# Fortescue The New Favor in Iran Ore

#### 17 August 2018

The Companies Officer
Australian Securities Exchange Ltd
Level 40, Central Park
152-158 St Georges Terrace
Perth WA 6000

Dear Madam or Sir

### **Fortescue Mineral Resources Update: Development Properties**

Fortescue Metals Group (ASX: FMG, Fortescue) presents the attached Mineral Resources statement for its Development Properties at 30 June, 2018.

The report updates the Inferred Mineral Resource estimates in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, December 2012 (the JORC Code) as required by the Australian Securities Exchange. The annual summary will be included in Fortescue's 2018 Annual Report which should be read in conjunction with the enclosed statement.

#### **Summary: Mineral Resources Development Properties - Hematite**

	June 201	8	June 2017		
	In-situ tonnes (mt)	Fe%	In-situ tonnes (mt)	Fe%	
Greater Chichester	433	56.4	433	56.4	
Greater Solomon	2,658	56.8	2,658	56.8	
Western Hub	1,642	57.1	2,125	57.9	
Nyidinghu	2,463	57.4	2,463	57.4	
Total Development Mineral Resources	7,198	57.1	7,680	57.3	

Tonnage information has been rounded and as a result the figures may not add up to the totals quoted.

The Western Hub Inferred Mineral Resource has changed to 1,642 million tonnes (mt). This decrease follows the transfer of the Eliwana deposit to the operating properties for the 2018 reporting period. This has been partly offset by a 393 mt increase to the Lora, Boolgeeda and Vivash deposits. The additional tonnes include high grade bedded iron deposits (BID) in the Brockman Iron Formation, along with channel iron deposits (CID) and detrital iron deposits (DID).

Chief Executive Officer, Elizabeth Gaines said, "With our Eliwana project now underway, it is pleasing to see our hematite mineral resources at our development properties maintained at over





seven billion tonnes, with the Nyidinghu resource remaining as a significant development option for the future."

Yours sincerely Fortescue Metals Group Ltd

## Cameron Wilson Company Secretary

Media contact:

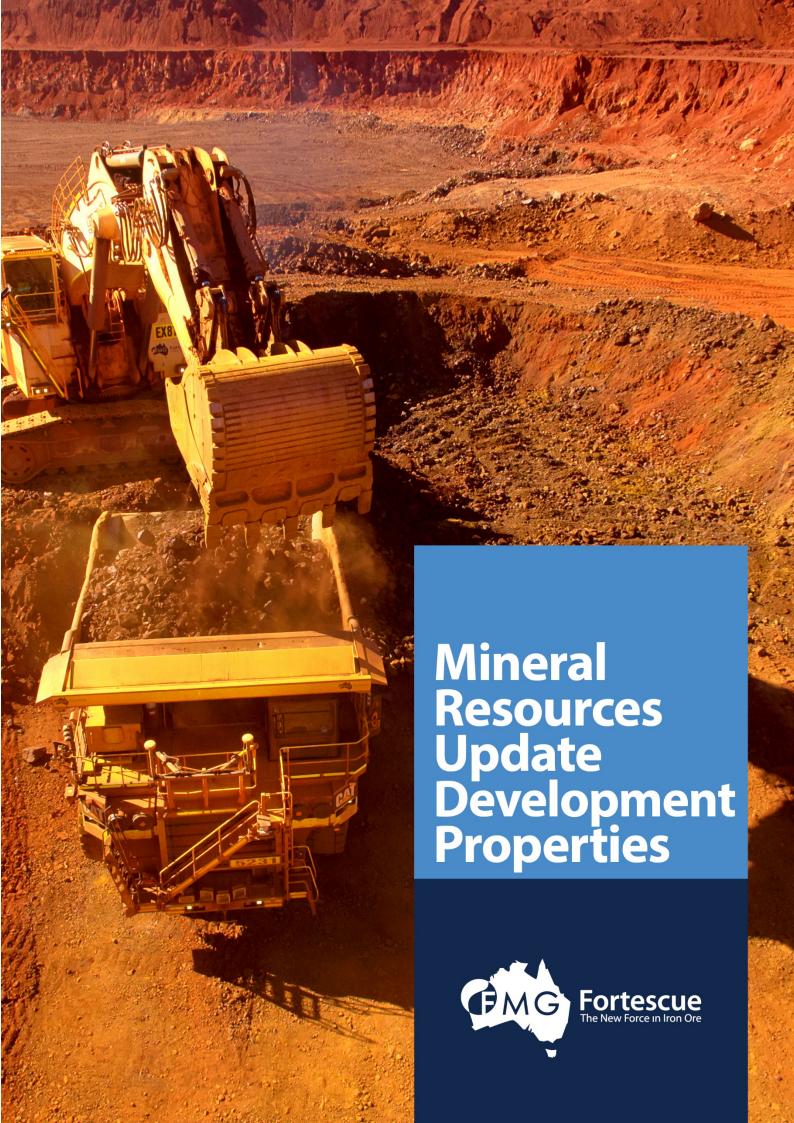
Michael Vaughan, Fivemark Partners **E:** mediareleations@fmgl.com.au

**M:** +61 422 602 720

**Investor Relations contact:** 

Stuart Gale

E: investorrelations@fmgl.com.au



#### **GREATER WESTERN HUB**

Updated Mineral Resource estimates have been produced for deposits within Fortescue's Western Hub to add 393 million tonnes (mt). These were done with the intention of updating both the existing estimation footprint and the stratigraphic interpretation. The Mineral Resource estimates are in compliance with the 2012 edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' (JORC Code, 2012). The Mineral Resources are classified as Inferred. The Eliwana deposit has previously been reported as part of the Western Hub development properties, this has now been transferred to the Eliwana Operating Properties for reporting.

Deposits in the Western Hub are located approximately 100-140km west and north-west of Tom Price and are 100-150km west of Fortescue's Solomon operations in the Pilbara region of Western Australia.



Figure 1: Fortescue Mineral Resource and operations overview.

Estimates have been completed for the Lora, Boolgeeda and Vivash deposits. These deposits are located within 15-40km of Eliwana.

The Lora deposit occurs near the western margin of the Hamersley Basin. The deposit contains bedded iron deposits (BID) mineralisation hosted by the Brockman Iron Formation and minor detrital iron deposits (DID). Mineralisation covers an area approximately 8km along strike and 600m across strike. Mineralisation occurs at surface and extends to depths of up to 130m with an average thickness of 30m. Further drilling over the project areas has resulted in an increase of the Mineral Resource to 189mt, an increase of 65mt from the previous release on August 18 2017.

The Boolgeeda deposit is a channel iron deposit (CID) in the Western Hub. The CID occurs in a channel in the central part of the drainage system and as a series of mesas at the northwest and southeast ends. In the central area the CID is covered by 20-50m of detritals. Throughout the area the CID mineralisation is found from surface and up to depths of 80m at an average thickness of 30-40m. The mineralisation occurs over a distance of approximately 20km along the channel and up to 600m across the channel. Further drilling over the project areas has resulted in an increase of the Mineral Resource to 490mt, an increase of 232mt from the previous release on August 18 2017.

The Vivash deposit is situated on the southern limb of the Brockman Syncline. The deposit consists of BID with mineralisation hosted by the Brockman Iron Formation and minor DID. Mineralisation occurs over a length of approximately 2km along the main escarpment. Mineralisation occurs at surface and to depths of up to 160m with an average thickness of 25m. This is a new project.

For all deposits in the Western Hub, drill samples are from Reverse Circulation (RC) drilling rigs with cone splitters. RC drill holes have been drilled on a nominal  $200m \times 100m$  and  $400m \times 100m$  spaced grid, with a small amount of  $100m \times 100m$  spaced drill holes.

All data is captured electronically and has to pass extensive quality assurance and quality control (QAQC) procedures. QAQC is an ongoing analysis and includes validation of drill hole collar coordinates, field standards, laboratory standards, field duplicates, twin holes as well as 'round robin' checks between laboratories. No major issues were identified with precision, accuracy or bias. The estimations incorporate all of the validated RC holes drilled in the area by Fortescue that have collar and assay information loaded into the acQuire database. Geological logging, geochemistry and geophysical data were used to identify the stratigraphic units which were then modelled in 3D.

Grades estimated in the models were Fe, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, P, Mn, MgO, CaO, TiO<sub>2</sub>, Na<sub>2</sub>O, S, K<sub>2</sub>O, and LOI total. However, only Fe, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, P and LOI total are quoted here as the other elements are not considered significant. Variography and detailed statistics using Snowden Supervisor software was used to determine the estimation parameters for the grade modelling. Ordinary Kriging and inverse distance cubed were used as modelling techniques to estimate grades. Estimation was done using Vulcan software.

Density has been determined from down-hole geophysical measurements throughout the deposits. For the Brockman BID deposits these have been compared with bulk density measurements on diamond core drilled at the analogous Eliwana deposit. Average rounded densities by geological unit and mineralisation have been applied globally to the models.

The cut-offs used to report these Mineral Resources vary slightly across the deposits to deliver similar grades to Fortescue's current production specifications. BID and DID at Lora is reported at greater than or equal to 54% Fe. BID at Vivash is reported at greater than or equal to 50% Fe and DID is reported at greater than or equal to 52% Fe. CID at Boolgeeda is reported at greater than or equal to 52% Fe.

The estimates have been classified as Inferred Mineral Resources and reported in accordance with the JORC Code, 2012 Edition. The classification is derived from consideration of the confidence in geological and mineralisation continuity, sample spacing, sample statistics, estimation parameters, interpretational uncertainties, mapping and the potential for economic extraction. The Mineral Resource summary for these deposits is shown in Table 1.

**Table 1: Mineral Resource summary.** 

Ore Type	In-Situ Tonnes (mt)	Iron Fe %	Silica SiO2 %	Alumina Al2O3 %	Phos P %	Loss On Ignition LOI %	
			Lora				
Detritals	29	56.5	8.18	4.02	0.076	6.0	
Brockman BID	159	58.9	5.07	2.97	0.165	7.1	
TOTAL	189	58.5	5.56	3.13	0.151	6.9	
		В	oolgeeda				
CID Lower	490	55.4	5.92	2.84	0.043	11.4	
	Vivash						
Detritals	12	57.7	7.68	5.14	0.045	3.7	
Brockman BID	84	58.8	6.00	2.73	0.113	6.6	
TOTAL	96	58.7	6.21	3.03	0.104	6.2	

Tonnage information has been rounded and as a result the figures may not add up to the totals quoted

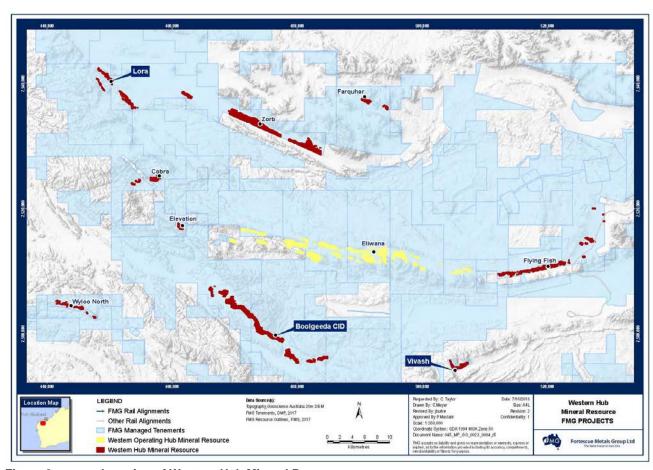


Figure 2: Location of Western Hub Mineral Resources.

The Mineral Resource inventory compared with the previous reporting period for these deposits is shown in Table 2. In accordance with the requirements of the JORC Code, 2012 Edition for reporting Mineral Resources, the JORC Code, 2012 Edition Table 1 for each estimate is provided in the attachment.

Table 2: Western Hub total Mineral Resource inventory.

		June 2018					June 2017					
Project	In-Situ Tonnes (mt)	Iron Fe %	Silica SiO2 %	Alumina Al2O3 %	Phos P %	Loss On Ignition LOI %	In-Situ Tonnes (mt)	Iron Fe %	Silica SiO2 %	Alumina Al2O3 %	Phos P %	Loss On Ignition LOI %
					We	stern Hub						
Eliwana	-	-	-	-	-	-	875	58.8	5.45	3.05	0.115	6.5
Flying Fish	205	60.2	3.98	2.38	0.059	6.7	205	60.2	3.98	2.38	0.059	6.7
Vivash	96	58.7	6.21	3.03	0.104	6.2	-	-	-	-	-	-
Cobra	152	58.6	5.90	2.54	0.149	7.1	152	58.6	5.90	2.54	0.149	7.1
Lora	189	58.5	5.56	3.13	0.151	6.9	124	58.6	5.19	3.31	0.151	6.9
Zorb	337	54.6	6.57	3.14	0.040	11.2	337	54.6	6.57	3.14	0.040	11.2
Farquhar	41	58.2	5.56	2.98	0.123	7.6	41	58.2	5.56	2.98	0.123	7.6
Elevation	33	59.4	4.75	2.68	0.129	7.0	33	59.4	4.75	2.68	0.129	7.0
Boolgeeda	490	55.4	5.92	2.84	0.043	11.4	258	55.5	5.74	2.89	0.049	11.4
Wyloo North	101	60.4	5.38	2.60	0.107	5.0	101	60.4	5.38	2.60	0.107	5.0
TOTAL	1,642	57.1	5.72	2.85	0.078	9.0	2,125	57.9	5.53	2.93	0.094	7.9

Tonnage information has been rounded and as a result the figures may not add up to the totals quoted

#### **COMPETENT PERSON'S STATEMENT**

The information in this report that relates to Exploration Targets, Exploration Results and Mineral Resources is based on information compiled by Mr Stuart Robinson who is a Fellow of The Australasian Institute of Mining and Metallurgy, and Mr Nicholas Nitschke and Ms Erin Retz who are Members of The Australasian Institute of Mining and Metallurgy. Mr Stuart Robinson, Mr Nicholas Nitschke and Ms Erin Retz are full time employees of Fortescue Metals Group Ltd. Mr Robinson, Mr Nitschke and Ms Retz have sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity which they are 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 Robinson, Mr Nitschke and Ms Retz consent to the inclusion in this report of the matters based on this information in the form and context in which it appears.

## JORC Table 1: Lora

## **Section 1 Sampling Techniques and Data**

Criteria	Commentary
	A total of 222 reverse circulation drill holes and 17,103 1m composite samples were
	used in the model. Samples sent for element and analytical work were selected based
	on potential ore-grade material with a reasonable envelope both above and below this
	interval. Most holes where possible undergo down hole geophysical logging.
Sampling	Analytical standards were used to assist in checking laboratory results. Field duplicates
techniques	were used to assist with determining sampling quality at the rig. Geophysical probes
techniques	were calibrated on a regular basis using static methods and specific calibration holes.
	Drill hole locations were determined by survey contractors.
	All samples were taken on 1m intervals from reverse circulation drill holes. A sample
	weighing approximately 1 to 3 kilograms was collected for each metre which was
	transported to a commercial laboratory and then pulverised for XRF analysis.
Drilling	Reverse circulation (RC) drill holes of approximately 140mm diameter were completed
techniques	using a standard face sampling hammer. The majority of drill holes are vertical with only
,	three being drilled on an angle.
	The quality of each sample sent to the laboratory was recorded by the logging geologist
	at the time of drilling and categorised as either poor, moderate or good. 93% of samples
Drill sample	were recorded as good, 4% were recorded as moderate and 3% were recorded as poor.
recovery	No major issues with the sample collection system were identified during drilling. Minimal
-	loss of fines was achieved through the use of an automated sample collection and splitting system.
	There is assumed to be no expected relationship between sample recovery and grade.
	Geological logging was completed by geologists experienced in iron ore mineralisation.
	The standard of logging is suitable to support an estimate of Mineral Resources.
	Stratigraphy, mineralogy, chip size, chip shape, chip recovery, hardness, colour,
Logging	moisture and sample quality were recorded for all drill holes. Chip trays from RC holes
	were collected on an intermittent basis.
	All RC drill holes were geologically logged.
	Drilling samples are collected in labelled bags, which are stored onsite or sent for
	analysis. These samples are collected using a cone splitter installed directly beneath the
	cyclone. Wet samples are collected using the same technique as dry samples, with
	thorough cleaning of sampling system between samples. Wet samples are allowed to
	dry before being processed.
	The sample collected from the cone splitter represents approximately 6 to 7% of the total
Sub-sampling	sample interval. Cone splitters are the preferred splitting system used by Fortescue as
techniques and	they generally give the most representative sample in both dry and wet conditions.
sample	At the laboratory, samples were weighed, dried and pulverised to either 90% passing
preparation	through 106 microns (SGS) or 85% passing through 75 microns (Genalysis).
<b>,</b> - <b>,</b> - · · · · · · · ·	Coarse field standards (approximately 1 in 100 samples) and laboratory standards (1 per
	lab job) were used as a quality control measure at different sub-sampling stages.
	Rig duplicate samples are taken at an average of 3 rig duplicate samples per
	approximately 100 samples sent to the laboratory. An analysis of these duplicate
	samples indicates that they are of good quality and repeatable.  No formal analysis of the appropriateness of sample size compared to grain size has
	been completed but the sampling regime is considered to be industry best practice.
	All samples were sent to SGS or Genalysis laboratories for analysis. All laboratories
Quality of assay data and laboratory tests	have National Association of Testing Authorities, Australia (NATA) accreditation. The
	standard elements tested were Fe, SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , P, MnO/Mn, MgO, CaO, TiO <sub>2</sub> , Na <sub>2</sub> O, S
	and K <sub>2</sub> O by X Ray Fluorescence (XRF) and a three point LOI thermo gravimetric
	analysis at 371, 650 and 1000 degrees Celsius. This is considered a total analysis.
	No geophysical tools were used to determine any element concentrations used in the
	estimate.
	Field duplicates were collected at a rate of approximately 3 in 100 samples. Standards
	are submitted at approximately 1 in every 100 samples. Analysis of duplicates did not
	indicate any major issues. Analysis of laboratory standard results indicates high

	issues with laboratory sample preparation and standard certification in the past. Field standard results have been closely monitored and such issues have now been mitigated.
	Significant intersections have been visually verified by Fortescue's Exploration
	Managers.
	No twin holes have been completed at this stage of the project.
Verification of	Sample data is stored using a customised acQuire database, which includes a series of
sampling and	automated electronic validation checks. Fortescue data entry procedures are
assaying	documented and readily available. Only trained personnel perform further manual
assayirig	validation in order to confirm results reflect field collected information and geology.
	Samples returning below detection limits were given the result of half the detection limit.
	Missing data was set to -99 and those samples were excluded from statistical analysis
	and estimation.
	Drill hole collar locations have been surveyed using a differential GPS (by Down Under
	Surveys), with an accuracy of better than 3cm for Easting and Northing and 5cm in
	elevation. Down hole surveys have been completed on 14 of the drill holes. Collar survey
Location of data	data is validated against planned coordinates and the topographic surface.
points	Grid coordinates given for each point are Map Grid of Australia (GDA94) and heights are
	in the Australian Height Datum. The project area lies inside UTM zone 50.
	The topography was created from 2m contours produced from 1 metre LIDAR data.
	Vertical and horizontal accuracy of this data is+/-0.15 metres.
	The grade estimate used RC drill holes which occur on a grid spacing of 200m × 100m
Data spacing	with a small amount of 100m × 100m spacing drilled areas for assays and geology.
and distribution	This level of drill spacing is sufficient to establish the degree of geological and grade
	continuity required for an Inferred Mineral Resource
	No sample compositing was conducted for this estimation.
Orientation of	Drill holes have been predominantly drilled as vertical holes in drill lines sub-
data in relation	perpendicular to the local bearing of the ore body. The mineralisation is sub-horizontal
to geological	and these vertical holes are sufficient to imply geological and grade continuity.
structure	No material relationship is apparent between sampling bias and geological orientation.
Sample security	To ensure sample security consignment notes (sample submission information) have
	been used and direct delivery to site laboratories has been carried out.
A	All sampling has been carried using Fortescue standard procedures.
Audits or	For analogous deposits Fortescue has had a sampling audit conducted by Snowden. For
reviews	this project there were no major risk factors relating to the sampling and assaying of the
	data. Similar rigs and splitter systems were utilised in this deposit.

Section 2 Reporting of Exploration Results

Criteria	Commentary
Mineral tenement and land tenure status	FMG Pilbara Pty Ltd is a wholly owned subsidary of Fortescue Metals Group and owns 100% of all mineral rights in the tenements which cover the Resource: E47/1832, E47/1988. These are all live, granted tenements.  The tenements are within the Kuruma Marthudunera (Part A) native title determination (WCD2016/006), the Kuruma Marthudunera Part B native title determination (WCD2018/003), and the Puutu Kunti Kurrama and Pinikura (PKKP) native title determination (WCD2015/003). Fortescue has a current Land Access Agreement with the PKKP native title holders.
	The tenure is currently generally in good standing and no impediments are known to exist.
Exploration done by other parties	BHP has performed exploration for iron within the Lora project area. No historical data has been used by Fortescue.
Geology	Mineralisation within the Lora deposit is a hosted by bedded iron deposit (BID) and detrital iron deposit (DID). Bedded mineralisation is found within the Dales Gorge, Whaleback Shale and Joffre Members of the Brockman Iron Formation.
Drill hole Information	Collar details of the RC drill holes used in the Lora estimate are not being reported here.
Data aggregation methods	No exploration results are being reported. For methods used in the estimation of Lora please refer to: Section 3 Estimation and Reporting of Mineral Resources.

Relationship between mineralisation widths and intercept lengths	No exploration results are being reported. Please refer to: <i>Orientation of data in relation to geological structure</i> in <i>Section 1 Sampling Techniques and Data</i> for the geometry of mineralisation with respect to drill hole angle.
Diagrams	The Mineral Resource extents are shown in the release.
Balanced	No exploration results are being reported and this is not pertinent to the reporting of
reporting	Mineral Resources.
	The density study carried out at Lora is discussed in: Section 3 Estimation and Reporting of Mineral Resources.
Other substantive exploration data	Geological surface mapping of the Lora project has been carried out by Fortescue geologists. Dip and strike measurements, stratigraphy and mineralisation have been recorded into a database.
ехріогаціон цаца	Down hole geophysics has been carried out on some RC drill holes including: natural gamma, magnetic susceptibility and gamma gamma density.
	The estimated groundwater level has been recorded on most RC drill holes.
Further Work	Further infill drilling and metallurgical test work is planned for Lora. Extensions to known
T UTITIET VVOIK	mineralisation may occur in the area.

Section 3 Estima	ation and Reporting of Mineral Resources
Criteria	Commentary
	Sample data is stored using a customised acQuire database, which includes a series of automated electronic validation checks. AcQuire is a secure and an industry standard strength database.
Database integrity	Only trained personnel perform further manual validation on the data in order to confirm results reflect field collected information and geology. In order to ensure integrity of the database, any changes to the database only occur after a review of the suggested changes are authorised, and these changes can only be performed by an authorised person. Prior to modelling, further validation was performed on the dataset being used.
Site visits	The Competent Person and Competent Persons team conducts regular site visits, approximately every two to three months when drilling operations are in progress to inspect the model area, RC drill hole logging and sampling practices. Discussions are held regularly with site geologists.
Geological interpretation	Logging and geological interpretation was completed by geologists experienced in iron ore mineralisation. Geology over the majority of the deposit is relatively straight forward. There is some risk of misinterpretation in areas of wider spaced drilling with limited assay data, however, this is not considered to be material.  Geological interpretation is based on geological logging, down hole geophysics and geochemistry of RC drill samples.  The stratigraphy of Lora is reasonably well known and it is envisaged that any alternative geological interpretation, with or without further drilling, would not have a material impact on the Mineral Resource estimate. Extrapolation of mineralisation has been restricted to approximately half of the nominal drill spacing.
	All samples are flagged with their host geological zone, only samples with the same geological zone as the block to be estimated can be used in grade estimation.  It is not expected that further drilling will change the grade and geological continuity. The geological continuity is generally good compared with analogous areas.
Dimensions	Mineralisation at Lora occurs in three areas, over a total area of 9km along strike and 2m across strike. Mineralisation occurs at surface and to depths of up to 200 metres. The defined mineralised units are between 5m and 200m thick with an average thickness of 30-50m.
Estimation and modelling techniques	Ordinary Kriging was used to estimate all mineralised units and inverse distance cubed for all waste domains. Estimation was done using Vulcan software. Mineralisation was extrapolated half the distance of drill spacing away from the drilling. The deposit was domained by stratigraphy, structure, local strike/orientation and mineralised/unmineralised zones.  No assumptions regarding the recovery of by-products have been made.

	The iron ore suite of Fe, SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , P, Mn, MgO, CaO, TiO <sub>2</sub> , Na <sub>2</sub> O, S, K <sub>2</sub> O, LOI Total, LOI 371, LOI 650 and LOI 1000 has been estimated.
	Estimation into parent cells of 50mE x 100mN x 1mRL was used. Size and orientation of parent blocks reflected half the nominal drill spacing and orientation of mineralisation. Sub blocking down to 6.25mE x 6.25mN x 1mRL was used along domain boundaries to better define the domain interface.
	Up to three estimation passes were used for each element, gradually increasing search ellipse distances with each pass. Search distances along strike and across strike varied between each domain. These were primarily defined by sample spacing within each domain and determined by neighbourhood iterative tests.
	No assumptions behind the modelling of selective mining units have been made.
	Correlation between some elements has been noted during statistical analysis. Similar variogram parameters were achieved for mineralised domains that had elements with a correlation coefficient of > 0.7 or < -0.7.
	The definition of mineralised zones within each stratigraphic unit was accomplished using an indicator approach. The probability of any zone being mineralised was estimated using appropriate geochemical indicator thresholds for Fe, SiO <sub>2</sub> and Al <sub>2</sub> O <sub>3</sub> for the individual stratigraphic units. These thresholds were based on data population statistics and visual validation. A domain code was assigned to each sample, defined by the stratigraphic unit and mineralisation.
	Some element grades were top-cut during estimation based on coefficient of variation values higher than 1.2.
	Visual validation of the block model coding of the domains was completed prior to estimation. Once estimated, the grade of all elements was also visually validated. Visual validation of both the domains and grade were completed in Vulcan by comparing section and plan slices of the block model against the drill holes. Statistics for the mean grade of the mineralised blocks within each stratigraphic unit were compared to the
	mean grade of the mineralised samples within each stratigraphic unit. Overall, the mean values between the model and samples are within an acceptable range. Trend analysis graphs have been created for each of the mineralised domains. These have been generated in Northing, Easting and RL, for all elements. The trend analysis graphs show the modelled grade vs. the raw data grade at a particular slice in space. The trend
	analysis charts show that overall, the model grade is consistent with the raw data and shows no bias. Areas with a large number of samples correlate much better with the model grade than do areas with few samples.
Moisture	Tonnages are estimated on a dry basis.
Cut-off parameters	A cut-off of greater than or equal to 54% Fe was used to report the tonnages of all stratigraphic units. This has been used for analogous Fortescue estimates and represents a similar cut-off to current product specifications.
Mining factors or assumptions	It is assumed that mining will be carried out with medium to large scale mining equipment using 5 metre bench heights, though bench heights may vary depending on mining studies. These methods will be similar to analogous Fortescue deposits where conventional: truck & shovel/excavator; drill & blast and; grade control methods are used. The impact of dilution will be assessed as part of the mining studies.
Metallurgical factors or assumptions	It is assumed that similar metallurgical techniques to analogous Fortescue operations will be utilised. The expectation is that material will be dry-processed by screens and crushers. Final processing methods will be defined by further mining studies.
Environmental factors or assumptions	Fortescue has an extensive environmental and heritage approvals process. Waste is considered to be inert and formed waste dumps will conform to WA standards. Waste will be formed as dumps or into mining voids. In the case of acid and fibre mitigation, Fortescue has industry standard procedures. Some beneficiation may take place but reject is considered to be inert and there are no foreseen problems with tailings disposal. It is assumed material will be transported to existing ore processing facilities and use current tailings disposal infrastructure.
Bulk density	Density has been calculated from down-hole geophysical measurements throughout the deposit. Average rounded densities by geological unit and mineralisation have been compared with analogous deposits and then applied globally to the model. Whilst on site down-hole geophysical tools are calibrated fortnightly in a designated test diamond drill hole.

	Down-hole geophysical probes measure the insitu bulk density which accounts for void spaces. These measurements are not corrected for moisture but are validated against known dry bulk densities from diamond core drilled in analogous Fortescue projects. Down-hole geophysical measurements are grouped by geological and mineralisation domains.  The densities used are similar to known densities for current and historic mines, of similar geology and mineralisation, across the Pilbara.
Classification	The Mineral Resource has been classified as Inferred. This takes into account drill spacing and data integrity, geological complexity, grade estimation quality, interpreted risk and mineralisation continuity.
	The Mineral Resource classification reflects the views of the competent persons.
Audits or reviews	Internal reviews have been completed during all stages of the estimate. External audits of the estimation process has been completed for analogous deposits with no significant flaws identified. Similar processes have been used for this estimate.
	Grade and geological continuity is sufficient for an Inferred Mineral Resource.
Discussion of relative	Greater confidence in applied density values will be achieved through further physical density and down-hole geophysical measurements.
accuracy/ confidence	The global estimate is sufficient to imply the grade and geological continuity in the area of the Inferred Mineral Resource.
	No production data is available at this stage.

# JORC Table 1: Boolgeeda

# **Section 1 Sampling Techniques and Data**

Criteria	Commentary
	A total of 386 reverse circulation drill holes and 17,827 1m composite samples were
	used in the model. Samples sent for element and analytical work were selected based
	on potential ore-grade material with a reasonable envelope both above and below this
	interval. Most holes where possible undergo down hole geophysical logging.
Sampling	Analytical standards were used to assist in checking laboratory results. Field duplicates
techniques	were used to assist with determining sampling quality at the rig. Geophysical probes
4	were calibrated on a regular basis using static methods and specific calibration holes.
	Drill hole locations were determined by survey contractors.
	All samples were taken on 1m intervals from reverse circulation drill holes. A sample
	weighing approximately 1 to 3 kilograms was collected for each metre which was
Duillin a	transported to a commercial laboratory and then pulverised for XRF analysis.
Drilling	Reverse circulation drill holes of approximately 140mm diameter were completed using a
techniques	standard face sampling hammer. All drill holes are vertical.
	The quality of each sample sent to the laboratory was recorded by the logging geologist
	at the time of drilling and categorised as either poor, moderate or good. 53% of samples
Drill comple	were recorded as good, 16% were recorded as moderate and 25% were recorded as
Drill sample recovery	poor. 5% of samples did not have quality recorded.  No major issues with the sample collection system were identified during drilling. Minimal
recovery	loss of fines was achieved through the use of an automated sample collection and
	splitting system.
	There is assumed to be no expected relationship between sample recovery and grade.
	Geological logging was completed by geologists experienced in iron ore mineralisation.
	The standard of logging is suitable to support an estimate of Mineral Resources.
	Stratigraphy, mineralogy, chip size, chip shape, chip recovery, hardness, colour,
Logging	moisture and sample quality were recorded for all drill holes. Chip trays from RC holes
	were collected on an intermittent basis.
	All RC drill holes were geologically logged.
	Drilling samples are collected in labelled bags, which are stored onsite or sent for
	analysis. These samples are collected using a cone splitter installed directly beneath the
	cyclone. Wet samples are collected using the same technique as dry samples, with
	thorough cleaning of sampling system between samples. Wet samples are allowed to
	dry before being processed.
	The sample collected from the cone splitter represents approximately 6 to 7% of the total
Cub compling	sample interval. Cone splitters are the preferred splitting system used by Fortescue as
Sub-sampling	they generally give the most representative sample in both dry and wet conditions.
techniques and sample	At the laboratory, samples were weighed, dried and pulverised to either 90% passing
preparation	through 106 microns (SGS) or 85% passing through 75 microns (Genalysis).
proparation	Coarse field standards (approximately 1 in 100 samples) and laboratory standards (1 per
	lab job) were used as a quality control measure at different sub-sampling stages.
	Rig duplicate samples are taken at an average of 3 rig duplicate samples per
	approximately 100 samples sent to the laboratory. An analysis of these duplicate
	samples indicates that they are of good quality and repeatable.
	No formal analysis of the appropriateness of sample size compared to grain size has
	been completed but the sampling regime is considered to be industry best practice.
Quality of assay data and laboratory tests	All samples were sent to SGS or Genalysis laboratories for analysis. All laboratories
	have National Association of Testing Authorities, Australia (NATA) accreditation. The
	standard elements tested were Fe, SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , P, MnO/Mn, MgO, CaO, TiO <sub>2</sub> , Na <sub>2</sub> O, S
	and K <sub>2</sub> O by X Ray Fluorescence (XRF) and a three point LOI thermo gravimetric
	analysis at 371, 650 and 1000 degrees Celsius. This is considered a total analysis.
	No geophysical tools were used to determine any element concentrations used in the
	estimate.
	Field duplicates were collected at a rate of approximately 3 in 100 samples. Standards
	are submitted at approximately 1 in every 100 samples. Analysis of duplicates did not
	indicate any major issues. Analysis of laboratory standard results indicates high
	confidence in XRF analysis at each laboratory. Analysis of field standards indicates an

	ongoing issue with laboratory sample preparation and standard certification. Field standard results are closely monitored and actions are underway to mitigate issues.
	Significant intersections have been visually verified by Fortescue's Exploration Managers.
	No twin holes have been completed at this stage of the project.
Verification of	Sample data is stored using a customised acQuire database, which includes a series of automated electronic validation checks. Fortescue data entry procedures are
sampling and assaying	documented and readily available. Only trained personnel perform further manual validation in order to confirm results reflect field collected information and geology.
	Samples returning below detection limits were given the result of half the detection limit. Missing data was set to -99 and those samples were excluded from statistical analysis and estimation.
	Drill hole collar locations have been surveyed using a differential GPS (by Down Under
	Surveys), with an accuracy of better than 3cm for Easting and Northing and 5cm in
	elevation. Down hole surveys have been completed on three of the drill holes. Collar
Location of data	survey data is validated against planned coordinates and the topographic surface.
points	Grid coordinates given for each point are Map Grid of Australia (GDA94) and heights are in the Australian Height Datum. The project area lies inside UTM zone 50.
	The topography was created from 2m contours produced from 1 metre LIDAR data.
	Vertical and horizontal accuracy of this data is+/-0.15 metres.
	The grade estimate used RC drill holes which occur nominally on a 400m ×100m spacing with some more sparsely drilled areas for assays and geology.
Data spacing	This level of drill spacing is sufficient to establish the degree of geological and grade
and distribution	continuity required for an Inferred Mineral Resource
	No sample compositing was conducted for this estimation.
Orientation of	Drill holes have been drilled as vertical holes in drill lines sub-perpendicular to the local
data in relation	bearing of the ore body. The mineralisation is sub-horizontal and these vertical holes are
to geological	sufficient to imply geological and grade continuity.
structure	No material relationship is apparent between sampling bias and geological orientation.
Sample security	To ensure sample security consignment notes (sample submission information) have
	been used and direct delivery to site laboratories has been carried out.
	All sampling has been carried using Fortescue standard procedures.
Audits or	For analogous deposits Fortescue has had a sampling audit conducted by Snowden. For
reviews	this project there were no major risk factors relating to the sampling and assaying of the
	data. Similar rigs and splitter systems were utilised in this deposit.

Section 2 Reporting of Exploration Results

Criteria	Commentary
Mineral tenement and land tenure status	The Boolgeeda CID deposit is located within 100% owned Fortescue Exploration licences E47/1299, E47/1300 and E47/1301.
	The tenements are within the Puutu Kunti Kurrama and Pinikura (PKKP) native title determination (WCD2015/003). Fortescue has a current Land Access Agreement with the PKKP native title holders.
	The tenure is currently generally in good standing and no impediments are known to exist.
Exploration done by other parties	Rio Tinto have performed exploration for iron within the project area. No historical data has been used by Fortescue.
Geology	Mineralisation within the Boolgeeda deposit is a hosted Channel Iron Deposit (CID).  Outcropping geology in the project is Brockman Iron Formation.
Drill hole Information	Collar details of the RC drill holes used in the Boolgeeda estimate are not being reported here.
Data aggregation methods	No exploration results are being reported. For methods used in the estimation of Boolgeeda please refer to: Section 3 Estimation and Reporting of Mineral Resources.

Relationship between mineralisation widths and intercept lengths	No exploration results are being reported. Please refer to: <i>Orientation of data in relation to geological structure</i> in <i>Section 1 Sampling Techniques and Data</i> for the geometry of mineralisation with respect to drill hole angle.
Diagrams	The Mineral Resource extents are shown in the release.
Balanced	No exploration results are being reported and this is not pertinent to the reporting of
reporting	Mineral Resources.
Other substantive exploration data	The density study carried out at Boolgeeda is discussed in: Section 3 Estimation and Reporting of Mineral Resources.
	Geological surface mapping of the Boolgeeda project has been carried out by Fortescue geologists. Dip and strike measurements, stratigraphy and mineralisation have been recorded into a database.
	Down hole geophysics has been carried out on some RC drill holes including: natural gamma, magnetic susceptibility and gamma gamma density.
	The estimated groundwater level has been recorded on most RC drill holes.
Further Work	Further infill drilling and metallurgical test work is planned for Boolgeeda. Extensions to
	known mineralisation may occur in the area.

Section 3 Estimation and Reporting of Mineral Resources	
Criteria	Commentary
Database integrity	Sample data is stored using a customised acQuire database, which includes a series of automated electronic validation checks. AcQuire is a secure and an industry standard strength database.  Only trained personnel perform further manual validation on the data in order to confirm results reflect field collected information and geology. In order to ensure integrity of the database, any changes to the database only occur after a review of the suggested changes are authorised, and these changes can only be performed by an authorised
Site visits	person. Prior to modelling, further validation was performed on the dataset being used.  The Competent Person and Competent Persons team conducts regular site visits, approximately every two to three months when drilling operations are in progress to inspect the model area, RC drill hole logging and sampling practices. Discussions are held regularly with site geologists.
Geological interpretation	Logging and geological interpretation was completed by geologists experienced in iron ore mineralisation. Geology over the majority of the deposit is relatively straight forward. There is some risk of misinterpretation in areas of wider spaced drilling with limited assay data, however, this is not considered to be material.  Geological interpretation is based on geological logging, down hole geophysics and geochemistry of RC drill samples.  The stratigraphy of Boolgeeda is reasonably well known and it is envisaged that any alternative geological interpretation, with or without further drilling, would not have a material impact on the Mineral Resource estimate. Extrapolation of mineralisation has been restricted to approximately half of the nominal drill spacing.  All samples are flagged with their host geological zone, only samples with the same geological zone as the block to be estimated can be used in grade estimation.  It is not expected that further drilling will change the grade and geological continuity. The
Dimensions	geological continuity is generally good compared with analogous areas.  The CID mineralisation at Boolgeeda is found from surface and up to depths of 80m at an average thickness of 30-40m. The mineralisation covers an area approximately 20km along the channel and up to 600m across the channel. The CID occurs in a channel in the central part of the drainage system and as a series of mesas at the northwest and southeast ends.
Estimation and modelling techniques	Ordinary Kriging was used to estimate all mineralised CID units and inverse distance cubed for all remaining domains. Estimation was done using Vulcan software.  Mineralisation was extrapolated half the distance of drill spacing away from the drilling. The deposit was domained by stratigraphy, local strike/orientation and mineralised/unmineralised zones.

No check estimate has been conducted. Reconciliation against the previous estimate shows an increase in tonnes and similar overall grades. No assumptions regarding the recovery of by-products have been made. The iron ore suite of Fe, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, P, Mn, MgO, CaO, TiO<sub>2</sub>, Na<sub>2</sub>O, S, K<sub>2</sub>O, LOI Total, LOI 371, LOI 650 and LOI 1000 has been estimated. Estimation into parent cells of 100mE x 50mN x 1mRL was used. Size and orientation of parent blocks reflected half the nominal drill spacing and orientation of mineralisation. Sub blocking down to 6.25mE × 6.25mN × 0.5mRL was used along domain boundaries to better define the domain interface. Up to three estimation passes were used for each element, gradually increasing search ellipse distances with each pass. Search distances along strike and across strike varied between each domain. These were primarily defined by sample spacing within each domain and determined by neighbourhood iterative tests. No assumptions behind the modelling of selective mining units have been made. Correlation between some elements has been noted during statistical analysis. Similar variogram parameters were achieved for mineralised domains that had elements with a correlation coefficient of > 0.7 or < -0.7. The definition of mineralised zones within each stratigraphic unit was accomplished using an indicator approach. The probability of any zone being mineralised was estimated using appropriate geochemical indicator thresholds for Fe, SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> for the individual stratigraphic units. These thresholds were based on data population statistics and visual validation. A domain code was assigned to each sample, defined by the stratigraphic unit and mineralisation. Some element grades were top-cut during estimation based on coefficient of variation values higher than 1.2. Visual validation of the block model coding of the domains was completed prior to estimation. Once estimated, the grade of all elements was also visually validated. Visual validation of both the domains and grade were completed in Vulcan by comparing section and plan slices of the block model against the drill holes. Statistics for the mean grade of the mineralised blocks within each stratigraphic unit were compared to the mean grade of the mineralised samples within each stratigraphic unit. Overall, the mean values between the model and samples are within an acceptable range. Trend analysis graphs have been created for each of the mineralised domains. These have been generated in Northing, Easting and RL, for all elements. The trend analysis graphs show the modelled grade vs. the raw data grade at a particular slice in space. The trend analysis charts show that overall, the model grade is consistent with the raw data and shows no bias. Areas with a large number of samples correlate much better with the model grade than do areas with few samples. Moisture Tonnages are estimated on a dry basis. A cut-off of greater than or equal to 52% Fe was used to report the tonnages of all CID Cut-off stratigraphic units. This has been used for analogous Fortescue estimates and parameters represents a similar cut-off to current product specifications. It is assumed that mining will be carried out with medium to large scale mining equipment using 5 metre bench heights, though bench heights may vary depending on Mining factors mining studies. These methods will be similar to analogous Fortescue deposits where or assumptions conventional: truck & shovel/excavator; drill & blast and; grade control methods are used. The impact of dilution will be assessed as part of the mining studies. It is assumed that similar metallurgical techniques to analogous Fortescue operations Metallurgical will be utilised. The expectation is that material will be dry-processed by screens and factors or assumptions crushers. Final processing methods will be defined by further mining studies. Fortescue has an extensive environmental and heritage approvals process. Waste is considered to be inert and formed waste dumps will conform to WA standards. Waste Environmental will be formed as dumps or into mining voids. In the case of acid and fibre mitigation, factors or Fortescue has industry standard procedures. Some beneficiation may take place but assumptions reject is considered to be inert and there are no foreseen problems with tailings disposal. It is assumed material will be transported to existing ore processing facilities and use current tailings disposal infrastructure. Density has been calculated from down-hole geophysical measurements throughout the Bulk density deposit. Average rounded densities by geological unit and mineralisation have been

	compared with analogous deposits and then applied globally to the model. Whilst on site down-hole geophysical tools are calibrated fortnightly in a designated test diamond drill hole.  Down-hole geophysical probes measure the insitu bulk density which accounts for void spaces. These measurements are not corrected for moisture but are validated against known dry bulk densities from diamond core drilled in analogous Fortescue projects.
	Down-hole geophysical measurements are grouped by geological and mineralisation domains.
	The densities used are similar to known densities for current and historic mines, of similar geology and mineralisation, across the Pilbara.
Classification	The Mineral Resource has been classified as Inferred. This takes into account drill spacing and data integrity, geological complexity, grade estimation quality, interpreted risk and mineralisation continuity based on the semivariogram ranges of influence.
	The Mineral Resource classification reflects the views of the competent persons.
Audits or reviews	Internal reviews have been completed during all stages of the estimate. External audits of the estimation process has been completed for analogous deposits with no significant flaws identified. Similar processes have been used for this estimate.
	Grade and geological continuity is sufficient for an Inferred Mineral Resource.
Discussion of	Greater confidence in applied density values will be achieved through further physical
relative	density and down-hole geophysical measurements.
accuracy/	The global estimate is sufficient to imply the grade and geological continuity in the area
confidence	of the Inferred Mineral Resource.
	No production data is available at this stage.

## JORC Table 1: Vivash

# **Section 1 Sampling Techniques and Data**

	Commentary
	A total of 94 reverse circulation drill holes and 5,094 1m composite samples were used
	in the model. Samples sent for element and analytical work were selected based on
	potential ore-grade material with a reasonable envelope both above and below this
	interval. Most holes where possible undergo down hole geophysical logging.
Sampling	Analytical standards were used to assist in checking laboratory results. Field duplicates
techniques	were used to assist with determining sampling quality at the rig. Geophysical probes
,	were calibrated on a regular basis using static methods and specific calibration holes.
l	Drill hole locations were determined by survey contractors.
	All samples were taken on 1m intervals from reverse circulation drill holes. A sample
	weighing approximately 1 to 3 kilograms was collected for each metre which was transported to a commercial laboratory and then pulverised for XRF analysis.
	Reverse circulation (RC) drill holes of approximately 140mm diameter were completed
Drilling	using a standard face sampling hammer. The majority of the drill holes are vertical with
techniques	only three being drilled on an angle.
	The quality of each sample sent to the laboratory was recorded by the logging geologist
	at the time of drilling and categorised as either poor, moderate or good. 90% of samples
	were recorded as good, 5% were recorded as moderate and 5% were recorded as poor.
Drill sample	No major issues with the sample collection system were identified during drilling. Minimal
recovery	loss of fines was achieved through the use of an automated sample collection and
	splitting system.
	There is assumed to be no expected relationship between sample recovery and grade.
	Geological logging was completed by geologists experienced in iron ore mineralisation.
	The standard of logging is suitable to support an estimate of Mineral Resources.
Logging	Stratigraphy, mineralogy, chip size, chip shape, chip recovery, hardness, colour,
Logging	moisture and sample quality were recorded for all drill holes. Chip trays from RC drill
	holes were collected on an intermittent basis.
	All RC drill holes were geologically logged.
	RC drilling samples are collected in labelled bags, which are stored onsite or sent for
	analysis. These samples are collected using a cone splitter installed directly beneath the
	cyclone. Wet samples are collected using the same technique as dry samples, with
	thorough cleaning of sampling system between samples. Wet samples are allowed to
	dry before being processed.
	The sample collected from the cone splitter represents approximately 6 to 7% of the total
Sub-sampling	sample interval. Cone splitters are the preferred splitting system used by Fortescue as
techniques and	they generally give the most representative sample in both dry and wet conditions.
sample	At the laboratory, samples were weighed, dried and pulverised to either 90% passing
preparation	through 106 microns (Ultra Trace) or 85% passing through 75 microns (Genalysis).
	Coarse field standards (approximately 1 in 100 samples) and laboratory standards (1 per
	accreditation. The standard elements tested were Fe, SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , P, MnO/Mn, MgO,
	CaO, TiO <sub>2</sub> , Na <sub>2</sub> O, S and K <sub>2</sub> O by X Ray Fluorescence (XRF) and a three point LOI
	1 CaO, 1102, Nazo, 5 and 120 by X hay I horescence (XIXI ) and a timee point LOI
Quality of assay	thermo gravimetric analysis at 371, 650 and 1000 degrees Celsius. This is considered a
Quality of assay	thermo gravimetric analysis at 371, 650 and 1000 degrees Celsius. This is considered a total analysis.
data and	thermo gravimetric analysis at 371, 650 and 1000 degrees Celsius. This is considered a total analysis.  No geophysical tools were used to determine any element concentrations used in the
	thermo gravimetric analysis at 371, 650 and 1000 degrees Celsius. This is considered a total analysis.  No geophysical tools were used to determine any element concentrations used in the estimate.
data and	thermo gravimetric analysis at 371, 650 and 1000 degrees Celsius. This is considered a total analysis.  No geophysical tools were used to determine any element concentrations used in the estimate.  Field duplicates were collected at a rate of approximately 3 in 100 samples. Standards
data and	thermo gravimetric analysis at 371, 650 and 1000 degrees Celsius. This is considered a total analysis.  No geophysical tools were used to determine any element concentrations used in the estimate.

	confidence in XRF analysis at each laboratory. Analysis of field standards have indicated issues with laboratory sample preparation and standard certification in the past. Field standard results have been closely monitored and such issues have now been mitigated.
	Significant intersections have been visually verified by Fortescue's Exploration Managers.
	No twin holes have been completed at this stage of the project.
Varification of	Sample data is stored using a customised acQuire database, which includes a series of
Verification of	automated electronic validation checks. Fortescue data entry procedures are
sampling and	documented and readily available. Only trained personnel perform further manual
assaying	validation in order to confirm results reflect field collected information and geology.
	Samples returning below detection limits were given the result of half the detection limit.
	Missing data was set to -99 and those samples were excluded from statistical analysis and estimation.
	Drill hole collar locations have been surveyed using a differential GPS (by Down Under
	Surveys), with an accuracy of better than 3 cm for Easting and Northing and 5 cm in
	elevation. Down hole surveys have been completed on three of the drill holes. Collar
Location of data	survey data is validated against planned coordinates and the topographic surface.
points	Grid coordinates given for each point are Map Grid of Australia (GDA94) and heights are
	in the Australian Height Datum. The project area lies inside UTM zone 50.
	The topography was created from 2m contours produced from 1 metre LIDAR data.
	Vertical and horizontal accuracy of this data is+/-0.15 metres.
	The grade estimate used RC drill holes which occur on a grid spacing of 200m × 100m with some more sparsely drilled for assays and geology
Data spacing	This level of drill spacing is sufficient to establish the degree of geological and grade
and distribution	continuity required for an Inferred Mineral Resource
	No sample compositing was conducted for this estimation.
Orientation of	Drill holes have been predominantly drilled as vertical holes in drill lines sub-
data in relation	perpendicular to the local bearing of the ore body. The mineralisation is sub-horizontal
to geological	and these vertical holes are sufficient to imply geological and grade continuity.
structure	No material relationship is apparent between sampling bias and geological orientation.
Sample security	To ensure sample security consignment notes (sample submission information) have
	been used and direct delivery to site laboratories has been carried out.
	All sampling has been carried using Fortescue standard procedures.
Audits or	For analogous deposits Fortescue has had a sampling audit conducted by Snowden. For
reviews	this project there were no major risk factors relating to the sampling and assaying of the
	data. Similar rigs and splitter systems were utilised in this deposit.

Section 2 Reporting of Exploration Results

Criteria	Commentary
Mineral tenement and land tenure status	The Vivash deposit is located within 100% owned Fortescue Prospecting licences P47/1674 and P47/1675.
	The tenements are within the Puutu Kunti Kurrama and Pinikura (PKKP) native title determination (WCD2015/003). Fortescue has a current Land Access Agreement with the PKKP native title holders
	The tenure is currently generally in good standing and no impediments are known to exist.
Exploration done by other parties	No historical data has been used by Fortescue.
Geology	The Vivash deposit is situated on the southern limb of the Brockman Syncline. The deposit consists of bedded iron deposits (BID) with mineralisation hosted by the Dales Gorge, Whaleback Shale and Joffre Members of the Brockman Iron Formation. There is also minor detrital iron deposits (DID). Mineralisation occurs over a length of approximately 2km along the main escarpment.
Drill hole Information	Collar details of the RC drill holes used in the Vivash estimate are not being reported here.

Data aggregation methods	No exploration results are being reported. For methods used in the estimation of Vivash please refer to: Section 3 Estimation and Reporting of Mineral Resources.
Relationship between mineralisation widths and intercept lengths	No exploration results are being reported. Please refer to: Orientation of data in relation to geological structure in Section 1 Sampling Techniques and Data for the geometry of mineralisation with respect to drill hole angle.
Diagrams	The Mineral Resource extents are shown in the release.
Balanced	No exploration results are being reported and this is not pertinent to the reporting of
reporting	Mineral Resources.
Other	The density study carried out at Vivash is discussed in: Section 3 Estimation and Reporting of Mineral Resources.
	Down hole geophysics has been carried out on some RC drill holes including: natural gamma, magnetic susceptibility and gamma gamma density.
substantive exploration data	Geological surface mapping of the Vivash project has been carried out by Fortescue
exploration data	geologists. Dip and strike measurements, stratigraphy and mineralisation have been
	recorded into Fortescue database.
	The estimated groundwater level has been recorded on most RC drill holes.
Further Work	Further infill drilling and metallurgical test work is planned for Vivash. Extensions to
	known mineralisation may occur in the area.

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

Criteria	Commentary
	Sample data is stored using a customised acQuire database, which includes a series of automated electronic validation checks. AcQuire is a secure and an industry standard strength database.
Database integrity	Only trained personnel perform further manual validation on the data in order to confirm results reflect field collected information and geology. In order to ensure integrity of the database, any changes to the database only occur after a review of the suggested changes are authorised, and these changes can only be performed by an authorised person. Prior to modelling, further validation was performed on the dataset being used.
Site visits	The Competent Person and Competent Persons team conducts regular site visits, approximately every two to three months when drilling operations are in progress to inspect the model area, RC drill hole logging and sampling practices. Discussions are held regularly with site geologists.
Geological interpretation	Logging and geological interpretation was completed by geologists experienced in iron ore mineralisation. Geology over the majority of the deposit is relatively straight forward. There is some risk of misinterpretation in areas of wider spaced drilling with limited assay data, however, this is not considered to be material.  Geological interpretation is based on geological logging, down hole geophysics and geochemistry of RC drill samples.  The stratigraphy of Vivash is reasonably well known and it is envisaged that any alternative geological interpretation without further drilling, would not have a material impact on the Mineral Resource estimate. Extrapolation of mineralisation has been restricted to approximately half of the nominal drill spacing.  All samples are flagged with their host geological zone, only samples with the same geological zone as the block to be estimated can be used in grade estimation.  It is not expected that further drilling will change the grade and geological continuity. The geological continuity is generally good compared with analogous areas. The main factors affecting continuity are stratigraphy, structure, erosion and weathering.
Dimensions	Mineralisation at Vivash occurs over a strike length of approximately 2km along the main Vivash escarpment. Mineralisation occurs at surface and to depths of up to 160 metres. The defined mineralised units have an average thickness of 20-30m.
Estimation and modelling techniques	Ordinary kriging was used to estimate all mineralised domains and inverse distance cubed for all waste domains. Estimation was done using Vulcan software. Mineralisation was extrapolated approximately half the distance of drill spacing away from the drilling.

The deposit was domained by stratigraphy, local strike/orientation and mineralised/unmineralised zones. Check estimates were completed in selected areas of the deposit using inverse distance cubed. This is the Maiden Mineral Resource for this deposit. No assumptions regarding the recovery of by-products have been made. The iron ore suite of Fe, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, P, Mn, MgO, CaO, TiO<sub>2</sub>, Na<sub>2</sub>O, S, K<sub>2</sub>O, LOI Total, LOI 371, LOI 650 and LOI 1000 has been estimated. Estimation into parent cells of 50mE x 50mN x 1mRL was used. Size and orientation of parent blocks reflected half the nominal drill spacing and orientation of mineralisation. Sub blocking down to 6.25mE x 6.25mN x 0.5mRL was used along domain boundaries to better define the domain interface. Up to three estimation passes were used for each element, gradually increasing search ellipse distances with each pass. Search distances along strike and across strike varied between each domain. These were primarily defined by sample spacing within each domain and determined by neighbourhood iterative tests. No assumptions behind the modelling of selective mining units have been made. Correlation between some elements has been noted during statistical analysis. Similar variogram parameters were achieved for mineralised domains that had elements with a correlation coefficient of > 0.7 or < -0.7. The definition of mineralised zones within each stratigraphic unit was accomplished using an indicator approach. The probability of any zone being mineralised was estimated using appropriate geochemical indicator thresholds for Fe, SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> for the individual stratigraphic units. These thresholds were based on data population statistics and visual validation. A domain code was assigned to each sample, defined by the stratigraphic unit and mineralisation. Some element grades were top-cut during estimation based on coefficient of variation values higher than 1.2. Visual validation of the block model coding of the domains was completed prior to estimation. Once estimated, the grade of all elements was also visually validated. Visual validation of both the domains and grade were completed in Vulcan by comparing section and plan slices of the block model against the drill holes. Statistics for the mean grade of the mineralised blocks within each stratigraphic unit were compared to the mean grade of the mineralised samples within each stratigraphic unit. Overall, the mean values between the model and samples are within an acceptable range. Trend analysis graphs have been created for each of the mineralised domains. These have been generated in Northing, Easting and RL, for all elements. The trend analysis graphs show the modelled grade vs. the raw data grade at a particular slice in space. The trend analysis charts show that overall, the model grade is consistent with the raw data and shows no bias. Areas with a large number of samples correlate much better with the model grade than do areas with few samples. Tonnages are estimated on a dry basis. Moisture A cut-off of greater than or equal to 50% Fe was used to report the tonnages of all bedded stratigraphic units. A higher cut-off of 52% Fe was used for all detrital deposits. Cut-off parameters These cut-offs have been used for analogous Fortescue estimates and represents a similar cut-off to current product specifications It is assumed that mining will be carried out with medium to large scale mining equipment using 5 metre bench heights, though bench heights may vary depending on Mining factors mining studies. These methods will be similar to analogous Fortescue deposits where or assumptions conventional: truck & shovel/excavator; drill & blast and; grade control methods are used. The impact of dilution will be assessed as part of the mining studies. Metallurgical It is assumed that similar metallurgical techniques to analogous Fortescue operations factors or will be utilised. The expectation is that it will be a process as applied at Firetail. Final assumptions processing methods will be defined by further mining studies. Fortescue has an extensive environmental and heritage approvals process. Waste is considered to be inert and formed waste dumps will conform to WA standards. Waste Environmental will be formed as dumps or into mining voids. In the case of acid and fibre mitigation, factors or Fortescue has industry standard procedures. Some beneficiation may take place but assumptions reject is considered to be inert and there are no foreseen problems with tailings disposal.

	It is assumed material will be transported to existing ore processing facilities and use current tailings disposal infrastructure.
Bulk density	Density has been calculated from down-hole geophysical measurements throughout the deposit. Average rounded densities by geological unit and mineralisation have been compared with analogous deposits and then applied globally to the model. Whilst on site down-hole geophysical tools are calibrated fortnightly in a designated test diamond drill hole.
	Down-hole geophysical probes measure the insitu bulk density which accounts for void spaces. These measurements are not corrected for moisture but are validated against known dry bulk densities from diamond core drilled in analogous Fortescue projects. Down-hole geophysical measurements are grouped by geological and mineralisation domains.
	The densities used are similar to known densities for current and historic mines, of similar geology and mineralisation, across the Pilbara.
Classification	The Mineral Resource has been classified as Inferred. This takes into account drill spacing, data integrity, geological complexity, grade estimation quality, interpreted risk and mineralisation continuity.
	The Mineral Resource classification reflects the views of the competent persons.
Audits or reviews	Internal reviews have been completed during all stages of the estimate. External audits of the estimation process has been completed for analogous deposits with no significant flaws identified. Similar processes have been used for this estimate.
	Grade and geological continuity is sufficient for an Inferred Mineral Resource.
Discussion of	Greater confidence in applied density values will be achieved through further physical
relative	density and down-hole geophysical measurements.
accuracy/ confidence	The global estimate is sufficient to imply the grade and geological continuity in the area of the Inferred Mineral Resource.
Cormaence	No production data is available at this stage.
	140 production data is available at this stage.