regia digest and the mixed acid digestion results.<br>• The QAQC of sample preparation and analysis processes were via the following samples:<br>  • Certified reference materials (CRMS) inserted into the sample sequence at a frequency of one in 20.<br>  • Field duplicates inserted at a rate of one in every 20 samples.<br>  • Blanks inserted at a rate of one in every 20 samples.<br>  • Laboratory QAQC samples were inserted with a minimum of two standards and one blank for every batch of 40 samples.<br>• Hillgrove's Quality policy is that at a minimum of 5% of all samples are CRM's, 5% of samples submitted are blanks and 5% of samples submitted are field duplicates thus ensuring that as a minimum, 15% of all samples submitted for analysis are QAQC samples.<br>• Results from all returned QAQC samples provide reasonable confidence as to the accuracy of the assay results used in the estimation. Field duplicates show a good correlation with original sample results and in general most CRM results fall within the expected ranges. |
| *Verification of sampling and assaying* | • Umpire laboratory checks were undertaken during 2008 and 2011 with no significant issues identified.<br>• There have been no twinned holes drilled for the Kanmantoo Copper Mineral Resource.<br>• Primary sample data is captured in the field onto paper templates and then entered electronically into Excel templates and stored on the Hillgrove server. The Excel templates were then imported into the SQL database using data entry procedures and database import tools. Data was visually checked by the Geologist prior to import and additional validation was carried out by the database upon import.<br>• Copper results were reported in ppm units from the laboratories and then converted to a % value within the database. |
| *Location of data points* | • The map projection of Map Grid of Australia 1994 - Zone 54, (MGA94-54) was used all work undertaken for this Mineral Resource.<br>• Hillgrove drilling pre-2011 was planned and set-out using the local Kanmantoo Mine Grid and then transformed to MGA94-54 for the Resource estimation. The Kanmantoo local grid is oriented at +10º to MGA94_Zone 54 – (i.e. local grid North equates to 010º MGA94_Zone 54).<br>• Within the database the relative level (RL) has been calculated as RL+1000m to ensure no negative RL values within the dataset.<br>• The topographic surfaces used in the estimation have accuracy in the z direction of approximately +/-1m for the majority of the block model area due to the use of lower resolution contours outside the direct mine areas. The source of the contours used outside of the Mining area was sourced from a mix of 2008 flyover data and other Surveys performed Prior to Nov 2008. The Kanmantoo Mine area and immediate surrounds have +/-20mm accuracy as this area is updated by the Hillgrove Surveyors regularly using a DGPS (Trimble R8 GNSS Model 3 using kinematic option).<br>• Pre-2011, all drillhole collars were surveyed by Engineering Surveys Pty Ltd (Adelaide) using DGPS. All pick-ups were reported in MGA94-54 coordinate system and converted to local grid.<br>• Post-2011, all drillhole collars surveyed using DGPS (Trimble R8 GNSS Model 3 - kinematic option) by onsite Hillgrove Surveyors. The accuracy of this instrument is 10mm in the horizontal plane and 20mm in the vertical. All pick-ups were reported in MGA94-54 coordinate system and converted to local grid.<br>• Downhole surveys were determined using a variety of methods including Gyro tool, Camteq, Digital downhole cameras, Eastman single shot camera and Compass Clinometers. For all holes initial surveys were completed with either a conventional Eastman single shot camera or digital down hole survey tools and then the majority of drillholes were re-surveyed using a Gyro tool. |

| Criteria | Commentary |
|---|---|
| | • All downhole survey methods have a priority assigned to them in the drillhole database and therefore holes with data from multiple methods have had their survey values allocated according to this priority. |
| *Data spacing and distribution* | • Drilling was completed throughout the deposit on a variable section spacing of between 15 m to 40m and an on-section collar spacing of between 10 m and 50m.<br>• The variable drill spacing both along strike and on-section was considered during resource classification; mineralisation estimated on broader spaced drilling was given a lower confidence classification than mineralisation estimated using tighter spaced drilling.<br>• All samples were composited to 2m lengths prior to geostatistical analysis and Mineral Resource estimation. |
| *Orientation of data in relation to geological structure* | • The majority of holes are angled drillholes (dipping between -55º and -75º) drilled from (Kanmantoo local grid) east to west. The Kanmantoo local grid is oriented at +10º to MGA94_Zone 54 – (i.e. local grid North equates to 010º MGA94_Zone 54). The rotation of the local grid reflects the average 010º strike of the main mineralised lenses and local dominant mineralisation controls. Predominantly the main mineralised lenses dip steeply to local grid east, therefore east-west (local grid) orientated drillholes and section provide as close to practicable "true width", representative intersections of lithology and mineralisation.<br>• Whilst some mineralised lenses, most notably the Nugent-O'Neil lens and Emily domain are somewhat oblique to the general 010º strike of the mineralised zones, these lenses still generally exhibit a steep easterly dip and their orientation is not considered to have introduced any sampling bias material to the Resource estimation. |
| *Sample security* | • RC samples – A Hillgrove employee is present for the collection of samples off the rig and is also responsible for collecting and organising the samples ready for assay. Hillgrove has a detailed sample collection/submission procedure in place to ensure sample security.<br>• Assay samples are collected from the rig at the end of each day by Hillgrove Field Technicians, sealed in large plastic bags and placed at the Exploration office ready for pick up by courier. Check sheets detailing all samples for a specific batch are generated prior to the samples leaving site.<br>• DD samples – A Hillgrove employee is responsible for picking up the completed core from the rig at the end of each day and moving it to the core yard ready for processing. Hillgrove Field Technicians and geologists are then responsible for all core movements through to sampling and preparing for transport to the preparation facility.<br>• Sample transport is by dedicated road transport to the sample preparation facility. All samples are transported in sealed plastic bags and are accompanied by (either paper form or by email) a detailed sample submission form generated by the Field Technician.<br>• On receiving a batch of samples, the receiving laboratory checks received samples against a sample dispatch sheet supplied by Hillgrove personnel. On completion of this check a sample reconciliation report is provided for each batch received. |
| *Audits or reviews* | • Core logging and sampling methods were reviewed by Runge in 2008 and were considered to be of a very high standard (report: Mineral Resource Estimate Kanmantoo Copper Deposit South Australia, Feb 2008). |

## *Section 2 Reporting of Exploration Results*

| Criteria | Commentary |
|---|---|
| *Mineral tenement and land tenure status* | • The Kanmantoo Copper Deposit is situated 55kms south-east of Adelaide on Mining Lease (ML) 6345 and is owned 100% by Hillgrove Resources Limited (HGO).<br>• The Mining Lease overlies freehold land also held by Hillgrove Resources.<br>• There are no Native Title interests, nor are there any historical or environmental issues considered material to this Mineral Resource. |
| *Exploration done by other parties* | • The Kanmantoo Copper Deposit has a long history of exploration and mining dating back to the mid-19$^{th}$ century.<br>• In 1962, Mines Exploration Pty Ltd discovered a number of strong geophysical anomalies which were quickly followed up by a large diamond drilling program of 15,800m. The results of this program led to a decision to begin mining in 1968.<br>• In the mid 1990's the Kanmantoo Project area became part of a joint venture between Kelaray Pty Ltd and Pima Mining N.L. and auger drilling identified several new prospects although follow up RC work failed to identify any new significant targets.<br>• Hillgrove Resources commenced exploration drilling in 2004 and since then have completed a number of exploration drill campaigns which have resulted in extensions and additions to the known deposit. Pre-strip and near surface mining commenced in early 2011 and the commissioning of the processing plant was completed in November of the same year. |
| *Geology* | • Mineralisation occurs as a complex system of structurally controlled veins, with mineralisation typically forming pipe-like bodies and lenses of chalcopyrite, pyrrhotite, pyrite, magnetite, chalcocite and bornite within a quartz + biotite + andalusite ± garnet ± chlorite schist host rock. Structural studies suggest the main controls on the mineralisation are north-south striking shear zones and north-north-east/north-east striking cross-shears and tension veins. |
| *Drill hole Information* | • No exploration results have been reported in this release, therefore this section is not material to this report. |
| *Data aggregation methods* | • No weighting average techniques or grade truncations have been reported in this release.<br>• No metal equivalent values have been reported. |
| *Mineralisation widths and intercept lengths* | • No exploration results have been reported in this release, therefore this section is not material to this report. |
| *Diagrams* | • Diagrams that are relevant to this release have been included in the body of the release. |
| *Balanced reporting* | • No exploration results have been reported in this release, therefore this section is not material to this report. |
| *Other exploration data* | • No exploration results have been reported in this release, therefore this section is not material to this report. |
| *Further work* | • No exploration results have been reported in this release, therefore this section is not material to this report. |

**Section 3 Estimation and Reporting of Mineral Resources**

| Criteria | Commentary |
|---|---|
| *Database integrity* | • Hillgrove Resources utilise an SQL database system which is managed by the Senior Geologist.<br>• Primary data is collected manually in the field onto paper templates and then later entered electronically into excel templates with lookup tables and fixed formatting to aid validation. Primary data is stored on Hillgrove's server and then imported into the SQL database using detailed data entry standards and database import tools.<br>• Data is visually checked and validated prior to being imported into the SQL database and additional validation is performed on import via a number of embedded validation rules within the SQL database system. This automatic validation is configured through the use of library tables, triggers and stored procedures designed to ensure data integrity with respect to a number of fundamental quality essentials. Any data which violates these rules is rejected and quarantined until the errors are corrected.<br>• For the Mineral Resource, data tables were exported from the SQL database as comma separated files (CSV's) using export tools embedded with the database. These CSV files were then imported into a standalone Access database for the sole purpose of the estimation. Data within this new Access database was visually checked against the original SQL database dataset using the 3D software package |
| *Site visits* | • The Competent Person works at the Kanmantoo Copper mine and regularly visits the production pit. The Competent Person has also viewed a small amount of RC drill samples and a small quantity of diamond core. The Competent Person has also been involved in the daily grade control processes such as blast hole logging and the generation of grade control models and block outs which were used to aid interpretation of some of the mineralised zones for this Mineral Resource. |
| *Geological interpretation* | • Structural studies conducted by Hillgrove denote that the main controls on mineralisation are the north-south striking shear zones and the north-east to north-north-east striking cross-shears and tension veins. This strong structural control is evident throughout the entire deposit and often generates rapid changes to mineralisation over very short distances.<br>• The dip of the mineralisation is generally steeply dipping (70º to 80º) towards the East.<br>• Mining of the Spitfire and Main Zone domains together with the availability of the more detailed grade control drilling data has revealed that the mineralisation and host structures are more complex than can be detailed by the spacing of the exploration drilling.<br>• Geologic domains were predominately modelled on chorite, sulphur and copper content with a moderate influence from structural knowledge gained during mining. Due to the drilling spanning such a large time period, the variability in logging practices over time makes the lithology and alteration logs very difficult to model and interpret both on and between sections.<br>• Throughout the deposit the geological continuity of both the mineralisation and its host structures varies significantly between domains.<br>• Domains were projected around 50m beyond the limit of drilling. |
| *Dimensions* | • The Kanmantoo Copper Deposit Mineral Resource model has a north-south strike length of 2.1km, a maximum width of approximately 1km east-west and extends 620m vertically. Within this area, the mineralisation within the areal limit of the Giant Pit (includes the Kavanagh and Spitfire deposits) which is the subject of this Mineral Resource Estimate has been modelled over 530m along strike, 350m east-west and 400m down-dip. |
| *Estimation and modelling techniques* | MODELLING<br>• The three dimensional mineralisation wireframes were completed using Micromine 2011 Ver 12.5.2<br>• Domain interpretation updates were completed using 10m and 20m spaced sections, dependent on drillhole spacing.<br>• Wireframe objects for 3 domains at Kavanagh and 3 domains at Spitfire were built for the new modelling method.<br>• A large weak alteration domain was interpreted that wholly includes the 6 mineralised domains above.<br>• Modelling of mineralisation was completed using chlorite, sulphur and copper values. A 0.1% copper envelope, 0.5% Sulphur envelope and Chlorite |

| Criteria | Commentary |
|---|---|

alteration index were used to delineate mineralised geology from mineralised waste.

- Major geological domains were interpreted predominately on mineralisation, with some influence from grade control copper grades.
- Sectional interpretations were extrapolated to a minimum of 25m down-dip of the deepest drillhole if drilling did not close off mineralisation and half the drillhole spacing if extrapolating between a mineralised and an un-mineralised drillhole. Interpretations were often extended beyond 25m down-dip of intersections were drillholes on adjacent sections intersected mineralisation at deeper depths. Along strike, mineralisation was extrapolated to half the drill section spacing at the termination of lenses.

GRADE ESTIMATION

- Block estimation and geostatistical analysis was completed within the GS3M software package of FSSI Australia.
- Block size was defined by the nature of the orebody, drillhole spacing and the selective mining unit (SMU).

| | | | |
|---|---|---|---|
| Model Min. Coords: | 317880.00mE | 6114600.00mN | 704.00mRL |
| Model Max. Coords: | 318500.00mE | 6115260.00mN | 1232.00mRL |
| Panel Size: | 10.00mE | 20.00mN | 12.00mRL |
| Number of Panels: | 62E | 33N | 44RL |
| Discretization Pts: | 3E | 5N | 4RL |
| No. of Domains: | 7 | | |

- Multiple Indicator Kriging (MIK) was used to estimate copper, silver, sulphur and gold grades.
- Bismuth was estimated from a regression algorithm of block Cu and block Bi due to a lack of Bi data covering the entire area
- The mineralised domain boundaries were used as “soft” boundaries for interpolation.
- Two metre assay composites were used for interpolation
- The variography, conditional statistics for each domain for each metal were generated from the domained 2 m composites.
- Three estimation passes were employed for all domains, each subsequent pass having an increased search size. These search parameters were determined using drill hole density and variography as a guide.

| Criteria | Commentary |
|---|---|
| | <table><tr><td></td><td>Measured</td><td>Indicated</td><td>Inferred</td></tr><tr><td>East</td><td>12</td><td>20</td><td>20</td></tr><tr><td>North</td><td>42</td><td>70</td><td>70</td></tr><tr><td>Elev</td><td>42</td><td>70</td><td>70</td></tr><tr><td>Min Octants</td><td>4</td><td>4</td><td>2</td></tr><tr><td>Min Composites</td><td>16</td><td>16</td><td>8</td></tr><tr><td>Max Composites</td><td>48</td><td>48</td><td>48</td></tr><tr><td>Search Rotation</td><td colspan="3">Strike is 020deg NE, Dip is -75deg East</td></tr><tr><td>Block Rotation</td><td colspan="3">none</td></tr></table><br>• Each element within each domain was analysed for the presence of extreme high values and top cut values were applied on an element and domain basis where applicable. Top cut values were determined using basic statistical analysis, assessment of log probability plots and spatial evaluation of high outliers.<br>• Validation of the estimation was undertaken using basic statistical evaluation of the mean block grades against mean declustered drillhole grades. These checks indicate that there is no material error within the estimate.<br>• Reconciliation against previous Mineral Resource estimates and the pit production data has been carried out for the period 1 January 2016 to 30 April 2016. The model estimates 8% less tonnes with a copper grade 7% lower than recorded by mine production for the same area at a 0.2% copper cut-off over 0.8Mt<br>• Reconciliation against the Kavanagh stage 1 pit, shows the new resource model to estimate 3% more tonnes and 1% lower grade compared to production at a 0.2% COG over 3.82Mt of ore mined<br>• Reconciliation work on Mineral Resource against Mill production is ongoing. |
| *Moisture* | • Tonnages are estimated on a dry basis. |
| *Cut-off parameters* | • A 0.2% copper cut-off has been applied for reporting of the Mineral Resource. This grade is considered by Hillgrove Resources to be the economically viable lower cut-off grade. |
| *Mining factors or assumptions* | • The Kanmantoo Copper deposit is currently mined by open pit method.<br>• The MIK estimation method reports a “recoverable resource” through the use of a volume-variance correction factor derived from the volume of the mining block and the sample variograms. The resultant estimation model accounts for internal dilution, the dilution due to mining selectivity and the dilution due to the Information Effect of the nominated sampling pattern. |

<table>
<tr><th>Criteria</th><th>Commentary</th></tr>
<tr><td></td><td>
<table>
<tr><th colspan="6">CHANGE OF SUPPORT PARAMETERS FOR EACH DOMAIN</th></tr>
<tr><td>DOMAIN</td><td>B/D VAR-RATIO</td><td>B/P VAR-RATIO</td><td>INFO EFFECT</td><td>METHOD</td><td>S/P*INF0</td></tr>
<tr><td>Dom1</td><td>0.327</td><td>0.19</td><td>0.805</td><td>Lognorm</td><td>0.263</td></tr>
<tr><td>Dom2</td><td>0.468</td><td>0.243</td><td>0.784</td><td>Lognorm</td><td>0.367</td></tr>
<tr><td>Dom3</td><td>0.326</td><td>0.188</td><td>0.765</td><td>Lognorm</td><td>0.249</td></tr>
<tr><td>Dom4</td><td>0.253</td><td>0.164</td><td>0.692</td><td>Lognorm</td><td>0.175</td></tr>
<tr><td>Dom5</td><td>0.265</td><td>0.166</td><td>0.74</td><td>Lognorm</td><td>0.196</td></tr>
<tr><td>Dom6</td><td>0.385</td><td>0.207</td><td>0.79</td><td>Lognorm</td><td>0.304</td></tr>
<tr><td>Dom7</td><td>0.405</td><td>0.246</td><td>0.858</td><td>Lognorm</td><td>0.347</td></tr>
<tr><td colspan="2">Grade Control Sampling Pattern</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Sample Spacing</td><td>X: 4.0</td><td>Y: 4.0</td><td>Z: 6.0</td><td colspan="2">staggered pattern</td></tr>
</table>
<ul><li>The estimated resource is spatially limited to the currently permitted mine perimeter, and to the same depth as previously reported as “potentially economic” to the ASX 30 August 2013.</li></ul>
</td></tr>
<tr><td>Metallurgical factors or assumptions</td><td><ul><li>No metallurgical assumptions have been included in the resource</li><li>The Kanmantoo Copper Mine Processing Plant has been processing the Kanmantoo Ore for approximately 4.5 years with as expected recoveries for copper, gold and silver.</li><li>Grade control is based on Copper grade only – there is no copper equivalent used in mine selectivity or COG calculation</li></ul></td></tr>
<tr><td>Environmental factors or assumptions</td><td><ul><li>Waste dumping areas and tailing storage facilities (TSFs) are already approved and constructed within the current mining lease.</li><li>Both the mine and processing plant are in full operation under full regulatory approved environmental licences and permits.</li></ul></td></tr>
<tr><td>Bulk density</td><td><ul><li>Wax-coated Archimedes method density sample results were used to calculate density values for this Mineral Resource. The density results for 386 half core samples (a mixture of NQ and HQ in size) were available for density calculation.</li><li>The density data results were divided by both domain and oxidation state and the datasets were investigated for outliers and/or suspect values. Any suspect values were examined in terms of their lithology and removed if it was deemed appropriate. The mean of the dataset was then calculated (3.09t/m3 for primary ore) and applied to blocks within the block model on the basis of oxidation state and domain. Density values were assigned to the model once the estimation process was complete.</li><li>These Bulk Density values have been used for 4.5 years and reconcile against mine production and milling</li></ul></td></tr>
<tr><td>Classification</td><td><ul><li>The Mineral Resource has been classified into the confidence categories of Measured, Indicated, and Inferred according to geological confidence and reflect the Competent Person’s view on the deposit. This confidence is based on the density of copper assay data, continuity of mineralisation and knowledge of the orebody gained during recent mining activities. Other factors considered were the estimation pass associated with the block estimation, and the proportion of the panel that is above the 0.2% Cu cutoff grade.</li><li>The classification criteria are presented in the table above</li></ul></td></tr>
<tr><td>Audits or reviews</td><td><ul><li>An internal review of this Mineral Resource was completed in October 2016 and the model was considered suitable for external reporting.</li></ul></td></tr>
</table>

| Criteria | Commentary |
|---|---|
| *Discussion of relative accuracy/ confidence* | • Reconciliation against mill reconciled pit production data has been carried out for the period 2 February to September 2016. The model estimates 5% less tonnes with a copper grade 10% lower than recorded by mine production for the same area at a 0.15% Cu cut-off grade, over 1.6Mt of production<br>• Reconciliation against the Kavanagh stage 1 pit, shows the new resource model to estimate 3% more tonnes and 1% lower grade compared to production at a 0.2% COG over 3.8Mt of ore mined<br>• Reconciliation work on Mineral Resource against Mill production is still ongoing. |

## Section 4 Estimation and Reporting of Ore Reserves

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

<table>
<tr><th>Criteria</th><th>Commentary</th></tr>
<tr><td>Mineral Resource estimate for conversion to Ore Reserves</td><td>• The Mineral Resource estimate on which these Ore Reserves are based is the October 2016 Mineral Resource Statement – Kanmantoo Copper Mine released to the ASX as part of this announcement and is complimented by Sections 1 to 3 of this Table 1.<br>• The Mineral Resource estimate referenced above is inclusive of the Ore Reserves.</td></tr>
<tr><td>Site visits</td><td>• The Competent Person works at the Kanmantoo Copper mine and regularly visits the mine production and processing areas. They have been extensively involved with the operation since February 2012.</td></tr>
<tr><td>Study status</td><td>• The Kanmantoo Copper Mine has been mined by Hillgrove Resources by open pit methods since 2011, with operating contracts and arrangements in place. The Ore Reserve is based on operational experience with analysis at a higher level than a Feasibility Study.</td></tr>
<tr><td>Cut-off parameters</td><td>• A 0.2% Copper cut-off has been applied for modelling of mineralisation, in reporting of Mineral Resources and in reporting of Ore Reserves. The cut-off grade used is the marginal cut-off grade within the economic pit shell, taking into account mining and metallurgical recovery and site costs, along with refining costs, treatment charges and transport, but excluding mining costs.<br>• The primary assumptions used to generate the cut-off grade include:<br>  • Overall deductions based on Payable Revenue, Treatment costs, Refining charges, Penalties and Royalties of $5.00/t ore<br>  • A marginal process cost (inclusive of marginal site overheads and administration) of $5.65/t ore.<br>  • Minor contributions of Gold and Silver.</td></tr>
<tr><td>Mining factors or assumptions</td><td>• The Kanmantoo Copper deposit is currently mined by open pit methods and this method has been assumed as the basis for these Ore Reserves. General infrastructure at Kanmantoo is already established and no significant additional capital is anticipated.<br>• Open pit mining uses truck and excavator operations, with staged pit designs scheduled with the aim of maximising NPV. The current Giant pit design was based on an optimisation process and the economics have been validated using Measured and Indicated Mineral Resource material. The final pit design is subject to regular review. While there is inferred material within the resultant pit designs the Inferred material is treated as waste within these Ore Reserves.<br>• Pit slopes were based on geotechnical investigations, reports and the ongoing operations. The geotechnical conditions vary over a number of pit areas with the overall slope angles used for optimisation shown in the following table.<br><br>
<table>
<tr><th colspan="2">Geotechnical / Pit Design</th><th></th></tr>
<tr><th>Giant Pit</th><th>Overall Slope Angles</th><th>Inter Ramp Angles</th></tr>
<tr><td>North Wall (deg)</td><td>66</td><td>74</td></tr>
<tr><td>East Wall (deg)</td><td>52</td><td>74</td></tr>
<tr><td>South Wall (deg)</td><td>54</td><td>58</td></tr>
<tr><td>West Wall (deg)</td><td>55</td><td>58</td></tr>
</table>
• Grade Control involves the sampling and assaying of blast holes for a local grade estimate that is used to define the final ore and waste mine areas. The</td></tr>
</table>

| Criteria | Commentary |
|---|---|
| | Mineral Resource model has been built as a "recoverable resource" model using the MIK estimation method. The resultant estimation model accounts for internal dilution and the dilution due to mining selectivity. |
| *Metallurgical factors or assumptions* | • The Kanmantoo Copper Mine Processing Plant has been processing the Kanmantoo Ore for approximately 4 years and the primary mineralisation is currently treated at rates in the order of 3.6Mtpa. These Ore Reserves represent primary mineralisation.<br>• The processing method is appropriate for the primary mineralogy that presents in the orebody, a polymetallic sulphide ore that is processed using traditional flotation methods to produce a concentrate that is sold to smelters.<br>• The Primary Process Recovery for Cu is variable and derived from a linear tail correlation with feed grade based on operational results. For the expected feed grades a range for recovery of 88% to 94% is generated.<br>• The Primary recoveries for Au and Ag are fixed 50%.<br>• Allowance has been made for Bismuth as a deleterious element in the concentrate with a penalty of $10/tonne of concentrate applied. This penalty has been derived through the process of scheduling and simulation of the presentation of bismuth in the concentrate, followed by financial modelling to predict the costs and penalty rate.<br>• The mineral concentrate produced at Kanmantoo Copper Mines is specified in an off-take agreement.<br>• The offtake agreement is with Freepoint Commodities and covers the life of mine. The mine has been delivering to this agreement with the only deleterious element present being bismuth. |
| *Environmental* | • The mineralisation that is the subject of this Mineral Resource is located within Mining Lease ML 6345 (Kanmantoo) and ML6436 (a strip of land of approximately fifty metres wide and one hundred metres long that was required to completely extract the Nugent section of the orebody).<br>• Mining Lease 6345 overlies freehold land held by Hillgrove Resources under wholly owned subsidiary Kanmantoo Properties Pty Ltd. It contains some small areas listed under the Environment Protection and Biodiversity Conservation Act 1999 but these impact less than one percent of the Reserve. There are no Native Title interests, nor are there any other historical or environmental issues considered material to this Ore Reserve.<br>• Kanmantoo Copper Mines is an approved and operating mine and the relevant environmental and mine closure plans are in place (PEPR including MCCP). Waste dumping requirements and areas, along with tailing storage facilities have been built to design and are performing as modelled without being a source of contamination or environmental harm. The life of the mine was successfully extended until 2019 with this extension approved in 2014. |
| *Infrastructure* | • Kanmantoo is an operating mine and has the necessary infrastructure in place.<br>• Existing infrastructure includes:<br>  ◦ Crushing, grinding and milling facilities<br>  ◦ Ore processing plant and associated maintenance and storage facilities<br>  ◦ Mobile equipment operations and maintenance facilities<br>  ◦ Administration and security facilities<br>  ◦ Explosive storage and high explosive storage area (structural infrastructure owned by the explosive supplier)<br>  ◦ Electricity substation and distribution system and water supply and storage facilities<br>  ◦ Tailings storage and return water storage facilities<br>  ◦ Access roads |
| *Costs* | • Kanmantoo is an operating mine and operating costs are underpinned by operating budgets which are converted from first principles, current contracts and |

| Criteria | Commentary |
|---|---|
| | historical averages.<br>• General infrastructure at Kanmantoo is already established and no further expansionary capital costs have been included as it is assumed that the current infrastructure is adequate and will be maintained for the life of asset. Allowance has been made for sustaining capital primarily for the extension of the Tailings Storage Facility.<br>• Royalties are included in the cost assumptions based on:<br>  • 1.5% of mineral value to 31 January 2018<br>  • 8.5 % of mineral value to 1 February 2018 to 31 January 2019<br>  • 5.0 % of mineral value from 1 February 2019 onwards<br>Further cost information follows in the Revenue Factors section. |
| *Revenue factors* | • Pricing provided by Consensus Economics has been applied. The metal price assumptions are: US$5,385/t copper, US$1,145/Oz gold and US$17/Oz silver.<br>• The forward curve has been applied with the average AUD:USD exchange rate 0.72<br>• Transport and shipping costs cover road transport from site, port handling and shipping charges. These costs are derived from the copper concentrate transport contracts. The Transport and Shipping cost are in the order of $65/t copper concentrate.<br>• The mineral concentrate produced at Kanmantoo Copper Mines is specified in an off-take agreement. This details the percentage price payable, the treatment charges and refining charges. The treatment and refining charges are dependent on copper in concentrate grade and are therefore variable by material type and present in the range of US$600/t Cu metal.<br>• Overall deductions (based on Payable Revenue, Treatment costs, Refining charges, Penalties and Royalties) translate such that the ex-mine gate cost is in the order of US$1200/t copper metal.<br>• Allowances have been made for Bismuth as a deleterious element in the copper concentrate. A penalty of $5/dmt concentrate represents a penalty on the average Bismuth grade expected to present in the copper concentrate for sale. This was arrived at through simulation of concentrate grade presented. |
| *Market assessment* | • Hillgrove relies upon advice when assessing future trends and factors influencing supply and demand.<br>• Kanmantoo has a Life of Mine offtake agreement with Freepoint Commodities. |
| *Economic* | • Economic details have been described under previous headings.<br>• The Kanmantoo open pit is in operation and not subject to a development study. |
| *Social* | • Kanmantoo Copper Mines has undertaken considerable community consultation in association with local stakeholders, and government agencies resulting in approval to mine under the relevant lease and licence conditions.<br>• Hillgrove Resources participates in regular community meetings (KCCCC – Kanmantoo and Callington Community Consultation Committee Meetings) that assist with the communication of mine development, community feedback and thus the ongoing social license to operate. Currently the major work being undertaken by the committee with stakeholders is to develop a “Master Plan” for the local area incorporating features of mine closure and rehabilitation. |
| *Other* | • There are no material naturally occurring risks to be documented.<br>• Legal and regulatory requirements are advised to be in good standing. The Mine Lease expires in 2019 and is currently in good standing. |
| *Classification* | • The Ore Reserve is classified as Proved and Probable in accordance with the JORC Code, corresponding to the resource classifications of Measured and Indicated.<br>• Inferred Mineral Resources were treated as waste in the Ore Reserve estimate. |

| Criteria | Commentary |
|---|---|
| | • The Kanmantoo Copper Mine continues to optimise performance. The competent person feels that the Ore Reserve statement provides a reasonable balance between risk and opportunity and is consistent with industry practice and the intent of the 2012 JORC Code.<br>• No Probable Ore Reserves are derived from Measured Mineral Resources. |
| *Audits or reviews* | • An external review of the Ore Reserve Estimate was carried out by Competent Person with 15 years experience in October 2016. |
| *Discussion of relative accuracy/ confidence* | • Kanmantoo has used information based on operational performance since 2011 which adds to the robustness of the estimates utilised.<br>• Formal reconciliation against the geological model which forms the basis of the Ore Reserve Estimate is done on a monthly basis.<br>• The modifying factors that are most critical to the operation are:<br>  • Copper price (USD).<br>  • Exchange rates (AUD/USD).<br>  • Copper grade estimation which is influenced by grade estimation technique, mining dilution and mining recovery. |