



## **EL 1140 - NENGMUTKA**

### **ANNUAL REPORT**

#### **FOR TWELVE MONTHS ENDING 11<sup>TH</sup> MAY 2010**

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## SUMMARY

A 3D-IP/ resistivity survey was completed on EL 1140 as part of a larger survey extending over part of the mining lease ML 122. The survey was used to help identify structures and targets which may host gold/copper mineralisation.

Within EL 1140, the Mengmut Block survey was interpreted with eight drillholes proposed to test for vein style gold mineralisation. At the Magiabe porphyry survey block, one drillhole is proposed to test for porphyry style copper and gold mineralisation at depth.

Ten drill targets have been identified over the Gorocho/Wild Dog/Kavursuki Block which is predominantly within ML 122.

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## 1.2 Previous Exploration on the Wild Dog structure

Individual outcropping veins along the Wild Dog structure have been explored intermittently during the period 1983-1991. Early favourable hand and bulldozer trenching results from the Wild Dog vein focussed attention to this segment of the vein system and led to detailed drilling programmes during 1985-1987 and 1990-1991. Consequently, the remainder of the structure has received little attention. Detailed petrological study and modelling of the alteration assemblages from the northernmost 5km of the Wild Dog structure was amongst the last work completed prior to Gold Mines of Niugini's application for the area.

Leach's studies linked surface and sub-surface zones of interlayered illite-smectite, illite and sericite as a product of hydrothermal alteration overlying and related to the vein filling of steeply dipping structures. Concurrent with Leach's petrological work was a programme of (blind) drill testing of an alteration zone at Keamgi Hill, 1000m south of the Wild Dog veins, which intersected a pair of steeply dipping veins with a combined width of 30m, traceable over a strike of 400m, demonstrating the likelihood of intact linear zones of argillization to overlie vein bearing structures.

The Gunsap Mountain Structure was subsequently defined following the confirmation that much of the Nengmutka vein system is non-outcropping, being masked or capped by a hydrothermal clay zone. It is estimated that as much as 70% of the vein system within a 3km radius of the mineralized Wild Dog veins is non-outcropping, being capped by hydrothermal clays, and therefore remains unexplored. Prior to the grant of EL 1140 no detailed mapping of the Gunsap Mountain structure had been attempted. The Gunsap Mountain structure has subsequently been mapped at a 1:2500 scale over approximately 10km strike length of the Nengmutka vein system.

## 2.0 REGIONAL GEOLOGY (by D. Lindley)

Basement rocks in the Gazelle Peninsula, and throughout New Britain, comprise Late Eocene and Late Oligocene volcanoclastic formations (Baining Volcanics and Merai Volcanics, respectively); rocks typical of an embryonic island arc, intruded by dioritic plutons. During the Early to Middle Miocene a thick carbonate sequence (Yalam Limestone) accumulated on a platform which extended across most of the New Guinea islands region. Following this period of volcanic and tectonic quiescence, volcanism resumed in a belt restricted to the Baining Mountain Horst & Graben Zone. Andesitic and rhyolitic ashflow sheets covering a 600km<sup>2</sup> area (Nengmutka Volcanics) were erupted from a caldera complex comprising a series of at least three calderas. In the well known area between the Nengmutka and Rapmarina Rivers (area covered by EL 1140), these relatively thin ashflow units are interbedded with thick volcanic conglomerate and volcanic sandstone units. Precise age determination of the Nengmutka Volcanics has been unsuccessful due to extensive alteration, and the unit is considered to be of latest Oligocene-Pliocene age on stratigraphic grounds. The unit hosts the Nengmutka vein system, from which illite alteration has been dated at 22-23Ma suggesting a latest Oligocene date for the commencement of ashflow tuff volcanism. Fluvial and marine sequences of the Mio-Pliocene Sinewit Formation laterally intercalate with the Nengmutka Volcanics.

The regional structure of east New Britain is dominated by a series of north-northwesterly trending normal faults that run centrally through the Gazelle Peninsula. This extensional zone is referred to as the Baining Mountain Horst & Graben Zone. As mentioned above, a really extensive ashflow tuff volcanism was localised along this extensional zone during the Mio-Pliocene. The horst and graben zone with a strike length of 60km and a width of 30km, and containing three major persistent normal faults, corresponds with an abrupt zone of east to west crustal thinning which divides the Gazelle Peninsula into two distinct geological provinces. To the west of the horst and graben zone lies a block with an average depth to mantle of 18km; to the east the average depth to mantle is greater than 30km. The horst and graben zone documents a long history (commencing Late Oligocene-Early Miocene) of extensional tectonic processes in this portion of the New Britain arc.

## 3.0 EXPLORATION COMPLETED DURING 2009 – 2010

### 3.1 Introduction

Geological data compiled at 1:5000 scale map from early regional work indicates silicification, oxidation and argillic alteration associated with the Sinivit vein structure extends south from ML122 boundary. A number of veins south of ML122 Sinivit Mine were discovered in the early regional work program within the line of Sinivit vein structure and they include; Lulai Hill vein, Magiabe vein, Kungunga, Keamgi vein, Mengmut vein, Elamaraka vein, Muruk vein, Steel creek vein and Reges vein to the far south.

### 3.2 Work Completed during past 12 months

Five areas were gridded in preparation for 3DIP surveys within EL 1140 and partly overlapping ML 122 within EL 1140 (Figure 2). These include the Magiabe Block (0.5 km<sup>2</sup>), Gorocha Block (1.2 km<sup>2</sup>), and the Wild Dog /Kavursuki Block (0.68 km<sup>2</sup>) as shown in Appendix 1. The Mengmut survey block covering an area of approximately 0.8 km<sup>2</sup> was gridded wholly within EL 1140 (Figure 3). Three dimensional Induced Polarisation (3D-IP) surveys were carried to help determine the extent of the epithermal vein systems and provide a structural setting of the area.

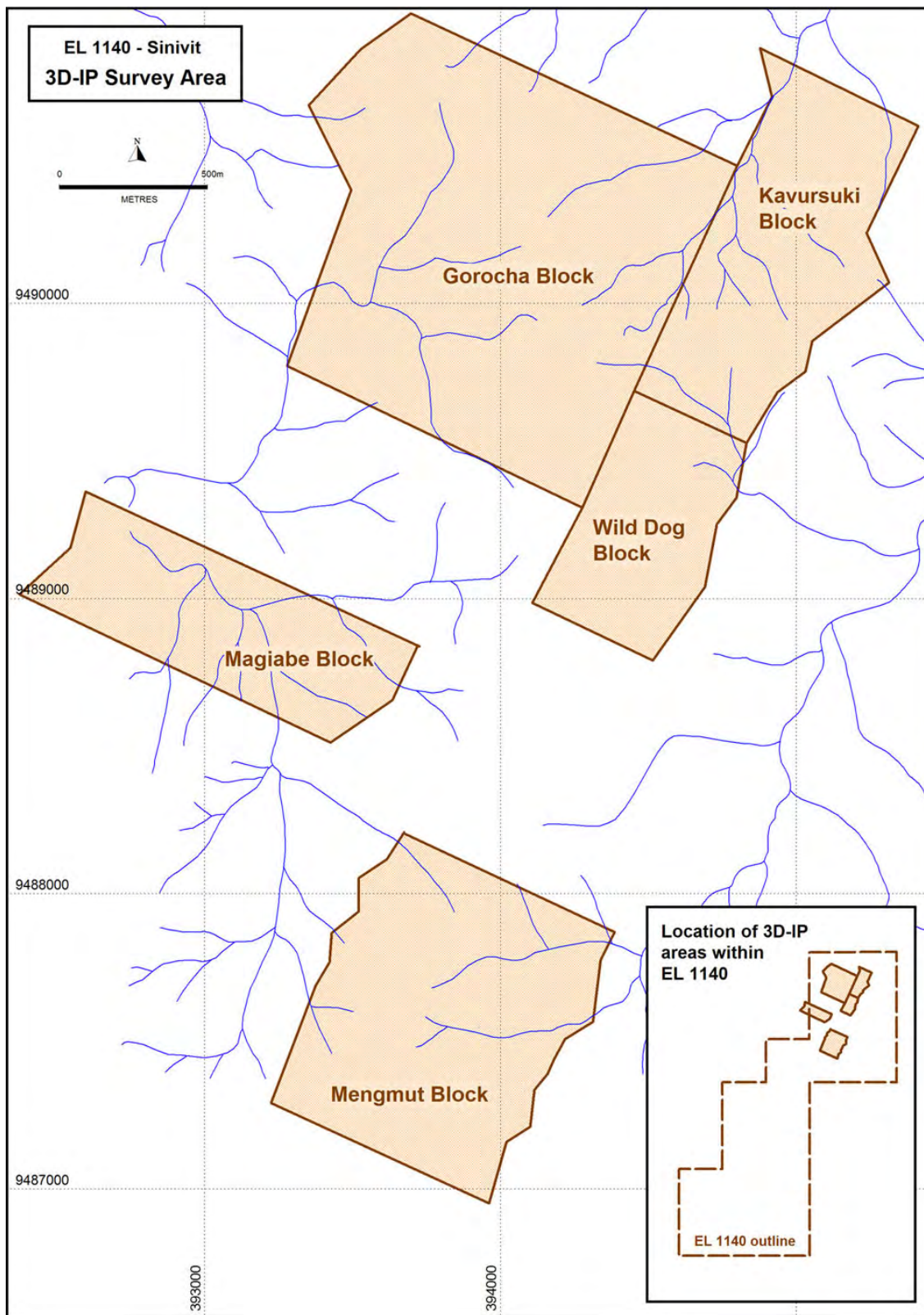
### 3.3 Mengmut Block Three Dimensional Induced Polarisation (3DIP) Survey Results

The gold mineralised zone within the “Keamgi Hill” quartz vein assemblage (C1) has an associated chargeability anomaly envelope (Figure 4 and 5). The low intensity broad chargeability response (4ms) is likely to be caused by associated clay/alteration and pyrite. It shows potential for extensions of the gold mineralised zone to be tested with additional drilling.

Zones of epithermal gold mineralisation at the Kungunga Vein (V3), Lulai Hill Vein (V5) and Magiabe Vein (V6) all occur within areas of reduced resistivity (<75 ohm.m) at about 75m depth (Figure 4). Other similar zones of lower resistivity (V1), (V2) and (V4) also indicate areas of gold mineralisation and warrant further testing by drilling. Recommended drill pads (Table 1) are located along historical tracks (Figure 6) which could be re-opened.

Table 1: Mengmut Block List of Targets (AGD66, Zone 56)

| Target | Description   | Proposed Drillhole   |
|--------|---|--|
| C1     | Zone of gold mineralisation 330m in length within a 470m long envelope of clay alteration evident as a slightly anomalous chargeability response. The zone is coincident with interpreted dextral faulting. | KProp_1:<br>(393690e, 9487690n)<br>KProp_2:<br>(393530e, 9487500n)   |
| R1     | Resistivity anomaly on a hilltop which may represent a mineralised quartz vein assemblage.  | MAProp_1:<br>(393810e, 9488090n)                                     |
| V1     | Structural zone of lower resistivity, possibly representing an area of vein style mineralisation.   | KProp_3:<br>(393760e, 9487390n)                                      |
| V2     | Structural zone of lower resistivity, possibly representing an area of vein style mineralisation.   | KProp_4:<br>(393580e, 9487640n)                                      |
| V3     | Structural zone of lower resistivity hosting the gold mineralised Kungunga vein system.   | KUProp_1:<br>(393900e, 9487740n)                                     |
| V4     | Zone of anomalous low resistivity which is possibly host to vein style mineralisation.  |  |
| V5     | Structural zone of lower resistivity hosting the gold mineralised Lulai Hill vein system.   | LUProp_1:<br>(394020e, 9488090n)<br>LUProp_2:<br>(393990e, 9488010n) |
| V6     | Structural zone of lower resistivity hosting the gold mineralised Magiabe vein system.  |  |



**Figure 2: Block Areas Surveyed with 3D Induced Polarisation**

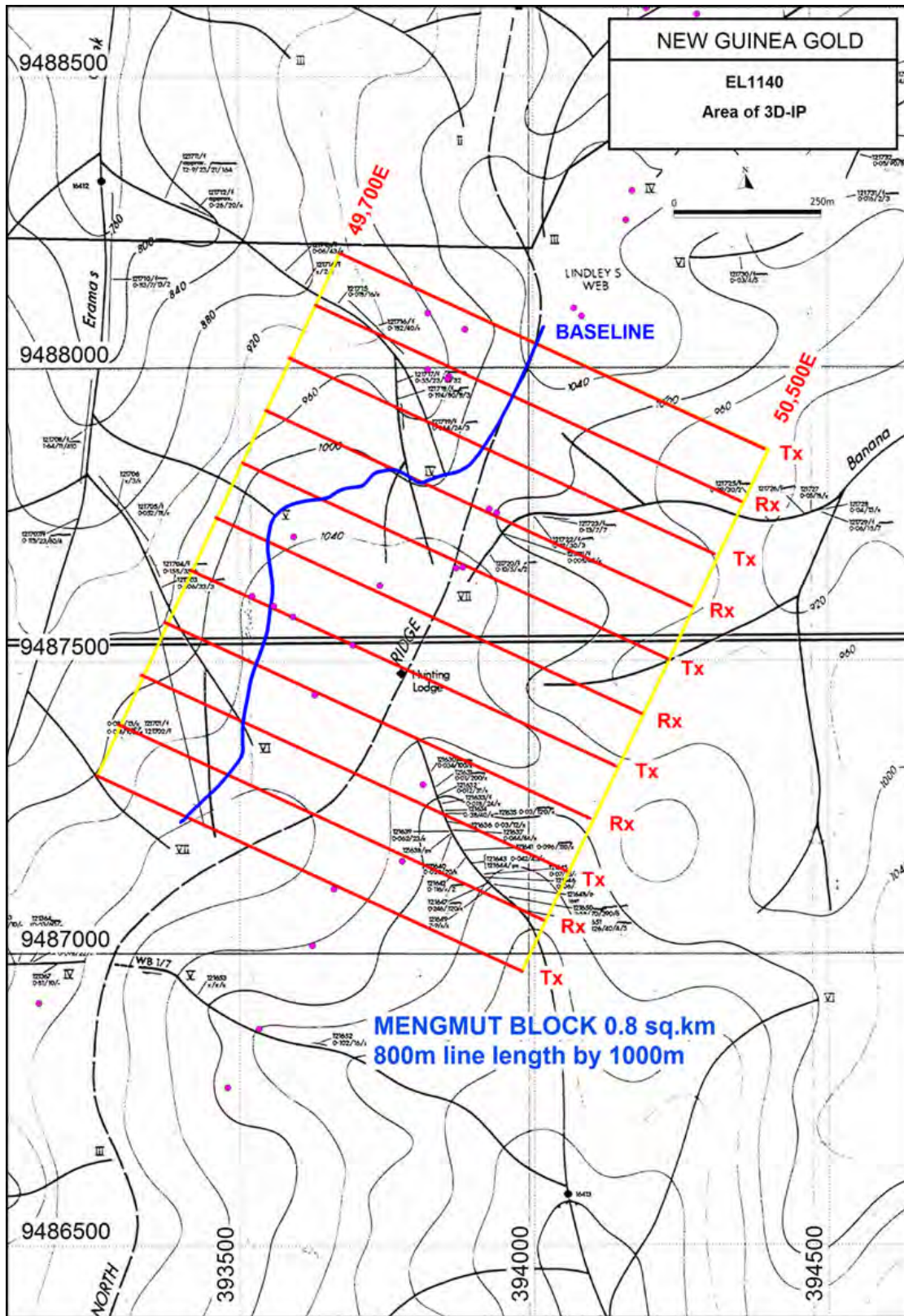


Figure 3: Mengmut Block Survey Lines

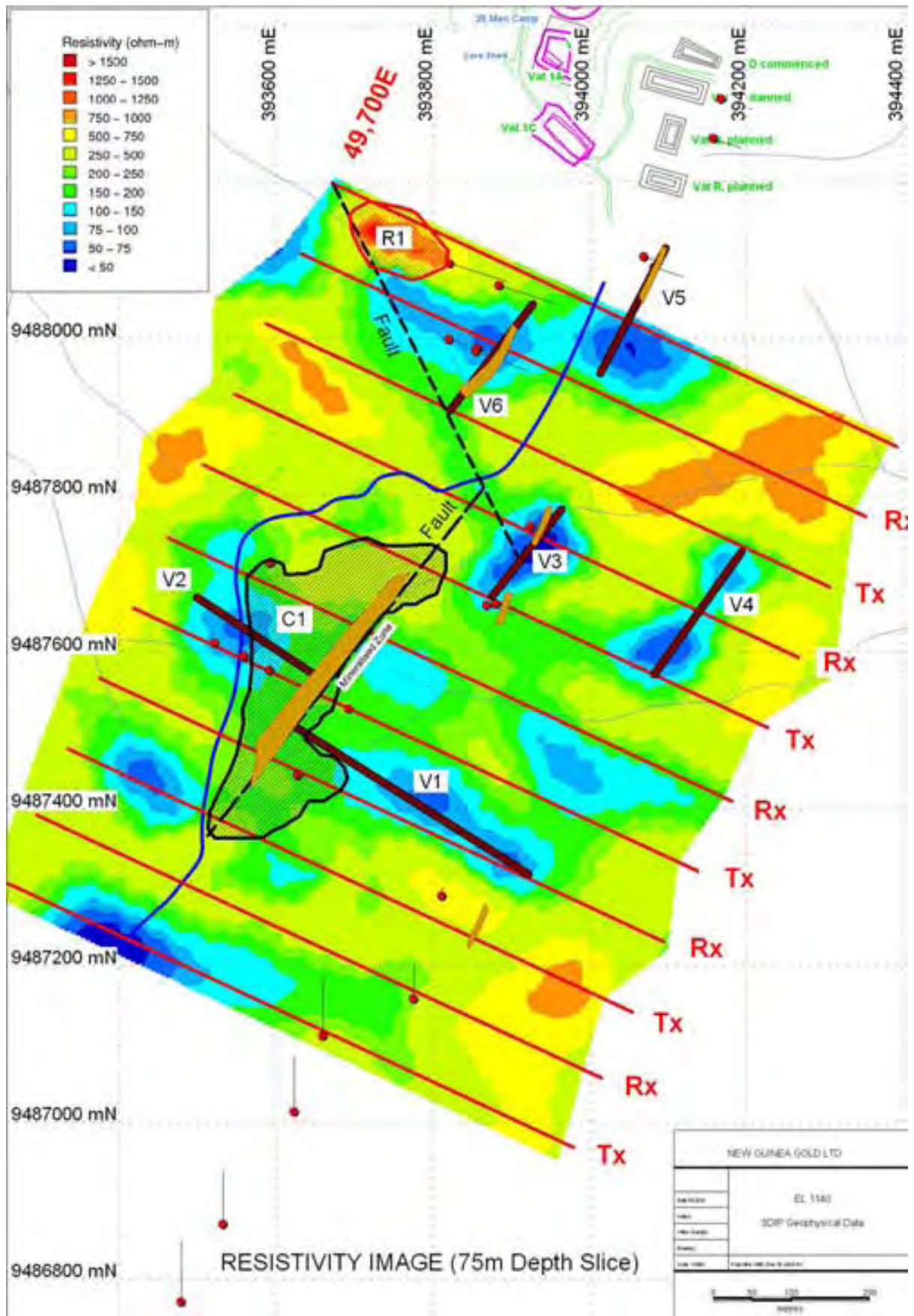


Figure 4: Mengmut Block Resistivity Image and Interpretation

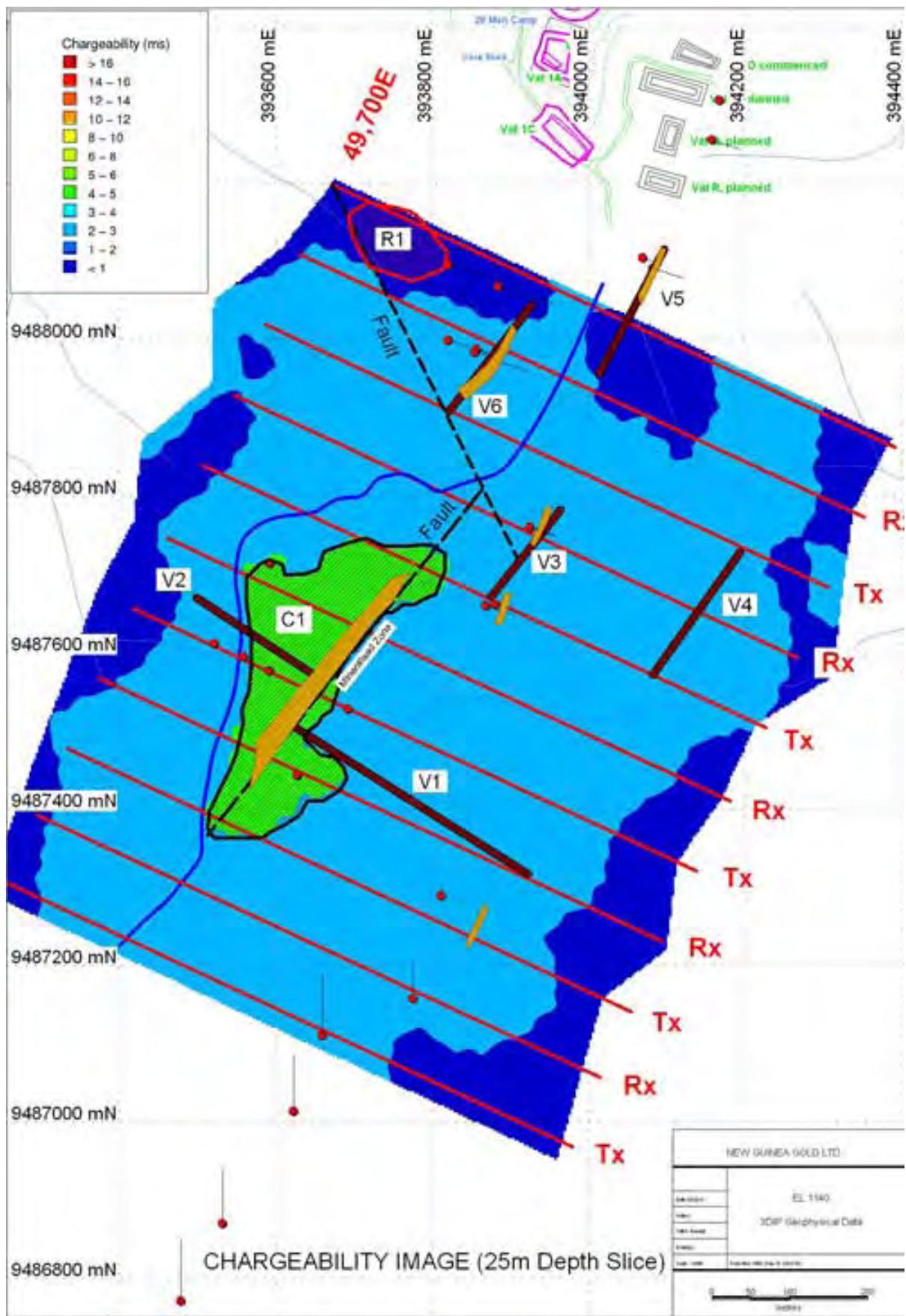


Figure 5: Mangmut Block Chargeability Image and Interpretation

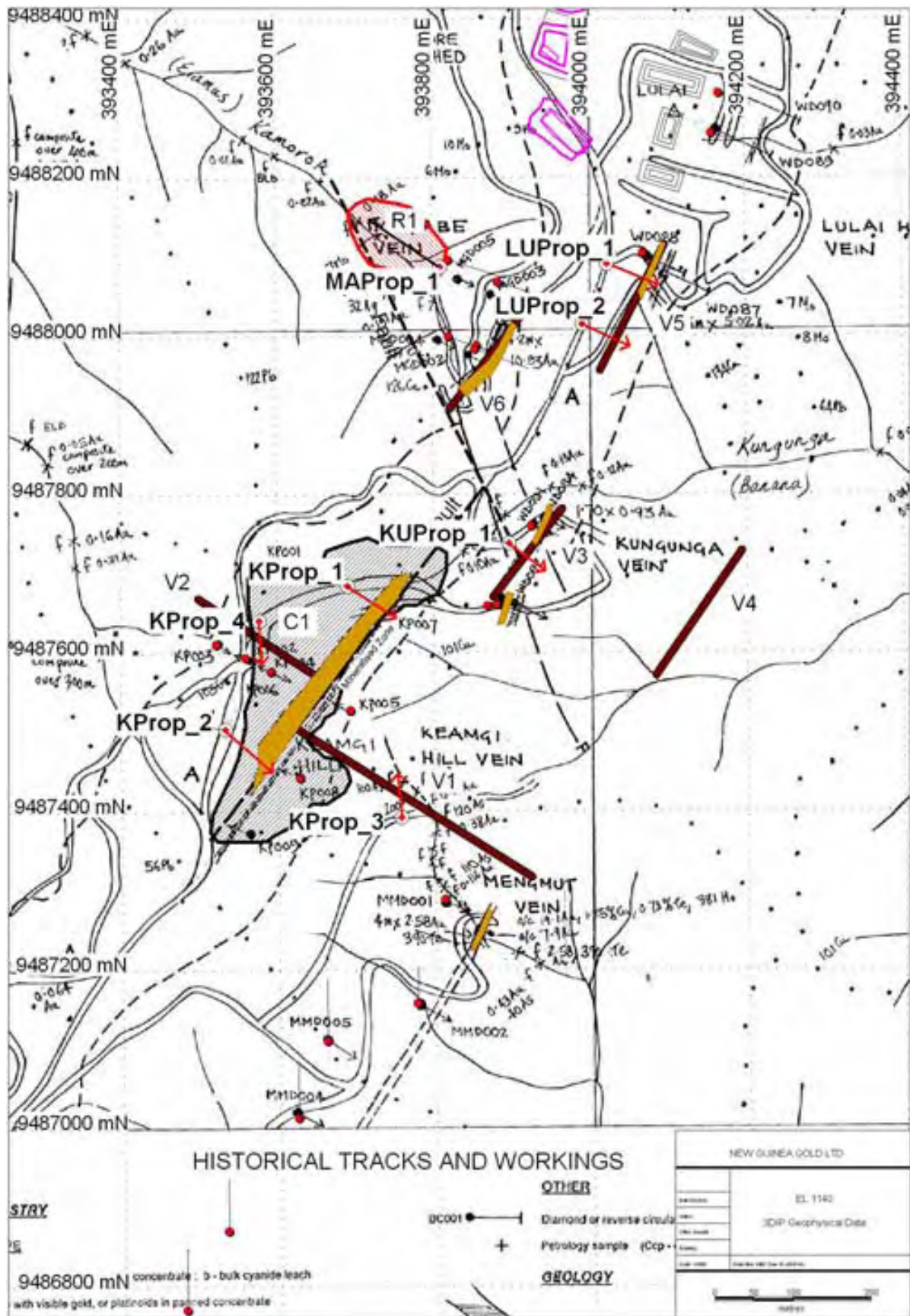


Figure 6: Mengmut Block Drillhole Proposals

### 3.4 Magiabe Block Three Dimensional Induced Polarisation (3DIP) Results

A relatively small 3DIP grid consisting of three survey lines 200m apart was completed over an area of 0.5km<sup>2</sup>. This survey covered part of the interpreted Magiabe porphyry that is associated with a distinct discrete airborne magnetic anomaly. Fine crystalline gold occurs at surface within the margin of a mapped potassic altered micro-monzodiorite on the margin of the “M1” chargeability anomaly (Figure 6).

Drillhole “MProp\_1” is proposed to test the “M1” chargeability anomaly for copper sulphide mineralisation and associated gold at depth.

#### MProp\_1:

Location: 393098e, 9488876n (AGD66, Zone 56)

Azimuth: east

Dip: -60 degrees

Depth: 300m

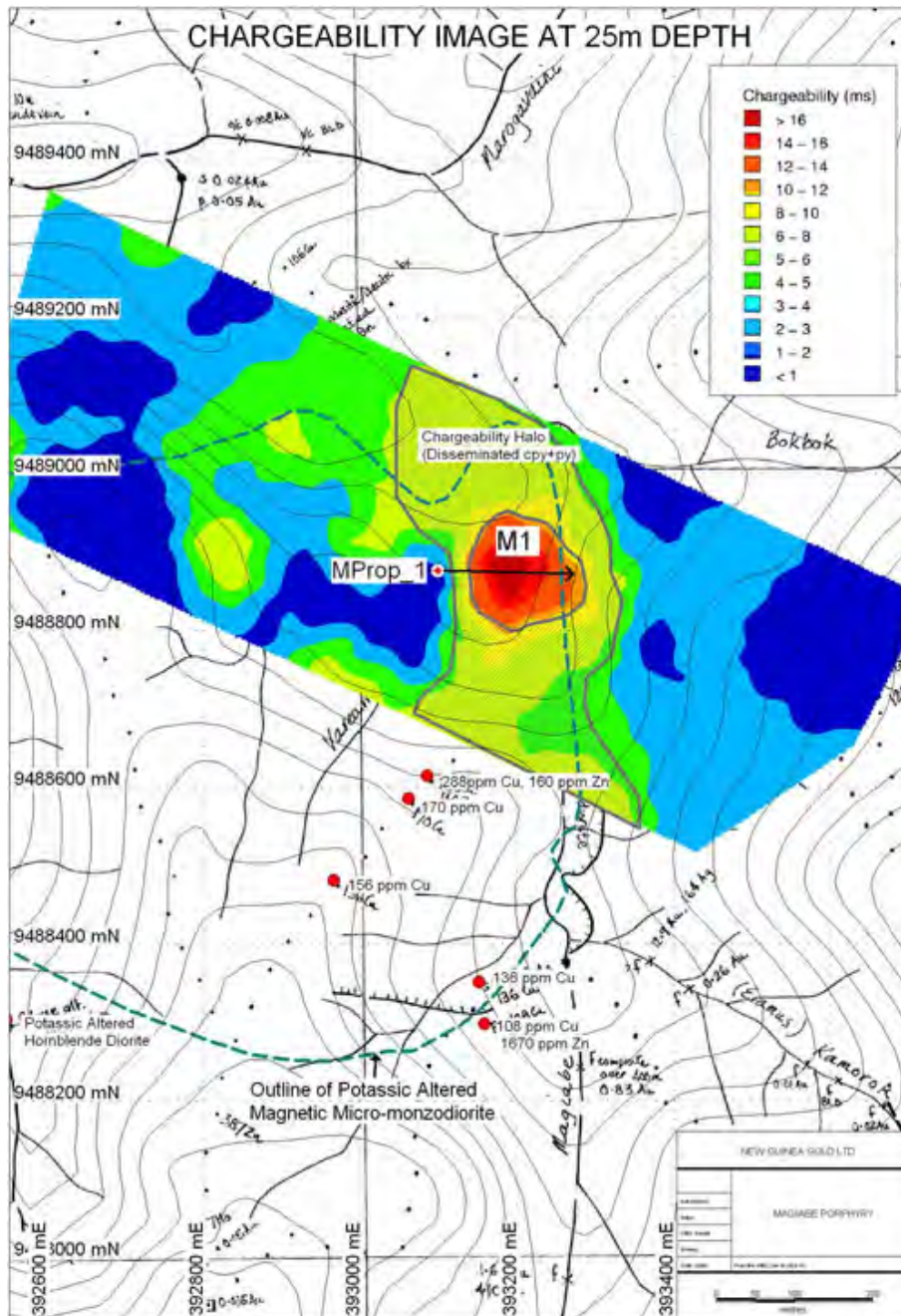


Figure 7: Magiabe Block Chargeability Image and Interpretation

### 3.5 Gorocho/Kavursuki/Wild Dog Block 3DIP Results

The Wild Dog and Kavursuki survey blocks were designed to test for extensions of vein style mineralisation and provide structural information to compliment existing mapping for broader style mineralised targets.

The mapped mineralised Kavursuki zone (K1) is slightly higher in resistivity (500 ohm.m) than the host volcanics to the east (Figure 8). The vein assemblage also has an associated weak chargeability response (Figure 10) caused by alteration and pyrite at depth. The central sulphide zone (CSZ) occurs as a slight chargeability anomaly possibly caused by low percentages of copper and iron sulphides.

Results from drillholes into the broad approximately 500m diameter Gorocho (G2) anomaly show a 40m thick zone of intensely phyllic altered (quartz-sericite-illite-pyrite) mineral assemblage. Pyrite content in hole 08WDD117, within the anomaly, has estimated pyrite content of up to 10% from 30 to 60 metres depth. These sulphides overlie a network of structures which are interpreted be caused by horizontal pathways where hydrothermal fluid flow have caused alteration and possibly mineral deposition (Map 1).

The three dimensional resistivity imagery shows that these pathways appear to be channeled from a more major zone of hydrothermal fluid flow 700m further west (Figure 9). The "Zone of Hydrothermal Fluid Flow" lies in a zone of interpreted dilation related to the nearby Gunsap Mountain Structure. The feature occurs as a distinct apparent "pipeline" of lower (50 ohm.m) resistivity (Figure 11). This zone may be host to significant gold and copper mineralisation and drillholes are proposed to test different geophysical targets (Table 2).

A number of proposed drillholes have been selected to test the cause of the geophysical targets (Figure 12) and help provide a diagnostic aid to exploring for additional gold and copper mineralisation.

Table 2: Gorocho/Kavursuki/Wild Dog Block Drill Hole Proposals

| <b>Proposed Drillhole</b> | <b>Description</b>  | <b>Location (AGD66, Zone 56)</b>                                  |
|---------------------------|---|---|
| GProp_1                   | Kavursuki Vein system and related sulphide mineralisation. Resistivity and chargeability anomaly (K1) to be drill tested.   | 395023e, 9490578n<br>Dip = - 60deg<br>Az = 103MN<br>Depth = 160m  |
| GProp_2                   | An interpreted vein assemblage associated with higher resistivity (K2).   | 394693e, 9490291n<br>Dip = -60 deg<br>Az = 117 MN<br>Depth = 180m |
| GProp_3                   | An interpreted vein assemblage associated with higher resistivity (K3).   | 394549e, 9490024n<br>Dip = -60 deg<br>Az = 110 MN<br>Depth = 140m |
| GProp_4                   | An interpreted vein assemblage associated with higher resistivity (K4).   | 394789e, 9489972n<br>Dip = -60 deg<br>Az = 286 MN<br>Depth = 140m |
| GProp_5                   | An interpreted vein assemblage associated with higher resistivity (K5).   | 394950e, 9490012n<br>Dip = -60 deg<br>Az = 286 MN<br>Depth = 140m |
| GProp_6                   | An interpreted vein assemblage associated with higher resistivity (K6).   | 394746e, 9489720n<br>Dip = -60 deg<br>Az = 115 MN<br>Depth = 100m |
| GProp_7                   | A discrete conductivity anomaly (G1) extending to over 100m vertical depth. Mineralisation may be associated with hydrothermal fluid flow within this structure.          | 394021e, 9489716n<br>Dip = vertical<br>Depth = 150m               |
| GProp_8                   | This drill hole is designed to test the northern part of a significantly sized and strong elongated conductivity anomaly which may be host to copper/gold mineralisation. | 393960e, 9490690n<br>Dip = -60 deg<br>Az = 112 MN<br>Depth = 300m |
| GProp_9                   | This drill hole is designed to test the central part of the elongated conductivity anomaly/zone of hydrothermal fluid flow.   | 393830e, 9490450n<br>Dip = -60 deg<br>Az = 195 MN<br>Depth = 300m |
| GProp_10                  | This drill hole is designed to test the intersection of the elongated conductivity anomaly/zone of hydrothermal fluid flow with an ESE trending structure.                | 393700e, 9490110n<br>Dip = -60 deg<br>Az = 109 MN<br>Depth = 200m |

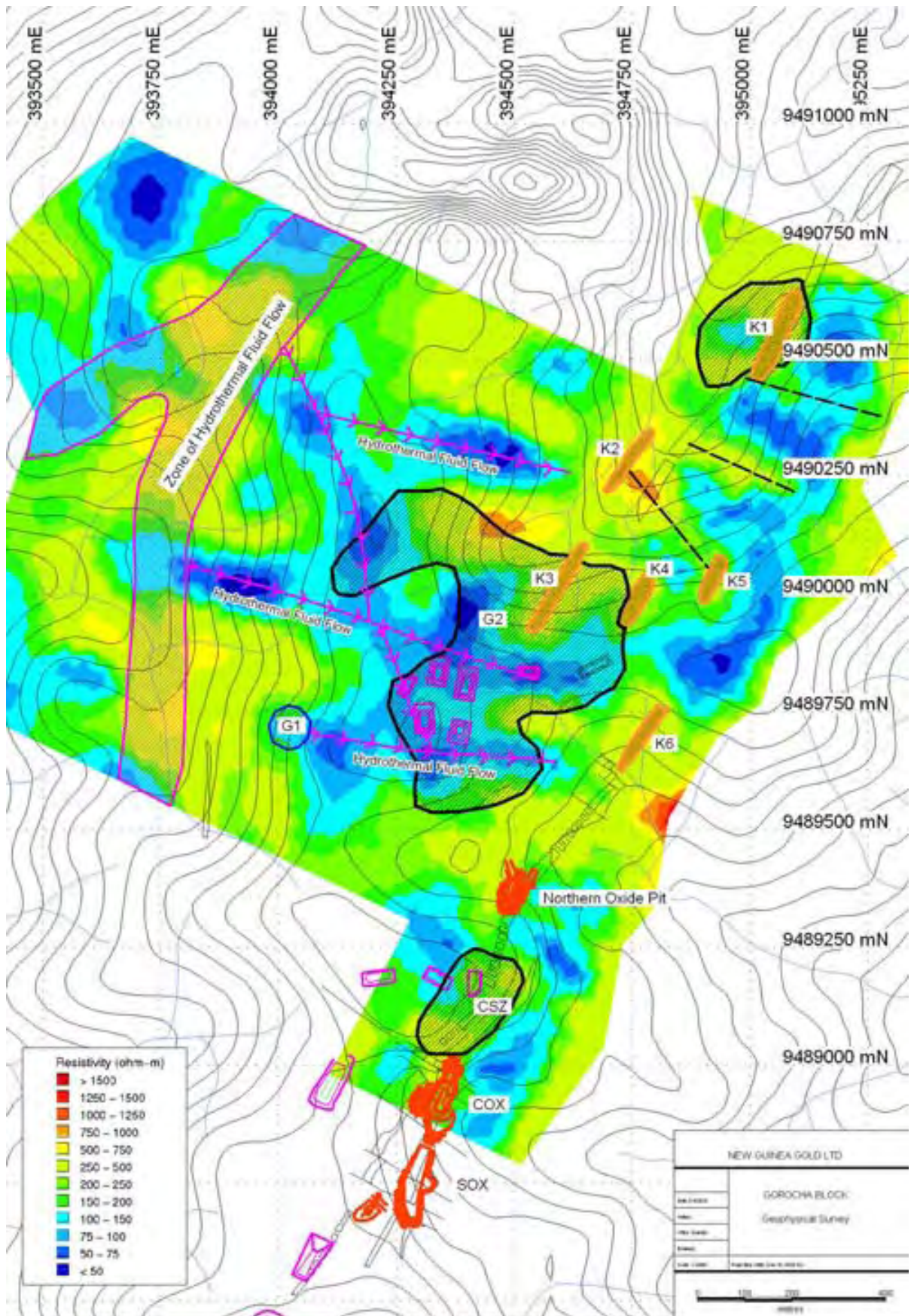


Figure 8: Gorocho Block Resistivity Image (25m) and Interpretation

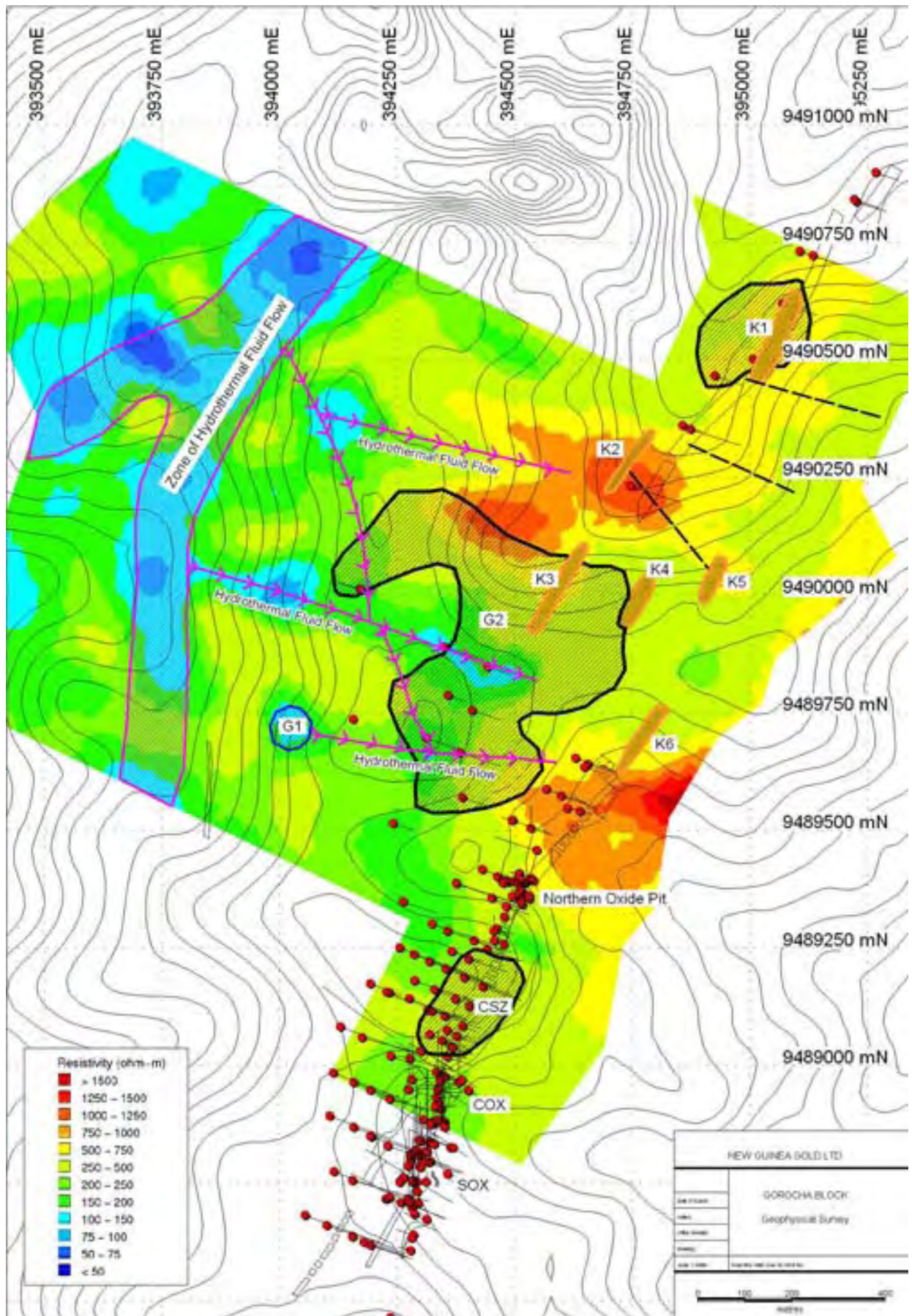


Figure 9: Gorocho Block Resistivity Image (100m) and Interpretation

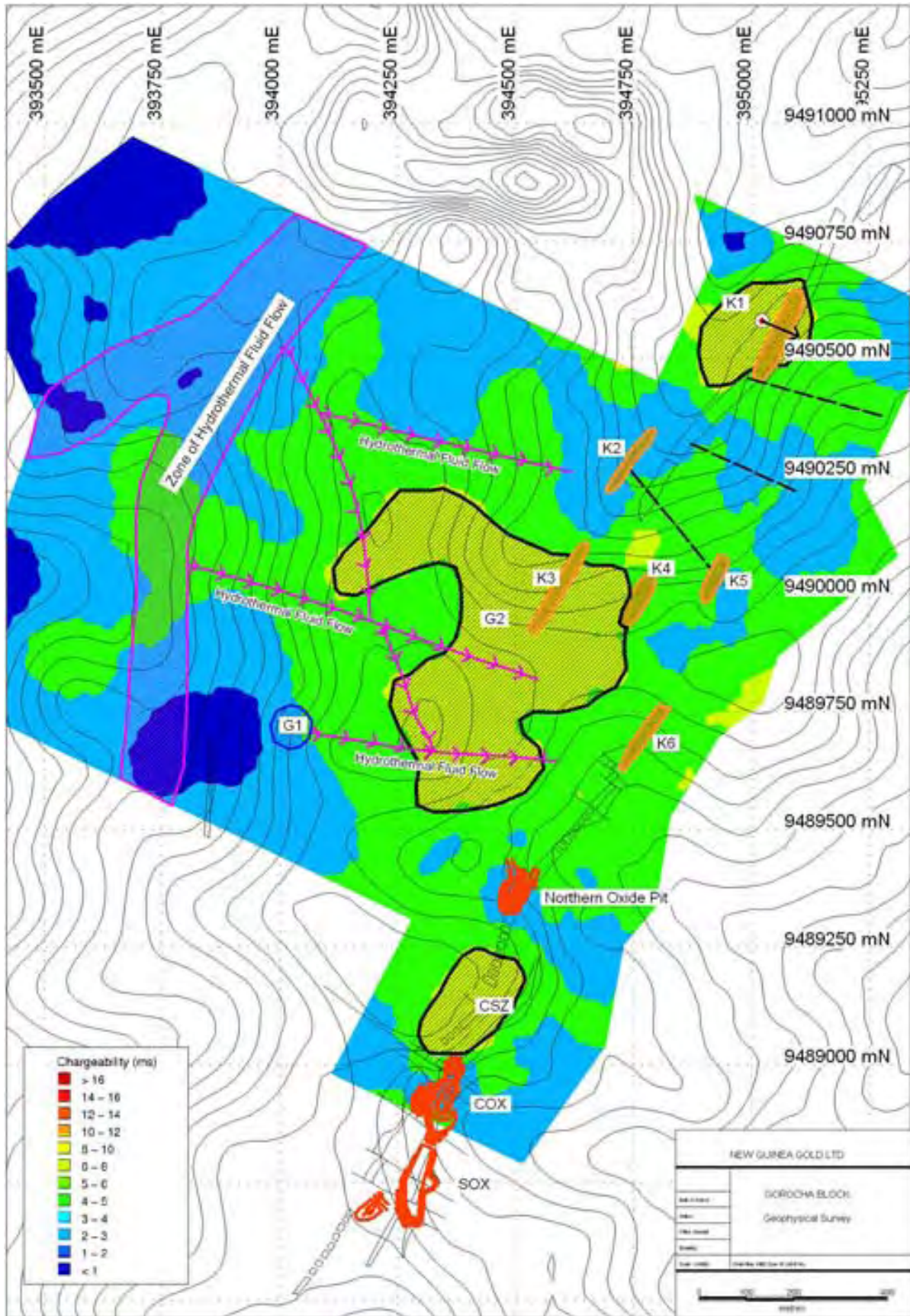


Figure 10: Gorocho Block Chargeability Image (25m)

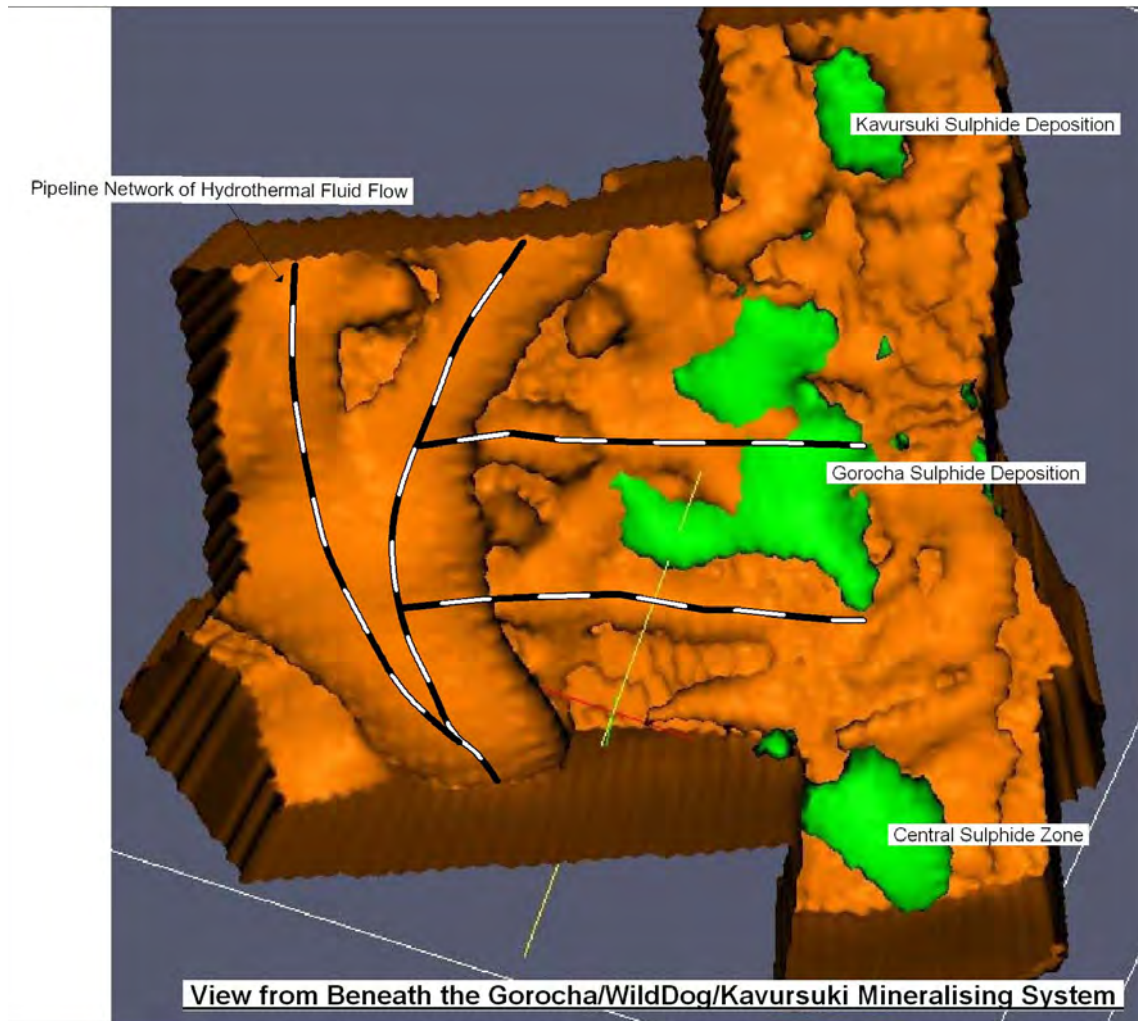
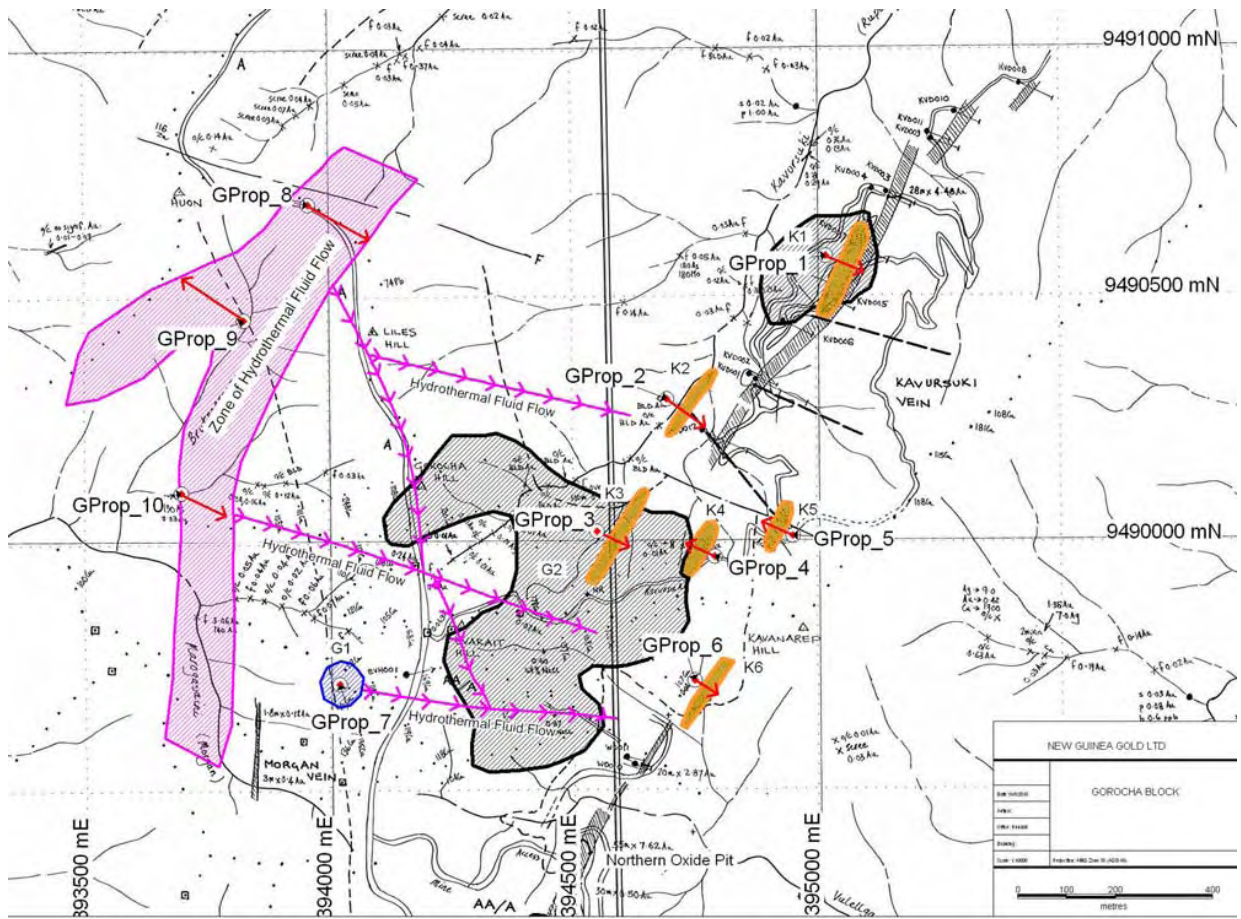


Figure 11: Resistivity (Brown) and Chargeability (Green) Image



**Figure 12: Gorocho Block Proposed Drillholes**

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### **APPENDIX**

- Appendix 1: Proposal for Geophysical Surveys at Sinivit ML122 and EL1140 by Aimex Geophysics January 2010
- Appendix 2: SJ Geophysics Logistics Report
- Appendix 3: 3DIP Resistivity and Chargeability Images
- Appendix 4: 3DIP Survey Daily Summary and Costs Summary