

# East Tennant Ground Gravity Survey Final Report

**Round 13 Geophysics and Drilling Collaborations Program** 

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## 3. Abstract

Strategic Energy Resources Ltd (SER) was a successful applicant in Round 13 of the Geophysics and Drilling Collaboration Program for a proposed ground gravity survey over its three tenements within the East Tennant region. In 2019, data acquired under Geoscience Australia's 'Exploring for the Future' program revealed a lithospheric connection between the Tennant Creek and Mt Isa mineral fields. In particular, previously unrecognised major features favourable for hosting large mineral systems were seen in the East Tennant region<sup>1</sup>. The area is currently the focus of the National Drilling Initiative which is drilling a number of stratigraphic holes to increase the geological knowledge of the region.

SER identified gravity as a key dataset for defining hematite (or magnetite) hosted Iron Oxide Copper-Gold (IOCG) mineralisation in the region and with much of the regions gravity coverage at 2km spacing, identified that detailed infill has the potential to reveal previously unknown anomalies large enough to be the expressions of significant mineralised bodies.

SER completed its survey between 23 August and 7 September 2020. The survey collected 3094 new stations at 400m or 800m spacing over the three granted SER tenements within the East Tennant region. Results have greatly improved the quality of the gravity coverage over the tenements with preliminary interpretations identifying previously unknown features within the gravity highs, cross cutting features (structures) and refining the gravity expression of gravity ridges.

SER will undertake further modelling of the data to guide target generation in the region with plans to drill test the high priority targets.

<sup>1</sup> For further details regarding Geoscience Australia's work at East Tennant see: <u>https://www.ga.gov.au/eftf/minerals/fis/east-tennant</u>



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# 5. Introduction

SER's East Tennant project consists of three granted exploration licences for 947km<sup>2</sup>. SER's focus in the East Tennant area is to explore for IOCG mineralisation in the Proterozoic basement underlying the Georgina Basin sediments.

EL32109 is located ~100km east of the township of Tennant Creek. It is located on vacant crown land comprising sand dunes and flat arid waterways.

EL32306 is located 40km northeast of the Barkly Homestead (Roadhouse) adjacent to the Tablelands Highway. It is located on pastoral land on Alroy Station.

EL32307 is located 80km northeast of the Barkly Homestead adjacent to the Tablelands Highway. It is located on pastoral land on Alroy Station.

Access to EL32306 & EL32307 is via the Tablelands Highway north of the Barkly Roadhouse, then along station tracks (Figure 1) whilst on EL32109 there are no gazetted tracks. Access has previously been gained by ground gravity acquisition teams using side by side gator vehicles and four wheel drive vehicles.



Figure 1: East Tennant location maps

# 6. Regional context

The geology of the Tennant Region has been discussed in detail in Ahmad et al., 2009 and Ahmad and Munson 2013. It comprises three geological provinces: the northern Tomkinson Province, the central Warramunga Province, and the southern Davenport Province.

The Tomkinson Province contains Palaeoproterozoic platform sedimentary rocks that are interpreted to be stratigraphically equivalent to the McArthur Basin.

The Davenport Province is defined by the extents of the Hatches Creek Group, a siliciclastic sequence of sandstone, conglomerate, siltstone, shale and carbonate rocks with interbedded volcanic and pyroclastic rocks that postdates the ca 1810 Ma Murchison Event. The Hatches Creek Group overlies the Ooradidgee Group.

The Warramunga Province predates the ca 1860-1850 Ma Tennant Event and comprise the Warramunga Formation (including the correlative Junalki Formation and Woodenjerrie beds). The Warramunga Formation is a polydeformed succession of lower greenschist-facies turbiditic sequence of sandstone and wacke, siltstone, mudstone, shale and hematite-rich argillaceous banded ironstone with interbedded felsic volcanic rocks, which have been intruded by syn-orogenic granite and granodiorite, as well as by felsic porphyries. U-Pb geochronology indicates a maximum depositional age of ~1860 Ma for the Warramunga Formation. The Tennant Event resulted in an erosional angular unconformity between the Warramunga Formation and the overlying bimodal Ooradidgee Group. The Ooradidgee Group is a discrete package of rocks characterised by fluvial to deltaic sedimentation accompanied by subaerial felsic and mafic volcanism (1830 – 1815 Ma) and by penecontemporaneous subvolcanic intrusive activity. The Ooradidgee Group is characterised by lateral facies variations around several volcanic centres.

The name Warramunga defines the formation that hosts iron-oxide associated copper-gold mineralisation in the Tennant Creek Goldfield the identification of which in the covered East Tennant region would increase the prospectiveness of the region.

#### Geology

Very little is known about the basement geology of the entirety of EL32109. As per the STRIKE database no existing drilling is recorded. The area is covered in transported sediments, typically sand dunes and dry water courses. EL32109 is also fully covered by the Georgina Basin a Neoproterozoic basin which is known to been significantly deep in parts. EL32109 is near the edge of the Georgina Basin and geophysical modelling has indicated that depth to basement is in the vicinity of 200-300m (St Barbara EL26038 2009 ATR).

EL32306 & EL32307 are overlying the interpreted East Tennant gravity ridge. The area is covered in transported sediments, typically sand dunes and dry water courses. The areas are within the Georgina Basin. The interpreted solid geology interpretations suggest varyingly magnetic Ooradidgee Formation is the basement geology, however there are no known basement tenement drillholes within the tenements, so the true nature of the basement remains unknown.

#### Mineralisation

The closest known mineralisation is the copper gold deposits/prospects within the Tennant Creek area. These are commonly interpreted as ironstone (magnetic) end members of the IOCG mineralisation classification. Some high grade gold deposits and prospects are also common in the Tennant Creek region (i.e. Emmerson Resources Ltd high-grade Mauretania Prospect). Mauretania is associated with hematite ironstones and has high grade gold and copper in drilling (see EMH ASX announcement 5 February 2020). This Mauretania

discovery is further proof of concept to the potential for hematite rich IOCGs to exist in the East Tennant region where NE structures and density features remain untested. The recent prospectivity analysis work undertaken by Geoscience Australia identified the NE striking zone between Tennant Creek and Mt Isa a potentially prospective for IOCG mineralisation.

### 7. Previous exploration

EL32109 was granted to SER on 18 November 2019 and exploration activities to date have involved desktop evaluation and planning. Planned reconnaissance visits to the tenement in early 2020 have had to be delayed due to travel restrictions resulting from the COVID-19 virus.

The eastern third of the tenement was covered in ~2km ground gravity spacing by Geoscience Australia in 2019 and the western side of the tenement was covered in close spaced ground gravity (800m with 400m infills) by St Barbara Ltd in 2009. St Barbara were interested in the area's IOCG potential and were successful in an early round of NT collaborative funding to drill test gravity highs in 2009. They relinquished their tenure before completing any drilling.

On EL32109 SER's completed survey infills the ~2km gravity stations and will be merged with the high quality St Barbara data collected in 2009 (see Figure 2 & Figure 3).

EL32306 & EL32307 were granted on 17 August 20. The two tenements were awarded to SER as part of the competing East Tennant application process in early 2020. The two tenement areas have been covered by the Geoscience Australia East Tennant project which has collected airborne electromagnetics, MT stations and coarse (2km) gravity stations. The gravity data defined the East Tennant gravity ridge on which EL32306 is overlying (Figure 3). This survey represents SERs first active exploration on EL32306 and EL32307.



Figure 2: EL32109 existing gravity coverage



Figure 3: EL32306 & EL32307 existing gravity coverage, with planned stations

# 8. Exploration concept

The mineralisation model explored for within the East Tennant region is Iron Oxide Copper Gold (IOCG). The Tennant Creek area approximately 100km to the west of EL32109 is a well known mining district which includes magnetite bearing IOCG type mineralisation (ironstones). Whilst Tennant Creek mineralisation is a different mineralisation model compared to the classic IOCG deposits (i.e. Olympic Dam or Mt Isa Inlier) it is a derivative of the same system. The recent prospectivity analysis work undertaken by Geoscience Australia identified the northeast striking zone between Tennant Creek and Mt Isa as potentially prospective for IOCG mineralisation. EL32109 is located within this zone with known gravity highs that have not been defined to prospect scale or drill tested. EL32306 & EL32307 are within the East Tennant Ridge within the prospectivity zone which is yet to be defined through drilling.

Whilst the Tennant Creek IOCG's are magnetite bearing meaning airborne magnetics is the primary geophysical tool for mapping their expression it is postulated that in the East Tennant terrain the IOCG mineralisation could be related to hematite and if that proves to be correct gravity data is the key dataset for identifying potential mineralised bodies.

IOCG mineralisation involves the characteristic influx of iron and metal bearing fluid into a fractured host unit, which typically increases the density of the resulting unit. As a result of this process systematic ground gravity surveys have been extensively utilised in IOCG terranes to target and identify IOCG mineralisation.

## 9. Details of the collaborative program

SER was a successful candidate for Round 13 of the Geophysics and Drilling Collaborative Program for its proposed program to collect detailed ground gravity over its three tenements within the East Tennant region. SER's proposed a fixed cost budget of approximately \$200,000 with \$100,000 contributed by the Northern Territory government through the collaboration.

3094 new stations were collected over the three tenements at 400m or 800m spacing (see Figure 4 & Figure 5), 2207 on EL32109, 802 on EL32306 and 85 on EL32307. 272 stations were duplicated for survey quality control. The survey was undertaken by Daishsat Geodetic Surveys using Scintrex CG-5 Autograv gravity meters for gravity data acquisition and base station control. Leica GX1230 differential GNSS receivers were used for gravity station positional acquisition. Gravity and GNSS data were acquired using Daishsat ATV (DATV) methods. 4 DATV crews were utilised to survey the project.

EL32109 is remote and whilst mainly flat, the lack of existing tracks across the tenement meant that traversing the tenement was slow. EL32306 & EL32307 are on pastoral land so less vegetated than EL32109 and contained some black soil plains.

Daishsat had undertaken the 2008 (St Barbara survey) on the western portion of EL32109 and they merged the data with the new stations collected within EL32109 at SERs request (see Figure 4).

The survey was completed between the 23 August and 9 September 2020, with no incidents reported.



Figure 4: EL32109 displaying existing and new gravity stations



Figure 5: EL32306 & EL32307 displaying existing and new gravity stations

## 10. Results and interpretations

The results and interpretations of the gravity survey are preliminary as merging with existing data, leveling, and modelling the data is yet to be undertaken.

The new data over EL32109 has greatly improved the quality of the gravity coverage over the tenement. Definition of the gravity highs and ridges within the tenement has greatly improved and a number of potential cross cutting faults can be interpreted, including along north west striking orientations (Figure 6 & Figure 8).

The detailed 400m grid data over EL32306 appears to have greatly improved the definition of the East Tennant Ridge within the tenement area. Initial observations of the gravity results suggest that the gravity peak is striking slighty oblique to the dominant northeast striking trend which appears to be controlled by the northeast striking faults. This could be a result of the relative small tenement size compared to the regional trend, or it could indicate that the geological source of the gravity high is affected by, but not controlled by, the northeast striking reginal faults (Figure 7 & Figure 8).



Figure 6: EL32109 new residual gravity data



Figure 7: EL32306 & EL32307 new residual gravity data



Figure 8: East Tennant regional gravity image with new data

### 11. Conclusion

The ground gravity survey was successfully undertaken collecting 3094 new stations over the three SER East Tennant tenements.

Initial interpretations of the data indicate that the increased data coverage has greatly increased the definition of the texture within the gravity highs, identified cross cutting features (structures) and improved the definition of the East Tennant Ridge.

SER will use this dataset as the key data set for ongoing geophysical targeting in the East Tennant region to define drill ready targets which the company will test with an initial drilling program.

### 12. References

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