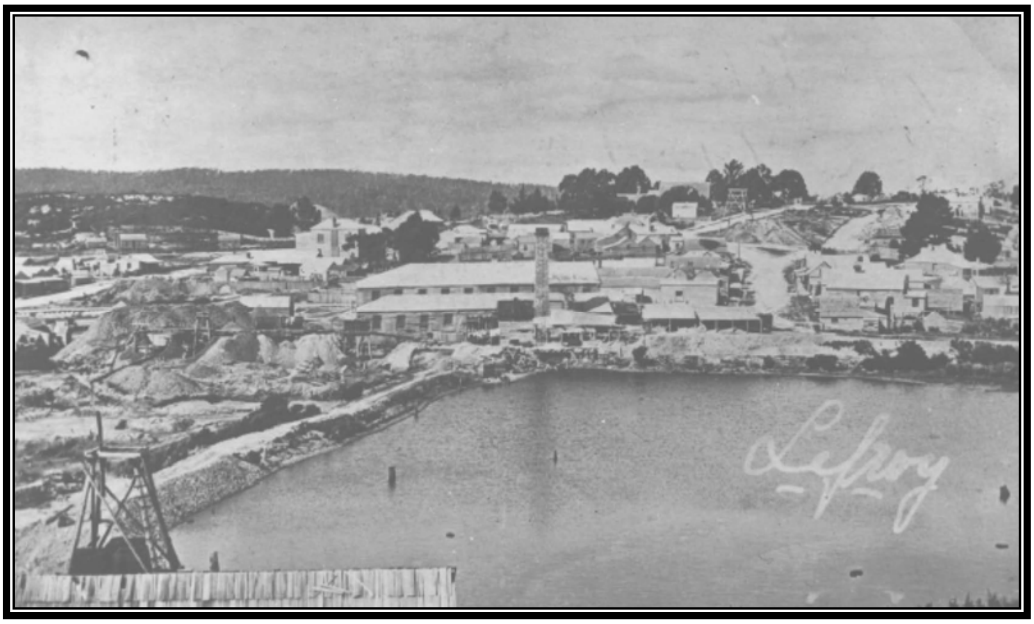
Lefroy Resources Limited

LEFROY PROJECT AREA

EL2/2002

Annual Report



John Canaris
October 2004

LEFROY PROJECT AREA
EL 2/2002 - Annual Report

CONTENTS

FIGURES

TABLES

APPENDICES

SUMMARY

Exploration Licence 2/2002 was originally vacant ground applied for by Sapphire Trading Pty Ltd on 24/01/2002. Lefroy Resources Limited (LEF) entered into an agreement securing a 100% interest in the tenement subject to successful Public Listing. EL2/2002 was transferred to LEF in August 2004.

EL 2/2002 flanks the historic Lefroy Goldfield, and is comprised of mostly Mathinna meta-sedimentary lithologies, which hosts the majority of Au mineralisation in the area. Data compilation was completed with LEF incorporating existing data into a 2D and 3D GIS (Geographic Information System) environment. Work includes the compilation of historic plans from the 1800's, government mapping and open file company information, old drill holes, soil geochemistry and rock chip data and remote sensing. This information has been combined with remote information such as airborne photography, satellite imagery and regional geophysics, allowing spatial interrogation through multiple datasets.

Because the gold mineralisation is structurally complex a robust structural model has been developed to better define exploration target. A low level airborne geophysical survey has been completed over parts of the EL, adjoining the Lefroy Goldfield. This survey was flown at 50m line spacing and provides greatly improved resolution when compared to existing State Government 200 metre data. A ground geophysics orientation program was completed over old workings at Lefroy, which is hoped will provide a suitable method to be used over the EL into the future.

John Canaris
Chief Executive Officer

INTRODUCTION

Lefroy Resources Limited (LEF) holds a 100% owned exploration land package in the north eastern Goldfields of Tasmania. This consolidated tenement package contains at least three separate mineralised structures, the most important being the Lefroy Goldfield with a recorded production of approximately 200,000oz of gold. The Lefroy Goldfield is located between the western and eastern portions of EL2/2002. This tenement represents an important potential extension of the Lefroy Fields and is therefore included in the Lefroy Project Area.

In 2004 LEF commenced exploration activity on key target areas focusing on the historic Lefroy Goldfield. The Company is focused on the discovery and development of high grade lode-style gold deposits. Initial drilling is aimed at testing the potential for economic mineralisation beneath the historical workings and elsewhere within the tenements, as there remains significant potential for sub-surface high grade shoots that have gone undetected in the past.

The Lefroy Goldfield extends for at least 5 kilometres through the old gold-rush town of Lefroy, 40 kilometres north of Launceston. The Lefroy Goldfield contains many historic workings and shafts located on approximately 30 gold reefs which were mined and subsequently abandoned in the late 1800's.

Records indicate that the average mined grade of the field was in excess of 30g/t Au. As mining in the old Goldfield progressed following the numerous gold shoots to depth, the ore became sulphidic and without the benefit of advanced metallurgical technology many mines were closed as mill recoveries decreased. This factor combined with water infiltration and increasing mining costs forced the eventual closure of the field. These high grade gold lodes and shoots are a primary target for LEF, which is focusing its initial efforts on delineating and drill testing targets around the old workings and their potential extensions.

Previous exploration between 1966 and 1985 focused on the deep alluvial lead potential of the field, and despite fairly encouraging results, there was no follow up. In 1994 the operators of the Beaconsfield Goldmine commenced testing the area for a low-grade bulk mineralisation near surface. The deep high grade lode potential was eventually tested with four diamond drill holes and two sister holes before the tenements were surrendered due to financial difficulties.

Deviation of these drill holes was a problem and resulted in the targets not being properly tested. One hole did however hit a splay from a reef assaying 40cm @ 6.37g/t Au from 255.75m below the old workings.

LOCATION

The Lefroy Gold Field is located in north- east Tasmania, 45 kilometres north of Launceston and 14 kilometres east of George Town. Tenements cover Crown Land, Commonwealth Government Land, State Forest and private property. Terrain is moderately undulating, and the Lefroy Gold Field can be accessed via sealed roads.

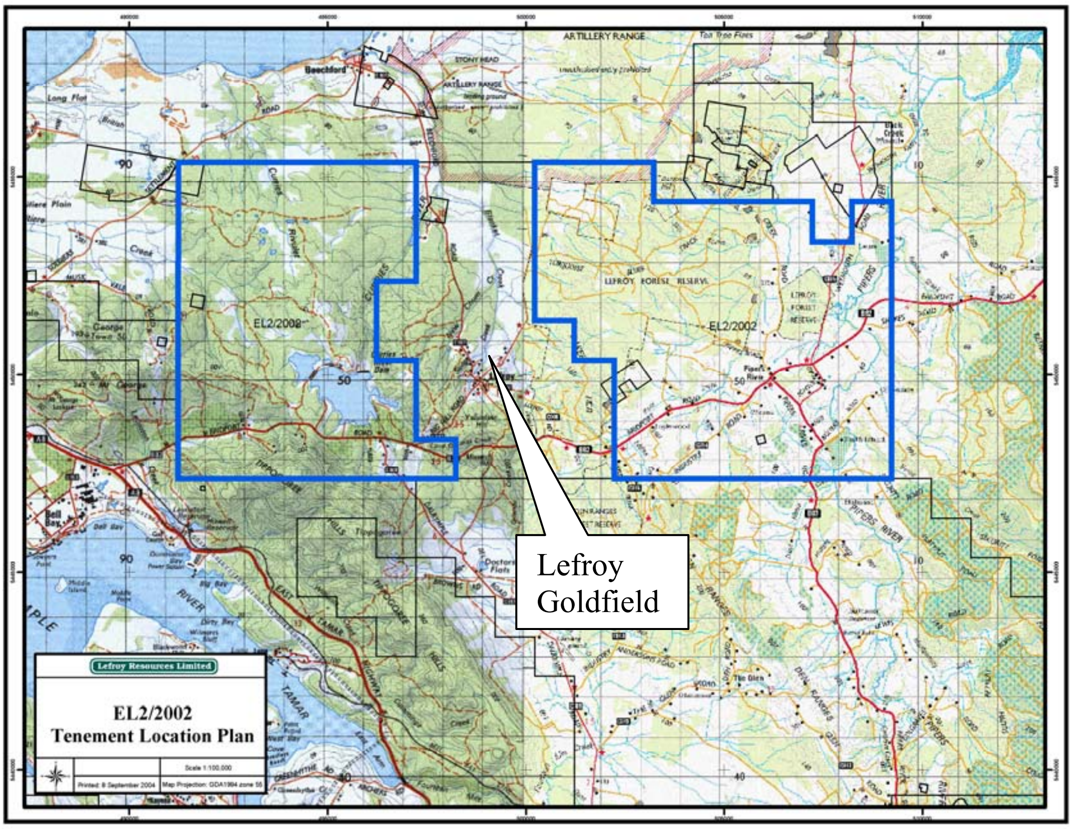


Figure 1. Tenement Location Plan

LAND TENURE

EL2/2002 was vacant ground applied for by Sapphire Trading P/L on the 24th of January 2002. Lefroy Resources Limited was formed in November 2003 to acquire the EL from Sapphire Trading P/L. The EL was transferred to Lefroy Resources in August 2004. The EL carries a tenure period of 5 years, expiring in October 2008.

The licence carries a minimum expenditure commitment of $41,250 for the first 2 years. It covers 55 square kilometers and includes CAR Reserve, System Informal Reserve, Crown Land, Forest Reserve, Private Property, State and Multiple Use Forest. Within the licence are but excluded from it are:

a) Mining Leases amounting to approximately 115ha
b) Crown Reserve amounting to approximately 54ha

GEOLOGY

Mineralised reefs in the region are hosted by Mathinna Supergroup turbidites of Cambrian to Ordovician age. Known mineralised zones are centred in Lefroy and Back Creek Goldfields. Mineralisation is of Early to Middle Devonian age, with Au reef formation coinciding with a third regionally compressive deformation event (D3), and a second phase of orogenesis (Reed 2002).

Mineralisation

Gold mineralisation in the Area occurs in quartz veins and reefs along a series of parallel east-west fault planes and shear zones (Russell and van Moort, 2003). These structures have been traced for up to 10 kilometres (Purvis, 1998) and are frequently 10-20 metres wide. Some zones are up to 60 metres wide, with gold quartz “lodes” occurring anywhere within the shear (Bottrill et al 1994).

EXPLORATION HISTORY

Geochemistry – 1982 and 1989

The EL has had virtually no exploration work in its western portion and very little activity in the eastern portion. During the 1980’s and 90’s most of the activity in the area was confined to exploring for “deep lead” alluvial deposits. In the 1980’s two regional drainage surveys partially covered the area but the sampling pattern is thought to be of too low density to be of any real value. This work was done by CRA Exploration in 1982 and Billiton in 1989.

Sapphire Trading Ltd (2002)

State funded airborne geophysical surveys flown over the area in 1993 and 1999 has provided new geoscientific information. These data have been re-processed and interrogated by the Company as follow on from work initiated by Sapphire. This low resolution data provides a useful regional tool and has verified the effectiveness of magnetics and radiometrics in delineating target areas at the Lefroy Project Area. Sapphire's interpretation of the 1999 data, released in 2001, has identified several highly prospective targets along known structures and at least one new structure. The interpretation shows an important aeromagnetic and radiometric anomaly representing a significant eastern extension of one of the largest reefs in the Field, into EL2/2002.

ECONOMIC POTENTIAL

Gold was known at Lefroy as early as 1840, but not worked until 1869. By 1871 mining was well established, and concentrated at 50 mines working along 30-35 individual reefs. Ore recovery was mostly limited to less than 140 metres depth, and persisted in earnest until around 1899. During this time approximately 187,000 ounces were recorded (from 4 main reefs), with a further 8,100 ounces mined since 1900 and an estimated 5,500 ounces recovered from alluvial deposits (Bottrill et al. 1994).

Total production from the Field is probably higher as it is reasonable to assume that much of the gold produced, particularly in early times, was not declared and therefore not recorded. Gold reefs were located at or just below the surface by panning outcropping rock and soil, leaving concealed reefs undiscovered. Furthermore, early miners only extracted and processed free-milling gold from the oxide zone, with gold in gold-bearing sulphides remaining undetected due to crude pan-testing methods. As a general rule, when Au dropped below approximately 1 ounce (30g/t) mining ceased.

ACTIVITY

Data Compilation and GIS – 3D Model

LEF has recovered data and information from various government archives and agencies in Tasmania, providing an important insight into grades and tons recovered from the Lefroy Goldfield in the early days of the goldfield's history. Hard copy and digital data has also been supplied by the previous tenement holders, was verified and combined into the Company's digital database. This information includes drilling, soil and rock chip sampling, mapping and interpretation work. LEF has completed a 2D and 3D GIS (Geographic Information System) environment. Software platforms utilised include:

- ArcGIS 9.2 (with Geosoft Target Extension)
- Micromine Modules and Fracsis

Work includes the compilation of historic plans from the 1800's, government mapping and open file company information, old drill holes, soil geochemistry and rock chip data and remote sensing. This information has been combined with remote information such as airborne photography, satellite imagery and regional geophysics, allowing spatial interrogation and drill target selection.

Structural Model

Due to the structural controls on mineralisation and their complexity, previous workers at Lefroy have recognised the need for detailed structural work to be carried out. A structural model for mineralisation was developed (supplied as Appendix 1) and is being applied to a detailed interpretation of the newly acquired airborne data.

Airborne Geophysics

An airborne geophysical survey (aeromagnetics, radiometrics and DTM) was completed over the Lefroy Goldfield and its surrounds. UTS (Universal Tracking Systems Pty Ltd) of Perth were contracted and provided a fixed-wing Fletcher FU24 single engine, piston aircraft. A low level survey was completed for approximately 1,800 line kilometres. The survey was flown at 50 metre line spacing and has provided greatly improved resolution when compared to the existing State Government data acquired at 200m line spacing as part of the Western Tasmanian Regional Mineral Program (WTRMP). Equipment can be summarised as follows:

Airborne Magnetic Sensors

- UTS designed fixed stinger attachment to the survey aircraft.
- Scintrex CS-2 Cesium Vapour Magnetometer.
- 0.001nT resolution, 0.01nT sensitivity.
- RMS AADCII Automatic Aeromagnetic Digital Compensator.
- 10Hz (0.1 second) magnetic sampling rate.
- Develco Vector Magnetometer (XYZ Components).

Base Station Diurnal Magnetometer

- Scintrex 'Envi-mag' Proton Magnetometer.
- 0.1nT resolution, 0.1nT sensitivity.
- 0.2Hz (5 seconds) magnetic sampling rate.

Gamma Ray Spectrometer

- Exploranium Model GR-820 Spectrometer.
- 2 x 16 litre detector packs (32 litre total volume).
- 256 channels.
- 1Hz (1.0 second) sampling rate.
- Digital Temperature and Humidity data recorded

The UTS Logistics Report and is supplied as Appendix 2. Geophysical imagery is supplied as Appendix 3 and Digital Data is supplied on CD ROM in Appendix 4.

Ground Geophysics – Orientation Survey

An orientation survey was conducted over selected targets near Lefroy town, to test the effectiveness of the technique in the area. Lines were selected on the basis of easy access and having known mineralisation. Zonge Engineering & Research Organization of Adelaide were contracted to provide gradient IP, fixed loop EM and CSAMT. Zonge applied 1 crewchief and 1 transmitter operator, and 2 vehicles to operate the equipment. Equipment comprised of:

- 8 channel GDP-32
- XMT-32 controller
- TEM/CSAMT coil
- GGT-10 transmitter system or large GGT-30 system
- Voltage regulator
- Necessary ancillary equipment for IP, TEM and CSAMT survey
- Field data processing system

Final data for this work is yet to be received, and will be supplied in due course.

DISCUSSION

Initial data compilation and desktop planning, resulting in an integrated GIS database will serve as ongoing planning support for the project. It will be regularly added to and updated as information becomes available. The structural model will be incorporated into an integrated interpretation and form the framework for drill target picking in 2004/2005. Airborne geophysical data has provided excellent structural information required to determine controls on mineralisation etc. This information is yet to be interpreted. Ground Geophysical orientation work was designed to test the effectiveness of the techniques over known mineralisation. The results of the work were greatly affected by power line interference and therefore cannot be solely relied upon.

CONCLUSIONS & RECOMMENDATIONS

Historical and anecdotal information points to the Goldfield having significant potential. This is supported by a detailed desktop study of the Field. Previous workers recognised the need for a good structural understanding of the Field and this has been a starting point for LEF's exploration work. LEF is continuing to build on both its GIS model of the field and the understanding that comes from it.

A preliminary review of the airborne geophysical data indicates that it is revealing significant structural information, to be interpreted in the coming weeks. The data certainly is providing greatly improved resolution when compare to the regional WTRMP 200m data.

Ground geophysical data collected in still under review. LEF may repeat some of the orientation work in areas less affected by power lines. Preliminary review indicates the following:

- Gradient Array IP data is showing good correlation with local geological changes and may represent an effective mapping tool for the future;

- EM data has provided little benefit. It is either greatly affected by power lines or the equipment is not operating properly;

- CSAMT holds some promise with resistive features roughly corresponding with known mineralisation. It has been affected by power lines.

A detailed interpretation of the airborne geophysical data is being carried out, to provide a structural interpretation and solid geology map of the EL. Other information and the structural model for mineralisation will be applied to provide a target map. This target map will form the basis for target selection in the 2004/2005 drill season.

EXPENDITURE

Expenditure at the EL during the year October 2003 to October 2004 was as follows:

EXPENDITURE	**Amount**
Administration and Management Wages	$21,500
Desktop Work/GIS/Database/Planning/Map Making	$5,000
Field Work, Field Support, Track Cutting	$1,000
Airborne Geophysics Acquisition and Ground Support	$22,300
Ground Geophysics Orientation Survey	$3,500
TOTAL	**$53,300**

Table 1. Expenditure

REFERENCES

Bottrill, R.S., Huston, D.L., Taheri, J. and Khin Zaw, 1992	Gold in Tasmania. Geological Survey Bulletin 70, Tasmanian Department of Mines.
Bottrill, R.S., Taheri, J. and Keele, R.A., 1994	A Field Guide to Gold Deposits in northeastern Tasmania, MRT Report 1994/19.
Purvis, J., 1998	Annual Report – Lefroy EL 1/95, Lefroy Joint Venture.
Purvis, J., 1999	Annual Report – Lefroy EL 1/95, Allstate Explorations NL.
Reed, A., 2002	Targeting Hard-Rock Gold Mineralisation at Lefroy, Northeastern, Tasmania, Australia. Sapphire Trading In-House Confidential GIS.
Reed, A., 2002	Formation of Lode-style gold mineralisation during Tabberabberan wrench faulting at Lefroy, eastern Tasmania, Aust. J. of Earth Sciences.
Russell, D.W. and van Moort, J. C., 1992	Mineralogy and stable isotope geochemistry of the Beaconsfield, Salisbury and Lefroy Goldfields, Geological Survey Bulletin.
Russell, D.W. and van Moort, J. C., 2003	Lefroy and Beaconsfield Gold Mines, Tamar region, Tasmania; CRC LME.

APPENDICIES

LEFROY PROJECT AREA

EL 2/2002

APPENDIX 1.

LEFROY GOLDFIELD
STRUCTURAL MODEL

LEFROY STRUCTURAL MODEL

LOCATION

1:25,000 Topographic Map Sheets:
Bell Bay 4844, Retreat 5044, Weymouth 5045, Low Head 4845

1:50,00 Geological Map Series:
Beaconsfield, Pipers River

PREPARED FOR
LEFROY RESOURCES LIMITED

Suite 5, 589 Stirling Hwy, Cottesloe 6011, Perth WA

BY
RICHARD A. KEELE
144, BRISBANE STREET, HOBART, TASMANIA 7000
(with contributions from John Baxter)

DATE:

1st October 2004

LIST OF CONTENTS

LIST OF FIGURES

1.0 SUMMARY

The Lefroy mineralised system comprises a quartz vein array, of D3 age, arranged in a ladder style along a NNW-trending D1-D2 structural corridor. Individual E-W auriferous quartz veins formed as a result of wrench faulting in a stress regime in which $\sigma 2$ was vertical at the close of the Mid-Devonian Tabberabberan Orogeny.

D3 "saddle reefs" - formed as a result of tightening of pre-existing folds in the D1 fold-thrust zone – controlled high-grade gold shoots at the Native Youth. The 45° W plunge of the gold shoot at the Volunteer is principally due to the intersection of D2-D3 faults with the steeply S-dipping reef.

It is recommended that a conceptual deep target beneath the Native Youth and Morning Star reefs be investigated with deep sounding CSAMT with the aim of locating another D1 thrust system at depth.

2.0 INTRODUCTION

Lefroy Resources Limited (LRL) was floated on the ASX in 2004 with the aim of exploring and developing the historic gold mining field of Lefroy, situated in northeast Tasmania. The Lefroy Structural Model has been developed: (1) as a means of providing LRL with a robust targeting tool for drilling in the Lefroy goldfield, and (2) as part of a commitment to the Australian Stock Exchange.

The report has been compiled in conjunction with John Baxter of Continental Resource Management in Perth, WA.

3.0 LOCATION, ACCESSIBILITY AND PHYSIOGRAPHY

Lefroy is located on the eastern side of the Tamar River approximately 30 km NE of the Beaconsfield gold deposit (Figure 1). Although the Lefroy goldfield is easily accessible outcrop is poor (<5%). Much of the current surface structural information on the field has come from the Bridport-Georgetown Highway road cut that passes within 20m of the Volunteer reef. Tertiary basalt, and their associated gravels and sand deposits, obscure much of the geology at the north end of the field (eg. Native Youth and Pinafore-Chum).

4.0 PREVIOUS STRUCTURAL STUDIES

Thureau (1882, 1883) was the first geologist to recognise that the auriferous veins at Lefroy occurred in an anticline "almost four miles across" that was developed in slate beds, prompting an analogy with the saddle reefs in Bendigo. His reference to the Native Youth, in which he described the gold reefs as occurring in "very thinly laminated beds, exhibiting a wavy texture throughout and almost horizontally deposited" is a reference to stripey S1 cleavage commonly deformed by D3 folds in the district. He also showed that a folded quartz sandstone bed, in part, controlled the shoot geometry at the Native Youth (Figure 2).

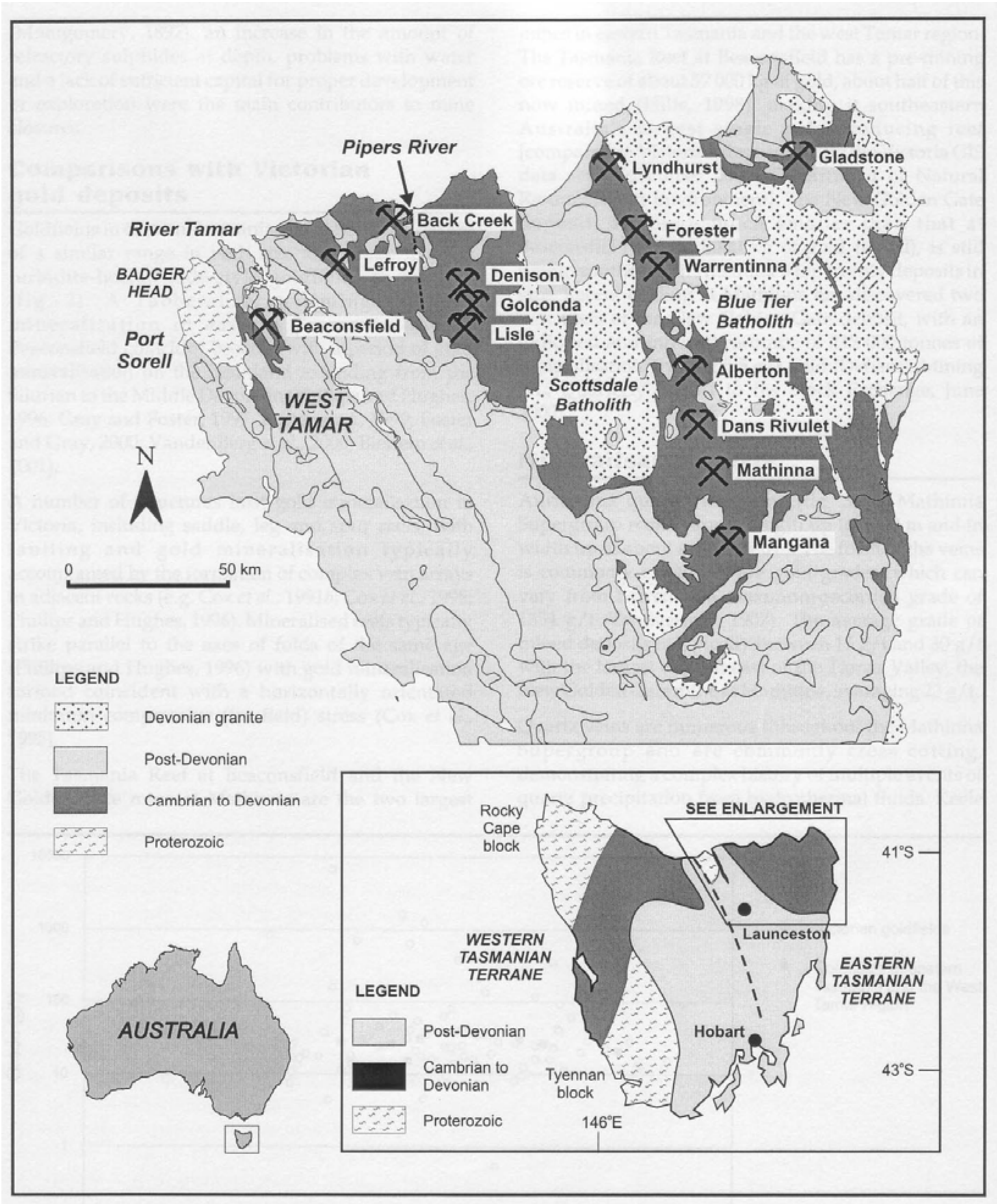


Figure 1 Location and simplified geology of the major goldfields in eastern Tasmania. Lefroy lies between the Beaconsfield and Back Creek deposits

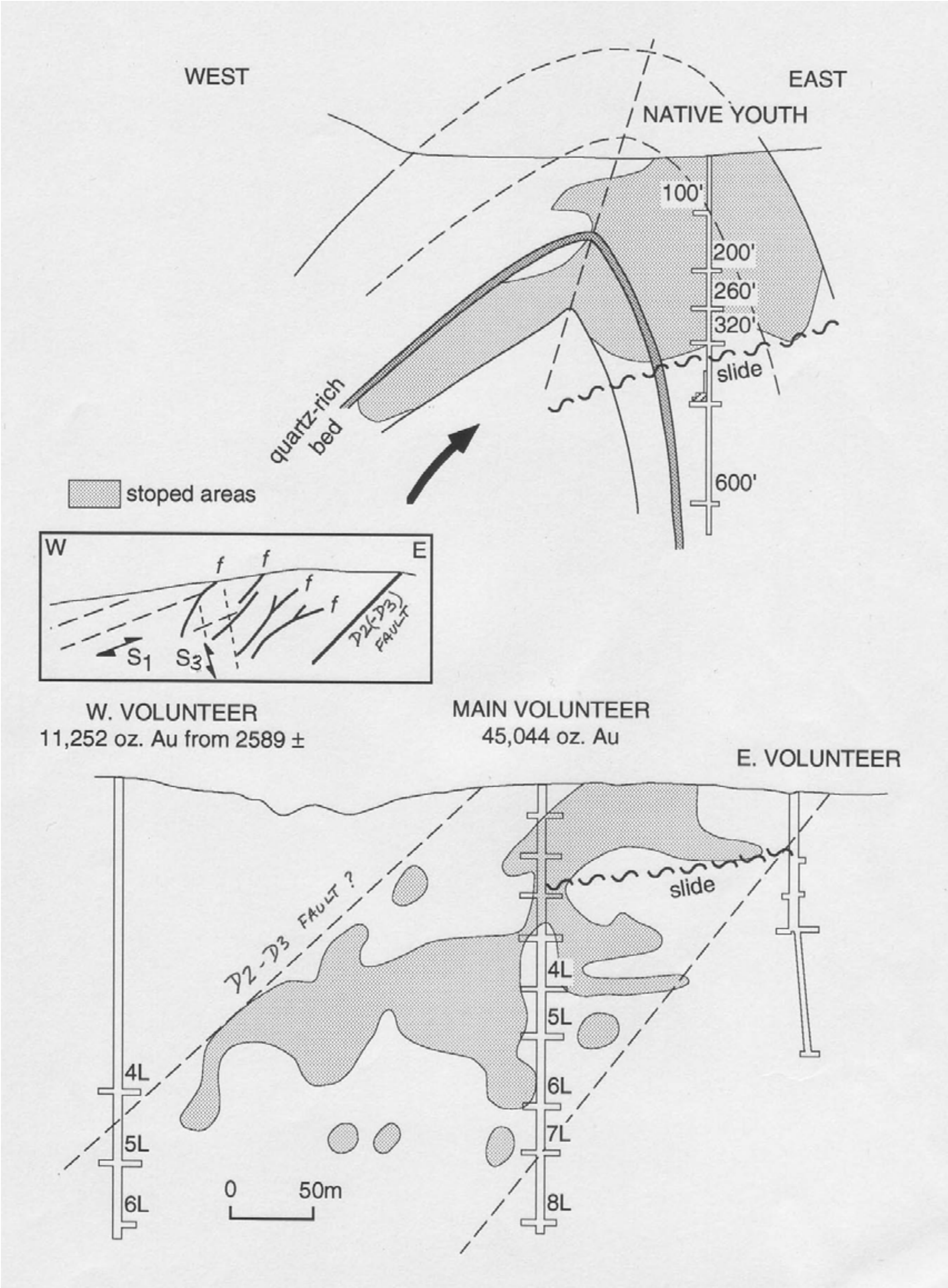


Figure 2 Long section through the Native Youth and Volunteer mines.

Montgomery (1897) recognised there were two types of auriferous lode at Lefroy: these he called “mullocky lodes” and “quartz lodes” respectively. The “mullocky lode” was recognised as a fault because of the broken nature of the auriferous quartz, which had experienced considerable post-depositional disruption and dislocation. The second type of lode was called “quartz formation” because of its thick regular development of gold-bearing quartz reef. The Volunteer-Land O’Cakes, the Clarence and Pinafore reefs were good examples of the former, whereas the Native Youth, Chum and Morning Star were all excellent examples of the latter. The Golden Point & Crown was considered to be a hybrid because it showed characteristics of both. Montgomery believed that the quartz lodes formed first and that the “mullocky formation” was the result of later movements across the lodes.

Thureau and Montgomery both recognised the fact that mudstone-shale sequences tended host the mullocky lodes, whereas sandstone sequences generally hosted the quartz lode types. This demonstrated that host-rock rheologies were always considered important controls to major lode systems at Lefroy.

The landmark study Powell and Baillie (1992) showed that Lefroy lies on the overturned limb of an E-directed D1 recumbent fold in the Pipers River Recumbent Zone (Figure 3). Fold structures east of the Pipers River are upright in style, which has led other workers - notably Reed (2001) - to speculate that there is an unconformity separating these two structurally distinct domains, in which these Benambran-aged (or late Delamerian?) recumbent structures are absent to the east.

The Volunteer-Land O’Cakes reefs is a jogged fault system, in which a strong As + Au soil anomaly defined a zone of high fluid permeability at the overlap between the two faults (Keele 1996). The movement has been suggested to be dextral; however, given the orientation of the far field stress at the time of D3, the movement is likely to be sinistral. Therefore, the ore fluids had been introduced into a contractional (and not an extensional) jog.

A detailed study of the diamond drill core from Allstate’s drilling at the Volunteer (Reed 2001) concluded that the westerly plunge of the Volunteer ore body was due to the intersection of a shallow W-dipping D1 thrust with the ENE-trending D3 quartz veins. Facing evidence in drill core (DDH L1) showed that the Volunteer mineralisation coincided with a change from overturned (down-hole facing) sandstone beds in the west from normal facing (up-hole facing) siltstone-mudstone units the east (Figure 4). Reed recognised D3 by its localized folding of S1/S2 and disruption to the D1/D2 veins. Auriferous sulphide mineralisation is typically associated with D3 brecciation and folding of D1/D2 structures in core.

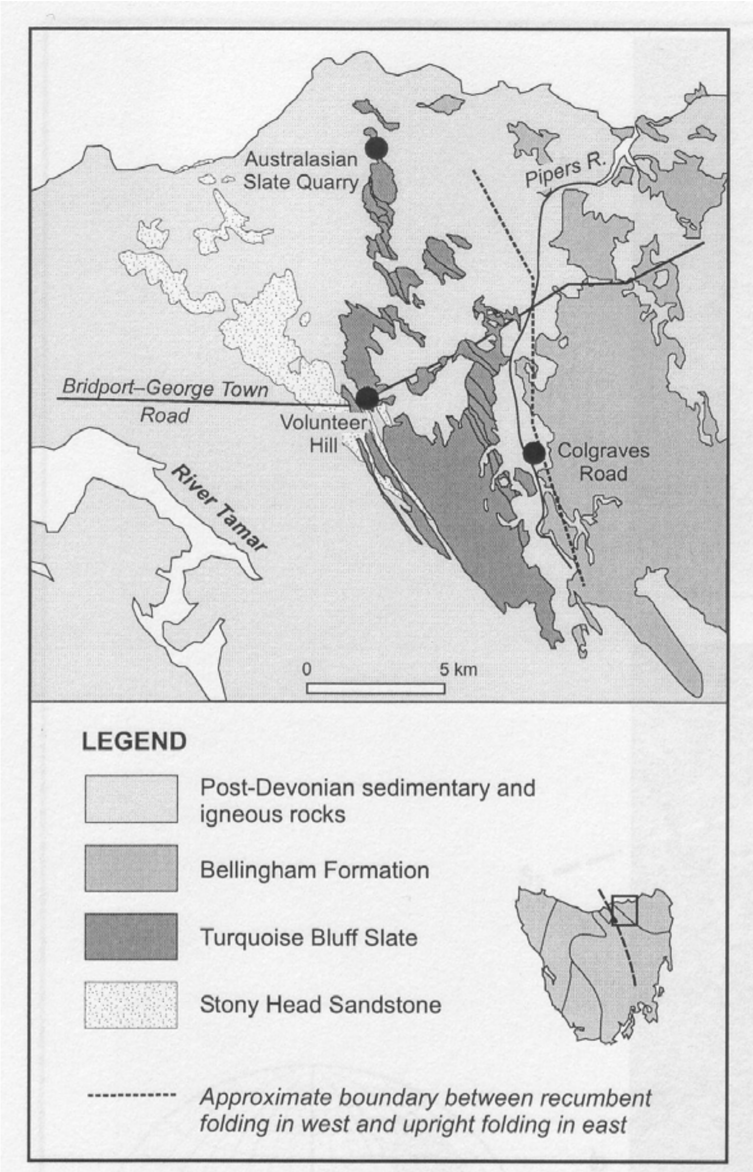


Figure 3 Location of the Volunteer lode in Lefroy showing the position of the eastern boundary to the Pipers River Recumbent Zone (from Reed 2004)

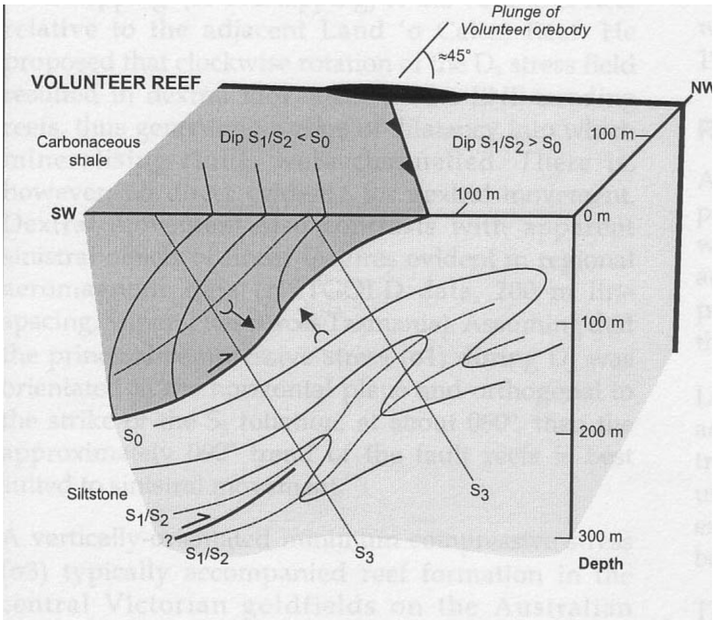


Figure 4 Block Diagram of the Volunteer D 1 thrust (from Reed 2001)

5.0 STRUCTURAL HISTORY

There are three major phases of deformation in the Lefroy district related to two orogenies (Reed 2001). D1 is an E-directed recumbent folding event that is either a very Late Delamerian (Cambro-Ordovician) or Benambran (E. Ordovician) in age. D2 is an E-directed thrusting event during the first phase of the Tabberabberan (Middle Devonian) Orogeny. D3 is a W-vergent thrusting event that stitched the eastern and western Tasmania terranes together at the close of the Tabberabberan Orogeny (Figure 5). Gold mineralisation in NE Tasmania occurred between 389-391 Ma (Reed 2004, & Black pers. com. 2004).

The extensional nature of the D2 fabric at Lefroy (see below) suggests that D2 may have been related to the emplacement of granitoids at depth, i.e., the equivalent of the (405-395 Ma) Pyengana and Georges River Plutons, east of the Scottsdale Batholith. There is little evidence for D2 folding at Lefroy.

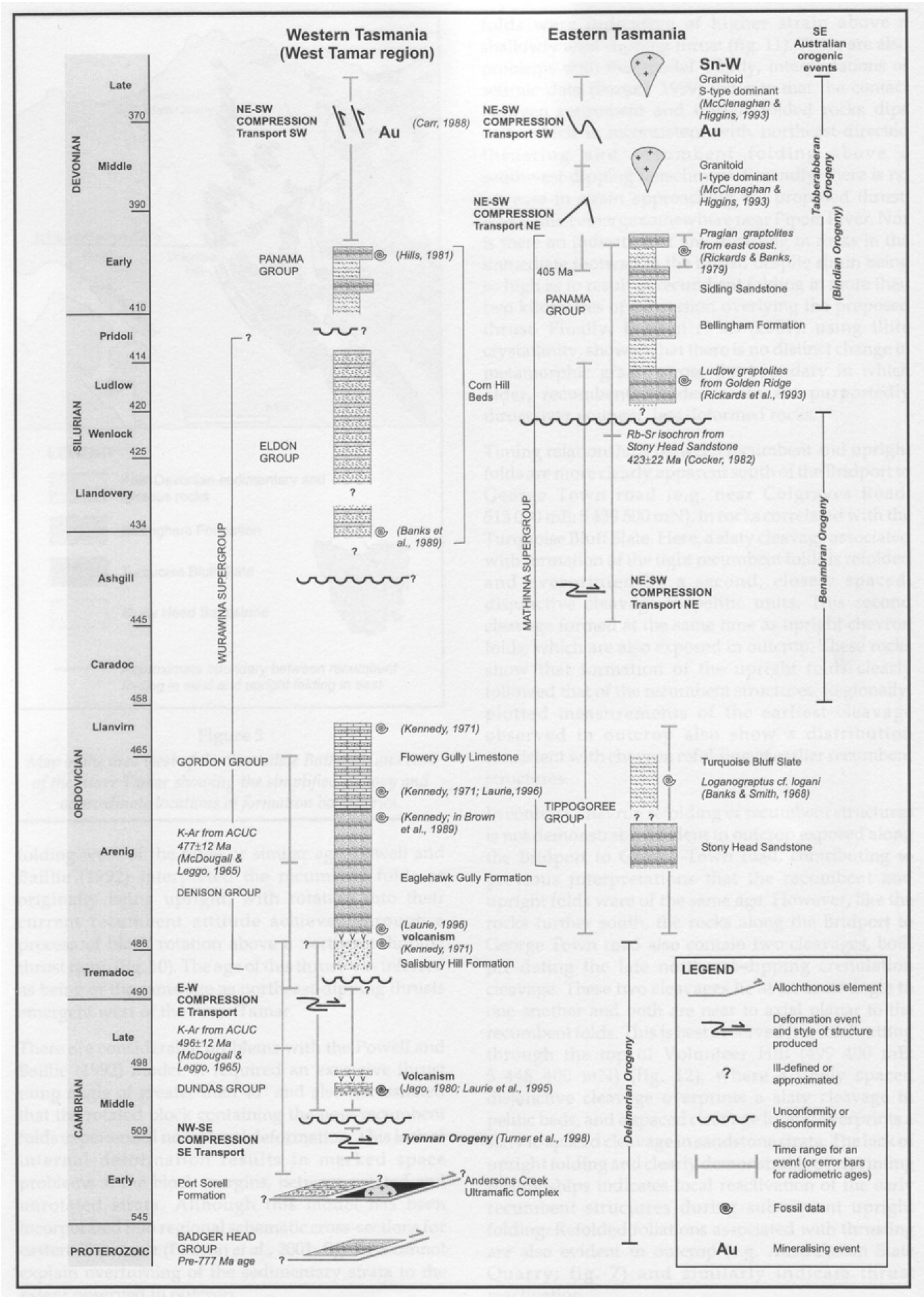


Figure 5 Time–Space diagram for eastern Tasmania (from Reed 2004).

6.0 STRUCTURAL SETTING

Regional Structures

The crustal structure beneath the Lefroy deposits has been modeled by Keele et. al., (1994) and Reed (2004). In both models the fluids are sourced from a shallowly E-dipping D3 detachment fault that daylights beyond the Beaconsfield gold mine on the western side of the Tamar Fracture Zone (Figure 6). The steeply dipping D3 vein structures and faults tapped, or "short-circuited" the gold fluids at depths of between 5 and 10 kms. Arsenopyrite geothermometry data suggests that Lefroy was closer to the fluid source than Beaconsfield: Lefroy fluids were hotter (460-470° C) than Beaconsfield (370-440°C, unpublished data).

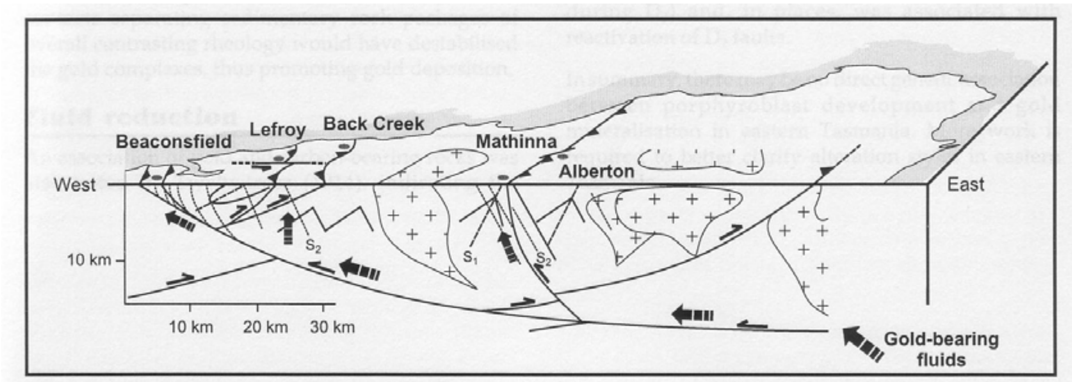


Figure 6 Block diagram sketch of eastern Tasmania showing possible fault architecture beneath the Lefroy deposit (from Reed 2004).

Local Structures

The local setting is dominated by an *en-echelon* D3 quartz vein array that trends in a NW to NNW direction along the length of the goldfield (Figure 7). Individual reefs trend ENE to NE and dip vertically or steeply S, with the exception of the Native Youth that dips N. A number of these D3 structures are faults (e.g. Volunteer, Pinafore & Clarence) with unknown displacements. The longest of these structures is the Volunteer, which may be traced for 10 km in the magnetic images. The remaining reef structures, however, do not occur beyond two important quartzite-mudstone marker beds situated east and west of the town and average from 250 m to 1.5 km in length (Figure 7). The longest of these reefs in the central part of the field is the Morning Star reef, which has been traced across the Tertiary basalt out crop, a total distance of 2-3 km.

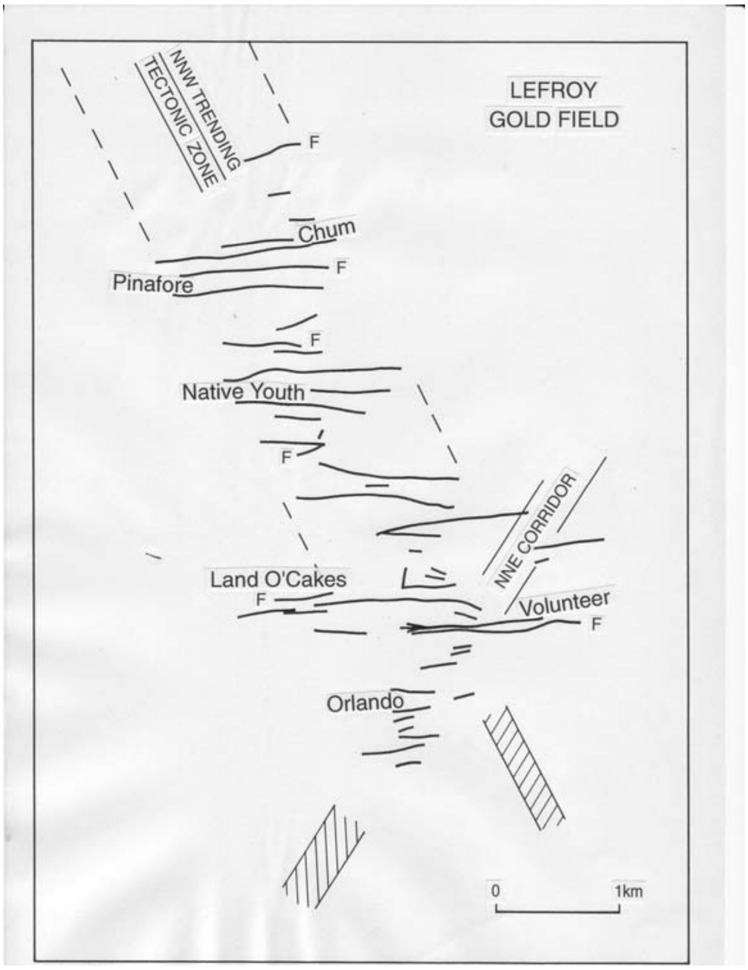


Figure 7 D3 quartz vein array in the Lefroy goldfield. Reefs marked "F" are the D3 faults (or "mullocky formation" in the old terminology)

Volunteer–Specimen Hill Area

D1

Detailed observations along the road cut show that S1 is a gently SW-dipping penetrative foliation developed in overturned sandstone-siltstone-mudstone sequences (Figure 8). A number of faults can be seen in the road cut, which make up the NW-trending D1 "corridor" that runs through the goldfield (Keele 1996) (Figure 7).

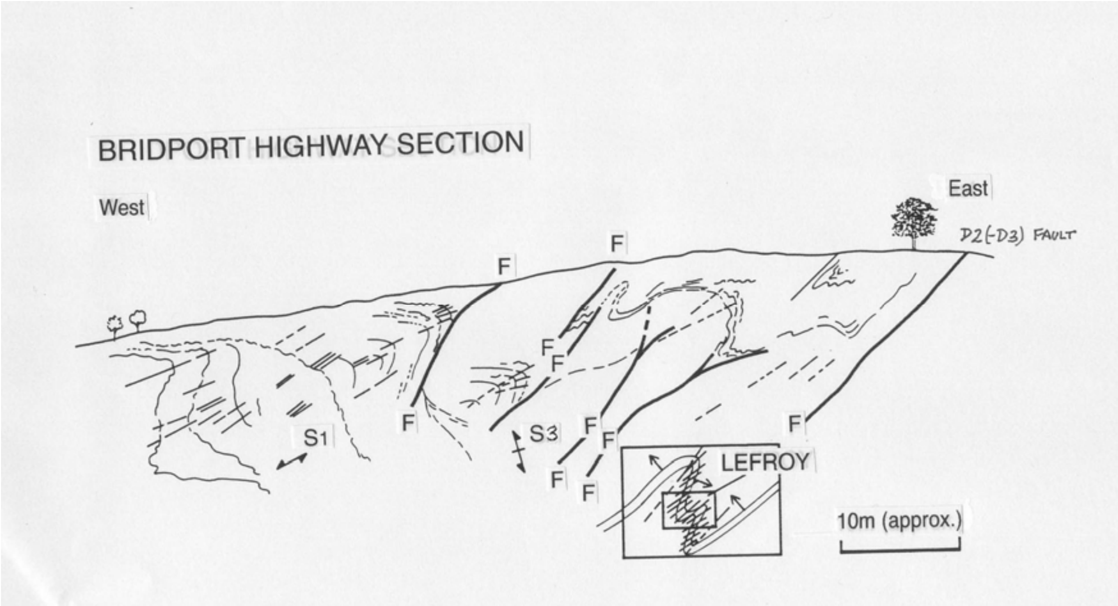


Figure 8 Structural geology sketch of the south side of the road cut at the Volunteer; note that the view has been made looking north by reversing the image.

D2

S2 is an extensional crenulation/shear band fabric in S1 that gives a consistent normal sense of shear in outcrop. D2 faults are 1-30 cm wide moderately W-dipping zones that contain quartz veining, alteration and cataclastic textures. These faults are probably re-activated during D3. The anastomosing or "stripey" S1 cleavage, which is well developed in certain units that are composed of alternating sandstone and siltstone. This indicates that shearing dominated the D2 event. The D2 faults (and shear bands) have exploited the rheological contrasts in the sandstone-siltstone-mudstones; hence these D2-D3 faults generally follow stratigraphic contacts (Figure 8).

D3

At Lefroy vein orientation is geometrically related to D3 structures (Powell 1991): S3 is a steep E-dipping NNW-trending crenulation cleavage developed in the finer grained lithologies. It strikes NNW and is related to the W-vergent collisional phase of the Devonian Orogeny. A number of structures such as quartz veins, joints, intersecting lineations, fold axes etc, are attributed to this deformation (Figure 9). The NE-trending "breakthrough veins" are related the NE vein array, which is well developed at the south end of the field (Monarch-Orlando); a NE cut-off to quartz reefs at the north end of the field (Chum-Pinafore-Golden Era) may also be an expression of this array (Figure 7). There is a high probability that these veins are mineralised.

A series of NW-trending post-ore faults with small displacements cut the reef at the Native Youth. These contain no quartz and are not mineralised.

A regional cross-section through the Lefroy field (Groves 1965) reveals that the fault lodes (F) generally have S-dips (Volunteer, Pinafore and Clarence), whereas the dilational quartz lodes (Q) have vertical or steep N-dips (Native Youth, Morning Star (Figure 10). Individual reefs at Lefroy appear to have experienced either extension (dilational quartz lodes) or wrenching (fault lodes), or a combination of both (Golden Point & Crown).

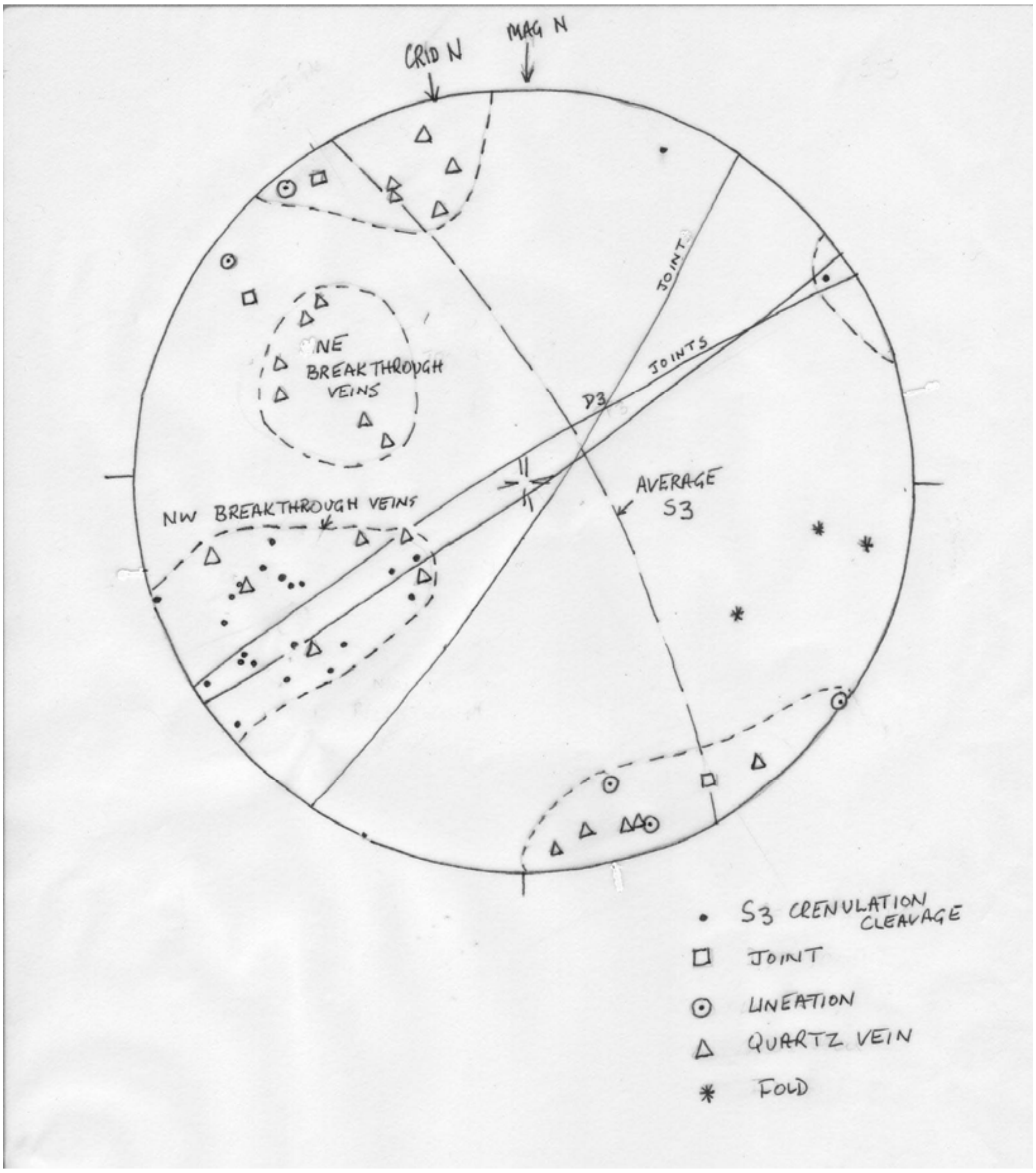


Figure 9 Stereonet of D3 structures (equal angle). Data is mostly from the Volunteer-Specimen Hill-Monarch Hill area. (Note this stereonet is plotted with Magnetic north: AMG north is 14° in an anti-clockwise direction)

7.0 MICROSTRUCTURES

Microscopically, three cleavages are present in the deformed slates associated with the reefs (e.g., Chum and Pinafore). S1 is a penetrative foliation (usually at a low angle to bedding); S2 is an extensional crenulation cleavage - often in a conjugate relationship with the crenulation cleavage, S3, which is best developed in the siltstone-mudstone lithologies. By its very nature, S3 is a brittle-ductile event. Mineralised quartz veins, which contain small amounts of gold, arsenopyrite, chalcopyrite, tetrahedrite, bournonite, galena, sphalerite and pyrite (Bottrill 1996), are therefore syn to post-D3 in age (Reed 2001, Powell 1991).

8.0 DISCUSSION

In summary, the Lefroy Structural Model consists of a quartz vein array, of D3 age, arranged in a ladder style along a NNW-trending D1-D2 structural corridor. Individual E-W auriferous quartz veins formed as a result of wrench faulting in a stress regime in which $\sigma 2$ was vertical.

A longitudinal section through the Volunteer (Chisolm 2004) indicates that the 45° W plunge of the shoots may be the result of secondary shear movement during D3 (Figure 11). Alternatively, the 45° W plunge of the Volunteer shoot is due to the intersection of W-dipping D2-D3 faults (controlled principally by rheological differences across bedding surfaces) with the steep S-dipping reef.

The orientation of the D3 fold axes (and earlier D1 folds) suggests that the main litho-structural control to shoot development at Lefroy is sub-horizontal. The implication is that further substantial gold reserves may be found at depth in a re-make of the kind of structures found at surface. The main challenge is to find another D1 thrust system (and associated D1 to D3 anticlines) beneath the current Volunteer Thrust. If the system is stacked then there is every prospect of finding further rich ore shoots at depth.

An interesting possibility is that the reefs currently mined may merge into a single reef (or at the least a few reefs) at depth. There is some evidence that this could happen (see Figure 10).

A challenge will be to model in 3D the shallow-dipping Volunteer D1 thrust system through the goldfield.

9.0 CONCLUSIONS AND RECOMMENDATIONS

The Lefroy Structural model is able to:

- Explain the nature of the quartz vein arrays with respect to the stress field.
- Establish that the fault regime was one of wrenching ($\sigma 2$ vertical) rather than thrusting during the mineralizing event.
- Establish the timing of the gold mineralisation with respect to the Tabberabberan Orogeny of Middle Devonian age.
- Demonstrate that pre-existing geometry (due to early deformation) played a crucial role in the localizing the ore shoots
- Show the high-grade gold shoots at the Native Youth are controlled by D1 fold-thrusts that have been modified during D3 forming “saddle reefs”.
- Indicate D2 is an extensional (shear) event at Lefroy
- Suggest the permeability of the wall-rocks were enhanced by D3 reactivation of D2 faults in the vicinity of the quartz reefs (Volunteer)

- Demonstrate the slightly different orientations of the two types of reefs in the goldfield (F = "mullocky" and Q = dilational quartz) carry possibility that a target zone exists at depth.
- Explain the 45 W plunge of the Volunteer shoot as the intersection of bedding (or rheologically) controlled D2-D3 faults with the vertical reef.

It is recommended that the Deep Target (Figure 10) at the Native Youth be investigated with deep sounding CSAMT in order to locate another D1 thrust/D3 anticline system at depth.

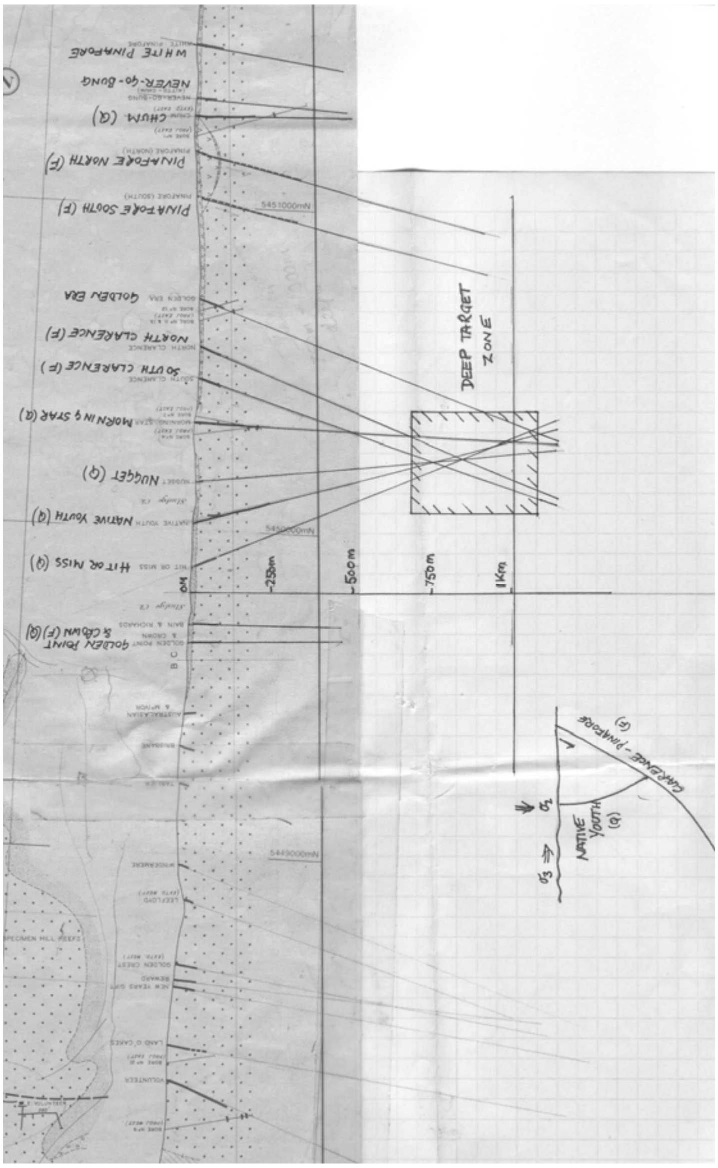


Figure 10 N-S Cross–section through the Lefroy Quartz reefs (looking west). The fault lodes are marked (F) and the quartz lodes (Q). Note the convergence of the two types beneath the Native Youth (from Groves 1965).

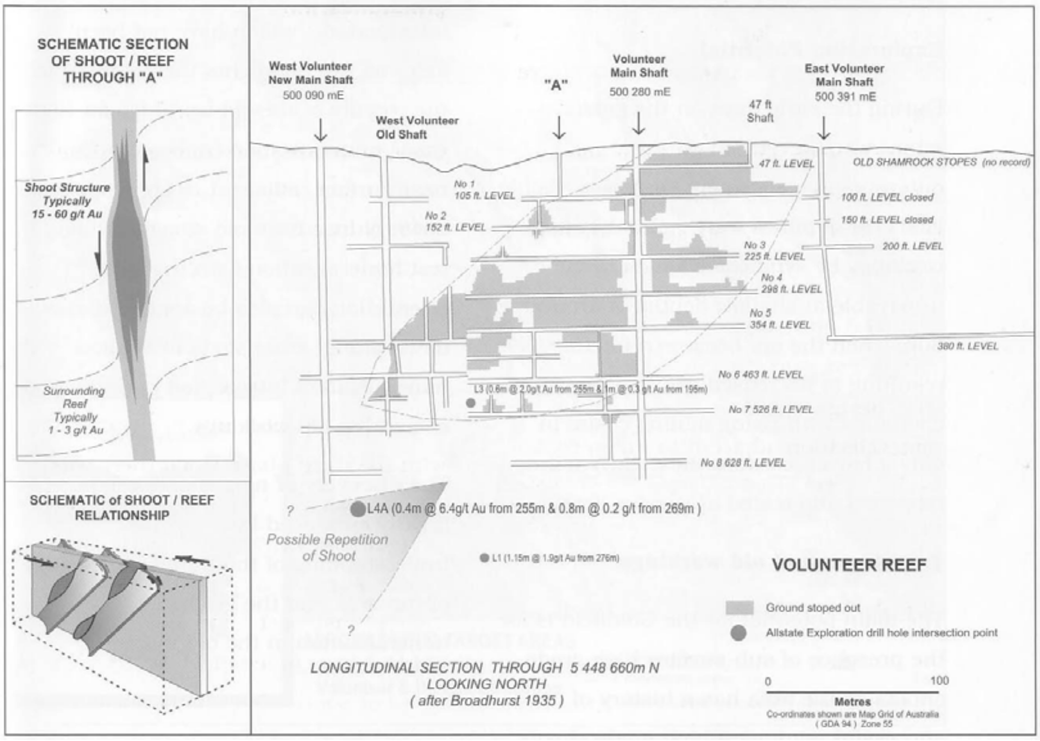


Figure 11 Longitudinal section through the Volunteer, showing the secondary shear model and the potential for further ore shoots at depth (from Chisolm 2004).

10.0 BIBLIOGRAPHY AND REFERENCES

Bottrill, R.S., 1996. The ore petrology of some samples from the Lefroy Goldfield (report to CKGM NL)

Chisolm, J., 2004. Lefroy Resources Limited Prospectus.

Groves, D.I., 1965. Geology of the Lefroy Goldfield. Technical Report Department of Mines, Tasmania No. **9**, 59-76.

Keele, R. A., Taylor, B and Davidson, G.J., 1994. Relationship between Devonian Thrusting and gold mineralisation in northeastern Tasmania, in: *Contentious Issues in Tasmanian Geology*, eds: D.R. Cooke and P. A. Kitto. Geol. Soc. Australia Abstr. No. **39**, 69-72.

Keele, R. A., 1996. Gold mineralisation and structure in the Mathinna Supergroup. MSc. Course Notes. Centre for Ore Deposit and Exploration Studies, Univ. of Tasmania, unpublished.

Montgomery, A., 1897. Lefroy Goldfield, Tasmania: report on the geological structure and mining development, Parliamentary Report.

Powell, C. McA., 1991. Structure of the Beaconsfield and Lefroy Goldfields. Report, Division of Mines and Mineral Resources Tasmania, 1991/16

Powell, C. McA. and Baillie, P. W., 1992. Tectonic affinity of the Mathinna Supergroup in the Lachlan Fold Belt. Tectonophysics **214**, 193-209.

Reed, A.R., 2001. Pre-Tabberabberan deformation in eastern Tasmania: a sothern extension of the Benambran Orogeny. AJES 48; 785-796.

Reed, A.R., 2002. Formation of lode-style gold mineralisation during Tabberabberan wrench faulting at Lefroy, eastern Tasmania. AJES, 49: 879-890.

Reed, A. R., 2004. Gold Mineralisation and the Regional Palaeozoic Structure of the Mathinna Supergroup, eastern Tasmania. Tasmanian Geological Survey Record 2004/01. Mineral Resources Tasmania, Hobart.

Thureau, G., 1883. Report on the future prospects of deep mining of gold-bearing quartz lodes at Lefroy, Parliamentary Report.

Appendix 1 Lefroy Structural Database

	Lefroy Structural Database							
	AMG Aus 66			(Magnetic azimuth - add 14 degrees of declination to get grid N)				
Field No.	**Easting**	**Northing**	**S0**	**S1**	**S3**	**Quartz Veins**	**Other**	**Comments**
LF1	498,860	5,448,800	198/82w	182/39sw				Overturned limb
LF3	500,527	5,448,499	298/26w		327/82e			Overturned limb
LF3A	500,527	5,448,499	306/48sw	315/28sw				
LF3B	500,527	5,448,499	282/63sw					
LF5	498,947	5,448,680		177/7w				Land O'Cakes
LF19	499,173	5,448,590		335/24w				
LF27	499,672	5,448,676	326/85w	307/42w	342/90	256/79s		Specimen Hill
LF27A	499,672	5,448,676			341/71e	265/87n		
LF27B	499,672	5,448,676				346/80e		
LF27C	499,672	5,448,676				005/5w		
LF31	498,770	5,448,702		296/11sw				
LF31A	498,770	5,448,702		274/40sw				
LF32	498,720	5,448,747		323/73sw				
LF35	498,672	5,448,422		165/26w		165/26w		
LF72	499,346	5,448,255		133/29w				Monarch Hill
LF-VHT1-0	499,230	5,448,320		325/15sw		025/70se		Volunteer Hwy Section
LF-VHT1-10	499,250	5,448,320	150/32sw	325/18sw		072/85n		
LF-VHT1-20	499,270	5,448,325				286/6n		
LF-VHT1-40	499,310	5,448,330				338/75e		
LF-VHT1-70	499,330	5,448,335					058/84n	joint
LF-VHT1-90	499,350	5,448,340				065/81s	287/65sw	D2-D3 fault
LF-VHT1-90A	499,350	5,448,340				280/36s		
LF-VHT1-90B	499,350	5,448,340				065/81s		
LF-VHT1-110	499,370	5,448,350					306/61sw	D2-D3 fault
LF-VHT1-120	499,385	5,448,350				073/85s		
LF-VHT1-130	499,400	5,448,355				040/70se		
LF-VHT1-150	499,440	5,448,355	308/65sw					
LF-VHT1-170	499,470	5,448,360	282/36sw	335/23e				
LF-VHT1-170A	499,470	5,448,360		304/30sw				
LF83	499,523	5,447,851		160/38w		050/86n		Top of monarch hill
LF86	499,387	5,449,008		290/23sw	326/80e	295/17sw		Windermere tunnel
LF106A	498,095	5,448,809	138/62w	130/46sw	167/68e			
" B	"	"		160/8sw				
LF120	498,042	5,448,758		106/7n			5/330	F3 fold
LF130	499,480	5,450,400		185/24e	146/86w	155/37e		
" A	"	"				137/40e		
" B	"	"				160/48e		
" C	"	"				087/31s		
LF135	510,209	5,451,917	123/10n		295/90		027/81e	Conjugate fracture
LF136	509,945	5,451,987			292/85s		16/098	F3 fold
LF136A	509,894	5,452,005		050/6e	145/38e			
" B	509,747	5,452,011	135/58e					
LF137	508,607	5,451,587		072/9s				
LF-VHT2-0	499,030	5,448,300						Volunteer highway
-VHT2-10	499,020	5,448,300		145/29sw		130/155		section, start (east to west)
-VHT2-30	499,000	5,448,300	157/66sw			160/52w		
-VHT3-0	498,759	5,448,280						
-VHT3-10	498,745	5,448,280				066/23s		
-VHT3-20	498,732	5,448,275				015/41e		
-VHT3-30	498,720	5,448,270		143/13sw	160/76e			
-VHT3-70	498,690	5,448,260				120/25s		
-VHT3-100	498,660	5,448,240				072/72s		
-VHT4-0	498,463	5,448,100						
" -30	498,400	5,448,080		156/35sw	156/67e			
" -100	498,325	5,448,060	150/55sw	145/48sw				
" -110	498,310	5,448,060	155/62sw			198/68s		
LF229	500,764	5,448,585	337/75w	312/51sw	327/88e	153/57w		PipersRiver shop
" A	"	"				200/48e		o/turned beds
" B	"	"				080/84n		
" C	"	"				215/70e		
LF249	499,150	5,448,000	322/38e	336/42w	325/45e			Monarch Hill
	499,925	5,448,195		310/41sw				
LF-VC-14	499,920	5,448,250		272/29s				Volunteer Costean
LF-VC-35	499,920	5,448,227					266/68s	Shear=HW of Qtz-sul zone

LF-VC-35A	499,920	5,448,227		140/30sw		253/85n		
LF-VMS	499,895	5,448,220	186/12e					normal facing by main Volunteer shaft
LF274	498,913	5,447,645		155/34sw			4/160	Plunge of crenulation
LF276	499,086	5,447,636		163/30sw	140/77e			Old Lncst Rd
LF276A	499,086	5,447,636		035/16se				F3 folded S1
LF277	499,134	5,447,832		153/11sw				Old Rd
LF278	499,162	5,447,809		140/21sw				
LF279	499,200	5,447,900		140/63sw				
LF283	499,239	5,448,321		145/40w	138/64e	142/70e	3/306	S3-S1 intersection (cren)
LF283A	499,239	5,448,321				213/65nw	088/54s	Fr. Cleav. in qv
LF283B	499,239	5,448,321					055/87s	jnt. adjacent to qv
LF284	499,283	5,448,330		146/16sw	148/81e	165/15w	1/125	Lin, S3-S1 intersect.
LF285	499,350	5,448,334	138/23sw	128/35sw	338/78e	110/24s	13/165	Lineation
LF285A	499,350	5,448,334	280/75s				146/48sw	D2-D3 Fault Zone
LF286	499,422	5,448,346	122/54sw	110/25s	155/65e			
LF287	498,170	5,446,810		120/52sw	158/68e			Lefroy road cut
LF287A	498,170	5,446,810		135/8s			132/75w	D2-D3 zone
LF288	500,453	5,448,549	127/40sw	125/15sw	155/81e			Beds overturned
LF289	506,339	5,450,142	130/80e	090/70s			7/100	F3 fold
LF290	502,634	5,447,960	180/10w				2/320	Lin on S1, Troopers Track
LF291	503,097	5,446,627	330/17ne	327/7ne	315/70ne			
LF292	503,071	5,446,479	315/55ne	145/14sw	135/45e		25/122	F3 fold
LF293	507,300	5,450,400	125/76e	090/36s				
LF294	507,740	5,450,700	088/57s	085/32s				
LF295	508,500	5,451,230		042/5s	140/88ne			
LF296	510,000	5,451,960		135/34ne				
LF297	502,300	5,444,980		010/8e	145/72ne			Native Industry
LF297A	502,300	5,444,980		138/45sw				
LF298	502,450	5,443,500		150/46w				

APPENDIX 2.

UTS GEOPHYSICS REPORT

Logistics Report

for a

DETAILED AIRBORNE MAGNETIC, RADIOMETRIC AND DIGITAL TERRAIN SURVEY

for the

LEFROY PROJECT

carried out on behalf of

LEFROY RESOURCES LIMITED

by

UTS GEOPHYSICS

(UTS Job #A649)

FAUNTLEROY AVENUE, PERTH AIRPORT
PO BOX 126, BELMONT WA 6984
Telephone +61 8 9479 4232 Facsimile +61 8 9479 7361
A.B.N. 31 058 054 603

TABLE OF CONTENTS

1 GENERAL SURVEY INFORMATION

In September 2004, UTS Geophysics conducted a low level airborne geophysical survey for the following company:

Lefroy Resources Limited
Suite 5
Cottesloe Corporate Centre
589 Stirling Highway
COTTESLOE WA 6011

Acquisition for this survey commenced on the 18th September 2004 and was completed on the 21st September 2004.

2 SURVEY LOCATION

The area surveyed was approximately 50km east of Devonport in Tasmania. Survey boundary coordinates are provided in Appendix C of this report.

The survey was flown using the AMG84 coordinate system (a Universal Transverse Mercator projection) derived from the Australian Geodetic Datum and was contained within zone 55 with a central meridian of 147 degrees. Details of the datum and projection system are provided in Appendix B of this report.

3 AIRCRAFT AND SURVEY EQUIPMENT

The UTS navigation flight control computer, data acquisition system and geophysical sensors were installed into a specialised geophysical survey aircraft.

The list of geophysical and navigation equipment used for the survey is as follows:

General Survey Equipment

- FU24 – 954 fixed wing survey aircraft.
- UTS proprietory flight planning and survey navigation system.
- UTS proprietory high speed digital data acquisition system.
- Novatel 3951R, 12 channel precision navigation GPS.
- RACAL MK IV real time differential GPS system.
- UTS LCD pilot navigation display and external track guidance display.
- UTS post mission data verification and processing system.
- Bendix King KRA-405 radar altimeter.

Magnetic Data Acquisition Equipment

- UTS tail stinger magnetometer installation.
- Scintrex Cesium Vapour CS-2 total field magnetometer.
- Fluxgate three component vector magnetometer.
- RMS Aeromagnetic Automatic Digital Compensator (AADC II).
- Diurnal monitoring magnetometer (Scintrex Envimag).

Radiometric Data Acquisition Equipment

- Exploranium GR-820 gamma ray spectrometer.
- Exploranium gamma ray detectors.
- Barometric altimeter (height and pressure measurements).
- Temperature and humidity sensor.

3.1 *Survey Aircraft*

The aircraft used for this survey was a FU24 – 950 series fixed wing survey aircraft, owned and operated by UTS Geophysics, registration VH-UTR. The specifications are as follows:

Power Plant

- Engine Type Single engine, Lycoming, IO-720
- Brake Horse Power 400 bhp
- Fuel Type AV-GAS

Performance

- Cruise speed 105 Kn
- Survey speed 100 Kn
- Stall speed 45 Kn
- Range 970 Km
- Endurance (no reserves) 5.6 hours
- Fuel tank capacity 490 litres

3.2 *Data Positioning and Flight Navigation*

Survey data positioning and flight line navigation was derived using real-time differential GPS (Global Positioning System).

Navigation was provided through a UTS designed and built electronic pilot navigation system providing computer controlled digital navigation instrumentation mounted in the cockpit as well as an externally mounted track guidance system.

GPS derived positions were used to provide both aircraft navigation and survey data location information.

The GPS systems used for the survey were:

- Aircraft GPS Model Novatel 3951R
- Sample rate 0.5 Seconds (2 Hz)
- GPS satellite tracking channels 12 parallel
- Typical differentially corrected accuracy 1-2 metres (horizontal)
3-5 metres (vertical)

3.3 UTS Data Acquisition System and Digital Recording

All geophysical sensor data and positional information measured during the survey was recorded using a UTS developed, high speed, precision data acquisition system. Survey data was downloaded onto magnetic tape on completion of each survey flight.

Instrument synchronisation times were measured and removed in real-time by the UTS data acquisition system.

3.4 Altitude Readings

Accurate survey heights above the terrain were measured using a King radar altimeter installed in the aircraft. The height of each survey data point was measured by the radar altimeter and stored by the UTS data acquisition system.

- Radar altimeter models — King KRA- 405 twin antenna altimeter
- Accuracy — 0.3 metres
- Resolution — 0.1 metres
- Range — 0 - 500 metres
- Sample rate — 0.1 Seconds (10Hz)

The digital terrain model is calculated by subtracting the terrain clearance (radar altimeter) from the GPS height (interpolated to 0.1 Hz), and as such the accuracy is constrained by the differentially corrected GPS position.

3.5 UTS Stinger Mounted Magnetometer System

The installation platform used for the acquisition of magnetic data was a tail mounted stinger. This proprietary stinger system was constructed of carbon fibre and designed for maximum rigidity and stability.

Both the total field magnetometer and three component vector magnetometer were located within the tail stinger.

3.6 Total Field Magnetometer

Total field magnetic data readings for the survey were made using a Scintrex Cesium Vapour CS-2 Magnetometer. This precision sensor has the following specifications:

- Model — Scintrex Cesium Vapour CS-2 Magnetometer
- Sample Rate — 0.1 seconds (10Hz)
- Resolution — 0.001nT
- Operating Range — 15,000nT to 100,000nT
- Temperature Range — -20^{o}C to +50^{o}C

3.7 Three Component Vector Magnetometer

Three component vector magnetic data readings for the survey were made using a Develco Fluxgate Magnetometer. This precision sensor has the following specifications:

- Model — Develco Fluxgate Magnetometer
- Sample Rate — 0.1 seconds (10Hz)
- Resolution — 0.1nT
- Operating Range — -100,000nT to 100,000nT
- Temperature Range — -20^{o}C to +50^{o}C

3.8 *Aircraft Magnetic Compensation*

At the start of the survey, the system was calibrated for reduction of magnetic heading error. The heading and manoeuvre effects of the aircraft on the magnetic data was removed using an RMS Automatic Airborne Digital Compensator (AADC II).

Calibration of the aircraft heading effects were measured by flying a series of pitch, roll and yaw manoeuvres at high altitude while monitoring changes in the three axis magnetometer and the effect on total field readings. A 26 term model of the aircraft magnetic noise covering permanent, induced and eddy current fields was determined. These coefficients were then applied to the data collected during the survey in real-time. The coefficients are listed in Appendix F

UTS static compensation techniques were also employed to reduce the initial magnetic effects of the aircraft upon the survey data.

3.9 Diurnal Monitoring Magnetometer

The base station magnetometer was located in a low gradient area beyond the region of influence of any man made interference to monitor diurnal variations during the survey.

The specifications for the magnetometers used are as follows:

- Model Scintrex Envimag
- Resolution 0.1 nT
- Sample interval 5 seconds (0.2 Hz)
- Operating range 20,000nT to 90,000nT
- Temperature -20°C to +50°C

3.10 Barometric Altitude

An Air DB barometric altimeter was installed in the aircraft so as to record and monitor barometric height and pressure. The data was recorded at 0.10 second intervals and is used for the reduction of the radiometric data.

- Model Air DB barometric altimeter
- Accuracy 2 metres
- Height resolution 0.1 metres
- Height range 0 - 3500 metres
- Maximum operating pressure: 1,300 mb
- Pressure resolution: 0.01 mb
- Sample rate 10 Hz

3.11 Temperature and Humidity

Temperature and humidity measurements were made during the survey at a sample rate of 10Hz. Ambient temperature was measured with a resolution of 0.1 degree Celsius and ambient humidity to a resolution of 0.1 percent.

3.12 Radiometric Data Acquisition

The gamma ray spectrometer used for the survey was capable of recording 256 channels and was self stabilising in order to minimise spectral drift. The detectors used contain thallium activated sodium iodide crystals.

Thorium source measurements were made each survey day to monitor system resolution and sensitivity. A calibration line was also flown at the start and end of each survey day to monitor ground moisture levels and system performance. The background and height corrected thorium channel from the test lines, along with the source measurement results are presented in Appendix E along with a location map for the test lines.

- Spectrometer model Exploranium GR820
- Detector volume 32 litres
- Sample rate 1 Hz

4 PERSONNEL

4.1 *Field Operations*

UTS Geophysics operators and data processors	Sean Plunkett
UTS Geophysics Survey Pilots	Peter Blewett Dan Silva

4.2 *Project Management*

Lefroy Resources Limited	John Canaris
UTS Geophysics Perth Office	Russell McChesney Barrett Cameron

5 SURVEY PARAMETERS

The survey data acquisition specifications for each area flown are specified in the following table:

PROJECT NAME	LINE SPACING	LINE DIRECTION	TIE LINE SPACING	TIE LINE DIRECTION	SENSOR HEIGHT	TOTAL LINE KM
Lefroy	50m	045-225	200m	135-315	65m	1,748
Bangor (not completed)	100m	000-180	1000m	090-270	80m	108
TOTAL						**1,856**

The total number of line kilometres of survey data collected over the survey areas specified in the above table was 1,856.

The specified sensor height for the magnetic samples is as stated in the above table. This sensor height may be varied where topographic relief or laws pertaining to built up areas do not allow this altitude to be maintained, or where the safety of the aircraft and equipment is endangered.

The coordinate boundaries for the survey areas flown are detailed in Appendix C.

6 SURVEY LOGISTICS

The base location used for operating the aircraft and performing in-field quality control and data processing of the survey data was the Argosy Motel in Devonport, Tasmania. The aircraft was operated from the Devonport airstrip. The flight logs are summarised in Appendix G.

6.1 Diurnal Magnetometer Locations

The following table contains the approximate locations where the diurnal base station magnetometers were located for the survey duration.

Area Name	Period	Base Station ID	Location
Lefroy and Bangor	18/09/04 - 21/09/04	31	400m North of Devonport Aero Club

7 DATA PROCESSING PROCEDURES

7.1 Data Pre-processing

The raw survey data was loaded from the field tapes and the recorded data trimmed to the correct survey boundary extents. Any survey lines subsequently reflown were removed from the dataset.

At the commencement of each acquisition flight, all the instrumentation clocks were synchronized to local time, and the error and latency of each instrument in providing its data measurement calculated. The results of these latency measurements were recorded into a synchronisation file, and the results used to assign GPS positions to the magnetic, radiometric and elevation data. As a result of the physical separation of the sensors, a small residual offset still exists between instrument timings.

To compensate for this residual parallax error, an adjustment was made to the instrument clocks. The magnetic and radar altimeter data was adjusted by 0.600 seconds, and the radiometric data was adjusted by 1.375 seconds for each flight.

The synchronized, parallax corrected data was then exported as located ASCII data.

7.2 Magnetic Data Processing

The diurnal base station data was checked for spikes and steps, and suitably filtered prior to the removal of diurnal variations from the aircraft magnetic data.

The filtered diurnal measurements were subtracted from the diurnal base field and the residual corrections applied to the survey data by synchronising the diurnal data time and the aircraft survey time. The average diurnal base station value was added to the survey data.

An eighth difference filter was run on the raw magnetic survey data in order to identify any remaining spikes in the data, which were manually edited from the data.

The X and Y positioning of the data was then checked for spikes before applying the IGRF correction. Any spikes in the positions were manually edited. The updated IGRF 2000 correction was calculated at each data point (taking into account the height above sea level).

This regional magnetic gradient was subtracted from the survey data points.

Tie line levelling was applied to the data by least squares minimisation, using a polynomial fit of order 0, of the differences in magnetic values at the crossover points of the survey traverse and tie line data.

In order to remove any residual long wavelength variations in the tie line levelled data along the traverse lines, polynomial levelling was then applied.

Final micro-levelling techniques were then selectively applied to the tie line levelled data to remove minor residual variations in profile intensity

Located and gridded data were generated from the final processed magnetic data.

7.3 Radiometric Data Processing

Statistical noise reduction of the 256 channel data was performed using the Noise Adjusted Singular Variable Decomposition (NASVD) method described by Hovgaard and Grasty (1997).

A noise-adjusted singular value decomposition is performed, and the number of components to be used is determined by inspection of plots of the spectral components and by a statistical analysis of the contributions of the components.
If the spectral shapes show any unusual characteristics, further analysis of the concentrations of the spectral components in the line data is performed in order to identify and eliminate any corrupt spectra. If such spectra were eliminated, the NASVD process is re-performed, in order to obtain spectral components free of any bias from corrupt spectra.

Only the dominant spectral shapes (identified as described above) were used in the spectral reconstruction process. The first 5 NASVD components were used for this process. Plots of the first 10 components are included in Appendix I.

Channels 15-250 only are spectrally smoothed, as these contain the regions of interest and are not dominated by the lower end of the Compton continuum. The energy spectrum between the potassium and thorium peaks was recalibrated from the spectrally smoothed 256 channel measurements.

The aircraft background spectrum and the scaled unit cosmic spectrum were then subtracted from the 256 channel data. This 256 channel data was then windowed to the 5 primary channels of total count, potassium, uranium, thorium and low-energy uranium. Dead time corrections were then applied to the data. Radon background removal was performed using the Minty Spectral Ratio method (1992).

The radar altimeter data was corrected to standard temperature and pressure, and height corrected spectral stripping was then applied to the windowed data. Height attenuation corrections based on the STP radar altimeter were then performed to remove any altitude variation effects from the data.

The corrected count rate data was then converted to ground concentrations for potassium, uranium and thorium (sensitivity coefficients are supplied in Appendix F).

Final micro-levelling techniques were then selectively applied to the tie line levelled data to remove minor residual variations in profile intensities. Located and gridded data were generated from the final processed radiometric data.

7.4 Digital Terrain Model Data Processing

The raw radar altimeter data was checked for spikes, and any found were manually edited. The GPS altimeter data was checked for spikes and steps, and any found were manually edited.

The radar altimeter data was then subtracted from the GPS altimeter data. The separation distance between the GPS antenna and the radar altimeter of 1.4 metres was subtracted from the digital terrain data.

The digital terrain data thus derived was tie line levelled and gridded. Tie line levelled data was then examined and selectively microlevelled to produce a grid without line dependent artifacts.

For further information concerning the survey flown, please contact the following office:

Head Office Address:

UTS Geophysics
Fauntleroy Avenue, Perth Airport
REDCLIFFE WA 6104

Tel: +61 8 9479 4232
Fax: +61 8 9479 7361

Postal Address:

UTS Geophysics
P.O. Box 126
BELMONT WA 6984

Quoting reference number: A649

APPENDIX A - LOCATED DATA FORMATS

MAGNETIC LOCATED DATA

FIELD	FORMAT	DESCRIPTION	UNITS
1	I8	LINE NUMBER	
2	I8	FLIGHT/AREA NUMBER	AAFF (Area/Flight)
3	I8	DATE	YYMMDD
4	F8.1	LOCAL TIME	sec
5	F10.0	FIDUCIAL NUMBER	
6	F4.0	UTM/AMG ZONE	
7	F11.2	EASTING (AMG84)	metres
8	F11.2	NORTHING (AMG84)	metres
9	F11.6	LATITUDE (WGS84)	degrees
10	F11.6	LONGITUDE (WGS84)	degrees
11	F11.2	EASTING (MGA94)	metres
12	F11.2	NORTHING (MGA94)	metres
13	F6.1	RADAR ALTIMETER HEIGHT	metres
14	F6.1	GPS HEIGHT (WGS84)	metres
15	F6.1	TERRAIN HEIGHT (CORRECTED)	metres
16	F10.3	RAW MAGNETIC INTENSITY	nT
17	F10.3	DIURNAL CORRECTION	nT
18	F10.3	IGRF CORRECTION	nT
19	F10.3	TIE LEVELLED TMI	nT
20	F10.3	FINAL MAGNETICS	nT

RADIOMETRIC LOCATED DATA

FIELD	FORMAT	DESCRIPTION	UNITS
1	I8	LINE NUMBER	
2	I8	FLIGHT/AREA NUMBER	AAFF (Area/Flight)
3	I8	DATE	YYMMDD
4	F7.0	LOCAL TIME	sec
5	F10.0	FIDUCIAL NUMBER	
6	F4.0	UTM/AMG ZONE	
7	F11.2	EASTING (AMG84)	metres
8	F11.2	NORTHING (AMG84)	metres
9	F11.6	LATITUDE (WGS84)	degrees
10	F11.6	LONGITUDE (WGS84)	degrees
11	F11.2	EASTING (MGA94)	metres
12	F11.2	NORTHING (MGA94)	metres
13	F6.0	TOTAL COUNT (RAW)	Counts/sec
14	F5.0	POTASSIUM (RAW)	Counts/sec
15	F5.0	URANIUM (RAW)	Counts/sec
16	F5.0	THORIUM (RAW)	Counts/sec
17	F5.0	COSMIC (RAW)	Counts/sec
18	F5.0	BISMUTH 609 (RAW)	Counts/sec
19	F5.0	LIVE TIME	milli sec
20	F8.2	TOTAL COUNT (CORRECTED)	Counts/sec
21	F7.2	POTASSIUM (CORRECTED)	Counts/sec
22	F7.2	URANIUM (CORRECTED)	Counts/sec
23	F7.2	THORIUM (CORRECTED)	Counts/sec
24	F6.1	RADAR ALTIMETER HEIGHT	metres
25	F6.1	GPS HEIGHT (WGS84)	metres
26	F6.1	PRESSURE	hPa
27	F5.1	TEMPERATURE	Degrees Celcius
28	F8.2	TOTAL COUNT DOSE RATE	nGy
29	F8.2	POTASSIUM GRND CONCENTRATION	%
30	F8.2	URANIUM GRND CONCENTRATION	ppm
31	F8.2	THORIUM GRND CONCENTRATION	ppm

GRIDDED DATASET FORMATS

Gridding was performed using a bicubic spline algorithm.

The following grid formats have been provided:

- ER-Mapper format

LINE NUMBER FORMATS

Line numbers are identified with a six digit composite line number and have the following format - ALLLLB, where:

A	Survey area number
LLLL	Survey line number 0001-8999 reserved for traverse lines 9001-9999 reserved for tie lines
B	Line attempt number, 0 is attempt 1, 1 is attempt 2 etc..

UTS FILE NAMING FORMATS

Located and gridded data provided by UTS Geophysics uses the following 8 character file naming convention to be compatible with PC DOS based systems.

File names have the following general format - JJJJAABB.EEE, where:

JJJJ	UTS Job number	
AA	Area number if the survey is broken into blocks	
BB	M	Magnetic data
	R	Radiometric data
	TC	Total count data
	K	Potassium counts
	U	Uranium counts
	Th	Thorium counts
	DT	Digital terrain data
EEE	File name extension	
	LDT	Located digital data file
	FMT	Located data format definition file
	ERS	Ermapper gridded data header file
		Ermapper data portion has no extension
	GRD	Geosoft gridded data file

APPENDIX B - COORDINATE SYSTEM DETAILS

Locations for the survey data are provided in both geographical latitude and longitude and Universal Transverse Mercator metric projection coordinate systems.

WGS84	World Geodetic System 1984
Coordinate Type	Geographical
Semi Major Axis	6378137m
Flattening	1/298.257223563
AMG84	Australian Map Grid 1984
Coordinate Type	Universal Transverse Mercator Projection Grid
Geodetic datum	Australian Geodetic Datum
Semi Major Axis	6378160m
Flattening	1/298.25
MGA94	Map Grid of Australia 1994
Coordinate type	Universal Transverse Mercator Projection Grid
Geodetic datum	Geocentric Datum of Australia
Semi major axis	6378137m
Flattening	1/298.257222101

APPENDIX C - SURVEY BOUNDARY DETAILS

Job ID code: A6490101
Client: Lefroy Resources Limited
Job: Lefroy
AMG84 Zone 55Grid Zone: 55
Include Point: 0.0 0.00

Surround

502586.000	5442216.000
506886.000	5446316.000
500500.000	5453000.000
499000.000	5451500.000
496250.000	5454250.000
493486.000	5451616.000

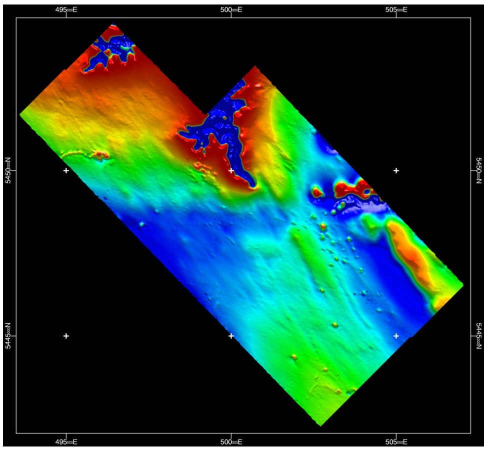
Job ID code: A6490201
Client: Lefroy Resources Limited
Job: Bangor
AMG84 Zone 55Grid Zone: 55
Include Point: 50.0 0.00

Surround

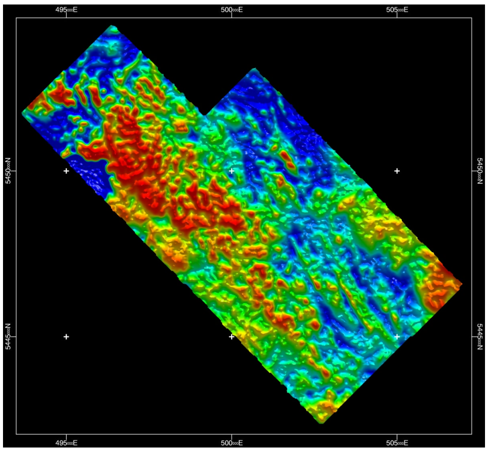
513000.000	5439500.000
515400.000	5439500.000
515400.000	5435500.000
513000.000	5435500.000

APPENDIX D - PROJECT DATA OVERVIEW

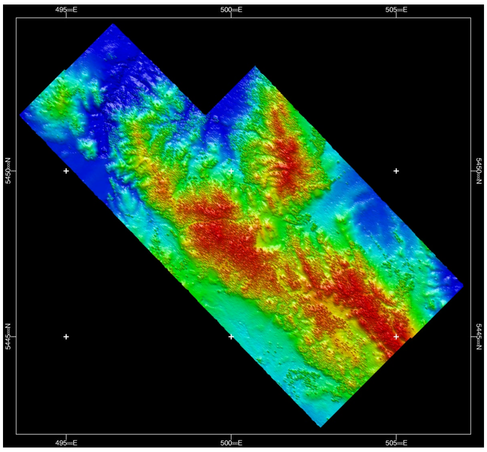
Lefroy Project



Total Magnetic Intensity



Radiometric Total Count



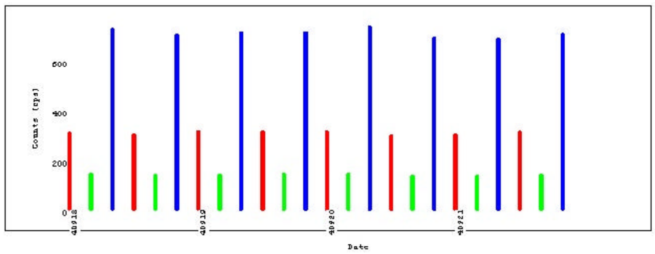
Digital Terrain Model

APPENDIX E – RADIOMETRIC CALIBRATION RESULTS

These charts show the results of the daily thorium source tests for each aircraft at all locations occupied during the course of the survey.

Date	K	U	Th	% Error
40918	298.8	132.3	718.5	1.8
40918	292.6	130.3	694.6	-1.0
40919	305.4	128.0	703.5	0.7
40919	302.4	131.3	705.7	0.9
40920	303.2	131.6	725.3	2.8
40920	289.3	125.5	684.9	-2.6
40921	293.9	126.1	678.3	-2.7
40921	302.0	127.5	699.1	-0.0
Avrg	**298.4**	**129.1**	**701.2**	**0.0**

Thorium Source Test (Ground)



APPENDIX F – ACQUISITION AND PROCESSING PARAMETERS

Magnetic Data

RMS AADC Coefficients

Solution Date: 12/09/2004 Solution Altitude: 5000 ft AGL

Standard Deviation Total Field Uncompensated	1.530×10^{-1}
Standard Deviation Total Field Compensated	4.719×10^{-2}
Improvement Ratio	3.2

Magnetic Processing Parameters

Model	:	IGRF 2000
Average Declination	:	13.78 degrees
Average Inclination	:	-71.29 degrees
Average Field strength	:	61462.41 nT
Average diurnal	:	60790.08 nT

Radiometric Data

Lefroy Sensitivity Coefficients at 65m

Total Count:	34.918 cps/dose rate
Potassium:	124.205 cps/%k
Uranium:	13.249 cps/ppm
Thorium:	7.181 cps/ppm

Bangor Sensitivity Coefficients at 80m

Total Count:	31.475 cps/dose rate
Potassium:	111.13 cps/%k
Uranium:	12.004 cps/ppm
Thorium:	6.532 cps/ppm

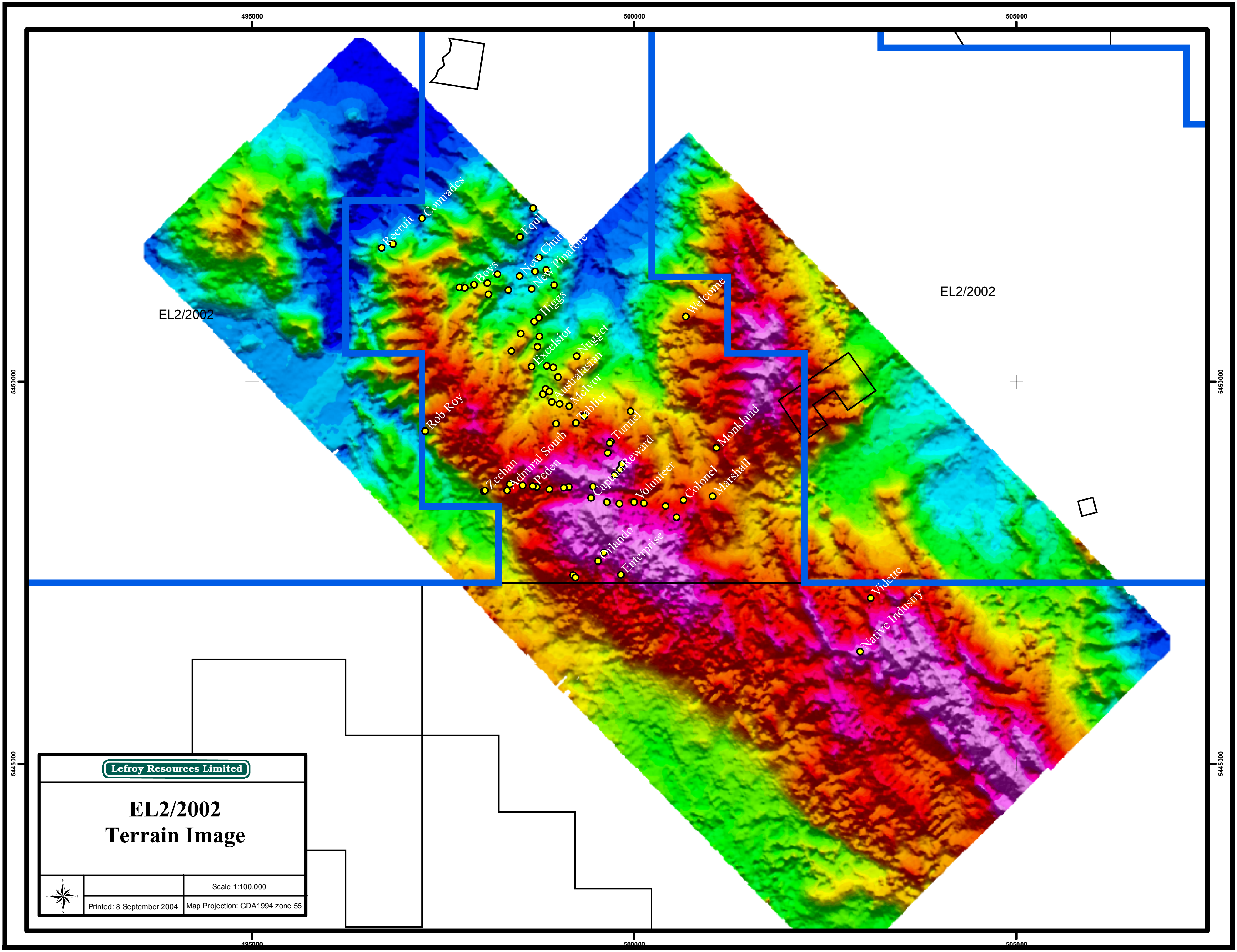
Final Reduction – Area 01 data reduced to STP height datum 65m and 80m for Area 02

APPENDIX G – SURVEY FLIGHT LOGS

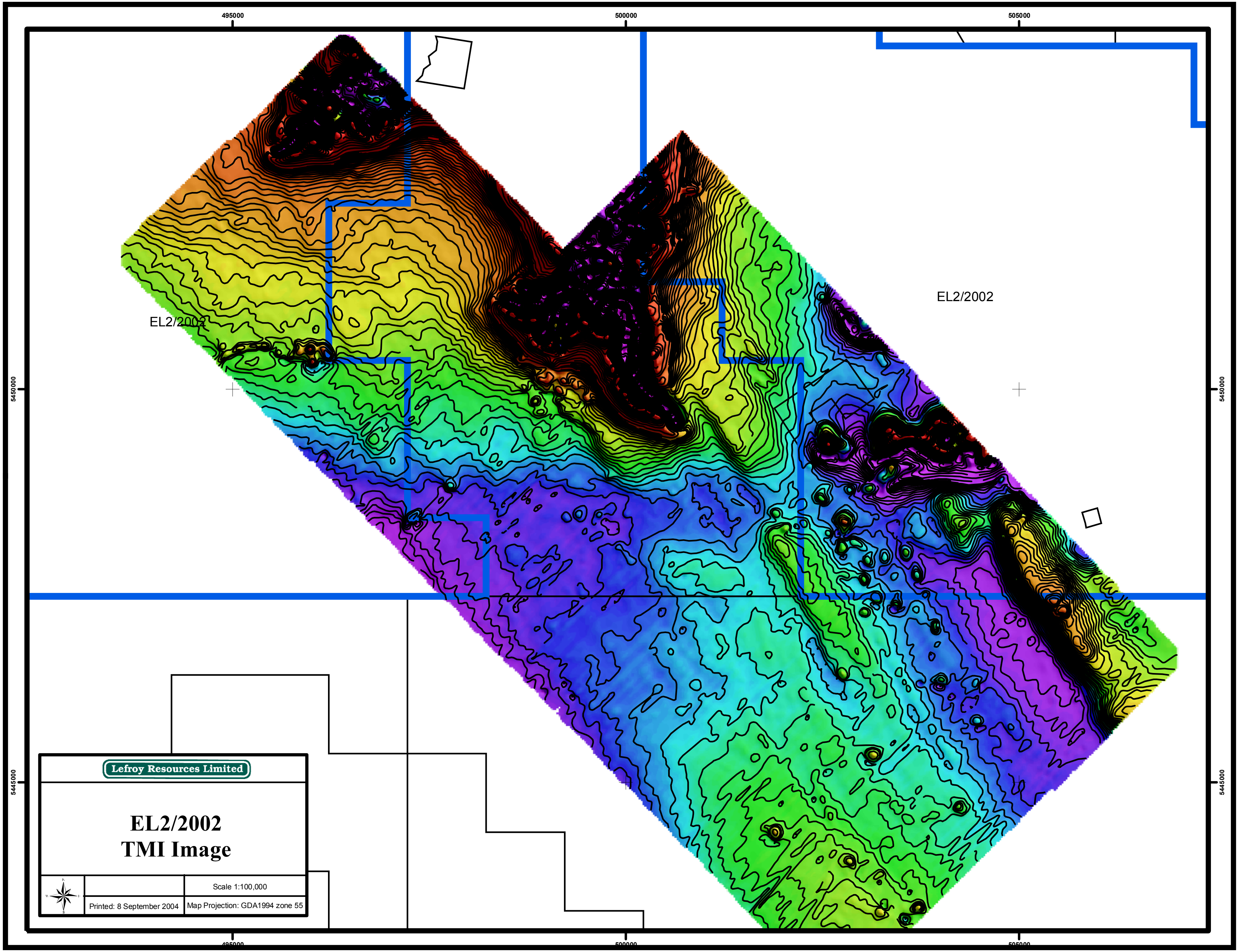
Flight Date	Area No	Flight No	Area Name / Survey Details	Lines Flown	Line Km Flown
18/09/04	01	01	Lefroy Traverse Lines: 101170-101890	73	427
19/09/04	01	02	Lefroy Traverse Lines: 101160-101020, 101900-102020	28	140
19/09/04	01	03	Lefroy Traverse Lines: 102030-102640, 101010-100620	102	474
19/09/04	01	04	Lefroy Traverse Line: 100600	1	6
19/09/04	01	T1	Lefroy Tie Lines: 190010-190100	10	130
20/09/04	01	05	Lefroy Traverse Lines: 100610, 100590-100010	60	351
20/09/04	01	T2	Lefroy Tie Lines: 190110-190230	13	158
20/09/04	01	T3	Lefroy Tie Lines: 190240-190300	7	62
21/09/04	02	01	Bangor Traverse Lines: 200010-200040	4	16

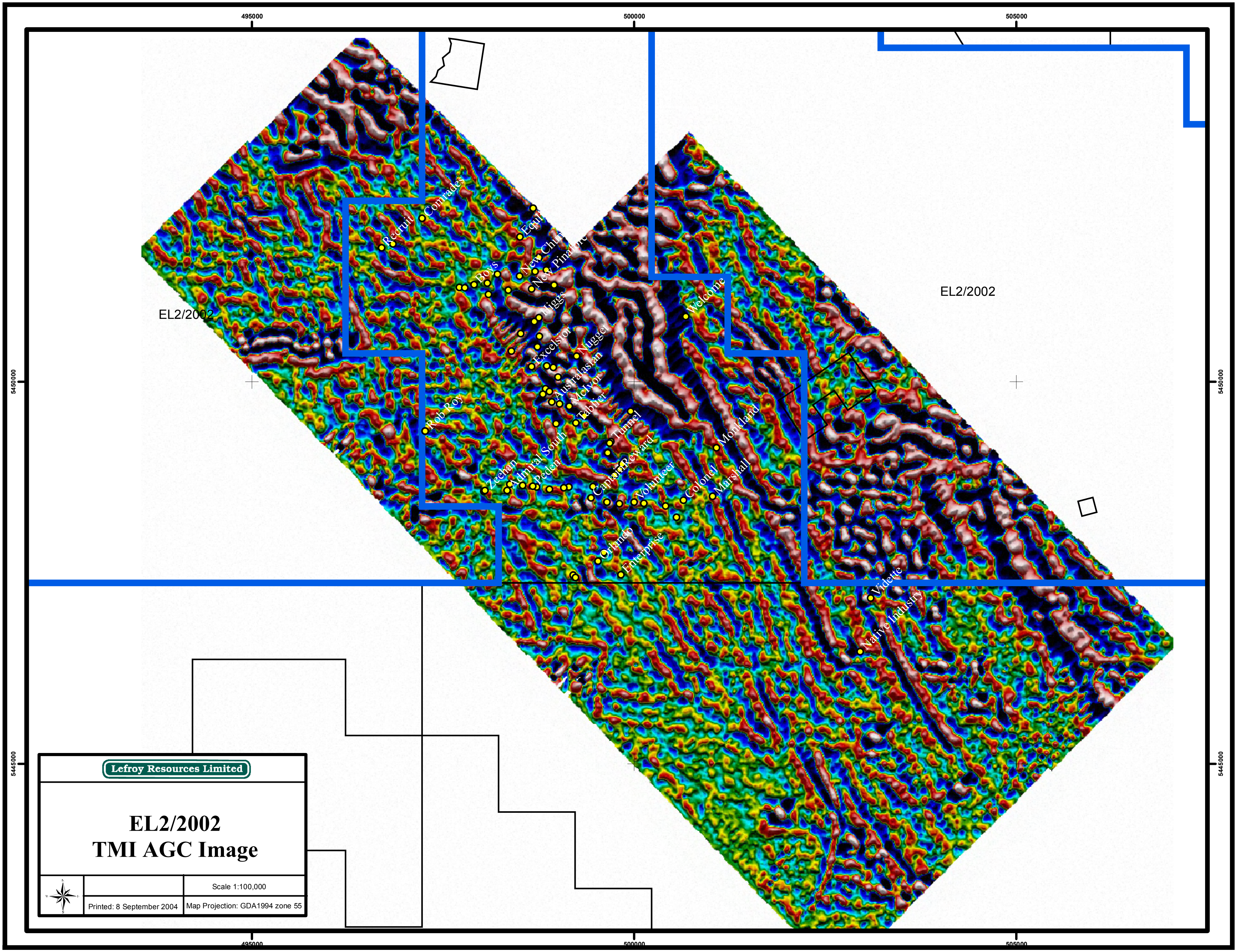
APPENDIX 3.

GEOPHYSICAL IMAGERY

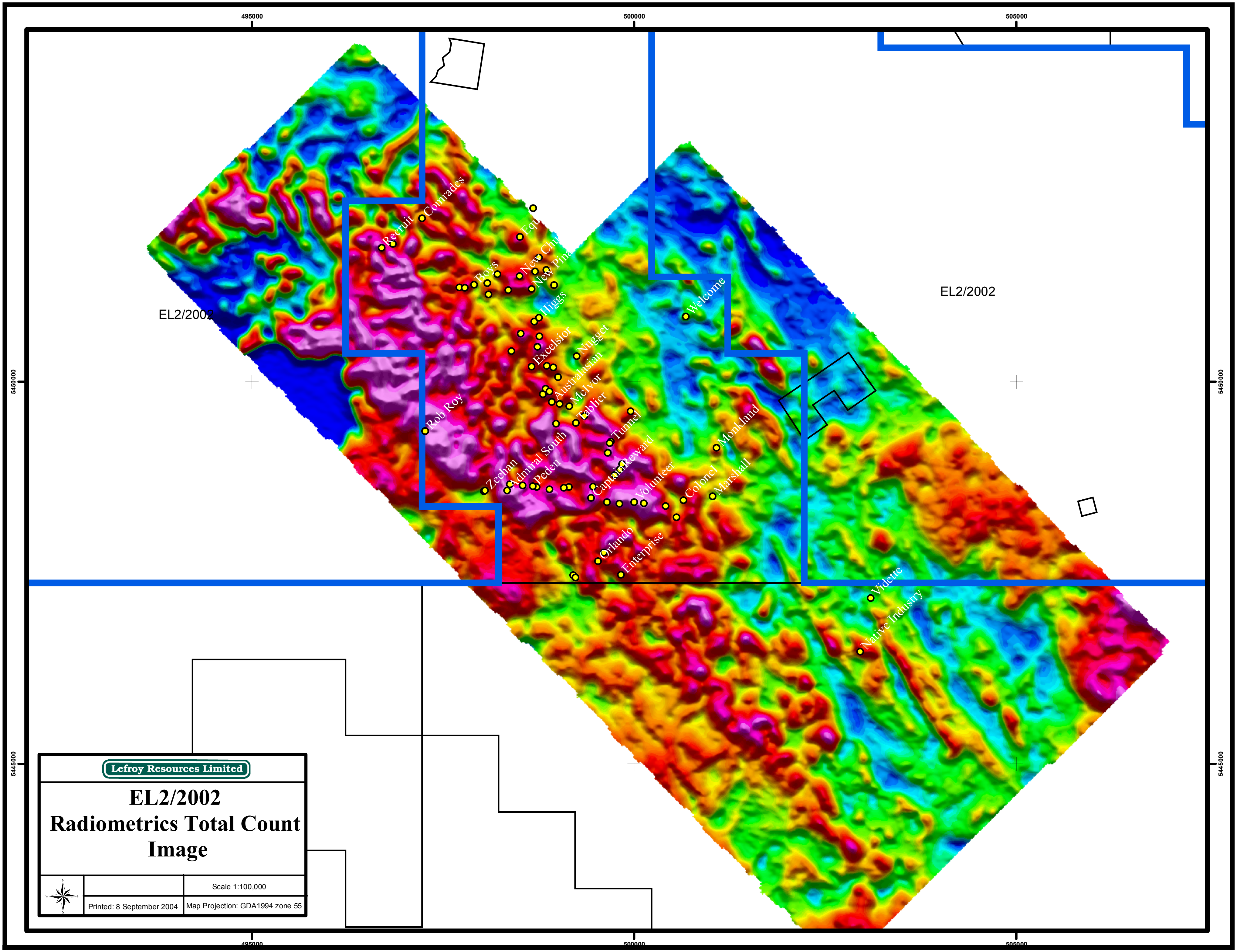


495000
500000
505000
5450000
5445000
EL2/2002
EL2/2002
Comrades
Recruit
Boys
New Pinafore
Higgs
Excelsior
Nugget
Australasian
McIvor
Rob Roy
Tunnel
Zeehan
Admiral South
Peden
Captain Reward
Volunteer
Colonel
Marshall
Monkland
Welcome
Orlando
Enterprise
Vidette
Native Industry
Lefroy Resources Limited
EL2/2002
Terrain Image
Scale 1:100,000
Printed: 8 September 2004
Map Projection: GDA1994 zone 55


495000
500000
505000
5450000
5445000
EL2/2002
EL2/2002
Lefroy Resources Limited
EL2/2002
TMI Image
Scale 1:100,000
Printed: 8 September 2004
Map Projection: GDA1994 zone 55



495000
500000
505000
5450000
5445000
EL2/2002
EL2/2002
Comrades
Recruit
New Chum
New Pinafore
Boys
Biggs
Excelsior
Nugget
Australasian
McIvor
Rob Roy
Tunnel
Welcome
Monkland
Volunteer
Colonel
Marshall
Zeehan
Admiral South
Orlando
Enterprise
Vidette
Native Industry
Lefroy Resources Limited
EL2/2002
TMI AGC Image
Scale 1:100,000
Printed: 8 September 2004
Map Projection: GDA1994 zone 55



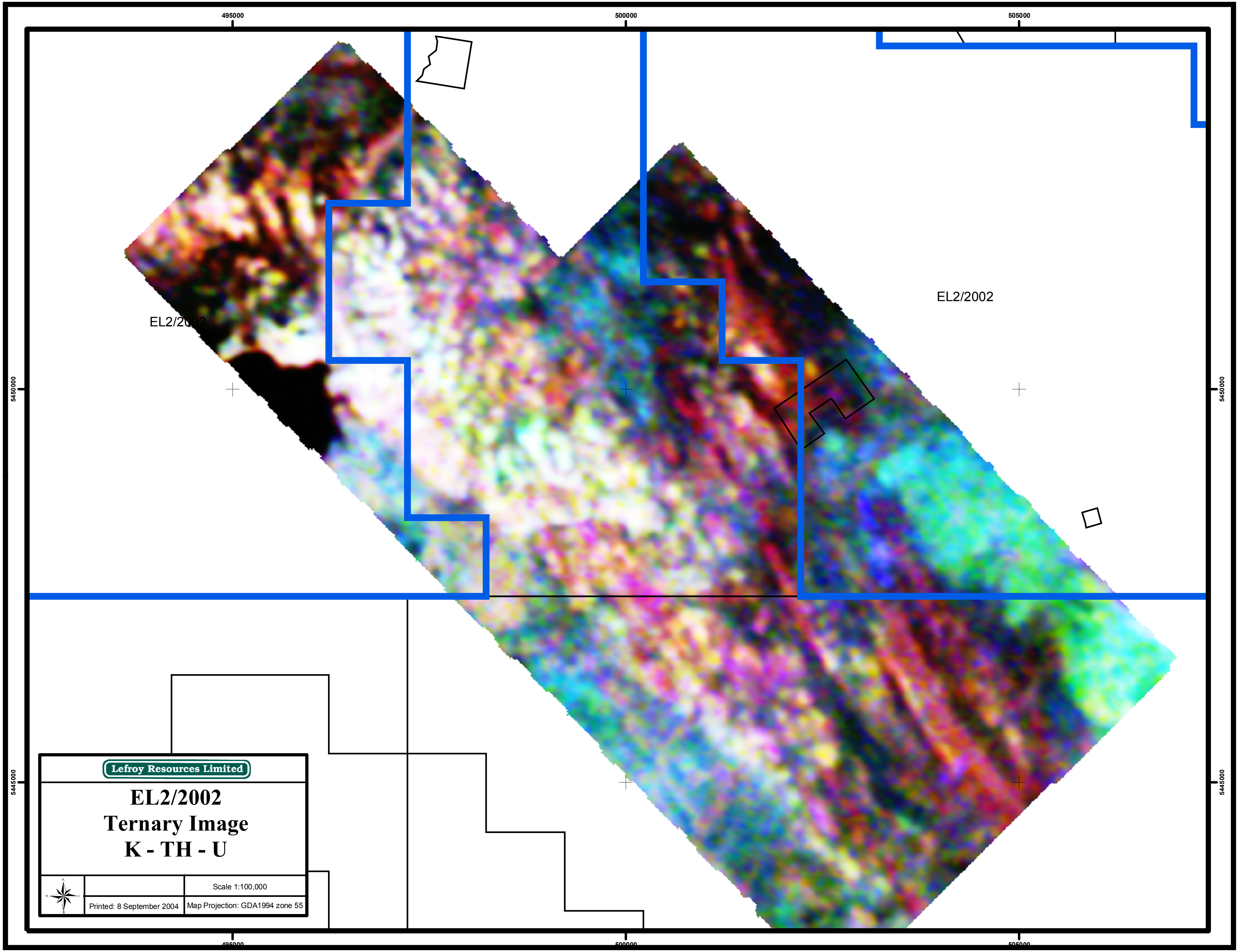
Lefroy Resources Limited

EL2/2002 Radiometrics Total Count Image

Scale 1:100,000

Printed: 8 September 2004

Map Projection: GDA1994 zone 55



495000
500000
505000
5450000
5445000
EL2/2002
EL2/2002
Lefroy Resources Limited
EL2/2002
Ternary Image
K - TH - U
Scale 1:100,000
Printed: 8 September 2004
Map Projection: GDA1994 zone 55

APPENDIX 4.

DIGITAL DATA
(Supplied on accompanying CD-ROM)