

**Moina Gold Pty Ltd  
Annual Report on Exploration  
EL 29/2009 – “Cethana”  
September 2017 to September 2018**

**Grant MacDonald - B.Sc. (Hons)  
Moina Gold Pty Ltd  
PO Box 3110, South Burnie.  
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**Abstract**

Promised funding for a three prospect drilling programme did not eventuate in sufficient time during the reporting year to allow for the planned drilling.

Moina Gold Pty Ltd is seeking an extension of term to allow the proposed drilling holes at each of the

- Bell Mount – 2 holes for 500-600m + DHEM on each
- Sayers and – 1 hole for 150m + DHEM
- Round Mountain prospects – 1 hole for 300m + DHEM

over the 2018/19 summer.

Work done on the tenement in the 2017/18 reporting year has consisted of planning for these drillholes.

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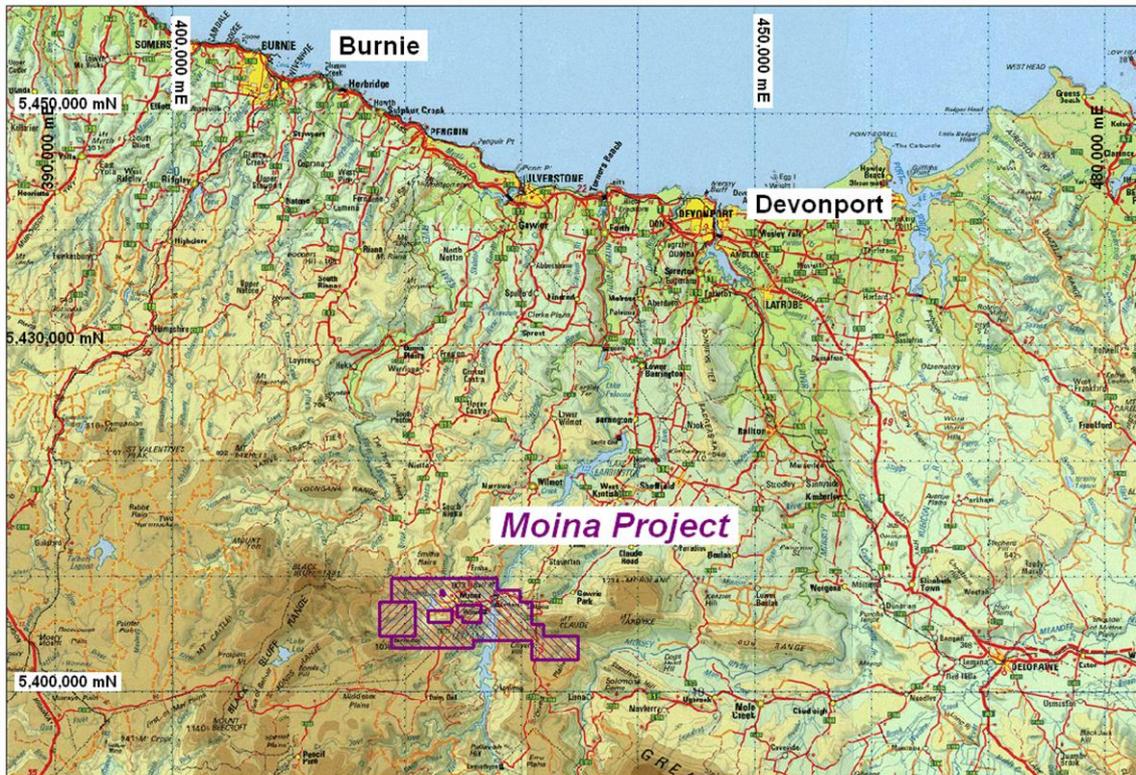
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## 1.0 Introduction

### 1.1 Exploration Rationale

Moina Gold Pty Ltd is aware of the polymetallic potential of the Moina area, largely a product of the highly fertile Dolcoath Granite, and is exploring for any and all commodities.

In particular the area has proven potential for Au, Ag, Cu, Pb, Zn, Sn, W, Bi, Mo, F and Fe. More conceptually the area may have potential for Y, Nb and rare earths (La, Ce, Nd, Pr and Sm).



**Figure 1.1: Moina Project location in Tasmania's central north.**

### 1.2 Geology

Cambrian quartz+feldspar+biotite porphyry of the Mt. Read Volcanics, Ordovician siliciclastic sediments of the Denison Group and the Devonian Dolcoath Granite form the basement geology to the licence area and are the host and/or source of all potential (hard-rock) mineralisation. A veneer of Tertiary basalt covers this basement geology over much of the licence area.

In the central south of the licence the Cambrian rocks consist of quartz+feldspar+biotite porphyry and felsic volcanoclastics of the Bull Creek Formation. In the northern part of the licence, i.e. north of Machinery Creek Fault and near Mt Jacob, the Cambrian volcanics are from the upper part of the CVC and lowermost Tyndall Group and consist of felsic (commonly quartz phytic) volcanics and volcanoclastics with minor mafic volcanics.

These volcanics are unconformably(?) overlain by the lowermost unit of the Ordovician sequence, the Roland Conglomerate, a siliciclastic quartz pebble conglomerate of 10-20m thickness. The Roland conglomerate is conformably overlain by the quartzose Moina Sandstone which is up to 250m thick. The uppermost (approximately 40m thick) part of the Moina Sandstone is a sequence of interbedded calcareous siltstones with lesser calcareous sandstones and limestone and is known informally as the "Transition Beds". These two units constitute the upper units of the Denison Group. The "Transition Beds" are conformably overlain by the Gordon Limestone which is approximately 400m thick.

The Cambrian-Ordovician sequence has been intruded by the Middle-Devonian Dolcoath I-type Granite with formation of a number of discrete skarn type ore bodies within the "Transition Beds". The granite outcrops on either side of Lake Cethana. Subsurface the granite is known to extend as a spine extending westerly from the area of outcrop as far at least as Stormont.

The Cambrian-Ordovician sequence lies in a broad (~10km wavelength) open east-west trending F1 syncline. This folding occurred early in the Middle Devonian Tabberabberan Orogeny. Superimposed on this F1 fold are west-northwest trending shorter wavelength F2 folds with wavelengths. These folds formed later in the orogeny and are associated with southwest verging thrust faulting. The folded sequence is faulted by a number of known faults also of Middle Devonian age. The recent 3D IP has also suggested the presence of further brittle faults. Late in the orogeny the Dolcoath Granite intruded into this faulted and folded terrain.

Mineralisation in the district occurs in a range of forms and settings with the Higgs workings chasing disseminated to semi-massive Au+Ag+Pb+Zn with commonly a pyrrhotite gangue in biotite hornfelsed sediments and/or gold+pyrite in sandstone. The Round Hill workings targeted Au+Ag+Pb mineralisation reportedly in

### 1.3 Location and access

EL 29/2009 "Cethana" lies in Tasmania's central north and is accessed by a number of bitumen roads including the Cradle Mountain Link Road, Claude Road and Olivers Road (see figure 1.1).

The current licence extends from Mt Claude in the east to Stormont in the west (see figure 1.2).

Access within the licence is by a number of bitumen and gravel roads.

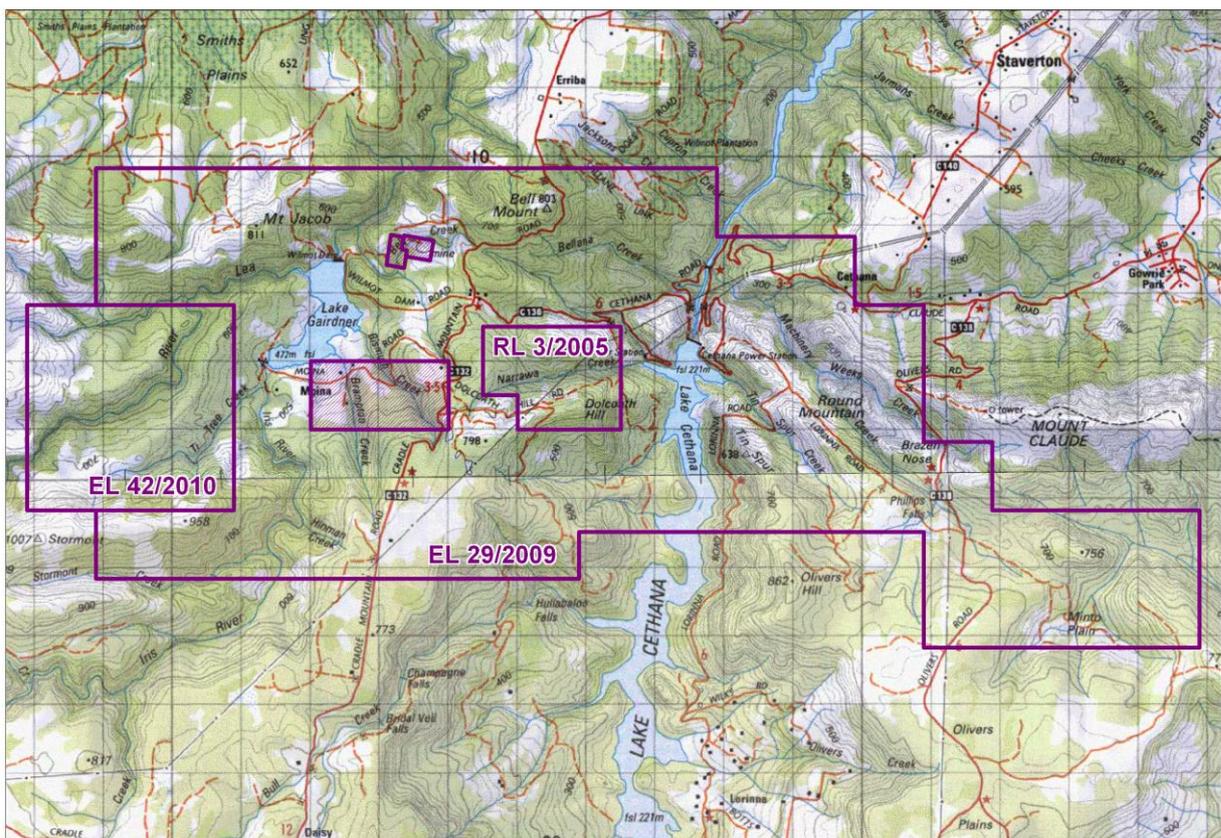


Figure 1.2: EL 29/2009 location plan. Background is Tasmap 1:100,000 mapsheet, datum AGD66.

#### **1.4 Land status and usage**

The licence area is used for a range of purposes. Much of the area is Crown Land with forestry activities in part and some land around the lakes vested to the H.E.C. The remaining land is privately owned bushland with limited farming around Lake Gairdner.

#### **1.5 Tenure**

EL 29/2009 was won by tender by Frontier Resources Ltd. and was granted on 13<sup>th</sup> September, 2009. In early 2012 the licence was transferred to Torque Mining Ltd., a spin-off from Frontier Resources Ltd.

The licence was reduced in size in September 2012 with the relinquishment of the eastern end of the licence over Mt Roland.

In early 2016 the licence was transferred to Moina Gold Pty. Ltd..

## **2.0 Review of Previous Work**

### **2.1 Prior to current tenement**

The area covered by EL 29/2009 was explored like the rest of western and northern Tasmania in the latter part of the 19th century but with more significant flourishes in the early and mid 20<sup>th</sup> centuries. The Stormont deposit was found in the mid 1920's, the Higgs deposit was discovered in the mid 1930's, the Shepard and Murphy mine was working into the 1950's and the All Nations mine until the 1960's.

The western, prospective and retained portion of the tenement has been held under a range of exploration licences since the 1960's with principal companies CRAE, Comalco, Mt Lyell M&R Co/Renison Goldfields/Goldfields Exploration, Mincor, Billiton/Shell, Noranda, Jervois, Titan, Goldstream, Tasgold, Frontier and now Torque Mining Ltd.

Previous work has consisted of regional geochemical and geophysical surveys with grids established over essentially all prospective rocks (other than the Dolcoath Granite itself). That work has led to the discovery and definition of the Shepard and Murphy fluorine deposit.

Historical drilling has been carried out at the Stormont, Fletchers Adit, Ti Tree Creek, Mt Jacob, All Nations, Hugo Skarn, Shepard and Murphy skarn/lodes, Higgs, West Higgs, Narrawa Reward, Three Sisters, Round Mountain and Tin Spur.

### **2.2 During current tenement**

The Moina Project was a principal focus of exploration by Torque Mining Ltd with much of the project area within EL 29/2009 "Cethana".

In the 2010/2011 reporting period exploration consisted of two bodies of work.

- Existing high resolution geophysics, aeromagnetics, gravity and radiometrics was processed and imaged. Magnetism is of particular use given the association between mineralisation and magnetite.
- 1057 soil samples were collected on a nominally 100m x 50m grid (1271 samples in total including sampling on adjacent RL 3/2005) around the Dolcoath Granite margin on both sides of Lake Cethana.

The compiled soil geochemical data set (including this data) reveals a number of coherent zones of anomalous Au, Sn, W, Mo and Bi around the margin of the Dolcoath Granite and extending into EL 29/2009. Within EL 29/2009 anomalies are also defined at Tin Spur, Round Hill, Ti Tree Creek and Mt. Jacob (Pb). Figures 2.1 to 2.5 show results for Au, Bi, W, Sn and Mo in the area of the 2010/2011 survey respectively.

In the 2011/2012 reporting period exploration consisted of

- Inclusion in an ambitious regional scale 3D IP survey over ~24 square kilometres of Frontier's Moina Project, extending from Round Mountain east of Lake Cethana to Stormont, west of Lake Gairdner.  
The survey was highly successful in defining a number of anomalous features with both discrete chargeability highs in a number of favourable locations and discrete conductivity anomalies either representing mineralisation or indicating the presence of favourable rocks in favourable structural settings. Figures 2.6 to 2.12 summarise the extent and results of this survey.
- Drilling two holes at the Bulls chargeability anomaly on the western slopes of Lake Cethana. BSD1 (117m) and BSD2 (66.85m) intersected a quartz+feldspar+biotite+/-hornblende porphyry with narrow zones of pyrite alteration with weakly anomalous Cu, Pb and Zn associated.
- Soil sampling around the Bell Mount alluvial field and the Bulls IP anomaly

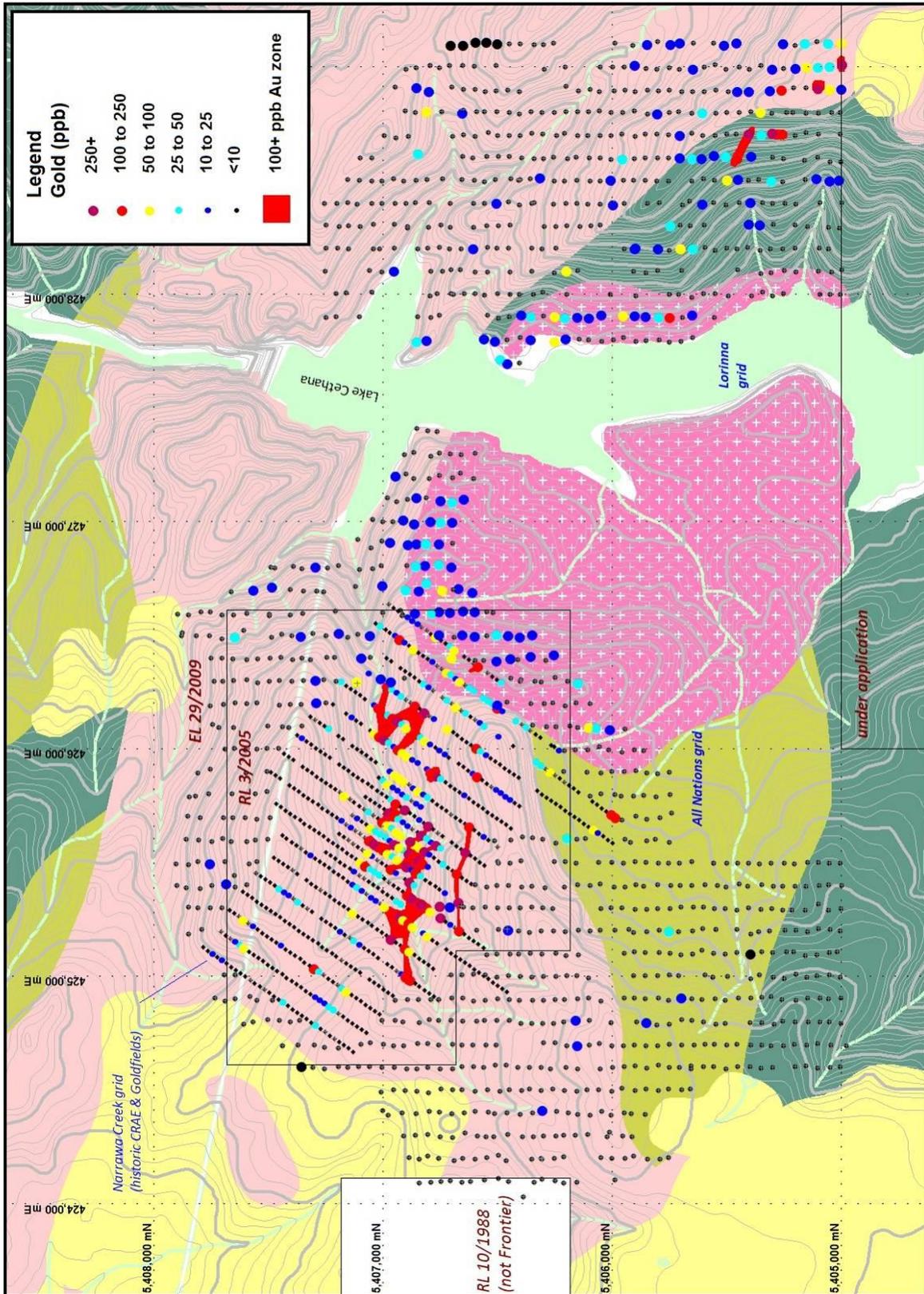


Figure 2.1. Au soil results, 1987 GFEL survey and 2010/2011 Frontier sampling.

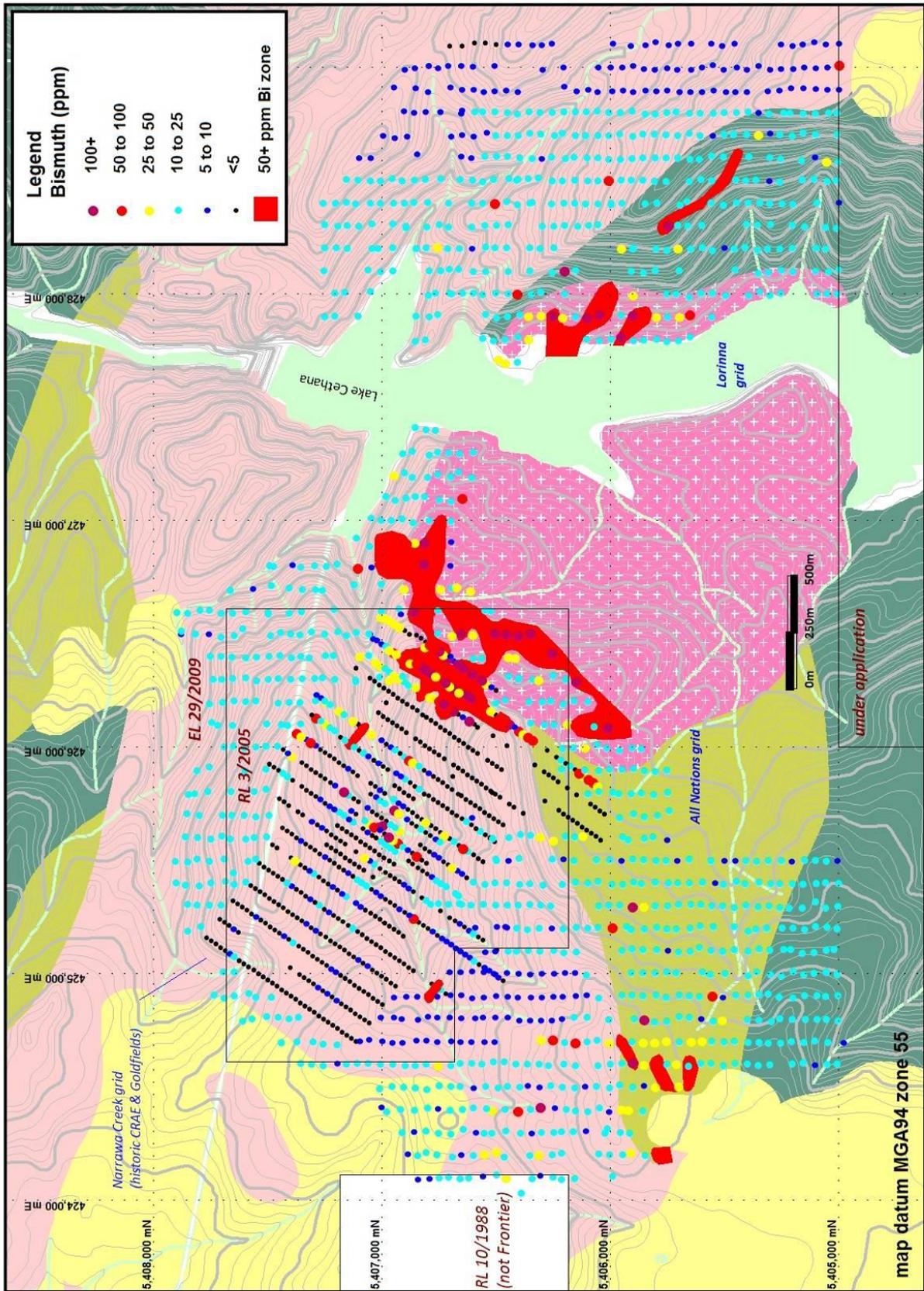


Figure 2.2. Bi soil results, 1982/1983 CRAE and 2010/2011 Frontier sampling.

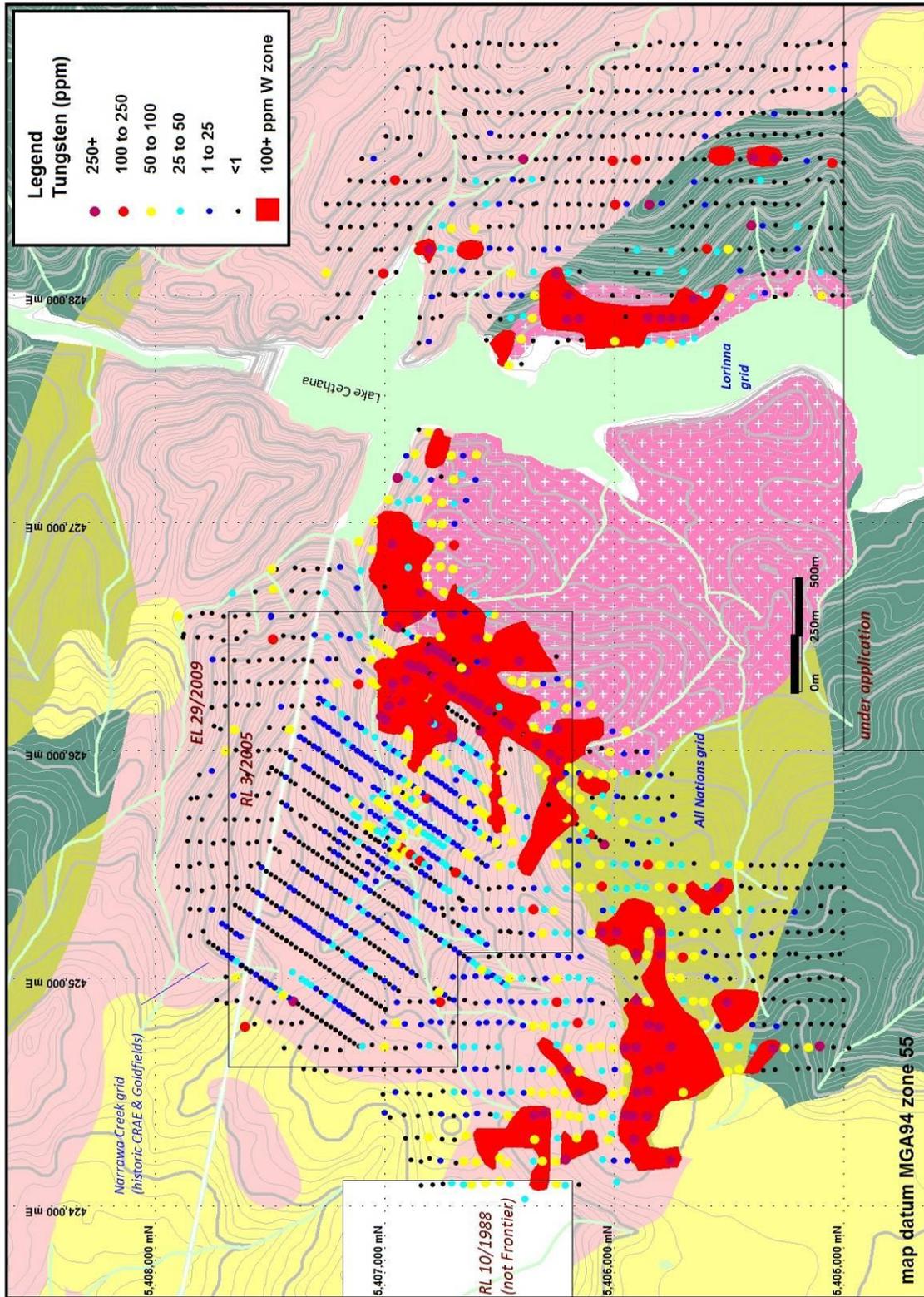


Figure 2.3. W soil results, 1982/1983 CRAE and 2010/2011 Frontier sampling.

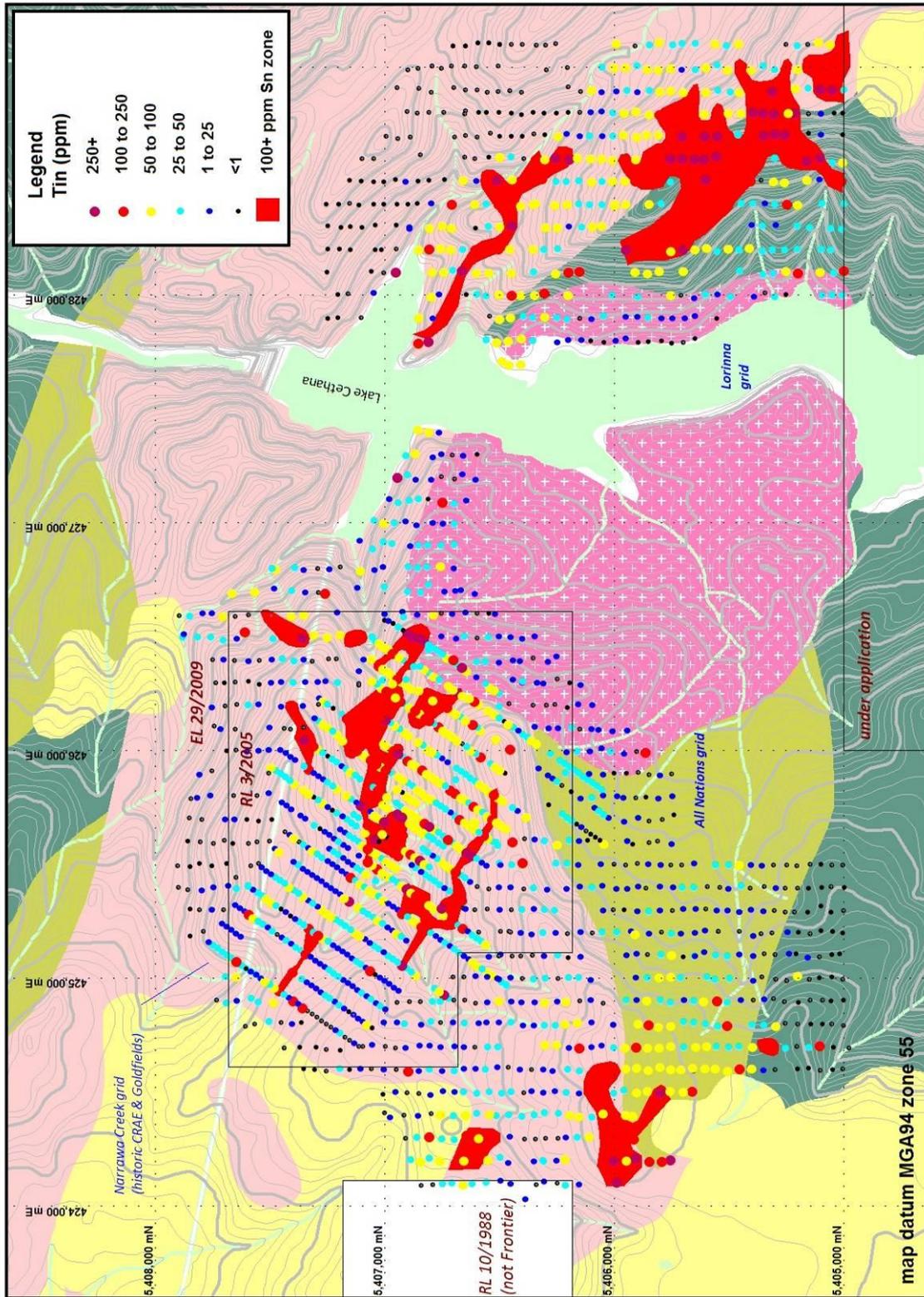


Figure 2.4. Sn soil results, 1982/1983 CRAE and 2010/2011 Frontier sampling.

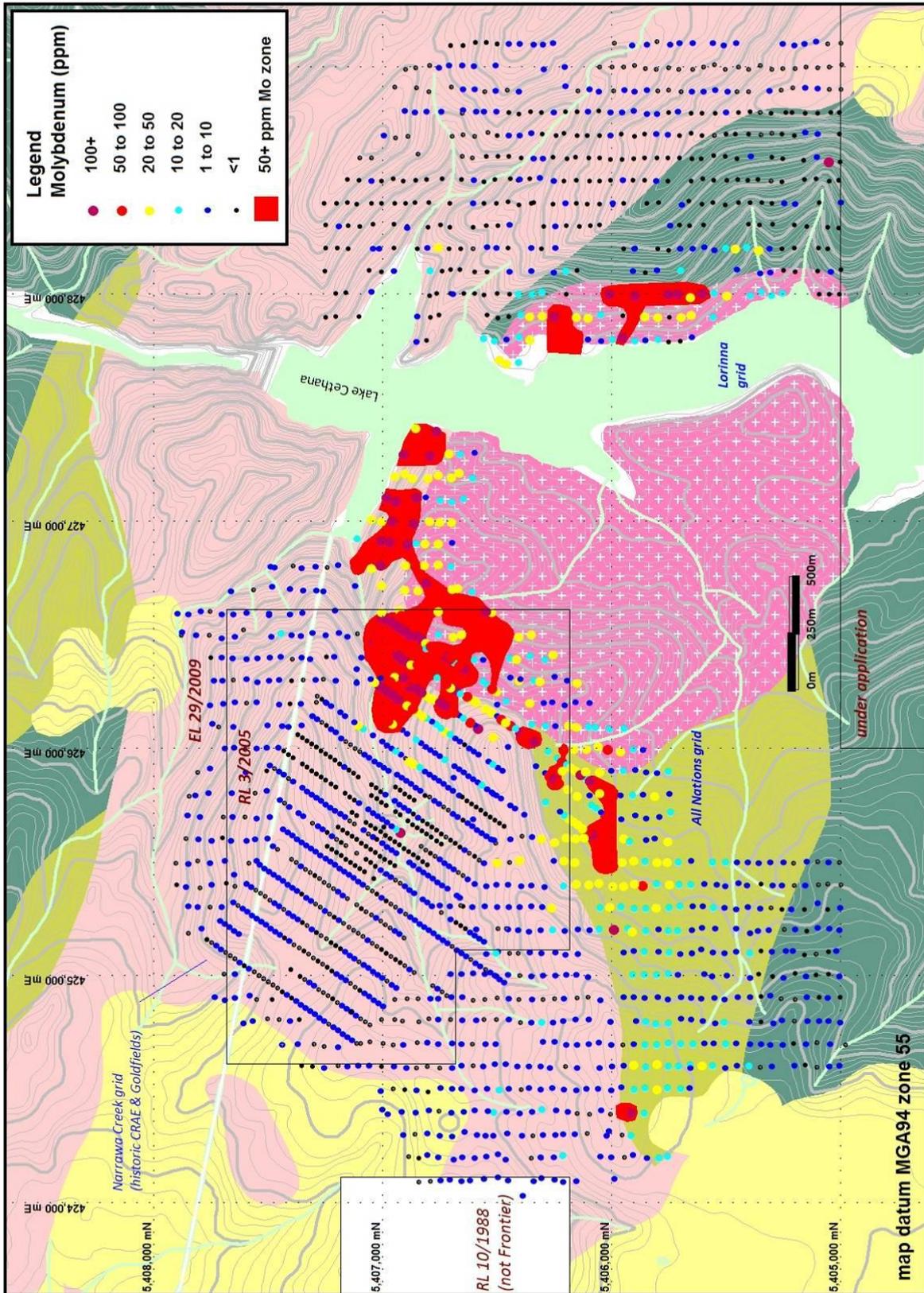


Figure 2.5. Mo soil results, 1982/1983 CRAE and 2010/2011 Frontier sampling

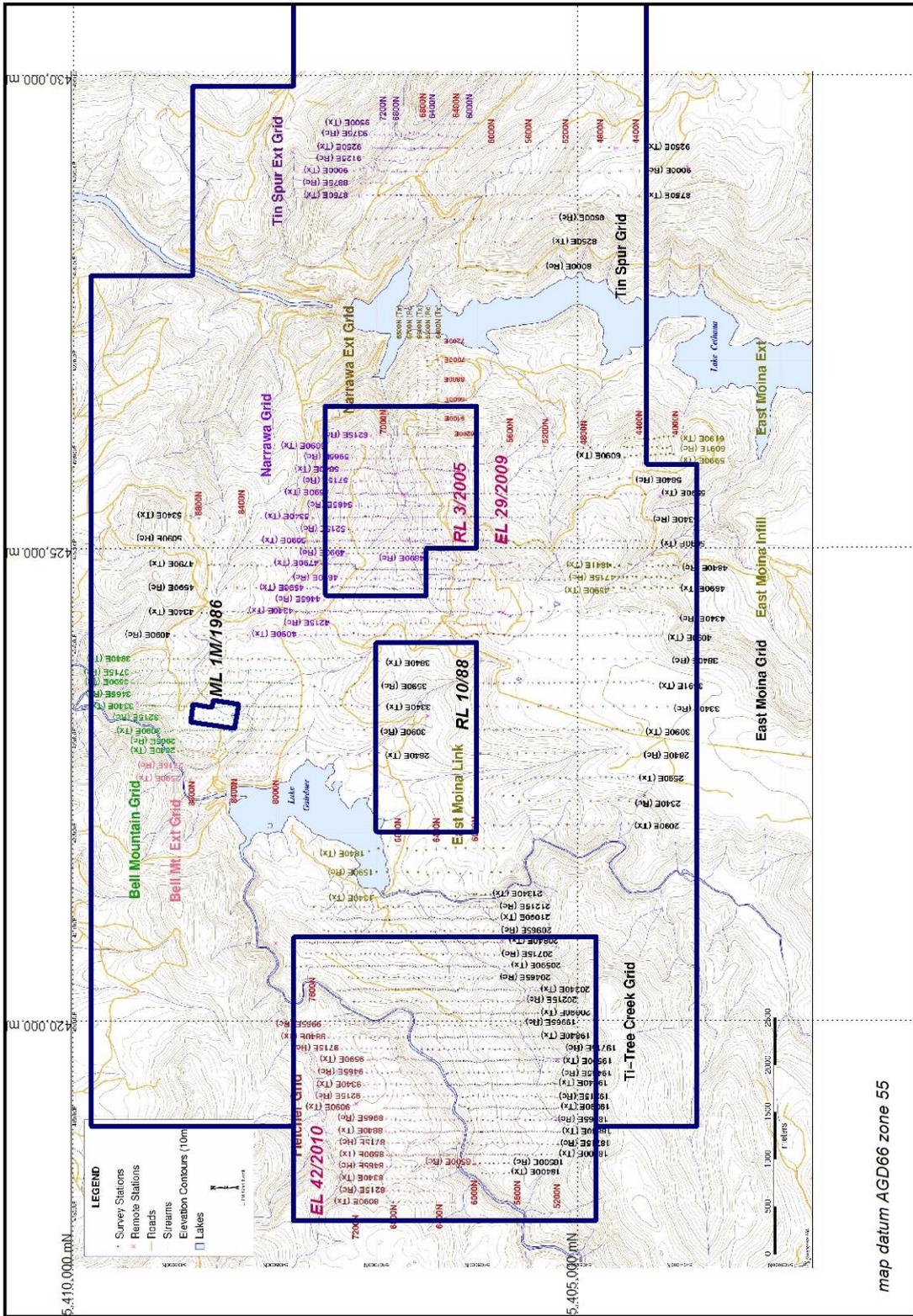


Figure 2.6: Moina Project 3D IP survey grids and tenements

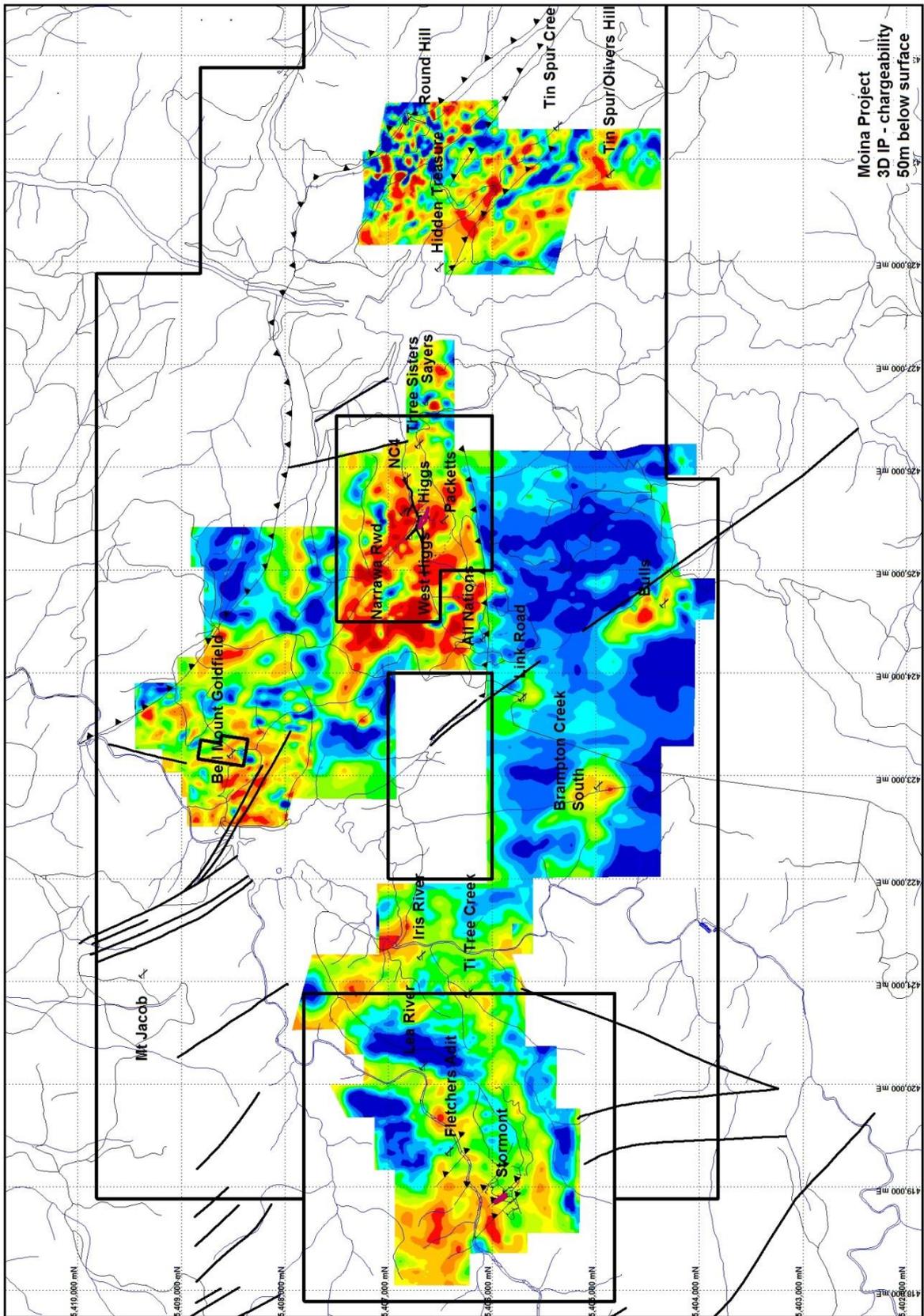


Figure 2.7: Regional 3D IP chargeability at 50m depth

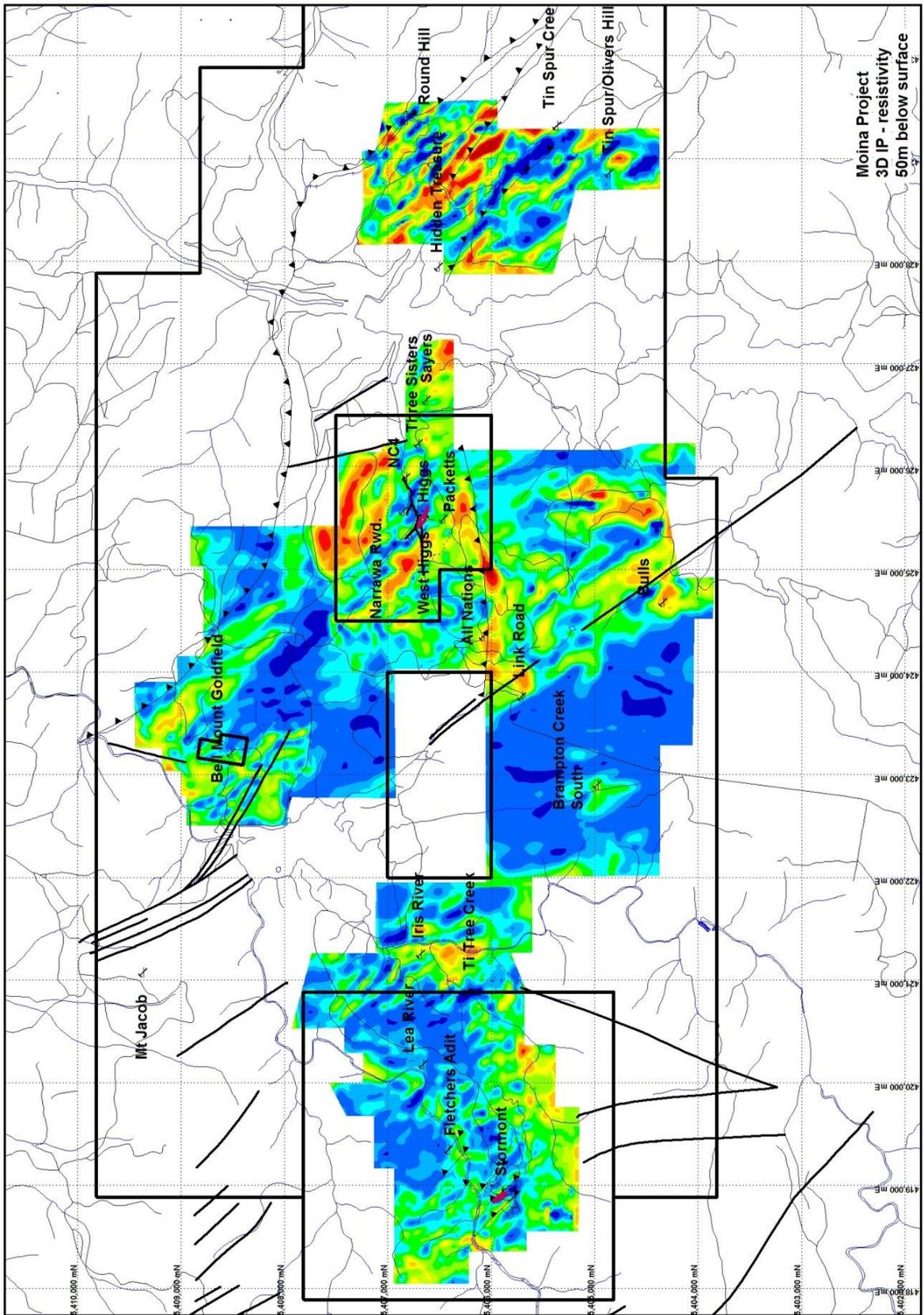


Figure 2.8: Regional 3D IP resistivity at 50m depth

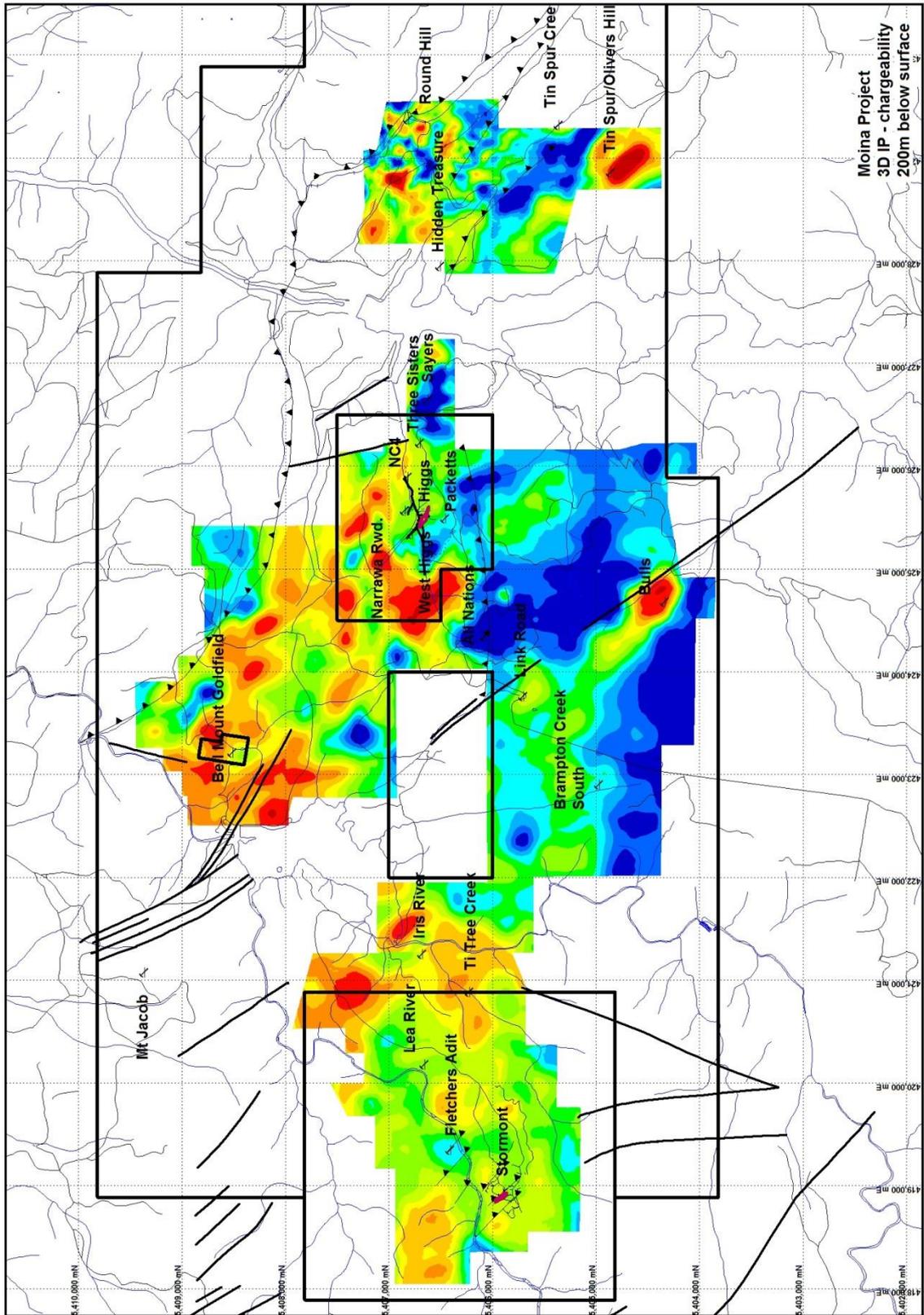


Figure 2.9: Regional 3D IP chargeability at 200m depth

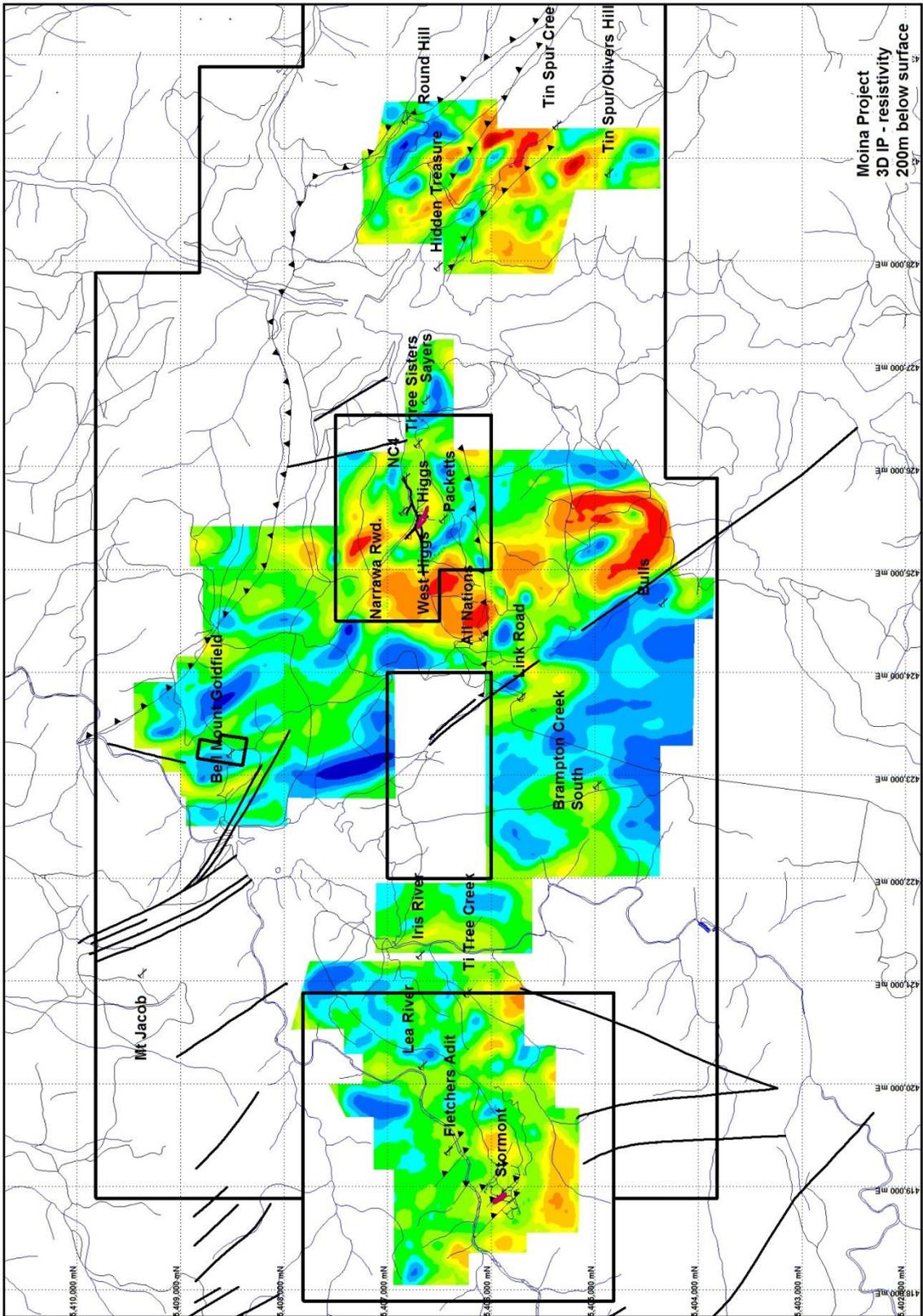


Figure 2.10: Regional 3D IP resistivity at 200m depth

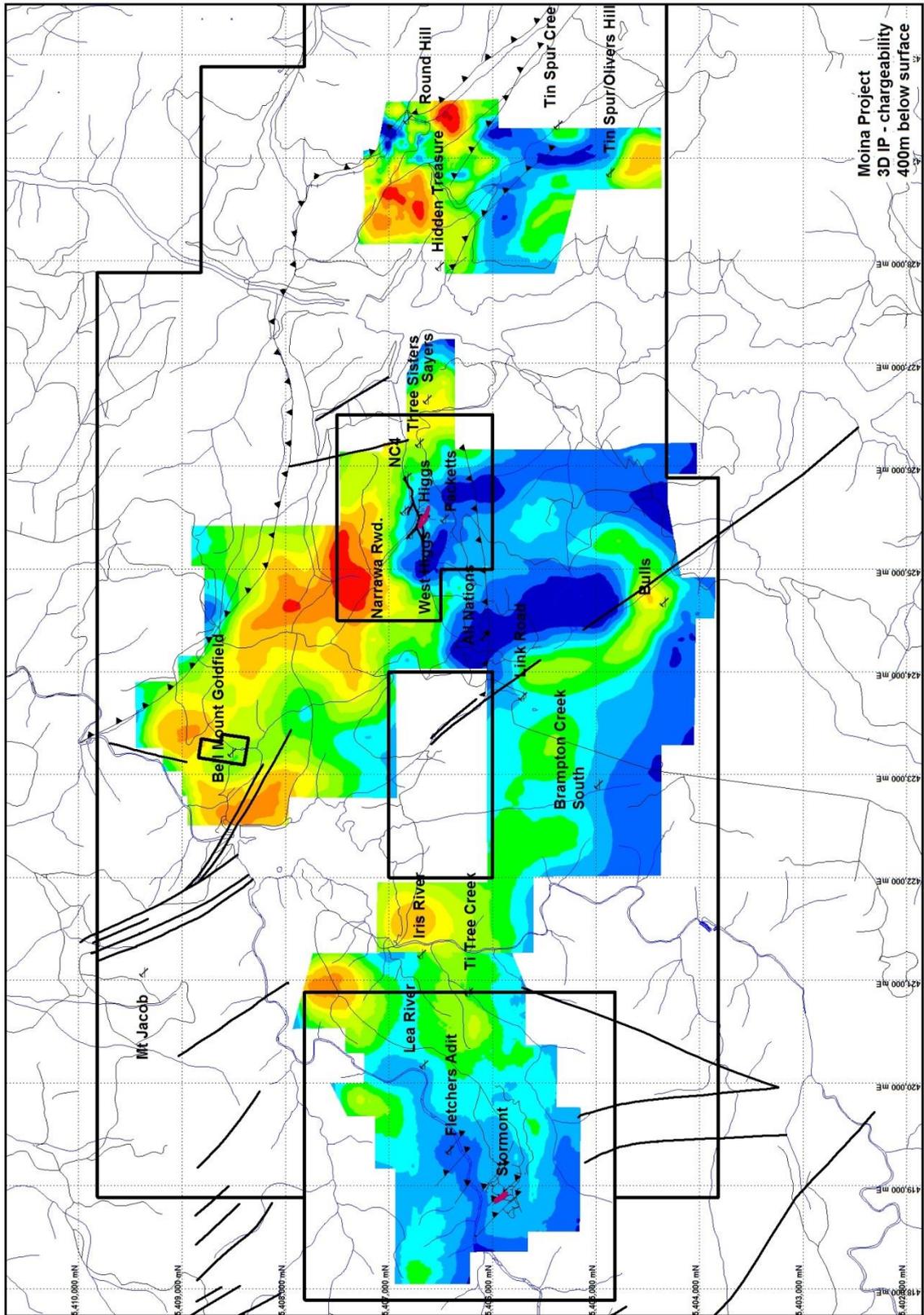


Figure 2.11: Regional 3D IP chargeability at 400m depth

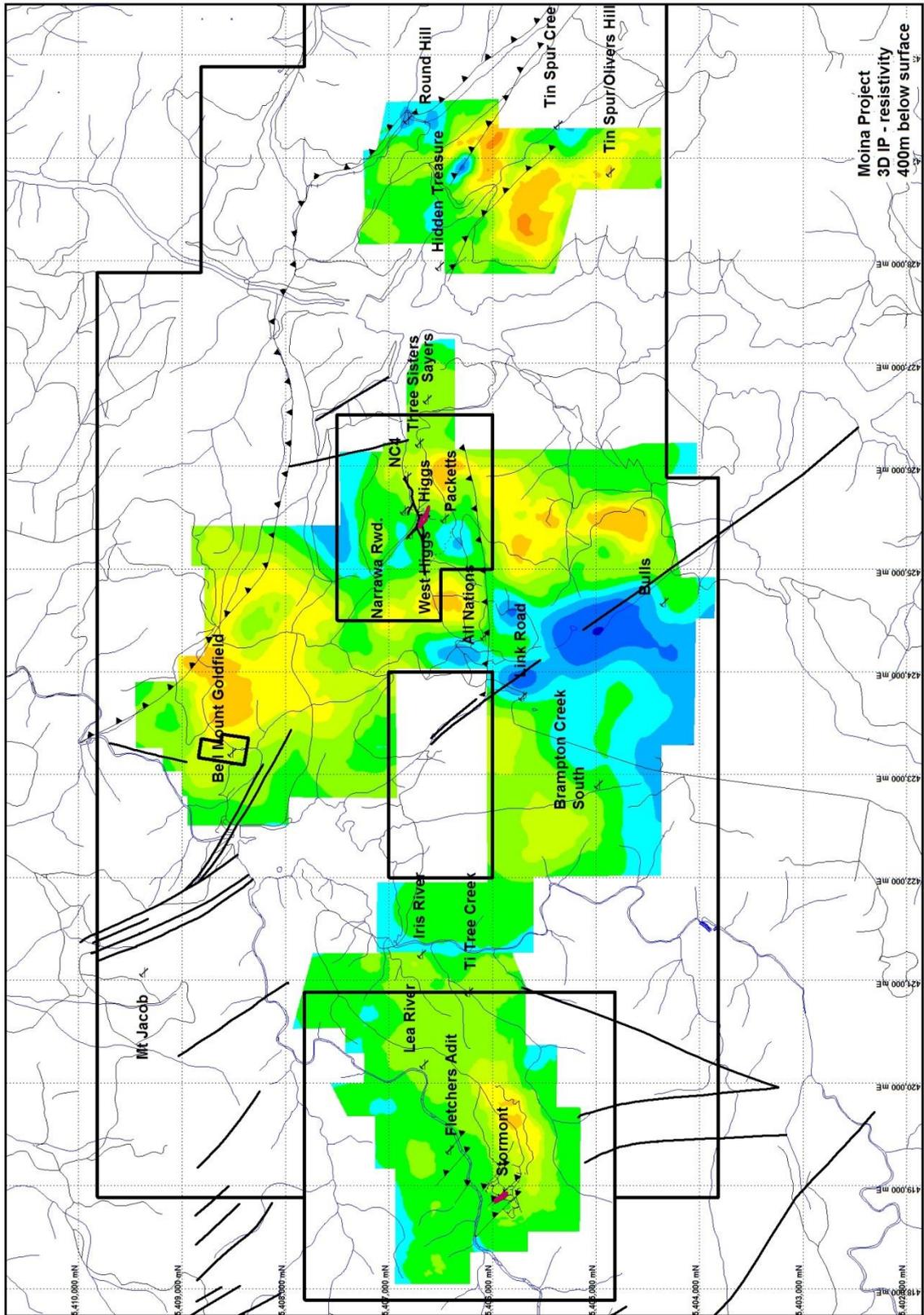
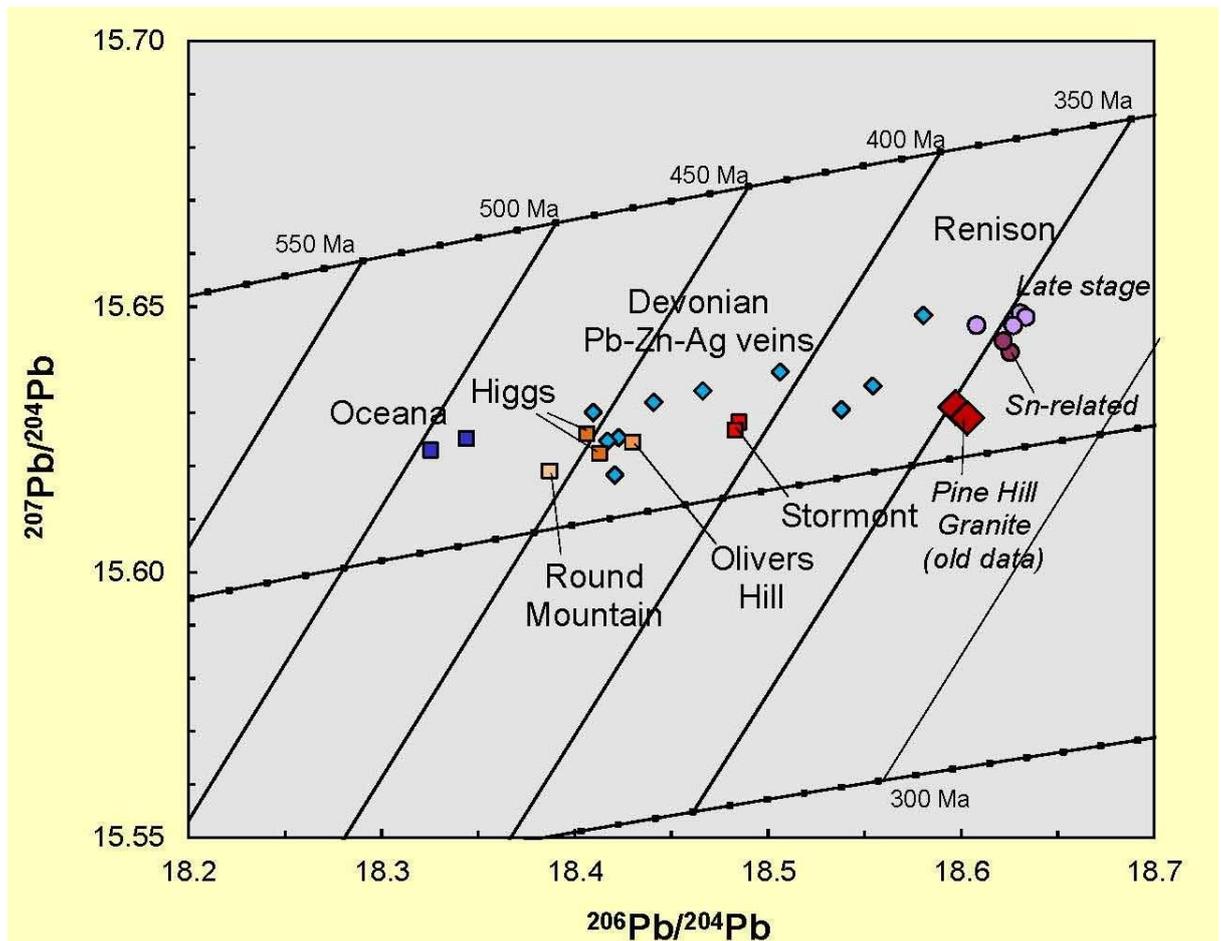


Figure 2.12: Regional 3D IP resistivity at 400m depth

In the 2012/2014 reporting period exploration consisted of

- the submission of a number of samples of galena from prospects in the Moina region for lead isotope dating as part of a CSIRO project.



**Figure 2.13: Age and lead isotope ratios for Moina project samples.**

No work was carried out from 2014 to 2016.

EL 29/2009 was transferred to Moina Gold Pty Ltd in early January 2016. Both prior to the transfer and subsequent reconnaissance field visits were made to a number of prospects within the tenement.

Work done in the 2015/16 year consisted of some desktop research into lithium with the Catalogue of Tasmanian Minerals (Bottrill and Baker, 2008) referring to Reid (1919) and Petterd in Twelvetrees (1908) reporting occurrences of spodumene and lepidolite (and possibly Zinnwaldite) in a number of workings on the Moina field i.e. Squib, Shepard and Murphy, Sayers/Blacks, Dolcoath, Princess, Hidden Treasure and Premier.

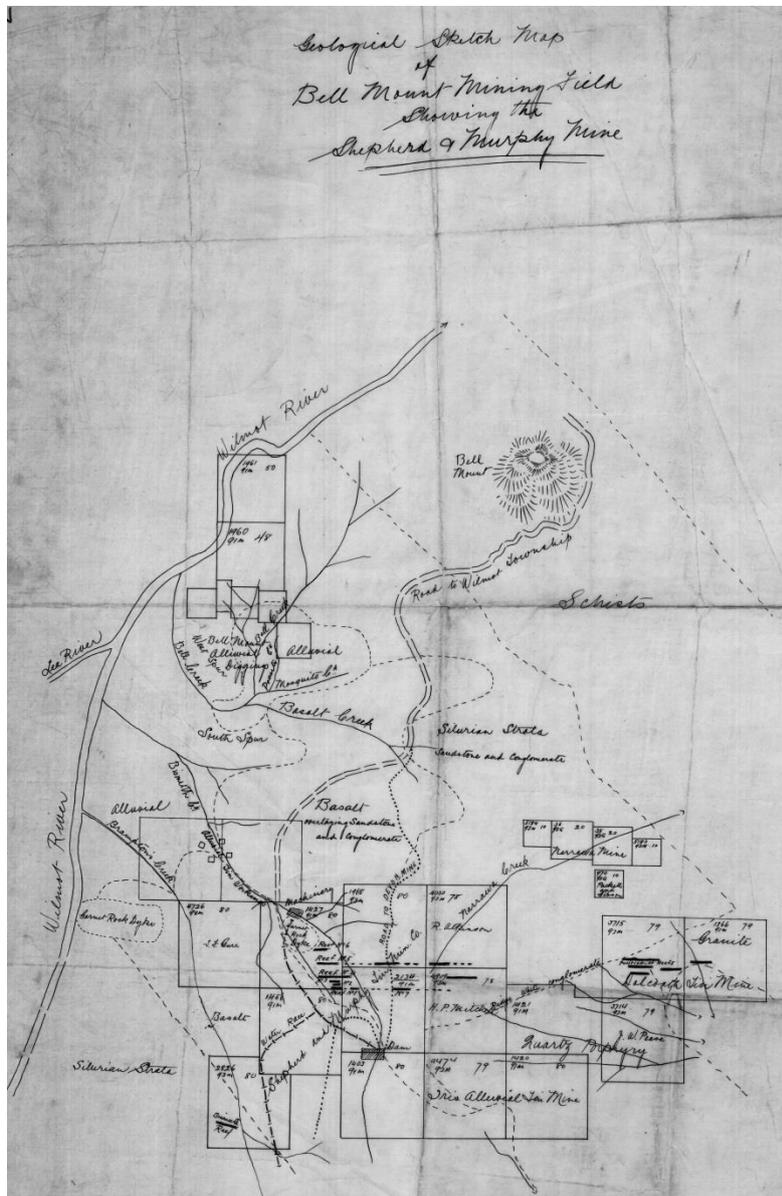
In 2016/17 focussed on (1) further consideration of the source of the gold at the Bell Mount goldfield, and (2) 3D modelling of the 3D IP data from the Frontier Resources NL survey

The source of the coarse gold nuggets at the Bell mount alluvial goldfield has been a major focus of Frontier/Torque/Moina Gold. The Bell Mount goldfield has produced over 3000oz's from alluvial workings with large nuggets not uncommon. It continues to produce nuggets up to 3oz in size.

The alluvial (?) gold is found in the base of a thin layer (generally <1m) of Tertiary aged scree and gravel which covers the slopes of the hills which surround and define the basin.

The Bell Mount field was visited on a number of times in the late 19<sup>th</sup>/early 20<sup>th</sup> centuries by eminent government geologists Montgomery, Twelvetrees, Reid and Broadhurst. The following summarises their opinions of the source of the gold.

Montgomery visited the Bell Mount alluvial field in 1893 as part of a larger survey of the Moina district with Bell Mount alluvial constituting 1 of 10 pages in his report, producing the first map of the workings.



**Figure 2.14: Geological sketch and lease map of the Moina mining district showing the location of the Bell Mount alluvial diggings, as well as the Bismuth Creek alluvial tin workings, the Iris Alluvial Tin Mine, Dalcoath Tin Mine, Narrawa Mine and Shephard and Murphy Tin Mine Co. – Montgomery 1893, MRT plan No. 316.**

Regarding the source of the gold he states: "It would seem to come from the slopes of Bell Mount, but it may also possibly be derived from the re-washing of older gravels belonging to the river system obliterated by the basaltic flows."

Geo. Waller visited the Moina area in 1901 and wrote that “the angular character of both the wash and gold, and the presence of quartz in the gold, makes it more probable that the gold has been derived from reefs or veins in the country-rock. I think, therefore, that the most probable source of the gold is to be found on the southern and south-western slopes of Bell Mount, more probably in the sandstone than in the schists.”



**Figure 2.15.: Close-up of Bell Mount alluvial area from figure 3, Waller, 1901.**

W.H. Twelvetrees visited the area in 1907 and again in 1913 stating in 1913 that “on the whole, the specimens have most probably come from veins quite near- in sandstone and conglomerate. The indications are that they have been derived from the conglomerate belt which extends across the field from the crags west of the road at Bell Mount to the other side of the Iris River.”

A. McKintosh-Reid visited in 1919 and concluded that “it is probable that the greater quantity of the gold distributed in this area has been derived from veinlets containing sulphidic minerals. .... Possibly some gold has been derived from sulphidic ores occurring in the mineral belt which contains the Wilmot ore-body, and which extends eastwards towards Round Hill. In this event the solutions must have migrated some distance from their source.”

In 1934 E. Broadhurst wrote “The most probable explanation seems to be, therefore, that the original occurrence of the gold was in small veinlets in sandstone or conglomerate. The gold then came, both free and included in the detrital material, from the west and north and collected in the basin. The gold was then reconcentrated in the stream courses where it was found and worked.”



Ian Jennings (1979) mapped the Sheffield quadrangle and summarised all old workings in the region. Regarding the source of the gold to the alluvial field he summarised these preceding government geologists' reports as that "the general consensus of opinion in later reports such as those by Waller (1901), Twelvetrees (1913), Reid (1919) and Broadhurst (1934) is that the gold is close to its source, and that the gold and alluvium probably originated from the south and south-west slopes of Bell Mount. Twelvetrees (1913) notes that had the gold originated from the south or south-east of the field, then cassiterite and wolframite would also be present in the wash.'

The opinions expressed in each of the six reports concur on one aspect, that the gold is close to its source. All argue for the source of the gold being pyritic veins in sandstone and conglomerate (though reef (lode) style is also a possible alternative. Reid also recognises that the Wilmot mine style (which we recognise as the same as Higgs mineralisation which extends for km's along strike) may be a source.

The pyritic vein in sandstone and conglomerate style should generate chargeability anomalies in the 3D IP data. The Wilmot mine style (i.e. that which we call Higgs/West Higgs style) should show as conductivity anomalies in the 3D IP data.

### *3D IP 3D Modelling – Higgs-Bell Mt Corridor*

3D IP data from the 2011/2012 survey has been modelled as a series of isosurfaces in SURPAC and 3D DTM's generated. Those DTM's which define the Higgs-Bell Mount corridor were sectioned in SURPAC and exported as .dxf's into Mapinfo/Discover and sections generated in order to illustrate the geophysical characteristics of the rocks around and beneath the alluvial goldfield.

Figures generated in this work are reproduced herein.

Strong 3D IP chargeability anomalies (Bell Mount, Bell Mount East and Machinery Creek Thrust chargeability trends) underlie the Bell Mount goldfield.

Four 3D IP conductivity high (= resistivity low anomalies) (i.e. Bell Mount #1, #2, #3 and Machinery Creek Thrust conductivity trends) can also be seen extending from Higgs/West Higgs in a west-northwesterly direction beneath basalt cover until they re-appear paralleling mapped faults which meet the Bismuth Creek Fault in the vicinity of the Bell Mount alluvial goldfield.

A fifth conductivity anomaly, the Bismuth Creek conductivity trend, appears to be due to a deep Tertiary channel running along the eastern side of the Bismuth creek Fault.

Exploration at Higgs and West Higgs in the Narrawa Creek valley along strike to the southeast has intersected sulphidic mineralisation in two associations or facies. Discrete, stratabound/stratiform, biotite hornfels with variable Pb+Zn+/-gold facies is surrounded by a broader halo of pyritic+/-gold sandstone facies, typically with grades <1g/t but up to 20g/t in places. 3D IP conductivity anomalies correspond 1:1 with the former type whilst chargeability anomalies map out the halo of the latter type.

3D IP suggests both rock types are present beneath the Bell Mount alluvial goldfield with the location of the Bell Mount goldfield at the northwestern end of a structural/geophysical corridor with the Higgs and West Higgs deposits/prospects at the southeastern end strongly suggesting a similar genesis between the two.

Pyritic sandstone outcrops along the roadcuts to the Lake Gardner dam and in a quarry used to source rock for the dam. Limited sampling in the old quarry returned up to 0.14g/t Au in pyritic sandstone with elevated lead and zinc but gold grades are also quite variable at Higgs/West Higgs.

Semi-massive base metals in biotite hornfels characterises the mineralisation at the Wilmot mine, the northwesternmost extension of the Bell Mount #3 conductivity trend suggesting that this style of mineralisation does continue beneath the Tertiary scree cover beneath the Bell mount goldfield.

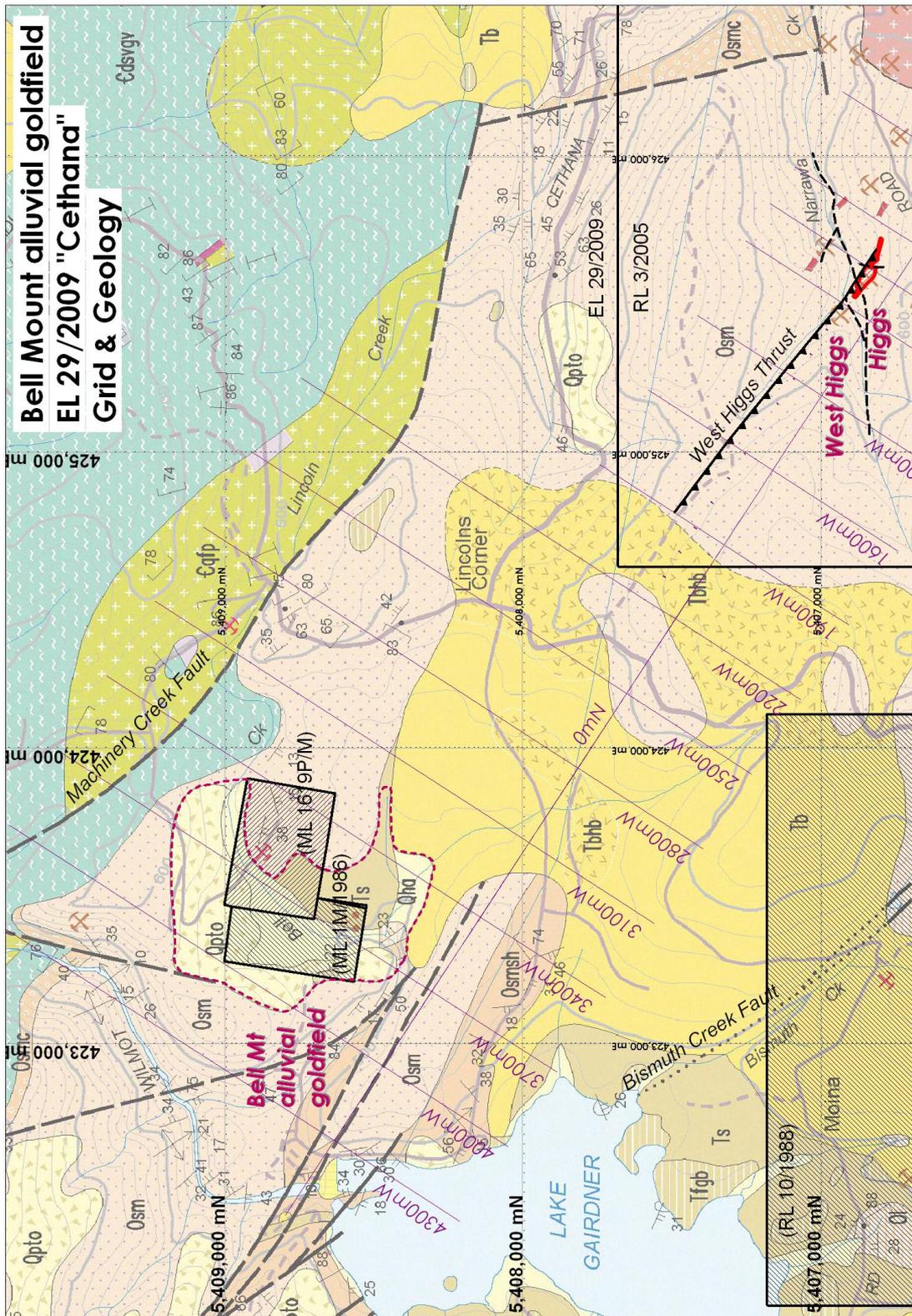


Figure 2.17: Bell Mount Goldfield Geology and Sections Grid

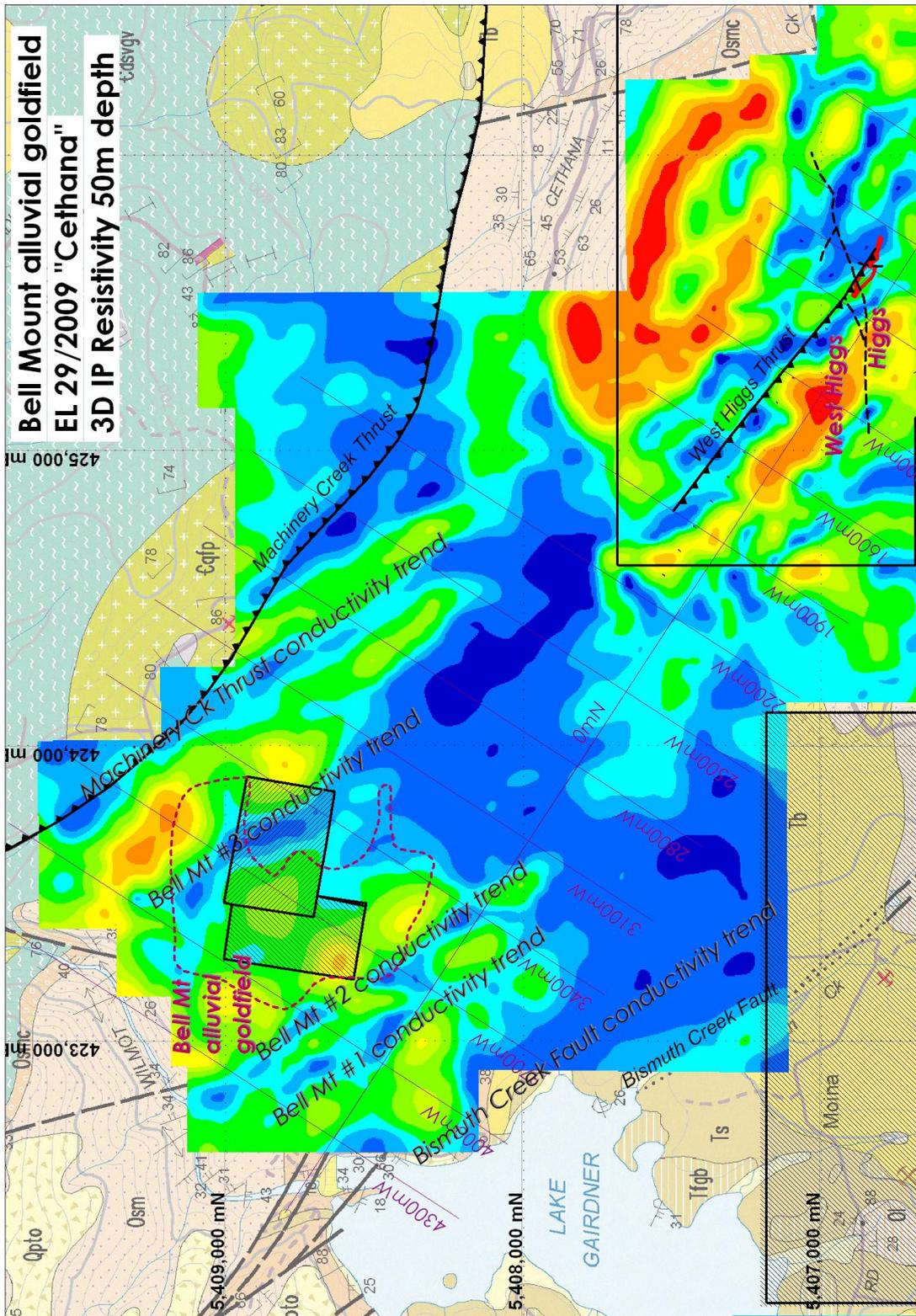


Figure 2.18: Bell Mount Goldfield – 3D IP Resistivity at 50m depth showing conductivity trends (dark blue).

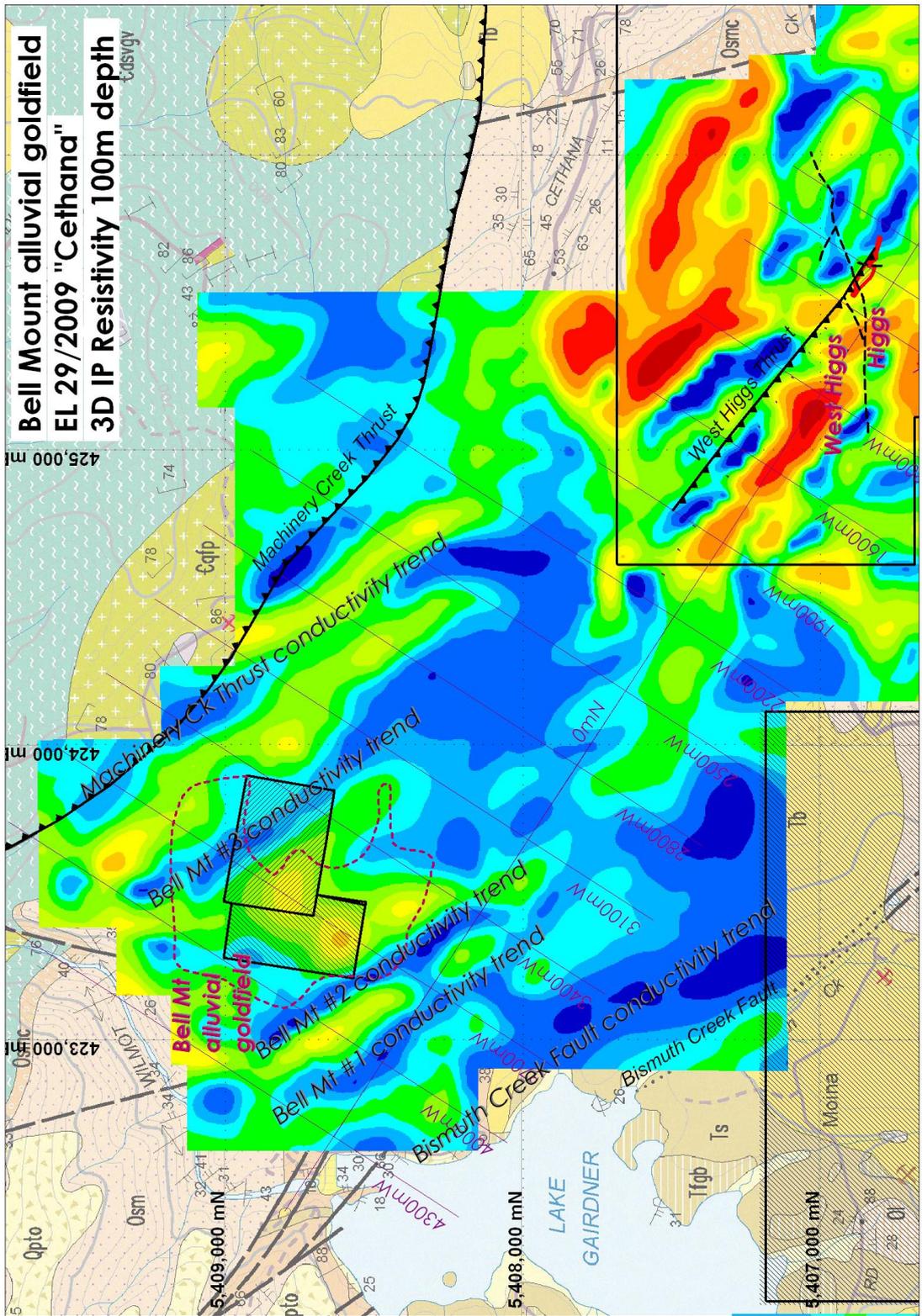


Figure 2.19: Bell Mount Goldfield – 3D IP Resistivity at 100m depth showing conductivity trends (dark blue).

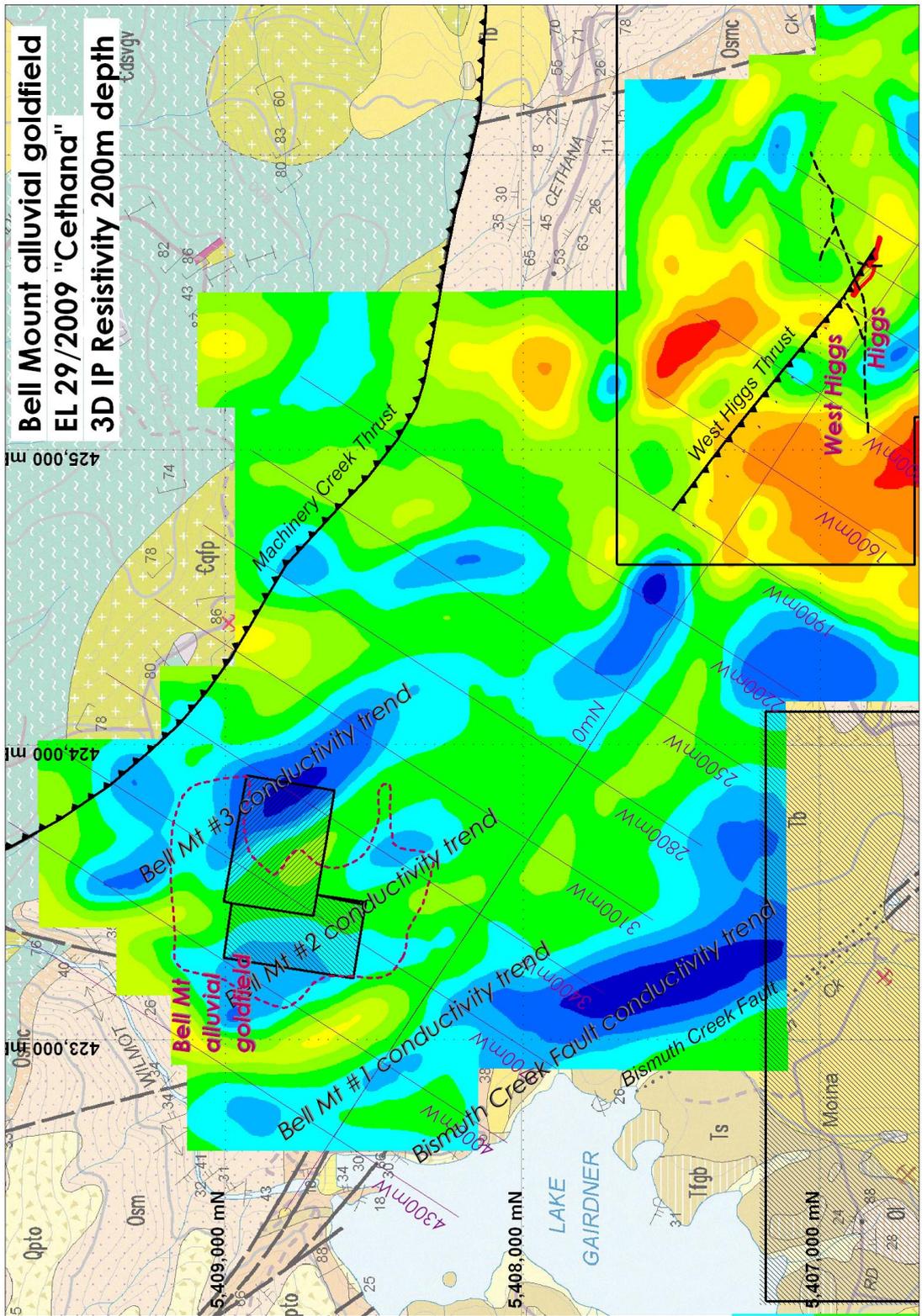


Figure 2.20: Bell Mount Goldfield – 3D IP Resistivity at 200m depth showing conductivity trends (dark blue).

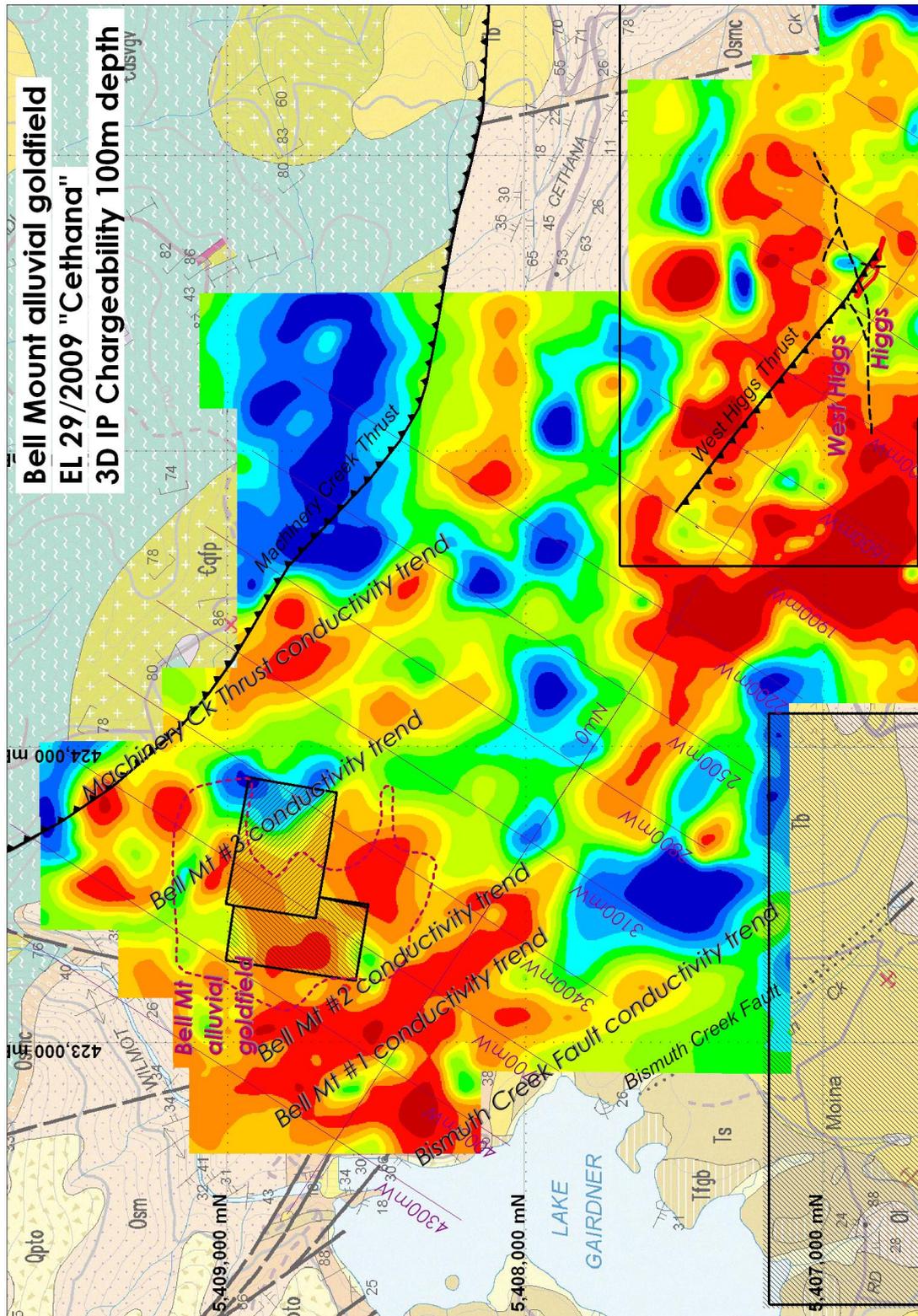


Figure 2.21: Bell Mount Goldfield – 3D IP Chargeability at 100m depth showing conductivity trends (dark blue).

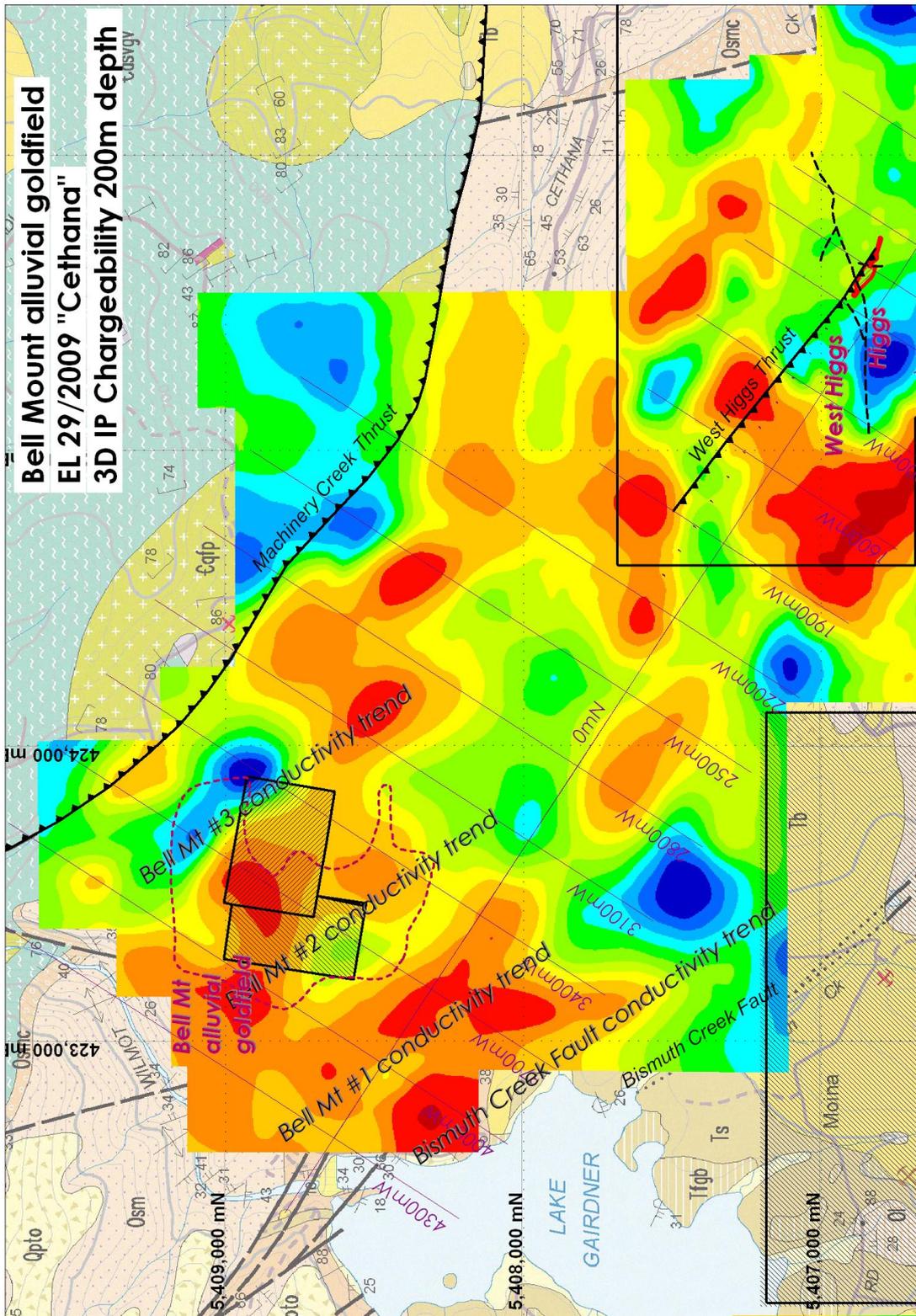
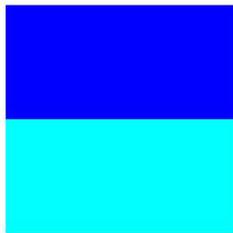


Figure 2.22: Bell Mount Goldfield – 3D IP Chargeability at 200m depth showing conductivity trends (dark blue).

# Legend

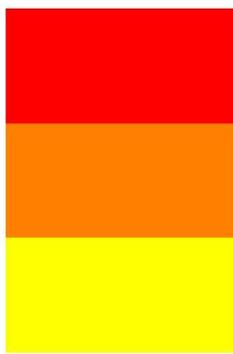
## Resistivity



<100 ohm m

100 - 500 ohm m

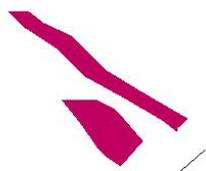
## Chargeability



0.02 SI

0.01 - 0.02 SI

0.001 - 0.01 SI



Higgs orebodies

*Figure 2.23: Legend for figures 2.24 to 4.22.*

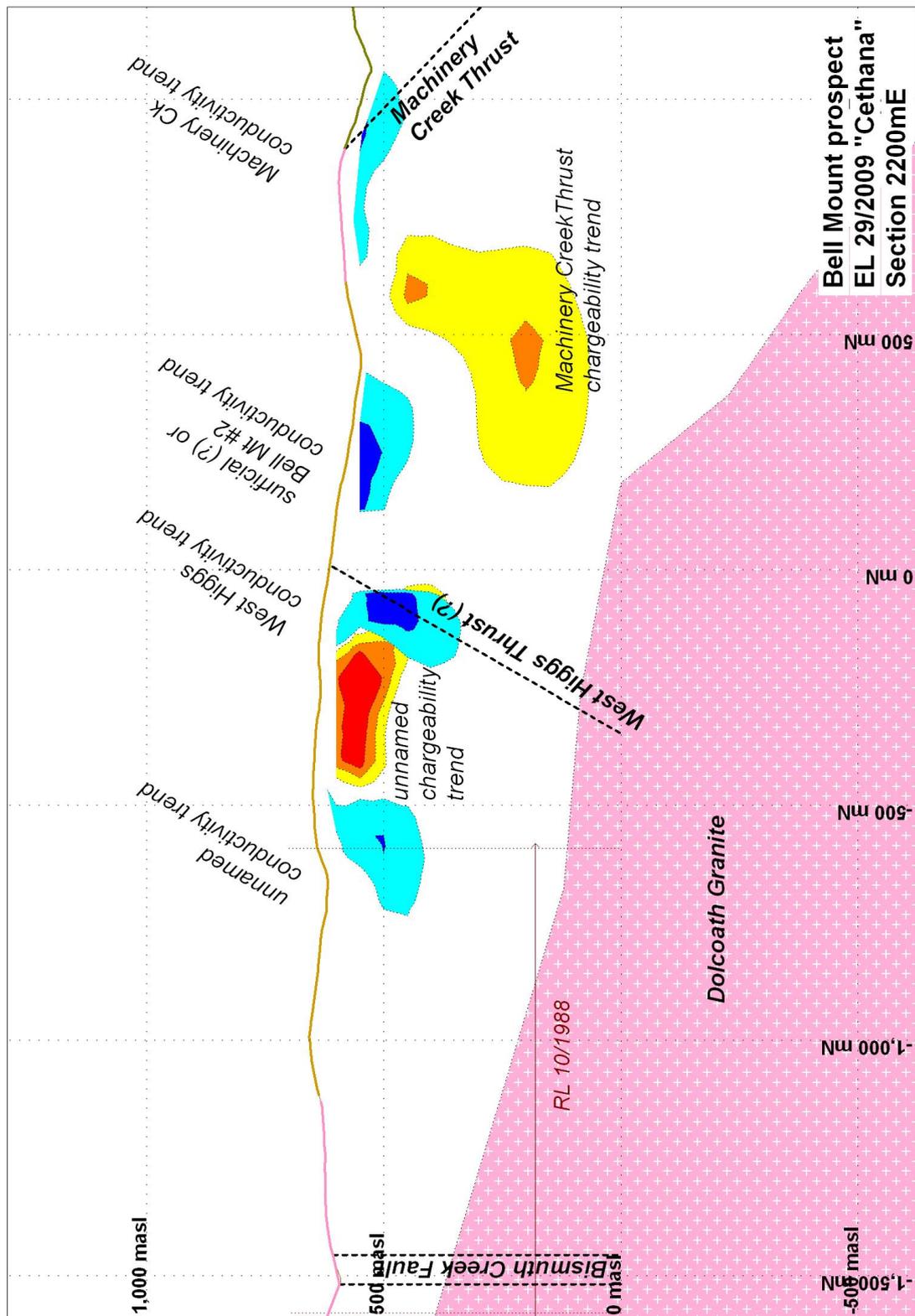


Figure 2.24: Bell Mount goldfield Section 2200mW showing 3D IP conductivity and chargeability anomalies superimposed on known geology.

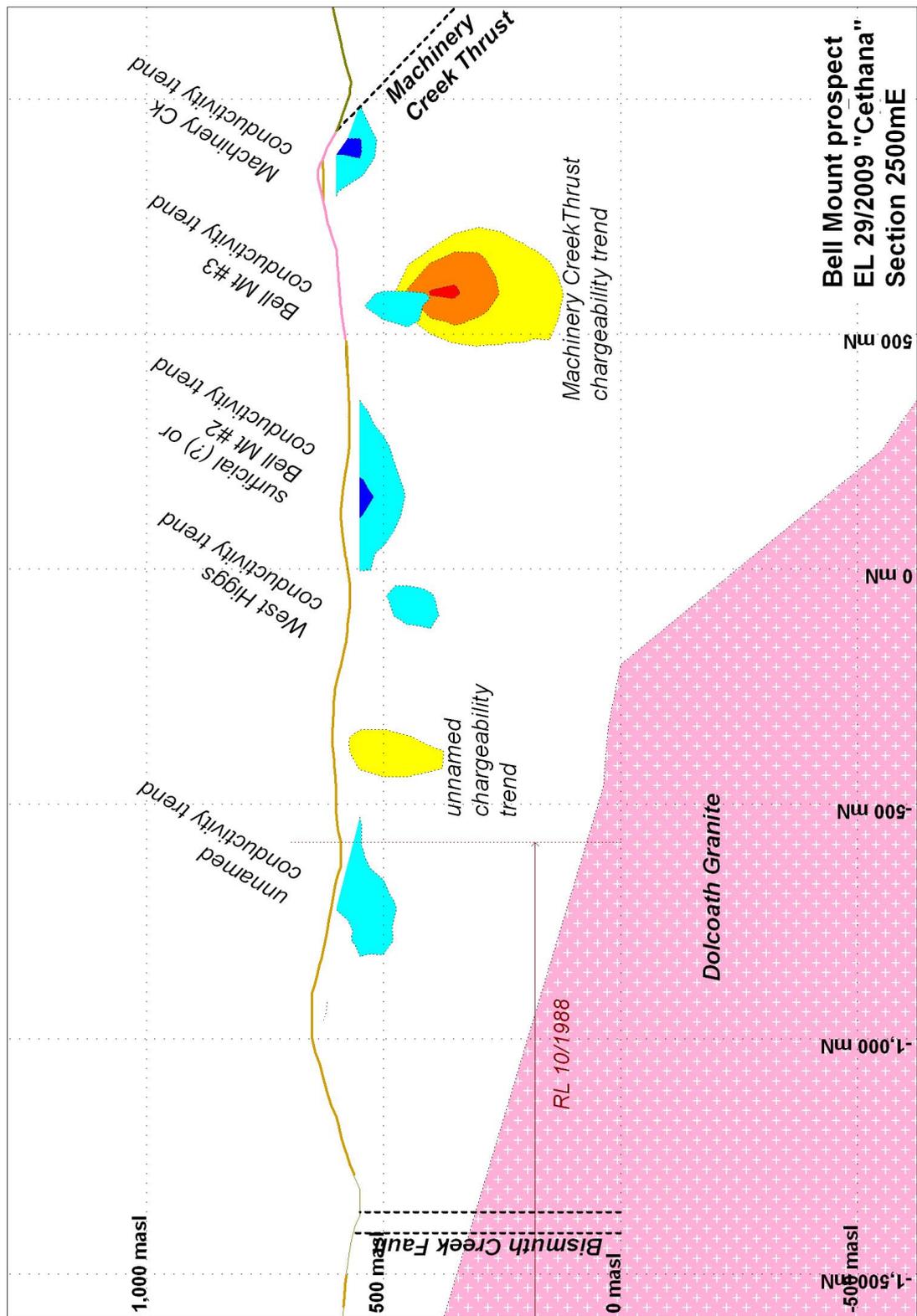


Figure 2.25: Bell Mount goldfield Section 2500mW showing 3D IP conductivity and chargeability anomalies superimposed on known geology.

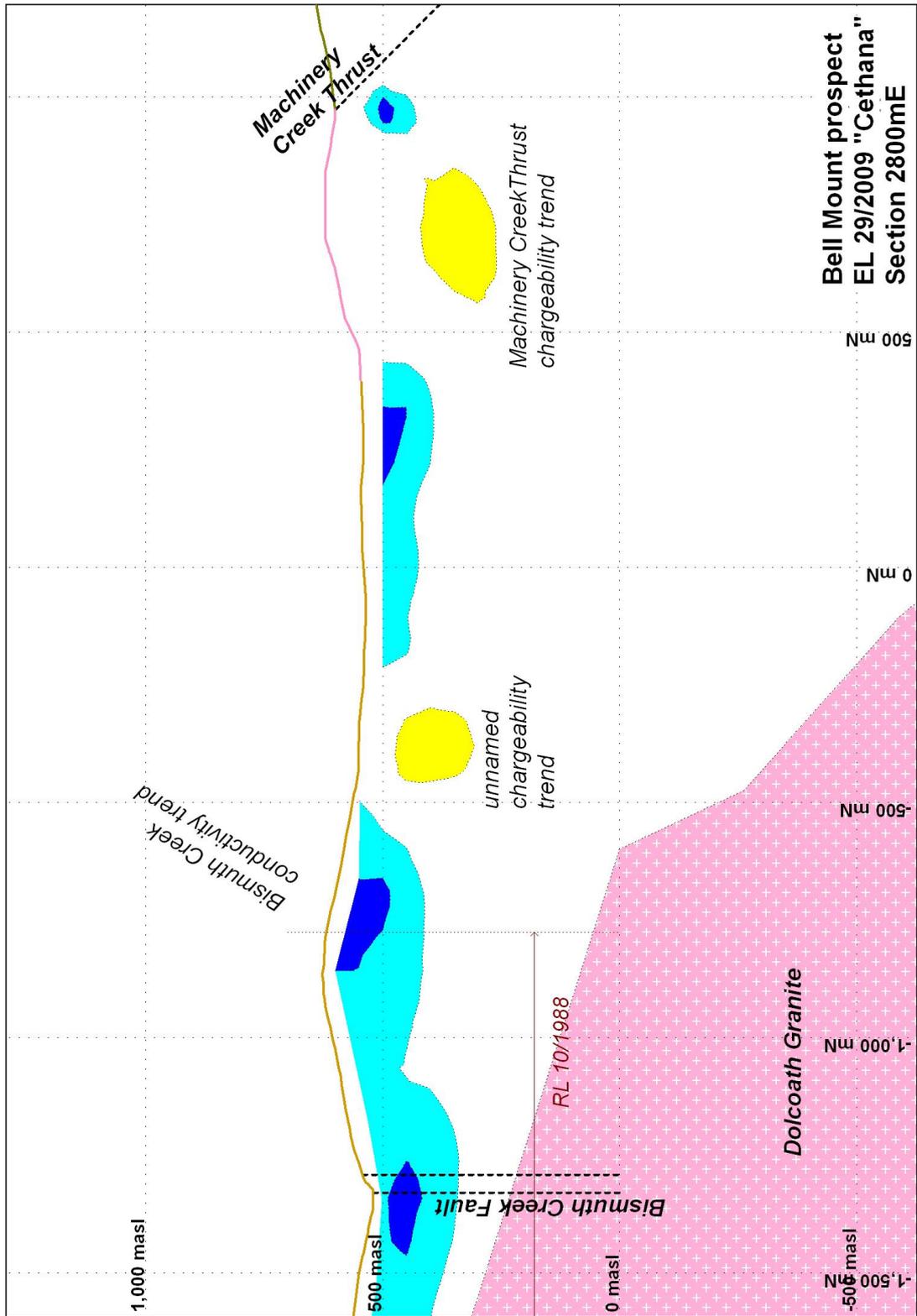


Figure 2.26: Bell Mount goldfield Section 2800mW showing 3D IP conductivity and chargeability anomalies superimposed on known geology.

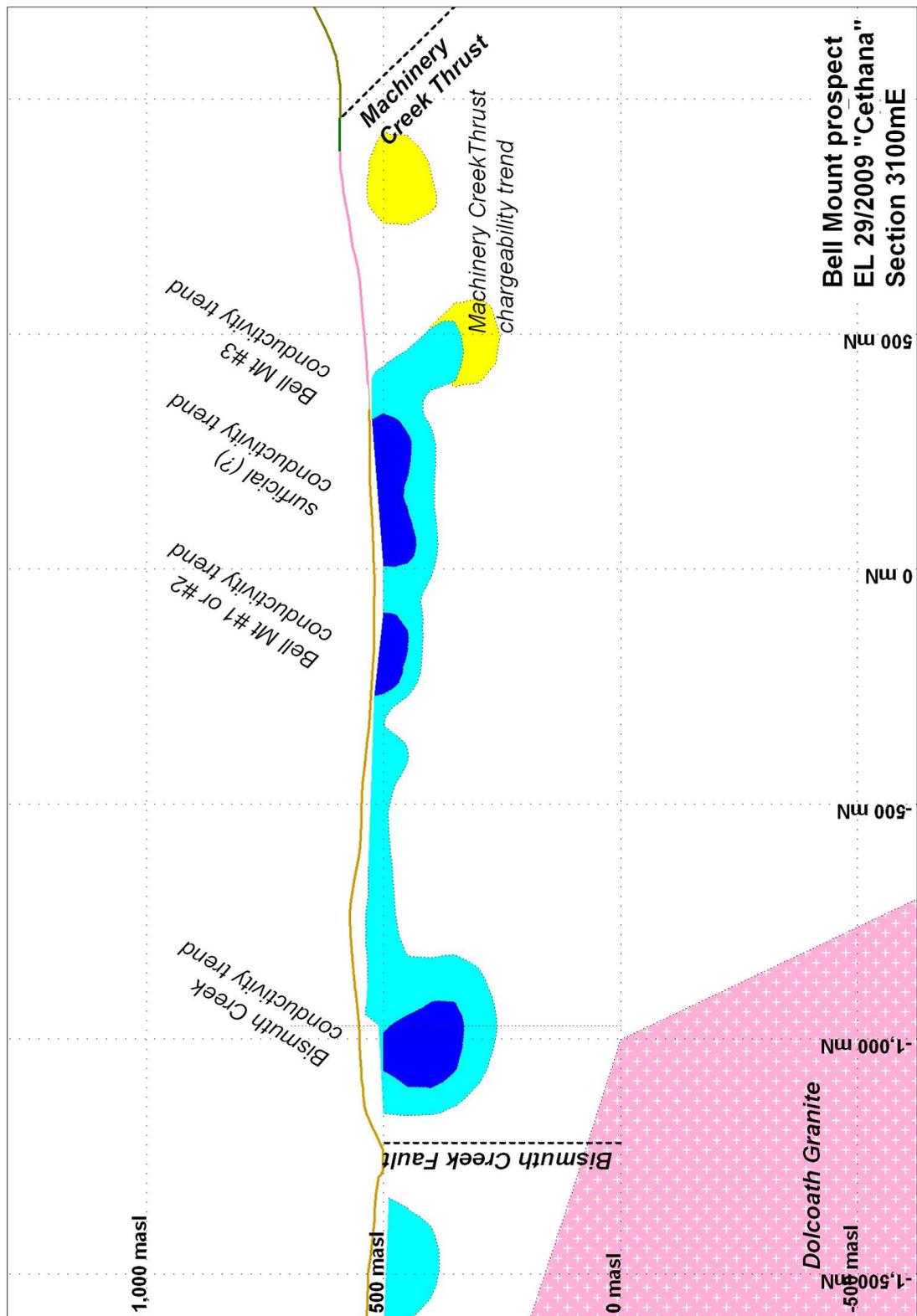
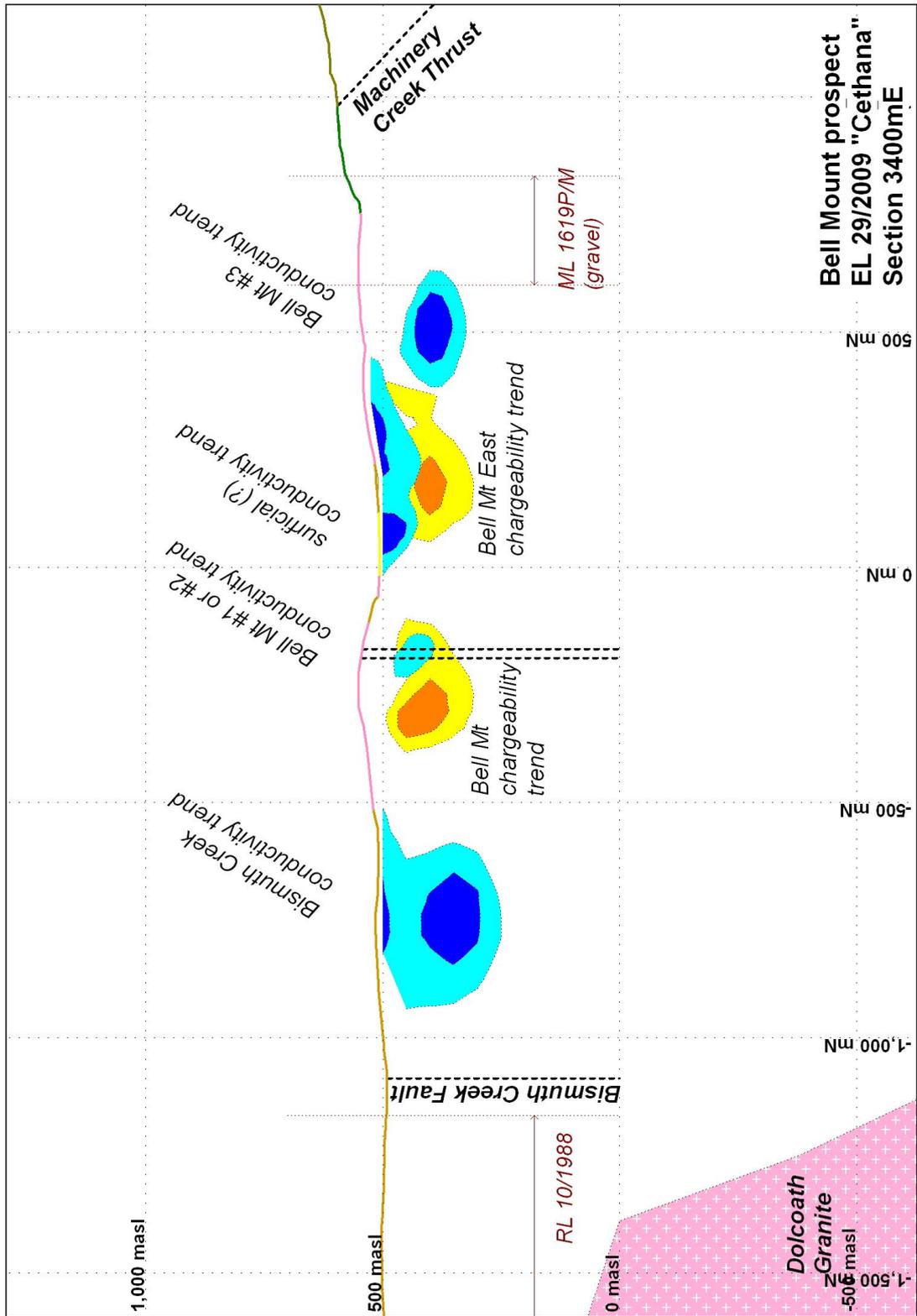


Figure 2.27: Bell Mount goldfield Section 3100mW showing 3D IP conductivity and chargeability anomalies superimposed on known geology.



**Figure 2.28: Bell Mount goldfield Section 3400mW showing 3D IP conductivity and chargeability anomalies superimposed on known geology.**

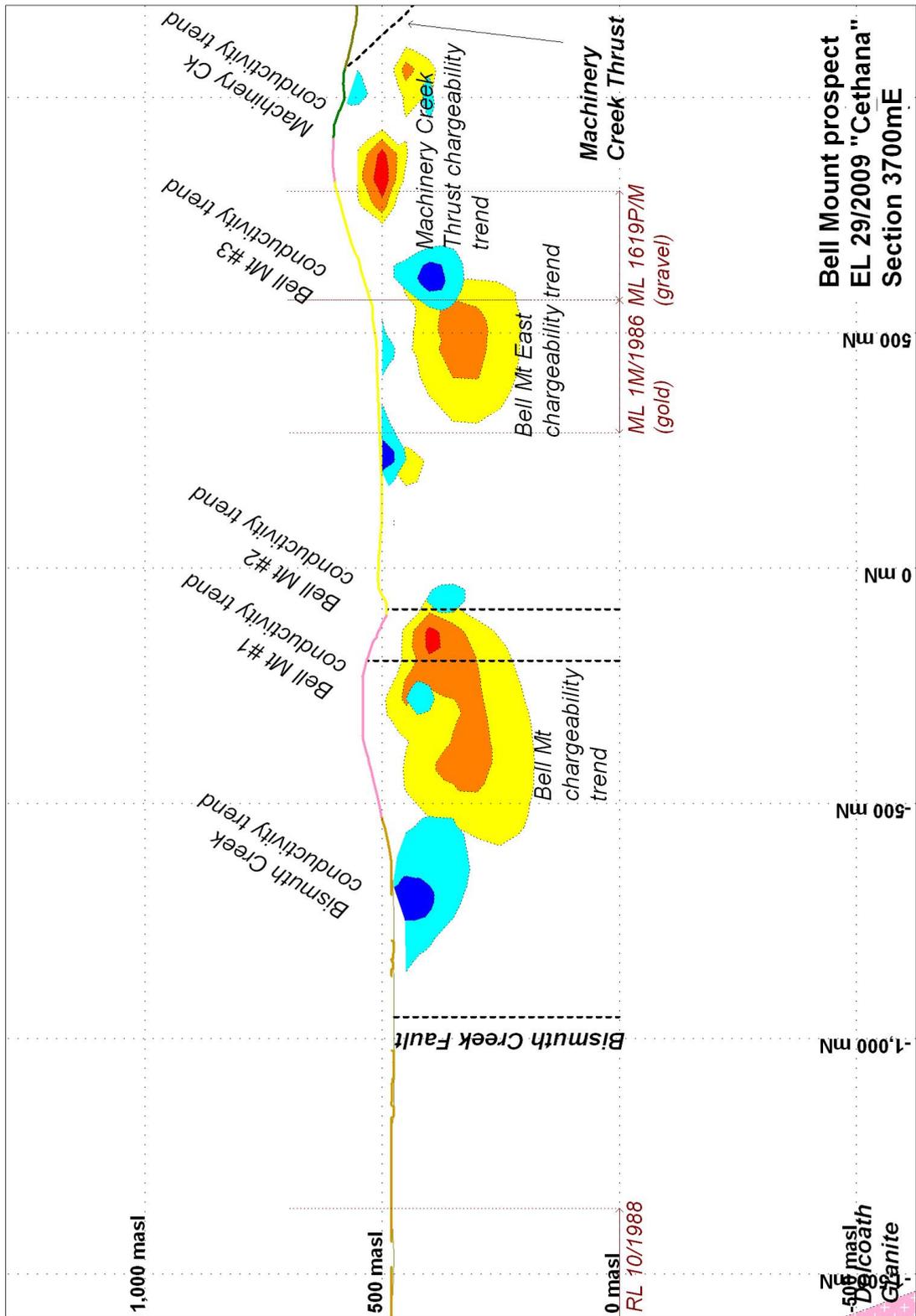


Figure 2.29: Bell Mount goldfield Section 3700mW showing 3D IP conductivity and chargeability anomalies superimposed on known geology.

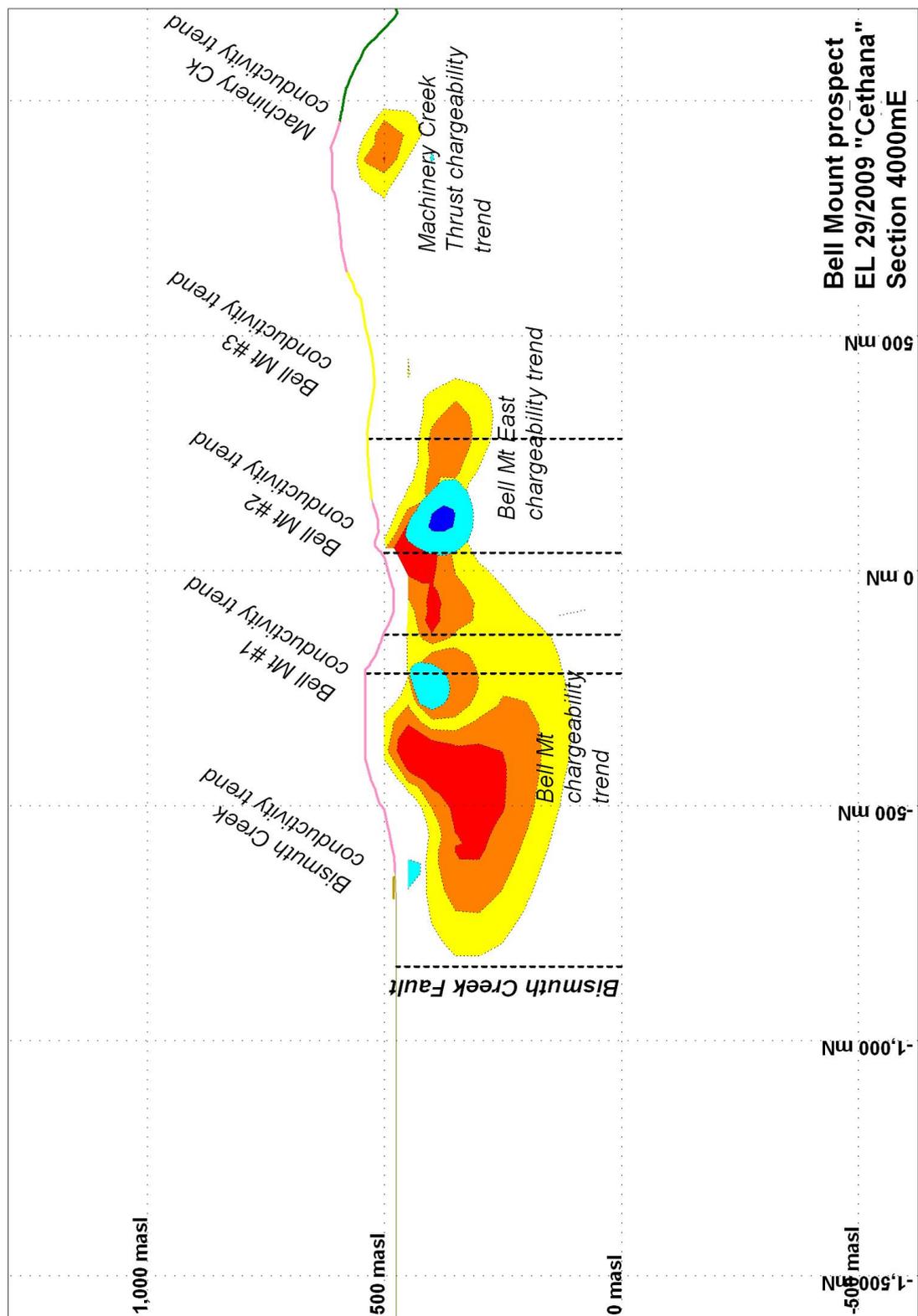
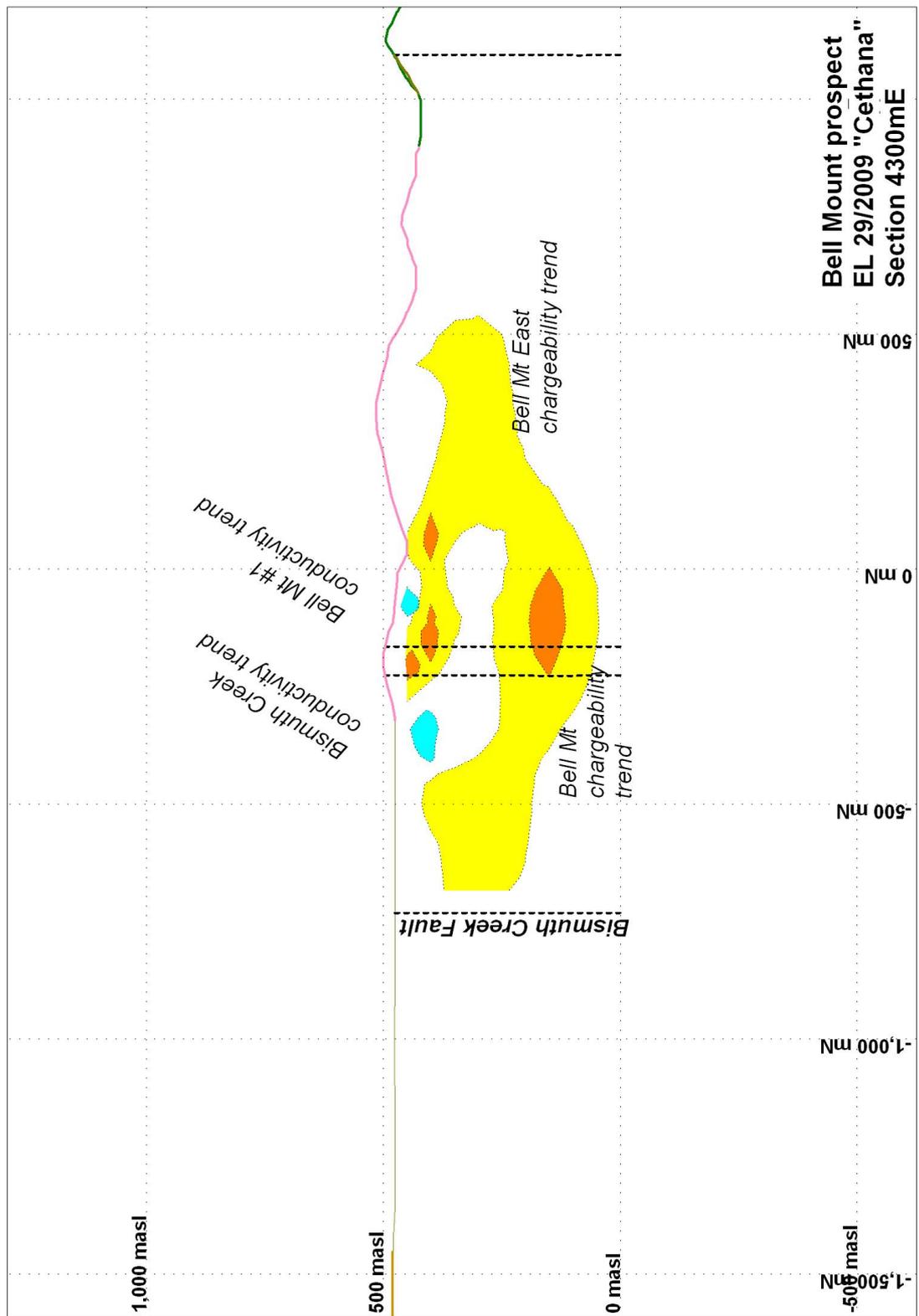


Figure 2.30: Bell Mount goldfield Section 4000mW showing 3D IP conductivity and chargeability anomalies superimposed on known geology.



**Figure 2.31: Bell Mount goldfield Section 4300mW showing 3D IP conductivity and chargeability anomalies superimposed on known geology.**

### 3.0 Work Done in the Reporting Year

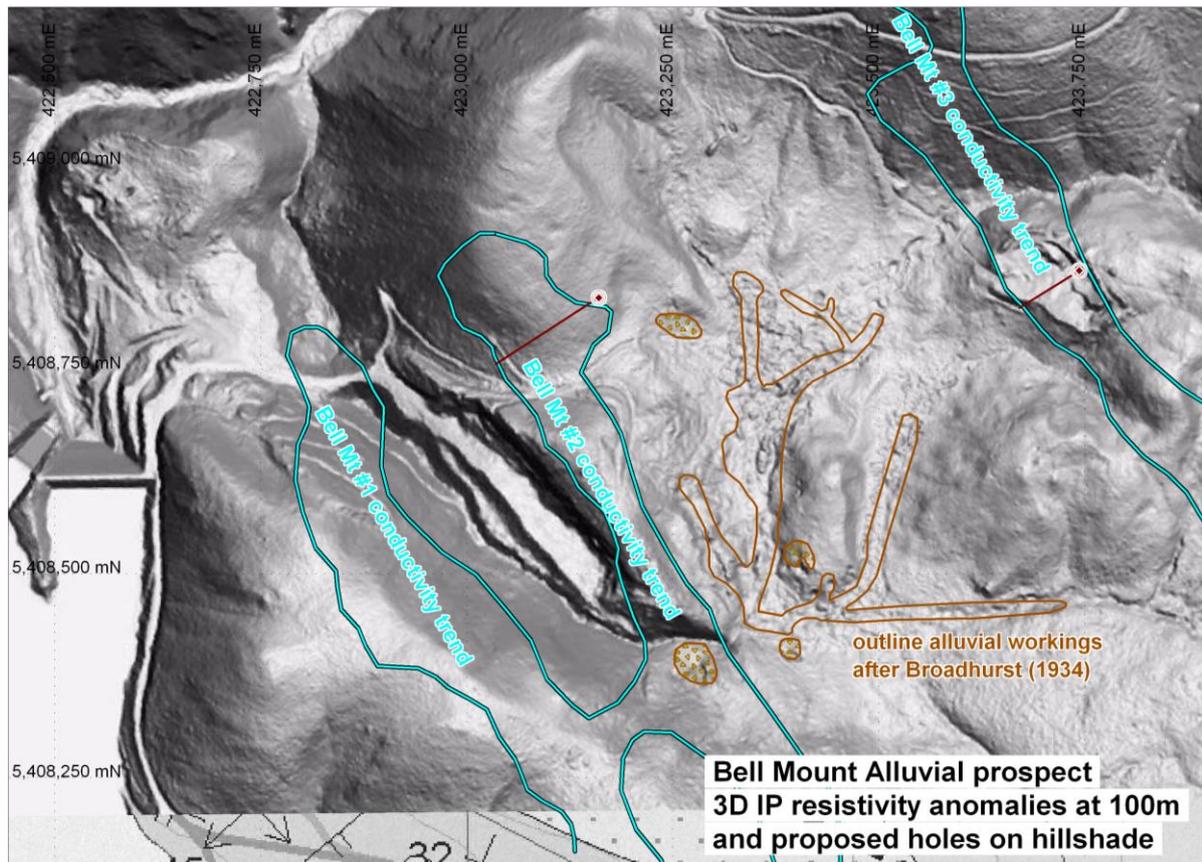
With the expectation of funding work focused on planning for drilling at each of the Bell Mount, Sayers and Round Mountain prospects.

#### 3.1 Bell Mount

As discussed earlier the source of the gold in the Bell Mt. alluvial goldfield is unknown but is believed to be proximal.

Two holes of 250-300m's each are proposed to test conductivity anomalies associated with chargeability anomalies beneath the hills which surround the basin based on analogies with the Higgs deposit and its associated 3D IP anomalism.

Both holes should be surveyed with downhole EM.



**Figure 3.1:** Bell Mount alluvial prospect showing proposed holes (maroon), 3D IP conductivity anomalies and the outline of alluvial workings at the time of Broadhurst's visit (1934) superimposed on the hillshade image derived from LIDAR by DPIPWE.

#### 3.2 Sayers

The Sayers prospect consists of coincident 3D IP chargeability and conductivity anomalies in an area of old workings on a greisen style system with associated anomalous Nb and Y.

These anomalies are intriguing and can be tested by a single 150m hole.

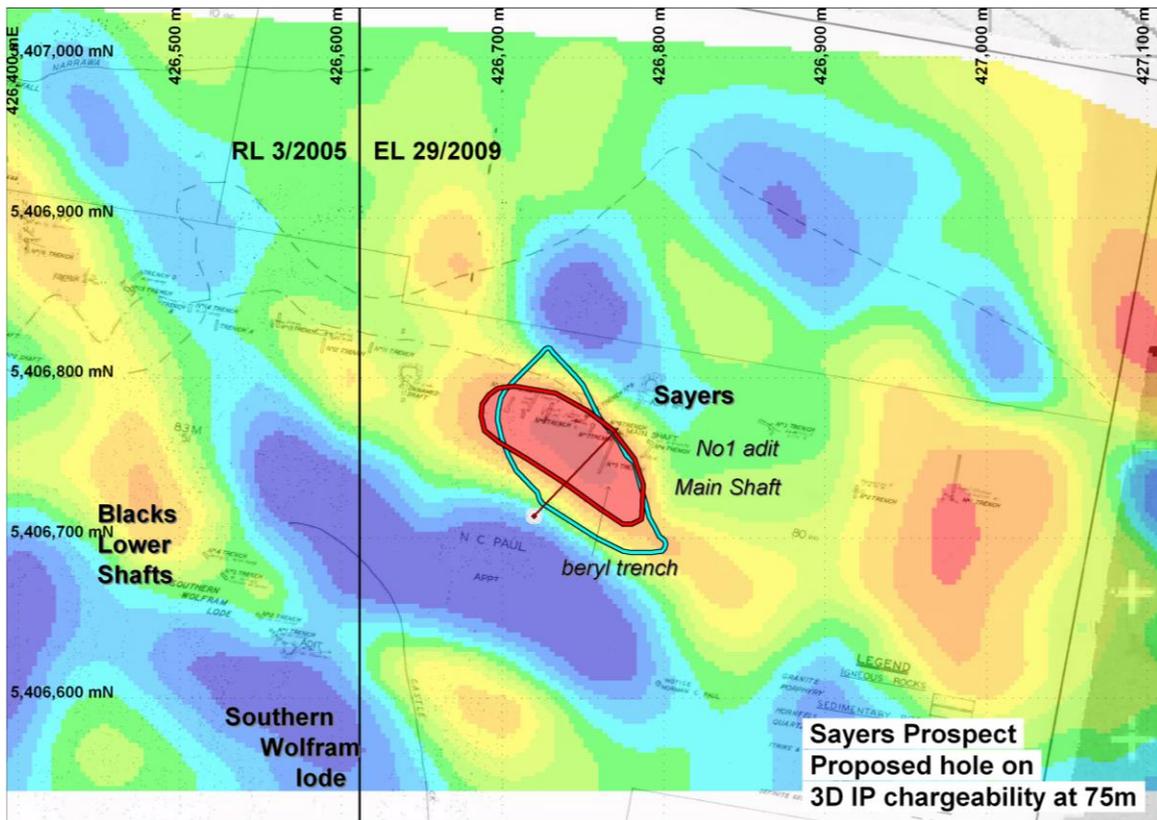


Figure 3.2: Sayers prospect showing proposed hole on 3D IP chargeability at 75m depth and old workings.

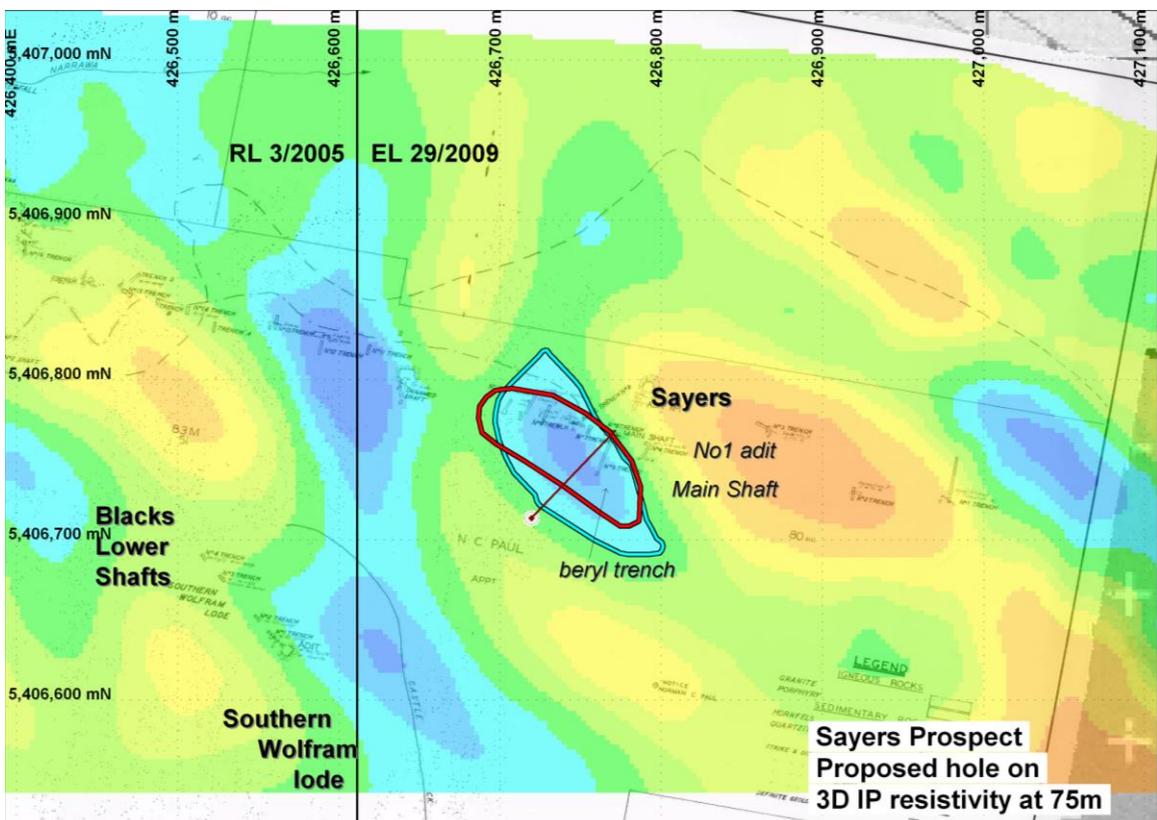


Figure 3.3: Sayers prospect showing proposed hole on 3D IP resistivity at 75m depth and old workings.

### 3.3 Round Mountain

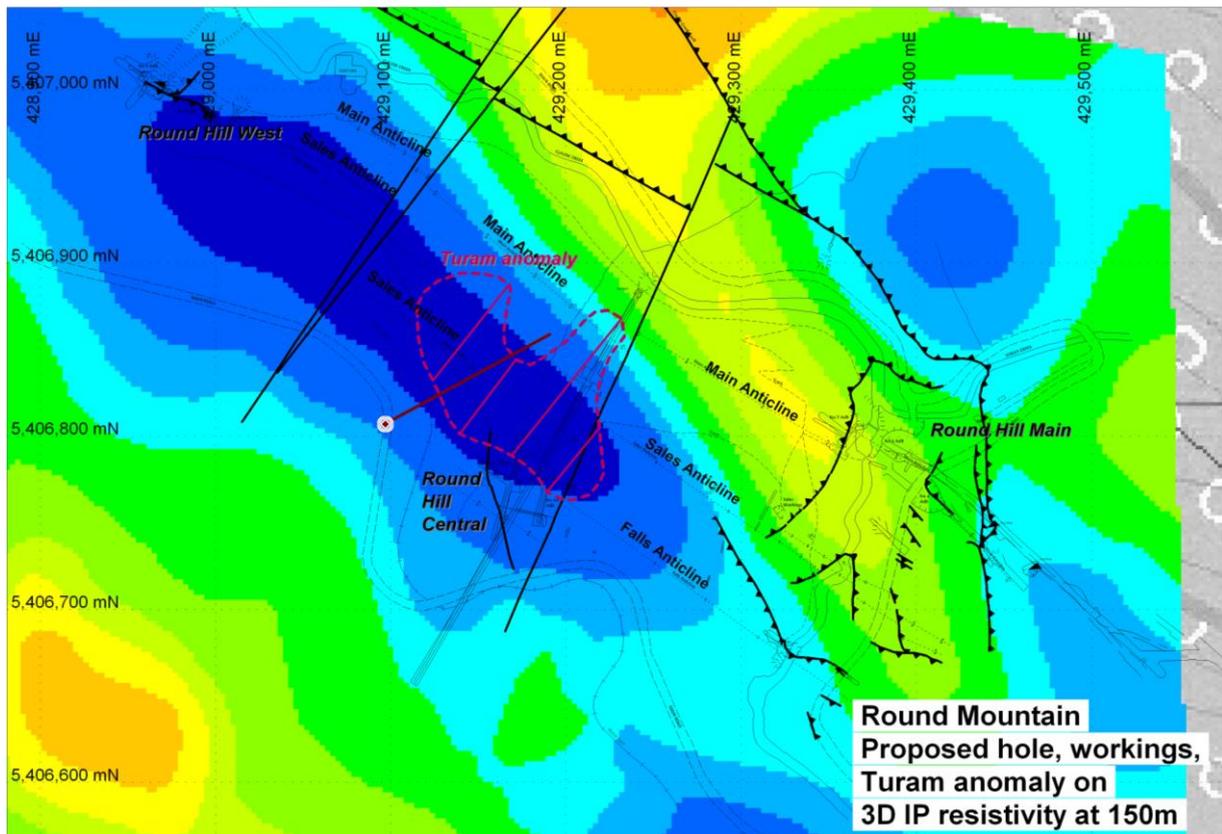
The Round Mountain prospect has been discussed in previous reporting.

A coincident 3D IP conductivity and Turam anomaly corresponds spatially with the Sales Anticline.

A similar 3D IP anomaly corresponds with the Round Hill Main mine.

Whilst there is a strong possibility the anomaly is lithological it also occupies an analogous structural position to the Round Hill Main mineralisation.

A single 300m hole should be sufficient to test the anomaly with downhole EM follow-up.



**Figure 3.4:** Round Mountain prospect showing proposed hole with respect to old workings, 3D IP conductivity and Turam anomalies.

#### **4.0 Results**

There are no new results to report.

## **5.0 Conclusions and Recommendations**

It is recommended that the proposed drilling be carried out at the Bell Mt. alluvial, Sayers and Round Mountain prospects as soon as possible.

## **6.0 Environmental Management**

There are no outstanding environmental management issues for EL 29/2009.

## 7.0 Expenditure

	\$
Geology	3,000
Geochemistry	0
Geophysics	0
Remote Sensing	0
Drilling	0
Gridding	0
Land Access	0
Rehabilitation	0
Feasibility Studies	0
Other	0
Administration	300
Total	3,300

## 8.0 References

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