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PANAUST

COMPANY ANNOUNCEMENT
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Frieda River Copper-Gold Project Ore Reserve update

PanAust Limited (PanAust) is pleased to announce an updated Ore Reserve estimate for the Frieda River Copper-Gold Project (FRCGP) in Papua New Guinea (PNG).

The 2018 Horse-Ivaal-Trukai, Ekwai and Koki (HITEK) Ore Reserve estimate for the FRCGP is reported according to the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code). The 2018 HITEK Ore Reserve reported in Table 1 is supported by the Sepik Development Project Feasibility Study (Feasibility Study) completed in 2018. This Ore Reserve estimate replaces the 2017 HITEK Ore Reserve estimate and represents a near doubling of the Ore Reserve tonnage.

Table 1: 2018 HITEK Ore Reserve

Class	Tonnes (Mt)	Copper grade (%)	Gold grade (g/t)
Proved	604	0.51	0.30
Probable	761	0.42	0.21
Total	**1,365**	**0.46**	**0.25**

Ore Reserve notes:

(i) Estimated at commodity prices of US$3.30 per pound (lb) copper and US$1,390 per ounce (oz) gold
(ii) Reported using a breakeven economic cut-off value that considers relevant modifying factors
(iii) The Ore Reserve is reported on a 100% ownership basis
(iv) Total values may include minor computational errors due to rounding.

Comparison to previous estimates

An Ore Reserve was declared in 2017 supported by the 2016 FRCGP Feasibility Study and 2017 Addendum. The material increase between 2017 and 2018 (Table 2) is supported by several significant enhancements (in order of impact on the Ore Reserve estimate):

- Relocation of the integrated storage facility (ISF) from the Nena River to the Frieda River:
  - significantly increases the reservoir storage from 0.9Bm^3 to 3.3Bm^3 enabling future mine life extensions beyond 33 years

- enables up to 490MW firm hydroelectric power generation capacity with the potential to export surplus power compared to the 2016 study which generated up to 102MW
- lowers the project power cost from the blended intermediate fuel oil and hydroelectric power cost of US¢6.5/kWh in 2017 to US¢1.3/kWh significantly reducing the process operating cost from US$5.18/t processed to US$4.02/t processed

- Expansion of the HITEK process plant (Stage 2) from a peak of 49Mtpa to 65Mtpa in Year 8 of operations compared to the nominal process rate of 40Mtpa:
  - Increases revenue in Years 10 to 15 to offset strip ratio and mine waste cost increases enabling economic expansion beyond the original 18 years
  - Maintains annual cash flows through to Year 15 before the increasing strip ratio and decreasing head grade combine to reduce annual cash flow.

Table 2: 2018 HITEK Ore Reserve vs 2017 HITEK Ore Reserve

	2017 HITEK Ore Reserve			2018 HITEK Ore Reserve		
Class	**Tonnes (Mt)**	**Copper grade (%)**	**Gold grade (g/t)**	**Tonnes (Mt)**	**Copper grade (%)**	**Gold grade (g/t)**
Proved	413	0.54	0.32	604	0.51	0.30
Probable	272	0.45	0.21	761	0.42	0.21
Total	**686**	**0.50**	**0.28**	**1,365**	**0.46**	**0.25**

Ore Reserve estimate preparation

The 2018 Ore Reserve estimate was derived from the 2017 HITEK Mineral Resource which is summarised in Table 3.

Table 3: 2017 HITEK Mineral Resource

Class	Tonnes (Mt)	Copper grade (%)	Gold grade (g/t)
Measured	620	0.53	0.30
Indicated	1,240	0.44	0.22
Subtotal (M+I)	**1,860**	**0.47**	**0.25**
Inferred	780	0.35	0.18
Total (M+I+I)	**2,640**	**0.44**	**0.23**

Mineral Resource notes:

(i) Reported at a copper cut-off grade of 0.2% (total copper)
(ii) The Mineral Resource is reported on a 100% ownership basis
(iii) May include minor computational errors due to rounding
(iv) The HITEK Mineral Resource is constrained within an optimiser shell with a Revenue Factor of 1.5. (RF1 is US$3.30/lb Cu and US$1,455/oz Au). The name of the lower limit triangulation file is "FRL_HITEK_V3_25x25x15_1608v1e HIT-MII EK-MII_Shell_06_1.5.sft" and was based on the 2017 HITEK Mineral Resource.

The Mineral Resource block model was used as the basis for an open-pit optimisation process that considered only material with a Measured and Indicated Mineral Resource classification. The open-pit optimisation generated a range of open-pit shells that represented tonnage and corresponding value increments. The open-pit shell selected for open-pit design corresponds to a copper price of US$2.90/lb and a gold price of US$1,276/oz for the larger Horse-Ivaal-Trukai (HIT) deposit and a copper price of US$2.05/lb and a gold price of US$899/oz for the smaller Ekwai and Koki (EK) deposits. A detailed open-pit design was prepared from the selected open-pit shells and used for Ore Reserve estimation. The open-pit design includes 50m wide ramps and safety berms on the open-pit walls to accommodate the selected mine fleet.

Blocks classified as Measured and/or Indicated Mineral Resource with a positive economic value were selected as ore. The cut-off value used to define the Ore Reserve was applied on a net smelter return (NSR) basis which incorporates realisation costs, metallurgical recovery, ore processing and general and administrative costs. The breakeven NSR differentiates ore from waste rock on a static unscheduled basis. Material having a positive value represents a net positive cash flow increment that supports its reporting in the Ore Reserve. The Ore Reserve is defined at the point at which ore is delivered to the HITEK process plant.

A mine production schedule for the HITEK deposits, named the Ore Reserve schedule, was prepared for the purpose of verifying the declaration of the Ore Reserve estimate. Only Measured and Indicated Mineral Resource classifications within the designed open-pit were accepted as mill feed. All Inferred Mineral Resource was treated as waste rock.

Economic evaluation of the Ore Reserve schedule including all relevant modifying factors, project capital and operating costs demonstrates technical and economic extraction of the portion of the Measured and Indicated Mineral Resource within the open-pit design. Measured and Indicated Mineral Resources were converted to Proved and Probable Ore Reserve classifications, respectively. The economic evaluation yielded a positive net present value (NPV) at US$3.30/lb copper and US$1,390/oz gold, supporting the declaration of an Ore Reserve for the HITEK deposits.

Competent Person Statement: Ore Reserves

The data in this report that relate to Ore Reserves for the Frieda River Copper-Gold Project are based on information reviewed by Mr Scott Cowie who is a Member and Chartered Professional (Mining) of the Australasian Institute of Mining and Metallurgy (MAusIMM(CP)). Mr Cowie is a full-time employee of PanAust Limited. Mr Cowie has sufficient experience relevant to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Cowie consents to the inclusion in the report of the Ore Reserves in the form and context in which they appear.

Competent Person Statement: Mineral Resources

The data in this report that relate to Mineral Resources for Frieda River (HITEK) are based on information reviewed by Mr Shaun Versace who is a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM). Mr Versace is a full-time employee of PanAust Limited. Mr Versace has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Versace consents to the inclusion in the report of the Mineral Resources in the form and context in which they appear.

Forward-Looking Statements

This announcement includes certain "Forward-Looking Statements". All statements, other than statements of historical fact, included herein, including without limitation, statements regarding forecast production performances, potential mineralisation, exploration results and future expansion plans and development objectives of PanAust Limited are forward-looking statements that involve various risks and uncertainties. There can be no assurance that such statements will prove to be accurate and actual results and future events could differ materially from those anticipated in such statements.

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JORC Table 1

Section 1: Sampling techniques and data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes or hand-held XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.*	The sampling used for Mineral Resource estimation at Horse-Ivaal-Trukai, Ekwai and Koki (HITEK) at Frieda River, consists of diamond core drilling with core diameters between PQ (~85mm) and NQ (~47mm). Drilling has been undertaken between 1969 to 2016 and consists of a total of 815 drill holes with 195,169m of core. The drilling can be divided into six phases (1a, 1b, 2, 3, 4 and 5) based on the year drilled and the nature and quality of the sampling and assay techniques. The standard drill sample interval is two metres, regardless of core diameter. The two metre assay interval was cut in half lengthways using a diamond blade core saw with one half used for sample preparation and analysis and the remaining half kept in archive at Frieda River base camp. The diamond core assay samples form the basis for the copper, gold, minor and deleterious element estimates for the HITEK deposits. Of the 815 drill holes there are 537 (162,504m) which are sufficiently verified by quality assurance and quality control measures on key data inputs, including copper and gold assay grades, to be used for Mineral Resource estimation. There are approximately 75,000 valid assays in the 537 drill holes that are used for copper and gold estimation. Bulk density and moisture content measurements were taken using a wax sealed immersion technique on 0.1m length whole core samples and, together with supporting whole tray method determinations, form the basis for the dry bulk density estimates for the HITEK deposits. 10,770 spatially distributed density samples were analysed across a range of rock types, alterations and depths. Metallurgical, geotechnical and environmental samples and logging have been collected from the diamond core drilling. Geotechnical sampling includes rock strength and material handling properties (plus oriented core and acoustic televiewer logging), metallurgical sampling includes flotation, comminution and mineralogical studies, and environmental samples have been taken to test the environmental properties and acid generating potential of the rocks.

Criteria	JORC Code explanation	Commentary
	• *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.*	Geochemical assay samples were subjected to varying levels of quality assurance/quality control (QAQC) over different drill phases. The types of assay QAQC includes certified reference materials (standards), field duplicates, crush stage replicates and blanks. A program of twin drilling was undertaken by the Project's previous owner. Two matrix matched company standards were generated using coarse pulp rejects, principally composed of the rock type Horse microdiorite with potassic alteration (chosen as it is not prone to oxidation). Two standards were certified by Ore Research Ltd., a reputable company specialising in certified reference materials. The two standards are the high grade FXC09 and the lower grade XFR-Y. Sieve tests were performed on the pulverised samples during Phase 4 and 5 (representing 83% of the samples used for the Mineral Resource estimate). The target was 90% of material passing 10 mesh and 40 mesh; this was routinely achieved. Failures in the 10 mesh sieve triggered inspection and adjustment of the jaws of the Boyd crusher. The dry bulk density wax sealed immersion technique samples were checked and compared to whole tray dry bulk density measurements. An approximate +5% bias was detected in wax coated immersion samples above the gypsum-anhydrite dissolution surface; this has led to a correction to dry bulk density estimates. The bias is likely due to sample selection favouring intact higher density samples for the wax immersion technique. Drill collar positions have been surveyed and checked using subsequently improved survey methods over the different drill phases, including differential GPS surveys. All collar locations are surveyed to a high level of accuracy with less than one metre differences between original and check surveys in 95% of the cases where check surveys have been undertaken. Downhole surveys using a single shot Eastman camera were taken approximately every 50m downhole for Phase 2 to 4 and 30m for Phase 5. The films have been checked and no issues were detected although the presence of large amounts of magnetite alteration in the potassic zone have the potential to cause errors. The magnetic intensity is recorded from the instrument to allow quality control checking at the time the survey is being undertaken; this has reduced the errors by rejecting orientations in strongly magnetic rocks or re-surveying at a different depth. Downhole surveys were not undertaken for Phase 1a holes, a practice that was common at the time. This represents an element of uncertainty; this uncertainty is reflected in removing these drill holes from the HIT estimate (where they are located in the well-drilled core of the deposit), and only allowing a maximum of Inferred classification at Koki where the Phase 1a holes are used to estimate (Phase 1a holes are abundant at Koki, 26 out of 46 holes are Phase 1a). The nature of the

Criteria	JORC Code explanation	Commentary
		mineralisation (massive porphyry) means that highly accurate drill hole position is less critical than for other deposit types. Original laboratory assay files have been checked against the assays used for the Mineral Resource estimate and no issues were detected. The majority of geochemical assay samples have had rigorous quality assurance and quality control checks and those samples that have material errors in QAQC have been removed from the estimate. There is no reason to doubt the veracity of the samples that have no QAQC, however it is not possible to confirm their accuracy and precision. For this reason samples with no QAQC that were used in the estimate were only used for estimating blocks with a lower Mineral Resource classification than they would otherwise achieve, given their sample spacing and distribution. This has occurred for the Phase 1a holes at Koki (as described above, blocks estimated with Phase 1a holes had an Inferred classification). Phase 1b holes at HITEK were not used for estimating blocks which would otherwise achieve a Measured classification.
	• *Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1m samples from which 3kg was pulverised to produce a 30g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	Sample preparation was originally performed in a dedicated laboratory facility on site using experienced staff sourced through Astrolabe in Madang. Core is marked up into two-metre intervals, photographed, logged, sawn and dried in a wood fired oven in which the temperature is kept below 115°C to prevent loss of volatile native elements. A two-stage primary crushing circuit reduces the fragment size to less than 5mm. A LM5 ring mill pulveriser is used to pulverise the sample to -150#. Each 2m sample produces 8-10kg of material. A 1kg subsample is riffle split into a sealed plastic bag and despatched to Astrolabe Pty Ltd (Astrolabe) laboratory for assay. The 9kg (approx.) reject sample is stored on site. Every tenth sample has two 1kg subsamples collected, the second of which is submitted as part of a separate batch for assay by Astrolabe. The result is used to check for bias and repeatability of the onsite preparation protocols. Astrolabe pulverise the 1kg of sample to -200# and take a final 250g split for assay. A cone splitter was introduced into the process after the -2mm roll crusher stage during Drilling Phase 3. Phase 4 and 5 drilling, which constitutes 80% of the drill metres contributing to the HITEK Mineral Resource estimate, closely followed earlier methodology, with half core being crushed, pulverised and sub-sampled on site. New in Phase 4 was the use of the Boyd crusher to grind to -2mm in a single step, and sub-sampled using the integrated Rotating Sample Divider. The second sub-sampling step, from 3.5kg down to 200g, is done by scooping directly from the bowl of the LM5, as before. Copper was analysed by aqua regia digest/solvent extraction for Phase 1 samples, aqua regia digest/atomic absorption spectroscopy for Phase 2 samples, and aqua regia digest/inductively coupled plasma – optical emission (ICP-OES) spectroscopy for Phase 3

Criteria	JORC Code explanation	Commentary
		and 4 samples. Gold was analysed by 20g fire assay for Phase 1 samples and 50g fire assay for Drilling Phase 2, 3 and 4 samples. A default suite of elements was Cu, Pb, Zn, Ag, Mo and S. The primary laboratory for Phase 4 and 5 assay work was ALS in Townsville. Check assay samples were sent to Genalysis in Perth and Townsville. The standard assay suite was gold by 50g fire assay (Method code Au-AA26) and copper and minor/deleterious elements by multi element ICP OES (method ME-ICP41). This uses an aqua regia digest, consistent with the Phase 1 to Phase 3 work. Copper values greater than 0.5% were reassayed by method Cu-OG46, which employs a more precise dilution and AA finish. Sequential copper assays from samples collected during drilling Phase 4 were undertaken on composites made from seven adjacent two metre pulps. The compositing and sub-sampling was performed by ALS in Townsville, using intervals and assigning sample numbers provided by the geology team on site. The sequential copper assay consisted of the following steps: 1. Citric acid leach. Liquor assayed and, 2. Residue subjected to dilute H_2SO_4 leach. Liquor assayed and, 3. Rinse, residue subjected to dilute cyanide leach. Liquor assayed and, 4. Rinse, residue subjected to four acid digest and assay. The initial citric acid step was added in March 2010 to check for the presence of copper oxide and carbonate minerals.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	All holes at Frieda River are drilled with triple tube diamond drilling with core sizes ranging from PQ (~85mm core diameter) to NQ (~47mm core diameter). The core is typically oriented using Ezi-mark orientation markers, although the fractured nature of the rock above the gypsum-anhydrite dissolution boundary makes orientation of the core very difficult. Below the gypsum-anhydrite dissolution surface, where the RQD is typically 100, orientation marks work well.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.*	Recoveries are measured and recorded by core length on both in the engineering log on a run by run basis, and in the geological log on a per sample interval basis.
	• *Measures taken to maximise sample recovery and ensure representative nature of the samples.*	Triple tube wireline drilling was employed for Phase 2 to 5 drill holes. The core is pumped out of the barrel into splits, where it is geotechnically logged and photographed before being put into clean pre-marked core trays. The core trays are covered and flown from the rig site in a long line basket to base camp to complete the logging and sampling process.
	• *Whether a relationship exists between sample recovery and grade and whether sample bias*	Scatter plots of copper grade versus core recovery indicate lower grades at lower core recoveries; however this effect is most likely due to low core recoveries in friable alluvium

Criteria	JORC Code explanation	Commentary
	may have occurred due to preferential loss/gain of fine/coarse material.	and highly oxidised material, where low copper and gold grades exist. Overall core recovery is approximately 90% in the mineralised parts of the deposit (supergene and hypogene) and no clear bias due to low core recovery can be detected. AMC (2013) noted that "An analysis of copper and gold grades versus (core) recovery exhibits a relatively small range in grade variation, over the recovery range from 0 – 100%. Average copper and gold grade is lower when the core recovery is below 15% and above 70%. There is no obvious bias. Based on the documented analysis findings, AMC considers that the core recovery is reasonable."
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.*	Core logging has been performed to a sufficiently high standard. Visual logging codes are validated from multiple sources of data, including geochemistry, sequential copper and sulphur assays (testing for the presence of oxidised copper minerals) and have good agreement with rock mechanical properties, such as hardness and RQD, and metallurgical properties, such as correlated high flotation test results with the potassically altered Horse Microdiorite. All drill core from Phase 2 and onwards has been systematically logged using standard procedures. Significant effort in standardising geological description has been made, including re-logging historical core and re-coding historical drill hole logs by the previous owner of the deposit. The logging codes used have adopted and refined the system instituted by Cyprus in 1998, providing historical continuity and internal consistency. Phase 2 logs have been recoded or relogged as necessary. Core from Phase 2 onwards is preserved on site and digital core photography is available for most holes. Core handling, core photography and logging procedures are well developed and of a high standard. The core is stored at Frieda River Base camp in three covered core stores.
	• *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	Logging is qualitative and quantitative; lithology and alteration were logged qualitatively and mineralisation, geotechnical, structural and some aspects of petrology were logged quantitatively. 100% of the core was logged. Most drill holes have been digitally photographed.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.*	The same sampling protocol has been in use for all the drilling used in the resource estimate: 1. Two-metre intervals are sawn in half lengthways with a diamond saw 2. Half core is dried and the whole interval crushed to 90% passing -10 mesh. 3. A 3.5kg sub-sample is taken and ground to finer than -40 mesh in a ring mill.

Criteria	JORC Code explanation	Commentary
		Since 2007, the circuit has been modified using a combination Boyd Crusher and rotating sample divider to produce an approximate 3kg split at -10 mesh in a single pass. This was pulverised in an LM5 mill as before, then a 250g split is taken from the bowl and dispatched to the primary laboratory. The LM5 product was tested to ensure greater than 90% of material passes -40 mesh, which it comfortably achieved. Reject splits are retained on site, where they are used for magnetic susceptibility measurement and then archived.
	• *If non-core, whether riffled, tube sampled, rotary split, etc. And whether sampled wet or dry.*	All samples used to inform the Mineral Resource estimate are diamond core samples.
	• *For all sample types, the nature, quality and appropriateness of the sample preparation technique.*	The nature, quality and appropriateness of the sample preparation technique have been independently verified by Golder Associates (2011), FRL staff (2015) and ALS (2016). ALS provided consulting services to FRL for the Phase 5 drilling to rehabilitate, calibrate and operate the sample preparation facility. A sample preparation audit is included in the QAQC report, which finds the facility and processes are "fit for purpose and meet global sample preparation standards in the production of a sub-sample for assaying".
	• *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.*	A sampling procedure was adopted from a sampling audit and heterogeneity study undertaken by Francis Pitard at the nearby Nena deposit. The sampling protocol for Nena was adopted for the HITEK deposits; this was considered conservative as the HITEK deposits exhibited lower heterogeneity than the Nena deposit. Sampling and comminution stages were selected to keep the theoretical sampling error within acceptable limits. Quality control for subsampling includes size screening at two stages with a target of 90% passing 10 mesh (for crushing) and 40 mesh (for grinding) with 83% of samples subject to screening. A total of 1,434 coarse crush stage replicates (-2mm after the Boyd Crushing stage) were analysed from Phase 4 and 5 drill samples. Analysis of the results indicates acceptable precision for copper and gold.
	• *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.*	Xstrata procedures called for field duplicates to be selected at approximately 1 for every 100 regular samples with the remaining half core submitted as the field duplicate. Despite this requirement there are no field duplicates for drilling Phase 4, only crush stage replicates. The same process was used for Phase 5 drilling.
	• *Whether sample sizes are appropriate to the grain size of the material being sampled.*	The sample sizes are considered appropriate for the grain sizes at each stage of the subsampling process. The sampling program was audited by sampling consultant Dr Francis Pitard in 1994 and sampling practices since that time have followed the

Criteria	JORC Code explanation	Commentary
		recommendations. The error arising from sampling is reasonably assumed to be less than ±5%.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*	The digestion technique of aqua regia is considered a near total digest for copper which when assayed using a suitable instrument, such as atomic absorption spectroscopy or inductively coupled plasma – optical emission spectroscopy, produces a suitable assay for copper, silver, molybdenum, arsenic and other minor and deleterious elements. Gold was assayed by fire assay, a total gold determination technique. Generally the larger the charge of material being assayed the more reliable the assay result. The fire assay charge of material was 50g for the majority of samples (approximately 90%) used for the Mineral Resource estimate. The remaining gold assays used a 25g charge.
	• *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.*	The magnetic susceptibility of the rocks at the HITEK deposits was determined by a hand held instrument. The results of the magnetic susceptibility readings are not used directly to inform the Mineral Resource estimate but do provide secondary geological information that can be used to help constrain geological boundaries (ie presence of magnetite in potassically altered rocks). Magnetic susceptibility meters typically contain self-calibrating features. The model or models of the magnetic susceptibility meters used at HITEK are unknown for Phase 1 to4; an SM-20 magnetic susceptibility meter was used for Phase 5 (sensitivity 10^{-6} SI units).
	• *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	Phase 1a - No QAQC information is available for checking Phase 1 assays for accuracy and precision. Apparently no quality control samples such as standards, duplicates or blanks were used during this program. The absence of downhole surveys is another contribution to the uncertainty. Given the location of the Phase 1a holes at HIT (in the core and surrounded by newer drill holes) the Phase 1a holes were not used for the Mineral Resource estimate. However at Koki there are 26 holes out of 46 that are Phase 1a holes. Several twin drill holes have shown that the copper and gold grades are similar and there is no explicit reason to doubt the veracity of their assays. Excluding these holes would likely result in a worse estimate than if they were used. However given the uncertainty in their location and twin drill hole repeatability, this uncertainty is reflected by assigning the Mineral Resource estimated with these holes with the lowest possible classification of Inferred; this also means these estimates are unable to be converted to an Ore Reserve. Phase 1b - Twin hole program concluded that 25 holes from Phase 1b at HIT were considered adequate for Indicated and Inferred resources. Some variation between the twin holes was observed but in most cases the assays are correlated with a high degree of certainty.

Criteria	JORC Code explanation	Commentary
		Phase 2 to 5 - QAQC data from these drill phases show acceptable precision and accuracy. Therefore assay data from these drill phases were used in the estimation of Measured, Indicated and Inferred Resources.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.*	Independent reviews by Golder Associates (2011 and prior) included site visits. The core was reviewed and found to be adequately logged and sampled. FRL staff and contractors reviewed the core and new drill holes in 2015 and 2016 and found the HITEK core to be adequately logged and sampled.
	• *The use of twinned holes.*	During 2010 a program of twinning some of the old diamond drill holes was undertaken. Seven of the Phase 1b holes were twinned, a total of 2,338m, or 23% of the Phase 1b program. On the basis of the twin results, it was concluded that 25 of the Phase 1b holes had assays of adequate quality to be included in the resource estimate. These 25 drill holes from Phase 1b have been used for block grade interpolation; however, for Resource Classification they have been used for Indicated and Inferred only. Two twin drill holes of the Phase 1a holes at Koki were drilled in 2016; the holes produced similar patterns and grades and there is no reason to doubt the veracity of the assays of the Phase 1a holes.
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*	Original logs are stored in a secure facility in Brisbane, Australia with some information including original downhole surveys and drillers reports being held at site (Frieda River base camp, PNG) along with the remaining archive of half drill core in a dedicated core storage facilities. The previous owner of the Project used the Microsoft SQL 2008 R2 database software for a secure centralisation of drill hole information, with the SQL Server Express 2008 R2 to update the database structure and to build custom views and queries since 2010. An internal software (Frieda River Exploration and Drilling or '(FRED') web interface, was used as the data management interface. This database was used by the previous owner of the Project to managed all drill hole data including the geological data, chemical analysis results, geotechnical data, magnetic susceptibility data, etc. FRL is maintaining ongoing electronic sample security though the use of a commercial geological database, acQuire, using the Microsoft SQL 2008 database engine. The data is managed by full time geological data managers. Documentation of primary data, data entry procedures and data storage protocols are detailed in the QAQC report.
	• *Discuss any adjustment to assay data.*	There have been no recorded instances of adjusting assay data. FRL has not adjusted any assay data, and previous assay results have been checked against the original certified

Criteria	JORC Code explanation	Commentary
		assay results from the assay labs. Some transcription errors in the non-economic elements were detected and corrected.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.*	The majority of holes (~90%) have been surveyed by differential Global Positioning System (DGPS) with a stated precision of <1m on three dimensions at the 95% confidence interval and ongoing position checks using control points. Various methods have been used to survey the collar position of the remaining drill holes. All drill holes were either surveyed using laser theodolite and EDM or TOTAL Station in closed traverses, or using receiver. Accuracy of the collar positions is estimated to be better than one metre. Collar coordinates are cross-referenced to the relevant survey documents, which are scanned into a digital archive. Several drill hole locations were confirmed by Golder as being approximately correct using a hand-held GPS in 2011 and the same was confirmed by FRL staff in 2015.
	• *Specification of the grid system used.*	PNG94, the gazetted national grid system of Papua New Guinea. Height defined relative to Mean Sea Level at Aitape, PNG.
	• *Quality and adequacy of topographic control.*	Topography has been measured using a highly accurate and precise LiDAR survey with ground survey points and 30% line overlap. There are no bodies of water, extensive structures or features that may affect or mislead the topography surface. Minor cartographic licence has been applied to remove the existing structures from the surface. Accuracy has been reported as a one standard deviation vertical tolerance of ±0.3m. Overlaps between various LiDAR survey data sets were checked and vertical differences at collocated points in vegetation free areas are between -0.03m to -0.06m, indicating no levelling issues between 2009 and 2011 survey blocks.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.*	There are no Exploration Results being reported.
	• *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.*	The HITEK deposit has been drilled on an approximate grid of 75m x 75m at the deposit centre at HIT, which coincides with the resource classified as Measured. Drill sections are mostly oriented 030°True North (TN) to 210°TN and spaced 75m apart. There are considerable local variations to this scheme caused by topography and constraints on drill pads in mountainous terrain. Data clustering in the upper portions of the deposit is common, due to fan drilling from helicopter accessible drill pads cut into the steep terrane. At Ekwai and Koki the drilling sections are aligned 080° with a spacing of approximately 90m x 70m at Ekwai and 140m x 70m at Koki in the most intensively drilled parts of the deposit, which coincides with an Indicated classification. Similar to HIT, some drill holes are drilled off-grid at Koki and Ekwai to test for barren post-mineralisation intrusives.

Criteria	JORC Code explanation	Commentary
		Most samples are collected at two-metre intervals and composited to four metres for estimation.
	• *Whether sample compositing has been applied.*	The typically two-metre samples were combined into 14m 'composites' by adding equal weights from all seven pulp packets then giving the resulting pulp a quick pulverise in a small mill. These 14m composites were then used for the sequential copper and sequential sulphur assays. In some instances, the samples cross domain boundaries. For this reason the sulphur assays from the 14m samples were not used for the sulphur estimate. Compositing for estimation purposes (ie calculated composites) saw the typically two-metre length samples composited to four-metre lengths using length weighting, with composites 'broken' on estimation unit domain boundaries. Composites with less than one metre length were excluded from the estimate. Length and density weighting was not considered necessary given the nature of the deposit and highly continuous and similar lithologies/densities.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.*	The majority of holes are oriented at a dip of 50° to 55° and azimuth 210° from true north. Twenty holes from Phase 2 to 4 (6,939m) are drilled on the historical Horse Grid, oriented 080° TN to 260° TN. A further 108 Phase 2 to Phase 4 holes, totalling 32,561m, were drilled more than ten degrees off the Ivaal grid, providing some security against directional bias in the dataset.
	• *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	The orientation between key mineralising structures and drill holes is adequate to fairly test the structures.
Sample security	• *The measures taken to ensure sample security.*	A chain of custody was maintained by the use of commercial grade tamper proof security tags for transport of the samples between site and laboratory. The sample security was then maintained at the laboratory through NATA and ISO accredited systems. Assay results were reported as signed certificates of analysis which were imported directly into the database.

Criteria	JORC Code explanation	Commentary
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	"Golder conducted a review of on-site sampling and data during 16 to 19 July 2011 and found the sampling technique and data capture and storage of a high standard. The sampling procedure is well documented and considered to be appropriate. It is carried out in a systematic manner consistent with the written protocols. The procedures are routinely audited and there is a high awareness of the importance of maintaining consistent procedures." Golder Associates (2011). ALS laboratory services from Townsville, Australia were requested to audit the sample preparation facility in 2016 for the Phase 5 drilling. "The objective of this audit was to determine compliance to existing and recently modified work instructions, safety procedures and equipment maintenance requirements of the Frieda River preparation facility. All processes were reviewed and evaluated in terms of the processes being fit for purpose and meet global sample preparation standards in the production of a sub-sample for assaying." (ALS (2016)).

Section 2: Reporting of exploration results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.*	The Frieda River Project area is located in the northern foothills of Central Range in western Papua New Guinea, West Sepik Province at approximately latitude 4.699 south, longitude 141.763 east, between 500m and 1,200m above sea level. The area is remote from roads and facilities and is by air from Mt Hagen in the Highlands or Wewak on the northern coast. The reported Mineral Resources are secured by Exploration License No. 58 covering an area of 150.6km^2. Frieda River Limited (FRL) is the manager of the Frieda River Joint Venture, with the participants holding interests in EL58 representing their interests in the joint venture. FRL holds an 80% interest in EL58, with Highlands Frieda Limited (a subsidiary of Highlands Pacific Limited) holding the remaining 20%.
	• *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.*	Exploration License 58 is securely held. There are no known impediments to obtaining a mining licence to operate in the area.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	Exploration drilling has been undertaken in the Frieda River area since 1969 by various parties: • Exploration was first carried out by Mount Isa Mines Ltd in 1968. • Sumitomo Metal Mining Co Ltd and Mount Isa Mines Ltd between 1974 and 1987. • Highlands Gold Ltd completed a 36 drill hole campaigns during 1993 to 1997. • Cyprus-Amax Minerals entered into a joint venture agreement with Highlands Pacific Ltd and OMRO Frieda and drilled 19 holes between 1998 and 1999. • In 2002, Highlands Pacific Ltd entered into joint venture agreement with Noranda Pacific and OMRO Frieda Co Ltd, and in 2005, Noranda Pacific Ltd merged with Falconbridge and Xstrata entered the Project through acquisition of Falconbridge in 2006. A total of 371 holes have been drilled between 2002 and 2011. • Since 2015 Frieda River Limited have drilled a total of 26 holes to improve the confidence in the Koki and Ekwai Mineral Resource.
Geology	• *Deposit type, geological setting and style of mineralisation.*	Frieda River is a porphyry copper-gold deposit of island arc affinity. Mineralisation is mainly hosted by the Horse microdiorite, which intruded into older diorites and volcanics of the Frieda River Igneous Complex.
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of all holes*	A table of the drill hole collars, orientation and what information the drill hole contributes to the estimate is included in the Estimation Parameters Statistics and Validation report. The HITEK deposits contain 815 drill holes of which 537 (162,504m) are sufficiently verified

Criteria	JORC Code explanation	Commentary
		by quality assurance and quality control measures on key data inputs, including copper and gold assay grades, to be used for Mineral Resource estimation The HITEK Mineral Resource is based on the following quality assured drill hole data; • Copper, 534 drill holes, 75,042 aqua regia digest Inductively coupled plasma – optical emission spectroscopy (ICP-OES) or atomic absorption spectroscopy (AAS) assays • Gold, 534 drill holes, 75,235 50g or 25g fire assays • Silver, 530 drill holes, 74,185 aqua regia digest ICP-OES or AAS assays • Arsenic, 456 drill holes, 64,973 aqua regia digest ICP-OES or AAS assays • Antimony, 439 drill holes, 62,784 aqua regia digest ICP-OES or AAS assays • Dry bulk density, 368 drill holes, 10,770 wax-immersion tests • Copper oxide, 395 drill holes, 7,779 sequential copper assays • Sulphur, 312 drill holes, 42,813 aqua regia digest ICP-OES or AAS assays • Point load index, 157 drill holes, 2,756 geometrical and failure mode valid tests
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.*	No grade truncations have been applied to the drill core assay samples. A cut-off grade of 0.2% total copper has been applied to the reported Mineral Resource.
	• *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.*	The deposit style (copper porphyry) precludes short intercepts. Statistically significant grade outliers are rare for gold only and where they do occur, a limiting function in the estimation software (the 'high yield' function) prevents the high grade from being extended over large volumes. No aggregation methods have been applied.
	• *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	No metal equivalent values have been used.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should*	The mineralisation widths of this porphyry copper style deposit are very large (in the order of 100s of metres) and the sample interval is two metres. The sampling intervals are considered appropriate to determine the geological and grade continuity and provide adequate resolution on domain boundaries.

Criteria	JORC Code explanation	Commentary
	be reported. • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	The deposit has a northwest trending steeply dipping geometry. Drill holes are typically drilled perpendicular to the main geometry. The majority of holes at HIT are oriented at a dip of 50° to 55° and azimuth 210° TN. Twenty holes from Phase 2 to 4 (6,939m) are drilled on the historical Horse Grid, oriented 080° TN to 260° TN. A further 108 Phase 2 to Phase 4 holes, totalling 32,561m, were drilled more than ten degrees off the lvaal grid, providing some security against directional bias in the dataset. The majority of holes at Ekwai and Koki are drilled at a dip of 45° to 70° and an azimuth of 260° true north. Approximately one fifth of the holes are drilled off grid to test for local barren intrusives and provide some security against directional bias in the data set
Diagrams	• *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.*	Maps and section views are included in the 2018 Feasibility Study, Chapter 4, Geology and Mineral resources.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	There are no exploration results being reported with this Mineral Resource estimate.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	Metallurgical test work, geotechnical, hydrogeological and other mining studies are included in the relevant Mineral Processing and Mining chapters of the feasibility study. There are no over-riding factors from that which affect the Mineral Resource.
Further work	• *The nature and scale of planned further work.* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas.*	There is no further work planned for the HITEK Mineral Resource.

Section 3: Estimation and reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.*	Geological logs, driller's reports, survey certificates and other relevant drill-hole data are physically collated in well maintained files for each individual drill hole. These folders have also been scanned and catalogued digitally. The geological, survey, analytical and meta-data for the Project are maintained in electronic files. Internal checks of the analytical database consistency were made in 2015 and 2016 by FRL staff. Some aspects (ie weathering based on acid and cyanide soluble copper) were checked in every drill hole with available assays; other aspects such as lithology, alteration, downhole surveys and mineralogy were checked by randomly selecting 5% of drill holes and making spot checks of the correspondence between assay certificates and electronic data. Downhole surveys were checked by identifying any intervals with >5° deviation in dip or >10° deviation in azimuth; data errors were corrected using the scanned survey records. FRL staff made a comprehensive random check of drill core during the 2015 and 2016 site visit. Core from HITEK and surrounding areas within the FRIC were relogged to check for consistency. No material issues were detected. Checks were made against the logs and 3D models. The hard copy drill hole information and scanned copies are well organised and considered to be in acceptable condition. The storage of this information is considered appropriate. A review of the database against the drill holes found no major discrepancy for the drill holes checked.
	• *Data validation procedures used.*	Internal database checks include correcting primary key violations, object and record tracking and a suite of drill hole checks including overlapping intervals.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	Golder Associates conducted site visits to Frieda River in 2009 and in 2011. The outcome found no issues that required urgent attention. The highest priority items noted related to the arsenic and molybdenum exploratory data analysis. The average molybdenum grade assayed in all drill core samples is 32ppm and arsenic 7ppm. The checks on the data have identified no material issues. Mr Leaman and Mr Carpenter of FRL conducted a site visit in 2015 and 2016. The outcome was that some lithology codes to the west of HIT were inconsistent with the rocks, principally differentiating extrusive versus intrusive igneous rocks. The issues were

Criteria	JORC Code explanation	Commentary
		confined to a mixed lithology zone on the western edge of the planned HIT open-pit and do not affect the Mineral Resource estimate. No other issues were detected.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.*	The observed geological continuity within the HITEK porphyry potassic and phyllic zones is high, with a readily identifiable late stage barren intrusive (the Flimtem Trachyandesite) that has been modelled out. The confidence within the core of the system is high. Around the margins of the phyllic alteration zone is a barren alteration type called the quartz-illite-pyrite. The geological process that formed this alteration type is uncertain, with two current hypotheses. The first is that it is a post-mineralisation low temperature highly acidic phase that has stripped the copper from the rocks. The second is that it is a contemporaneous coaxial alteration type between phyllic and propylitic assemblages. Either way it introduces uncertainty in the orientation, shape and nature of the contacts. This uncertainty is reflected in the estimate having a low classification around the margin.
	• *Nature of the data used and of any assumptions made.*	The data upon which the estimate is based is almost entirely the drill holes. The logged geological data from the drilling is descriptive in nature. Multiple layers of information exist from the geological logging, geochemical assays, core photographs and engineering properties of the rocks, which has been used to check on interpretations.
	• *The effect, if any, of alternative interpretations on Mineral Resource estimation.*	An alternative estimation on the HIT deposit was performed by Hellman & Schofield Consultants, Sydney, Australia. The estimate was entirely unconstrained by any boundaries. The results indicate very similar overall tonnes and grade, with differences only in the classifications. The deposit, with its continuous nature, large amounts of drilling and coefficient of variation less than one for the valuable domains, appears resistant in overall tonnes and grade to alternative interpretations.
	• *The use of geology in guiding and controlling Mineral Resource estimation.*	A combination of lithology, alteration, weathering and structural features form the basis for copper, gold, silver, arsenic, antimony, density, total sulphur, and copper oxide and point load index estimation domains. The majority of boundaries are hard boundaries, ie only data within the domain is used to inform the domain. This is based on the known geological or geochemical processes that formed the boundaries and confirmed by contact profile analysis.

Criteria	JORC Code explanation	Commentary
	• *The factors affecting continuity both of grade and geology.*	Physical and geochemical boundaries affect the geological and grade continuity at HITEK. Physical boundaries include the Horse-Ivaal fault and the Trukai-Ivaal fault, both of which have identifiable lithology and alteration offsets. A sharp contact exists between the mineralised Horse Ivaal and Trukai porphyries and the post mineralisation Flimtem Trachyandesite (FT) intrusives. The FT has a variable thickness that ranges in drill holes from a single sample (two metres) thick intercept up to 170m thick, depending on the true thickness and orientation of the drill hole. The FT has been modelled using geology indicators by kriging with intercepts treated as hard boundaries to honour the observed field relationship. A high grade contemporaneous intrusive called the Hornblende Monzonite intrudes between two FT duke swarms at Horse and has been modelled separately. Notable geochemical discontinuities are observed in the weathering horizons, with sharp changes in copper and total sulphur contents in the extremely weathered portions of the profile. The copper oxide content is strongly influenced by the weathering and a sharp basal contact exists on the change between supergene and hypogene mineralisation.
		A contact that is both physical and geochemical in nature exists at the gypsum anhydrite dissolution surface, a boundary above which sulphates have been dissolved from the rock. This has resulted in highly fractured rocks which have RQD values of zero, as well as a notable density bias and step change in the total sulphur. The gypsum anhydrite dissolution surface is also important for the rock hardness, measured by point load index and has a strong influence over the rock mass properties and hence open cut slope angles.
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	The HITEK Mineral Resource has the following extents: Along strike (SE-NW) = 3,000m Across strike (NE-SW) = 2,400m (maximum extent 3,000m) RL = 1,300 to -360m. Ekwai Debom and Perth Ridges are not included in this extent.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer*	The Mineral Resource of Horse-Ivaal-Trukai was estimated using established geostatistical techniques following comprehensive statistical and exploratory data analysis. The evaluation of appropriate geological groupings for combination into statistical estimation populations was undertaken through the iterative statistical definition of Estimation Domains for copper, gold, silver, arsenic, antimony, density, total sulphur, copper oxide and point load index.

Criteria	JORC Code explanation	Commentary
	software and parameters used.	Four-metre downhole composites truncated at estimation domains have been used for the estimation. A minimum of one metre in length was required for a composite. Three dimensional experimental variograms were generated and modelled. The variogram models were validated by the 'leave-one-out' validation technique. Block grade interpolation was carried out using three-pass ordinary kriging in parent blocks of 25m x 25m x 15m down to regular sub blocks of 5m x 5m x 5m. Each pass reflected the various ranges established by the variogram models for each element and domain. Maptek Vulcan mining software (version 9.1.7) has been used for block grade interpolation and resource classification. No direct grade capping was done; the extended influence of the high grade outlier composites was restricted in the kriging plans where necessary. The impact of this restriction was assessed by interpolating auxiliary block models without restrictions to the outliers and also by close visual inspection of the results. An inverse distance weighted copper estimate was also obtained without the restriction to outliers and served as reference for checking the presence of bias at the global scale. No bias was detected.
	• *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.*	Check estimates using an inverse distance weighted method were used to compare the composite data against the ordinary kriged estimates in swath plots. No issues were detected. The HITEK deposits have not been mined in the past and reconciliation with production data is not possible.
	• *The assumptions made regarding recovery of by-products.*	It is assumed that the concentration of molybdenum is too low to be economically recovered as a by-product, potentially by an order of magnitude, given the planned plant design.
	• *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).*	The concentration of deleterious elements arsenic and antimony are low enough to indicate the concentrate would not attract a penalty. The projected final concentrate grades determined from metallurgical test work indicate concentrations below penalty levels.
	• *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.*	The parent block size is 25m x 25m x 15m with subblocking to 5m x 5m x 5m to provide adequate resolution against domain boundaries. The highest drilling density is approximately 75m x 75m. Search distances range from 50-80% of the variogram model range for the highest confidence first pass of estimates. Search distances increase to 150% of the variogram model range for the lowest confidence third pass of estimates.
	• *Any assumptions behind modelling of selective mining units.*	It is assumed that the drilling is representative of the selective mining unit of 25m x 25m x 15m. A discrete gaussian transform from 75m to 25m support was performed as a check. The net effect on the grade-tonnage curve was minimal (QG, 2015). Therefore the Mineral

Criteria	JORC Code explanation	Commentary
		Resource at the 0.2% total copper cutoff is assumed to approximate the recoverable portion.
	• *Any assumptions about correlation between variables.*	Copper and gold exhibit a strong correlation (r ~0.7). This observation forms the basis for the decision that the copper estimation domains should be used for the gold estimation domains.
	• *Description of how the geological interpretation was used to control the resource estimates.*	Four interpretations on Lithology, Alteration, Weathering and Structural zone have been used in various combinations to define estimation domains for copper, gold, density and copper oxide. Additional subdomains are defined for the total sulphur and point load index estimates.
	• *Discussion of basis for using or not using grade cutting or capping.*	Grade cutting was not used as the sampling and assaying is considered representative of the deposit. A software-specific method of "high yield samples" has been used. The method works by restricting the distance over which samples with specified 'high' grades can extend. The method prevents rare high grade samples 'smearing' across large distances.
	• *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	Estimate and sample statistics were compared and no material discrepancies were noted. Visual checks between drill hole data and the block model were performed. Swath plots of the copper, gold, density indicated no issues. A small issue with the third pass estimate was noted by Xstract (2016); this would impact some of the Inferred Mineral Resource at Koki, around 10 blocks or 0.2 Mt of material. There has been no production at HITEK or anywhere else within EL58 so reconciliation is not possible.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	Tonnages are based on volume measurements converted using dry bulk densities. The dry bulk density was based on a 0.1m long core sample which was oven dried at 80-90°C for 12 hours before wax immersion testing, backed up with a duplicate water displacement and whole tray dry bulk density testing.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	The Mineral Resource model is constrained by assumptions about geological mineralisation controls. The tabulated resources are based on cut-off grades of 0.2% Cu.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider*	The kriged block dimension is identical to that to be employed in future mine planning and is currently envisaged as the selective-mining unit (SMU) for the projected operation. Given the current scale of observation of 75m x 75m it is possible that the future recoverable portion of the deposit may be different. This was tested by QG (2015) using a

Criteria	JORC Code explanation	Commentary
	potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	discrete gaussian transform of the blocks to SMU size. The resulting grade tonnage curve was similar to the untransformed curve. An open-pit mining method is assumed to be suitable for this deposit. The potential for future underground mining exists but is not supported by any studies. Therefore it is not considered for the Mineral Resource.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	Process route for the HITEK mineralisation is currently defined as a milling and standard flotation operation. This is based on ~200 spatially distributed comminution and flotation testwork results. Recovery factors have been updated to reflect the latest available data. No high levels of penalty elements have been recovered in flotation testwork.
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	FRL are not aware of any environmental issues that would affect the eventual economic extraction of the deposit. The environmental factors are being assessed as part of the normal statutory processes required.
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the*	Dry bulk density data has been collected from both waxed and whole tray methods. A comparative study from 7,445 samples was carried out and on the results from the study,

Criteria	JORC Code explanation	Commentary
	method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.	bulk density data is interpolation using ordinary kriging by density estimation domains in the block model. Post processing involved subtracting 0.13g/cm^3 from the estimated block density of mineral zones above the gypsum-anhydrite dissolution surface. Fresh rock density estimates were not altered. The density measuring method is considered appropriate and the number and distribution of measurements are considered adequate for the Mineral Resource estimation.
	• *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.*	The wax immersion method adequately accounts for void spaces when determining the bulk density. The whole tray method adequately accounts for void spaces and fractured rocks when determining the bulk density.
	• *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	Blocks that were not estimated were assigned a default value based on averages of wax immersion and whole tray density tests. Based on the results from the whole tray and wax immersion methods a post processing step is used to subtract 0.13g/cc from the density estimates above the gypsum-anhydrite dissolution surface.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.*	The approach to the Mineral Resource classification of the HITEK deposits is mainly based on kriging performance indicators. Each successive estimate pass stipulated a minimum number of samples, minimum number of drill holes and maximum search radius. The kriging variance was used to confirm maximum estimation error for each pass to ensure the error did not exceed the stated acceptable accuracy. Samples were used to spatially constrain the Measured, Indicated and Inferred Mineral Resources. 25 drill holes from Phase 1b at HIT have not been considered for classifying Resources as Measured, they have been considered for Indicated and Inferred only. 26 drill holes from Phase 1a have been used for Inferred Mineral Resource only.
	• *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).*	The quality, quantity and appropriateness of the drilling and assaying at the Horse-Ivaal-Trukai, Ekwai and Koki (HITEK) deposits is adequate to support Measured, Indicated and Inferred Mineral Resources. Quality Assurance/Quality Control procedures are of a satisfactory degree and rigour to support the highest level of Mineral Resource classification where the spacing and distribution of the drilling is in the order of 75m x 75m spacing. The quantity and nature of the deleterious elements do not pose a significant risk to the processing at the HITEK deposits. The core recovery is considered sufficient to support geological interpretation and provide unbiased grade estimates.

Criteria	JORC Code explanation	Commentary
	• *Whether the result appropriately reflects the Competent Person's view of the deposit.*	The results reflect the view of the Competent Person.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	An independent expert peer review for HIT was carried out by Quantitative Geoscience (QG) in 2015. An independent expert peer review for Ekwai and Koki was carried out by Xstract Mining Consultants in 2016. In both instances there were no fatal flaws although there were several high level recommendations, being: • The classification at HIT may be too optimistic (this has been addressed in the current HITEK V3 model) • There are no dedicated documented procedures for estimation methods, meaning it would be difficult to replicate the estimate
Discussion of relative accuracy/confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.*	The Horse-Ivaal-Trukai, Ekwai and Koki (HITEK) deposits Mineral Resource is a global resource with no production data. The Mineral Resource estimate is currently supported by a substantial geological and drill hole data and analytical results. The accuracy and confidence level of the Mineral Resource may be classed as follows: • Measured Mineral Resource: ± 10% grade and tonnes at a 95% confidence interval for a three month production interval • Indicated Mineral Resource: ± 20% grade and tonnes at a 95% confidence interval for a three month production interval • Inferred Mineral Resource: ± 50% grade and tonnes at a 95% confidence interval for a three month production interval
	• *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.*	The HITEK Mineral Resource estimate is a global estimate with no change of support. The HITEK Mineral Resource is constrained within an area considered to have prospects of eventual economic extraction. This is based on an optimiser open cut shell using the same physical and financial parameters as the Ore Reserve, except with a higher Revenue Factor of 1.5. The Revenue Factor 1.5 uses a copper price of US$4.95/lb Cu and a gold price of US$2,175/oz Au. The name of the shell is "FRL_HITEK_V3_25x25x15_1608v1e HIT-MII EK-MII_Shell_06_1.5.sft". This approach is identical to the previously reported Mineral Resources from 2008 to 2015. It should be noted that Ekwai and Koki are included and only reported within this shell, making the Ekwai and Koki Mineral Resource have the same constraints as HIT for the first time.
	• *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	The Horse-Ivaal-Trukai, Ekwai and Koki (HITEK) deposits are undeveloped and have no production data.

Section 4: Estimation and Reporting of Ore Reserves

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• *Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.* • *Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.*	The Horse-Ivaal-Trukai-Ekwai-Koki (HITEK) Mineral Resource estimate is unchanged from May 2017 as no new data or interpretation has occurred. Mr Shaun Versace is the Competent Person for the Mineral Resource estimate. Mr Versace is a Member of the Australasian Institute of Mining and Minerals and a full time employee of PanAust Limited (PanAust). Frieda River Limited (FRL) is a wholly-owned subsidiary of PanAust. FRL is a participant in an unincorporated joint venture with Highlands Frieda Limited, a wholly-owned subsidiary of Highlands Pacific Limited. FRL manages the Project and holds an 80% interest; Highlands holds the remaining 20% interest. The Mineral Resource is an Ordinary Kriged model rotated 60 degrees west from true north. Drilling at HITEK includes 815 drill holes of which 537 (162,504m) are sufficiently verified by quality assurance and quality control (QAQC) measures on key data, including copper and gold assay grades, to be used for Mineral Resource estimation. At Horse-Ivaal-Trukai (HIT) the drilling sections are aligned 030° from true north with a spacing of approximately 75m x 75m in the most intensively drilled parts of the deposit. This drill hole spacing generally resulted in a Measured classification. Spacing varies vertically due to drill holes being drilled in fan patterns from helicopter accessible drill pads cut into the steep terrain, with a more uniform spacing at depth. A minor number of drill holes are at various orientations to the grid to test for directional bias and intrusives that may strike parallel to the drilling grid. Drilling at the Ekwai and Koki porphyries are aligned 080° with a spacing in the most intensively drilled parts of the deposits of approximately 90m x 70m at Ekwai and 140m x 70m at Koki. This drill hole spacing generally resulted in an Indicated classification. Estimation domains were defined using observed geology along with assumptions based on geological and grade continuities observed at deposits with of similar type. The copper, gold, silver, arsenic, antimony, density, total sulphur, copper oxide grade and point load index (Is_{50}) values were estimated using ordinary kriging on typically four metre composites into a parent block size of 25m x 25m x 15m with sub blocks of 5m x 5m x 5m to provide adequate resolution along domain boundaries. Rock quality designation (RQD) was assigned to blocks based on their weathering, lithology, alteration and whether above or below the gypsum/anhydrite dissolution surface (GAS, a zone approximately 300m deep, below the weathering, where sulphates that bind the rock are typically present below and absent above). Estimates for HITEK were performed in passes with the pass number informing the Mineral Resource classification. At HIT, the highest passes for copper, gold and density are

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		classified as Measured. Indicated has a one-lower pass and Inferred has at a minimum, estimates for copper and gold, and an assigned density. At Ekwai and Koki, classification solids have been created in order to exclude some well-drilled areas containing drill holes from early phases. The Mineral Resource model is regularised to a standard block size for downstream mine engineering work to a block size of 25m x 25m x 15m. This model is called the mine planning model (file name: FRL_HITEK_V3_25x25x15_20180515_v1). The Mineral Resource is inclusive of those Mineral Resources modified to produce the Ore Reserve.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	PanAust staff responsible for the preparation of the Ore Reserve estimate made several visits to the Frieda River Copper-Gold Project (Project) area. The Competent Person for the Ore Reserve has visited the Frieda River project area on three or more occasions to view drill core, assess the site conditions, determine pioneering access routes, consider water management alternatives, inspect the terrain and identify suitable locations for mining and infrastructure locations.
Study status	• *The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.* • *The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.*	The Ore Reserve is supported by the Sepik Development Project Feasibility Study (Feasibility Study) completed in September 2018. The Feasibility Study generated detailed designs and cost estimates, a life of mine (LOM) production plan and cash flow model that demonstrated a technically achievable and economically viable mine plan. The Project will be developed at a greenfield site based on the mining and processing of a portion of the HITEK porphyry copper-gold deposits.
Cut-off parameters	• *The basis of the cut-off grade(s) or quality parameters applied.*	The cut-off value used to define the Ore Reserve was applied on a NSR basis and incorporates revenue calculations, realisation costs, metallurgical recovery, ore processing and general and administrative costs. A breakeven NSR differentiates ore from waste rock on a static unscheduled basis. Mineralised blocks with a positive economic value were selected as ore and reported in the Ore Reserve. The Ore Reserve is defined at the point at which ore is delivered to the HITEK process plant. Mining costs are not included in this analysis on the basis that any block within the final pit would be removed with its extraction and processing costs covered by either its own

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		extraction or that of a deeper block. Hence the economically mineable material comprises all mineralised material that, when delivered to the pit rim, has a recovered value greater than the cost of all downstream site costs, concentrate transport and realisation charges. Silver is not included in the Ore Reserve because the estimated average concentrate grade was below the industry payable threshold of 30g/t silver in concentrate.
Mining factors or assumptions	• *The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (ie either by application of appropriate factors by optimisation or by preliminary or detailed design).* • *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.* • *The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.* • *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).* *The mining dilution factors used.* • *The mining recovery factors used.* • *Any minimum mining widths used.* • *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.* • *The infrastructure requirements of the selected mining methods.*	The HITEK deposits will be developed as a large-scale conventional open-pit mine using truck and shovel with 15m high benches at Horse-Ivaal-Trukai (HIT) and 10m benches at Ekwai and Koki. The majority of the ore and waste material is drilled and blasted before being excavated by electric-hydraulic shovels and excavators. Mined ore and waste rock will be hauled to the open-pit rim, delivered to separate primary crushers and conveyed to either the process plant (ore) or barge loading facility (waste). A small portion of open-pit waste material will be hauled to surface dumps based on its material properties. Ore will be fed into a conventional comminution and flotation process plant producing a copper-gold concentrate for export to custom smelters. Waste rock and process tailings will be stored subaqueously within an engineered integrated storage facility (ISF). Workshop, warehouse, office and refuelling infrastructure will be established to support mining activities. Slope design recommendations for final open-pit walls were provided by Pells Sullivan Meynink (PSM). Slope design parameters are supported by drill hole information, acoustic televiewer surveys, geotechnical mapping and field observations. The slope design parameters were applied to the open-pit optimisation and design used for the Ore Reserve estimate. Water diversion structures and a water treatment facility were incorporated into the mine design to accommodate the high annual rainfall and expected water quality. The Mineral Resource model incorporates an allowance for dilution. Dilution is made up from two sources: • Dilution block grades from the estimated proportion of barren intrusions (Flimtem Trachyandesite • Internal dilution as an effect of the re-blocking process used to construct the mine planning model. The combined dilution within the mine planning model resulting from these factors is estimated to be 5%. The Ore Reserve is not modified to account for ore loss. The mineralisation is present as a large and homogeneous deposit. There are limited ore and waste boundaries within the

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		open-pit design. Planned close spaced grade control drilling prior to mining will be used to minimise potential ore loss and dilution. The Ore Reserve was estimated within an open-pit design prepared by PanAust's technical services group and Andrew Vidale Consulting Services (AVCS) in the period 2016 to 2018. Optimisation of the open-pit limits was completed using the Lerchs Grossman algorithm as implemented in Geovia's Whittle software and was verified using Maptek OptiPit and AVCS MaxFlow software. The open-pit optimisation process only considered Measured and Indicated Mineral Resource. The open-pit optimisation generated a range of open-pit shells that represented tonnage and corresponding value increments. The open-pit shell selected for open-pit design corresponds to a copper price of US$2.90/lb and a gold price of US$1,276/oz for the larger HIT deposit and a copper price of US$2.05/lb and a gold price of US$899/oz for the smaller Ekwai and Koki (EK) deposits. A detailed open-pit design was prepared from the selected open-pit shells and used for Ore Reserve estimation. The open-pit design includes 50m wide ramps and safety berms on the open-pit walls to accommodate the selected mine fleet. No minimum mining width was specified in the open-pit optimisation. The open-pit design process considered access and allowed sufficient working area to accommodate large mining equipment. Smaller mining fleets will be used for pre-stripping and mining areas with a narrower mining width. A LOM production schedule was prepared in 2018 using the open-pit design and mine planning model that forms the basis for the Ore Reserve estimate. The production schedule demonstrates that ore can be delivered to the process plant in sufficient quantity each year over the mine life to satisfy the assumptions associated with the costs and revenues used in the Ore Reserve estimate. The waste movement required to extract the Ore Reserve is 1,570Mt. The Inferred Mineral Resource was not considered for conversion to Ore Reserve.

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Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.* • *Any assumptions or allowances made for deleterious elements.* • *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the Ore Reserve estimation been based on the appropriate mineralogy to meet the specifications?*	The metallurgical process design is appropriate for treatment of porphyry copper-gold mineralisation. The flowsheet is similar to that used successfully at PanAust's Phu Kham Copper-Gold Operation in Laos. The process plant design and technology is conventional and consists of crushing, grinding, and sulphide flotation processes for production of a copper-gold concentrate having an approximate average grade of 26% copper. The design and the equipment are proven and consistent with existing operations treating large porphyry deposits throughout the world. Extensive metallurgical test work was undertaken for materials characterisation (hardness, mineralogy, mineral liberation) and process development on variability samples representing the major weathering, lithology and alteration units. This characterisation determined two metallurgical ore types; oxidised and primary. These ore types are defined by the content of acid soluble copper as a proportion of the total copper content (CuOx%). The oxidised ore type contains greater than or equal to 3% CuOx% primary ore contains less than 3% acid soluble copper. Metallurgical recovery factors are applied to both ore types. The oxidised ore copper recovery is a function of acid soluble copper and pyrite content estimated by the sulphur to copper ratio. The oxidised ore gold recovery is proportional to copper recovery with a similar function applied. The primary ore copper and gold recoveries were determined from test work and found to be within a tight band of results, hence a fixed recovery for copper and gold is applied. Metallurgical test work indicates that concentrate will be low in deleterious elements and will not attract penalty charges. The copper concentrate is expected to be attractive to custom smelters. Bench and pilot scale test work on large ore type composites and period composites confirmed the results of the variability test work.

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Environmental	• *The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	Comprehensive environmental baseline data has been collected over a period of eight years including terrestrial ecology, aquatic ecology, soil, water and sediment quality and the near-shore marine environment. Analysis and modelling of this data has informed a comprehensive Environmental Impact Statement (EIS) for the Project. The EIS was developed in accordance with PNG Government guidelines and an approved terms of reference. The key environmental issues requiring mitigation strategies are disturbance within the Frieda River Copper-Gold Project (Project) footprint, fugitive sediment emissions during construction and dissolved metal emissions during operations and closure. Important strategies for protecting the environment are the subaqueous deposition of mine waste rock and process tailings within an integrated storage facility (ISF) and active treatment of open-pit contact water. Environmental management strategies will be guided by standards implemented by PanAust Limited, an internationally recognised leader in environmental management and sustainability. Geochemical characterisation studies on waste rock were conducted between 2009 and 2011 for the HIT deposit and in 2016 for the Ekwai and Koki deposits. A substantial portion of the mined waste rock and process tailings is susceptible to acid and metalliferous drainage. These studies guided the development of the waste management strategy detailed in the Feasibility Study and adopted for the Project. The key strategies for limiting impact on the environment is the subaqueous deposition of mine waste rock and process tailings within the ISF and active treatment of open-pit water. The Project is designed to limit fugitive sediment emissions from the mine site and the potential for acid and metalliferous drainage using an ISF. The ISF is designed to Australian National Committee on Large Dams Incorporated (ANCOLD) guidelines. The ISF design is supported by extensive modelling which shows no significant adverse long term impact on downstream water quality. The Project will meet the PNG Environment (Water Quality Criteria) Regulation 2002, World Health Organisation Drinking Water Standards, and the Australian and New Zealand Environment Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand 2000 (ANZECC/ARMCANZ) guidelines for the protection of 95% of freshwater aquatic species in the Sepik River. A conceptual closure plan has been completed. The plan describes the proposed completion criteria, post-mining land use and post-closure management, monitoring and surveillance requirements.

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Infrastructure	• *The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	The Project is a greenfield site with no road, power, water and ground transport infrastructure. Limited road and ocean port infrastructure is available outside the Project area. The Project area is sparsely populated with sufficient land available for development. All infrastructure necessary to establish and support the Project was identified, designed and costed during the Feasibility Study. The cost to construct the necessary infrastructure was included in the discounted cashflow model that was used to validate the Ore Reserve estimate.

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Costs	• *The derivation of, or assumptions made, regarding projected capital costs in the study.* • *The methodology used to estimate operating costs.* • *Allowances made for the content of deleterious elements.* • *The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co- products.* • *The source of exchange rates used in the study.* • *Derivation of transportation charges.* • *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.* • *The allowances made for royalties payable, both Government and private.*	Costs and revenue estimates were prepared during the Feasibility Study and are reported in real 2018 US dollars as at Q1 calendar 2018. The capital cost estimate comprises direct costs, indirect costs and a contingency amount. The estimates were derived using 3D models, drawings and sketches, construction productivity and installation rates, equipment prices, an indirect cost build-up from first principles and a quantitative cost and schedule risk analysis to estimate the contingency. The total capital cost used for the economic evaluation to verify the Ore Reserve is US$6.4 billion. Operating cost estimates were developed from first principles including but not limited to equipment productivities, usage rates for consumables, labour costs and general and administrative costs. The operating cost estimates are benchmarked against similar mining operations including PanAust's existing operations in Laos (Phu Kham and Ban Houayxai), Lihir and Ok Tedi. The Feasibility Study resulted in average life of mine operating costs of: • Mining: US$2.16/t ore mined (US$4.67/t processed) • Ore processing: US$4.02/t processed • Logistics: US$0.41/t processed • General and administrative: US$2.02/t processed • Realisation costs: US$1.30/t processed • Total production cost: US$12.43/t processed No cost penalties were applied for deleterious elements, based on test work results. Metal prices were based on the long term market assessment developed independently by Wood Mackenzie in June 2018. Exchange rates are based on prevailing rates as at Q1 calendar 2018. Transport charges were developed using a transport economic model which considered all inbound freight and outbound concentrate charges. Smelting and refining charges were based on existing contract terms and PanAust's assessment of future copper concentrate sale terms and benchmarked using an independent report. A royalty of 2% from the gross revenue is required to be paid to the Government of PNG under the prevailing mining legislation. No private royalties are payable.

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Revenue factors	• *The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.* • *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	Revenue calculations were based on the Ore Reserve block model grades and calculated metallurgical recoveries for copper and gold, long term metal prices for copper and gold, and assumed contractual terms for treatment charges and metal payables. These values were incorporated into the NSR calculation and DCF model. Smelting and refining charges assumed in the Ore Reserve estimate were based on existing contract terms and PanAust's assessment of future copper concentrate sale terms. Revenue prices for copper (US$3.30/lb) and gold (US$1,390/oz) were used to prepare the Ore Reserve estimate based on Wood Mackenzie's independent long term market assessment.
Market assessment	• *The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.* • *A customer and competitor analysis along with the identification of likely market windows for the product.* • *Price and volume forecasts and the basis for these forecasts.* • *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	Copper concentrate is widely traded in international markets. PanAust has more than 10 years' experience in the copper concentrate market through its subsidiary company, Phu Bia Mining, which has established a strong market reputation for quality under long term sales contracts of copper concentrate. Industry analysts expect the copper market to be balanced until 2018 after which demand is forecast to exceed supply. The pipeline of supply from likely new mine developments and expansions is not considered sufficient to meet the projected demand by 2022. There is a need for significant new concentrate supply for the supply-demand balance to be restored beyond 2022. Hence analysts generally have a positive long term price outlook for copper. The Project will be competing against a number of greenfield and brownfield, in terms of the demand for refined copper and the requirement for new and incremental sources of concentrate to feed global custom smelting capacity. The majority of new production is expected to come from outside Asia. Increasing the level of Asian regional supply increases the security of supply for custom concentrate smelters. The Project, with its excellent product quality, will be a concentrate of choice and contribute towards the base-load for regional smelters. Major demand for the Project's copper concentrate is expected to come from China and India. Export to Indonesia represents an opportunity for the Project should new custom smelter capacity be established.

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Economic	• *The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.* • *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	Costs and revenue estimates were prepared during the course of the Feasibility Study and reported in real 2018 US dollars. Cost estimates are reported in real 2018 US dollars as at Q1 calendar 2018. No cost escalation has been applied. The Ore Reserve estimate was validated using a discounted cash flow analysis model. The analysis incorporated the economic inputs derived from the Feasibility Study and the assumptions that support the Ore Reserve. The Project has a positive NPV at a discount rate of 8%. Sensitivity analysis was performed in the financial model on key inputs. The NPV is most sensitive to factors influencing copper revenue (price, grade, and recovery), discount rate, and development capital.
Social	• *The status of agreements with key stakeholders and matters leading to social licence to operate.*	PanAust undertakes structured engagement with all levels of government, landowners, communities and other stakeholders. No major agreements have been established with key stakeholders. There are no known social issues that threaten the license to operate.
Other	• *To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:* • *Any identified material naturally occurring risks.* • *The status of material legal agreements and marketing arrangements.* • *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the Ore Reserve is contingent.*	The HITEK Mineral Resource is located on Exploration License 58 in the Sandaun province of PNG. The exploration license is held by the Frieda River Joint Venturers and has been renewed on numerous occasions. The region experiences high rainfall and occasional elevated seismicity events. Geohazards are present in the immediate Project area. There are no other significant naturally occurring risks. There are no material legal or marketing arrangements. An application for a Special Mining Lease (SML) was submitted by the Frieda River Joint Venturers in June 2016 and will form the basis for obtaining the necessary mining tenements and associated development agreements. It is intended that the 2018 Feasibility Study will support an amendment to the 2016 SML application. A separate application for environmental permits will be made. There are reasonable grounds to expect that the necessary government approvals will be received.
Classification	• *The basis for the classification of the Ore Reserves into varying confidence categories.* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	All critical assumptions applied to mining, ore processing, tailings and waste rock storage, cost and revenue are support by the estimates in the Feasibility Study and it is considered to be at a level of confidence appropriate for an Ore Reserve estimate. The confidence

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	• *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	classification was therefore derived solely from the category of the Mineral Resource estimate: • The Proved Ore Reserve estimate is the economically mineable part of the Measured Mineral Resource estimate. • The Probable Ore Reserve estimate is the economically mineable part of the Indicated Mineral Resource estimate. These classifications appropriately reflect the Competent Person's understanding of the deposit.
Audits and reviews	• *The results of any audits or reviews of Ore Reserve estimates.*	The mine planning model was reviewed by AVCS Consulting whose recommendations were incorporated into the model. The open-pit optimisation, open-pit design, LOM inputs and assumptions and operating cost estimation were independently reviewed and responses incorporated where appropriate. The 2018 HITEK Ore Reserve has been internally and externally peer reviewed with no significant concerns identified.

	Criteria	Risk rating	Commentary
Discussion of relative accuracy/confidence. ***Rated between 1 and 5 with 1 being the highest level of accuracy/confidence.***	Mineral Resource	3	The absence of close spaced grade control drilling introduces an inherent level of uncertainty into the Mineral Resource estimate. The Mineral Resource model for the HITEK deposit was developed from a robust exploration data set. The Mineral Resource model and estimation process was independently reviewed by Xstract Mining Consultants (Ekwai and Koki)[1] and Quantitative Geoscience Consultants (HIT)[2] which provides confidence in the approach and methodology.
	Project status	3	The Project is a greenfield development in a remote location requiring significant new infrastructure and significant funding. It is possible that financing may not be made available to the Joint Venturers and the Project does not proceed. There are inherent levels of uncertainty for the Project's development until PNG government permits are issued and development conditions are agreed. Recent changes to the fiscal regime could harm to Project's economic returns. Future adverse legislative

[1] *Koki Ekwai Mineral Resource Audit,* Xstract, 2016
[2] *HIT Mineral Resource review*, QG, 2015

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			changes may make the Project unattractive to investors and the Project may not proceed to development.
	Cut-off parameters	3	Uncertainty relates to the underlying assumptions used to develop the revenue and cost models. The NSR cut-off is sensitive to metallurgical throughput and recovery models, the operating cost estimate and future metal prices, whose true values are unknown at this time. The selected open-pit shell equates to a conservative revenue factor 0.88 with metal price assumptions (US$2.90/lb copper and US$1,276/oz gold) that are below the value assumed for this Ore Reserve estimate (US$3.30/lb copper and US$1,450/oz gold). Cash flow modelling for the Project demonstrates that the Project is feasible. The Project also demonstrates a robust unit cash cost of copper production.
	Mining factors	3	Uncertainty relates to the underlying assumptions used to complete geotechnical, dilution and recovery assessment, water and waste management designs. The geotechnical slope stability recommendations were provided by an independent geotechnical consultant based extensive field work, 3D modelling and risk assessments. Ore loss is considered to be low due to the nature and size of the ore body. Water management (both groundwater and surface water) is considered in the open-pit designs and is included in the cost estimates for the Feasibility Study. The waste management plan uses a conveyor and barge loading system to place waste rock into the ISF from Year 1. Mining productivity and operating time estimates are based on experience in similar conditions which provides confidence in these estimates.
	Metallurgy factors	2	The configuration of ore processing plant was developed by internal and independent experienced professionals and benchmarked from existing operations under similar conditions. The flowsheet selection and throughput and recovery models were developed from a suite of laboratory and pilot plant tests. Test work supports metallurgical recovery assumptions for material above the minimum copper grade criteria selected of 0.15% copper for primary ore and 0.2% copper for oxidised ore. Comminution and flotation test work and an independent peer review support the metallurgical recoveries for the oxide and primary ore types. The mine plans considers the impact of the two ore types. Ore hardness increases with open-pit depth and additional grinding capacity has been incorporated into the process plant design to offset the reduced

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			throughput from harder ores. This configuration has been included in the production schedule and cost estimate.
	Environmental	3	Uncertainty arises from the Project's construction and operation in the high rainfall climate and steep terrain. Tailings disposal, waste rock management and water management practices are based on the high standards and successful experience at PanAust's existing operations. Mine waste rock and process tailings will be stored subaqueously in an ISF. The ISF design is supported by extensive modelling which shows no significant adverse long term impact on downstream water quality. Experienced internal and independent personnel have developed the environmental designs and action plans for the Project. A comprehensive EIS has been prepared along with proposed environmental management plans to mitigate adverse environmental harm.
	Infrastructure	3	The uncertainty relates to the remoteness and lack of infrastructure supporting the Project's development. The Feasibility Study fully defines the infrastructure required to develop the Project: an ocean port, airport, public road, mine access road, concentrate pipeline, hydroelectric project, ISF and supporting infrastructure. The Feasibility Study developed designs, cost estimates and implementation plans that provides confidence in these infrastructure requirements.
	Cost Estimates	3	Uncertainty relates to the underlying assumptions and data used to develop the cost models. Cost estimates are considered reliable based on benchmarking data and independent review. Some uncertainty may exist with regards to the estimation of some quantities and future costs. These risks are considered to be consistent with industry practices and market-related price movements for goods and consumables.
	Revenue	3	Uncertainty relates to the future market supply and demand that influences the copper price. Long term prices for copper and gold have been provided by a reputable independent party based on their expert view of future supply and demand and the resultant price forecast. Residual uncertainties for copper and gold prices exist. These risks are considered to be consistent with industry practices and market-related supply and demand movements.

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	Market assessment	1	Uncertainty relates to the future sales agreements. The copper concentrate market is considered low risk. Existing long term contracts exist for the concentrate produced by PanAust's Phu Kham Copper-Gold Operation. Independent and renowned market specialists, CRU and Wood Mackenzie forecast deficits emerging in copper supply from 2022 and reverting to surpluses from 2025, assuming new supply is incentivised by higher prices to invest. Long term both groups forecast the market to be in equilibrium. Metallurgical test work indicates that Project concentrate will be low in deleterious elements and will be attractive to potential customers.
	Economic	3	Uncertainty relates to the influence of external market influences. The NPV of the Project is supported by the assumptions and analysis described in the Feasibility Study. The project will have life of mine operating costs in the first quartile of global production costs and will therefore sustain positive operating cash flows through low points in future metal price cycles.
	Social	3	Uncertainty relates to the social support for the Project and the conditions that may arise from the Mine Development Forum to be convened as part of the SML process. Negotiation of, and compliance with, acceptable compensation, resettlement and benefit sharing agreements will be critical to establishing and maintaining Project support. PanAust intends to maintain the support of host communities through transparent and effective stakeholder engagement, including community development programs, capacity building initiatives, compensation, dispute resolution and grievance management.
	Classification	2	Uncertainty relates to the assumptions in the modifying factors used in the Ore Reserve estimate. The Ore Reserve classification reflects the Competent Person's confidence in the modifying factors and is based on the underlying Mineral Resource classification.