EL28/1988
Mt Zeehan

Final Drilling Project Report for Denali EDGI Holes

E Haley and J Denholm

Avebury Nickel Mine

Tenement Holder: Allegiance Mining Pty Ltd (Voluntary Administrators Appointed, Receivers and Managers Appointed)

Tenement Operator: Avebury (Operating) Pty Ltd (Voluntary Administrators Appointed, Receivers and Managers Appointed)

Address: PO Box 62 Zeehan TAS AUS 7469

Datum for all listed coordinates: GDA94

Date Published: 04/01/2024

EXECUTIVE SUMMARY

Avebury (Operating) Pty Ltd (Avebury) was awarded an Exploration Drilling Co-Funding grants totalling up to $50,000 under the Tasmanian Government's Exploration Drilling Grant Initiative (EDGI) Round 7, in September 2022. The grant was awarded to Avebury to undertake the Denali exploration drilling project, testing the Denali exploration prospect near Trial Harbour on EL28/1988, 5km west of Avebury mine.

The proposed project was for three diamond drill holes, totalling 600m (approximately 200m each). After extensive stakeholder negotiation and site preparation, drilling of the three holes was undertaken between April and June 2023.

The first hole, TH008 was drilled on an azimuth of 018° true north (T), through highly deformed serpentised ultramafics, and terminated at 254.7m in hornfelsed volcaniclastics.

The rig was then turned eastward to drill TH009 from the same pad as TH008 on an azimuth of 104T°. The hole was drilled into serpentised ultramafics, through hornfelsed volcaniclastics, and terminated at a target depth of 200.5m in clastic sediments. Numerous faults were encountered at various intervals.

The third hole, TH010 was drilled 50m to the north of TH009 and TH008, into hornfelsed volcanics with numerous small zones of serpentinised ultramafic and small igneous dykes. It was terminated at 230.3m in clastic sediments. Although not highly prospective for nickel, TH010 contains various other base metals and valuable data in regard to the genesis and modelling of the Avebury Deposit (5 km to the north west) and will continue to be interrogated by Avebury's PhD student as part of the Australian Centre for Ore Deposit and Earth Sciences (CODES) critical metals research collaboration.

Selected samples from all three holes were sent for assay to two different laboratories. TH008 and TH009 were analysed for using a four acid digest a. TH010 final results returned in December 2023. All three holes are cased with PVC for the option of future downhole geophysical surveys however going forward, Avebury plans to focus on targets closer to the mine. The program was successful in further defining the western extents of the Avebury style mineralisation.

TABLE OF CONTENTS

1 INTRODUCTION 4
Exploration philosophy and drill program objectives 4
Location and Access 5
Land Tenure 5
..... 6
Geological Setting 7
2 PREVIOUS WORKS 9
3 WORKS COMPLETED 10
Drilling 10
Logging and Photography 11
Sampling and Analysis 12
Surveying 12
4 RESULTS 13
Lithology 14
Structure 17
Geochemistry 20
6 EXPENDITURE 20
6 ENVIRONMENTAL MANAGEMENT 20
7 RECOMMENDATIONS FOR FURTHER WORKS 22
8 REFERENCES 23
9 LIST OF FILES ACCOMPANYING THIS REPORT 23

TABLE OF FIGURES

Figure 1. Location of EL28/1988– image from MRT map. 6
Figure 2. Location of Denali Prospect within EL28/1988. 8
Figure 3. Previous drilling with significant intersections and mapped contacts. 9
Figure 4. Location of Denali drill holes and traces with mapped surface contacts. 11
Figure 5. Cross section of Denali traces showing lithological contacts. 13
Figure 6. Approximate total sulphide abundances of Denali holes. 15
Figure 7. Percentage Magnetite in Denali drillholes. 16
Figure 8. Plot of poles to planes of Denali veins. 17
Figure 9. Stereographic plot of fault planes and poles. 18
Figure 10.Parasidic folding in Crimson Creek Formation volcaniclastics. 19
Figure 11. Repaired four-wheel drive track and drill pad levelled with sumps filled. 21

1 INTRODUCTION

Exploration philosophy and drill program objectives

The primary objective of Mallee Resources (as primary operant of Avebury's tenements) is to add to their nickel inventories at the Avebury Nickel Mine.

A three hole, 600m drilling program was proposed in the Denali prospect area located approximately 5km west of Avebury mine. Previous drilling between 2006 and 2011 by Allegiance and MMG identified skarn altered serpentinite style nickel mineralisation, similar to that of Avebury, around the northern contact of the Trial Harbor Ultramafic body which required follow up drilling. The best intercept was 3m @ 0.79% Ni from 61m in drill hole A223A (Callaghan, 2008).

The aim of this program was to extend the known extents of this nickel mineralisation and compare it with Avebury. A secondary aim was to follow up serpentinite dyke intersections in the hanging wall rocks just south of the contact between the host volcaniclastics and the Oonah formation. This contact has regional geological significance as it suggests overthrusting of the Oonah Formation onto younger rocks. One drillhole was planned to intersect this contact at depth (TH010 at 180m). Further investigation of this hole is planned to be undertaken by CODES PhD candidate Jose Barillas Diaz (Characterisation of the Avebury nickel deposits, Zeehan, Western Tasmania) as part of the Environmentally Sustainable Production of Critical Minerals Project, funded by the Australian Government's Regional Research Collaboration Program (Critical Metals Collaboration).

Location and Access

EL28/1988 is a Category 1 Exploration License, held by Allegiance Mining Pty Ltd, which in 2022 was acquired by Mallee Resources, owner of the Avebury Nickel Mine (operating as Avebury (operating) Pty Ltd). The lease currently covers 25 square kilometres and is located approximately 9 kilometres southwest of Zeehan. The main body of the lease (including the Denali Prospect) is southwest of Avebury, but a narrow strip also exists to the north of the Avebury mine lease (figure 1). The Avebury Mine leases (now 4M/2022) were excised from EL28/1988 and adjacent Allegiance exploration licences in 2003 and 2007, with the surrounding licences (EL22/1997 and EL37/2003) amalgamated into EL28/1988 in 2013.

Access to the Denali Prospect area is via a four-wheel drive track off Ernies Drive, which branches off the Trial Harbour Road at the southern end of the township. This track services the telecommunications towers at the top of the hill overlooking the Trial township, approximately 200m before the drill sites. Prior to drilling, Avebury liaised with Telstra to upgrade the road, including covering exposed underground cables. Alternative access to the drill sites is via a lesser (unmaintained) track which runs 2.5 km northeast to the Trial Harbour Road. This route is a popular thoroughfare for trail riding and four-wheel driving. Both Denali drill sites are adjacent to this track.

Land Tenure

The tenement is predominantly Future Potential Production Forest (Crown), with a belt of Regional Reserve along the coastline. The area is prospective for Avebury style nickel mineralization, which is the focus of the company. However, it also contains known tin deposits. Figure 1 shows the location of the tenement in Tasmania, in relation to the Avebury Mine Lease.

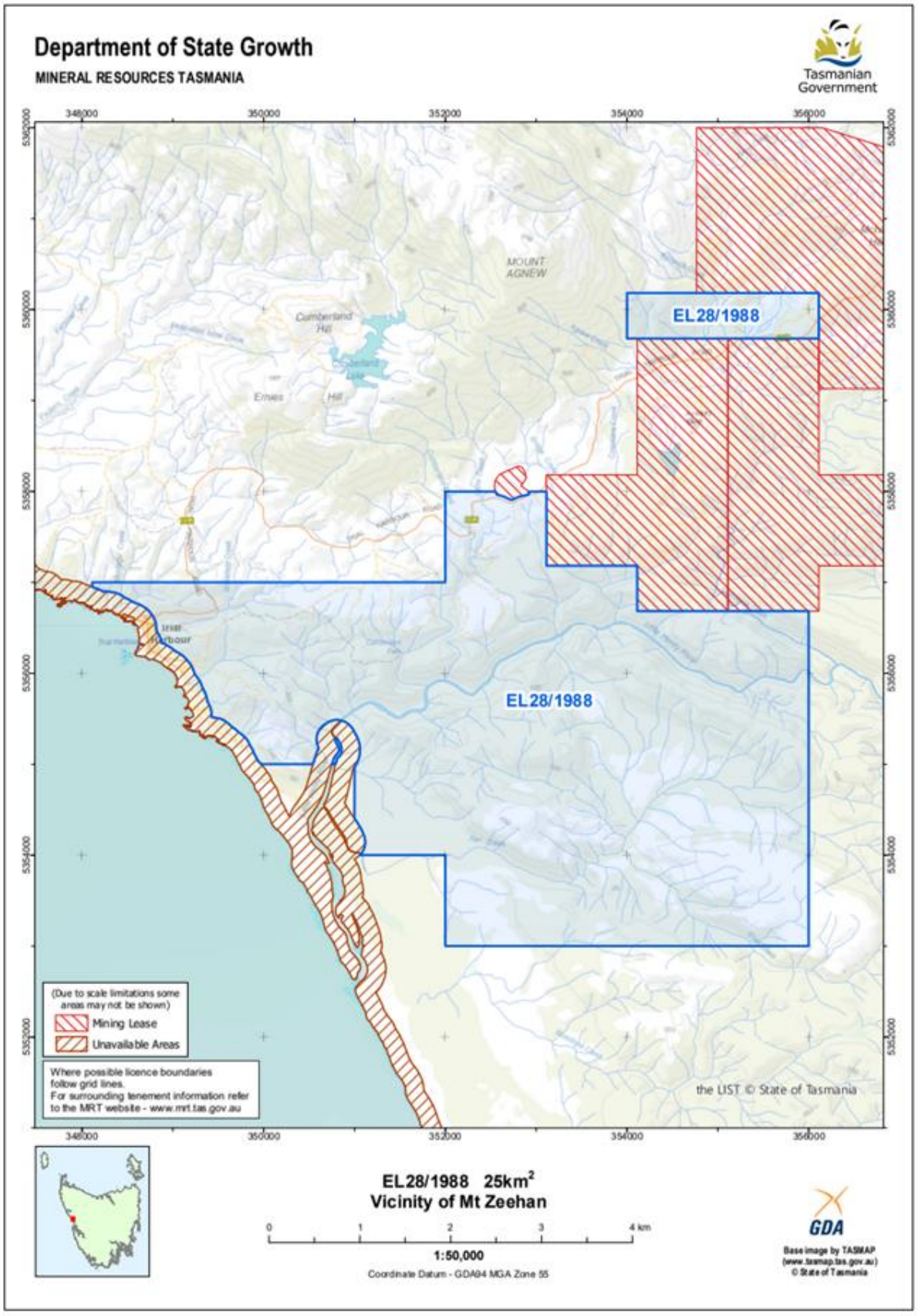

Figure 1. Location of EL28/1988– image from MRT map.

Geological Setting

MacDonald (2019) describes Trial Harbour Block of EL28/1988 (figure 2, over), including the vicinity of the Denali Prospect, as follows:

“The Trial Harbour block lies immediately west of Avebury and is essentially a continuation of the geology at Avebury with a west-northwest elongate ultramafic body enclosed in Crimson Creek Sediments outcropping over a strike length of 2.7km. Magnetics suggests the body continues another 4km’s beneath cover.

“The Crimson Creek Formation in the Trial Harbour area is generally similar to that at Avebury, although finer sedimentary units are more common in the former area. The greater abundance of finer units in conjunction with rare conglomerates suggest a more distal to source and deeper basinal deposition environment was present at Trial Harbour, compared with Avebury. The ultramafics at Trial Harbour are similar to those at Avebury, although they are more widespread and thicker.” (Reid, 2004).

The ultramafic intrusive is Neoproterozoic in age (640-570ma) and probably formed in oceanic crust.

Along the northern edge of EL28/1988 the Crimson Creek/ultramafic block is overlain by thrust emplaced Proterozoic Oonah Formation sediments. To the north of this is the outcropping margin of the Heemskirk Granite.

The Heemskirk Granite is Devonian in age (400ma) and has (1) partially metasomatised the ultramafic host rock to a skarn assemblage, particularly around the margin, and (2) variably added granophile elements such as arsenic, bismuth, lead, antimony and tin to the ore. The granite outcrops less than 1 km to the north and west of the Denali drill sites, and passes beneath the Avebury deposit (5km north west) at moderate depth.

This thrust fault obscures the northwesternmost part of the ultramafic body. Apart from this the margins of the body outcrops as far east as Burbank beyond which aeromagnetics suggests that it continues under cover.

The northern margin of the ultramafic is mapped as in-situ by all government and industry geologists i.e. Burton (1972) for EZ, Parkinson (1993) for CRAE and Reid (2001) for Allegiance. It has been intersected in drill holes A223/223A and A224 in the western part of this northern margin and is best described as interfingering with intersections of variably skarned serpentinite interbedded with greywacke sediments.”

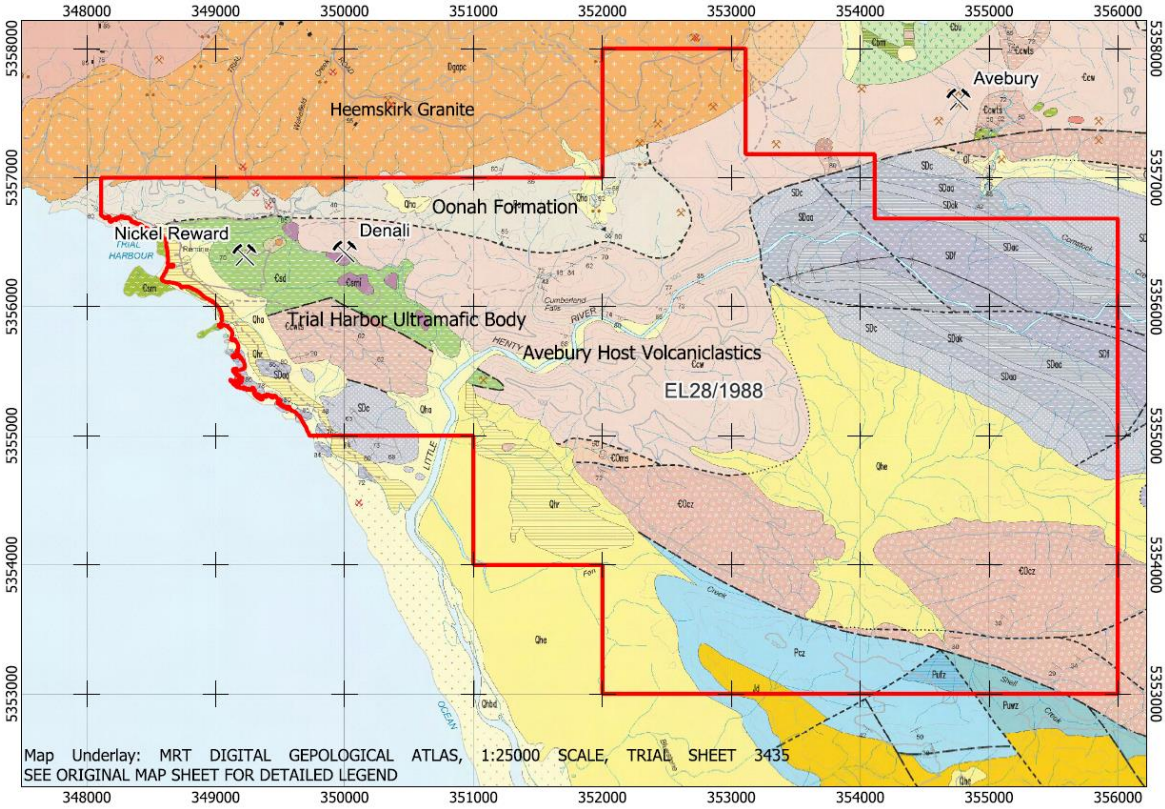

Figure 2. Location of Denali Prospect within EL28/1988, on inferred basement geology.

2 PREVIOUS WORKS

Previous works have including various drill programs and surface mapping. Nearby drill holes and mapped contacts are shown in figure 3, below.

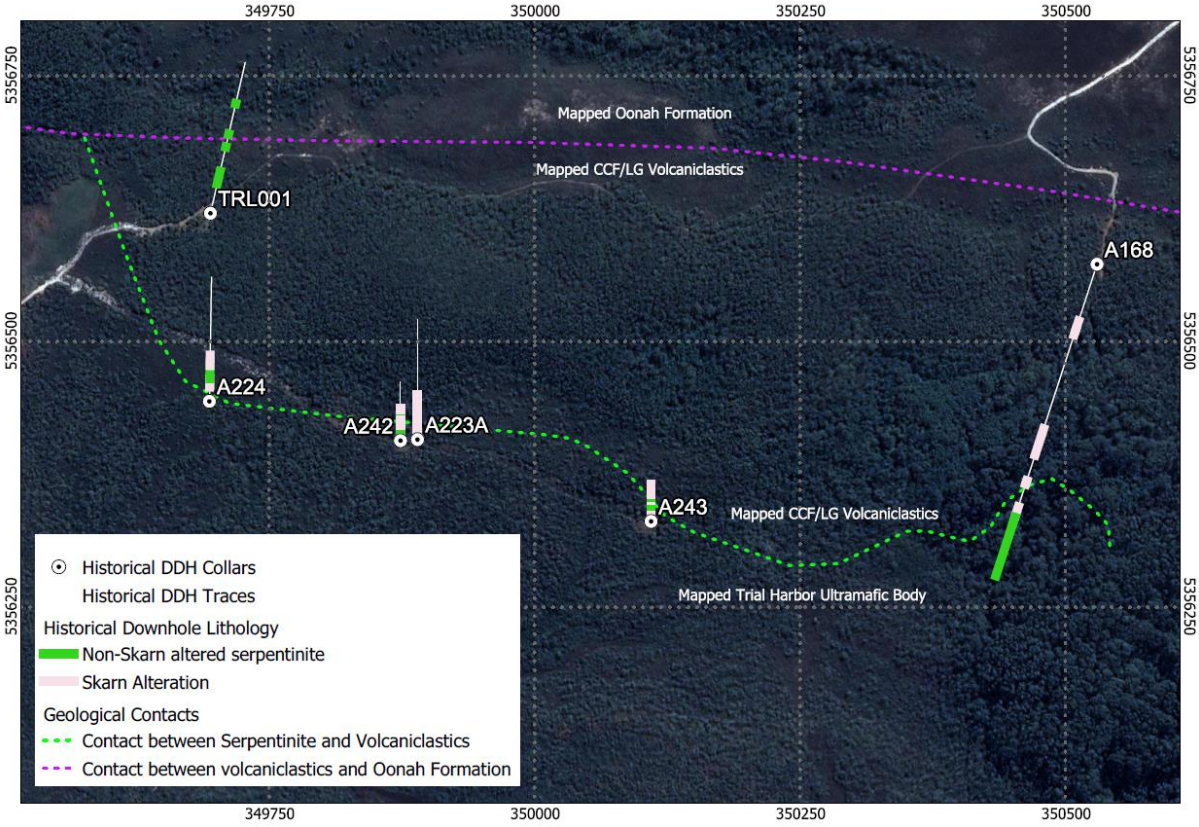

Figure 3. Previous drilling with significant intersections, and mapped contacts.

3 WORKS COMPLETED

Drilling

Edrill was awarded the contract for the Denali Program. On 5th April ED0047, an LF-70 track assisted rig was mobilised to site. Drilling commenced on the 5th of April, with one crew of driller and offsider working day shift to complete the three holes. Some delays were experienced due to extreme weather events and rig breakdown. Holes were started with HQ and HWT casing reamed to solid ground, then NQ2 tails to target depth. Core was oriented, with bottom of hole marked on each run by the driller's offsider. All holes exceeded target depth and were terminated in the respective target lithology. At completion, all holes were cased with 40mm PVC, for future downhole geophysics. A dummy probe was run to the bottom of each hole to confirm the successful PVC casing.

Drilling was completed on 6th June, the rig demobilised, cleaned on site and sprayed with Phytoclean and all material removed from site. Drill core was transported by road freight to MRT's Mornington Core library on July 27th, 2023.

All three collars were within 25m of as planned, with azimuths for TH009 and TH010 as planned, and lift and rotation less than 1° per 30m. TH008 was drilled on an azimuth of 27° north of originally planned, and extended 50m to reach the target lithology. The table below is a summary of the drill holes as planned and as drilled (note: PH2 was drilled first and named TH008); a total of 685.5m was drilled. Figure 4 shows the collar location and trace of the three holes. The surveyed collar locations are shown in Appendix A, and the downhole surveys are in Appendix B.

Planned:

BH_ID	Easting	Northing	Azi_T	Azi_Mag	Dip	Depth	RL	Datum
PH1	349555	5356560	100	086	-60	200	100	GDA94
PH2	349555	5356560	45	031	-60	200	100	GDA94
PH3	349643	5356606	14	000	-50	200	100	GDA94

Drilled:

BH_ID	Easting	Northing	Azi_T	Azi_Mag	Dip	Depth	RL	Datum
TH008	349567	5356546	18	004	-65	254.7	99	GDA94
TH009	349569	5356549	104	090	-65	200.5	99	GDA94
TH010	349626	5356603	14	000	-50	230.3	100	GDA94

Figure 4. Location of Denali drill holes and traces, with mapped surface contacts.

Logging and Photography

All three holes were geologically logged in full for lithology, alteration, mineralisation, significant structures and core recovery using in-house logging codes. The data was checked and verified prior to being entered into Avebury's new master database.

Core was transported to Avebury's Zeehan core shed for logging. Primary data was collected digitally using a field laptop computer. Core selected for assay was taken to Avebury mine site for cutting and sampling.

Logs are provided in Appendix C, and logging codes are provided in Appendix G. Geochemistry of TH010 as determined by pXRF at 1m intervals is provided in Appendix D. Laboratory assay results including QA/QC are provided in digital appendixes 12 to 15. These have been separated by assay method / laboratory.

The drill core was photographed both dry and wet, after markup and before cutting (full core). Photos of core trays are presented in Appendix F.

Sampling and Analysis

The three holes were selectively sampled for assay, based on estimated mineral abundance and alteration style. Core was half cut by Avebury core technicians. 51 TH008 samples, which was all magnetite rich serpentenised ultramafic and contained fibrous material, was sent to SGS in Perth for full suite ICP-OES analysis. Results are contained in appendices 14 and 15, and discussed in section 4, below. TH009 also contained fibrous material and was prepared in SGS's new laboratory at Avebury Mine site. 22 samples were sent for assay and results are also contained in appendices 14 and 15 and discussed in section 4.

The mineralisation of TH010 was vastly different from the previous two holes, being almost wholly in hornfels and skarn, as opposed to serpentinised ultramafic. TH010 was pXRF'd by Avebury core technicians at 1m intervals from 88m to 200m, and various other spots of interest. Results are shown in Appendix D, and discussed in section 4, below. QA/QC for the pXRF included blanks and duplicate readings after each 25 samples. QA/QC is shown in appendix E. Although not considered highly prospective for Avebury style Nickel mineralisation, TH010 can provide valuable insight into the geneses of the orebody, and thus samples from TH010 were selected by Avebury's UTAS PhD student to be analysed at ALS as part of the critical minerals' collaboration. The 22 samples from TH010 were analysed by ICP-AES for 48 elements, as well as Pt, Pd and Au by fire assay. Further samples were also selected for laser ablation (LA) ICP at UTAS laboratories.

A total of 95 samples were selected for assay.

Surveying

Collar coordinates (eastings and northings) were initially determined with handheld GPS. and accurate to within ± 20m. These were adjusted from the original planned locations by the drilling coordinator as necessary to suit site conditions and access requirements. Due to the highly magnetic nature of the area, the azimuth and dip of the TH009 and TH010 was determined using a true north seeking azimuth aligner tool, after TH008 (aligned by traditional compass / stringline methods) was found to be 30° off planned. Abel Tasman would be proud.

The holes were surveyed with a true north seeking gyro instrument at 30 metre intervals during drilling. For TH009 and TH010, full hole surveys were completed at end of hole, with measurements taken at 5m intervals.

After completion of the drill program, coordinates and relative levels for all three collar locations were determined by Avebury Surveyors using differential GPS, accurate to ± 0.005m. The downhole surveys are provided in Appendix B.

4 RESULTS

The lithology, geochemistry and measured structures of the three Denali drill holes are contained in the digital appendices to this report. Figure 5 (below) shows a visualization of the three holes (and nearby TRL001) in 3D space, with topography and mapped surface geology.

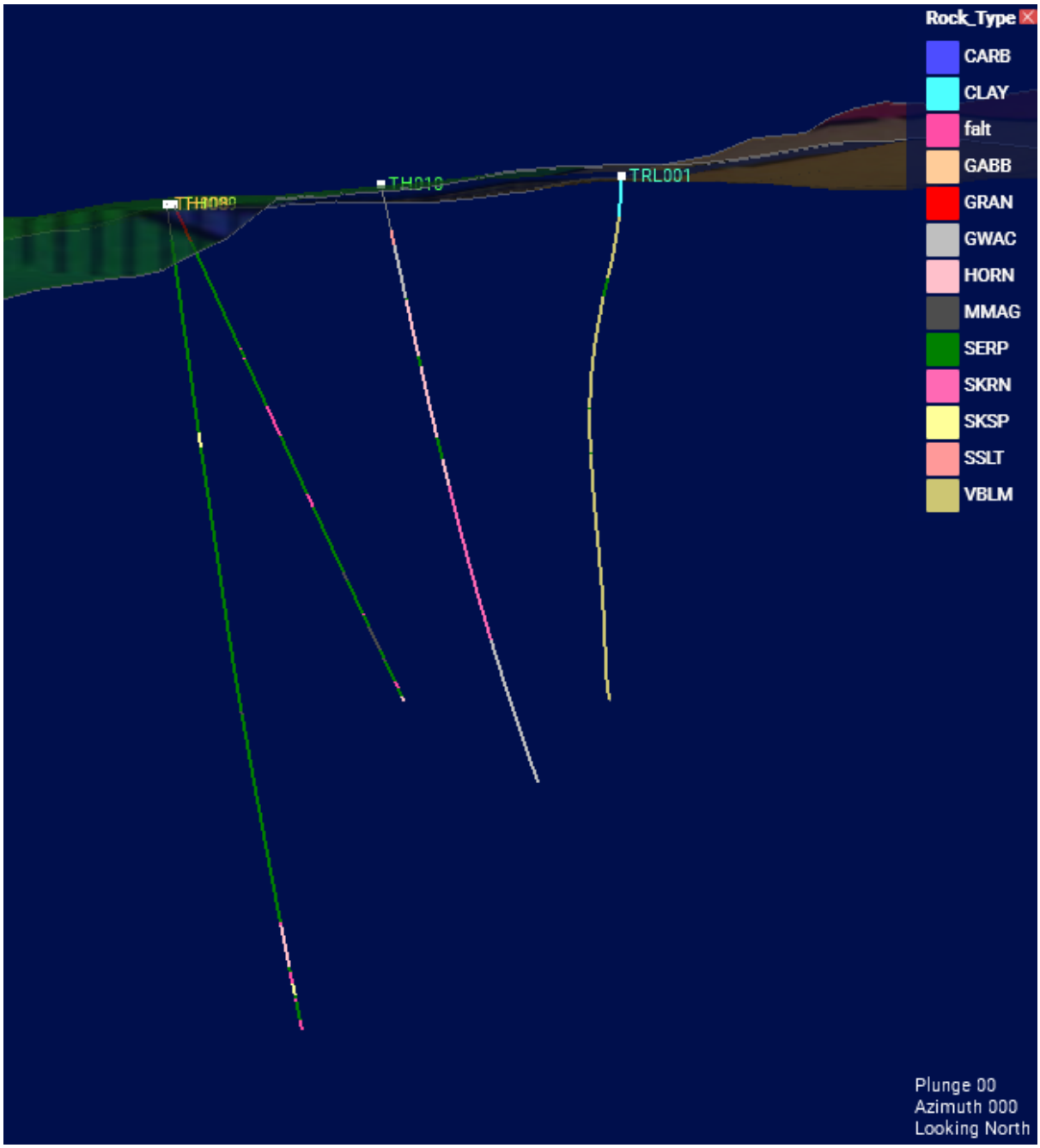

Figure 5. Cross section of Denali traces showing lithological contacts.

Note that the VBLM (medium grained, basaltic, lithic volcaniclastic) in TRL001 (logged in 2011) may be the same unit as the GWAC logged in TH010 nearby.

Lithology

Both the lithology and mineralisation of TH010 was markedly different from TH008 and TH009, although not unexpected. Newnham (2002) states that Exploration of EL 28/1988 was initially directed towards the search for zinc deposits. The area was considered prospective for deposits hosted by Ordovician limestones (Irish style deposits) and Precambrian sediments (Century style deposits). TH010 most notably intersected high sphalerite, chalcopyrite (with pyrrhotite and pyrite, and minor pentlandite) in garnet pyroxene skarn from 90 – 100m, with other small intersects in skarn and serpentinised ultramafics further down. Figure 6 shows a visualisation of the total percentage (visual estimate and based on pXRF) of sulphides in each hole. Generally, in Avebury core sulphide contents are low, with up to about 3% pentlandite and associated pyrrhotite and magnetite in both serpentinised ultramafic and ultramafic skarn. However, in TH010 the percentage of chalcopyrite and sphalerite was significant, and these values have been added to pentlandite and pyrrhotite to produce the sulphide abundances shown in figure 6 (below).

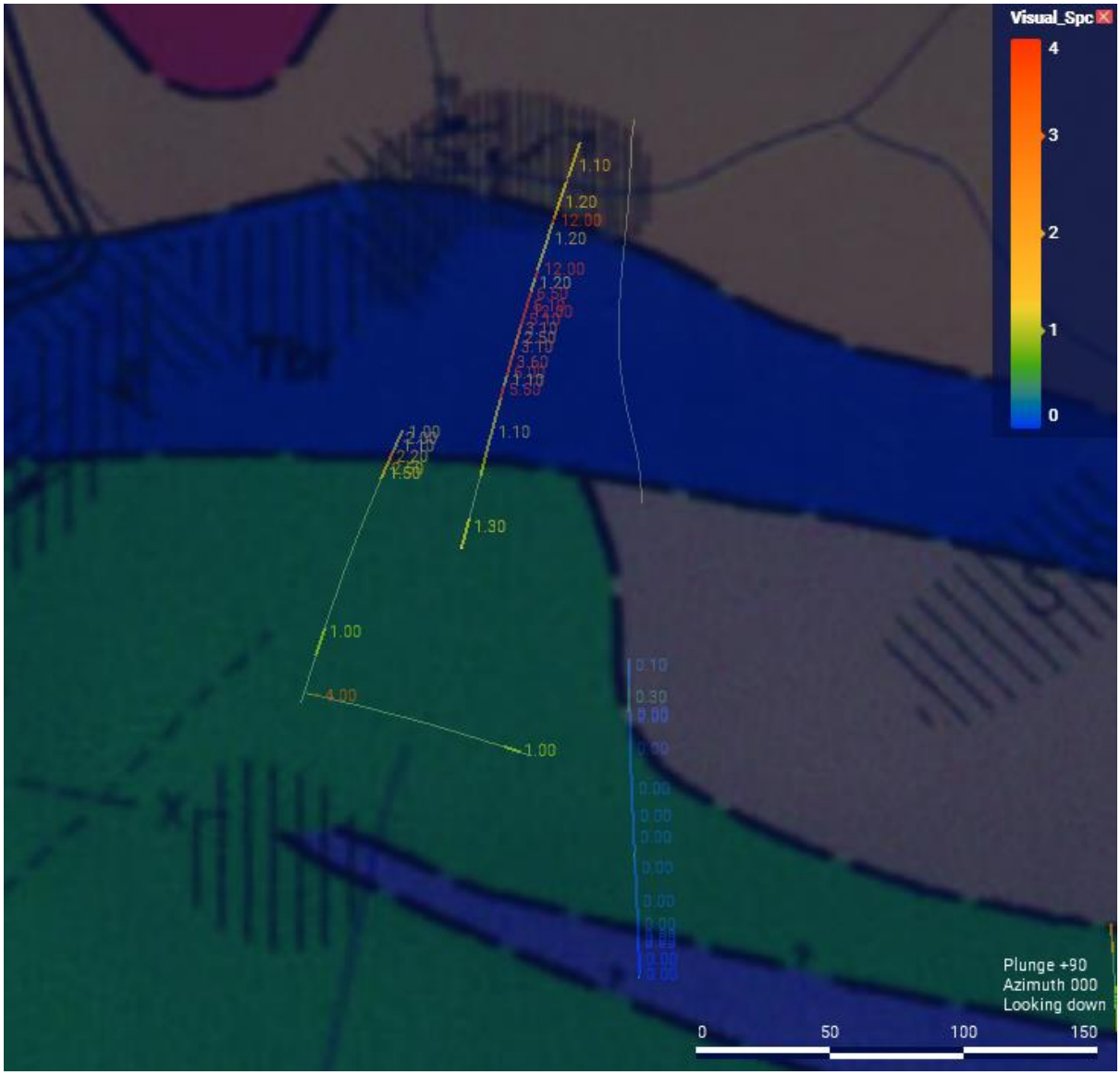

Figure 6. Approximate total sulphide abundances of Denali holes.

Figure 7 is a visualisation of percentage magnetite across the three holes. TH008 and TH009 both contained up to 10m @ 40% magnetite (visual estimates confirmed with pXRF). pXRF also indicated high nickel content (up 1m @ 2.8%) within the zones of high magnetite. These areas did not contain visual sulphides, and it is hypothesized that some of the magnetite is nickel bearing, where Ni replaces Fe ions in the magnetite. Assay results are discussed in section 5.

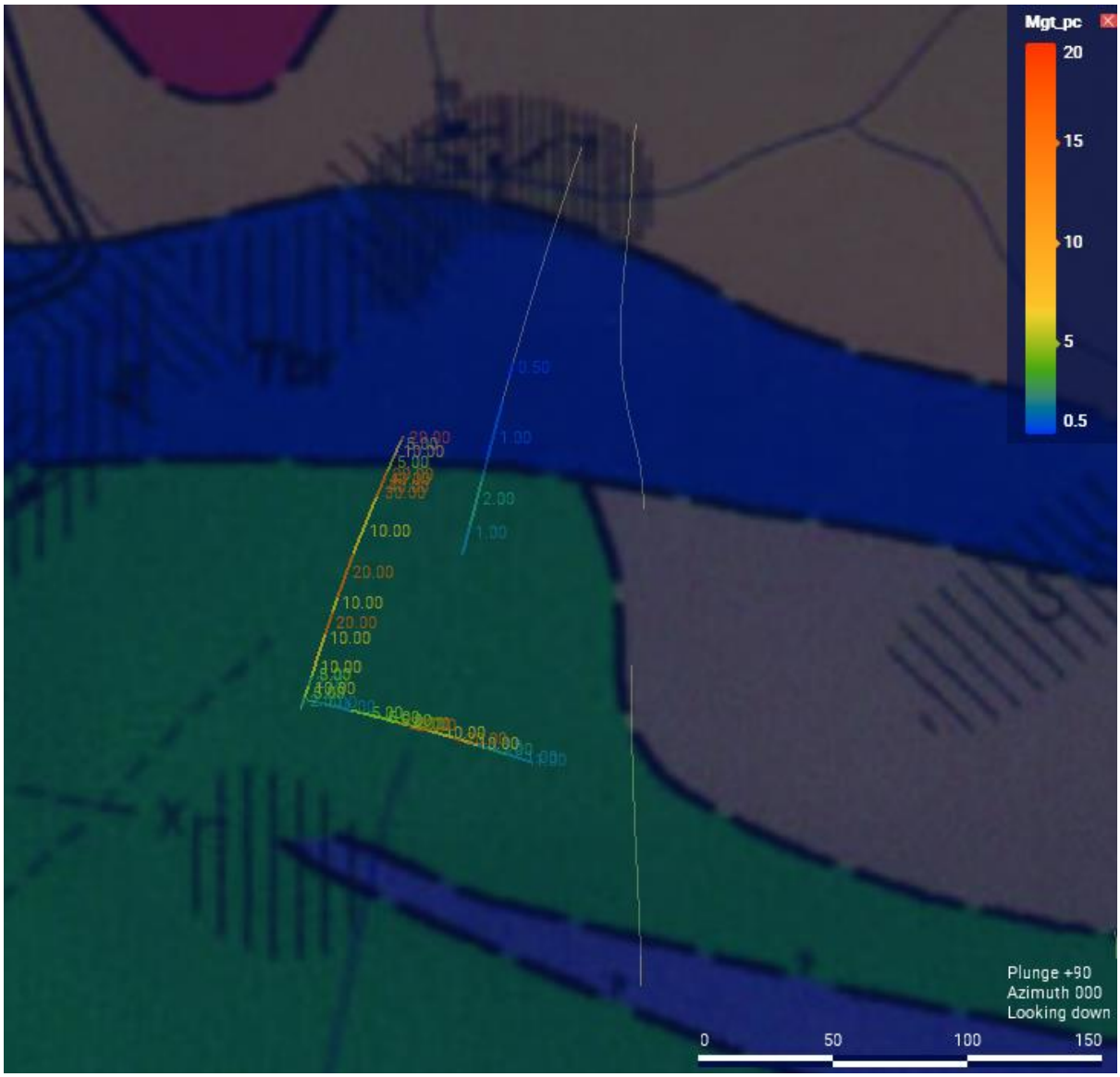

Figure 7. Percentage Magnetite in Denali Drillholes.

Structure

Structural data was collected from all three oriented holes, with faults, veins, contacts and bedding measured.

Lower hemisphere equal area stereographic projections of poles to the planes of 120 representative vein alpha and beta measurements do not show strong correlation (figure 8). This is indicative of the variable metasomatism associated with numerous stages of the Devonian granite intrusion. Further examination of fluid flow and timing will be undertaken by CODES PhD candidate Jose Barillas Diaz as part of the Critical Metals Collaboration project on the Characterisation of the Avebury Nickel Deposits in the latter half of 2023.

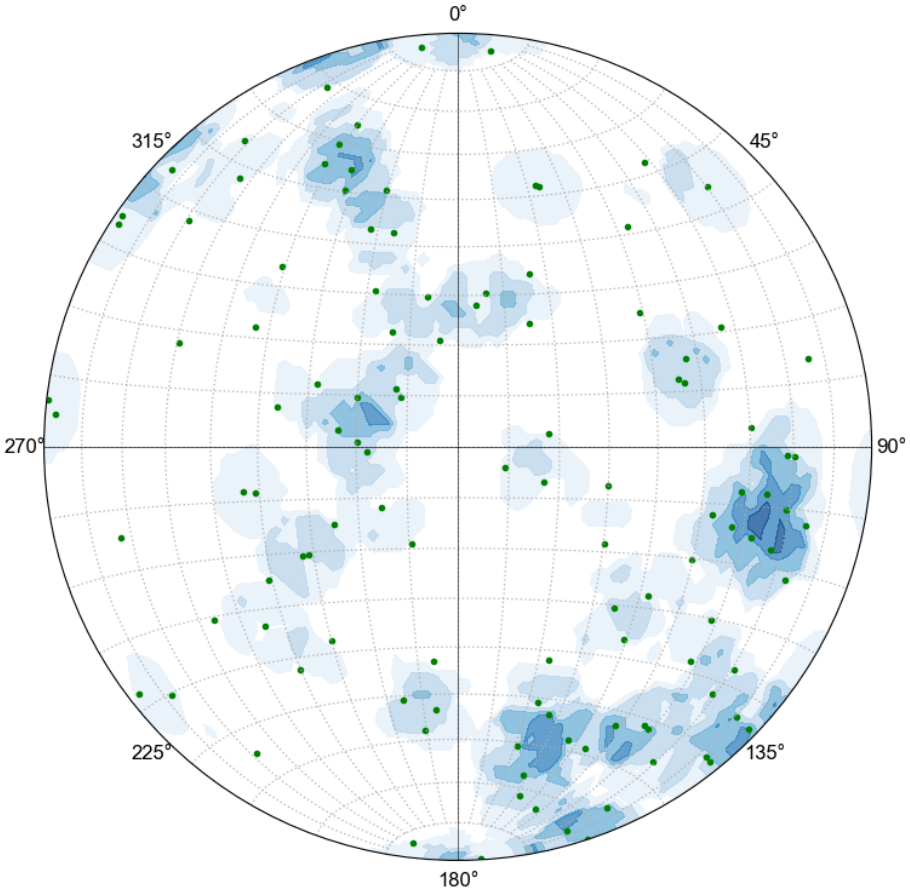

Figure 8. Plot of poles to planes of Denali veins.

Plotting of fault data from all three holes indicates at least three major deformation events. Figure 9 shows planes of fault data from the three holes, and poles with Schmidt contouring.

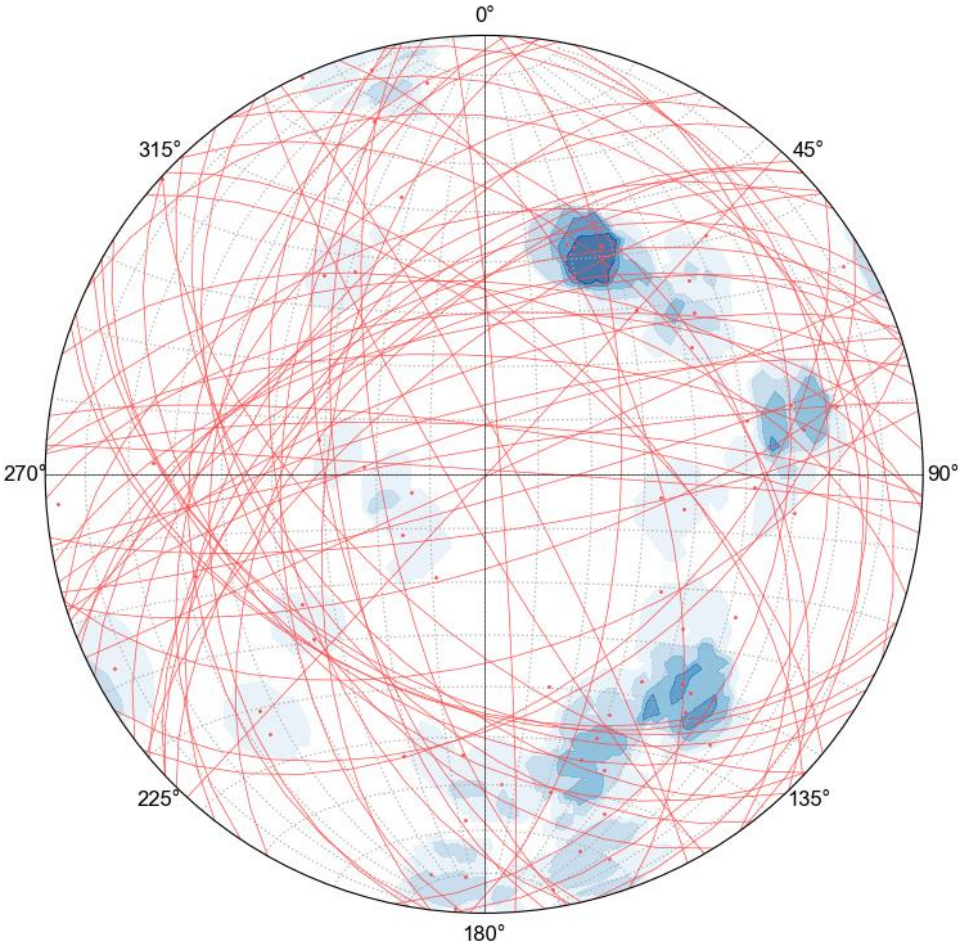

Figure 9. Stereographic plot of fault planes and poles.

Some well-preserved small-scale structures are visible in the weakly metamorphosed sedimentary units at the bottom of TH010, such as the parasitic “S” fold and adjacent foliation in figure 10, below.

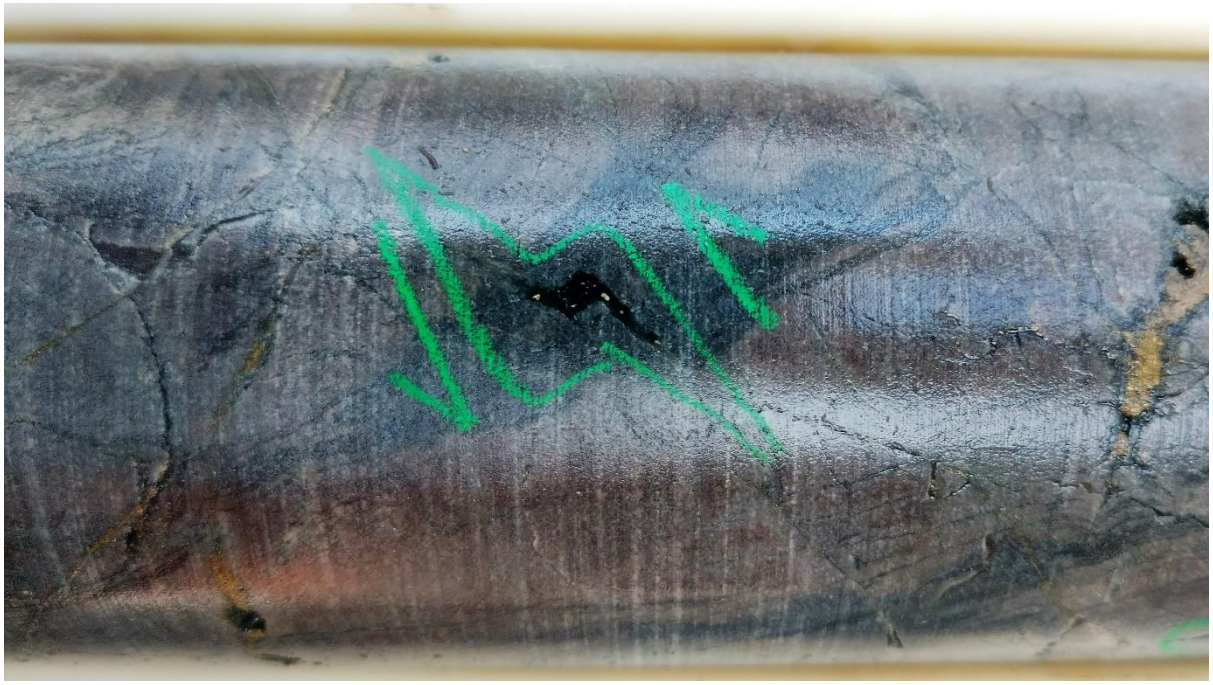

Figure 10.Parasidic folding of Crimson Creek Formation volcaniclastics, with shear directions shown in green.

Appendix 6 contains details of structures, and measurements in oriented core.

Geochemistry

Final assay results were returned in December 2023. TH008 returned a nickel grade of 5m @ 0.43% from 205 – 210m depth. 0.4% is considered cutoff grade at Avebury Nickel mine, however this isolated pocket of low grade is consistent with background Ni in the serpentite in the area, and not considered worthy of follow up at this stage, on account of the depth and location.

TH008 also returned slightly elevated zinc numbers throughout the hole, the highest intercept being 7m @ 0.54% from 236 to 243m, with a peak of 0.765% Zn at 239m.

There were no significant intercepts in TH009, in fact Ni was below the expected background level of the serpentinite. Zn was slightly elevated (0.3%) in the skarn below the serpentinite (183m – 185m), likely as sphalerite associated with pyrite and pyrrhotite in minor stringer veins.

TH010 yielded no significant base metal or platinum group element intercepts, but will be important for modelling fluid flows in the region.

6 EXPENDITURE

A total of $180,277 was spend on the Denali drilling program. A spreadsheet showing breakdown off costs, plods and receipts have been submitted to MRT separately to this report. as broken down in the table below. $150,875 was spent directly on drilling.

Total Drilling Costs	Direct Drilling Costs	Eligible EDGI Amount
$186,227	$154, 875	$50,000

6 ENVIRONMENTAL MANAGEMENT

Site preparation and operations were undertaken in accordance with the Mineral Exploration Code of Practice (MECoP), and exploration work permit WPA23/1.

After drilling was complete, sumps at the two drill sites were backfilled, and the ground levelled close to its original form. Ruts in the access road (four-wheel drive track) were filled in using coarse material (surface sand and gravel) that was stockpiled from the cleared drill sites. Figure 11 shows the improved access road, with the remediated lower drill site to the side.

Figure 11. Repaired four-wheel drive track and drill pad levelled with sumps filled. (Note access to the drill pad remains open for DHEM.)

7 RECOMMENDATIONS FOR FURTHER WORKS

The three Denali holes are cased with 50mm PVC casing and the collar locations marked and access maintained for any potential downhole geophysics in the future. Due to the high magnetite content of the entire TH008 and TH009 holes and surrounding area, DHEM may not yield useful results for these holes. DHEM for TH010 may provide valuable additional data and this option will be considered with future programs.

The three holes, particularly TH010 are of interest to UTAS PhD student José Luis Barillas Díaz as part of the CODES Critical Metals Project “Characterisation of the Avebury nickel deposits, Zeehan, Western Tasmania”. including analysing silica content and hydration to plot fluid flows and conducting LA-ICP-MS on selected samples.

It is recommended that in the future all Averbury greenfield exploration holes, such as the three in the Denali drill program, are assayed for a full suite of elements, including pathfinder elements, so that detailed vectoring analysis can be undertaken, and near misses better identified.

From an operational perspective, Avebury is satisfied with the data obtained from this program and plans to focus resources on targets closer to the Mine in the future. Numerous targets have been identified with recent reinterpretation of vertical time-domain electromagnetics (VTEM). A detailed airborne gravity gradiometry survey is planned for all Avebury’s tenements next year. This will cover the Denali Prospect and surrounding area, as well as further refining the VTEM targets closer to the mine.

8 REFERENCES

Callaghan, T., 2011, EL28/1988 Zeehan, Annual Report to December 2008. OZ Minerals.

Denholm, J., 2022, EL28/1988 Mount Zeehan, Annual Report 2021-22. Avebury Nickel Mine.

MacDonald, G., 2019, Dundas Mining Pty Ltd Annual Report on Exploration EL 28/1988 “Mount Zeehan” Dec. 2018 to Dec. 2019.

McGilvray, T. and Denwer, K, 2011, Annual Report for the period ending December 2011. Prepared for MMG.

Newnham, L. A., 2002, Zeehan Nickel Project Annual Report for Period Ending October 2002, prepared for Allegiance Mining NL.

9 LIST OF FILES ACCOMPANYING THIS REPORT

Description	Filename	File format
Report *(this file)*	EL281988_202401_01_Report.pdf	pdf
Surface Locations	EL281988_202308_02_SL_1.xls	xls
Downhole Direction Survey	EL281988_202308_03_DS_1.xls	xls
Downhole Lithology	EL281988_202308_04_DL_1.xls	xls
Downhole Geochemistry	EL281988_202308_05_DG_1.xls	xls
Quality Assurance Quality Control	EL281988_202308_06_QAQC_1.xls	xls
Downhole Structure	EL281988_202308_07_DL_1.xls	xls
Avebury Logging Codes	EL281988_202308_08_Lithologycodes	xls
File Listing *(this list)*	EL281988_202308_09_FileListing	xls
Core Photographs (Index)	EL281988_202308_10_CorePhotoIndexFile	xls
Core Photographs (zipped jpegs)	EL281988_202308_11CorePhotos	zip
Downhole Geochemistry (2)	EL281988_202401_12_DG_1.xls	xls
Quality Assurance Quality Control (2)	EL281988_202401_13_QAQC_1.xls	xls
Downhole Geochemistry (3)	EL281988_202401_14_DG_1.xls	xls
Quality Assurance Quality Control (3)	EL281988_202401_15_QAQC_1.xls	xls