



FIRST AND FINAL REPORT 2018 - 2021

EL1/2013 Lake Margaret Road

WESTERN TASMANIA



Exploration Licence held by: Australian Mineral Resources

Report compiled by: Dean Delaney, March 2022



EXECUTIVE SUMMARY

AMR acquired Exploration Licence 1/2013 over the Lake Margaret Road area on 9 October 2017, under a transfer arrangement from Stebbo's Diamond Drilling Pty Ltd. With this report, AMR relinquishes the tenement following expiry of the overall five-year Licence period and a twelve-month extension agreement with Mineral Resources Tasmania.

This report addresses tenement relinquishment compliance requirements under the Tasmanian *MRD Act 1995* and summarises AMR's exploration activity, review of exploration and geological interpretations to assist future explorers in the search for new mineral deposits in Tasmania.

AMR has explored this 5 km² block of Cambrian Mount Read Volcanics for gold and metallic sulphide deposits but has not gathered enough evidence of economic mineralisation to justify or attract investment in drilling. Despite the likelihood of several small gold deposits, the tenement no longer remains part of AMR's exploration strategy.

Historically, being 1 km west of the Mt Lyell Mine Lease, the Licence area has been explored for copper/gold VHMS ore bodies, but without encouraging results. The tenement is underlain mostly by Mid-Cambrian Yolande River Sequence volcanoclastic rocks, regionally barren of VHMS mineralisation, and in its northwest by the more prospective CVC Group. These volcanoclastic rocks are intruded by late Mid-Cambrian seafloor intermediate to acid sills. Historically, Devonian quartz traversing the area in veins (and dominating the regolith) has been explored for gold at the Lake Margaret Road Gold site and at other sites immediately adjacent to the Licence area.

Exploration activities 2017/2018 to 2020/2021:

- field mapping, chip sampling and stream sediment sampling
- research on orogenic gold deposit and structural analysis
- geological model development
- preparation of development plans
- investment in drilling equipment.

Exploration costs over the period of tenure total \$89,930.

Prospects

Mapping, modelling and geochemical sampling by AMR have identified seven possible prospects of sub-cropping vein-hosted gold. Targeted mapping of altered volcanoclastics, porphyries and Devonian quartz reefs, and further chip sampling and stream sediment sampling would enable siting of cored boreholes to test deposit extent and ore concentration of small shallow gold prospects.

Acknowledgement:

AMR remains grateful for continued assistance from former licence-holders Rory Wray-McCann and the late Lance Stebbings for field and logistics assistance, local oversight and invaluable contributions of knowledge, support and philosophy that have helped achieve and inspire our efforts.

Cover photograph: Entrance to Lake Margaret Road Gold adit.



CONTENTS

EXECUTIVE SUMMARY	2
CONTENTS.....	3
1. INTRODUCTION	5
Report Brief.....	5
Location.....	5
Map Conventions	5
Geographical setting	7
Access.....	7
Historical setting and current land tenure.....	7
Regional Geological setting.....	11
Local Geology	12
2. PREVIOUS EXPLORATION	16
Gold from Devonian quartz veins	16
VHMS	16
Metallic sulphides in andesitic intrusions.....	17
Remobilised VHMS gold (Henty-style).....	19
Summary of Exploration prior to 2021	21
3. EXPLORATION RATIONALE.....	25
Philosophy.....	25
Technical exploration objectives for EL 1/2013 Lake Margaret Road	25
4. FIELD EXPLORATION RESULTS.....	26
4.1 Catchment-based stream sediment pan-concentrate sampling	26
4.2 Geological mapping and chip sampling	27
4.3 Site inspection of mineral occurrences.....	28
4 DISCUSSION AND GEOLOGICAL MODEL	31
Lithology and Stratigraphy.....	31
Tectonics and Structure	34
Mineralisation mechanisms and patterns	36
5 ENVIRONMENTAL, CULTURAL HERITAGE	40
6 EXPLORATION EXPENDITURE 2016 - 2022.....	40
7 REFERENCES.....	41
8 APPENDICES.....	43



Appendix A1: Catchment based stream sediment gold sampling program	43
Appendix A2: Catchment based stream sediment multi-element sampling results	45
Appendix B: Plants of conservation significance – Lake Margaret area	46
Appendix C: Excerpt from a heritage assessment of the Arthur Pieman Conservation Area	50
Appendix D: Geological observations and stream gold sampling map	51
Appendix E Rock sample locations (easting, northing) and descriptions	53



1. INTRODUCTION

Report Brief

AMR acquired Exploration Licence 1/2013 over the Lake Margaret Road area on 9 October 2017, with 3 years left to run, under a transfer arrangement from Stebbo’s Diamond Drilling Pty Ltd. With this report, AMR relinquishes the tenement with expiry of the complete five-year Licence period and a twelve-month extension agreement with Mineral Resources Tasmania.

This report addresses tenement relinquishment compliance requirements under the Tasmanian *MRD Act 1995* and summarises AMR’s exploration activity, review of exploration and geological interpretations to assist future explorers in the search for new mineral deposits in Tasmania.

Location

Mineral Exploration Licence EL1/2013 Lake Margaret Road is located around 220 km WNW from Hobart – between Tasmania’s West Coast Range and the coast, about 4 hours’ drive from Hobart along the Lyell Highway. The Licence area is a 5 km² block located 3 km north of Queenstown (shown as the faintly shaded block on Figure 1.1 below). The block is 1 km x 5 km, running north.

Immediately south of the block is the Lyell Highway intersection with the Murchison Highway as the Lyell proceeds south-westerly onward towards Strahan and the Murchison tracks north towards Burnie and Zeehan.

The historical Lake Margaret village and hydro-electric power station is less than 1 km due north of the tenement. The access road to Lake Margaret bisects the middle 3 km of the block, for which the area has been named – Lake Margaret Road.

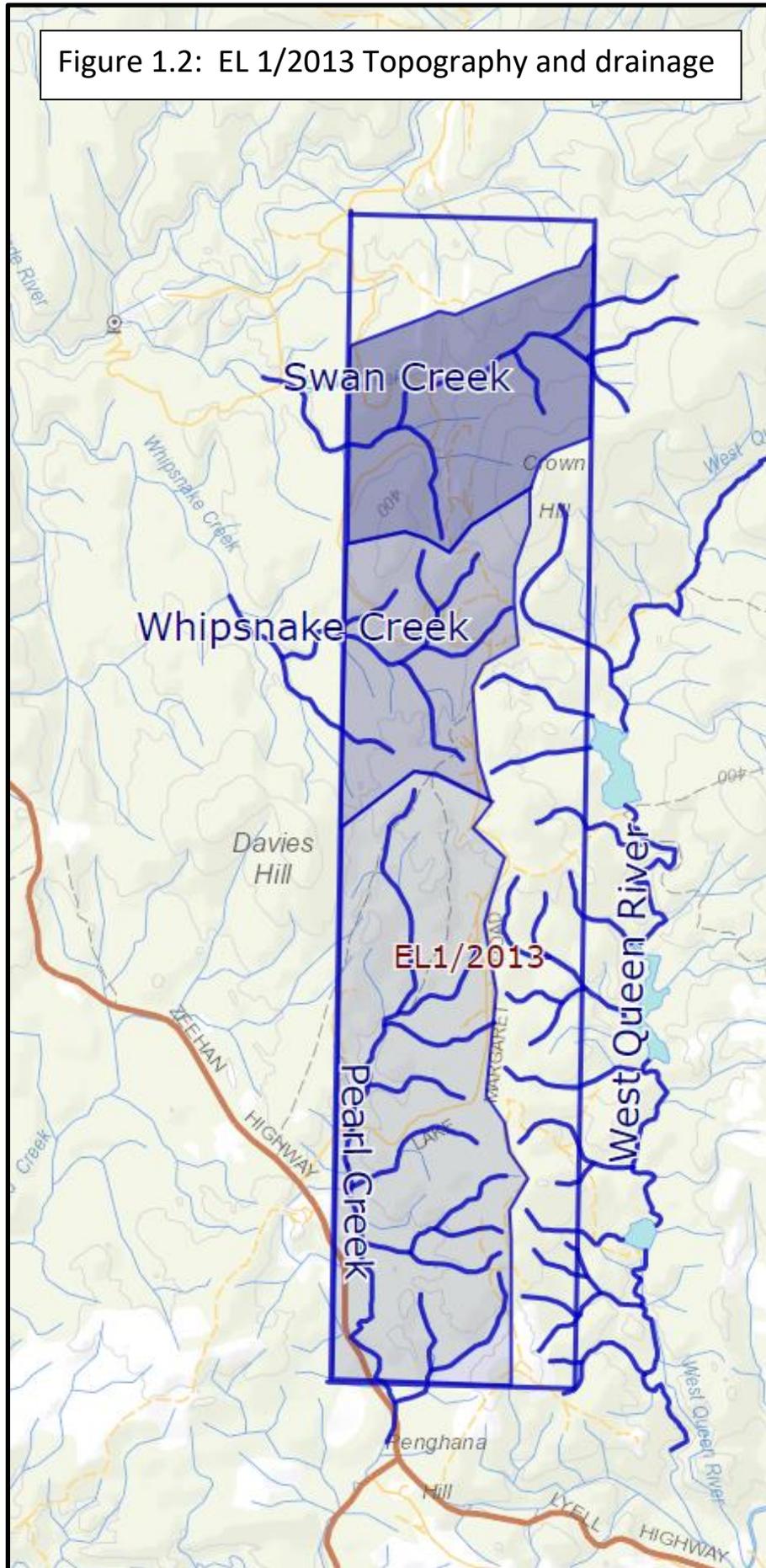


Figure 1.1: Location of EL1/2013 Lake Margaret Road

Map Conventions

Coordinates in this report and in digital data associated with this report are recorded as GDA94: UTM Zone 55.

Figure 1.2: EL 1/2013 Topography and drainage





Geographical setting

Compared to the nearby West Coast Range, the topographic relief of the EL1/2013 Licence area is moderate. The block tracks along the west bank of the West Queen River. Swan Creek, flowing west, crosses the northernmost 1 km² block of the tenement at about 350 m AHD, with banks rising to 400m to the north. In the 1 km² block further south, the twin peaks of Crown Hill (400 m and 500 m) stand out as a topographical landmark. The topography of the southern 3 km² consists of a northerly trending ridge about 350 m high that bifurcates the area into the Whipsnake and Pearl Creek catchments to the west, and the west side of the West Queen River catchment to the east (see Figure 1.2).

The vegetation in the area has been subject to regular wildfires over its history and was sourced for fuel wood in the early part of the last century. Most of the licence is now covered by heath, native grass swamps and dense tea-tree re-growth. The bedrock is siliceous, and topsoil is generally less than 50 cm deep and leached, with abundant quartz float, but the area is also boggy and peaty in parts.

The Queenstown area has an annual average rainfall of about 2400 mm, with less than 30 days of clear skies annually, and a maximum daily temperature range of 12 to 20 degrees C.

Access

Access within the tenement is good. The well-maintained Lake Margaret gravel road diverts east from the Murchison (Zeehan) highway, 1 km north of the Lyell Highway Strahan intersection. The road then bisects the block along the northerly trending ridge, towards the village and power stations. The ridge, its western flank and the southernmost 1 km² block are accessible via fire trails, tracks to the Mt Lyell pondages along the West Queen River, and tracks to HV powerline easements. (The Lake Margaret power transmission lines to Mt Lyell Mine parallel the road either side within 100 metres and continue through the southernmost block towards the Mount Lyell Mine and Queenstown). Away from the trails and roads, access is by foot only, restricted by the regrown vegetation and the steep slopes of creek gullies where access is becoming increasingly difficult following recent years of dense tea-tree (manuka), sword grass and bauera regrowth.

Overgrown too, is the 110-year-old Lake Margaret tramway route that ran, again northerly, through the western half of the tenement area.

Historical setting and current land tenure

The Lake Margaret area was possibly ranged by hunters and collectors from the Peterndic band (Ryan, 1996 in Huys, 2010, see Appendix E) who could have passed seasonally through the Queen River Valley to the east and south (Corbett, 1980). The Queen River valley marks the easternmost limit of Peterndic / Toogee Country (Horton, AIATSIS, 1996).

AMR acknowledges the ancestral first race inhabitants of the land and their descendants and undertakes exploration activities with due respect for Country.

The first European to explore the region on foot was Charles Gould who battled through the terrain in the 1860s. In 1881 Cornelius Lynch found alluvial gold in the Queen River valley near what became Lynchford, and prospectors and miners migrated into the remote area. By the mid 1890's the alluvial deposits had been worked for over 40,000 ounces of gold. Source lodes generally had disappointed - 'did not live any depth' (Zeehan and Dundas Herald, 16th November 1891), yielding about 3,000 recorded ounces (The Mercury, 'West Coast Discoveries 1883'). Anecdotally, these yield figures are deemed minima, as miners achieved a better price for their gold by stowing it and cashing it in Victoria.



In 1893, the Mount Lyell Gold Mining Company was formed to mine copper on an existing gold lease (the Iron Blow). Interest and employment in gold, other than as a valuable accessory to copper, waned. In the 25 years from 1895, three million tonnes of timber were cut to fuel the smelter furnaces. The Queen River valley and adjacent plateaus were denuded by woodcutting and erosion, including the relatively exploitable ridge along the Lake Margaret Road. The tramway was the only access to the area for woodcutting and to the power station from Queenstown until the Lake Margaret Road was built in 1963.

The power station and dam were constructed on the Yolande River between 1911 and 1918 by the Mount Lyell Mining and Railway Company to generate hydro-electric power, forming the Lake Margaret reservoir. The station is now upgraded, owned and operated by Hydro Tasmania.

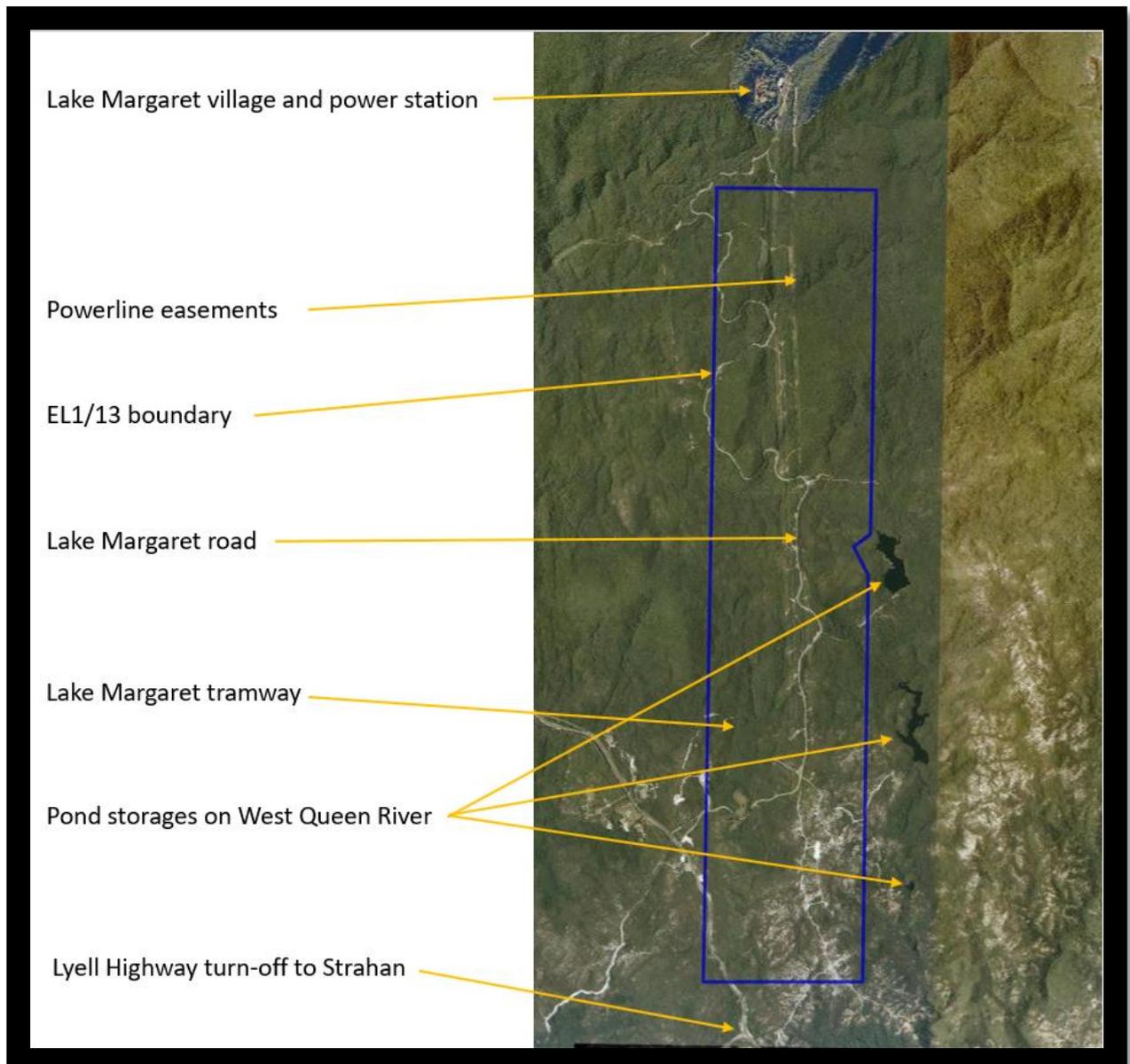


Figure 1.3: EL1/2013 access details (State Orthophoto base map – MRT)

In the Lake Margaret Road Licence area, the creeks have been prospected for alluvial gold over the last 120 years. There is evidence of minor alluvial workings on McCusicks Creek and Swan Creek, and trenching of quartz veins on Penghana Hill (both in the southern block). Early last century an adit was dug to intersect two 'thin' veins that had been found to



bear gold in outcrop at the Lake Margaret Road Gold prospect in the centre of the area. The prospect was not developed (reference lost). A cutting excavated for the Lake Margaret tramway (probably during the 1912 tramway extension) revealed a concentrated pyritic schist lens with minor gold, copper, and accessory minerals – the ‘Tramway Pyrite’.

Within the Lake Margaret exploration Licence area today there is one 100-acre block under private freehold at 16 Margaret River Road, but most of the area remains publicly managed land under the Crown. Roughly the western half of the northernmost 1km² block (see Figure 1.4) is a Hydro-Electric Corporation authorisation that is restricted by a boom-gate. This is for asset security and public safety and access for exploration under the MRDA 1995 can be authorised by Hydro Tasmania. An “electricity transmission infrastructure protection overlay” is held by TasNetworks over the transmission corridors that extends 30 metres either side of the powerlines. This is mainly for use by local government in their planning provisions, but drilling and development operations would require electrical safety advice from the powerline authority.

Threatened fauna sitings and areas of conservation significance for fauna and flora are discussed at Chapter 6 of this report. Figure 1.5 shows other land tenure allocations and reserves that have been found NOT to be present on EL1/2013.

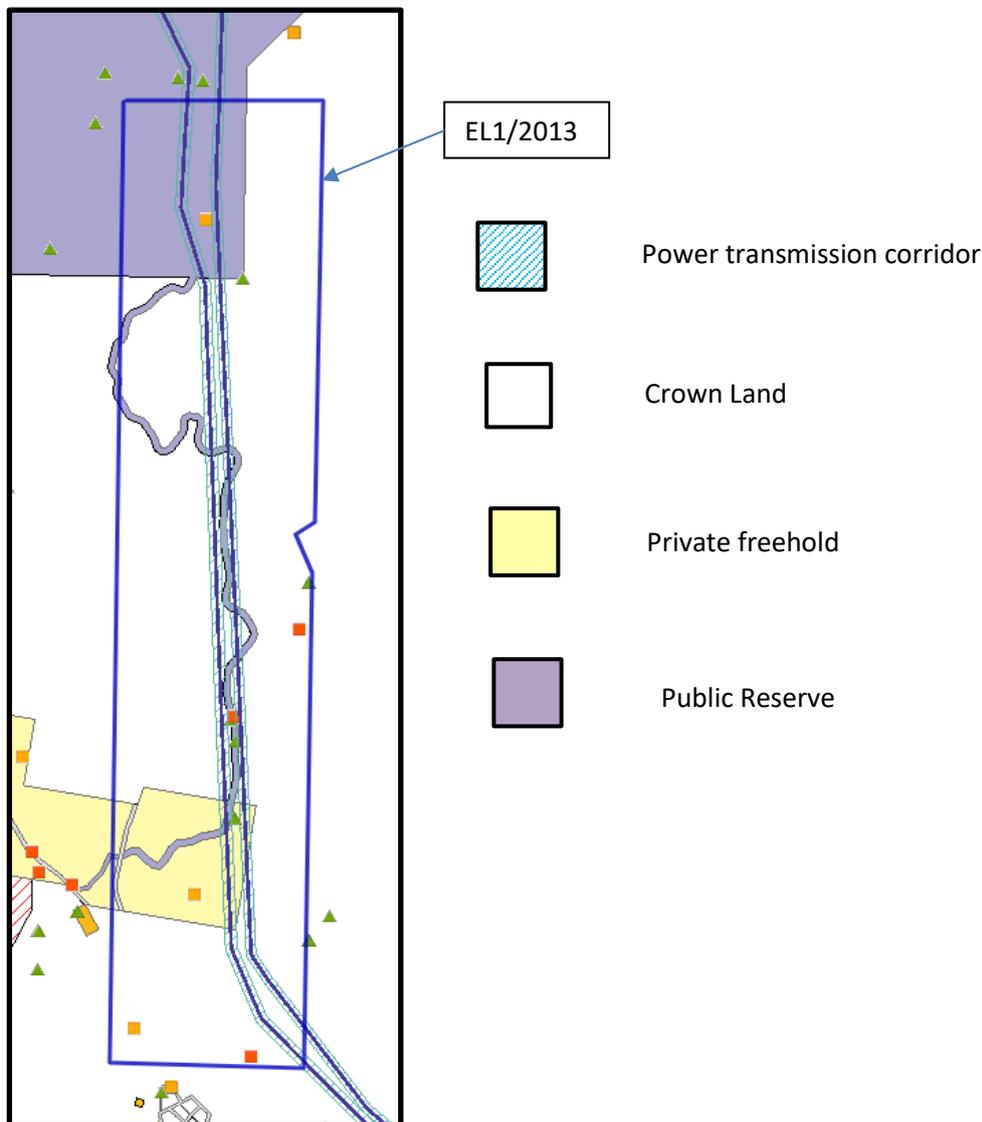


Figure 1.4: EL1/2013 Land tenure (Source MapList, DPIPW)



<p>Threatened Native</p> <p>▶ Vegetation Communities 2020 (TNVC 2020) <input type="checkbox"/></p>	<p>▶ Communication Sites (ACMA) <input type="checkbox"/></p>
<p>▶ Forest Groups <input type="checkbox"/></p>	<p>▶ Conservation Covenants <input type="checkbox"/></p>
<p>▶ STT Three Year Plan <input type="checkbox"/></p>	<p>▶ Public Land Classification <input type="checkbox"/></p>
<p>▶ STT Tasmanian Reserve Estate (CAR) <input type="checkbox"/></p>	<p>▶ Private Timber Reserves <input type="checkbox"/></p>
<p>▶ STT Recreational Hunting Areas <input type="checkbox"/></p>	<p>▶ Private Reserves <input type="checkbox"/></p>
<p>▶ STT Production Forest <input type="checkbox"/></p>	<p>▶ Local Government Area Reserves <input type="checkbox"/></p>
<p>▶ STT Potential Chemical Application <input type="checkbox"/></p>	<p>▶ Future Potential Production Forest <input type="checkbox"/></p>
<p>▶ STT Permanent Timber Production Zone <input type="checkbox"/></p>	<p>▶ Threatened Flora Point <input type="checkbox"/></p>
<p>▶ STT Non Production Forest <input type="checkbox"/></p>	<p>▶ Threatened Fauna Point <input checked="" type="checkbox"/></p>
<p>▶ STT Informal Reserves <input type="checkbox"/></p>	<p>▶ Raptor Nests <input type="checkbox"/></p>
<p>STT FMU - Forest Management and Controlled Wood <input type="checkbox"/></p>	<p>▶ Conservation Significance Flora Point <input checked="" type="checkbox"/></p>
<p>STT Australian Forest Standard - Defined Forest Area <input type="checkbox"/></p>	<p>▶ Conservation Significance Fauna Point <input checked="" type="checkbox"/></p>
<p>▶ Transmission Lines <input checked="" type="checkbox"/></p>	<p>▶ Category 1 Exploration Licence <input type="checkbox"/></p>
<p>Electricity Transmission Infrastructure Protection Code Overlay (Filtered) <input checked="" type="checkbox"/></p>	<p>▶ Land Tenure <input checked="" type="checkbox"/></p>
<p>▶ Declared Gas Pipeline Planning Corridor <input type="checkbox"/></p>	<p>▶ Cadastral Parcels <input checked="" type="checkbox"/></p>
	<p>▶ Authority Land <input type="checkbox"/></p>
	<p>▶ Aboriginal Land <input type="checkbox"/></p>

Figure 1.5: EL1/2013 Land tenure holdings investigated for purpose of this report. Ticked boxes represent the only tenure conditions over land in the block.



Regional Geological setting

The following notes can be referenced to the 1:250 000 South West Tasmania sheet (Brown et al, 2005) and the 1:25 000 Professor sheet (Vicary, M.J. 2004) compiled by Mineral Resources Tasmania MRT (for excerpt see Figure 1.6).

Rock units that outcrop in the Lake Margaret area are part of Mount Read Volcanics (MRV) series deposited in the Dundas Trough in the middle Cambrian (Corbett & Turner, 1989, and others). The MRV series is dominated by rhyolitic, dacitic and andesitic volcanics and volcano-sedimentary equivalents (Corbett and Solomon, 1989). The surface rocks on EL1/2013 are predominantly equivalents of the Western Volcano-Sedimentary Sequence (WVSS - Corbett et al, 2014) lithological association of the MRV, locally termed the Yolande River Sequence, with Central Volcanics Complex (CVC) sequences to the east, intruded by two massive andesite sills (McPhie & Allen, 1992; Corbett, 1992).

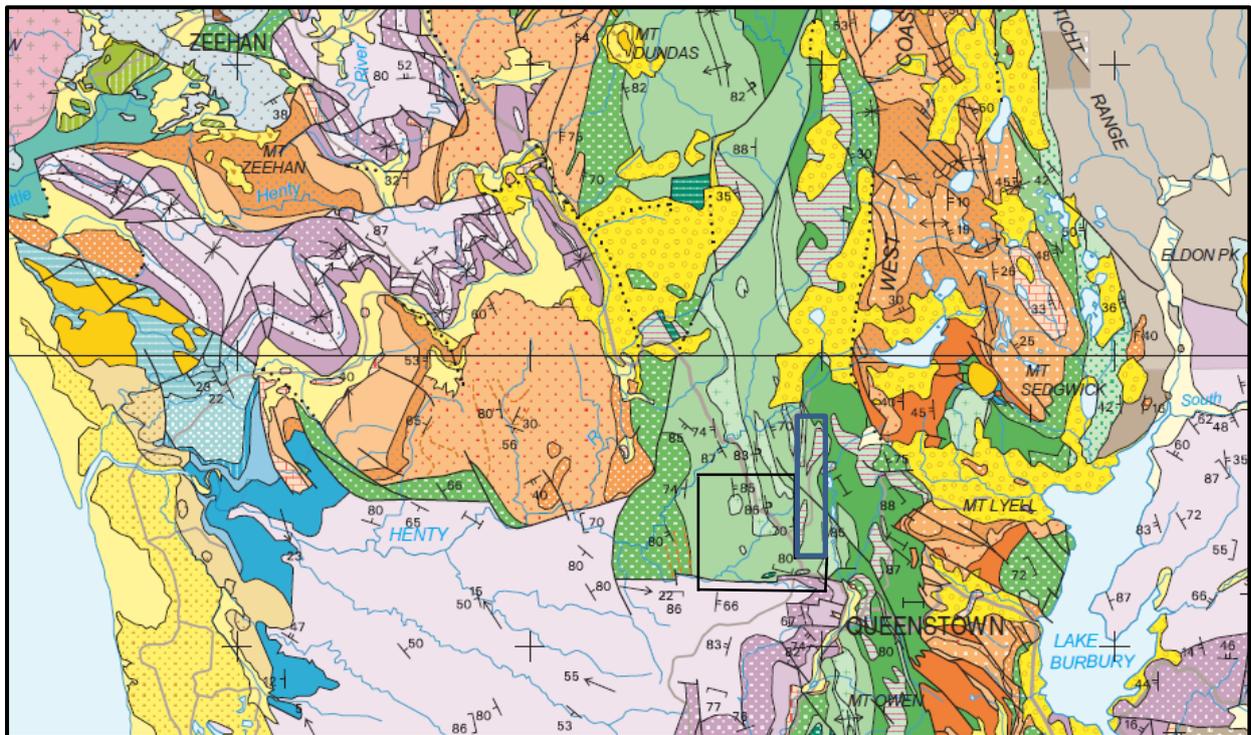
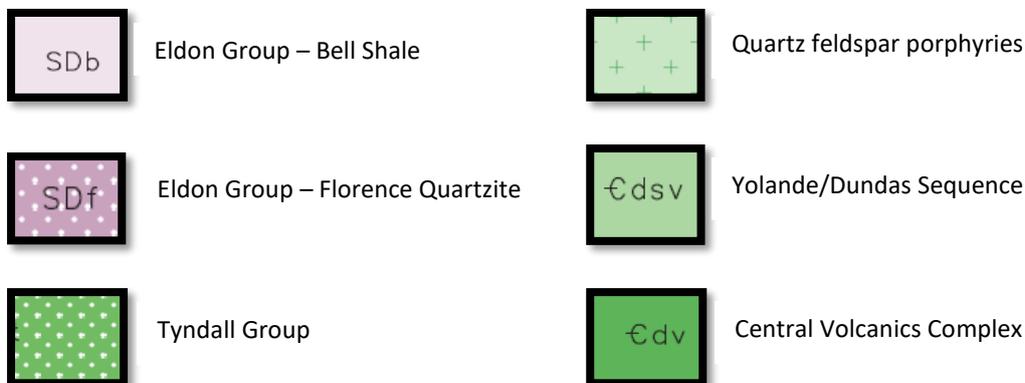


Figure 1.6: Regional Geology of EL 1/2013, shown with blue border (Excerpt from Brown et al, 2005)





EL 1/2013 is located geologically on the western side of a regionally northerly mapped contact between the Yolande volcano-sedimentary sequence, and the volcanoclastic/pyroclastic Central Volcanics Complex. More detailed mapping (1:25 000 series) suggests that the contact trends more NNW in places. Bedding planes are notoriously difficult to find and discern in the MRVs, but where reliable in the Queenstown area, a northerly strike to the steeply dipping strata is most common. Locally, this northerly trend parallels the course of the West Queen River, Pearl Creek, the West Coast Range and the Great Lyell Fault system. Whether the topographical features of Lake Margaret Road thus reflect structural features or differential erosion of bedding, is not clear.

The prospective VHMS horizon where the Tyndall Group overlies CVC rocks has not been proven to outcrop on the Licence area. Float samples of purple sandstone from the power corridor near the Tramway Pyrite resemble Tyndall lithology but may not be in situ in any case.

Local Geology

These notes have been summarised from an investigation of source literature undertaken throughout the tenure. Figure 1.7 shows the distribution of rock types and broad stratigraphy on EL 1/2013, sourced from TheList on the MRT website.

Yolande Sequence. The pastel aqua colour represents the undifferentiated felsic volcano-sedimentary silts, ash falls and crystal and lithic mass flow deposits of the Yolande River sequence. Stratigraphic relationships in the Yolande rocks are complex because of repetitious deposition, autochthonous debris flows, intrusion, past tectonics and structural disturbance. The defined units mapped within the undifferentiated Yolande sequence consist of interbedded volcanically-derived sandstone, siltstone and mudstone (cdsvs). Sandstones sampled from the Yolande Sequence in EL1/2013 have been described as crystal, vitric and lithic tuffs of both the Yolande and CVC (Everard 1982, Botrill 1988). The Yolande units at least, are thought to be reworked and deposited by mass flows onto a shallow marine shelf or basin slope (Corbett et al, 2014). In field observations and hand specimens, bedding planes in outcropping sandstones are indistinguishable from structurally induced planes. Some of the shales strike approximately north-south or NNW with steep dips to the east and west. Bedding intersected in West Sedgewick DDH3 dips steeply to the east. Notably, the dark slaty shale in this hole contained calcareous bands (Wilde and Kerr, 1990).

Central Volcanics Complex. Where the CVC is mapped in the northern half of EL1/2013 (pastel green - cdvt) it is represented by volcanoclastic or pyroclastic (Vicary, 2004) 'eutaxitic feldspar crystal tuff' (Botrill).

Late mid-Cambrian Andesites. Two feldspar hornblende porphyritic andesite bodies occur in the area, the 'Horse Paddock Andesite' at Penghana in the south, and the 'Crown Hill Andesite' just north of the Tramway Pyrite prospect. Both appear to generally parallel the north-south local strike of the surrounding country rocks, suggesting that the lavas were deposited as sill-like shallow intrusives, probably into wet, weakly-consolidated sediments several million years after those host sediments were deposited. This style of intrusion was suggested convincingly by Morrison and Griffiths (1998) to explain the quartz-feldspar-phyrlic porphyries just west of EL1/2013 (yellow ochre on Figure 1.7). The emplacement of the andesites is likely contemporaneous with the deposition of the Lynchford member of the Comstock formation (lower Tyndall Group) (White, 1996). The Crown Hill Andesite has been dated as 475-498 Ma (Everard & Villa, 1994) and the Horse Paddock Andesite at 494 Ma (Vicary, pers comm). The andesites are magmatic (although samples of andesitic tuffs have been reported in the same mapped areas) medium grey to grey/green in fresh specimens and vary in texture from andesite to micro-diorite and are often almost completely hydrothermally or deuterically altered to sericite, chlorite and quartz (Sheppard, 1974).



The remaining significant rock unit appearing in Figure 1.7 is recorded as a feldspar-quartz-pyroxene porphyry (Cfpp) in the north of the area (yellow ochre, white dots). Two samples taken within its mapped boundaries have been described as 'vitric tuff' (Everard, 1982).

The Tramway Pyrite is a 2- to 3-metre-wide outcrop of massive pyritic quartz sericite schist located at 379445 mE 5345685 mN (AMR GPS:379439 5345694 370 ahd), where the old tramway intersects one of the Lake Margaret HV electricity transmission corridors. The Tramway Pyrite surface expression has a probable strike length of no more than 30 metres (Wilde and Kerr 1990) at a surface trend of 330° (AMR). Samples assayed in 1972 (Sheppard) and 1987 (Wilde and Kerr) show similar values of anomalous gold (0.7 ppm) and 30% iron pyrite, but without anomalous concentrations of other economic metals.

Observation from Shepard 1974 - The rocks on both sides of the mineralised zone have been extensively altered or weathered to a blue/grey or white clay. The western side probably grades into fresh andesitic lavas observed 'a few tens of feet to the south. ... It seems probable that the pyritic lens is situated on or close to the contact of an andesitic lava sequence with shales and acid tuffs (to the east)' (Sheppard).

Five samples, each representing a 2 ft. width, were taken across the lens. Values obtained were as follows (pyrite in %, all others in ppm) :

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
FeS ₂	29.5	35.2	19.1
Cu	565	1020	220
Pb	80	100	50
Zn	23	35	15
Co	39	45	30
Ni	18	20	10
Mn	21	45	15
Ag	0.76	1.0	0.4
Au	0.68	1.0	0.4

The concentrations of all elements, except Ni, Zn and FeS₂ increased towards the centre of the lens; Cu x 5, Mn x 3, Au and Ag x 2½ and Pb x 2. Zn and Co concentrations across the body were

Figure 1.7: Metal element concentrations of the Tramway Pyrite (Sheppard, 1974)

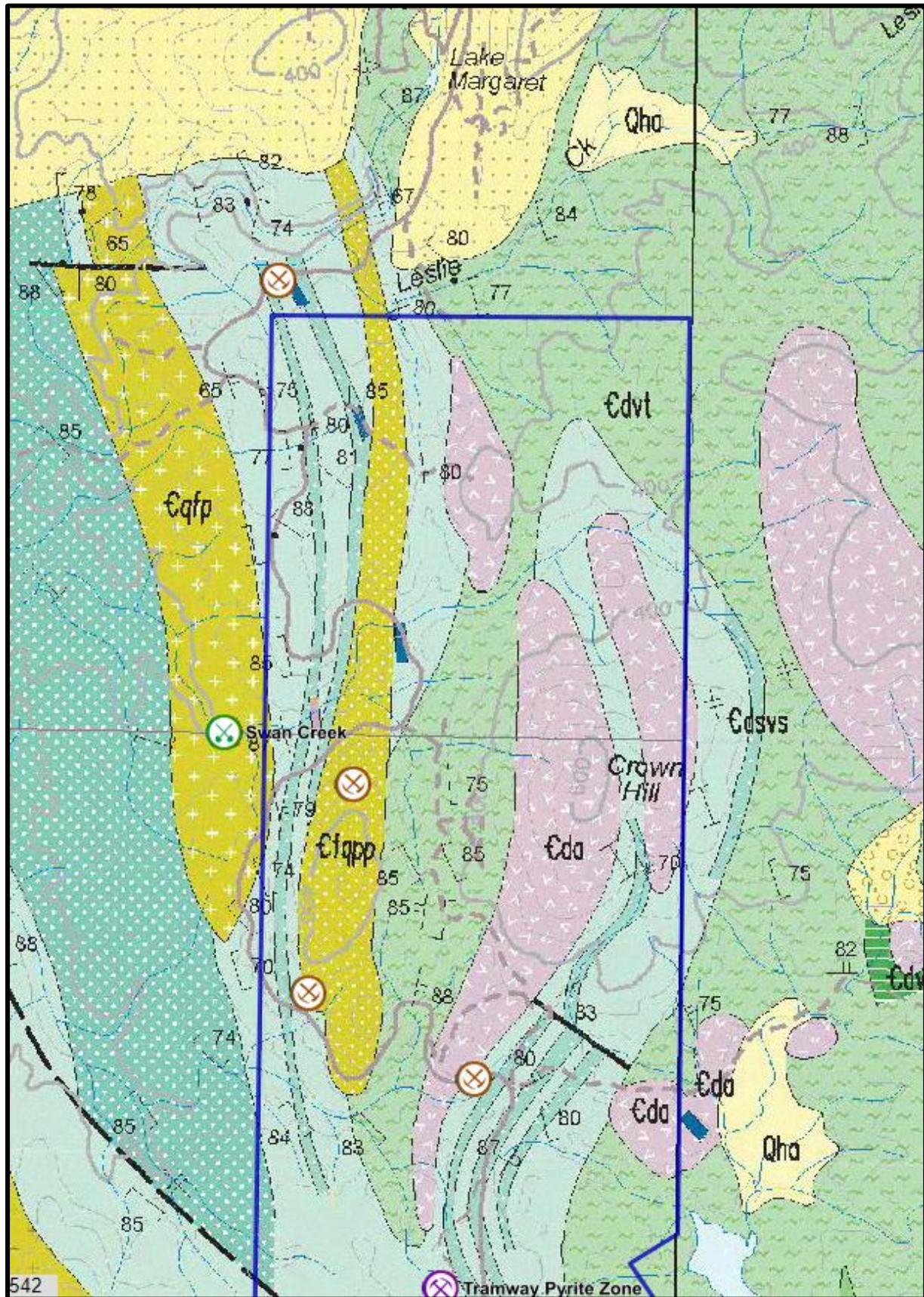


Figure 1.8A – EL1/2013 North 1: 25,000 geology (Vicary, 2004. Sourced TheList – MRT)

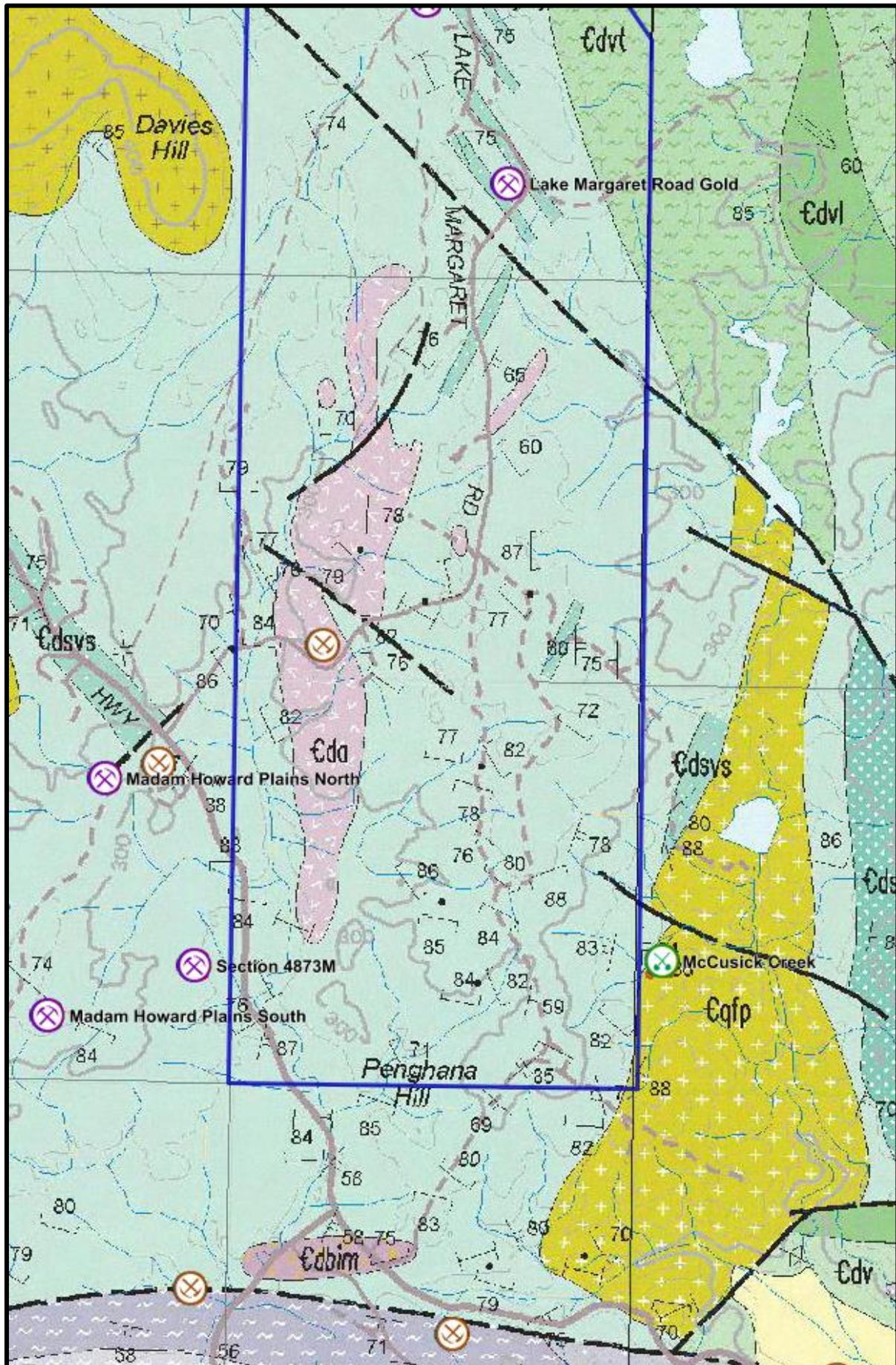


Figure 1.8B – EL1/2013 South 1: 25,000 geology (Vicary, 2004. Sourced TheList – MRT)



2. PREVIOUS EXPLORATION

Gold from Devonian quartz veins

It can be expected that more than a century of corporate and amateur prospecting and panning has scoured the Queenstown area effectively for obvious visible surface concentrations of gold. During the late 19th and early 20th Centuries, Swan Creek, McCusicks Creek and Southgates Creek and nearby tributaries of the Queen and Yolande Rivers were prospected for alluvial gold. There have also been anecdotal reports of panning success at the Lake Margaret Road intersection and along the tramway route that runs parallel to it. Sources of the alluvial gold have generally been found regionally to be thin (0.3 – 1 metre) quartz and quartz carbonate veins of Devonian age and varying orientation. Tunnels were dug, targeted at the continuation of prospective surface vein concentrations at a depth of 50 feet at Lake Margaret Road Gold Prospect, and at McCusicks Creek (50 metres east of the licence area in the south) but auriferous shoots were not found to persist with depth. The McCusicks site was worked continuously for hard rock gold for two years (1886-1888) but failed to produce commercial quantities of gold.

A 1983 geological review by Mt Lyell and RGC (Renison Goldfields) geologists found broad agreement with Sheppard's (1974) geological interpretation of the area. The review found small historical gold workings were centred on east-west quartz veins, in rocks varying from Cambrian acid-intermediate porphyries to Siluro-Devonian sandstones, the unifying feature being the ability of the host lithology to form open fractures. Alteration of the host rocks is moderate sericitization.

1984/85: RGC investigated gold potential by carrying out a comprehensive regional stream sediment survey over western drainages in the Yolande area to indicate economic bedrock gold mineralization. Minimum sample density was one sample per 2 km² assayed for Au, Cu, Pb, Zn, Fe, Ag, As, W, Sb, Te and Tl.

No visible gold was detected in most drainages, confirmed by the low assay results. But one of two areas identified as having moderately anomalous gold geochemistry consisted of the western tributaries of the West Queen River (comprised mostly by EL1/2013) with the western side of the drainage as the source area. Gold was identified in panned concentrate and minus 80 mesh sediment samples sporadically along 3.5 km of the drainage (up to 2.66 g/t Au) and about 600 metres wide. No bedrock source for this mineralization was identified. Sheppard's geological interpretation map shows a prominent elongate sub-volcanic intrusive quartz-feldspar porphyry in this area which may be related to the gold. A similar rhyolitic porphyritic intrusion is the host rock to other gold workings at Diamond Hill 2 km to the west. However, previous sampling of this and other similar bodies in the Lake Margaret area has failed to yield anomalous gold (FitzGerald, 1983). Other very minor and scattered gold geochemical anomalies were located during the survey, ... particularly west of the Lake Margaret township (Gold Creek) and Swan Creek (90 ppb) neighbouring EL1/2013. These sporadic locations were not thought sufficiently encouraging to warrant further investigation.

There has been no corporate exploration specifically for reef gold recorded in the area since 1987.

VHMS

Mt Lyell Mine under various ownership and partnerships (e.g. RGC, BHP), and the small operations that held several licences within the greater Yolande / West Lyell block between 1971 and 2005 were primarily exploring for metallic sulphides, given the area's proximity to the Mt Lyell copper-silver-gold deposit. Explorers held the concept that splays off nearby major faults, particularly the Great Lyell Fault system, might form fault-bound blocks of Central Volcanics Complex (CVC) rocks with volcanic hosted massive sulphide (VHMS) potential. Several programs (see Table 2.1) of mapping, aerial and ground-based



geophysics surveys, and stream sediment and rock chip sampling failed to locate a prospective VHMS drilling target. No exhalative horizons were inferred in the outcropping CVC strata and it became progressively apparent that massive sulphides were unlikely to have been emplaced during deposition, or within the depositional environment, of the Yolande Sequence. These volcano-sedimentary, mass flow and shelf deposit rocks were deposited under open-basin deeper marine conditions distal from the flanks of the VHMS-rich central belt of Mount Read CVC volcanics (Purvis, 1983). Additionally, throughout the MRV footprint, VHMS ore deposits occur only within about a one kilometre band westward of the crustal scale Great Lyell Fault that lies 1 - 3 km east of EL1/2013.

Mount Lyell mine exploration identified two zones of elevated Pb and Zn in soil, northeast of the Tramway pyrite - but outside EL1/2013 - in CVC tuffs and shales. The northernmost of these coincided with an anomalous IP response and was tested with DDH WS3 and a trench. WS3 revealed anomalous Pb and Zn with up to 0.11% Zn and 760 ppb Pb. Samples were not assayed for gold.

In 2007/8, G M Wiggins drilled four shallow (<50 m) diamond drill holes (Lake Margaret DDH 1-4), targeting one of four promising IP anomalies identified in the Mt Lyell geophysics field program carried out by Scintrex (1976-1984). The holes were drilled in sandstone and siltstone showing about 1% pyrite near the contact between the southern end of the Crown Hill Andesite and Yolande River Sequence volcanoclastics. Samples were analysed for Ag, As, Co, Cr, Cu, Fe, Mg, Ni, Pb, S, Zn, Au, Pd, and Pt with no anomalous results.

Also in 2007, drill hole MH04 drilled by Low Impact Drilling (LIDDS) 150 metres west of EL1/2013, intersected a metre of galena-rich veinlets assaying 7.9% lead and 5 ppm silver, in quartz-stockworked siltstone / fine-grained sandstone at less than 128m depth.

Metallic sulphides in andesitic intrusions

The only exploration drilling in EL1/2013 has been targeted at lead/zinc/silver or copper/gold mineralisation in altered zones in the 'Crown Hill Andesite' north of the Tramway Pyrite prospect (Wilde and Kerr, 1990) and the 'Horse Paddock Andesite' at Penghana (Corlett et al, 1996). There was no mineralisation of economic interest intersected at either site.

Crown Hill Andesite

In 1984, RGC's West Sedgewick DDH 1 and 2 were spudded about 100 metres northeast of the Tramway Pyrite site and drilled to test the prospect at a vertical depth of 200 metres. WS1 was abandoned at 90 m prior to reaching the andesite or the target alteration zone. WS2 penetrated steeply east-dipping Yolande tuffaceous sandstones and dark slate before reaching and terminating in the andesite at 220m (~180m vertically beneath the surface Tramway Pyrite exposure). The altered andesite and the tuffs and slates show 1-2% disseminated pyrite, and chalcopyrite is present in carbonate veins to 100 m downhole. Mt Lyell collected six samples from shale in WS2 and had a best result of 1.5m @ 93 ppm Cu 420 ppm Pb. BHP cut additional samples from shale for a best assay of 1.4% combined Pb/Zn. In 1991, BHP analysed 24 samples of core from WS2 for Au, Cu, Pb, Zn, Ag, Ba and As; with maximum 215 ppm Cu, 100 ppm Pb, 188 ppm Zn (Read & Cameron, 1991). They reported no gold above 0.010 ppm, and no anomalous metals.

The prospect at the surface averages 30% pyrite, so the drilling established that it does not extend at those concentrations vertically to 180 metres depth and, if the alteration zone trends generally northerly as would be expected, it does not extend to 100 metres depth on an easterly dip.

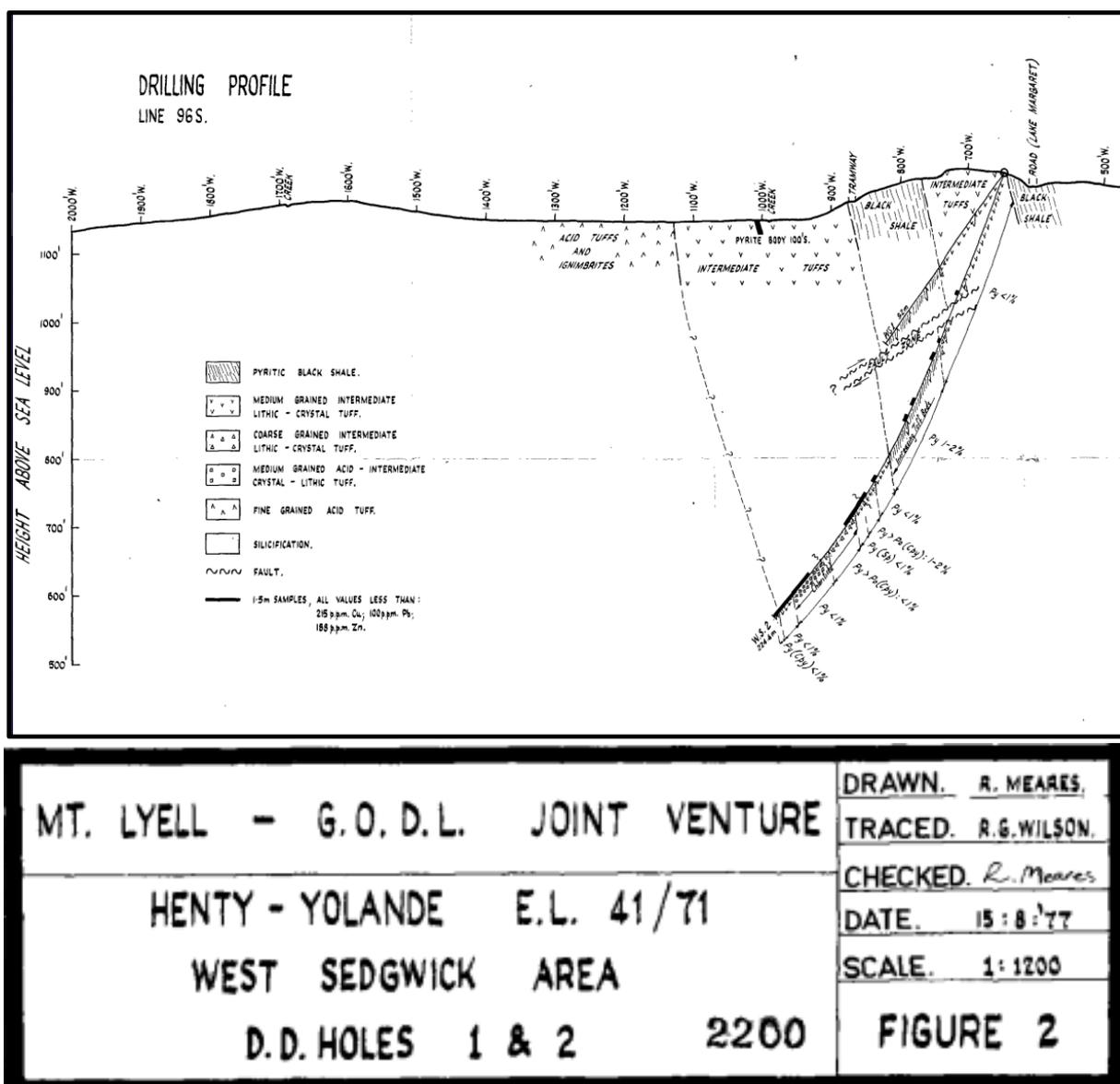


Figure 2.1 (Meares, 1978)

Penghana “Horse Paddock” Andesite

In March, 1995, the Penghana ‘Horse Paddock’ Andesite was explored because of its similar habit, composition and setting to the Garfield prospect south of Queenstown, and similar anomalous Pb and Zn soil geochemistry to the margins of the Garfield andesite. Its significant magnetic signature also drew the attention of explorers, although this 1995 phase of exploration attributed the signature to magnetite as an alteration product – it was not magmatic. PEN DDH 001 was targeted at the main magnetic anomaly in the andesite body and an associated soil anomaly of 214 ppm Cu, 122 ppm Pb and 290 ppm Zn. The hole was collared within the Yolande River Sequence tuffs and shales, intersecting slightly albitised (1% pyrite) equigranular-then-porphyrific andesite from 40.5 m to 229.5 m with a 0.45m quartz-carbonate-chlorite-epidote vein at 60 m with 5% chalcopyrite, galena and pyrite (1 m at 1.7% Cu and 0.62% Pb).



From 229.7 to 272.1 (EOH) m the hole intersected a 12 m pale grey siltstone and 30 m of crystal rich quartz feldspar phyric volcanoclastic sandstones of the Yolande River Sequence. The marginal andesite at this contact from 220 m to 230 m is strongly carbonate/quartz veined but was not assayed for base metals or gold. A DHEM Survey on hole PEN001 in November 1995 indicated that there were no off hole conductors present. (Penghana notes derived from Corlett et al (1996)).

Local sampling of the quartz feldspar porphyry intrusions in the Yolande sequence, that border EL1/2013 (Groves, 1964) found no economic concentrations of metallic sulphides or precious metals in the porphyries, and only sporadic low-grade albitic, chloritic, sericitic and sideritic alteration – often adjacent to Devonian quartz veins (which have been found to carry gold).

Remobilised VHMS gold (Henty-style)

Historically, exploration for a Henty-style gold prospect has been more focused on the Beatrice and West Sedgewick exploration licence areas to the northeast of EL1/2013, proximal to the Great Lyell Fault. Apart from samples of the Tramway Pyrite outcrop and stream sediment sampling, no analyses for gold have been undertaken. Whereas structural trends and orientations might be similar to Henty's shear-hosted gold, the distance to crustal scale faults and the absence of exhalative volcanic deposits (CVC) or limestones reduce the potential for Henty-style gold in EL1/2013.

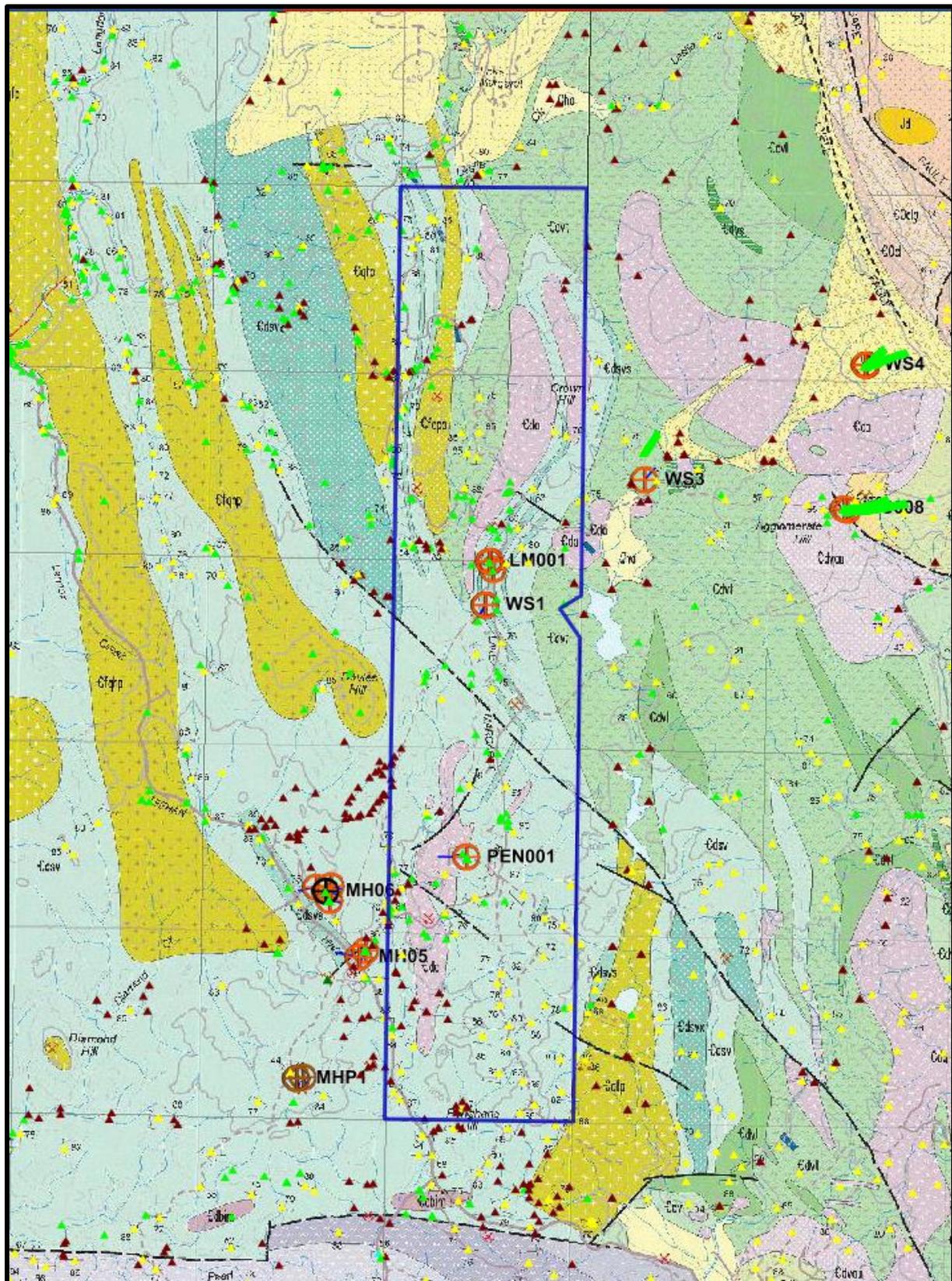


Figure 2.2: EL1/2013 Location plan showing borehole locations (from LISTMap – MRT)

The following table summarises the recorded exploration activities relevant to the Lake Margaret Road area up until 2021, including the AMR program.



Summary of Exploration prior to 2021

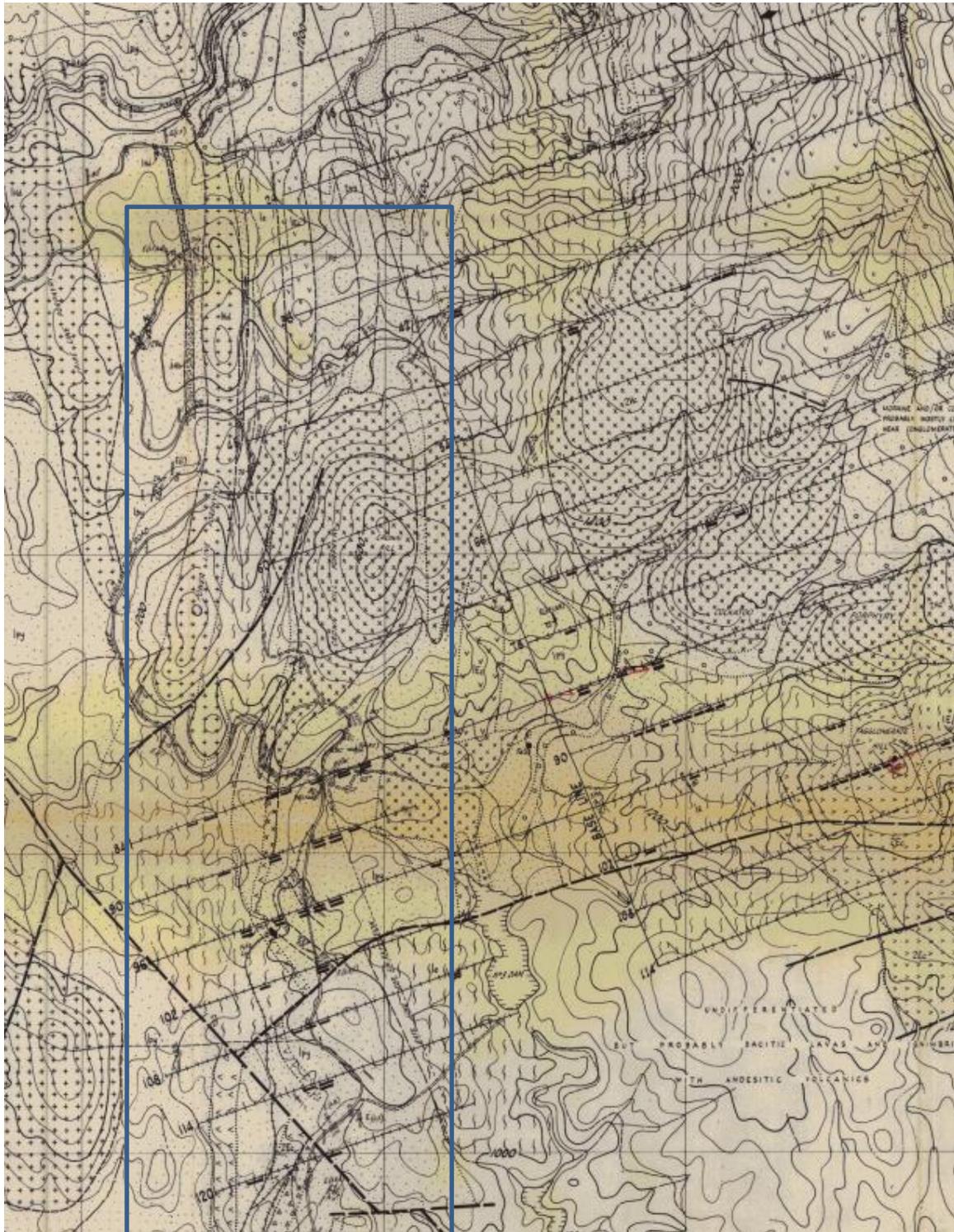
Period	Company	Tenement	Activity and result
1884-1888	Various prospectors and associations	Claim	McKusick, Baily and Guffney discovered quartz leaders at McKusick's Creek (1884). Prospected by John Brown and then Mr 'Graham and party' - diggings patchy and abandoned in 1886. 480 oz of gold including crystal specimen gold up to 1 inch long (in Thureau, 1886). Pegged by Griffin and NPA in late 1886. NPA sunk 6 m shaft on a vein at the boundary of porphyry and schist. Gold "prospects up to 1oz. to the dish". 'Fine gold' with 'no refractory minerals'. Southgates Ck pegged 1886. NPA dug 3 adits into soft porphyry 'dyke' 100m wide. Abandoned in October 1888.
1888-1956			No evidence found of corporate or private exploration in area covered by EL1/2013.
1956-62	Rio Tinto Australia Exploration (RTAE)		Airborne EM and to the west of EL1/2013 area, magnetic survey with ground EM, gravity, stream and soil geochemistry and mapping over an anomaly near the MRV - Owen contact. A subsequent I.P. survey gave negative results and no further work was carried out.
1965-71	Pickands Mather		Dipole-dipole I.P. over same Owen contact showed no anomalies.
1971-1974	Mt Lyell Mining & Railway Co. Ref: Sheppard (1974)	EL41/71 & EL 9/66 (Yolande area)	Geophysics (Scintrex – ref Howland-Rose 1974) stream geochemistry and mapping: West Sedgewick grid between Tramway Pyrite and Lake Margaret village (marginally in EL1/2013 top eastern boundary): I.P., ground magnetics and field mapping: 4 of 36 IP anomalies considered significant, 2 over mapped 2-3% pyritic altered pyroclastics (geochemistry no base metal anomalies). Anomalies possibly disseminated sulphide, or graphitic and/or pyritic shales. Put focus on black shales. Stream sediment: analysed for Cu, Pb, Zn, Co and Ni – no anomalies. Upper Swan Creek 85 ppm Cu, 115 ppm Pb and 160 ppm Zn (possibly 'HIMO' but <100m downstream of a significant IP anomaly). Point 56 is solely within EL1/2013 at 55 Cu, 90 Pb, 110 Zn. 1973: Tramway Pyrite lens discovered (in Vicary & Callaghan, 2002).
1975	Mt Lyell Mining & Railway Co. Ref: Sheppard (1975)	EL41/71 & EL 9/66 (Yolande area)	Extended I.P. survey covering the centre north of EL1/2013 (including Tramway Pyrite zone) see Figure <>: 9/22 anomalies considered of major geophysical importance, including the Pyrite. Most of these attributed to disseminated pyrite and black shales (Howland-Rose). Base metal only geochemistry on last year's West Sedgewick Grid I.P. detected some coincident



			geochemical responses including Pb >600 ppm in the southern part of that grid. 3 samples taken within north easternmost EL1/2013: Cu 55-85 ppm, Pb 70-90 ppm, Zn 105-160 ppm.
1977-78	Mt Lyell Mining & Railway Co. Ref: Meares (1978)	E.L. 41/71 (Henty – Yolande)	At West Sedgwick, three diamond drill holes tested two targets - (i) WS1&2 the Lake Margaret tramway pyrite lens and (ii) WS3 a combined I.P./geochemical anomaly on Line 84S. No significant sulphide or alteration zones were intersected.
1980		Regional	1980 regional airborne EM (Dighem) survey - low confidence in inconsistent results (Morrison, 1997).
1981-87	Mt Lyell Mining & Railway Co. / Renison Goldfields Exploration Ref: Poltock, R. (1992)	Henty - Yolande Area EL9/1966	1983 geological review in broad agreement with Sheppard's (1974) geological interpretation. 1984/85: Regional stream sediment survey over western drainages in the area to identify economic bedrock gold mineralization. Minimum of one sample per 2 km ² . Assayed for Au, Cu, Pb, Zn, Fe, Ag, As, W, Sb, Te and Tl. The western tributaries of the West Queen River (EL1/2013) identified as having vein gold potential in an area 3.5 km by about 600m wide. No bedrock source for this mineralization was identified.
1989-91	BHP Ref: Wilde & Kerr (1989, 1990)	EL 102/87 West Sedgwick area	(See text) DDH WS1 (90m) & 2 (220m) targeted to intersect the pyritic quartz-sericite schist Tramway Pyrite zone at ~200 m depth. Full area UTEM survey (Lamontagne Geophysics) detected a NW trending anomaly to the NE of EL1/2013 area, corresponding with the anomalous Pb/Zn soils tested by WS3. No other major anomalies were identified.
1990	BHP-Utah Minerals International Ref: Read & Cameron (1991)	EL102/87 (Queenstown)	24 core samples from WS-2 assayed for Au and also Cu, Pb, Zn, Ag, Ba and As. Max 0.01 ppm Au, 105 ppm Cu, 130 ppm Pb, 410 ppm Zn) 'downgrading the gold bearing potential of this alteration zone'.
1995 - 1997	RGC Exploration Ref: Corlett et al (1996)	EL102/87 (Queenstown)	PEN DDH 001 drilled at Penghana Prospect to test a magnetic anomaly in an andesite unit that has affinities with the Garfield andesite. No mineralisation other than a 45cm base metal vein was intersected. This hole was also tested with down hole EM – no off-hole conductors indicated. No further work recommended.
2002	Aurion Gold / Goldfields Exploration	EL 6/1998	Relogging of WS-2. 11 samples from WS002 (Au, Cu, Pb, Zn, Ag, As and Bi) from a zone of massive quartz veining in WS002. No anomalous results. Recommended: Exploration should examine the West Sedgwick area for Henty – Comstock style Au



	Ref: Vicary & Callaghan (2002, 2003)		mineralisation. This report contains a detailed lithological map of the Lake Margaret Road area.
2007/08	G M Wiggins Ref: Wiggins (2007)		Lake Margaret DDH 1-4 (<50m holes), targeting one of four promising IP anomalies near the southern tip of Crown Hill Andesite identified in the Mt Lyell geophysics field program carried out by Scintrex (1976-1984). Moderately altered sandstone/siltstone showing about 1% pyrite. Samples analysed for Ag, As, Co, Cr, Cu, Fe, Mg, Ni, Pb, S, Zn, Au, Pd, and Pt with no anomalous results.
2013 - 2017	LIDDS / Stebbo's Diamond Drilling	EL1/2013	LIDDS aimed to drill to follow up IP anomalies identified by Scintrex (1974). Discontinued due to commitments on the adjacent Diamond Hill block and personal circumstances.
2017-2020	Australian Mineral Resources	EL1/2013	<ol style="list-style-type: none"> 1. Compilation and summary of exploration reports and historical records of mining, and prospecting to date 2. Model development: Research and application of regional structural geology; interpretation of electromagnetic, gravity and radiometric reports; licence-wide structural geological and stratigraphic model; models of known in-Licence deposits. 3. Geological mapping and chip sampling to validate existing maps and ground truth draft models. 4. Mini-catchment based stream sediment gold sampling.



THE MOUNT LYELL M. & R. COY. LTD. GEOLOGICAL DEPARTMENT		DRAWN. N.H.S. TRACED. R.B.W. CHECKED.
HENTY - YOLANDE E.L. 41/71 WEST SEDGWICK GRID GEOLOGICAL MAP SHOWING I.P. ANOMALIES		DATE 29.5.78 SCALE. 1:4000
004		MAP 4



3. EXPLORATION RATIONALE

Philosophy

The objective of mineral exploration is to enable estimation of the quantity, quality and spatial dimensions of a resource to a defined level of confidence, prior to consideration for extraction. AMR believes that the most rigorous way to economically explore for mineral resources at regional, local and deposit/prospect scales is a scientific approach to mitigate uncertainty around the investment decision. There are three steps.

1. Integrate all accessible existing information and relevant evidence into a hypothesis and a preferred geological model.
2. Design and implement the exploration program itself, to test the premises of the hypothesis and fill information gaps in the draft geological model. The results of the exploration program prove, reinforce, adjust or disprove the hypothesis and model.
3. If the premises can be assumed to be sufficiently true, then the hypothesis is supported, and the third stage is to apply the preferred model to the specific deposit(s) to reach a quantitative estimate of overall resources and economics (which entails further proof by drilling).

Technical exploration objectives for EL 1/2013 Lake Margaret Road

To locate all places in and around the licence block where the conditions for ore deposition have occurred.

1. Define surface lithologies
2. Locate stream sediment gold and other concentrations in mini-catchments
3. Determine fault/vein orientations and geometry
4. Differentiate auriferous veins from barren veins
5. Adapt model
6. Sample and assay surface occurrences
7. Identify potential drill sites.

AMR has been exploring primarily for orogenic vein-hosted gold on the Lake Margaret Road block. The potential for volcanogenic metallic sulphides (Pb, Zn) in the east of, and at depth in the area has been concurrently assessed.

Regional geophysics and broad surface sampling for gold and metallics over the past fifty years has not led to the definition of prospective minerals targets, but there is evidence of multiple small rich concentrations of gold on the Licence and to all sides of it. AMR undertook a methodical exploration program to locate the sources of alluvial gold in creek catchments on EL1/2013 and neighbouring EL16/2015 Diamond Hill; and investigate the type of geometry, spatial persistence and gold concentrations that could be anticipated in those veins.

The incentive for AMR to engage in the program was the proliferation between about 1885 and 1915 of quartz reef prospects throughout the Queen River valley. During this West Coast gold rush, prospectors tracked alluvial shows upstream to locate source 'lodes'. Once the lode was pegged, tracked, trenched and assayed, money was sought to fund teams of usually less than five miners to chase the metre-scale reefs and gold shoots underground using hand tools, and to set up water-driven separation plants ('stampers'). Few mines persisted below the water table, and not one lode lived up to expectations. The gold 'shoots', initially discovered at the surface at concentrations often exceeding an ounce of gold per ton (28 ppm) were found to 'peter out' laterally and with depth within their quartz reefs.



Today, technology, accessibility, ore treatment, and geological and mining knowledge have advanced, exploration and logistical costs have decreased significantly, and gold price increased significantly in real terms over the 100 years during which the prospects have lain dormant. A reconsideration is due of the nature of these deposits - their extent, quality, the method of potential extraction, and their economics. The Lake Margaret Road block alone might not hold the resources to be cost-effectively developed, but if the area could be expanded to include other prospects adjacent to the area, then economies of scale could make development of several prospects viable.

4. FIELD EXPLORATION RESULTS

Field exploration during the three years of the Licence to 4 October 2021 consisted of the following.

4.1 Catchment-based stream sediment pan-concentrate sampling

During the reporting period, AMR carried out a micro-catchment stream sediment gold sampling and AAS assay program (Appendix A) on EL1/2013 and the adjacent EL16/2015 Diamond Hill block to the west, targeting watercourses draining Davies Hill south-east, Pearl Creek headwaters and Whipsnake Creek. The fire assay/AAS 50g (ALS Burnie, 2018) results of 30 samples were received and have been included on the 1:5000 topographic field map (Appendix D).

Additionally, selected sediment samples were assayed for multi-element analysis down to trace level with interest in anomalous barite, lead, copper, silver, iron and arsenic and other elements representative of gold vectors - Bi, Sb, Se, and Te (see Appendix A2).

No visible gold has been detected in pan concentrates to date.

Catchment sampling to date has prioritised catchments identified using the draft geological model. About 25% of all catchment areas in EL1/2013 has been sampled. About 40% of the prospective 'gold belt' trend has been sampled. AMR estimates that it would need another 70 samples to complete the map and sample all catchments optimally. At a rate of 5 samples per day = 14 field-days.

Multi-element assays show no correlation of gold with other elements assayed. Whipsnake Creek tributaries 2 and 3 exhibit the maximum values in most of the metallic and rare earth metals in these samples. These sites are the only ones selected for multi-element analysis that drain the CVC and / or Crown Hill Andesite outcrops in EL1/2013.

Gravel provenance: gravel samples have been retained from the stream sediment sampling program.

Outcomes:

- NB: Stream sediment sampling is an inexact analysis and values are relative only, not quantitatively comparable with other programs or even between sites (see Appendix A). These samples can only determine that gold concentrations exist in a catchment and will assist in locating such but should not be used to infer economic value.

The outcomes strengthen the case (in EL16/2015 Delaney, 2017) for the existence of a gold deposit in rhyolite on Davies Hill immediately west of the lease boundary. The creeks in EL1/2013 that drain the southern slopes of Davies Hill are anomalous for gold. Rhyolitic porphyry daylightings along the crest of the southern hump of Davies Hill. Consequently, the headwater catchments of Pearl Creek are likely to be anomalous in the mini-catchment



draining the western slope of Davies Hill in EL1/2013 too. This catchment extends easterly to include the Lake Margaret Gold prospect.

The portion of the 'gold belt' north from McCusicks Creek to the Lake Margaret Road remains unsampled. The apparent lack of porphyritic intrusions gave this area a lower priority in sampling.

The far northern unsampled portion of the 'gold belt', however, the Swan Creek catchment, drains two porphyries and is relatively easily accessed from the road. To sample this mini-catchment would take one field day. (Note that Whipsnake Creek though, where it also drains the feldspar-quartz-pyroxene porphyry, and lies within the 'gold belt', is not anomalous in gold at all).

The model postulates a parallel subsidiary gold belt that trends through Davies Hill. Tracking the subsidiary belt south, there is an unsampled mini-catchment in EL1/2013 that surrounds the southern half of the Horse Paddock Andesite.

4.2 Geological mapping and chip sampling

Interpreted and observation geological maps of EL1/2013 have been updated (see Figures 5.4 and Appendix E). Note that AMR's field observations and interpretations of stratigraphic units are generally consistent with MRT mapping as recorded on 1:25 000 sheet (Vicary et al, 2004) and at this stage no update is considered necessary.

4.2.1 Tramway mapping and chip sampling

A traverse of the southern portion of the old tramway route was undertaken, to supplement the mapping of Vicary (2005) on the northern extent. MRT mapping shows the tramway as being underlain by undifferentiated Yolande River Sequence rocks, and the traverse has not changed that interpretation. Four **rock types** were distinguished – a light grey shaly siltstone, fine-grained buff coloured sandstone and orange to red/brown coarser tuffaceous sandstone - the colours of these rocks are attributed to weathering - and dark grey shale. Interpreted bedding orientations were north and NNW trending, and steeply dipping (east?). Samples have been retained, location and field descriptions listed in Appendix E, but not thin sectioned or analysed petrologically.

The tramway was sited to exploit the flattest route from an elevator at Raggedy Ann to Lake Margaret (on EL1/2013, orthophoto imagery of this straight flat route could be interpreted as reflecting a fault). The flat area causes outcrop to be sparse and obscured by organic-rich soil and quartz gravel, so **veins** within the Yolande country rocks cannot be mapped with certainty. There is, however, an observable pattern in the density of quartz float, which could reflect sets of short generally westerly-trending veins or pods, crossing a brittle but competent NNE trending unit 4-5 m thick at various orientations and various spacings (5m – 40 m). Near the boundary of the tramway with AMR's neighbouring exploration licence area (Diamond Hill) the spacing of veins could be every 3 to 5 metres along the unit. It should be noted that the recent (30-40 y.o.) trail along the tramway follows the competent unit here, and the close-spaced quartz float concentrations could be dumped road base (?), however pod-like concentrations of quartz can be observed away from the road and others extend beyond the road verges. Some shallow excavations would resolve this.

The trend of the quartz pods is plotted on field map Appendix D. The competent unit is a fine-medium grained (possibly indurated) sandstone.

Statistically, the most common vein trends are 080 and 130. There is no visible gold, so the objective of distinguishing one vein orientation as gold-bearing has not been realised.



4.2.2 Recording orientation of other quartz veins

Outcrop is scarce throughout EL1/2013, being limited to road and track batters, larger creeks, some resistant ridges and trends of quartz float in the regolith. Only creeks and batters, on digging, can reveal vein or bedding orientations.

Estimated vein trends are plotted onto the field map (Appendix D) in orange. Although generally east-west, the trends of veins in EL1/2013 vary to follow most of the regional tectonic trends – that is, the eight compass bearings approximately every 30 degrees from due north to SSE. Table 4.1 lists these bearings and the sources of evidence for their existence (from Delaney, 2018, 2017/18 Annual Report – EL16/2015 Diamond Hill).

Apart from in the rhyolitic porphyries adjacent to EL1/2013, the thickness of veins in the Yolande Sequence have not been found to exceed 0.7 metres. The breadth and (presumably) depths of vein deposits vary with host rock and structural discontinuities. From aerial photography and mapping tracing and extrapolation between sites, vein ‘reefs’ in EL1/2013 can be 3 metres (or less) to 100 metres long.

• Orientation ->	WNW	NW	NNW	N	NNE	NE	ENE	EW
Magnetics		X	X	X		X		
Total Mag Intensity		X	X	X	X	X		X
Induced polarity			X	X			X	
Geology Mapping	X	X	X	X	X	X	X	X
Radiometric	X	X	X	X	X	X		X
Topographic		?	X	X	X	X	X	X
Aerial photography		X	X	X	X	X	X	X

TABLE 4.1: Evidence for tectonic trends in EL1/2013

4.3 Site inspection of mineral occurrences

4.3.1 Lake Margaret Road Gold

DUTY OF CARE: The Lake Margaret Gold Adit was located 25 metres S34°W from the currently mapped site (on MRT Mapview), at GDA94 MGA55: 379638E 5345318N altitude 370 m AHD (assume 5 m error in bearings). The revised site is provided here for safety, as the entry cutting is 3 metres deep in medium-density bushland and could result in injury.

The adit and two gold-bearing thin quartz veins are indicated (but not plotted) on an old Mt Lyell Mining and Railway Company map (since lost in theft of AMR vehicle). The excavated tunnel is almost 2 metres high and extends 47 metres horizontally under the Lake Margaret Road on a bearing of 045°, through Yolande Sequence units that appear to strike at 300-310° and dip sub-vertically (west?) (see Field Map Appendix D and Figure 4.1). The tunnel terminates in medium grey shale, with no significant quartz veins encountered.

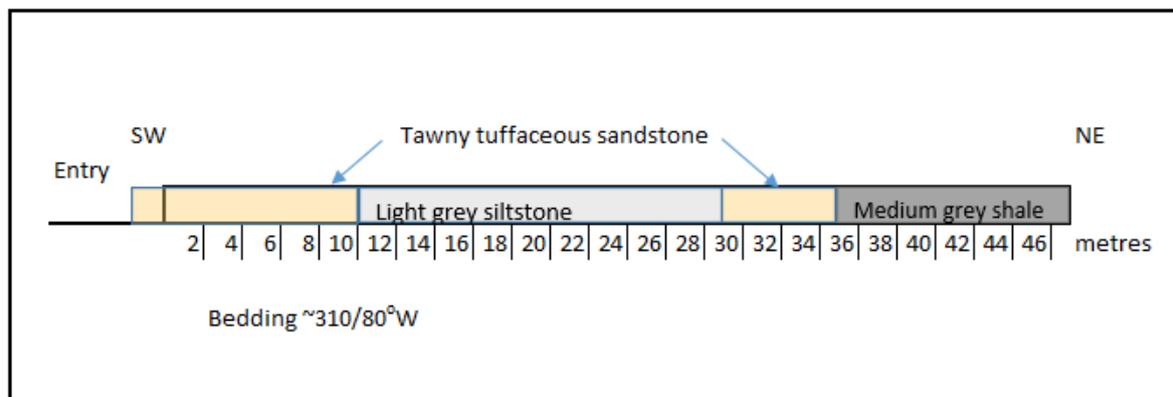


Figure 4.1: Long section of Lake Margaret Road Gold adit

A cursory investigation of the ground surface area, vertically above the plotted end of the tunnel, revealed an anomalous hole 2 m long and 0.5m deep trending 030°, 20 metres south of the tunnel end. It is not convincing as an excavation and could be from natural causes. The search did not reach the surface point directly above the end of the adit. This is where the 'two thin veins' would be expected to have been found in outcrop.

A double quartz vein is exposed, however, in the western batter of an HV transmission tower track at about 379616E 5345458N 398 m AHD (see Field Map Appendix A). It appears to be one vein 0.7 m thick, apparent dip 20° to 330, duplicated by a low angle fault (see photo Figure 4.2a & B). The wall rocks are tawny tuffaceous sandstone. A channel sample across the exposure has been retained, but not assayed because the exposure was found to be 100 metres north of the Lake Margaret Road Gold tunnel, dipping in the opposite direction. This exposure is thus unlikely to represent the dual veins that initiated the original exploration.

When this twin vein was discovered and thought to be possibly the LMRG target, it was decided to map and sample the quartz float in the vegetated area behind the batter. The area is a pine plantation where float has been exposed by forestry tines. Nineteen chip samples were collected over a 100-metre traverse between 379663E 5345480N and 379728E 5345398N, located and retained for future assay.



Figure 4.2A and 4.2B:
Double vein exposure 100 m north of Lake Margaret Road Gold site. Photos face 070°.



4.2.5 McCusicks Creek Excursion

DUTY OF CARE: The McCusicks Creek exploratory shaft (dug 1886) has been located, obscured by sword grass, at 380008E 5343207N (assume 5 m error in bearings). It has now been flagged with tape and a temporary warning sign. Depth has not been measured but historical records suggest that it could be 12 metres deep. The McCusick Shaft was sunk on a gold-bearing vein outcrop in porphyry.

DUTY OF CARE: The McCusicks Creek ‘open cut’ that was excavated to follow a vein (possibly Brown’s ‘leader’ of 1884) forms cliffs 3-4 metres high at its distal end at which, it is recorded historically, there is a shaft. The cut is 20 metres long and 2 metres wide. The entry to the cut is located at 379990E 5343280N, the dangerous end at about 380008E 5343267N.

McCusicks Tunnel No1 is located at 380033E 5343305N 265 m ahd. It was dug to test altered ‘soft’ gold-bearing porphyry that had been discovered by following alluvial gold concentrations up McCusicks Creek. The 6’ tunnel extends horizontally for 36 metres on a bearing of 105° compass. Five metres from the entry there is a crosscut 6 metres long on the southern side bearing 190, with a winze at the end that is 2 m deep as far as the surface of the water in it. The winze extends upward to 2.5m up from tunnel floor. The tunnel starts in medium-grey shale for 3 metres before a clean vertical contact with buff coloured porphyry. The porphyry extends until it encounters a hard ‘andesitic’ rock at 30 m after which the tunnel terminates at 36 metres. There are no obvious veins in the shale or the porphyry intersected.

McCusicks Tunnel No2 is located at 380023 5343295 267 m ahd. This tunnel is 15m long trending 172°. It appears to follow a 0.8 m wide silicified grey shale (observed in roof) and terminates in light grey siltstone. There are no obvious veins in the adit.

Southgates Creek tunnel was commenced to test the porphyry body from the southern side, from a second creek that had supported short term alluvial mining. The tunnel commences at 380146 5343211 280 ahd and bears 275° for 15 metres in altered porphyry up to a roof collapse on black infilled joints (sub horizontal dipping due east). There are vertical joints every 70cm across adit roof and 70° south dipping joints subparallel to the adit. Historical records report that this tunnel extended for another 25 metres in the direction of the McCusicks shaft vein.

4 DISCUSSION AND GEOLOGICAL MODEL

Lithology and Stratigraphy

Previous work and ground-truth mapping have enabled interpretation of a ‘straw-man’ stratigraphic column for rocks found on EL1/2013 (Figure 5.1) despite and accounting for, the complexity of lateral facies changes, repetitious deposition, intrusion, past tectonics and structural disturbance. This model stratigraphy is put forward for testing by mapping, drilling and research of stratigraphic information from neighbouring areas. It was developed using MRT mapping records (mostly Everard, 1982, unpublished data) and AMR’s mapping.

The time relationship of the volcano-sedimentary Yolande Sequence and the CVC volcanoclastic/pyroclastic units is debatable. The composition is similar, being predominantly



acid/intermediate felsic. One possibility is that the two sequences represent a spatial transition from subaerial/submarine volcanics to shelf deposits of the same time. Alternatively, in a volcanic arc sequence, the more proximal volcanics would be expected to underlie reworked or eroded sediments of the same composition. The two sequences in this area are juxtaposed, implying that either the boundary between the formations is displaced by faulting of kilometre scale, or they are sequential (or both). Corbett (1979) found that the two sequences were found to interfinger in the nearby Tyndall area, which is possible in an environment of cyclic eruptive episodes. If the depth of the folded sedimentary stack is 2-5 km (Leaman, 1992) there is enough accommodation to accept a graded sedimentary transition between proximal and distal deposits (the large fault concept) but obvious tectonic evidence would be expected from large scale faulting. Although narrow fault breccias have been recorded in the area, it seems reasonable to place the CVC rocks in the Lake Margaret Road area stratigraphically below, or older, than the Yolande Sequence. If the rocks on the western side of the tenement face west and young west (as they do consistently in AMR's former Diamond Creek area immediately west of EL1/2013, then it also follows that the rocks in the east are older.

The igneous rocks on, and immediately adjacent to EL1/2013 could represent a classic BADR crustal melt differentiation sequence (Basalt-Andesite-Dacite-Rhyolite; referred to in Solomon, 1965). The distribution and configuration of the rhyolitic, dacitic and andesitic porphyries, following structural interpretation and a study of the nature of the contacts, supports the observation of Morrison and Griffiths (1998) that they are generally conformable with host bedding. The Penghana and Crown Hill andesites have been dated at several million years younger than the Yolande volcano-sedimentary sequence in which they occur (Andesites Crown Hill 474 Ma – Baillie and Green, 1984; Penghana 494 Ma Vicary (2017 pers. comm.)) and thus must have intruded or burrowed as sills into lightly consolidated Yolande volcanics as part of a volcanic event that occurred several million years after CVC/Yolande deposition (probably early Tyndall volcanic period whose clastics are geochemically similar). In the straw-man column the intrusives are presented at their stratigraphic emplacement level, rather than their time of intrusion.

Quartz veins proved to be more difficult to map than anticipated. Road cuttings and rare creek exposures sometimes offer orientations and thickness estimates, but most evidence of veins consists of concentrations of quartz float on the regolith and, deceptively, in eluvium. When observing quartz float, a location and vague trend might be discerned along with a relative idea of width, but dip and dip direction are not measurable. The unreliability of trend and width of exposures is demonstrated at several sites where measurements change within 1-2 metres. The pattern of veining appears to be as a series of lensoidal pods of undetermined depth, striking SSE to ENE across northerly to NNW trends. The orientations and spatial extents of gold concentrations within veins has been modelled but not verified. Due to the abundance of quartz fragments on the Licence, few rock chip samples have been selected for assay.

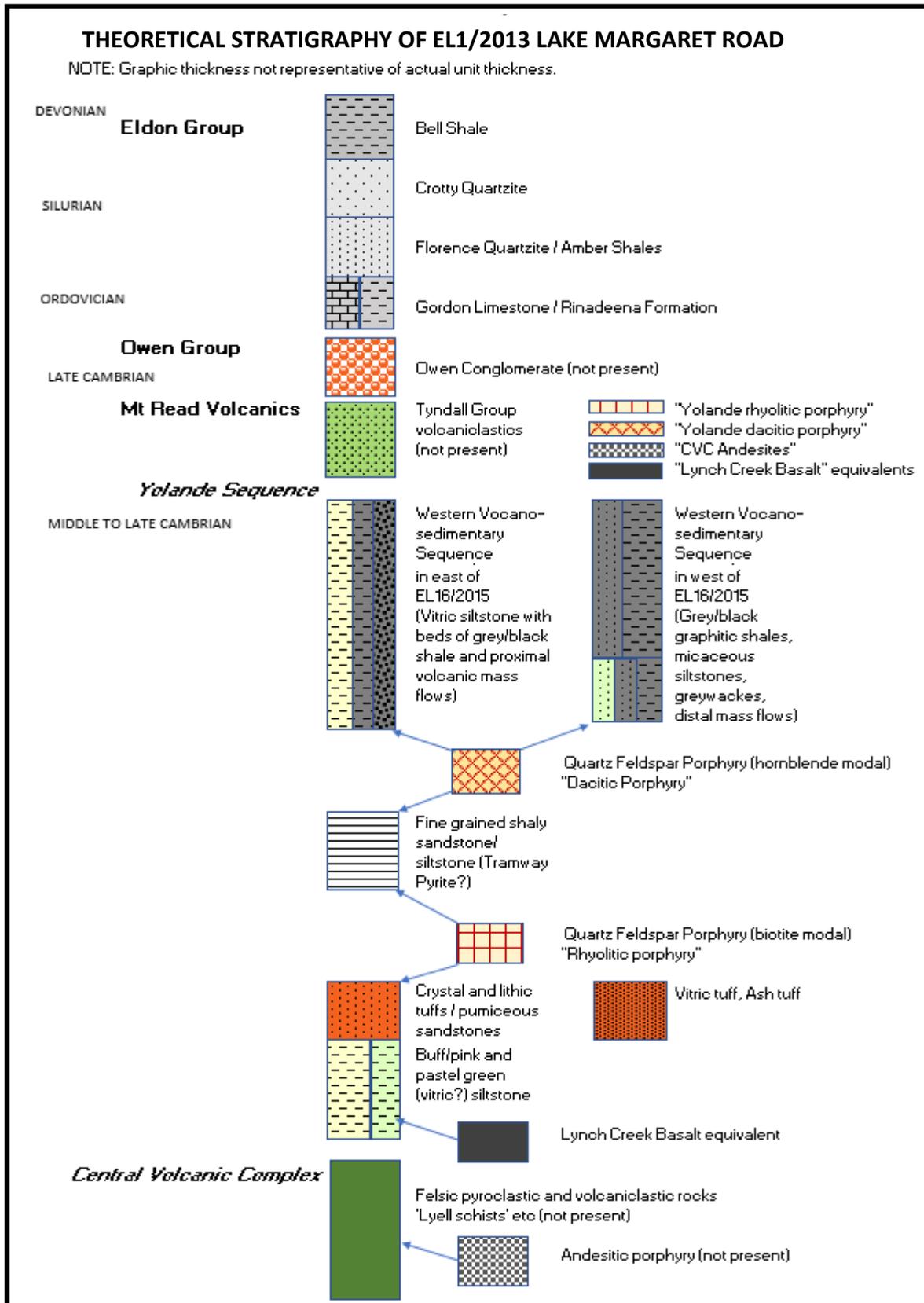


Figure 5.1 Interpreted stratigraphic column



Implications of stratigraphy and lithology for future exploration:

Understanding of the stratigraphy and lithology in the area remain important in any future exploration because:

- The rheology of adjacent rock types is an indication of vein and alteration zone ore potential, so stratigraphic relationships (e.g. porphyry/shale) are a guide to prospect locations.
- The consistent conformable nature of the porphyries along with distinctive magnetic signatures (where present) makes them useful marker horizons for mapping and structural interpretation.
- Where adjacent rock types don't have a direct stratigraphic relationship, there is faulting, with potential vein infilling or alteration pathways. Sharp linear lithological discontinuities / boundaries in outcrop indicate faulting or bedding changes, both of which could have conducted or accommodated hydrothermal venting.
- Theoretically, the BADR magmatic differentiation sequence would provide evidence for interpreting the stratigraphic facing of the vertically stacked strata, due to the density and viscosity differences between the magmatic fractions. These physical characteristics generally result in the earlier, denser mafic magma intruding lower and further into the sediment pile and the final, rhyolitic sills ending up stratigraphically higher and chunkier. (Telford in Hine, 1994 in Griffiths 1998, McPhie and Allen, 1992). Once uprising magma reached rocks or sediments less dense than itself, it would have ceased to rise further. If the magma did not encounter sediments of lower density, then it continued upward until it extruded to the surface.
- In some areas (Victorian goldfields, Carolina Slate Belt) carbonaceous lithologies (eg graphitic shales) are thought to chemically catalyse gold deposition. Black shales are present in the Yolande Sequence in EL1/2013.
- More needs to be known about surface and sub-surface geology. Despite paucity of outcrop and drill holes, future explorers might refine geological maps through mapping and evidence-based reinterpretation.

Tectonics and Structure

Sheppard (1974) deciphered bedding facings in his mapping to develop a structural model of a few NNW-trending, upright, tight folds, the limbs of which dip at angles of 70° - 90°. He also observed that the fold axes get progressively closer together towards the east, towards the Great Lyell Fault. The implied increasing compression in this direction (during the Taberabberan Orogeny?) may have eventually resulted in further movement on the Lyell Shear, of a compressional nature, along the eastern limb of the easternmost anticline. Sheppard's interpretation has not been challenged by subsequent explorers.

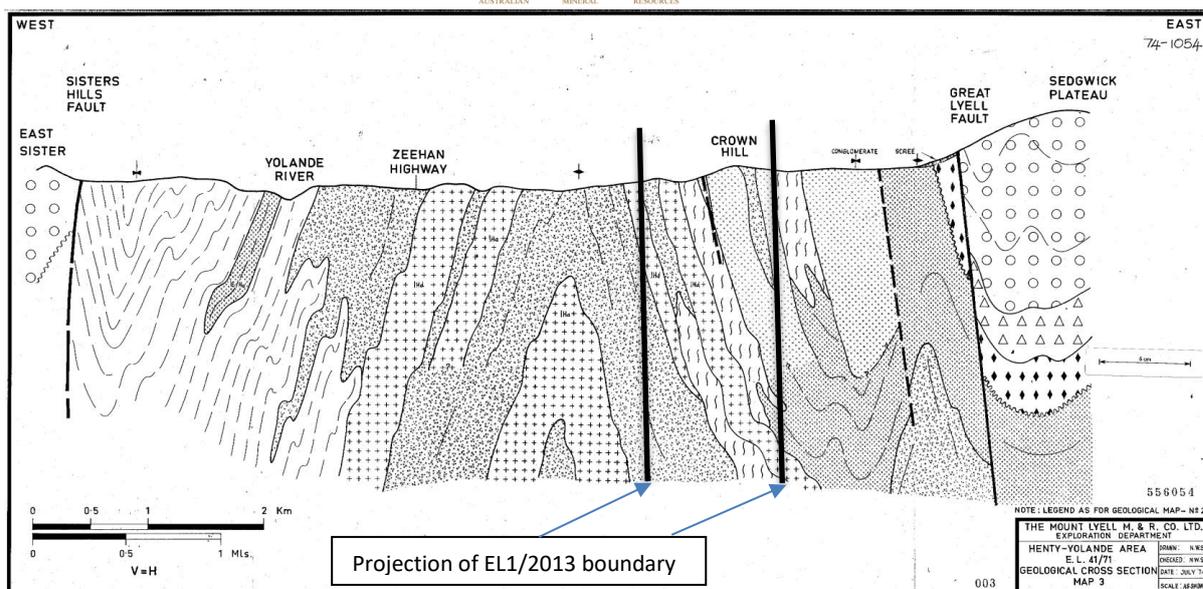


Figure 5.2: Structural cross section across the EL1/2013 area EW across Crown Hill (Sheppard, 1974)

AMR's regional structural assumptions are:

Cambrian pyroclastic and volcanoclastic MRV sediments were laid down on the eastern margin of a subsiding back arc basin, accommodated by basin subsidence along northerly trending en echelon normal faults in the basement. One of these northerly crustal structures was the Great Lyell Fault. These subsiding basement features could have caused the overlying sediment stack to be gently folded along sub-horizontal north-south hinge lines.

In the Late Cambrian, tectonism associated with a major compression during the continuing Tyennan / Delamerian Orogeny started to elevate the Tyennan Block massif. The Tyndall volcanism event occurred nearby, possibly exploiting the Great Lyell Fault, and the unconsolidated earlier Cambrian Yolande and CVC sediments were intruded by burrowing lavas that formed porphyry sills generally conformable with bedding planes. The rising Tyennan Block caused the more proximal crustal faults to reverse, steepening the dip of the Cambrian strata adjacent.

By middle Devonian time, a generally ENE vergent compressional tectonic event (D1) steepened the northerly folding and imposed NNW thrusting on the rocks and probably further reversal of the northerly crustal faults. The outcome in the rocks now underlying EL1/2013 was a block of mostly sub-vertical north-south trending beds of Cambrian volcanoclastic rocks and volcanic sills, dislocated and duplicated by NNW thrusts. The steep bedding could represent the limbs of tight fault-bound anticlines and synclines or snapped thrust sheets of competent siliceous strata.

In the Late Devonian (D2), closely-spaced north-east directed sinistral wrench shearing resulted in an apparent NNW regional trend to bodies of rock that internally retained north-south striking bedding.

The complex structural history has imparted no less than eight lineation orientations upon the area (and presumably rocks in the area) that may represent shears, thrusts, bedding, wrench faulting or combinations of these. There are almost certainly more faults than those already mapped or postulated.



Implications of structure and tectonics for exploration:

- It would be conclusive to locate unambiguous bedding planes at spaced locations to establish if bedding strikes north-south, consistent with some recorded field observations regionally, or NNW as mapped by Sheppard.
- In combination with new lithological and stratigraphic understanding, the structural analysis assists in identification of sites for targeted exploration on the block.
- Mapped curvilinear faults were probably caused by major tectonic vectors that exploited various pre-existing planes of weakness (e.g. NNW regional trend could have exploited a combination of pre-existing northerly and north-westerly trending faults under an ENE vergent stress field).
- The close-spaced (few hundred metres) NE and NW shears would mean progressive dislocation of ore bodies in the Licence area (to the west as one moves north).

Mineralisation mechanisms and patterns

Outcomes:

- There is gold on the Lake Margaret Road Licence area, probably in modest volumes but possibly in rich buried concentrations. The best discoveries, Swan Creek and McCusick's Creek Devonian vein gold prospects are still probably sub-economic prospects, each about 100 metres outside the boundary of EL1/2013.
- In the Queenstown area, gold occurs along NNW-trending belts that can be related to trends in deep crustal gravity differentials ('gravity worms' of Murphy et al, 2004). One of these belts diagonally transects the Lake Margaret Road Licence for the middle 3 km. It appears to be about 200 metres wide, almost exactly as postulated by Poltock (1992) from stream geochemistry. Regionally, gold mineralisation does occur up to 5 km laterally from the northerly trending Great Lyell Fault (for example Diamond Hill, Madam Howards Gold, May, Princess, Hall's Creek, etc are kilometres further west from the GLF than the entirety of EL1/2013).
- A second belt paralleling the postulated main gold belt can be inferred in EL1/2013. It tracks between Davies Hill and Raggedy Ann prospect to the south.
- Narrow sub-vertical blocks of brittle rocks bound by faults may have acted as reservoirs for hydrothermal fluids enabling gold precipitation. All known and likely Devonian vein gold concentrations on nearby EL16/2015 (Delaney, 2019), at McCusicks and Swan Creeks, Gold Creek 2 km further north and in the MRV generally appear to be hosted by rhyolitic porphyry. Vein quartz deposits tend to dilate in rhyolitic (Quartz-Feldspar-Biotite phyrlic) porphyries and perhaps competent sandy units in the interbedded Yolande River 'undifferentiated' volcano-sedimentary rocks, compared to the siltier layers. Note that rhyolitic porphyries have not been found in outcrop on EL1/2013.
- The only record (but lost) of significant gold occurs in a double quartz vein at the Lake Margaret Road Gold site. The host rock is mapped as Yolande sequence.
- Borehole MH04, outside the EL1/2013 boundary, intersected anomalous concentrations of lead (1 metre @ 7.9% and 1.5 metres @ 1%) in galena and zinc (3.2 m @ 0.65%) in sphalerite at less than 152 m vertical depth. No sulphides of interest were recorded in the 45 metres below. The orientation of MH04 is sub-parallel to alteration trends in the region (e.g. Henty Gold), thus the apparent intersection thickness is likely to be significantly less than actual thickness of this mineralised zone.



- Existence of VHMS deposits in economic quantities or depths in Yolande Sequence rocks is highly improbable.
- Proposed model for gold deposits interpreted for EL1/2013 is that the gold ore concentrations occur at intersections of
 - 1) moderately-plunging, lath-shaped alteration zones (NNW or NNE orientations) that transected and altered ‘chimneys’ of brittle host rocks that are bound by less permeable country rocks; and
 - 2) transverse quartz vein ‘blows’. Under this model, gold precipitated from auriferous hydrothermal fluids that channelled from an underlying mother fault that defines the NNW ‘gold belt’. Upon pressure release gold would have precipitated and settled gravitationally within the reservoirs in the brittle host rocks.

Faults and host body limits truncate/displace both the veins and the altered horizons resulting in pod-like point concentrations rather than extended ore channels. Average size of the auriferous pod shoots regionally is estimated at no more than 100m x 15m x 0.7m. Average gold concentration is unlikely to exceed 1 oz/tonne, calculated to about ~2500 ounces per deposit. To become economic for extraction the same conditions would need to be closely-spaced, and predictable and/or inter-vein alteration zones would need to offer complementary modest concentrations of gold or accessory ore minerals).

- The Tramway pyrite body is (considered to be) part of one of the (Cambrian) alteration zones.

Implications for exploration:

- The only prospective mineral potential in EL1/2013 is gold (or barite) in the Devonian veins. Note: ‘Devonian’ is an assumption based on penetration of local Ordovician-Silurian rocks.
- The likely drilling targets would be quartz reefs around the faulted boundaries of any rhyolitic porphyry host rocks (or perhaps the andesite bodies) particularly adjacent to fine-grained and/or graphitic rocks.
- Based on theory, sediment sampling, quartz vein strikes and rock chips, the potential exploration targets on the Licence are:
 - 500 metres NNW of McCusicks Creek near the track to Mt Lyell Pond #1
 - Lake Margaret Road Gold
 - mid-way between Lake Margaret Road Gold and the Tramway pyrite
 - the boundary of the Crown Hill Andesite and ‘gold belt’ (300 m north of Tramway Pyrite)
 - 500 m SSE of the Swan Creek Gold site (boundary of FQPx porphyry)
 - 300 m SSE of the Swan Creek Gold site (boundary of FQPx porphyry)
 - Boundary of Swan Creek QFP porphyry upstream of the plotted Swan Creek prospect.
- Further exploration implies closely-spaced gridded soil sampling, targeted stream sediment sampling and quartz vein mapping about potential exploration sites before committing to drill (especially where any rhyolitic porphyry bodies are revealed).

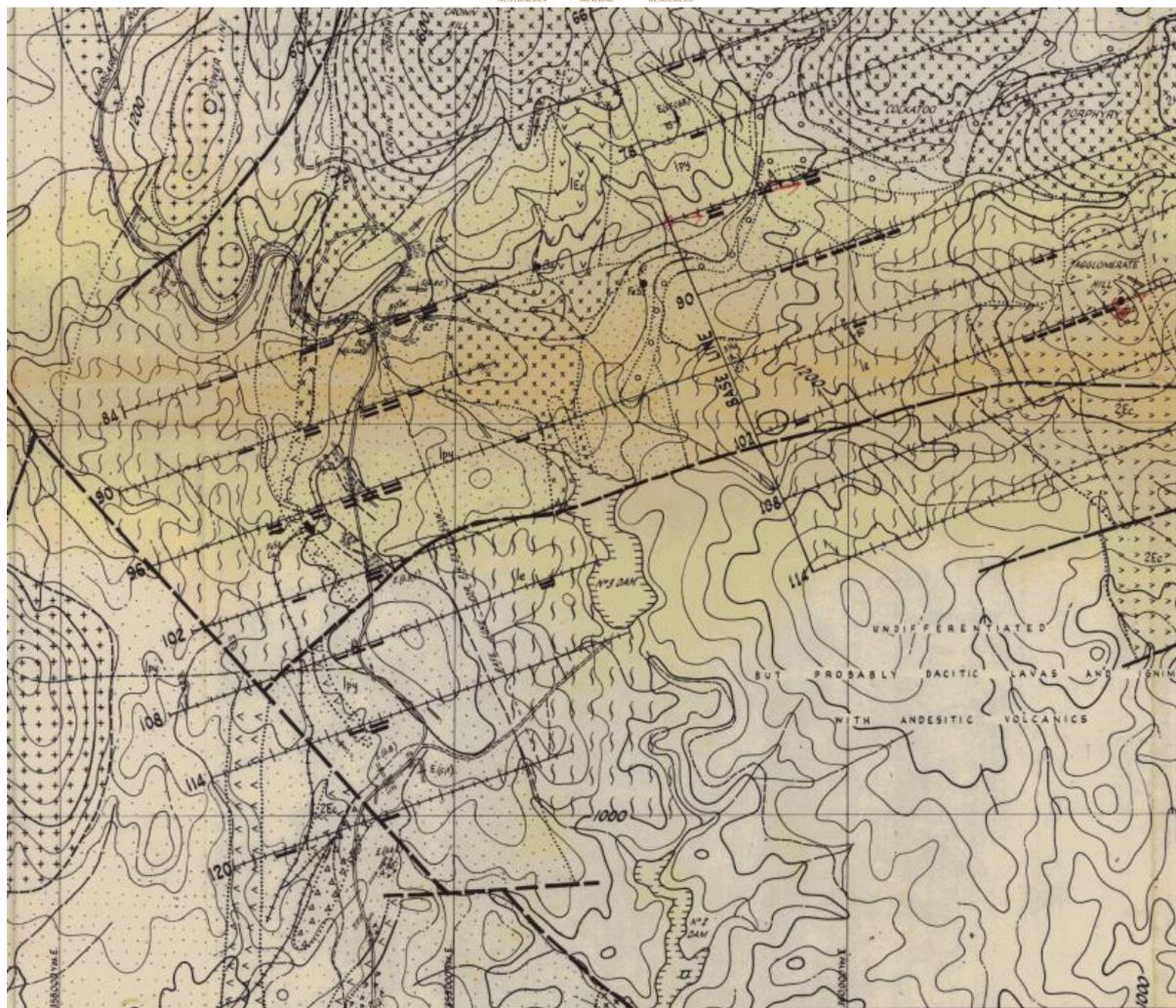


Figure 5.3: IP grid in the Lake Margaret Gold – Tramway Pyrite area (Sheppard, 1974)

Implications for economics:

- AMR's exploration target is to exceed 50,000 ounces of resource. To achieve this, AMR's exploration would need to demonstrate the same quantum of gold as recorded mined for the entire west coast goldfield in a decade.
- Proving more than 50,000 ounces of gold resources from veins would require:
 - exploitation of economies of scale through securing sufficient ground prospective for gold (a number of small shallow mines); and/or
 - evidence of larger Beaconsfield or Henty-style deposits. AMR considers a million-ounce deposit beneath EL1/2013 as unlikely. Although the structural conditions probably do exist on the Licence, there is no evidence of the intensity of silicification/alteration necessary to form a Beaconsfield or Henty-style deposit.
- AMR has found investment for exploration drilling difficult to attract because of the limitations imposed by the modest gold resource implied on EL1/2013.

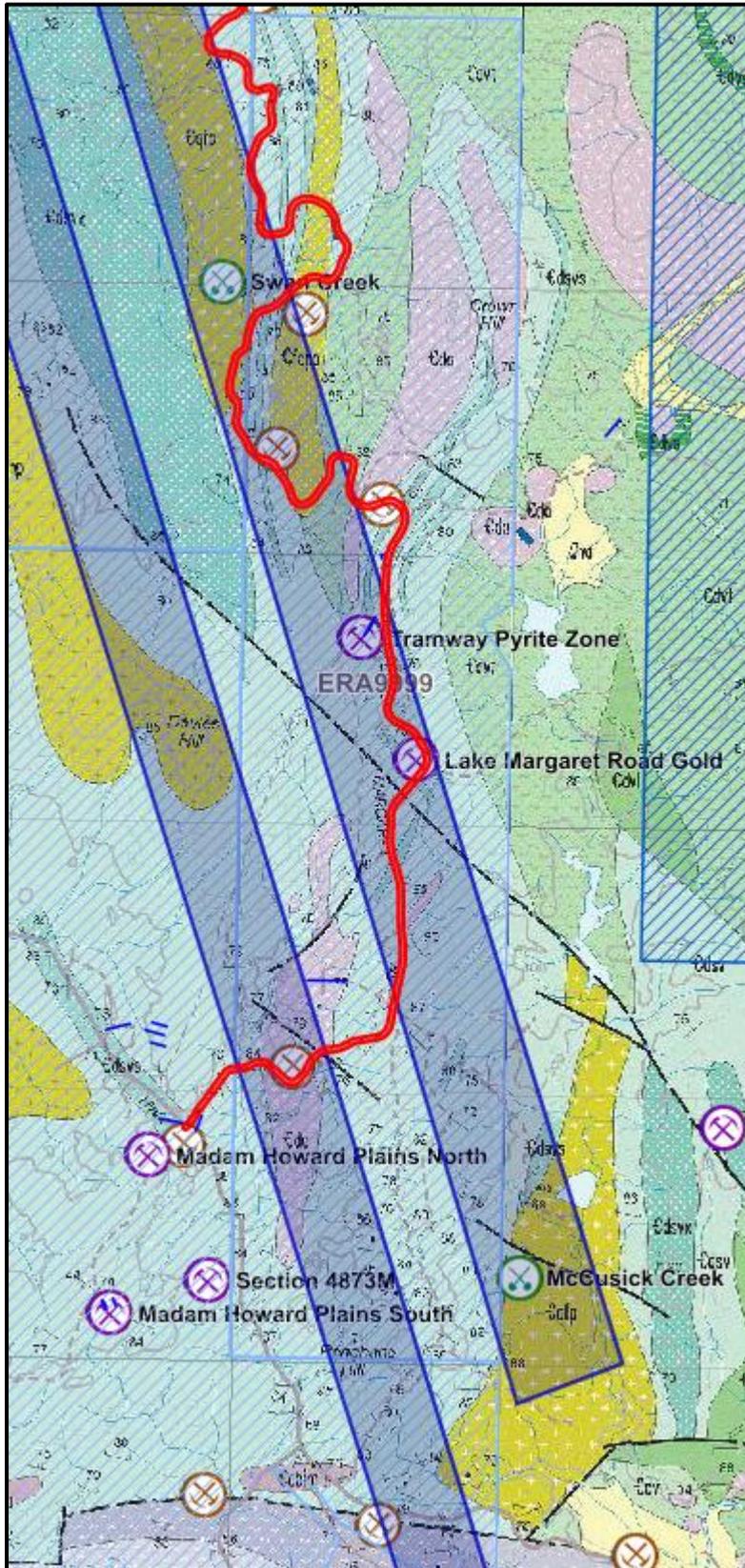


Figure 5.4: EL1/2013 Interpreted Geology



5 ENVIRONMENTAL, CULTURAL HERITAGE

No works as specified by the *Mineral Exploration Code of Practice* (Bacon & Pemberton, 2012) or 'controlled actions' (*EPBCA*, 1999) were undertaken during the period. Field work on public land consisted of outcrop recording and chip sampling, and stream sediment panning only (process description in Appendix A).

Access was by two persons by foot during summer months only from roadside or fire trails, with minimal damage to regrown common native species (predominantly manuka, bauera and cutting grass). No track cutting, or gridding was undertaken. Both the geologist and field assistant have researched and viewed images of plants of conservational significance (Appendix B) for familiarity prior to the program. Movement through scrub and swampy areas was undertaken to alert fauna including frogs, lizards and snakes (one sighted).

Conservation Significance Fauna Points recorded on MyList (DPIPWE):

Ombrastacoides leptomerus Not threatened; *Cyclodomorphus casuarinae*, she-oak skink Not threatened; *Tachyglossus aculeatus*, short-beaked echidna, Not threatened; *Sarcophilus harrisii*, tasmanian devil, THREATENED; x 3

Conservation Significance Flora Points recorded on MyList (DPIPWE):

Microlaena tasmanica, tasmanian ricegrass, Not threatened
Pimelea cinerea, grey riceflower, Not threatened
Gleichenia dicarpa, pouched corallfern, Not threatened (Powerline easement 1)
Sticherus tener, silky fanfern, Not threatened (Powerline easement 1)
Xyris muelleri, roundhead yelloweye, Not threatened (Powerline easement 2) x3
Oreobolus oxycarpus subsp brownie, sharpfruit cushionsedge, Not threatened (Powerline easement 2)
Centrolepis monogyna, western cushion-bristlewort, Not threatened (Powerline easement 2)
Lythrum hyssopifolia, small loosestrife, Not threatened

The nearest record of aboriginal relics is from the Queen River valley (Corbett, 1980) 300 metres to the east of the Licence area (West Queen). Aboriginal inhabitation of the ridge above the river valley is unlikely (Appendix D). Apart from excavation depressions, trenching, the tramway route, a historical exploration tunnel and one known shaft, there is no evidence of white cultural heritage elements of historical value on EL1/2013.

6 EXPLORATION EXPENDITURE 2016 - 2022

Expenditure EL1/2013	July to August 2017/2018	July to August 2018/2019	July to August 2019/2020	July to August 2020/2022	TOTAL 2017-2022
Field	0	\$4,901	\$5,196	\$4,038	\$14,856
Geology	0	\$21,450	\$19,250	\$17,490	\$58,190
Equipment	0	\$1,366	\$737	\$3,113	\$5,216
Tenements Adm	0	\$1,909	\$3,201	\$3468	\$9,302
Services	\$723	0	\$2,365	0	\$2,365
TOTAL	\$723	\$29,627	\$31,470	\$28,110	\$89,930



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8 APPENDICES

Appendix A1: Catchment based stream sediment gold sampling program

Pan concentrate drainage survey for gold

At each site two litres of -5 mm sediment are sieved into a pan, then panned to a concentrate of approximately 60 g of wet sand. The concentrate is bagged and sent to ALS Burnie where it is assayed, unpulped, by Fire Assay/AAS so that a total concentration (ppb) of gold in the sample is determined. The concentration values in Table B are derived by relating the ppb (micrograms) of gold in the 50g pan concentrate sample to the original field sample weight of about 2 kg.

Note that the concentrates were not sieved to -#80 as in other programs so that larger particles would not be excluded.

Values of gold concentrations are relative only, not precise or quantitatively comparable to other programs.

Stream sediment analysis is an inexact science due to variation between samples:

- Impacts of historical human disturbance of alluvium and removal of gold (including roads, drainage alteration and quarries) (especially 30 years of onsite prospecting)
- Alluvial gold concentration varies naturally across any one location (e.g. leads, paleochannels, bars, bedrock fissures)
- Accessibility of sites (creek gullies are thickly overgrown, streams go 'underground' beneath organic-rich bog)
- Accessibility to comparable alluvial gold trap 'qualities'
- Sample depths (some deeper or closer to bedrock)
- Fens organics and muds act as filters to colluvial gold
- Impacts of some root systems thought to selectively absorb gold
- Organic mud content - 2 kg including mud in a sieve is not the same as 2 kg of sand/gravel
- Different sampling techniques
- Gold concentrations in source veins might be distal or proximal to the creek.



Table A: Pan concentrate results (Gold) – Summer 2018 and Summer 2019
Samples taken in Lake Margaret Road Exploration Licence Area (EL1/2013)

Sample ID	Easting GDA94	Northing GDA94	Concentrate Au (ppm)	Sediment Au (ppb)
PC001	379209	5344605	0.006	
PC1a1	379526	5344809	0.000	
PC1a2	379456	5344670	0.003	
PC1a3	379288	5344593	0.001	
PC2a4	379227	5344622	0.440	22
PC3a1	379077	5344820	0.003	
PC3a2	379078	5344762	0.003	
PC3a3	379100	5344708	0.003	
PC3a4	379177	5344702	0.000	
PC3a5	379168	5344596	0.003	
PC4a1	379521	5344484	0.359	18
PC4a2	379397	5344460	0.001	
PC4a3	379319	5344495	0.090	5
PC4a4e	379209	5344554	0.270	14
PC4a4w	379207	5344555	0.529	26
WC01	379273	5346002	0.003	
WC1a1	379393	5345727	0.009	
WC1a2	379365	5345732	0.081	4
WC1a3	379336	5345881	0.003	
WC1b1	379393	5345727	0.003	
WC1b2	379365	5345732	1.715	86
WC1b3	379336	5345881	0.015	1
WC2a1	379419	5346372	0.001	
WC2a2	379313	5346380	0.003	
WC2a3	379316	5346187	0.003	
WC2b1	379534	5346168	0.003	
WC2b2	379475	5346138	0.003	
WC2b3	379364	5346151	0.001	
WC3a1	379124	5346340	0.003	
WC3a2	379006	5346260	0.003	
WC3a3	379001	5346204	0.001	
WC4a1	379054	5346036	0.003	
WC4a2	378978	5346113	0.003	
WC4r1	378980	5345809	0.003	
WC4r2	379348	5345844	0.001	
WC5A1	379124	5345740	0.194	10
WC5A2	379038	5345745	0.010	1
WQ1a1	379640	5346036	0.003	
WQ1a2	379811	5345988	0.001	
WQ2a2	379870	5345732	0.003	
WQ1/2a1	379804	5345931	0.003	



Appendix A2: Catchment based stream sediment multi-element sampling results

Results of 2019/20 sediment sampling: Multi-element Analysis

AuME-ST4 SAMPLE	Au	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge
PC001	0.0063	0.025	0.23	1.18	<10	23.8	0.09	0.055	0.02	0.007	38.4	0.494	2.32	0.247	2.47	0.38	0.496	0.048
PC1a1	0.0002	0.294	0.35	2.52	<10	31.6	0.14	0.066	0.01	0.048	53.6	2.13	2.87	0.202	9.06	0.51	1.13	0.07
PC1a3	0.0009	0.048	0.4	4.88	<10	42.8	0.19	0.132	0.02	0.016	55.2	1.715	4.84	0.444	6.85	0.57	0.922	0.072
PC3a4	0.0001	0.023	0.06	0.41	<10	11.2	0.04	0.052	0.01	0.005	14.8	0.22	2.9	0.092	1.82	0.231	0.188	0.023
PC4a2	0.0006	0.047	0.2	1.33	<10	22.8	0.11	0.077	0.02	0.007	27.1	0.723	7.3	0.259	3.91	0.34	0.78	0.036
PC4a3	0.0901	0.037	0.34	2.87	<10	31.1	0.1	0.095	0.03	0.011	32	1.07	8.23	0.258	5.39	0.61	1.1	0.044
PC4a4e	0.27	0.056	0.34	3.96	<10	45.4	0.19	0.083	0.02	0.019	53.3	1.845	5.1	0.371	6.62	0.76	0.878	0.067
WSC2a1	0.0008	0.049	1.69	11.55	<10	84.9	0.7	0.164	0.06	0.127	33.1	11.4	20.7	0.599	19.1	2.65	3.79	0.064
WSC2b3	0.0005	0.055	1.89	12.2	<10	108	0.79	0.141	0.03	0.289	49.3	19	22.8	0.425	42.5	3.8	5.14	0.073
WSC3a3	0.0009	0.064	0.97	6.98	<10	80	0.35	0.109	0.04	0.051	47.8	3.65	15.15	0.399	12	1.51	2.16	0.07
WSC4r2	0.0006	0.034	0.7	12.15	<10	61.7	0.24	0.11	0.01	0.014	29.3	1.45	8.71	0.235	13.45	1.33	1.795	0.042
WSC5A4	0.0543	0.046	0.17	1.22	<10	23.5	0.08	0.068	0.01	0.028	11.65	0.381	3.62	0.281	2.66	0.28	0.529	0.021
WSC5b5	0.0214	0.028	0.14	2.46	<10	13.8	0.07	0.047	0.01	0.01	18.15	0.594	3.59	0.143	1.75	0.34	0.455	0.026
WSC1a2	0.0812	0.054	0.45	11	<10	71	0.14	0.098	0.01	0.012	40.1	1.165	6.48	0.268	8.23	0.74	1.17	0.051
WQ1a2	0.0005	0.056	0.42	5.59	<10	134.5	0.1	0.087	0.02	0.015	28.7	2.03	7.79	0.211	24.7	0.85	1.165	0.038

AuME-ST4 SAMPLE	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Pd	Pt	Rb	Re	S
DESCRIPTI	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
PC001	0.069	<0.004	<0.005	0.08	18.9	1.1	0.03	30.6	0.11	0.005	0.039	0.56	0.004	9.98	<0.001	<0.001	4.37	<0.001	<0.01
PC1a1	0.079	0.012	0.007	0.08	26.2	0.9	0.03	160.5	0.28	0.01	0.056	0.65	0.004	26.3	0.001	<0.001	5.31	<0.001	<0.01
PC1a3	0.12	0.007	<0.005	0.14	27	1.6	0.05	68.2	0.2	0.009	0.079	1.49	0.007	16.6	<0.001	0.001	8.66	<0.001	0.01
PC3a4	0.076	<0.004	<0.005	0.04	7.34	0.3	<0.01	19.9	0.32	0.003	0.106	1.06	0.001	5.65	<0.001	0.001	2.07	<0.001	<0.01
PC4a2	0.091	0.005	0.005	0.05	13.85	0.8	0.05	36.9	0.14	0.007	0.17	1.3	0.004	12.9	<0.001	0.001	4.02	<0.001	<0.01
PC4a3	0.098	0.004	0.007	0.07	15.95	1.7	0.08	54.5	0.42	0.006	0.121	2.76	0.005	11.25	<0.001	0.008	5.46	<0.001	<0.01
PC4a4e	0.093	0.006	0.007	0.1	26.6	1.4	0.04	78.5	0.17	0.007	0.084	1.4	0.012	15.15	<0.001	<0.001	6.55	<0.001	<0.01
WSC2a1	0.071	0.024	0.02	0.11	21.7	5.3	0.16	160	0.78	0.008	0.301	8.23	0.026	24.2	<0.001	0.001	7.77	<0.001	0.01
WSC2b3	0.082	0.021	0.022	0.06	24.7	5.5	0.18	474	0.74	0.005	0.173	9.27	0.038	32	0.001	0.001	4.47	<0.001	0.01
WSC3a3	0.106	0.015	0.014	0.11	26.7	3.8	0.14	115	0.49	0.008	0.164	5.91	0.016	29.3	<0.001	0.002	6.69	<0.001	0.01
WSC4r2	0.048	0.008	0.01	0.08	15.55	1.5	0.08	58.8	0.42	0.008	0.099	2.72	0.017	23.4	<0.001	<0.001	4.62	<0.001	0.01
WSC5A4	0.073	0.006	0.005	0.09	5.39	0.6	0.01	38	0.27	0.006	0.049	1.29	0.002	10.75	<0.001	<0.001	6.14	<0.001	<0.01
WSC5b5	0.087	0.004	<0.005	0.07	8.62	0.5	0.02	32.9	0.3	0.004	0.077	1.43	0.002	4.98	0.001	<0.001	4.73	<0.001	<0.01
WSC1a2	0.037	0.009	0.008	0.07	22.1	1.1	0.06	45.1	0.35	0.007	0.059	2.06	0.018	24.8	0.001	<0.001	4.17	<0.001	0.01
WQ1a2	0.059	0.01	0.036	0.07	15.65	1.8	0.07	31.6	0.41	0.006	0.052	1.73	0.007	37.1	0.001	0.001	3.45	<0.001	0.01

AuME-ST4 SAMPLE	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
DESCRIPTI	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
PC001	0.091	0.336	<0.1	0.15	1.71	<0.005	0.01	2.64	0.001	0.024	0.245	2.4	0.208	2.15	4.9	4.02
PC1a1	0.149	0.548	<0.1	0.23	1.53	<0.005	0.01	1.82	0.002	0.045	0.195	3.2	0.159	2.61	13.3	4.23
PC1a3	0.555	0.761	<0.1	16.8	4.08	<0.005	0.01	3.93	0.002	0.048	0.455	6.8	0.114	3.87	9.8	6.1
PC3a4	0.132	0.107	<0.1	0.23	0.9	<0.005	<0.01	1.665	0.003	0.011	0.179	0.7	0.114	0.996	1.7	3.44
PC4a2	0.134	0.985	<0.1	0.21	5.51	<0.005	0.01	2.39	0.014	0.023	0.402	7.5	0.07	2.02	6.2	4.56
PC4a3	0.171	0.904	<0.1	0.26	11.25	<0.005	0.01	2.15	0.007	0.032	0.356	11.3	0.127	2	9.3	5.11
PC4a4e	0.261	0.921	<0.1	1.1	3.99	<0.005	0.01	3.8	0.002	0.039	0.531	11.4	0.07	3.76	12.3	4.65
WSC2a1	0.845	2.93	0.3	0.57	15.5	<0.005	0.02	5.42	0.013	0.133	1.285	53.9	0.047	3.71	49.7	4.1
WSC2b3	0.611	5.51	0.3	0.65	16.65	<0.005	0.04	7.16	0.012	0.094	1.63	75.9	0.013	4.24	61	5
WSC3a3	0.391	1.5	0.1	0.27	11.6	<0.005	0.02	3.93	0.007	0.061	0.729	23.7	0.061	4.13	32.7	5.33
WSC4r2	0.379	1.475	0.1	0.99	6.94	<0.005	0.03	2.88	0.003	0.047	0.55	19.9	0.027	2.9	16.3	2.91
WSC5A4	0.198	0.26	<0.1	0.19	1.74	<0.005	<0.01	1.36	0.001	0.047	0.212	1.9	0.14	1.395	9.9	3.54
WSC5b5	0.134	0.156	<0.1	0.15	1.16	<0.005	<0.01	1.88	0.001	0.027	0.219	2.1	0.136	1.405	4.5	3.51
WSC1a2	0.338	1.27	0.1	0.23	8.14	<0.005	0.03	2.43	0.002	0.043	0.439	11.3	0.064	3.1	10.3	2.43
WQ1a2	0.307	0.739	0.1	0.19	9.37	<0.005	0.01	2.6	0.001	0.04	0.369	11.2	0.195	1.83	67.6	3.23

Appendix B: Plants of conservation significance – Lake Margaret area

(Note: All have been recorded in EL1/2013. None of the pictured species are classified as 'Threatened').



Tasmanian rice grass;



Roundhead yellow eye - 'Tasmanian' yellow eye pictured.



Pimelea cinerea, grey riceflower (*P. linifolia* pictured)



Gleichenia dicarpa, pouched coralfern





Sticherus tener, silky fanfern

Oreobolus (Cyperaceae)

4b:108

Tasmania has six species of *Oreobolus*. All of these are subalpine and alpine tufted plants that form dense clusters, cushions or mats on boggy soil. They are one of the more abundant groups of plants in this habitat. In most species, the tufts are flattened from side to side (with a row of leaves on each edge of the flattened shoot), but in *O. pumilio* the tufts are not flattened and the leaves are spirally arranged.





Centrolepis monogyna, western cushion-bristlewort (photo: Plants Tas-Mania)



Lythrum hyssopifolia, small loosestrife



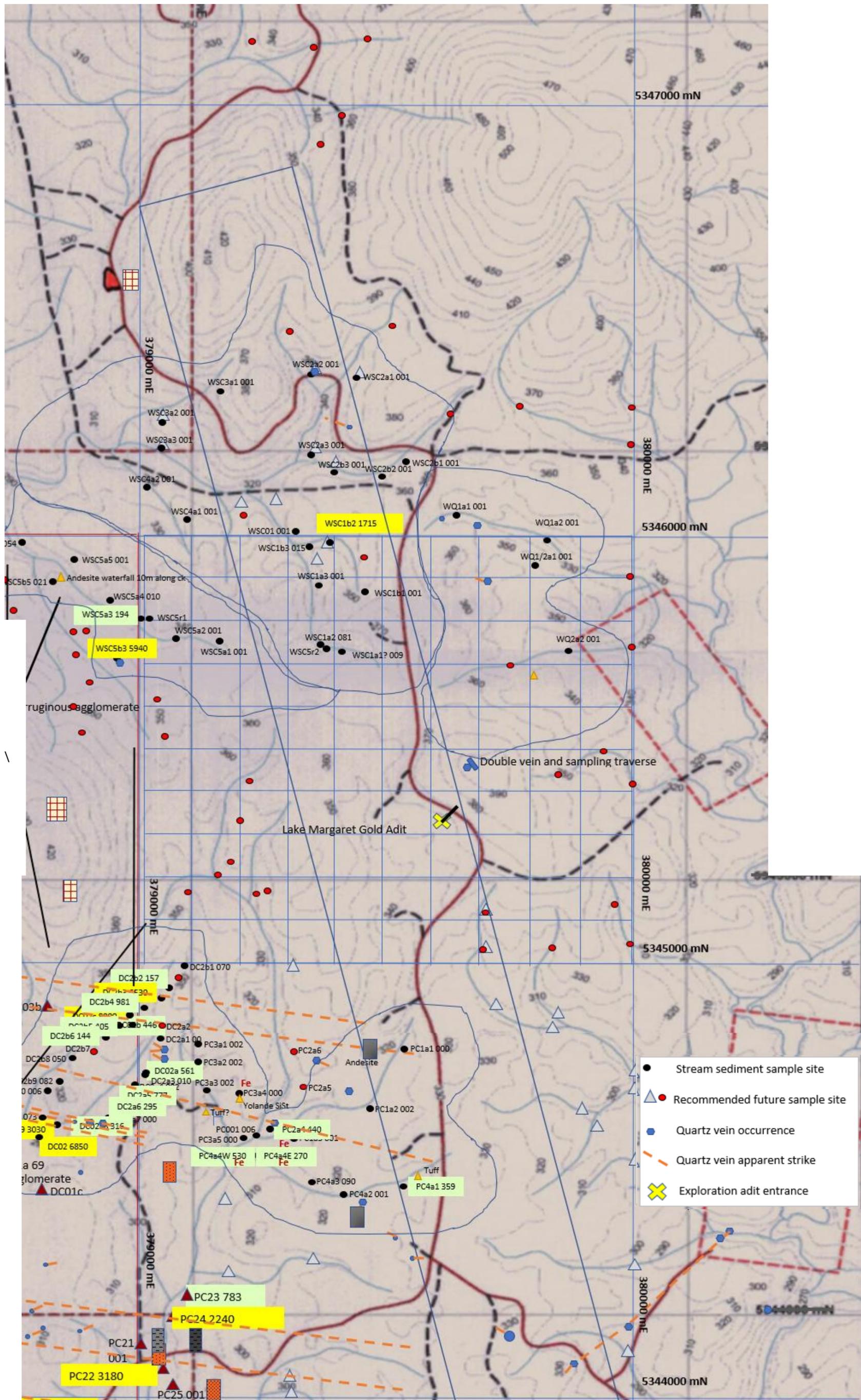


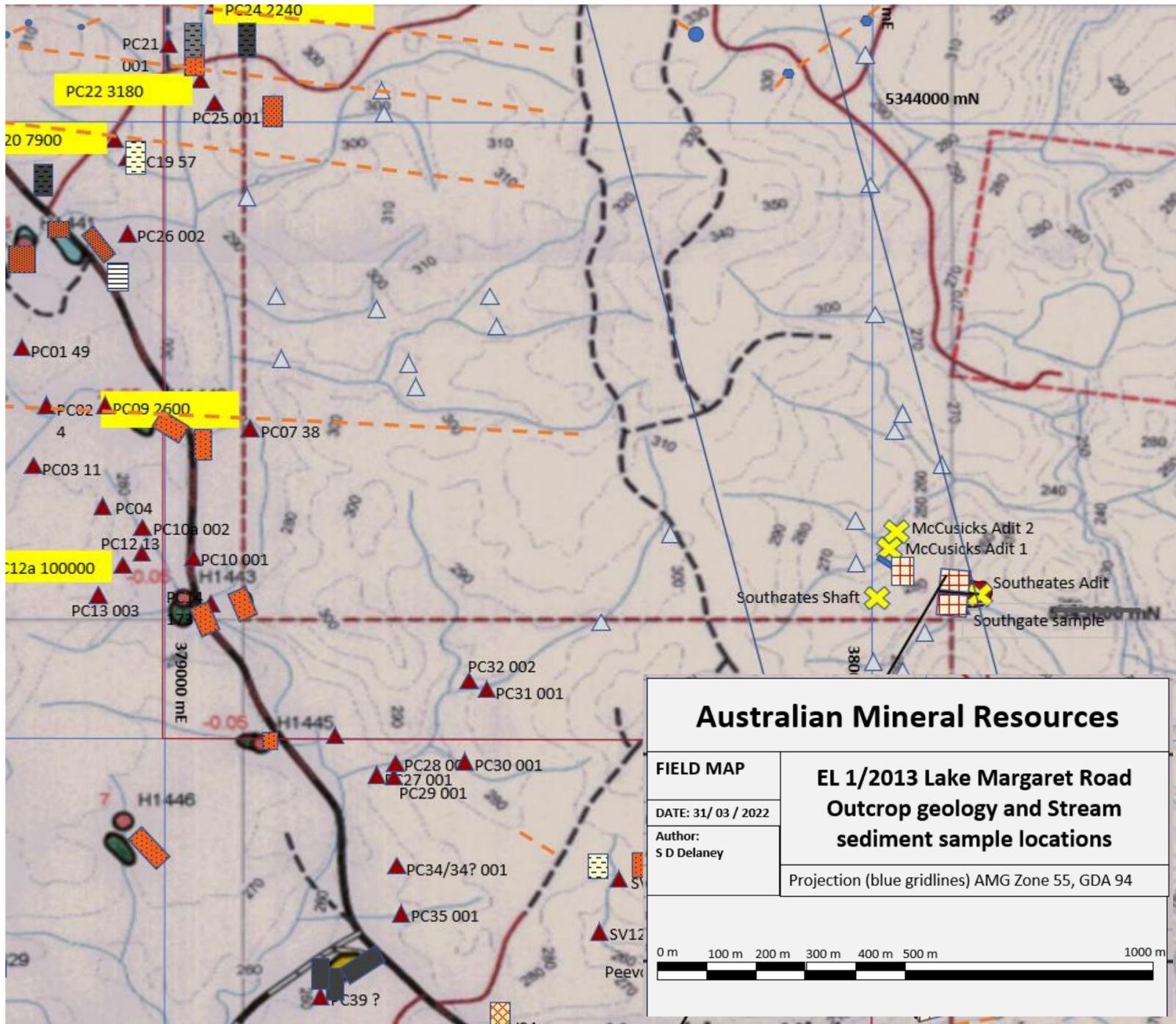
Appendix C: Excerpt from a heritage assessment of the Arthur Pieman Conservation Area

Source: Huys, Stuart. (2010). *An Aboriginal Cultural Heritage Assessment of Designated Vehicle Tracks Within the Arthur Pieman Conservation Area*. Cultural Heritage Management Australia. Sourced from <http://www.parks.tas.gov.au/file.aspx?id=25109>

“Dense vegetation, rugged terrain and huge annual rainfalls are believed to have restricted the movement of the North West tribe to the coastal fringes.... Within the Queen River Valley, Corbett (1980) documented 30 sites, the majority of which represent a few artefacts scattered over a small area. Artefact scatters were found to typically occur on small flats close to water, low flat ridges and saddles, while on the upper valley slopes and low-lying button grass plains, cultural material was rarely encountered.... Within the King River valley region the largest and most numerous scatters are located on low ridges or rises on the buttongrass plains. In contrast to previous assessments of Holocene land use of the region, which depict fleeting visits using the rivers as highways, the evidence from the King River valley indicates more regular use of the area by Aboriginal people who used the sedgelands as highways as opposed to the rivers (Freslov 1993). ... the general pattern of Aboriginal occupation of forests throughout Tasmania indicates limited occupation of the forest zone, with small artefact scatters resulting from transient camping by small mobile groups (Cosgrove 1990)”.

Appendix D: Geological observations and stream gold sampling map





Appendix E Rock sample locations (easting, northing) and descriptions

379124	5346340	Qz cobbles up to 10cm2, sample fgss lithic, medium grey brown, sl FeSt
379290	5346210	sample fgss lithic, med grey brown
379796	5345667	Sample Rock, light grey white, weathered/altered
379107	5344654	End of Dawesy Road. Abundant qz in tuff? (sample) trend 360? Steep dip East
379502	5346140	Light grey SiSt
379450	5345700	SS, quartzitic, dark red
379450	5345674	SS, quartzitic, dark red
379393	5346238	Qz vein
379495	5344862	Yolande lithic tuff (20m radius outcrop near trans towers)
377150	5346650	Quartz Feldspar porphyry
378630	5344050	Dacite/andesite
Horse paddock sample		Andesite
379450	5345675	Pyritic schist
379624	5345469	Orange SiSt below vein
379624	5345469	Channel sample twin quartz vein
379624	5345469	SiSt above vein
379529	5345430	SS fawn-pink-yellow, on track from LMR, trend 300
379519	5345405	SS fawn-pink-yellow
379530	5345390	tuffaceous SS?, buff
379533	5345414	tuffaceous SS?, buff
379520	5345414	Grey chert
379569	5345385	light grey SiSt roof of vein
379569	5345385	Quartz vein, strike 030, 26 degrees to 290, 0.75m tk
379569	5345385	Floor of vein
378644	5344205	Near MH08. Lgy SiSt. Cleavage trend 064
378677	5344159	Near MH06. Same SiSt. Dip 90. Cleavage 105. Dip vertical. Same rock at MH07 and MH08
378717	5344242	Light float across track
378756	5344229	Quartz float zone. Photo 1 and 2.
378783	5344166	start of tramway traverse in boggy heath
378764	5344183	Quartz float on track.
378805	5344124	Start of pad wall - no qz
378846	5344139	End of pad wall. Continuous SiSt fgSS lgy yellow (cream) red brown stain on exposed surfaces. Limonite yellow orange stain at this end for 10m. Quartz float over top 0.4m. Qz blocks at this end appear in situ, but zone discontinues ((photos facing south)
378858	5344133	1m2 blocks. Trends towards TW06b blocks in wall
378877	5344124	No evidence of qz crop bw sites 1 and 2.
378893	5344136	continuous quartz trend on resistant downhill-trending bank from area bw q1 and q2.(WSW)
378803	5344150	Start of quartz pod trend off top of pad wall. Theory - a set of EW veins across a brittle 200d bed 4m thick. Spacing of veins every 3 to 5 metres along bed. Sample taken of competent bed. Vein dip probably SE modest.
378819	5344109	Qz float to 10cm. Follow trend to TW06q4b
378826	5344099	part of trend TW04q4a to here, then lost in scrub boggy here.
378796	5344180	Qz pod bw tramway trail and pad, but undisturbed by either excavation. No qz bw here and pad excavation 6m south.
378789	5344184	light float on bog 6m north at TW07b. On tramway there is minor float every 2m (3 times) towards east from last TW07 tramway trail site. More of these trace floats on tramway boggy track every 6m to next site.
378772	5344192	again along Tw07 trend, fine qz pod in scrub
378798	5344246	Thick float across tramway trail
378815	5344248	Qz float to 5cm, presents as 4 pods 0.7 x 0.7m over 4.5m trend.
378829	5344286	Qz float up to 5cm.
378900	5344506	Along tramway highway abundant quartz over SiSt (graded roadbase?). This obscures any trends or patterns, until this site with orange redbrown stained rock as at pad.
379010	5344662	Red brown clayey stained sist
378978	5344616	Quartz vein. Trend continues 0.5m into scrub either end.
379580	5344416	Traced Qz float up to 7cm to here from LMR bearing 095
379583	5344358	Redbrown stained siltstone and orange-weathering fgss? Or same unit. In small quarry cut bw Transtower and road. Trends in bg 023 and 308.
379415	5344410	Penghana 01 drill site.
379423	5344425	Second BG Competent SiSt bed 2.5m wide
379419	5344422	BG Competent SiSt 2.0m+ tk, 16m long trend 190 to LM03d
379419	5344399	No anomalous Qz along the competent unit. 20m back east along track is another 5m long competent siltstone; 15m further east is a 2m tk sandy competent unit; then redbrown stained pliable unit followed by a hard resistant andesitic unit thickness (sample) to LM03e on track. Joints at 245d.
379478	5344382	Andesite on western bank of NS creek, redbrown Siltstone on eastern bank (creek is contact (faulted?). Cleavage in SiSt at 337d.
379482	5344377	Probable 0.7m Qz vein in track base trend 350? 2m east of that, across redbrown SiSt bw, is a 2m competent Sist at 360 bg.

- 379531 5344359 How qz veins present in the competent SiSt (photos). Note differing orientations. 120d is most common in three separate veinlets dipping almost vertical, the next most common appears to be blowout into bg planes that dip sv east?
- 379538 5344346 discts qz vein 0.25m tk, <1m long in redbrown stain rock, prob vertical
- 379776 5344171 On Pond 2 road. 10cm qz vein trend 270, dip 30S. Wallrocks competent clayey lt-orange weathering silt to south, cream weathering rock to north (samples)
- 379779 5344183 10cm tk qz vein, shallow apparent south dip in same road batter as LM06. No sign in road gutter so could be steep or subvertical, or dip west? Vertical channel cut shows 15d dipS, 237d
- 379766 5344141 0.7m vein in road pavement, trending 320, dip 80S?
- 379815 5344112 15cm qz vein in batter cliff. Trend 080d, dip 15-20d W. Either side competent SiSt weathering cream (not orange here) red brown stain non surfaces probably organic (lichens?).
- There are joints in rock parallel to vein. BG could be steep east? (too many planes)
- 379912 5344074 Irregularly-contained 0.75m tk qz vein striking 220 out of road batter cliff in same host rocks as above, weathering cream-orange above and siliceous dirt-brown below but striking cream on hammer divots (see photos)
- 379980 5344046 competent SiSt 40m plus wide along road base at creek.
- 380186 5344365 Vein in path to pond2 0.5m wide trend 228, crosses creek 30m along strike downhill, so probably vertical.
- 380212 5344372 ...and definitely crosses creek again here.
- 380190 5344343 ...and here across track, still 0.5m wide. Wallrocks same as all day. Note photo shows float sitting on vein.
- 380197 5344342 Float pod trends 165 for 4m. Another the same size 30m uphill on trend, followed by another 5 @ 2m apart in towards a quartz blow. Trends 165 and 190, and big one at top 270. 'All over the shop up here'.
- 380192 5344290 Rock sample of resistant tuff or porphyry from blow area.
- 379455 5345793 Tramway Pyrite transpower pad site. All boggy scrub south of here on trans easement.
- 379456 5345799 Tramway Pyrite transpower pad site. Medium light grey shaly siltstone strikes 179 from here for 15m (to LM14). Is at least 5m wide to east side of pad. Multiple cleavages strike 130 dipping steeply north, rotating to 180. Also 150d dip 40E halfway along outcrop
- Limonite stained 50%. Other cleavages low angle shown in photoof wall, facing east. Unit continues out to road.
- 379466 5345771 East side of shaly sist ends here. Next unit east is poss a clayey (lithic) sandstone? (sample)
- 379534 5345725 Over road get the same med grey shaly sist to here, then looks like the sandstone going southward along road in gutter batter?
- 379534 5345748 Med grey shale becomes carbonaceous(?) here, blackening following the cleavage trend og 140d. The carbonaceous section is about 16m tk along the road batter, until outcrop lost at north end. (check coordinates)
- 379616 5345458 Lake Margaret Gold veins photo facing 070. Two 0.7m tk qz veins apparent dip 20d to 330.
- 379576 5342454 Thin 2cm veins in SiSt (sampled) trending 090, sv dip.
- 379538 5345764 Road batter - Dark grey shale, carbonaceous? With non-calcite veining/laminae. Sample K. Cleavage or bedding? Strikes 120, dip sv. Apparent thickness 20 metres.

LMRG quartz traverse

- 379663 5345479
- 379670 5345476
- 379669 5345467
- 379674 5345469
- 379676 5345459
- 379677 5345452
- 379673 5345450
- 379677 5345445
- 379680 5345440
- 379683 5345430
- 379686 5345429
- 379690 5345425
- 379689 5345417
- 379689 5345413
- 379700 5345413
- 379707 5345409
- 379715 5345411
- 379719 5345409
- 379728 5345398