

**ANNUAL REPORT 2018/19**  
**EL16/2015 DIAMOND HILL**  
**WESTERN TASMANIA**



**Exploration Licence held by:** Australian Mineral Resources  
2/29 Waruda St  
Kirribilli NSW, 2061

**Report compiled by:** Dean Delaney, April 2019

## EXECUTIVE SUMMARY

AMR has held Exploration Licence 16/2015 over the Diamond Hill area since 4 March 2016.

Exploration activities 2018/19 have included:

- field mapping, stream sediment sampling, and logging and sampling of outstanding drill core;
- draft model development, desktop research, assessment and interpretation of available geological and geophysical records and reports; and
- drafting of exploration and development plans.

The Licence area remains prospective for gold in Devonian veins. Historically, gold and barite have been found in economic concentrations, but ore continuity and volume were found too unreliable for sustained mining. Gold exploration in the area has been sporadic and incidental.

Mapping and geochemical sampling by AMR in the report period reveal a possible 8 prospects for vein-hosted gold shoots in addition to the historical Diamond Hill and Madam Howards Plains barite deposits.

Costs in 2018/2019 were \$51,711.

Exploration activities in the upcoming Year 4 will include:

- Continuation of the successful stream sediment gold sampling program coupled with quartz vein mapping to locate and test near-surface gold concentrations on the EL;
- Detailed mapping around known and new prospect areas to ground-truth draft models of deposits, and inform preliminary drilling decisions and mine plans; and
- Commence shallow drilling beneath identified deposits;
- Assess the viability and feasibility of extracting implied resources.

Along with gold, the program will concurrently test for barite and metallic mineralisation.

Minimal estimated expenditure for exploration in Year 4 of the Licence is \$100 000.

AMR is investigating funding opportunities and if successful the activities are anticipated to be intensified and expenditure commensurately higher.

### **Acknowledgement:**

AMR remains grateful for continued assistance from former licence-holder and EL16/2015 resident Rory Wray-McCann for field and logistics assistance, local oversight and invaluable contributions of knowledge, support and philosophy that have helped achieve and inspire our efforts.

**Cover photo:** Rhyolitic quartz feldspar porphyry (or keratophyre) sample showing quartz veins. This is the considered host rock type for Devonian gold on the Diamond Hill Licence area.

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# 1. INTRODUCTION

## Report Brief

Tasmanian Exploration Licence EL 16/2015 continued to be held in entirety by Australian Mineral Resources Pty Ltd (AMR) throughout the reporting period 4 March 2018 to 4 March 2019.

To satisfy Section 204A of the Mineral Resources Development Act, 1995 (MRDA), AMR submits this document to report on mineral exploration investigations and expenditure undertaken in the third year of EL16/2015, and to update the nature of work proposed under the licence in the next two years.

## Location

The area covered by Mineral Exploration Licence EL16/2015 Diamond Hill is a 13 km<sup>2</sup> block lying 3 km north west of Queenstown on Tasmania’s west coast (shown as the faintly shaded block surrounding the yellow star on Figure 1.1 below). The Licence area lies around 220 km from Hobart on a west north-westerly bearing – about 4 hours’ drive from Hobart along the Lyell Highway.

Queenstown Aerodrome is located immediately to the South, the Mount Lyell Mining Lease lies one to two kilometres to the East, and the Zeehan (Murchison) Highway bridge crossing of the Yolande River is immediately North. The yellow star on Figure 1.1 shows the location of Diamond Hill itself, for which the area has been named. In the south east of the block, the Lyell Highway proceeds south west onward towards Strahan from its intersection with the Murchison Highway, which tracks north to Burnie on the north coast.

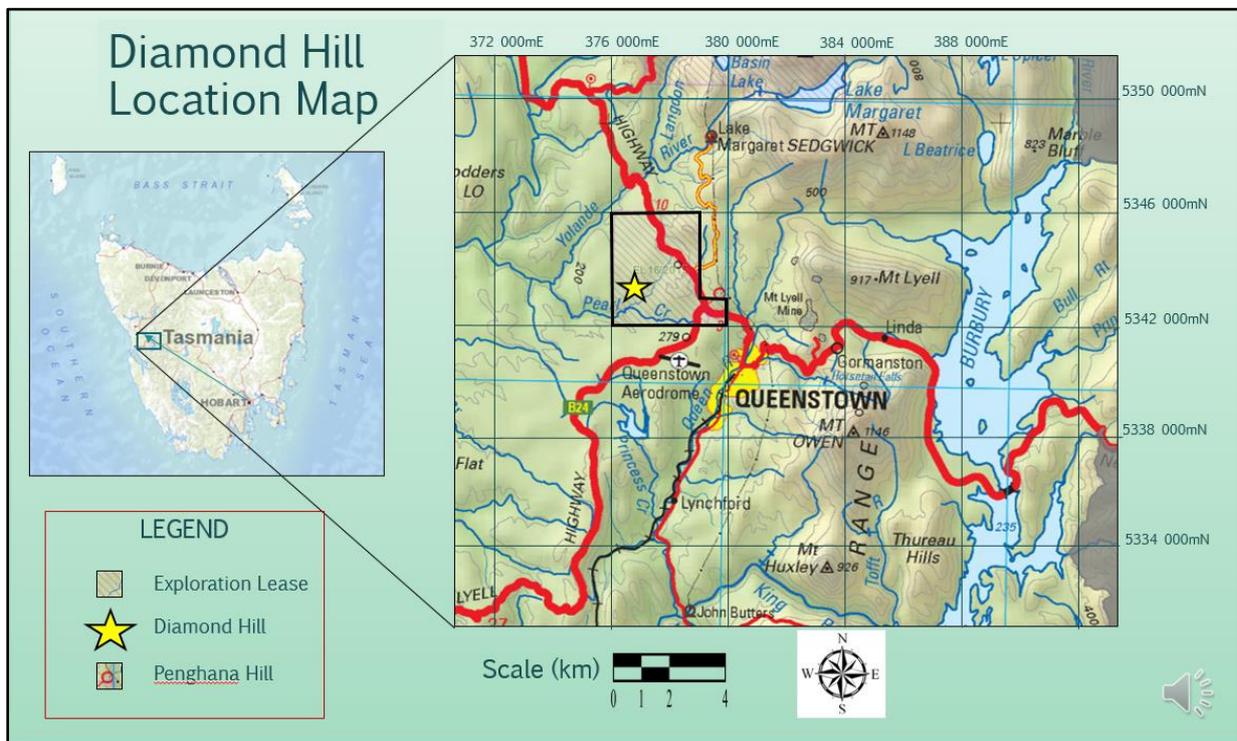


Figure 1.1: Location of EL16/2015 Diamond Hill

## Map Conventions

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

## Geographical setting

Compared to the nearby West Coast Range, the topographic relief of the Licence area is relatively flat, consisting of undulating hills with Diamond Hill standing out as a topographical landmark in the central south, and Davies Hill in the north east. Pearl Creek trends close to the full length of the eastern boundary of the Licence area and, to the south of Penghana Hill (AHD 300m) at the south-eastern corner, switches westward along the southern boundary. Diamond Creek runs diagonally across the block from Davies Hill (AHD 420m) in the north east to its intersection with Pearl Creek near the south-western corner. Topographically the catchments of these two creeks comprise the south eastern three-quarters of the block. The north-east quarter drains westward into the Yolande River. Topography is between AHD 250m and 300m, apart from at Davies Hill (AHD 420m), Diamond Hill (AHD 320m), and the Pearl Creek gully as it departs the area (AHD 120m).

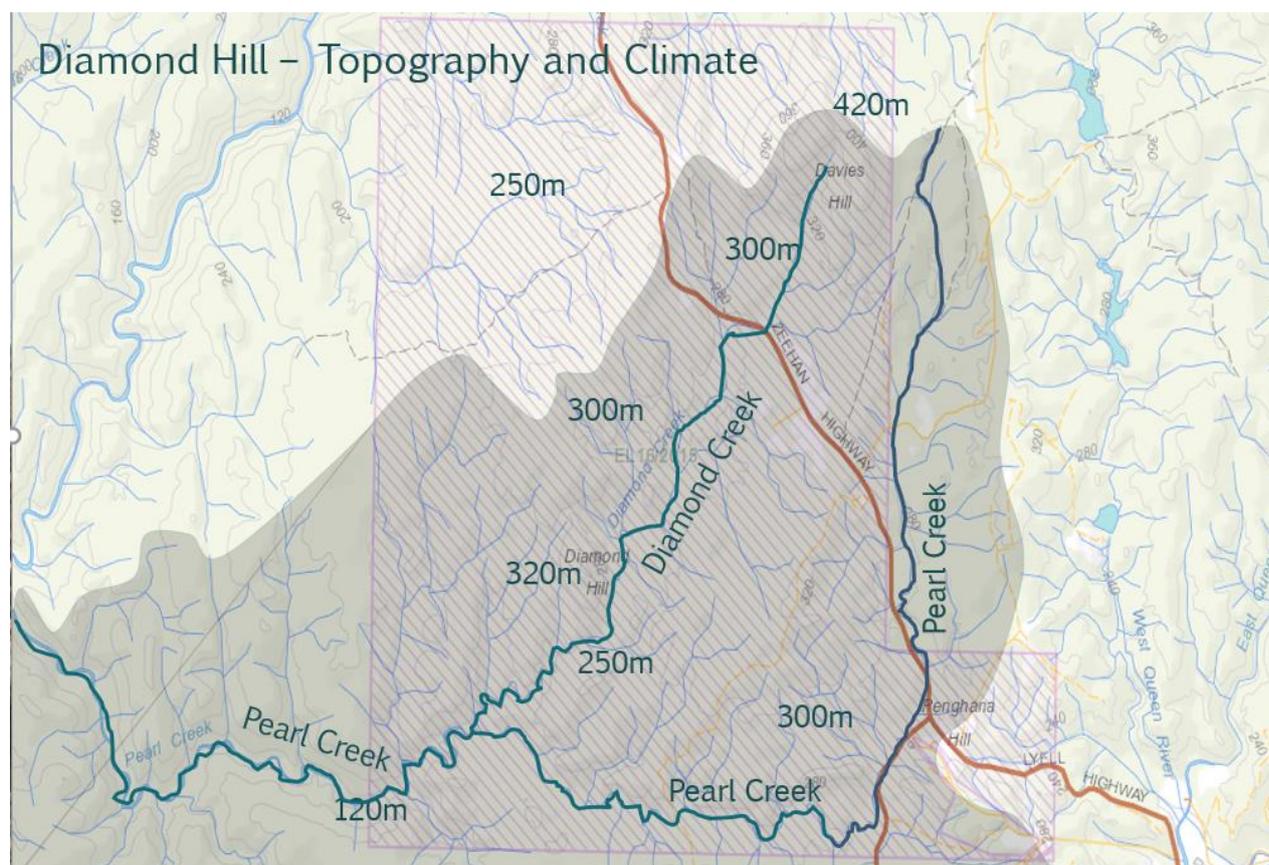


Figure 1.2: EL 16/2015 Topography and drainage pattern.

The vegetation in the area has been subject to regular wildfires over its history and was sourced exhaustively 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, 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

The most southern 5 km of the Murchison (Zeehan) highway diagonally transects the eastern half of the block. This eastern half can be accessed off the Murchison and Lyell Highways albeit through thickly regrown scrub. A deteriorating fire trail (shown in orange on Figure 1.2) accesses the south-east quadrant. Access to the western part is limited to a walking track coming off the Murchison Highway a kilometre below the northern boundary, through the north of EL 16/2015. From this trail the Diamond Hill prospect has in the past been accessed overland, reportedly following the route of the Queenstown to Zeehan trail used at the beginning of the twentieth century. Apart from in the far west, Davies Hill and Stubbs Valley in the south eastern corner, the parts of EL 16/2015 not accessible by road are not steep or heavily forested but especially in creek gullies, access is becoming increasingly difficult following recent years of abundant tea-tree (manuka), cutting grass and bauera regrowth.

## Historical setting and current land tenure

The Diamond Hill area was probably ranged by hunters and collectors from the Peterndic band (Ryan, 1996 in Huys, 2010, see Appendix E) who probably passed seasonally through the Queen River Valley to the east (Corbett, 1980). 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. Gould named the relatively flat area consisting of Diamond Hill and the Queenstown Aerodrome area 'Honeysuckle Plains', although by the Twentieth Century the same area was known as Madam Howards Plains.

In 1881 Cornelius Lynch found alluvial gold in the Queen River valley 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. 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 hills were denuded by woodcutting and erosion, including the relatively accessible slopes and plains of the Diamond Hill area. It was a woodcutter who discovered the auriferous quartz reefs on Diamond Hill in 1914.

On the Diamond Hill Licence area, the creeks have been prospected for alluvial gold over the last 120 years. There is evidence of minor alluvial workings on Diamond Creek. In 1915 four adits were dug into Diamond Hill itself, to locate at depth and follow two gold-bearing quartz vein lodes, one that had been tracked on the surface for 300 metres and the other for 35 metres. Samples assayed in 1915 and 1916 at 1 to 3 oz/tonne (28 to 84 g/tonne), but such concentrations presumably did not persist underground as veins were only driven on for 15 metres either side of the exploration drives, at 15 and 25 metres depth.

Two small open cut barite mines operated in the area between 1910 and 1920, winning 1300 tonnes (300 m<sup>3</sup>) of high-grade (99.8%) barite.

Within the Diamond Hill exploration Licence area today there are six residential blocks under private freehold along the Zeehan Highway, but most of the area remains under the Crown. Roughly the western half of the Licence Area (see Figure 1.3) is DPIPWE Future Potential Production Forest Area (Lot 192 on the Central Plan Register). This is publicly managed

land and remains available under the MRDA 1995. There are small stockpile and gravel quarry reserves, opposite the Lake Margaret road and at the beginning of the Strahan road.

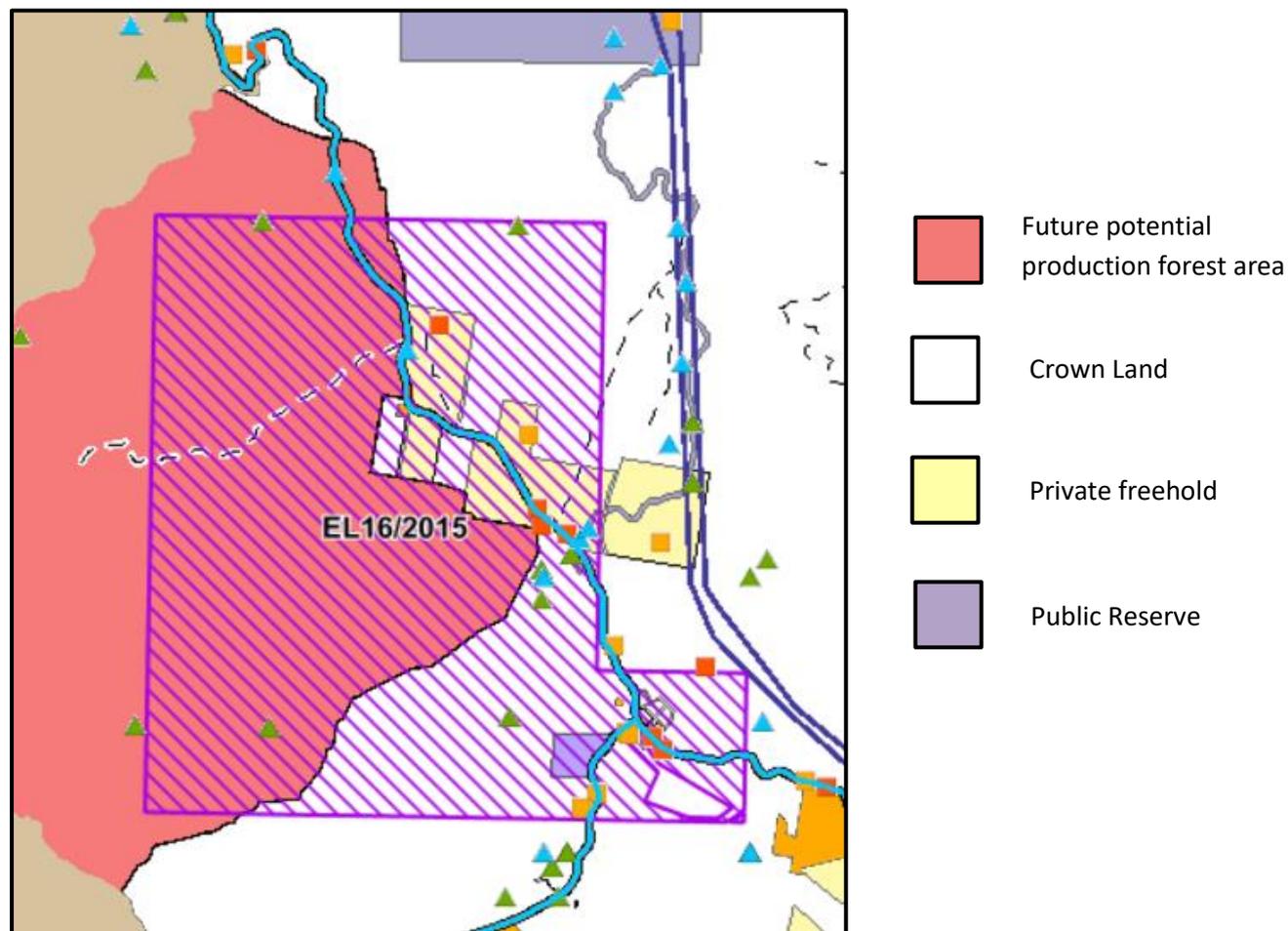


Figure 1.3: EL16/2015 Land tenure (Source MapList)

## 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 (see Figure 1.4).

EL 16/2015 covers the south eastern third of a discernible geological wedge, herein termed the 'Yolande wedge', located:

- to the west of the Mt. Read Central Volcanics Complex (CVC) that outcrops at Mounts Lyell and Sedgewick;
- south east of the South Henty Fault; and
- north of the Firewood Siding Fault.

Rock units that daylight in the wedge 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 EL 16/2015 are predominantly equivalents of the Western Volcano-Sedimentary Sequence (WVSS - Corbett et al, 2014) lithological association of the MRV, here known as the Yolande River Sequence, bookended by Central Volcanics Complex (CVC) sequences to the east and, probably, Tyndall Group rocks (McPhie & Allen, 1992; Corbett, 1992) to the west. The highly prospective VHMS horizon where the Tyndall Group

overlies CVC rocks has not been shown to outcrop on the Licence area. Shallow marine sedimentary units of the Devonian Bell Shale and Florence Quartzite stages of the Eldon Group are present south of the Firewood Siding Fault in the far south of EL16/2015.

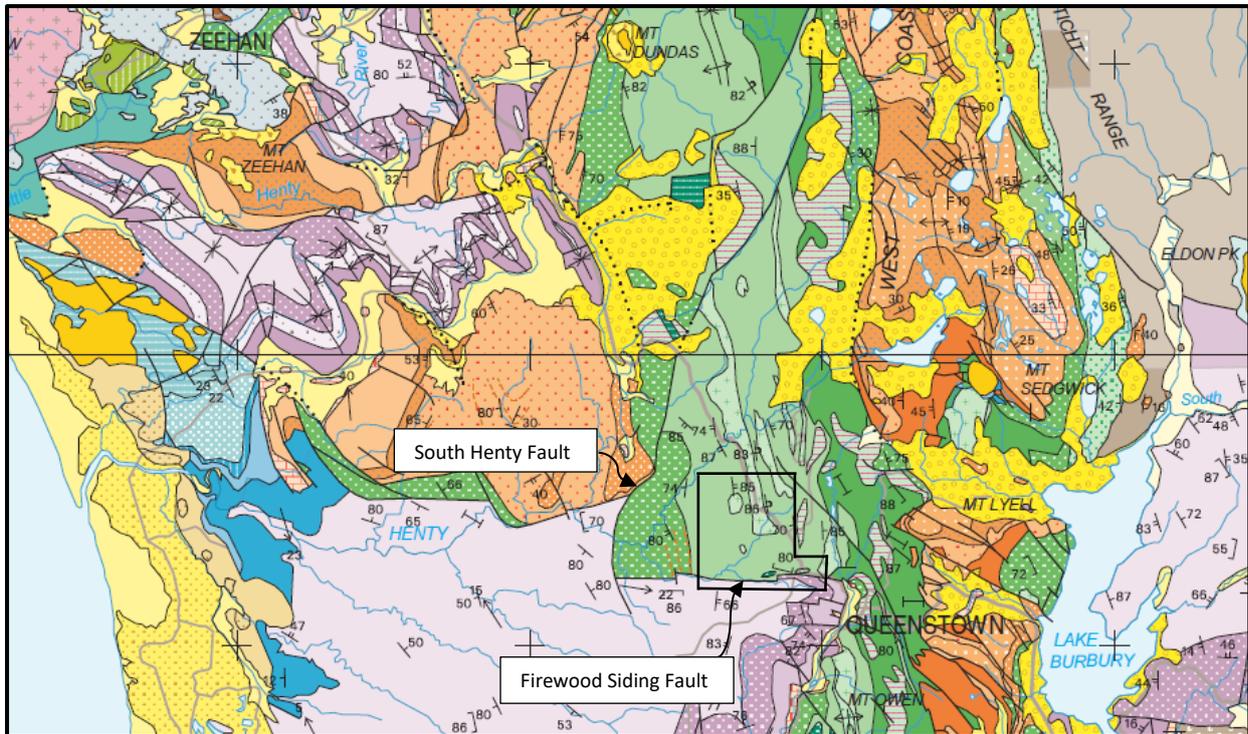
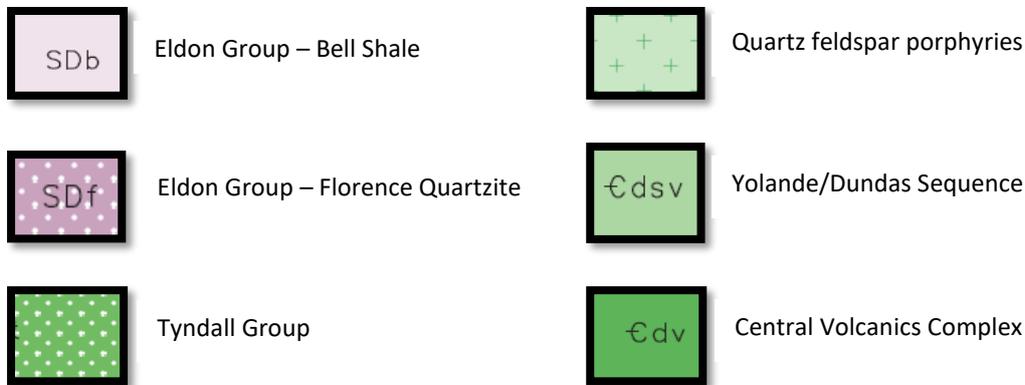


Figure 1.4: Regional Geology of EL 16/2015 (Excerpt from Brown et al, 2005)



### Local Geology

The following notes have been summarised from an investigation of source literature undertaken in the initial Licence year. Figure 1.5 shows the distribution of rock types and broad stratigraphy on EL 16/2015, sourced from TheList on the MRT website.

The pastel aqua colour (tinted blue in the Licence area) represents the undifferentiated felsic silts, ash falls and mass flow deposits of the Yolande River sequence. Stratigraphic relationships in the Yolande rocks are assumed complex because of lateral facies changes, repetitious deposition, autochthonous debris flows, intrusion, past tectonics and structural disturbance. One undifferentiated sedimentary unit (cdsv: interbedded siltstone, sandstone mudstone), has been defined on the sheet, shown in light blue and trending NW along the Murchison Highway. Field observation has identified within it dark shales and siltstones striking north-south with a 75-degree dip to the west.

The NNW-trending dark yellow shapes represent quartz-feldspar-phyric porphyries - 'rhyolitic' (white hatching – MRV igneous suite I) and 'dacitic' (grey hatching – MRV igneous suite II) (Morrison and Griffiths 1998; Corbett et al, 2014) – that intruded the volcanoclastic sequence in the area. The work of Griffiths (1998) suggests convincingly that these lavas intruded wet, weakly-consolidated sediments several million years after those host sediments were deposited. The two lava types were probably intruded at different times from different magma sources, or different differentiates, forming sill-like flows parallel to the host bedding. The southernmost mapped outcrop of the rhyolitic porphyry hosts the Diamond Hill auriferous quartz veins. Griffiths (1998) mapped the Diamond Hill rhyolite to be a north west trending fault-bound block, unlike the pipe-shaped circle shown in Figure 1.5.

Two outcrops of Cambrian basalt occur in the south, adjacent to the Firewood Siding Fault within or abutting the Yolande volcanoclastics. These have been reported as MRV suite III or suite 2b by petrology (both in Corbett, 2014, p175, p179) possibly correlated with the Lynch Creek and Que-Hellyer basalts.

In the remaining 5% of the area, the Devonian Eldon Group rocks crop out along the southern rim of the area, faulted against the Yolande River beds along the Firewood Siding Fault.

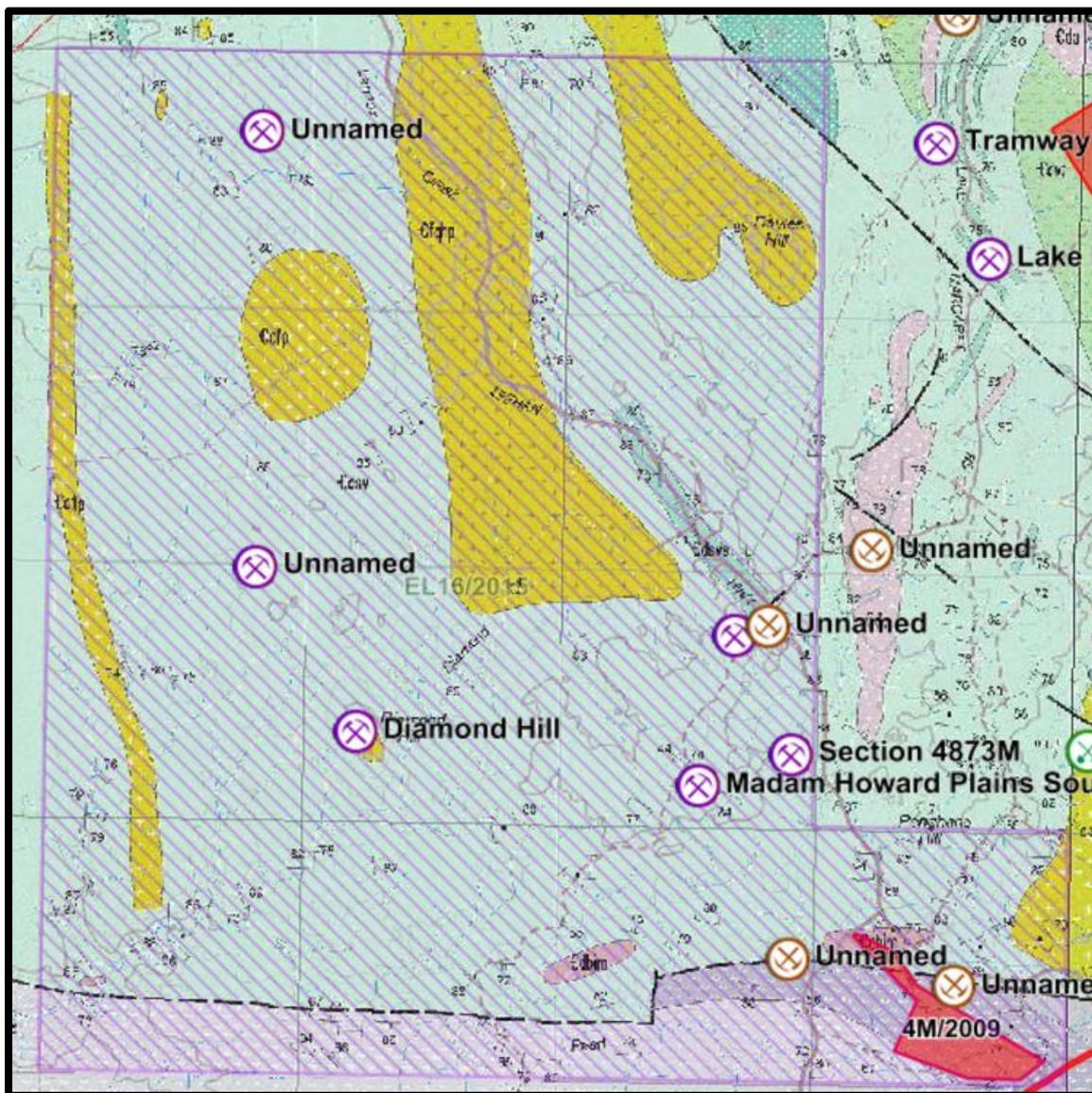


Figure 1.5 - 1: 25,000 mapped geology (Vicary, 2004. Sourced TheList – MRT)

Structurally, EL16/2015 lies in the north-south trending Dundas Trough that is generally expressed by northerly trending sub-vertical beds of Mount Read Volcanics either side of a subsurface Cambrian granite spine and centred 5 kilometres west of the Tyennan Block stratotectonic element. In EL16/2015, the sub-vertical stacks of Yolande River beds lie to the west of the CVC and granite spine. The western 'shoulders' of the Cambrian granite body might be present at 2 km depth (Leaman, 1993). The extrapolation of the northwest trending Owen Fault transects the far north-eastern corner of the area, and the enigmatic east-west Firewood Siding Fault is in the south. Other faults inferred by previous explorers include:

- the NNE-trending Yolande River fault immediately outside the NW corner of the Licence;
- northeast or NNE trending faults inferred by Wells (1976): Davies Hill Fault trending along Diamond Creek and immediately south of the Diamond Hill mineralisation; and Lightning Ridge Fault parallel and 500m to the south east, terminating the dacitic porphyry north of the Madam Howard Barite mineralisation;
- an ESE trending fault between the northerly and southerly adits at Diamond Hill inferred by Mt Lyell MRC in 1983; and
- a north-south fault tracing Pearl Creek inferred by the geophysical analysis of Leaman (1993).

## 2. PREVIOUS EXPLORATION

### Gold from Devonian quartz veins

During the late 19th and early 20th Century, Diamond and Pearl creeks and adjacent tributaries of the Queen and Yolande Rivers were prospected for alluvial gold. Hard rock mining commenced after the Diamond Hill reef was discovered in 1914 and was abandoned in (probably) 1917. The Madam Howards Plains barite mines operated from 1917 to 1919.

Between 1971 and 2005, regional rock chip and sparse stream sediment surveys by mid-tier explorers (see Table 2.1) determined the gold and barite-bearing quartz veins to be beneath the threshold of economic interest. Modern explorers could not replicate the concentrations of gold reported by pioneering prospectors.

It should be expected that more than a century of corporate and amateur gold prospecting and panning has scoured the surface effectively for obvious visible surface concentrations. None has been officially reported; but there is evidence of alluvial workings in Diamond Creek, and anecdotal reports of panning success at the Lake Margaret road intersection, Madam Howards Plains South, Lennox Creek and Pearl Creek. Raggedy Ann Creek 1 km to the south of the Licence has rewarded local panning for a century.

The Diamond Hill area has been demonstrated to hold hard rock gold sources, present in the dual quartz vein lodes at Diamond Hill purported to contain native gold concentrations of 1 to 3 ounces per ton in hand-selected samples (Trove reference in Delaney, 2018). There are also two unrecorded excavations on veins 700m and 1500m north of Diamond Hill. Nearby, the McCusicks prospect 1 km to the east and Madam Howards Plains Gold Mine 1 km to the south were both worked for hard rock gold for two and ten years respectively.

### VHMS

The mid-tier mining companies that held several licences over the greater Yolande 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 the bordering major faults 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 prospective VHMS drilling targets. No CVC volcanic fault blocks were discovered, and it became progressively apparent that massive sulphides are unlikely to have been emplaced during deposition of the Yolande Sequence, because these volcanoclastic, 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 1 km band westward of the Great Lyell Fault system.

### Metallic sulphides in rhyolitic and dacitic porphyries

Quartz feldspar porphyry intrusions in the Yolande sequence were sampled between 1971 and 2005, including core from the Department of Mines boreholes (Groves, 1964) at the Madam Howards South mine. The sampling found no economic concentrations of metallic sulphides or precious metals in the porphyries, and only sporadic low-grade albitic, chloritic, sericitic and sideritic alteration - probably caused by Devonian influx of hydrothermal fluids.

### Remobilised VHMS gold (Henty-style)

The Licence holder over the Yolande block between 2003 and 2006, Glengarry Resources (Richards, 2005), explored for a Henty-style remobilised VHMS gold deposit. Surface sampling indicated that if such a deposit exists it would be deeply buried and not economically recoverable.

The most recent Licence holder over the area (LIDDS, 2006 – 2013) completed five boreholes with renewed interest in the potential for gold, sulphides and barite associated with structural features near the eastern boundary. Evidence of low-level anomalous gold in veins, broad albite/sericite alteration in one of the porphyry types, a metre @ 7.9% Pb and 5.0 g/t Ag at 128m and 3 metres @ 0.65% Zinc in veined siltstones in MH DDH04, trace base metals and several shear zones were considered encouraging (De Vries, 2010; Callaghan 2012). LIDDS was unable to continue exploration due to personal circumstances.

The following table summarises the recorded exploration activities relevant to the Diamond Hill area up until 2018. There was no recorded exploration between 2013 and when AMR acquired the Licence area in March 2016.

## Summary of Exploration prior to 2018/2019

Period	Company	Tenement	Activity and result
1915-1917	Diamond Creek Prospecting Association	Mining Licence	Adits were developed to explore two ESE trending gold-bearing quartz veins 40m apart at a depth of 25m. No further record of Company after March 1917. Possibly failure to raise capital to proceed further or deterioration of ore laterally and /or with depth.
1910-1920	Colonial Barite Company	Mining Licence	Trenched an ENE trending 600m-long quartz and barite lode up to 3m wide, developing 60m of it to 5m depth. 500m further to the NE, three adits were developed on a discontinuous 400m-long NNE trending vein. 1336 t of 99% BaSO <sub>4</sub> were recovered altogether.
1962	Mines Department		3 shallow inclined cored drill holes in 'keratophyre' at Madam Howards Plains South barite mine targeted vertical extension of the barite lode. The lode, if vertical did not persist at 50m depth more than a thin quartz-veined keratophyre interval 1-2m thick averaging 13-26% Ba.
1971-1983	Mt Lyell Mining & Railway Co.	EL47171 & EL 9/66 (Yolande area)	<p>Rock chip geochemistry (ironstone gossans).            1973-1975 stream sediment geochemistry failed to deliver economic results but did not test for gold.</p> <p>6 line km of gridding &amp; IP survey over Madam Howards Plain (Howland Rose, 1984); 7 weak and 1 moderate IP anomalies; strongest anomalies coincided with mapped black shale units. The grid did not specifically intersect the main barite lodes. Follow-up soil geochemistry yielded one 200 ppm Pb anomaly. Quartz keratophyre host rocks intensely altered to clay.</p> <p>Rock chip assays - Diamond Hill (max 2 ppm Au).</p> <p>1981-1983: Regional stream sediment (379 samples) and rock chip (72) geochemistry survey (only few sampling for Au): South of Madam Howards Barite 1.2 ppm Au; Pearl Ck (1050 ppm Cu, minor Pb, Zn); Gold Ck (1km north of EL 16/2015) 1.6 ppm in sediment but no significant Au from country rock.</p> <p>1980 regional airborne EM (Dighem) survey - low confidence in inconsistent results (Morrison, 1998).</p> <p>A 1983 Yolande area review found small 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 generally absent, apart from moderate sericitization at Diamond Hill, adjacent to hydrothermal veins.</p>
1984	Gold Fields Exploration Ltd	EL 9/66	Supplementary stream sediment and rock chip geochemistry confirmed anomalies at Pearl Ck (Cu), Madam Howards South (Au), Gold Ck (Au, Zn) source undiscovered.

1985-90	Cyprus Minerals	EL 11/85	No work on Diamond Hill area.
1991-95	Pasminco & minor partners Hudspeth/ Norgold/Arimco	EL 25/91	Exploration for Tyndall / CVC - 'Holy Host' horizon. 1993 Geoterrex Helimag/radiometrics survey - regional structural geology interpretation. Results interpreted by Leaman (1993) revealed a major syncline, to the west of present EL 16/2016, shaped by NE, NW and subordinate E-W structures; structurally and magnetically distinctive volcanic units to the east with N-S trends.
1996 – 2002  Work ceased in 1998 and ground relinq'd in 2002.	Copper Mines of Tasmania (CMT)	EL 27/1995	Continued exploration for VHMS mineralisation associated with Tyndall group contact with Yolande sequence, east and west of Leaman's syncline.  Surface quartz and barite veins were chip-sampled and assayed in the area around the Madam Howards Barite prospects - only one record of gold above 0.005 ppm (0.013).  The quartz, carbonate, barite veins and felsic volcanic host rocks from the 1962 drill holes at Madam Howards were assayed for gold. Results only marginally higher than surface samples with best results 1m interval at 0.12 ppm and 2.5m at 0.11 ppm.  At Diamond Hill prospect, 10 of 51 surface rock chip samples assayed >1ppm Au - maximum of 18.3 ppm.  B/C horizon soil geochemistry traverse inconclusive.  Pan concentrate drainage survey recorded gold anomalies around Diamond Hill and Madam Howards, in marked contrast to the earlier -80# survey. This contrast may reflect gold particle size distribution (Morrison and Griffiths, 1998).  BSc Honours project on the Diamond Hill area included surface and adit mapping, ground magnetics and soil samples (Griffiths, 1998). A-horizon soil samples gave a stronger gold response than B/C-horizon samples.
2002-2005	Glengarry Resources		Mapping and soil sampling of 3 east-west lines traversing the westernmost 1.5 km of the central Diamond Hill area. 30 rock chip samples at Madam Howards Barite (highest 0.4 ppm Au in vein quartz); Diamond Hill (highest 1.4 ppm in quartz vein) and north and south Yolande tracks (0.008 and 0.010 ppm). Defined a NNW trending 'Au-prospective' corridor 250m wide.
2008	Wray McCann, Stringer	EL28/1995	Extensive field investigations in Davies Hill area including Diamond Creek tributary sluicing sample (~5g/t Au in sediments). Drillhole Davies Hill DDH 1 (length 150m, inclination 50° to 255) intersected interbedded tuffaceous sandstones and dark grey shales consistent with the Cdsvs sequence.

2006 - 2012	LIDDS / Stebbo's Diamond Drilling	EL1/2006	<p>LIDDS aimed to drill geophysical anomalies.</p> <p>MH04 (208.2m deep) 70° inclination to 200° grid azimuth: intersected 180m interbedded light grey vitric and dark grey volcanoclastic siltstones, and 28m 'pink' siltstone (no veins, slight bleaching). 3m interval of Qz veining @ 15m depth, 1m Qz vein @ 36m. 128-165m moderate stockwork quartz-carbonate-chlorite-sericite veining with minor base metals. Peak assay of 1.0 metre @ 7.9% Pb and 5.0 g/t Ag from 128.20m. No anomalous gold in alteration zone (&lt;0.01 ppm). Veins not sampled.</p> <p>MH05 (200.2m) 55° inclination to 280 grid azimuth: intersected 38m quartzite-sandstone, 33m rhyolitic porphyry/lava, 14m black shale, 5m sandstone, 66m fawn sericitic (vitric?) siltstone, 44m interbedded pale green siltstone/black shale. Quartz/siliceous veins throughout, shear zones, faults - spacing ~10m, and low-level sericitic alteration. 1.2m@2.5ppm Au at 90m depth in siltstone(?), 1m@1 ppm Au in Qz/carbonate vein at 159m. 0.5 ppm @ 135.7m. All other individual metre samples including veins &lt;0.1 ppm.</p> <p>MH06 (140m deep, 55° at 105 azimuth) targeted a sub-cropping quartz vein in porphyry 200m along strike NNE of the northern Madam Howard barite. Borehole intersected a broken 2.5m Qz-rich fault zone @ 25m depth (unsampled), above a 7.5m sericite/siderite-altered cream-brown porphyry with trace disseminated euhedral pyrite, 13m of Yolande sequence volcanoclastic mass flows and vitric siltstones, and a 94m pale-red albite-altered porphyry tending pale grey-green in phases, with fine disseminated pyrite to 0.5%, zones of weak sericite-chlorite alteration containing gold above detection (&lt;0.6ppm) in small 2-10cm Qz-carbonate-pyrite stockworks. One 0.9m thick Qz-carbonate vein in porphyry at 119m assayed 1.4 g/t Au.</p> <p>MH07 (length 99m, inclination 50° to 105) drilled 20m across bedding strike from MH06 and 50m south. Although thinned – probably by faulting – the two porphyries were present, surrounded by siliceous volcanoclastic silts and mass flows.</p> <p>MH08 (44m, 50° at 105 azimuth), 68 m long, 25m across strike and 28m north of MH06; intersected tuffaceous silts, sandstones and mass flows but no evidence of either porphyry. No significant alteration, faulting or quartz veining.</p>
2016-2018	Australian Mineral Resources	EL16/2015	<p>1. Compilation and summary of exploration records and historical (Trove) records of mining, prospecting and exploration to date</p>

			<ol style="list-style-type: none"> <li>2. Model development: Research and application of regional structural geology from literature and interpretation of electromagnetic, gravity and radiometric reports</li> <li>3. Research into orogenic vein-hosted gold deposits</li> <li>4. Purchase of equipment in anticipation of exploration program (including 2 surface drill rigs) and in the field:</li> <li>5. Initial overview visits and scout geological mapping and chip sampling to validate existing maps and ground truth draft model</li> <li>6. Commencement of a mini-catchment based stream sediment gold sampling program (Pearl Creek and upper Diamond Creek catchments)</li> <li>7. Lithological re-log and photographing of Madam Howards Plains MH DDH 05 to DDH 08</li> <li>8. Sampling of core.</li> </ol>
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### 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).

#### Exploration objectives for EL 16/2015 Diamond Hill

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

**To estimate the quantity, quality and spatial dimensions of the ore deposits to a defined level of confidence, to inform decisions on extraction.**

1. Define surface lithologies
2. Locate surface 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. Drill intersections

AMR is exploring primarily for orogenic vein-hosted gold on the Diamond Hill block. The presence of high-grade barite in the same vein type offers synergistic value in exploring concurrently for barite. The potential for volcanogenic iron oxide copper gold (IOCG) ore and metallic sulphides in the east of, and at depth in the area will be 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 other than Diamond Hill itself, but there is evidence of multiple small rich concentrations of gold on the Licence and to the north, south and east of it. AMR is undertaking a methodical exploration program to locate the sources of alluvial gold in creek catchments; and investigate the geometry, spatial persistence and gold concentrations of the veins.

The incentive for AMR to invest in such a program is the proliferation between about 1885 and 1915 of quartz reef prospects throughout the King and Queen River valleys. 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 developed, 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 Diamond Hill block alone might not hold the resources to be cost-effectively developed, but if the area under Licence can be expanded to include other reefs in the area, then economies of scale could make development viable.

## **4. EXPLORATION RESULTS – Work completed in EL16/2015 for Year 3 (2018/19)**

Exploration during the third year of the Licence to 4 March 2019 consisted of:

1. Refinement of Licence-wide structural model
2. Development of two individual prospect draft models (Diamond Hill and Madam Howards South barite prospects)
3. Identification of sites for detailed (subcrop) mapping and sampling, followed by drilling
4. Resource assessment and box-cut plans for Madam Howards South barite prospect and Diamond Hill Gold Mine.

and in the field:

5. Geotechnical logging and graphics of Madam Howards DDH 06 to 08
6. Sampling and assay of cores
7. Ground-truth mapping and chip sampling
8. Continuation of the comprehensive mini-catchment based stream sediment gold sampling and AAS assay program (Davies Hill East and Stubbs Valley catchments)
9. Conception and initiation of a gravel provenance study.

2017/18 plan	2018/19 status
Continue stream sediment sampling field program (200 sites = 40 man-days)	Sampled Davies Hill, Stubbs Valley and Peevor's Lode catchments (50 sites = 30 man-days). Site access time-consuming
Engage cutters to expedite access (and grid for detailed mapping) (20 man-days)	Field crew accessed sites without cutting of tracks. Gravel provenance to replace gridded mapping in the short term
Integrate with search for possible source lodes, vein outcrop mapping, lithological ground-proofing and rock samples	Veins mapped where observed in sampled areas and road cuttings, veins across creeks noted, rock samples taken for mapping purposes
Map Diamond Hill and Davies Hill prospects in detail (14 days)	Under way, to be completed before June 2019
Design shallow drilling program for Diamond or Davies Hill	Shallow drilling program designed for Diamond Hill and Davies Hill (each 360m in six cored holes) and Madam Howards South Barite (200m in four cored holes)
Research geochemical and mineralogical gold vectors other than ppm gold. Consider applying to existing samples and core	Vectors for high-sulphide gold deposits, including As, are not indicative for the native orogenic vein gold typical of EL16/2015. Multi-element sediment sample results showed no correlation of Au with As, Bi or Ba.
Conduct preliminary research into gold ore concentration and deterioration (petering-out principle) (10 days) Design scope and arrange for academic (Hons) study of above (5 days)	Not yet done. Research pending results of the year's structural studies to assess possibility of structural truncation of gold shoots
Review structural interpretation to identify potential significant fault intersections.	Completed
Prepare supplementary report to provide 2018 stream sediment assay results and core photographs in database-compatible format	Results provided with this report
Complete structural logging of MH06 – MH08	Under way. Target date 30 May 2019.
Locate assay samples from MH05, and core from 1998 Davies Hill 1	MH05 assay results located. Supplementary sampling required. Chip samples from Davies Hill 1 located but no record of depths.
Check borehole locations with GPS	To be completed June 2019.
Re-check measurement of MH06 core sample locations in core	Completed.
Structure the draft model in freeware packages and populate with preliminary data. Obtain quote for VULCAN, Target or Datamine	Current modelling and data being input and prepared digitally in Excel for future conversion into commercial package

## Lithology and Stratigraphy

### Outcomes:

Interpreted and observation geological maps of EL16/2015 have been progressively improved (see Figures 4.1 and Appendix E). Patterns have been detected in the Yolande Sequence rocks enabling interpretation of a theoretical ‘test’ stratigraphy, despite and accounting for, the complexity of lateral facies changes, repetitious deposition, intrusion, past tectonics and structural disturbance.

- The igneous rocks on EL16/2015 represent a classic BADR crustal melt differentiation sequence (Basalt-Andesite-Dacite-Rhyolite; Solomon, 1965). The composition of volcanoclastics is predominantly acid/intermediate felsic.
- The distribution and configuration of the rhyolitic and dacitic porphyries, following structural interpretation, supports the observation of Morrison and Griffiths (1998) that they are generally conformable with host bedding. One of the Yolande River porphyries (dacitic or rhyolitic) has been U-Pb zircon dated at 498 Ma (+-0.6) (Vicary et al, 2015?). As such it is some 2 million years younger than the host Yolande River volcano-sedimentary sequence that was probably derived from the CVC volcanic event (500 Ma). If so, these bodies must have intruded or burrowed as sills into lightly consolidated Yolande volcanoclastics as part of a volcanic event that occurred 2 million years after CVC/Yolande deposition. Despite their intrusive nature, the porphyry sills appear to be consistent in their stratigraphic position within the Yolande host rocks in the area.
- The ‘enigmatic’ Cambrian basalts outcropping immediately north of the Firewood Siding Fault are coarse-grained and almost andesitic and therefore likely to be fault emplaced sills, conformable with the earlier host rocks and of Tyndall age (?).
- A ‘straw-man’ stratigraphic column for rocks found on EL16/2015 is presented at Figure 4.2. This model stratigraphy is to be tested by mapping, drilling and researching stratigraphic information from neighbouring areas. It was developed using MRT mapping records (mostly Everard, 1982, unpublished data) and AMR’s mapping.
- Quartz veins are more difficult to map than anticipated. Road cuttings and rare creek exposures are reasonably reliable, 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 recorded along with an 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. Due to the abundance of quartz fragments on the Licence, AAS assays of rock chips have not yet been dispatched. Gold in surface quartz will be assayed as the stream sediment results better define targets.
- Gravel provenance. As noted in prior reports (Delaney, 2018), outcrops are rare due to mechanical and chemical weathering, and made obscure and inaccessible by vegetation, regolith, colluvium, alluvium and humic accumulation. Detailed mapping is not achievable without clearing and/or excavation. During the report year, AMR realised that with little extra time, gravel samples can be collected from stream sediment sites for later clast identification and sorting – resulting in empirical evidence of rocktypes that must occur within each 0.125 km<sup>2</sup> mini-catchment. Results can be incorporated into observed mapping, and correlation of dominant rock type and quartz components with gold assays should prove valuable.
- AMR drafted graphic logs of the past five boreholes drilled on the Licence and extrapolated vertical lithologies to ground surface to add detailed information to the geology maps and test stratigraphic column.
- Hand specimens taken at targeted sites have redefined previous interpretive maps of the area.

**Implications for exploration:**

Stratigraphy and lithology in the area remain of importance for achieving AMR's exploration objectives:

- The rheology of adjacent rock types is an indication of vein 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 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. Sharp linear lithological discontinuities/boundaries in outcrop indicate faulting or bedding changes, both of which could have accommodated hydrothermal vein deposits.
- 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. (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. Mapping and AMR's draft model so far place the dacite stratigraphically above the rhyolite (and the Lynch Creek Basalt in its type area appears to be at the top of the Yolande sequence). These positions are inconsistent with the density hypothesis. Infill field mapping is required to validate the theoretical stratigraphy.
- The lavas within the Yolande and CVC are not syn-depositional. This means that volcanic centres during sedimentation could have been more distant than the Great Lyell Fault, possibly beyond the terrane boundary with the Tyennan block, with the ash tuffs suggesting that at least some of the vents were subaerial (thus exposed to later erosion). If so, CVC rocks might persist beneath the Yolande sequence in the Licence area, although they would be distant from the alteration effects of the Great Lyell Fault and thus difficult to identify.
- The basalts are unlikely to have been emplaced by the Firewood Siding Fault and are more likely to have been intruded as sills into the Yolande sediments during the Tyndall volcanic event towards the end of deposition of the Mount Read Volcanics. These occurrences are probably similar to the Lynch Creek Basalts to the south of Queenstown. This implies a higher stratigraphic position of the Yolande rocks adjacent to the Firewood Siding Fault.
- In some areas (Victorian goldfields, Carolina Slate Belt) lithologies (eg graphitic shales) are thought to chemically catalyse gold deposition. Black shales are present in the Yolande Sequence.

More needs to be known about surface and sub-surface geology. Despite paucity of data sites AMR should continue to refine geological maps through mapping and evidence-based reinterpretation.

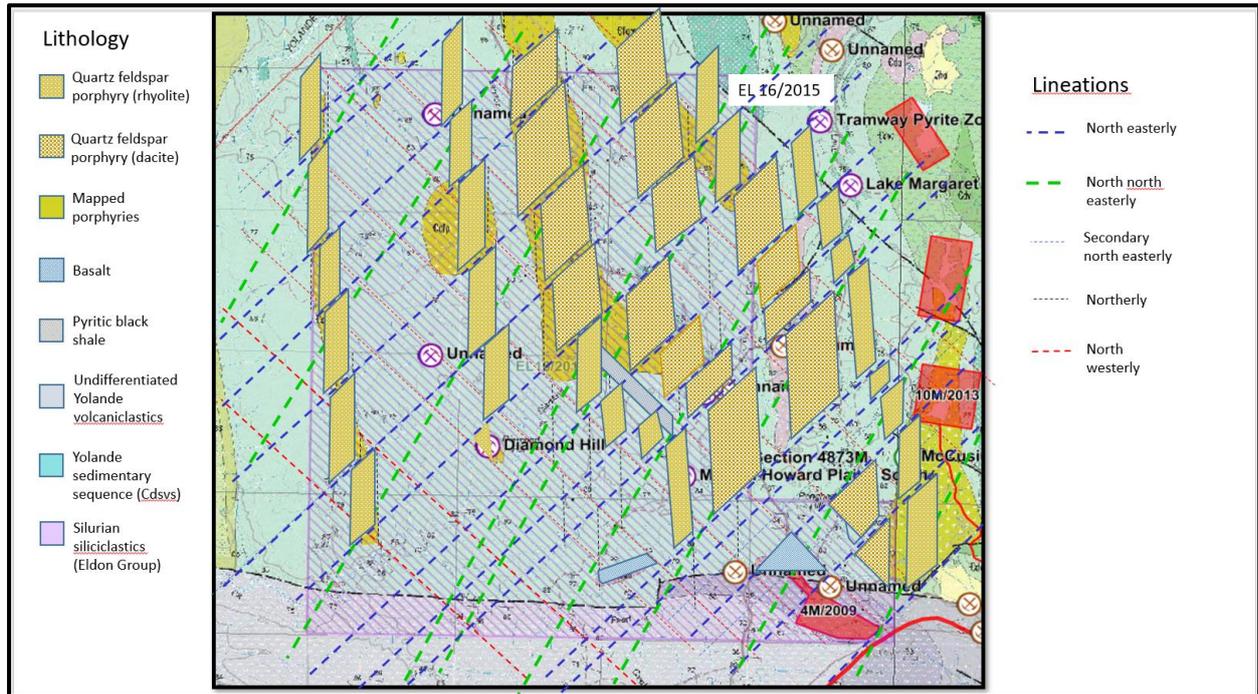


Figure 4.1: New geological surface interpretative map

Figure 4.1 shows AMR's interpreted distribution of lithologies based on field observations, previous mapping and geophysical interpretation. Field work during the coming year will include truth-testing of this as part of the Licence-wide model, including the conjectured existence of the porphyry blocks in the fault-bound bands north east of Diamond Hill, which do not exhibit the typical magnetic signature of the dacite porphyries.

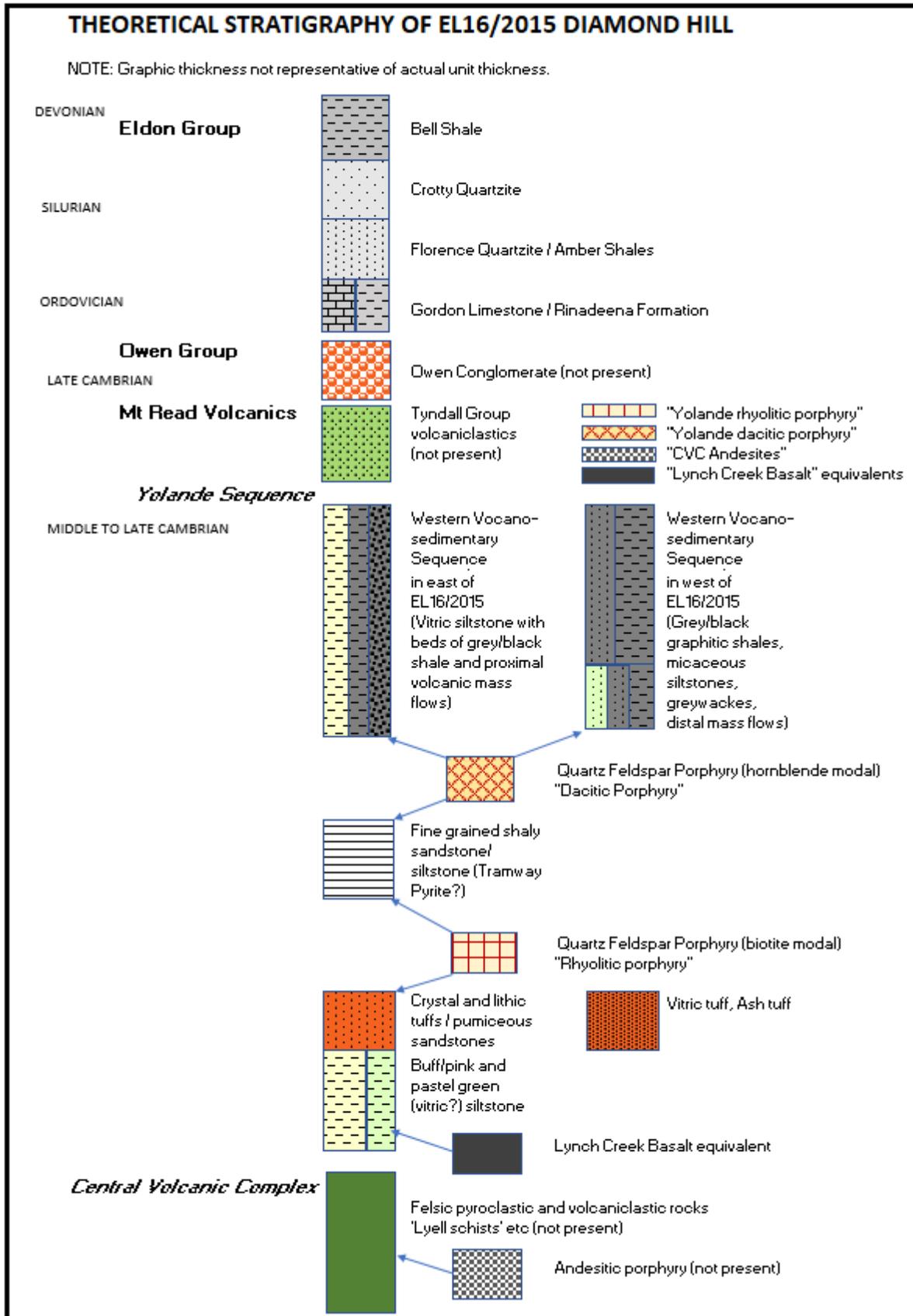


Figure 4.2 Interpreted stratigraphic column

## Tectonics and Structure

### Outcomes: (Structural model)

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. The basement features resulted in the overlying sediment stack being gently folded along sub-horizontal north-south hinge lines. In the Late Cambrian, subcrustal tectonism associated with 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 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 Cambrian strata.

By middle Devonian time, a generally ENE vergent compressional tectonic event (D1) imposed steeper northerly folding and NNW thrusting on the rocks and probably further reversal of the northerly crustal faults. The outcome in the rocks now underlying EL16/2015 was a block of mostly sub-vertical north-south trending beds of Cambrian volcanoclastic rocks, dislocated and duplicated by NNW thrusts. The steep bedding could be the limbs of tight fault-bound anticlines and synclines or snapped thrust sheets of competent siliceous strata, and it still reflects the larger-scale crustal features beneath.

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 apparent WNW Linda trend that encompasses the Mt Lyell mineralisation along the Great Lyell Fault extends through EL16/2015. If the Linda trend pre-dates the D2 shearing, then like the bedding, its traces will have been distorted to WNW from an original north west trajectory by the north-easterly shears. Similarly, the enigmatic east-west strike of the Firewood Siding Fault (FSF) bounding the south of EL16/2015 is probably in fact WNW. Note that the FSF now presents as a normal fault of several hundred metres' vertical displacement, indicating post Bell-Shale-time extension to the SSW (Teepookana Basin / Dubbill Barrel Synclinorium).

Figure 4.1, the interpretive map, was derived by unravelling the north-easterly D2 shears, that are apparent on geophysical maps and show as dislocations of the mapped northerly strike of bedding on geological maps. A major D1 thrust could also be theoretically reversed to achieve the configuration of an almost horizontal northerly-trending syncline(?) imposed on the broader GLF anticline by D1 compression (see Figure 4.3). Note that the truncation of the western occurrences of both porphyries currently remains unexplained.

The complex structural history has imparted no less than eight lineation orientations upon 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.

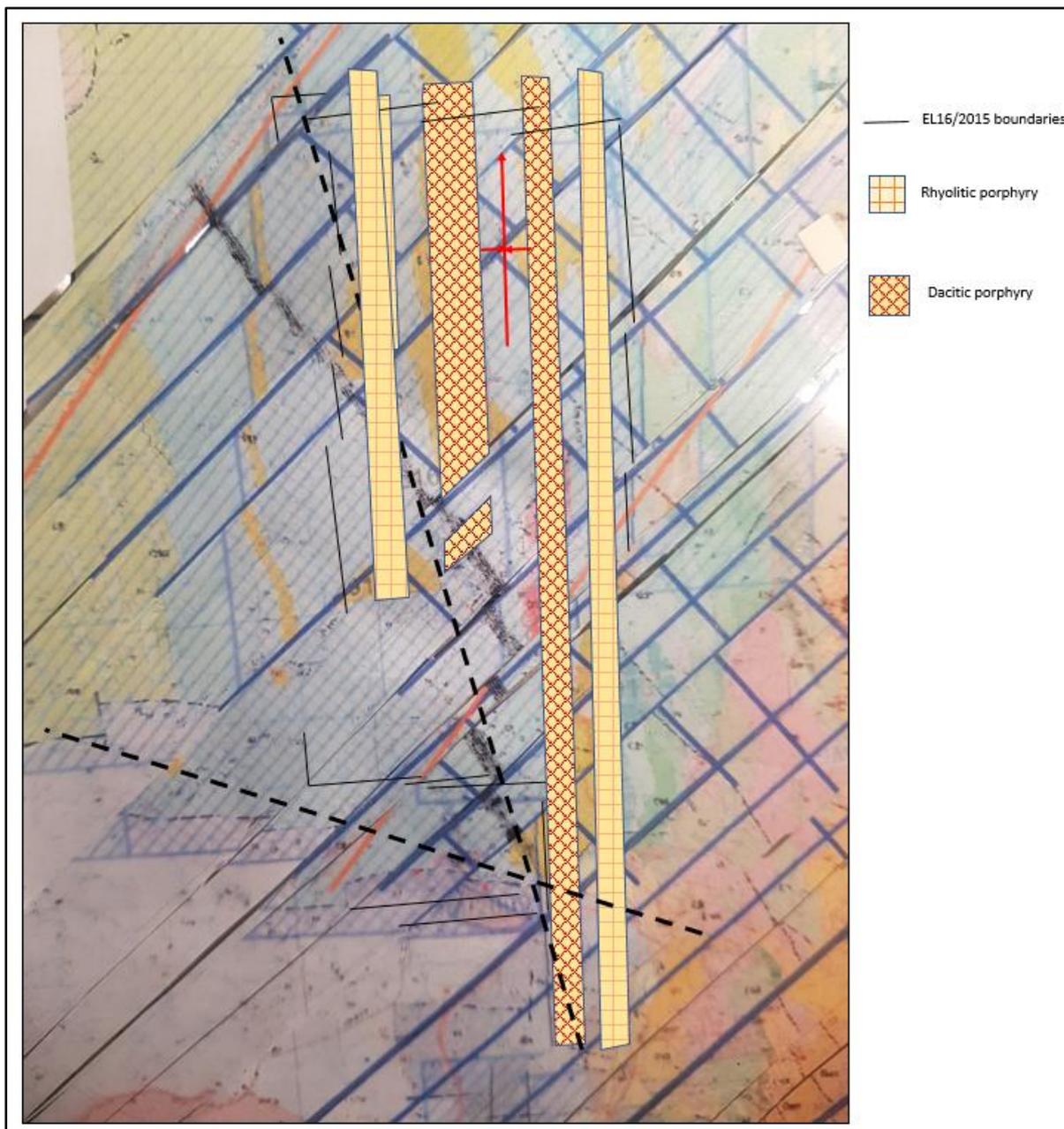


Figure 4.3 'Unravelled' plan interpretation showing porphyry bands pre D1 thrusting.

#### Implications for exploration:

- Bedding is north-south, consistent with recorded and remeasured field observations and core intersections. The consistent strike enables distinction in the field between bedding and differently-oriented structurally-imposed foliations (joints, cleavages and faults).
- In combination with new lithological and stratigraphic understanding, the structural analysis has enabled AMR to identify sites for targeted exploration on the block.
- If the surface expression of the model is supported by further exploration, then maps and cross-sections will be valuable for locating buried ore traps and concentrations.
- Mapped curvilinear faults were probably caused by major tectonic vectors that exploited various pre-existing planes of weakness (e.g. NNW regional trend probably exploited a combination of pre-existing northerly and north-westerly trending faults).

- The next steps in modelling are:
  1. to apply information on the other structural trends identified in geophysical, topographical and geological lineaments;
  2. allocate likely dip and plunge declinations and trends to the surface features; and
  3. determine whether any vein (lode) geometry is displaced by the faulting (are there more than one episode of auriferous hydrothermal injection?)

## Mineralisation mechanisms and patterns

### Outcomes:

- There is gold on the Diamond Hill Licence area, probably in modest extent but rich concentrations.
- In the Queenstown area, gold occurs in NNW-trending belts that can be related to trends in deep crustal gravity differentials ('gravity worms' of Murphy et al, 2004). At least one of these belts transects the Diamond Hill Licence, as does the WNW Linda Trend that controlled Mt Lyell ore deposition. Also, regionally, the gold mineralisation rarely occurs beyond 5 km laterally from the northerly trending Great Lyell Fault.
- Similar Devonian vein gold prospects with historically recorded economic concentrations exist within 1 km of the Licence area (Madam Howards Gold Mine, McCusicks Creek, Raggedy Ann prospect) and regionally. These are closer to the southeast quadrant of EL16/2015.
- Narrow sub-vertical blocks of brittle rocks bound by faults may have acted as conduits for hydrothermal ore deposition. All known and likely Devonian vein gold prospects on EL16/2015 and in the MRV generally appear to be hosted by rhyolitic porphyry.
- Continuing to map quartz vein geometry will expose the permeability architecture (faults and lithologies) that existed at the time of hydrothermal activity. The regional paleo-stress field presumably influenced crystallization/solidification in traps after the powerful surface-directed orogenic pulses dissipated. The preferential concentration of gold in the quartz into ore shoots probably depended on a combination of localised pressure (primarily) and temperature conditions, adjacent unit rheology and fluid chemistry.
- Previous explorers have sampled intersections of the quartz-feldspar-phyric porphyries, finding only low-grade alteration and gold registering at best barely above detection. Where gold is detected in the country rocks it appears to be associated with quartz or quartz-carbonate veins or stockworks and alteration.
- Barite exists in scattered high concentrations.
- Borehole MH04 intersected anomalous concentrations of lead (1 metre @ 7.9% and 1.5 metres @ 1%) in galena and zinc (3.2 m @ 0.65%) as sphalerite at less than 152 m vertical depth. No sulphides of interest recorded in the 45 metres below.
- Existence of VHMS deposits in economic quantities or depths in Yolande Sequence rocks is highly improbable.

### Implications for exploration:

- The prospective potential in EL16/2015 is gold or barite in the Devonian veins. Note: 'Devonian' is an assumption based on penetration of local Ordovician-Devonian rocks. AMR has no evidence yet to cite that **all** veins on the Licence are of Devonian age. The Licence area satisfies all conditions (e.g. mineralisation trends) for auriferous vein shoot deposition.

- There is enough evidence to justify targeting of quartz reefs in rhyolitic porphyry host rocks.
- Exploration targets on the Licence have been expanded beyond Diamond Hill, and Madam Howards South barite, with identification of prospects at Davies Hill, Peevors Creek and Madam Howards South gold creek. While investigating these, AMR will continue to search for other prospects on the Licence and will try to predict locations of blind ore concentrations and thereby also define likely barren zones.
- Further quartz vein occurrences should be mapped.
- The eastern and south-eastern part of the Licence area might hold the best potential for gold mineralisation.
- The anomalous sulphides intersection in MH04 might represent 'leakage' from a deeper ore body – possibly in CVC-type strata that were exposed to a source of alteration other than the Great Lyell Fault.

## Historical records of mining, prospecting and exploration

### Outcomes:

- Extensive searches of the Trove database reveal records of gold exploration from the 'West Coast Gold rush' of 1893-1917. Up to 1895, 3,000 ounces of hard rock gold and 40,000 ounces of alluvial gold from the west coast area were reported in Tasmania (Delaney, 2018, Appendix A).
- The historical Diamond Hill venture ceased operation after two years, the implication being that the gold concentrations deteriorated laterally and with depth. Similar deteriorations were recorded throughout the State (e.g. Princess, May, Lefroy, Davie PA). Discontinuation of these ventures was most often because of ore shoots 'petering out', a lack of development capital, extraction, transport and treatment costs, water ingress, lack of labour availability, and poor reputation of the field.
- Veins varied in orientation and, where auriferous averaged 0.7 metres wide.
- The obvious surface prospects in the region were discovered by searching creeks or chipping outcropping quartz veins.
- Subsequent exploration has not uncovered further economic mineralisation.
- It should be expected that more than a century of corporate and amateur gold prospecting and panning has scoured the surface effectively for obvious surface concentrations. None have been officially reported; but there is evidence of old alluvial workings in Diamond Creek, and anecdotal reports of panning success at the Lake Margaret road intersection, Madam Howards Plains South, Lennox Creek and Pearl Creek. Raggedy Ann Creek 1 km to the south of the Licence has rewarded local panning for a century.
- EL16/2015 has been demonstrated to hold hard rock gold sources, present in the multiple quartz vein lodes at Diamond Hill purported to contain native gold concentrations of 1 to 3 ounces per ton in hand-selected samples (Trove reference). There are two unrecorded excavations on veins 700m and 1500m north of Diamond Hill. Nearby, the McCusicks prospect 1 km to the east and Madam Howards Plains Gold Mine 1 km to the south were both worked for hard rock gold.

### Implications for exploration:

- 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 will require:

- resolution of the spatial deterioration of auriferous ore concentrations in orogenic veins (coined here as ‘the petering-out principle’) to establish the potential for extensions or further ore bodies; and/or
  - exploitation of economies of scale through securing further ground prospective for gold; and/or
  - evidence of larger Beaconsfield or Henty-style deposits. AMR considers a million-ounce deposit beneath EL16/2015 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 will need to consider all advantages offered by improvements in exploration and transport technology, local and regional infrastructure, geological knowledge, and geophysical and geochemical techniques in pursuing a rigorous, methodical but inexpensive exploration program.
  - The project should benefit from commissioning a research project into the reasons for apparent deterioration of surface concentrations of auriferous veins with depth (and laterally).

## Catchment-based stream sediment pan-concentrate sampling program

### Outcomes:

- During the reporting period, AMR continued the detailed stream sediment sampling program (Appendix A). Watercourses draining Davies Hill south, Pearl Creek (north) and the Peevors Creek / Stubbs Valley catchments were sampled (locations at Appendix A). The fire assay/AAS 50g (ALS Burnie, 2018) results of another 41 samples were received and added on to the 1:5000 topographic map (refer 2016/17 report).
- Selected sediment samples have been assayed down to trace level for barite, lead, copper, silver, iron and arsenic.
- The creeks draining the southern slopes of Davies Hill are relatively strongly anomalous for gold. This is consistent with 2017/18 results for the western slopes. Rhyolitic porphyry outcrops along the crest of the southern hump of Davies Hill.
- Pearl Creek trends just outside the eastern boundary of EL16/2015 in AMR’s neighbouring tenement EL1/2013 ‘Lake Margaret Road’. Its headwater catchments are also strongly anomalous and likely to be sourced from a lode other than Davies Hill.
- The catchments that enter Pearl Creek from the east, inside EL16/2015 (south eastern square kilometre) are now considered barren of gold.
- Results are scattered for the streams that enter Pearl Creek from the western side (all in EL16/2015) with four strong anomalies, four moderate and seven very low-grade anomalies. There is no pattern evident, with the high results each in separate mini-catchments among poorer results.
- The results for Stubbs Valley tributaries south of the Lyell Highway barely show trace gold. Interestingly, one sample draining the Silurian rocks south of the Firewood Siding Fault showed elevated barite, zinc, lead, copper and iron compared to all other samples.
- No visible gold has been detected in the samples. This outcome was expected.
- AMR commenced a Gravel Provenance sampling Gravel provenance (see ‘Lithology and Stratigraphy’). Samples have been identified, bagged, marked-up, and delivered

to Hobart for the analysis. Sorting and documentation of results will commence in the next quarter.

#### **Implications for exploration:**

- About 30% of the area has been sampled, some by only one sample per mini-catchment. AMR estimates that it would need another 500 samples to complete the map. At a rate of 5 samples per day = >100 field-days. The optimal level of detail for the map is being reassessed on progressive receipt of assay results. Current strategy is to prioritise catchments identified using the draft geological model.
- The above outcomes strengthen the case for the existence of a gold deposit in rhyolite on Davies Hill.
- The barren south east tributaries of Pearl Creek fit the draft model in that the dacitic porphyries do not appear to host significant gold concentrations.
- The apparently random results in the mid-east require follow-up. The draft model would predict that assays from this area, overlying dacitic porphyry, would be background only.
- The results are enough to encourage continuation of the program, which will provide a clearer picture of whether spaced sampling along streams is sufficient to reveal patterns leading to hard rock gold discoveries.
- Multi-element assays show no correlation of gold with other elements assayed. The slightly elevated metals in Stubbs Valley 03 sample have been noted.
- Stream sediment sampling is an inexact analysis and values are relative only, not quantitatively comparable (see Appendix A). These samples indicate that gold concentrations exist in a catchment and will assist in locating such but should not be used to infer economic value.

#### **Madam Howards series borehole logs and drilling**

##### **Outcomes:**

No drilling was undertaken in the reporting period, however:

- Results of core samples for assay from MH06 and MH07 core have been received (Appendix D).
- Key result in borehole MH07 of 7.9 g/tonne Au over 1 metre at less than 40 metres vertical depth, in a quartz vein below a fault truncating the top of albite-altered rhyolitic porphyry(?). Bedding dipping steeply west.
- Graphic logs have been prepared for MH04, MH05, MH06, MH07 and MH08 (see Appendix D).
- Core from MH06 and MH07 was geotechnically logged during the year but the most interesting results are pending completion of detailed logging of discontinuities and their orientations (completion by June 2019).
- Full core trays are progressively being carted in small single loads from Queenstown to MRT Mornington core store. Remaining core is pending completion of discontinuities logging and supplementary assay sampling.
- The core sample from MH06 1.41ppm Au sample at 119.0m has been corrected, position of barren sample at 139.3m corrected to 137.5-138.0m), and 1.9m sample at 0.67ppm Au at 78.8m (should be 0.9m from 79.8m).



- Preliminary sites for the next series of holes have been determined. These initial locations have been targeted for maximum geological value and might need to be changed for logistics and practicality or changed subject to information from detailed mapping of veins and rock units prior to drilling program (details at section <>).
- Core photographs in database-compatible format are provided with this report by electronic submission. Hardcopy versions were appended previously (Delaney, 2018) and database formatted lists are attached at Appendix D.
- MRT officers have corrected the database records for MH06, MH07 and MH08 as requested in this section of last year's report.

#### Implications for exploration:

- Further assay and logging:
  - MH04: inspect and photograph core at Mornington (core above 125 metres unsampled), geotechnical log
  - MH05: locate, inspect and photograph core, sample around 40 metre depth (top of rhyolite intersection), geotechnical log
  - MH07: 9 samples from the bottom 25 metres
  - MH08: 13 samples from strata below porphyry occurrences
  - Locate records or core from Davies 1.
- MH07 intersection demonstrates gold at economic concentration and depth.
- MH07 intersection supports the hypothesis that quartz veins intersecting the altered rims of rhyolite porphyry intrusion(s) are conditions for deposition of gold in this area. These become target conditions for further exploration.
- Likely westerly dip of beds allows for syncline and thrust sheet models, thus allowing hypothesis that CVC strata underlie the Licence area at depth.
- MH 04 and MH 05 have penetrated the deepest into the Yolande Sequence, both revealing sericitisation and silicification towards the base. According to the straw man

stratigraphy presented in this report, it is possible that the lowest strata are part of the underlying CVC sequence.

- Graphic logs reveal that intersected sequences could be correlatable, and cross sections can be prepared. For example, the sequence of MH 08 is stratigraphically about 50 metres below MH 07 and MH 06, both of which are no more than 50 metres away. Interpretation of geotechnical logging should throw light on the nature of the displacement between these sequences.
- Existence of a significant NNW trending thrust between MH08 and MH06 / MH07 (dipping east at 70 degrees).
- Major displacement between MH 04-05 and MH 06-08, placing them on opposite limbs of the postulated pre-Tabberabberan syncline.
- Results from geotechnical logging to be included in the latest versions of the draft model. Possible vein and joint/cleavage orientations can indicate nature of discontinuity regimes. Unfilled discontinuities might indicate post-hydrothermal mobilisation.
- Madam Howards series drilling to be extended to include shallow holes at Madam Howards South, Diamond Hill and Davies Hill (latter could extend Davies Hill series). See next section 'Proposed Work Program'.

## Interpretation and draft models

### Outcomes:

- The draft model has been further developed from last year's description (Delaney, 2018) as described at Section 4 of this report (Tectonics and Structure).

### Implications for exploration:

- The favoured model remains the orogenic/transcurrent faults model, augmented by the tight faulted syncline/thrust sheets and alteration zones. Exploration should target the information necessary to close the information gaps for computer-modelling prospects based on this model.
- Further model validation has and will ensure cost-effective optimisation of drilling.
- Other models should not be discounted.

## 5. PROPOSED WORK PROGRAM YEAR 4

1. Continue stream sediment sampling field program (100 sites = 40 man-days):
  - Priorities are Madam Howards South, Davies Hill West and a trend-line NNW from Diamond Hill. This completes coverage of mini-catchments draining the known rhyolitic porphyry outcrops in the tenement.
  - Integrate with search for possible source lodes, vein outcrop mapping, lithological ground-proofing and rock samples.
2. Trench and assay prospective vein outcrops
3. Map Diamond Hill and Davies Hill prospects in detail (14 days)
4. Cost, fund and arrange shallow drilling program for Diamond Hill, Madam Howards South or Davies Hill.
5. Conduct preliminary research into gold ore concentration and deterioration; (10 days)

6. Augment existing structural interpretation to identify potential significant fault intersections.
7. Locate assay samples from MH05, core from 1998 Davies Hill 1.
8. Prepare a justifiable resource assessment.

Estimated exploration costs Year 4:	
Stream sediments	\$ 45,000
Mapping	\$ 10,000
Geology	\$ 35,000
Supplementary	\$ 7,000
Tenement Admin	\$ 3,000
<b>Total Program</b>	<b>\$ 100,000</b>

Note that AMR is investigating funding opportunities and if successful the listed activities are anticipated to be intensified and expenditure commensurately higher.

A draft drilling program is outlined at Appendix B.

## 6. 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 searched and viewed images of plants of conservational significance (Appendix C) for familiarity prior to the program. Movement through scrub and swampy areas was undertaken to alert fauna including frogs, lizards and snakes (none sighted).

The nearest record of aboriginal relics is from the Queen River valley (Corbett, 1980) 2 km to the east of the Licence area (West Queen). Aboriginal inhabitation of the slopes and exposed plains of Diamond Hill is unlikely (Appendix D). Apart from excavation depressions, trenching, six historical exploration tunnels and two known shafts, there is no evidence of white cultural heritage elements of historical value on EL16/2015.

## 7. EXPENDITURE 2018/19

Exploration Expenditure EL16/2015	April to March 2016/2017	April to March 2017/2018	April to March 2018/2019	TOTAL 2016-2019
Field program	\$15,160	\$14,881	\$18,231	\$48,217
Geology	\$13,077	\$21,085	\$28,050	\$62,212
Exploration Equipment	\$7,723	\$21,555	\$1,422	\$29,491
Tenement Administration	\$3,579	\$2,152	\$2,354	\$6,941
Services	\$432	0	\$1,654	\$2,086
<b>TOTAL EXPENDITURE</b>	<b>\$39,971</b>	<b>\$59,674</b>	<b>\$51,711</b>	<b>\$151,356</b>

## 8. REFERENCES

- Bacon, C. A., Pemberton, J. (2012). *Mineral Exploration Code of Practice* (Fifth Edition). Mineral Resources Tasmania: Hobart.
- Bailey, P. W. & Green, D. C. (1984). *A radiometric age for the Crown Hill Andesite, western Tasmania*. Mineral Resources Tasmania, (unpublished).
- Bottrill, R. S., Huston, D. L., Taheri, J. & Khin Zhaw (1992). *Gold in Tasmania*. In Geological Survey Bulletin 70: An island of potential. Tasmania Department of Mines.
- Brown, A.V., Calver, C.R., Corbett, K. D., Everard, J. L. Forsyth, S. M., Goscombe, B. D., Green, G. R., McClenaghan, M. P., Pemberton, J., Seymour, D. B. & Vicary, M. J. (comp). (2005). *Geology of Southwest Tasmania*. Edition 2011.1. Digital Geological Atlas 1:250 000 Scale Series. Mineral Resources Tasmania.
- Callaghan, T. (2013). *Annual report EL1/2006 Diamond Hill western Tasmania*. For Stebbo's Diamond Drilling. Unpublished annual report.
- Cook, N. J., Ciobanu, C. L., Spry, P. G., & Voudouris, P. G. (2014). *Understanding gold-(silver)-telluride-(selenide) mineral deposits* IGCP-486. Downloaded 28 March, 2019 from <https://www.researchgate.net/publication/258128796>
- Corbett, K.D. (1979). *Stratigraphy, correlation and evolution of the Mt Read Volcanics in the Queenstown, Jukes-Darwin and Mt Sedgwick areas*. Department of Mines Tasmania, Geological Survey: Bulletin 58
- Corbett, K. D. (1980) *A Record of Aboriginal Implement Sites in the Queenstown Area, Tasmania*. Papers and Proceedings of the Royal Society of Tasmania Vol. 114:35-39.
- Corbett, K. D., Calver, C. R., Everard, J.L., & Seymour, D. B., (1989). *Queenstown: 1:25,000 Geological Mapping Sheet*. Tasmanian Department of Mines Geological Atlas.
- Corbett, K. D., (1992). *Stratigraphic-volcanic setting of massive sulphide deposits in the Cambrian Mount Read Volcanics, Tasmania*. Economic Geology 87.
- Corbett, K. D., Quilty, P. G. & Calver, C. R. (Eds). (2014). *Geological Evolution of Tasmania*. Special Publication No 24. Geological Society of Australia Inc.
- Corbett, K. D., and Solomon, M. (1989). *Cambrian Mt Read volcanics and associated mineral deposits*. In *Geology and Mineral resources of Tasmania*. Geological Society of Australia Special Publication 15 pp. 84-153.
- de Vries, P. J., (2008, 2009, 2010). (Five documents) *EL01/2006 - Diamond Hill Tasmania annual technical report 4th September 2009 - 3rd September 2010. EL01/2006 - Diamond Hill, Tasmania - annual technical report, 4th September 2008 - 3rd September 2009. Annual Report 2006 to 2007, Diamond Hill. Annual Report 2006 to 2007, Diamond Hill*. Low Impact Diamond Drilling Specialists Pty Ltd. Mineral Resources Tasmania Technical Reports
- Delaney, S.D., (2018). *Annual report 2016/117 and 2017/18, EL16/2015 Diamond Hill* (unpublished). Australian Mineral Resources Pty Ltd.
- Griffiths, A. G., (1998). *The Geology, Geochemistry and Magnetism of Yolande River Sequence Porphyries, Northwest of Queenstown*. Unpublished BSc Honours thesis, CODES SRC/School of Earth Sciences, University of Tasmania.
- Groves, D.I., (1964). *Madam Howard Plains Barite deposit*. Tasmanian Mines Department Technical Report No8.
- Howland-Rose, A.W. (1974). *A Report on Gradient Array Electrical Induced Polarisation Reconnaissance Survey Over the Madame Howard Grid, Henty-Yolande Area E.L. 41/71, Queenstown, West Coast Tasmania*. Mt Lyell Mining and Railway Company Ltd.
- Leaman, D. E., (1992). *Finding Cambrian keys: An essay in controversy, prospectivity and tectonic implications*. In Geological Survey Bulletin 70: An island of potential. Tasmania Department of Mines.
- Leaman, D.E., (1993). *EL25/91 Yolande River Aeomagnetic Survey Acquisition*. Pasminco Exploration.

- Morrison, K. C., (1997). *Exploration Licence 27/95 – Yolande River Year 1 Annual Report*. Unpublished annual report for Copper Mines of Tasmania Pty Ltd
- Morrison, K. C. and Griffiths, A. G., (1998). *CMT Pty Ltd Exploration Licence 27/95 - Yolande River, Year 2 Annual Report*. Tasmanian Mines Department Technical Report
- Morrison, K. C. (2002). *Relinquishment and Final Report - EL27/1995 - Yolande River*. Copper Mines of Tasmania Pty Ltd. Unpublished annual report.
- Morrison, K. C. (2002). *Western Tasmanian Regional Minerals Program. Mount Read Volcanics Compilation*. Report on field investigations Mt Darwin - Mt Murchison region. Mineral Resources Tasmania, Tasmanian Geological Survey: Record 2002/18
- Murphy, B., Denwer, K., Keele, R.A., Stapleton, P., Korsch, R., Seymour & D.B., Green, G.R. (2004). *Tasmania Mineral Province Geoscientific database, 3D geological modelling, mines and mineral prospectivity: Project T3 Final Report*. Mineral Resources Tasmania.
- Poltock, R. (1992). *Pasminco Exploration Yolande EL 11/85 and Yolande River EL 25/91 Annual Report 1991-92*. Arimco Mining Pty Ltd, Leaman Geophysics, Pasminco Australia Ltd. Unpublished annual report.
- Richards, D. (2005). *EL 21/2003 - Yolande River, Final Report for the period 12 July 2003 to 30 June 2005*. Glengarry Resources Ltd. Unpublished annual report.
- Richards, D., Morrison, K.C. (2004). *Annual report for peiod ending 10 June 2004 - Yolande River - EL21/2003*. Glengarry Resources Ltd. Unpublished final report.
- Solomon, M. (1965) *The Spilite – keratophyre association of West Tasmania and the ore deposits at Mt Lyel, Rosebery and Hercules*, PhD thesis. The University of Tasmania (unpublished).
- Vicary, M. J. (compiler) (2004). *Digital Geological Atlas 1:25 000 scale series. Sheet 3634 'Professor'*. Mineral Resources Tasmania.
- Vicary, M. J., Mortensen, J. K., McNeill, A. W., Gemmell, J. B, & Friedman, R. M. (2015?) *High-Precision U-Pb Zircon Chronostratigraphy of the Mount Read Volcanic Belt in Western Tasmania, Australia: New Results and Implications for VHMS Exploration*. Poster presentation, State Government of Tasmania.
- Wells, K. (1971). *Annual Report on EL10/69 (Lake Dora-(Henty)-Mt Huxley Area*. Mt Lyell Mining and Railway Company Ltd. Unpublished annual report.
- Wells, K. (1976). *Review of Exploration Tenements EL 9/66, EL 10/69 and EL 41/71*. Mt Lyell Mining and Railway Company Ltd. Unpublished annual report.

## 9. APPENDICES

### Appendix A: Catchment based stream sediment gold sampling program

#### Pan concentrate drainage survey for gold

At each site two litres of -5 mm sediment is 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.

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 as at Davies Hill)
- 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')
- Accessibility of similar alluvial gold trap types
- Sample depths (some deeper or closer to bedrock)
- Fens, organics and muds act as filters to colluvial gold
- Organic mud content - 2 kg including mud in a sieve is not the same as 2 kg of sand/gravel
- Different processes (eg mesh) and panning techniques
- Gold concentrations in source veins might be distal or proximal to the creek.

**Table B: Gold pan concentrate results of initial samples – Summer 2018**

Sample ID	Easting GDA94	Northing GDA94	Concentrate Au (ppm)	Sediment Au (ppb)
DC01	378582	5344347	0.008	<b>0</b>
DC01A	378653	5344552	0.069	<b>2</b>
DC02	378762	5344610	6.85	<b>171</b>
DC02A	378970	5344743	0.561	<b>14</b>
DC02B	378957	5344850	0.446	<b>11</b>
DC02C	378937	5344875	8	<b>200</b>
DC03	378600	5344745	0.052	<b>1</b>
DC03A	378750	5345025	0.002	<b>0</b>
PC01	378754	5343639	0.049	<b>1</b>
PC02	378789	5343537	0.004	<b>0</b>
PC03	378774	5343441	0.011	<b>0</b>
PC07	379080	5343504	0.38	<b>10</b>
PC09	378871	5343542	2.6	<b>65</b>

PC10	378998	5343281	0.001	<b>0</b>
PC10A	378934	5343338	0.002	<b>0</b>
PC12	378934	5343293	0.013	<b>0</b>
PC12A	378908	5343279	120	<b>3000</b>
PC13	378867	5343237	0.003	<b>0</b>
PC14	379029	5343207	0.173	<b>4</b>
PC19	378918	5343933	0.057	<b>1</b>
PC20	378885	5343974	7.9	<b>198</b>
PC21	378972	5344111	0.001	<b>0</b>
PC22	379002	5344042	3.18	<b>80</b>
PC23	379049	5344222	0.783	<b>20</b>
PC24	379036	5344178	2.24	<b>56</b>
PC25	379005	5344062	0.002	<b>0</b>
PC26	378820	5343820	0.002	<b>0</b>
PC27	379262	5342940	0.001	<b>0</b>
PC28	379288	5342961	0.001	<b>0</b>
PC29	379288	5342957	0.001	<b>0</b>
PC30	379414	5342957	0.001	<b>0</b>
PC31	379439	5343075	0.001	<b>0</b>
PC32	379380	5343080	0.002	<b>0</b>
PC33	379214	5343007	0.001	<b>0</b>
PC35	379313	5342706	0.001	<b>0</b>
PC36	378985	5342467	0.747	<b>19</b>
PC37	379017	5342263	0.001	<b>0</b>
PC38	379036	5342442	0.001	<b>0</b>
SV01	379815	5342403	0.001	<b>0</b>
SV02	380015	5342239	0.002	<b>0</b>
SV03	379535	5342431	0.004	<b>0</b>

Table B: Results of 2018/19 sediment sampling

## Appendix B: Draft drilling outline

### Madam Howards Plains South barite occurrence:

Four to six 50-metre holes should be drilled to determine the nature of the barite deposit:

Sites A and B are on the southern side to test southerly dip of the barite lode. Remaining holes to test continuation and quality of a vertical lode.

### Diamond Hill gold

Four to six 50-100 metre inclined holes to be drilled from south of the lodes to determine vein geometry and test for the presence of economic gold concentrations (shoots) laterally and at depth.

Drilling sites pending assessment and assay of veins and detailed lithological and where possible structural mapping.

### Davies Hill gold:

Site A 378990 5345055 – Drilling a quartz reef near faulted (NNE feeder trend) in rhyolitic porphyry near contact with crystal tuff (?).

Site B 378865 5345085 - Drilling the same quartz reef in rhyolitic porphyry.

Site C 378720 5345080 – Drilling the quartz reef in rhyolitic porphyry near conformable contact with crystal tuff / siltstone(?).

Site D 378790 5344750 – Drilling a north westerly faulted contact between rhyolitic porphyry and volcanoclastics.

Site E 378900 5345390 - Drilling a north westerly faulted contact between rhyolitic porphyry and volcanoclastics.

Site F 379047 5345240 – Drilling a NW trending structure separating rhyolitic porphyry and volcanoclastics at its intersection with NNE feeder trend.

Holes proposed to be 50-100 metres in length at 45 degrees inclination, sited 25m south and 15 metres west of the intersection of the vein with the rhyolite contact. The holes would be drilled with a northerly azimuth to intersect the probable southerly dipping vein transecting the porphyry body.

The purpose of the program is to determine vein geometry and test for the presence of economic gold concentrations.

Appendix C: Plants of conservation significance – Queenstown area



Western cushion-bristlewort;



Slender heath myrtle



Roundhead yellow eye - 'Tasmanian' yellow eye pictured.



short purpleflag;



Tasmanian rice grass;



graceful wallaby grass)

## Appendix D: 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 E: Core sample assay, core photos, graphic logs

## MH06 Additional Core assay samples and results

### MH06 Assay samples

Reason	Sample Id.	Top	Base	Thickness	Description	Au (ppm)
Corrected	4506	79.8	80.7	0.9	Previous typo as 78.8 gave 1.9m thk	0.67
Corrected	4508	137.5	138	0.5	Mismeasured at 139.3 to 140.0m	<0.01
Corrected	??	119.5	120.5	1.0	Mismeasured at 119.0 to 120.0 m	1.41

Additional sample	MH06002	46	46.3	0.3	Silicified Siltstone	
Additional sample	MH06003	70.2	70.4	0.2	Unaltered porphyry c sparse pyrite	0.034
Additional sample	MH06004	80.7	81	0.3	Vein below sample 4506 (0.67 ppm)	0.067
Additional sample	MH06005	89.8	90.1	0.3	not cut	0.168
Additional sample	MH06006	90.1	91	0.9	Slightly altered porphyry (cut)	0.012

- The core sample from MH06 1.41ppm Au sample at 119.0m has been corrected to 119.5-120.5 m, position of barren sample at 139.3m corrected to 137.5-138.0m), and 1.9m sample at 0.67ppm Au at 78.8m (should be 0.9 m thick from 79.8m).

## MH06 Core photos index

### Madam Howards Plains DDH 06

#### Dry

Drill hole	Photo	Trays	From (m)	To (m)	Core condition
MH 06	MH 06 Trays 1_2 (dry).jpg	1 & 2	0.00	16.20	Dry, exposed 2 years
MH 06	MH 06 Trays 3_4 (dry).jpg	3 & 4	16.20	24.90	Dry, exposed 2 years
MH 06	MH 06 Trays 5_6 (dry).jpg	5 & 6	24.90	31.30	Dry, exposed 2 years
MH 06	MH 06 Trays 7_8 (dry).jpg	7 & 8	31.30	36.10	Dry, exposed 2 years
MH 06	MH 06 Trays 9_10 (dry).jpg	9 & 10	36.10	41.50	Dry, exposed 2 years
MH 06	MH 06 Trays 11_12 (dry).jpg	11 & 12	41.50	46.80	Dry, exposed 2 years
MH 06	MH 06 Trays 13_14 (dry).jpg	13 & 14	46.80	52.40	Dry, exposed 2 years
MH 06	MH 06 Trays 15_16 (dry).jpg	15 & 16	52.40	57.80	Dry, exposed 2 years
MH 06	MH 06 Trays 17_18 (dry).jpg	17 & 18	57.80	63.15	Dry, exposed 2 years
MH 06	MH 06 Trays 19_20 (dry).jpg	19 & 20	63.15	68.30	Dry, exposed 2 years
MH 06	MH 06 Trays 21_22 (dry).jpg	21 & 22	68.30	73.10	Dry, exposed 2 years
MH 06	MH 06 Trays 23_24 (dry).jpg	23 & 24	73.10	78.00	Dry, exposed 2 years
MH 06	MH 06 Trays 25_26 (dry).jpg	25 & 26	78.00	83.10	Dry, exposed 2 years
MH 06	MH 06 Trays 27_28 (dry).jpg	27 & 28	83.10	88.30	Dry, exposed 2 years
MH 06	MH 06 Trays 29_30 (dry).jpg	29 & 30	88.30	93.60	Dry, exposed 2 years
MH 06	MH 06 Trays 31_32 (dry).jpg	31 & 32	93.60	99.10	Dry, exposed 2 years
MH 06	MH 06 Trays 33_34 (dry).jpg	33 & 34	99.10	104.20	Dry, exposed 2 years
MH 06	MH 06 Trays 35_36 (dry).jpg	35 & 36	104.20	109.60	Dry, exposed 2 years
MH 06	MH 06 Trays 37_38 (dry).jpg	37 & 38	109.60	114.70	Dry, exposed 2 years
MH 06	MH 06 Trays 39_40 (dry).jpg	39 & 40	114.70	119.50	Dry, exposed 2 years
MH 06	MH 06 Trays 41_42 (dry).jpg	41 & 42	119.50	124.90	Dry, exposed 2 years
MH 06	MH 06 Trays 43_44 (dry).jpg	43 & 44	124.90	130.25	Dry, exposed 2 years
MH 06	MH 06 Trays 45_46 (dry).jpg	45 & 46	130.25	137.30	Dry, exposed 2 years
MH 06	MH 06 Trays 47_48 (dry).jpg	47 & 48	137.30	140.00	Dry, exposed 2 years

**Wet core**

MH 06	MH 06 Trays 1_2 (wet).jpg	1 & 2	0	16.2	Wet, exposed 2 years
MH 06	MH 06 Trays 3_4 (wet).jpg	3 & 4	16.2	24.9	Wet, exposed 2 years
MH 06	MH 06 Trays 5_6 (wet).jpg	5 & 6	24.9	31.3	Wet, exposed 2 years
MH 06	MH 06 Trays 7_8 (wet).jpg	7 & 8	31.3	36.1	Wet, exposed 2 years
MH 06	MH 06 Trays 9_10 (wet).jpg	9 & 10	36.1	41.5	Wet, exposed 2 years
MH 06	MH 06 Trays 11_12 (wet).jpg	11 & 12	41.5	46.8	Wet, exposed 2 years
MH 06	MH 06 Trays 13_14 (wet).jpg	13 & 14	46.8	52.4	Wet, exposed 2 years
MH 06	MH 06 Trays 15_16 (wet).jpg	15 & 16	52.4	57.8	Wet, exposed 2 years
MH 06	MH 06 Trays 17_18 (wet).jpg	17 & 18	57.8	63.15	Wet, exposed 2 years
MH 06	MH 06 Trays 19_20 (wet).jpg	19 & 20	63.15	68.3	Wet, exposed 2 years
MH 06	MH 06 Trays 21_22 (wet).jpg	21 & 22	68.3	73.1	Wet, exposed 2 years
MH 06	MH 06 Trays 23_24 (wet).jpg	23 & 24	73.1	78	Wet, exposed 2 years
MH 06	MH 06 Trays 25_26 (wet).jpg	25 & 26	78	83.1	Wet, exposed 2 years
MH 06	MH 06 Trays 27_28 (wet).jpg	27 & 28	83.1	88.3	Wet, exposed 2 years
MH 06	MH 06 Trays 29_30 (wet).jpg	29 & 30	88.3	93.6	Wet, exposed 2 years
MH 06	MH 06 Trays 31_32 (wet).jpg	31 & 32	93.6	99.1	Wet, exposed 2 years
MH 06	MH 06 Trays 33_34 (wet).jpg	33 & 34	99.1	104.2	Wet, exposed 2 years
MH 06	MH 06 Trays 35_36 (wet).jpg	35 & 36	104.2	109.6	Wet, exposed 2 years
MH 06	MH 06 Trays 37_38 (wet).jpg	37 & 38	109.6	114.7	Wet, exposed 2 years
MH 06	MH 06 Trays 39_40 (wet).jpg	39 & 40	114.7	119.5	Wet, exposed 2 years
MH 06	MH 06 Trays 41_42 (wet).jpg	41 & 42	119.5	124.9	Wet, exposed 2 years
MH 06	MH 06 Trays 43_44 (wet).jpg	43 & 44	124.9	130.25	Wet, exposed 2 years
MH 06	MH 06 Trays 45_46 (wet).jpg	45 & 46	130.25	137.3	Wet, exposed 2 years
MH 06	MH 06 Trays 47_48 (wet).jpg	47 & 48	137.3	140	Wet, exposed 2 years

## MH07 Core assay samples

MH07 Assay samples						
Reason	Sample Id	Top	Base	Thickness	Description	Au (ppm)
Gold assay	MH7001	27.00	28.00	1.00	Porphyry near faulted contact	0.007
Gold assay	MH7002	29.90	30.00	0.10	Slightly altered porphyry	0.008
Gold assay	MH7003	30.60	30.72	0.12	Qz vein, rubbly, FeSt on surfaces	1.395
Gold assay	MH7004	35.70	36.00	0.30	Fe stained porphyry	0.534
Gold assay	MH7005	38.20	38.35	0.15	Slightly altered sheared volcanoclastic	0.121
Gold assay	MH7006	38.35	39.15	0.80	Slightly altered vc c Qz veining	0.165
Gold assay	MH7007	39.40	39.45	0.05	Qz stockwork in vc, pyrite	0.501
Gold assay	MH7008	38.65	38.90	0.25	Lg Qz vein in vc sericitic alt'n	
Gold assay	MH7009	39.40	39.45	0.05	Irr Qz vein, alt pyrite band	
Gold assay	MH7010	40.85	40.95	0.10	Lg cryst Qz vein, Sid on fractures	0.86
Gold assay	MH7011	41.00	41.31	0.31	Qz and rubble in shear zone	
Gold assay	MH7012	42.40	42.55	0.15	Altered porphyry at Qz contact	0.596
Gold assay	MH7013	42.55	43.50	0.95	Qz rubble, KL	7.86
Gold assay	MH7014	43.50	43.90	0.40	Vein and pyrite in porphyry	1.405
Gold assay	MH7015	43.90	44.00	0.10	Altered porphyry c 0.2% pyrite	0.146
Gold assay	MH7016	44.00	44.35	0.35	Vein	0.066
Gold assay	MH7017	44.35	45.00	0.65	Vein	0.026
Gold assay	MH7018	48.02	48.14	0.12	Vein	0.009
Gold assay	MH7019	49.00	49.10	0.10	Vein	0.02
Gold assay	MH7020	53.00	53.10	0.10	Vein	0.022
Gold assay	MH7021	54.50	54.65	0.15	Vein	8.2
Gold assay	MH7022	56.30	57.33	1.03	Vein	0.04
Gold assay	MH7023	70.50	71.50	1.00	Sericitic veins and black alteration	0.011
Gold assay	MH7024	75.00	75.20	0.20	Sericite	0.015
Gold assay	MH7025	60.50	60.80	0.30	Base of rhyolitic porphyry	
Gold assay	MH7026	60.80	61.50	0.70	Top of vitric sandstone/siltstone	
Gold assay	MH7027	61.50	62.00	0.50	Slightly silicified sandstone/siltstone	
Gold assay	MH7028	79.80	80.00	0.20	Lg Qz vein, glassy, sparse fest	
Gold assay	MH7029	80.20	80.50	0.30	Fault breccia in Qz vein matrix	
Gold assay	MH7030	80.50	81.00	0.50	Fault breccia in Qz vein matrix	
Gold assay	MH7031	81.00	81.70	0.70	Broken fault breccia in Qz vein matrix	
Gold assay	MH7032	81.70	82.00	0.30	Unbroken fault breccia c Qz	
Gold assay	MH7033	88.90	89.80	0.90	Lg-wh Qz vein, broken, minor FeSi	

## MH07 Core photos index

**Madam Howards Plains DDH 07**

Drill hole	Photo	Trays	From (m)	To (m)	Core condition
<b>Dry</b>					
MH 07	MH 07 Trays 1_2 (dry).jpg	1 & 2	0.00	15.30	Dry, exposed 2 years
MH 07	MH 07 Trays 3_4 (dry).jpg	3 & 4	15.30	28.25	Dry, exposed 2 years
MH 07	MH 07 Trays 5_6 (dry).jpg	5 & 6	28.25	35.35	Dry, exposed 2 years
MH 07	MH 07 Trays 7_8 (dry).jpg	7 & 8	35.35	44.40	Dry, exposed 2 years
MH 07	MH 07 Trays 9_10 (dry).jpg	9 & 10	44.40	51.95	Dry, exposed 2 years
MH 07	MH 07 Trays 11_12 (dry).jpg	11 & 12	51.95	59.05	Dry, exposed 2 years
MH 07	MH 07 Trays 13_14 (dry).jpg	13 & 14	59.05	67.00	Dry, exposed 2 years
MH 07	MH 07 Trays 15_16 (dry).jpg	15 & 16	67.00	74.50	Dry, exposed 2 years
MH 07	MH 07 Trays 17_18 (dry).jpg	17 & 18	74.50	81.80	Dry, exposed 2 years
MH 07	MH 07 Trays 19_20 (dry).jpg	19 & 20	81.80	89.40	Dry, exposed 2 years
MH 07	MH 07 Trays 21_22 (dry).jpg	21 & 22	89.40	96.25	Dry, exposed 2 years
MH 07	MH 07 Tray 23 (dry).jpg	23	96.25	99.00	Dry, exposed 2 years
<b>Wet</b>					
MH 07	MH 07 Trays 1_2 (wet).jpg	1 & 2	0.00	15.30	Wet, exposed 2 years
MH 07	MH 07 Trays 3_4 (wet).jpg	3 & 4	15.30	28.25	Wet, exposed 2 years
MH 07	MH 07 Trays 5_6 (wet).jpg	5 & 6	28.25	35.35	Wet, exposed 2 years
MH 07	MH 07 Trays 7_8 (wet).jpg	7 & 8	35.35	44.40	Wet, exposed 2 years
MH 07	MH 07 Trays 9_10 (wet).jpg	9 & 10	44.40	51.95	Wet, exposed 2 years
MH 07	MH 07 Trays 11_12 (wet).jpg	11 & 12	51.95	59.05	Wet, exposed 2 years
MH 07	MH 07 Trays 13_14 (wet).jpg	13 & 14	59.05	67.00	Wet, exposed 2 years
MH 07	MH 07 Trays 15_16 (wet).jpg	15 & 16	67.00	74.50	Wet, exposed 2 years
MH 07	MH 07 Trays 17_18 (wet).jpg	17 & 18	74.50	81.80	Wet, exposed 2 years
MH 07	MH 07 Trays 19_20 (wet).jpg	19 & 20	81.80	89.40	Wet, exposed 2 years
MH 07	MH 07 Trays 21_22 (wet).jpg	21 & 22	89.40	96.25	Wet, exposed 2 years
MH 07	MH 07 Tray 23 (wet).jpg	23	96.25	99.00	Wet, exposed 2 years

## MH08 Core assay samples

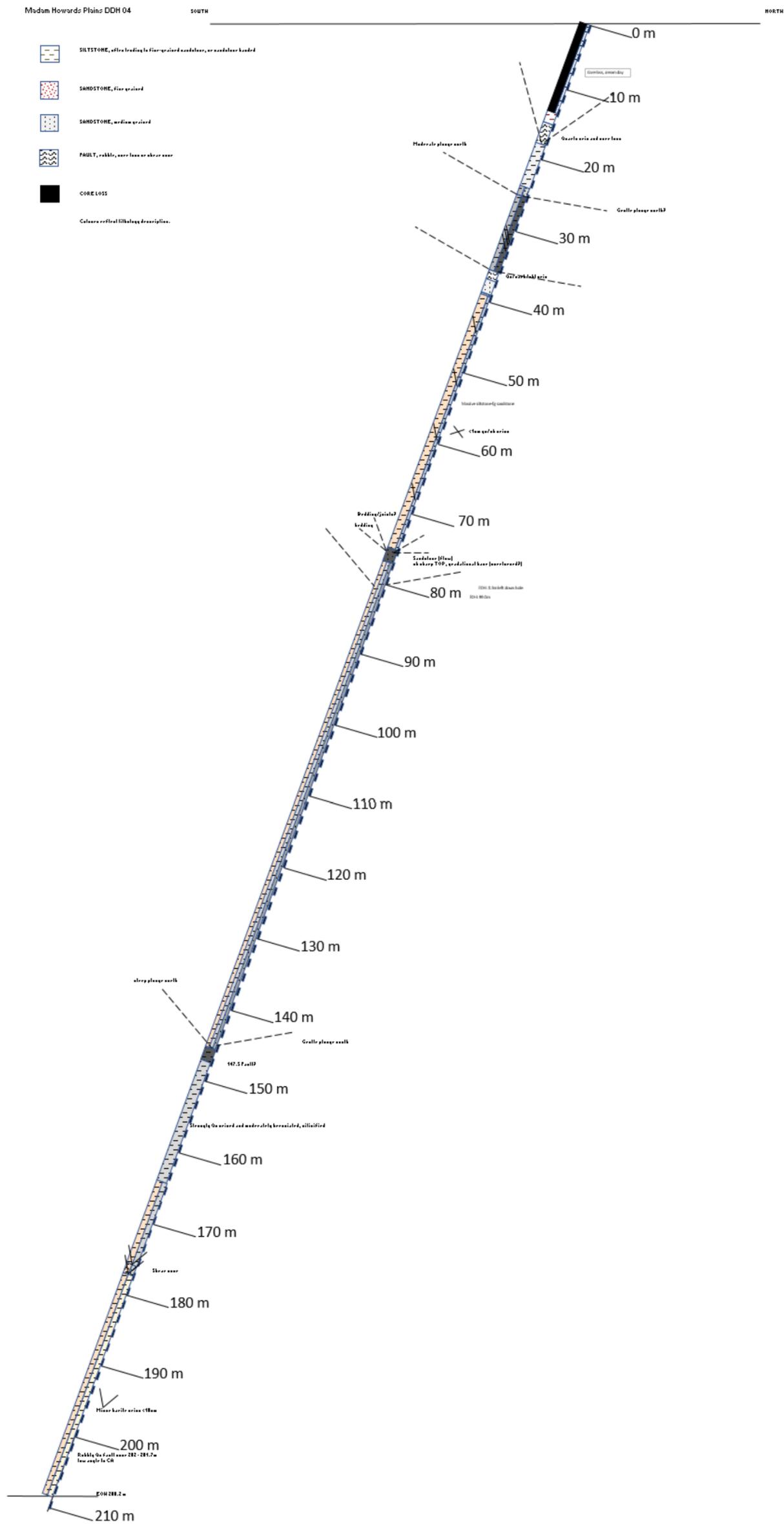
## MH08 Assay samples

Reason	Sample Id.	Top	Base	Thickness	Description	Au (ppm)
AAS Gold assay	MH8001	23.70	24.20	0.50	Contact of lim-stained vc with rhyolitic siltstone	
AAS Gold assay	MH8002	28.40	29.20	0.80	Vein in rhyolite Fe, Qz, siderite and black stain	
AAS Gold assay	MH8003	37.00	37.25	0.25	Fresh rhyolitic siltstone	
AAS Gold assay	MH8004	46.00	47.85	1.85	Sericitic bands in rhyolite siltstone	
AAS Gold assay	MH8005	53.30	53.55	0.25	Siltstone iron-stained in part	
AAS Gold assay	MH8006	56.70	58.50	1.80	top of mass flow	
AAS Gold assay	MH8007	58.50	60.80	2.30	Rhyolitic siltstone	
AAS Gold assay	MH8008	40.85	40.95	0.10	Lg cryst Qz vein, Si on fractures	
AAS Gold assay	MH8009	41.00	41.10	0.10	Lg cryst Qz vein, Si on fractures	
AAS Gold assay	MH8010	41.00	41.31	0.31	Qz and porphyry rubble in shear zone	
AAS Gold assay	MH8011	43.40	43.50	0.10	Qz rubble	
AAS Gold assay	MH8012	43.50	43.90	0.40	Vein and pyrite in porphyry	
AAS Gold assay	MH8013	43.90	44.00	0.10	Altered porphyry c 0.2% pyrite	

## MH08 Core photos index

## Madam Howards Plains DDH 08

Drill hole	Photo	Trays	From (m)	To (m)	Core condition
<b>Dry</b>					
MH 08	MH 08 Trays 1_2 (dry).jpg	1 & 2	0.00	21.80	Dry, exposed 2 years
MH 08	MH 08 Trays 3_4 (dry).jpg	3 & 4	21.80	29.20	Dry, exposed 2 years
MH 08	MH 08 Trays 5_6 (dry).jpg	5 & 6	29.20	36.30	Dry, exposed 2 years
MH 08	MH 08 Trays 7_8 (dry).jpg	7 & 8	36.30	43.50	Dry, exposed 2 years
MH 08	MH 08 Trays 9_10 (dry).jpg	9 & 10	43.50	50.50	Dry, exposed 2 years
MH 08	MH 08 Trays 11_12 (dry).jpg	11 & 12	50.50	57.60	Dry, exposed 2 years
MH 08	MH 08 Trays 13_14 (dry).jpg	13 & 14	57.60	64.00	Dry, exposed 2 years
MH 08	MH 08 Trays 15_16 (dry).jpg	15	64.00	68.30	Dry, exposed 2 years
<b>Wet</b>					
MH 08	MH 08 Trays 1_2 (wet).jpg	1 & 2	0	21.8	Wet, exposed 2 years
MH 08	MH 08 Trays 3_4 (wet).jpg	3 & 4	21.8	29.2	Wet, exposed 2 years
MH 08	MH 08 Trays 5_6 (wet).jpg	5 & 6	29.2	36.3	Wet, exposed 2 years
MH 08	MH 08 Trays 7_8 (wet).jpg	7 & 8	36.3	43.5	Wet, exposed 2 years
MH 08	MH 08 Trays 9_10 (wet).jpg	9 & 10	43.5	50.5	Wet, exposed 2 years
MH 08	MH 08 Trays 11_12 (wet).jpg	11 & 12	50.5	57.6	Wet, exposed 2 years
MH 08	MH 08 Trays 13_14 (wet).jpg	13 & 14	57.6	64	Wet, exposed 2 years
MH 08	MH 08 Trays 15_16 (wet).jpg	15	64	68.3	Wet, exposed 2 years



Madam Howards Plains DDH 05

