

# **ELKEDRA DIAMONDS NL**

## **Altjawarra Craton Diamond Project**

### **Final Relinquishment Report for**

**EL 22546 (Desert Plain)**

**By:**

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Map Sheets:

1: 250,000: Sandover River (SF53-08)

1:100,000: Carbeen (6255)

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Elkedra Diamonds NL Perth library

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## **1 INTRODUCTION**

Exploration License EL 22546 is located on the Sandover River (SF53-08) 1:250,000 sheet in central Northern Territory. This report details all work carried out on the tenement up to September 17, 2003 by Elkedra Diamond NL.

## **2 CONCLUSION**

Twenty six low priority magnetic anomalies were identified within the tenement. The anomalies and tenement location ranked low priority in terms of diamond prospectivity of the Altjarrowa Craton and no further work is currently warranted.

## **3 GEOLOGICAL SETTING**

### **3.1 Regional Geology**

The Altjarrowa diamond project is located on the North Australian Craton, which represents an amalgamated terrain that was consolidated around 1,800 Ma. From a diamond exploration perspective, the significance of the North Australian Craton is that it hosts all of Australia's diamond mines to date including the recently discovered diamondiferous Merlin kimberlites located on the eastern portion of the North Australian Craton. Of particular importance is the age of the Merlin pipes, which have been dated as Devonian (~380 Ma). Elkedra Diamonds are targeting this same kimberlite event, or younger, in the southern Georgina Basin located south of the Merlin field.

The project area incorporates several kilometers of Cambro-Ordovician platform sediments of the southern Georgina Basin, which wholly veneer a basement continental block referred to as the Altjarrowa Block. The southern Georgina basin and the underlying Altjarrowa Block in particular, are associated with a zone of anomalously thick lithosphere extending to at least 200km depth as recognized from recent seismic tomography studies (Kennett, 1997; Van der Hilst *et al.*, 1998; Debayle and Kennett, 2000). The geophysical data highlight the area as highly prospective for the emplacement of diamond-bearing kimberlites.

### **3.2 Tenement Geology**

The relinquished portion of the tenement is underlain predominantly by Quaternary sediments.

## **4 EXPLORATION COMPLETED**

Exploration activities undertaken include:

- 1) Processing and targeting for aeromagnetic anomalies off the Elkedra survey.

### **4.1 Magnetism**

The release of the Elkedra aeromagnetic survey flown by Tesla Airborne for the NTGS has proved critical in this early stage of exploration and forms the basis of all geophysical work undertaken in the tenement. A total of 17 anomalies were identified from the aeromagnetic data with ground magnetic surveys over selected higher priority anomalies.

All aeromagnetic interpretation and processing were undertaken by Dr. Duncan Cowan of Cowan Geodata Services, Perth.

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68000 mE

70000 mE

# TENEMENT STATUS

Scale 1:300,000



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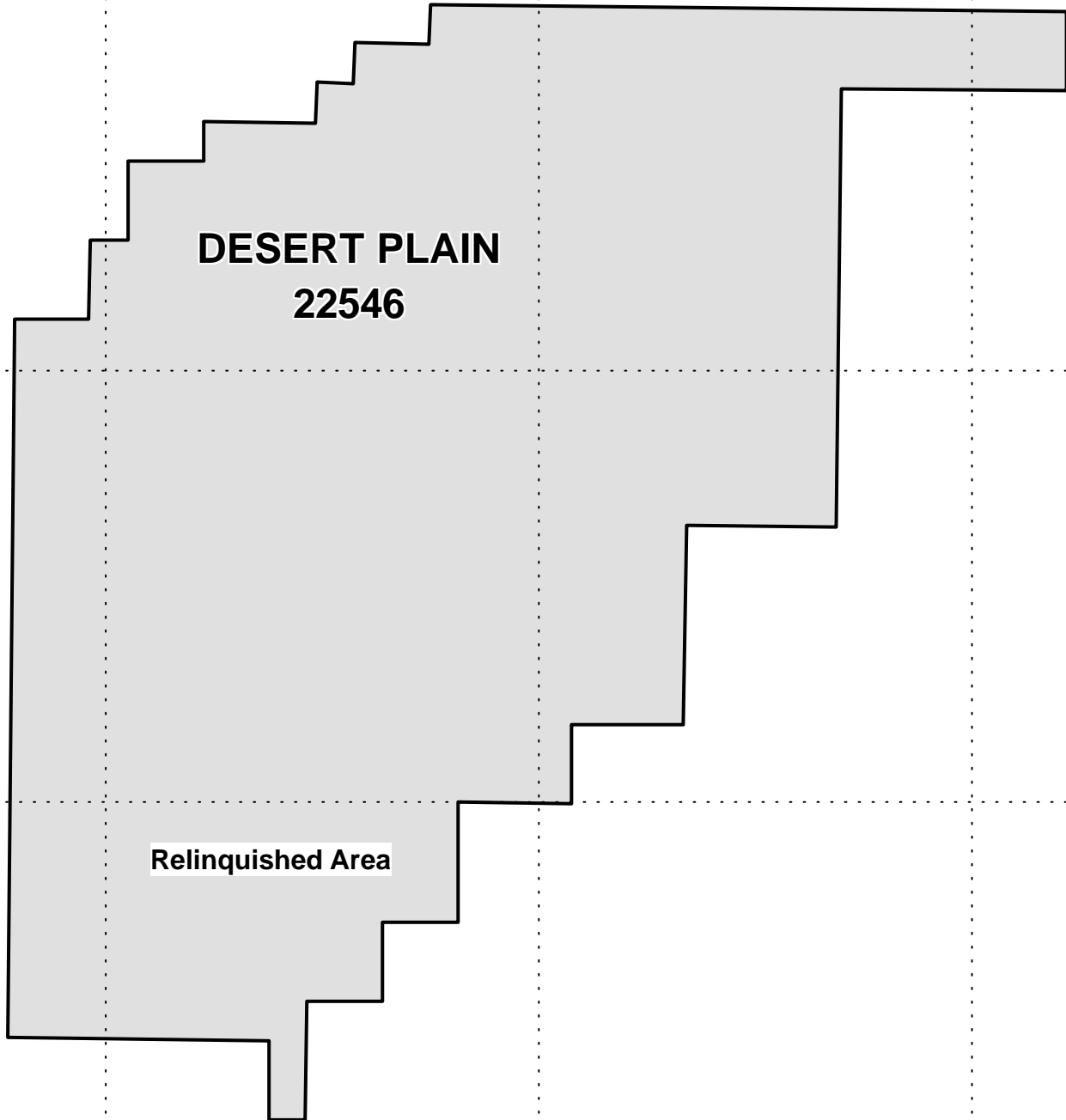
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**FIGURE 1**

The aeromagnetic, altimetric dtm and radiometric data covering the tenement area were windowed out of the Elkedra NTGS dataset. The windowed area was initially analyzed by running the “Smart” filter program of Cowan Geodata Services. The filter is a simple pattern recognition technique developed by Cowan Geodata Services. The program uses regression analysis between a window of the grid data and a typical model anomaly to identify roughly circular anomalies. The model data calculated is a full 3D vertical cylinder implementation. The method involves various inputs to the program including window size, model cylinder radius, top and bottom depths and amplitude response. The filter was run once to test response using a standard 200m diameter cylindrical model with a 30m depth, 400m grid window, and 25-200nT amplitude range. Twenty-six anomalies were identified and are summarized in Appendix 1.

Further data enhancement and preliminary kimberlite target screening was later undertaken using a combination of techniques which included:

- 1D Wavenumber filtering
- 2D Euler deconvolution depth calculation
- 2D Werner deconvolution depth calculation
- Modelling and inversion of individual anomalies

The focus was on identifying possible kimberlite targets in the presence of significant intrasedimentary background noise due to maghemite channels, areas of ferricrete, clay-pans and sinkholes and cultural sources. The altimetric dtm and radiometric data were used to assist in anomaly screening. Identifying possible kimberlite magnetic anomalies in an area of extensive drainage and palaeosurface related magnetic anomalies is difficult due to a high degree of anomaly overlap as well as interference from anomalies due to shallow basement rocks. The relatively wide line spacing of 400-m limits spatial resolution of small sources as small kimberlites located between flight lines may not be detectable or produce only weak magnetic anomalies with magnetic attributes similar to sinkholes etc. No additional anomalies were identified and the previously identified anomalies were given low priority ranking.

## 5 REFERENCES

Debayle, E. and Kennett, B.L.N. (2000) The Australian continental upper mantle: Structure and deformation inferred from surface waves. *Journal of Geophysical Research*, 105B11, 25423-25450.

Kennett, B.L.N. (1997) The mantle beneath Australia. *AGSO Journal of Australian Geology & Geophysics*, 17(1), 49-54.

Van der Hilst, R.D., Kennett, B.L.N. and Shibutani, T (1998) Upper mantle structure beneath Australia from portable array deployment. In: J. Braun et al, editors. *Structure and Evolution of the Australian Continent*. 39-57.

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# AEROMAGNETIC ANOMALIES

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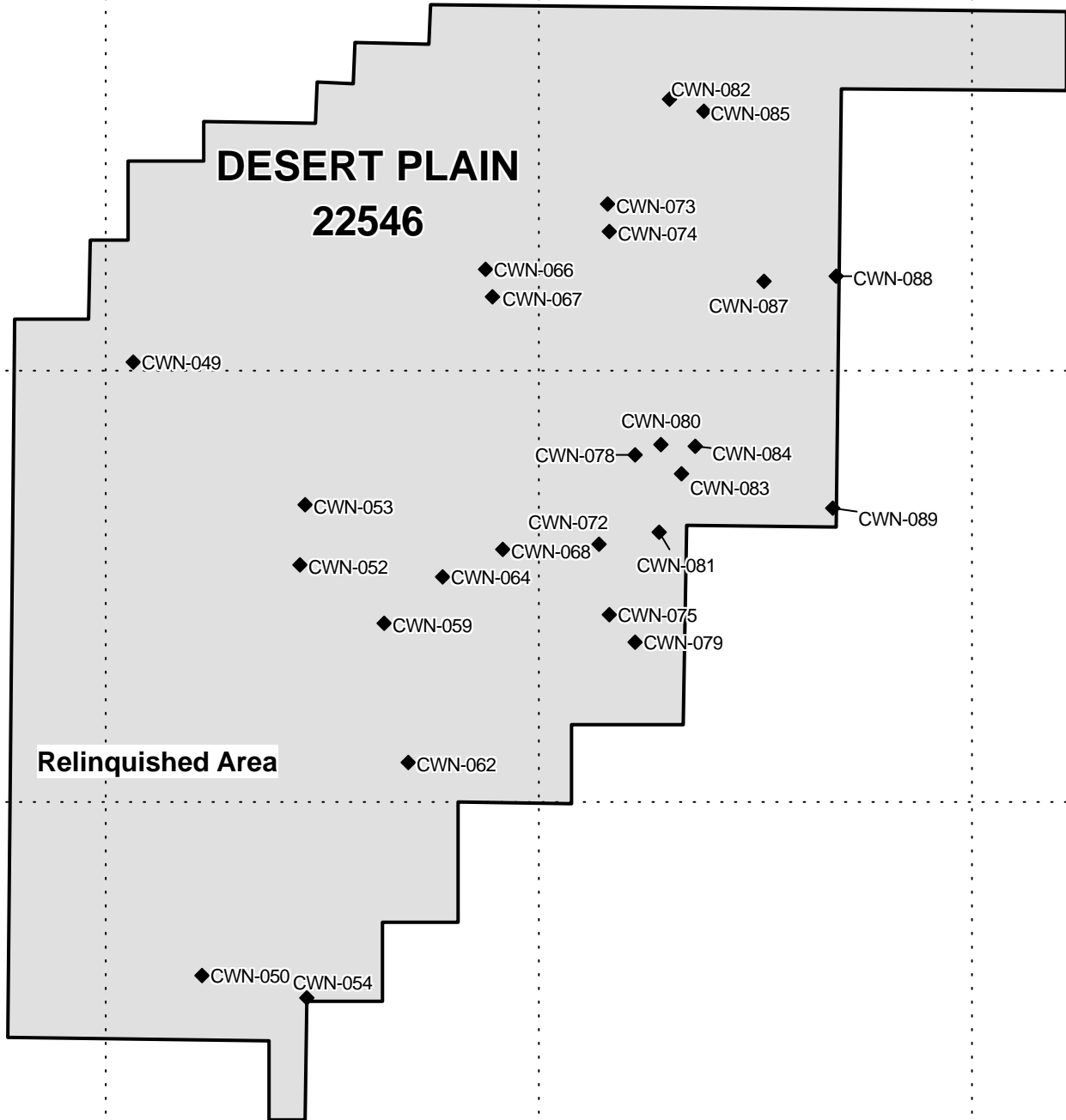
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PLAN 1

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