

EL28/1988 ZEEHAN

**ANNUAL REPORT TO
DECEMBER 2008**

Volume 1 of 2.

**Tim Callaghan
Chief Geologist
Avebury Nickel Mine**

CONTENTS

- 1 Summary
- 2 Introduction
- 3 Exploration Completed 2007 - 08
 - 3.1 Trial Harbour Aeromagnetic Anomaly
 - 3.2 ML Application
 - 3.3 Geological mapping
- 4 Exploration Planned 2008 -09

APPENDICES

Appendix 1 Drill logs

Appendix 2 Petrographic Reports

ENCLOSURES

Map

All figures and coordinates in this report are in Geodetic Datum AGD66.

1 SUMMARY

Exploration Licence 28/1988 lies adjacent to ML 3M/2003 which hosts the Avebury Nickel Sulphide deposit and is highly prospective for similar styles of mineralisation. The Avebury Nickel Sulphide deposit is hosted in Cambrian Ultramafic Rocks and which have been demonstrated to extend onto the surrounding EL's, including EL28/1988.

In the past twelve months the following work was completed:

- Conversion of the eastern portion of EL28/1988 to ML 6M/2007.
- Drilling of three DDH at the Trial Harbour Anomaly.
- 1:1000 scale interpretive Geology Map update.

Annual expenditure on EL28/1988 was \$0.82M.

Exploration planned for 2008 includes:

- Drill testing the Trial Harbour anomaly initially with two diamond drill holes.

A total near mine exploration budget of approximately \$4.1M has been submitted for the 2009 calendar year.

2 INTRODUCTION

EL28/1988 Zeehan of 13 km² is located west and south of the Avebury Nickel Mine (Figure 1). The EL once covered the current Mine leases, with 3M/2003 excised in 2003 and 6M/2007 recently excised with the delineation of the East Avebury Resource. Only the western portion of the EL remains.

The EL is highly prospective for Avebury style nickel sulphide mineralisation. The Avebury deposits are hosted in serpentinised dunite or strongly metasomatised, tremolite-diopside ultramafic skarn intruded into Mid Cambrian basaltic volcanoclastics. The altered ultramafics have a strong magnetic signature due to high concentrations of magnetite. High resolution aeromagnetism is a key early exploration tool. Much of the ultramafic is not outcropping and time consuming and expensive diamond drilling in often rugged terrain is required for effective exploration.

Allegiance Metals are actively exploring ML's 3M/2003 and 6M/2007, and surrounding EL28/1988, EL22/1997 and EL37/2003. Development of the Avebury Mine and Mill was completed in June 2008 and is currently in a ramp up phase. The current mine is designed to produce 7,000tpa of Ni in high grade concentrates from 900,000tpa of ore. The current resource is tabulated in Tables 1 - 3.

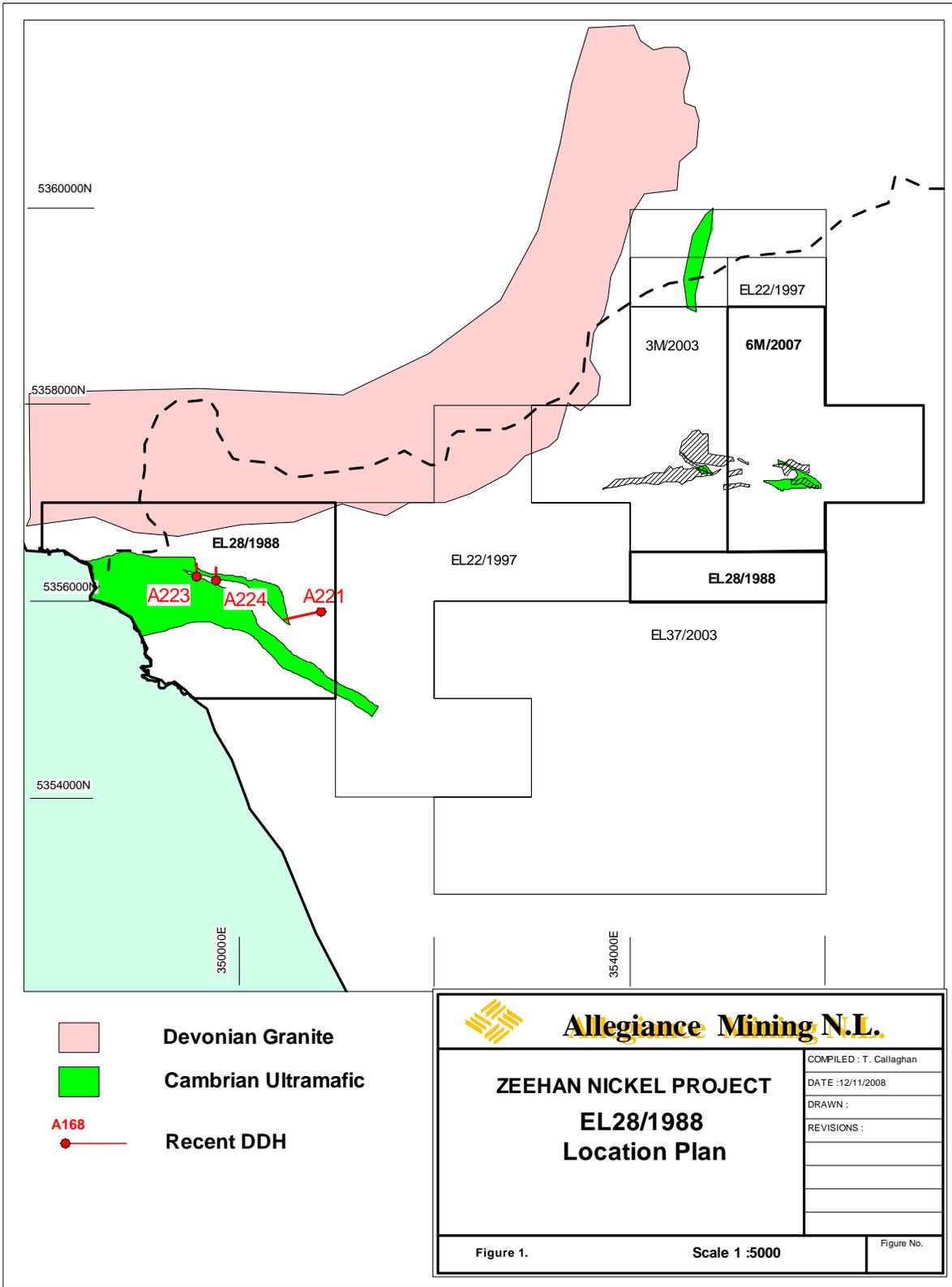
Avebury Mineral Resources, January 2008.

Table 1. Mineral Resources 0.4% Ni Cut Off				Contained Ni t	
Classification	Tonnes	Ni %	As ppm	Ni t	Previous
Inferred	9,760,000	0.88	381		
Indicated	6,050,000	1.01	338		
Measured	2,370,000	1.03	346		
Total	18,180,000	0.95	362	172,000	158,000

Table 2. Mineral Resources 0.7% Ni Cut Off				Contained Ni t	
Classification	Tonnes	Ni %	As ppm	Current	Previous
Inferred	6,880,000	0.99	465		
Indicated	4,900,000	1.09	390		
Measured	2,220,000	1.06	294		
Total	14,000,000	1.04	412	145,000	131,000

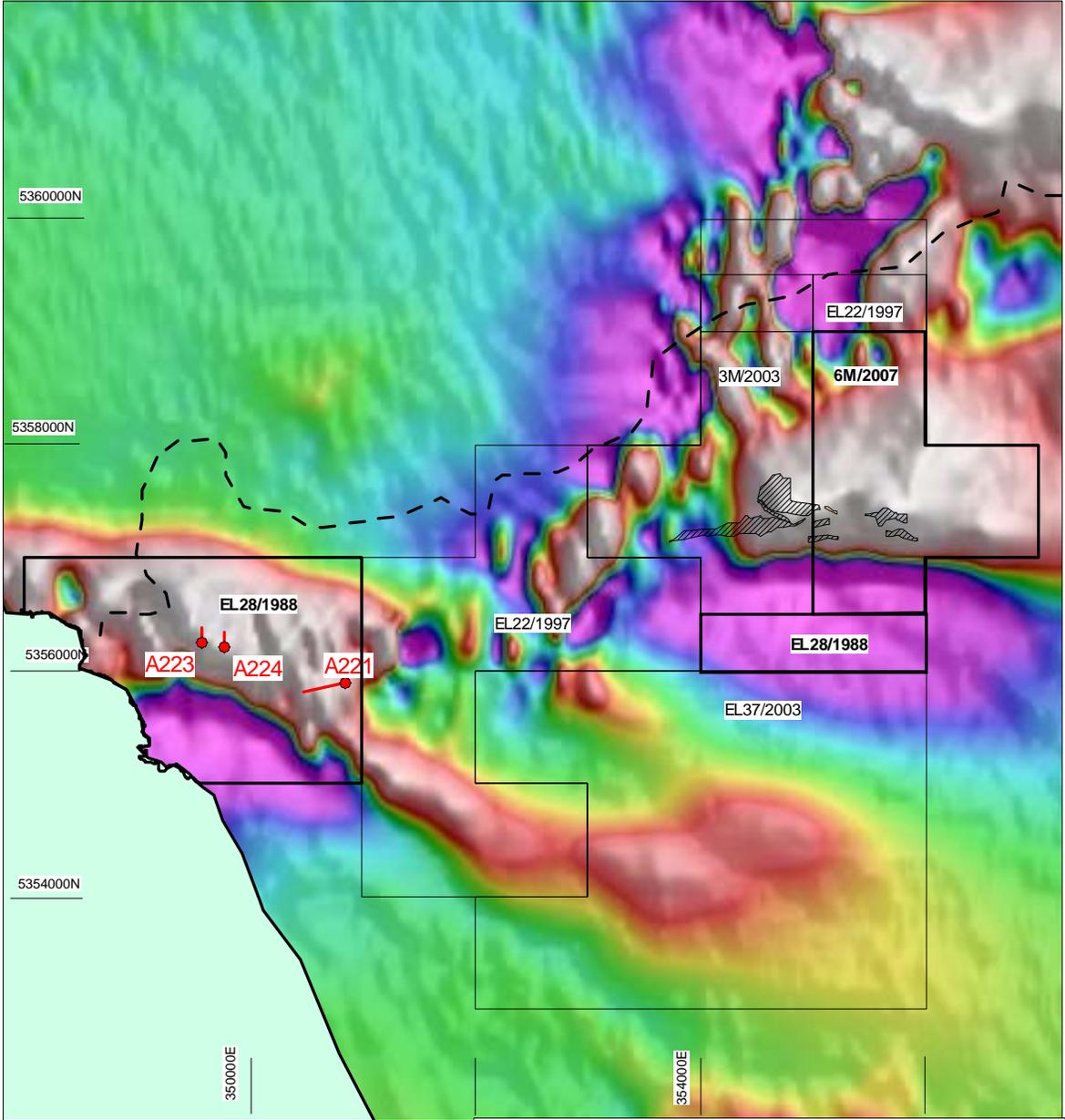
Table 3. Mineral Resources 0.85% Ni Cut Off				Contained Ni t	
Classification	Tonnes	Ni %	As ppm	Current	Previous
Inferred	3,720,000	1.18	672		
Indicated	3,370,000	1.24	355		
Measured	1,730,000	1.14	345		
Total	8,820,000	1.20	488	105,000	102,000

Exploration has continually extended the Avebury Resource with recent ML additions from EL 28/1988. Further resource additions from the ML and surrounding EL's are anticipated. On April 4 2007 a request for amalgamation of exploration expenditure on the near Mine Exploration was granted. Exploration for the past year focused on East Avebury (6M/2007) and depth extensions of the known resources on 3M/2003. EL28/1988 is strategically important to the Avebury Project and will continue to be the focus of exploration and resource expansion.



- Devonian Granite
- Cambrian Ultramafic
- A168
● — Recent DDH

<b style="font-size: 1.2em;">Allegiance Mining N.L.	
ZEEHAN NICKEL PROJECT EL28/1988 Location Plan	COMPILED : T. Callaghan DATE :12/11/2008 DRAWN : REVISIONS :
Figure 1.	Scale 1 :5000
Figure No.	



- Devonian Granite
- Cambrian Ultramafic
- A168
 Recent DDH



Allegiance Mining N.L.

ZEEHAN NICKEL PROJECT
EL28/1988
Location Plan
 TMI Image

COMPILED : T. Callaghan
DATE :12/11/2008
DRAWN :
REVISIONS :

Figure 2.

Scale 1 :5000

Figure No.

3 EXPLORATION COMPLETED 2007 – 08

The following work was completed on EL28/1988 during the twelve month period ended 8 December 2008:

- Drilling of three holes into the large amplitude Trial Harbour aeromagnetic anomaly
- East Avebury ML Application
- 1:10 000 scale geology map update.

3.1 Trial Harbour Aeromagnetic Anomaly

Three DDH's were drilled into the high amplitude Trail Harbour aeromagnetic anomaly (Figure 1 and 2). Drill logs are located in the appendices.

DDH A221 was a helicopter supported hole collared in what is interpreted to be Dundas Group volcanoclastic conglomerate, sandstones and siltstones. The volcanoclastics were variably phlogopite altered or actinolite-diopside altered. A thin dyke of metasomatised ultramafic was intersected between 29.1 and 30.3m. The hole intersected a large body of quartz-feldspar-phyric rhyolite from 279 to 430m down hole. The hole successfully identified the eastern margin of the Trial Harbour ultramafic intrusion, however no significant nickel sulphides were identified. The hole was terminated in the host ultramafic rocks.

DDH A223 and A224 were designed to test the Trial Harbour ultramafic intrusion at shallow levels beneath an intense magnetic high. Both holes intersected serpentinitised ultramafic, ultramafic skarn and massive magnetite with what are interpreted to be xenoliths of volcanoclastic sandstones. The holes ended in Crimson Creek Formation volcanoclastics to the north. Drill hole A223 intersected several zones of nickel sulphide mineralisation with a best intercepts of:

61.0 – 64.0m 3.0m @ 0.8% Ni.

A petrographic and mineragraphic report on selected samples is included in the appendices.

These three holes all successfully identified the host ultramafic rock, one of which identified Avebury Style Nickel sulphide mineralisation. Follow up exploration is required particularly around the outcropping northern margin of the Trial Harbour Anomaly. Drilling will recommence in the summer.

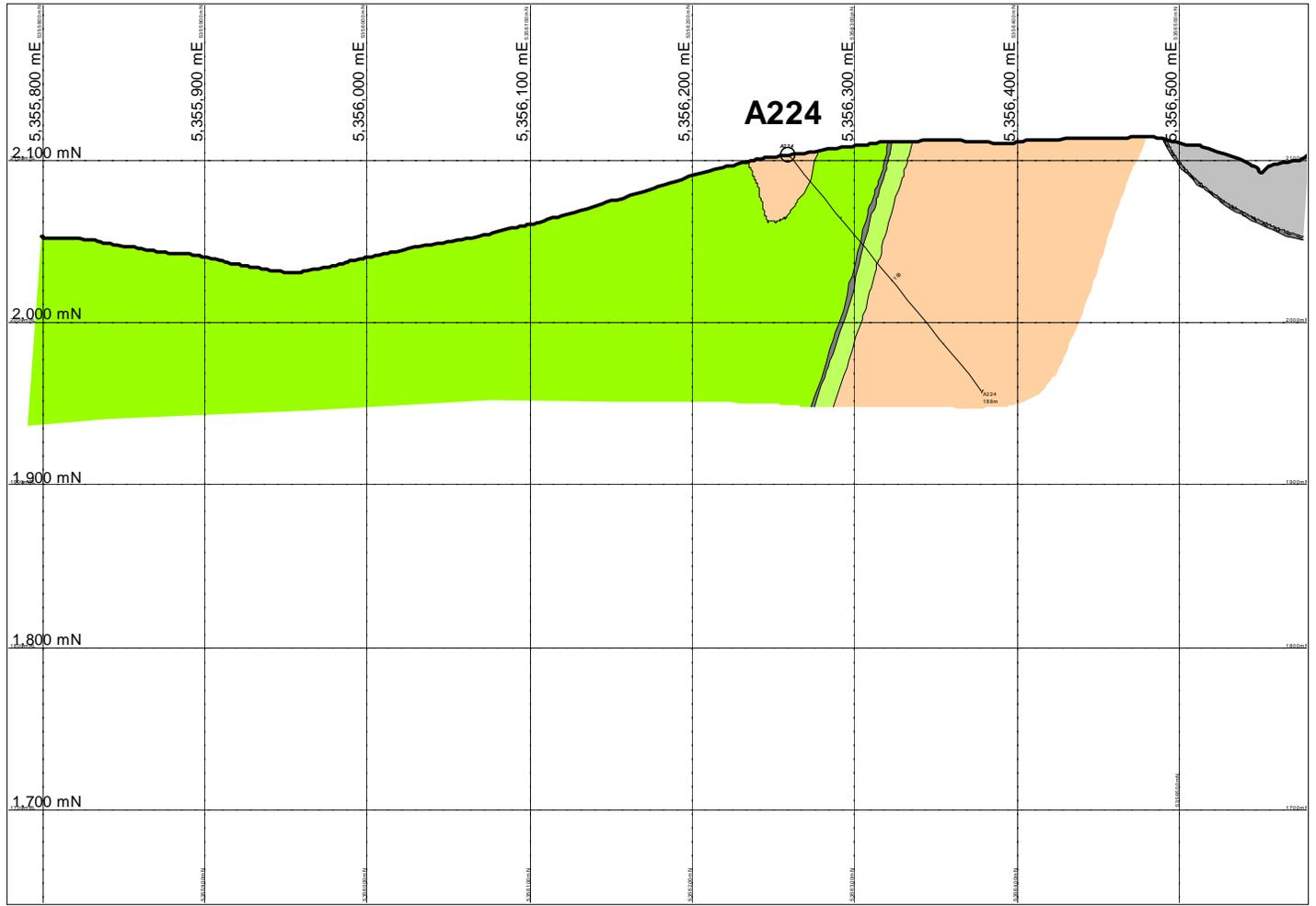


Figure 3. Section 349 600E. Legend in Figure 6.

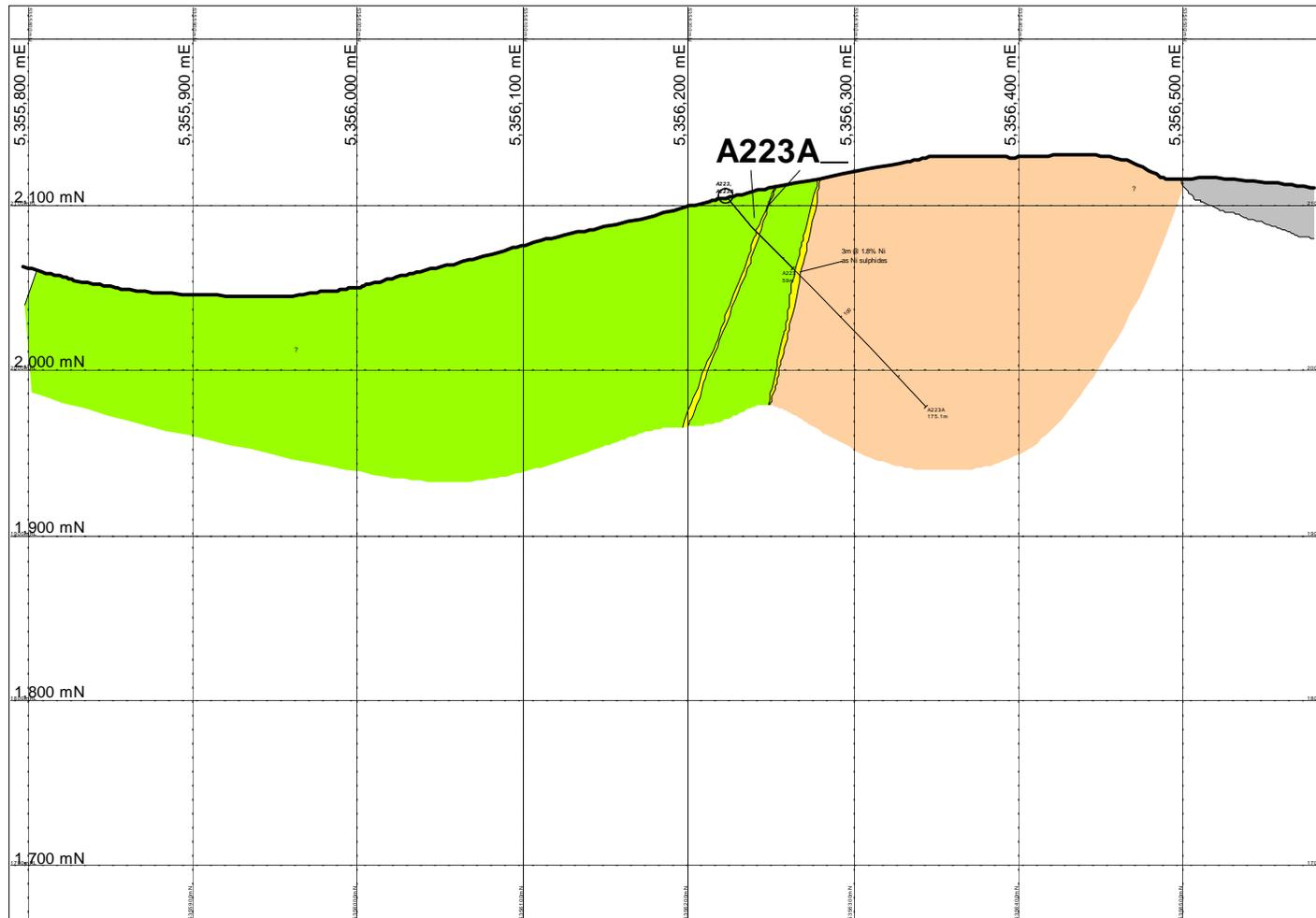


Figure 4. Section 349 775E. Legend in Figure 6.

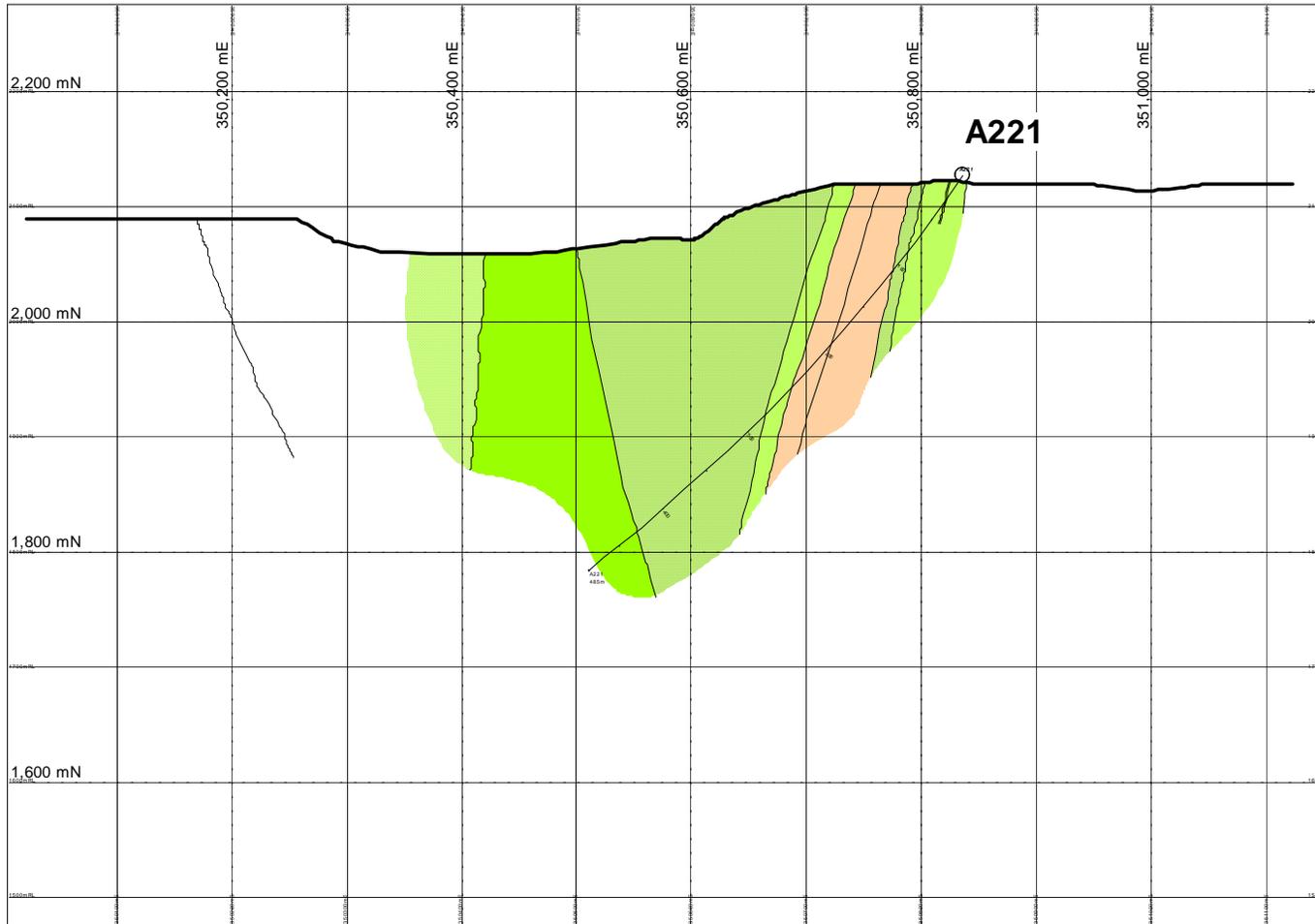


Figure 5. Section 5355850N. Legend in Figure 6.

LEGEND

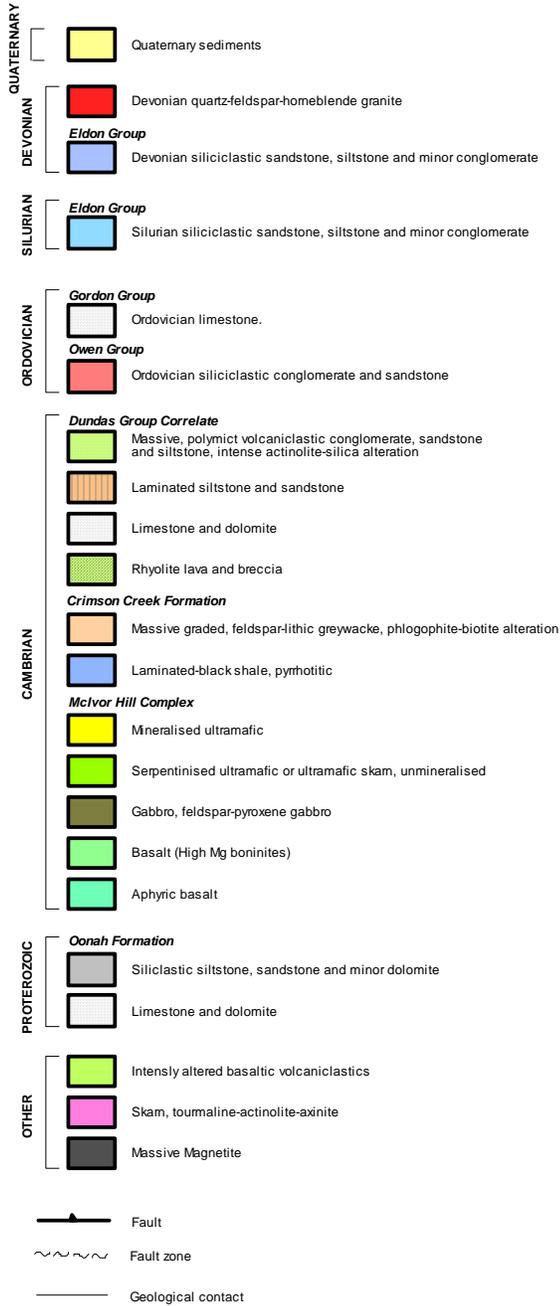


Figure 6, Legend for figures 3, 4 and 5.

3.2 ML Application

A Mine Lease Application for the eastern portion of EL 28/1988 was granted by Mineral Resources Tasmania late last year . Allegiance Mining NL have asked for the new ML to be amalgamated with the current Avebury ML 3M/2003. Exploration drilling has continued throughout 2008 on ML 6M/2007.

3.3 Geological Mapping

The Avebury district Interpretive Geology Map was updated this year with the additional information gained over the past 5 years. Much of the additional information has come from drilling which has increased our understanding of the field relationships of the geology in the Avebury district. Some field checking and remapping of selected areas was used to update the map.

The 1:10 000 map sheet is located in the Enclosures.

4 EXPLORATION PLANNED 2008 – 09

Exploration planned for 2008 – 09 will include:

- Drilling of Trial Harbour aeromagnetic anomaly.

Two diamond drill holes testing a strong magnetic high west of Trial Harbour have been proposed for the coming financial year (Figure 7).

Holes A and B will be accessed via existing roads in the Trial Harbour area. Hole A will require the rig to be walked across button grass moorland for 500m along the valley floor.

Hole A (AMG 349,800E, 5,356,070N) is designed to test a very strong magnetic anomaly within ultramafic rocks down dip from previous hole A223. The hole will be of approximately 500m length testing the ultramafic-sediment boundary to the north.

The rig will access the site by walking across the button grass, minimising soil disturbance as much as possible. The drillers will be required to access the site by foot and a helicopter will be used to service the rig (fuel in, core out) whilst on site.

Hole B (AMG 349,250E, 5,356,210N) is located towards the top of the hill behind Trial Harbour. The rig will be accessed via the 4wd track servicing this area.

Vegetation is dominated by low regrowth eucalypt and banksias scrub as well as significant patches of open ground.

No earthworks are anticipated for this work. Drill cuttings will be bagged as much as possible or left behind.

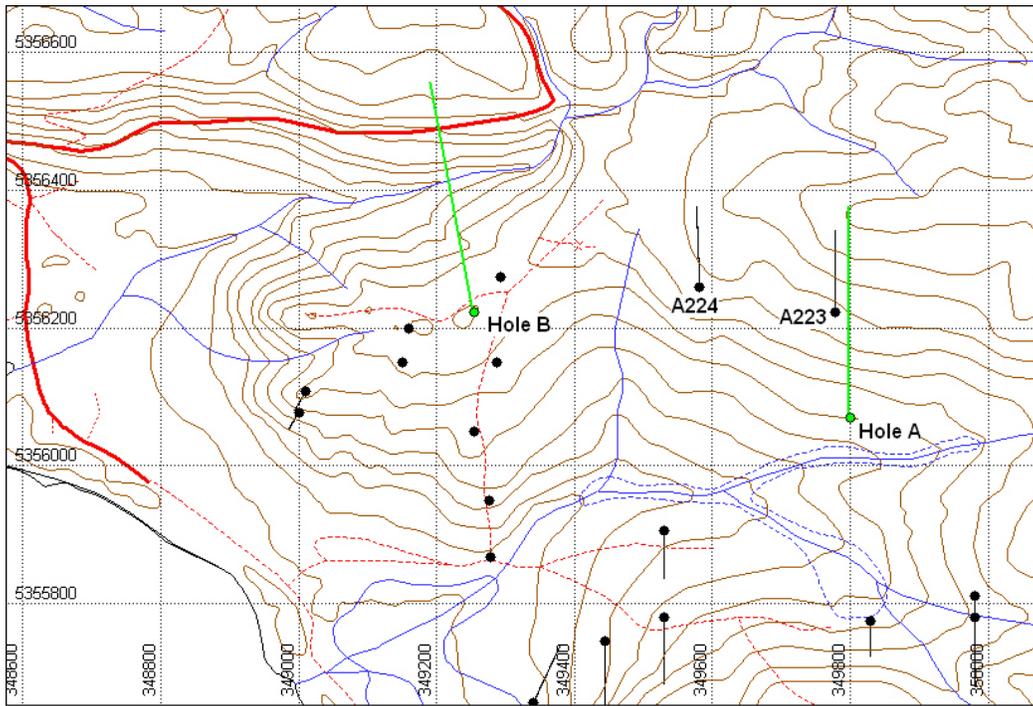


Figure 7. Trial Harbour Proposed Drilling.

5 SCHEDULE AND BUDGET

Exploration of the Avebury Mine Lease and surrounding EL's is continuing on an annual basis with 3-4 surface exploration rigs. An annual exploration budget of approximately \$4.1M has been submitted for the 2009 calendar year. The work program for EL28/1988 is expected to cost a minimum of \$400 000.

Appendix 1

Drill Logs

Allegiance Metals Drill Log

Project	BHID	From	To	Stratigraphy	Rock Type	Alteration	Colour	Visual S%	L.Cont.	Struct	BCA	Description
Trial_Ha	A223A	0	13.3		LOSS							Hole starts at 13.3m where it lips off rods left in A223.
Trial_Ha	A223A	13.3	18.3	Csu	SKSP	DiMt	W2	0.05	Bk	Fo	60	Massive white, black-and-white and rarely dirty khaki green altered ultramafic. Intense diopside alteration. Magnetite veins and blebs common, occasionally with very minor to trace brassy sulphide, possibly pyrrhotite. Patchy weak foliation at around 60 to CA. Small zones of semi-massive magnetite, increasing downhole. Massive and semi-massive magnetite. Minor diopside. Trace sulphide.
Trial_Ha	A223A	18.3	20.5	Csu	MMAG	MtDi	N	0.05	Gr			Very small clay altered fault at 20.0m.
Trial_Ha	A223A	20.5	40.5	Csu	SKSP	DiMt	W2	0.01	Sp	Fo	65	Massive white and black-and-white altered ultramafic. Intense diopside alteration. Magnetite veins and blebs common. Trace brassy sulphide associated with magnetite. Minor accessory red-brown garnet and late coarse calcite patches. Moderately strong foliation between 60-70 degrees to CA. Minor disseminated bright green silicate (probably Ni rich). Small zones semi-massive magnetite.
Trial_Ha	A223A	40.5	43.7	Ccc	GWAC	DiSi	A2	0.00	Sp			Massive pale purplish, off-white, grey and green intensely altered mafic rock probably volcanoclastics. Alteration varies from silica-k-feldspar to diopside and actinolite-chlorite. Somewhat broken.
Trial_Ha	A223A	43.7	44.3	Csu	SKSP	Di	A1	0.05	Sp			Massive pale grey/grey-green intensely altered ultramafic skarn? Intense diopside alteration, trace sulphide, minor calcite and epidote veinlets.
Trial_Ha	A223A	44.3	48.1	Ccc	GWAC	SiKf	P2	0.00	Sp			Massive pale purplish, off-white and cream intensely altered and metasomatised mafic rock, probably volcanoclastics. Intense silica-k-spar alteration with minor epidote and actinolite.
Trial_Ha	A223A	48.1	50	Csu	SKSP	Di	A1	0.05	Sp	Fo	50	Massive pale grey/grey-green intensely altered ultramafic skarn. Intense diopside alteration, trace sulphide, trace zaratite. Moderate foliation around 50 degrees to CA.
Trial_Ha	A223A	50	55.1	Ccc	GWAC	SiKf	P2	0.00	Sp			Massive pale purplish, off-white and cream intensely altered and metasomatised mafic rock, probably volcanoclastics. Intense silica-k-spar alteration with minor epidote and actinolite.
Trial_Ha	A223A	55.1	56.1	Csu	SKSP	Di	A1	0.05	Sp	Fo	50	Massive pale grey/grey-green intensely altered ultramafic skarn. Intense diopside alteration, trace sulphide, trace zaratite. Moderate foliation around 50 degrees to CA. Minor epidote.

Allegiance Metals Drill Log

Project	BHID	From	To	Stratigraphic	Rock Type	Alteration	Colour	Visual S%	L.Cont.	Struct	BCA	Description
Trial_Ha	A223A	56.1	57.8	Ccc	GWAC	SiKf	P2	0.00	Sp			Massive pale purplish, off-white and cream intensely altered and metasomatised mafic rock, probably volcaniclastics. Intense silica-k-spar alteration with minor epidote and garnet.
Trial_Ha	A223A	57.8	66.1	Csu	SKSP	DiSi	G2	0.70	Sp			Massive pale green and mid grey intensely altered and metasomatised ultramafic and possibly some minor xenoliths of mafic rock? To about 60.9 interval is pale green diopside +/- tremolite with minor zaratite, epidote and sulphide; from 60.9 to about 64.2m the rock becomes dark grey, strongly silicified and considerably more sulphide rich, along with common magnetite as disseminations and semi-massive patches. The remainder of the interval is pale green tremolite-diopside-calcite altered. Sulphide is probably a combination of po and pe.
Trial_Ha	A223A	66.1	69.7	Cba	VBLB	PhAc	B3	0.10	Gr			Massive mid to dark brown and green, brecciated and altered basaltic volcaniclastic sandstone and siltstone. Pervasive phlogopite alteration with patchy strong actinolite +/- diopside overprint; also minor intense epidote overprint.
Trial_Ha	A223A	69.7	92.4	Ccc	GWAC	PhAc	B3	1.00	Ft	Bd	45	Massive to well-bedded quartz-feldspar lithic wacke, siltstone and minor shale. Bedding variable where noted, from 30 to 60 degrees to CA. Moderate pervasive phlogopite alteration with minor actinolite +/- diopside overprint. Sulphide rare to about 86m, then quite pyrrhotitic to end of interval with trace associated cp. Trace coarse red/honey-brown sphalerite and galena as disseminations at uphole end of interval.
Trial_Ha	A223A	92.4	92.6		FALT	Ch	G4	0.00	Ft	Ft	60	Small brittle fault in altered sediments. Minor chlorite alteration.
Trial_Ha	A223A	92.6	147.9	Ccc	GWAC	PhAc	B3	1.00	Gr	Bd	45	Massive to foliated dark brown/grey-brown lithic greywacke and siltstone. Bedding generally indistinct and/or brecciated. Where preserved/noted typically around 45-60 degrees to core axis but variable. Some zones foliation appears tectonic at 60 degrees to CA. Pervasive phlogopite alteration. Hornfelsed. Mostly sulphide is rare, but locally abundant (eg 5% average over 103-107m). Where present sulphide is mostly pyrrhotite as blebs and stringers with trace chalcopyrite and commonly associated with fine grained milky silica. Domainal actinolite-diopside overprinting towards lower contact.

Allegiance Metals Drill Log

Project	BHID	From	To	Stratigraph	Rock Type	Alteration	Colour	Visual S%	L.Cont.	Struct	BCA	Description
Trial_Ha	A223A	147.9	166.2	Ccc	VBLF	AcPh	A4	1.50	Gr	Bd	45	Massive to bedded dark brown, grey, pale grey and green moderately to intensely altered and metasomatised basaltic volcanoclastic sediments. Highly variable alteration assemblage includes actinolite, diopside, silica, phlogopite, magnetite, axinite, carbonate. Bedding locally preserved but mostly unrecognisable. Locally strongly pyrrhotitic.
Trial_Ha	A223A	166.2	171.4	Ccc	GWAC	PhSi	B4	1.00	Gr	Bd	55	Massive to well-bedded dark brown/grey-brown greywacke and siltstone. Pervasive phlogopite-silica alteration. Minor pyrrhotite stringers. Core moderately broken. Bedding brecciated and core somewhat vughy with chlorite alteration adjacent to uphole contact.
Trial_Ha	A223A	171.4	175.1 END	Ccc	VBLF	PhPr	B3	0.00	Bk			Massive dark brown and pale cream-grey patchily altered basaltic volcanoclastics. Pervasive phlogopite alteration with strong domainal diopside-silica-prehnite? overprint. Bedding indistinct.

Allegiance Metals Drill Log

Project	BHID	From	To	Stratigraphy	Rock Type	Alteration	Colour	Visual S%	L.Cont.	Struct	BCA	Description
Trial_Ha	A221	0	12		LOSS							Tri-cone to 12m no core recovery
Trial_Ha	A221	12	18	Ccc	SILT	CyLi	A3	0.30	Bk	Bd		Mid-grey thinly bedded/laminated siltstone and lithic sandstone. Broken rubbly ground with poor core recovery. Recovered fragments fairly fresh but some minor clay and limonite is present. Bedding appears inconsistent, probably deformed.
Trial_Ha	A221	18	29.1	Ccc	VBLB	PhSi	B4	0.80	Gr			Massive dark grey-brown basaltic volcanoclastics. Mix of thinly bedded/laminated siltstones, lithic wacke/greywacke and thin zones of poorly sorted polymictic breccias. Bedding disrupted and brecciated. Alteration dominated by phlogopite-silica with minor actinolite and/or diopside. Sulphide, mostly pyrite, as disseminations, selective clast replacement and fracture coatings. Minor disseminated sphalerite adjacent to lower contact which is mixed over about 1m. Increasingly sulphide rich towards downhole contact.
Trial_Ha	A221	29.1	30.3	Csu	SKSP	TmSp	G3	1.50	Sp			Massive mid-green strongly altered ultramafic/mafic dyke. Tremolite-serpentine altered with disseminated pyrrhotite, galena, sphalerite and possibly pentlandite? Lower contact sharp but undulating. Minor calcite veins and blebs with diffuse edges.
Trial_Ha	A221	30.3	66.6	Ccc	VBLB	PhSi	B4	0.80	Gr	Bd	35	Massive dark grey-brown basaltic volcanoclastics. Mix of thinly bedded/laminated siltstones, lithic wacke/greywacke and zones of poorly sorted polymictic breccia/conglomerate. Bedding disrupted and brecciated. Alteration dominated by phlogopite-silica with minor actinolite and/or diopside. Sulphide, mostly pyrrhotite as veins and blebs. Good ground conditions. BCA highly variable.
Trial_Ha	A221	66.6	74.4	Ccc	VBLB	DiAc	A2	0.80	Gr			Massive pale grey and grey-green altered basaltic volcanoclastics. Strongly brecciated and altered greywacke/lithic wacke and siltstone. Alteration dominated by pale-bleached diopside with lesser actinolite and minor phlogopite. Pyrrhotite veins and disseminations throughout. Very good ground, case off to NQ at 70m.
Trial_Ha	A221	74.4	84.2	Ccc	SILT	PhSi	B3	2.50	Sp			Pale to mid-brown laminated siltstone with lesser lithic wacke and shale. BCA highly irregular, bedding disrupted and brecciated. Pyrrhotite veins and blebs common.
Trial_Ha	A221	84.2	109	Ccc	LRQB	KfSi	A1	0.75	Sp			Massive very pale grey quartz phyric to aphyric rhyolite lava and lava breccia. Peperitic lower contact. Small lithic clasts (siltstone) occur sporadically

Allegiance Metals Drill Log												
Project	BHID	From	To	Stratigraph	Rock Type	Alteration	Colour	Visual S%	L.Cont.	Struct	BCA	Description
Trial_Ha	A221	109	193.4	Ccc	SILT	PhAc	B4	0.50	Sp	Bd	30	throughout. Pyrrhotite blebs and small stringers occur in localised concentrations. Patchy crystalline k-feldspar/diopside alteration.
Trial_Ha	A221	193.4	194.6	Ccc	EBLB	PhAc	B4	0.75	Sp			Mid to pale brown laminated coarse siltstone/fine grained greywacke/lithic wacke with much lesser thin lithic sandstone beds and rare poorly sorted pebble breccia. BCA generally quite consistent around 30 degrees, but variable between 5 and 60 degrees. Pervasive phlogopite alteration. Phyrrotite-pyrite locally common but overall minor, as cross-cutting veins, stratabound/stratiform disseminations and selective clast replacement. Graded beds mainly fine uphole. Rare Ac veins, usually with minor associated epidote, sphalerite and galena.
Trial_Ha	A221	194.6	203.2	Ccc	GWAC	Ph	B3	0.50	Gr	Bd	20	Massive dark brown and green pebble polymictic pebble breccia/conglomerate. Poorly sorted sub-rounded clasts. Some clasts appear to be a mafic plutonic possibly dolerite or gabbro. Pervasive phlogopite alteration with some actinolite overprinting and disseminated/clast replacement pyrrhotite.
Trial_Ha	A221	203.2	207.4	Ccc	GWAC	SiPo	A4	1.00	Gr			Mid to pale brown thinly bedded to massive fine to medium grained greywacke. Planar joints with chlorite-pyrite coatings. Disseminated and vein pyrrhotite. Fine bleached fractures and some larger brecciated zones which are also bleached. Pervasive phlogopite alteration.
Trial_Ha	A221	207.4	232.1	Ccc	GWAC	PhDi	B3	0.50	Gr	Bd	20	Very dark grey greywacke with minor siltstone and shale. Hard brittle ground, silicified? Silica-pyrrhotite veining.
Trial_Ha	A221	232.1	233	Ccc	CONG	PhAc	B4	0.50	Sp			Mid to pale brown thinly bedded to massive fine to medium grained greywacke. Lesser siltstone and rare pebble conglomerate/breccia. Pervasive phlogopite alteration with fine bleached fractures. Some diopside alteration in siltstones increasingly common downhole. Planar joints with chlorite-pyrite coatings. Bedding usually consistent around 20-30 degrees to core axis, brecciated and disrupted in places.
Trial_Ha	A221											Massive dark brown and green polymictic pebble breccia/conglomerate. Poorly sorted well-rounded clasts. Some clasts appear to be a mafic plutonic possibly dolerite or gabbro. Pervasive phlogopite alteration with some actinolite overprinting and veinlet pyrrhotite.

Allegiance Metals Drill Log

Project	BHID	From	To	Stratigraph	Rock Type	Alteration	Colour	Visual S%	L.Cont.	Struct	BCA	Description
Trial_Ha	A221	233	244.8	Ccc	SILT	PhDi	B3	0.50	Gr	Bd	25	Mid to pale brown thinly bedded to laminated siltstone with lesser coarse sandy layers and minor thin zones of pebble breccia. Pervasive phlogopite alteration with fine bleached fractures. Some diopside alteration in siltstones. Bedding usually consistent around 20-30 degrees to core axis, brecciated and disrupted in places. Hard brittle core (hornfelsed) moderately broken.
Trial_Ha	A221	244.8	256	Ccc	VBLB	SiKf	R3	0.75	Sp			Massive to foliated red-brown and pale grey, hard to very hard and brittle altered basaltic volcaniclastics? Some preserved clastic textures, also textures which appear sub-mylonitic/deformation related. Alteration dominated by silicification with K-feldspar? and some remanent phlogopite. Carbonate veins with minor sulphides which include py-cp-po-galena and at least two phases of sphalerite (one fe-rich, one fe-poor). Probably altered and deformed Crimson/Contiguous Ck.
Trial_Ha	A221	256	266.4	Ccc	SILT	PhDi	B4	0.75	Gr			Massive dark brown siltstone and greywacke. Pervasive phlogopite alteration. Bedding generally obscure or disrupted and brecciated. Hornfelsed. Brittle, moderately broken. Some diopside alteration. Po disseminations and stringers.
Trial_Ha	A221	266.4	279.4	Ccc	VBLB	PhAc	B4	0.50	Sp			Massive to foliated brown, red-brown to green and white altered basaltic volcaniclastics. Some preserved coarse clastic textures, also textures which appear sub-mylonitic/deformation related. Alteration varies from phlogopite to phlogopite-diopside and actinolite-diopside, also silicified. Probably Contiguous Ck
Trial_Ha	A221	279.4	429.8	Ccc	LRQB	SiKf	A2	0.50	Sp			Moderately broken, hard brittle ground. Massive very pale grey quartz phyric to aphyric rhyolite. Commonly contains pebble to cobble size sub-rounded to well-rounded clasts of sedimentary rock, dominantly siltstone. Patches foliated (flow-banding?). Partially resorbed quartz phenocrysts. Common soft black to dark green laths; possibly chloritised biotite? Some later quartz veining. Minor to trace po-py-sp.
Trial_Ha	A221	429.8	434.8	Csu	SERP	SpCb	N	0.00	Ft			Massive mottled black, dark green and grey moderately to strongly altered serpentinitised ultramafic. Alteration is serpentine-calcite-magnetite-tremolite. No significant sulphide detected.
Trial_Ha	A221	434.8	435.3		FALT	CyCb	N	0.00	Ft			Brittle fault in ultramafic. Some core loss. In recovered core, minor clay alteration and some carbonate fill.

Allegiance Metals Drill Log												
Project	BHID	From	To	Stratigraph	Rock Type	Alteration	Colour	Visual S%	L.Cont.	Struct	BCA	Description
Trial_Ha	A221	435.3	441.2	Csu	SERP	TmSp	G3	0.00	Gr			<p>Massive mottled mid-green and very dark green-grey altered serpentinitised ultramafic. Strong tremolite alteration. No significant sulphide detected.</p> <p>Massive white/off-white intensely altered ultramafic. Very strong to intense diopside alteration.</p> <p>Massive, mottled very dark green, grey and paler green-white serpentinitised ultramafic. Mottled tremolite alteration. Abundant magnetite near start of interval but very minor in remainder. Minor coarse grained disseminated calcite.</p> <p>Massive white/off-white intensely altered ultramafic. Very strong to intense diopside alteration with some later intense silicification in parts. Fine flecks and veinlets of a bright green nickel silicate in silicified zone. Late calcite-molybdenite veining in silicified zone (very minor).</p> <p>Massive mottled black, dark green and grey moderately to strongly altered serpentinitised ultramafic. Alteration is serpentine-calcite-magnetite-tremolite. Trace brassy sulphide. Parts weakly foliated at around 10-20 degrees to CA</p> <p>END</p>
Trial_Ha	A221	441.2	445.2	Csu	SKSP	Di	W2	0.00	Gr			
Trial_Ha	A221	445.2	451.4	Csu	SERP	SpTm	G4	0.00	Sp			
Trial_Ha	A221	451.4	465.9	Csu	SKSP	DiSi	A2	0.00	Sp			
Trial_Ha	A221	465.9	485	Csu	SERP	SpCb	G3	0.05	Bk			

Allegiance Metals Drill Log

Project	BHID	From	To	Stratigraphy	Rock Type	Alteration	Colour	Visual S%	L.Cont.	Struct	BCA	Description
Trial_Ha	A224	0	1		SOIL							Peat soil.
Trial_Ha	A224	1	3.6	Ccc	SSLT	Li	B3	0.00	Sp			Weathered and fissile, pale cream to brown siltstone. Deeply weathered and broken. Clay altered with Humic acid staining.
Trial_Ha	A224	3.6	12.7		CLAY	Cy	OB	0.00	Sp			Orange and brown/green clay. Deeply weathered and completely decomposed siltstones.
Trial_Ha	A224	12.7	21.5	Ccc	GWAC	PhDi	C2	0.00	Sp			Pale cream and brown siltstone and greywacke. Intense phlogopite alteration and overprinting cream diopside alteration. Intensely metasomatised. Minor relict bedding and feldspar grains.
Trial_Ha	A224	21.5	24	Csu	SKSP	TrDi	C1	0.00	Sp			Massive, pale cream, intensely metasomatised ultramafic skarn. Pervasive fine grained crystalline diopside alteration with minor relict magnetite veining. Late vughy alteration veins with trace sphalerite-galena.
Trial_Ha	A224	24	25.5	Csu	MMAG	Mt	N	0.00	Sp	Fo	80	Massive foliated and veined magnetite. Coarse magnetite with minor serpentinite and diopside altered ultramafic. Strongly sheared with late vughy bleaching. Minor disseminated sphalerite.
Trial_Ha	A224	25.5	34	Csu	SKSP	MtDi	A3	0.00	Sp	Fo	75	Laminated and mylonitic ultramafic skarn and magnetite. Alternating mylonitic layers of 2 to 50 cm. Strongly foliated and sheared. Ultramafic is composed of cream fine grained diopside skarn with black magnetite banding. Vughy and faulted zones within mylonite.
Trial_Ha	A224	34	54.1	Csu	SERP	SpMt	G4	0.00	Gr	Vn	70	Massive, dark grey/green serpentinite. Mine disseminated magnetite and minor medium grained euhedral magnetite to 2mm. Sparse, late carbonate/chalcedony veins.
Trial_Ha	A224	54.1	70.1	Csu	SKSP	SpDi	A2	0.00	Ft			Massive, pale grey and black ultramafic skarn. Mottled (colloidal?) textured diopside skarn with relict remnant serpentinite. Up to 5% massive magnetite nodules and veins.
Trial_Ha	A224	70.1	73.7		FALT							Faulted skarned ultramafic. 2.8m cavity.
Trial_Ha	A224	73.7	86	Cba	VBLM	DiAc	A2	0.00	Gr	Bd	45	Massive feldspar-lithic volcanoclastic greywacke and siltstone. Intense actinolite-diopside alteration overprinting earlier phlogopite alteration. Graded beds facing up hole. Strong hornfelsing and metsomatic alteration.
Trial_Ha	A224	86	107	Ccc	GWAC	PhAc	B4	0.00		Bd	45	Massive, dark brown, feldspar-lithic volcanoclastic greywacke. Graded beds with

Allegiance Metals Drill Log

Project	BHID	From	To	Stratigraph	Rock Type	Alteration	Colour	Visual S%	L.Cont.	Struct	BCA	Description
Trial_Ha	A224	107	113	Cba	VBLM	DiAc	A2	0.00	Gr	Bd	60	up hole facing. Pervasive phlogopite alteration. Moderately hornfelsed. Massive feldspar-lithic volcanoclastic greywacke and siltstone. Intense actinolite-diopside alteration overprinting earlier phlogopite alteration. Graded beds facing up hole. Strong hornfelsing and metsomatic alteration.
Trial_Ha	A224	113	153	Ccc	GWAC	PhAc	B4	0.00	Ft	Bd	60	Massive, dark brown, feldspar-lithic volcanoclastic greywacke. Graded beds with up hole facing. Pervasive phlogopite alteration. Moderately hornfelsed. Patchy, late actinolite-diopside alteration veins and selvages.
Trial_Ha	A224	153	153.2		FALT	Cb	W	0.00	Ft	Ft	30	Late brittle fault. White calcite infill.
Trial_Ha	A224	153.2	157	Ccc	GWAC	PhAc	B4	0.00	Gr	Bd	65	Massive, dark brown, feldspar-lithic volcanoclastic greywacke. Graded beds with up hole facing. Pervasive phlogopite alteration. Moderately hornfelsed. Patchy, late actinolite-diopside alteration veins and selvages.
Trial_Ha	A224	157	171.1	Cba	VBLM	DiAc	A2	0.30	Gr	Bd	60	Massive feldspar-lithic volcanoclastic greywacke and siltstone. Intense actinolite-diopside alteration overprinting earlier phlogopite alteration. Graded beds facing up hole. Strong hornfelsing and metsomatic alteration. Coarse sporadic pyrrhotite veining and blebs associated with intense actinolite alteration.
Trial_Ha	A224	171.1	188	Ccc	GWAC	PhAc	B4	0.10	Gr	Bd	65	Massive, dark brown, feldspar-lithic volcanoclastic greywacke. Graded beds with up hole facing. Pervasive phlogopite alteration. Moderately hornfelsed. Patchy, late actinolite-diopside alteration veins and selvages with minor pyrrhotite veins. EOH

Appendix 2.

Petrographic Report

REPORT N2885PE08

PETROLOGY OF SIXTEEN SAMPLES FROM AVEBURY TASMANIA

A.B.N. 30 008 127 802

Telephone	(Aust):	(08) 8440 7100	Unit 2, 35 Cormack Road	PO Box 338
	(Int):	61 8 8440 7100	Wingfield	Torrensville
Plaza				
Facsimile	(Aust):	(08) 8440 7198	South Australia 5013	South Australia
5031	(Int):	61 8 8440 7198	AUSTRALIA	AUSTRALIA

30 May 2008

Allegiance Metals Pty Ltd
P O Box 62
ZEEHAN
TAS 7469

Attention: David Gibbons

REPORT N2885PE06

PETROLOGY OF SIXTEEN SAMPLES FROM AVEBURY TASMANIA

YOUR REFERENCE:	Email of 18 March 2008
SAMPLE IDENTIFICATION:	30001-30014, 22114 and 22117
MATERIAL:	Diamond drill core and rock samples.
DATE RECEIVED:	27 March 2008
PROJECT MANAGER:	Frank Radke

Frank Radke
Senior Mineralogist

FR : mb

SUMMARY

Sixteen (16) samples submitted by Allegiance Mining for petrological descriptions were given the following rock names.

SAMPLE NUMBER	ROCK NAME
30001	Serpentinised Dunite
30002	Mineralised Diopside Skarn
30003	Diopside Skarn
30004	Diopside Skarn
30005	Chlorite Altered Diopside Skarn
30006	Serpentinite
30007	Greisenised Diopside Skarn
30008	Diopside Skarn
30009	Prehnite Altered Diopside Skarn
30010	Mineralised Serpentinite
30011	Tremolite Schist
30012	Carbonate Altered Ultramafic Rock
30013	Rhyolite
30014	Mineralised Serpentinite
22114	Tuffaceous Sediment
22117	Fine-Grained Sandstone

This group of samples consists mainly of altered ultramafic rocks. Most of the samples have been altered to diopside skarns. Most of the diopside skarns contain disseminated chromite indicating the original rocks were ultramafic rocks. This suite also contains some serpentinised ultramafic rocks as well as one sample (30012) which show pervasive carbonate (probably calcite) alteration. Some of the diopside skarns exhibit prehnite veining and alteration and this is most pronounced in sample 30009.

The sulphide mineralisation in these samples consists mainly of pentlandite and pyrrhotite. Sample 30010 shows supergene replacement of pentlandite by violarite and pyrrhotite by pyrite.

Sample 30013 is thought to be a welded tuff or ignimbrite of rhyolitic composition while sample 22114 is a sedimentary rock with a significant tuffaceous component. Sample 22117 is a recrystallised, fine-grained detrital sedimentary rock. Samples 22114 and 22117 contain moderate amounts of a reddish brown, intensely pleochroic biotite of metamorphic or metasomatic origin.

1. INTRODUCTION

Sixteen (16) samples were submitted by Allegiance Metals Pty Ltd for petrographic and mineragraphic description. Seven of the samples were submitted for both petrographic and mineragraphic description and nine samples for petrographic description only.

2. PROCEDURE

Thin sections were made of the nine samples submitted for petrographic description and polished thin sections were made of the seven samples submitted for petrographic and mineragraphic description. The sections were microscopically examined and mineral proportions were visually estimated. Selected hand specimens (samples 30013, 22114 and 22117) were stained with sodium cobaltinitrite after hydrofluoric acid etch to detect the possible presence and location of potash feldspar. This is only mentioned in the hand specimen descriptions where potash feldspar has been detected. Some samples were also tested for calcite using dilute hydrochloric acid.

3. PETROGRAPHIC AND MINERAGRAPHIC DESCRIPTIONS

The individual petrographic and mineragraphic descriptions follow.

SAMPLE: 30001

ROCK NAME: Serpentinised Dunite

HAND SPECIMEN: This is a massive rock with a mottled dark to medium grey colour.

POLISHED THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Serpentine	60	Alteration
Olivine	20	Igneous
Talc	14	Alteration
Magnetite	5	Alteration/(?)Igneous
Chromite	1	Igneous
Pentlandite	Trace	(?)Igneous
(?)Pyrite	Trace	(?)Igneous
(?)Violarite	Trace	Alteration

This sample consists of olivine crystals between 10mm and 25mm in size partially replaced by serpentine forming veins and fracture linings within the olivine crystals. Remnants of the olivine crystals show uniform extinction over areas ranging up to 2mm indicating the size of the original olivine crystals. Talc is concentrated in patches up to several millimetres wide as small, randomly oriented flakes below 0.1mm long located interstitially between the olivine crystals.

Magnetite is disseminated through the rock as anhedral grains ranging up to 1mm wide although most of the magnetite has a grain size below 0.1mm. The magnetite is intergrown with the serpentine and is locally concentrated in irregular patches up to a few millimetres wide.

Chromite is disseminated through the rock as crystals ranging up to 0.8mm wide. Most of the chromite crystals are rimmed by magnetite. Traces of sulphide were noted in an area approximately 1mm wide. The sulphide consists mainly of small pentlandite grains below 0.1mm. Very small amounts of possible pyrite and violarite were also noted in the area containing pentlandite. The sulphides are also intergrown with the serpentine.

This is an olivine rich ultramafic rock (probably a dunite), which has been largely replaced by serpentine. Most of the magnetite is thought to be an alteration product associated with the serpentinisation but some of the magnetite could be an original igneous mineral.

SAMPLE: 30002

ROCK NAME: Mineralised Diopside Skarn

HAND SPECIMEN: This is a fine-grained rock with a mottled green to pale grey colour.

POLISHED THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Clinopyroxene (Diopside)	75	Metamorphic
Pentlandite	13	(?)Igneous
Pyrrhotite	10	(?)Igneous
(?)Perovskite	1	(?)Igneous
Alteration Product	1	Alteration

This sample consists mainly of a coarse-grained clinopyroxene mosaic with a grain size of 1 to 2mm. In some areas the clinopyroxene forms much finer grained aggregates with a grain size below 0.5mm. The clinopyroxene is probably diopside

Sulphides are concentrated in patches up to 1cm and consist of both pentlandite and pyrrhotite in sub-equal amounts. Minor sulphides also form fine disseminations with a grain size below 0.1mm. Some clinopyroxene crystals contain skeletal intergrowths of pentlandite.

A mineral tentatively identified as perovskite is disseminated through the rock as inclusions within clinopyroxene crystals below 0.02mm wide. The perovskite generally has a translucent reddish brown colour and forms angular crystals. A small number of these crystals have euhedral cubic shapes. The perovskite is concentrated in patches of finer grained pyroxene up to a few millimetres wide with a slightly turbid character. The perovskite crystals are generally rimmed by an unidentified mineral thought to be an alteration product of perovskite.

This is a calc-silicate skarn comprised mainly of clinopyroxene. Sulphide mineralisation consisting of pentlandite and pyrrhotite is present as patches up to about 1cm in size and may have been inherited from an original ultramafic rock.

SAMPLE: 30003

ROCK NAME: Diopside Skarn

HAND SPECIMEN: This is a fragmental appearing rock containing brown areas up to several centimetres in size separated by irregular veins with a pale grey colour. Minor sulphides are locally present as small patches within areas up to a few millimetres wide.

THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Clinopyroxene (Diopside)	55	Metamorphic
Phlogopite	25	Metamorphic
Chlorite	13	Alteration
Sphene	5	Metamorphic
Opagues	2	Metamorphic

This sample consists of randomly oriented prismatic clinopyroxene (probably diopside) crystals up to 1.5mm long forming a mosaic intergrown with interstitial phlogopite. The phlogopite is a weakly pleochroic brown phyllosilicate forming flakes up to 0.5mm long. Although most of the phlogopite forms interstitial intergrowths between clinopyroxene crystals in some areas the phlogopite forms flaky aggregates comprised of small flakes below 0.2mm long. Small grains and granular aggregates of sphene are typically intergrown with the phlogopite.

The phlogopite shows varying degrees of alteration to a colourless chlorite with low birefringence. In some areas the phlogopite has been completely replaced by chlorite but other areas consist of phlogopite marginally replaced by chlorite. It is thought that the grey veins noted in hand specimen represent areas in which the phlogopite has been largely or completely replaced by chlorite.

The thin section includes a small patch, approximately 1mm wide, comprised of finely divided opaque grains with a grain size below 0.2mm.

This is a diopside skarn thought to be a metamorphosed and ultramafic rock.

SAMPLE: 30004

ROCK NAME: Diopside Skarn

HAND SPECIMEN: This is a massive rock with a mottled, pale green colour.

POLISHED THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Clinopyroxene (Diopside)	95	Metamorphic
Sphalerite	3	Metamorphic
(?)Biotite	2	Alteration
Chalcopyrite	Trace	Alteration
Pentlandite	Trace	Alteration
Pyrite	Trace	(?)Alteration

This is essentially a monomineralic rock comprised of clinopyroxene (probably diopside) crystals between 0.5 and 2mm long. Most of the clinopyroxene forms a mosaic of anhedral to weakly prismatic crystals but irregular voids up to approximately 1mm wide are lined with prismatic clinopyroxene crystals. Within localised areas the clinopyroxene forms very finely granular aggregates with a grain size below 0.1mm. Locally the clinopyroxene shows incipient alteration to a pale brown phyllosilicate thought to be biotite. This alteration is particularly pronounced around some of the irregular voids.

The thin section includes an area approximately 1cm wide consisting of anhedral sphalerite. In transmitted light this sphalerite has a dark reddish brown colour indicating a high iron content. The sphalerite also contains abundant finely divided chalcopyrite inclusions. The sphalerite appears to fill an irregular void lined with recrystallised clinopyroxene. Trace levels of chalcopyrite, pentlandite and pyrite form very small disseminations with a grain size below 0.05mm. These disseminated sulphides generally occur interstitially between clinopyroxene crystals and are generally associated with areas showing incipient biotite alteration.

This is a diopside skarn possibly representing a metamorphosed ultramafic rock such as a pyroxenite. Sulphide mineralisation consists mainly of sphalerite with very small amounts of other sulphides including chalcopyrite, pentlandite and pyrite.

SAMPLE: 30005

ROCK NAME: Chlorite Altered Diopside Skarn

HAND SPECIMEN: This is a pale green rock, which is cut by randomly orientated pale grey to off-white veins up to a few millimetres wide.

POLISHED THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Clinopyroxene (Diopside)	75	Metamorphic
Chlorite	20	Alteration
Magnetite	3	Alteration
Pentlandite	1	Alteration
Pyrrhotite	Trace-1	Alteration
Chalcopyrite	Trace	Alteration
Phlogopite	Trace	Alteration

This sample consists mainly of weakly prismatic clinopyroxene (probably diopside) crystals up to 1.5mm long with a random orientation. Within some areas the clinopyroxene form very finely granular aggregates with a grain size below 0.05mm

The clinopyroxene is altered to chlorite along irregular veins, which would represent the paler coloured veins noted in hand specimen. Most of the chlorite forms well-developed flakes up to 0.5mm long with a weakly pleochroic green colour and anomalous birefringence. A small proportion of the chlorite forms finely divided flaky aggregates with a pale brown colour. Some of the larger, weakly pleochroic green chlorite flakes contain small areas with high birefringence and a weakly pleochroic brown colour, which appear to be remnants of a phyllosilicate (probably phlogopite).

Magnetite and sulphides comprised largely of pentlandite and pyrrhotite with traces of chalcopyrite are generally intergrown with the chlorite veins. The magnetite forms anhedral grains up to 0.3mm wide. Some of the larger magnetite crystals have a zoned character with darker cores. These cores lack the deep red translucence in transmitted light typical of chromite and are thought to be chrome rich magnetite rather than true chromite. The sulphides form anhedral grains generally below 0.2mm wide located interstitially between the chlorite flakes. In some areas pentlandite forms very fine interstitial

intergrowths between fine-grained clinopyroxene crystals. Some magnetite and sulphides are disseminated through the rock as interstitial intergrowths between clinopyroxene grains.

This is a diopside skarn alteration with chlorite veins containing concentrations of magnetite and sulphides. There is some evidence that much of the chlorite represents original phlogopite, which has been subsequently completely replaced by chlorite.

SAMPLE: 30006

ROCK NAME: Serpentinite

HAND SPECIMEN: This is a massive rock with a fine-grain size and a dark green colour. A margin of this sample has a white vein approximately 3cm wide. Testing with dilute hydrochloric acid produces strong effervescences in this vein indicating it contains calcite. The fine-grained host rock also shows localised effervescence along what narrow veins or granular areas indicating they contain calcite.

POLISHED THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Serpentine	85	Alteration
Magnetite	8	Alteration
Chromite	3	Igneous
(?)Greenalite	3	Alteration
Pentlandite	Trace-1	Alteration
Pyrrhotite	Trace	Alteration
Carbonate	Trace	Alteration
Sphalerite	Trace	Alteration
Chalcopyrite	Trace	Alteration
Olivine	Trace	Alteration

This sample consists of the fibrous serpentine forming a matrix through which anhedral magnetite crystals are disseminated. The serpentine generally forms an interlocking mesh with a localised weakly developed preferred orientation. The rock shows no remnant textures from the original ultramafic rock although a single small remnant of olivine 0.05mm wide was noted. Intergrown with the serpentine is a reddish brown phyllosilicate as irregular flakes up to 0.1mm long. This phyllosilicate was identified as a member of the kaolinite-serpentine group (possibly greenalite) by X-ray diffraction analysis in sample 30008.

Magnetite forms anhedral grains and aggregates up to 0.2mm wide. Large chromite crystals up to 1mm wide are disseminated through the rock and are typically rimmed by magnetite. Sulphides comprised mainly of pyrrhotite are disseminated through the rock as irregular patches up to 1mm wide. Minor pyrrhotite and traces of sphalerite and chalcopyrite are intergrown with some of the pentlandite rich sulphide patches. In transmitted light the sphalerite ranges in colour from a pale yellow to a deep red indicating variable iron content. Minor carbonate was noted as fine intergrowths with some of the sulphides. Testing of the hand specimen suggests this carbonate could be calcite. Calcite was also noted in the hand specimen as fine disseminations in the serpentinite but none could be seen in thin section.

This is an ultramafic rock possibly representing a dunite or peridotite, which has been completely altered to serpentine with the development of moderate amounts of magnetite.

SAMPLE: 30007

ROCK NAME: Greisenised Diopside Skarn

HAND SPECIMEN: This is a fine-grained rock with a massive texture and a mottled pale grey to off-white colour. The rock contains irregular black patches up to about 1 cm in size.

THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Clinopyroxene (Diopside)	45	Metamorphic
Clay/Sericite	35	Alteration
Tourmaline	15	Alteration
Sphene	3	Metamorphic
Chlorite	1	Alteration
Opagues	1	Alteration

This sample consists mainly of prismatic clinopyroxene crystals up to 2mm long intergrown with large patches of finely divided phyllosilicates termed clay/sericite in the above list of minerals. The clinopyroxene is most likely diopside and shows variations in grain size and texture within different areas although most areas consist of prismatic clinopyroxene crystals. The clay/sericite forms patches up to a few centimetres wide as a fine, felsic matrix of weakly to moderately birefringent phyllosilicates. The clay/sericite could represent completely altered pre-existing mineral such as feldspar.

Tourmaline forms prismatic crystals up to 1mm in size as well as angular, interstitial intergrowths between clinopyroxene crystals. The tourmaline is a pleochroic variety ranging in colour from orange to green. Sphene is disseminated through the rock as crystals and aggregates up to 0.3mm wide. Most of the sphene grains and aggregates have anhedral shapes although some exhibit euhedral prismatic shapes.

A colourless chlorite with low birefringence occurs interstitially between clinopyroxene crystals. Minor opaques were also noted locally as angular, interstitial fillings between clinopyroxene crystals.

This is thought to be a diopside skarn, which has been subjected to a greisen style alteration with the development of poorly defined phyllosilicates termed clay/sericite in the above list of minerals and tourmaline.

SAMPLE: 30008

ROCK NAME: Diopside Skarn

HAND SPECIMEN: This is a massive, pale green rock with white mottling and dark grey to black patches up to several millimetres in size.

THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Clinopyroxene (Diopside)	80	Metamorphic
Phlogopite	8	Metamorphic
Chlorite	5	Alteration
Garnet	3	Metamorphic
(?)Greenalite	2	Alteration
Opaques	2	Metamorphic/Alteration

This sample consists mainly of clinopyroxene with variations in grain size and texture within different areas. In some areas the clinopyroxene has a very fine-grain size below 0.1mm while in other areas it forms coarser grained mosaic with grain sizes ranging up to 0.4mm. The thin section includes some irregular void spaces several millimetres wide, which are rimmed by large, prismatic diopside crystals ranging up to 1.5mm in length. Large phlogopite crystals up to 2mm long also rim these voids. The phlogopite has a very weakly pleochroic brown colour and is partially altered to a pleochroic green chlorite.

Garnet forms small crystals below 0.1mm wide concentrated in irregular patches up to several millimetres wide. The garnet is generally intergrown with the diopside and is associated with opaque minerals. Opaques are also disseminated through the rock as anhedral grains and aggregates intergrown with the diopside.

An unusual orange clay mineral forms flakes and flaky aggregates, which fill irregular voids spaces. In some areas this clay contains inclusions of degraded clinopyroxene. X-ray diffraction analysis identified this clay as a member of the kaolinite-serpentine group (possibly greenalite).

This is a diopside skarn showing some late development of phlogopite. The phlogopite has a degraded character showing partial alteration to chlorite and the diopside shows localised alteration to possible greenalite.

SAMPLE: 30009

ROCK NAME: Prehnite Altered Diopside Skarn

HAND SPECIMEN: This is a massive rock with a mottled pale green to white colour.

THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Prehnite	75	Alteration
Clinopyroxene (Diopside)	24	Metamorphic
Sphene	1	Metamorphic
Opagues	Trace	Alteration

This sample consists mainly of prehnite crystals ranging up to 1mm in length intergrown with a clinopyroxene, which is almost certainly diopside. The prehnite crystals form a mosaic, which in some areas have a radiating texture. The clinopyroxene forms prismatic crystals typically below 0.1mm long. A small number of larger clinopyroxene crystals ranging up to 0.4mm wide are present. The clinopyroxene is concentrated in localised areas and in some cases occurs as disseminations through larger prehnite crystals.

Accessory sphene forms anhedral-disseminated grains up to 0.4mm wide. Opagues are disseminated through the rock as very small grains and aggregates below 0.1mm wide. Most of the opagues occur as inclusions in prehnite crystals.

This is thought to be a diopside skarn, which has been largely replaced by prehnite.

SAMPLE: 30010

ROCK NAME: Mineralised Serpentine

HAND SPECIMEN: This is a massive, pale grey rock containing irregular sulphide patches up to 1cm long, which generally have ovoid shapes.

POLISHED THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Serpentine	45	Alteration
Pentlandite	30	Alteration
Magnetite	20	Alteration
Chromite	2	Igneous
Tremolite	2	Alteration
Clay	1	Alteration

The polished thin section was cut from a sulphide rich area and the above mineral proportions reflect this. The sample consists largely of a matted intergrowth of fibrous serpentine through which large pentlandite bodies are disseminated. The pentlandite bodies range up to approximately 1cm in size and are intergrown with magnetite. Most of the magnetite occurs marginal to pentlandite and contains inclusions of chromite.

Acicular tremolite crystals are concentrated around the margins of the magnetite and pentlandite bodies. The tremolite generally forms crystals below 0.2mm in length, which radiate outward from the

magnetite and pentlandite. Locally orange clay forms small intergrowths with the magnetite. This clay is similar the clay identified as possible greenalite in sample 30008 by XRD.

This is a serpentinised ultramafic rock containing moderate amounts of pentlandite and magnetite.

SAMPLE: 30011

ROCK NAME: Tremolite Schist

HAND SPECIMEN: This is a massive rock with a greenish grey colour containing irregular, pale to white grey veins up to 4mm wide.

POLISHED THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Amphibole (Tremolite)	90	Metamorphic
Chlorite	4	Alteration
Prehnite	3	Alteration
Leucoxene	1	Alteration
Opagues	2	Metamorphic

This sample consists mainly of large amphibole crystals up to 2mm wide with a weakly developed preferred orientation defining a vague foliation. The amphibole has a very pale green to colourless character and is most likely tremolite. Although most of the amphibole has a relatively coarse grain size being above 1mm, a small proportion of amphibole forms much finer grained aggregates with a grain size of about 0.1mm.

Chlorite is present as colourless flakes located interstitially between amphibole crystals. Chlorite also forms flaky aggregates up to several millimetres wide. Prehnite forms discontinuous veins up to several millimetres wide as crystals ranging up to 0.2mm long. Turbid aggregates of leucoxene ranging up to 0.2mm are locally intergrown with the amphibole. The leucoxene tends to be concentrated in areas up to several millimetres wide.

Opaques form small, disseminated grains, which are generally below 0.05mm and are included within tremolite crystals.

This is considered to be a metamorphic rock comprised mainly of tremolite and could represent a metamorphosed and altered ultramafic rock. The rock is also veined by prehnite.

SAMPLE: 30012

ROCK NAME: Carbonate Altered Ultramafic Rock

HAND SPECIMEN: This is a very fine-grained rock with a pale grey colour exhibiting an irregular banding comprised of concentric ovoid bodies. Testing with dilute hydrochloric acid produces strong effervescences indicating the sample contains abundant calcite. The rock is also weakly magnetic to a hand magnet.

THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Carbonate (Calcite)	85	Alteration
Talc	5	Alteration
Serpentine	5	Alteration
Chromite	1	Igneous
Sphalerite	Trace	Alteration
Opaques	4	Alteration

This sample consists mainly of a granular carbonate mosaic with variations in grain size along vague bands. The banding noted in hand specimen is emphasised by concentrations of finely divided opaque

material within different bands. The opaques are thought to consist largely of magnetite. Testing of the hand specimen indicates the carbonate consists mainly if not exclusively of calcite.

Serpentine forms fibrous aggregates ranging up to 0.4mm wide. Well-developed flakes of a birefringent phyllosilicate, which is almost certainly talc, are disseminated through the rock. These flakes range up to 0.2mm in length and have a random orientation.

Chromite crystals ranging up to 0.6mm wide are disseminated through the rock and have angular to anhedral shapes. Many of the chromite crystals have opaque rims of probable magnetite. Traces of sphalerite were noted as anhedral grains below 0.1mm wide with a pale yellow colour.

This is thought to be an ultramafic rock such as a dunite or peridotite, which has been subjected to serpentinisation as well as the development of abundant carbonate (mainly calcite), magnetite and talc. The opaques consist mainly of magnetite but it could include small amounts of sulphides. A trace of sphalerite is present in the sample.

SAMPLE: 30013

ROCK NAME: Rhyolite

HAND SPECIMEN: This is a massive, fine-grained rock with a pale grey colour and fine dark grey to black spotting. Staining with sodium cobaltinitrite after hydrofluoric acid etch produces localised staining suggesting minor potash feldspar is locally present.

THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Felsic Matrix	75	Alteration
Sericite	20	Alteration
Quartz Phenocrysts	4	Igneous
Chlorite	1	Alteration
Rutile/Leucoxene	Trace	Alteration
Opaques	Trace-1	Alteration

This sample consists mainly of very finely granular felsic minerals with a grain size below 0.05mm intergrown with finely divided sericite. The sericite is concentrated in irregular patches some of which

have shard shapes indicating a tuffaceous origin. The felsic minerals are thought to consist mainly of quartz although testing of the hand specimen indicates minor potash feldspar is locally present and is also possible that plagioclase could be present. Quartz phenocrysts up to 0.4mm wide are disseminated through the rock and generally have angular, broken appearing shapes.

Chlorite is locally present, as flaky aggregates up to a few millimetres wide comprised of flakes below 0.1mm long. The chlorite is a pale green weakly pleochroic variety with low, anomalous birefringence. The chlorite is commonly intergrown with slightly coarser grained felsic minerals. Very small grains and aggregates of rutile/leucoxene occur as inclusions within the chlorite flakes. Opaques are disseminated through the rock as small grains below 0.05mm wide. The opaques tend to be concentrated in localised areas up to a few millimetres wide, which would represent the dark spots noted in hand specimen.

This is thought to be a welded tuff or ignimbrite of rhyolitic composition showing pervasive alteration to sericite and probable quartz.

SAMPLE: 30014

ROCK NAME: Mineralised Serpentinite

HAND SPECIMEN: This is a fine-grained, massive rock with dark grey and pale grey areas.

POLISHED THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Serpentine	25	Alteration
Tremolite	25	Alteration
Magnetite	20	(?)Igneous/Alteration
Pyrrhotite	10	(?)Igneous
Chlorite	5	Alteration
Olivine	5	Igneous
Violarite	3	Supergene
Pentlandite	3	(?)Igneous
Pyrite	3	Supergene
Chromite	1	Igneous

This thin section was cut from both the dark grey and pale grey areas, which can be seen to consist of serpentine rich and tremolite rich areas respectively. The serpentine forms a fibrous mesh containing remnants of olivine ranging up to 0.6mm wide. The tremolite forms small crystals, which are generally below 0.2mm long and have vague prismatic shapes. The tremolite forms a somewhat matted interlocking matrix with no preferred orientation.

Magnetite is concentrated in irregular patches up to several millimetres wide as anhedral grains and aggregates. Sulphides are intergrown with the magnetite and also form discontinuous veins. The sulphides consist mainly of pyrrhotite but include minor pentlandite as grains ranging up to 0.4mm wide. In the serpentine rich areas the pentlandite has been largely replaced by violarite and the pyrrhotite shows some replacement by supergene pyrite. The supergene alteration is less pronounced in the tremolite rich areas although minor violarite and supergene pyrite are also present in these areas.

Chlorite is locally present as pale yellow flakes with low birefringence. Chromite is disseminated through the rock as anhedral grains ranging up to 1mm in size, which are typically rimmed by magnetite.

This is an ultramafic rock such as a dunite or possibly a peridotite, which shows serpentinisation as well as the localised development of tremolite. Sulphide mineralisation is associated with magnetite. The primary sulphide mineralisation consists of pentlandite and pyrrhotite showing some supergene alteration of pentlandite to violarite and pyrrhotite to pyrite.

This rock consists mainly of felsic minerals thought to be comprised largely of feldspar and quartz. The exact proportions of feldspar and quartz are difficult to determine due to the fine-grain size of the felsic minerals and the presence of finely divided sericite and clay. The felsic minerals show great variations in texture ranging from finely granular aggregates with a grain size below 0.05mm to larger, aggregates comprised of areas up to 0.2mm wide with patchy extinction. These different textures occur in bands up to several millimetres wide, which accounts for the banding noted in hand specimen. The felsic minerals with patchy extinction could be a product of devitrification suggesting that the original sedimentary rock may have had a glassy and probably tuffaceous component. The finely granular bands appear to be a fine-grained detrital sediment.

A reddish brown biotite occurs interstitially between the coarse grained, patchy extinguishing felsic minerals. Slightly better developed biotite flakes ranging up to 0.1mm in length are locally present in discontinuous lenses below 0.2mm wide. The rock also contains an unusual orange clay with low birefringence. Finely divided sericite and weakly birefringent clay are intergrown with the felsic minerals as interstitial intergrowths between grains and as fine dustings of the coarser patchy extinguishing felsic minerals.

Traces of tourmaline were noted as very small prismatic crystals below 0.05mm wide. The well-developed prismatic shape of the tourmaline suggests it could be an alteration product. Minor opaques are disseminated through the rock as small grains below 0.1mm wide.

This is thought to be a sedimentary rock, which has been subjected to low grade metamorphism and alteration with the development of a reddish brown biotite. This sample has a lamellar banded character thought to be a sedimentary origin with some bands having textures suggesting a devitrification and possibly a tuffaceous component.

SAMPLE: 22117

ROCK NAME: Fine-grained Sandstone

HAND SPECIMEN: This is a massive, fine-grained rock with a medium brown colour.

THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Quartz	85	Recrystallised Detrital
Biotite	13	Alteration/(?)Metamorphic
Tourmaline	1	Alteration/Detrital
Zircon	Trace	Detrital
Opagues	1	Alteration

This sample consists of a granular quartz mosaic with a grain size between 0.05 and 0.15mm. The quartz has a recrystallised texture but still retains vague remnant detrital shapes. A reddish brown biotite forms finely divided flaky aggregates below 0.1mm wide located interstitially between the quartz grains. This biotite is similar in character to biotite in Sample 22114.

Accessory tourmaline forms disseminated grains up to 0.4mm wide. Some of the tourmaline forms rounded grains, which are thought to be of detrital origin but tourmaline also forms prismatic crystals, which are thought to be an alteration product. Much of the prismatic tourmaline is intergrown with biotite. A few small zircon crystals below 0.05mm wide are disseminated through the rock. The rock also contains some finely divided opaque grains below 0.05mm wide.

This is a fine-grained quartz rich sedimentary rock such as a fine-grained sandstone, which has been subject to low-grade metamorphism producing a recrystallised texture. The rock also contains interstitial biotite of alteration or possibly metamorphic origin.

SAMPLE: 22114

ROCK NAME: Tuffaceous Sediment

HAND SPECIMEN: This is a banded and foliated rock containing pale grey to white and darker grey bands and lenses ranging from a few millimetres to 1cm in width. Many of the wider, darker grey

bands have irregular lenticular shapes. The rock also exhibits a schistose foliation and the banding has a somewhat folded character. Microchemical tests produced localised weak staining suggesting minor potash feldspar could be present.

THIN SECTION:

An optical estimate of the constituents gives the following:

Mineral	%	Origin
Quartz/Feldspar	75	Sedimentary/(?)Igneous
Biotite	10	Alteration
Clay	10	Alteration
Sericite	5	Alteration
Limonite	Trace	Alteration
Tourmaline	Trace	(?)Alteration
Opagues	Trace-1	Alteration