SPHERE MINERALS LIMITED

A SUBSIDIARY OF
GLENCORE

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ASX ANNOUNCEMENT: MINERAL RESOURCE UPDATE FOR GUELB EL AOUJ MAGNETITE IRON ORE DEPOSIT, MAURITANIA

Sphere Minerals Limited (Sphere) (ASX Code SPH) is pleased to announce an update to its Mineral Resource estimate for its 50% owned Guelb el Aouj East magnetite deposit, Mauritania (Figure 1, Figure2), covering the total Guelb el Aouj East deposit. Additional to the current resource update, Sphere has recently also completed resource estimations on the 50% owned Bou Derga (Inferred fresh resource of 510 Mt grading at 36% Fe)[1] and Tintekrate (Inferred fresh resource of 710 Mt grading at 36% Fe)[2] deposits. Information resulting from the completed drilling on the el Aouj Centre deposit is now being processed and a resource update for this deposit will be released once this is complete and will conclude the recent exploration program in Mauritania. Historically (2004)[3] an Inferred fresh resource of 225 Mt at a grade of 36% Fe was announced for the 50% owned el Aouj Centre deposit.

Total resources (fresh and oxidised) in the overall Guelb el Aouj Project area (Figure 1) have increased to 3.8 billion tonnes. The total updated fresh resource for el Aouj East of 1870 Mt Measured, Indicated and Inferred (Table 1) represents an increase of 895 Mt on the previous (August 2013)[4] fresh resource estimate of 975 Mt, at a similar grade. The tonnage increase is due to additional drilling in 2013 (Figure 4) which has provided:

- Additional resource definition in the northern part of Guelb el Aouj East; and
- Additional resource and improved confidence in and around the southern part of the deposit based on in-fill drilling in this area together with re-entry of a number of the 2005 to 2006 drill holes and completion of holes to the footwall waste unit.

The update has increased the fresh Measured Resource from 385 Mt to 400 Mt and the Indicated Resource from 500 Mt to 1170 Mt. The Inferred resource tonnage has increased from 90 Mt to 300 Mt. The proportion of resources that are now classified as Measured or Indicated has changed from 90.8% to 84% due to the large increase in Inferred resource in the previously undrilled/unclassified part of the deposit, where the drill line spacing is now 200 m.

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[1] ASX Release, 27 July 2012. Quarterly Activities Report for the Quarter Ending June 2012. The Competent Person for the geological information was Dr Schalk van der Merwe and the Competent Person for the resource estimate was Mr Alan Miller. The cut-off grade used for the fresh mineralisation was 20% DT80 wt% (i.e. the mass recovery of Davis Tube separation testwork conducted on head samples with a d95 size of 80 µm)

[2] ASX Announcement, 4 October 2013, "Maiden Inferred Mineral Resource Estimate for Tintekrate magnetite deposit, Mauritania".The Competent Person for the geological information was Dr Schalk. van der Merwe and the Competent Person for the resource estimate was Alan Millar. A 20% DT80 wt% cut-off grade was used for the fresh material and a 20% head Fe cut-off grade was used for the weathered material

[3] ASX Announcement, 20 October 2004. Dr Sia Khosrowshahi (Golder) is the nominated Competent Person accepting overall responsibility for the resource estimation. The cut-off grade used for the fresh mineralisation was 20% head Fe.

[4] ASX Announcement, 23 August 2013. The Competent Person for the geological information was Dr Schalk van der Merwe and the Competent Person for the resource estimate was Mr Alan Miller. The cut-off grade used for the fresh mineralisation was 20% DT80 wt% (i.e. the mass recovery of Davis Tube separation testwork conducted on head samples with a d95 size of 80 µm).

Figure 1: Location of Guelb el Aouj East deposit in the el Aouj Project Area

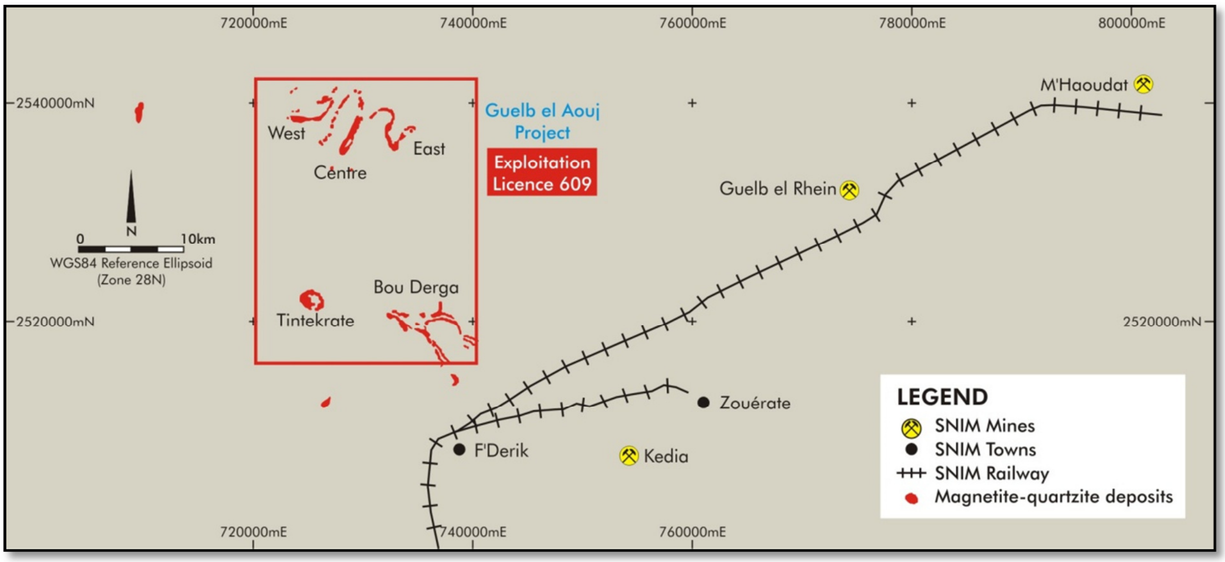
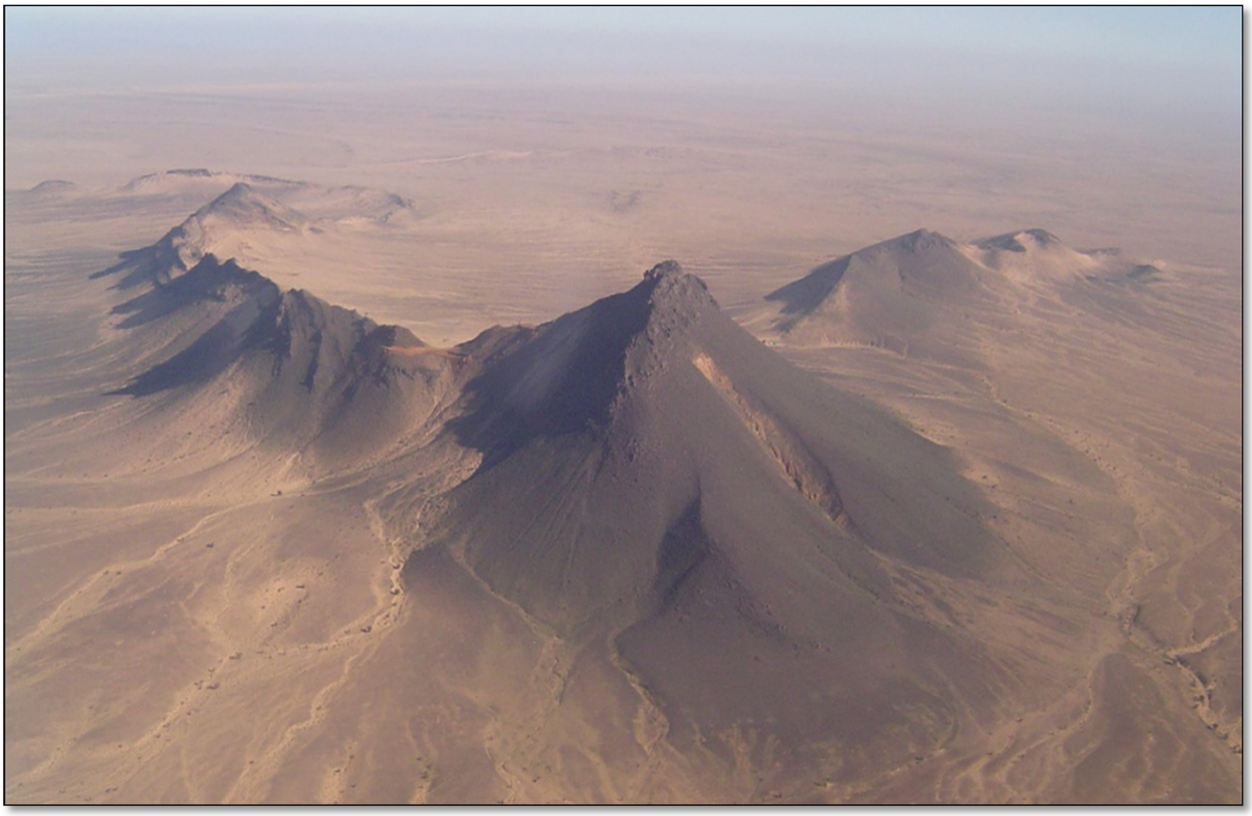


Figure 2: Guelb el Aouj East Deposit Looking North
Showing the southern closure, western and eastern limbs of the synform structure



Sphere Minerals and SNIM (Société Nationale Industrielle et Minière) have conducted an exploration drilling program of approximately 93,000 m targeting the el Aouj East and Centre magnetite deposits. The program commenced in late-2011 and was concluded in June 2013. The exploration program was managed by the holder of the El Aouj mining tenement, El Aouj Mining Company, a Mauritanian company owned by Sphere Minerals Limited (50%), and SNIM (50%). Sphere Minerals Limited is a subsidiary company of Glencore.

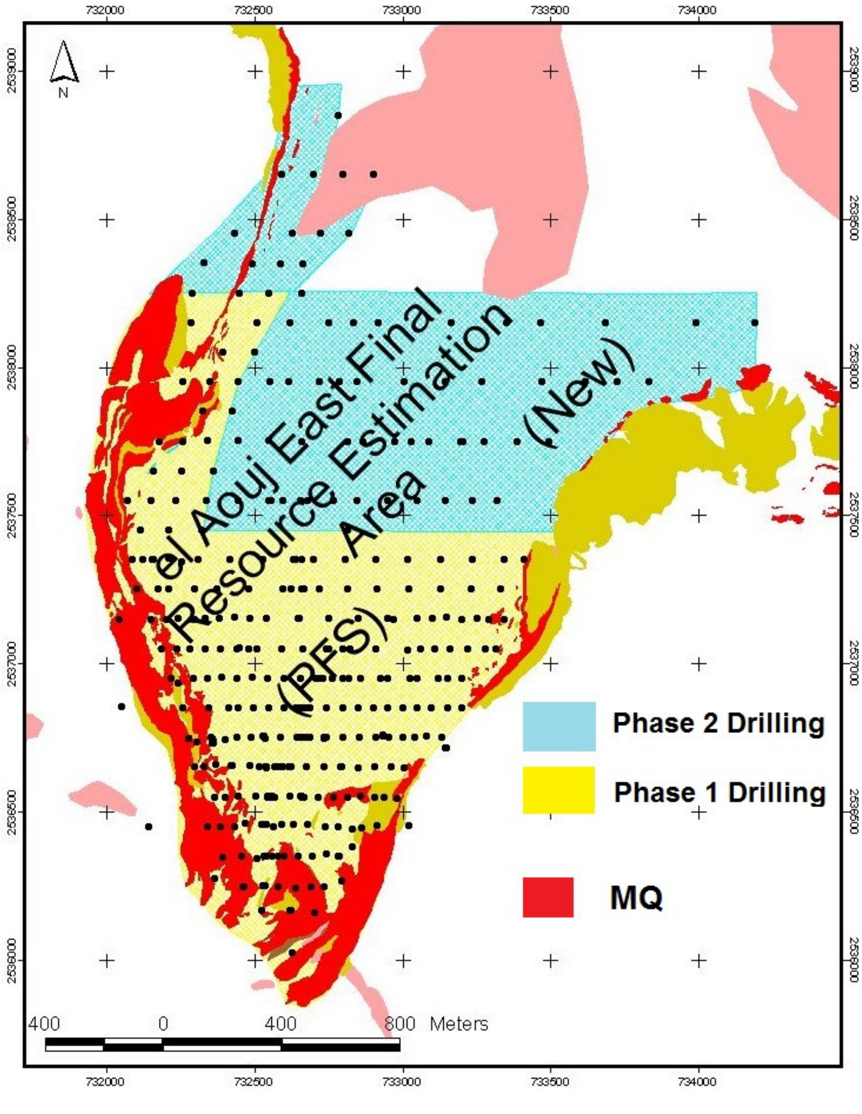
The current resource statement covers the entire el Aouj East deposit (Figure 3) and has been prepared to underpin a Pre-Feasibility work program in support of a potential Phase I mining project (currently under study) as well as a potential expanded (Phase II) mining project.

The Mineral Resource estimate was prepared and classified by Golder Associates Pty Ltd (Golder) in accordance with The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012 Edition) based on drill hole data and a 3-dimensional wireframe interpretation supplied by Sphere.

The Mineral Resource update is based on a block model interpolated using Ordinary Kriging (OK) and is reported for fresh mineralisation on a head basis (**Table 1**) and Davis Tube concentrate mass recovery (wt%) and grades (Table 2). It is also reported on a head basis (Table 3) for weathered (oxidised) mineralisation.

The classification is based principally on drill hole data density, geological confidence criteria and the representativeness of the drill hole sampling.

Figure 3:
Phased exploration approach at the el Aouj East deposit.



The location of all drill holes used in the estimation is shown in Figure 4 and the interpreted domains are shown in the cross sections in Figure 5 to Figure 10. The higher degree of uncertainty in the Inferred resource estimates is reflected by rounding some values to a smaller number of significant digits than in the Measured and Indicated resources.

Table 1: Guelb el Aouj East Mineral Resource, Fresh Mineralisation
At 20% DT80 wt%[1] Cut-off Grade, Dry Head Basis, Inclusive of Ore Reserves

Classification	Mt (dry)	Fe %	SiO_2 %	Al_2O_3 %	P %	MgO %	S %	K_2O %	LOI %
Measured	400	36	44	1.1	0.069	2.2	0.033	0.55	-0.6
Indicated	1,170	36	44	1.1	0.069	2.3	0.042	0.52	-0.7
Inferred	300	36	44	1.1	0.06	2.1	0.04	0.5	-0.9
Total	**1,870**	**36**	**44**	**1.1**	**0.07**	**2.2**	**0.04**	**0.5**	**-0.7**

Table 2: Guelb el Aouj East Mineral Resource, Fresh Mineralisation
At 20% DT80 wt%[1] Cut-off Grade, Dry DT80 Concentrate Basis, Inclusive of Ore Reserves

Classification	DT80 wt%[1]	Fe %	SiO_2 %	Al_2O_3 %	P %	MgO %	S %	K_2O %	LOI %
Measured	45	69.8	2.5	0.24	0.007	0.41	0.018	0.020	-3.1
Indicated	45	69.2	3.0	0.25	0.007	0.48	0.020	0.022	-3.0
Inferred	45	69.5	2.6	0.3	0.006	0.4	0.02	0.02	-3.1
Total	**45**	**69.4**	**2.8**	**0.2**	**0.007**	**0.5**	**0.02**	**0.02**	**-3.1**

[1] DT80 wt% is the mass recovery of Davis Tube testwork conducted on mineralised drill samples pulverised to a size of 95% passing 80 µm. This is a standard setting characterisation test that enables the variability of the mineralisation to be assessed within and between deposits.

Table 3: Guelb el Aouj East Mineral Resource, Weathered Mineralisation
At 20% Head Fe Cut-off Grade, Dry Head Basis, Inclusive of Ore Reserves

Classification	Mt (dry)	Fe %	SiO_2 %	Al_2O_3 %	P %	MgO %	S %	K_2O %	LOI %
Measured	70	34	46	1.6	0.075	0.7	0.008	0.71	1.2
Indicated	80	35	45	1.2	0.063	1.2	0.011	0.52	0.8
Inferred	30	35	45	1.8	0.06	0.9	0.01	0.7	0.9
Total	**180**	**35**	**45**	**1.5**	**0.07**	**1.0**	**0.01**	**0.6**	**1.0**

Geological Interpretation

The Guelb el Aouj East magnetite deposit is located on Exploitation Permit 609 (Figure 1) which was granted for a 30 year period on 27 April 2008 by the Mauritanian Council of Ministers. The Permit is securely held by the El Aouj Mining Company SA (EMC and is not constrained by any native tile interests, historical sites, wilderness or national parks.

The deposit was mapped geologically by Sphere in 2004 at a scale of 1:10,000. Seven reconnaissance holes were drilled by SNIM in 1970 but these are not used in the resource estimation.

The Guelb el Aouj East deposit is hosted within the Dorsale Reguibat, an uplifted part of the Archaean West African Craton, which dominates the northern third of Mauritania's surface geology. This Craton hosts a significant iron ore province in the Tiris Zemmour region, and contains highly deformed and metamorphosed iron formation rocks and volcanics of the Tiris Group. Recrystallisation and aggregation of the magnetite grains in the meta-banded iron formation (BIF) units has resulted in partial to total destruction of the original banded (bedding) texture to produce the Guelb el Aouj East magnetite-quartzite deposit.

Outcrop expression of the deposit is strong with the limbs of the synform represented by two prominent ridges of erosion resistant magnetite-quartzite mineralisation.

The Guelb el Aouj East deposit is a north-plunging synform. The mineralised sequence has typical true thicknesses of 150 m to 200 m, with structural thickening in the synformal keel between the limbs. Each limb of the synform outcrops over a strike length of approximately 2.5 km and the deposit remains open towards the north, at depths to 850 m below surface.

Figure 5 to Figure 10 show cross sections (whose positions are marked on Figure 4) of the geology from north to south across the deposit at 400 m spaced intervals. The dip of the western limb is somewhat steeper than that of the eastern limb. The deposit has a sharp leptinite (leucocratic gneiss) footwall contact and an amphibolite hanging wall contact. The magnetite quartzite mineralisation is subdivided into three domains (MQ1, MQ2 and MQ3) separated by internal waste bands of barren quartzite (QMM1 and QMM2).

The weathered zone which, though variable, has an average vertical thickness of approximately 80 m and in this zone partial to complete oxidation of magnetite to hematite has occurred. Oxidation significantly reduces the Davis Tube mass recovery (wt%) in mineralised drill samples.

The geological interpretation for Guelb el Aouj East is based on lithology, head grades and Davis Tube separation testwork and was completed by Sphere geologists on cross sections using Surpac® modelling software. 3D wireframe geological modelling was carried out by Sphere and reviewed by Golder prior to its use to construct the block model.

The Mineral Resource estimate is constrained by the mineralisation domain boundaries on the west, south and eastern sides of the orebody and by the last row of boreholes to the north. Resource estimates for extrapolations greater than 100 m from drilling are unclassified and therefore not included in this resource statement.

Figure 4: Guelb El Aouj East Drill Hole Location Plan

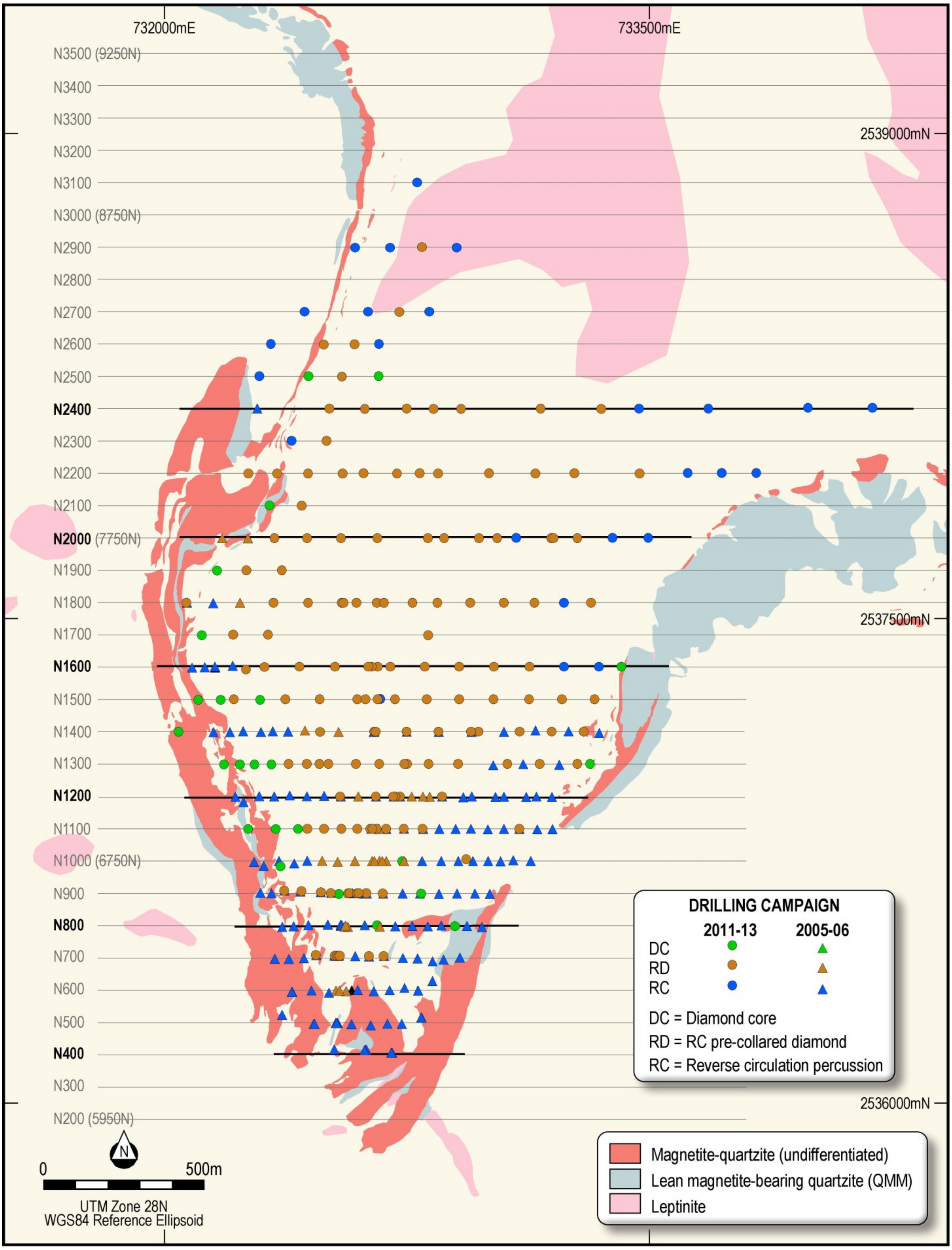


Figure 5: Geological Cross Section (Section No. N2400)

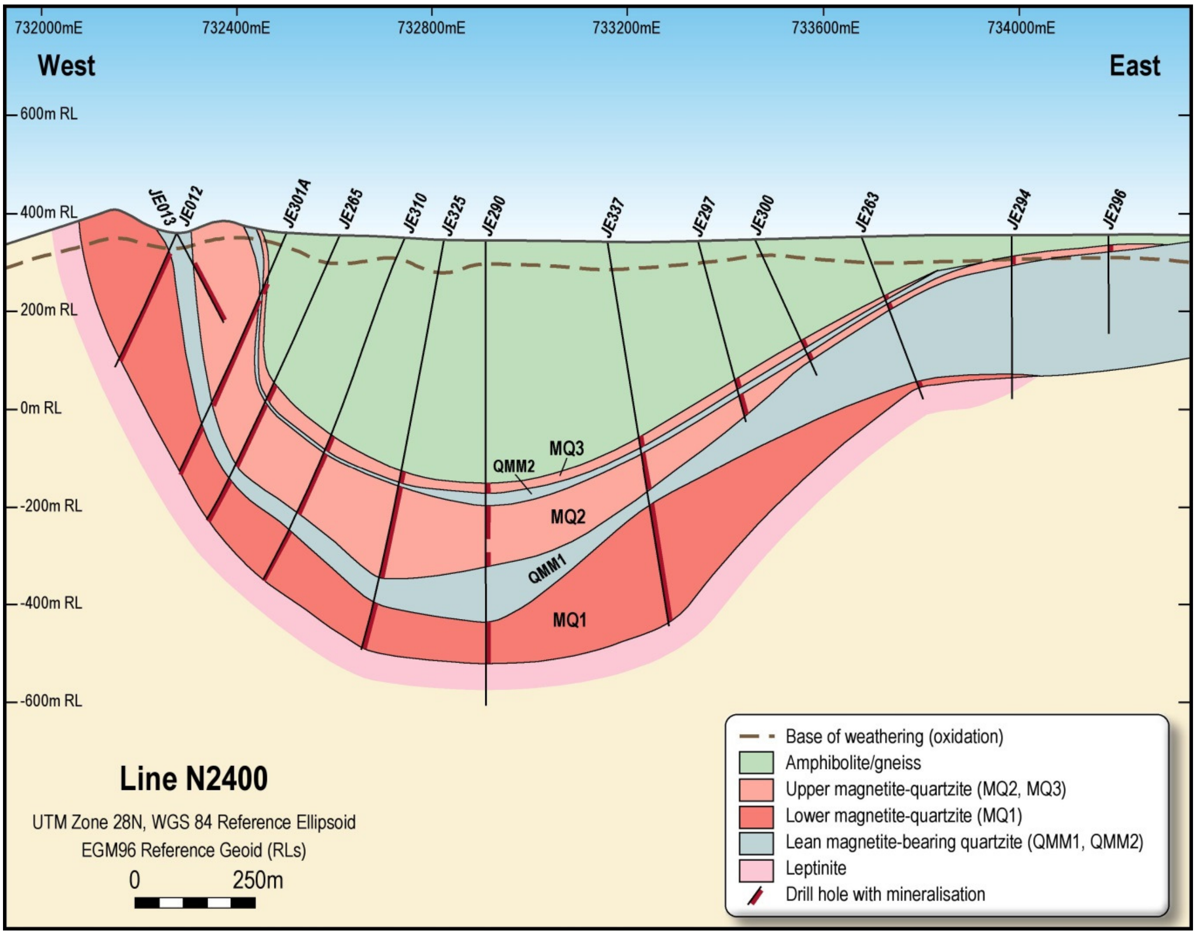


Figure 6: Geological Cross Section (Section No. N2000)

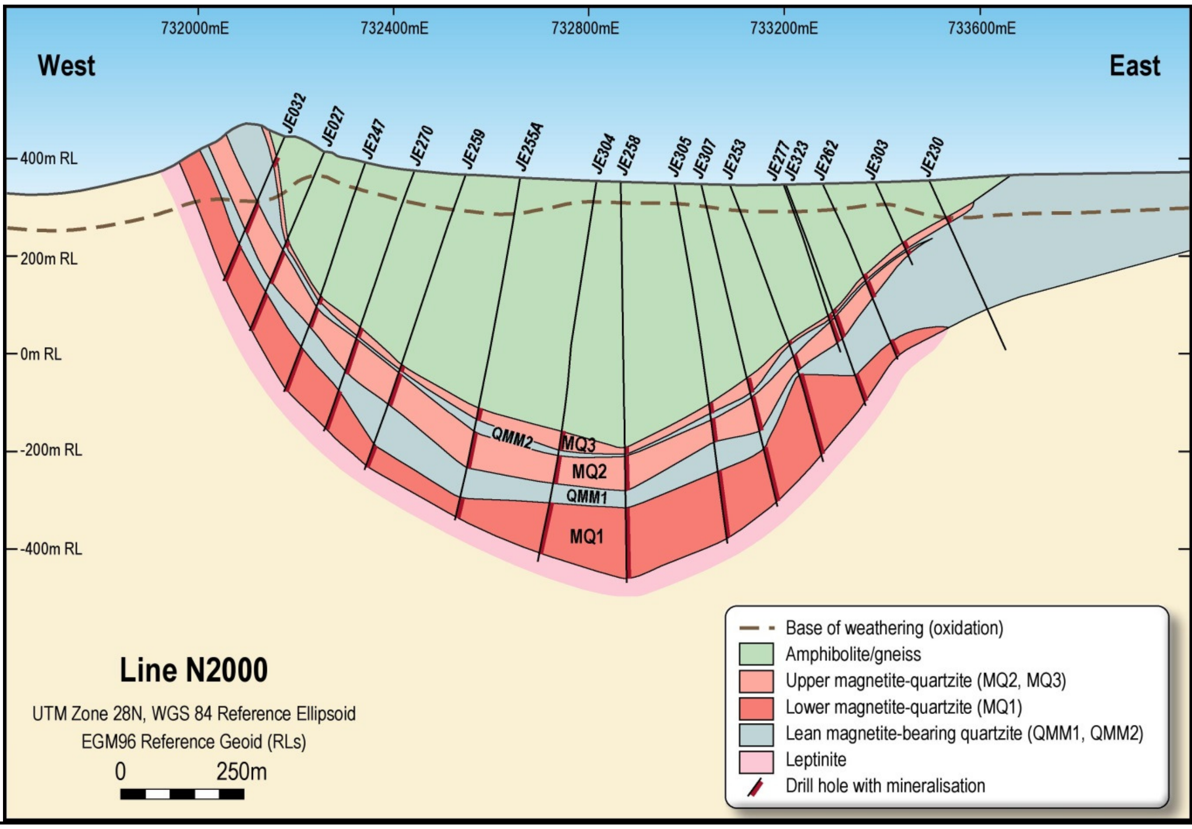


Figure 7: Geological Cross Section (Section No. N1600)

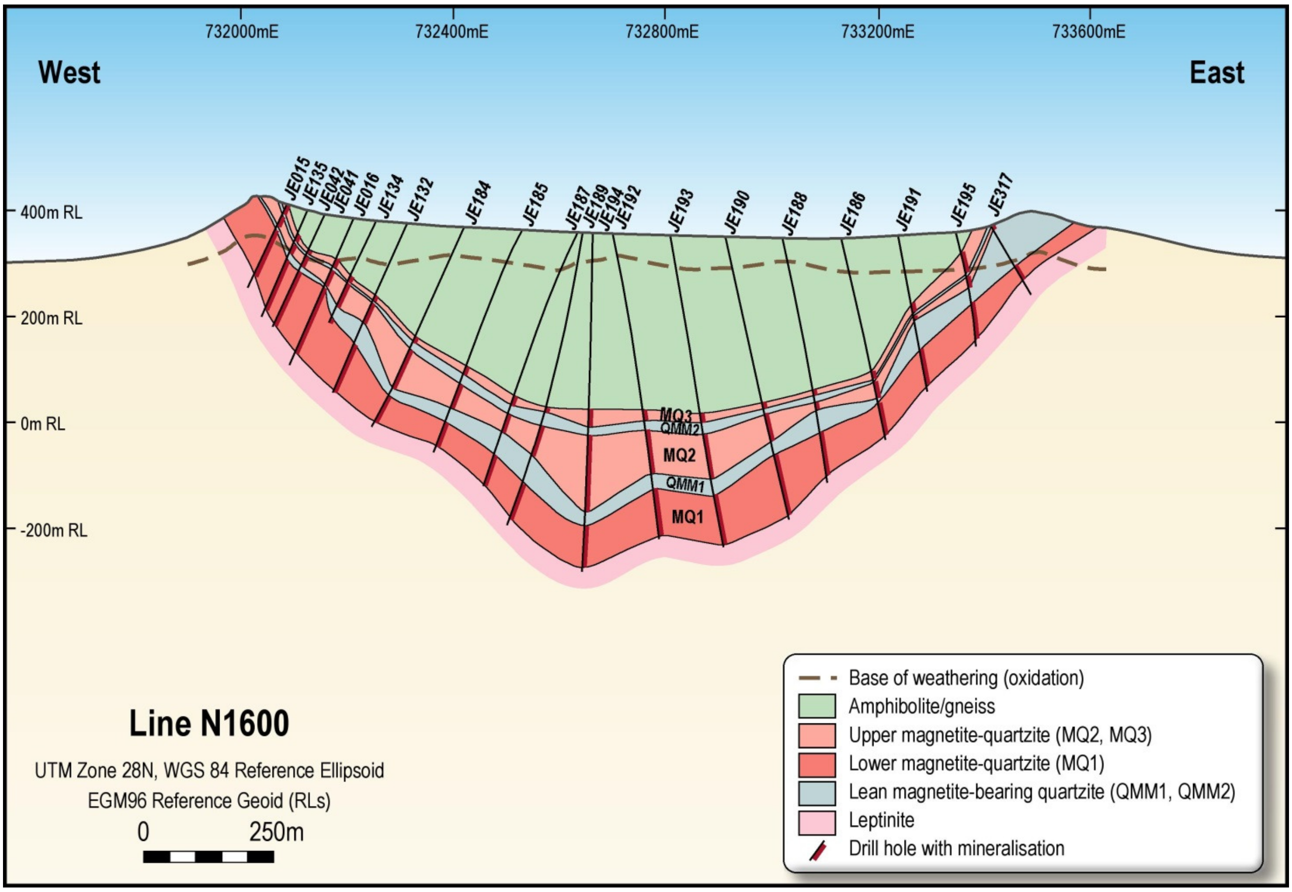


Figure 8: Geological Cross Section (Section No. N1200)

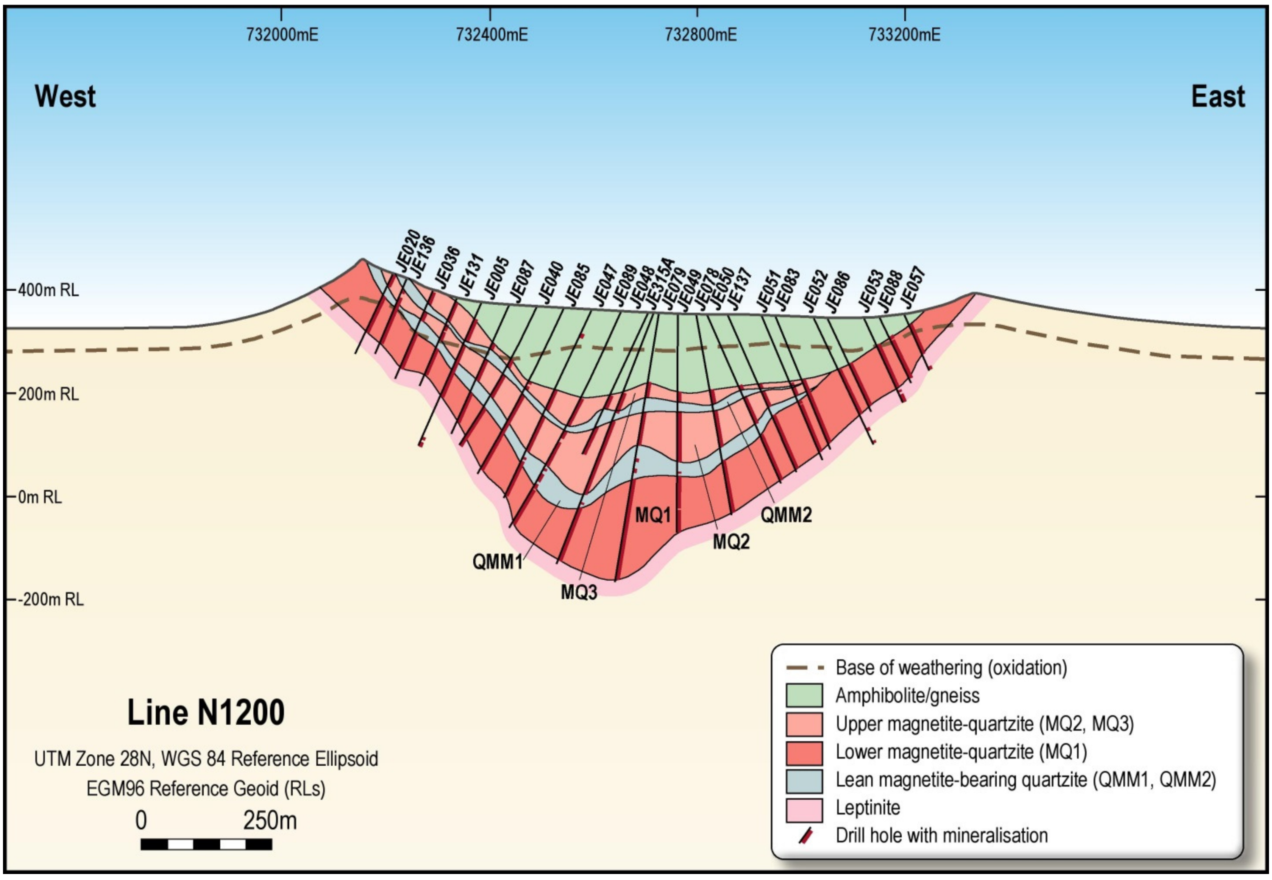


Figure 9: Geological Cross Section (Section No. N800)

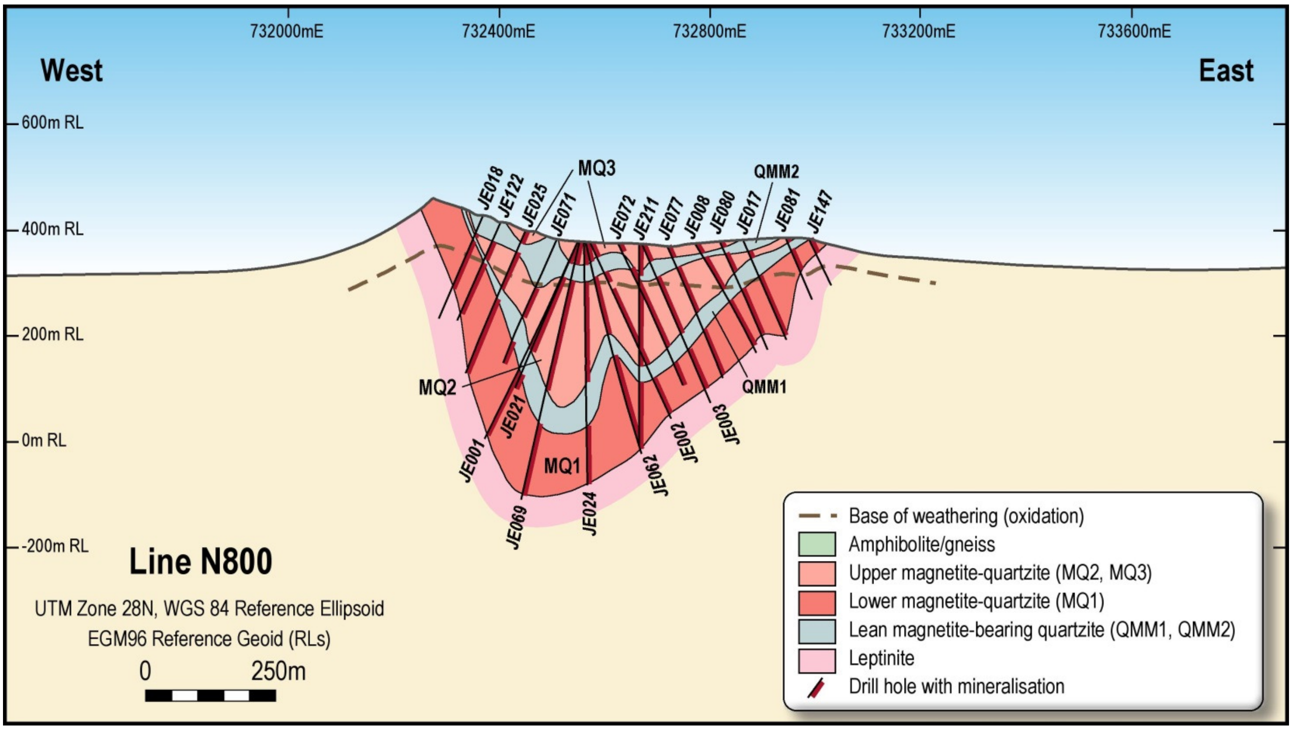
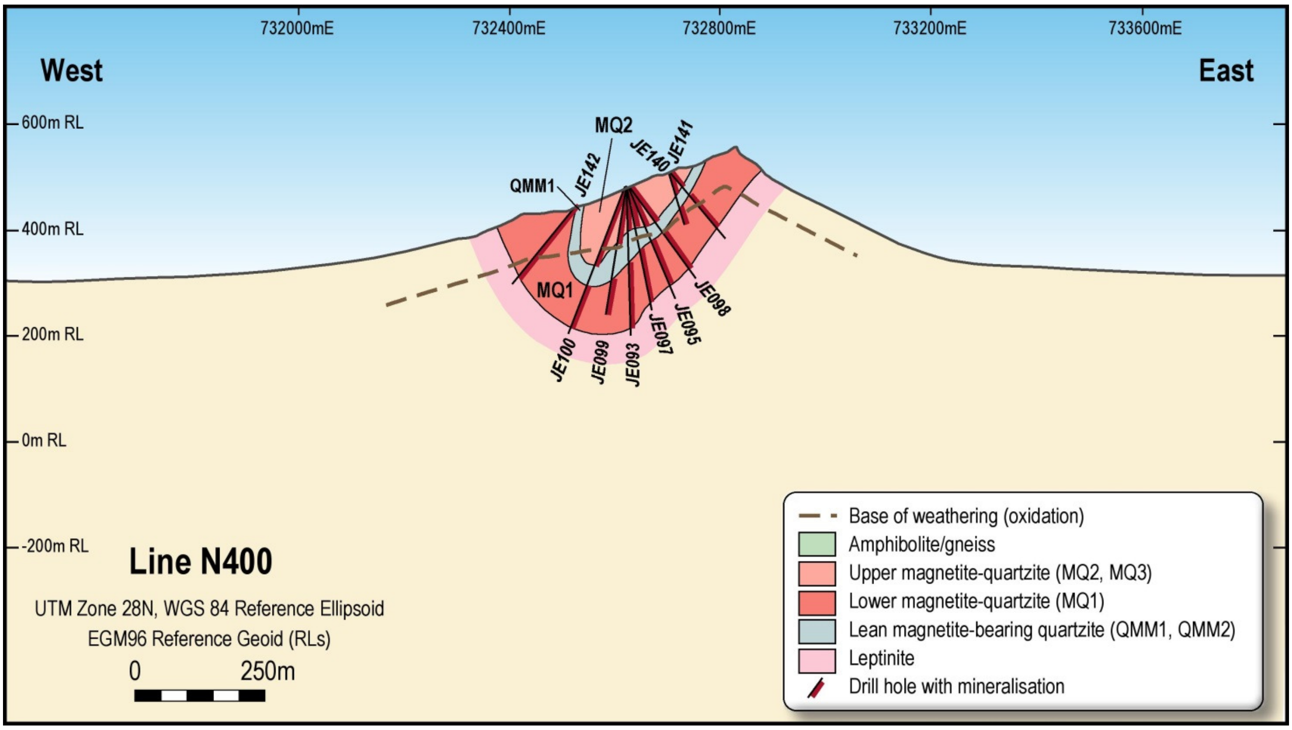


Figure 10: Geological Cross Section (Section No. N400)



Drilling Techniques

This resource statement is an update to the previous resource statement announced to the ASX in August 2013[5]. In addition to the drill holes drilled in 2005 and 2006, further 160 resource definition drill holes, with an emphasis on diamond drilling, were drilled in 2011 to 2013.

The total quantity of resource definition drilling used in this updated resource estimation is 343 drill holes with a total drilled length of 116 675.61 m, as shown in Table 4. This includes all drilling done in 2005 to 2006 (43,553.2 m in 183 holes) and in 2011 to 2013 (73,112.41 m in 160 holes). The drilling done in 2011 to 2013 includes deepening by diamond drilling of a number of the RC holes that were drilled in 2005 to 2006.

Table 4: Guelb El Aouj East Drill Hole Summary

Hole type	Hole type	No. of holes	RC drilled (m)	DC drilled (m)	Total drilled (m)
RC only	RC	146	31,760.00		31,760.00
RC pre-collarerd diamond	RD	167	44,563.05	32,965.51	77,528.56
DC only	DC	30		7387.05	7,387.05
Total		**343**	**76,323.05**	**40,352.56**	**116,675.61**

As shown in Figure 4, the drill hole sections are spaced 200 m and 100 m apart and holes are spaced at approximately 100 m or 50 m apart on the section lines.

All samples used in the resource estimate were collected from reverse circulation (RC) and diamond drilling (DC). In many cases holes are pre-collared with RC and then completed with diamond core tails. This was done to overcome the depth limitations of the RC drilling (303 m in 2005 to 2006 and up to 570 m in 2011 to 2013) and/or because core samples are required for metallurgical testwork as well as resource definition. Diamond core tails extended from 303 m or less downhole depth to as much as 950 m downhole depth (equivalent to vertical depth below surface of approximately 800 m).

Core diameters used included HQ (63.5 mm diameter), HQ3 (triple tube, 61.1 mm); NQ (47.6 mm); NQ2 (50.6 mm) and NQ3 (triple tube, 45.1 mm). HQ sizes were generally limited to less than 200 m downhole depth. Drill core was oriented using an ACE® core orientation tool. RC drill hole diameters varied from 5¼" to 5½" (133 mm-140 mm) and face sampling hammers were used.

Drill holes were orientated on azimuths within the plane of each cross section and inclined to provide intersections normal or close to normal to the bedding. As the Guelb el Aouj east deposit is a synform and the sections are orientated exactly east-west (UTM Zone 28N, WGS84 reference ellipsoid) this involved azimuths of 270º when drilling the western synform limb and 90º for the eastern limb, with occasional vertical some holes in the keel zone of the synform (Figure 4). The inclinations used when drilling the limbs were 50º to the horizontal or steeper.

All drill hole collar positions were located and picked up by Sphere using its differential GPS (DGPS)-based survey control (coordinates and RLs) and this is considered adequate for the purposes of this study as it provides a coordinate accuracy of ± 40 cm and a height accuracy of ± 80 cm.

Approximately 78% of the drill holes have been downhole surveyed by a contractor (Terratac) for deviation using a gyroscopic tool.

[5] ASX Announcement: "Sphere Minerals Limited", 23 August 2013

Sampling/sub-sampling Techniques

Primary 1 m RC samples are collected from an air cyclone at the drill rig. Three successive primary samples are collected at the drill site, split to 25% of primary volume using standalone rifflers and these are combined to produce a bulk 3 m composite sample. This composite is then riffle split to 12.5% of the volume to provide a regular laboratory sample and a field duplicate quality assurance and quality control (QAQC) sample, each typically 4 kg to 5 g. The field duplicates are submitted to the laboratory at the rate of one per 25 regular samples. Grade-by-size analysis was also conducted on selected RC chips as a QAQC procedure and did not identify any significant sample bias.

Drill core was logged at the drill site for core run details such as core recovery and rock quality designation (RQD). Core recovery was recorded by measuring the length of recovered core and comparing this with the drilled interval. It exceeds 98% for fresh rock and averages about 80% for weathered rock. The core was logged, marked for sampling based on lithology and with a minimum sample length of 0.5 m and maximum 3.0 m. It was then photographed whole. Core for sampling was cut in half lengthways with a diamond saw, with one half sawn again (quartered). One quarter core was then taken as the laboratory sample and the remainder archived/ reserved for use for metallurgical testwork.

Downhole geophysical logging has been completed on most of the holes. This includes natural gamma, conductivity and magnetic susceptibility. All drill samples are also measured for magnetic susceptibility using hand held instruments.

Sample Analysis Methodology

Sample preparation and Davis Tube (DT) separation testwork were conducted at the Sphere sample preparation and DT testwork laboratory in Zouerate, Mauritania.

The RC and core laboratory samples average 4 kg to 5 kg and are considered appropriate in relation to the inherent grain size of the mineralised samples.

Core samples are crushed to -6 mm size in a jaw crusher. Core and RC samples are then dried at 105º C for 2 to 4 hours and are crushed successively in 3 mm and 1 mm rolls crushers and then milled for 3 minutes in a LM2000 pulveriser to produce a pulp with a minimum 95% passing 80 micron (0.08 mm) size, and averaging 97% passing this size for the samples from the drilling done in 2011 to 2013.

DT testwork is undertaken in Sphere's site laboratory on the resulting sample pulps. Head pulps and DT concentrates are sent, together with the field duplicates and four separate matrix-matched standards, to Bureau Veritas (Ultra Trace) laboratory in Perth, Western Australia. The samples are assayed by X-ray diffraction (XRF) using fusion beads for Fe, P, SiO_2, Al_2O_3, CaO, MgO, MnO, Na_2O, TiO_2, S, K_2O,BaO, and V_2O_5; and by Thermal Gravitational Analysis (TGA) for loss-on-ignition (LOI) at 371ºC, 538ºC and 1000ºC. The methods used produced total assay results reported on a % basis. Negative LOIs result from weight gain during the TGA as a result of oxidation of magnetite to hematite.

Check head pulp analyses were performed at an independent laboratory (SGS, Perth, WA) at the rate of 2.1% of all head assays. Repeat DT testwork was also performed in house and in the SNIM laboratory in Zouerate, Mauritania. Golder considers the accuracy and precision of all the QAQC results to be acceptable.

Resource Estimation Methodology

All drilling data was validated by Sphere. A small proportion of the data had unresolved validation issues and this was marked to Golder for exclusion from the estimation. Golder performed additional checks of the internal validity of the data set.

The standard DT test used in this resource estimation is referred to as the "DT80" test. DT80 wt% is the mass recovery produced from DT testwork at a magnetic field strength of 3000 gauss, conducted on (~3 m) mineralised drill samples pulverised to a liberation grind size of at least 95% passing 80 µm. As all the DT80 test settings are fixed the concentrate grade and mass recovery (wt%) vary with the sample mineralogy and Fe grade.

Golder composited the drill samples to standard 3 m support. No grade top-cuts were applied.

Stratigraphic horizons were modelled by Sphere as a wireframe in three dimensions to define the geological domains that were used to flag the sample data for statistical analysis and estimation. This wireframe was transferred to Golder and validated.

A digital terrain model (DTM) based on a LIDAR survey conducted by Fugro under contract to Sphere in 2011 was produced by AAM Limited by filtering the LIDAR data to ensure a data point at least every 20 m or when heights changed by more than 0.15 m. The drill hole collar elevations converted from WGS84 reference ellipsoid to EGM96 reference geoid were found to closely match the DTM.

Golder generated a three dimensional block model using Vulcan® software. The primary (parent) block size used is 25 m in y (N-S) by 25 m in x (E-W) by 12 m in z (height), which is one quarter of the minimum drill hole spacing of 100 m by 100 m. The sub-block size, which provides higher resolution at domain boundaries, is 5 m (x) by 5 m (y) by 3 m (z).

Statistical and geostatistical analysis was carried out on drilling data composited to 3 m (downhole following application of a Golder unfolding technique. This included variography to model spatial continuity in the geological domains.

The Ordinary Kriging (OK) interpolation method was used for resource estimation of the following variables; Head: Fe, SiO_2, Al_2O_3, CaO, MgO, P, S, Na_2O, K_2O, LOI; and DT80: DTC wt%, DTC Fe, DTC SiO_2, DTC Al_2O_3, DTC CaO, DTC MgO, DTC P, DTC S, DTC Na_2O, DTC K_2O and DTC LOI, using variogram parameters defined from the geostatistical analysis. Variograms were modelled for Domain 1, Domain 2 and Domain 3. Variograms from Domain 1 were used for external waste domains.

A review of the QAQC data was completed. The QAQC program included company standards, blanks and field duplicates submitted at a rate of 8% to 10% of all assayed samples. Pulps have been assayed at one independent laboratory (SGS). Independent DT repeats have been completed and three RC holes have been twinned with diamond holes. No apparent discrepancies were identified in the QAQC data.

In situ density values (dry t/m^3 basis) were assigned to the mineralised domains to convert block volumes to tonnages, using the following separate regressions for fresh and weathered rock. The regressions were derived by Sphere based on density measurements on 11 366 fresh rock specimens and 383 weathered rock specimens of mineralised and waste rock and their matching head Fe assays. A 3% rock void factor is applied to the fresh rock density regression and 5% void factor to the weathered rock density regression, as follows:

- Fresh mineralisation and waste 0.97*(Head Fe x 0.0282 + 2.5279)
- Weathered mineralised and waste 0.95*(Head Fe x 0.0273 + 2.3115)

Estimations of concentrate grades were weighted by DT80 wt%, to appropriately reflect the relationship between DT80 wt% and the DT80 concentrate assays. Weighting was completed by calculating the accumulation (DT80 wt% × DT80 assay) and subsequently back calculating the DT80 assay estimates by dividing by relevant estimated DT80 wt% values.

Cut-off Grades and Classification Criteria

The resource estimates were classified in accordance with The Australasian Code for Reporting of Identified Mineral Resources and Ore Reserves (JORC Code, 2012 Edition). The classification was considered appropriate on the basis of drill hole spacing, sample interval, geological interpretation and representativeness of all available assay data.

This Mineral Resource has been defined using geological boundaries and a cut-off grade of 20% DT80 wt% for fresh (un-oxidised) mineralisation and a cut-off grade of 20% head Fe for weathered (oxidised) mineralisation. All reported concentrate grades were weighted by DT80 wt%.

The Mineral Resource classification was performed by Golder based on the geological complexity, number of drill samples, drill hole spacing and sample distribution, data quality and estimation quality for grades and DT80 wt%. The Competent Person responsible for the estimation and classification is satisfied that the result appropriately reflects his view of the deposit. Continuous zones (domains) meeting the following criteria were used to define the resource classification:

Measured Resource

- Drill hole spacing approximately 100 m x 50 m;
- More than 20 samples per parent block.

Indicated Resource

- Drill hole spacing approximately 100 m x 100 m;
- More than 10 samples per parent block.

Inferred Resource

- Drill hole spacing wider than 100 m x 100 m;
- One drill hole per parent block;
- Increased geological complexity.

Mining and Metallurgical Methods

The DT80 is a standard process mineralisation characterisation test that enables cross-comparison within and between deposits due to the variability of the DT80 concentrate grades and mass recovery results depending on the sample characteristics. As the DT80 test requires fine grinding, it also provides a useful mimic for a pellet feed product. It was the only DT test performed on Guelb el Aouj East drill samples in 2005 and 2006 when the focus of the project was on the production of direct reduction (DR) grade pellet feed/pellets, for which a concentrate grade exceeding 70% Fe was required.

More recently, Sphere has been investigating the feasibility of producing a coarser sized magnetite concentrate, with a top size of approximately 1.6 mm and a grade of around 66% Fe. Testwork has shown that this is possible using dry magnetic separation (DMS) methods. Such a product is potentially attractive to customers as a sinter feed blend (SFB) rather than a pellet feed. Sphere's joint venture partner, SNIM, has demonstrated this with its Guelb el Rhein SFB magnetite product, produced since the 1980s.

To investigate the potential for a SFB product, Sphere has conducted a separate set of DT separation testwork on mineralised drill core samples from the 2011 to 2013 drilling at Guelb el Aouj East, This is known as the Davis Tube Liberation Grind Size test (DTLib), and is in addition to the standard DT80 test. With the DTLib test (unlike the DT80 test) the sample grind time is varied until a fixed target concentrate grade of 65% ±1.3% Fe is achieved, which occurs with most samples. The sample is then sized and the d90 size (90 % passing) is determined. This is known as the liberation grind size (DTLib d90 μm) and varies from sample to sample. The mass recovery is also determined from this testwork. The coarse grained magnetite-quartzite liberates readily even at -1 mm size whereas the finer grained magnetite-quartzite requires additional grinding, and hence reports with lower d90 sizes. The DTLib d90 size has been included in the geological model but does not form a direct part of the mineral resource estimation.

The DTLib metallurgical data has been included in the geological model to enable estimations of DTLib wt% (mass recovery) and DTLib d90 size distribution in the geological model and hence in the mining model/mine planning schedules.

The DTLib d90 µm liberation grind sizes, mass recoveries and concentrate chemistry have been interpolated into the block model but do not form part of the resource estimation as such. They are included in Table 5 as supplementary information to demonstrate the coarse liberation characteristics of the Guelb el Aouj East mineralisation. The DTLib d90 grind size averages 360 µm at a high 51% mass recovery (wt%).

Table 5: Guelb el Aouj East Metallurgical Davis Tube Liberation Grind Size Data

	Measured	Indicated	Inferred	Total
% of Resource	21.5	62.4	16.1	100
DTLib d90 µm	350	360	380	360
DTLib wt%	51.3	50.7	52.1	51.1
DTLib Fe %	64.9	65.0	65.0	65.0
DTLib SiO2 %	8.4	8.3	8.4	8.3
DTLib Al2O3 %	0.30	0.29	0.28	0.29
DTLib S %	0.022	0.024	0.025	0.024
DTLib CaO %	0.26	0.30	0.30	0.29
DT Lib P %	0.016	0.014	0.010	0.014
DT Lib K2O %	0.050	0.037	0.028	0.038
DT Lib MgO %	0.75	0.75	0.66	0.74
DT Lib Na2O %	0.028	0.028	0.027	0.028
DTLib LOI (1000°C) %	-2.77	-2.80	-2.83	-2.80

In addition to the DTLib testwork, batch and pilot plant metallurgical testwork for a SFB product is currently being conducted at the Studien-Gesellschaft für Eisenerz-Aufbereitung (SGA) research laboratory in Germany on representative life-of-mine bulk samples totalling 26 t, composited from drill core. These include separate tests of the Lower MQ domain (MQ1) and the Upper MQ domains (MQ2+MQ3) as well as a 40:60 blend of Upper MQ and Lower MQ. (SGA is an independent process company specialising in iron and steel process testwork and has been used extensively by Sphere for its batch and pilot plant metallurgical testwork programs since 2004. This included testwork on bulk samples collected in 2006 that established that DR grade pellet feed and pellets could be produced from the Guelb el Aouj East mineralisation.

JORC CODE (2012 Edition) ASSESSMENT CRITERIA ("Table 1")

The JORC Code (2012) describes a number of criteria, which must be addressed in the Public Report of Mineral Resource estimates for significant projects. These criteria provide a means of assessing whether or not parts of or the entire data inventory used in the estimate are adequate for that purpose. The resource estimate stated in this document was based on the criteria set out in Table 1 of that Code. These criteria are discussed as follows.

JORC Code Assessment Criteria	Comments
Sampling Techniques *Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* *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 (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g 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 (e.g. submarine nodules) may warrant disclosure of detailed information.*	Reverse circulation (RC) drilling and diamond core (DC) drilling were used to obtain samples for geological logging, Davis Tube (DT) testwork and assaying at Bureau Veritas (Ultra Trace) laboratories in Canning Vale, WA. Downhole geophysical logging used – gamma, conductivity and magnetic susceptibility (MS). Primary (1 m) RC chip samples were riffle split and composited to 3m samples for chemical analysis. DC drilling used to obtain core samples. For sampling, these were quartered at intervals determined by lithology to a maximum sample length of 3 m. For both RC and DC the 3 m composite samples were pulverised to 95% passing 80 μm size for head assays using XRF and TGA. Concentrates from DT testwork were also DT concentrates were also assayed by X-ray Fluorescence (XRF) using fusion beads and Thermogravimetric Analysis TGA (TGA). All drill samples were logged using hand held magnetic susceptibility meters for which calibration standards were prepared and available.
Drilling Techniques *Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc), and details (e.g. 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).*	RC drilling was used for many of the shallower targets and as pre-collars for DC tails, mostly to a downhole limit of the depth of weathering or the depth limit of the RC rig (about 300 m). RC hole diameters were 5¼"- 5½" (133-140 mm). Face-sampling hammers were used. DC tails extended from 300 m (or less, depending on actual RC pre-collar depth) to as much as 800 m down hole. DC core diameters included HQ (63.5 mm), HQ3 (triple tube, 61.1 mm), NQ (47.6 mm), NQ2 (50.8 mm) and NQ3 (triple tube, 45.1 mm). Most was NQ sizes, with HQ sizes generally limited to depths of less than 200 m. Core was orientated using an ACE® orientation tool.
Drilling Recovery *Method of recording and assessing core and chip sample recoveries and results assessed.* *Measures taken to maximise sample recovery and ensure representative nature of the samples.*	Recovery has been recorded for RC drilling by weighing primary 1 m samples. Average recovery across a 6 m rod is about 95%. For DD holes, recovery of fresh rock is close to 100% and recovery of weathered material is about 85%. There is no evidence of bias between sample recovery and

Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	grade.

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.* *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc), photography.* *The total length and percentage of the relevant intersections logged*	The entire lengths of all RC and DC holes have been logged for lithology, weathering, and colour using a standard set of in-house logging codes. Descriptive geotechnical logging is performed on all core as an integral part of the logging. The logging method is quantitative with provision for supplementary qualitative comments. RC and DC samples were logged for magnetic susceptibility (MS) using hand-held MS meters. For DC holes, mineralised zones were logged for grain size and banding type. Summary geotechnical information was recorded for all DC holes. Selected DC holes were also deepened well into footwall rocks to obtain additional geotechnical information on wall rock conditions. All core trays were photographed both wet and dry prior to core being sampled. The geological model is supported by visual grade trends and variography (preferred axes of continuity) and is the basis for defining the geostatistical domains. The geological logging, assays and DT data have been used to develop the geological interpretation.
Sub-Sampling Techniques and Sample Preparation *If core, whether cut or sawn and whether quarter, half or all core taken.* *If non-core, whether riffled, tube sampled, rotary split, etc, and whether sampled wet or dry.* *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* *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.* *Whether sample sizes are appropriate to the grain size of the material being sampled.*	For RC samples a 3-stage multi-tier riffle was used to split the primary 1 m samples (collected at the cyclone) which were normally dry or only slightly moist as collected, as a result of limited groundwater and the high air volumes/pressures used. Three successive primary sample (25%) splits were combined to produce bulk 3m composites that were further split to 2 x 12.5% sub-samples. Field Duplicate samples (QAQC) were collected from a second sample chute at the base of the splitter that also produced the Regular laboratory sample. DC sample intervals were physically marked on the core, which was sawn in half lengthways with a diamond core-cutting saw, with one half sawn again. The resulting quarter core was taken for the laboratory sample and the remaining ¾ core was archived. The laboratory sample sizes, typically 4-5 kg for RC and DC samples, are considered appropriate to the grain and particle sizes for representative sampling in respect of fundamental sampling error considerations (Gy's equation). The field duplicates and laboratory repeats were assayed and found acceptable in comparison with regular laboratory samples, with no major issues identified. A comprehensive Standards & Procedures Manual ("QuickGuide") defines the field procedures including field sample splitting, laboratory sample preparation and QAQC procedures.

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. *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.* *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	For RC chips, QAQC field duplicates were taken from the 3-stage multi-tier riffle splitters during compositing (to 3 m samples).at the rate of 4% of all samples submitted to the lab. In-house matrix-matched standards (4 separate grades) together representing 4% of samples submitted to the lab and blanks (2%) were submitted with each assay batch of head samples. (Note: submission of blanks was discontinued for the 2011-13 campaign.). The four standards were prepared in-house and the standard grades defined by "round robin" analysis at four separate laboratories (SGS, Amdel, Ultra Trace and ALS). They have grades that cover the typical range of mineralised or near mineralised grades experienced, i.e. 17.4% Fe; 22.4% Fe; 35.6% Fe; and 43.4% Fe. Primary (1 m) sample weights and 3 m composite sample weights were recorded as part of the sample recovery checks. Samples were prepared and DT testwork performed in Sphere's Zouerate laboratory in Mauritania. Core samples were crushed to -6 mm in a jaw crusher. Core and RC samples were dried for 2-4 hours at 105ºC, crushed in 3 mm then 1mm rolls crushers and milled for 3 minutes in an LM2000 pulveriser to 95% passing 80 µm size.. DT80 testwork was performed in the site lab on aliquots of these pulps. DTLib testwork was performed on the -1 mm crushings and on progressively milled samples until the liberation target grade of 65% Fe ± 1.3% Fe was achieved. Head pulps, DT80 and DTLib concentrates were assayed at Bureau Veritas (Ultra Trace) laboratories in Canning Vale, Western Australia, for 13 elements by XRF: Fe, P, SiO_2, Al_2O_3, CaO, MgO, MnO, Na_2O TiO_2, S, K_2O, BaO, V_2O_5; and TGA for LOI371°C, LOI538°C and LOI1000°C. The methods used produced total assay results. 1 225 head sample pulps (4.4% of all regular head assays) in total were sent to an external laboratory in Western Australia (SGS) for repeat assay. These were from the 2005-06 and 2011-13 drilling campaigns. 104 DT samples from the 2011-13 drilling campaign had repeat DT testwork performed in an independent (SNIM) lab in Zouerate, Mauritania. 328 DT samples from the 2011-13 drilling campaign had in-house repeats performed on each of at least five Davis Tube separators to monitor repeatability of DT results in the site lab. A Niton Model XL3t GOLDD+ hand-held XRF is used in the site lab as a preliminary check on total Fe grade for head and Davis Tube concentrate Fe grades ahead of full iron ore assay at Ultra Trace, using in-house calibrations. The accuracy and precision for all the QAQC results is considered acceptable.

Verification of Sampling and Assaying	
The verification of significant intersections by either independent or alternative company personnel. *The use of twinned holes.* *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* *Discuss any adjustment to assay data.*	Mineralisation intersection data is inspected and verified independently by consultants, including the Database Manager, Consultant Geologist and Golder. The Consultant Geologist and Golder geological and mining staff visited the deposit in 2006 and 2013 and undertook a site inspection of the deposit, logging, sampling and laboratory procedures And concluded that good quality control checks and validations ensure the data is accurate. Three sets of twin RC and DC drill holes have been completed and show overall good correlation of head and DT concentrate grades in the mineralised domains. Documentation includes a Standards & Procedures Manual ("QuickGuide") and data loading and other records and procedural documents maintained by the Perth-based Database Manager of the Access© Drill hole Database. Data is stored in an Access® database with good management protocols (including back-up) and good documentation of updates and changes to the database.
Location of Data Points	
Accuracy and quality of surveys used to locate drill holes (collar and downhole surveys), trenches, mine workings and other locations used in Mineral Resource estimation. *Specification of the grid system used.* *Quality and adequacy of topographic control.*	The exploration database includes surveyed drill hole collar coordinates (x, y) referenced to UTM (Zone 28N) using the WGS84 reference ellipsoid, and quoted within a precision of centimetres. An Orion® DGPS with error correction from OmniStar® satellite was used to set out and pick up all drill hole collar positions. This provides an accuracy of ±0.4 m in x, y and ±0.8 m in z. The DGPS elevation (z) reference is the WGS84 ellipsoid. Collar elevations were converted in the Access® database to the EGM96 elevation geoid by subtracting 38.809 m from the WGS84 collar RL, consistent with the transformation derived by AAM, Western Australia. Collar coordinates are referenced to UTM Zone 28N and referenced to WGS84. The surveyed collar RLs for holes drilled in 2005 and 2006 used in the resource estimation (JE001-183) were replaced by RLs obtained from the draped DTM (based on the Fugro 2011 LIDAR mapping, see below). The collar RLs for all holes drilled in 2011 to 2013 were obtained by subtracting 38.809 m from the DGPS RLs. Approximately 76% of drill holes have been downhole surveyed for deviation using a gyroscopic or a Maxibor tool: Contractor Surtron logged the 2005/06 holes and contractor Terratec the 2011-13 holes. All holes re-entered in the 2011-13 campaign were re-surveyed by Terratec. Single shot downhole camera hole inclination surveys were also run through the rods for all 2011-13 holes. Model deviation curves were derived for those holes that could not be gyro surveyed due to blockages, based on the single shot data and neighbouring gyro surveyed holes. Some minor inaccuracies in drill hole direction is possible in

	deeper holes that do not have gyro downhole surveys. There are 6 drill holes deeper than 300 m that do not have gyro downhole surveys. Downhole geophysical logging has been conducted on most holes. This includes natural gamma, magnetic susceptibility and conductivity A digital terrain model (DTM) was constructed based on topographic mapping using LIDAR that was performed by Fugro in 2011. The drill hole collar elevations (converted to EGM96 geoid reference were found to closely match the DTM elevations at the collar coordinates for each drill hole.
Data Spacing and Distribution *Data spacing for reporting of Exploration Results.* *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.* *Whether sample compositing has been applied.*	Drilling has been mostly been conducted on drill lines (sections) spaced 100 m apart, with some sections spaced 200 m apart in the northern part of the deposit. Drill holes are spaced approximately 100 m or 50 m apart on the drill lines. The drill hole spacing is considered sufficient to establish the good geological and grade continuity observed, with no structural discontinuities. There are areas of thickening due to folding; and a dolerite dyke cross cut the deposit towards the northern end of defined mineralisation. Drill samples have been composited to 3 m lengths (from raw samples not exceeding 3 m length) to provide a standard sample support for geostatistical analysis. Variograms were modelled for Domain 1 (MQ1), Domain 2 (MQ2) and Domain 3 (MQ3). Variograms from Domain 1 were used for internal and external waste domains.
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.* *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.*	Most of the holes were drilled along lines normal to the (approximate) N-S strike of the axial plane of the Guelb el Aouj East synform. The drill hole azimuths were towards either 090° (E synformal limb) or 270° (W synformal limb). Drill hole inclinations varied from 50° (from the horizontal) on the synformal limbs to vertical in the keel areas of the Guelb el Aouj East synform, to achieve close to normal (true thickness) intersections of the mineralised units and to prevent sampling bias.
Sample Security *The measures taken to ensure sample security.*	All drill samples are labelled using sample ticket books with SampleIDs randomly pre-allocated to Regular laboratory and various QAQC sample types (Field Duplicates and Standards). The HoleID and drilled (From-To) interval for each Regular and Field Duplicate sample is recorded on the sample ticket book stub and in the Sample Allocation Table. Sample preparation and Davis Tube testwork is performed in Sphere's Zouerate laboratory. Davis Tube concentrate SampleIDs are suffixed "C" for DT80 concentrates, and "L" for DTLib concentrates to avoid any misidentifications. Drill head sample pulps and Davis Tube concentrates were securely packaged on site in kraft sample bags, boxed,

	securely packaged and freighted to Ultra Trace laboratories in Western Australia for assay by an express airfreight courier with "chain of custody" documentation between site, the assaying laboratory and the Perth-based drill hole database manager.
Audits and Reviews *The results of any audits or reviews of sampling techniques and data.*	Golder conducted an audit of the drilling, sampling and database at Lebtheinia, Mauritania in June 2008. These same procedures and recommendations from the audit have been applied to Guelb el Aouj East and are incorporated into the Standards & Procedures Manual (QuickGuide). Golder also conducted a site visit in July 2013.

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 security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	The Guelb el Aouj East magnetite deposit is located on Exploitation Permit 609, granted for a 30 year period on 27 April 2008. This Permit is securely held by the El Aouj Mining Company SA, a Mauritanian company owned by Société Nationale Industrielle et Minière (SNIM, 50%) and Sphere Minerals Ltd (50%). Sphere Minerals Ltd, is a subsidiary company of Glencore. The Permit is not constrained by any native tile interests, historical sites, wilderness or national parks.
Exploration Done by Other Parties	
Acknowledgment and appraisal of exploration by other parties.	The deposit was mapped by Sphere in 2003 at a scale of 1:10:000. This mapping, together with 7 reconnaissance holes (6 percussion and 1 DC for a total of 1327 m) drilled by SNIM in 1970, identified the potential of the deposit and enabled an initial exploration target to be set. All drilling exploration results used in this resource estimation were produced by Sphere from its drilling campaigns in 2005-06 and 2011-13.
Geology	
Deposit type, geological setting and style of mineralisation.	The Guelb el Aouj East deposit is an N-S striking N-plunging synformal structure defined by an Archaean magnetite-quartzite (MQ) unit that ranges in true thickness from approximately 150 m to over 200 m. Each limb of the synform outcrops over a strike length of approximately 2.5 km. The MQ unit has been sub-divided into two main sub-units: the lower MQL (also known as MQ1, Domain 1) and upper MQU, which are separated by a lean magnetite/waste unit (QMM1). The MQU has been split into the MQ2 (Domain 2) and MQ3 (Domain 3) units as these are separated by an internal waste unit (QMM2). The MQ unit is a meta-BIF – a metamorphosed (to granulite facies) banded iron-formation (BIF). Recrystallisation and aggregation of the magnetite grains has resulted in partial to total destruction of the original BIF banded texture to produce the Guelb el Aouj magnetite-quartzite deposits. The Weathered zone averages 80-85 m thick. In this zone magnetite has partially to completely oxidised to hematite, resulting in lowered magnetic susceptibility and DT mass recoveries compared to fresh mineralisation.

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. *Data validation procedures used.*	Data collection procedures are standardised in Sphere's Guelb el Aouj Standards & Procedures Manual (QuickGuide) Data is captured on site mostly using FieldMarshal® software installed on ruggedized ToughBook® PCs and loaded into an Access® database in Perth, WA under the control of a data base manager. The loading procedures and other validation steps include numerous validation checks on the data. These include value range checks and contextual cross-checks between lithology and degree of weathering logged, magnetic susceptibility, head grades, DT concentrate grades and DT mass recoveries. All validation issues are referred to the site exploration team for resolution, which may include reclogging, resampling, repeated DT tests and/or re-assay. On loading the original data for modelling, Golder performed additional checks that validated the internal integrity of the data set provided by Sphere.
Site Visits	
Comment on any site visits undertaken by the Competent Person and the outcome of those visits. If no site visits have been undertaken indicate why this is the case.	Golder conducted a site visit to Guelb el Aouj East in 2006 during the first (2005-06) resource definition drilling campaign and a geotechnical drilling program, the latter managed by Golder. A good understanding of the extent and structure of the deposit was obtained by inspection of outcrops and drill holes. A second visit to the deposit by Golder was conducted in 2013. This included reviewing the core logging, sampling and laboratory procedures. Golder reported the facilities as well managed, with good quality control checks to ensure the correct procedures are followed, and validations to ensure the results are accurate.
Geological Interpretation	
Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit. *Nature of the data used and of any assumptions made.* *The effect, if any, of alternative interpretations on Mineral Resource estimation. The use of geology in guiding and controlling Mineral Resource estimation.* *The factors affecting continuity both of grade and geology.*	Geological interpretation based on lithology and DT data was completed by Sphere geologists on cross-sections using Surpac® software. 3D (wireframe) geological modelling was carried out by Sphere on behalf of EMC and reviewed by Golder. All available valid data was used in the interpretation, primarily including lithology, magnetic susceptibility, head assays, DT assays and location data (collar positions and downhole surveys). The current drill hole spacing provides a high degree of confidence in the interpretation and continuity of grade and geology and the definition of the boundary between Weathered and Fresh mineralisation. This is essentially a stratiform deposit whose physical continuity is determined by the hanging wall, footwall and internal waste boundaries of the three mineralised domains (MQ1, MQ2 and MQ3). The grade continuity is also determined by the bounds of the deposit and internal variability probably related to varying composition and degree of recrystallization due to high grade metamorphism.

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 Guelb el Aouj East mineral resources have the following maximum extents: Easting = 1 800 m at the widest section; Northing = 2440 m; RL (height) = The natural topographic surface varies from RL 506 m to RL 344 m (EGM96). The depth below surface to the upper limit of mineralisation varies from 0m (outcropping weathered mineralisation) to approximately 380 m in the northern keel of the synform. The deepest mineralisation extends to a vertical depth of about 866 m below surface (JE290).
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 software and parameters used. *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* *The assumptions made regarding recovery of by-products.* *Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).* *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* *Any assumptions behind modelling of selective mining units.* *Any assumptions about correlation between variables.* *Description of how the geological interpretation was used to control the resource estimates.* *Discussion of basis for using or not using grade cutting or capping.* *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	Mineralisation is defined by zones identified from downhole lithological and geochemical data. Fresh mineralised material is identified as having >20% DT80 wt% (DT mass recovery) and Weathered as >20% head Fe. All other material is identified as waste. Vulcan® software was used for the block modelling. The parent block size used is 25 m (x) by 25 m (y) by 12 m (z), i.e. not less than ½ to ¼ of the drill hole spacing in the x (east) and y (north) directions. The sub-block size used to improve resolution at mineralisation boundaries is 5 m (x) by 5 m (y) by 3 m (z). No specific assumptions are made regarding selective mining units (SMU) except to say that the 12 m block height is a likely actual mining bench height and that SMU size for mining could reasonably be the resource block size (say 25 m by 25 m by 12 m). No high-grade restraining or cutting was applied as there were no significant grade outliers identified. The maximum extrapolation distance from data points was 100 m. Check estimates: the magnitude of the updated resource tonnage is consistent with the previous resource estimate when the parts of the deposit not previously drilled (in the northern part of the synform) are taken into account. The overall grade of this and the 2006 resource estimates are similar; and the bulk density regressions derived for the updated resource are also similar. No significant levels of deleterious elements are present in the resource and sulphur levels in the assayed waste rocks are low (0.08%), suggesting that acid mine drainage is unlikely to be an issue. The wireframe model embodying the cut-off grades mentioned above was validated by Golder and any changes discussed and agreed with Sphere. The empty block model was derived from the wireframe using Vulcan® modelling software. Estimations for DT concentrate grades were weighted appropriately by DTR to reflect the relationship between

	DTR and DT concentrate assays. Weighting was completed using the accumulation (DTR × DT concentrate assay) and then back calculating DT concentrate assays by dividing by the relevant estimated DTR values. The accumulated grades were represented by Acc* where * is the concentrate element. Using parameters derived from modelled variograms, Ordinary Kriging (OK) was used to estimate average block grades for Fe, SiO_2, Al_2O_3, CaO, P, MgO, S, Na_2O, K_2O, LOI, DTR, AccFe, AccSi, AccAl, AccCa, AccP, AccMg, Acc_S, AccNa, AccK and AccLOI. The correlation between variables was considered during variography and estimation. Although the variograms are modelled individually for each variable, the ranges of the structures are kept similar so as to preserve metal balance and block grade assays total close to 100%. Due to the synformal structure, unfolding was used during variography and estimation to enable correlation of samples around the fold structure. The estimation was conducted in three passes with the search size increasing for each pass The model was validated visually and statistically using swath plots and comparison to sample statistics. The validation was acceptable using all these methods. respects
Moisture *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	All resource tonnages are assumed dry basis and were converted from volumes using dry bulk density factors derived for Fresh and Weathered rock (mineralised and waste) by regressions relationships of rock density against head Fe, with assumed void factors applied of 3% for fresh rock and 5% for weathered rock .
Cut-off Parameters *The basis of the adopted cut-off grade(s) or quality parameters applied.*	The resource model is constrained by assumptions about economic cut-off grades. The Fresh mineralisation is confined by a 20% DT80 wt% cut-off and tabulated resources are based on cut-off grades of 20% DT80 wt%. Weathered (oxidised) mineralisation is confined and tabulated by a head grade cut-off of 20% Fe. The reason for the different cut-offs is that the Fresh mineralisation has the potential to be processed exclusively by magnetic separation processes whereas the Weathered mineralisation, due to extensive oxidation of magnetite to hematite, would require an alternative, gravity-based non-magnetic process.
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 potential mining methods, but the assumptions made regarding mining methods and parameters when estimating*	The block model has been built using a parent cell size of 25 m (x) by 25 m (y) by 12 m (z), primarily determined by data availability. No other mining selectivity or other economic assumptions have been made in the block model, except that intersections of internal waste exceeding 6m and extending across several drill holes have locally been separately determined as internal waste. It is considered at this stage that the open pit mining bench height is likely to be 12m or close, as per the

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.*	model primary block height. Evaluation of the expected open pit mining selectivity that may be achieved will be possible (e.g. using conditional simulation modelling) once the grade control, blasting, mining, stockpiling and blending systems have been defined.

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.*	It is assumed that the metallurgical domains are primarily governed by the stratigraphic position of the mineralisation (MQU, MQL) and waste boundaries. It is assumed that the expected metallurgical recovery and concentrate grades for a pellet feed product can be inferred from DT80 test results (conducted on drill samples milled to liberation size of 95% passing 80 μm). In 2006-07, batch and pilot plant metallurgical testwork conducted at SGA laboratories in Germany confirmed the technical viability of producing direct reduction (DR) grade pellet feed (>70% Fe) and DR pellets (~68% Fe) from a wet medium and low intensity magnetic separation circuit, with grinding by high pressure rolls crusher (HPGR). Davis Tube Liberation (DTLib) testwork conducted on mineralised drill samples drilled in 2011-13 (but not on the 2005-06 drill samples) shows that the liberation grind size varies from less than 100 μm to about 800 μm, averaging around 350 μm. These results provide confidence that a sinter fines (SFB) product with a grade of 65-66% Fe can be obtained from Guelb el Aouj East. Batch and pilot plant dry LIMS (Low Intensity Magnetic Separation) and MIMS (Medium Intensity Magnetic Separation) testwork at SGA laboratories in Germany is underway on approximately 26 t of bulk core sample to establish the technical viability of producing a dry magnetic separation (DMS) concentrate product for a sinter fines blend product (with a nominal top size of 1.6 mm) at grades of 65-66% Fe. Initial results are encouraging. Several separate flow sheets are being studied as part of a current Pre-Feasibility Study (PFS) for the El Aouj Project.
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.*	Based on environmental studies conducted at Guelb el Aouj East by Scott Wilson (now part of URL) during a Definitive Feasibility Study (DFS) (completed in 2008) for the production of DR pellets, it is assumed that there are no significant environmental issues with respect to mining waste or process residue (tailings) that would affect the prospect for eventual economic extraction of the deposit. The environmental aspects of a SFB project are being considered as part of the current PFS.

Bulk Density *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* *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.* *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	The dry bulk density values used in the resource model were assigned using separate linear regressions (of bulk density vs. head Fe %) for Fresh and Weathered rocks. Separate regressions were derived specifically for el Aouj East from measurements on 11 366 Fresh rock DC specimens and 383 Weathered rock specimens and their associated head Fe %. A 3% void factor is applied to the Fresh rock predictions and a 5% void factor for Weathered rock to Weathered rock predictions.
Classification *The basis for the classification of the Mineral Resources into varying confidence categories.* *Whether appropriate account has been taken of all relevant factors, i.e. 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.* *Whether the result appropriately reflects the Competent Person(s)' view of the deposit.*	Resources were classified in accordance with the Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012 Edition). The classification of Mineral Resources was completed by Golder based on the geological complexity, number of drill samples, drill hole spacing and sample distribution, data quality and estimation quality for grades and DT80 wt%. The Competent Person is satisfied that the result appropriately reflects his view of the deposit. Continuous zones meeting the following criteria were used to define the resource class: Measured Resource ● Drill hole spacing about 100 m × 50 m ● Number of samples greater than 20 per parent block Indicated Resource ● Drill hole spacing about 100 m × 100 m ● Number of samples greater than 10 per parent block Inferred Resource ● Drill hole spacing wider than 100 m × 100 m ● Number of drill holes used of one per parent block ● Greater geological complexity
Audits or Reviews *The results of any audits or reviews of Mineral Resource estimates.*	No independent reviews of the Mineral Resource estimate have been conducted to date.

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 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.* *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	Drill hole spacing studies based on the DTR variogram was completed by Golder for Guelb el Aouj East in 2005. The approach considers the theoretical estimation error incurred in estimating grades for various drilling grids. An estimation error of less than 10% for Measured Resource, 10 to 15% for Indicated Resource and greater than 15% for Inferred Resource on a six month production period at an assumed ROM annual production rate of 18 Mt/a. The relative accuracy is reflected in the resource classification discussed above that is in line with industry acceptable standards. This updated Mineral Resource estimate is a global estimate with no production data.

COMPETENT PERSONS' STATEMENT

The Competent Person responsible for the geological interpretation (wireframe model, and the drill hole dataset used in the resource estimation of the Guelb el Aouj East Magnetite Deposit is Dr Schalk van der Merwe, the fulltime Exploration Manager of Sphere Minerals Limited. Dr van der Merwe is a member of a Recognised Overseas Professional Organisation (ROPO), the South African Council for Natural Scientific Professionals (SACNASP). Dr van der Merwe has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the Australasian Code for Reporting of Exploration Results , Mineral Resources and Ore Reserves (2012 Edition). Dr van der Merwe consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.

The Competent Person responsible for the Mineral Resource estimation and classification of the Guelb el Aouj East Magnetite Deposit is Mr Alan Miller, who is a full-time employee of Golder Associates Pty Ltd and a member and Chartered Professional of the Australasian Institute of Mining and Metallurgy (AusIMM) Mr Miller has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (2012 Edition). Mr Miller consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.