EL 6335 – Annual Technical Report
Billa Kalina Project
9 April 2019 – 8 April 2020

EL 6335, Strategic Energy Resources Ltd, Nick Burn

Contents

Figures

Appendices

1. Summary

This report summarises the exploration activities undertaken on tenement EL 6335 by Strategic Energy Resources Ltd (ASX: SER) for the period 9 April 2019 to 8 April 2020.

The tenement totals 526km^2 in area and is located approximately 140km NNW of Roxby Downs on the Billa Kalina (SH5307) 1:250,000 Map Sheet. A land access agreement for drilling between SER and the traditional owners is currently being finalised. A deed of access has been executed with the Department of Defence for access to the Woomera Prohibited Area (WPA).

Activity within EL 6335 is targeting Iron Oxide Cu-Au-U (IOCG-U) breccia deposits. SER selected the Stuart Shelf region on the northeast margin of the Gawler Craton as Geoscience Australia and others recognise it as having all the essential ingredients for IOCG-U mineral systems. The broader Olympic Cu-Au Province is host to significant IOCG-U deposits such as Olympic Dam, Prominent Hill, Carrapateena, Oak Dam West and more recent discoveries. The northern areas are considered under-explored due to thick sequences of younger sedimentary cover.

Work during the reporting period included:

- Review of previous reported exploration in the area.
- Re-interpretation and analysis of existing geophysical data, particularly gravity, magnetics, and seismic surveys, including the unconstrained inversion of available gravity and magnetic data
- Infill Ground Gravity survey

Future proposed exploration by Strategic Energy Resources is drill targeting and testing of the identified gravity/magnetic anomaly in the crystalline basement.

2. Exploration Index Map

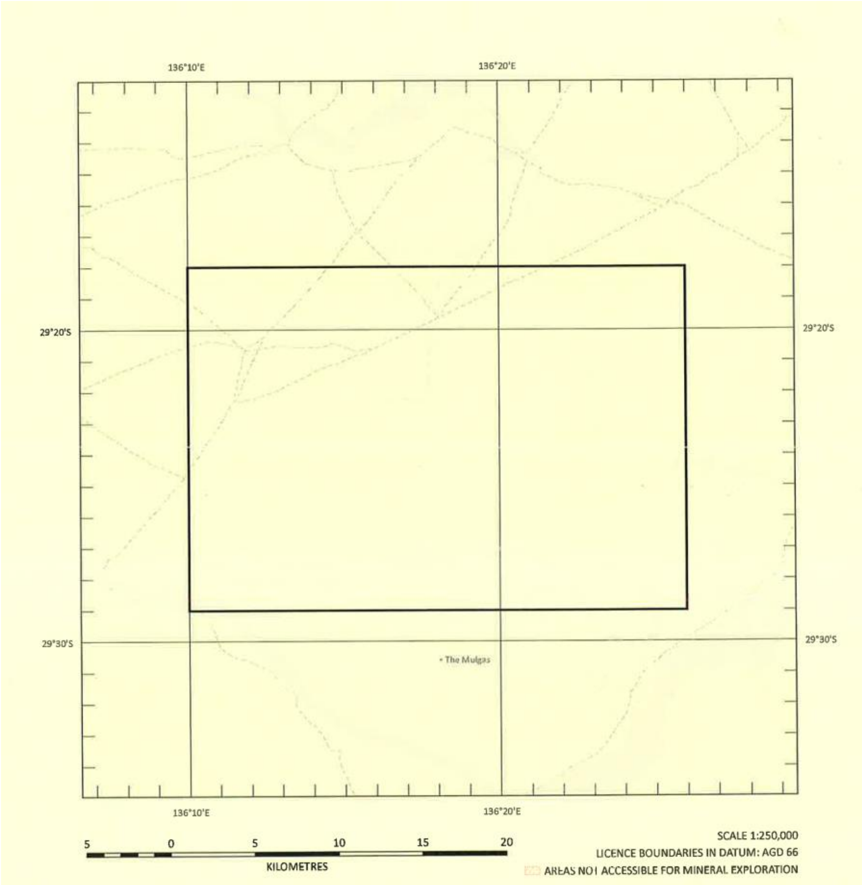

Fig 1: EL 6335 Exploration Index Map

3. Keywords

1:250,000 Map Sheet Billa Kalina (SH5307); 1: 100,000 Map Sheet Irrapatana (6308);
Margaret Creek; Binda Boudna;
Copper; Gold; Uranium; IOCG
SR8; SR11; SR12; LNC11-30; LNC11-31
Gawler Craton; Mt Woods Domain; Eromanga Basin; Great Artesian Basin;
Cadna-owie Formation; Marree Subgroup; Bulldog Shale; Ooodnadatta Formation; Boorthanna Formation; Tapley Hill Formation;
Strategic Energy Resources Ltd; Billa Kalina IOCG Project

4. Introduction, History and Exploration Rationale

4.1 Tenure

The tenement EL 6335 is 100% owned and operated by SER and covers an area of 526km^2.

EL 6335 was granted on 9 April 2019 for 2 years.

4.2 Location

The tenement area is approximately 350km north of Port Augusta and around 140km NNW of Roxby Downs in South Australia. It is situated in the area to the west of the township of Marree, to the south of the township of William Creek, and to the southwest of Lake Eyre. The tenement is situated on the Billa Kalina (SH5307) 1:250,000 Map Sheet.

The tenement is located to the east of the Mount Woods Inlier, and along the same trend as several known Stuart Shelf deposits such as Olympic Dam, Prominent Hill and Carrapateena (Figure 2).

Access to the tenement is via the Oodnadatta Track and station tracks.

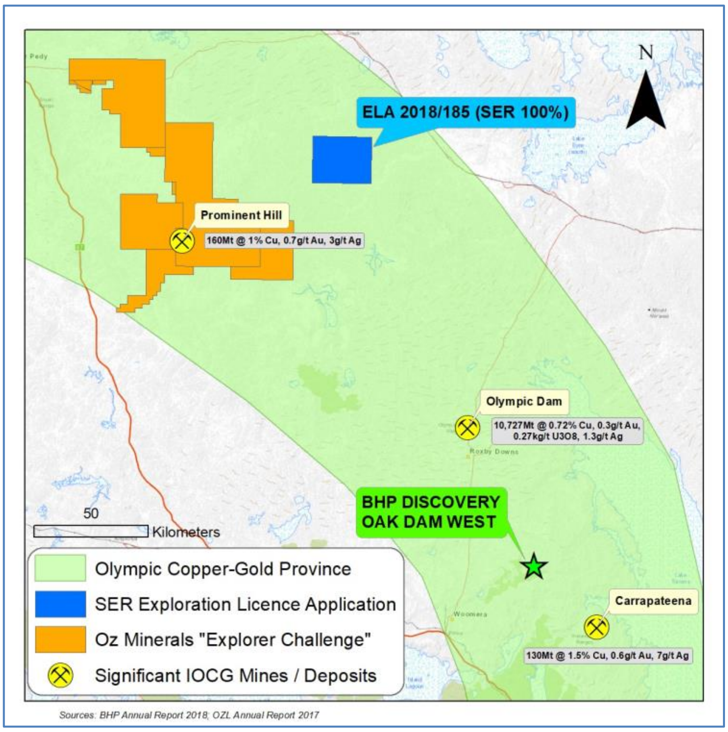

Fig 2: Billa Kalina Project in relation to local IOCG deposits and prospects

4.3 Data Review

Limited historic drillholes in and around the tenement were reviewed to identify whether crystalline basement was intersected with no holes successfully identified within the tenement. The tenement has two existing holes: SR11 and SR12. The deepest, SR12, has a maximum depth of 399m terminating in the Boorthanna Formation.

Other drillholes of note in the region include:

- *Corrie Appa Bore:* 3km south of the tenements, drilled in 1895 to 566m, failed to intersect basement.
- *FHD1:* 32km south of the tenements, WMC drilled to 743.8m terminating in the Tapley Hill Formation.
- *BD2:* 68km south of the tenements, WMC drilled to 829.4m terminating in the Hutchinson Group.
- *SR 17/2:* 22km south of the tenements, drilled to 1500m, failed to intersect basement, terminated in the Wilyerpa Formation.
- *SR6:* 26km to the south of the tenements, drilled to 899.6m, terminating in the Yudnamutana Subgroup.
- *SR 13/2:* 27km north of the tenements, drilled to 900m, terminating in the Burra Group.

Work by Tasman Resources ("Tasman") 80km southeast of the tenement at the Titan and Vulcan prospects intersected IOCG-U associated mineralisation. Titan intersected the Gawler Range Volcanics at 600m and the Hutchinson Group at 650m. Tasman Resources reports that the Vulcan hole, VUD7, intersected strong chlorite/sericite altered basement volcanics at 847m followed by a thick zone of "classic" IOCGU-style mineralised hematite breccias between 1065m and the bottom of the hole at 1227.8m.

Large and Van der Weilan (SAREIC 2014 Technical Forum) stressed the importance of albite, pyrite, chlorite, hematite, pyrite, tungsten and bismuth in the geochemical signature of IOCG-U deposits.

Review of the records of above historic drillholes were also examined for geochemical indicator minerals.

Notes of interest include

- raised bismuth levels and anomalous silver concentrations (Wright and Dow, 1979) from SR8.
- trace amounts of pyrite were found in lower part of the Tapley Hill formation in SR17/2: 638 - 906m.
- trace pyrite and possible chalcopyrite under the base of the Tapley Hill, in the matrix of the Sturtian Glacial deposits in SR6. Drilling logs from SR6 indicate a notable pyritic, quartz-hematite fragment at 738m, possibly reworked sediment originating from an older lithology.

No geochemical information of note was in reports for the other holes. The importance of REE indicators is to be investigated.

4.4 Exploration History

EL 6335 has been explored for a variety of commodities through the years. The SARIG tenement database identified numerous past holders of exploration licences intersecting the SER EL6335, with exploration occurring since the mid-1970s.

Data review was mainly restricted to those focussing on IOCG-U exploration within the last 40 years. Companies that did not conduct any exploration, have not been discussed.

Newmont Australia Ltd (1977 – 1979) – EL 327, EL 335

Newmont Australia explored for Olympic Dam style base and precious metal deposits in the Precambrian basement. The geophysical data was assessed and several targets selected for drill testing. Figure 4 below shows EL 6335 overlain on Newmont's 1979 drill hole location map.

There are two holes within EL6335 (SR11, SR12) and near the SER tenement (SR6, SR8, SR13, SR17-2). None of these historic drillholes reached crystalline basement with the interpreted ending as follows:

Hole	Max	Unit	Age
SR6	890m	Yudnamutana Subgroup	Neoproterozoic
SR8	101m	Dolomite Rock	Neoproterozoic?
SR11	104m	Stuart Range Formation (Shale)	Permian
SR12	399m	Boorthanna Formation (Diamictite)	Permian
SR13/2	900m	Burra Group (Quartzite)	Neoproterozoic
SR17/2	1500m	Wilerpa Formation (Arkose)	Neoproterozoic

From (Wright and Dow, 1979, Wright, 1978b, Wright, 1978a)

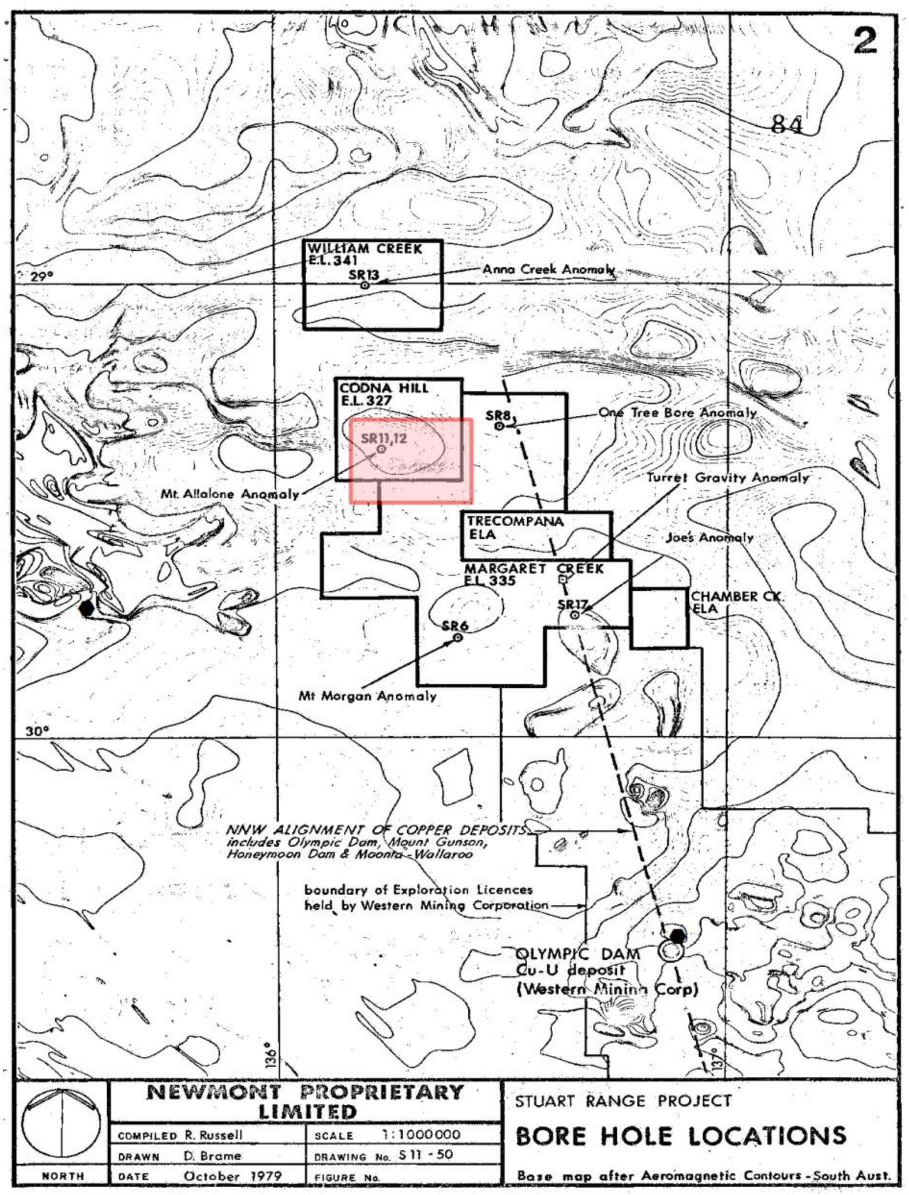

Figure 3: EL6335 on Newmont Pty Ltd 1979 drill hole location map

Stockdale Prospecting Ltd (1981 – 1986) – EL 852, EL 1169, EL 1186
Stockdale Prospecting targeted diamonds in the southeast extension of the Boorthanna Trough. They utilised aeromagnetic data to isolate prospective anomalies and constructed a Mesozoic sediment isopach map from previous drillhole data. They conducted multiple geophysical surveys and drilled 21 percussion holes totalling 1820m on geophysical or surface structural anomalies searching for heavy mineral indicators. Several indicator minerals were recovered but no source kimberlitic intrusion was identified so the ground was surrendered.

Finders Mines Ltd (2000 – 2010) – EL 2758, EL 2759, EL 3337
Flinders Mines explored for sedimentary uranium, base metal mineralisation and diamond occurrences. FM commissioned a geophysical analysis of most of the area and resolved a deep combined magnetic/gravity anomaly at Ferguson Hill (an old WMC prospect). A significant air-core campaign was undertaken to the south of EL6335 (all holes < 50m depth) with potential for kimberlites suggested however this wasn't completed before expiry in 2005. Assessment of open file magnetic data by FM concluded that crystalline basement was too deep to be viable. A joint venture with Eromanga Uranium in 2007 flew an airborne TEM and magnetic survey across EL 3337 and concluded there were no significant anomalies that warranted further investigation.

Adamus Resources Ltd (2002-2004) EL 2904
Adamus explored for Prominent Hill type IOCG-U mineralisation as part of its "Hoover Project" to the SW of the tenement. This included a 500m grid ground gravity survey over almost all of the tenement. No suitable targets were identified.

Tasman Resources (2004-2009) – EL 3174
Tasman Resources explored for various commodities over half a decade in the area. Targeted commodities included IOCG-U, zinc, copper and base metals. Work involved data compilation and review, reprocessing of various geophysical data and geochemical surface sampling. More advanced exploration was only conducted on prospects outside of the SER licence area.

Barrick Gold of Australia Ltd (2007-2009) – EL 3897, EL 3898, EL 3990
Barrick Gold of Australia Ltd explored for IOCG-U deposits along the north-eastern margin of the Gawler Craton from 2007 to 2009. They conducted a helicopter-borne ground gravity survey in conjunction with PIRSA (survey 2007A3), which covers parts of the tenement. Interpretation of the gravity data was considered encouraging with several anomalous areas identified was relinquished. (Goldsmith and Mathews, 2009)

Rio Tinto Exploration (2011-2012)
Rio Tinto explored for sediment hosted uranium from 2011 to 2012 across both tenements, then named EL 4729 and EL 4728. As no land access was negotiated, available geophysical data was reviewed and reassessed for target generation. Drill core and chips from some units were analysed however none of the historic drillholes revealed uranium mineralisation within the Cretaceous sandstone units. (McMahon, 2012, McMahon, 2013).

GB Energy (2013-2018)
Strategic Energy Resources has targeted the current licence area of EL6335 based on the previous exploration conducted by GB Energy. GB completed extensive geophysical surveying and data interpretation investigating the previously identified basement anomaly with drill targeting a priority.
In conclusion, GB undertook extensive ground-based surveys to further re-interpret the original geophysical data to re-define the EL5231 gravity drill target, however the current market conditions

for drill testing of deep IOCG targets and changing priorities determined that the licence was allowed to expire.

Summary activity descriptions are as follows;

Open file 3D geophysical inversion

Existing geophysical datasets (gravity and magnetics) were obtained, processed and interpreted by Moore Geophysics identified deep crustal structures trending NW/SE as well as crosscutting structures orientated E/W and NW/SE. 3D inversion modelling of the gravity data indicated the presence of several dense sub-surface bodies roughly aligned with the regional fabric.

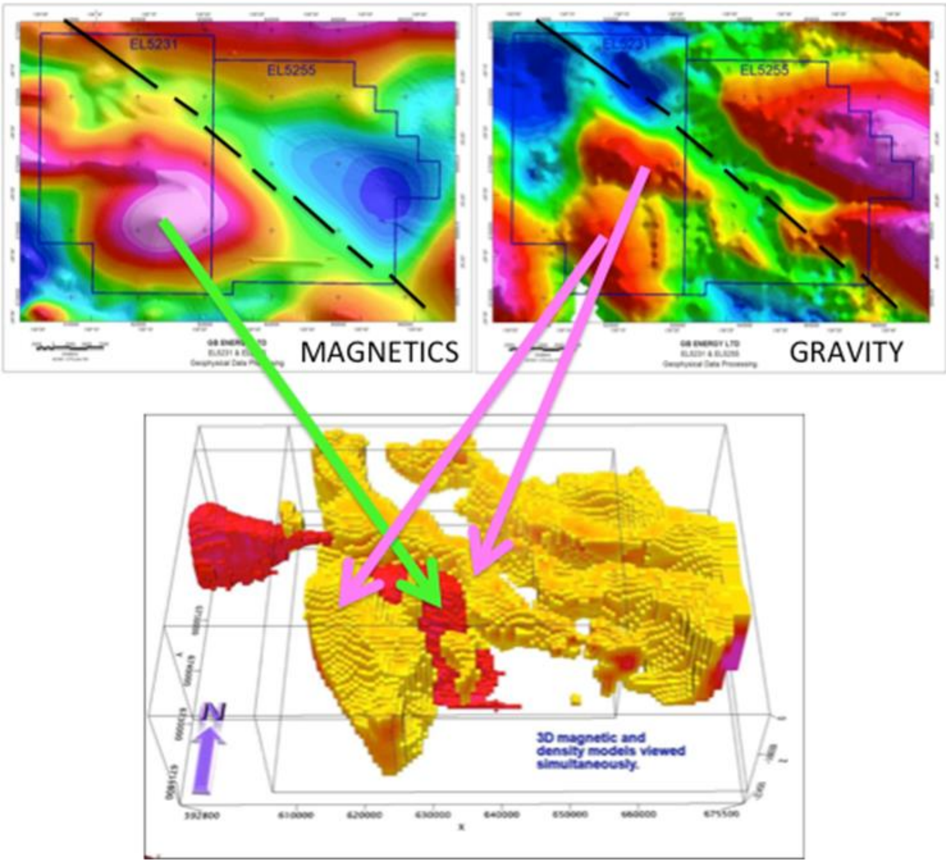

Fig 4: Density and magnetic susceptibility UBC inversion showing anomaly overlap (Moore, 2013)

Magnetic data acquisition

GBEE contracted Daishsat to collect two aeromagnetic lines along existing LNC11-30 and LNC11-31 seismic lines at 2m resolution. The magnetic survey was used to constrain depth to crystalline basement as well as highlighting potential anomalies consistent with IOCG-U mineralisation.

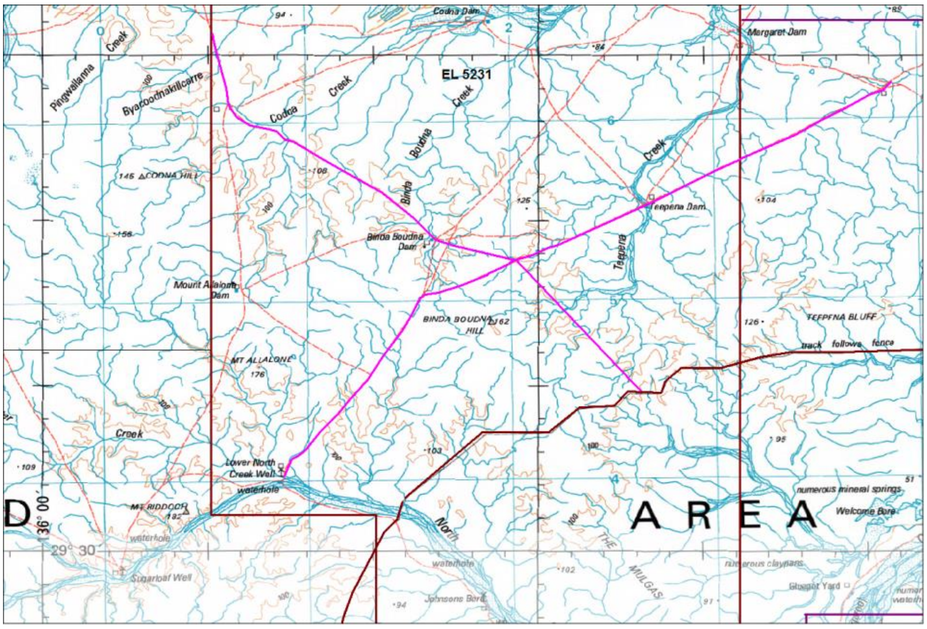

Fig 5: 2011 Seismic / 2014 Aeromagnetic traverses

Ground gravity acquisition

Daishsat Geodetic Surveyors carried out a precision GPS-Gravity survey for GB Energy Limited with a total of 1,622 new gravity stations surveyed. The survey consisted of two phases: a main survey grid comprising of 1,344 gravity stations acquired on a regional 1500m station grid with stations located equidistant from the existing 2007 South Australian PACE gravity survey; and two semi-detailed gravity traverses comprising of 278 stations acquired at 250m intervals coincident with existing seismic lines and the low-level helimag survey.

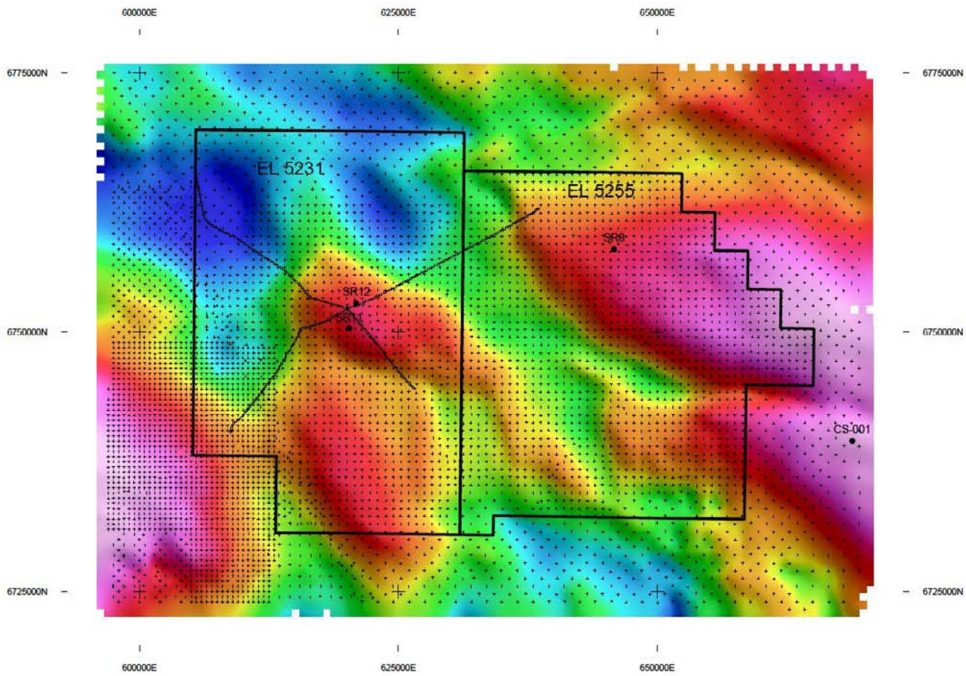

Figure 6: 2014 Ground Gravity Survey

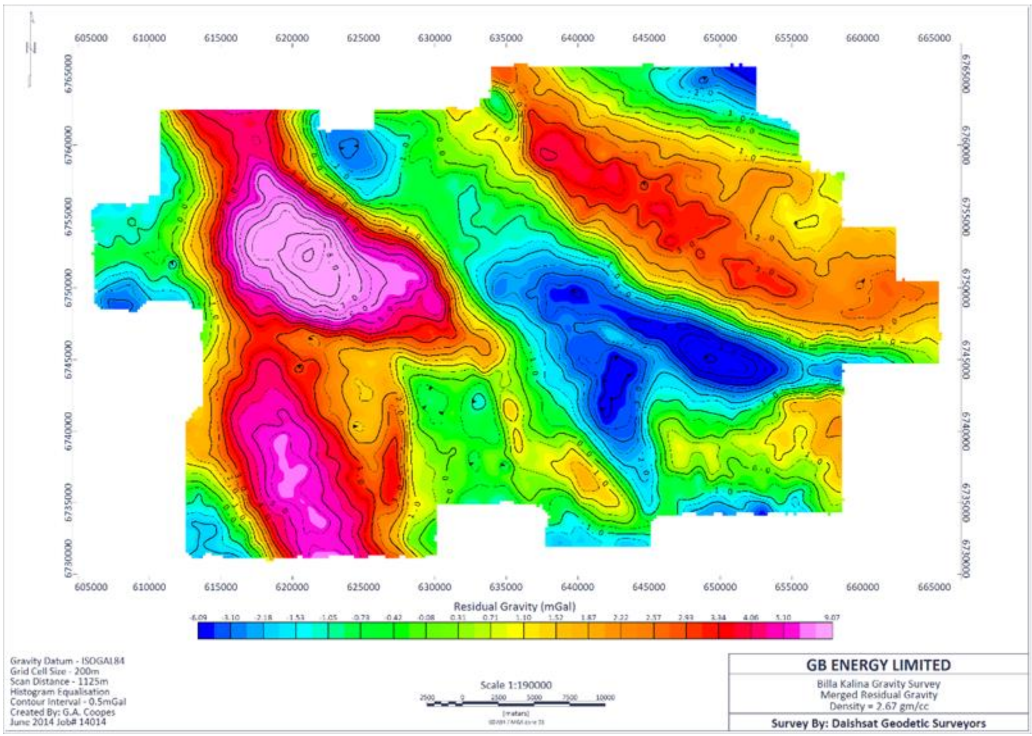

Figure 7: Merged Residual Gravity

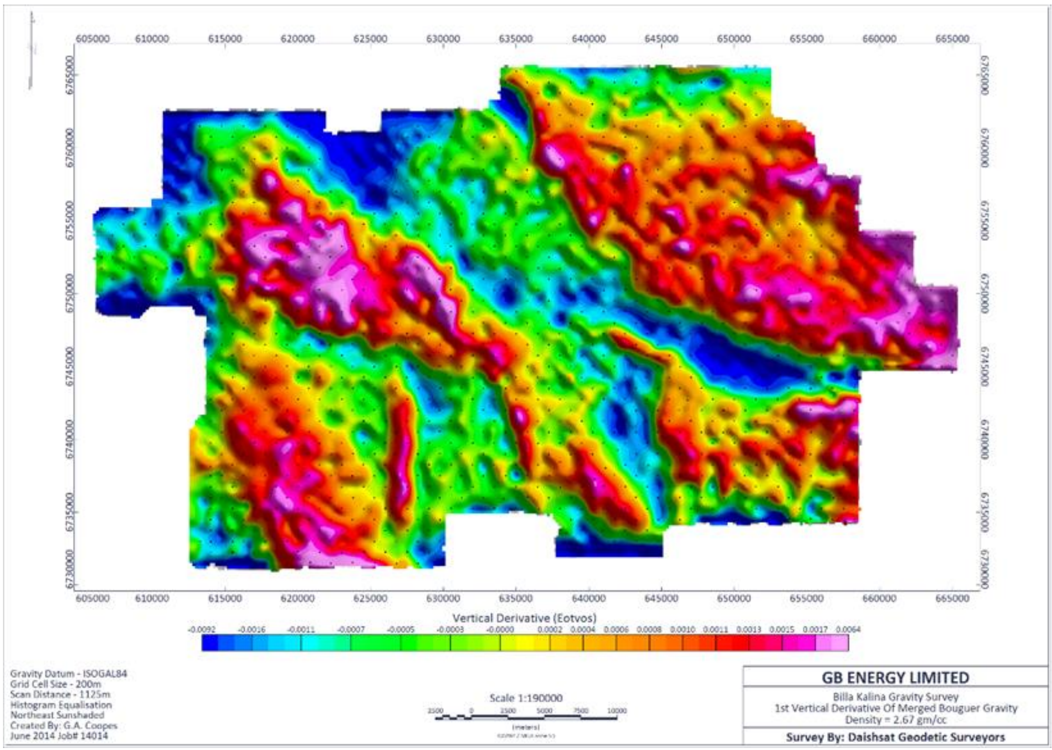

Fig 8: 1st VD Gravity Survey

4.5 Exploration Targets, Objectives and Rationale

Strategic's primary exploration target is IOCG-U mineralisation hosted in hematite-magnetite breccia complexes. The broader Olympic Cu-Au Province is host to Olympic Dam, Prominent Hill, Carrapateena, Hillside and more recent discoveries e.g. Oak Dam West. The northern areas are under-explored due to thick sequences of sedimentary cover.

The tenement is located to the east of the Mt Woods Inlier, and along the same NW/SE trend as several known Stuart Shelf deposits such as Olympic Dam, Prominent Hill and Carrapateena.

Exploration Strategy

The exploration strategy adopted by SER includes three stages: target generation, refined geophysical analysis and undercover drilling.

IOCGU deposits are characterised by hydrothermal ore styles, strong structural controls, abundant magnetite and/or hematite and a broad space-time association with batholithic granitoids.

- The project area is proximate to a major NW/SE crustal structure and associated secondary / tertiary faults and potential dilation zones. These structures are potential pathways for mineralising fluids.
- Strategic has identified offset gravity and magnetic anomalies located central to the EL 6335 tenement that may represent magnetite/hematite alteration.

5. Geology

5.1 Regional Geological History (Newell ,2005)

The Gawler Craton has a history of Archaean and early Proterozoic orogenic evolution terminating during the Carpentarian with a relatively stable platform. Deposition on the Stuart Shelf commenced 1400 Ma (Adelaidean System) with continental siltstones and shales accompanied by flood basalts, followed by shallow water sedimentation until Cambrian times.
Reactivation of faults initiated during the Devonian formed the Boorthanna Trough, a north-south half-graben structure, which represents the southerly extension of the Arckaringa Basin. Glaciation in the upland areas flanking the basin and contemporaneous subsidence during the Upper Carboniferous/Lower Permian accounted for the deposition of the Boorthanna Formation.
Later tectonic stability in the Permian produced a low energy, marine environment during which the Stuart Range Formation was deposited, followed by regression and deposition of the freshwater Mount Toondina Beds.
Major tectonic movements during the Late Jurassic/Early Cretaceous period caused uplift of the Gawler Platform in faulted blocks and marked the start of the Cretaceous transgressions.
The post Cretaceous period has mainly been one of erosion, deep weathering and formation of duricrust. Silcrete, dominantly pedogenic in character, caps units of Adelaidean to Tertiary age and occurs as clasts in younger sediments.

5.2 Surface Geology

The surface geology of EL6335 is dominated by Bulldog Shale with small areas of Cadna-owie Formation. The Permian Boorthana Formation, outcrops in the south of the tenement. The remainder of the area consists of Tertiary and Quaternary alluvial, fluvial, aeolian and playa sediments (Figure 6).

The predominant hydrological features in this region are the (usually) dry salt lakes of Lake Eyre South to the east and Lake Eyre to the northeast. Most watercourses in the area drain northerly into the Lake Eyre depression.

A series of mound springs occur in the area (Figure 4), discharging from the underlying Great Artesian Basin, these are of importance as they may indicate underlying faults.

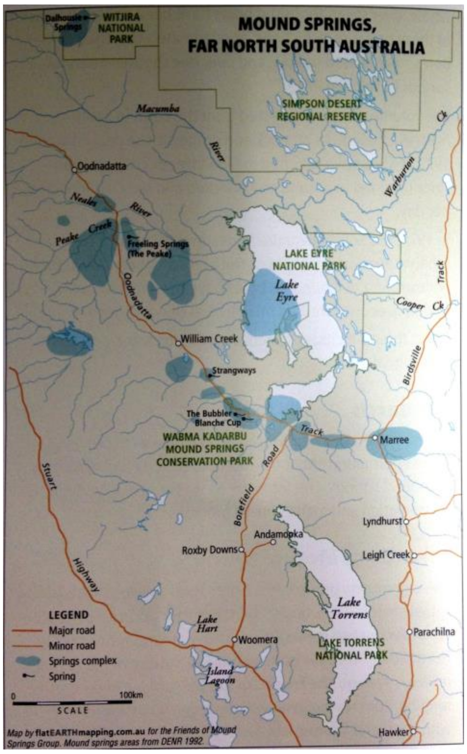

Figure 9: Mound Springs, Far North SA (FOMS flyer)

5.3 Eromanga Basin / Great Artesian Basin (after PIRSA)

The tenement is situated over the Early Jurassic to Late Cretaceous, multi-aquifer basin Eromanga Basin / Great Artesian Basin (GAB). The Eromanga Basin consists of three main sequences: the lower non-marine, the marine and the upper non-marine.

- The lower non-marine consists of fluvial sandstones interbedded with shales and discontinuous thin coals (Poolowanna Formation), overlain by a thick fine to coarse grained sandstone unit with granule and pebble layers and shale interclasts (Algebuckinga Sandstone). The lower non-marine sequence is prospective for oil and gas.
- The marine sequence represents a transition from non-marine to marginal marine to open marine shale and sandstone. The Cadna-owie Formation which lies at the base of this sequence represents the onset of a marine transgression and consists of non-marine to marine sandstone, siltstone, calcareous sandstone, and pebbly sandstone. The Cadna-owie is overlain by the thick Marree Subgroup, which includes the siltstone and mudstone dominated Bulldog Shale and Oodnadatta Formation.
- The upper non-marine sequence consists of the Winton Formation, a mixture of lithic and feldspathic sandstone, mudstone, siltstone, and minor conglomerate. Local coal, lignite and volcanic detritus are also present.

5.4 Adelaide Geosyncline and Stuart Shelf

A deeply subsided sedimentary basin with at least four main phases of rifting in the Adelaidian (Neoproterozoic) and one in the early Cambrian. Twelve major transgressive/regressive cycles in the Adelaidian and three in the Cambrian.
The sequence consists of a thick pile of sedimentary rocks and minor volcanic rocks that were deposited on the eastern margin of Australia during the time of breakup of the supercontinent Rodinia. Dominant lithologies are, in order of decreasing abundance, siltstone, sandstone (both mature and feldspathic), dolomite, limestone and diamictite.

5.5 Basement Geology

The Gawler Craton has a history of Archaean and early Proterozoic orogenic evolution terminating during the Carpentarian with a relatively stable platform (see summary at Figure 6).

The eastern margin of the Gawler Craton has been extensively altered by a regional-scale system of iron-rich mineralised hydrothermal fluids, associated with widespread, comagmatic Gawler Range Volcanics and Hiltaba Suite magmatism. IOCG-U mineralisation in the Olympic Copper Gold province is associated with the ca. 1595-1575 Ma Gawler Range Volcanics and Hiltaba Suite igneous event.

Altered rocks include deformed Palaeoproterozic sediments and granites as well as the Mesoproterozoic Hiltaba Suite, Gawler Range Volcanics and interbedded sediments.

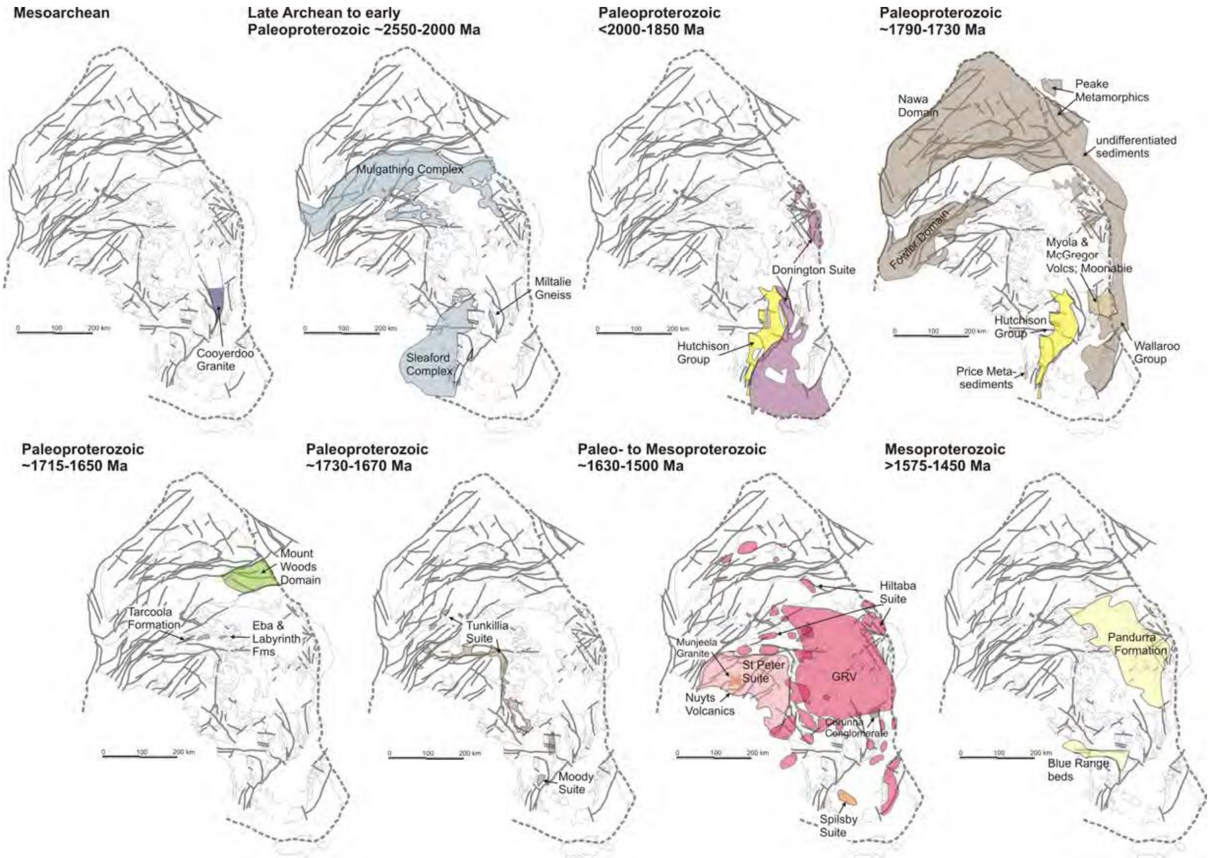

Fig 10: Archean to Mesoproterozoic development of the Gawler Craton, showing the location of major rock units formed in each interval (after Hand et al., 2007)

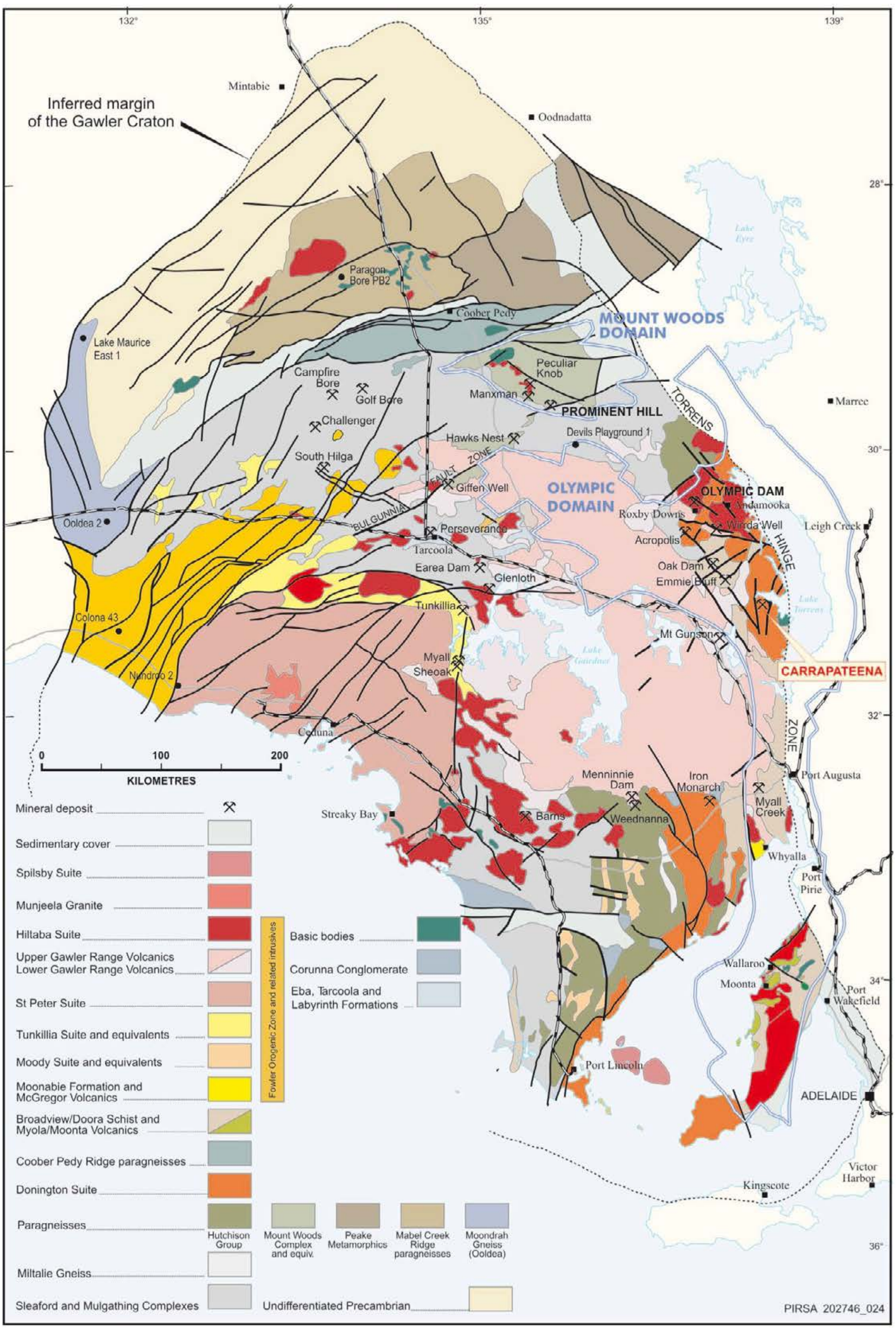

Fig 11: Interpreted solid geology of the Gawler Craton (Wilson, 2012)

5.6 Mineralisation Model

SER is exploring for Prominent Hill and Olympic Dam style IOCG mineralisation. The model presented by Haynes et al. (2004) for the genesis of Olympic Dam has been an important factor in SER's approach to exploration.

Primary targets combine offset gravity and magnetic anomalies, proximity to secondary or tertiary faults splaying from the NE/SW or NW/SE regional fault lines (fluid pathways) and proximity to Hiltaba or Donnington suite granites (fluid sources).

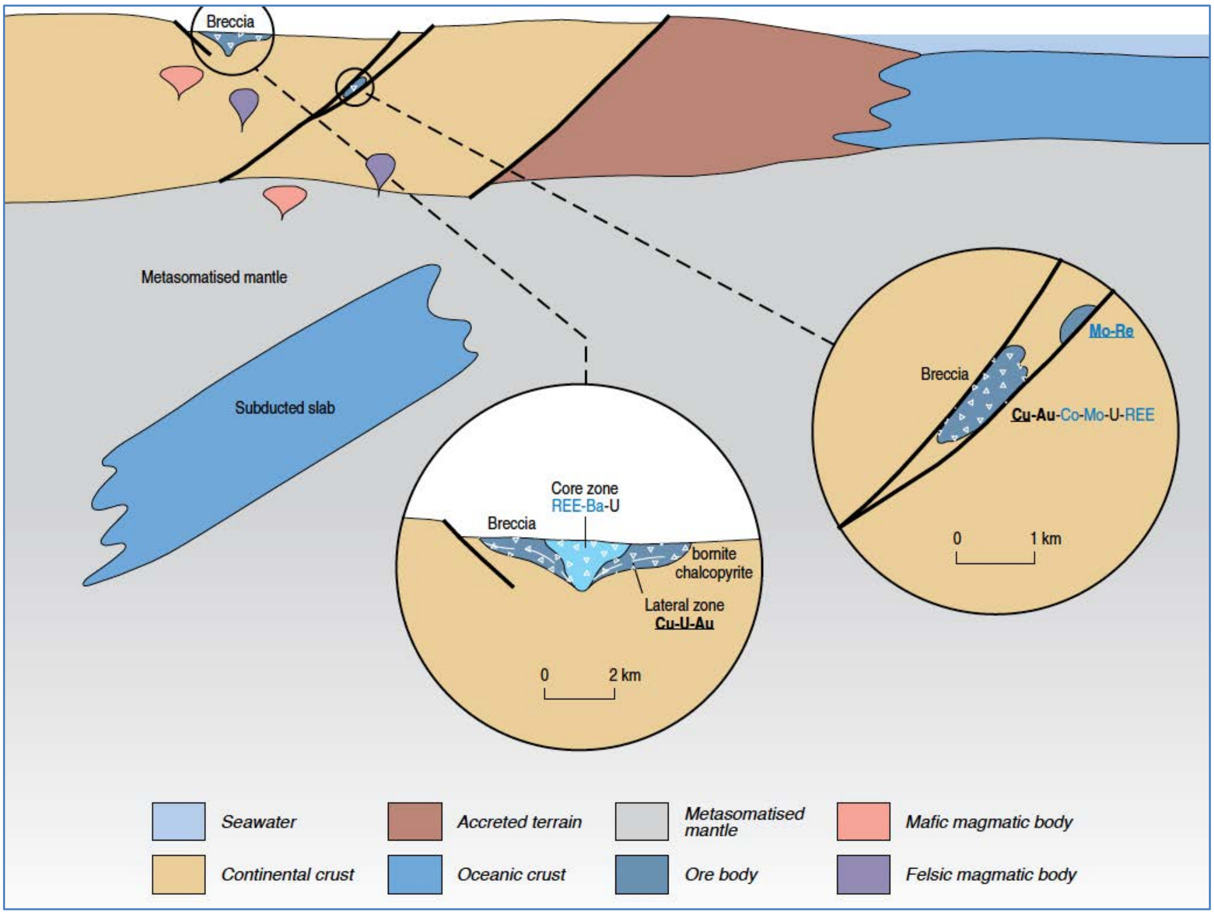

Fig 12: IOCG-U mineral system development
(Geoscience Australia - Critical Commodities for a high-tech world: Australia's potential to supply world demand, 2013)

6. Exploration EL6335

Activities undertaken in the first year of tenure include;

6.1 Land access

In the first year of tenure, negotiation for access was undertaken with the following stakeholders

- Landholders; Billa Kalina and Anna Creek Station
- Department of Defence; Woomera Protected Area (Green Zone)
- Arabana People: Registered Native Title Corporation

Finalisation of drill access for the next stage of exploration is ongoing with the Arabana Corporation and WPACO (Woomera Protected Area Coordination Office). Work program applications for drill access are currently being drafted for this next stage.

6.2 Infill gravity survey

Daishsat Geodetic Surveyors successfully carried out a precision ground gravity survey during February 2020 with a total of 1,288 new gravity stations surveyed in EL6335.

Scintrex CG-5 Autograv gravity meters were used for gravity data acquisition and base station control. Leica GX1230 differential GNSS receivers were used for gravity station positional acquisition with all gravity and GNSS data acquired using Daishsat ATV methods.

The survey consisted of one area, with 1,111 planned stations at a 250m by 250m station spacing interval. During the survey, an additional 177 infill stations were added by SER, bringing the total of new stations surveyed to 1,288. The infill station spacing was 250m east west (offset 125m from the easting of the original planned stations), and 125m north south.

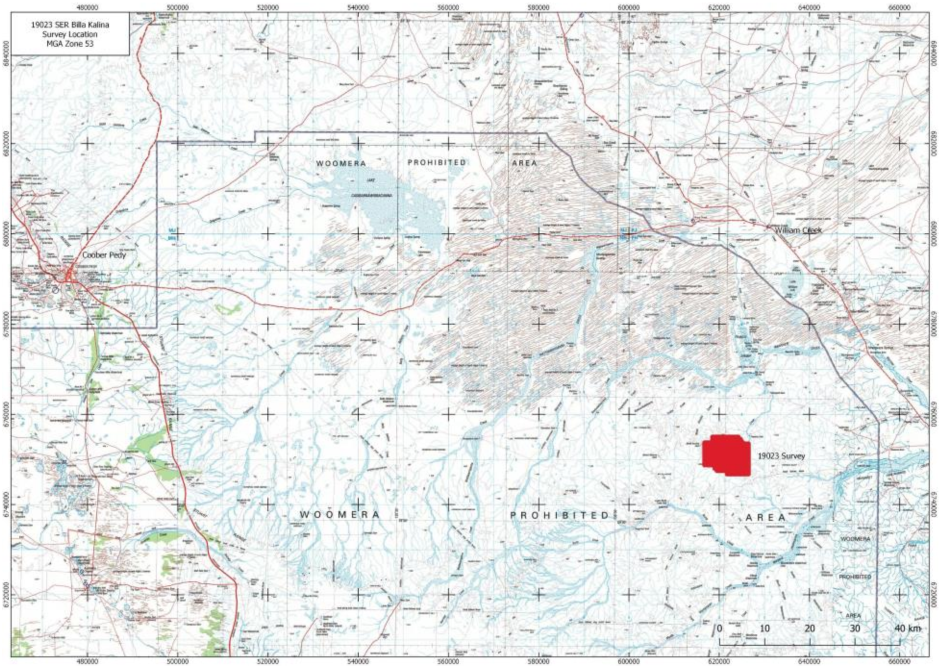

Fig 13: 2020 Ground Gravity Survey Location

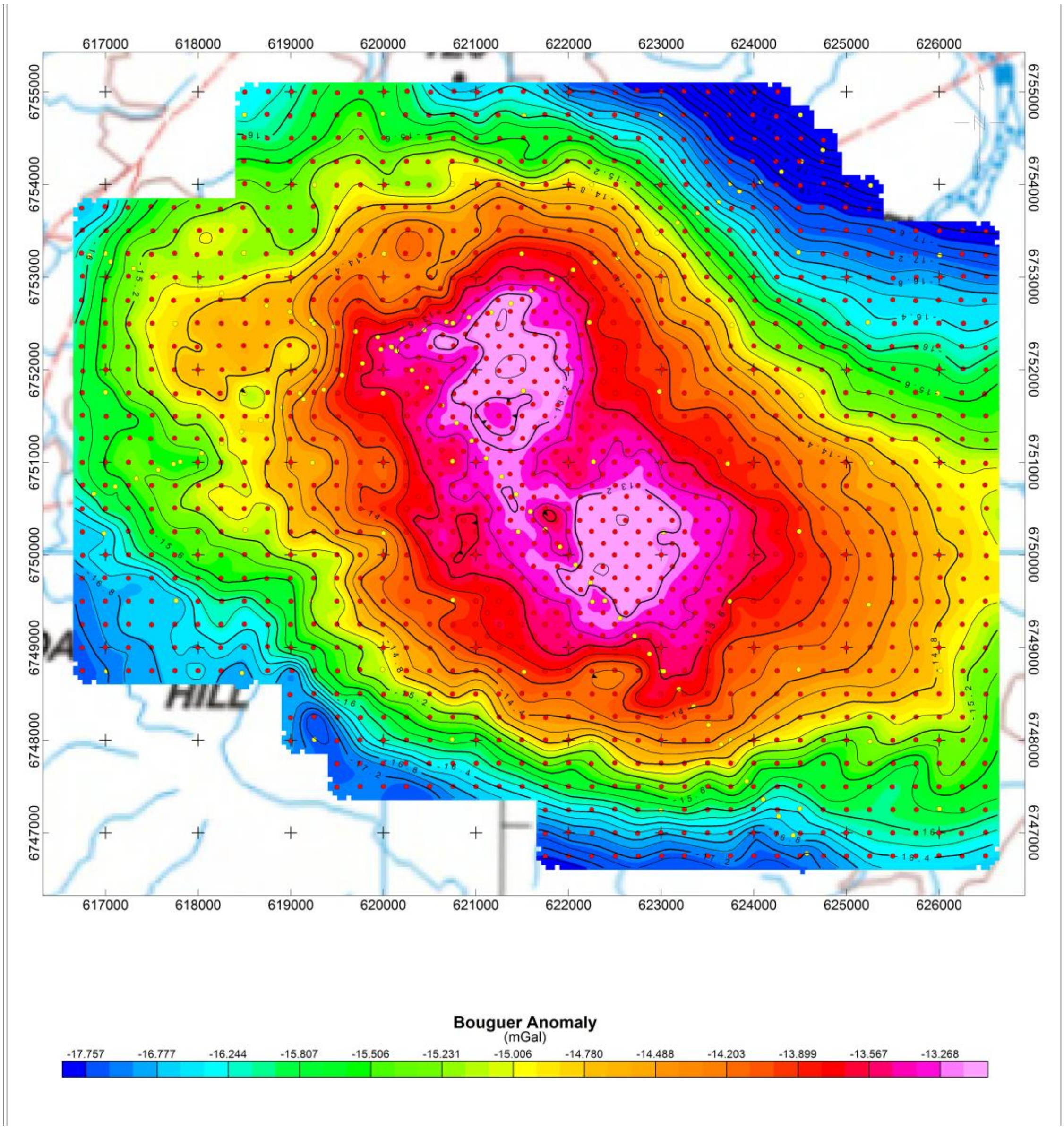

Fig 14: 2020 Ground Gravity Survey (Infinite Slab Bouguer Anomaly)

6.3 Data interpretation

Drill targeting activities under way in the first year of tenure involve collection of further field data (i.e. ground gravity) and reprocessing of the full data set, including

- Re processing of the gravity i.e. 3d gravity/magnetic inversion studies to generate greater defined drill target
- Re processing of historical seismic data for depth data, rather than time. i.e. interval/depth velocity function is used to stretch/compress the seismic two-way times to depth for drill targeting purposes

7. Conclusions

Work during the reporting period included:

- an extensive review of previous reported exploration and re-interpretation of existing geophysical data, including magnetic, gravity and seismic, unconstrained inversion geophysical data
- infill ground gravity survey
- land access negotiation

Analysis and interpretation of both historical and the new acquired infill gravity data reveal:

- a deep crustal structure trending NW/SE with lower order cross-cutting structures orientated E/W and NW/SE; and
- a dense sub-surface body that envelopes a large, deep-seated, magnetic intrusive.
- allows greater defined drill targeting of basement anomaly

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STRATEGIC ENERGY RESOURCES

BILLA KALINA GRAVITY SURVEY

PROCESSING AND LOGISTICS REPORT

February 2020

Report number 19023

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DAISHSAT
GEODETIC SURVEYORS

TABLE OF CONTENTS

1.0 INTRODUCTION

Daishsat Geodetic Surveyors successfully carried out a precision ground gravity survey during February 2020 for Strategic Energy Resources Ltd (SER), with a total of 1,288 new gravity stations surveyed in northern South Australia.

Scintrex CG-5 Autograv gravity meters were used for gravity data acquisition and base station control. Leica GX1230 differential GNSS receivers were used for gravity station positional acquisition. All gravity and GNSS data were acquired using Daishsat ATV methods.

The survey was conducted using two ATV crews and was completed safely, on time and within contract specifications.

Photo 1 – A Daishsat DATV, a highly modified all-terrain vehicle

2.0 SURVEY OVERVIEW

The gravity survey was conducted on SER's Billa Kalina project, approximately 150km east of Coober Pedy and 50km south of William Creek.

The survey consisted of one area, with 1,111 planned stations at a 250m by 250m station spacing interval. During the survey, an additional 177 infill stations were added by SER, bringing the total of new stations surveyed to 1,288. The infill station spacing was 250m east west (offset 125m from the easting of the original planned stations), and 125m north south.

The terrain encountered in the survey area was generally flat through to low hills, on gibber plains.

The survey was reasonably remote, with crews obtaining fuel and supplies before heading into site. The crews were fully self-supporting, conducting vehicle and equipment maintenance as required and on site during the duration of the project.

Photo 2 – Typical terrain found in the survey area

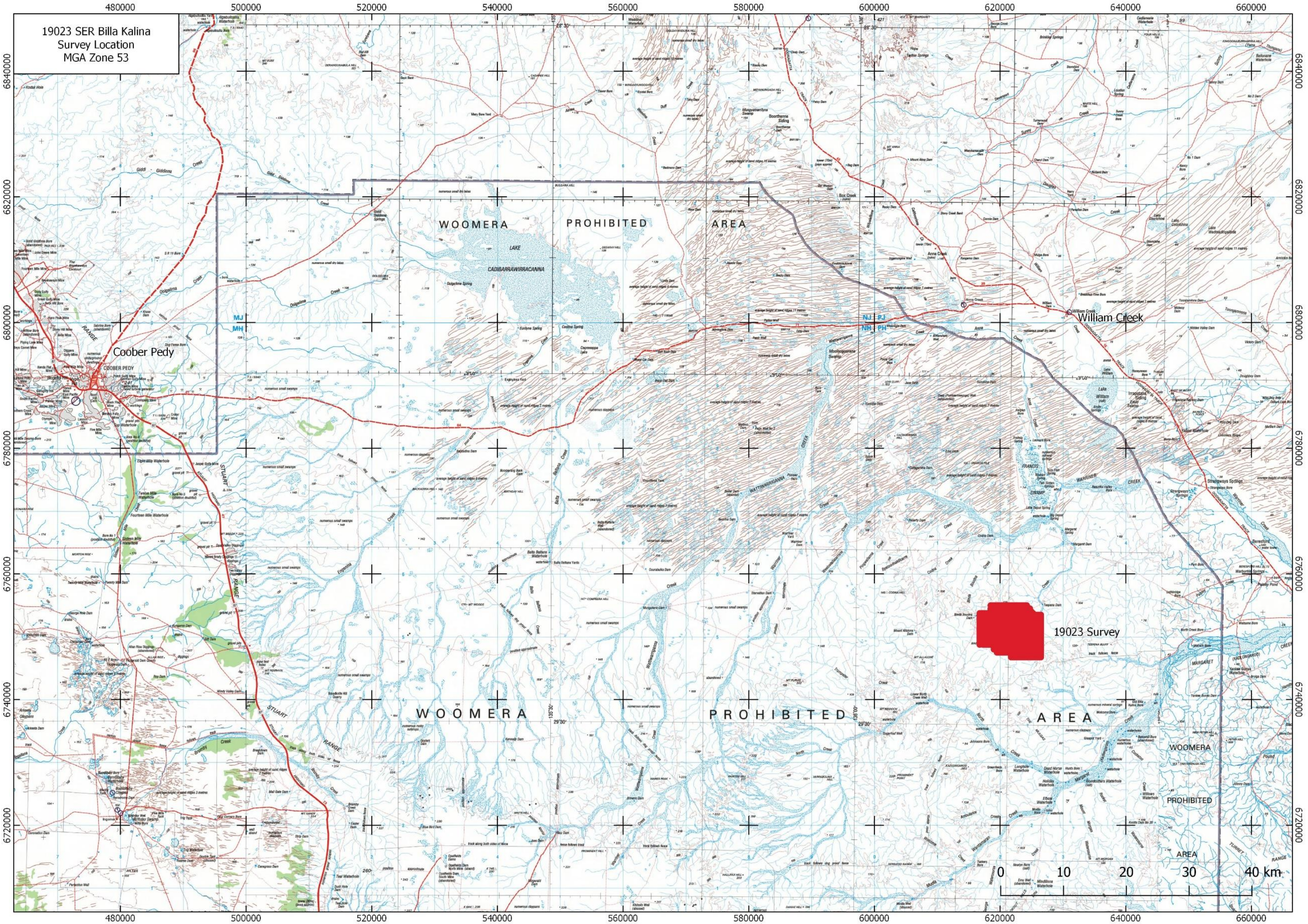


Figure 1 – Survey Location

3.0 PERSONNEL AND EQUIPMENT

3.1 Personnel

Gravity surveying, final data reduction, image processing and reporting was conducted by Daishsat Surveyors and Geophysicists. A full description of the personnel involved in the survey is listed in Appendix C – Survey information.

3.2 Survey equipment

Surveying equipment utilised on this survey included:

- Scintrex CG-5 Gravity meters
- Leica System GX1230 dual frequency DGNSS receivers
- Garmin vehicle-mounted GNSS receivers for navigation
- Notebooks for data processing and backup

3.3 Vehicles

Toyota Landcruisers were used for transport to and from site with heavily customised John-Deere Gator 4WD all-terrain vehicles (ATV's) used to acquire gravity stations.

The Landcruisers are fitted with a range of safety equipment including:

- Dual fuel tanks
- Spare tyres and tyre repair kit
- Satellite phone and UHF Radios
- Garmin inReach satellite tracking device
- Self-recovery equipment including winch and snatch straps
- Tools and spares to enable field repairs as necessary
- Survival kit with EPIRB emergency locator beacon
- First Aid kits

The Daishsat ATV's used were equipped with the following survey and safety equipment:

- Garmin inReach satellite tracking device
- 10L jerry can of spare fuel
- Spare tyres and tyre repair kit
- Satellite phone and UHF Radio
- Personal First Aid Kit
- Self-recovery equipment including winch, snatch straps
- Tools and spares to enable field repairs as necessary
- Survival kit with EPIRB emergency locator beacon

3.4 Accommodation

To minimise daily travel times, crews set up a fly camp as close to the survey area as possible.

Our fly camps consist of a small tent and swag for each person, and a small area for the vehicles and ATV's. All equipment and rubbish were removed upon demobilisation from site, causing minimal impact on the surrounding environment.

Photo 3 – Fly camp on site for the survey

3.5 Communications

The survey crews were equipped with hand-held Iridium satellite phones, vehicle-mounted UHF radios and Garmin inReach satellite tracking and messaging devices. The inReach system allows for real time monitoring of the crews' location (whether in a vehicle or on foot) via a web interface, and two-way messaging between the office and other crews onsite. Scheduled daily communication and data exchanges with the Murray Bridge office were ongoing for the duration of the job and this enabled survey updates and interim data to be reported to the client on a regular basis.

4.0 GNSS SURVEYING AND PROCESSING

4.1 Set out and surveying of the grid

Set out of the survey grid was done concurrently with the gravity data acquisition using Leica GX1230 dual-frequency GNSS units operating in autonomous mode. Where possible, the readings were taken as close as possible to the nominated coordinates. Some stations were moved from their nominated coordinates for various reasons including inaccessible trees and scrub, topographical features that could introduce severe local gravity terrain effects and other topographical issues making access to the station difficult or unsafe. Raw kinematic GNSS data was logged by a Leica GX1230 receiver during the gravity observations to determine the precise location of the GNSS antenna. Repeat gravity stations were strategically placed throughout the survey to monitor and control gravity meter performance and positional accuracy.

4.2 Survey datum and control

An existing GNSS base station (with gravity base located coincident), station number 1106, was utilised for this survey. Station 1106 was established previously by Daishsat.

A typical Daishsat base station consists of a star picket witness post with an affixed Daishsat plaque along with a short star picket driven to refusal about 10cm above ground level and emplaced about 30cm to the left of the witness post. All bases are photographed to create a permanent record that will ensure accurate access to this site as a future resource.

Further base station information is described in Appendix D – Base station location and information.

Photo 4 – Base 1106 used for the survey

Coordinates for base station 1106 have been calculated (in 2014) using three days' worth of static GNSS data connected to Australian based IGS (International GNSS Service, formerly the International GPS Service) stations using Geoscience Australia's online GNSS processing system, AUSPOS. The base positions obtained from AUSPOS usually show final accuracy standard deviations (SD) of better than 5mm obtained for x, y and z, and can be considered first order.

4.3 Processing of the position and level data

Raw kinematic GNSS data were logged at 5 second intervals on the Leica GX1230 GNSS receiver and static GNSS data was logged at 5 second intervals on a Leica GX1230 GNSS receiver set up on the GNSS base station. Surveys are planned such that base to rover baseline lengths are kept as short as possible to maintain reliable and accurate positional resolution. At times additional GNSS receivers are placed in the field at temporary unmarked locations to shorten the baseline lengths.

At the end of each day all raw GNSS data was downloaded onto a laptop, compressed and transferred to the Daishsat FTP site. The data was processed using Waypoint's (Novatel) GrafNav GNNS post-processing software to produce positions accurate to within a couple centimetres for the antenna location at every 5 second epoch.

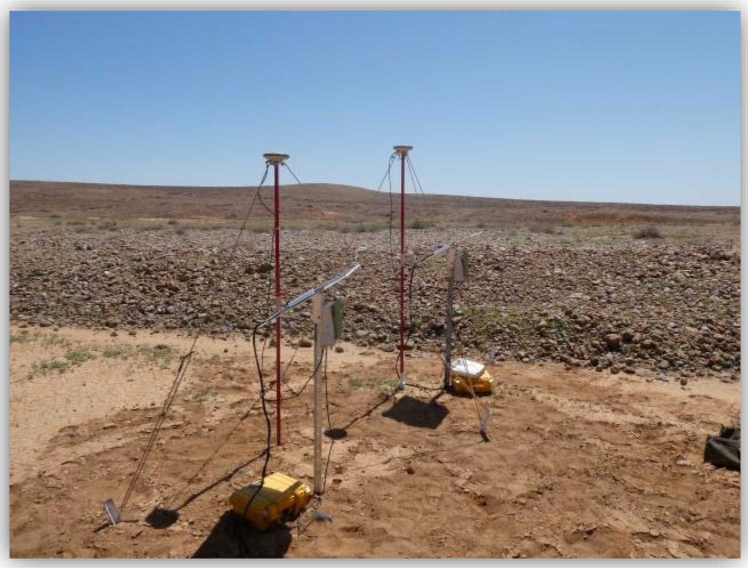


Photo 5 – A Leica GX1230 GNSS receiver set up over base 1106 with a redundant base set up nearby

4.4 Quality control of the position and level data

The GNSS data was processed using Waypoint's (Novatel) GrafNav GNSS post-processing software. This software has many tools and applications that assist our Surveyors and Geophysicists processing and analysing the data to ensure quality positional data is reliably and consistently obtained for all gravity stations throughout the project. Experience is required in structuring the field observations to collect reliable and accurate data in different conditions. Trees, scrub, long baseline lengths, different satellite windows and other factors can affect the GNSS observations and these need to be taken into account when planning and processing a survey. Repeat analysis on the survey data had demonstrated that accurate and reliable positional data has been collected and processed for this project.

5.0 GRAVITY ACQUISITION AND PROCESSING

5.1 Gravity data acquisition

Scintrex CG-5 Autograv gravity meters were used exclusively for the field acquisition. For each gravity observation the CG-5 gravity meter was carefully placed on its tripod and levelled, restricting the vertical and horizontal levels to 5 arc seconds. Once the meter was level, two gravity observations of 20-second stacking time were read and recorded. The instrument was monitored for any seismic or instrumental noise and the X/Y tilts, temperature and tolerance between readings was monitored during the reading by the Surveyor. The tolerance between readings is set at 0.030 of a dial reading and any readings falling outside of this were re-read. Field readings were also manually recorded by the field crews in Daishsat gravity field books along with any observations that may affect the reading.

During the day the field crews monitored any internal repeat gravity stations collected for abnormal drift and tares as well as the drift closure at the end of the day. If the meter received a bump or knock the previous station was revisited in order to detect if a tare had occurred.

5.2 Gravity base stations

The gravity base used for this survey was previously established base 1106, located coincident with the GNSS base station as described in section 4.2.

Gravity base 1106 was previously tied (in 2014) with multiple loops to Australian Fundamental Gravity Network station 1967939308, located at William Creek.

Further base station information is described in Appendix D – Base station location and information.

When in the field during field acquisition, a base station reading was taken in the morning before surveying commenced, and after the last field observation of the day. When taking a base station reading, the observed gravity values were stacked over 120 seconds to ensure accuracy. Observations were repeated until the readings repeated to 0.010 of a dial reading or less.

5.3 Gravity data processing

At the end of each day the raw gravity data was downloaded from the CG-5 instruments onto a laptop where preliminary quality control was carried out. Any erroneous station numbers were corrected and readings that fell outside of tolerance were removed. Once this was done Daishsat's in-house software was used to average the two 20-second readings for each gravity station, remove the Scintrex Earth Tide Correction and assign each gravity station reading an easting and northing co-ordinate and a ellipsoidal elevation. Geosoft GRAVRED software was then used to perform gravity reductions to produce a set of observed gravity values that can be used for gridding, imaging and further analysis.

The following corrections were applied to the raw gravity data using Geosoft's GRAVRED software:

Instrument Scale Factor (SF): This correction is applied to correct each raw gravity reading (in dial units) to a relative gravity unit value based on the meter calibration.

$$R_{SF} = r_d \times SF$$

Where:

R_{SF} = scale factor corrected reading in milliGals

r_d = raw gravity meter reading in dial units

SF = instrument scale factor (dial units/milliGal)

Earth Tide Correction (ETC): This correction is applied to correct for regular variations in the Earth's gravitational field due to changes in the relative position of the moon and sun. The Scintrex calculated ETC was removed and a new ETC was calculated using Geosoft Formulae.

$$r_{ETC} = r_{SF} + ETC$$

Where:

r_{ETC} Earth Tide Corrected reading in milliGals

r_{SF} Scale Factor Corrected reading in milliGals

ETC Earth Tide Correction (ETC) in milliGals

Instrument Drift Correction (IDC): This correction is applied to compensate for the daily changes in the gravity meter due to mechanical stresses and strains encountered during surveying. The extension and contraction of the gravity meter spring with slight variations in temperature (obeying Hooke's Law) are the major cause of drift. The drift is assumed to be linear and is calculated by measuring the difference between the last and first base readings.

$$ID = \frac{r_{B2} - r_{B1}}{t_{B2} - t_{B1}}$$

Where:

ID Instrument Drift in milliGals/hour

r_{B2} 2^{nd} Gravity Base reading in milliGals

r_{B1} 1^{st} Gravity Base reading in milliGals

t_{B2} Time of 2^{nd} Gravity Base reading

t_{B2} Time of 1^{st} Gravity Base reading

Observed Gravity (G_{OBS}): The preceding corrections are applied to each of the raw gravity readings to calculate the earth's relative gravitational attraction at each of the field gravity stations. Absolute gravity values are determined relative to a known Observed gravity value at each base. Observed Gravity values were calculated for both the ISOGAL84 and AAGD07 gravity datum's.

$$G_{BOS} = G_{B1} + (r_{ETC} - r_{B1}) - (t - t_{B1}) \times ID$$

Where:

G_{B1} Gravity Base Observed Gravity in milliGals
r_{ETC} Earth Tide Corrected reading in milliGals
r_{B1} Gravity Base reading in milliGals
t Time of field reading
t_{B1} Time of Gravity Base reading
ID Instrument Drift in milliGals/hour

Once Observed Gravity values were produced, an Excel spreadsheet was used to calculate Infinite Slab Bouguer Anomaly and Spherical Cap Bouguer Anomaly for each gravity station.

The following corrections were applied to produce Infinite Slab Geoidal Bouguer Anomaly values:

Theoretical Gravity (G_{T67}): As the Earth is not a perfect sphere, with the polar radius being smaller than the equatorial radius, gravity values vary with latitude. This is due to the differences in the distance from the centre of the Earth's mass and differences in centrifugal accelerations at varying latitudes. The theoretical value of gravity was calculated using the 1967 variant of the International Gravity Formula and used to latitude correct the observed gravity.

$$G_{T67} = 978031.8456 \times (1 + 0.005278895 \times \sin^2\phi + 0.000023462 \times \sin^4\phi)$$

Where:

ϕ GDA94 latitude in decimal degrees

Infinite Slab Free-Air Correction (ISFAC): Since gravity varies inversely with the square of distance, it is necessary to correct for changes in elevation between stations to reduce field readings to a datum surface.

$$ISFAC = (0.3087691 - 0.0004398 \times \sin^2\phi) \times h_{AHD} - 0.0000001442 \times h_{AHD}^2$$

Where:

h_{AHD} Height of the gravity meter above the Geoid (Ausgeoid09) in meters

Infinite Slab Bouguer Correction (ISBC): This correction accounts for the attraction of material between the station and datum plane that is ignored in the free-air calculation. A value of 2.67 t/m^3 was used in the correction to represent solid earth.

$$ISBC = 0.04191 \times \rho \times h_{AHD}$$

Where:

P Earth density in gm/cc
h_{AHD} Height of the gravity meter above the Geoid (Ausgeoid09) in meters

Infinite Slab Free Air Anomaly (ISFAA): This is obtained by applying the Infinite Slab Free Air Correction (ISFAC) to the Observed Gravity reading.

$$ISAA = G_{OBSG} – G_{T67} + ISFAC$$

Infinite Slab Bouguer Anomaly (ISBA): This is obtained when all the preceding reductions or corrections have been applied to the observed gravity reading.

$$ISBA = G_{OBSG} – G_{T67} + ISFAC – ISBC$$

The following corrections were applied to produce Spherical Cap Ellipsoidal Bouguer Anomaly values:

Theoretical Gravity (G_{T80}): The theoretical gravity value for each gravity station was calculated using the closed form of the 1980 International Gravity Formula (Moritz, 1980) and used to latitude correct the observed gravity.

$$G_{T80} = 978032.67715 \times ((1+0.001931851353 \times \sin^2\phi)/\sqrt{(1 - 0.00669438002290 \times \sin^2\phi)})$$

Where:

ϕ GDA94 latitude in decimal degrees

Atmospheric Correction (AC): This correction removes the effect of the change in mass of the atmosphere above the ellipsoid by shifting it vertically into the interior of the geoid.

$$AC = 0.874 - 0.000099 \times h_{ELL} + 0.00000000356 \times h_{ELL}^2$$

Where:

h_{ELL} Height of the gravity meter above the ellipsoid (GRS80) in meters

Ellipsoidal Free-Air Correction (EFAC): Since gravity varies inversely with the square of distance, it is necessary to correct for changes in elevation between stations to reduce field readings to a datum surface. The free air correction was calculated using GRS80 ellipsoidal heights and the second order approximation equation (Heiskanen and Mortiz, 1969):

$$EFAC = –1 \times (0.3087691 – 0.0004398 \times \sin^2\theta) \times h_{ELL} + (7.2125 \times 10^{-7}) \times h_{ELL}^2$$

where:

h_{ELL} Height of the gravity meter above the ellipsoid (GRS80) in meters

ϕ GDA94 latitude in decimal degrees

Spherical Cap Bouguer Correction (SCBC): This correction accounts for the attraction of material between the station and datum plane that is ignored in the free-air calculation. The Bouguer correction uses the closed form equation for the gravity effect of a spherical cap of radius 166.7 km based on a spherical Earth with a mean radius of 6,371.0087714 km, height relative to the GRS80 ellipsoid, and an earth density of 2.67 t/m^3 was used in the correction to represent solid earth.

$$\textbf{SCBC} = 2 \times \pi \times (6.67428 \times 10^{-11}) \times \rho \times ((1 + \mu) \times h - \lambda \times R)$$

Where:

π pi

ρ Earth density in gm/cc

h height of the gravity meter above the GDA94 ellipsoid in meters

μ & λ are dimensionless coefficients with following definitions

$\mu = ((1/3)*\eta^2 - \eta)$

where:

$\eta = h/R$

$\lambda = (1/3)\{(d + f\delta + \delta^2)[(f - \delta)^2 + k]^{1/2} + p + m*\ln(n/(f - \delta + [(f - \delta)^2 + k]^{1/2})\}$

where:

$d = 3*\cos^2\alpha - 2$

$f = \cos\alpha$; Please Note this “f” is NOT the same as the parameter “f” in Free Air Correction above.

$k = \sin^2\alpha$;

$p = -6*\cos^2\alpha\sin(\alpha/2) + 4*\sin^3(\alpha/2)$;

$\delta = R_o / R$;

$m = -3*\sin^2\alpha\cos\alpha = -3*k*f$ *Note “m” is NOT the same as the parameter “m” in Free Air Correction above.

$n = 2*[\sin(\alpha/2) - \sin^2(\alpha/2)]$

$\alpha = S/R_o$, with S = Bullard B Surface radius = 166.735 km.

Ellipsoidal Free Air Anomaly (EFAA): This is obtained by applying the Atmospheric Correction (AC) and Ellipsoidal Free Air Correction (FAC) to the observed gravity reading.

$$\textbf{EFAA} = G_{OBS} - (G_{T80} - AC) - EFAC$$

Spherical Cap Bouguer Anomaly (SCBA): This is obtained when all the preceding reductions or corrections have been applied to the observed gravity reading.

$$\textbf{SCBA} = EFAA - SCBC$$

5.4 Gravity meter calibrations and scale factors

All the company gravity meters undergo regular calibrations over the Kensington to Norton Summit calibration range in Adelaide. Meters are also calibrated upon return from repair by the manufacturer (Scintrex in Canada).

Along with calibrations we also conduct regular tilt tests, sensor drift calibrations and temperature adjustments in our technical workshops in Murray Bridge.

The gravity meters used on the survey along with their most recent calibration factors are described in Appendix C – Survey information.

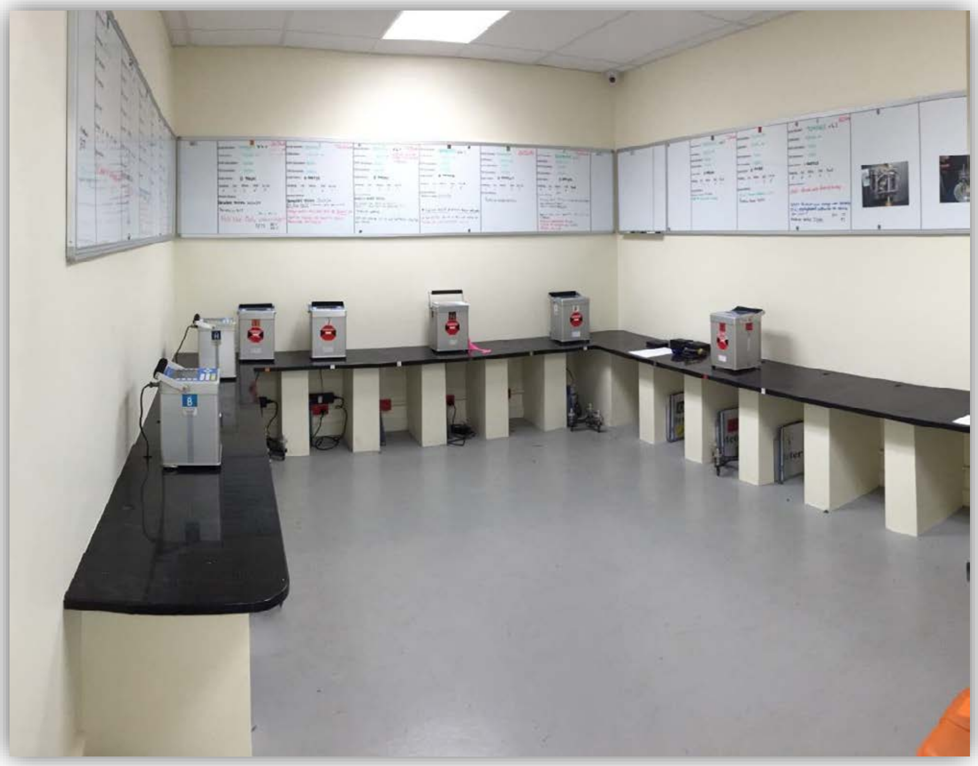


Photo 6 – Daishsat's gravity calibration room

5.5 Quality control of the processed gravity data

Following the reduction of the gravity data, quality control was carried out to check the repeatability of the positional and gravity observations.

The elevation and gravity data was gridded at 1/5th of the line spacing using ChrisDBF to produce ERMapper compatible grid files of the AHD Elevation and Infinite Slab Bouguer Anomaly. A Remove Regional filter (using a First Order Polynomial) and a First Vertical Derivative Filter were both applied to the Infinite Slab Bouguer Anomaly grid to produce a Residual Anomaly grid and a First Vertical Derivative grid respectively. These grids were imaged using Oasis Montaj where they were checked for any anomalous points. A plot of the acquired gravity stations was regularly monitored to make sure no stations were missed.

Photo 7 – A Surveyor levelling a Scintrex CG5 gravity meter

6.0 RESULTS

Raw and processed GNSS and gravity data are contained on a USB drive as Appendix E. A hardcopy plot of station locations and gridded data images are contained in Appendix A.

6.1 Stations surveyed and survey progress

In total 1,288 new gravity stations were acquired during the project and of these, 57 (4.4%) were revisited for survey quality control.

Additionally, 12 stations were acquired from existing historical data in the area, to assist with data merging if required.

The entire survey was completed in 7 days.

6.2 Data repeatability

Analysis of the repeat data shows that measurement repeatability was excellent for both GNSS and Gravity observations. An analysis of the survey data is included in Appendix B. Based on the repeat data, one can assume the following typical accuracies for the observables:

Gravity standard deviation (SD) of repeats:	SD < 0.026 mGal
Height standard deviation (SD) of repeats:	SD < 0.017 m

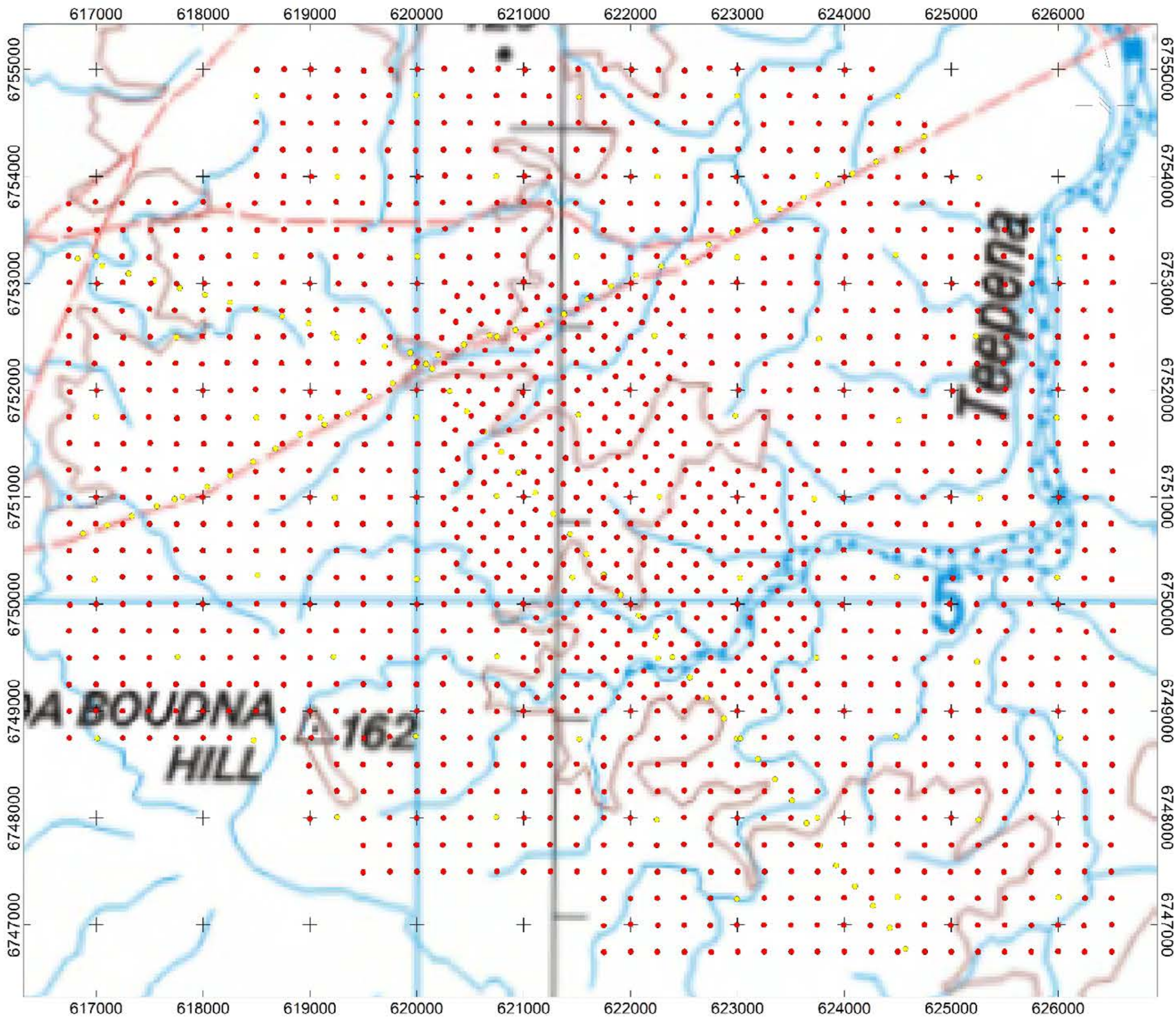
7.0 CONCLUSION

Daishsat Geodetic Surveyors successfully carried out a precision ground gravity survey during February for Strategic Energy Resources Ltd.

The survey was conducted safely, without incident and with minimal environmental impacts. Final results have been demonstrated to be accurate, reliable and conducted to the highest standards with modern calibrated acquisition equipment, professional experienced staff, proven acquisition techniques and quality control procedures.

Appendix A

Station location plot and gridded data images



Scale 1:42700

500 0 500 1000 1500

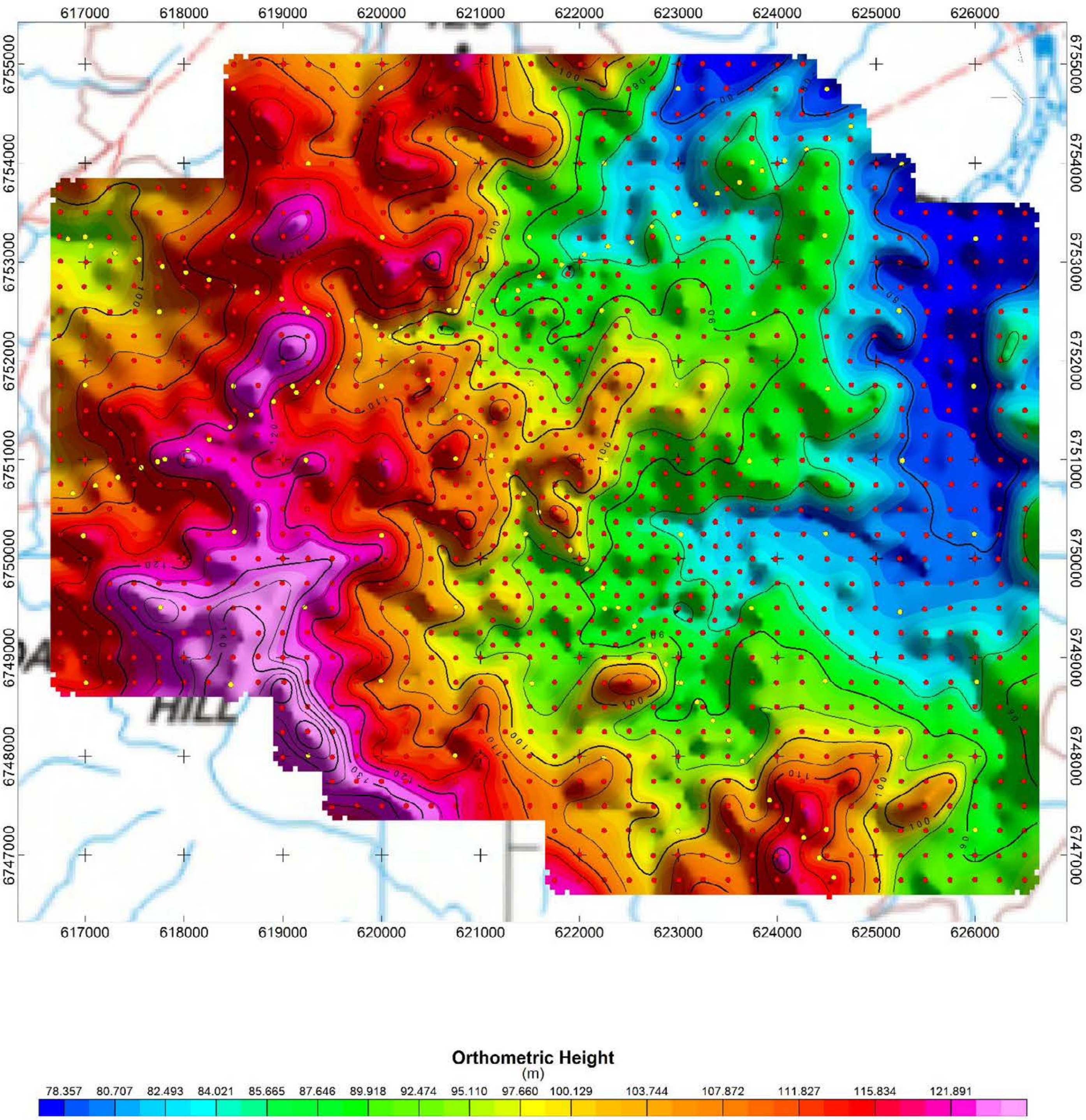
(meters)

GDA94 / Map Grid of Australia zone 53

19023 SER

Billa Kalina 2020 Gravity Survey
Station location plot
1,288 new stations surveyed
Red dots = surveyed stations / Yellow dots = 2014 surveyed stations

Surveyed by Daishsat Geodetic Surveyors



Scale 1:42700

500 0 500 1000 1500

(meters)

GDA94 / Map Grid of Australia zone 53

19023 SER

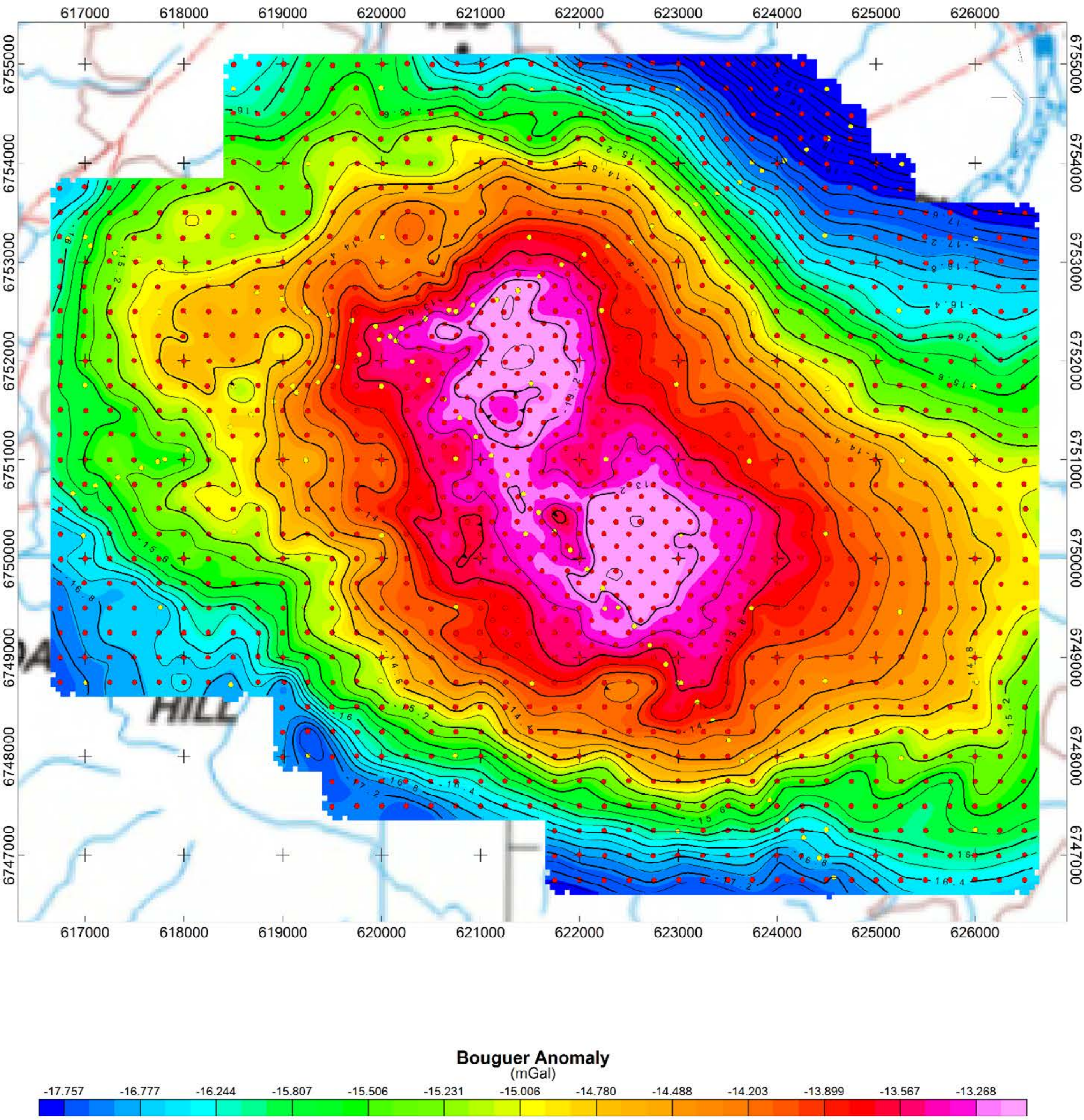
Billa Kalina 2020 Gravity Survey

Orthometric Height (AHD AUSGeoid09)

50m cell size / Histogram equalisation / NE sunshaded / 5m contours

Red dots = surveyed stations / Yellow dots = 2014 surveyed stations

Surveyed by Daishsat Geodetic Surveyors



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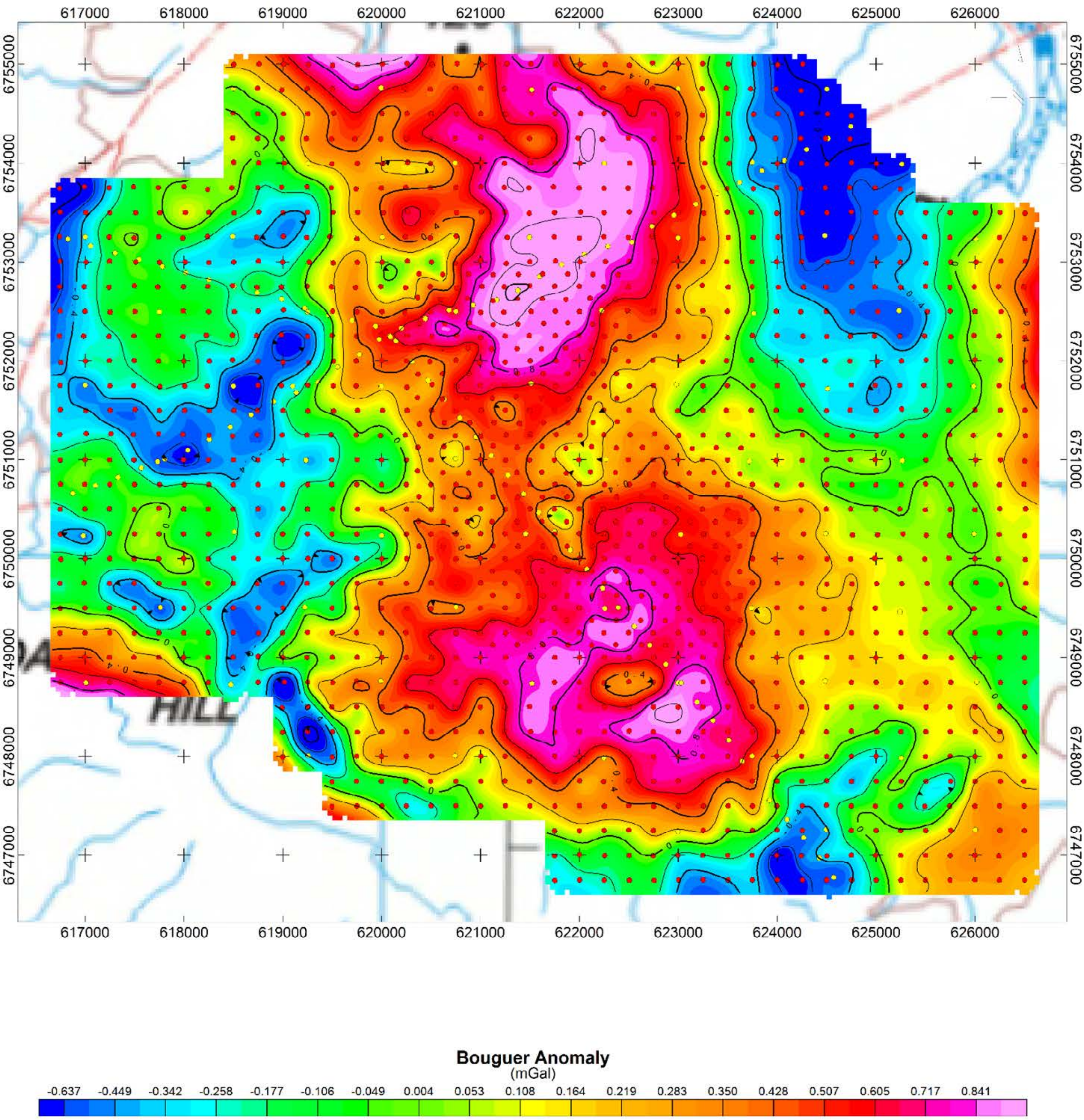
(meters)

GDA94 / Map Grid of Australia zone 53

19023 SER

Billa Kalina 2020 Gravity Survey
Infinite Slab Bouguer Anomaly (2.67gm^3)
50m cell size / Histogram equalisation / 0.2mGal contours
Red dots = surveyed stations / Yellow dots = 2014 surveyed stations

Surveyed by Daishsat Geodetic Surveyors



Scale 1:42700

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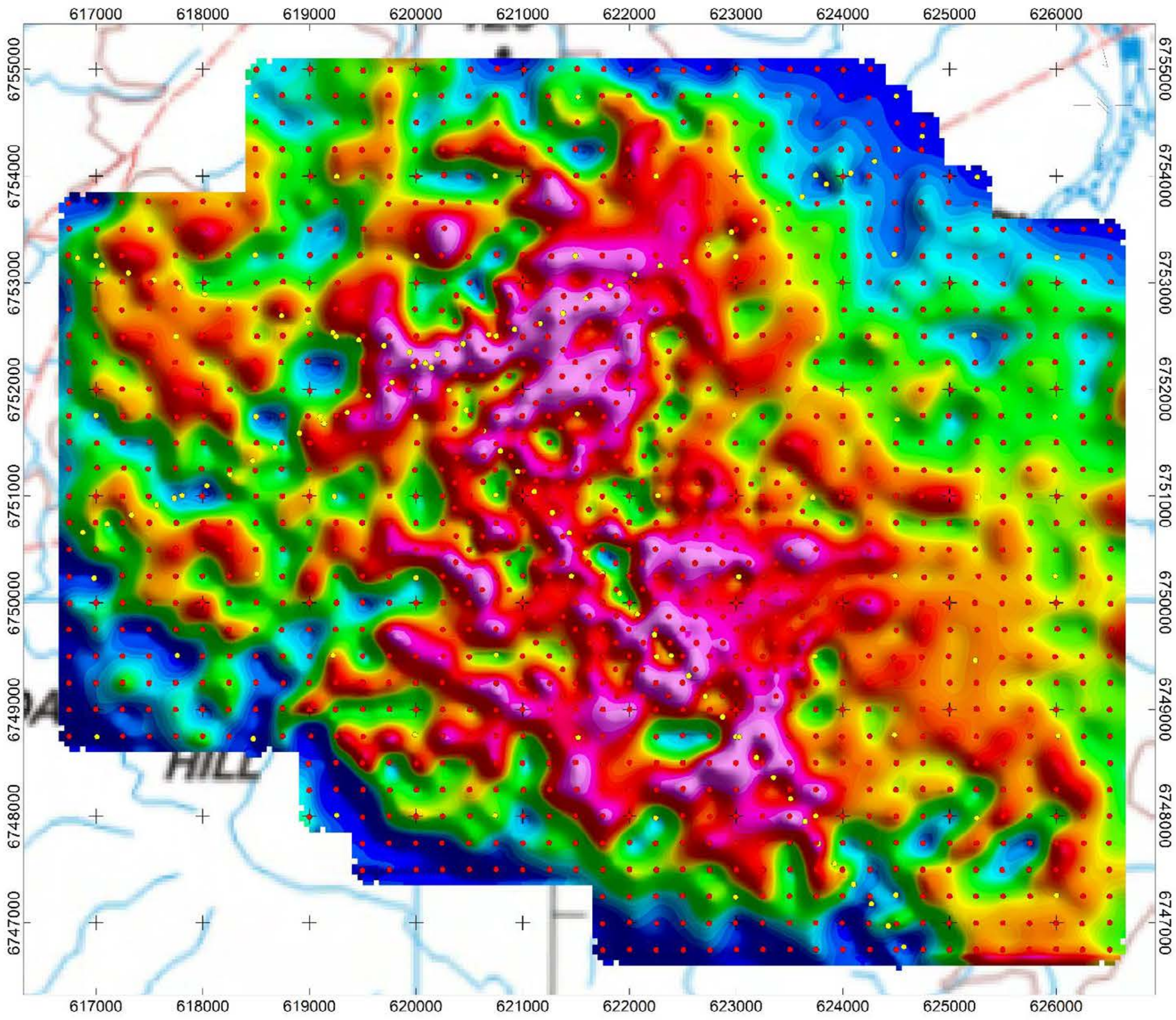
(meters)

GDA94 / Map Grid of Australia zone 53

19023 SER

Billa Kalina 2020 Gravity Survey
Reisdual Gravity (2.67gm^3)
50m cell size / Histogram equalisation / 0.2mGal contours
Red dots = surveyed stations / Yellow dots = 2014 surveyed stations

Surveyed by Daishsat Geodetic Surveyors



Scale 1:42700

500 0 500 1000 1500

(meters)

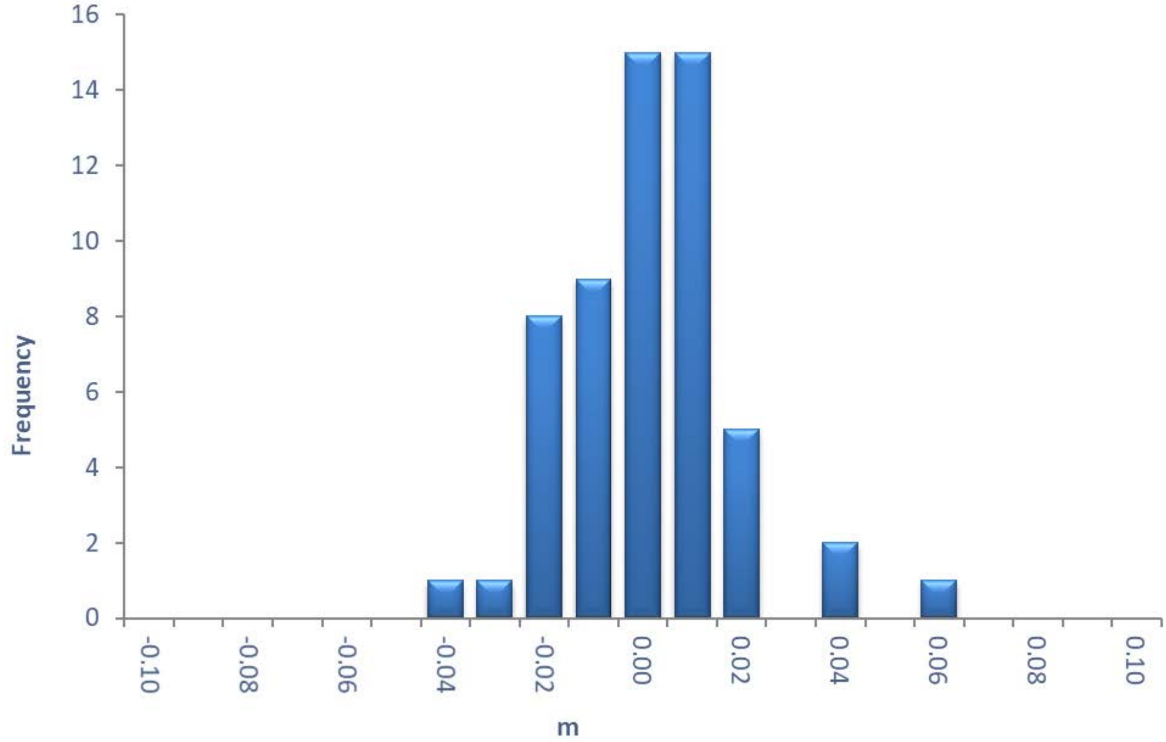
GDA94 / Map Grid of Australia zone 53

19023 SER
Billa Kalina 2020 Gravity Survey 1st Vertical Derivative of Infinite Slab Bouguer Anomaly (2.67gm^3) 50m cell size / Histogram equalisation / NE sunshaded Red dots = surveyed stations / Yellow dots = 2014 surveyed stations
Surveyed by Daishsat Geodetic Surveyors

Appendix B

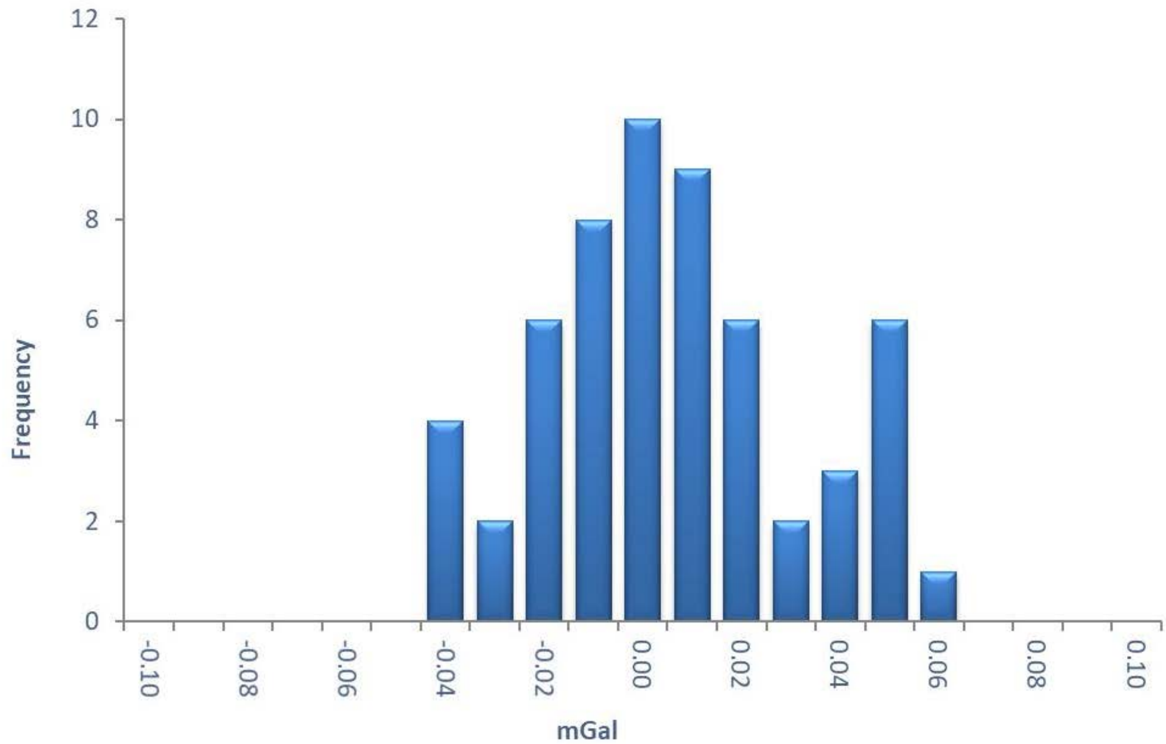
Repeat tabulation and analysis

Histogram of height repeats



Height standard deviation (SD) of repeats: 0.017 m

Histogram of gravity repeats



Gravity standard deviation (SD) of repeats: 0.026 mGal

Appendix C

Survey information

19023 Strategic Energy Resources - Billa Kalina Survey	
Survey Details	
Survey date	13th - 19th February, 2020
Surveyors / Personnel	Jason Scott / James Gates
Processors	Harley Jones / Ben Wyschnja
Techniques employed	Post processed DATV gravity
GPS receiver types used	Leica GX 1230
Number of new points acquired	1,288
Number of repeats on new points	57 (4.4 %)
Number of repeats on existing stns	12
Station / line spacing	250m x 250m, infill 250m x 125m (offset)
Height observation accuracy (SD)	0.017 m
Gravity observation accuracy (SD)	0.026 mGal
GNSS / Gravity bases used	Daishsat Base 1106

Gravity Meters			
Meter Serial	**Meter Letter**	**Scale Factor**	**Date & State of Calibration**
CG5 - 80340364	J	1.000910	26/11/19 SA
CG5 - 80400377	O	1.001422	2/8/19 SA

Appendix D

Base station locations and information

GNSS/Gravity Base 1106 - Bundabound Trig

FINAL AUSPOS CO-ORDINATES

MGA94 / AHD		GDA94 / WGS84	
EASTING (m)	620088.508	LATITUDE (DMS)	29° 21' 11.61127" S
NORTHING (m)	6752243.429	LONGITUDE (DMS)	136° 14' 13.63801" E
ZONE (UTM, South)	53	ELL HT (m)	104.551
ORTHO HT (AHD, m)	99.275		
N (AUSGEOID09, m)	5.276		

GRAVITY AND CONTROL DETAILS

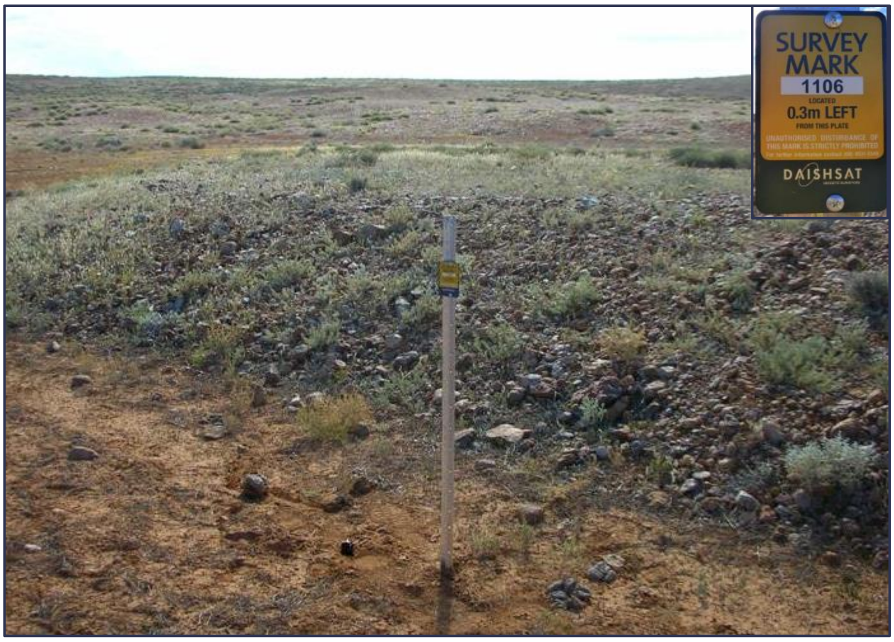
OBSERVED GRAVITY	CONTROL DETAILS
979240.855 ISOGAL84 (mGal)	**GNSS** – Daishsat using a multiple static sessions and the AUSPOS online GNSS Processing system. Expected accuracy of station coordinates better than 0.005m.
979240.777 AAGD07 (mGal)	**Gravity** – Daishsat using multiple ABA ties to AFGN station 1967939308 located at the William Creek Hotel. Expected accuracy better than 0.010 mGal

MISCELLANEOUS DETAILS

Est. Date: 19/06/2014	Established By: Peter Rose	Survey: 14014

DESCRIPTION AND ACCESS

This base station consists of a small star picket protruding from the ground and is witnessed by a Daishsat survey plaque, placed on a large star picket ~ 0.3m to the right. The base is located ~50km south-southwest of William Creek and can be accessed by heading south from the William Creek Hotel along the Oodanadatta Track for 35.9km (MGA94 Z53 652940mE 6773600mN); then turn right and following the track to the west. At 37.9km take the left-hand fork; at 45.8km pass through a gate and continue straight on; at 55.2km pass cattle yards on the left, a soak on the right and a track on the left. Continue west passing through a gate at 71.9km and at 75.1km the base station can be found 30m on the left hand side of the track.



Field Photo Of Base

Appendix E

Data USB & Field header descriptions

(USB storage attached to back cover)

Daishsat Data - Column Headers		
Field Header	**Field Description**	**Units**
PROJECT	Contractor Project Number	
OPERATOR	Contractor Company Name	
SURVEY_NAME	Survey Name	
STATION	Unique Station ID	
LINE	Survey Line number (if applicable, -99 for null values)	
RECORD_TYPE	Record observation type (Base, Field, Repeat, Existing_Repeat)	
METER_MODEL	Model of Gravity Meter	
METER_SN	Serial Number of Gravity Meter	
EAST_MGA94_m	Easting (MGA Grid, GRS80, GDA94)	m
NORTH_MGA94_m	Northing (MGA Grid, GRS80, GDA94)	m
ZONE	UTM Zone Number	
LAT_GDA94_DD	Coordinate Latitude (Geodetic, GRS80, GDA94)	DD
LONG_GDA94_DD	Coordinate Longitude (Geodetic, GRS80, GDA94)	DD
HEIGHT_AHD09_m	Orthometric Height - Australian Height Datum AHD (AUSGEOID09)	m
HEIGHT_GRS80_m	Ellipsoid Height (Geodetic, GRS80, GDA94)	m
N_AUSGEOID09_m	Geoid Ellipsoid separation N (AUSGEOID09)	m
DATE	Observation Date (DD/MM/YYYY)	
TIME	Observation Time (HH:MM:SS)	
DIAL_mGal	Gravity Dial Reading	mGal
SCALE_mGal	Scale Factor Applied to Dial Reading	mGal
ETC_mGal	Earth Tide Correction (Longman)	mGal
DRIFT_mGal	Drift value applied to Dial Reading	mGal
OBSG84_mGal	Observed Gravity (ISOGAL84)	mGal
OBSG07_mGal	Observed Gravity (AAGD07)	mGal
TG1967_mGal	Theoretical Gravity (1967 variant)	mGal
TG80_mGal	Theoretical Gravity (1980 variant)	mGal
ISFAC_mGal	Infinite Slab Free Air Correction using Orthometric Height (AHD AUSGEOID09)	mGal
ISFAA_mGal	Infinite Slab Free Air Anomaly using Orthometric Height (AHD AUSGEOID09)	mGal
ISBC_267_mGal	Infinite Slab Bouguer Correction (2.67 t/m^3) using Orthometric Height (AHD AUSGEOID09)	mGal
ISBC_240_mGal	Infinite Slab Bouguer Correction (2.40 t/m^3) using Orthometric Height (AHD AUSGEOID09)	mGal
ISBC_220_mGal	Infinite Slab Bouguer Correction (2.20 t/m^3) using Orthometric Height (AHD AUSGEOID09)	mGal
ISBA_267_mGal	Infinite Slab Bouguer Anomaly (2.67 t/m^3) using Orthometric Height (AHD AUSGEOID09)	mGal
ISBA_240_mGal	Infinite Slab Bouguer Anomaly (2.40 t/m^3) using Orthometric Height (AHD AUSGEOID09)	mGal
ISBA_220_mGal	Infinite Slab Bouguer Anomaly (2.20 t/m^3) using Orthometric Height (AHD AUSGEOID09)	mGal
ATMC_mGal	Spherical Cap Atmospheric Correction using Ellipsoid Height (Geodetic, GRS80, GDA94)	mGal
EFAC_mGal	Spherical Cap Free Air Correction using Ellipsoid Height (Geodetic, GRS80, GDA94)	mGal
EFAA_mGal	Spherical Cap Free Air Anomaly using Ellipsoid Height (Geodetic, GRS80, GDA94)	mGal
SCBC_267_mGal	Spherical Cap Bouguer Correction (2.67 t/m^3) using Ellipsoid Height (Geodetic, GRS80, GDA94)	mGal
SCBC_240_mGal	Spherical Cap Bouguer Correction (2.40 t/m^3) using Ellipsoid Height (Geodetic, GRS80, GDA94)	mGal
SCBC_220_mGal	Spherical Cap Bouguer Correction (2.20 t/m^3) using Ellipsoid Height (Geodetic, GRS80, GDA94)	mGal
SCBA_267_mGal	Spherical Cap Bouguer Anomaly (2.67 t/m^3) using Ellipsoid Height (Geodetic, GRS80, GDA94)	mGal
SCBA_240_mGal	Spherical Cap Bouguer Anomaly (2.40 t/m^3) using Ellipsoid Height (Geodetic, GRS80, GDA94)	mGal
SCBA_220_mGal	Spherical Cap Bouguer Anomaly (2.20 t/m^3) using Ellipsoid Height (Geodetic, GRS80, GDA94)	mGal
DIFF_EAST_m	Repeat Error for MGA Easting Observation	m
DIFF_NORTH_m	Repeat Error for MGA Northing Observation	m
DIFF_GDA94_m	Repeat Error for Ellipsoid Height (GDA94)	m
DIFF_OBSG84_mGal	Repeat Error for Observed Gravity (ISOGAL84)	mGal
CLOSURE_mGal	Loop Closure	mGal
BASE_GRV	Gravity Base Station Number	
BASE_GPS	GPS Base Station Number	

EL 6335 – Annual & Final Technical Report
Billa Kalina Project
9 April 2020 – 8 April 2021

EL 6335, Strategic Energy Resources Ltd, Neil Chalmers

Contents

Figures

1. Summary

This report summarises the exploration activities undertaken on tenement EL 6335 by Strategic Energy Resources Ltd (ASX: SER) for the period 9 April 2020 to 8 April 2021.

The tenement totals 526km^2 in area and is located approximately 140km NNW of Roxby Downs on the Billa Kalina (SH5307) 1:250,000 Map Sheet. A land access agreement for drilling between SER and the traditional owners is currently being finalised. A deed of access has been executed with the Department of Defence for access to the Woomera Prohibited Area (WPA).

Activity within EL 6335 is targeting Iron Oxide Cu-Au-U (IOCG-U) breccia deposits. SER selected the Stuart Shelf region on the northeast margin of the Gawler Craton as Geoscience Australia and others recognise it as having all the essential ingredients for IOCG-U mineral systems. The broader Olympic Cu-Au Province is host to significant IOCG-U deposits such as Olympic Dam, Prominent Hill, Carrapateena, Oak Dam West and more recent discoveries. The northern areas are considered under-explored due to thick sequences of younger sedimentary cover.

Work during the reporting period included:

- Modelling of gravity data
- Interpretations of results and targeting review

Strategic Energy Resources has decided to relinquish the tenement due to the depth to modelled gravity shells and intensity of the response not deemed likely to be sourced from an IOCG system.

2. Exploration Index Map

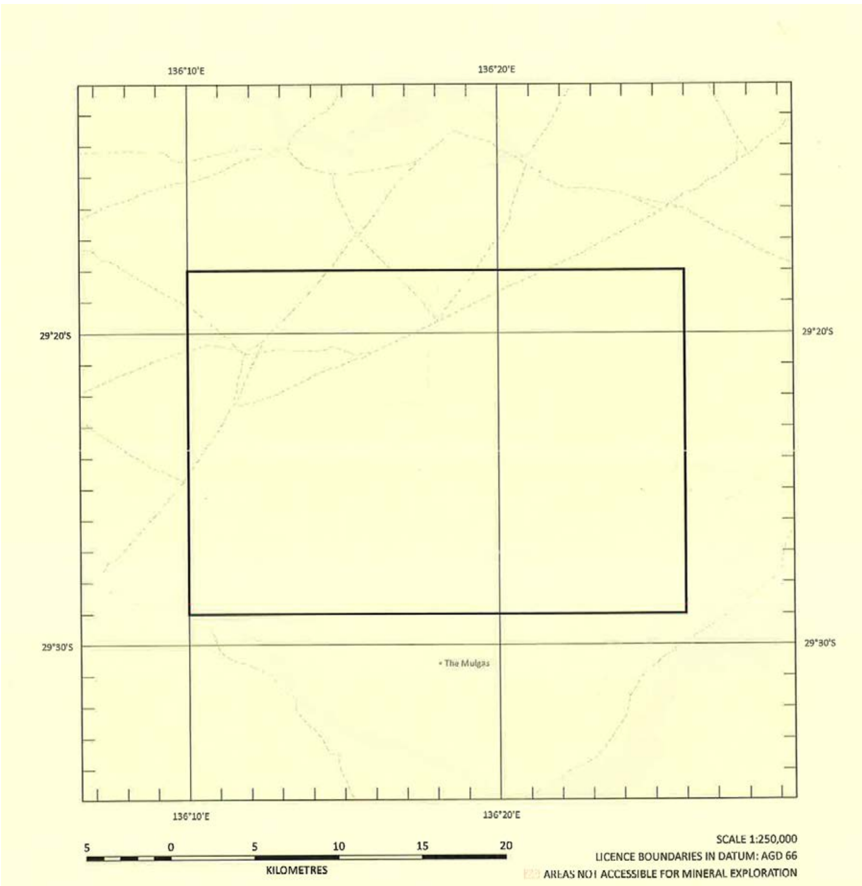


Fig 1: EL 6335 Exploration Index Map

3. Keywords

1:250,000 Map Sheet Billa Kalina (SH5307); 1: 100,000 Map Sheet Irrapatana (6308);
Margaret Creek; Binda Boudna;
Copper; Gold; Uranium; IOCG
SR8; SR11; SR12; LNC11-30; LNC11-31
Gawler Craton; Mt Woods Domain; Eromanga Basin; Great Artesian Basin;
Cadna-owie Formation; Marree Subgroup; Bulldog Shale; Ooodnadatta Formation; Boorthanna Formation; Tapley Hill Formation;
Strategic Energy Resources Ltd; Billa Kalina IOCG Project

4. Introduction, History and Exploration Rationale

4.1 Tenure

The tenement EL 6335 is 100% owned and operated by SER and covers an area of 526km^2.

EL 6335 was granted on 9 April 2019 for 2 years.

4.2 Location

The tenement area is approximately 350km north of Port Augusta and around 140km NNW of Roxby Downs in South Australia. It is situated in the area to the west of the township of Marree, to the south of the township of William Creek, and to the southwest of Lake Eyre. The tenement is situated on the Billa Kalina (SH5307) 1:250,000 Map Sheet.

The tenement is located to the east of the Mount Woods Inlier, and along the same trend as several known Stuart Shelf deposits such as Olympic Dam, Prominent Hill and Carrapateena (Figure 2).

Access to the tenement is via the Oodnadatta Track and station tracks.

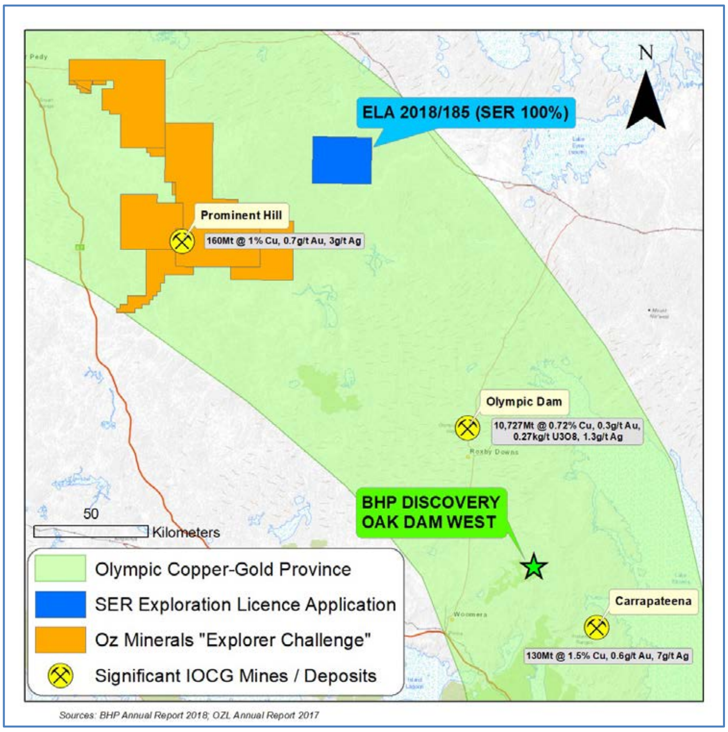


Fig 2: Billa Kalina Project in relation to local IOCG deposits and prospects

4.3 Data Review

Limited historic drillholes in and around the tenement were reviewed to identify whether crystalline basement was intersected with no holes successfully identified within the tenement. The tenement has two existing holes: SR11 and SR12. The deepest, SR12, has a maximum depth of 399m terminating in the Boorthanna Formation.

Other drillholes of note in the region include:

- *Corrie Appa Bore:* 3km south of the tenements, drilled in 1895 to 566m, failed to intersect basement.
- *FHD1:* 32km south of the tenements, WMC drilled to 743.8m terminating in the Tapley Hill Formation.
- *BD2:* 68km south of the tenements, WMC drilled to 829.4m terminating in the Hutchinson Group.
- *SR 17/2:* 22km south of the tenements, drilled to 1500m, failed to intersect basement, terminated in the Wilyerpa Formation.
- *SR6:* 26km to the south of the tenements, drilled to 899.6m, terminating in the Yudnamutana Subgroup.
- *SR 13/2:* 27km north of the tenements, drilled to 900m, terminating in the Burra Group.

Work by Tasman Resources (“Tasman”) 80km southeast of the tenement at the Titan and Vulcan prospects intersected IOCG-U associated mineralisation. Titan intersected the Gawler Range Volcanics at 600m and the Hutchinson Group at 650m. Tasman Resources reports that the Vulcan hole, VUD7, intersected strong chlorite/sericite altered basement volcanics at 847m followed by a thick zone of "classic" IOCGU-style mineralised hematite breccias between 1065m and the bottom of the hole at 1227.8m.

Large and Van der Weilan (SAREIC 2014 Technical Forum) stressed the importance of albite, pyrite, chlorite, hematite, pyrite, tungsten and bismuth in the geochemical signature of IOCG-U deposits.

Review of the records of above historic drillholes were also examined for geochemical indicator minerals.

Notes of interest include

- raised bismuth levels and anomalous silver concentrations (Wright and Dow, 1979) from SR8.
- trace amounts of pyrite were found in lower part of the Tapley Hill formation in SR17/2: 638 - 906m.
- trace pyrite and possible chalcopyrite under the base of the Tapley Hill, in the matrix of the Sturtian Glacial deposits in SR6. Drilling logs from SR6 indicate a notable pyritic, quartz-hematite fragment at 738m, possibly reworked sediment originating from an older lithology.

No geochemical information of note was in reports for the other holes. The importance of REE indicators is to be investigated.

4.4 Exploration History

EL 6335 has been explored for a variety of commodities through the years. The SARIG tenement database identified numerous past holders of exploration licences intersecting the SER EL6335, with exploration occurring since the mid-1970s.

Data review was mainly restricted to those focussing on IOCG-U exploration within the last 40 years. Companies that did not conduct any exploration, have not been discussed.

Newmont Australia Ltd (1977 – 1979) – EL 327, EL 335

Newmont Australia explored for Olympic Dam style base and precious metal deposits in the Precambrian basement. The geophysical data was assessed and several targets selected for drill testing. Figure 4 below shows EL 6335 overlain on Newmont's 1979 drill hole location map.

There are two holes within EL6335 (SR11, SR12) and near the SER tenement (SR6, SR8, SR13, SR17-2). None of these historic drillholes reached crystalline basement with the interpreted ending as follows:

Hole	Max	Unit	Age
SR6	890m	Yudnamutana Subgroup	Neoproterozoic
SR8	101m	Dolomite Rock	Neoproterozoic?
SR11	104m	Stuart Range Formation (Shale)	Permian
SR12	399m	Boorthanna Formation (Diamictite)	Permian
SR13/2	900m	Burra Group (Quartzite)	Neoproterozoic
SR17/2	1500m	Wilerpa Formation (Arkose)	Neoproterozoic

From (Wright and Dow, 1979, Wright, 1978b, Wright, 1978a)

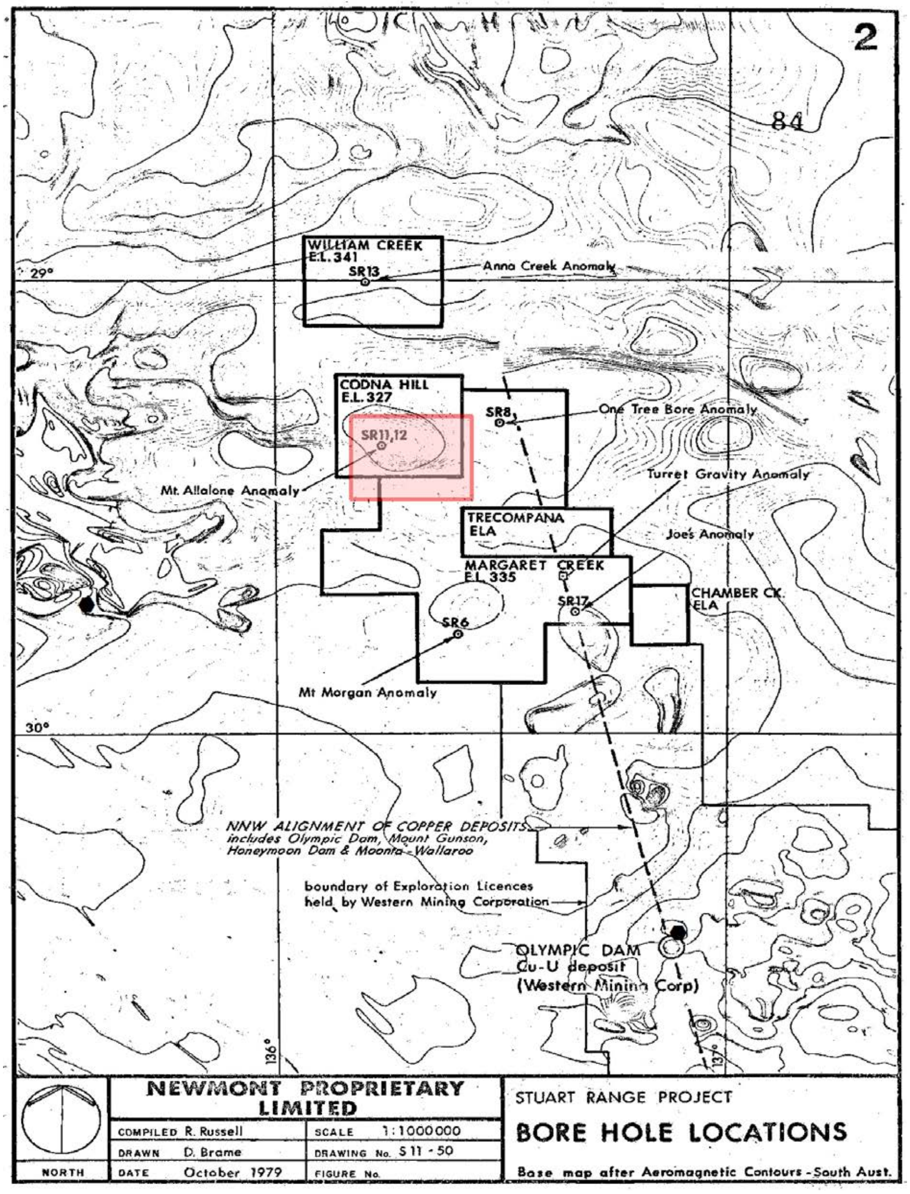


Figure 3: EL6335 on Newmont Pty Ltd 1979 drill hole location map

Stockdale Prospecting Ltd (1981 – 1986) – EL 852, EL 1169, EL 1186
Stockdale Prospecting targeted diamonds in the southeast extension of the Boorthanna Trough. They utilised aeromagnetic data to isolate prospective anomalies and constructed a Mesozoic sediment isopach map from previous drillhole data. They conducted multiple geophysical surveys and drilled 21 percussion holes totalling 1820m on geophysical or surface structural anomalies searching for heavy mineral indicators. Several indicator minerals were recovered but no source kimberlitic intrusion was identified so the ground was surrendered.

Finders Mines Ltd (2000 – 2010) – EL 2758, EL 2759, EL 3337
Flinders Mines explored for sedimentary uranium, base metal mineralisation and diamond occurrences. FM commissioned a geophysical analysis of most of the area and resolved a deep combined magnetic/gravity anomaly at Ferguson Hill (an old WMC prospect). A significant air-core campaign was undertaken to the south of EL6335 (all holes < 50m depth) with potential for kimberlites suggested however this wasn't completed before expiry in 2005. Assessment of open file magnetic data by FM concluded that crystalline basement was too deep to be viable. A joint venture with Eromanga Uranium in 2007 flew an airborne TEM and magnetic survey across EL 3337 and concluded there were no significant anomalies that warranted further investigation.

Adamus Resources Ltd (2002-2004) EL 2904
Adamus explored for Prominent Hill type IOCG-U mineralisation as part of its "Hoover Project" to the SW of the tenement. This included a 500m grid ground gravity survey over almost all of the tenement. No suitable targets were identified.

Tasman Resources (2004-2009) – EL 3174
Tasman Resources explored for various commodities over half a decade in the area. Targeted commodities included IOCG-U, zinc, copper and base metals. Work involved data compilation and review, reprocessing of various geophysical data and geochemical surface sampling. More advanced exploration was only conducted on prospects outside of the SER licence area.

Barrick Gold of Australia Ltd (2007-2009) – EL 3897, EL 3898, EL 3990
Barrick Gold of Australia Ltd explored for IOCG-U deposits along the north-eastern margin of the Gawler Craton from 2007 to 2009. They conducted a helicopter-borne ground gravity survey in conjunction with PIRSA (survey 2007A3), which covers parts of the tenement. Interpretation of the gravity data was considered encouraging with several anomalous areas identified was relinquished. (Goldsmith and Mathews, 2009)

Rio Tinto Exploration (2011-2012)
Rio Tinto explored for sediment hosted uranium from 2011 to 2012 across both tenements, then named EL 4729 and EL 4728. As no land access was negotiated, available geophysical data was reviewed and reassessed for target generation. Drill core and chips from some units were analysed however none of the historic drillholes revealed uranium mineralisation within the Cretaceous sandstone units. (McMahon, 2012, McMahon, 2013).

GB Energy (2013-2018)
Strategic Energy Resources has targeted the current licence area of EL6335 based on the previous exploration conducted by GB Energy. GB completed extensive geophysical surveying and data interpretation investigating the previously identified basement anomaly with drill targeting a priority.
In conclusion, GB undertook extensive ground-based surveys to further re-interpret the original geophysical data to re-define the EL5231 gravity drill target, however the current market conditions

for drill testing of deep IOCG targets and changing priorities determined that the licence was allowed to expire.

Summary activity descriptions are as follows;

Open file 3D geophysical inversion

Existing geophysical datasets (gravity and magnetics) were obtained, processed and interpreted by Moore Geophysics identified deep crustal structures trending NW/SE as well as crosscutting structures orientated E/W and NW/SE. 3D inversion modelling of the gravity data indicated the presence of several dense sub-surface bodies roughly aligned with the regional fabric.

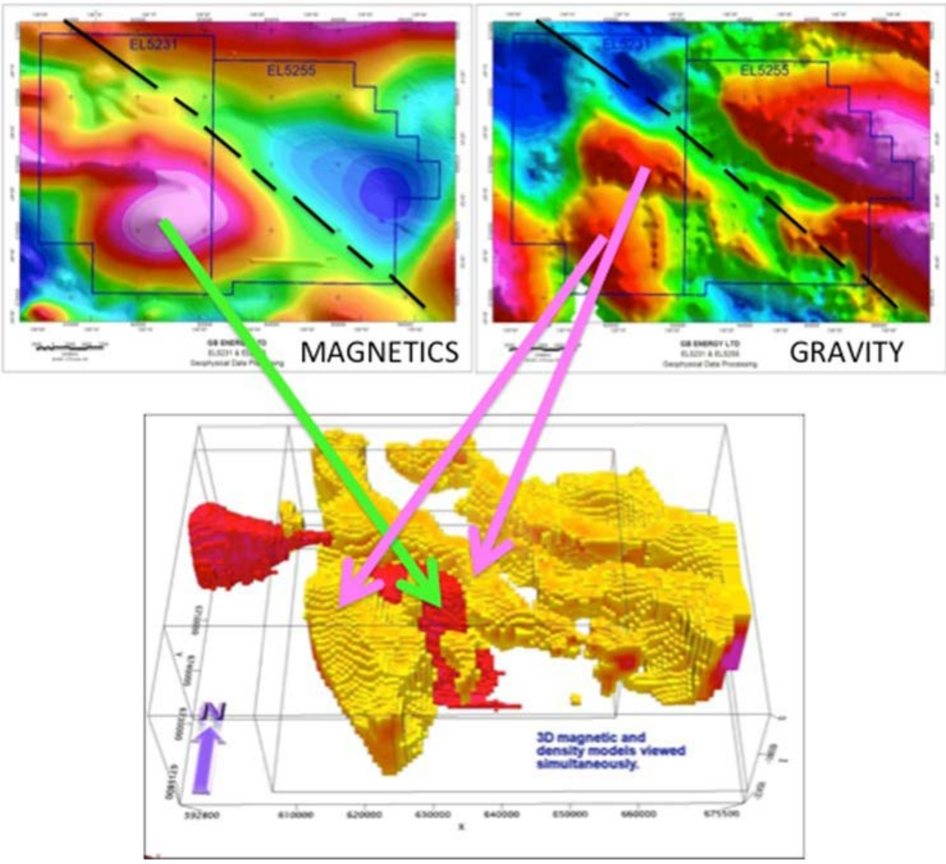


Figure 4: Density and magnetic susceptibility UBC inversion showing anomaly overlap (Moore, 2013)

Magnetic data acquisition

GBEE contracted Daishsat to collect two aeromagnetic lines along existing LNC11-30 and LNC11-31 seismic lines at 2m resolution. The magnetic survey was used to constrain depth to crystalline basement as well as highlighting potential anomalies consistent with IOCG-U mineralisation.

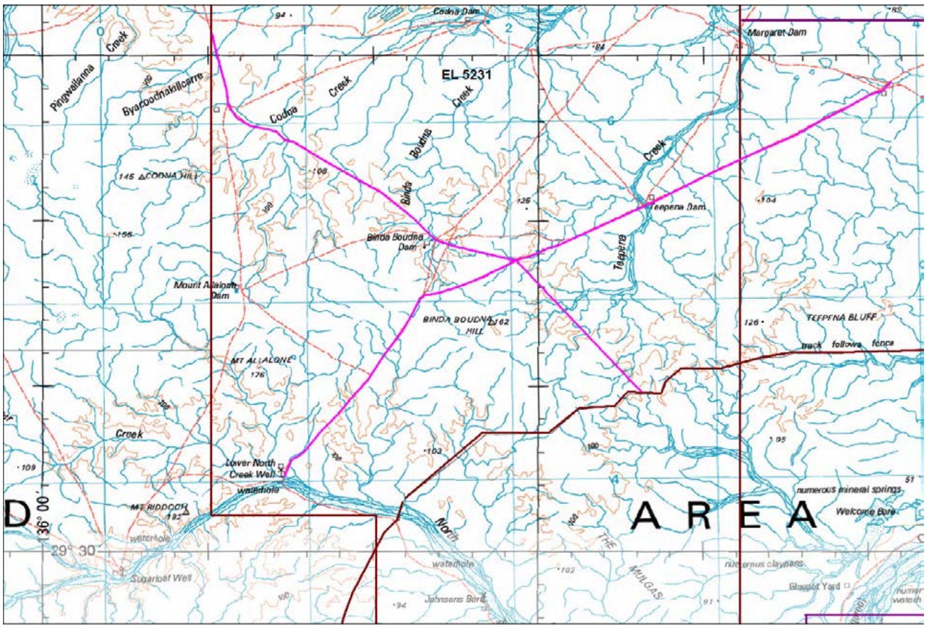


Figure 5: 2011 Seismic / 2014 Aeromagnetic traverses

Ground gravity acquisition

Daishsat Geodetic Surveyors carried out a precision GPS-Gravity survey for GB Energy Limited with a total of 1,622 new gravity stations surveyed. The survey consisted of two phases: a main survey grid comprising of 1,344 gravity stations acquired on a regional 1500m station grid with stations located equidistant from the existing 2007 South Australian PACE gravity survey; and two semi-detailed gravity traverses comprising of 278 stations acquired at 250m intervals coincident with existing seismic lines and the low-level helimag survey.

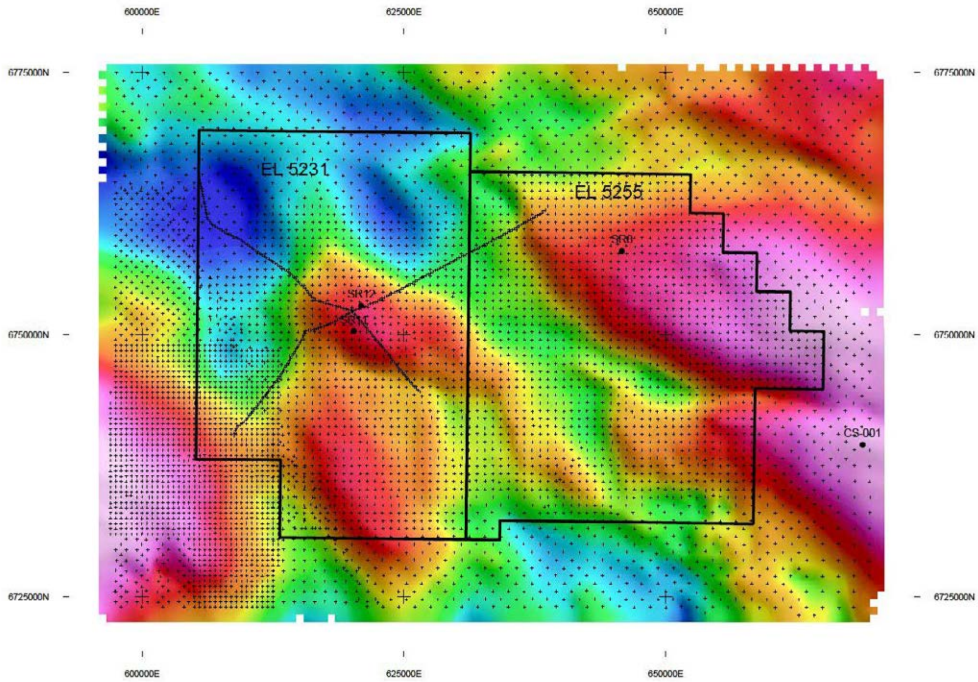


Figure 6: 2014 Ground Gravity Survey

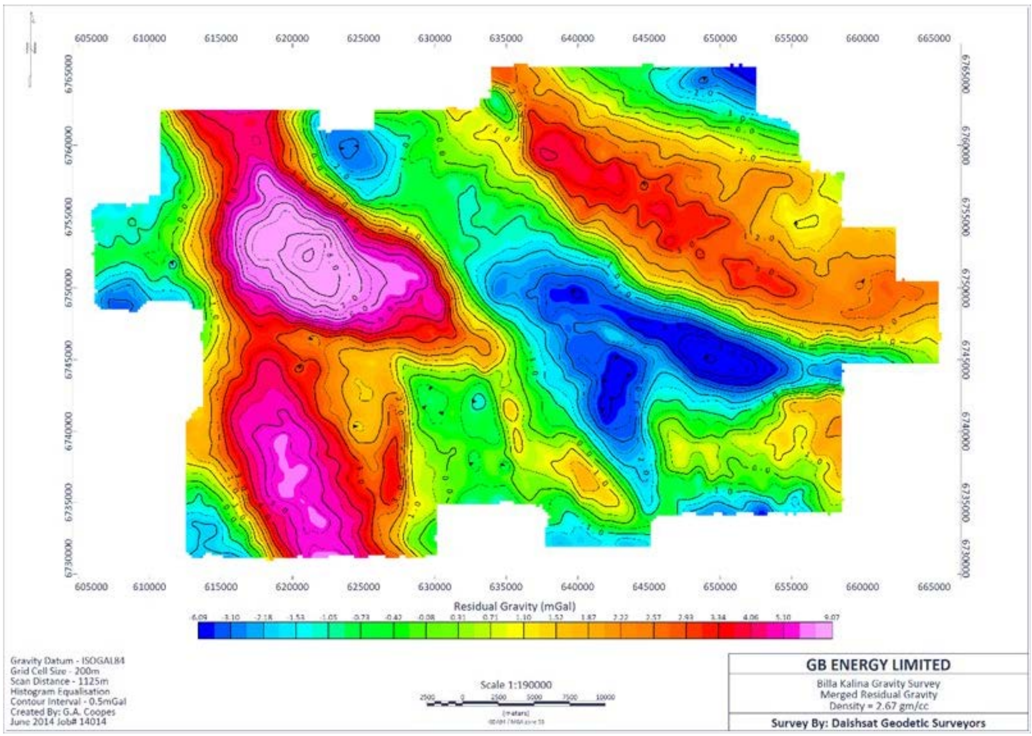


Figure 7: Merged Residual Gravity

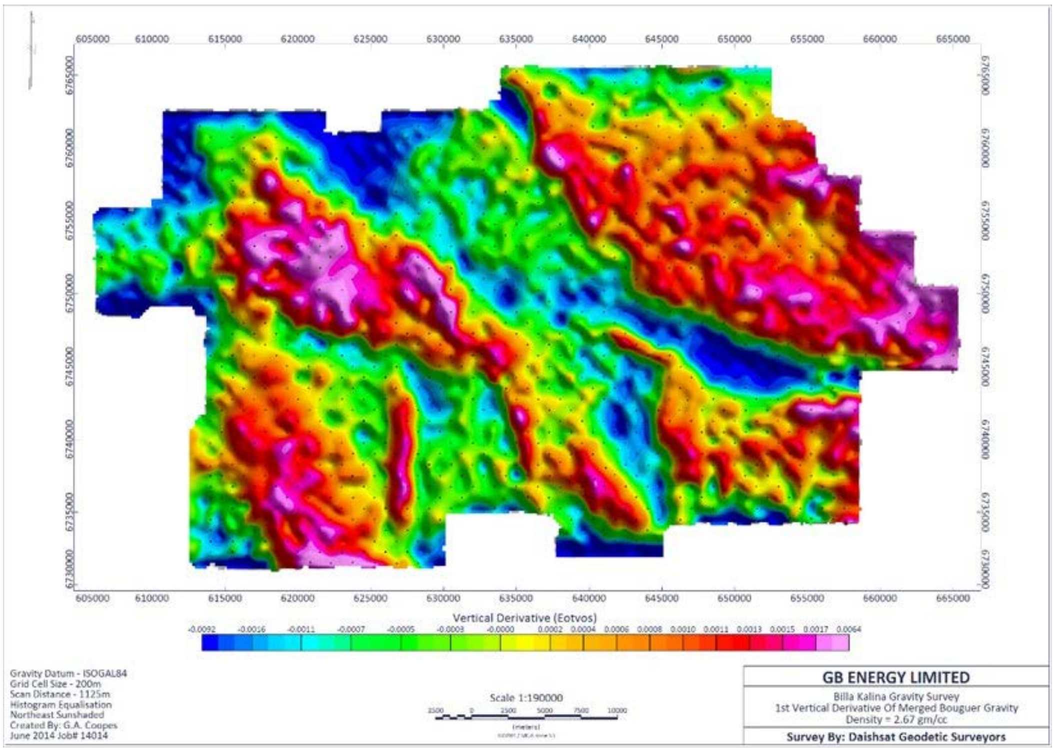


Figure 8: 1st VD Gravity Survey

4.5 Exploration Targets, Objectives and Rationale

Strategic's primary exploration target is IOCG-U mineralisation hosted in hematite-magnetite breccia complexes. The broader Olympic Cu-Au Province is host to Olympic Dam, Prominent Hill, Carrapateena, Hillside and more recent discoveries e.g. Oak Dam West. The northern areas are under-explored due to thick sequences of sedimentary cover.

The tenement is located to the east of the Mt Woods Inlier, and along the same NW/SE trend as several known Stuart Shelf deposits such as Olympic Dam, Prominent Hill and Carrapateena.

Exploration Strategy

The exploration strategy adopted by SER includes three stages: target generation, refined geophysical analysis and undercover drilling.

IOCGU deposits are characterised by hydrothermal ore styles, strong structural controls, abundant magnetite and/or hematite and a broad space-time association with batholithic granitoids.

- The project area is proximate to a major NW/SE crustal structure and associated secondary / tertiary faults and potential dilation zones. These structures are potential pathways for mineralising fluids.
- Strategic has identified offset gravity and magnetic anomalies located central to the EL 6335 tenement that may represent magnetite/hematite alteration.

5. Geology

5.1 Regional Geological History (Newell ,2005)

The Gawler Craton has a history of Archaean and early Proterozoic orogenic evolution terminating during the Carpentarian with a relatively stable platform. Deposition on the Stuart Shelf commenced 1400 Ma (Adelaidean System) with continental siltstones and shales accompanied by flood basalts, followed by shallow water sedimentation until Cambrian times.

Reactivation of faults initiated during the Devonian formed the Boorthanna Trough, a north-south half-graben structure, which represents the southerly extension of the Arckaringa Basin. Glaciation in the upland areas flanking the basin and contemporaneous subsidence during the Upper Carboniferous/Lower Permian accounted for the deposition of the Boorthanna Formation.

Later tectonic stability in the Permian produced a low energy, marine environment during which the Stuart Range Formation was deposited, followed by regression and deposition of the freshwater Mount Toondina Beds.

Major tectonic movements during the Late Jurassic/Early Cretaceous period caused uplift of the Gawler Platform in faulted blocks and marked the start of the Cretaceous transgressions.

The post Cretaceous period has mainly been one of erosion, deep weathering and formation of duricrust. Silcrete, dominantly pedogenic in character, caps units of Adelaidean to Tertiary age and occurs as clasts in younger sediments.

5.2 Surface Geology

The surface geology of EL6335 is dominated by Bulldog Shale with small areas of Cadna-owie Formation. The Permian Boorthana Formation, outcrops in the south of the tenement. The remainder of the area consists of Tertiary and Quaternary alluvial, fluvial, aeolian and playa sediments (Figure 6).

The predominant hydrological features in this region are the (usually) dry salt lakes of Lake Eyre South to the east and Lake Eyre to the northeast. Most watercourses in the area drain northerly into the Lake Eyre depression.

A series of mound springs occur in the area (Figure 4), discharging from the underlying Great Artesian Basin, these are of importance as they may indicate underlying faults.

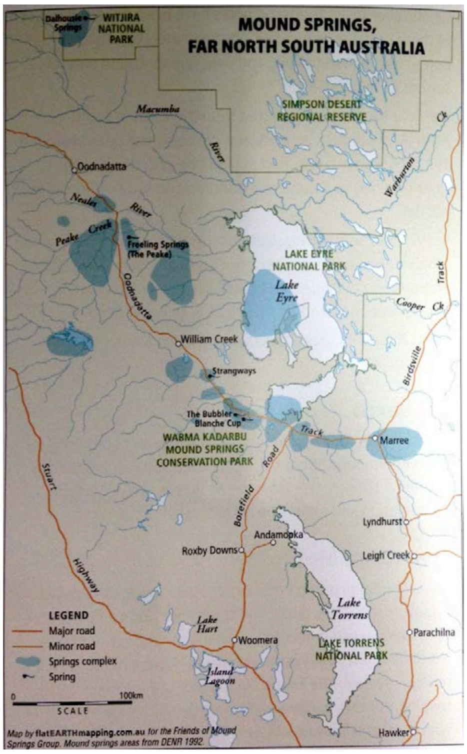


Figure 9 Mound Springs, Far North SA (FOMS flyer)

5.3 Eromanga Basin / Great Artesian Basin (after PIRSA)

The tenement is situated over the Early Jurassic to Late Cretaceous, multi-aquifer basin Eromanga Basin / Great Artesian Basin (GAB). The Eromanga Basin consists of three main sequences: the lower non-marine, the marine and the upper non-marine.

- The lower non-marine consists of fluvial sandstones interbedded with shales and discontinuous thin coals (Poolowanna Formation), overlain by a thick fine to coarse grained sandstone unit with granule and pebble layers and shale interclasts (Algebuckinga Sandstone). The lower non-marine sequence is prospective for oil and gas.
- The marine sequence represents a transition from non-marine to marginal marine to open marine shale and sandstone. The Cadna-owie Formation which lies at the base of this sequence represents the onset of a marine transgression and consists of non-marine to marine sandstone, siltstone, calcareous sandstone, and pebbly sandstone. The Cadna-owie is overlain by the thick Marree Subgroup, which includes the siltstone and mudstone dominated Bulldog Shale and Oodnadatta Formation.
- The upper non-marine sequence consists of the Winton Formation, a mixture of lithic and feldspathic sandstone, mudstone, siltstone, and minor conglomerate. Local coal, lignite and volcanic detritus are also present.

5.4 Adelaide Geosyncline and Stuart Shelf

A deeply subsided sedimentary basin with at least four main phases of rifting in the Adelaidian (Neoproterozoic) and one in the early Cambrian. Twelve major transgressive/regressive cycles in the Adelaidian and three in the Cambrian.
The sequence consists of a thick pile of sedimentary rocks and minor volcanic rocks that were deposited on the eastern margin of Australia during the time of breakup of the supercontinent Rodinia. Dominant lithologies are, in order of decreasing abundance, siltstone, sandstone (both mature and feldspathic), dolomite, limestone and diamictite.

5.5 Basement Geology

The Gawler Craton has a history of Archaean and early Proterozoic orogenic evolution terminating during the Carpentarian with a relatively stable platform (see summary at Figure 6).

The eastern margin of the Gawler Craton has been extensively altered by a regional-scale system of iron-rich mineralised hydrothermal fluids, associated with widespread, comagmatic Gawler Range Volcanics and Hiltaba Suite magmatism. IOCG-U mineralisation in the Olympic Copper Gold province is associated with the ca. 1595-1575 Ma Gawler Range Volcanics and Hiltaba Suite igneous event.

Altered rocks include deformed Palaeoproterozic sediments and granites as well as the Mesoproterozoic Hiltaba Suite, Gawler Range Volcanics and interbedded sediments.

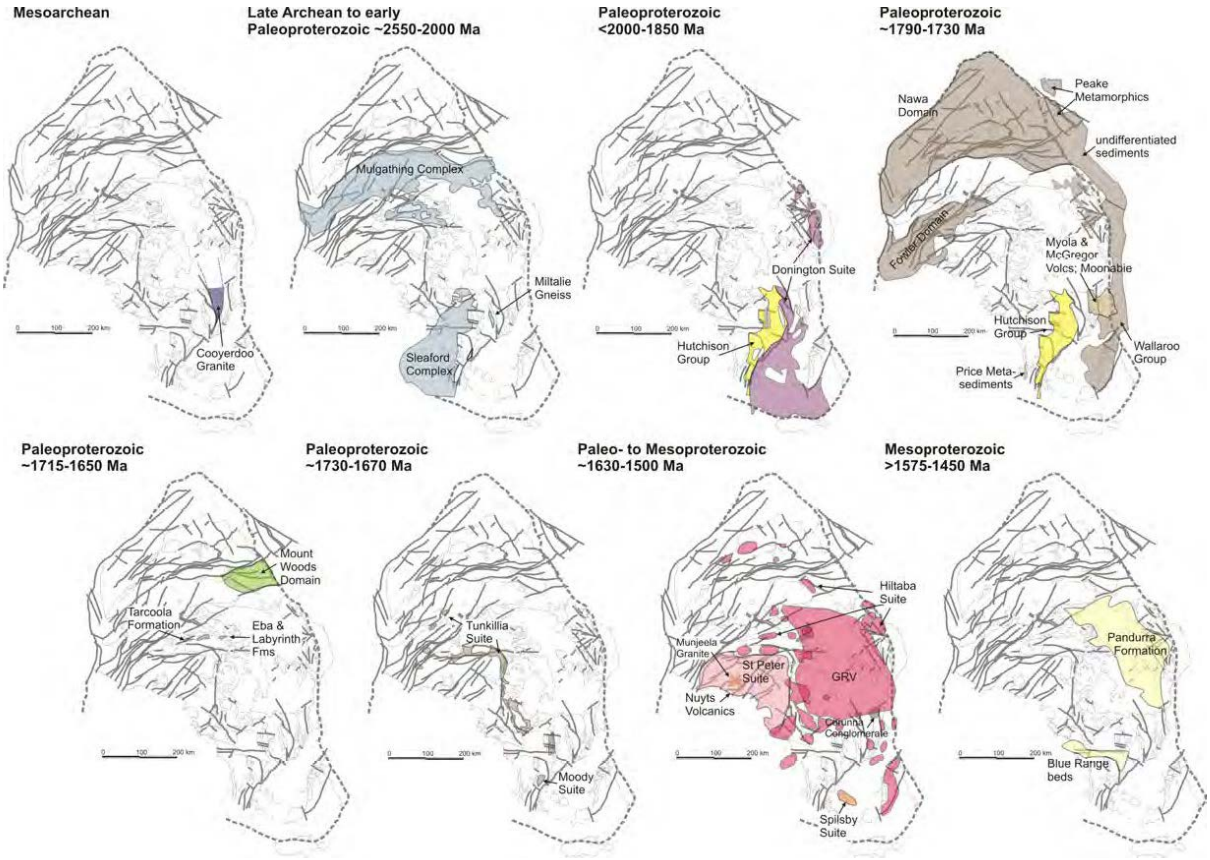


Figure 10: Archean to Mesoproterozoic development of the Gawler Craton, showing the location of major rock units formed in each interval (after Hand et al., 2007)

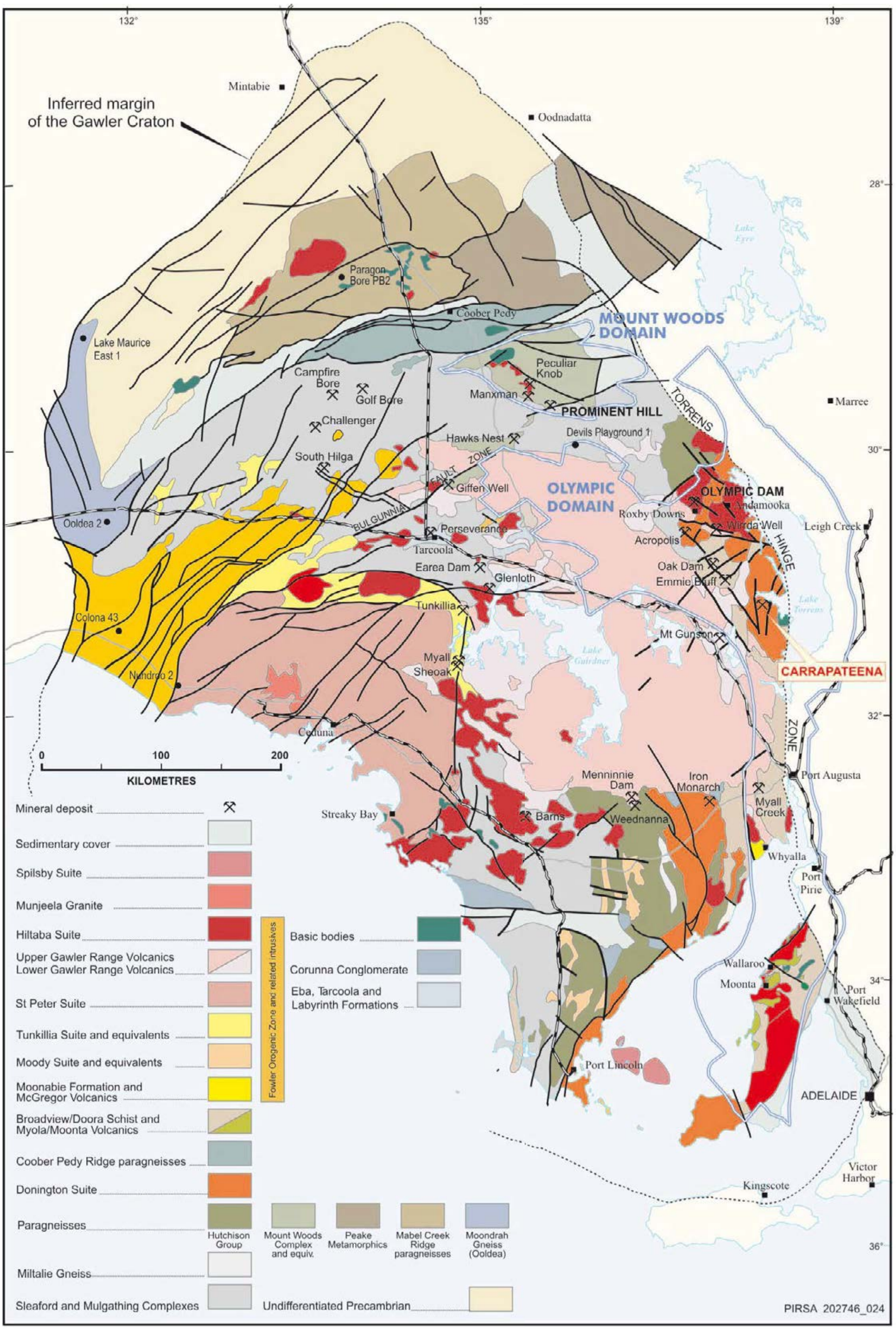


Figure 11: Interpreted solid geology of the Gawler Craton (Wilson, 2012)

5.6 Mineralisation Model

SER is exploring for Prominent Hill and Olympic Dam style IOCG mineralisation. The model presented by Haynes et al. (2004) for the genesis of Olympic Dam has been an important factor in SER's approach to exploration.

Primary targets combine offset gravity and magnetic anomalies, proximity to secondary or tertiary faults splaying from the NE/SW or NW/SE regional fault lines (fluid pathways) and proximity to Hiltaba or Donnington suite granites (fluid sources).

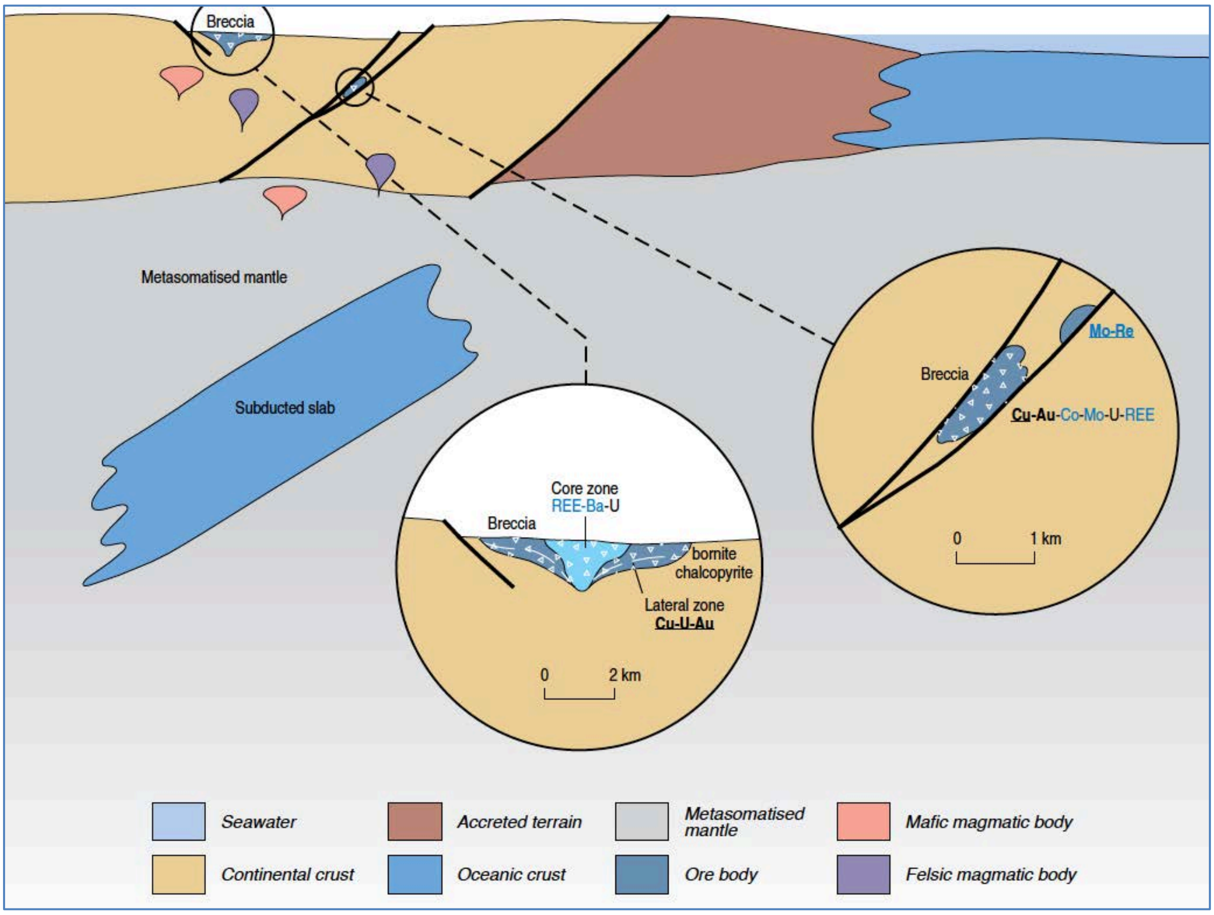


Figure 12: IOCG-U mineral system development
(Geoscience Australia - Critical Commodities for a high-tech world: Australia's potential to supply world demand, 2013)

6. Exploration EL6335

During the first year of tenure SER undertook negotiation with landholders Billa Kalina and Anna Creek Stations, discussions with the Department of Defence re Woomera Protected Zone access and negotiation with the Arabana Corporation re an NTMA.

SER also collected infill ground gravity and preliminary reprocessing which are all detailed in Burn 2020 (1st year Annual technical report for EL6335)

6.1 Geophysical Modelling

During the 2nd year of tenure SER engaged expert geophysical consultants Terra Resources to process and model the gravity and magnetic data over EL6335 including the ground gravity data SER collected in 2020.

Terra produced magnetic and gravity density shells which were used to identify potential target zones deemed equivalent to the known response of IOCG deposits.

Terra identified two target zones:

- Target A: Gravity only target, with a +0.05g/cc gravity shell at ~1030m and +0.1g/cc shell at ~2900m
- Target B: Coincident magnetic and gravity shell zone with +0.05g/cc gravity shell at ~780m

Terra noted that there were no +0.15g/cc gravity shells within EL6335 which is their interpreted required gravity response for an IOCG target (Figure 13).

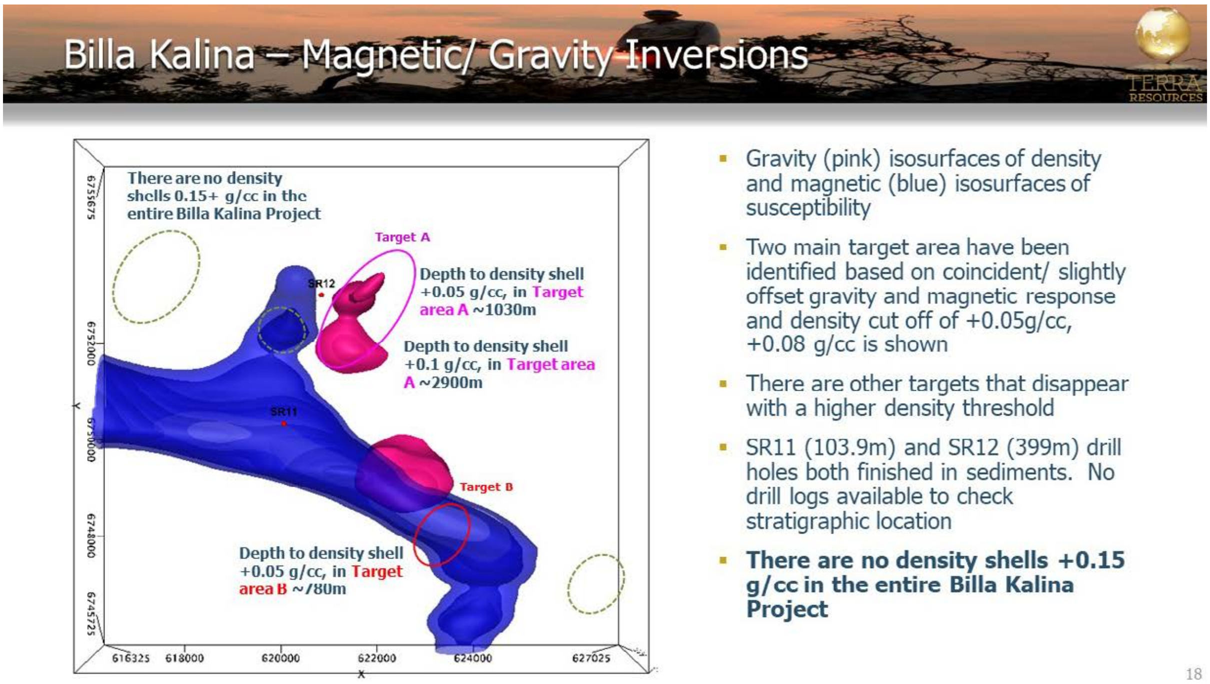


Figure 13: Terra Geophysics image of modelled magnetic and gravity shells with targets

7. Conclusions

Work during the reporting period included:

- modelling of the gravity and magnetic data
- target identification and ranking
- SER decided that the targets are too deep and interpreted to be no dense enough to be sourced from a IOCG deposit
- SER has decided to relinquish EL6335

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