

**Frontier Resources Ltd  
Annual Report on Exploration  
EL 42/2010 – “River Lea”  
April 2011 to April 2012**

**Part 1 of 6  
Annual Report**

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- G Aboriginal Heritage Assessment – Western Syncline and Far West drilling, Vernon Graham  
*Addendum to Graham. V, (2007) Aboriginal Archaeological (Heritage) Survey. In Reference to a Proposed Mineral Exploration in the area of the Stormont Track (Forestry Track – Coupe Number MI 017D) via Moina by leaving the Cradle Link Road up the back of Lake Gairdner, North Western Tasmania - Project: Proposed Mineral Exploration in the area of the Stormont, extension to the Abovementioned (Permit No; EL 42/2010 River Lea) drilling programme.*
- H Ground magnetics digital data
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## 1.0 Summary

## 2.0 Introduction

### 2.1 Location and Access

EL 42/1010 "River Lea" lies immediately west of Lake Gairdner on the margin between Tasmania's central north and west coast. It is one of three contiguous tenements which constitute Frontier Resources Ltd's Moina Project, centred on the Dolcoath Granite.

The licence is accessed by bitumen road to the Moina township turn-off on the Cradle Mountain Link Road, about 3 km's from the licence's eastern boundary, thence by a gravel road. The last section beyond the boom gate near the Iris River bridge is a logging road owned by Forestry Tasmania. This road provides the only practicable access within the licence though over grown logging roads north of the River Lea may be accessible when the River Lea is crossable (dry times, temporary bridge).



**Figure 2.1: EL 42/2010 River Lea and Moina Project location, northern Tasmania.**

### 2.2 Tenure

The licence was granted to Frontier Resources Ltd. on 3<sup>rd</sup> April 2011 as a result of a successful tender under the ETA system (after the relinquishment of Frontier's previous licence RL 4/2005).

### 2.3 Land Status, Usage, Topography and Vegetation

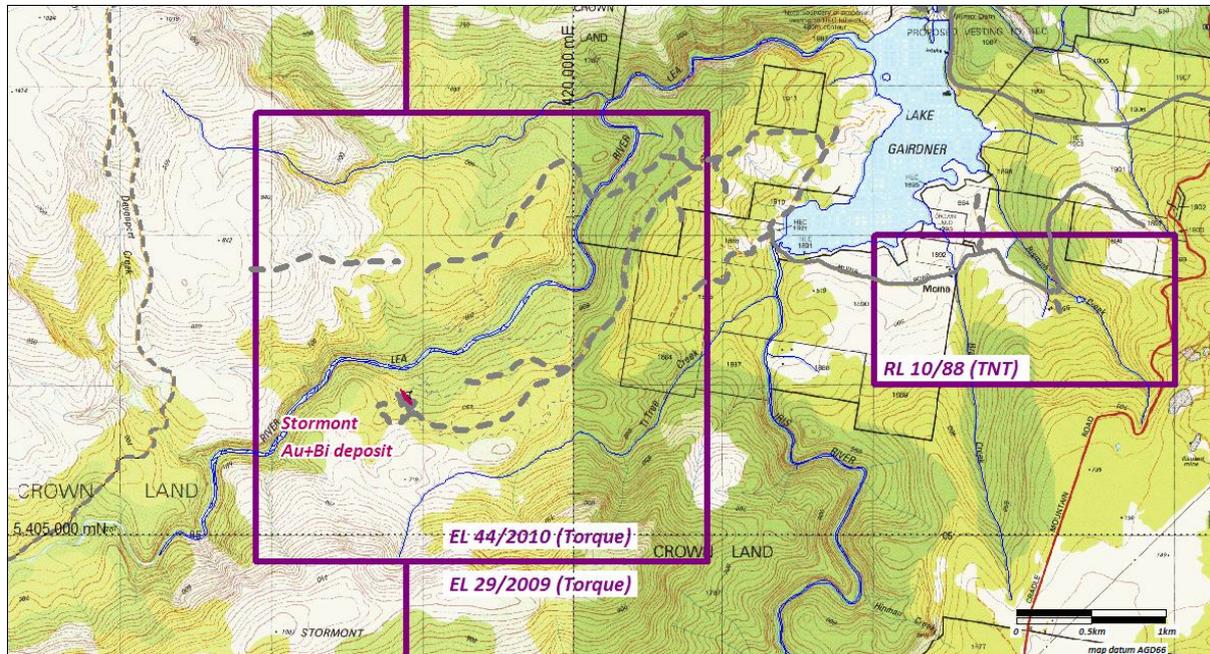
95% of the licence area is classified as State Forest or Crown Land. The remaining 5% is private land on the eastern margin of the licence around Ti Tree Creek where it is maintained as bush. The only use the area has been put to is forestry.

Topographically the licence lies amongst the foothills of the Black Bluff Range and Stormont at elevations between 500m and 900m above sea level.

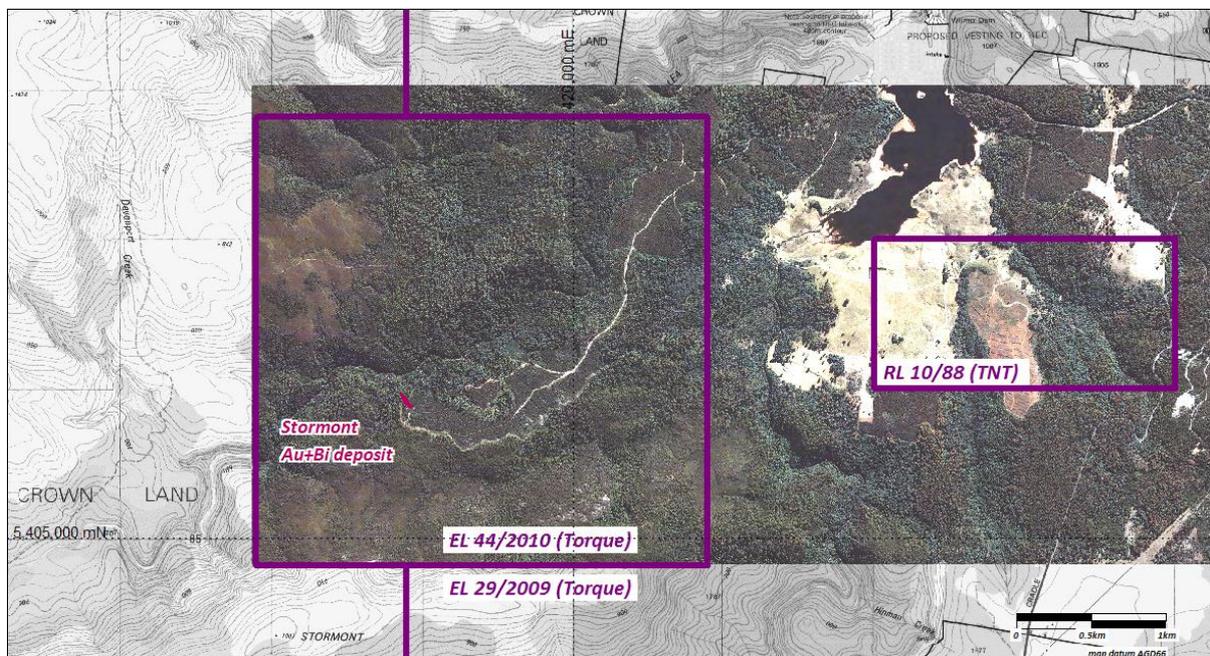
The licence is diagonally bisected by the northeast flowing River Lea with the southern part of the licence being the northern slopes of Mt. Stormont, the northern side of the river a plateau in the foothills to the Black Bluff Range to the west.

The Stormont deposit lies at the westernmost edge of a Forestry Tasmania (+/- Gunns Ltd JV) plantation which extends along the ridge between the River Lea and Ti Tree Creek to the south. The area north of the river has seen logging in the past but is now just regrowth.

Apart from the plantation areas most of the vegetation type is either wet Sclerophyll, "low dense vegetation" i.e. bauera/ti tree, or heath.



**Figure 2.2a: EL 42/2010 "River Lea" showing topography, tracks and prospects – base is 1:25,000 Tasmap (Lea and Cethana sheets).**



**Figure 2.2b: EL 42/2010 "River Lea" showing topography, tracks and prospects – base is orthorectified airphoto**

### **3.0 Geology**

#### **3.1 Regional Geology**

Cambrian volcanics and associated sediments of the Mt. Read Volcanics, Ordovician sediments of the Denison and Gordon Groups 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. These rocks are obscured over a significant portion of the licence by a thin veneer (<25m based on drilling) of unconformably overlying Tertiary basalt and lesser, commonly basal, sediment including clays.

Structurally the Cambrian-Ordovician sequence is gently folded about an east-west trending F1 syncline whose axis corresponds broadly with the path of the Lea River within the licence area and passes through the Stormont deposit area itself. Superimposed on this F1 fold are northwest trending sub-horizontal F2 folds with wavelengths around 150m. Both episodes of folding occurred in the Middle Devonian Tabberrabberan Orogeny. F2 folds formed later in the orogeny and are apparently associated with southwest verging thrust faulting. Northwest to north-northwesterly strike slip faults are also common and probably postdate thrusts. Late in the orogeny the Dolcoath Granite intruded into this faulted and folded terrane.

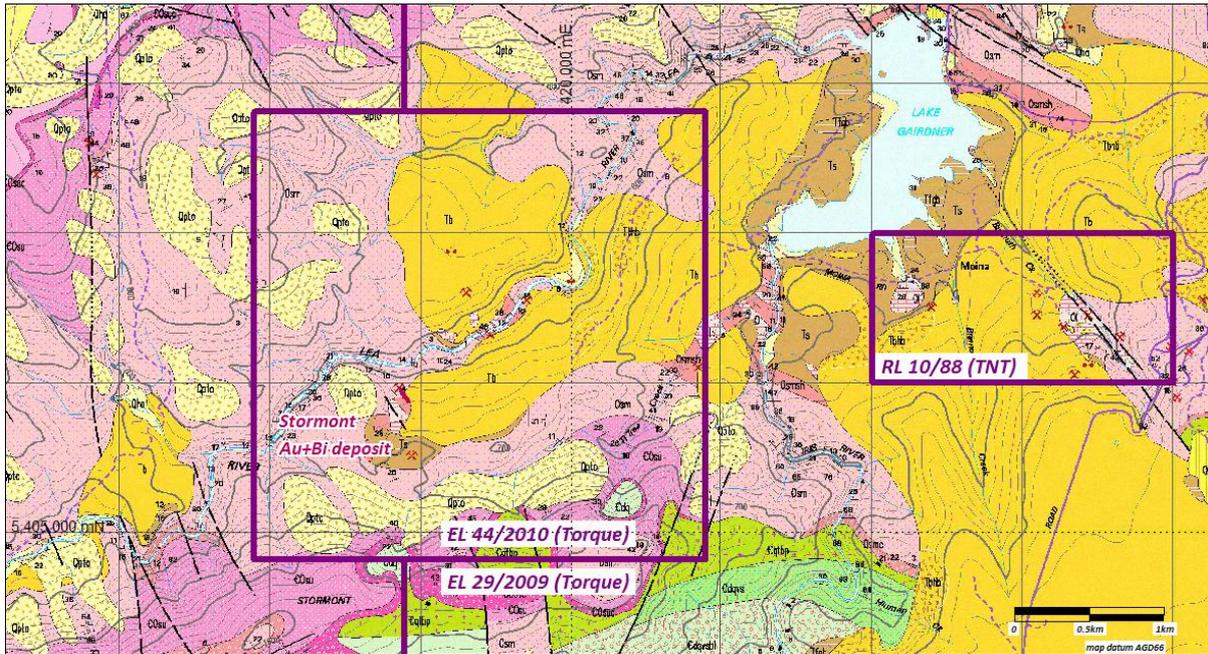
The Cambrian rocks are generally obscured by the overlying Ordovician and only outcrop in windows in the region. Where outcropping the rocks consist of crystal rich sandstones and rhyolitic volcanics and volcanoclastics typical of the uppermost Mt. Read Volcanics unit, the Tyndall Group.

These volcanics are unconformably overlain by the lowermost unit of the Ordovician sequence exposed in outcrop and drilling within the licence area, the Roland Conglomerate, a siliciclastic quartz pebble conglomerate of 10-20m thickness. This unit is conformably overlain by the quartzose Moina Sandstone which is ~200m thick. This unit is conformably overlain by a thin, approximately 40m thick sequence of interbedded calcareous siltstone with lesser calcareous sandstone and limestone known informally as the "Transition Beds". These three units together constitute the Denison Group. The "Transition Beds" are conformably overlain by the Gordon Limestone which is approximately 400m thick regionally. In the Stormont area the basal part of the Gordon Limestone (Gordon Group) is a pyritic black shale (see discussion below).

Regionally the Cambrian-Ordovician sequence has been intruded by the Middle-Devonian Dolcoath I-type Granite with formation of a number of discrete skarn type orebodies formed within the "Transition Beds" or basal Gordon Limestone units. Known skarn bodies consist of the Shephard and Murphy fluorite skarn, Hugo skarn, Fletchers Adit, Ti Tree Creek and Stormont skarns. Within the Stormont RL the granite is not exposed in outcrop or drill core but is believed from gravity data to underlie the licence at a depth of <500m.

The Tertiary cover is apparently sheet-like with commonly a basal clay or gravel overlain by basalt.

(This summary is repeated in section 3.2 in the resource report in appendix B).



**Figure 3.1: Tenement geology after Mineral Resources Tasmania's mapping – Lea and Cethana 1:25,000 sheets. Green rocks are Cambrian volcanics and volcanoclastics, Pink rocks are Ordovician sediments, Brown rocks are Tertiary sediments overlain by Orange rocks which are Tertiary basalt.**

### 3.2 Stormont Au+Bi Deposit Geology

The following summary is taken from the resource report. There is a considerable amount of further detail given in the resource report and the reader is referred to this (appendix B).

The Stormont Au+Bi deposit is a skarn type orebody with gold and bismuth mineralisation hosted in a dominantly garnet+actinolite skarn assemblage. Skarn type mineralisation is formed by the alteration of precursor carbonate minerals to calc-silicate minerals by hydrothermal fluids derived from granitic intrusions at depth.

The precursor rocks to the skarn are interpreted by more recent workers (Newnham, 1993 and Reid, 2009) to be a unit of calcareous sandstones and finer sediments known informally as the Transition Beds, lying stratigraphically between the underlying Moina Sandstone and overlying Gordon Limestone. The informal Transition Beds name is due to the rocks being transitional between sandstones beneath and limestones above.

Earlier workers (Fleming, 1988) interpreted the skarn as replacement of more pure limestone at the base of the Gordon Limestone.

The debate is essentially where to place the base of the Gordon Limestone stratigraphic unit in the area.

There are no recognisable gritty intervals (such as in the host rocks to the Higgs deposit interpreted as Transition Beds) though stratiform zonation of skarn mineral assemblages, particularly magnetite bearing, suggests an in-homogeneity in sediment and thus at least part of the skarn is hosted in impure limestone at least.

The interpretation used herein is that the host to the skarn is the Transition Beds.

In the Stormont deposit the skarned rocks lie in the core of a sub-horizontal southeast-northwest trending F2 syncline where they have been preserved from erosion.

Economic gold and bismuth mineralisation is found in the stratigraphic upper half of the skarned Transition Beds with the lower half characterised by a different assemblage of calc-silicate minerals and with generally low gold and bismuth values apart from adjacent to the Stormont Adit Fault.

Mineralisation is spatially and apparently genetically associated with the north-northeast striking, ~70° southwest dipping Stormont Adit Fault which passes along the northeastern limb of the syncline. Hydrothermal fluids from the Dolcoath Granite at depth have utilised this fault as plumbing.

Mineralisation is also associated spatially with the Stormont Thrust, which has a similar strike but dips moderately to the northeast. Some previous workers interpreted this structure to be the main fluid pathway but this interpretation is questioned by subsequent drilling and this fault is now considered to not be a significant control though it may have existed pre-mineralisation.

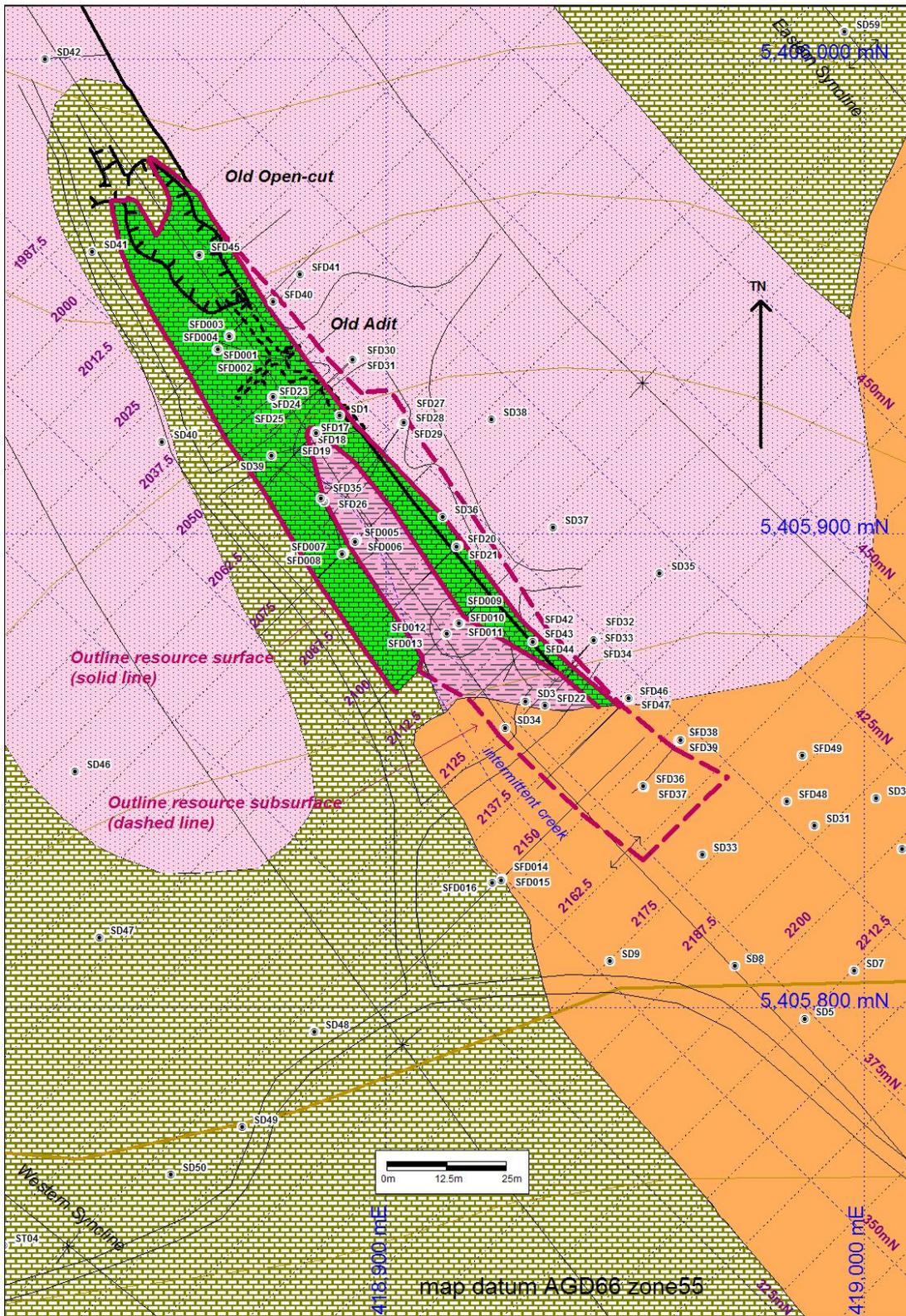


Figure 3.2: Stormont Au+Bi deposit geology – plan view

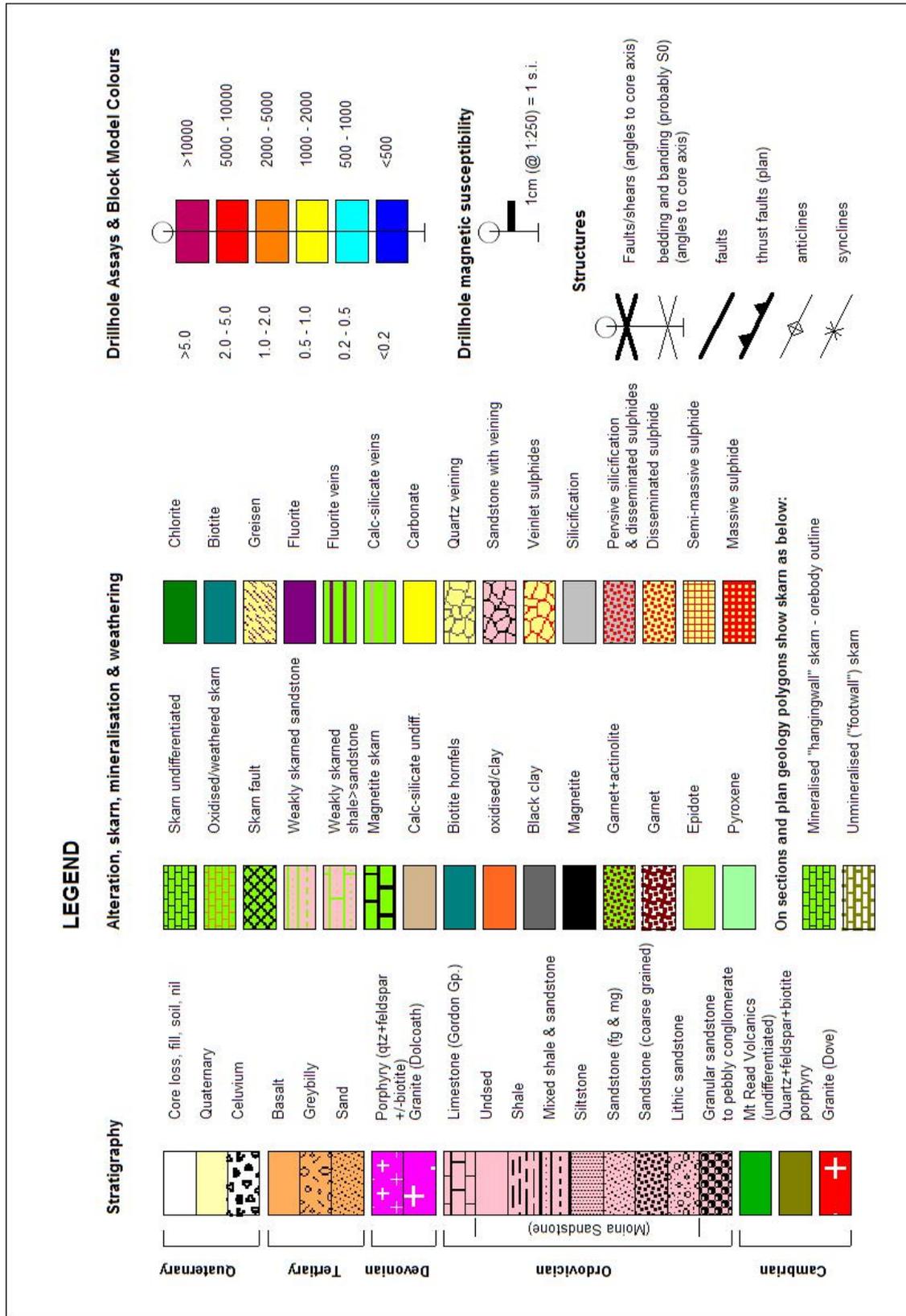
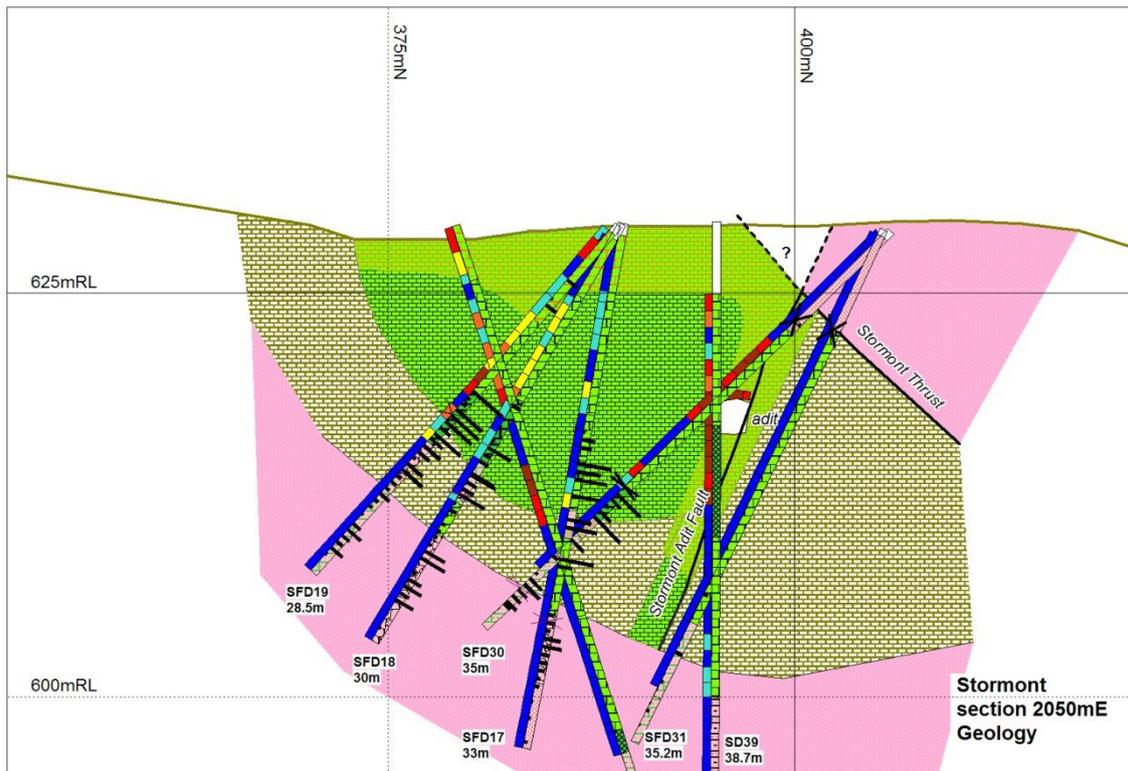


Figure 3.3: Legend for figures 3.2, 3.4 and figures 6.27 to 6.32



**Figure 3.4: Stormont Au+Bi deposit geology – representative section 2050mE**

#### **4.0 Exploration Philosophy**

Frontier Resources Ltd/Torque Mining Ltd is actively exploring for gold principally but with Bi, Mo, W, Sn, Cu, Pb, Zn, Ag, F and rare earths also targeted.

Most mineralisation known in the licence area and district is associated with the Dolcoath Granite, largely as skarns but with some lode style also.

In areas not under Tertiary cover soil sampling should be an effective tool bearing in mind the narrow shape of probable gold skarn mineralisation.

Beneath Tertiary cover (and in areas of poor outcrop) geophysics may provide vectors to favourable setting. Known gold skarn mineralisation is found in retrograde skarn assemblages which appear to immediately overlie magnetite rich skarn.

The regional 3D IP survey has shown correspondence between Stormont and the two adjacent syncline hosted skarn bodies (Western and Eastern Synclines) and shallow anomalous conductivity highs. This conductivity is apparently due to shale in the upper Moina Sandstone (i.e. stratigraphically just beneath the skarned sequence) but may be used to map out synclines, a favourable structural setting for the preservation of skarn.

## 5.0 Previous Exploration

Historical exploration over the tenement area would have commenced in the latter part of the 19<sup>th</sup> century, however, successful discoveries only commenced in the early part of the 20<sup>th</sup> century with the Stormont Au+Bi deposit discovered in 1928.

Other old workings which date back to the early phase of prospecting are the Fletchers Adit workings, Stormont gold mine, Lea River alluvials and the western portion of the Ti Tree Creek workings.

The following summary draws largely from Purvis (2000) with post-2000 exploration added.

"Largest was the Stormont Mine, where a 40m long and 8m deep opencut with 40m long adit were excavated in a body of mineralized skarn between 1928-34. The mine produced 6.3t of bismuth concentrate containing 63% bismuth and 91 oz of gold (Roberts, 1986).

A similar but more weakly mineralized Au-Bi skarn was prospected at Fletchers Adit on the south bank of the Lea River 1km NE of Stormont Mine. There is no record of production from Fletchers.

Alluvial gold was worked in the Lea River downstream of the Stormont Mine and Fletchers Adit occurrences.

Hard rock gold, hosted by thin quartz veins in a fault in Ordovician sandstone with conglomerate bands, was prospected by shafts 15m deep at the Stormont Gold Mine on the northern slopes of Mt Stormont (Twelvetrees, 1913). Again, there is no record of production.

There is no record or visible sign of historic prospecting in the Ti-Tree Creek skarn.

Modern large-scale systematic exploration of the (licence) area was initiated by Mt Lyell Co. in 1965. After an aeromagnetic survey they cut a grid extending from the Lea River to the Cradle Mountain Road. They followed up with detailed grids over the skarns at Ti-Tree Creek and the Stormont Mine - Fletchers Adit area.

(Just east of EL 42/2010's eastern boundary) magnetic and bismuth-in-soil anomalies delineated over the Ti-Tree skarn were investigated by 700m of costeaning and two test lines of pole-dipole IP. IP anomalies and costean rock chip intersections up to 10m @ 0.48% Bi were obtained. Drilling was recommended but not done.

In the Stormont Mine - Fletchers Adit area Mt Lyell undertook soil sampling and gradient array IP. They delineated a large skarn with modest bismuth-in-soil and IP anomalies north of the Lea River opposite Fletchers Adit, but did no drilling. No further work was done at Stormont Mine because their estimate for the mineralized skarn body (250,000 tons) was regarded as too small (McKibben, 1971). Mt Lyell withdrew in 1972.

In 1972-73 the Department of Mines drilled two holes into the Ti-Tree Creek. DOM2 (101m – within EL42/2010) intersected 15m of skarn at surface with a best interval of 3.2m @ 0.19% Bi & "trace" Au. DOM3 (95m – just outside EL 42/2010) intersected 13m of skarn and calc-silicate under 10m of Tertiary basalt, for a best result of 1m @ 0.11% Sn. From 1974-79 the licence area was part of a major exploration effort by Comalco, who discovered and drilled out the Moina Deposit (26 million tonnes @ 18% CaF<sub>2</sub>) (further east of EL 42/1010).

They searched the surroundings for similar mineralization, gridding almost the entire area at 50m spacing and carrying out mapping, soil sampling, magnetics, some IP and drilling.

At Ti-Tree Creek Comalco determined the DOM2 skarn contained up to 5.6% F. Chip sampling of outcropping magnetite-pyrite skarn returned values up to 0.65g/t Au over 4m. They drilled hole SMD31 (41m – inside EL 42.2010) to test a magnetic peak, intersecting 7m of magnetite skarn with low values: 0.15g/t Au & 1% F. They did a gradient array IP survey over Stormont Mine and Fletchers

Adit which indicated skarn extensions SW of Stormont, and east and west of Fletchers. However, they did no drilling at either prospect."

"Comalco was followed on the Moina project by two JV partners: Shell and CRA. CRA reassayed most of the Comalco holes for gold, concentrating on those in and around the Moina Deposit. In 1981 Shell drilled LGD1 (254m) at 5407500N / 420650E within (EL 42/1010), to test a coincident magnetic / gravity anomaly on the Moina Sandstone ridge west of Lake Gairdner. Below 101m the hole was in magnetite-veined Mt Read Volcanics. It was devoid of mineralization.

In 1983 Gold Fields Exploration took up the Stormont area after it was dropped by the Comalco JV. GFEL's target was gold and they determined all streams draining north from Mt Stormont were anomalous in gold. Channel sampling of the old workings at Stormont Mine returned values up to 42m @ 9.56 g/t Au & 0.5% Bi. Sampling of the final face in the adit showed the old miners stopped in ore grading 36.5 g/t Au and 1.1% Bi.

From 1988-90 GFEL drilled 21 holes at Stormont Mine and 9 near Fletchers Adit. The most significant intersections were in the Stormont skarn: 13m @ 4.1g/t Au, 0.46% Bi (SD1); 2.1m @ 12.8g/t Au, 0.35% Bi (SD3); and 5.4m @ 2.5g/t Au, 0.1% Bi (SD10).

At Fletchers the holes were all north of the Lea River and outlined a large area of weakly auriferous skarn mostly beneath thin Tertiary basalt. Best intersection was 2m @ 1.5 g/t Au in FD7. One hundred metres away the northern-most hole (FD8) had a 35m gold-anomalous section with 21m assaying 0.3 g/t Au. Despite the encouraging drill results GFEL withdrew in 1991.

In the 5 years Goldstream-Titan had (old EL) EL20/92 the exclusive focus of groundwork on the licence was drilling at (the) Stormont (Au+Bi) Mine. They put down a further 32 short holes, mostly in peripheral areas for generally poor results. Better intersections were all in the main mineralized zone: 10.5m @ 1.4 g/t Au (SD33); 9.5m @ 2.7g/t Au (SD36); 19.6m @ 2.9g/t Au (SD39) and 8m @ 1.8g/t Au (SD44). They estimated the deposit contained 100,000 - 150,000t @ 2-4g/t Au (Newnham, 1996).

The only work done by Goldstream-Titan on the EL outside Stormont was a high resolution helicopter-borne aeromagnetic survey of the whole 25 sq km tenement (EL 20/92) in 1996." (Purvis, 2000)

In August 1999 EL 20/92 was transferred to Jervois Mining N.L. (Jervois). In early 2000 Jervois drilled 4 holes (NTW size = 64mm) in the Stormont prospect (Purvis, 2000). Holes ST01, ST02 and ST03 were drilled at the southeastern end of the central zone with ST04 drilled into the western zone. All holes were drilled vertically. Both ST01 and ST02 intersected unmineralised skarn. ST03 was drilled apparently east of the Stormont fault. The results of the three holes in the central zone were poor but appear to have closed off the main mineralised zone between SD44 and ST01. ST04 in the western zone intersected 2.0m at 3.5g/t Au.

Jervois also drilled five holes (TC01 to TC05) totalling 188m (of which TC01, 04 and 05 lie within EL 42/2010) at the Ti Tree Creek skarn magnetic anomalies, anomalous Bi in soils and IP anomalies from the Mt Lyell survey. Four of the five holes intersected skarn though best result was 1m @ 1.32g/t Au and 0.18% Bi in TC04.

Frontier commenced work on the Stormont prospect in early 2008, completing diamond drillholes SFD001 to SFD016 (for 543.9m). All holes were drilled HQ/NQ. Frontier also carried out further channel sampling in the open cut with 16 samples for 21.8m.

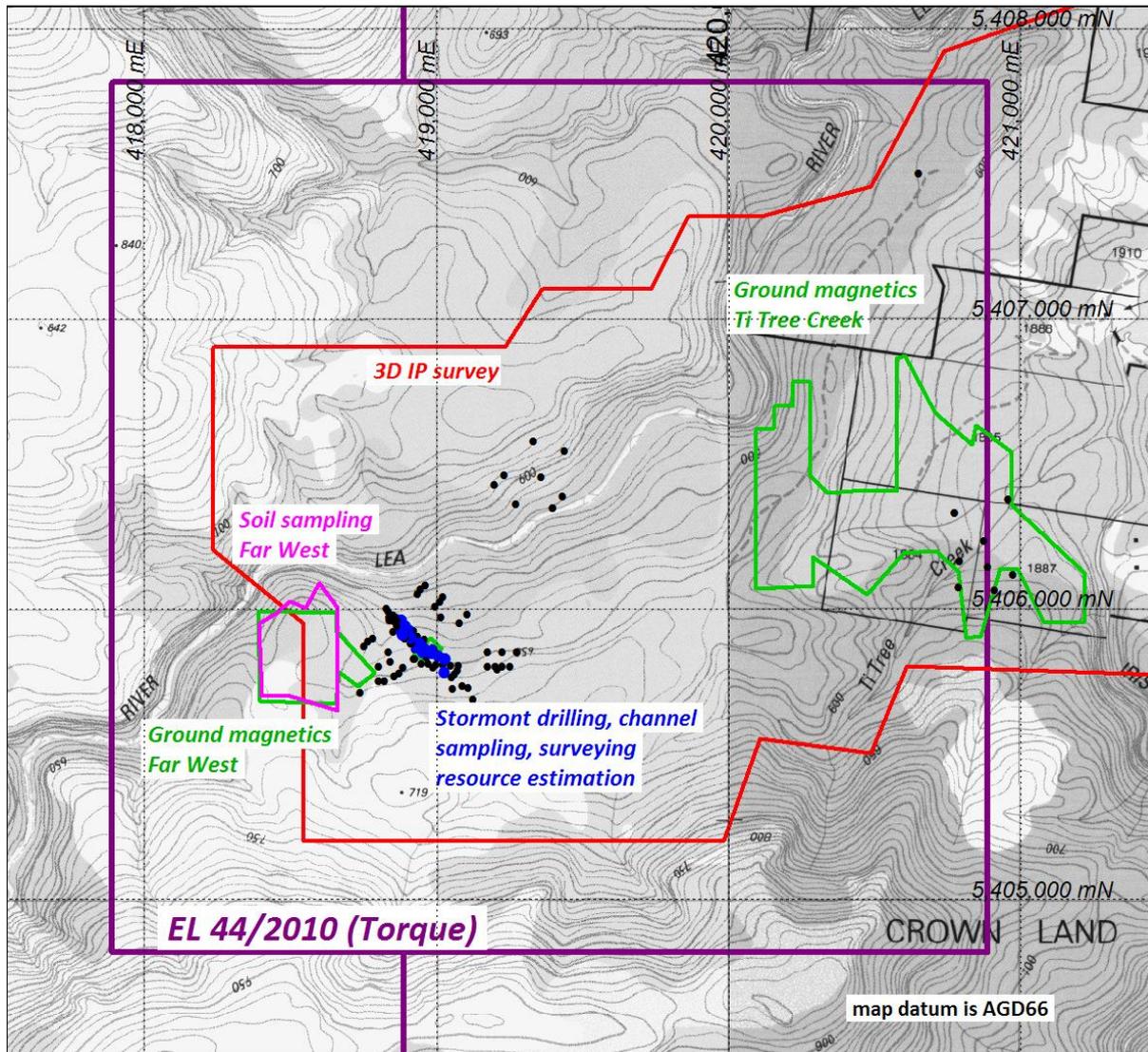
In 2009 Frontier estimated a JORC compliant Inferred Resource for the deposit (at 1.5g/t Au cutoff) of 91,400t @ 4.57g/t Au, 0.30% Bi and 3.52g/t Au for 13,430 oz Au, 277t Bi and 10,340 oz Ag.

## 6.0 Work Done May 2011 to April 2012

### 6.1 Introduction

EL 42/2010 is part of Frontier's Moina Project (also including RL 3/2005 "Narrawa Creek" and EL 29/2009 "Cethana").

The Moina Project was a major focus of Frontier's exploration activity in the second half of 2011 and early 2012 with a large regional 3D IP survey and drilling at both Stormont on EL 42/2010 and Narrawa Creek RL 3/2005. Work done in 2011/12 is summarised on figure 6.1.



**Figure 6.1: Summary of work completed in 2011/12 year.**

Drilling at Stormont focused on converting the current Inferred Resource to Indicated status and attempting to extend the resource to the southeast. Other work towards the generation of an Indicated Resource consisted of;

- Channel sampling northeast wall of old open cut.
- Re-assaying pulps for gold to address the 10.5% potential error from Burnie Research Laboratories assaying.
- Surveying old workings to generate a DTM of the old open cut and adit.
- Surveying old drillholes collars conventionally.
- QA/QC re-assaying and umpire check assaying sufficient to justify Indicated status.

- Generation of 3D wireframes of the deposit and associated geology in Surpac.
- Estimation of Indicated Resource using Surpac's Ordinary Kriging functionality.

The modelled resource utilises drillholes up to and including SFD47. Drillholes SFD48 to SFD55 were also completed during this drilling programme to the immediate southeast of the modelled resource but results did not justify the extension of the resource to include these holes. Whilst further details of holes up to and including SFD47 are included in the resource report in appendix B, details of holes SFD48 to SFD55 are included here in section 4.4.

Amy Cockerton completed her Monash University Masters Preliminary project thesis and also published a paper with supervisor Andrew Tomkins in Cockerton and Tomkins (2012).

Work was also carried out over the helimagnetic anomaly lying west of the Western Syncline and imaginatively named the Far West prospect. Here work consisted of;

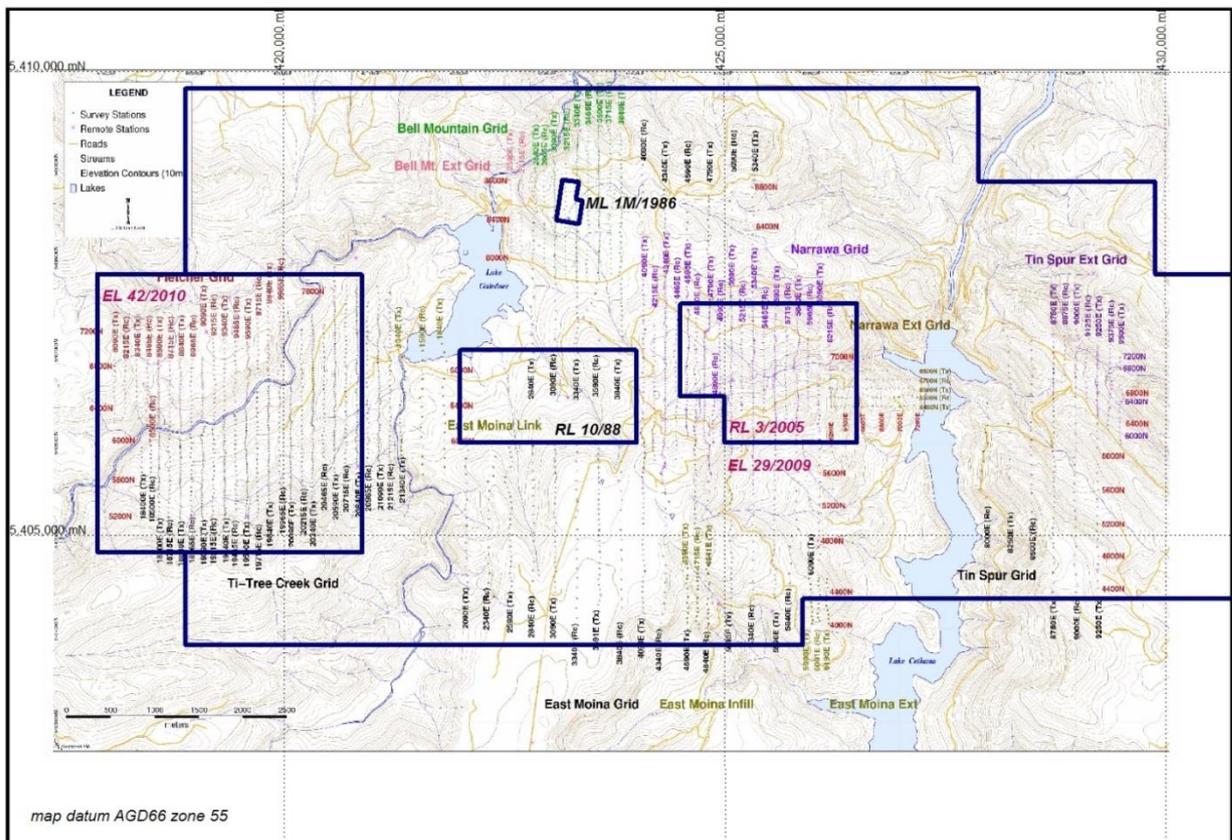
- 50m spaced gridding.
- Soil sampling.
- Ground magnetics.

In addition an Aboriginal heritage assessment was done of the Western Syncline/Far West area as part of the requirement for approval for drilling these prospects in the future.

## 6.2 3D IP Survey

### 6.2.1 Introduction

EL 42/2010 was included in a large 3D IP survey conducted over ~24 square kilometres of Frontier's Moina Project by SJ Geophysics and Frontier personnel. The area of the survey and surveyed lines are illustrated in figure 6.2.



**Figure 6.2: 3D IP grid lines surveyed in whole survey – grid lines run north-south. EL 42/2010 lies on the west side of the plan and is covered by the Fletcher (north of River Lea) and Ti-Tree Creek (south of River Lea) grids. A larger version of this figure is included in appendix A.**

The survey was carried out over a ~128km grid cut by Frontier's own crew cut over a 2 month period from mid-August 2011. Existing access and gridding was utilised wherever possible.

The grid was cut in a cursory fashion sufficient to remain open for the IP survey and any immediate soil sampling but expected to close over before 1 year.

Grid lines were true north-south (except for Narrawa extended on RL 3/2005 which was east-west), and were surveyed by a combination of suunto compass with handheld GPS checking. Map datum used in all work was AGD66 zone 55.

Grid spacing varied. Over the whole grid nominal spacings were 250m with 125m or 100m in selected areas. In the part of the grid which covered EL 42/2010 grid spacings were 125m with 100m spacings in the west and north-western parts of the grid. The unusual eastings were a result of incorporating an existing 100m MGA94 zone 55 grid in the Narrawa Creek area into the new grid.

The survey was carried out by SJ Geophysics of Vancouver with their in-house Volterra system. Details of the whole survey are given in the logistics report included as appendix A.

The benefits of the Volterra method is as follows (taken from logistics report):

*"In the standard 3DIP configuration, a receiver array was established along one survey line while current lines are located on two adjacent lines lying on either side of the receiver line. Current injections are performed sequentially at fixed increments (25, 50, 100 or 200m) along the current lines. By injecting current at multiple locations along current lines adjacent to receiver arrays, data acquisition rates are significantly improved over conventional surveys. Meanwhile, geophysical data are collected along a receiver array that consists of dipoles usually laid out along even intervals dictated partly by the receiver cable.*

*The Volterra system provides much more flexibility because each DABStix receiver records a single dipole, thus eliminating the need for specialised receiver cables and a centralised receiver control station. Dipoles can be oriented in any direction, can be of varying lengths, and completely avoid inaccessible areas if necessary."*

Frontier have had considerable success with the methodology and the SJ Geophysics crew in PNG and have used the methodology previously over its Elliott Bay tenements over the southern Mt Read Volcanics.

The survey was designed to try and achieve two outcomes:

Firstly to look for bigger systems at depth associated with the Dolcoath Granite intrusion. These might be disseminated sulphide type or stockwork/sheeted vein type systems in and around the margin of the granite. Regional scale 3D modelling of gravity and magnetic data by David Leaman (Leaman 1988) has shown the Dolcoath Granite, which outcrops to the east on either side of Lake Cethana, runs as an east-west spine beneath EL 42/2010 with a flattish top and steep northern edge running roughly coincident with the Lea River and the F1 synclinal fold axis at a depth of ~500m.

This was achieved by surveying on the 250m spaced grid where this is the grid spacing and incorporating closer spaced 125m and 100m data from detailed areas in a coarser deeper looking 3D inversion model.

Secondly to look nearer surface for analogs of the known deposits at Stormont and Higgs i.e. skarn's as well as other near surface possibilities such as Round Mountain style base metals in structural sites and Tin Spur style disseminated tin+gold.

The petrophysical properties of skarns depend very much on their mineralogy. Skarns such as the pyrrhotite+base metal+gold Higgs lodes are more favourable to IP than the low sulphide actinolite+garnet+gold+bismuth Stormont type skarns, though in the case of the latter a reasonably consistent association with magnetite skarn (defining base to mineralisation) may be useful.

The Fletchers and Ti-Tree Creek grids are 125m spaced for the most part with 100m spaced lines at the western ends.

### 6.2.2 Results

The survey has been very successful regionally in defining a number of chargeability and conductivity anomalies as well as helping map the subsurface geology. It has shown great utility for near surface targets in resistivity data.

Data is presented below as a series of depth below surface images of chargeability and resistivity. The latter are shown in greyscale as it acts to enhance the resistivity highs (= conductivity lows).

In particular resistivity lows i.e. conductivity highs in the data at around the depth to which Stormont extends clearly map out Stormont as well as the Western Syncline and Far West prospects to the immediate west and Eastern Syncline to the immediate east. East of here basalt (to ~20m? thick) obscures the prospective geology yet the resistivity image shows a series of similarly linear and predominantly north-northwest striking "conductive trends" (see figures 6.15 - 6.18 and 6.24 – 6.25).

The similarities are quite startling though there are still potential less than exciting explanations and other factors which need consideration. Firstly it is unlikely that the gold+/-bismuth mineralisation which is responsible for the resistivity low in the IP data. A number of options present themselves;

- anomalies may be due to black shale in the upper part of the Moina Sandstone but below the skarned sequence
- anomalies may be due to the black shale which immediately overlies the mineralised skarn
- anomalies may in part be due the magnetite rich skarn
- the base of the basalt is often a potentially conductive clay layer
- anomalies may be due to actinolite+garnet skarn being of lower resistivity than Moina Sandstone
- anomalies correspond to base metal +/- pyrrhotite mineralised biotite hornfels further east at Narrawa

The data has been interpreted by geophysicist Peter Swiriduk whose report details work over the whole project but which is included in its entirety as appendix A1.

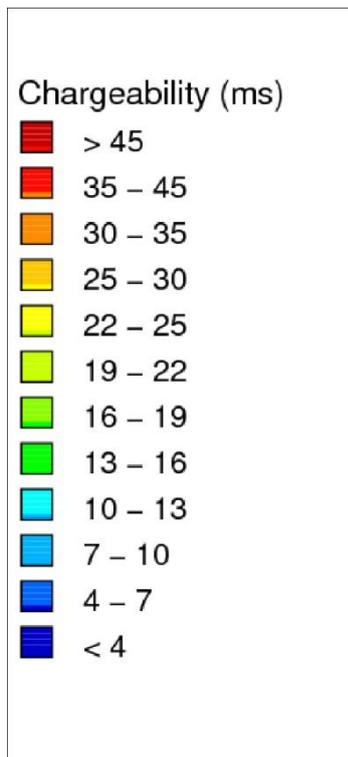
Peter uses somewhat different names for the trends in his figures 10 and 6 in Appendix A1 and reproduced here in figures 6.24 and 6.25.

Peter summarises the anomalies in table 6.1

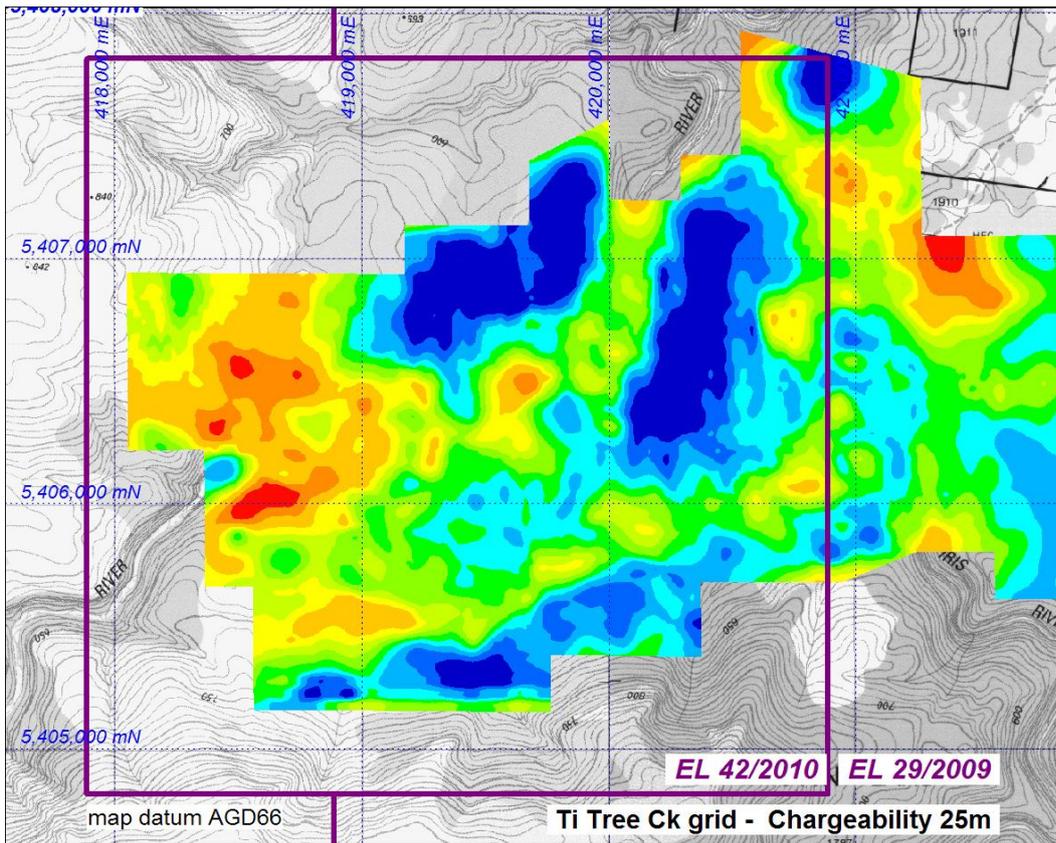
<b>Anomaly</b>	<b>Location</b>	<b>Description</b>
T11	418880e, 5405930N	Stormont gold and bismuth deposit within an interpreted syncline occurring as a linear conductivity anomaly.
T12	418760e, 5405790n	A 200m long conductivity anomaly 150m west of Stormont partly tested by drillhole SD20 with 6m@0.44g/t Au.
T13	418512e, 5405808n	A 150m long conductivity anomaly 380m west of Stormont.
T14	419240e, 5405800n	A 200m long conductivity anomaly 280m east of Stormont partly tested by drillholes SD15,16&18 (2m at 0.42 g/t Au) beneath basalt cover.
T15	419009e, 5405950n	The anomaly is 120m in length beneath basalt cover 100m east of Stormont with drillhole SD60 near its edge.

TI6	419133e, 5406060n	This anomaly is on an interpreted syncline under basalt.
TI7	419250e, 5405980n	A 135m long anomaly on the same trend as TI6.
TI8	419450e, 5405980n	This conductivity anomaly is part of a dual anomaly with TI9 200m in length beneath basalt cover.
TI9	419550e, 5406080n	The second part of dual conductivity anomaly TI8/TI9.
TI10	419700e, 5406100n	Occurring on an interpreted syncline beneath basalt with depth extent to over 150m.
TI11	419600e, 5406230n	A small anomaly 160m on the same trend NNW as TI10.
TI12	419870e, 5406230n	A 170m long anomaly trending NW beneath basalt cover.
TI13	420230e, 5406430n	A 220m long conductivity anomaly trending N-S.
TI14	419393e, 5406510n	Fletchers adit conductivity anomaly beneath basalt.
TI15	420600e, 5406520n	A 200m long anomaly on a syncline beneath basalt
TI16	420780e, 5406590n	A 200m long anomaly on a syncline beneath basalt
TI17	418720e, 5405380n	This circular 100m diameter conductivity anomaly can be inspected on ground and sampled.
TI18	419,580e, 5405660n	One of four anomalies (TI18 to 21) on NNW trending interpreted synclines partly associated with interpreted ENE structures. These targets can be mapped on ground and sampled.
TI19	420010e, 5406140n	An elongated conductivity anomaly in between ENE trending structures. This 300m long anomaly can be mapped and sampled on ground.
TI20	420240e, 5406210n	One of four anomalies in between ENE trending structures. This 300m long anomaly can be mapped and sampled.
TI21	420420e, 5406210n	One of four anomalies in between ENE trending structures. This 360m long anomaly can be mapped and sampled.
TI22	420840e, 5406190n	This discrete circular conductivity anomaly occurs on an interpreted structure.
TI23	420970e, 5406410n	A 260m long conductivity anomaly called the Ti-Tree Central Trend occurring between mapped basalt.
TI24	418340e, 5406280n	Discrete circular anomaly within Moina sandstone.
TI25	418360e, 5406640n	Elongated 300m long anomaly within Moina sandstone.
TI26	418710e, 5406550n	Elongated 450m long anomaly within Moina sandstone
TI27	418680e, 5406080n	Discrete 80m wide anomaly within Moina sandstone.
TI28	418960e, 5406600n	Discrete 70m diameter anomaly beneath basalt.
TI29	419840e, 5406740n	A 200m long anomaly called Lea River trending NW occurring beneath mapped basalt.
TI30	420230e, 5406910n	A 200m long anomaly trending NS on a syncline in basalt.
TI31	420950e, 5406910n	This 600m long conductivity anomaly occurs within a syncline called the Zabriskie Trend beneath basalt.
TI32	421080e, 5407020n	A NW trending anomaly 400m long beneath basalt.
TI33	421470e, 5406250n	Occurring on a syncline 240m long beneath basalt.
TI34	421630e, 5406350n	A 160m long anomaly the called Link Trend beneath basalt.
TI35	421430e, 5406900n	Iris Bridge Trend anomaly on a syncline recommended for mapping and sampling.
TI36	421400e, 5406620n	A 200m long N-S anomaly on the edge of mapped basalt.
TI37	421050e, 5407240n	Heggars Trend conductivity anomaly beneath basalt.
TI38	421110e, 5407390n	A 150m long anomaly beneath basalt.
TI39Chg	420880e, 5407360n	A 200m diameter chargeability anomaly with a conductivity anomaly at its centre on a NE trending structure and on the contact between mapped basalt and Moina

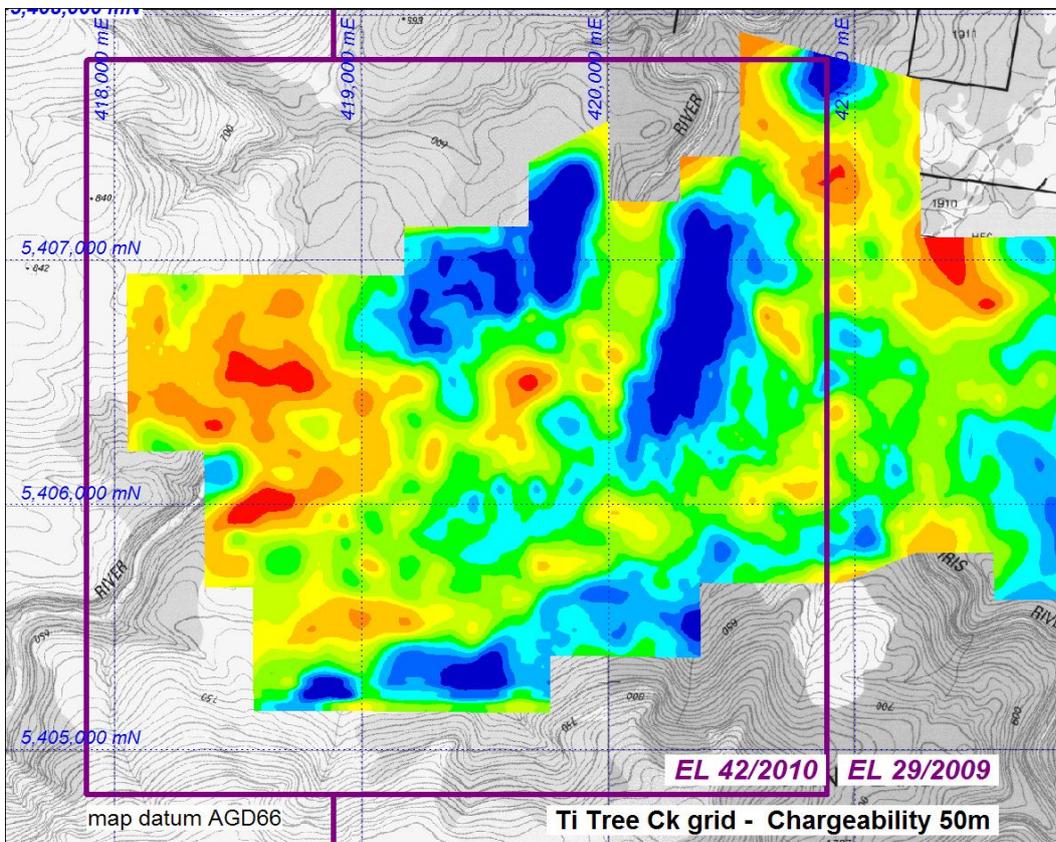
(LGD1)		sandstone.
TI40Chg	418550e, 5406640n	An 800m by 500m chargeability anomaly within Moina sandstone possibly caused by pyrite. The anomaly is host to the elongated conductivity anomalies TI26&28.



**Figure 6:3 3D IP chargeability legend**



**Figure 6.4: 3D IP Chargeability – 25m below surface**



**Figure 6.5: 3D IP Chargeability – 50m below surface**

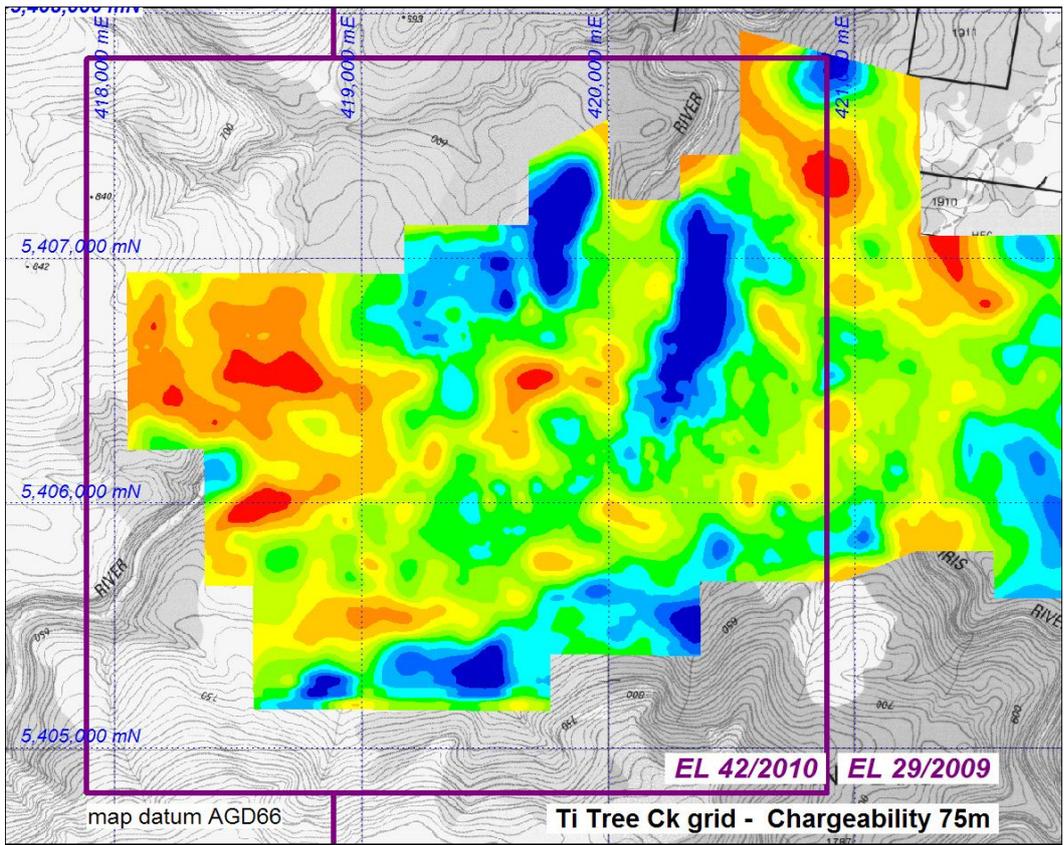


Figure 6.6: 3D IP Chargeability – 75m below surface

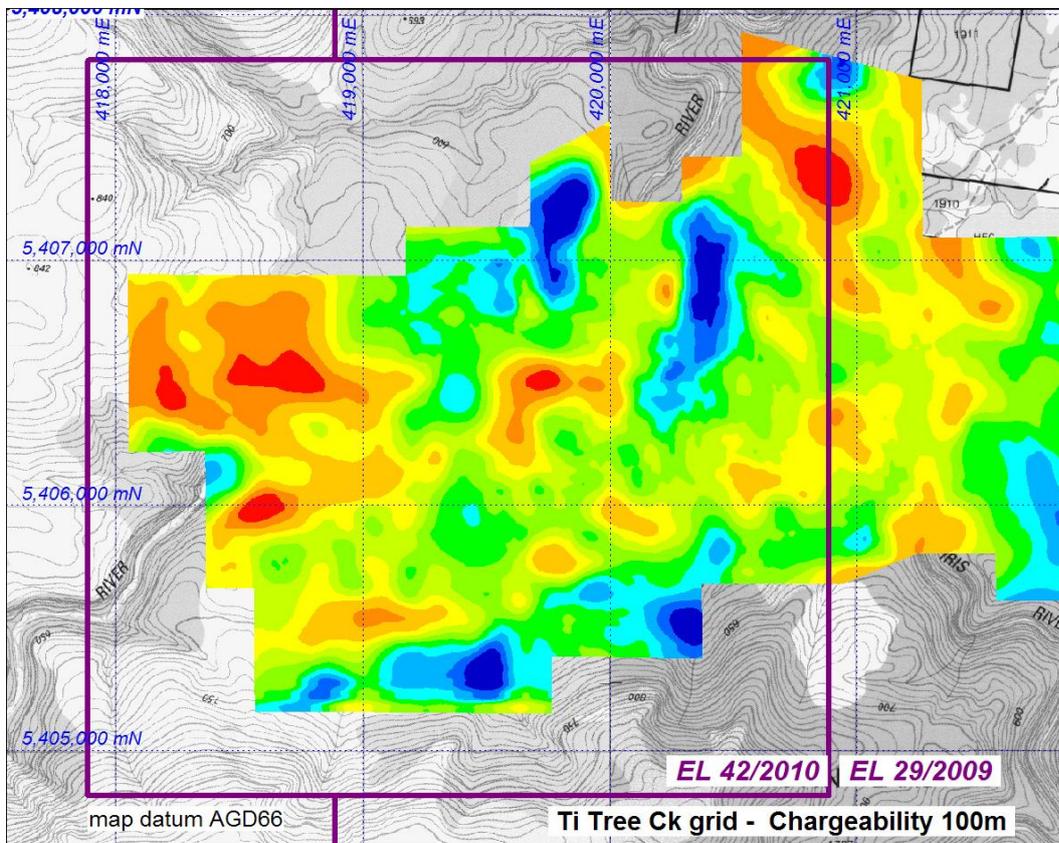
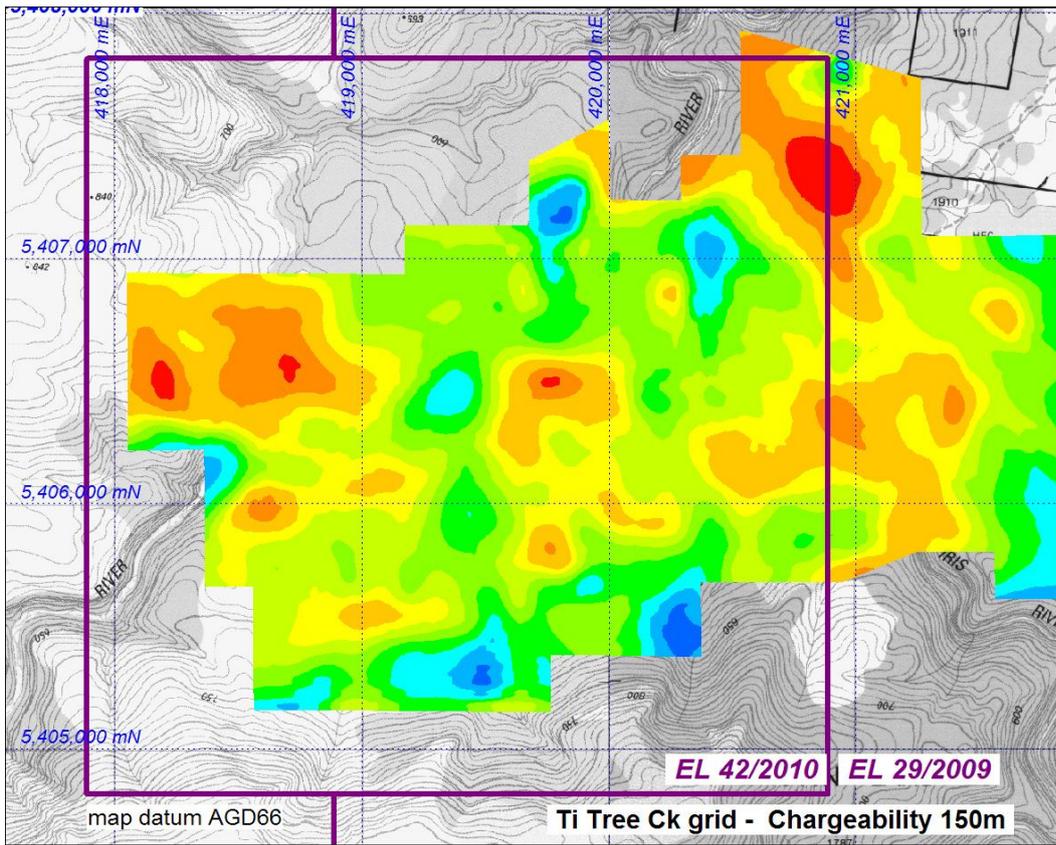
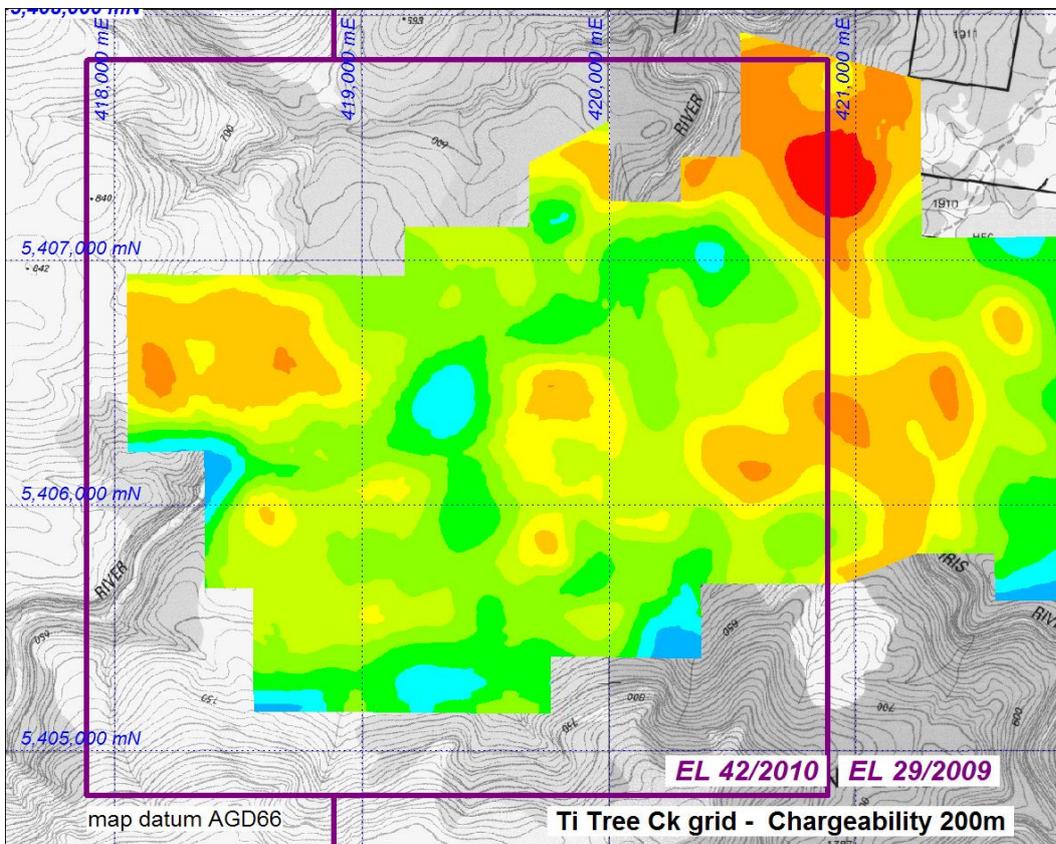


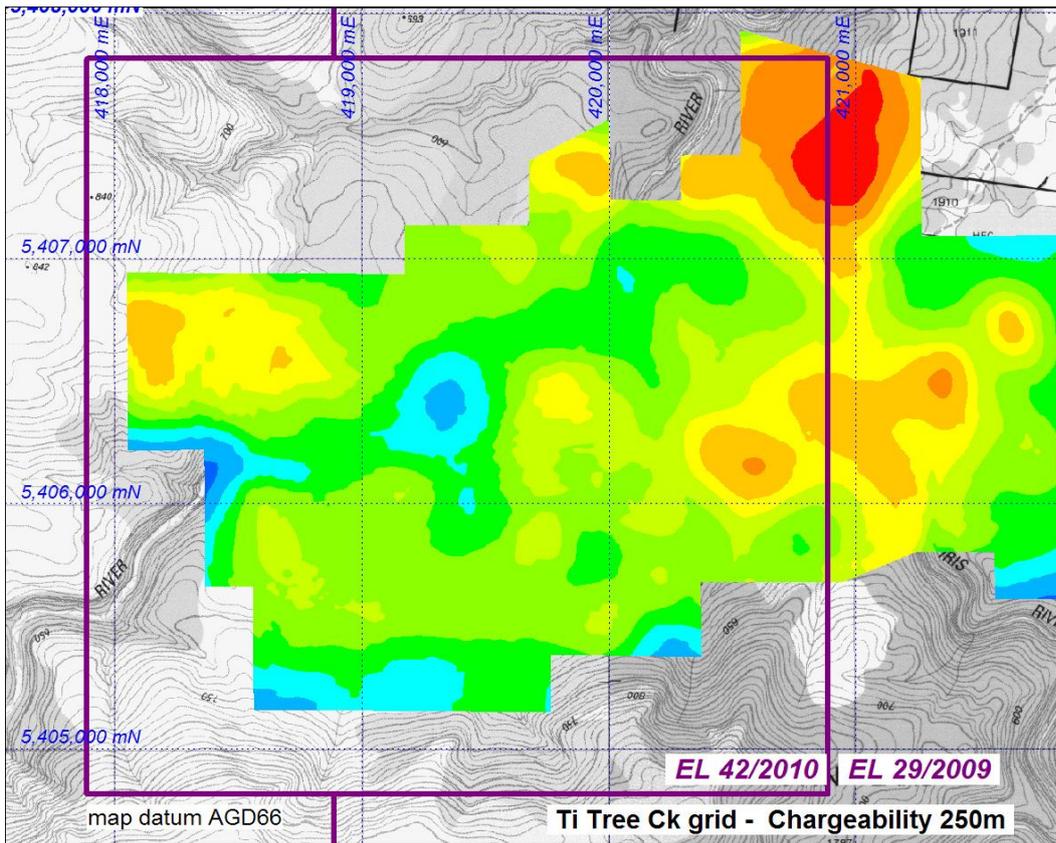
Figure 6.7: 3D IP Chargeability – 100m below surface



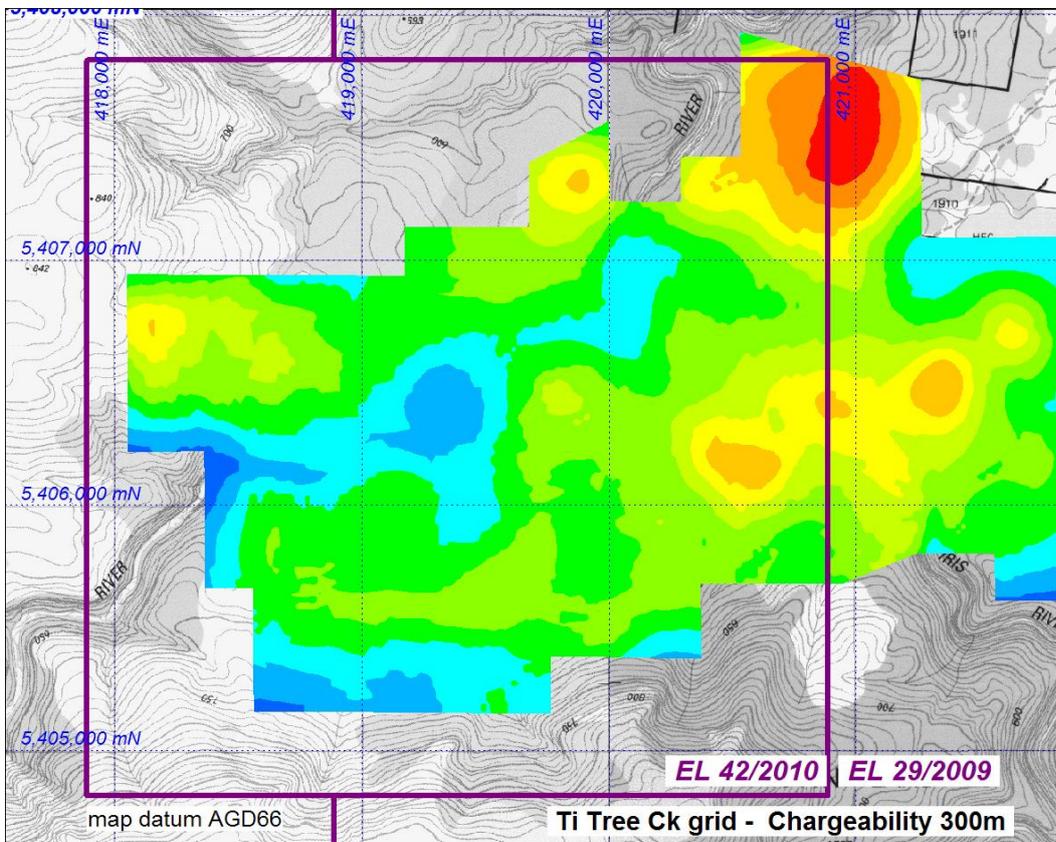
**Figure 6.8: 3D IP Chargeability – 150m below surface**



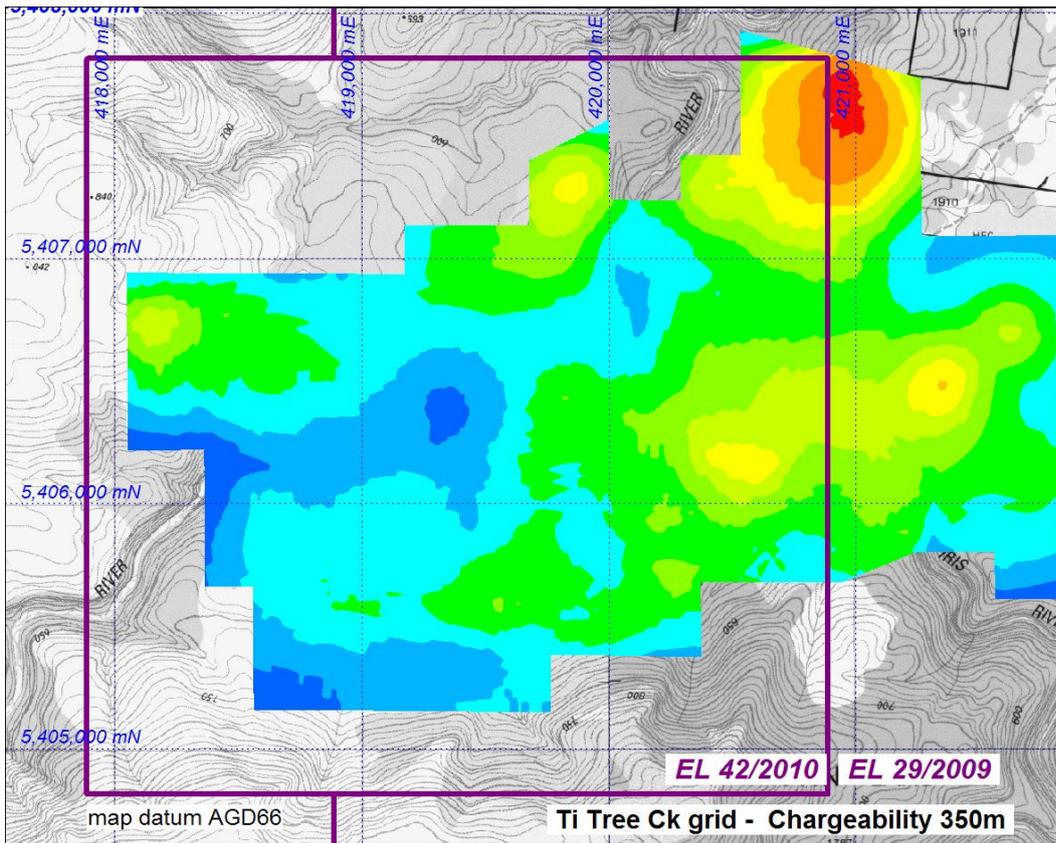
**Figure 6.9: 3D IP Chargeability – 200m below surface**



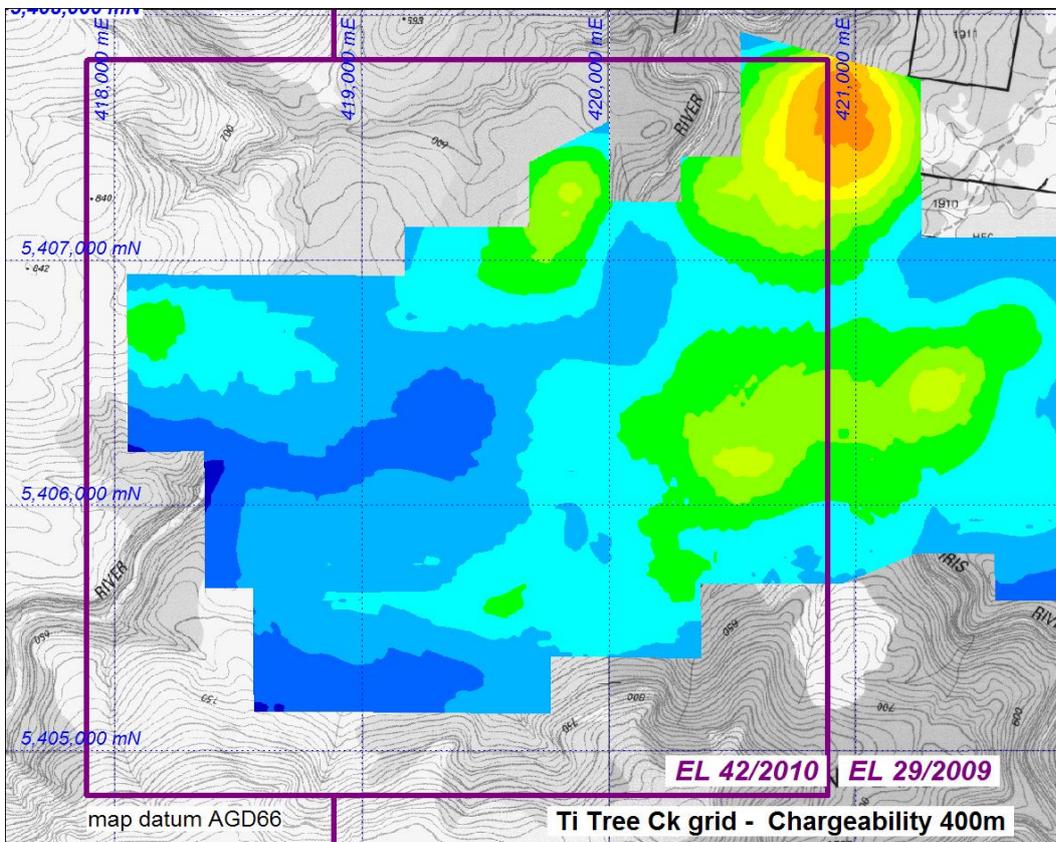
**Figure 6.10: 3D IP Chargeability – 250m below surface**



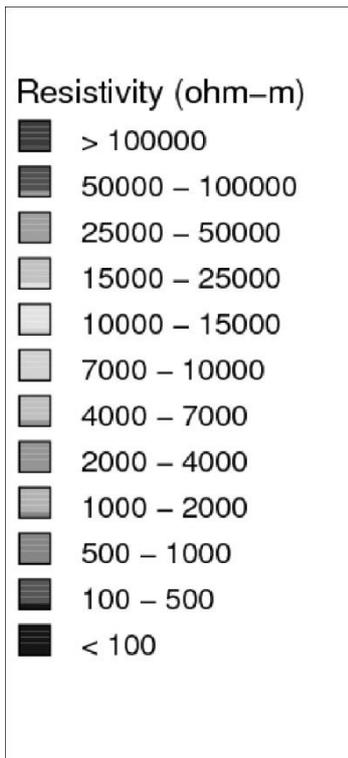
**Figure 6.11: 3D IP Chargeability – 300m below surface**



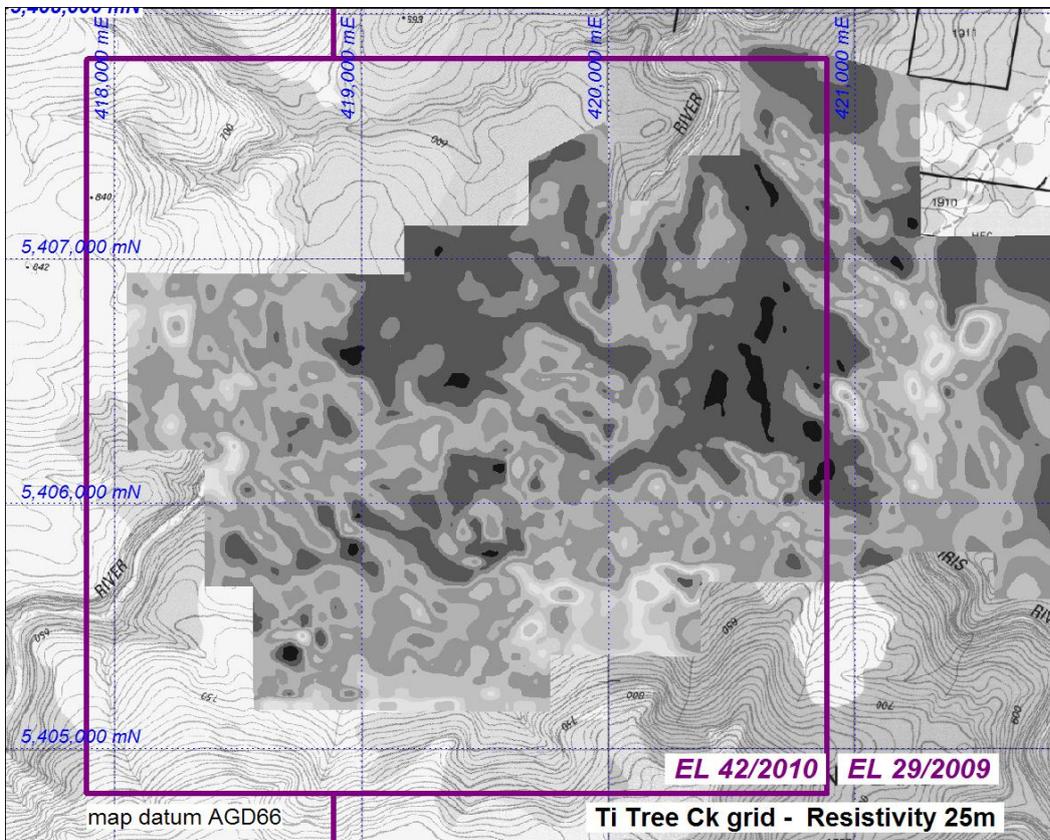
**Figure 6.12: 3D IP Chargeability – 350m below surface**



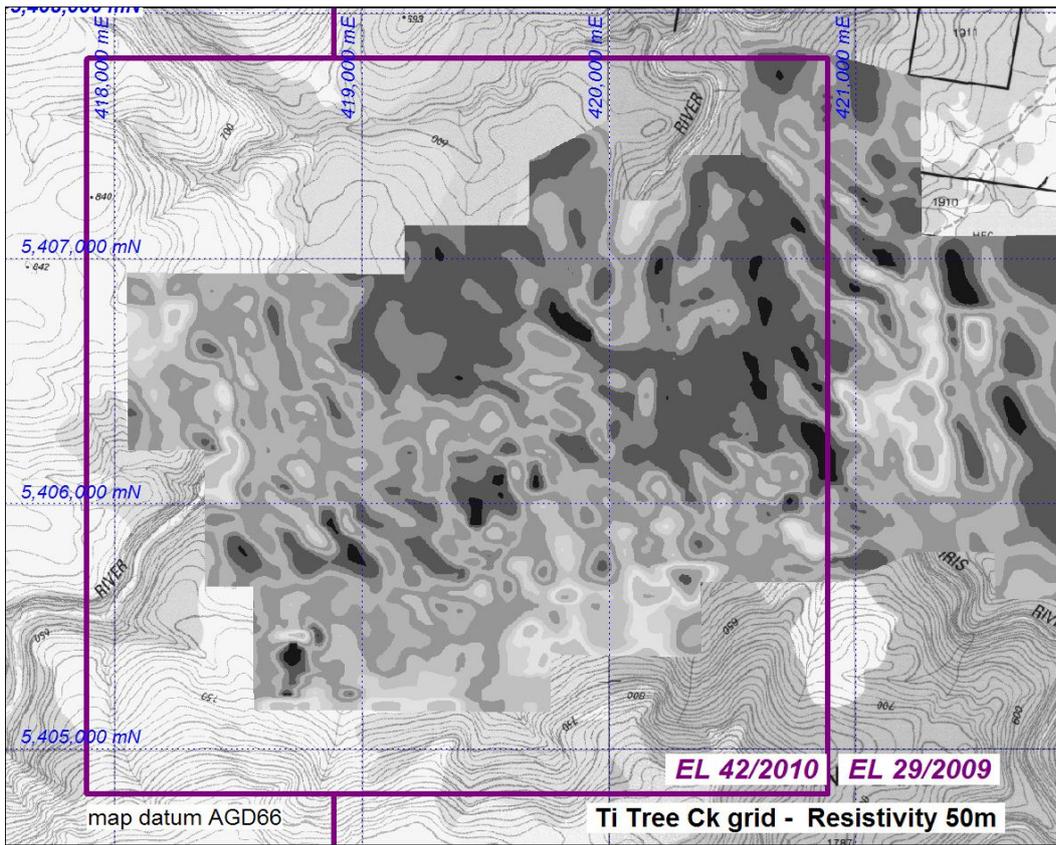
**Figure 6.13: 3D IP Chargeability – 400m below surface**



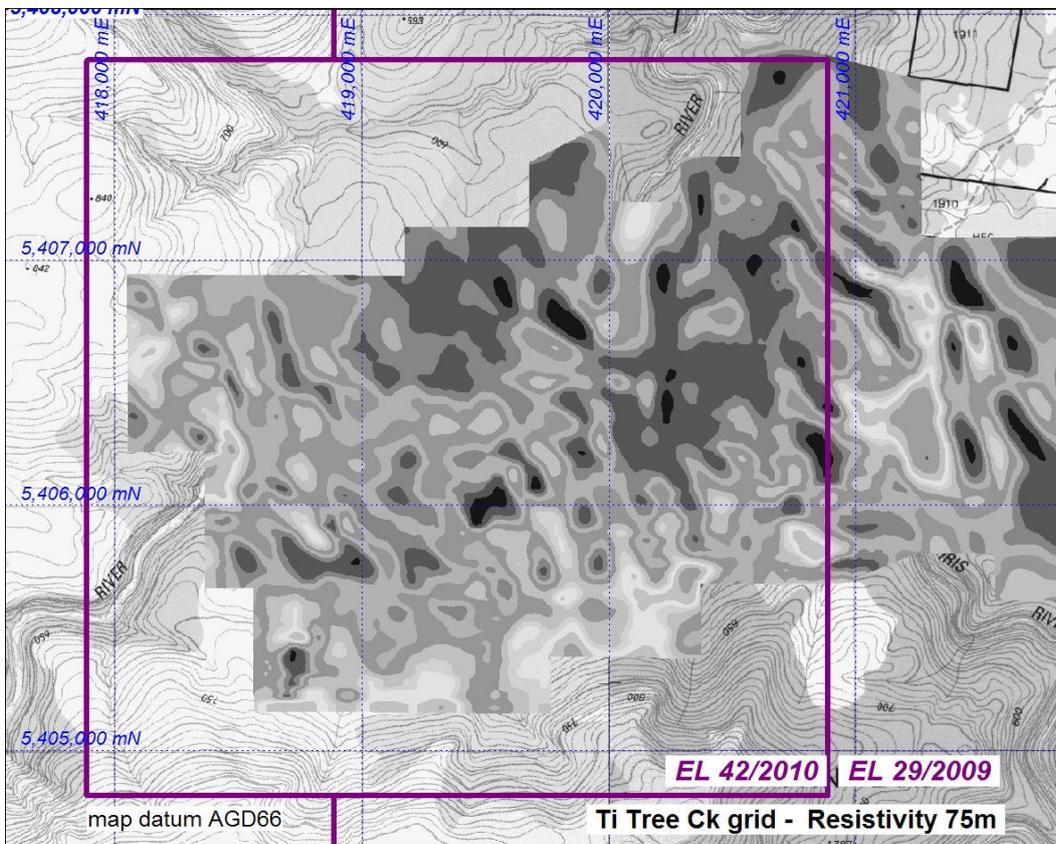
**Figure 6.14: 3D IP Resistivity legend**



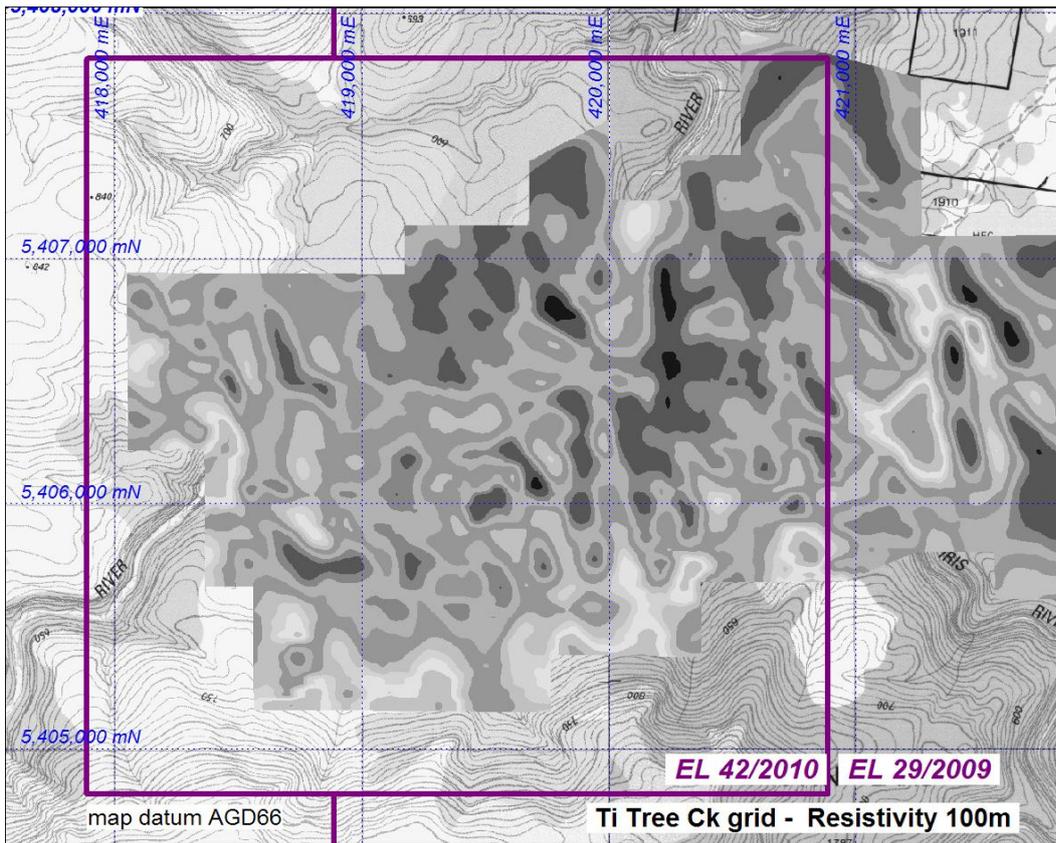
**Figure 6.15: 3D IP Resistivity – 25m below surface**



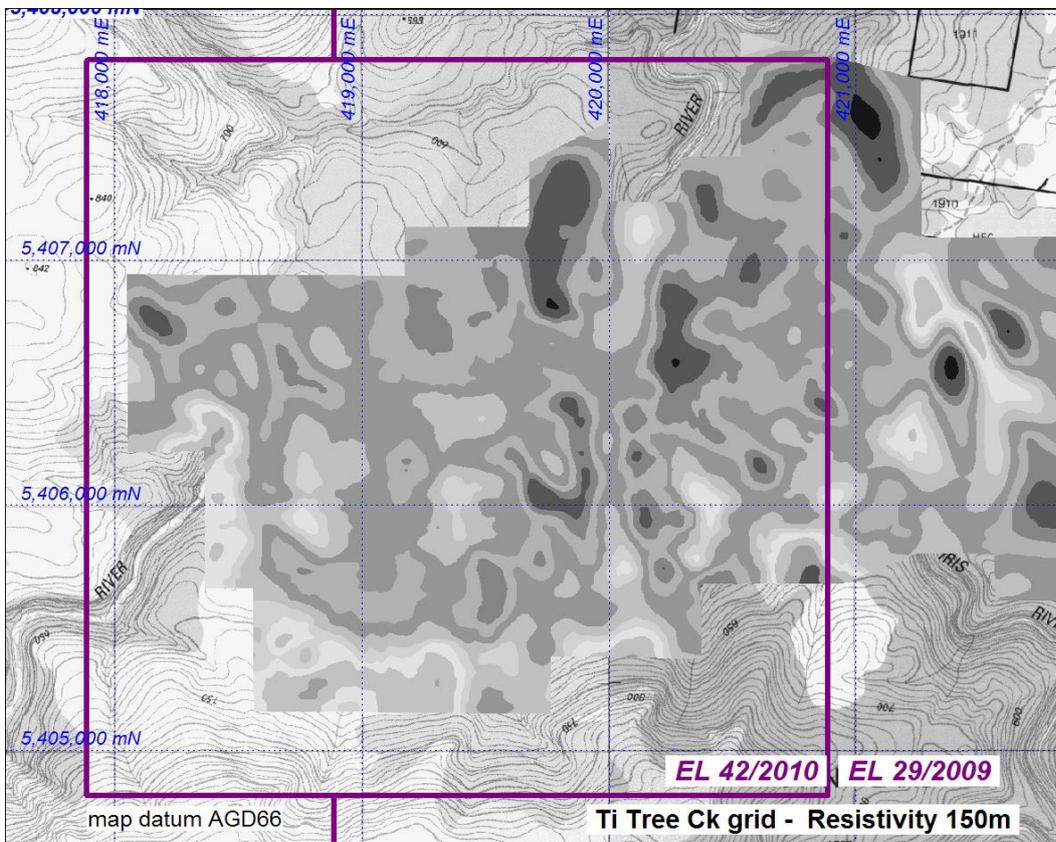
**Figure 6.16: 3D IP Resistivity – 50m below surface**



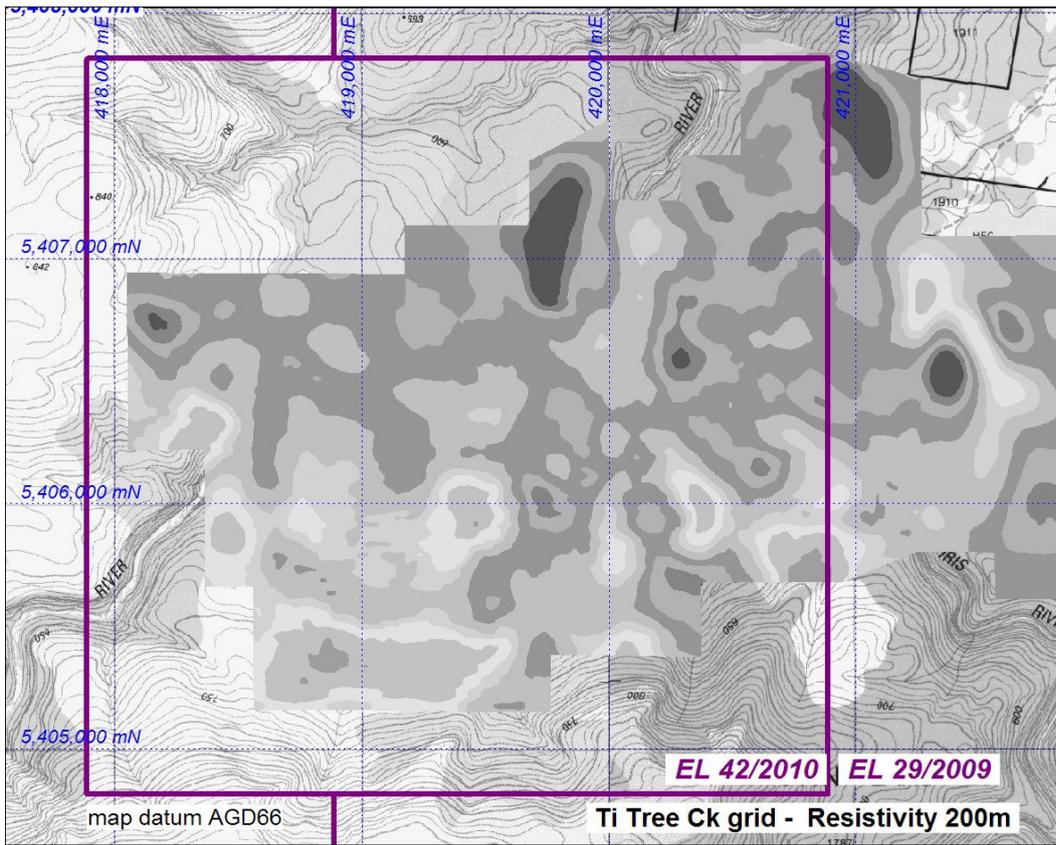
**Figure 6.17: 3D IP Resistivity – 75m below surface**



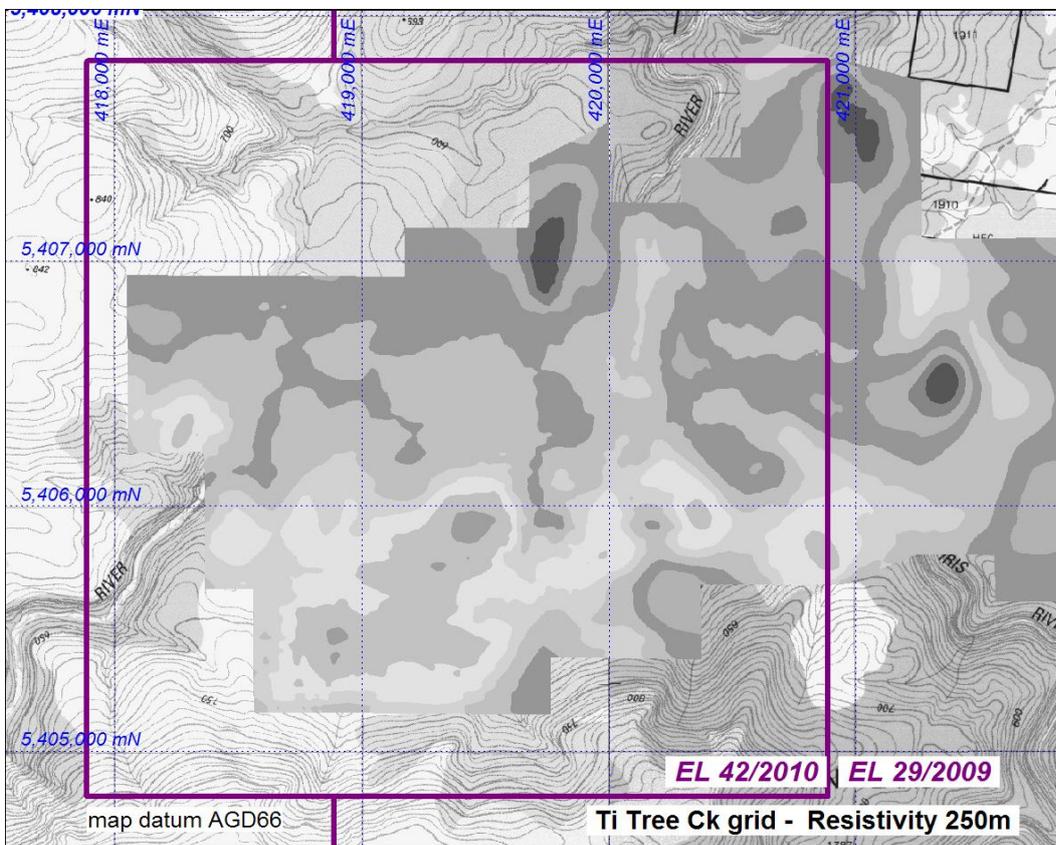
**Figure 6.18: 3D IP Resistivity – 100m below surface**



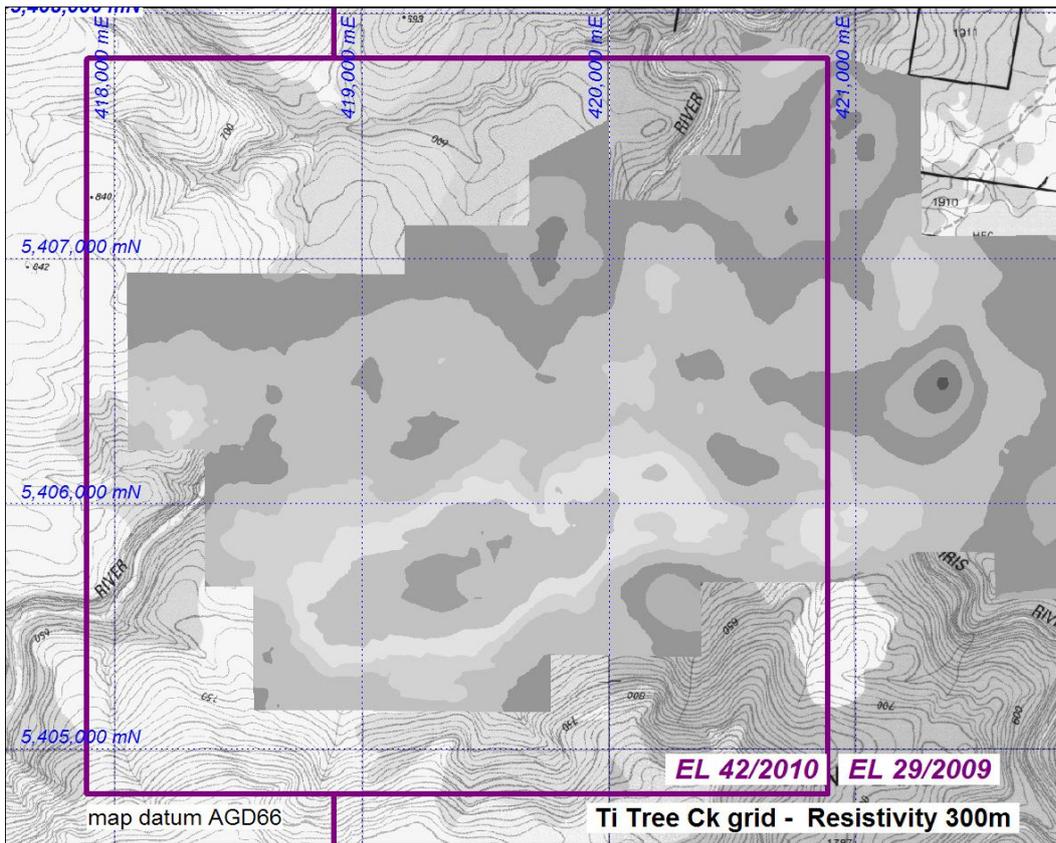
**Figure 6.19: 3D IP Resistivity – 150m below surface**



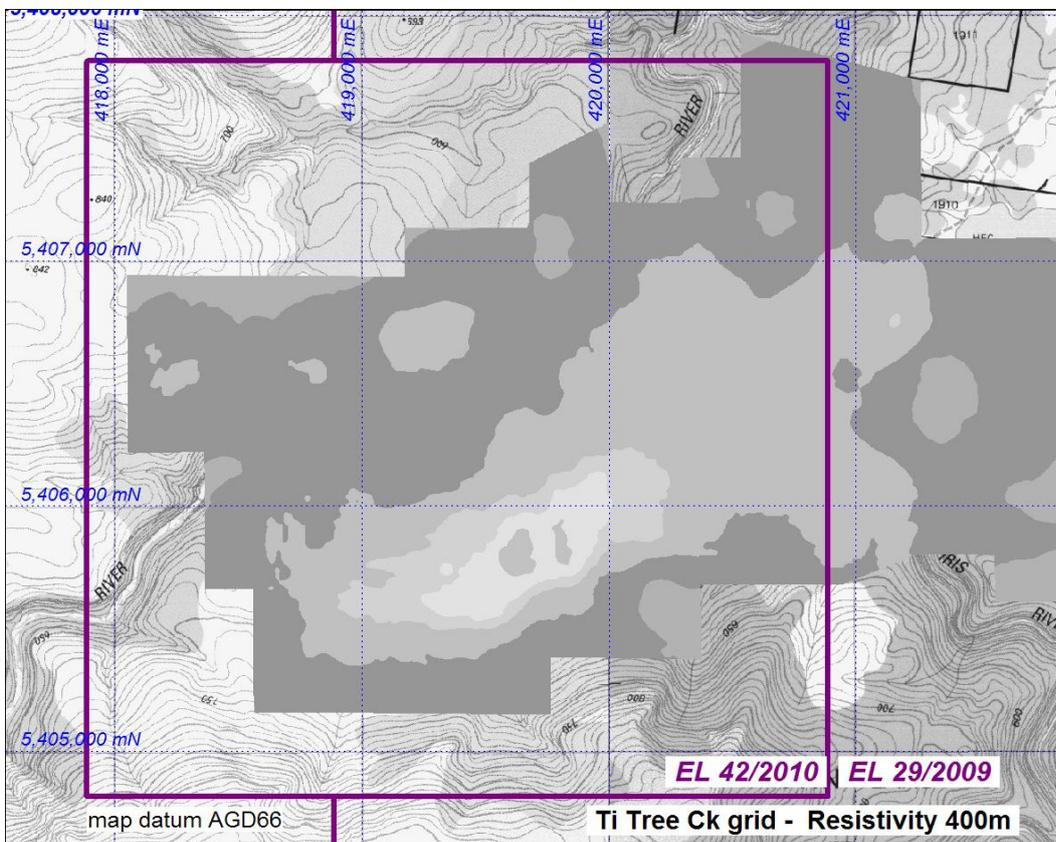
**Figure 6.20: 3D IP Resistivity – 200m below surface**



**Figure 6.21: 3D IP Resistivity – 250m below surface**



**Figure 6.22: 3D IP Resistivity – 300m below surface**



**Figure 6.23: 3D IP Resistivity – 400m below surface**

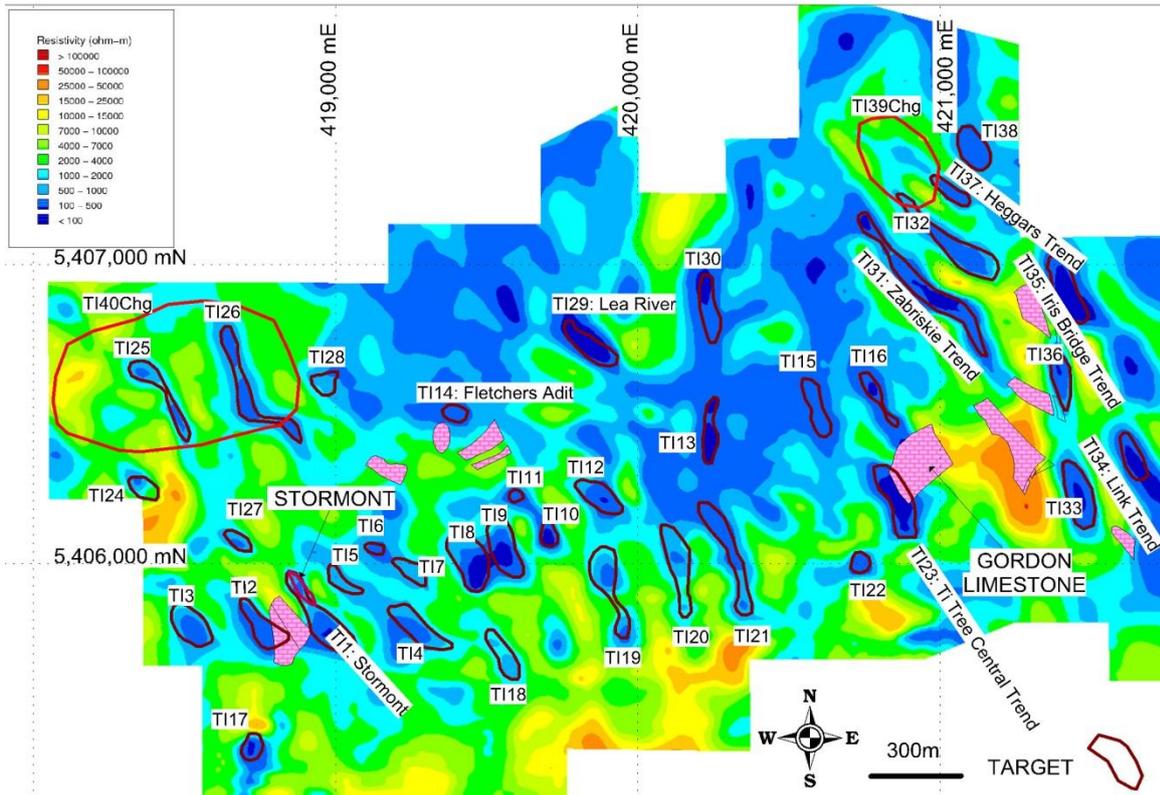


Figure 6.24: Ti Tree Creek grid resistivity 75m below surface with anomalies circled and named. Orange hatching is Tertiary basalt cover (figure 10 in Swiriduk in Appendix A1).

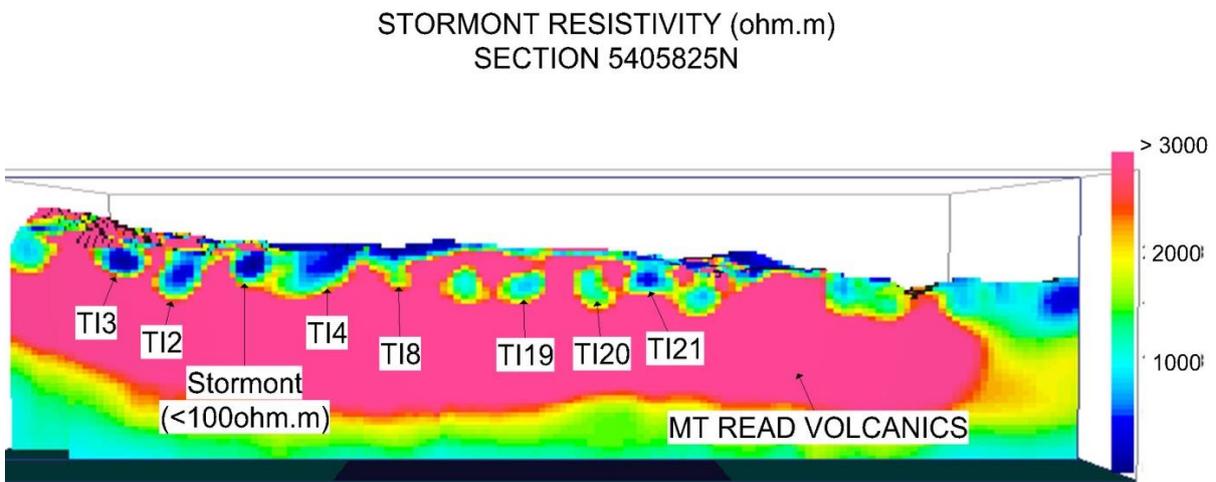


Figure 6.25: Ti Tree Creek grid cross section 5405825mN (AGD66) of resistivity showing targets. (Figure 6 in Swiriduk in appendix A1).

### 6.3 Stormont Resource Work

#### 6.3.1 Introduction

Frontier's previous resource estimation concluded that there were deficiencies in the data supplied for the estimation which precluded it from Indicated Status. A series of recommendations were made;

- *"Infill drilling on 12.5m sections with holes using the current fan geometry.*
- *Drilling angled holes towards the southwest on 12.5m spaced sections designed to intersect the Stormont Thrust before passing into the high grade zone on the eastern limb of the syncline.*
- *Further more thorough channel sampling of the old workings with both walls of the underground workings channel sampled and another tier of channel sampling along the walls of the open cut.*
- *Surface trenching again on 12.5m sections over the area of outcropping mineralisation.*
- *Umpire re-assaying of existing and new sampling.*
- *Conventional surveying of existing drillhole collar and channel sample locations including the old open cut and underground workings.*
- *Creation of a more accurate surface DTM*
- *More thorough relogging of existing drill core and mapping of exposures with foci on (1) mineral assemblages and controls on the distribution of Au and Bi mineralisation, and (2) geological structure, both in order to understand any structural control on mineralisation and for geotechnical purposes. Given the possible relationship between retrograde magnetite and Au + Bi mineralisation magnetic susceptibilities should be measured for all drill core. The use of PIMA which may be able to map out retrograde actinolite, probably associated with Au + Bi mineralisation."*

Frontier set to addressing these deficiencies carrying out the following work;

- Drilling 31 holes named SFD17 to SFD47 for 872.05m
- Drilling a number of these holes targeted to intersect the Stormont Thrust Fault before passing into mineralised skarn. Two holes were drilled specifically to test the Stormont Thrust Fault and Stormont Adit Faults to the immediate north-east of the adit.
- Channel sampling 42.9m along the north-eastern walls of the old open cut. Channel samples were named FRSTC06 to FRSTC11.
- Conventional surveying of most existing drillholes as well as 3D surveying of the old open cut and old adit sufficient to allow creation of wireframes of each. This too allowed creation of a better surface DTM.
- Re-assaying pulps from the 2008 drilling and channel sampling in order to confirm the error in the gold grades as assayed by Burnie Research Laboratories.

### **6.3.2 Drilling**

The Stormont resource drilling was completed with 872.1m drilled in 31 drillholes, SFD17 to SFD47. Drilling was done on nominal 12.5m sections midway between the existing 25m spaced drill sections. Some infill drilling was also done on these 25m sections.

Further drilling SFD48 to SFD52 continued to attempt to extend the resource to the southeast. The results of these holes are discussed in section 6.4.

Drilling was nominally towards the north-east (045° true = 031° magnetic) or south-west (225° true = 211° magnetic) or vertical though some holes were drilled at angles slightly at variant with these orientations in order to accommodate old workings or because of minor errors in set-up only realised once drilling.

Almost all holes were drilled by Frontier's own custom built RB38 rig, the exception being SFD's 26, 35, 40, 41 and 45 which were drilled with the Poltock man-portable rig.

RB38 holes were drilled HQ .

Of the Poltock rig holes, SFD35, 40, 41 and 45 were drilled TT56 throughout (slightly smaller than NQ) with SFD26 drilled TT56 to 7.35m and finished in TT46.

A compilation of all intersections used in the modelling is listed below.

**Table 6.2 Compilation of drillhole significant intersections used in modelling**

Hole_ID	From (m)	To (m)	Length (m)	Au (g/t)	Bi (ppm)	Ag (g/t)
SFD001	2.3	11.5	9.2	2.36	2632	8.21
SFD002	4	10	6	2.88	6370	17.8
SFD003	1.5	13.5	12	0.43	1327	2.33
SFD004	1.7	13	11.3	3.38	3074	6.19
inc SFD004	8	11	3	11.3	3079	6
SFD005	7.9	26	18.1	6.49	2555	4.49
inc SFD005	21.4	26	4.6	24	3991	5.96
SFD006	1.8	19.3	17.5	1.46	817	2.53
SFD007	0	7.5	7.5	2.48	1597	1.57
SFD008	0	9	9	1.88	827	1.3
SFD009	0	16.1	16.1	6.05	6821	5.06
inc SFD009	3.1	11	7.9	12.1	13752	9.52
SFD010	0	24.5	24.5	0.446	92.8	1.07
SFD011	1	18	17	3.54	1227	3.11
inc SFD011	11.5	16	4.5	8.86	3077	4.18
SFD012	4.8	16.1	11.3	0.09	23.7	0.177
SFD013	3.5	21.2	17.7	0.39	259	2.34
SFD014	27.7	32	4.3	0.212	213	2.16
SFD17	0.7	17.9	17.2	0.219	1100	1.99
SFD18	1.05	18	16.95	0.44	1322	2.62
SFD19	0.6	16	15.4	1.27	955	2.25
SFD21	0.4	26.8	26.4	7.59	3534	4.1
inc SFD21	7.5	12	4.5	37.3	14692	10.4
SFD22	6.7	15	8.3	5.14	910	0.12
inc SFD22	12.5	15	2.5	13.4	1076	0
SFD20	0.5	28	27.5	4.83	615	2.7
inc SFD20	4.5	18	13.5	8.34	1066	4.64
and SFD20	22.35	28	5.65	2.76	364	1.08
SFD23	1.2	16	14.8	0.6	1216	2.11
SFD24	1.5	13.5	12	5.58	1857	5.5
inc SFD24	10.5	13.5	3	11.5	6018	12.5
SFD25	1.5	15.2	13.7	2.92	1183	3.52
inc SFD25	9	11.6	2.6	8.05	2636	6.58
SFD26	0.3	18	17.7	0.43	69.6	0.91
SFD27	6	26.7	20.7	4.76	2365	2.03
inc SFD27	11.5	24	12.5	7.77	3913	3.36
SFD28	5.8	30	24.2	0.736	3220	3.71
SFD30	8	25.3	17.3	2.4	2639	1.39
inc SFD30	10	17	7	5.39	6476	3.43
SFD33	10	26.8	16.8	8.02	5000	5.23
inc SFD33	14	18	4	18.6	10039	9.5
and SFD33	23.1	25.3	2.2	25.8	17250	14
SFD35	0.2	30.2	30	0.96	2513	3.34
inc SFD35	3.44	8	4.56	2.7	3787	3.67
SFD36	13.5	25.5	12	0.6	824	0.75
SFD39	13	27	14	3.6	1180	0.83
SFD41	9.1	12.7	3.6	0.18	25	0.8
SFD42	0	11.35	11.35	0.2	47.1	1.67
SFD43	0.5	20.3	19.8	1.04	1271	2.07

SFD44	0.5	19.3	18.8	11.3	3354	4.43
inc SFD44	3.8	6	2.2	12.1	3240	6
and SFD44	13	17	4	39.3	8430	9.25
SFD45	0.55	4	3.45	1.42	1331	2.68
SFD46	4.5	12.5	8	0.668	672	1.06
SFD46	22.5	29.4	6.9	0.0545	400	0.594
SFD47	15	26.2	11.2	3.33	1107	2.71
inc SFD47	17	20	3	9.97	1358	0.6
SD1	4.5	19.5	15	3.58	3993	0.522
SD36	0	16.7	16.7	2.07	299	0
inc SD36	14.2	16.7	2.5	8.63	1296	0
SD34	13.9	17.3	3.4	0.006	2.21	0
SD39	0	19.6	19.6	2.87	915	0
inc SD39	15.6	17.6	2	16.8	5550	0
FRSTC01	2	10	8	1.09	2942	5.25
FRSTC02	0	2.5	2.5	2.2	3340	5.6
FRSTC03A	0	2.2	2.2	2.95	3353	7.82
FRSTC03B	0	5.8	5.8	4.21	1551	4.93
FRSTC04	0	1.3	1.3	25.4	5464	8
FRSTC06	2	5	3	1.55	2228	3.33
FRSTC07	0	15.2	15.2	2.44	2390	3.84
FRSTC08	0	3.5	3.5	1.49	423	2.29
FRSTC09	4	11	7	8.9	3138	8.71
FRSTC09	0	11	11	6.01	2107	6.27
FRSTC10	0	0.7	0.7	5.65	435	2
FRSTC11	0	1.9	1.9	0.682	220	1
GFSTC01	0	10	10	15.5	5866	4.8
GFSTC01	0	19	19	10	7735	4.16
GFSTC02	0	4	4	3.1	1860	2
GFSTC03	0	24	24	10.1	5188	6.54
GFSTC04	0	12.5	12.5	4.63	2642	4.16
GFSTC05	0	7	7	46.9	10967	11.7
GFSTC06	0	1.2	1.2	36.53	11000	6
GFSTC07	0	1.2	1.2	36.47	5300	5
GFSTC08	0	1.2	1.2	12.46	5000	2
GFSTC09	0	1.2	1.2	6.29	2400	3
GFSTC10	0	1.2	1.2	11.2	4700	3
GFSTC11	0	1.2	1.2	8.48	2500	7
GFSTC12	0	1.2	1.2	3.71	1300	3
GFSTC13	0	1.2	1.2	3.44	690	2

### 6.3.3 Channel Sampling

A total of 38.7m nominally 2m samples in six discrete contiguous channel samples were collected along the north-east wall of the old open cut using a diamond bladed saw. Samples were assayed as per diamond drill core (see explanation below).

Channel names continued the Frontier naming convention and were FRSTC07 to FRSTC11.

Channel sample locations were conventionally surveyed with xyz coordinates imported into Surpac and dummy survey tables manually calculated. These sample points helped map the old open cut and are consistent with the DTM generated from this surveying.

Better results are listed in table 6.2 but include 15.2m @ 2.44g/t Au and 0.24% Bi in FRSTC09 and 11.0m @ 6.0g/t Au and 0.21% Bi in FRSTC11. Almost all of the open cut was included in the final model generated for the orebody.

Channel samples in the two small adits support the presence of the Stormont Adit Fault or subsidiary structure with lower grades on the footwall side.

#### **6.3.4 Assaying – QA/QC and re-assaying of pulps for gold**

There has been a considerable amount of assaying which needs some explanation.

##### ***Assaying 2011/12 drillhole and channel samples***

All drillcore and channel samples were sent to AMDEL in Adelaide who crushed and pulverised each sample sending one split of the pulp back to Frontier Resources in Hagley and carrying out a gold fire assay on the other split.

The Frontier split was analysed in-house by Frontier's Olympus X-5000 desktop XRF machine for a very wide range of elements but including Bi, Ag, Cu, Pb and Zn. The in-house machine generates a raw, unadjusted XRF analyses. To adjust these analyses to absolute values requires about 5-10% of the samples to be analysed for each of the target elements by a more robust method e.g. ICP in an accredited laboratory. Initially 45 samples from within the 2009 resource model outline were selected and assayed by AMDEL (in appendix D4) using ICP partial and/or total digest (depending on the applicability of the method to the element and its abundance). The results from these were plotted against the raw, unadjusted in-house XRF analyses, the correlation coefficient considered and a regression equation generated. This regression equation was then used to adjust the raw XRF analyses to become adjusted XRF analyses.

Late in the drilling programme it was decided to have another batch of 44 samples analysed by AMDEL using ICP (appendix D5) to check that the regression equations being used to adjust raw analyses. Unfortunately the regression equations generated by this second batch were different from those generated from the first set to such an extent that it was felt that in-house generated analyses were not good enough for an Indicated Resource.

Due to the unsuitability of adjusted XRF analyses for an Indicated classified resource all remaining samples from within the resource outline were subsequently assayed by AMDEL using ICP (appendix D7) for Ag and Bi.

The second batch (44 samples plus 3 standards) was also sent to Intertek/Genalysis in Adelaide for umpire check assaying of Au, Bi and Ag (in appendix D6). The results show very good correlation between labs for Au, reasonable correlation for Bi but poor correlation for Ag with the Intertek/Genalysis analyses commonly up to ½ the AMDEL results. For this reason the silver component of the resource retains an Inferred classification.

This is further detailed in section 4.4.4 in appendix B.

##### ***Reassaying 2008/09 pulps for gold***

The 2009 resource report (MacDonald, 2009) noted the markedly consistent and significant discrepancy between the expected and actual analyses of independent gold standards included with 2008 drillhole and channel samples assayed by Burnie Research Laboratories. The average discrepancy suggested that all gold analyses from these batches were being undercalled by ~10.5%.

Pulps from these samples were located and sent to AMDEL in Adelaide for reassaying. The reassays are included in appendix D3, batch 2AD0858). This is further discussed in section 4.4.2 in appendix B.

##### ***Far West soils***

Soil samples were sent to AMDEL for gold fire assay (appendix D9) with a split of the pulp returned to Torque at Hagley where in-house XRF analyses was done for a wide range of elements. Regression equations generated from a regional soil sampling survey on Frontier's tenements to the east of Stormont were used to adjust these figures (appendix D8).

### 6.3.5 Surveying Stormont old workings and drill collars

In the 2009 resource estimation report a major deficiency noted was the potential error in drillhole collar positions with potential discrepancy in RL's of up ~10m!

Previous drilling had been surveyed using GPS without differential conversion.

Len McKenzie, a certified surveyor of Burnie, on two instances and his son Adam, a 4<sup>th</sup> year student, on one instance carried out surveying at Stormont.

On the first instance Len established control using differential GPS. He also surveyed many of the existing holes using differential GPS. Subsequent drilling was largely classically surveyed. Positional accuracy was +/-20mm in the horizontal plane, 200mm in the vertical.

The old open cut was surveyed using theodolite. Points were collected at nominally 5m spacings, points of inflexion and channel sample starts and finishes. Parts missed were the high cliff faces and the deep pool.

Adam and the author surveyed the old adit including both cross-cuts and the southeast extension past the dog-leg using theodolite.

### 6.3.6 Resource Estimation Methodology

The resource estimation methodology is detailed in the resource report in appendix B. The executive summary from that report is reproduced below.

#### ***Executive Summary***

#### ***Resource***

*An Indicated Resource has been estimated for the Stormont gold and bismuth deposit.*

*At a **0g/t gold cutoff** the deposit contains **157,144 tonnes** at **2.78g/t gold** for 14,047 ounces gold and **0.17% bismuth** for 264 tonnes bismuth.*

*At a **1.5g/t gold cutoff** the deposit contains **84,536 tonnes** at **4.38g/t gold** for 11,906 ounces gold and **0.23% bismuth** for 197 tonnes bismuth.*

*The silver component of the deposit remains as an Inferred Resource of 3.77g/t silver at the 0g/t gold cutoff, and 4.48g/t silver at the 1.5g/t gold cutoff due to unresolved poor repeatability in umpire check assaying.*

#### ***Geological model***

*The Stormont Au+Bi deposit is a skarn type (largely) stratiform/stratabound deposit hosted by the Ordovician Transition Beds (informal unit), a unit of calcareous sandstones at the top of the Moina Sandstone and immediately underlying the Gordon Limestone.*

*Mineralisation occurs largely as free gold (minor maldonite) and bismuth and bismuthinite in disseminations associated largely with garnet and actinolite.*

*The deposits overall dimensions are up to 32m vertical thickness, 35m horizontal width and a length of 160m. Mineralisation is found in the core and on the limbs of a sub-horizontal F2 syncline.*

*The resource outcrops for the most part, the southern portion being obscured in its centre by a stratigraphically overlying unit of black clay and with a thin Tertiary cover at its south-easternmost end.*

Whilst the distribution of mineralisation has a clear stratiform morphology, significant mineralisation is also focussed along the Stormont Adit Fault, a northwest striking, 65°-70° southwest dipping strike slip fault/fault zone.

### **Geostats**

Whilst statistically the correlation coefficient between Au and Bi is 0.42, visually the two are closely associated.

High grade outliers of Au, Bi and Ag have been dealt with by top cutting to 25g/t Au, 1.2% Bi and 15g/t Ag.

Variography, carried out on 2m composites, shows very similar ranges for each of Au and Bi (insufficient data for Ag), therefore the variogram model for Au was adopted for all three elements. The variogram model shows a low nugget effect of 15%. The variogram model shows a strike of 135° (true) in the z-plane, 0° in the x-plane and 0° in the y-plane with a short range of 15m and an overall range of 70m.

Reassaying 2008 Frontier pulps confirmed that the initial BRL gold assays were undercalled by ~10% and have been replaced in the database.

### **Block model**

A block model with parent size 5m (north) x 5m (east) x 5m (RL) was generated with sub-blocks of 1.25m x 1.25m x 1.25m.

Grades were estimated by Ordinary Kriging using the SURPAC estimation software. 3 passes were used with a minimum 12 and maximum 30 samples in the first two passes, minimum 6 and maximum 12 for the third pass. The first pass had a search ellipse of 15m x 5m x 3m, the second 25m x 9m x 4m and the third 70m x 25m x 12m.

An overall bulk density of 2.9g/cm<sup>3</sup> calculated from 84 core samples measured by the water immersion method was used in determining tonnages.

### **Recommendations**

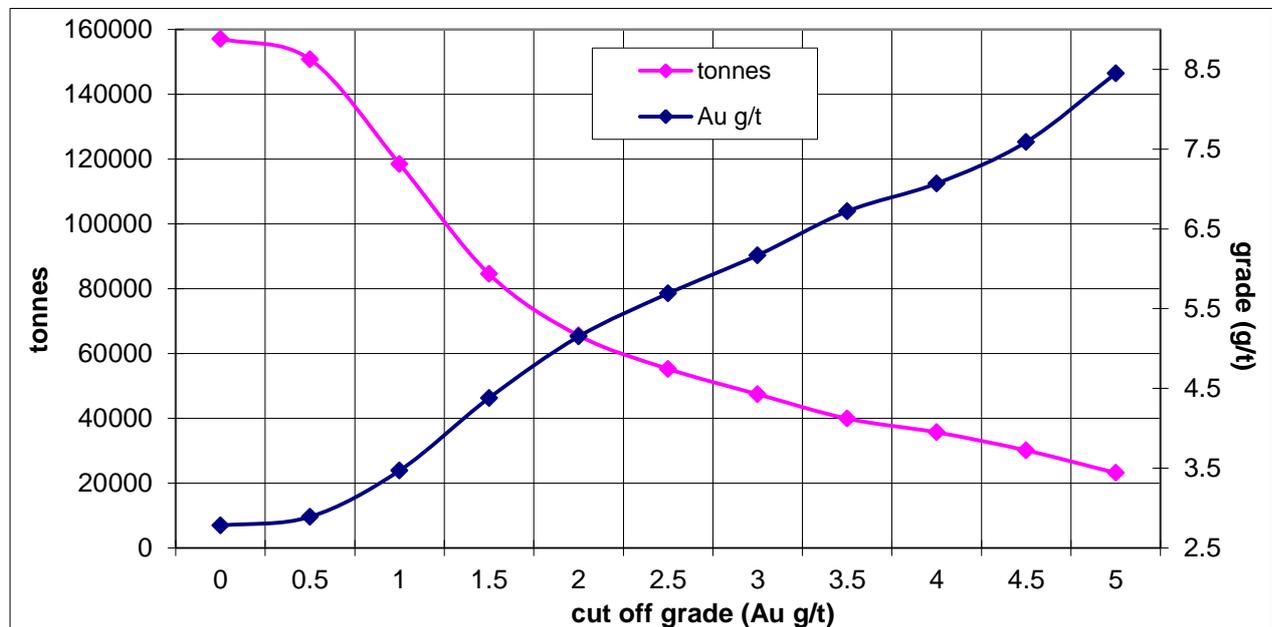
Whilst the resource as estimated is considered quite robust a number of recommendations have been made to the end of increasing this robustness in preparation for mining.

- Further silver umpire assaying is required to allow the silver component of the resource to be upgraded to indicated status.
- Trenching and sampling across the projected southwestern and northeastern margins of the deposit will improve confidence in the placement of the ore boundary on both sides and in particular clarify the nature of the material in the unattributed wedge along the northeastern side.
- Domaining the deposit into oxidised and fresh material and then estimating density into the block model will improve the tonnage estimation.
- Infill drilling (grade control) may allow domaining into Upper High Grade, Low Grade, Lower High Grade and Fault domains to be modelled with sufficient confidence.
- Further petrology and some detailed check re-logging may provide further insights into the macroscopic visual recognition of higher grade material to optimise "high grading" the +1.5g/t Au cutoff material.

### **6.3.7 Resource grades, tons and classification**

Indicated tons and grade figures and chart are shown below. For further details see full report in appendix B.

Au cut off (g/t)	Volume( m3)	Mass (t)	Au g/t	Bi %	oz Au	t Bi
0	54188	157144	2.78	0.168	14047	264
0.5	51990	150772	2.89	0.1699	14011	256
1	40869	118521	3.47	0.1929	13224	229
1.5	29150	84536	4.38	0.2331	11906	197
2	22605	65556	5.15	0.2607	10856	171
2.5	19055	55259	5.69	0.2784	10110	154
3	16357	47437	6.17	0.2952	9411	140
3.5	13762	39909	6.72	0.3164	8623	126
4	12301	35672	7.07	0.3134	8109	112
4.5	10379	30099	7.59	0.325	7346	98
5	7990	23172	8.45	0.3429	6296	79



**Figure 6.26: Tons and grade graph at range of Au cut-offs**

#### **6.4 Stormont southeast drilling**

The 2012 Indicated Resource estimate utilises data from drillholes up to and including SFD47. At the time of drilling it was unknown as to what extent the resource might be extended in the south-easterly direction. Drillholes up to SFD55 were completed as part of the resource definition drilling. It was only after assays were received and assessed from all drillholes that the extent of the resource in the south-easterly direction was established and holes SFD48 to SFD55 excluded.

The drillholes targeted the north-eastern limb of the syncline where historical holes SD8, 10, 33 and 44 had intersected ore grade gold and bismuth.

This zone along the north-eastern limb of the fold coincides with the strike projection of the Stormont Adit Fault, the structure considered to have a significant control on the distribution of mineralisation. The structure is not shown on the sections as it is considered to have verged with the black clay/skarn contact on these sections.

Holes were targeted directly at known intersections in an attempt to “flesh out” these zones.

Holes SFD48 to SFD55 were drilled on 25m spaced sections. All holes were drilled in HQ by the "big" RB38 rig. Hole positions are shown in plan view on figure 6.27 and in sectional view in figures 6.28 to 6.33.

SFD48 and 49 were drilled on section 2175mE (fig 2.8) in a south-westerly direction targeting SD33's 4.5m @ 3.14 g/t Au and 0.19% Bi (including 1.5m @ 9.0 g/t Au and 0.18% Bi).

SFD50 was drilled in a south-westerly direction on section 2200mE (fig 6.29).

SFD51 was drilled in a south-westerly direction on section 2225mE (fig 6.30) targeting SD10's 5.4m @ 2.5 g/t Au and 0.1% Bi.

SFD52 and 53 were drilled in a north-easterly direction on section 2250mE (fig 6.31).

SFD54 and 55 were drilled in a north-easterly direction on section 2275mE (fig 3.2) targeting SD44's 8.0m @ 1.8 g/t Au and 0.06% Bi (including 1.0m @ 4.82 g/t Au and 0.25% Bi).

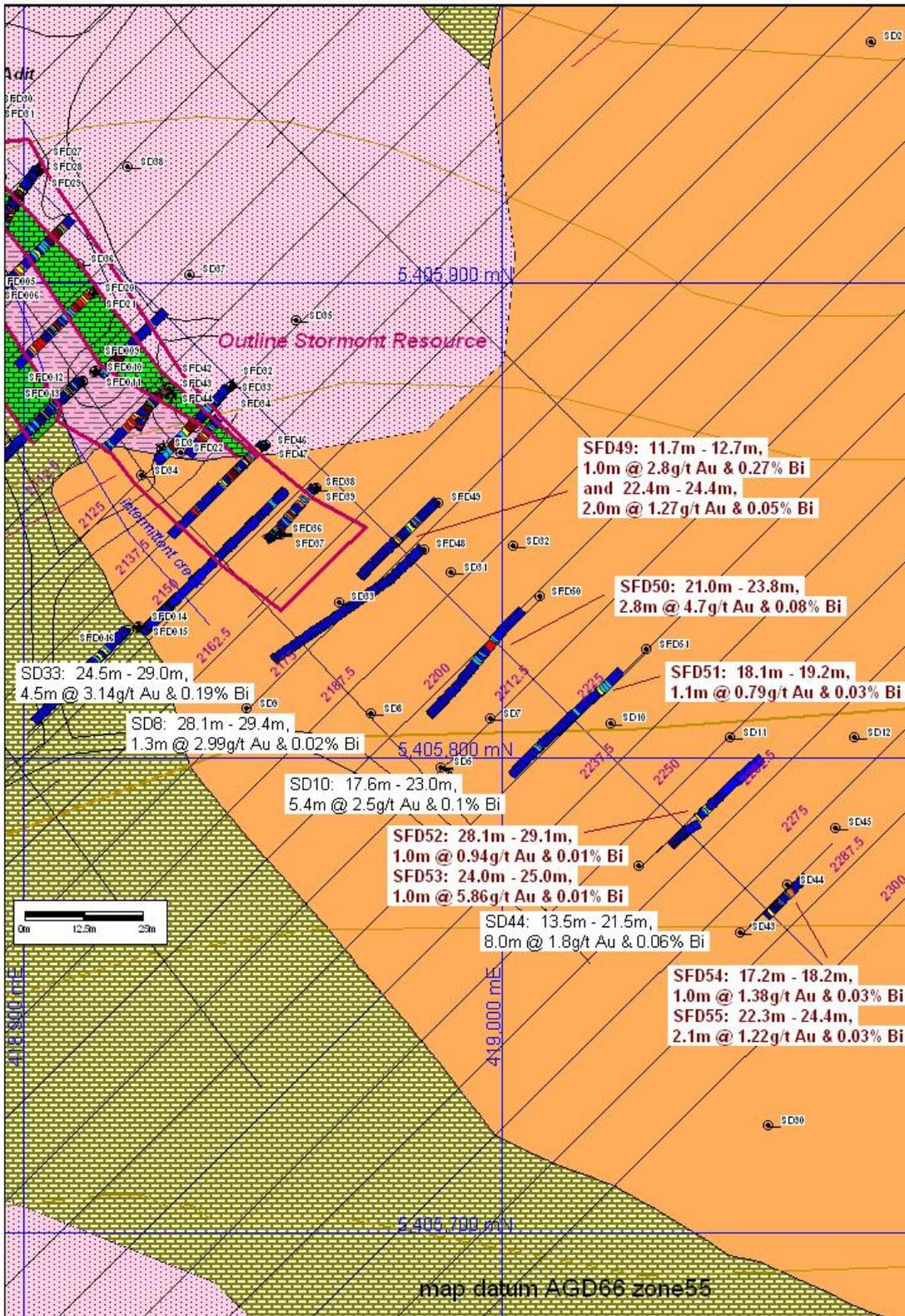


Figure 6.27: Plan view of Stormont southeast drilling



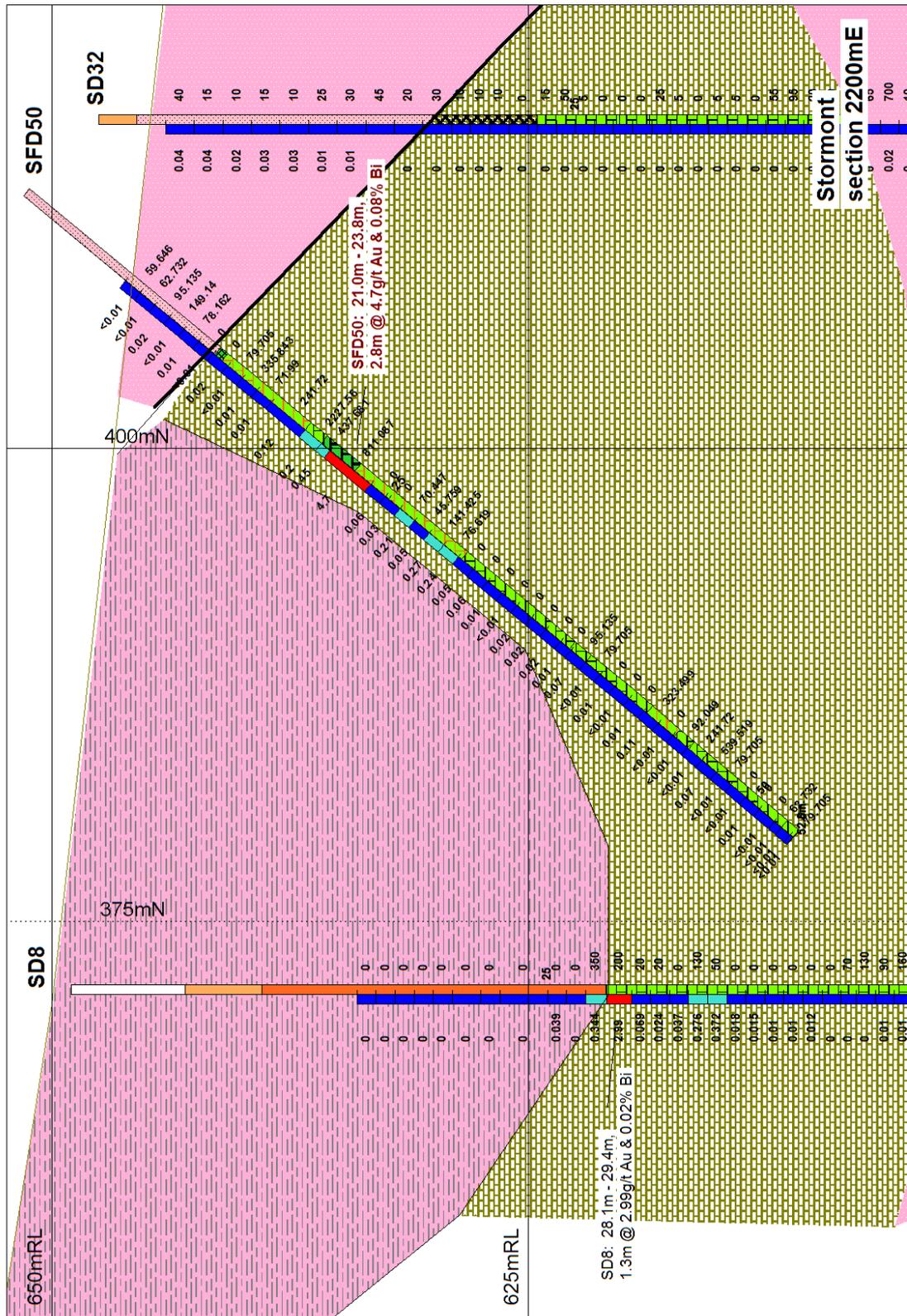


Figure 6.29: Section 2200mE – Stormont southeast

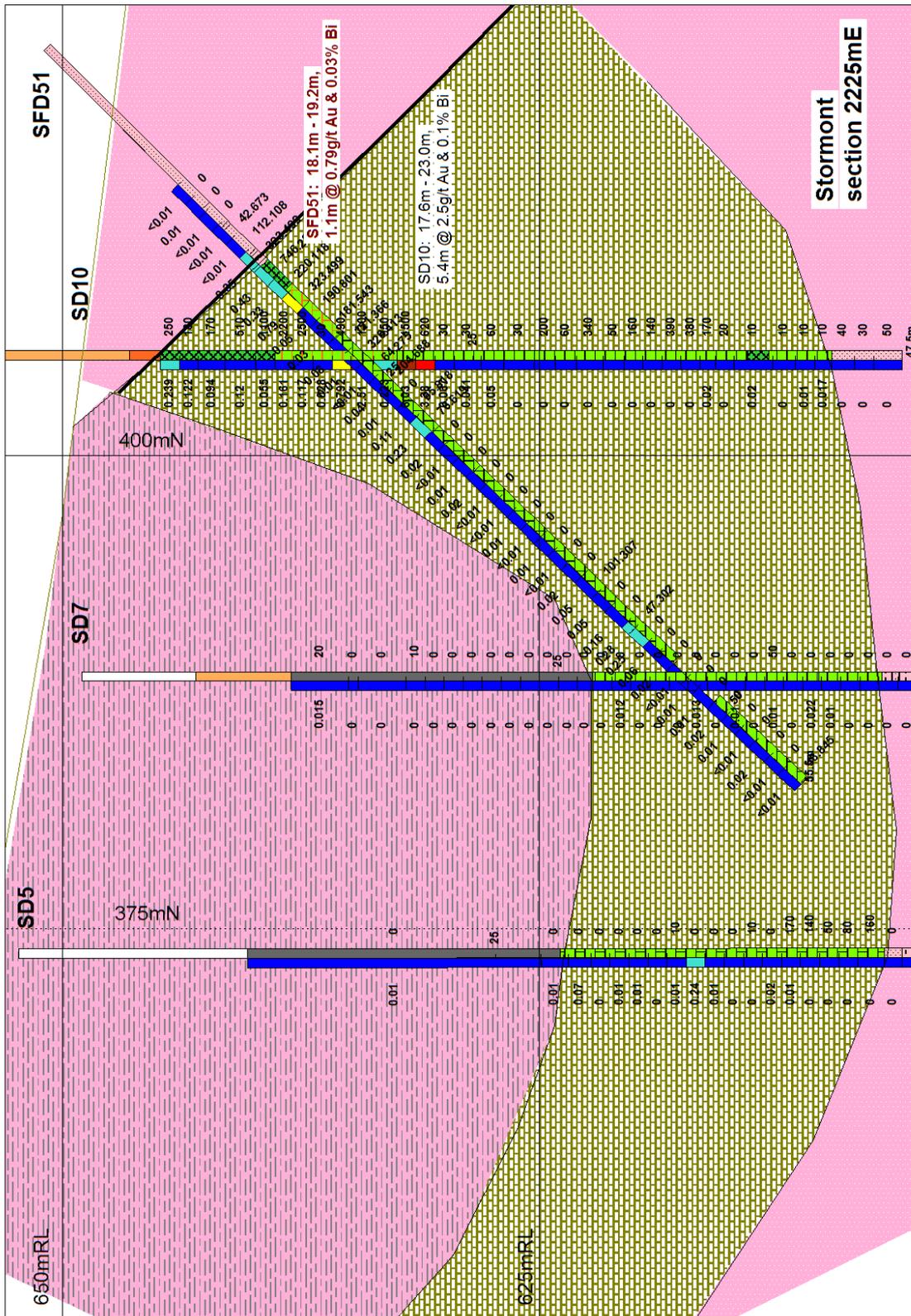
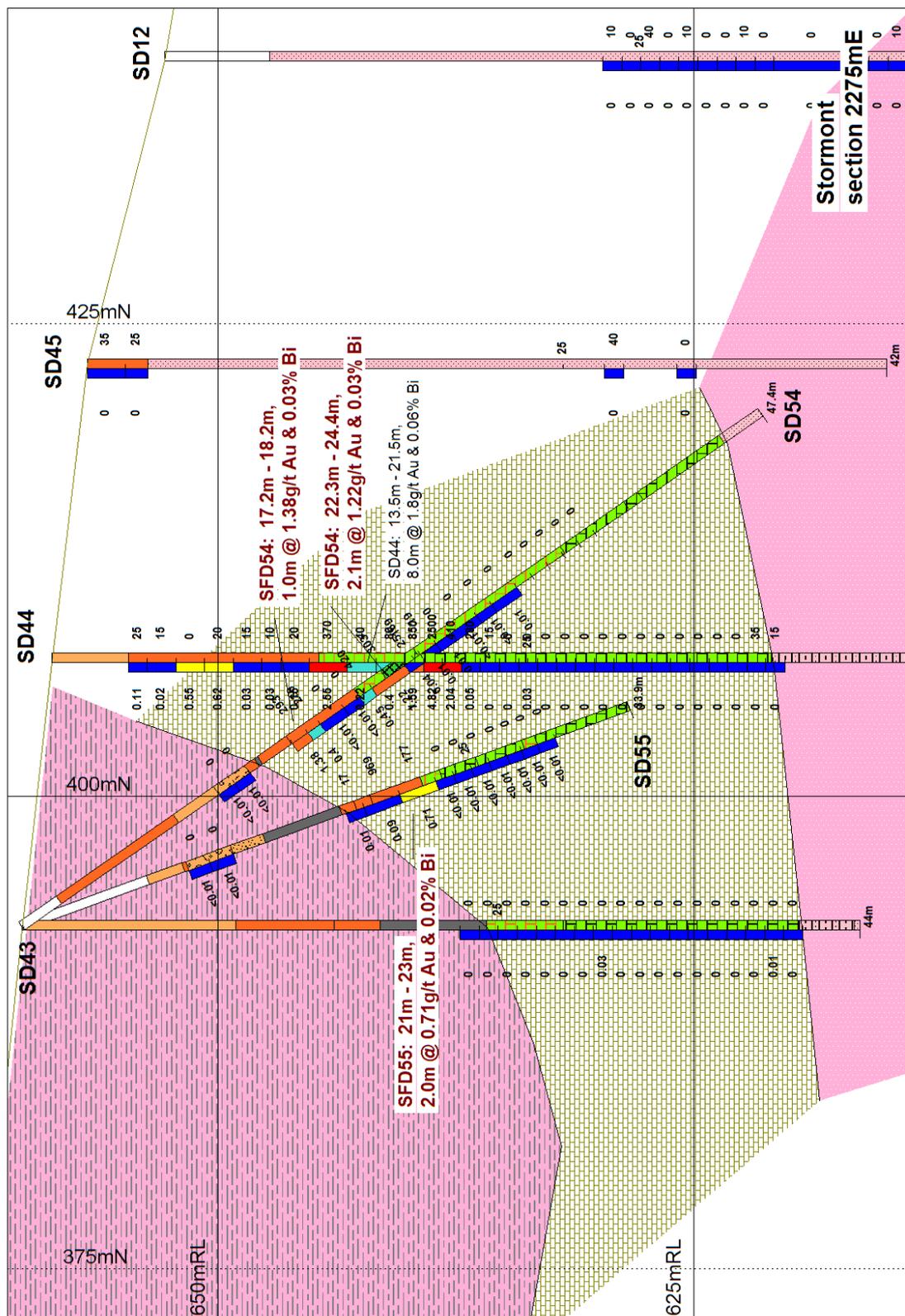


Figure 6.30: Section 2225mE – Stormont southeast





**Figure 6.32: Section 2275mE – Stormont southeast**

The collar positions of these holes were not surveyed by Len McKenzie using differential GPS. The positions of holes SFD48 to SFD51 were measured from control pegs which were surveyed in by Len

using differential GPS and which lie less than 10m away. The accuracy of these holes collar position is perhaps +/-2.5m.

Holes SFD52 and SFD53 were also surveyed from such a peg but at a distance of over 30m and on a compass bearing. SFD45 and SFD55 were intended to be collared at the collar of SD43 but this old hole could not be found and the position of these collars was established by GPS but also measuring off the access track. The accuracy of these holes position may be as much as +/-5m.

Hole details are given in Table 6.4 below.

Hole_ID	Section	AGD66 easting	AGD66 northing	RL	depth	azimuth (true)	dip
SFD48	2175mE	418984	5405843.6	647.9	60.4	225	-50
SFD\$9	2175mE	418987.1	5405853.4	646.5	46.4	225	-60
SFD50	2200mE	419008.1	5405833.6	651.5	52.8	225	-50
SFD51	2225mE	419030.5	5405822.6	651	55.5	225	-45
SFD52	2250mE	419029	5405777	657	52.9	45	-50
SFD53	2250mE	419029	5405777	657	43.3	45	-70
SFD54	2275mE	419050	5405763	660	47.4	45	-55
SFD55	2275mE	419050	5405763	660	33.9	45	-70

Summary logs follow:

SFD48

From	To	Summary Description
0.00	9.60	sandstone
9.60	12.60	qtz vein/fault
12.60	13.30	porous, weathered mag skarn/fault
13.30	21.20	magnetite skarn
21.20	22.00	oxidised chlorite skarn
22.00	47.20	mixed skarn
47.20	48.80	fault zone
48.80	53.00	mixed skarn
53.00	59.70	fault zone
59.70	60.40	mag skarn
60.40	EOH	

SFD49

From	To	Summary Description
0.00	6.70	sandstone
6.70	7.80	porous oxidised mag skarn/fault?
7.80	31.40	mixed skarn, decreasing in ox DH
31.40	46.40	mixed skarn
46.40	EOH	

## SFD50

From	To	Summary Description
0.00	13.10	sandstone
13.10	19.30	weathered skarn, fault?
19.30	20.40	weathered skarn
20.40	22.70	magnetite skarn
22.70	52.80	mixed skarn
52.80	EOH	

## SFD51

From	To	Summary Description
0.00	16.10	sandstone
16.10	17.90	weathered skarn, fault?
17.90	31.70	mixed skarn and clays
31.70	55.45	mixed skarn
55.45	55.50	qtzite
55.00	EOH	

## SFD52

From	To	Summary Description
0.00	2.30	soil
2.30	14.40	basalt
14.40	15.90	sand, sandstone, siltstone
15.90	19.90	black mud
19.90	21.40	grey clay
21.40	21.80	black mud
21.80	26.20	siltstone
26.20	29.10	skarn, fault?
29.10	45.20	mixed skarn
45.20	50.80	mixed qtzite, skarn, fault zone
50.80	51.90	pug
51.90	52.90	rubbly qtz
52.9	EOH	

## SFD53

From	To	Summary Description
0.00	1.30	soil
1.30	10.30	basalt
10.30	11.90	orange clay
11.90	14.90	sand
14.90	21.60	black, grey mud
21.60	22.50	orange, cream clay
22.50	23.90	weathered garnet skarn
23.90	25.90	Fault
25.90	43.30	mixed skarn
43.30	EOH	

## SFD54

From	To	Summary Description
0.00	9.90	Soil
9.90	12.50	basalt
12.50	14.45	grey billy conglomerate
14.45	15.10	clay
15.10	15.30	black mud
15.30	17.15	clay
17.15	23.20	clay, skarn
23.20	24.40	fault zone
24.40	44.90	skarn
44.90	47.40	qtzite, calc silicate
47.4	EOH	

## SFD55

From	To	Summary Description
0.00	7.00	soil
7.00	9.20	clay and basalt
9.20	11.70	grey billy conglomerate
11.70	13.50	fine sand/mud
13.50	17.80	black mud
17.80	18.60	clay
18.60	22.30	clay and skarn
22.30	28.00	skarn
28.00	28.70	fault?
28.70	33.90	skarn
33.9	EOH	

Better results are listed in table 6.5. These indicate that whilst the mineralised system continues along the northeastern limb of the syncline mineralisation is less extensive than in the resource area to the northwest.

**Table 6.5 Better Intersections – southeast drilling.**

Hole No	From (m)	To (m)	Interval (m)	Au (g/t)	Bi (%)
SFD48	13.6	14.6	1	0.03	0.11**
and	53.6	54.6	1	0.02	0.14**
SFD49	11.7	12.7	1	2.8	0.27**
and	14.7	16.5	1.8	0.65	0.03**
and	22.4	24.4	2	1.27	0.05**
SFD50	19.3	20.4	1.1	0.2	0.22**
and	21	23.8	2.8	4.7	0.08**
SFD51	18.1	19.2	1.1	0.79	0.03**
SFD52	24.1	25.1	1	0.62	0.02*
and	28.1	29.1	1	0.94	0.01*
SFD53	24	25	1	5.86	0.01*

Hole No	From (m)	To (m)	Interval (m)	Au (g/t)	Bi (%)
SFD54	17.2	18.2	1	1.38	0.03*
and	22.3	24.4	2.1	1.22	0.03*
SFD55	21	23	2	0.71	0.02*
SFD56			no significant intervals		

\* raw xrf results

\*\* adjusted xrf results

The drilling conducted is considered more than adequate to test for economic gold and bismuth mineralisation in this south-eastern zone and no further drilling is recommended.

### 6.5 Drillhole magnetic susceptibility

Magnetic susceptibility measurements were taken every ~0.5m on drillholes SFD17 to SFD25, SFD27 to SFD39 and SFD42 to SFD44 before the meter was required elsewhere. The data generated is shown on the relevant section on figures 3.7 to 3.17 in appendix B.

Elevated magnetism, due to magnetite, shows a number of spatial relationships with elevated gold and bismuth.

On sections 2037.5mE, 2050mE, 2062.5mE and 2087.5mE (no data for section 2075mE) elevated magnetism lies stratigraphically just beneath the gold/bismuth mineralised Lower High Grade domain (see section 3.3.5 and figures 3.26 to 3.28 in appendix B) and to a somewhat lesser degree towards the base of the Upper High Grade domain. On sections 2112.5mE, 2125mE and 2150mE (no data for sections 2100mE and 2137.5mE) the picture is a little more confused with elevated magnetism corresponding to lower grade sections between the higher grade zones, now less clearly recognisable domains. The relationship between bismuth, gold and magnetite is consistent with the destabilisation of gold in aqueous solution by retrograde alteration which produces magnetite.

The clear spatial relationship between gold/bismuth and magnetite, particularly on the northwestern sections, and the variation on this theme in the southeastern sections is intriguing.

### 6.6 Amy Cockerton's (Monash University Masters Preliminary student) study of Stormont deposit

Frontier Resources Ltd supported Monash University Masters Preliminary student Amy Cockerton, from Monash University and supervised by Andrew Tomkins, to complete a study on the Stormont deposit. Her thesis was to test and present the Stormont Au+Bi deposit as a potential case example of the Liquid Bismuth Collector Model (LBCM), a model for the precipitation of gold from bismuth saturated hydrothermal solutions.

Her work was done on samples supplied from earlier Frontier drillholes SFD004, 005 and 006 and included:

- 16 polished thin sections and three double polished thin sections. 8 Au+Bi and 4 Bi photomicrographs are included in figure 5 in appendix showing gold and bismuth department
- Electron microscopy
- 42 fluid inclusion heated analyses (3 actinolite, 39 garnet)
- Piston cylinder pressure simulation test

The thesis is included in appendix F.

Amy Cockerton has also published with her supervisor a paper in Economic Geology titled "Insights into the Liquid Bismuth Collector Model Through Analysis of the Bi-Au Stormont Skarn Prospect,

Northwest Tasmania" (Cockerton and Tomkins, 2012). The paper is included in appendix F with the abstract presented here:

"The liquid bismuth collector model has previously been proposed to explain the common association between gold and bismuth seen in many ore deposits, and involves the scavenging of gold from hydrothermal fluid by liquid bismuth. Here, textural relationships and temperature and chemical conditions of mineralization at the Stormont Bi-Au skarn prospect in northwestern Tasmania are analyzed to investigate whether the liquid bismuth collector model can explain gold accumulation at this prospect. The calc-silicate skarn assemblage containing grandite, hedenbergite, actinolite, magnetite, epidote, quartz, and calcite suggests that initial metasomatism involved temperatures >400° to 500°C. Visible gold is associated with native bismuth, bismuthinite, maldonite, galena, and an unknown Bi-Te-S mineral. Native bismuth is directly associated with grandite, which formed during initial stages of metasomatism. This implies that bismuth would have precipitated from a hydrothermal fluid as a liquid. Heating experiments showed that bismuth alloy inclusions in garnet melt between temperatures of 250° and 288°C. The mineralization setting at Stormont and textural relationships suggest that gold was scavenged from hydrothermal fluids by liquid bismuth. Rhythmically zoned grandite crystals provide evidence for fluctuating hydrothermal fluid conditions, which may have contributed to dissolution and reprecipitation of gold, thus facilitating an ore zone refining process within the prospect. This refining process is made possible by the tendency of liquid bismuth to scavenge gold from significantly undersaturated fluids. Infiltrating gold-undersaturated fluids can dissolve gold not in contact with bismuth, which can then be preferentially redeposited upon encountering a bismuth droplet, enhancing the correlation between the two elements. A long-lived and focused fluid flow system would maximize the efficiency of this ore zone refining process, which is likely to be relevant to gold deposition at a range of deposit types."

Essentially the model is based on three factors:

- Bismuth has a very low melting temperature of 271°C
- Bismuth and gold have a close chemical affinity and thermodynamic relationship
- Due to this relationship, given temperatures in excess of 271°C and bismuth-saturated hydrothermal fluid, bismuth will precipitate as a melt amongst that fluid, and the liquid bismuth will scavenge ionic gold from the fluid regardless of the concentration of gold.

This model sees bismuth rich fluids at temperatures above 271°C as zone-refining in the fluid, acting to enrich Au under-saturated hydrothermal fluids. Precipitation mechanisms are still required but the model has region wide implications given the widespread Bi soil anomalism which is not drilled.

### **6.7 Gridding and Soil Sampling – Far West prospect**

The Far West area was gridded (AMG north-south) at 50m spacings during the gridding for the 3D IP survey.

123 soils were collected on a 50m x 25m grid over the coincident magnetics (heli- and ground magnetics) and 3D conductivity anomaly with some samples collected at shorter intervals over the trend of the magnetics anomaly.

Sample locations and Au results are shown on figure 6.33 with Bi results in figure 6.34.

Soils were assayed for Au by fire assay by AMDEL in Adelaide. A split of the pulp generated was sent back to Tasmania and other elements were assayed by Frontier's in-house XRF.

Anomalous Au to 490, 140, 90ppb and 34ppb Au and Bi to 1420, 418, 351, 336 and 78ppm Bi corresponds with the trend of the geophysical anomalies.

## **6.8 Ground Magnetics – Far West prospect and Ti-Tree Creek**

Frontier had previously conducted ground magnetics surveys over the immediate Stormont area and extending from as far west as the Western Syncline zone to the Eastern Syncline using a rover and base station to give diurnally corrected data. Unfortunately the instrument was lent to PNG and has not been seen since.

The association between magnetite and gold/bismuth mineralisation and the relatively narrow style of mineralisation means that in places precise location of magnetic anomalies is required. A major problem with utilising hand-held (i.e. not real time-differential) GPS to locate reported locations which were themselves measured by hand-held GPS is that potential errors compound.

In order to truly locate the pronounced linear peak defined over the Western Syncline for drill targeting a single rover was hired. Readings were collected every 3m with every 10<sup>th</sup> sample point flagged and numbered. Appraisal of the data suggested diurnal variation was not significant given the range in nano-tesla's generated by the rock and so surveying was extended west over the Far West helimagnetics anomaly. The imagery generated from that work is shown with Frontier's earlier surveying as the base to figure 6.28. Raw data is included in appendix H.

Similar work was carried out over the Ti Tree Creek grid. Here confidence with the single rover surveying was tested with some significant discrepancies between existing ground magnetics and helimagnetics and the newly generated data. The line spacing meant meaningful imagery could not be generated. This Ti Tree Creek data set is not considered to be of reportable quality but is being further assessed. Raw data from this latter survey is also included in appendix H.

## **6.9 Aboriginal heritage assessment – Far West prospect**

An aboriginal heritage assessment was made of the Far West area by accredited Aboriginal Heritage Officer Mr. Vernon Graham of Launceston.

No evidence of previous aboriginal habitation or presence was noted. Previously heritage assessment had been made of the Stormont area and the track to Stormont and this survey's results are presented as an addendum to that report which is reproduced herein as appendix H.

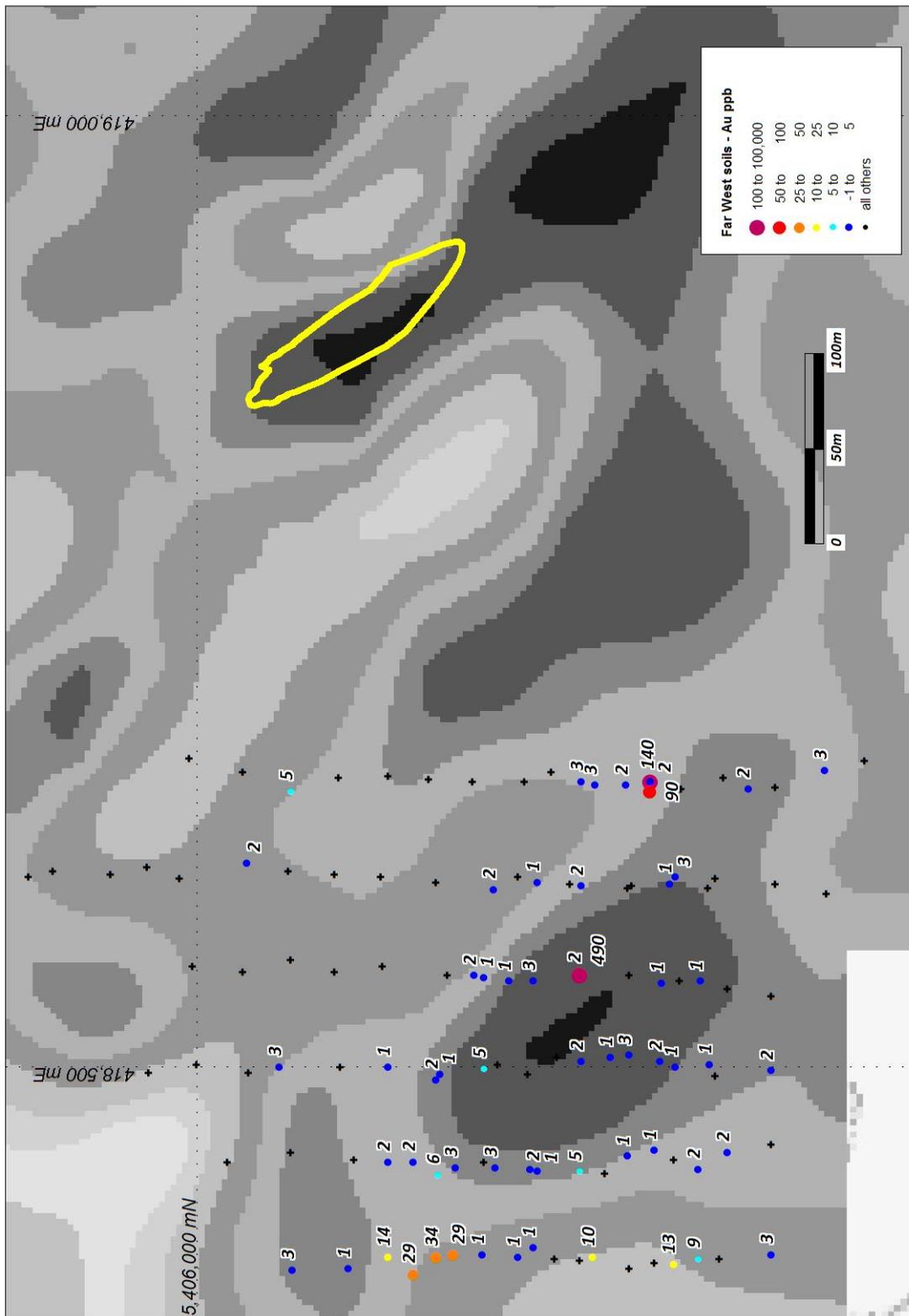


Figure 6.33: Far West soils – soil locations and Au results on 50m resistivity greyscale showing lows (dark) as conductivity anomalies. (North is to the left as the image is shown).

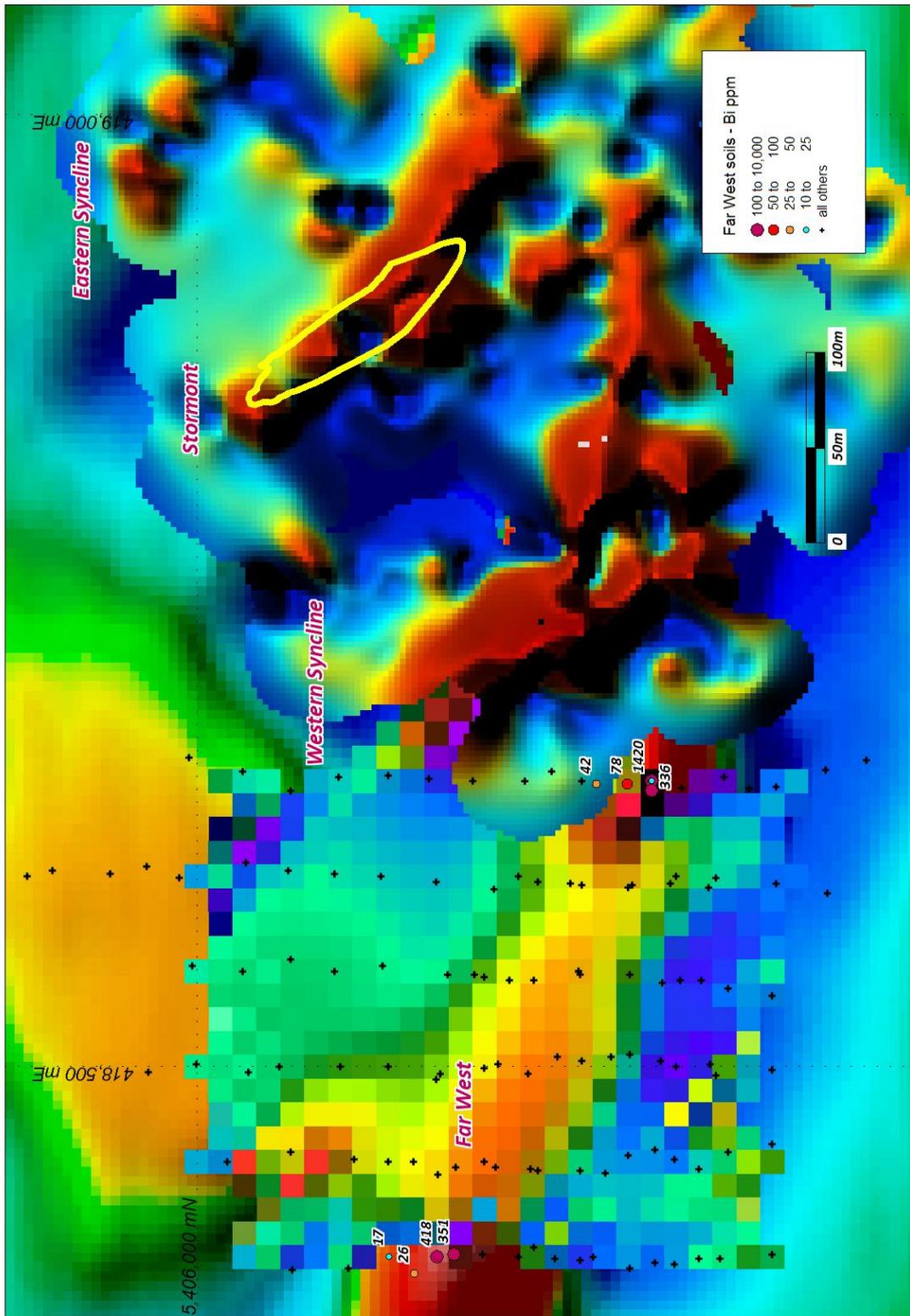


Figure 6.34: Far West soils – soil locations and Bi results on 2011 and 2008 ground magnetics overlying aeromagnetics 2VD image. (North is to the left as the image is shown).

## **7.0 Proposed work**

Work proposed for the 2012-2013 year will include the following:

- Pursue joint venture with BCD Resources and advance feasibility of treating ore at Beaconsfield mill with the aim of developing a mine over the Stormont deposit. At the time of completing this report this feasibility work had commenced.
- The 3D IP conductivity, magnetics and Bi soil surveys have defined a large number of targets with strong potential to be Stormont analogues and drilling these will be a focus.
- Further soil sampling is also warranted where Comalco mapping shows the basalt cover to be more fragmentary than MRT's mapping shows (i.e. between the track to Stormont and Ti Tree Creek and north of the Lea River alluvials).

## **8.0 Environmental**

There has been considerable activity on the ground on EL 42/2010 in the 2011-12 year.

3D IP surveying required the cutting of a 125m spaced (occasionally 50m) north-south grid line. This was done minimum width to allow passage of the IP wires with no stakes used, only flagging. It was not necessary to go in a dead straight line and so no trees needed cutting.

It is expected that the gridlines will have closed over in about 12 months.

Soil sampling at Far West utilised the 3D IP grid with soil samples collected by hand auger and all holes filled in.

Ground magnetics utilised the 3D IP grid and had negligible additional impact.

The bulk of the environmental impact came from the drilling work.

Drilling took place in the second half of 2011 and earliest 2012. Most holes were drilled with Frontier's custom built "R38" rated to 400m NQ. Holes SFD26, 35, 40, 41 and 45 were drilled with the minimal impact Poltock man-portable rig.

The rig and all gear and fuel movements were done using the Yanmar crawler with 4wd vehicles parked ~500m east on drier ground in order to minimise siltation.

Early drillholes used already cleared areas e.g. tracks as drill pads. Some later holes were drilled in the margins of the plantation requiring the clearing of the typical scrubby regrowth.

Silt runoff was managed by channelling the ephemeral creek which runs across the deposit into the old open cut where it could settle and decant through a geo-textile filter placed across the natural outflow from the open cut.

All holes have PVC in the top 1.5-3m with cement inside the pipe and around it (where needed).



**Figure 8.1:** Collars of drillholes SFD17, 18 and 19. Collars are cemented inside PVC pipe.



**Figure 8.2:** Collars of drillholes SFD20 and 21. Collars are cemented inside PVC pipe.



**Figure 8.3:** Collars of drillholes SFD22. Collars are cemented inside PVC pipe.



**Figure 8.4:** Collars of drillholes SFD22 foreground, 32, 33 and 34 background.



**Figure 8.5:** Collars of drillholes SFD23, 24 and 25. Collars are cemented inside PVC pipe.



**Figure 8.6:** Collars of drillholes SFD26 and 35. Collars are cemented inside PVC pipe.



**Figure 8.7:** Collars of drillholes SFD27, 28 and 29. Collars are cemented inside PVC pipe.



**Figure 8.8:** Pad of drillholes SFD27, 28 and 29.



**Figure 8.9:** Collars of drillholes SFD30 and 31. Collars are cemented inside PVC pipe.



**Figure 8.10:** Collars of drillholes SFD32, 33 and 34. Collars are cemented inside PVC pipe.



**Figure 8.11: Pad of drillholes SFD36 to 39**



**Figure 8.12: Collars of drillholes SFD36 and 37. Collars are cemented inside PVC pipe.**



**Figure 8.13:** Collars of drillholes SFD38 and 39. Collars are cemented inside PVC pipe.



**Figure 8.14:** Collar of drillholes SFD40. Collar is cemented inside PVC pipe.



**Figure 8.15:** Collar of drillholes SFD41. Collar is cemented inside PVC pipe.



**Figure 8.16:** Collars of drillholes SFD42, 43 and 44. Collars are cemented inside PVC pipe and are buried beneath ~1m of mud (drillsite was an old swampy hole).



**Figure 8.17:** Collars of drillholes SFD46 and 47. Collars are cemented inside PVC pipe. Water to right is rainwater in a puddle.



**Figure 8.18:** Collar of drillholes SFD48. Collar is cemented inside PVC pipe.



**Figure 8.19:** Collar of drillholes SFD49. Collar is cemented inside PVC pipe.



**Figure 8.20:** Collar of drillholes SFD50. Collar is cemented inside PVC pipe.



**Figure 8.21:** Collar of drillholes SFD51. Collar is cemented inside PVC pipe. This hole had made some water but was recemented and has stopped.



**Figure 8.22:** Collars of drillholes SFD52 and 53. Collars are cemented inside PVC pipe.



**Figure 8.23:** Access/pad of drillholes SFD52 and 53.



**Figure 8.24:** Collars of drillholes SFD54 and 55. Collars are cemented inside PVC pipe.



**Figure 8.25: Access/pad of drillholes SFD54 and 55.**

## 9.0 Expenditure

Geoscientific costs	geology	\$0.00
	geochemistry	\$18,988.15
	geophysics	\$436,532.77
	remote sensing	\$0.00
Drilling and gridding costs	gridding	\$33,161.00
	drilling	\$415,753.98
	meters drilled	\$0.00
Land Access costs		\$0.00
Rehabilitation costs		\$0.00
Feasibility costs		\$0.00
other costs (inc rental)		\$2,942.36
<u>Administration costs</u>		<u>\$8,947.40</u>
<b>Total costs</b>		<b>\$916,326.45</b>

## 10.0 References

- Askins, P.W. (1979) E.L. 7/74 Moina, Areas Covered by Moina Sheets 1, 2, 3. Report on All Investigations to September 1978. *Unpub. Rept. for Comalco Limited*. TCR 78\_1305
- Broadhurst, E. (1934) Report on the Stormont, Bell Mount and Black Bluff District. *Unpub. Rept. Mines Dept. Tasm.* UR1934\_032\_45
- Burns, K.L. (1959) The Stormont Bismuth Mine TR3\_36\_42
- Castro, C.H. (1990) E.L. 41/83 - Lake Lea Relinquishment Report *Unpub. Rept. for RGC Exploration Proprietary Limited* TCR 90\_3171
- Fleming, M.J. (1988) E.L. 41/83 - Lake Lea, Annual Report – 1988 *Unpub. Rept. for RGC Exploration Proprietary Limited*. TCR 88\_2888
- Keid, H.G.W. (1943) Report on the Moina Mineral District. *Unpub. Rept. Mines Dept. Tasm.* UR1943\_181\_198
- MacDonald, G. I. (2009) Stormont Au+Bi Project Resource Estimate, 2009. *Unpub. Rept. For Frontier Resources Ltd.*
- McKibben, J.P. (1972) – Annual Report on Moina Area – E.L. 8/65 1971-72 *Unpub. Rept. For Mt Lyell Mining and Railway Co. Ltd* TCR 72\_0888
- McKintosh-Reid A. (1927) Preliminary report on the Stormont Bismuth Prospect. *Unpub. Rept. Mines Dept. Tasm.* UR1927B\_076\_80
- Newnham, L.A. (1993) Annual Report EL 20/92 - Moina Area - 1992-93 *Unpub. Rept. for Goldstream Mining NL*. TCR 93\_3484
- Newnham, L.A. (1996) EL 20/92 Moina Area Stormont Mine Drilling Program 1995-96 *Unpub. Rept. for Goldstream Mining NL* .TCR 96\_3863
- Newnham, L.A. (1997) Annual Report - EL 20/92 - Moina Area *Unpub. Rept. for Goldstream Mining NL*. TCR 97\_4015
- Purvis, J.G. (2000) Report for Period August 1999-June 2000 - Stormont EL20/92 *Unpub. Rept. for Jervois Mining NL* TCR 00\_4472
- Reid, R. (2009) RL4/2005 River Lea – Annual Report to 7 August 2009 *Unpub. Rept. For Frontier Resources Ltd* closed file report
- Roberts, R.H. (1986) – E.L. 41/83 – Lake Lea Area Annual Report – 1985-86 *Unpub. Rept. For Goldfields Exploration Proprietary Limited* TCR 86\_2619
- Roberts, R.H. (1987) EL 41/83 - Lake Lea Area. Annual Report 1987 *Unpub. Rept. for Goldfields Exploration Proprietary Limited* TCR 87\_2758
- Scott, J.B. (1929) Mt Stormont Mine, Moina *Unpub. Rept. Mines Dept. Tasm.* UR1929\_018\_19
- Twelvetrees, W.H. (1913) – The Middlesex and Mount Claude mining field. *Bull. Geol. Surv. Tas.* 14.