ZEEHAN EL 28/1988

ANNUAL REPORT
FOR THE PERIOD ENDING DECEMBER 2011

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1. SUMMARY

EL28/1988 Zeehan is a prospective lease held by MMG Australia for the purpose of Nickel sulphide exploration potential. Work programs conducted in the current year consist of an aerial LIDAR survey, an aerial VTEM survey, and a single drill program focused on testing one of the most prospective coincident VTEM and Magnetic anomalies. Expenditure for the current term was ~**$189,000**.

Forthcoming work programs will include a litho-geochemical assessment of TRH001, with a subsequent downhole EM survey to identify the main downhole conductor. Further potential work will involve follow-up drilling of other EM and magnetic anomalies on the lease.

2. INTRODUCTION

EL28/1988 Zeehan is 13 km2 and is located west and south of the Avebury Nickel Mine (Figure 1). The EL is highly prospective for Avebury style nickel sulphide mineralisation. The Avebury deposits are hosted in serpentinised dunite and strongly metasomatised, tremolite-diopside ultramafic skarn intruded into Mid Cambrian basaltic volcaniclastics. Much of the ultramafic is not outcropping so to generate drill targets, heavy reliance is placed on geophysical techniques. High resolution aeromagnetics is a key early exploration tool as the altered ultramafics have a strong magnetic signature due to high concentrations of contained magnetite. Electromagnetic techniques are a key targeting tool in conventional nickel sulphide exploration and will be employed over the Avebury and surrounding tenements. Down hole electromagnetic surveys are also thought to have the potential to significantly enhance exploration success.

MMG take a holistic approach to exploration within the Zeehan to Trial Harbour areas due to the main targets being analogues of the Avebury system. MMG has assembled a highly prospective portfolio of tenements within the area. In line with this approach, exploration expenditure over the surrounding tenements of EL28/1988, EL22/1997 and EL37/2003 have been granted amalgamation to Avebury Mine exploration and resource expenditures.

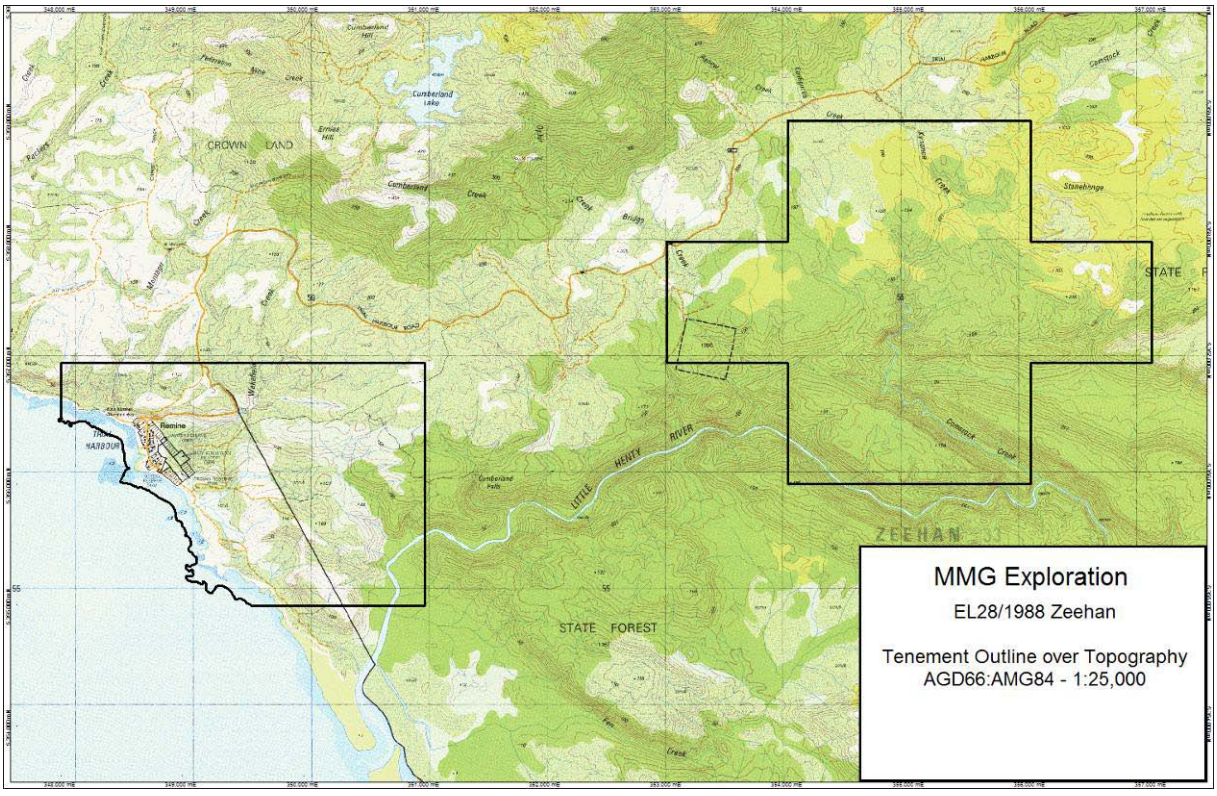

Figure 1: Location of EL28/1988 Zeehan (western portion is current)

3. LAND TENURE

EL28/1988 was initially 13 sq km and covered the current Avebury and Avebury East Mining leases, with 3M/2003 excised in 2003 and 6M/2007 excised with the delineation of the East Avebury Resource. Only the western portion of the EL remains coincident with the Trial Harbour township, and covers an area of 6 km^2.

The eastern two thirds of the lease is State Forest with the remaining western third lying within the Mount Heemskirk Regional Reserve (Crown Land). These boundaries also define the West Coast Planning Scheme 1999 zones, with the western two thirds being classed as Natural Resources and the eastern third falling under Environment Protection. Around the township of Trial Harbour itself, there is Public Reserve and Private Freehold land. A small area within the Southeast corner of the lease is classed as Informal Reserve (on State Forest or Forestry Tasmania managed land).

The Southeast Corner of the lease lies within the Macquarie Harbour Graben, Little Henty River Raised Last Interglacial Beaches, and Western Tasmanian Blanket Bog Geoconservation Sites. The North-eastern corner and the Northern boundary of the lease also lie within Western Tasmanian Blanket Bog sites.

4. GEOLOGY

The Avebury deposits are hosted in serpentinised Cambrian dunite or strongly metasomatised, tremolite-diopside ultramafic skarn obducted onto Mid Cambrian basaltic volcaniclastics. The ultramafic rocks demonstrably extend onto the surrounding EL's including EL 28/1988. EL 28/1988 is therefore considered highly prospective for Avebury style nickel sulphide mineralisation.

Variable metasomatism of the serpentinised host ultramafics, thought to have occurred during intrusion of the Heemskirk Granite, has formed two distinctly different mineral assemblages, each of which may host ore grade nickel sulphide mineralisation:

- **Essentially unmetasomatised serpentinised ultramafic:** a fine grained black rock composed predominantly of antigorite with minor disseminated chromite, magnetite and sulphides
- **Metasomatised serpentinised ultramafics:** pale grey or green, coarsely crystalline tremolite/actinolite and diopside with minor magnetite, chromite and sulphides.

Sulphide mineralisation in both serpentinised ultramafic and ultramafic skarn generally consists of pentlandite and pyrrhotite and is associated with magnetite in the form of crystalline intergrowths and veins within massive granular magnetite-chromite. Pentlandite occurs as coarse disseminations and stringer veins associated with secondary magnetite. Sulphide contents are generally low with mineralised ultramafic comprising between 0.5 to 3% sulphides although massive pentlandite does occur in some drill intersections.

Nickel sulphide mineralization is largely concentrated within the ultramafic immediately adjacent to its margins with nickel grades diminishing toward the interior of the intrusions. Some internal zones of nickel sulphide mineralisation are present.

The serpentinised ultramafics have a strong magnetic signature due to their high concentrations of magnetite, and their presence can be interpreted from magnetic images. The nickel sulphide mineralisation too has a strong magnetic signature due to the pentlandite-pyrrhotite-magnetite relationship. High resolution aeromagnetics is a key early exploration tool.

The Oonah Formation and the Crimson Creek Formation are the most prevalent sedimentary rocks, and the Devonian Granite and McIvor Hill Complex are the most prevalent igneous rocks within EL28/1988 (Figure 2).

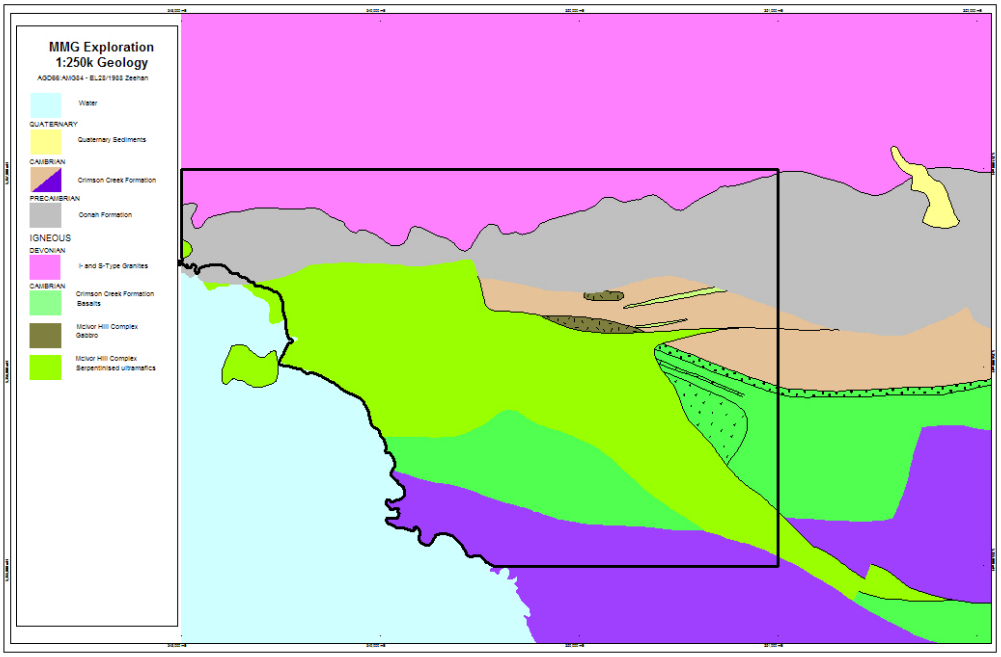

Figure 2: 1:250,000 Geology Map of EL28/1988 Zeehan

5. CURRENT EXPLORATION

Work Completed in the 2010-2011 Period

As part of the revitalisation of MMG Exploration's field activities during this reporting period, MMG focussed on conducting an aerial VTEM survey to assess the conductive properties of the geology, and drill testing the resultant magnetic and VTEM coincident high on EL28/1988 (Figure 3). The VTEM acquisition report and data are attached as digital data in appendix E and F respectively. Initial results highlighted the anomaly which was tested however recommendations were to revise and re-process the data. Tim Callaghan, from Resource and Exploration Geology, was consulted to review the initial data and provide a summary of the exploration potential of the tenement area. Results are included in Appendix A. The drill program was initially designed to test the anomaly from the north and south via 2 steeply dipping drillholes however due to environmental considerations the northernmost drillhole plan was abandoned. The southernmost drillhole, TRL001, was designed to test a likely continuation of potentially nickel bearing ultramafic at a depth of approximately 200m.

TRL001 was drilled to 205.9m at an inclination of -45º and was completed on the 12th of September, 2011. The drill pad was moved further to the south than originally planned again for further environmental considerations. The drillhole intersected a number of gabbro/peridotite dykes, the largest being 7m thick, and significant sulphides were apparent throughout the drillhole (Appendix B – Drill Logs). At this time, assays are pending and will be reported on in the following reporting period.

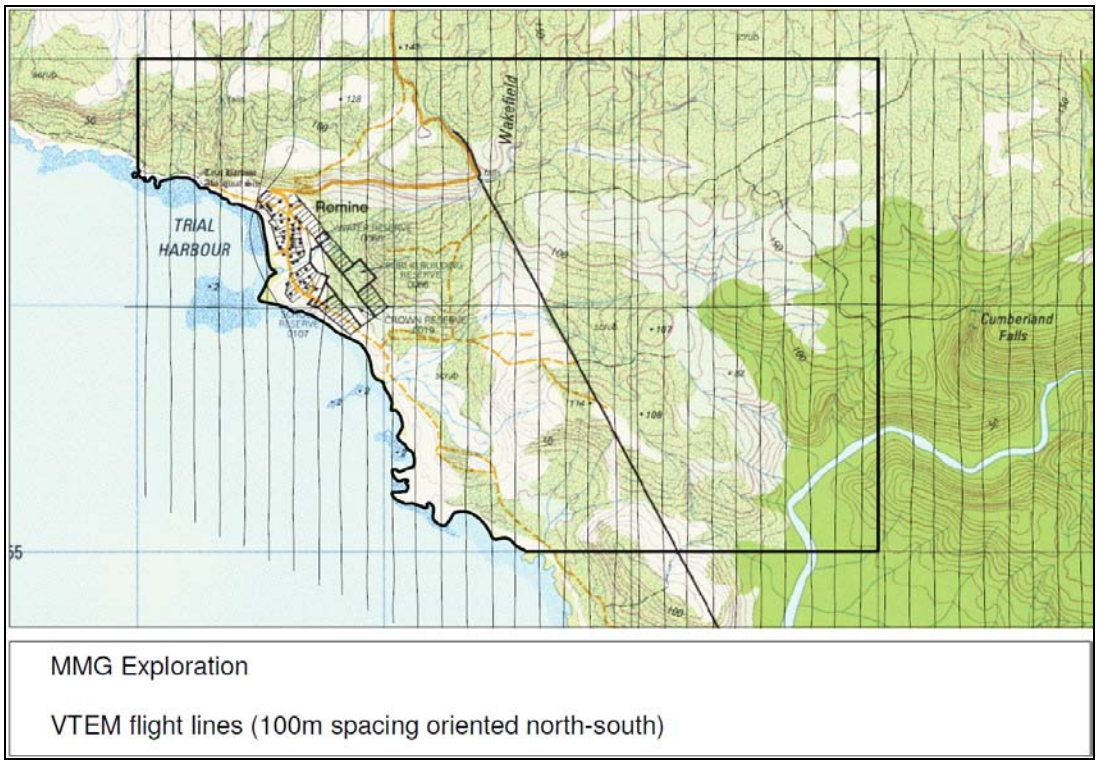

Figure 3: VTEM flight lines on EL28/1988

An aerial LIDAR (Light Detection and Ranging) survey was conducted by Fugro Spatial Solutions Pty. Ltd. over the total area of the licence during the reporting period. Flight lines were 1km apart with additional tie lines at the border of the relevant lease. Figure 4 and Table 1 contain the relevant information of the survey.

Figure 4: LIDAR Survey flight lines over EL28/1988

Product	Item	Format	Media	Projection
LIDAR				
Digital Terrain Model	Lidar ground model key points	ASCII	DVD	MGA94/55+AHD
Digital Elevation Model	2m Gridded DEM	ASCII	DVD	MGA94/55+AHD
Vertical Accuracy	+/- 0.20m at 1 ð			
Horizontal Accuracy	+/- 0.40m at 1 ð			
Contours	0.5m	DGN		MGA94/55+AHD
Report	Metadata	PDF		
IMAGERY option				
Orthoimage	0.25m GSD RGB	ECW	DVD	

Table 1: Key parameters and outputs for LIDAR survey over EL28/1988

6. PREVIOUS EXPLORATION

Exploration during the previous reporting period focused on drill testing within the Burbank prospect area targeting a northwest/southeast striking magnetic high. The prominent magnetic feature was considered to be a continuation of a potentially nickel bearing ultramafic at depth. The drill hole B012 was designed to test the magnetic high / ultramafic. Earlier drilling intersected serpentinised and sheared ultramafic rocks with nickel oxide mineralization associated with shearing.

Diamond drill hole B012 was a helicopter supported program that was completed on 27th March 2010 and drilled to a depth of 314.5m. The drill hole was designed to extend through the lower contact of an ultramafic body interpreted to be at around 450m depth coincident with the magnetic high feature. The drill hole intersected serpentinite from surface but failed to drill to the contact of the underlying Eldon Group siliciclastics due to drilling difficulties. As a consequence it also failed to adequately asses the large NW/SE trending magnetic high.

The sampled interval of B012 contains Ni in the range of 1170 to 3220 ppm Ni with an average across the 105m interval of 2300ppm. Co (average 90 ppm) is weakly variable and Cr (average 1074 ppm) slightly increases towards the EOH. These results are indicating non-enrichment, back-ground concentrations usually associated with ultramafic lithologies. There is no associated Cu anomalism.

Below detection As concentrations throughout the drill hole indicates that a hydrothermal system driven by the Devonian Granites (Avebury model) is unlikely to be present in this immediate area. This data down grades the prospect.

There was no on ground exploration in the later half of the reporting period. Exploration scaled back its approach from investigating at a prospect scale to more district scale reviews and targeting techniques.

7. ENVIRONMENTAL

As part of the drilling program and MRT work approvals system GHD were contracted to conduct a flora and fauna survey (botanical, zoological & ecological) of the proposed drill sites. The report is included in Appendix C.

Findings from the survey included:

- No threatened flora species
- No declared weed species
- Two vegetation communities not listed as threatened under the *Nature Conservation Act 2002*. Namely, *Eucalyptus nitida* dry forest and woodland (DNI), and Coastal Heathland at site 1, and Buttongrass moorland (MBU), and Eucalyptus Nitida (DNI) at Site 2 (abandoned).
- Good foraging habitat for listed fauna species, particularly in the Coastal Heathland (SCH), for the wedge-tailed eagle (*Aquila audax subsp. fleayi*) and the white-bellied sea eagle (*Haliaeetus leucogaster*). There were no sightings or audible occurrences of any species during the survey.

Based on the above observations and recommendations, included in the report, Site 2 was abandoned for the primary reasons of impact on the flora and fauna values of the site. Site 1 was also moved south to the ridgeline due to the possibility that drill fluids may overflow the sumps in the event of a heavy rainfall event, and would be directed into the town water supply.

By moving the drill site to the south, the impact on the environment was also significantly reduced because the pad was coincident with the existing track, and the water runoff from the program was located in a watershed not utilised by town water.

8. CONCLUSIONS AND RECOMMENDATIONS

Whilst assays are pending from the drilling program, initial handheld XRF assessment on drill core shows significant potential for the area with a likely follow-on drill program. Further analytical testing will be conducted on the drillhole, (i.e. lithogeochemistry, petrophysical characterisation), and Downhole EM is likely to proceed in the following reporting period. If the results are encouraging, a drill program will be designed and implemented, also in the following reporting period.

9. EXPENDITURE

Costs incurred during the reporting period are primarily due to the drill program and associated support activities.

Cost elements	Total Actual
602000 Salaries - Normal	1,431.76
602999 Salaries Recharge	8,169.19
603000 Oncost - Salaries	165.27
603999 Oncost Recharge	1,162.29
610890 General Consumables	1,650.00
615090 Fuel Oils & Greases	79.11
630180 Tel Line Lease/Rentl	70.00
630210 Aircraft/Helicopter	4,362.50
630305 Tenement Fees	901.31
635150 Env Cont - Contract	4,878.33
635270 Air Geophys - EM/Res	37,477.04
635300 Track Cutting	12,392.50
635530 Drilling Diamond	89,553.00
635590 Cont Field Labour	14,125.00
640125 Geological Cons	1,700.00
644000 Rep & Mtce MV	19.54
660030 Taxi fares	265.79
660060 Car Hire	69.86
660070 Airfares (Domestic)	634.80
660080 Accomm (Aust Travel)	70.00
660190 Meals (Travel Emp)	310.01
672000 Training - Courses	645.45
Administration	9,006.64
Total	**189,139.39**

APPENDIX A –VTEM acquisition report-

SURVEY AND LOGISTICS REPORT ON A HELICOPTER BORNE VERSATILE TIME DOMAIN ELECTROMAGNETIC (VTEM) SURVEY

on the

AVEBURY, TASMANIA AREA

AUSTRALIA

for

MINERALS AND METALS GROUP

by

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Project AA901
February, 2011

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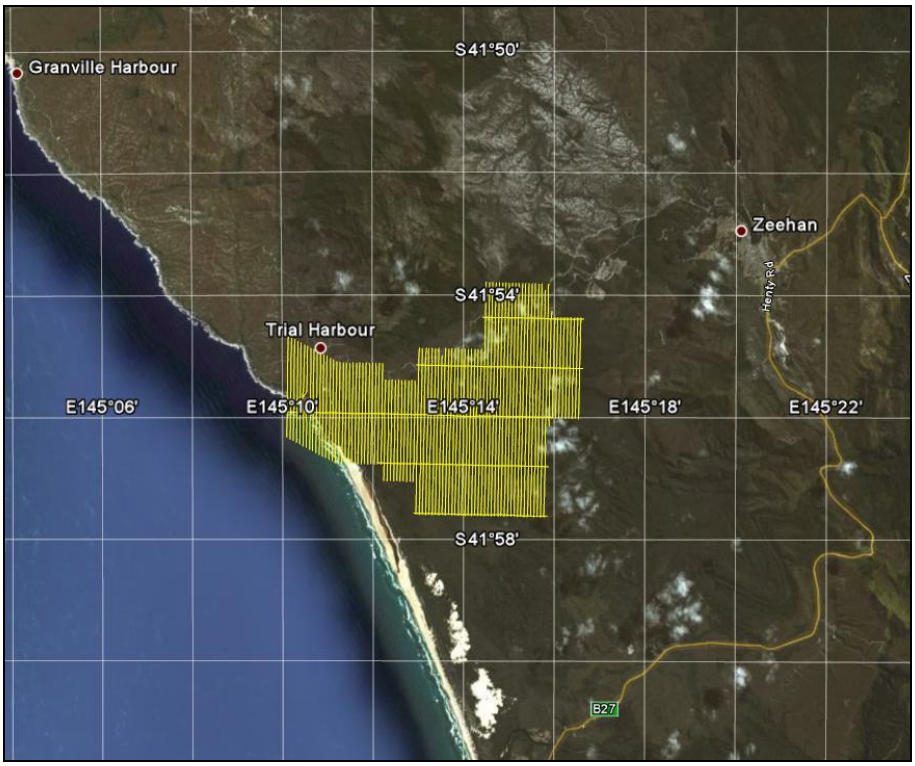
SURVEY AND LOGISTICS REPORT ON A HELICOPTER-BORNE VTEM SURVEY

1. SURVEY SPECIFICATIONS

1.1. General

Job Number	AA901
Client	Minerals and Metals Group.
Project Area	Avebury, Tasmania Area
Location	Australia
Number of Blocks	1
Total line kilometres	423
Survey date	12 - 20 January, 2011
Client Representative	Neil Hughes Tel: +61 3 9288 0759 Fax: +61 3 9288 0800 neil.hughes@mmgroupltd.com
Client address	Level 23, 28 Freshwater Place Southbank, Victoria, 3006, Australia

1.2. VTEM flight plan on Google EARTH™ Background



1.3. Survey block coordinates.

Easting UTM Z 55S	Northing UTM Z 55S
Avebury Area	
354124.86	5360186.15
354124.86	5358161.11
352111.47	5358161.11
352111.47	5357171.86
348142.86	5357171.86
348142.86	5356706.34
349690.73	5355181.74
351110.59	5355181.74
351110.59	5354180.86
352111.47	5354180.86
352111.47	5353179.98
356114.99	5353179.98
356114.99	5357183.50
357115.87	5357183.50
357115.87	5358184.39
356114.99	5358184.39
356114.99	5360186.15

1.4. Survey block specifications

Survey block	Line spacing (m)	Line-km (contractual)	Line-km (delivered)	Flight direction	Line number
Avebury	100	500	423	000 – 180	L10010 – L10900
	1500			090 – 270	T90010 – T90050

1.5. Survey schedule

Date	Flight #	Block	Nominal Production Km flown	Comments
12-Jan-11	1	Avebury	N/A	Test Flight
16-Jan-11	2,3	Avebury	209	Production
20-Jan-11	4,5	Avebury	216	Production

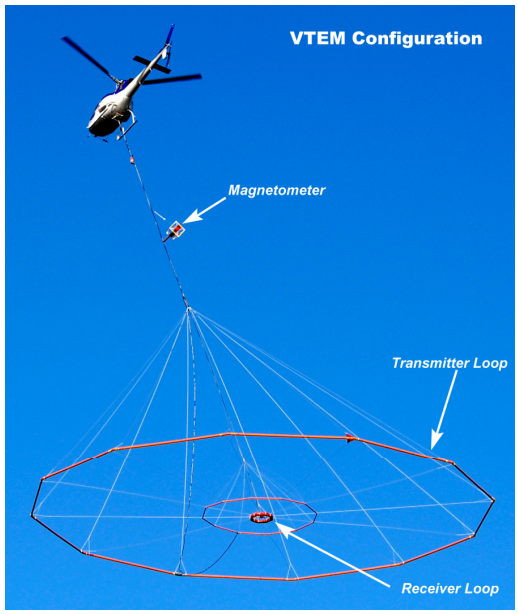
2. SYSTEM SPECIFICATIONS

2.1. Instrumentation

Survey Helicopter	
Model	AS 350 B3
Registration	VH-VTX
Nominal survey speed	80 km/h
Nominal terrain clearance	75 m
VTEM Transmitter	
Coil diameter	26 m
Number of turns	4
Pulse repetition rate	25 Hz
Peak current	200 Amp
Duty cycle	42%
Peak dipole moment	425,000 NIA
Pulse width	8.34 ms
Nominal terrain clearance	41 m
VTEM Receiver	
Coil diameter	1.2 metre
Number of turns	100
Effective area	113.1 m^2
Sampling interval	0.1 s
Nominal terrain clearance	41 m
Magnetometer	
Type	Geometrics
Model	Optically pumped cesium vapour
Sensitivity	0.02 nT
Sampling interval	0.1 s
Cable length	12 m
Nominal terrain clearance	65 m
Radar Altimeter	
Type	Terra TRA 3000/TRI 40
Position	Beneath cockpit
Sampling interval	0.2 s
GPS navigation system	
Type	NovAtel
Model	WAAS enabled OEM4-G2-3151W
Antenna position	Helicopter tail
Sampling interval	0.2 s
Base Station Magnetometer/GPS	
Type	Geometrics
Model	Cesium vapour
Sensitivity	0.001 nT
Sampling interval	1 s

2.2. VTEM Configuration

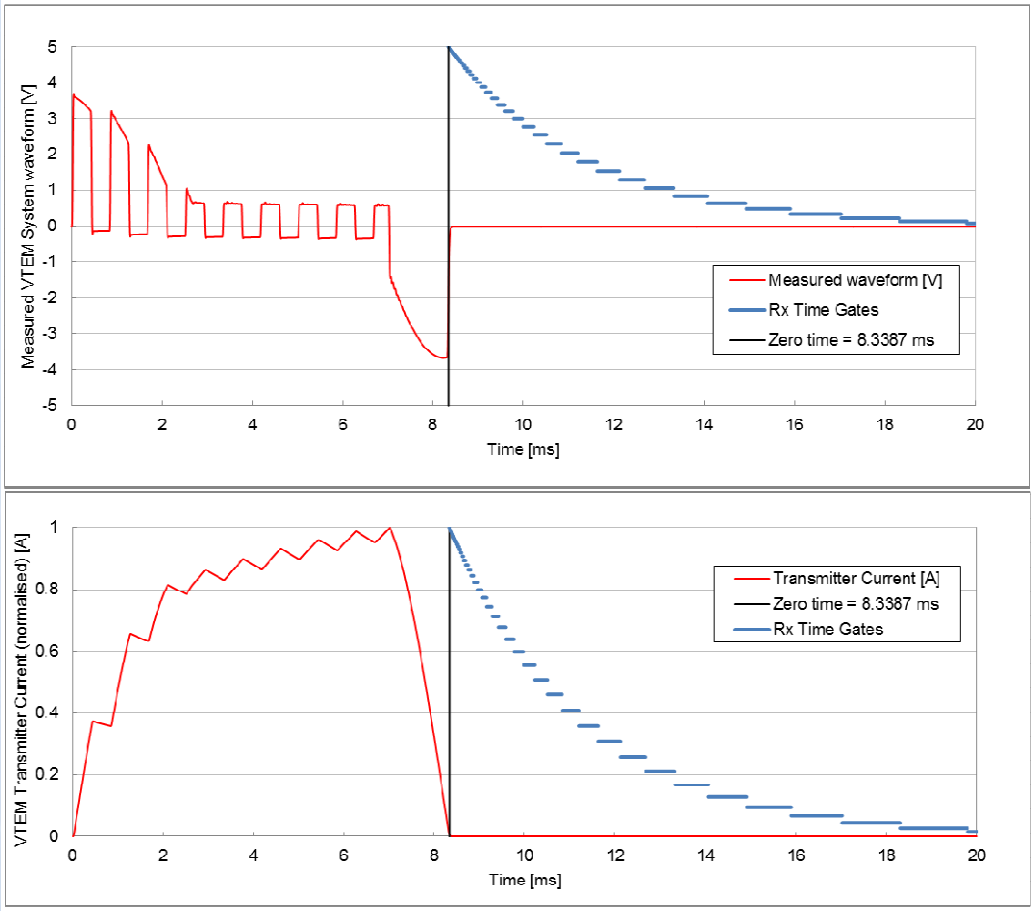
Configuration	
Cable angle with vertical	35 ˚
Cable length (EM receiver)	42 m
Cable length (Magnetometer)	12 m



2.3. VTEM decay sampling scheme

B-field VTEM Decay Sampling scheme				
Array	Microseconds			
Index	Middle	Start	End	Width
13	83	78	90	12
14	96	90	103	13
15	110	103	118	15
16	126	118	136	18
17	145	136	156	20
18	167	156	179	23
19	192	179	206	27
20	220	206	236	30
21	253	236	271	35
22	290	271	312	40
23	333	312	358	46
24	383	358	411	53
25	440	411	472	61
26	505	472	543	70
27	580	543	623	81
28	667	623	716	93
29	766	716	823	107
30	880	823	945	122
31	1010	945	1086	141
32	1161	1086	1247	161
33	1333	1247	1432	185
34	1531	1432	1646	214
35	1760	1646	1891	245
36	2021	1891	2172	281
37	2323	2172	2495	323
38	2667	2495	2865	370
39	3063	2865	3292	427
40	3521	3292	3781	490
41	4042	3781	4341	560
42	4641	4341	4987	646
43	5333	4987	5729	742
44	6125	5729	6581	852
45	7036	6581	7560	979
46	8083	7560	8685	1125
47	9286	8685	9977	1292

2.4. VTEM Transmitter Waveform over one half-period (January 2011)



3. PROCESSING

3.1. Processing parameters

Coordinates	
Projection	MAP GRID AUS ZONE 55
Datum	GDA 94
Spherics rejection (EM and Magnetic data)	
Non-linear filter	4 point
Non-linear filter sensitivity	0.0001
Low-pass filter wavelength	20 fids
Lag correction of other sensors to EM receiver position	
GPS	16 m
Radar	26 m
Magnetometer	17 m

3.2. Flight Path

The flight path, recorded by the acquisition program as WGS 84 latitude/longitude, was converted into the UTM coordinate system in Oasis Montaj. The flight path was drawn using linear interpolation between x,y positions from the navigation system. Positions are updated every second and expressed as UTM eastings (x) and UTM northings (y).

3.3. Electromagnetic Data

A three stage digital filtering process was used to reject major sferic events and to reduce system noise. Local sferic activity can produce sharp, large amplitude events that cannot be removed by conventional filtering procedures. Smoothing or stacking will reduce their amplitude but leave a broader residual response that can be confused with geological phenomena. To avoid this possibility, a computer algorithm searches out and rejects the major sferic events.

The signal to noise ratio was further improved by the application of a low pass linear digital filter. This filter has zero phase shift which prevents any lag or peak displacement from occurring, and it suppresses only variations with a wavelength less than the specified filter wavelength.

3.4. Magnetic Data

The processing of the magnetic data involved the correction for diurnal variations by using the digitally recorded ground base station magnetic values. The base station magnetometer data was edited and merged into the Geosoft GDB database on a daily basis. The aeromagnetic data was corrected for diurnal variations by subtracting the observed magnetic base station deviations.

Tie line levelling was carried out by adjusting intersection points along the traverse lines. A micro-levelling procedure was then applied. This technique is designed to remove persistent low-amplitude components of flight-line noise remaining after tie line levelling.

The corrected magnetic data was interpolated between survey lines using a random point gridding method to yield x-y grid values for a standard grid cell size of a quarter of the line spacing. The Minimum Curvature algorithm was used to interpolate values onto a rectangular regular spaced grid.

3.5. Digital Terrain Model

Subtracting the radar altimeter data from the GPS elevation data creates a digital elevation model.

4. DELIVERABLES

VTEM Survey and logistics report		
Format	PDF	
Copies	2 x Digital (DVD/CD) 2 x Hard copy	
Database		
Format	Digital Geosoft (.GDB)	
Channels	Name	Description
	X_UTM	X positional data (UTM Z55S / WGS84)
	Y_UTM	Y positional data (UTM Z55S / WGS84)
	X_MGA	X positional data (MGA Z55 / GDA94)
	Y_MGA	Y positional data (MGA Z55 / GDA94)
	Lon	Longitude data
	Lat	Latitude data
	Z	GPS antenna elevation (metres above sea level)
	Radar	Helicopter terrain clearance from radar altimeter (metres above ground level)
	RxAlt	EM Receiver and Transmitter terrain clearance (metres above ground level)
	DTM	Digital terrain model (metres)
	Gtime	UTC time (seconds of the day)
	MagTF	Raw Total Magnetic field data (nT)
	MagBase	Magnetic diurnal variation data (nT)
	MagDiu	Total Magnetic field diurnal variation and lag corrected data (nT)
	MagTieL	Tie-line leveled Total Magnetic field data (nT)
	MagMicL	Microleveled Total Magnetic field data (nT)
	dBdtZ[13] to dBdtZ[47]	dB/dtZ, Time Gates 83 µs to 9286 µs ($pV/A/m^4$)
	BfieldZ[13] to BfieldZ[47]	BfieldZ, Time Gates 83 µs to 9286 µs ($pV*m/A/m^4$)
	PLM	Power line monitor

Grids		
Format	Digital Geosoft (.GRD and .GI)[1]	
Grids	Name	Description
	AA901_Mag	Total Magnetic field (nT)

Maps		
Format	Digital Geosoft (.MAP)	
Scale	1:10 000	
Maps	Name	Description
	AA901_Mag	Total Magnetic field colour contours
	AA901_dBdtZ_Log	VTEM dB/dt profiles, Time Gates 0.667 – 9.286 ms in linear - logarithmic scale
	AA901_BfieldZ_Log	VTEM B-field profiles, Time Gates 0.667 – 9.286 ms in linear - logarithmic scale

[1] A Geosoft .GRD file has a .GI metadata file associated with it, containing grid projection information.

Waveform		
Format	Digital Excel Spreadsheet (AA901_VTEM_Waveform.xls)	
Columns	Name	Description
	Time	Sampling rate interval, 5.208 µs
	Volt	Output voltage of the receiver coil (volt)
	Current	Transmitter current (normalised to 1A peak)

Google Earth Flight Path file	
Format	Google Earth AA901_FlightPath.kml
	Free version of Google Earth software can be downloaded from, *http://earth.google.com/download-earth.html*

5. PERSONNEL

Geotech Airborne Limited Personnel	
Operator / Crew chief	Victor Wijaya
Data Processing (Preliminary)	Pete Holbrook
Data Processing (Final) /Reporting	Matt Holbrook
Final data supervision	Malcolm Moreton Data Processing Manager (malcolm@geotechairborne.com)
Overall project management	Keith Fisk Managing Partner and Director (keith@geotechairborne.com)

APPENDIX A

GENERALIZED MODELING RESULTS OF THE VTEM SYSTEM (by Roger Barlow)

Introduction

The VTEM system is based on a concentric or central loop design, whereby, the receiver is positioned at the centre of a 26.1 metres diameter transmitter loop that produces a dipole moment up to 625,000 NIA at peak current. The wave form is a bi-polar, modified square wave with a turn-on and turn-off at each end. With a base frequency of 25 Hz, the duration of each pulse is approximately 7.5 milliseconds followed by an off time where no primary field is present.

During turn-on and turn-off, a time varying field is produced (dB/dt) and an electro-motive force (emf) is created as a finite impulse response. A current ring around the transmitter loop moves outward and downward as time progresses. When conductive rocks and mineralization are encountered, a secondary field is created by mutual induction and measured by the receiver at the centre of the transmitter loop.

Measurements are made during the off-time, when only the secondary field (representing the conductive targets encountered in the ground) is present.

Efficient modeling of the results can be carried out on regularly shaped geometries, thus yielding close approximations to the parameters of the measured targets. The following is a description of a series of common models made for the purpose of promoting a general understanding of the measured results.

Variation of Plate Depth

Geometries represented by plates of different strike length, depth extent, dip, plunge and depth below surface can be varied with characteristic parametres like conductance of the target, conductance of the host and conductivity/thickness and thickness of the overburden layer.

Diagrammatic models for a vertical plate are shown in figures A and G at two different depths, all other parametres remaining constant. With this transmitter-receiver geometry, the classic **M** shaped response is generated. Figure A shows a plate where the top is near surface. Here, amplitudes of the duel peaks are higher and symmetrical with the zero centre positioned directly above the plate. Most important is the separation distance of the peaks. This distance is small when the plate is near surface and widens with a linear relationship as the plate (depth to top) increases. Figure G shows a much deeper plate where the separation distance of the peaks is much wider and the amplitudes of the channels have decreased.

Variation of Plate Dip

As the plate dips and departs from the vertical position, the peaks become asymmetrical. Figure B shows a near surface plate dipping 80º. Note that the direction of dip is toward the high shoulder of the response and the top of the plate remains under the centre minimum.

As the dip increases, the aspect ratio (Min/Max) decreases and this aspect ratio can be used as an empirical guide to dip angles from near 90º to about 30º. The method is not sensitive enough where dips are less than about 30º. Figure E shows a plate dipping 45º and, at this angle, the minimum shoulder starts to vanish. In Figure D, a

flat lying plate is shown, relatively near surface. Note that the twin peak anomaly has been replaced by a symmetrical shape with large, bell shaped, channel amplitudes which decay relative to the conductance of the plate.

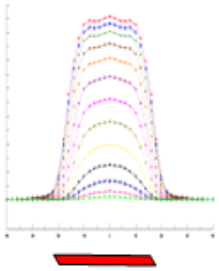
Figure H shows a special case where two plates are positioned to represent a synclinal structure. Note that the main characteristic to remember is the centre amplitudes are higher (approximately double) compared to the high shoulder of a single plate. This model is very representative of tightly folded formations where the conductors where once flat lying.

Variation of Prism Depth

Finally, with prism models, another algorithm is required to represent current on the plate. A plate model is considered to be infinitely thin with respect to thickness and incapable of representing the current in the thickness dimension. A prism model is constructed to deal with this problem, thereby, representing the thickness of the body more accurately.

Figures C, F and I show the same prism at increasing depths. Aside from an expected decrease in amplitude, the side lobes of the anomaly show a widening with deeper prism depths of the bell shaped early time channels.

A



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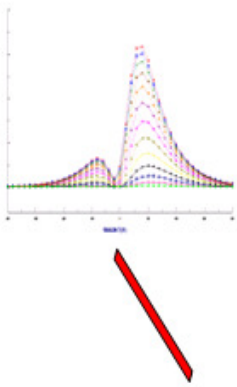

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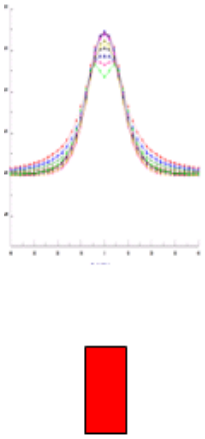

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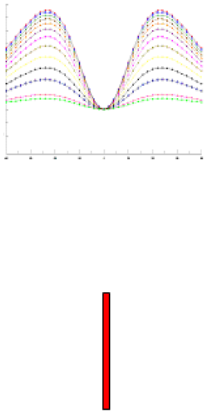

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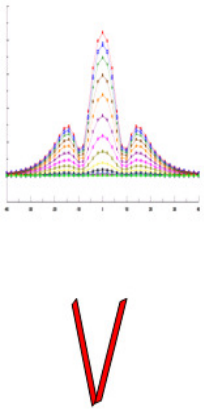

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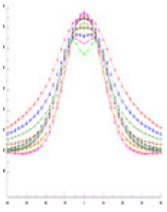

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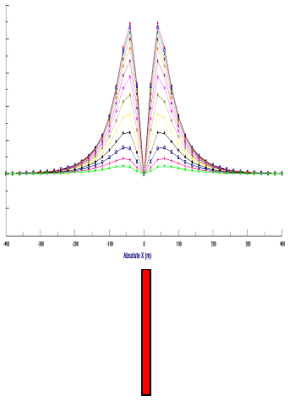

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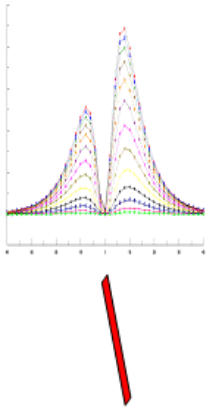

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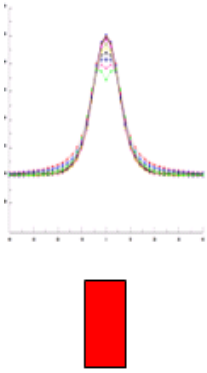


General Modeling Concepts

A set of models has been produced for the Geotech VTEM® system with explanation notes (see models A to I above). The reader is encouraged to review these models, so as to get a general understanding of the responses as they apply to survey results. While these models do not begin to cover all possibilities, they give a general perspective on the simple and most commonly encountered anomalies.

When producing these models, a few key points were observed and are worth noting as follows:

- For near vertical and vertical plate models, the top of the conductor is always located directly under the centre low point between the two shoulders in the classic **M** shaped response.
- As the plate is positioned at an increasing depth to the top, the shoulders of the **M** shaped response, have a greater separation distance.
- When faced with choosing between a flat lying plate and a prism model to represent the target (broad response) some ambiguity is present and caution should be exercised.
- With the concentric loop system and Z-component receiver coil, virtually all types of conductors and most geometries are most always well coupled and a response is generated (see model H). Only concentric loop systems can map this type of target.

The modelling program used to generate the responses was prepared by PetRos Eikon Inc. and is one of a very few that can model a wide range of targets in a conductive half space.

General Interpretation Principals

Magnetics

The total magnetic intensity responses reflect major changes in the magnetite and/or other magnetic minerals content in the underlying rocks and unconsolidated overburden. Precambrian rocks have often been subjected to intense heat and pressure during structural and metamorphic events in their history. Original signatures imprinted on these rocks at the time of formation have, it most cases, been modified, resulting in low magnetic susceptibility values.

The amplitude of magnetic anomalies, relative to the regional background, helps to assist in identifying specific magnetic and non-magnetic rock units (and conductors) related to, for example, mafic flows, mafic to ultramafic intrusives, felsic intrusives, felsic volcanics and/or sediments etc. Obviously, several geological sources can produce the same magnetic response. These ambiguities can be reduced considerably if basic geological information on the area is available to the geophysical interpreter.

In addition to simple amplitude variations, the shape of the response expressed in the wave length and the symmetry or asymmetry, is used to estimate the depth, geometric parameters and magnetization of the anomaly. For example, long narrow magnetic linears usually reflect mafic flows or intrusive dyke features. Large areas with complex magnetic patterns may be produced by intrusive bodies with significant magnetization, flat lying magnetic sills or sedimentary iron formation. Local isolated circular magnetic patterns often represent plug-like igneous intrusives such as kimberlites, pegmatites or volcanic vent areas.

Because the total magnetic intensity (TMI) responses may represent two or more closely spaced bodies within a response, the second derivative of the TMI response may be helpful for distinguishing these complexities. The second derivative is most useful in mapping near surface linears and other subtle magnetic structures that are partially masked by nearby higher amplitude magnetic features. The broad zones of higher magnetic amplitude, however, are severely attenuated in the vertical derivative results. These higher amplitude zones reflect rock units having strong magnetic susceptibility signatures. For this reason, both the TMI and the second derivative maps should be evaluated together.

Theoretically, the second derivative, zero contour or colour delineates the contacts or limits of large sources with near vertical dip and shallow depth to the top. The vertical gradient map also aids in determining contact zones between rocks with a susceptibility contrast, however, different, more complicated rules of thumb apply.

Concentric Loop EM Systems

Concentric systems with horizontal transmitter and receiver antennae produce much larger responses for flat lying conductors as contrasted with vertical plate-like conductors. The amount of current developing on the flat upper surface of targets having a substantial area in this dimension, are the direct result of the effective coupling angle, between the primary magnetic field and the flat surface area. One therefore, must not compare the amplitude/conductance of responses generated from flat lying bodies with those derived from near vertical plates; their ratios will be quite different for similar conductances.

Determining dip angle is very accurate for plates with dip angles greater than 30º. For angles less than 30º to 0º, the sensitivity is low and dips can not be distinguished accurately in the presence of normal survey noise levels.

A plate like body that has near vertical position will display a two shoulder, classic **M** shaped response with a distinctive separation distance between peaks for a given depth to top.

It is sometimes difficult to distinguish between responses associated with the edge effects of flat lying conductors and poorly conductive bedrock conductors. Poorly conductive bedrock conductors having low dip angles will also exhibit responses that may be interpreted as surfacial overburden conductors. In some situations, the conductive response has line to line continuity and some magnetic correlation providing possible evidence that the response is related to an actual bedrock source.

The EM interpretation process used, places considerable emphasis on determining an understanding of the general conductive patterns in the area of interest. Each area has different characteristics and these can effectively guide the detailed process used.

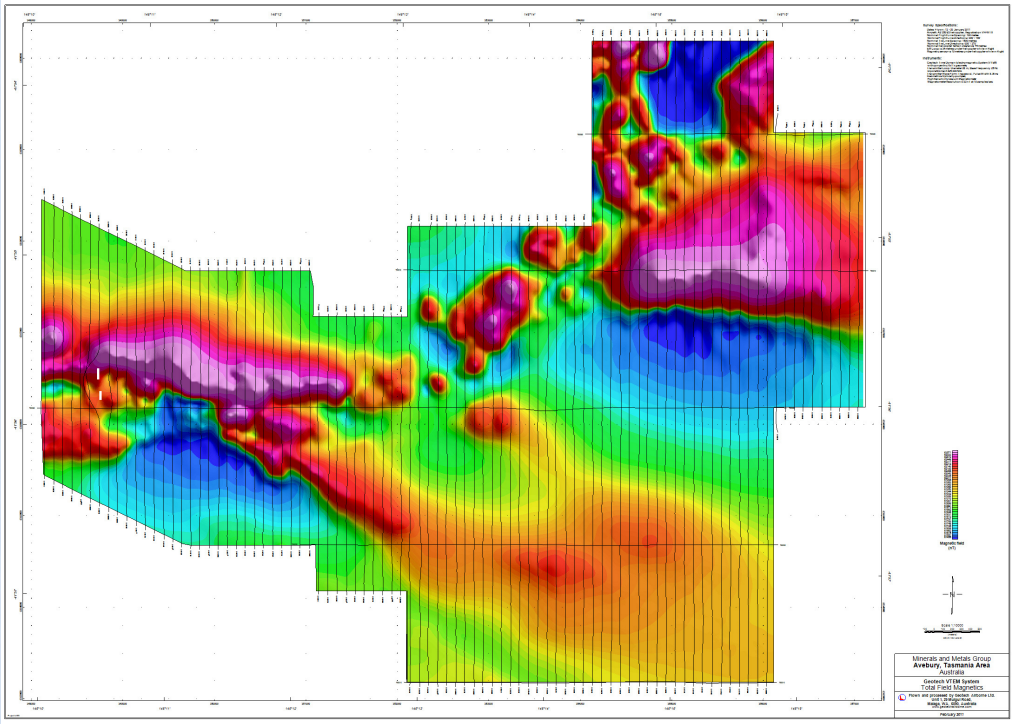
The first stage is to determine which time gates are most descriptive of the overall conductance patterns. Maps of the time gates that represent the range of responses can be very informative.

Next, stacking the relevant channels as profiles on the flight path together with the second vertical derivative of the TMI is very helpful in revealing correlations between the EM and Magnetics.

Next, key lines can be profiled as single lines to emphasize specific characteristics of a conductor or the relationship of one conductor to another on the same line. Resistivity Depth sections can be constructed to show the relationship of conductive overburden or conductive bedrock with the conductive anomaly.

APPENDIX B

GEOPHYSICAL MAP IMAGES
(not to scale)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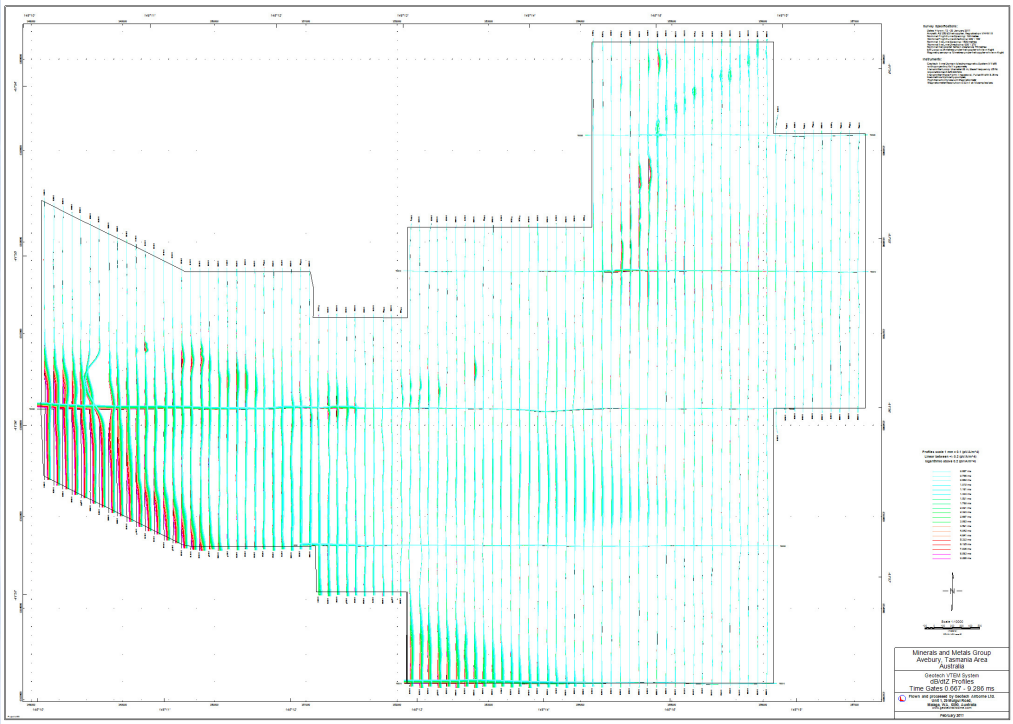
Avebury, Tasmania Area
Australia
Geotech VTEM System
Total Field Magnetics
February 2011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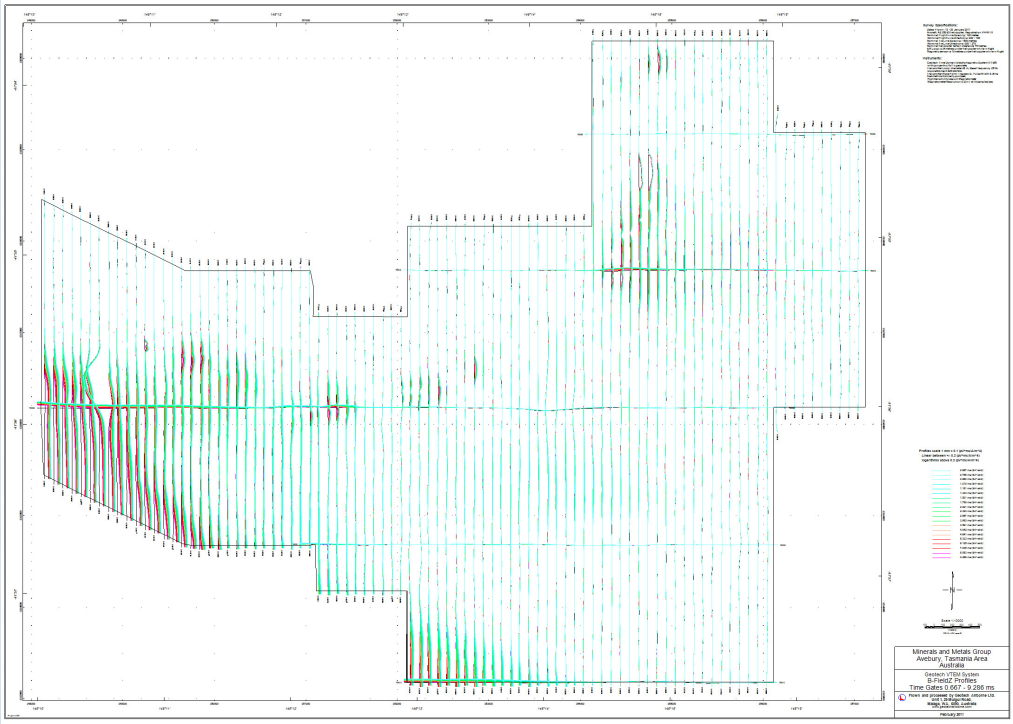
Australia
Geotech VTEM System
dB/dt Z Profiles
Time Gates 0.667 - 9.286 ms
February 2011


Minerals and Metals Group
Avebury, Tasmania Area
Australia
Geotech VTEM System
B-Field Z Profiles
Time Gates 0.667 - 9.286 ms
February 2011

APPENDIX B – Field Investigations VTEM anomaly.

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ABN 50886857181

FIELD INVESTIGATION

UNEXPLAINED VTEM ANOMALIES

AVEBURY DISTRICT

2011

Prepared for: MMG Pty Ltd

Tim Callaghan, April 2011

Contents

List of Figures

COORDINATES IN THIS REPORT ARE RECORDED IN AMG66 ZONE 55

1 INTRODUCTION

A VTEM survey was completed over the Avebury deposit and surrounding EL's by the Min-Metals Group (MMG) in 2010. Prominent conductive anomalies were identified, the largest of which was located over the Viking and North Avebury deposits.

Several other satellite conductors identified from the survey require geological investigation to try and identify the potential cause of the anomalies.

MMG requested a brief field inspection and data review of the areas of interest in March 2011. A field trip to the anomalies was completed on 5th April.

Three JPEG images of the areas of interest were provided by Helen Williams, Geophysicist for MMG. These included the six conductors to be investigated over-layed on images of the VTEM survey, Total Magnetic Intensity (TMI) and an aerial photograph.

2 LOCATION AND ACCESS

The anomalies are located on an incised peneplain around the base of Mt Agnew which dominates the northern aspect of the area of investigation. Vegetation consists of either low button grass moorland on poor soils developed on quartzite and granite, or wet sclerophyll eucalypt and tea-tree re-growth in creek gullies and on richer soils associated with the Crimson Creek Formation and the volcanics of the McIvor Hill Ultramafic Complex. The area is accessed by the all weather unsealed Trial Harbour road. Numerous firebreak and exploration tracks are accessible by 4WD. Many of the anomalies required foot access of several hundred metres.

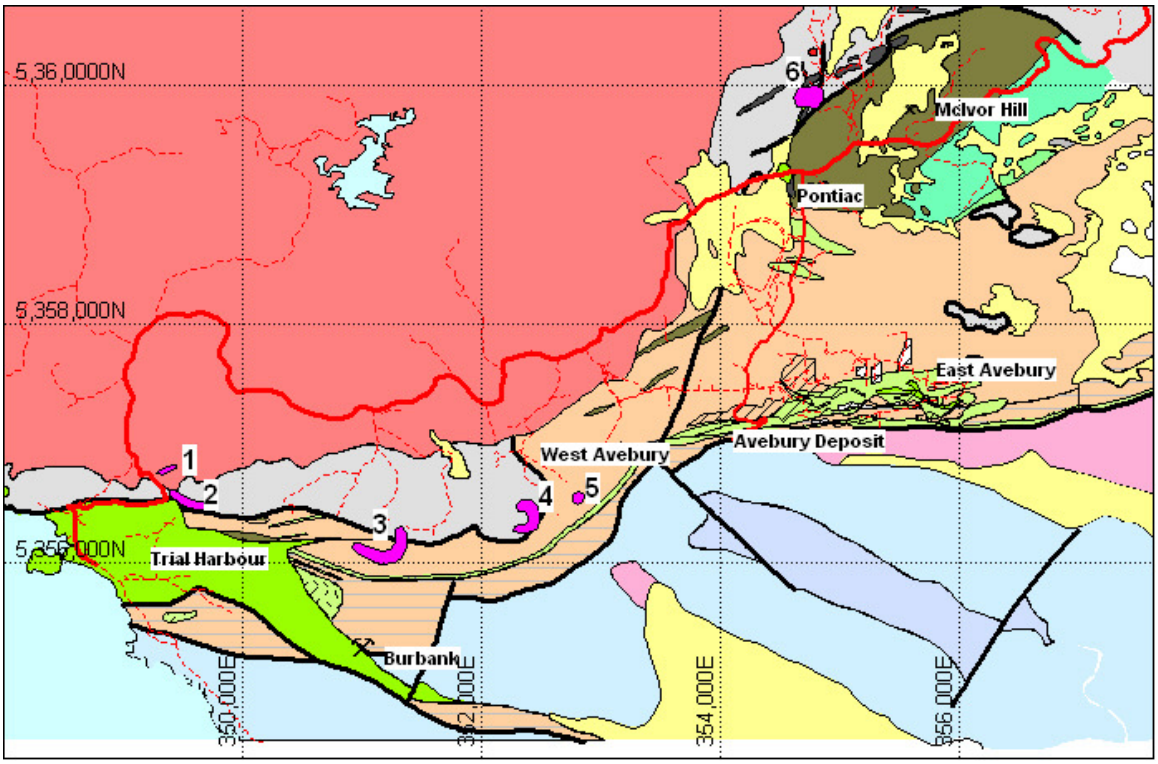


Figure 1. Avebury District Geology Map with unexplained VTEM conductor locations

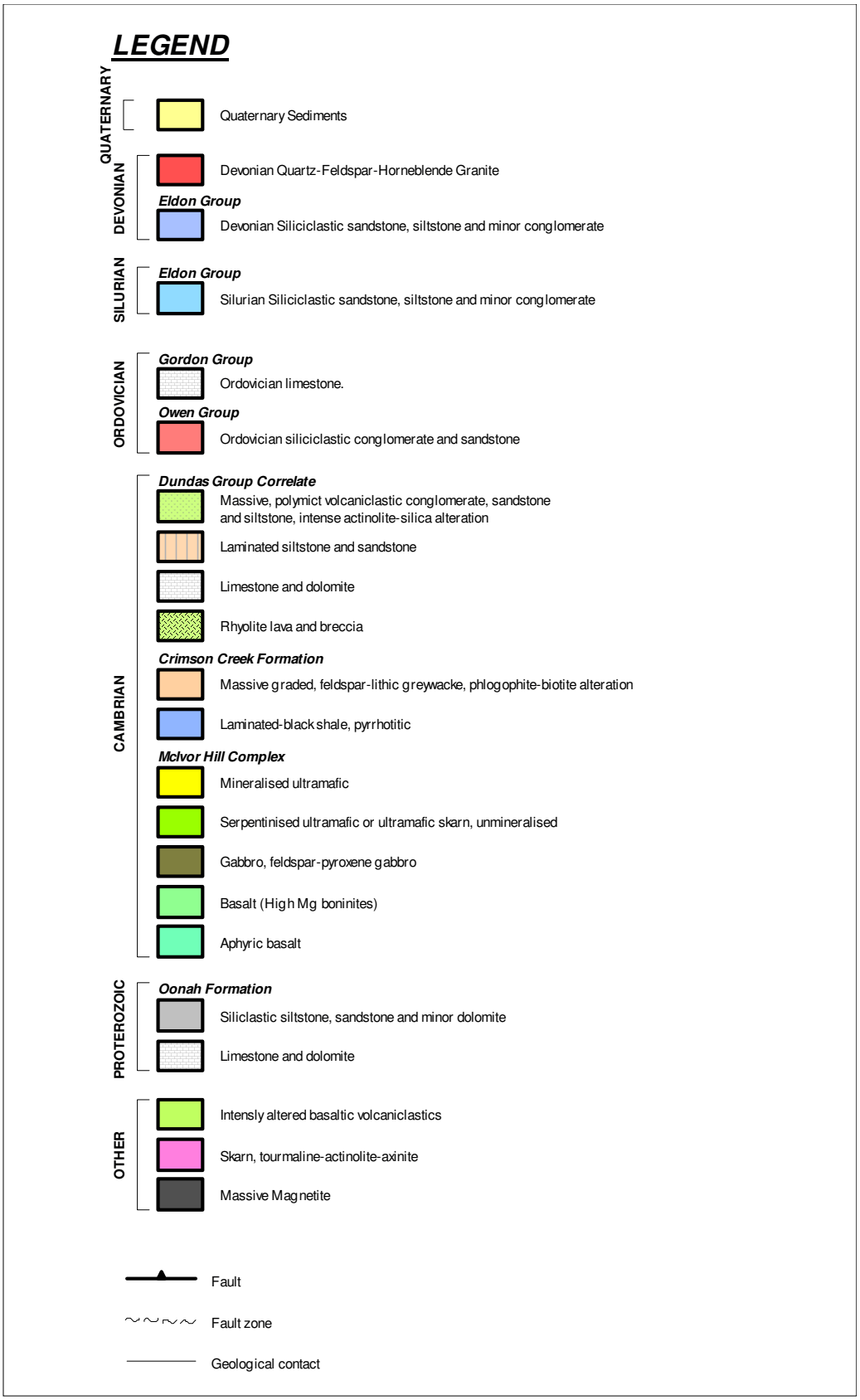


Figure 2. Legend for Figures 1, 3, 5 and 7.

3 GEOLOGY

The Avebury Nickel Sulphide deposits are hosted in moderately to steeply dipping Middle Cambrian ultramafic intrusives belonging to the McIvor Hill Mafic-Ultramafic Complex located on the western margin of the Late Precambrian to Early Devonian Dundas Trough on the West Coast of Tasmania.

The ultramafics are hosted in volcaniclastic sediments of the Early Cambrian Crimson Creek Formation and possibly the Cambrian Lower Dundas Group. The host sequence strikes east-west and has a dip of 60-70 degrees to the north. Facing criteria suggest the sequence is overturned and facing consistently south. The Crimson Creek Formation is dominated by voluminous well bedded feldspar-lithic greywacke and lesser pyrrhotitic black shale. The thick greywacke sequence transgresses conformably into a complex sequence of polymictic basaltic to rhyolitic conglomerate, basaltic volcaniclastic sandstone, greywacke, siltstone and limestone that may possibly represent the Cambrian Lower Dundas Group. The conglomerates include sub-rounded to angular clasts of feldspar phyric basalt and andesite, quartz phyric rhyolite, siltstone, chert and quartzite in a dominantly basaltic matrix. The Crimson Creek and Dundas Group are in unconformable and possibly faulted contact with the siliciclastics and carbonates of the Late Cambrian-Ordovician Wurrawina Supergroup to the south.

The ultramafic intrusives consist of serpentinised and metasomatised peridotite or dunite cumulates (Fander, 2000, Radke 2005) intruding both the Crimson Creek Formation volcaniclastic greywacke and the complex sequence of polymictic conglomerate, carbonate and sandstone. The intrusive is both concordant and discordant to bedding.

The whole sequence was moderately hornfelsed during the intrusion of the Heemskirk biotite-adamellite batholith at the end of the Devonian Tabberabberan Orogeny. The Heemskirk batholith is located 1-2km northwest of the Avebury Deposit. Pervasive phlogopite-biotite alteration of the greywacke and actinolite alteration of basaltic rocks has resulted from contact metamorphism. Locally intense metasomatism of the host sequence has formed an actinolite-diopside dominated assemblage with zones of intense boron metasomatism characterized by veins and nodules of axinite and tourmaline.

Variable metasomatism of the ultramafics has formed two distinctly different gangue mineral assemblages. Essentially unmetasomatised ultramafic is a fine grained black rock composed predominantly of antigorite with minor disseminated chromite, magnetite and sulphides. Metasomatised ultramafics have been converted to pale grey or green, coarsely crystalline tremolite/actinolite and diopside with minor magnetite, chromite and sulphides. Both gangue mineral assemblages may host ore grade nickel sulphide mineralisation.

Nickel sulphide mineralization is largely concentrated within the ultramafic immediately adjacent to its margins with nickel grades diminishing toward the interior of the intrusions. Some internal zones of nickel sulphide mineralisation are present.

Petrographic studies (Fander, 2000, Fander, 1999) indicate the main sulphide minerals to be pentlandite and pyrrhotite with lesser pyrite, chalcopyrite, millerite and nickel arsenides.

Pentlandite occurs as coarse disseminations and stringer veins associated with secondary magnetite. Most of the sulphides are coarse grained and re-crystallised post foliation due to the thermal and metasomatic effects of the Devonian granite intrusions. Sulphide contents are generally low with mineralised ultramafic comprising between 0.5 to 3% sulphides although massive pentlandite does occur in some drill intersections.

4 VTEM ANOMALIES

4.1 VTEM Anomalies 1 and 2.

VTEM anomalies 1 and 2 are located immediately east of the Trial Harbour road approximately 1km from the township of Trial Harbour. Geologically the area is complex with the Heemskirk batholith intruding the overthrust Precambrian Oonah Formation immediately north of outcropping metasomatised ultramafic. The ultramafic consists of diopside-magnetite alteration and massive magnetite in the road cutting immediately west of Anomaly 2.

Anomaly 1 is located over outcropping granite. Again the conductor is associated with a strong magnetic response. This target is probably of a lower priority with respect to nickel but may be a valid Sn-WO_3 target in griesenised granite.

Drilling and mapping in the vicinity of Anomaly 2 suggests it is hosted either within the overthrust Oonah Formation or within the underlying Crimson Creek Formation if near surface. However the associated large magnetic anomaly and proximal ultramafic outcrop suggests it may well be associated with a conductor within metasomatised ultramafic hosted within the Crimson Creek Formation. It is recommended this anomaly be followed up with additional geological and geophysical modeling and possible diamond drilling. The target is located within the Trial Harbour water catchment and care should be taken during drilling to avoid contamination.

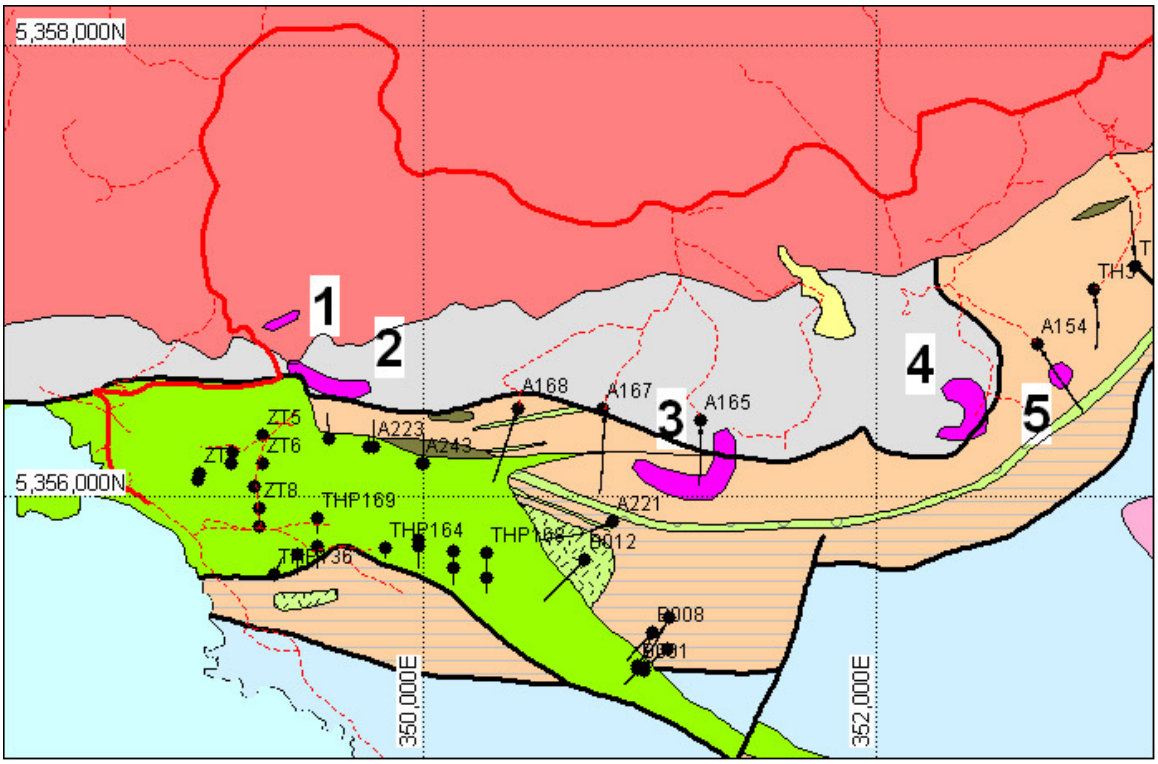


Figure 3. VTEM anomalies 1 -5 and geology. Legend as per figure 2.

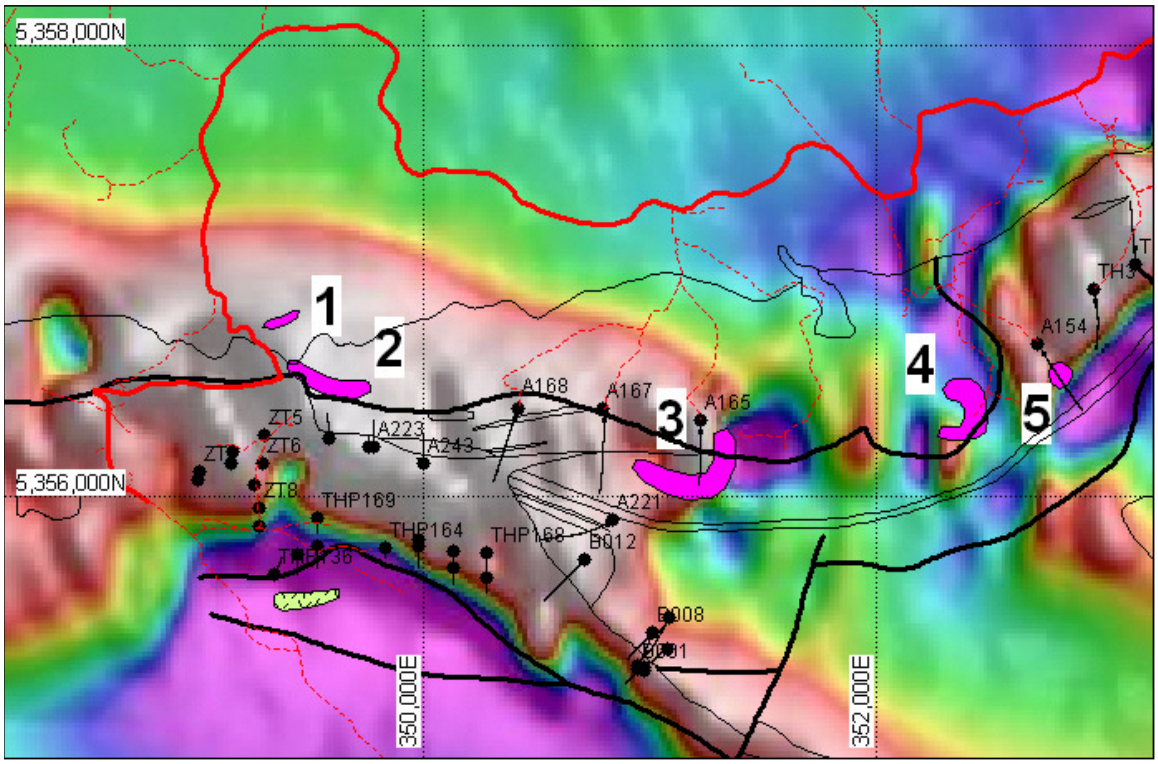


Figure 4. VTEM anomalies 1 - 5 and TMI Image.

4.2 VTEM Anomaly 3.

VTEM Anomaly 3 is coincident with a prominent magnetic high hosted in serpentinised ultramafic intruding steeply north dipping hornfelsed Crimson Creek Formation. The ultramafic was drilled in the summer of 2007 by DDH's A165, A167 and A168. The drillholes all successfully intersected Cambrian ultramafic rocks identical to those hosting the Avebury deposit.

Drillhole A165 passes directly under the surface projection of the VTEM anomaly (Figure 3 and 4). DDH A165 was collared in what was interpreted to be a thin thrust sheet of Precambrian siliciclastics. The hole passed into typical phlogopite altered feldspar-lithic basaltic volcaniclastic greywacke of the Crimson Creek Group. A thin, strongly sheared and tectonised ultramafic was intersected between 211.0m and 216.9m. The ultramafic was comprised of 50% massive magnetite with black serpentinite gangue and minor tremolite altered skarn veins. Ni and Cr assays were typical of background dunite values (0.2% Ni, 900ppm Cr). The hole successfully identified the attenuated western margin of the Trial Harbour ultramafic, however no significant nickel sulphides were identified.

The Crimson Creek Formation greywackes were intensely actinolite altered on either side of the ultramafic. Abundant pyrrhotite was associated with actinolite altered Crimson Creek Formation from 186m downhole and also within the serpentinite-magnetite altered ultramafic. The pyrrhotite mineralisation is the likely cause of the observed conductivity anomaly from the VTEM survey.

No further work is recommended.

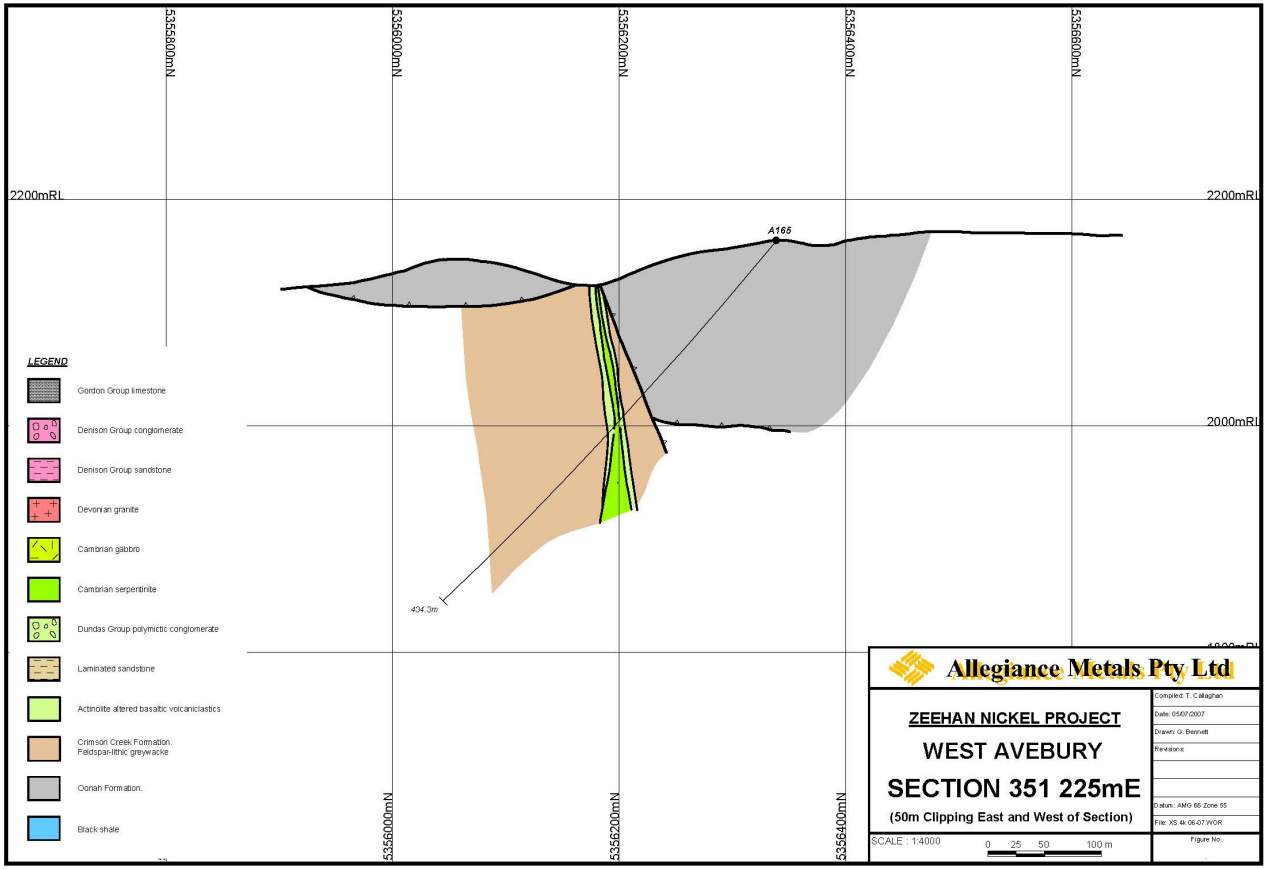


Figure 5. Section 351 225mE through VTEM anomaly 3. Drillhole A165 intersected serpentinite-magnetite altered ultramafic with a metasomatic halo of actinolite altered Crimson Creek Formation Greywacke. The alteration contained abundant Po probably responsible for the observed conductivity anomaly.

4.3 VTEM Anomaly 4 and 5

VTEM anomalies 4 and 5 are located 2km west along strike of the known western edge of the Avebury mineralisation (Figure 3 and 4). The area has been mapped and there is limited drilling data available.

Drillhole A154 was targeted on a discrete magnetic anomaly along strike from the Avebury deposit in what was regarded as a favorable stratigraphic position.

The hole intersected a pyrrhotitic black shale within the Crimson Creek Formation volcaniclastics between 89.9 and 93.3m and again at 128.2 and 133.3m which is coincident with the observed conductivity high (Figure 6). The hole passed through the Crimson Creek formation before intersecting polymict conglomerates of the Dundas Group. The hole ended in granite, suggesting the granite dips at a low angle of 30-40 degrees below surface. Minor tin mineralisation to 0.16% was associated with sericite-tourmaline-silica altered granite with minor disseminated pyrite. The pyrrhotitic shale is probably responsible for the observed conductivity anomaly. The magnetic anomaly was not resolved from the drilling. A downhole magnetic survey may be warranted on this hole to verify the location of the aeromagnetic high.

Anomaly 4 is located along the same stratigraphic position within the Crimson Creek Formation and is probably associated with the same pyrrhotitic shale horizon. There is no associated magnetic anomaly suggesting the conductor is unlikely to be associated with a mineralised ultramafic.

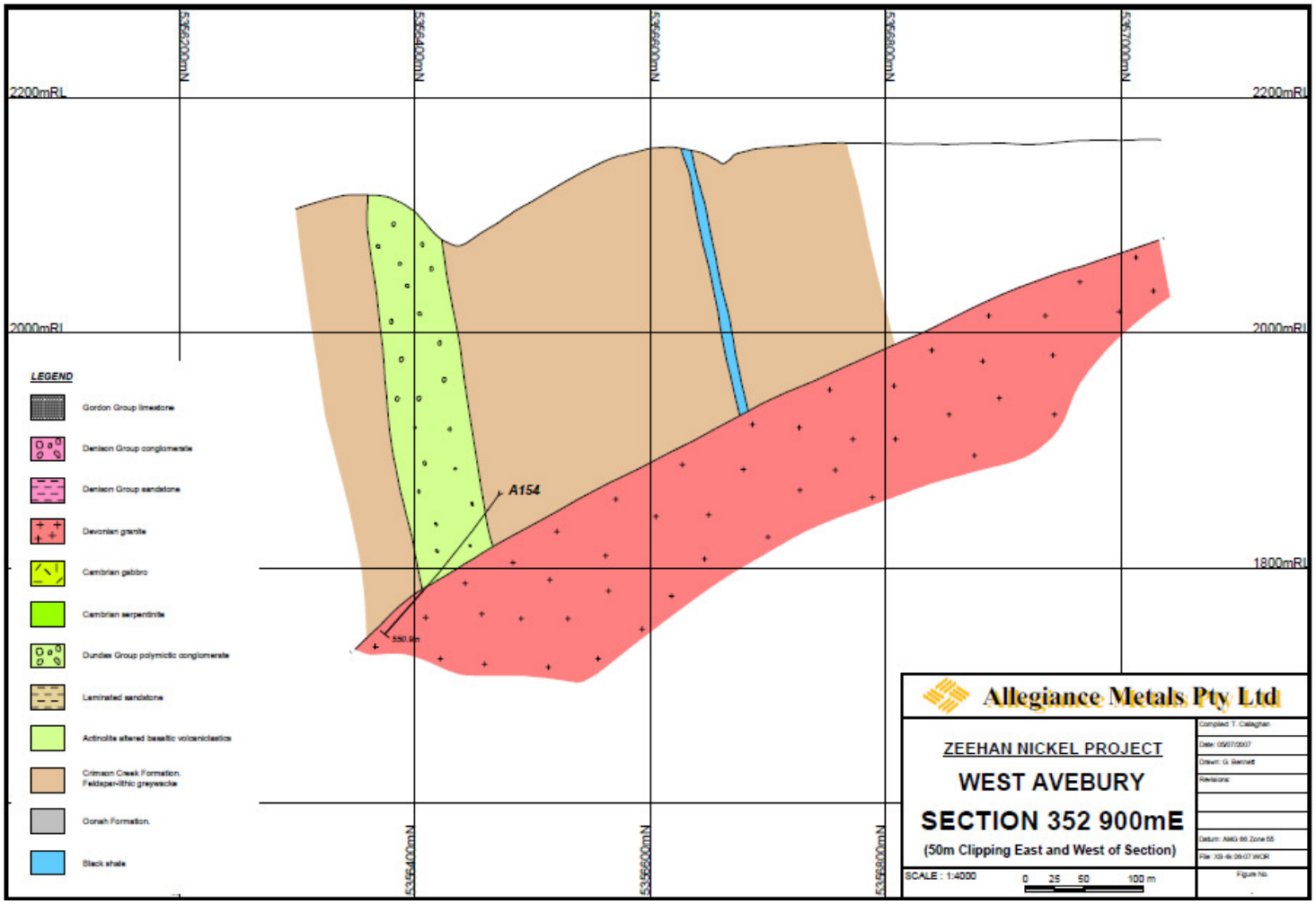


Figure 6. Section 352900 with DDH A154. A154 passed through the interpreted location of the VTEM anomaly. A pyrrhotitic black shale (blue) is located on the anomaly position and probably accounts for the observed response.

4.4 VTEM Anomaly 6.

VTEM anomaly 6 is located approximately 2km north of Avebury. The area is on the boundary of what is known as the Pontiac Prospect and the Tenth Legion Prospect to the north. The geology of the area is dominated by a complex sequence of Cambrian gabbro to the west. The eastern part of the prospect is in fault contact with the Precambrian Oonah Formation which as been intruded by the Heemskirk Granite further east (Figure 7). There are numerous serpentinite-massive magnetite bodies in the district extending to the northeast which are part of the Tenth Legion and Sylvester prospects. These two prospects have associated Sn-WO_3 and Pb-Zn mineralisation..

Several drillholes are located around the observed conductive anomaly. Drillholes P010 and P011 are located just south of the anomaly. These holes intersected massive gabbro, followed by a massive magnetite body with coarse pyrrhotite-pyrite mineralisation and magnetite-serpentinite-pyrrhotite-pyrite. Minor chalcopyrite is associated with the sulphide mineralisation. Interestingly the serpentinites contained no chrome or nickel as would be expected from serpentinised ultramafic. The holes were not assayed for Sn or WO_3.

The conductive anomaly is most probably explained by the massive magnetite-sulphide mineralisation.

This area does not appear to contain appreciable nickel but is highly prospective for Kara or Mt Lindsay style magnetite-Sn-WO_3 mineralisation.

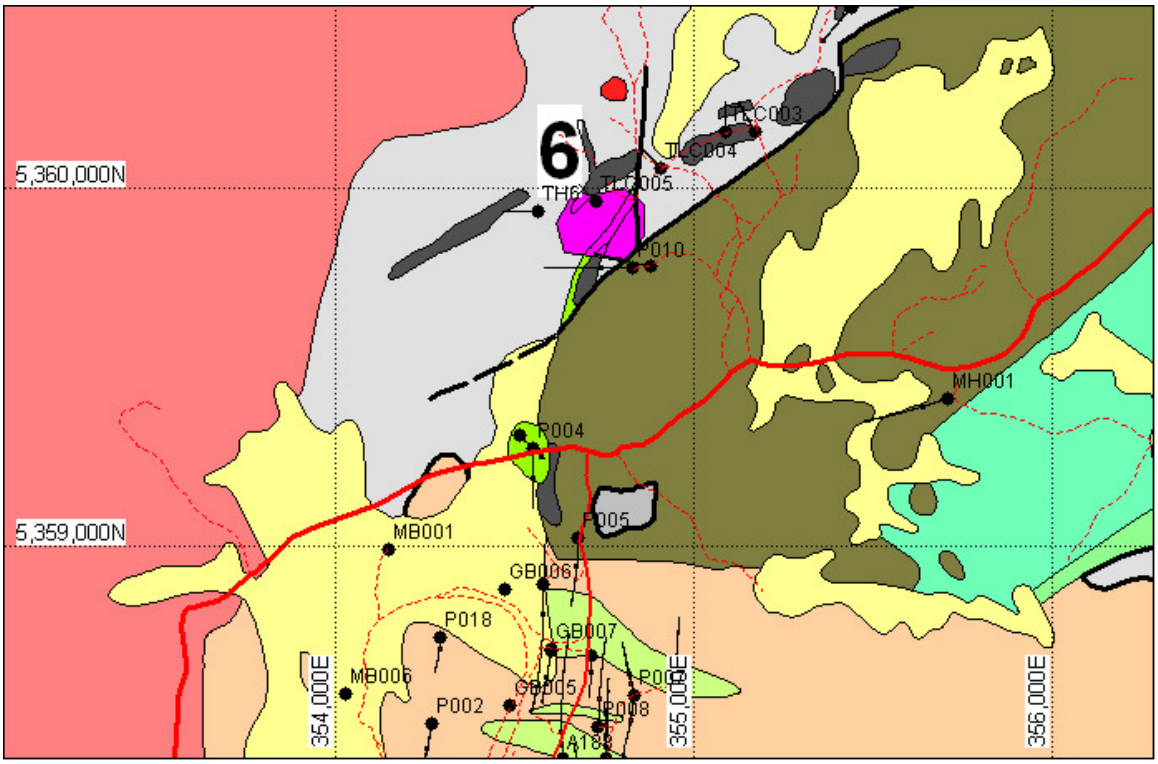


Figure 7. VTEM anomalies 6 and geology. Legend as per figure 2.

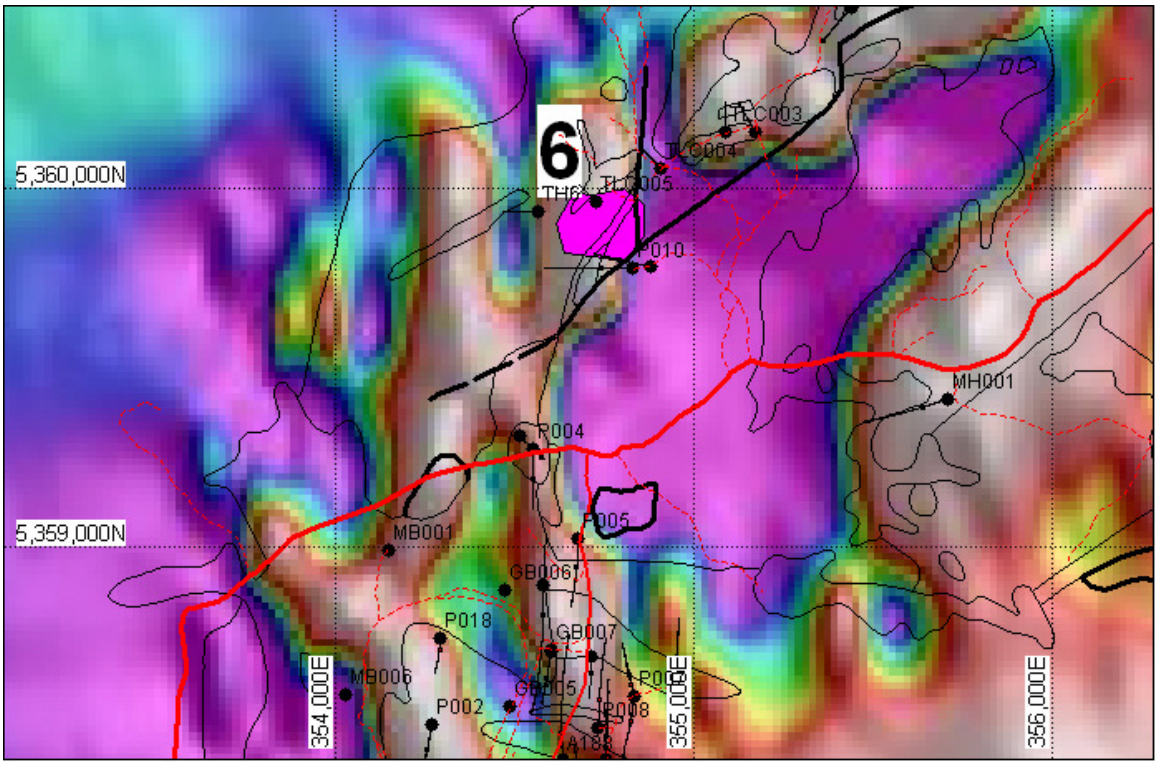


Figure 8. VTEM anomalies 6 and TMI.

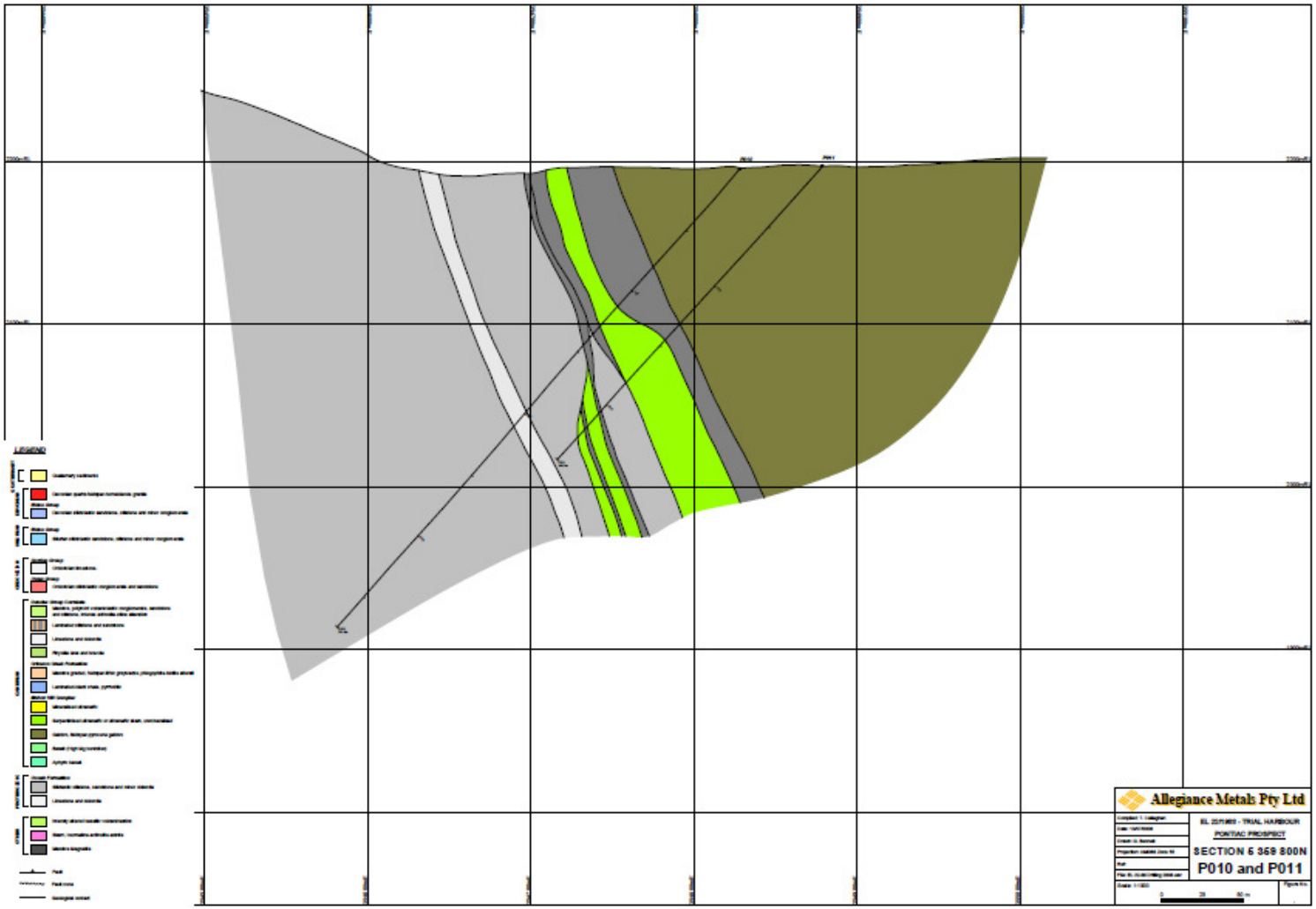


Figure 9. Section 5369800N. Drillholes P010 and P011. The holes intersected massive magnetite (dark grey) and serpentinite (bright green) with associated pyrrhotite-pyrite mineralisation. No appreciable Ni was observed. The holes were not assayed for Sn or WO_3.

5 RECOMMENDATIONS

Recommendations for follow up work include:

- **Anomaly 1 and 2. Geophysical and geological modeling possibly followed by drilling of anomaly 2 and possibly anomaly 1.**

These two targets have not been previously tested and are coincident with a prominent associated magnetic anomaly. Outcropping metasomatised ultramafic and massive magnetite is located a few hundred metres south along strike. The conductive anomaly may possibly be associated with nickel sulphide mineralisation or with Sn-WO3 mineralisation. Further investigation is warranted.

- **Anomaly 3. No further work recommended.**

The conductive anomaly has been drill tested by A165 and is probably associated with pyrrhotite-pyrite mineralisation and massive magnetite associated with the top of an ultramafic body. No significant Nickel mineralisation was identified.

- **Anomaly 4. No further work recommended.**

Anomaly 4 is probably associated with the pyrrhotitic shale horizon identified in drillhole A154 to the south. There is no associated magnetic high and the anomaly is unlikely to be associated with a mineralised ultramafic body.

- **Anomaly 5. Possible downhole magnetic survey.**

Anomaly 5 has been drill tested by A154 and is probably associated with two pyrrhotitic shale horizons hosted in the Crimson Creek Formation. However the source of the aero-magnetic anomaly was not identified in the drill hole and a downhole magnetic survey may be warranted. The granite intersected in A154 had minor associated Sn mineralisation.

- **Anomaly 6. Possible magnetite Sn-WO_3 target.**

Anomaly 6 is associated with massive magnetite-pyrite-pyrrhotite mineralisation. Some of the drillholes in the area have intersected anomalous Sn and WO_3 and follow up exploration for Kara or Mt Lindsay style mineralisation may be warranted. No nickel mineralisation has yet been identified in this area.

References

Fander, H W, 1999. Central Mineralogical Services. *Unpublished petrological report for Allegiance Mining NL.*

Fander, H W, 2000. Central Mineralogical Services. *Unpublished petrological report for Allegiance Mining NL.*

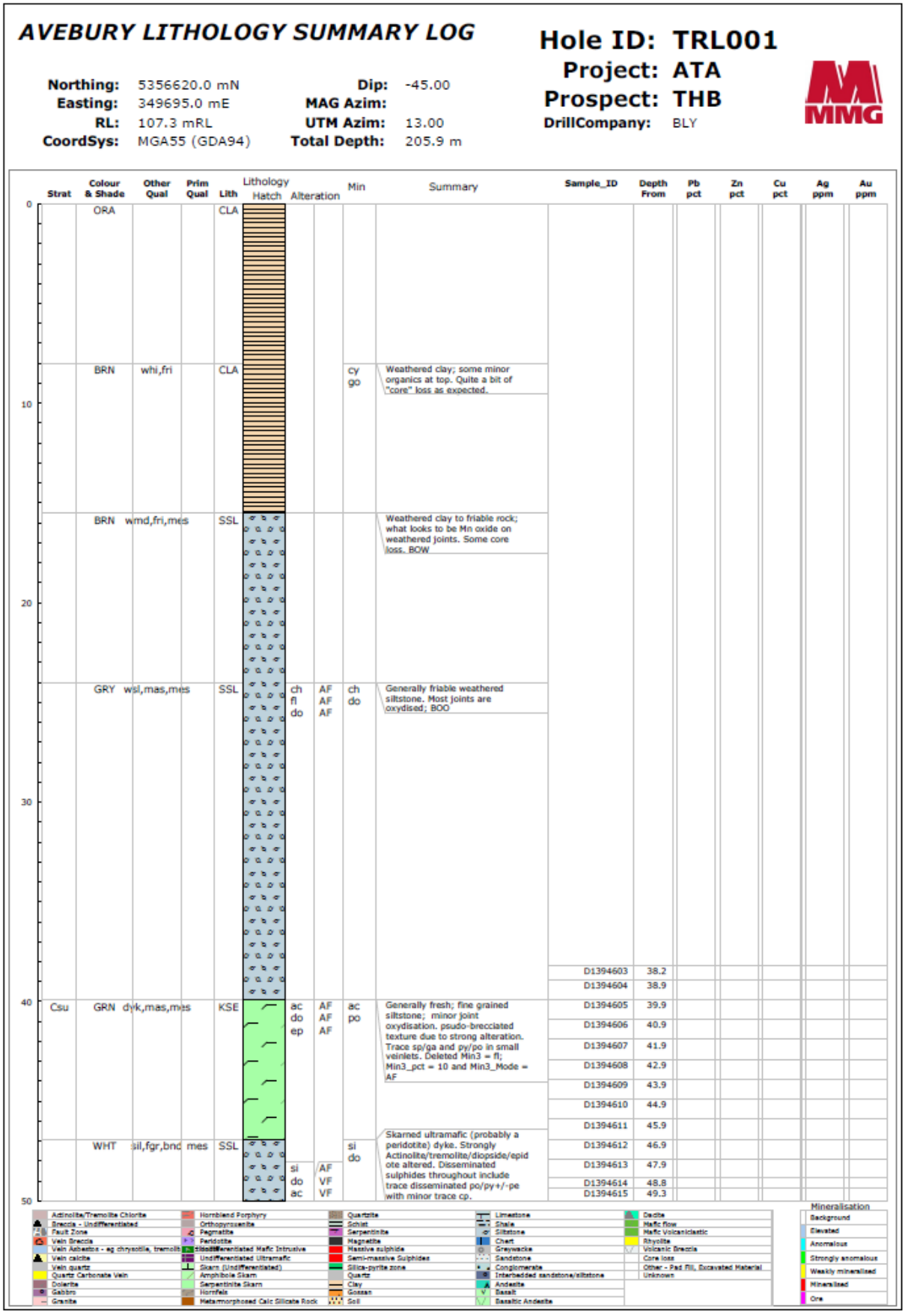
Radke F. Report 2060PE06. Petrology of 21 samples. *Unpublished petrological report for Allegiance Mining NL.*

STATEMENT OF INDEPENDENCE
Tim Callaghan has no material interest or entitlement in the securities or assets of MMG or any associated companies.

LIMITATIONS AND CONSENT
The report has been prepared for MMG using information available to the author at the time of writing. The opinions stated herein are given in good faith and with the belief that the basic assumptions are factual and correct and the interpretations reasonable.

This report is not intended for the use as a public document nor, in whole or in part, in a public document without written consent to the form and context in which it appears.

APPENDIX C- TRL001 Drill Log



AVEBURY LITHOLOGY SUMMARY LOG

Hole ID: TRL001
Project: ATA
Prospect: THB
DrillCompany: BLY

Northing:	5356620.0 mN	**Dip:**	-45.00
Easting:	349695.0 mE	**MAG Azim:**	
RL:	107.3 mRL	**UTM Azim:**	13.00
CoordSys:	MGA55 (GDA94)	**Total Depth:**	205.9 m

Strat	Colour & Shade	Other Qual	Prim Qual	Lith	Lithology Hatch	Alteration		Min	Summary	Sample_ID	Depth From	Pb pct	Zn pct	Cu pct	Ag ppm	Au ppm
	WHT	sil,fgr,bnd	mes	SSL		si do ac	AF VF VF	si do		D1394615	49.3					
Csu	GRN	dyk,mas,mes		KSE				ac do	Fine grained siltstone. psudo-brecciated texture due to strong si-do +/- ep-gt alteration. Some small patches still exhibit relict thinly laminated bedding. Trace sp/ga and py/po in small veinlets.	D1394616	57.3					
	WHT	sil,tbd,mes		SSL				si do		D1394618	57.5					
									Small utramafic dyke. Strongly si-ac-do+/-biotite altered with no relict textures. Disseminated to blebby sulphide; probably po with possible minor pe. Contacts are sharp.	D1394619	58.5					
	GRY	sil,tbd		SSL				ph py	Fine grained laminated siltstone/shale. psudo-brecciated texture due to strong si-do +/- ep-gt alteration (tends to be vein controlled) py/po in small si-ac veinlets. Rare trace sph.							
						ac do po	VF VF D			D1394620	80.9					
										D1394621	81.2					
										D1394622	82.2					
						ac do po	VF VF D			D1394623	84.7					
Csu	GRN	dyk,mas		MSE		ch mt py	VF D D	ch mt	Fine grained laminated; sometimes deformed; siltstone/shale. Weakly phlogopite altered with areas of vein/small dyke controlled ac-do+/-po alteration. Disseminated fine/medium grained py throughout	D1394624	90.9					
	BRN	sil,tbd		SSL		ph do	VF VF	ph py	Small utramafice serpentinised dyke. Strongly ch-mt-py altered with white qtz-carb veining. Disseminated to blebby magnetite and py.							

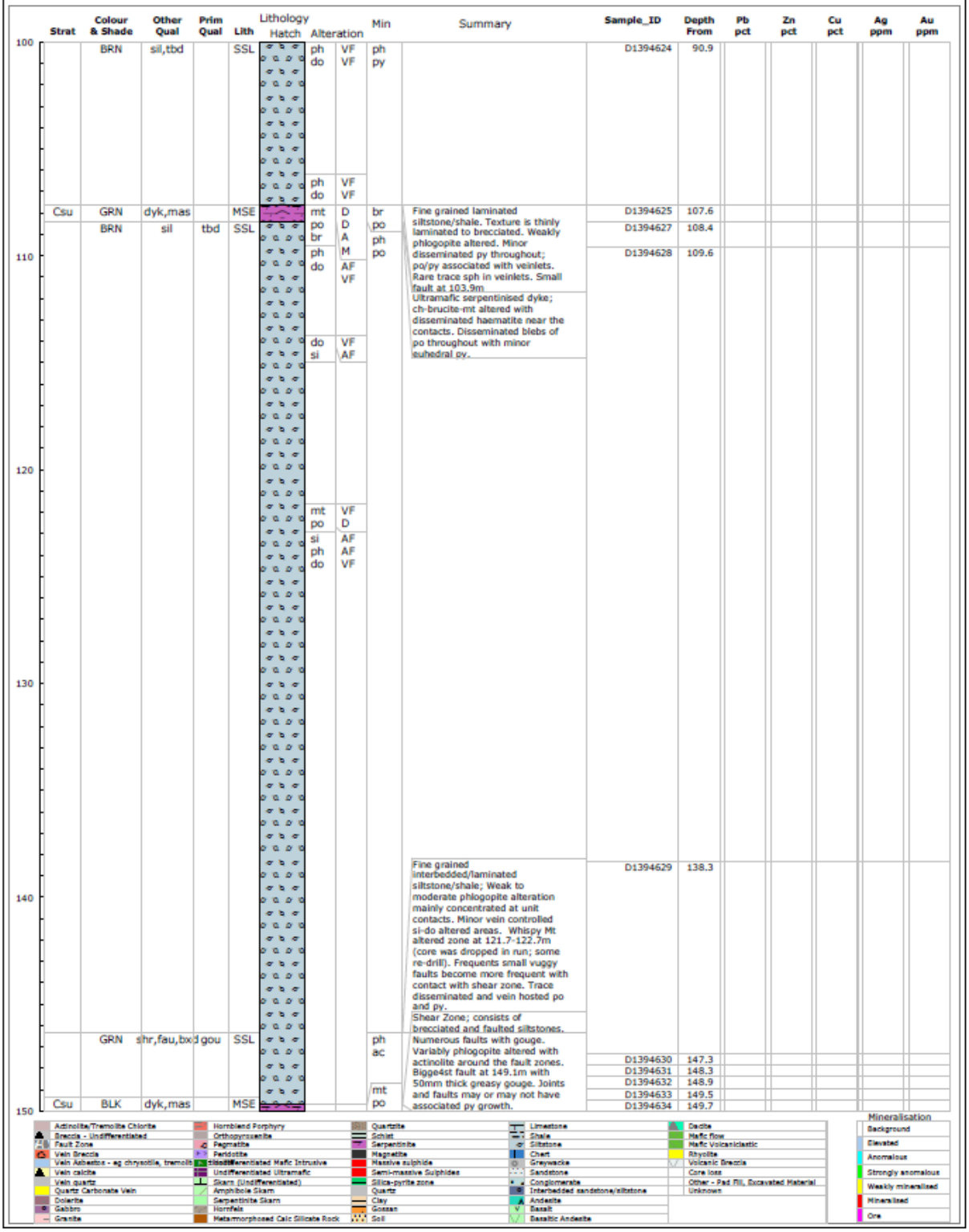
Actinolite/Tremolite Chlorite; Breccia - Undifferentiated; Fault Zone; Vein Breccia; Vein Asbestos - ag chrysotile, tremolite; Vein calcite; Vein quartz; Quartz Carbonate Vein; Dolerite; Gabbro; Granite; Hornblend Porphyry; Orthopyroxenite; Pegmatite; Peridotite; Undifferentiated Mafic Intrusive; Undifferentiated Ultramafic; Skarn (Undifferentiated); Amphibole Skarn; Serpentinite Skarn; Hornfels; Metamorphosed Calc Silicate Rock; Quartzite; Schist; Serpentinite; Magnetite; Massive sulphide; Semi-massive Sulphides; Silica-pyrite zone; Quartz; Clay; Gossan; Soil; Limestone; Shale; Siltstone; Chert; Greywacke; Sandstone; Conglomerate; Interbedded sandstone/siltstone; Andesite; Basalt; Basaltic Andesite; Dacite; Mafic flow; Mafic Volcaniclastic; Rhyolite; Volcanic Breccia; Core loss; Other - Pad fill, Excavated Material; Unknown

Mineralisation: Background; Elevated; Anomalous; Strongly anomalous; Weakly mineralised; Mineralised; Ore

AVEBURY LITHOLOGY SUMMARY LOG

Hole ID: TRL001
Project: ATA
Prospect: THB
DrillCompany: BLY

Northing:	5356620.0 mN	**Dip:**	-45.00
Easting:	349695.0 mE	**MAG Azim:**	
RL:	107.3 mRL	**UTM Azim:**	13.00
CoordSys:	MGA55 (GDA94)	**Total Depth:**	205.9 m



AVEBURY LITHOLOGY SUMMARY LOG

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CoordSys:	MGA55 (GDA94)	**Total Depth:**	205.9 m

Strat	Colour & Shade	Other Qual	Prim Qual	Lith	Lithology Hatch	Alteration		Min	Summary
	GRY	sil,tbd,bnd		SSL		ph py po	AF V M DF	py po	
	BLK	sil,mas		SSL					Weakly banded siltstone; weakly phlogopite altered. Disseminated py throughout with some weakly banded/disseminated po.
	GRY	sil,bxd		SSL				py fl	Massive to weakly banded dark siltstone. Strong irregular qtz-carb-py veining throughout.
	GRN	sil,mot	cgr	SSL				py mc	Chlorite? Altered siltstone breccia; disseminated py/po throughout; can be locally abundant. 1cm bleb of bright purple fluorite at 154m.
	BRN	sil,fgr		SSL				py po	Highly altered chl-epidote-py siltstone. No relict texture left. Disseminated to massive py with common large (upto 10mm) hexagonal marcasite (high temp py)
						ac do po	VF VF D		
						ac do po	VF VF D		
						ph sp	AF AF		

Sample_ID	Depth From	Pb pct	Zn pct	Cu pct	Ag ppm	Au ppm
D1394634	149.7					
D1394635	150.7					
D1394636	151.7					
D1394637	153.1					
D1394638	153.9					
D1394639	154.6					
D1394641	155.5					
D1394642	156.4					
D1394643	165.5					
D1394644	166.7					
D1394645	176.4					

Actinolite/Tremolite Chlorite; Breccia - Undifferentiated; Fault Zone; Vein Breccia; Vein Asbestos - ag chrysotile, tremolite; Vein calcite; Vein quartz; Quartz Carbonate Vein; Dolerite; Gabbro; Granite; Hornblend Porphyry; Orthopyroxenite; Pegmatite; Peridotite; Undifferentiated Ultramafic; Skarn (Undifferentiated); Amphibole Skarn; Serpentinite Skarn; Hornfels; Metamorphosed Calc Silicate Rock; Quartzite; Schist; Serpentinite; Magnetite; Massive sulphide; Semi-massive Sulphides; Silica-pyrite zone; Quartz; Clay; Gossan; Soil; Limestone; Shale; Siltstone; Chert; Greywacke; Sandstone; Conglomerate; Interbedded sandstone/siltstone; Andesite; Basalt; Basaltic Andesite; Dacite; Mafic flow; Mafic Volcaniclastic; Rhyolite; Volcanic Breccia; Core loss; Other - Pad fill, Excavated Material; Unknown

Mineralisation: Background; Elevated; Anomalous; Strongly anomalous; Weakly mineralised; Mineralised; Ore

AVEBURY LITHOLOGY SUMMARY LOG

Hole ID: TRL001
Project: ATA
Prospect: THB
DrillCompany: BLY

Northing:	5356620.0 mN	**Dip:**	-45.00
Easting:	349695.0 mE	**MAG Azim:**	
RL:	107.3 mRL	**UTM Azim:**	13.00
CoordSys:	MGA55 (GDA94)	**Total Depth:**	205.9 m

Strat	Colour & Shade	Other Qual	Prim Qual	Lith	Lithology Hatch	Alteration		Min	Summary	Sample_ID	Depth From	Pb pct	Zn pct	Cu pct	Ag ppm	Au ppm
	BRN	sil,fgr		SSL		ph sp	AF AF	py po								
									Fine grained laminated; slightly deformed siltstone-mudstone. (moderately cooked so more like a pyllite-pelite). Weakly phlogopite+/-garn et altered with common py+/-po stringer veinlets throughout. Minor areas 164.4m and 175.4m exhibit a actinolite-diopside-po alteration.							

200
210
220
230
240
250

Actinolite/Tremolite Chlorite
Breccia - Undifferentiated
Fault Zone
Vein Breccia
Vein Asbestos - ag chrysotile, tremolite
Vein calcite
Vein quartz
Quartz Carbonate Vein
Dolerite
Gabbro
Granite

Hornblend Porphyry
Orthopyroxenite
Pegmatite
Peridotite
Undifferentiated Mafic Intrusive
Undifferentiated Ultramafic
Skarn (Undifferentiated)
Amphibole Skarn
Serpentinite Skarn
Hornfels
Metamorphosed Calc Silicate Rock

Quartzite
Schist
Serpentinite
Magnetite
Massive sulphide
Semi-massive Sulphides
Silica-pyrite zone
Quartz
Clay
Gossan
Soil

Limestone
Shale
Siltstone
Chert
Greywacke
Sandstone
Conglomerate
Interbedded sandstone/siltstone
Andesite
Basalt
Basaltic Andesite

Dacite
Mafic flow
Mafic Volcaniclastic
Rhyolite
Volcanic Breccia
Core loss
Other - Pad Fill, Excavated Material
Unknown

Mineralisation
Background
Elevated
Anomalous
Strongly anomalous
Weakly mineralised
Mineralised
Ore

APPENDIX D – Flora and Fauna Survey

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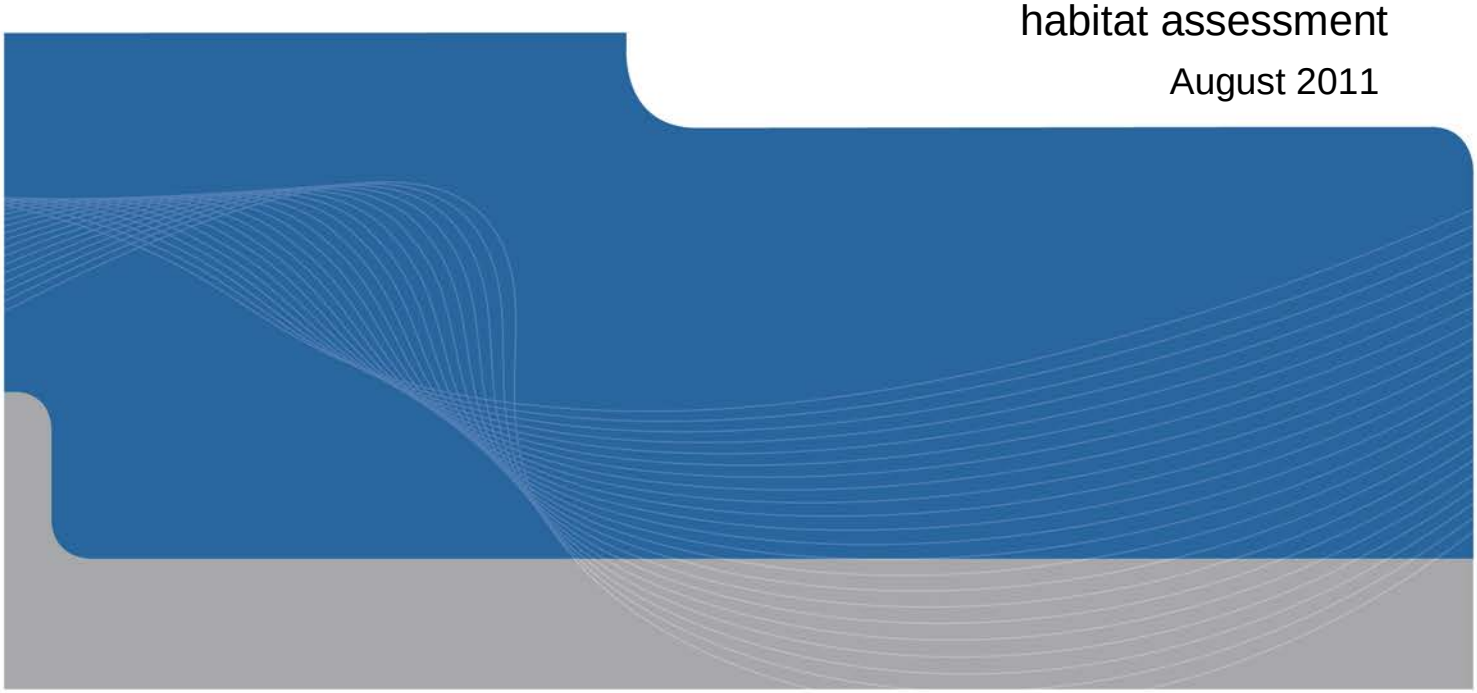
Minerals and Metals Group

Report for Exploration tracks and drill pads at Trial Harbour, Melba Flats and Lake Rosebery

Botanical survey and fauna habitat assessment

August 2011



INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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Acknowledgements

The Department of Primary Industries, Parks, Water and Environment is acknowledged for access to its Natural Values Atlas.

Miguel de Salas at the Tasmanian Herbarium is acknowledged for assistance with plant identification.

Staff at the Minerals and Metals Group Rosebery mine who assisted with site access and fieldwork, specifically Craig Archer and Sam Maloney.

Executive Summary

GHD Pty Ltd (GHD) has been engaged by Minerals and Metals Group (MMG) to undertake a botanical survey and fauna habitat assessment for the proposed exploration tracks and drill pads at Trial Harbour, Melba Flats and Lake Rosebery.

A GHD Senior Botanist and a GHD Ecologist conducted a botanical survey and fauna habitat assessment of the study sites on the 6th, 7th and 20th of July 2011. This work identified:

Trial Habour sites:

- No threatened flora species.
- No declared weed species.
- Two vegetation communities not listed as threatened under *Nature Conservation Act 2002*.
- Good foraging habitat for listed fauna species, particularly in the Coastal Heathland (SCH), for the wedge-tailed eagle (*Aquila audax subsp. fleayi*) and the white-bellied sea-eagle (*Haliaeetus leucogaster*).

Melba Flats:

- One threatened plant species *Pomaderris intermedia* listed as rare under *Nature Conservation Act 2002*.
- Three vegetation communities not listed as threatened under *Nature Conservation Act 2002*.
- One declared weed species gorse (*Ulex europaeus*) in two locations.
- Good quality habitat for several threatened fauna species including a fresh Tasmanian devil scat.
- Good quality foraging and nesting habitat for listed bird species, the grey goshawk (*Accipiter novaehollandiae*) and the masked owl (Tasmanian) (*Tyto novaehollandiae subsp. castanops*) within the open understorey of the *Nothofagus-Atherosperma* rainforest (RMT).

Lake Rosebery:

- No threatened flora species.
- No declared weed species.
- Three vegetation communities not listed as threatened under Nature Conservation Act 2002.
- High quality arboreal habitat (hollow bearing trees) for both bird and mammal species.

The above recommendations are based on current plans for the proposed exploration tracks and drill pads at Trial Harbour, Melba Flats and Lake Rosebery and may need to be revised if the plans change.

1. Introduction

1.1 Background

GHD has been engaged by MMG to undertake a botanical survey and fauna habitat assessment for the proposed exploration tracks and drill pads in three locations; Trial Harbour, Melba Flats and Lake Rosebery . This botanical survey and fauna habitat assessment forms part of the environmental assessments required to obtain approval for these projects.

1.2 Study Area

The proposed exploration tracks and drill pads are situated at the following locations in Western Tasmania as shown in Figure 1:

- Trial Harbour site 1, which is located approximately 700m east of the Trial Harbour residential area;
- Trial Harbour site 2, which is located approximately 250m north of Trial Harbour site 1;
- Lake Rosebery; and
- Melba Flats.

For each site the study area encompassed a:

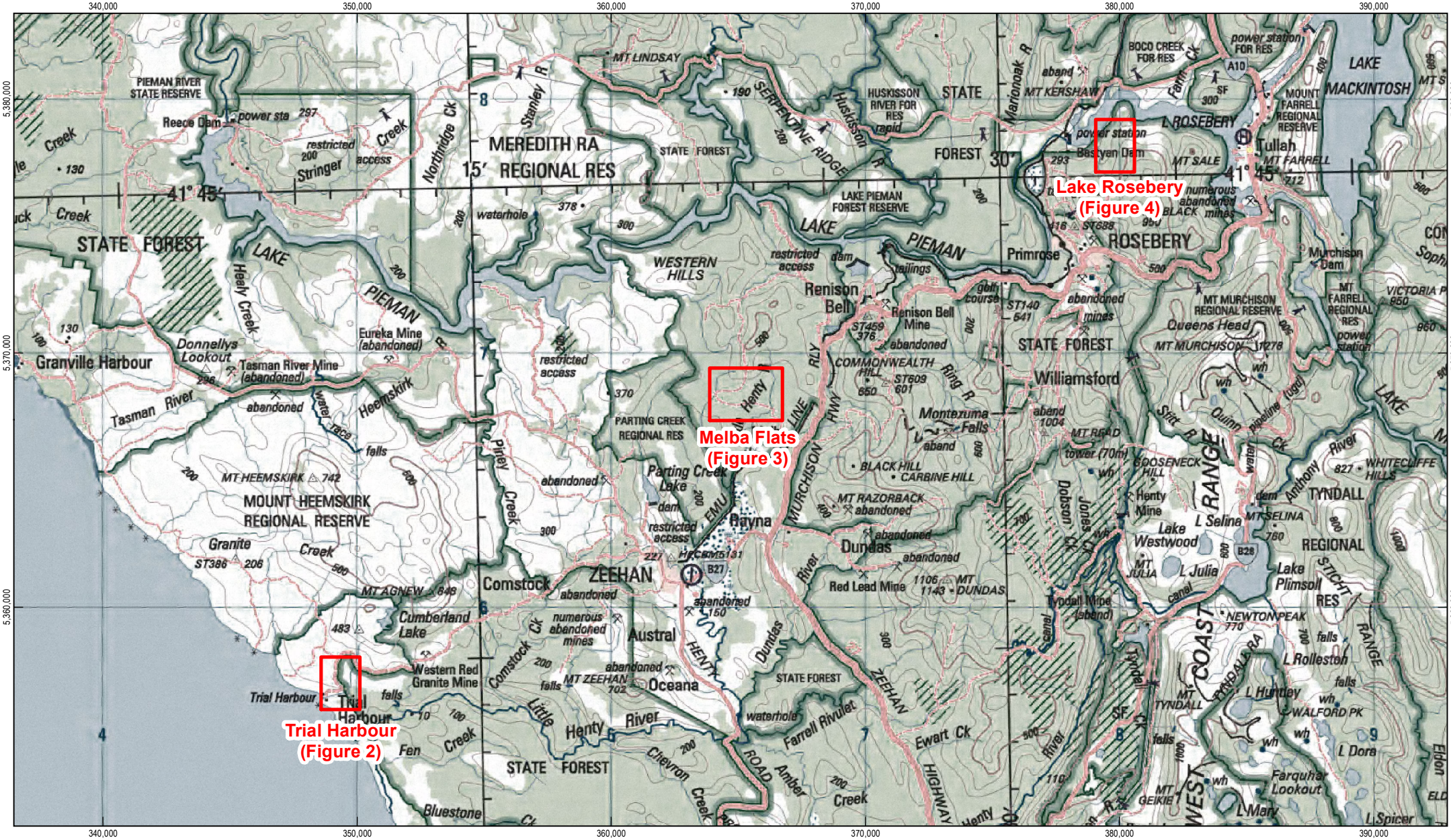
- 10m wide corridor along the proposed access track, which is anticipated to be the maximum width of disturbance during the track construction;
  20m by 20m area for each of the proposed drill pad sites; total access track distances of 250m for Trial Harbour site 1; 1km for option 1 and 250m for option 2 at Trial Harbour site 2; 3.25 km for Melba Flats; and 1.25 km for Lake Rosebery

Flora and fauna values immediately outside these zones were also noted if deemed to be significant.

1.3 Purpose of the Study

The purpose of this study was to:

- Describe the flora and fauna of the study area;
- Identify threatened ecological values within the study area;
- Evaluate the proposed exploration tracks and drill pads in three locations; Trial Harbour, Melba Flats and Lake Rosebery against relevant environmental legislation and policy;
- Outline potential impacts of the proposed exploration tracks and drill pads in three locations; Trial Harbour, Melba Flats and Lake Rosebery on ecological values;
- Outline mitigation measures to minimise potential impacts; and
- Provide recommendations on permits or processes required.



Paper Size A4

0 1 2 4

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD
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MMG
July 2011 Flora & Fauna Survey

Job Number 32-16026
Revision A
Date 01 Aug 2011

Vegetation Survey
Site Overview

Figure 1

G:\32\16026\GIS\Maps\3216026_FF_01_Overview_RevA.mxd

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com.au W www.ghd.com.au

Data source: State of Tasmania (TASMAP) Created by:jtoregan

2. Methodology

2.1 Background Research

The primary data sources accessed during the background research include:

- Natural Values Atlas (BCB 2011) - which provides a natural values report that identifies threatened fauna and flora records within 500 m and 5000 m of the centre of the study area;
- *Tasmania's Threatened Fauna Handbook* (Bryant & Jackson 1999) - which was consulted for threatened species recorded from the Dundas sheet (Tasmap 3636, Tasmania 1:25,000 series) and the Trial sheet (Tasmap 3435, Tasmania 1:25,000 series);
- The *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) 'Protected Matters Search Tool' (Commonwealth Government 2011) – which provides a report that identifies any matters listed under the EPBCA within a 5km buffer around the study area; and
- The LIST information database (Service Tasmania 2011) - which provides information on the location of vegetation communities according to the TASVEG 2005 and NRM Coastal Values Project 2006 mapping data, including the location of threatened vegetation.

2.2 Field Assessment

A GHD Senior Botanist and a GHD Ecologist conducted botanical surveys and fauna habitat assessments of the proposed exploration routes on 6th, 7th and 20th of July 2011.

The study area was surveyed on foot, noting and collecting plant species as needed, for confirmation and final identification at the Tasmanian Herbarium. All species observed were recorded along with fauna habitat values, native vegetation communities and weed infestations.

Statement of Compliance

Plant species were collected in accordance with the Department of Primary Industries, Parks, Water and Environment's Plant Collection Permit Number TFL 11119 (expiry: 30/06/2012).]

Declared weeds were collected, stored and transported in accordance with an exemption from provisions of the Weed Management Act 1999 issued by the Department of Primary Industries, Park, Water and Environment for the period January 1st 2011 until December 31st 2011.

2.3 Nomenclature and Assessment of Significance

All plants were identified in accordance with the *Census of Vascular Plants of Tasmania* (Baker and Duretto 2011). Flora and fauna conservation significance was determined in accordance with the Tasmanian *Threatened Species Protection Act 1995* (TSPA) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA). Weeds of significance were identified using the weeds index (DPIPWE) and *Weeds of the South East: An Identification Guide for Australia* (Richardson *et al*. 2007). Conservation significance of vegetation communities was assessed in accordance with the TASVEG 2005 and Regional Forestry Agreement (RFA) classification and associated criteria.

3. Biological Values

3.1 Native Flora

3.1.1 Potential threatened flora identified by desktop research

One threatened plant species *Orthoceras strictum* (horned orchid) has previously been recorded within 500 meters of the Trial Harbour study area, according to the Natural Values Atlas Report produced using the Natural Values Atlas[1].

No threatened plant species have previously been recorded within 500 metres of the Melba Flats study area, according to the Natural Values Atlas Report produced using the Natural Values Atlas[2].

No threatened plant species have previously been recorded within 500 metres of the Lake Rosebery study area, according to the Natural Values Atlas Report produced using the Natural Values Atlas[3].

Additional plant species listed under the TSPA and the EPBCA have also been recorded, or are predicted to occur, within 5 km of the study areas according to the Natural Values Report and the EPBCA Protected Matters Report. These species and their likelihood of occurrence are listed in **Table 1** for the Trial Harbour sites, **Table 2** for the Melba Flats sites and **Table 3** for the Lake Rosebery site.

Table 1 Threatened flora previously recorded in, or predicted to occur within 5 km, of the two study areas at Trial Harbour

Species	Tasmanian TSPA Status	Commonwealth EPBCA Status	Brief habitat description & Likelihood of occurrence within study area
Amphibromus neesii Southern swampgrass	Rare	Not Listed	In Tasmania *Amphibromus neesii* is found in damp ground around marshes, lagoons, river flats, pools and streams. It is known from the East Coast, North-East, Midlands and West Coast of Tasmania. **Highly unlikely, survey area not located in wetland habitat.**
Baumea gunnii Slender twigsedge	Rare	Not Listed	In Tasmania, *Baumea gunnii* inhabits wet moors, creeks and riverbanks throughout the State. **Possible, some suitable habitat in the wetter moorland areas of the site**. **Not recorded during the survey.**
Bunodophoron notatum Lichen	Endangered	Not Listed	In Tasmania, *Bunodophoron notatum* is found in calledendrous rainforests or in mature mixed forest with a callidendrous rainforest understorey, on the mature, shaded tree trunks of *Nothofagus cunninghamii.* **Unlikely, no suitable habitat.**
Deyeuxia minor small bentgrass	Rare	Not Listed	Inhabits open eucalypt forests or the margins of wet sclerophyll forest, in the south-west, south and north-east of the State. **Unlikely, habitat not wet eucalypt forest, not recorded during the survey.**

[1] Biodiversity Conservation Branch, DPIPWE, accessed 4th July 2011

[2] Biodiversity Conservation Branch, DPIPWE, accessed 4th July 2011

[3] Biodiversity Conservation Branch, DPIPWE, accessed 4th July 2011

Species	Tasmanian TSPA Status	Commonwealth EPBCA Status	Brief habitat description & Likelihood of occurrence within study area
Lachnagrostis scabra subsp. *scabra* rough blowngrass	Rare	Not listed	The species occurs in coastal habitats in the Bass Strait islands and the western part of the State, where it grows in damp ground, including seepage slopes, stream banks and swamps. **Possible, some suitable habitat, not recorded during the survey.**
Orthoceras strictum horned orchid	Rare	Not Listed	This uncommon and localised orchid occurs in coastal and near coastal areas in buttongrass moorland, sedgy and scrubby heathland, sedgy eucalypt shrubland and open forest across the State (Jones *et al*. 1999). **Possible, some suitable habitat, not recorded during the survey.**
Pterostylis ziegeleri grassland greenhood	Vulnerable	Vulnerable	In coastal areas it is found on the slopes of low stabilised sand dunes and in grassy dune swales, while in the Midlands it grows in native grassland or grassy woodland on well-drained clay loams derived from basalt. **Unlikely, unsuitable habitat.**
Ranunculus acaulis Dune buttercup	Rare	Not listed	Within Tasmania the species is restricted to the west and northwest coast, where it grows in seepage areas on the seaward sides of dunes. **Unlikely, study area not located on coastal dune systems.**
Veronica novae-hollandiae *Coast speedwell*	Vulnerable	Not Listed	Endemic to Tasmania. The species has been recorded along the State's west and southwest coasts between the Italian River and Cockle Creek, where it grows in sandy littoral banks and herbfields. **Unlikely, no suitable habitat, not recorded during the survey**.

Table 2 Threatened flora previously recorded in, or predicted to occur within 5 km, of the study area Melba Flats

Species	Tasmanian TSPA Status	Commonwealth EPBCA Status	Brief habitat description & Likelihood of occurrence within study area
Epacris glabella smooth heath	Endangered	Endangered	Occurs near Savage River and Renison Bell in the northwest within heath, open scrub or dry *Eucalyptus nitida* woodland on Cambrian serpentine in hilly terrain. An outlying population also occurs along the upper reaches of the Gordon River on sparsely vegetated Precambrian quartzite outcrops that are prone to flooding. **Highly unlikely, no suitable habitat, not recorded during the survey.**
Micrantheum serpentinum western tridentbush	Rare	Not Listed	Apparently restricted to Cambrian serpentine substrate, typically on rocky hillsides at approximately 170-480 metres above sea level, this species occurs in heathy shrubland, shrubby *Eucalyptus nitida* woodland, and moist, shaded gullies or creek banks in western Tasmania. **Highly unlikely, no suitable habitat, not recorded during the survey**.

Species	Tasmanian TSPA Status	Commonwealth EPBCA Status	Brief habitat description & Likelihood of occurrence within study area
Orthoceras strictum horned orchid	Rare	Not Listed	This uncommon and localised orchid occurs in coastal and near coastal areas in buttongrass moorland, sedgy and scrubby heathland, sedgy eucalypt shrubland and open forest across the State (Jones *et al*. 1999). **Unlikely, no suitable habitat.**
Persoonia muelleri subsp. *angustifolia* narrowleaf geebung	Rare	Not Listed	This species grows in rainforest to dense scrub, and perhaps within sub-alpine heath, in a variety of sedimentary and metamorphic substrata, predominantly within 50 metres of the west coast of Tasmania. **Highly unlikely, no suitable habitat**.

Table 3 Threatened flora previously recorded in, or predicted to occur within 5 km, of the Lake Rosebery study area

Species	Tasmanian TSPA Status	Commonwealth EPBCA Status	Brief habitat description & Likelihood of occurrence within study area
Deyeuxia densa heath bentgrass	Rare	Endangered	In Tasmania this species is widespread and occurs in open to lightly shaded situations, heaths, sedgelands and stream banks. **Highly unlikely, no suitable habitat.**
Barbarea australis riverbed wintercress	Endangered	Critically Endangered	Found near river margins, creek beds and along flood channels adjacent to the river. It occurs in shallow alluvial silt deposited on rock slabs or rocky ledges, or between large cobbles on sites frequently disturbed by fluvial processes. Highly **unlikely, no suitable habitat.**

Note: Likelihood of occurrence of threatened flora is assessed on a 4-tier scale:

Present - individuals recorded within the study area during the field assessment or any previous assessment within the boundaries of study area;

Possible - suitable habitat occurs within the study area;

Unlikely - suitable habitat unlikely to occur within the study area, or suitable habitat substantially modified, or suitable habitat present but species not recorded for over 50 years within 5 km of the site;

Highly unlikely - no suitable habitat present within the study area, and individuals not recorded within the study area during current or any previous assessment.

3.1.2 Threatened flora recorded within the study area

Trail Harbour site 1 and 2 No threatened plant species were found in either of the study areas during the field survey.

Melba Flats

One threatened plant species *Pomaderris intermedia* (lemon dogwood) was found in the study area during the field survey. One individual was recorded within a small population of *Pomaderris apetala* on the edge of the existing access track within the *Acacia melanoxylon* forest on rises (NAR). The previous known Tasmanian distribution was the north-east, east coast and Bass Strait Islands. The specimen has been lodged with the Tasmanian Herbarium as it is a west coast extension of range for the species.

Lake Rosebery

No threatened plant species were found in the study area during the field survey.

The survey was undertaken in July which is considered a suboptimal time of year for conducting a survey for herbaceous annuals and grasses. Due to the vegetation types recorded it is considered highly unlikely that either of the threatened species *Deyeuxia densa* (heath bentgrass) or *Barbarea australis* (riverbed wintercress) identified through the Natural Values Atlas report or the Protected Matters Search Tool have been overlooked.

3.2 Introduced Plants

No declared weed species were recorded within the Trail Harbour or Lake Rosebery study sites.

One species, *Ulex europaeus* (gorse), was recorded within the Melba Flats study area and is listed as a declared weed under the Tasmanian *Weed Management Act 1999*. The location is detailed in Table 4:

Table 4 Declared weed recorded within the Melba Flats study area

Species	Common Name	Approx. Area Covered	Easting (GDA94)	Northing (GDA94)
Ulex europaeus	gorse	20m2	364327	5368557
Ulex europaeus	gorse	30m2	364355	5368556

3.3 Vegetation Communities and Condition

The general vegetation community descriptions listed within the three study areas are taken from the document, *From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation* (Harris & Kitchener 2005). Vegetation descriptions at the sites were compiled from field notes.

3.3.1 Trial Harbour site 1

Two native vegetation communities were identified and mapped within the study area (refer Figure 2).

***Eucalyptus nitida* dry forest and woodland (DNI)**

This community is generally dominated by *Eucalyptus nitida* (western peppermint) over a dense and typically diverse heathy/sedgey understorey. Trees in the coastal form of this community are generally of mallee form and less than 10 metres in height, over an understorey of heath and sedges. A sparse intermediate layer of *Leptospermum* (teatree) species and *Banksia marginata* (silver banksia) may also occur. Inland ridges usually carry taller trees, clearly defined from an understorey of low heathland or tall, even-textured shrubs that do not exceed 4 metres in height.

Within the study area this community was dominated by stunted mature *E. nitida*, up to 2m in height, with a moderately dense canopy and an understorey shrub layer dominated by *Pultenaea juniperina*, *Allocasuarina zephyrea* and *Banksia marginata*. Other species present were *Pteridium esculentum*, *Acacia myrtifolia*, *Epacris lanuginosa*, *Epacris impressa*, *Gleichenia dicarpa*, *Diplarrena latifolia* and *Lepidosperma concavum*. This community is considered to be in pristine condition as there were no weeds recorded. This community is considered to be an intermediate between DNI and western wet scrub (SWW),

Plate 1 Stunted *Eucalyptus nitida* dry forest and woodland (DNI) Trial Harbour site 1

Coastal Heathland (SCH)

This community generally occurs on sand sheets and acid sandy soils on the coast. Coastal heathlands are typically floristically diverse. The most diverse families are *Orchidaceae, Cyperaceae, Restionaceae, Asteraceae, Myrtaceae, Fabaceae, Proteaceae* and *Epacridaceae*, Some scattered emergent, including eucalypt species, *Banksia marginata, Leucopogon parviflorus* or *Allocasuarina* species, may be present. The ground layer may be sparse and include *Lindsaea linearis, Selaginella uliginosa, Ehrharta distichophylla*, orchids, *Drosera* species and *Lepidosperma concavum*. The litter layer usually provides close to 100% cover.

Within the study area this community was dominated by low shrubs (height <1m) of *Acacia suaveolens*, *Banksia marginata*, *Leptospermum scoparium, Allocasuarina zephyrea* and *Hakea epiglottis*. The heath component included *Epacris lanuginosa, Leucopogon collinus, Sprengelia incarnata*, and *Styphelia adscendens*. The community also had a strong component of sedges and graminoids including *Lepidosperma filiforme*, *Lepidosperma laterale, Lepidosperma concavum, Patersonia fragilis* and *Diplarrena latifolia.* No weed species were recorded.

Plate 2 Coastal Heathland (SCH) at site 1 Trial Harbour showing the track to be subject to minor upgrading

3.3.2 Trial Harbour site 2

Two native vegetation communities were identified and mapped within the study area (refer Figure 2).

Buttongrass moorland (undifferentiated) (MBU)

Generally this vegetation type is distinguished from heathland and grassland mapping units by the presence of *Gymnoschoenus sphaerocephalus* and other graminoids, particularly sedges and cord rushes. The lack of large or abundant trees distinguished it from forest or woodland units, and the low height of shrubs distinguishes it from scrub units. *Gymnoschoenus sphaerocephalus* is the dominant species. MBU can range from pure *G. sphaerocephalus* communities to moorlands with a mixture of *G. sphaerocephalus* and low shrub species as well as numerous sedge species. It can be very open to dense, but most plants occur within a single layer or with an emergent layer of shrubs less than 2 meters tall.

Within the study area this community was dominated by *Leptospermum nitidum, L. scoparium*, *Lepidosperma laterale* up to a height of 1m with *Gymnoschoenus sphaerocephalus* also being present. There were also individuals of *Banksia marginata* and *Allocasuarina zephyrea*. The ground layer was considerably dense with *Gleichenia dicarpa, Leptocarpus tenax, Leucopogon collinus, Lycopodium deuterodensum, Pimelea linifolia* and *Sprengelia incarnata*.

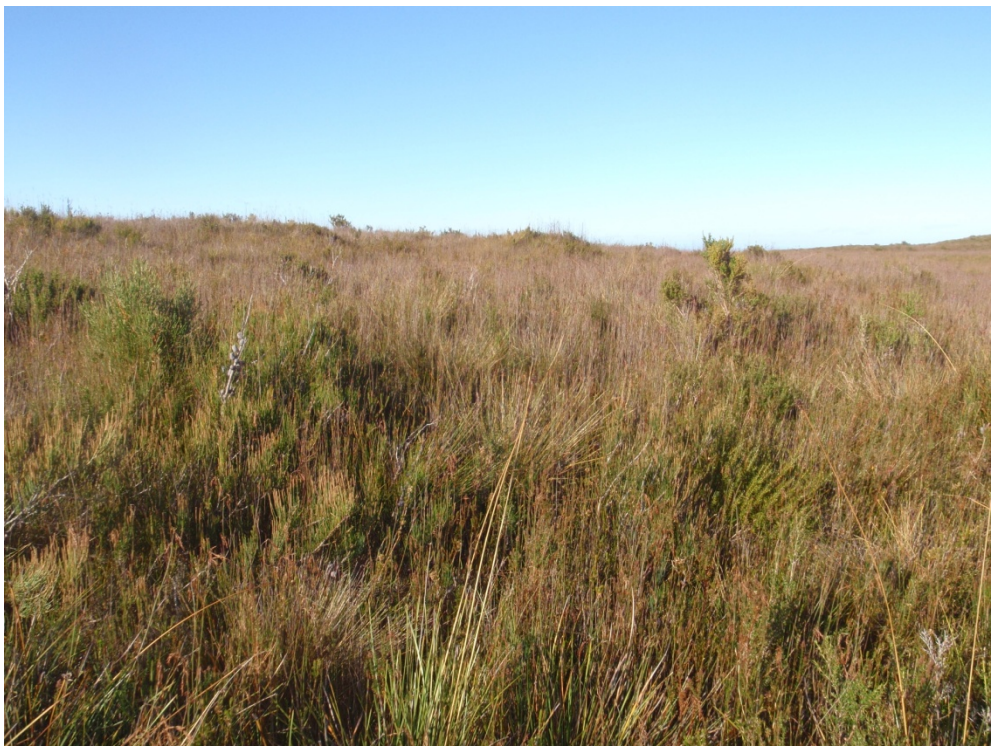


Plate 3 Buttongrass moorland (undifferentiated) (MBU) at Trial Harbour site 2

***Eucalyptus nitida* dry forest and woodland (DNI)**

Generally this community is dominated by *Eucalyptus nitida* (western peppermint) over a dense and typically diverse heathy/sedgey understorey. Trees in the coastal form of this community are generally of mallee form and less than 10 metres in height, over an understorey of heath and sedges. A sparse intermediate layer of *Leptospermum* (teatree) species and *Banksia marginata* (silver banksia) may also occur. Inland ridges usually carry taller trees, clearly defined from an understorey of low heathland or tall, even-textured shrubs that do not exceed 4 metres in height.

Within the study area this community was characterised by a canopy of *Eucalyptus nitida* up to a height of 4m with a dense understorey shrub layer dominated by *Leptospermum scoparium, Melaleuca squarrosa, Zieria arborescens, Acacia verticillata, Pultenaea daphnoides* and *Lomatia tinctoria*. Other species present were *Pteridium esculentum, Gahnia grandis* and *Lepidosperma laterale*.

Plate 4 *Eucalyptus nitida* dry forest and woodland (DNI) located at the proposed drill pad Trial Harbour site 2

3.3.3 Melba Flats study area

Three vegetation communities were identified and mapped during the field assessment (refer Figure 3) of the Melba Flats study area. These are not listed as threatened under Schedule 3A of the *Nature Conservation Act 2002*.

***Acacia melanoxylon* forest on rises (NAR)**

Regrowth *Acacia melanoxylon* (blackwood) trees of even height generally dominate this community, typically forming a closed forest over a diversity of understorey species ranging from relatively open to dense. Characterised by the almost complete dominance of even aged *Acacia melanoxylon* following fire in rainforests and mixed forests, this community may also be co-dominated by eucalypts such as *Eucalyptus obliqua* (stringybark) or *Eucalyptus nitida* (western peppermint). Rainforest or wet sclerophyll species such as *Nematolepis squamea* (satinwood), *Pomaderris apetala* (common dogwood), *Nothofagus cunninghamii* (myrtle), *Atherosperma moschatum* (sassafras), *Eucryphia lucida* (leatherwood) and *Leptospermum* species may be present, over a fern-dominated ground layer. Occurring on slopes with soils of moderate to high fertility this community may be structurally and floristically similar to *Acacia melanoxylon* swamp forest (NAF), and intergrades with and is replaced by *Acacia dealbata* forest (NAD) on fertile substrates.

This community mapped within the study area was dominated by *Acacia melanoxylon* up to 20m in height with an understory component comprising rainforest species such as *Nothofagus cunninghamii*, *Atherosperma moschatum, Eucryphia lucida*, *Leptospermum scoparium* and *L. lanigerum*. *Dicksonia antarctica* was common throughout the understorey with a ground layer component comprising *Blechnum nudum, Pteridium esculentum* and *Carex appressa.*

Plate 5 *Acacia melanoxylon* forest on rises (NAR) Melba Flats

Leptospermum with rainforest scrub (RLS)

Leptospermum with rainforest scrub (RLS) is generally a 2-5(sometimes to 8) m, scrub with an uneven canopy dominated by *Leptospermum* species (often *L. lanigerum*), with small rainforest trees in the understorey. These include *Nothofagus cunninghamii, Eucryphia lucida, Anopterus glandulosus, Phyllocladus aspleniifolius* and *Anodopetalum biglandulosum*. It is typically rich in *Bauera rubioides* and may have shrubby heath species. There may be scattered emergent *Eucalyptus nitida* or, on the margins of tall wet forest, *E. obliqua* or *E. delegatensis*. Rainforest regrowth after fire is included in RLS in world Heritage Area mapping, as is rainforest (of various forms) closely combined with *Melaleuca* or *Leptospermum* species scrub. Other shrubs may include *Orites diversifolia, Telopea truncata, Pittosporum bicolor, Nematolepis squamea, Cenarrhenes nitida, Pomaderris* species, *Acacia* species, *Lomatia* species, *Coprosma nitida, Hakea lissosperma* and *Tasmannia lanceolata.*

Within the study area *Leptospermum scoparium* was the dominant canopy species up to 6m in height with *Acacia melanoxylon* as the sub-dominant with scattered *Eucalyptus nitida* throughout. Rainforest species in the secondary stratum included *Nothofagus cunninghamii*, *Eucryphia lucida, Anopterus glandulosus, Phyllocladus aspleniifolius* and *Anodopetalum biglandulosum*. The ground layer component included *Gahnia grandis* and *Pteridium esculentum.*

Plate 6 *Leptospermum* with rainforest scrub (RLS) at the proposed drill site, Melba Flats. This is a historical drill site location.

***Nothofagus-Atherosperma* rainforest (RMT)**

This rainforest community is generally tall (> 25 m) and dominated by *Nothofagus cunninghamii* (myrtle) on relatively fertile soils. *Atherosperma moschatum* (sassafras) can sometimes dominate, and *Eucryphia lucida* (leatherwood) may co-dominate. This latter species may also dominate with *Acacia melanoxylon* (blackwood), *Anodopetalum biglandulosum* (horizontal) and *Phyllocladus aspleniifolius* (celerytop pine) on less fertile sites, sometimes associated with *Richea pandanifolia* (pandani), and occurring over broad-leaf and spindly shrubs such as *Anopterus glandulosus* (Tasmania laurel), *Cenarrhenes nitida* (native plum) or *Telopea truncata* (Tasmanian waratah) or fine-leaved species such as *Aristotelia peduncularis* (heartberry), *Pimelea drupacea* (cherry riceflower), *Pittosporum bicolor* (cheesewood), *Coprosma quadrifida* (native currant) and *Trochocarpa* (purpleberry) species. However, the greatest species diversity of vascular plants is generally represented by ferns, with *Dicksonia antarctica* (soft treefern) commonly occurring in the mid-storey, and epiphytic ferns such as *Hymenophyllum* (filmyfern) and *Grammitis* (fingerfern) species frequently occurring on tree trunks and logs.

Within the study area *Nothofagus cunninghamii* and *Atherosperma moschatum* were dominant species within the canopy reaching heights greater than 30m. The understorey was typically callidendrous with a high cover of moss and ferns including *Dicksonia antarctica, Hymenophyllum rarum, Hypolepis rugosula, Blechnum wattsii* and *Blechnum nudum*. *Ulex europaeus* (declared weed) was also recorded near the proposed drill pad site.

Plate 7 *Nothofagus-Atherosperma* rainforest (RMT) Melba Flats

***Nothofagus – Phyllocladus* short rainforest (RMS)**

Typically between only 8 to 20 metres in height, this community is often implicate rainforest vegetation with moderate to high floristic diversity, occupying low to moderately fertile sites in western Tasmania. It is distinguished from most other rainforest communities by the absence or low cover of the conifer genera and Leptospermum (teatree) species, and by the presence of the endemic species *Anodopetalum biglandulosum* (horizontal), *Eucryphia lucida* (leatherwood), and *Phyllocladus aspleniifolius* (celerytop pine). The latter two of these species generally co-dominates in the canopy with *Nothofagus cunninghamii* (myrtle), with shrubs and small trees dominating the understorey. *Eucalyptus nitida* (western peppermint) is an occasional emergent.

Within the study area this community was characterised by *Nothofagus cunninghamii* up to a height of 15m with a relatively high cover large *Phyllocladus aspleniifolius* and *Eucryphia lucida*. The understory was thamnic in nature with high densities of *Anodopetalum biglandulosum* and smaller individuals of *Phyllocladus aspleniifolius, Eucryphia lucida* and *Trochocarpa gunnii.*

Plate 8 *Nothofagus – Phyllocladus* short rainforest (RMS) beside the overgrown existing track proposed to be upgraded at Melba Flats

3.3.4 Lake Rosebery study area

Three vegetation communities were identified and mapped during the field assessment (refer Figure 4) of the Lake Rosebery study area. These are not listed as threatened under Schedule 3A of the Nature Conservation Act 2002.

***Eucalyptus nitida* forest over Leptospermum (WNL)**

This community is a tall wet eucalypt forest dominated by *Eucalyptus nitida*, with a dense understorey dominated by one or more species of Melaleuca and/or Leptospermum. It is floristically and structurally similar to *E. obliqua* over *Leptospermum* (WOL). The understory maybe sparse, but is more commonly dense, with *Gahnia grandis, Gleichenia microphylla* and *Bauera rubioides* common, together with rainforest shrubs such as *Anopterus glandulosus*.

Within the study site the community consisted of *Eucalyptus nitida* to 30m and very old *Eucalyptus obliqua* to 40 m in height, these old growth trees are considered to provide quality habitat and nesting opportunities for hollow dependant mammals and birds, particularly raptors. The understory component consists of *Leptospermum scoparium, Melaleuca squarrosa* and *Bauera rubioides*. The community was mostly located on the northern end of the survey area where it then merged into *Nothofagus-Atherosperma* rainforest (RMT).

Plate 9 *Eucalyptus nitida* forest over *Leptospermum* (WNL) at northern end of the study site near Lake Rosebery

Nothofagus-Leptospermum short rainforest (RML)

Rainforest in which 15-50% of the canopy is mature *Leptospermum* species is mapped as this community, and is generally thamnic with moderate floristic diversity. *Nothofagus cunninghamii* (myrtle) tends to co-dominate with *Phyllocladus aspleniifolius* (celerytop pine), *Eucryphia* species (leatherwood), *Atherosperma moschatum* (sassafras), *Anodopetalum biglandulosum* (horizontal), and sometimes *Acacia melanoxylon* (blackwood). This community may also include *Eucalyptus nitida* (western peppermint).

Within the study area this vegetation type occurred in the central part of the study area with *Leptospermum scoparium* dominating the canopy with a general sub dominance of *Nothofagus cunninghamii*. *Eucalyptus obliqua* emergents were also noted and are considered to provide quality habitat hollows and nesting opportunities for hollow dependant raptors and arboreal mammals. The understory was thamnic in nature with a dense cover of *Eucryphia lucida*, *Melaleuca squarrosa*, *Nematolepis squamea, Pittosporum bicolor*, and *Phyllocladus aspleniifolius*.

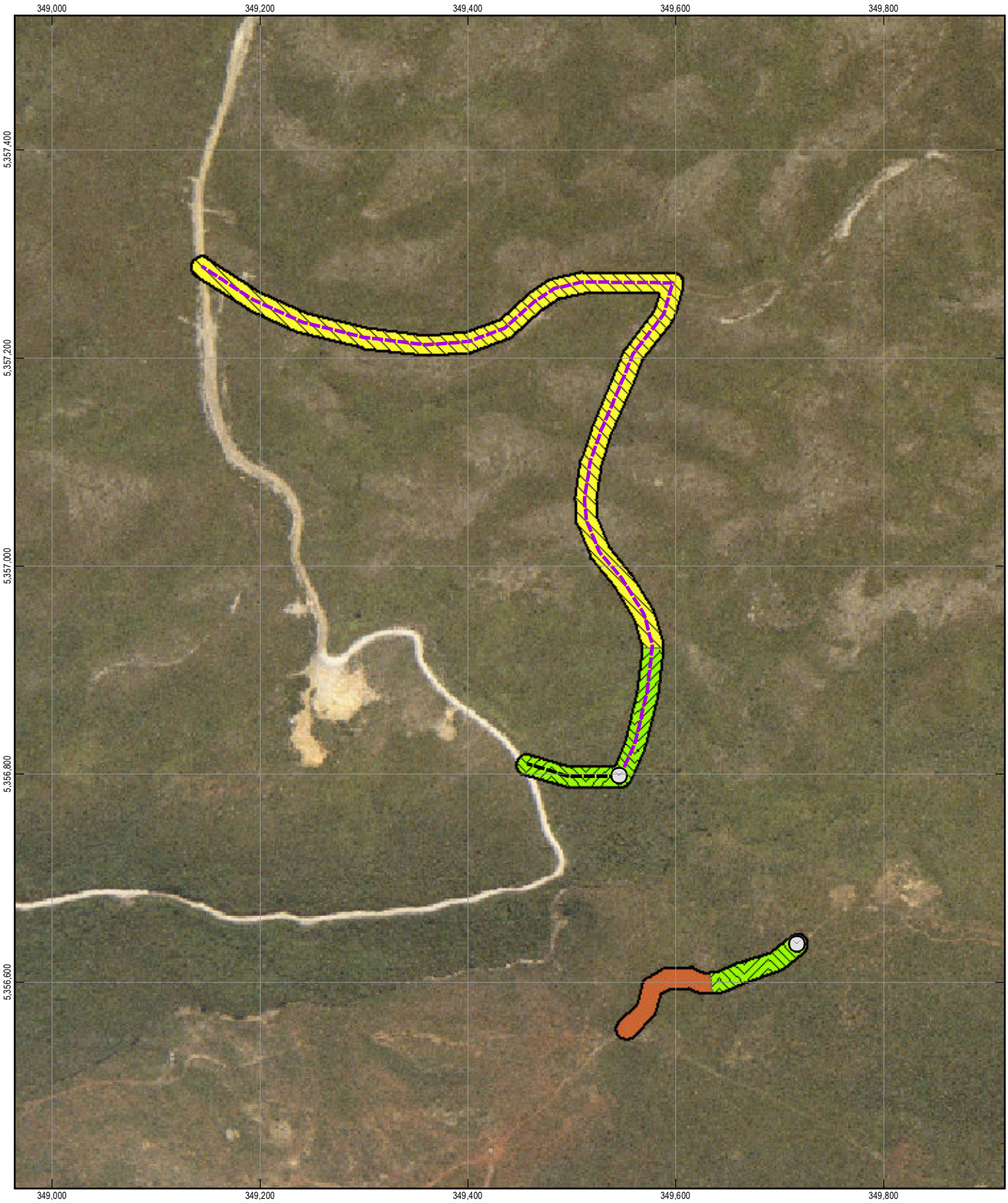
Plate 10 *Nothofagus-Leptospermum* short rainforest (RML) in the mid-section of the Lake Rosebery study site

***Nothofagus – Phyllocladus* short rainforest (RMS)**

Typically between only 8 to 20 metres in height, this community is often implicate rainforest vegetation with moderate to high floristic diversity, occupying low to moderately fertile sites in western Tasmania. It is distinguished from most other rainforest communities by the absence or low cover of the conifer genera and Leptospermum (teatree) species, and by the presence of the endemic species Anodopetalum biglandulosum (horizontal), Eucryphia lucida (leatherwood), and Phyllocladus aspleniifolius (celerytop pine). The latter two of these species generally co-dominates in the canopy with Nothofagus cunninghamii (myrtle), with shrubs and small trees dominating the understorey. Eucalyptus nitida (western peppermint) is an occasional emergent.

Within the study area this community occurs in the southern section of the survey area and was characterised by *Nothofagus cunninghamii and Atherosperma moschatum* with an occasional occurrence of *Phyllocladus aspleniifolius* within the canopy. The understorey structure was composed of *Eucryphia lucida*, *Anodopetalum biglandulosum, Pittosporum bicolor and Trochocarpa gunnii.*

'***Nothofagus – Phyllocladus short rainforest (RMS)*** **southern end of the Lake Rosebery study area**



LEGEND

- MMG Drill Pad Proposed
- Proposed Track Option 1
- Proposed Track Option 2
- Study Area

Dry Eucalypt Forest and Woodland

- DNI *Eucalyptus nitida dry forest and woodland*

Scrub, heathland and coastal complexes

- SCH *Coastal heathland*

Moorland, Sedgeland, Rushland and Peatland

- MBU *Buttongrass moorland (undifferentiated)*

Paper Size A4

0 50 100 200

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

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MMG
July 2011 Flora & Fauna Survey

Vegetation Survey
Trial Harbour

Job Number 32-16026
Revision A
Date 01 Aug 2011

Figure 2

2 Salamanca Square Hobart TAS 7000 Australia **T** 61 3 6210 0600 **F** 61 3 6210 0601 **E** hbamail@ghd.com.au **W** www.ghd.com.au

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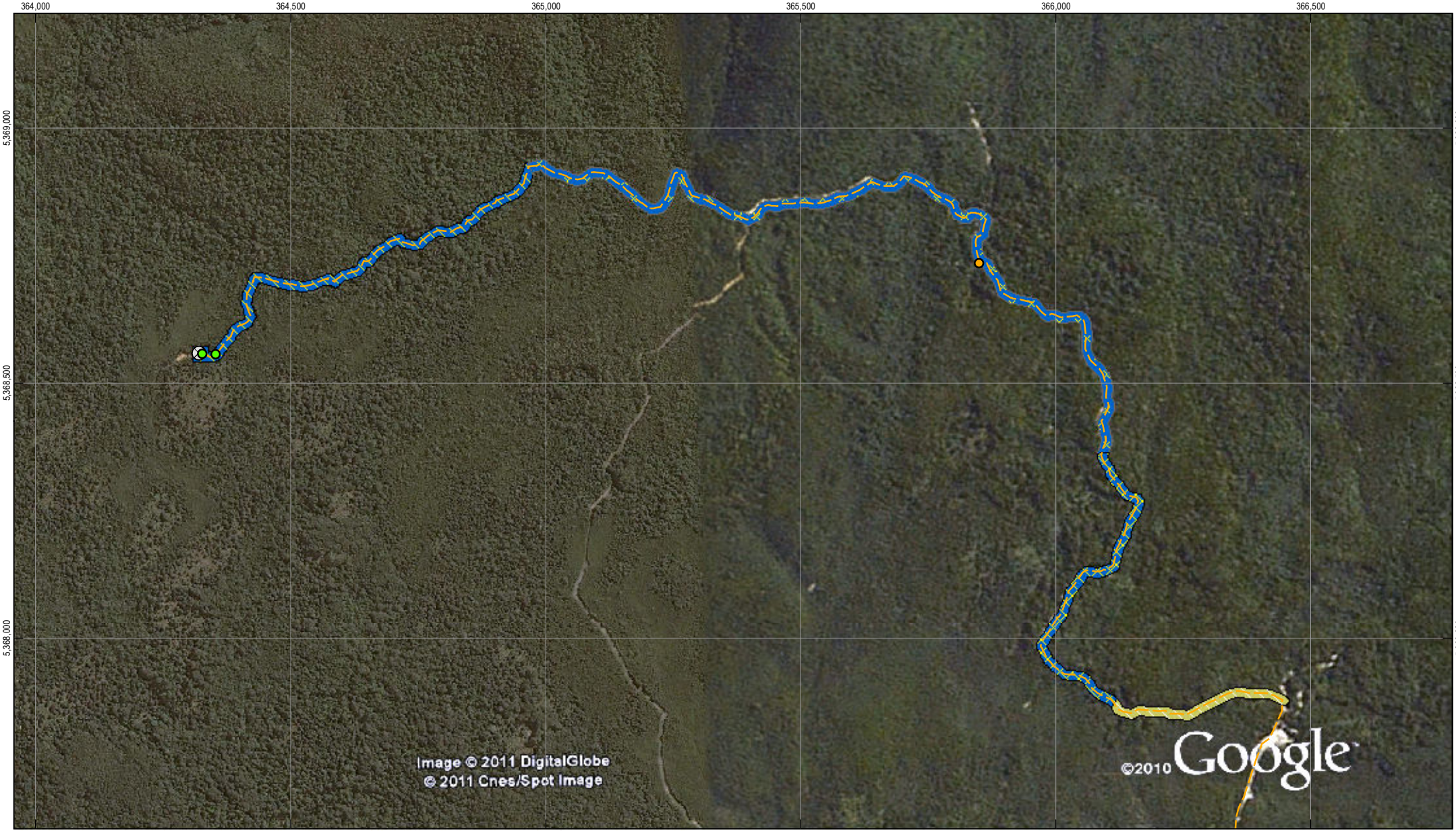
Data source: MMG Australia Ltd (Aerial Imagery, Tracks, Drill Pad Locations), GHD (Vegetation Communities) Created by:jtoregan



Paper Size A4

0 75 150 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- MMG Drill Pad Proposed
- *Ulex europaeus* (gorse)
- *Pomaderris intermedia*
- Track Location

Rainforest and related scrub

- RMS *Nothofagus / Phyllocladus short rainforest*
- RMT *Nothofagus - Atherosperma rainforest*
- RLS *Leptospermum with rainforest scrub*

Non-Eucalypt Forest and Woodland

- NAR *Acacia melanoxylon forest on rises*

GHD
CLIENTS | PEOPLE | PERFORMANCE

MMG
July 2011 Flora & Fauna Survey

Job Number 32-16026
Revision A
Date 04 Aug 2011

Vegetation Survey
Melba Flats

Figure 3

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2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com.au W www.ghd.com.au

Data source: Google Earth Pro (Satellite Imagery), GHD (Vegetation Communities) Created by:jtoregan

LEGEND

- *Cirsium vulgare*
- *Eucalyptus obliqua* (hollow bearing)
- Existing Track
- Proposed Track

Wet Eucalypt forest and woodland

- WNL *Eucalyptus nitida forest over Leptospermum*

Rainforest and related scrub

- RML *Nothofagus - Leptospermum short rainforest*
- RMS *Nothofagus - Phyllocladus short rainforest*

Paper Size A4

0 50 100 200

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

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MMG
July 2011 Flora & Fauna Survey

Vegetation Survey
Lake Rosebery

Job Number 32-16026
Revision A
Date 01 Aug 2011

Figure 4

2 Salamanca Square Hobart TAS 7000 Australia **T** 61 3 6210 0600 **F** 61 3 6210 0601 **E** hbamail@ghd.com.au **W** www.ghd.com.au

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Data source: MMG Australia Ltd (Aerial Imagery, Tracks, Drill Pad Locations), GHD (Vegetation Communities) Created by:jtoregan

3.4 Fauna Habitat Values

3.4.1 Potential threatened fauna identified by desktop research

Trial Harbour

According to the Natural Values Atlas Report[4], three threatened fauna have previously been recorded within 500 m of the Trial Harbour study areas.

- Wedge-tailed eagle (*Aquila audax* sbsp. *fleayi*) sight observation
- Spotted tailed quoll (*Dasyurus maculatus* subsp. *maculatus*) sight observation
- White bellied sea-eagle (*Haliaeetus leucogaster*) sight observation

Melba Flats

According to the Natural Values Atlas Report, no threatened fauna have previously been recorded within 500 m of the Melba Flats study area. Four species have the potential to occur within 500 m of the study area based on habitat values.

- Wedge-tailed eagle (*Aquila audax* sbsp. *fleayi*)
- Swift parrot (*Lathamus discolour*)
- Masked owl (*Tyto novaehollandiae*)
- Grey goshawk (*Accipiter novaehollandiae*)

Lake Rosebery

According to the Natural Values Atlas Report, no threatened fauna have previously been recorded within 500 m of the Lake Rosebery study area. However, six species have the potential to occur within 500 m of the study area based on habitat values.

- Wedge-tailed eagle (*Aquila audax* sbsp. *fleayi*)
- White bellied sea-eagle (*Haliaeetus leucogaster*)
- Grey goshawk (*Accipiter novaehollandiae*)
- Masked owl (*Tyto novaehollandiae*)
- Swift parrot (*Lathamus discolour*)
- Azure kingfisher (*Alcedo azurea* subsp. *diemenensis*)

Additional species have been recorded, or are predicted to occur based on habitat mapping, within 5 km of the site according to the Natural Values Atlas Report and the EPBCA Protected Matters Search Tool. These species (except listed marine species) and their likelihood for occurrence within the study sites are shown in Tables 5, 6, and 7 for the three study areas.

Table 5 Threatened fauna known to occur or predicted to occur within 5 km of the Trial Harbour study area

Species	Tasmanian TSPA Status	Commonwealth EPBCA Status	Brief habitat description & Likelihood of occurrence within study area
Mammals			
Dasyurus maculatus subsp. *maculatus* spotted-tailed quoll	Rare	Vulnerable	Most commonly inhabit cool temperate rainforest, wet sclerophyll forest, and coastal scrub. **Possible, some suitable coastal scrub habitat.**
Sarcophilus harrisii Tasmanian devil	Endangered	Endangered	May occur in a variety of forest types including coastal heath, open dry sclerophyll forest, and mixed sclerophyll rainforest. **Possible, some suitable coastal heath and scrub habitat.**
Birds			
Accipiter novaehollandiae grey goshawk	Endangered	Not Listed	Occurs in closed forests, with high priority nesting habitat along water courses with blackwoods. May otherwise nest in melaleuca, myrtle, teatree and eucalypt species, occasionally up to 100 metres from a watercourse. **Unlikely, no suitable water course within 100 meters of the study site.**
Aquila audax subsp. *fleayi* wedge-tailed eagle	Endangered	Endangered	Nest in old growth trees, and common in areas with a mosaic of forest, farmland and waterways. **Unlikely, no old growth large trees, however, may utilize the area for foraging.**
Ceyx azureus subsp. *diemenensis* azure kingfisher	Endangered	Endangered	Inhabits thick vegetation surrounding freshwater rivers, lakes, billabongs and swamps. **Unlikely, no suitable habitat.**
Haliaeetus leucogaster white-bellied sea-eagle	Vulnerable	Migratory	Generally nest and forage near the coast; however, also occur near large rivers and inland lakes. Require old growth trees for nesting. **Possible, study area is located within 700 meters of the coast.**
Hirundapus caudacutus white-throated needletail	Not Listed	Migratory	In Australia this species is almost entirely aerial. Occurs most often above wooded areas and heathland, but can occur over farmland and remnant vegetation at the edge of paddocks. **Possible, area contains suitable coastal heathland.**
Lathamus discolor swift parrot	Endangered	Endangered	Feed on the nectar of *Eucalyptus globulus* and *E. ovata*. Nest in tree hollows in eastern Tasmania, usually near the coast in dry forests. **Highly unlikely, no suitable habitat.**
Neophema chrysogaster orange-bellied parrot	Endangered	Critically Endangered	This migratory bird breeds only in coastal south-west Tasmania, spending winter in coastal Victoria and South Australia. Nesting in hollows in nearby eucalypt trees, the species generally feeds in sedgelands on the seeds of several heath plants and sedges. Its diet also includes seeds from buttongrass, *Helichrysum pumilum* and three *Boronia* species. **Unlikely, generally only found further south in Tasmania.**

Species	Tasmanian TSPA Status	Commonwealth EPBCA Status	Brief habitat description & Likelihood of occurrence within study area
Tyto novaehollandiae subsp. *castanops* masked owl (Tasmanian)	Endangered	Vulnerable	Usually found in lowland dry sclerophyll forest; however, can occur in wet sclerophyll forest, non-eucalypt dominated forest, scrub and urban environments. **Possible, some suitable habitat.**
Fish and Amphibians			
Prototroctes maraena Australian grayling	Vulnerable	Vulnerable	Occurs in middle to lower reaches of rivers and streams. **Highly unlikely, no suitable habitat.**

Table 6 Threatened fauna known to occur or predicted to occur within 5 km of the Melba Flats study area

Species	Tasmanian TSPA Status	Commonwealth EPBCA Status	Brief habitat description & Likelihood of occurrence within study area
Mammals			
Dasyurus maculatus subsp. *maculatus* spotted-tailed quoll	Rare	Vulnerable	Most commonly inhabit cool temperate rainforest, wet sclerophyll forest, and coastal scrub. **Possible, suitable habitat.**
Sarcophilus harrisii Tasmanian devil	Endangered	Endangered	May occur in a variety of forest types including coastal heath, open dry sclerophyll forest, and mixed sclerophyll rainforest. **Present, observation of scat.**
Birds			
Accipiter novaehollandiae grey goshawk	Endangered	Not Listed	Occurs in closed forests, with high priority nesting habitat along watercourses with blackwoods. May otherwise nest in melaleuca, myrtle, teatree and eucalypt species, occasionally up to 100 metres from a watercourse. **Possible, some suitable habitat.**
Aquila audax subsp. *fleayi* wedge-tailed eagle	Endangered	Endangered	Nest in old growth trees, and common in areas with a mosaic of forest, farmland and waterways. **Possible, some suitable habitat. Several old growth eucalypts recorded during the survey.**
Ceyx azureus subsp. *diemenensis* azure kingfisher	Endangered	Endangered	Inhabits thick vegetation surrounding freshwater rivers, lakes, billabongs and swamps. **Unlikely, due to the absence of suitable streams and watercourses.**
Haliaeetus leucogaster white-bellied sea-eagle	Vulnerable	Migratory	Generally nest and forage near the coast; however, also occur near large rivers and inland lakes. Require old growth trees for nesting. **Possible, some suitable habitat.**
Hirundapus caudacutus white-throated needletail	Not Listed	Migratory	In Australia this species is almost entirely aerial. Occurs most often above wooded areas and heathland, but can occur over farmland and remnant vegetation at the edge of paddocks. **Unlikely, no suitable habitat.**

Species	Tasmanian TSPA Status	Commonwealth EPBCA Status	Brief habitat description & Likelihood of occurrence within study area
Lathamus discolor swift parrot	Endangered	Endangered	Feed on the nectar of *Eucalyptus globulus* and *E. ovata*. Nest in tree hollows in eastern Tasmania, usually near the coast in dry forests. **Highly unlikely, no suitable habitat.**
Tyto novaehollandiae subsp. *castanops* masked owl (Tasmanian)	Endangered	Vulnerable	Usually found in lowland dry sclerophyll forest; however, can occur in wet sclerophyll forest, non-eucalypt dominated forest, scrub and urban environments. **Possible, some suitable habitat.**
Fish and Amphibians			
Prototroctes maraena Australian grayling	Vulnerable	Vulnerable	Occurs in middle to lower reaches of rivers and streams. **Highly unlikely, no suitable habitat.**

Table 7 Threatened fauna known to occur or predicted to occur within 5 km of the Lake Rosebery study area

Species	Tasmanian TSPA Status	Commonwealth EPBCA Status	Brief habitat description & Likelihood of occurrence within study area
Mammals			
Dasyurus maculatus subsp. *maculatus* spotted-tailed quoll	Rare	Vulnerable	Most commonly inhabit cool temperate rainforest, wet sclerophyll forest, and coastal scrub**. Possible, suitable habitat.**
Sarcophilus harrisii Tasmanian devil	Endangered	Endangered	May occur in a variety of forest types including coastal heath, open dry sclerophyll forest, and mixed sclerophyll rainforest. **Possible, some suitable habitat**.
Birds			
Accipiter novaehollandiae grey goshawk	Endangered	Not Listed	Occurs in closed forests, with high priority nesting habitat along watercourses with blackwoods. May otherwise nest in melaleuca, myrtle, teatree and eucalypt species, occasionally up to 100 metres from a watercourse. **Possible, some suitable habitat.**
Aquila audax subsp. *fleayi* wedge-tailed eagle	Endangered	Endangered	Nest in old growth trees, and common in areas with a mosaic of forest, farmland and waterways. **Possible, some suitable habitat.**
Ceyx azureus subsp. *diemenensis* azure kingfisher	Endangered	Endangered	Inhabits thick vegetation surrounding freshwater rivers, lakes, billabongs and swamps. **Unlikely, due to the absence of suitable streams and watercourses.**
Haliaeetus leucogaster white-bellied sea-eagle	Vulnerable	Migratory	Generally nest and forage near the coast; however, also occur near large rivers and inland lakes. Require old growth trees for nesting. **Possible, some suitable habitat.**
Lathamus discolor	Endangered	Endangered	Feed on the nectar of *Eucalyptus globulus*

Species	Tasmanian TSPA Status	Commonwealth EPBCA Status	Brief habitat description & Likelihood of occurrence within study area
swift parrot			and *E. ovata*. Nest in tree hollows in eastern Tasmania, usually near the coast in dry forests. **Highly unlikely, no suitable habitat.**
Tyto novaehollandiae subsp. *castanops* masked owl (Tasmanian)	Endangered	Vulnerable	Usually found in lowland dry sclerophyll forest; however, can occur in wet sclerophyll forest, non-eucalypt dominated forest, scrub and urban environments. **Unlikely, due to the lack of suitable foraging habitat.**

Note: Likelihood of occurrence of threatened flora is assessed on a 4-tier scale:

Present - individuals recorded within the study area during the field assessment or any previous assessment within the boundaries of study area;

Possible - suitable habitat occurs within the study area;

Unlikely - suitable habitat unlikely to occur within the study area, or suitable habitat substantially modified, or suitable habitat present but species not recorded for over 50 years within 5 km of the site;

Highly unlikely - no suitable habitat present within the study area, and individuals not recorded within the study area during current or any previous assessment.

The EPBCA Protected Matters Search Tool also identified a number of other migratory marine and coastal bird species as matters of national significance that may overfly the area. The present survey was confined to the terrestrial and freshwater aquatic habitats for vertebrate species within the study area, and as such overfly species were not considered in detail.

3.4.2 Fauna recorded within the study area

Trial Harbour Sites

No fauna species were observed/heard during the survey at the Trial Harbour.

Melba Flats

During the survey, evidence of the Tasmanian devil (*Sarcophilus harrisii*) utilising the area was apparent due to the observation of a fresh devil scat. Multiple fresh water crayfish burrows were also noted in several locations along the survey area. These burrows occur well outside the known habitat range of any threatened crayfish species in Tasmania. The common froglet (*Crinia signifera*) was also heard during the survey.

Lake Rosebery

One bird species was observed during the survey, the grey shrike-thrush (*Colluricincla harmonica).* Evidence of a common ring tailed possum (*Pseudocheirus peregrinus*) nest (drey) was also noted during the assessment located in a mature *Banksia marginata* approximately 5 meters above ground level.

3.4.3 Fauna habitat recorded within the study area

General Habitat Values

Trial Harbour

The study sites at Trial Harbour in general contain some potential foraging habitat for bird and mammal species. There have been positive sightings of the wedge tailed eagle and white bellied sea eagle in the Trial harbour area as identified by the Natural values atlas database and these species may forage within the vegetation types mapped within this area. Threatened mammal species such as the Tasmanian devil and the spotted tailed quoll may also utilise the study sites for foraging opportunities.

Melba Flats

The study site in general contains some good quality habitat for birds and mammals. The *Leptospermum* with rainforest scrub (RLS) and the *Acacia melanoxylon* forest on rises (NAR) provides good foraging, shelter and nesting habitat for several bird species including and not limited to raptors and owls, and may also provide habitat for more common mammals such as wallabies, possums, bandicoots. There was evidence that the Tasmanian devil (*Sarcophilus harrisii*) is currently utilising the area with observation of fresh devil scats within the study area. Threatened species such as the spotted-tailed quoll (*Dasyurus maculatus* subsp*. Maculatus)* may also utilise the site.

Lake Rosebery

The Lake Rosebery site contains some good quality habitat for both birds and mammals. The *Eucalyptus obliqua* forest over rainforest (WOR), *Nothofagus-Leptospermum* short rainforest (RML) and the Western wet scrub (SWW) provide suitable habitat values for several bird and mammal species.

Old growth *Nothofagus cunninghamii* and *Eucalyptus obliqua* individuals may also be providing foraging and/or nesting habitat for small and large birds and arboreal mammals. Large hollow bearing trees were recorded within all drill pad sites as well as along the northern section of the proposed access track route.

The threatened mammal species listed above in Table 7 (the spotted-tailed quoll and Tasmanian devil) may occur within the study area, but it is considered unlikely this would be critical habitat due to the relatively small size of the area to be impacted, as well as the close proximity to disturbance and human activities, specifically mining and current exploration activities. No dens were noted during the site inspection.

Threatened Fauna Habitat

Trial Harbour

Five threatened fauna species listed in Table 5 have been identified as potentially occurring on site based on habitat values:

1. Spotted-tailed quoll (*Dasyurus maculatus* subsp. *maculatus*) may forage and den within the study site particularly in the western wet scrub (SWW).
2. Tasmanian devil (*Sarcophilus harrisii*) may also utilise the western wet scrub for foraging and denning opportunities.
3. White-bellied sea-eagle (*Haliaeetus leucogaster*) is considered likely to forage and overfly the area due to the study sites proximity to the coast. The species frequently inhabits the coastal areas of Tasmania.

4. White-throated needletail (*Hirundapus caudacutus*) often forage in areas of updraughts, such as ridges, cliffs or sand-dunes above a wide variety of vegetation types including dense forest, scrub, cleared land and heathland mosaics, all of which occur within the study site.
5. Masked owl (Tasmanian) (*Tyto novaehollandiae* subsp. *castanops*) inhabits a diverse range of forests and woodlands including agricultural and forest mosaics. Forests with relatively open understoreys are particularly favoured when these habitats adjoin areas of open or cleared land. The area of coastal heathland (SCH) and western wet scrub (SWW) may provide potential foraging habitat.

Melba Flats

Six threatened fauna species listed in Table 6 have been identified as potentially occurring on site based on habitat values:

1. Spotted-tailed quoll (*Dasyurus maculatus* subsp. *maculatus*) is considered likely to forage and den within the study site, preferring forest types with consistent high annual rainfall.
2. Tasmanian devil (*Sarcophilus harrisii*) is expected to occur as evidence of this species was recorded during the recent survey with observation of a fresh scat. The forest types mapped during the survey provide habitat and foraging opportunities for the species.
3. Grey goshawk (*Accipiter novaehollandiae*) occurs in mature blackwood swamp forest, wet forest and mixed forest, primarily at lower altitudes. The study site includes *Nothofagus-Atherosperma* rainforest (RMT) and *Acacia melanoxylon* forest on rises (NAR) which provide quality habitat for this species.
4. Wedge-tailed eagle (*Aquila audax* subsp. *fleayi*) is considered likely to forage in the area, however, nesting opportunities maybe limited due to the lack of very large mature Eucalypt trees within the study site.
5. White-bellied sea-eagle (*Haliaeetus leucogaster*) may occasionally forage within the study area, however, it more frequently inhabits coastal areas and larger river and stream systems.
6. Masked owl (Tasmanian) (*Tyto novaehollandiae* subsp. *Castanops*) inhabits a diverse range of forests and woodlands including agricultural and forest mosaics. Forests with relatively open understoreys are particularly favoured when these habitats adjoin areas of open or cleared land. The semi open understory within the *Nothofagus-Atherosperma* rainforest *(RMT)* may provide some foraging and nesting opportunities.

Lake Rosebery

Five threatened fauna species listed in Table 7 have been identified as potentially occurring on site based on habitat values:

1. Spotted-tailed quoll (*Dasyurus maculatus* subsp. *maculatus*) is considered likely to forage and den within the study site, preferring forest types with consistent high annual rainfall.
2. Tasmanian devil (*Sarcophilus harrisii*) may utilise the western wet scrub for foraging and denning opportunities.
3. Grey goshawk (*Accipiter novaehollandiae*) occurs in mature blackwood swamp forest, wet forest and mixed forest, primarily at lower altitudes. The study site includes *Eucalyptus obliqua* forest over rainforest (WOR) and Western wet scrub (SWW) of which both provide suitable habitat.
4. Wedge-tailed eagle (Aquila audax subsp. Fleayi), has good quality nesting opportunities within the *Eucalyptus obliqua* forest over rainforest (WOR) and *Eucalyptus obliqua* wet forest (undifferentiated) (WOU) both of which contained many hollow bearing large old growth trees.
5. White-bellied sea-eagle (*Haliaeetus leucogaster*) may occasionally forage within the study area, however, it more frequently inhabits coastal areas and larger river and stream systems.

4. Potential Impacts and Recommendations

4.1 Significant Flora

One threatened flora species was found on the Melba Flats access track, *Pomaderris intermedia*. This is a new record for the distribution of the species which has only previously been recorded in the north, north east and east of the State. Only one individual was recorded during the survey. It is considered likely the individual recorded could be avoided during the upgrade/construction of the access track to the proposed drill pad location. The individual has been flagged to make it obvious for the construction crew. If it is determined that this plant cannot be avoided during the construction phase a permit under the Tasmanian Threatened Species Protection Act 1995 would be required for removal of a listed threatened species.

No threatened flora was found on the Trial Harbour or Lake Rosebery sites.

The following recommendations are made to minimise impacts to listed flora:

- Avoid the removal of the listed threatened species *Pomaderris intermedia;* and
- Avoid accidental impact by machinery operators and compression of the root systems of the *Pomaderris intermedia* individual by erecting a temporary fence before construction.

With these recommendations in place permits and approvals are unlikely to be required for threatened flora. If the *Pomaderris intermedia* cannot be retained approval is likely to be required under the TSPA 1995.

4.2 Native Vegetation

A large proportion of the proposed access tracks and drill pads at Trial Harbour site 1, Melba Flats and Lake Rosebery are to be located on pre-existing access tracks and will require minimal vegetation removal. Trial harbour site 2 has been surveyed for two access track options. It is recommended that the short track option (vegetation removal less than 200m^2) is utilised for this site as the amount of vegetation to be removed is considerably smaller than the longer option (vegetation to be removed approximately 1000m^2), however, the short track option crosses a small creek and appropriate culverts will need to be utilised and then removed after the completion of the exploration activities.

The eight vegetation types recorded during the survey are not listed as threatened communities. However the Lake Rosebery and Melba Flats sites both contain many large eucalypt and rainforest species which provide quality fauna habitat values and where possible the removal of large trees at these sites should be avoided. If avoidance is not possible, removal of these trees may require a permit/s under the Tasmanian *Threatened Species Protection Act 1995*.

To minimise impacts to vegetation communities only vegetation within the direct impact of the access tracks and drill pads should be cleared and all other native vegetation and indigenous trees, particularly hollow bearing old growth trees, retained where possible. Assuming vegetation clearance can be minimised and mature trees providing threatened fauna habitat can be retained, approval under the TSPA 1995 and EPBCA 1999 is unlikely to be required.

4.3 Fauna Habitat

The Trial Harbour study site provides some decent quality foraging habitat for the wedge tailed eagle and white bellied sea eagle. These species have been previously recorded in the area. The proposed access track at site 1 is located on an existing access track and will require minimal vegetation removal. Site 2 has two access track options and it is recommended that the short option be utilised to minimise the amount of vegetation to be removed.

The vegetation recorded and mapped at the Melba flats study site provides denning and foraging habitat for threatened mammal species such as the spotted tail quoll and the Tasmanian devil. The area also provides good quality foraging and nesting habitat for listed bird species, the grey goshawk (*Accipiter novaehollandiae*) and the masked owl (Tasmanian) (*Tyto novaehollandiae* subsp. *castanops*) within the open understorey of the *Nothofagus-Atherosperma* rainforest (RMT). If the proposed minor access track upgrade and drill pad clearing proceed; it is considered that this project should have a negligible impact on these threatened species.

The Lake Rosebery study area provides some high quality arboreal habitat for both bird and mammal species as a number of large hollow bearing trees were recorded. It is recommended that these trees are avoided were possible during construction of the access track and drill pads. Should the removal of a number of these trees be required a permit/s maybe required under Tasmania's *Threatened Species Protection Act 1995.*

4.4 Introduced Plants, Pests and Pathogens

One declared weed species was found on the study site at Melba Flats, *Ulex europaeus* (gorse). The proposed project may have the potential to distribute existing weeds to other parts of the study site or to areas outside of the proposed works, via vehicles, soil, machinery or human traffic. In addition, the works have the potential to result in the introduction of new weeds into the study site.

It is recommended that the localised gorse infestations be dealt with on location via cut and paste method of weed control and the burial of the plant waste on site to prevent the spread of seeds to other areas of the site.

It is recommended that weed, disease and pest control be considered in the detailed project planning either through incorporation of control measures in a site specific Construction Environmental Management Plan (CEMP) or preparation of a Weed Management/Hygiene Plan. This documentation should include control of weeds prior to construction where appropriate;

- Washdown and/or inspection of vehicles, machinery and boots before leaving/entering the site to ensure no viable plant materials or large clods of soil are transported;
- Washdown to be conducted in accordance with the *Tasmanian Washdown Guidelines For Weed and Disease Control* (DPIPWE 2004); and
- Control of material brought onto the site, such as clean fill, to ensure it is free from weed seeds or diseases.

The above recommendations are based on current plans for the proposed works and may need to be revised if the proposal plans change.

4.5 Further Studies

No further studies are proposed.

5. Limitations

This Botanical survey and fauna assessment (Report) considering the proposed exploration tracks at Trial Harbour, Melba Flats and Lake Rosebery of MMG:

- has been prepared by GHD Pty Ltd (GHD) pursuant to a contract with MMG;
- has been prepared based on information provided up to 25th July 2011;
- may only be used and relied on by MMG;
- must not be copied to, used by, or relied on by any person other than MMG without the prior written consent of GHD; and
- may only be used for the purpose of understanding the ecological attributes applicable to the site (and must not be used for any other purpose).

GHD and its servants, employees and officers otherwise expressly disclaim responsibility to any person other than MMG arising from or in connection with this Report.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Report are excluded unless they are expressly stated to apply in this Report.

The services undertaken by GHD in connection with preparing this Report:

- were limited to those specifically detailed in Section 1.2 of this Report;
- were limited to an ecological assessment of vascular plant species (ferns, conifers and flowering plants), terrestrial and migratory vertebrate fauna;
- did not include non-vascular flora (e.g. mosses, liverworts, lichens, and fungi), marine fauna habitat and invertebrate habitat, which were not formally surveyed as part of this assessment;
- included a field assessment during winter, which is considered a suboptimal time of year for assessing herbaceous annuals and grass species. Furthermore, threatened orchids that were identified as potentially occurring on site have their peak flowering period/s during October to November. Therefore, it is considered unlikely that threatened plant species were overlooked during the survey; and
- did not include a detailed fauna field survey (i.e. trapping) at the study area. The fauna investigation instead focussed on fauna habitat, and evidence of animals (e.g. scats, tracks, feathers).

Subject to the paragraphs in this section of the Report, the opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the time of preparation. GHD has not updated, and accepts no responsibility or obligation to update, this Report to account for events or changes occurring subsequent to the date that the Report was signed.

6. References

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7. Flora Species List

Job Number	3216026
Project	Exploration tracks and drill pads
Client	Minerals and Metals Group (MMG)
Site	Trial Harbour, Melba Flats and Lake Rosebery
Grid Reference	Midpoint of the study areas at approximately Trial Harbour GDA94 E 0349530 N5356700 Melba Flats GDA94 E0365500 N5368800 Lake Rosebery GDA94 E0379850 N5378000
Surveyed By	John Davies, Senior Botanist GHD Hobart; and James Hill, Ecologist GHD, Hobart
Date of Survey	6th, 7th and 20th July 2011
Plant Collection Permit No.	TFL 11119 Expiry date: 30th June 2012 Exemption to collect, store and transport declared weeds applies from: 01/01/11 to 31/12/11

Key:

	<u>STATE LEGISLATION</u>
r	rare – Tasmanian TSPA
v	vulnerable – Tasmanian TSPA
e	endangered – Tasmanian TSPA
	<u>COMMONWEALTH LEGISLATION</u>
VU	vulnerable – Commonwealth EPBCA
EN	endangered – Commonwealth EPBCA
CR	critically endangered – Commonwealth EPBCA
	<u>Introduced Species</u>
i	introduced
P	planted
D	declared weed – Tasmanian *Weed Management Act 1999*

Vascular Flora Recorded Within the Study Area at Trial Harbour Site 1

Status	Species Name	Common Name
Indigenous Species		
	Acacia myrtifolia	redstem wattle
	Acacia suaveolens	sweet wattle
	Allocasuarina zephyrea	western sheoak
	Banksia marginata	silver banksia
	Cassytha pubescens	downy dodderlaurel
	Chordifex hookeri	woolly buttonrush
	Dillwynia glaberrima	smooth parrotpea
	Diplarrena latifolia	western flag-iris
	Epacris obtusifolia	bluntleaf heath
	Epacris impressa	common heath
	Eucalyptus nitida	western peppermint
	Leucopogon collinus	white beardheath
	Gahnia grandis	cutting grass
	Gleichenia dicarpa	pouched coralfern
	Hakea epiglottis	beaked needlebush
	Helichrysum pumilum	everlasting
	Lepidosperma filiforme	common rapiersedge
	Lepidosperma laterale	variable swordsedge
	Lepidosperma concavum	sand swordsedge
	Leptospermum scoparium	common teatree
	Lindsaea linearis	screw fern
	Lomatia tinctoria	guitarplant
	Lycopodium deuterodensum	conifer clubmoss
	Melaleuca squarrosa	scented paperbark
	Patersonia fragilis	short purpleflag
	Pultenaea daphnoides var. obcordata	heartleaf bushpea
	Pultenaea juniperina	prickly beauty
	Pteridium esculentum	bracken

Status	Species Name	Common Name
	Sprengelia incarnata	pink swampheath
	Selaginella uliginosa	swamp spikemoss
	Styphelia adscendens	golden heath

Vascular Flora Recorded Within the Study Area at Trial Harbour Site 2

Status	Species Name	Common Name
Indigenous Species		
	Acacia verticillata	prickly moses
	Acacia suaveolens	sweet wattle
	Allocasuarina zephyrea	western sheoak
	Banksia marginata	silver banksia
	Blechnum wattsii	hard waterfern
	Calorophus elongatus	long roperush
	Chordifex monocephalus	smooth buttonrush
	Dianella tasmanica	forest flaxlily
	Epacris impressa	common heath
	Epacris obtusifolia	bluntleaf heath
	Eucalyptus nitida	western peppermint
	Gahnia grandis	cutting grass
	Gleichenia dicarpa	pouched coralfern
	Gleichenia microphylla	scrambling coralfern
	Goodenia ovata	hop native-primrose
	Gymnoschoenus sphaerocephalus	buttongrass
	Hakea epiglottis	beaked needlebush
	Leptocarpus tenax	slender twinerush
	Lepidosperma laterale	variable swordsedge
	Leptospermum nitidum	shiny teatree
	Leptospermum scoparium	common teatree
	Leucopogon collinus	white beardheath

Status	Species Name	Common Name
	Lomatia tinctoria	guitarplant
	Lycopodium deuterodensum	conifer clubmoss
	Melaleuca squarrosa	scented paperbark
	Pimelea linifolia	slender riceflower
	Philotheca virgata	twiggy waxflower
	Pomaderris elliptica var. diemenica	tasmanian yellow dogwood
	Pteridium esculentum	bracken
	Pultenaea juniperina	prickly beauty
	Pultenaea daphnoides var. obcordata	heartleaf bushpea
	Sprengelia incarnata	pink swampheath
	Zieria arborescens subsp. *arborescens*	stinkwood

Vascular Flora Recorded Within the Study Area at Melba Flats

Status	Species Name	Common Name
Indigenous Species		
	Acacia melanoxylon	blackwood
	Acacia mucronata	caterpillar wattle
	Acacia verticillata	prickly moses
	Agastachys odorata	fragrant candlebush
	Agrostis muelleriana	muellers bent
	Anodopetalum biglandulosum	horizontal
	Anopterus glandulosus	tasmanian laurel
	Atherosperma moschatum subsp. moschatum	sassafras
	Baloskion tetraphyllum subsp. tetraphyllum	tassel cordrush
	Bauera rubioides	wiry bauera
	Blechnum nudum	fishbone waterfern

Status	Species Name	Common Name
	Blechnum wattsii	hard waterfern
	Cassytha glabella	slender dodderlaurel
	Carex appressa	tall sedge
	Coprosma quadrifida	native currant
	Leptecophylla juniperina	pinkberry
	Deyeuxia sp.	bentgrass
	Dianella tasmanica	forest flaxlily
	Dicksonia antarctica	soft treefern
	Eleocharis gracilis	slender spikesedge
	Epacris impressa	common heath
	Eucalyptus nitida	western peppermint
	Eucalyptus ovata var. ovata	black gum
	Eucryphia lucida	leatherwood
	Gahnia grandis	cutting grass
	Gleichenia microphylla	scrambling coralfern
	Histiopteris incisa	batswing fern
	Hydrocotyle hirta	hairy pennywort
	Hymenophyllum rarum	narrow filmyfern
	Hypolepis rugosula	ruddy groundfern
	Juncus pallidus	pale rush
	Juncus planifolius	broadleaf rush
	Leptospermum scoparium	common teatree
	Leptospermum lanigerum	woolly teatree
	Leptospermum nitidum	shiny teatree
	Lycopodium deuterodensum	conifer clubmoss
	Melaleuca squarrosa	scented paperbark
	Microsorum pustulatum subsp. pustulatum	kangaroo fern

Status	Species Name	Common Name
	Monotoca glauca	goldey wood
	Monotoca scoparia	prickly broomheath
	Nematolepis squamea	satinwood
	Nothofagus cunninghamii	myrtle beech
	Olearia persoonioides	geebung daisybush
	Pimelea drupacea	cherry riceflower
	Pimelea linifolia	slender riceflower
	Phyllocladus aspleniifolius	celerytop pine
	Polystichum proliferum	mother shieldfern
r	*Pomaderris intermedia*	lemon dogwood
	Pteridium esculentum	bracken
	Sprengelia incarnata	pink swampheath
	Sticherus tener	silky fanfern
	Trochocarpa gunnii	fragrant purpleberry
	Tasmannia lanceolata	mountain pepper

Introduced Species

I, D	*Ulex europaeus*	gorse
i	*Juncus bulbosus*	bulbous rush
i	Juncus capitatus	capitate rush

Vascular Flora Recorded Within the Study Area at Lake Rosebery

Status	Species Name	Common Name
Indigenous Species		
	Acacia melanoxylon	blackwood
	Acacia mucronata	caterpillar wattle

Status	Species Name	Common Name
	Acacia melanoxylon	blackwood
	Agastachys odorata	fragrant candlebush
	Anodopetalum biglandulosum	horizontal
	Anopterus glandulosus	tasmanian laurel
	Atherosperma moschatum subsp. moschatum	sassafras
	Bossiaea cinerea	showy bossia
	Banksia marginata	silver banksia
	Bauera rubioides	wiry bauera
	Blechnum wattsii	hard waterfern
	Bossiaea cinerea	showy bossia
	Calorophus elongatus	long roperush
	Dianella tasmanica	forest flaxlily
	Dicksonia antarctica	soft treefern
	Eucalyptus nitida	western peppermint
	Eucalyptus obliqua	stringy bark
	Eucryphia lucida	leatherwood
	Gahnia grandis	cutting grass
	Gleichenia dicarpa	pouched coralfern
	Histiopteris incisa	batswing fern
	Hymenophyllum rarum	narrow filmyfern
	Leptospermum scoparium	common teatree
	Leptecophylla juniperina	pinkberry
	Melaleuca squarrosa	scented paperbark
	Microsorum pustulatum subsp. pustulatum	kangaroo fern
	Monotoca submutica	broomheath
	Nematolepis squamea	satinwood

Status	Species Name	Common Name
	Nothofagus cunninghamii	myrtle beech
	Pittosporum bicolor	cheesewood
	Philotheca virgata	twiggy waxflower
	Phyllocladus aspleniifolius	celerytop pine
	Pteridium esculentum	bracken
	Rumohra adiantiformis	leathery shieldfern
	Trochocarpa gunnii	fragrant purpleberry

Introduced Species

i	*Cirsium vulgare*	spear thistle

8. Legislation Summary

Legislative Implications

Activities that may impact upon threatened species or vegetation communities are regulated under both State and Federal legislation. The control of declared invasive species is also mandatory under State legislation. This includes but is not limited to:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA);
- Tasmanian *Threatened Species Protection Act 1995* (TSPA);
- Tasmanian *Weed Management Act 1999*;
- Tasmanian *Regional Forestry Agreement 1997*; and
- Tasmanian *Nature Conservation Act 2002.*

Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) applies to developments and associated activities that have the potential to significantly impact on matters protected under the Act. The Act also applies to environmental impact on Commonwealth Land or activities undertaken by the Commonwealth on other lands. The Australian Government Department of the Environment, Water, Heritage and the Arts administers the EPBCA.

Under the Act, unless exempt, actions require approval from the Commonwealth Minister for Environment and Heritage if they have, may have, or are likely to have a significant impact on a 'matter of national environmental significance'. There are seven matters of national significance:

- World Heritage sites;
- National heritage places;
- Nationally listed threatened species and ecological communities;
- Listed migratory species;
- Ramsar wetlands of international significance;
- Commonwealth marine areas; and
- Nuclear actions (including uranium mining).

Listed threatened species and ecological communities are recognised as matters of national environmental significance. Consequently, any action that may be likely to have a significant impact on listed species and ecological communities under the EPBCA must be referred to the Minister for determination on whether EPBCA approval is required. The referral process generally takes 20 business days to process, after which the Minister makes a determination on the need or otherwise for EPBCA assessment and approval. If approval is deemed to be necessary a formal assessment and approval process commences.

Tasmanian Threatened Species Protection Act 1995

The *Threatened Species Protection Act 1995* (TSPA) is used to protect Tasmania's threatened flora and fauna. The Act classifies and lists threatened flora and fauna in Tasmania according to their level of risk as rare, vulnerable, endangered or extinct.

The objective of the TSPA is to identify, classify and protect threatened flora and fauna species in Tasmania. According to the Act it is an offence to knowingly disturb listed flora or fauna without a permit from the Threatened Species Unit of DPIPWE.

If a development involves direct impact to an individual of a listed flora or fauna species a permit is required under the TSPA (pending some exemptions). This applies to flora and fauna but does not include habitat for listed species, which is protected through the Forest Practices Legislation.

Tasmanian Weed Management Act 1999

The *Weed Management Act 1999* is the central legislation controlling eradication of significant weeds in Tasmania. The Act aims to minimise the deleterious effect of weeds on productive capacity and natural values, promote strategic and sustainable eradication approaches, encourage community involvement and promote sharing of the responsibility for weed eradication.

Under the Act and associated Weed Management Plans, landowners and managers must take all reasonable measures to control the impact and spread of a declared weed.

Declared weeds are listed on the Department of Primary Industries, Parks, Water and Environment (DPIPWE) website (http://www.dpiw.tas.gov.au).

Forest Practices Act 1985

The *Forest Practices Act 1985* and associated documentation control land clearing on both public and private land in Tasmania. The Act applies to forest vegetation and threatened non-forest vegetation communities. Forest vegetation is described as native trees or other woody plants, including any seedlings that have the potential to grow to a height of 5 meters or more. There are no controls under the *Forest Practices Act* on clearing of non-forest vegetation that is not threatened.

A certified forest practices plan is required to authorize land clearing (clearing trees or clearing and converting threatened native vegetation) where the clearance is greater than 1 ha or involves vulnerable land (with some exemptions).

Clearance and conversion of threatened native vegetation communities is generally not permitted unless exceptional circumstances (as defined under the *Forest Practices Act 1985*) exist. The *Forest Practices Regulations 2007* provide some exemptions from the requirement to have a Forest Practices Plan to authorize land clearing. These include:

- Small scale clearing provided the land is less than 1 ha, the landowner has given consent, vegetation is not listed as 'vulnerable land', and timber volumes cleared do not exceed 100 tonnes;
- Clearing necessary to provide a reasonable buffer for existing infrastructure or for public safety;
- Clearing native vegetation regrowth (containing no more than 20 eucalypts more than 2 metres tall within a 0.5 hectare) on previously cleared land and converted land;
- Clearing associated with:
    - Dam works authorised by a dam permit
    - Easements for the construction and maintenance of electricity infrastructure and associated access tracks, where in accordance with an environmental management system endorsed by the Forest Practices Authority; and
    - Construction and maintenance of gas pipelines and public roads.

- Clearing in accordance with a conservation covenant, vegetation management agreement, or fire management program of a kind approved by the Forest Practices Authority;
- Clearing carried out for mining or mineral exploration activities that are authorised under a permit under the *Land Use Planning and Approvals Act 1993* or a licence or lease under the *Mineral Resources Development Act 1995*;
- Clearing carried out for the purposes of constructing buildings or associated developments, but only where they have been authorised under a permit issued under the *Land Use Planning and Approvals Act 1993*; and
- Clearing for railways within the meaning of the *Rail Infrastructure Act 2007*.

Vulnerable land is defined as land that:

- Is within a 10 metre buffer of a stream bank or 40 metres from a river; or
- Slopes steeper than 11-19 degrees (depending on rock type); or
- Is within a high or very high soil erodibility class; or
- Contains a threatened community; or
- Is inhabited by a threatened species; or
- Contains vulnerable karst soils; or
- Contains an area of trees reserved from harvesting or clearing under an expired Forest Practices Plan.

Nature Conservation Act 2002

The *Nature Conservation Act 2002* makes provisions with respect to the conservation and protection of the fauna, flora and geological diversity of Tasmania and provides the declaration of national parks and other reserved within the State.

The *Nature Conservation Act 2002* lists native vegetation communities. The status of these communities are established through scientific assessment against the criteria for 'rare' (a total range of less than 1,000 hectares), 'vulnerable' (70% of original area cleared) and 'endangered' (90% of original area cleared). The communities listed under this Act are protected under the *Forest Practices Act 1985*. The Act also defines the covenants under which offset areas are protected.

Wildlife Regulations Act 1999

The *Wildlife Regulations Act 1999* also protects many native animal species. Under this Act the taking, buying, selling or possession of specially protected wildlife is prohibited without a permit. Protected wildlife includes most native vertebrate fauna.

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APPENDIX E – Digital data from TRL001

APPENDIX F – VTEM data – attached DVD