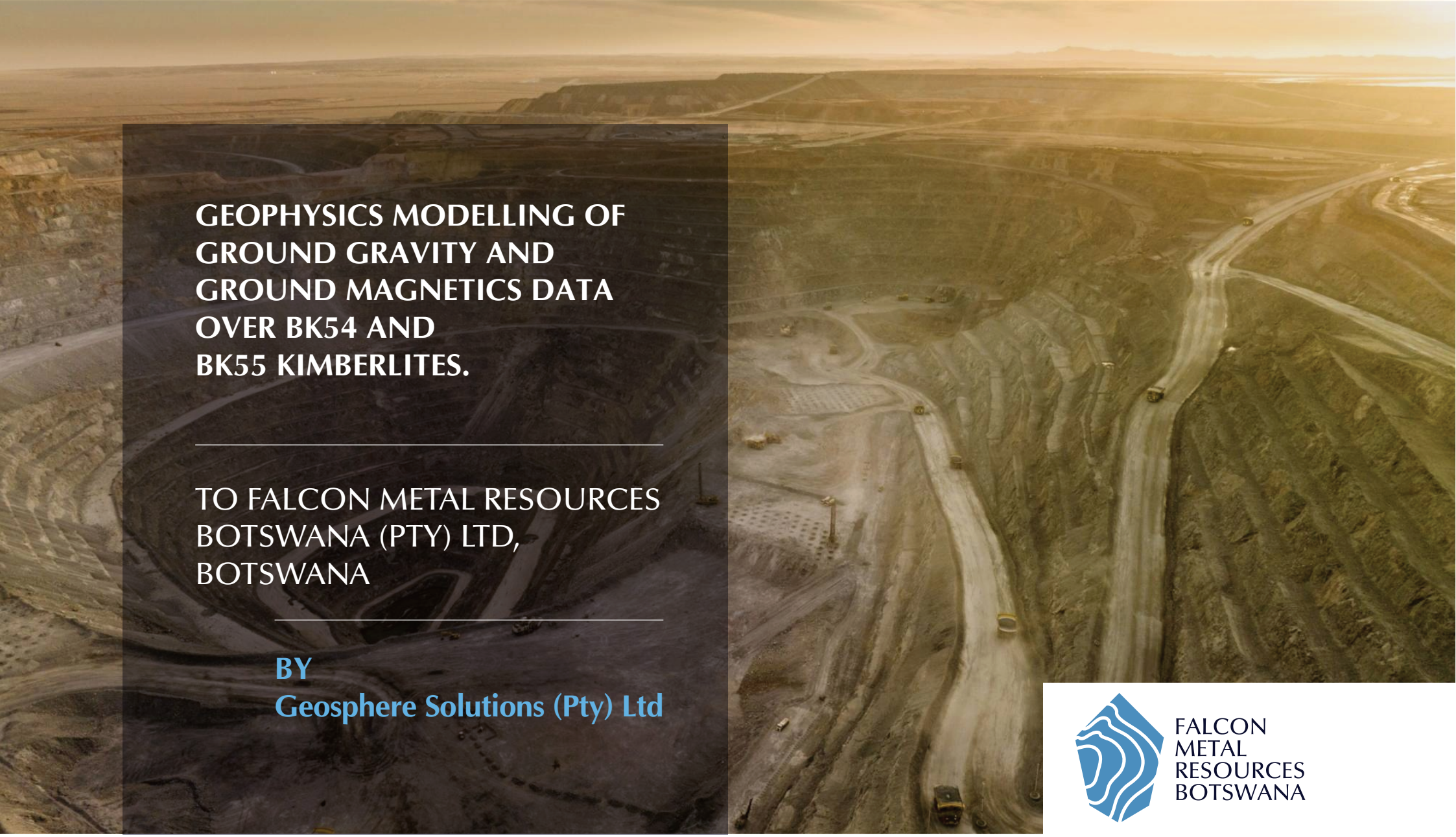


GEOPHYSICS MODELLING OF GROUND GRAVITY AND GROUND MAGNETICS DATA OVER BK54 AND BK55 KIMBERLITES.

TO FALCON METAL RESOURCES BOTSWANA (PTY) LTD, BOTSWANA

BY

Geosphere Solutions (Pty) Ltd

FALCON METAL RESOURCES BOTSWANA

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1. Introduction

This report details the modelling of Bouguer ground gravity anomaly and ground magnetics data over BK54 and BK55 kimberlites. The kimberlites are located in Xplor Copper Botswana PL000060/2026 APP, Falcon Subsidiary. The gravity and magnetic data anomaly were selected from ground gravity data (at 100m line spacing) that was acquired by De Beers Prospecting Botswana (Pty) Ltd. The kimberlites are located ~15 km south east of Orapa mine lease. These pipes are in area of very thick basalts (about 120m). Their responses are magnetic monopole highs of about 220nT. BK54 does not have a gravity response while BK55 has a positive Bouguer anomaly of 0.216 mGal.

2. Geology and Structure

Geologically, the area falls in Karoo sediments, with Basalt cover. Historic high-resolution magnetic surveys which blanket the current area, clearly maps the Basalt cover. The basalt cover downgrades the effectiveness of magnetics and gravity as a reconnaissance tools in the noisy and geologically complex area, however Karowe mine kimberlite (AK6) and BK11 mine kimberlites, which are in similar geological background with have response on the magnetics and gravity survey data.

In summary, the geology within the area (above granite, gneiss, schist and amphibolite basement) comprises the following from base to top:
• Permian Tlapana Formation, 40 – 160 m thick, with (carbonaceous) shaley mudstones, and thin coal measures with subordinate fine-grained sandstones and siltstones;

• Triassic Tlhabala Formation, 80 – 110 m thick, with monotonous massive grey to green grey mudstones with occasional fine-grained sandstone and siltstone horizons and some thin limestone bands (lower Masekwangwe Member);

• Triassic Mosolotsane Formation, 50 – 100 m thick, with red coarse- to fine grained quartz sandstones, interbedded with laminated red siltstones and mudstones. The sandstone forms erosional channels into mudstone units;

• Triassic Ntane Sandstone Formation, 20 – 160 m thick, unconformably overlying and overstepping the older Karoo Formations. The Ntane Sandstone is characterized by fine- to medium grained, well-sorted, massive beige sandstones with fluvial sandstones and local pebbly conglomeratic facies towards the base of the unit. The aeolian portion of the Ntane Sandstone has undergone widespread silica and carbonate replacement;

• Stromberg Basalts, 100 – 140m they overlie the sandstones. They also form dikes and sills in the area

• The area is covered with a thin layer of Kalahari sediments < 20 m thick.

3. Geophysics

The kimberlites are covered by airborne magnetics, ground magnetics data and ground gravity data. The survey specifications are summarized in the table 3 and table 4

Table 3: Specifications for surveys over BK54 and BK55 kimberlites

Method	Line Spacing (m)	Station Spacing (m)	Instruments	Accuracy
Ground Gravity	100	50	CG-5 Gravimeter	5µGal
Ground Magnetics	100	50	Geometrics G856 magnetics	3nT
Airborne magnetics	100	~5	Geometrics G822 Cesium vapor magnatometer	0.05nT

Table 4: Specifications for surveys over BK54 and BK55 kimberlites continued.

Method	Line Spacing (m)	Station Spacing (m)	Date Acquired by	Date Acquired
Ground Gravity	100	50	De Beers Prospecting Botswana	15 August 2006
Ground Magnetics	100	50	De Beers Prospecting Botswana	December 2004
Airborne magnetics	100	~5	Xcalibur Airborne Geophysics	August 2004

3.1 Ground gravity

The targeted gravity anomaly is covered by ground gravity at 100 m line-spacing and 50 m station-spacing. Scintrex CG-5 and CG-3 gravity meters were deployed for data acquisition. The associated topographical survey was carried out using Leica DGPS units. BK54 does not have gravity response associated with it, although a small well-isolated gravity high exists which may possibly be a feeder. BK55 kimberlite is associated with a 0.216mGal positive gravity anomaly. BK55 is also potentially larger than as outlined by magnetic data, the adjacent (to the east) positive gravity highs may be kimberlite and further drilling is recommended at 346278, 7623499.

3.2 Magnetics

The kimberlites are associated with elliptical positive magnetic anomalies. BK54 has 240.49nT whilst BK55 is associated with a 238.11nT positive anomaly.

4. Modelling methodology

A frustum body type was also used to forward model the gravity response. The starting model for the body was based on the on first vertical derivative (1VD) of the Bouguer corrected gravity grid. To achieve a good fit between the forward model and the source response, multiple inversions were run on the line data. Several lines were used for the modelling and good fits were obtained on all the modelled lines over the anomaly. A first-order regional trend was used to derive the regional gravitational field. A density contrast of 0.25 g/cc was obtained for the gravity anomaly. Table 5 list the derived density contrast from the modelling of BK55 kimberlite.

A frustum body type was used to forward model the magnetic response. The starting model was based on the analytical signal (AS). To achieve a good fit between the forward model and source response, multiple inversions were run on the line data. Several lines were used for the modelling but good fits were only obtained on a couple of lines over the anomaly. A first-order regional trend was used to derive the regional magnetic field. Table 6 list susceptibility contrast the model obtained from the magnetic data.

Table 5: Density contrast for BK55 kimberlites.

Anomaly	Density contrast g/cc	RMS
Gravity	0.25	3.5

Table 6: Magnetic Susceptibility contrast for the magnetics models.

Anomaly	Susceptibility contrast (SI)	RMS
BK55	0.03	4.6
BK54	0.03	4.6

5. Conclusions

- The 2D sizes and depths obtained from the gravity and magnetic data model are listed in Table 1 and Table 2
- Modelling of the gravity data indicated that the BK54 does not have a gravity response associated with it.
- The confidence on the model is low as there is lots of uncertainty at this stage of modelling due to lack of contact constraint

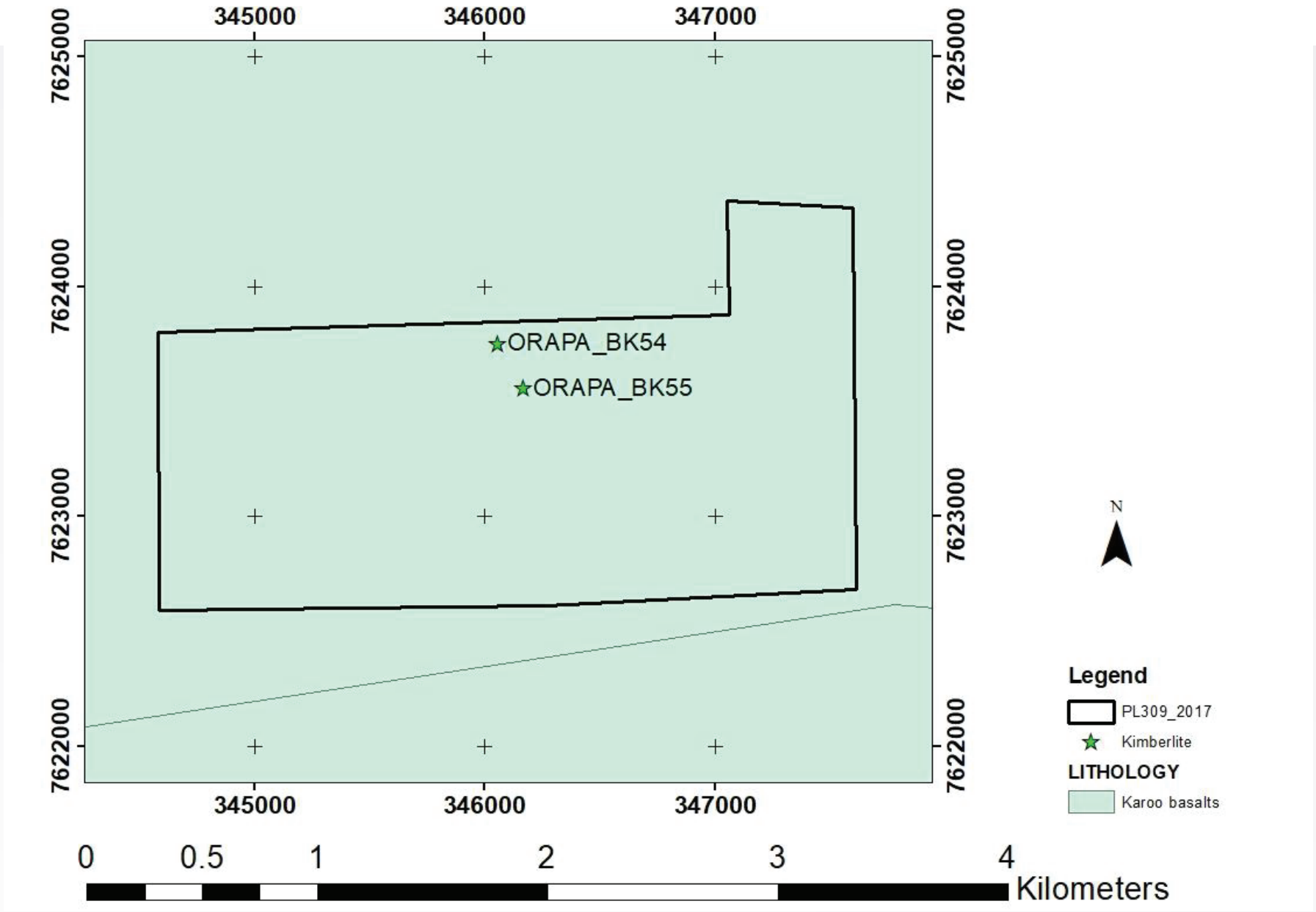


Figure 1: Generalized geology and outline of PL000060/2026 (black colour polygon).

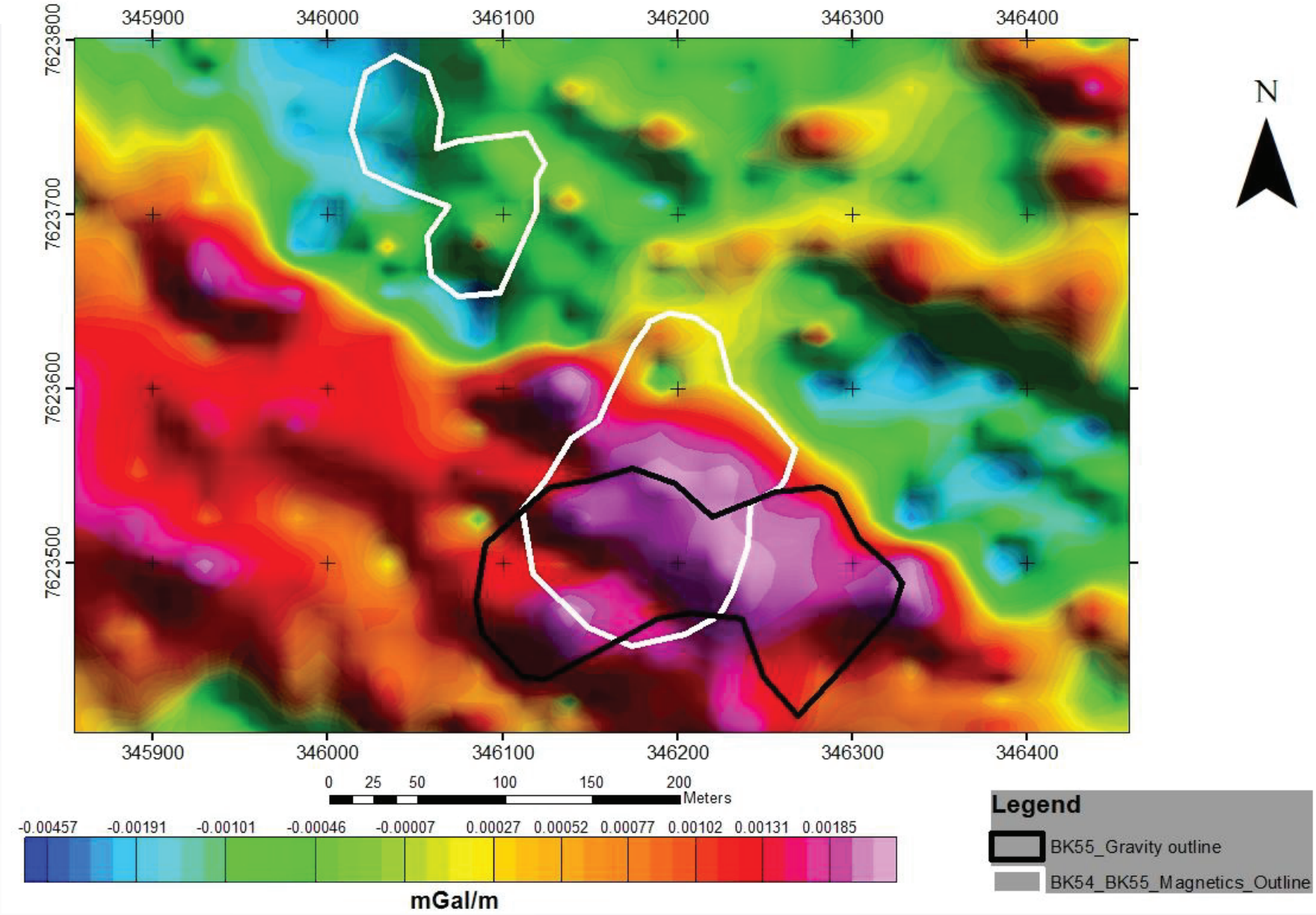


Figure 2: Gravity and magnetics model outlines BK54 and BK55 kimberlites over first vertical derivative of the Bouguer anomaly data.

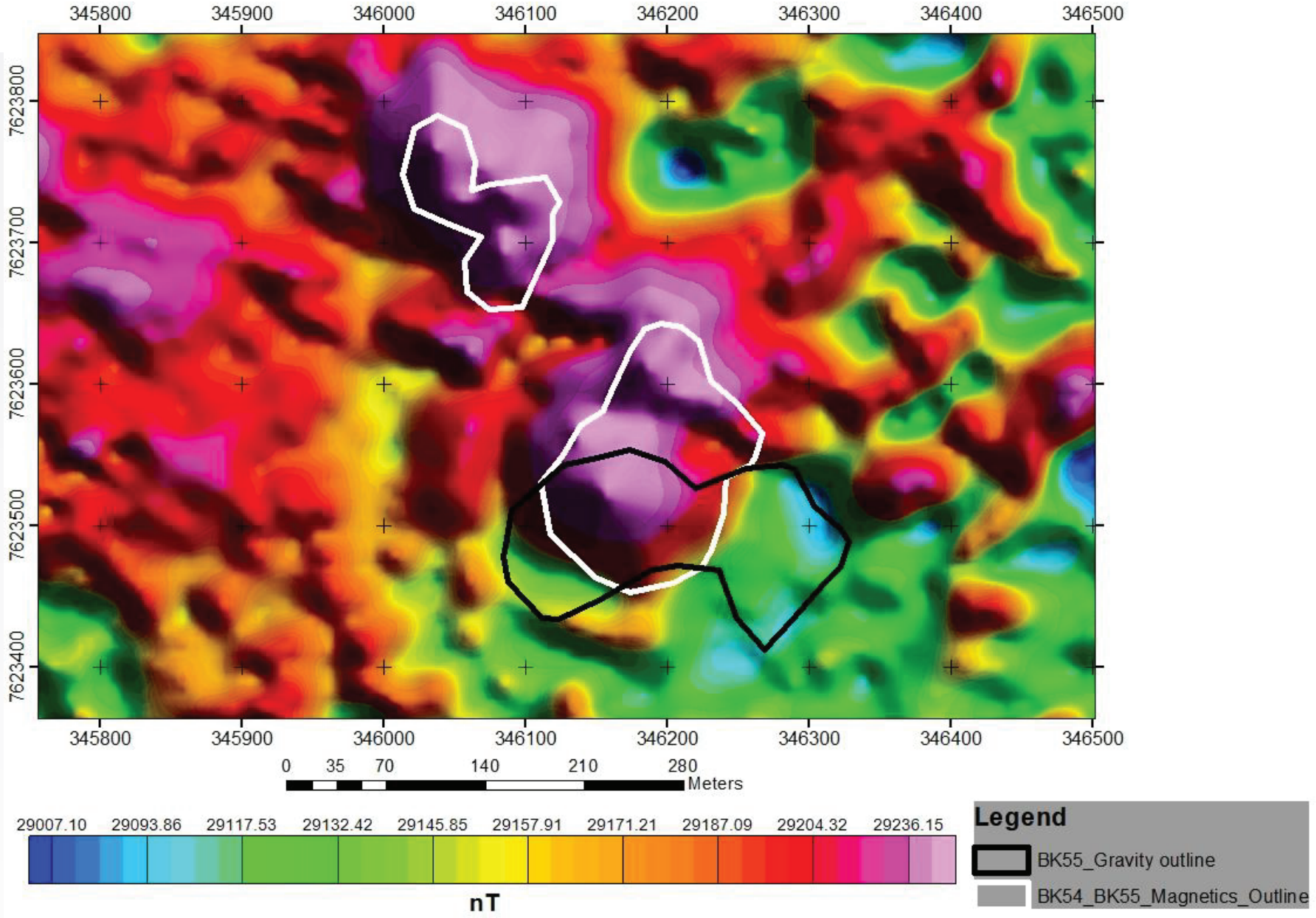


Figure 3: Gravity and magnetics model outlines BK54 and BK55 kimberlites over first vertical derivative over magnetic data.

Executive Summary

Kimberlite BK54 and BK55 are located in Prospecting license PL000060/2026, Xplor Copper Botswana , Falcon Subsidiary. It covers an aerial extent of 3.9659 km2. It is about 1km south of BK11 mine and about 1.5km north east of Karowe diamond mine. This report details the modelling of gravity anomaly and magnetic anomaly using Tensor Research Modelvision software. Due to ambiguity of potential fields and lack of constraints the anomalies and associated features can be modelled with different vertical extent. The size and depth for the gravity and magnetic model vertical extents are listed in Table 1 and Table 2.

Table 1: Depth and size for BK54 kimberlite

Kimberlite	Size (Ha)	Depth (m)	Vertical extent (m)
Magnetics	0.78	32	80

Table 2: Depth and size for BK55 kimberlite

Anomaly	Size (Ha)	Depth (m)	Vertical extent (m)
Gravity anomaly	3.54	20	100
Magnetics anomaly	1.8	35	80

It should be noted that the modelled depths and sizes may change with the acquisition of accurate drill hole information. At this stage, a low confidence is assigned to this model, due the uncertainty in the parameters used in modelling.