

## **Grange Resources Ltd. EL08/2014**

### **5411500mN Cut Line Investigation**

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### **Introduction**

Following is a succinct report on findings of line 5411500mN field mapping. The primary objective of field work was to increase geological knowledge within EL08/2014, extending mapping north of MRT's recently produced Savage River 1:25,000 scale geological map sheet (Cumming et al., 2019). Data generated aimed to duplicate MRT's geological mapping codes, allowing potential incorporation in MRT's next Donaldson map sheet.

Mapping aimed to provide a broad overview and was undertaken over three days in February 2020. Priority was investigating a 4.2km long E-W grid line (5411500mN) and a traverse up McAuliffe Creek, with economic geology considered via investigation of an aeromagnetic anomaly in the EL's east. Whilst not being a key focus, some magnetite potential was established. Further exploration considering IOCG models is warranted near this anomaly and the proximal Specimen Reef Au Mine. Limited rock chip samples were collected for reference and/or select later analysis as required. MRT rock codes were loosely assigned to field location notes.

### **Summary and Notable Points:-**

- Eastern AeroMagnetics Anomaly (Magnetic outcrop up to 30m wide was located, further detailed below).
- McAuliffe Creek Fault:- (Wp437) located a polymict cataclasite fault breccia with nearby (Wp439) laminar banded outcrop displaying local breccia texture overprinted by grey silicification(m/s) and semi massive sulphide (20%, pyrite).
- Flat fractures west of McAuliffe Creek on Line 5411500N are possibly indicative of nearby thrust faulting.
- FeOx concretions in alluvial gravels at the western end of line 5411500mN are coincident with a mapped regional fault.
- Shearing and foliation intensity is strongest north of the Mine Sequence strike and weakens to become variable and locally strong towards the west.
- Permian sandstone and granule conglomerate was mapped central to Line 5411500N; additional mapping will likely further shift revised geology polygons.
- Silicification down slope from the water race (wp357) appears to be pervading a coarse grained sandstone unit.

## Geology and Digital Data

Reporting includes geology polygons and line work modified from MRT digital data. Extraction of all geology polygons from the existing 1:25,000 geology bounding the Donaldson sheet was initially planned. This would have generated polygon extensions and additions, whilst providing an overlay matching the underlying 250k geology and allowed substitution into the current 25k cover. It was subsequently found that given the limited field data/time and complexity of map interpretation, that modification of the current (2020) 1:250,000 scale digital geology was simpler given the time constraints of the exercise. The 1:250,000 digital geology map appended is a modification / replicate the original statewide MRT map, but with fewer polygon nodes except near well controlled boundaries. Field structure observations are appended in MRT data format.

Comment on the observed geology, in part relating to various MRT mapped 1:25k and 1:250k map units is made below. Only minor changes in geological boundaries resulted from line 5411500mN mapping, with more confidence from additional mapping extending throughout the line accessed area being required. (compare Figures 1 and 2). Field waypoints were assigned a rock\_code and coloured to match the legend of the Savage 1:25,000 scale geology map. The 2020 version of the 1:250,000 digital geology from Mineral Resources Tasmania was similarly coloured to roughly match.

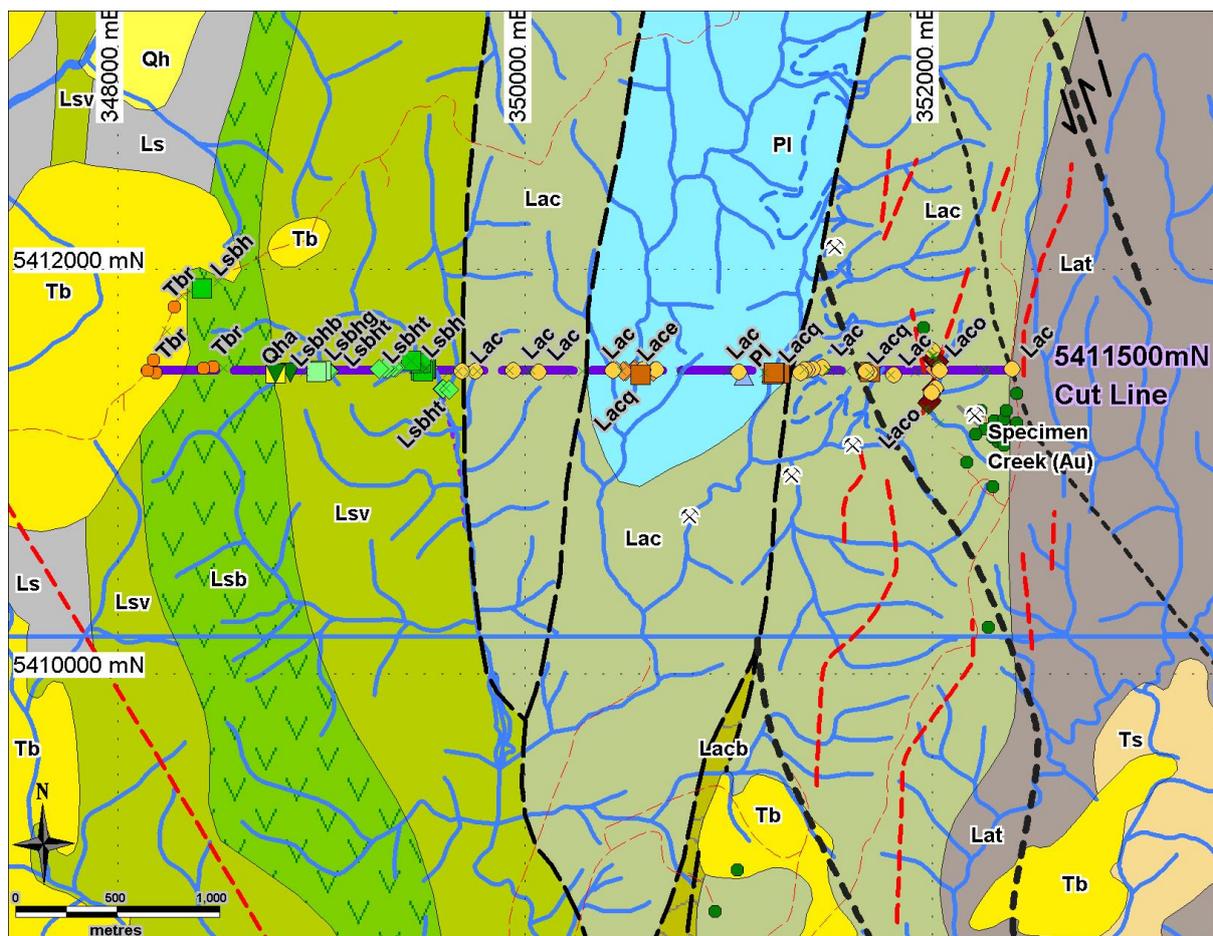


Figure 1: Field location geology codes matched to MRT's 1:25,000 Savage geological map sheet, interpreted magnetic unit distribution (red dashed lines) and historic drill holes (green dots) over MRT 1:250,000 digital geology (2020).



aeromagnetic survey (Turner, 1997). Potential fault and lithology distribution is highlighted in these grids, but issues remain to be resolved with further detailed mapping.

A 1VD filter with 98% clip was applied to the 50m flight line spaced Specimen Creek Aeromagnetics Total Magnetic Intensity grid to highlight strong magnetic responses at surface. 1VD aeromagnetics grids (Figures 3 & 4) readily define low magnetic response dislocations that are likely to be late faults of NNW orientation, similar to that previously mapped in 1:250,000 MT geology to the north of line 5411500mN.

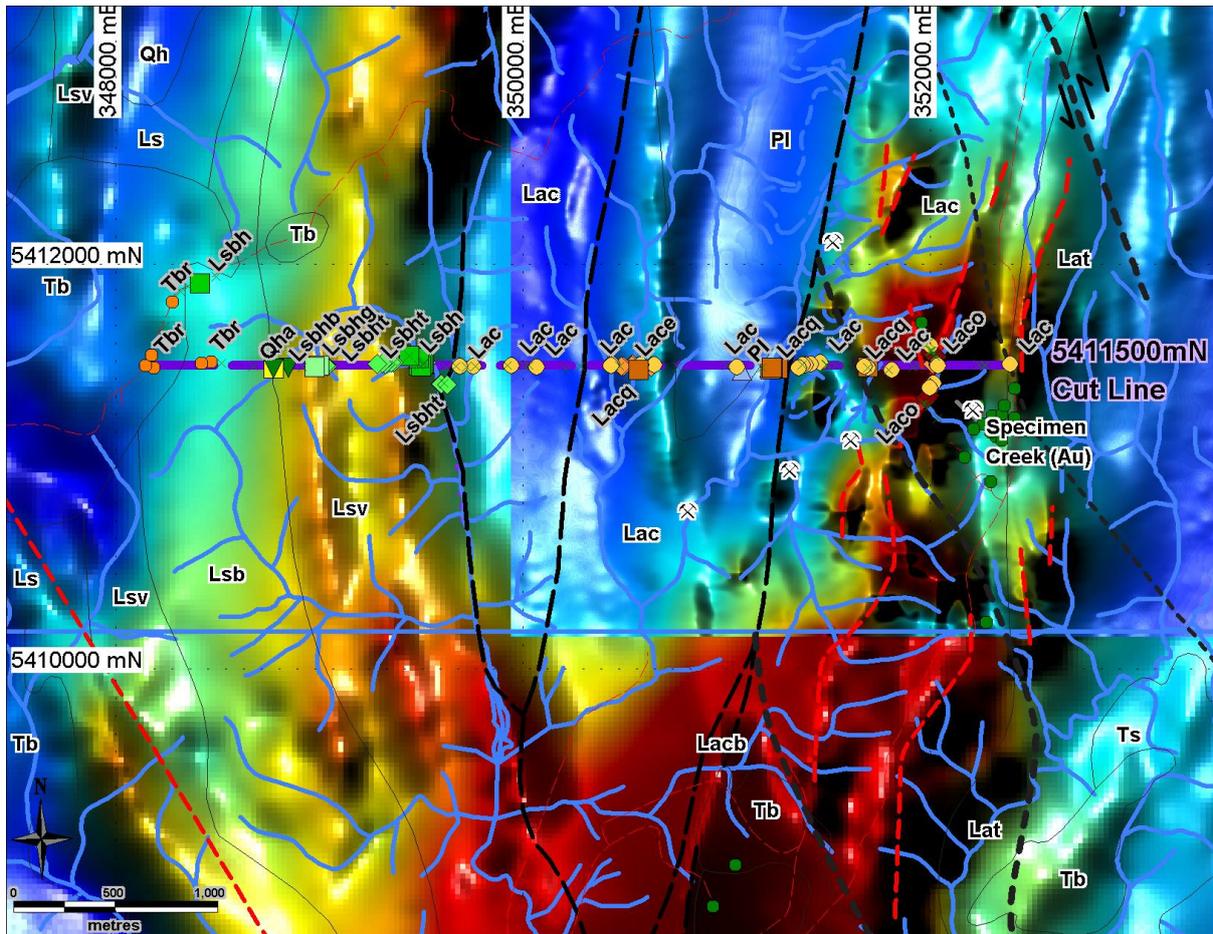


Figure 3: Total Magnetic Intensity grids for WTRMP overlain by Specimen Creek aeromagnetics, showing inferred NNW orientated faults (short dark grey dashed lines) and magnetic high lineaments (red dashed lines).

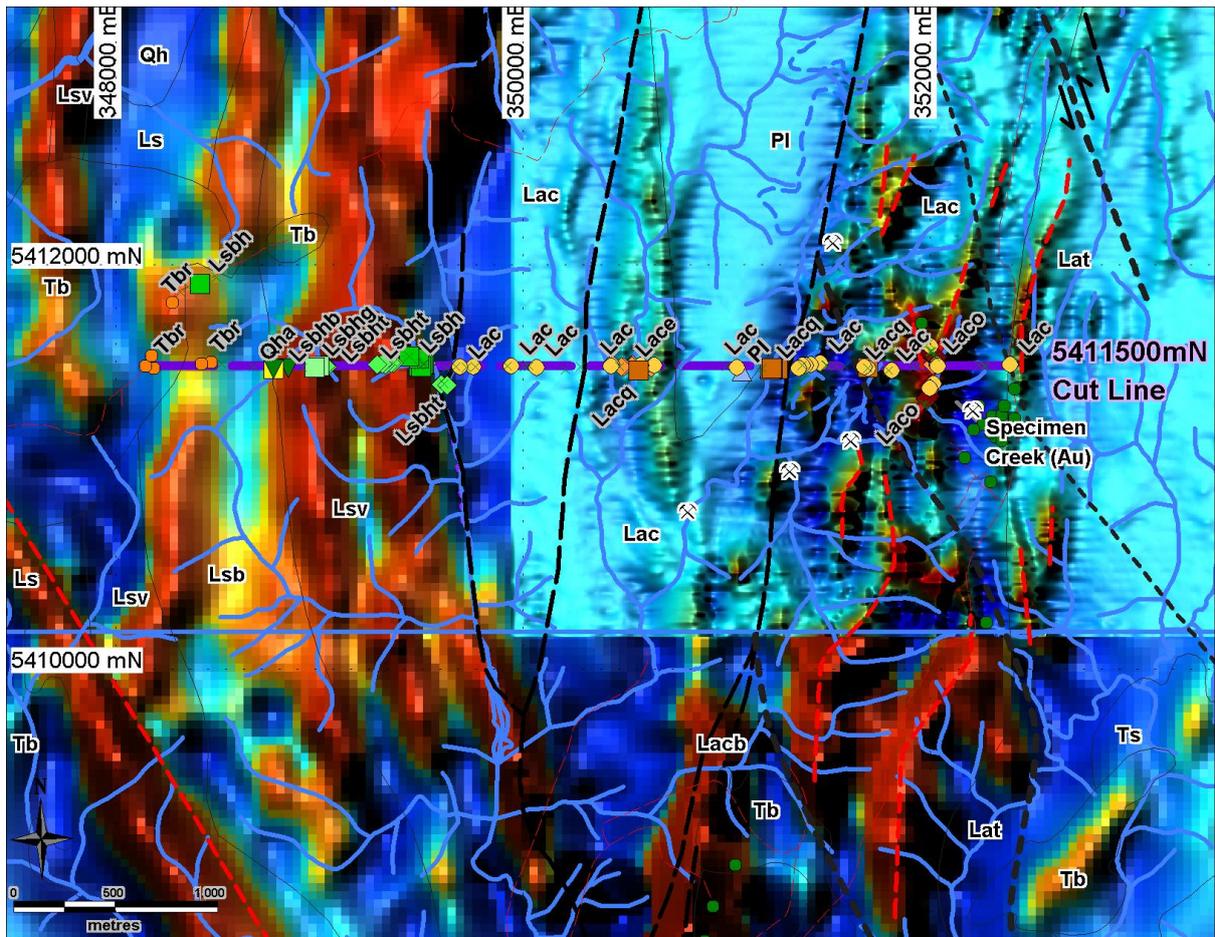


Figure 4: 1<sup>st</sup> Vertical Derivative grids for WTRMP overlain by Specimen Creek aeromagnetics, showing inferred NNW orientated faults (short dark grey dashed lines) and magnetic high lineaments (red dashed lines).

## Tertiary

Tertiary basalt was located at the western end of line 54121500mN, and similar to the Permian sediments is inferred to be relatively flat lying draping over the older palaeosurface and potentially locally palaeo-valley filling. No evidence of sub-basalt “greybilly” sediments was apparent.

The Tertiary basalts conform to strong magnetic lows, often with moderately elevated magnetic ridges internally. The later may conform to basalt feeder zones(?) or simply reflect thinner cover over more magnetic basement. New mapping around 347750mE, 5412000mN is likely to relocate the Tertiary basalt boundary, defining / extending a relatively magnetic mafic unit (Lsv) incursion from the north (compare Figures 2 & 3). Whilst, the current mapped Tb polygon at the western end of line 5411500mN has as yet not been moved east to reflect new field observations.

## Permian

Permian rocks may have previously been mapped on the NE aligned road in the north of EL8/2024, in part noting a 10° dip from Permian sediments mapped in the creek to the north. Eastern and western 250k mapped Permian boundaries are shown as faulted contacts (Figure 1). This is a less likely scenario for the Permian, particularly given that chloritic mafic schist and micaceous schist is

mapped through the area. The latter is largely within incised creek terrain, whilst Permian pebbly sandstone was located as float along the Line 5411500mN traverse, around 351150mE (Photo 1). It's form is anticipated to be relatively flat lying, with distribution cut by drainage patterns. The flattish slope observed in the field west of 351175mE on 5411500mN likely reflects basal Permian erosion. A new Permian boundary is tentatively assigned as roughly conforming to the relatively broad and flat ridge centred on 350950mE; this requires further clarification with the mapped boundary only resolved in the vicinity of the mapped line 5411500mN. This flat ridge is magnetically low, with the remapped boundary moved east to accommodate a band of relative magnetic high extending north through recently mapped chloritic schist (Figure 4).

The northern most mapped distribution of Permian rocks corresponds to an area of elevated Total Count (Figure 5) and U radiometrics. Whereas low radiometrics appears to negate the possibility of ridge capping Permian facies to the south of Line 5411500mN (Figure 5); distribution will likely resolve with further detailed mapping.



Photo 1: Permian pebbly sandstone / conglomerate; Waypoint 307.

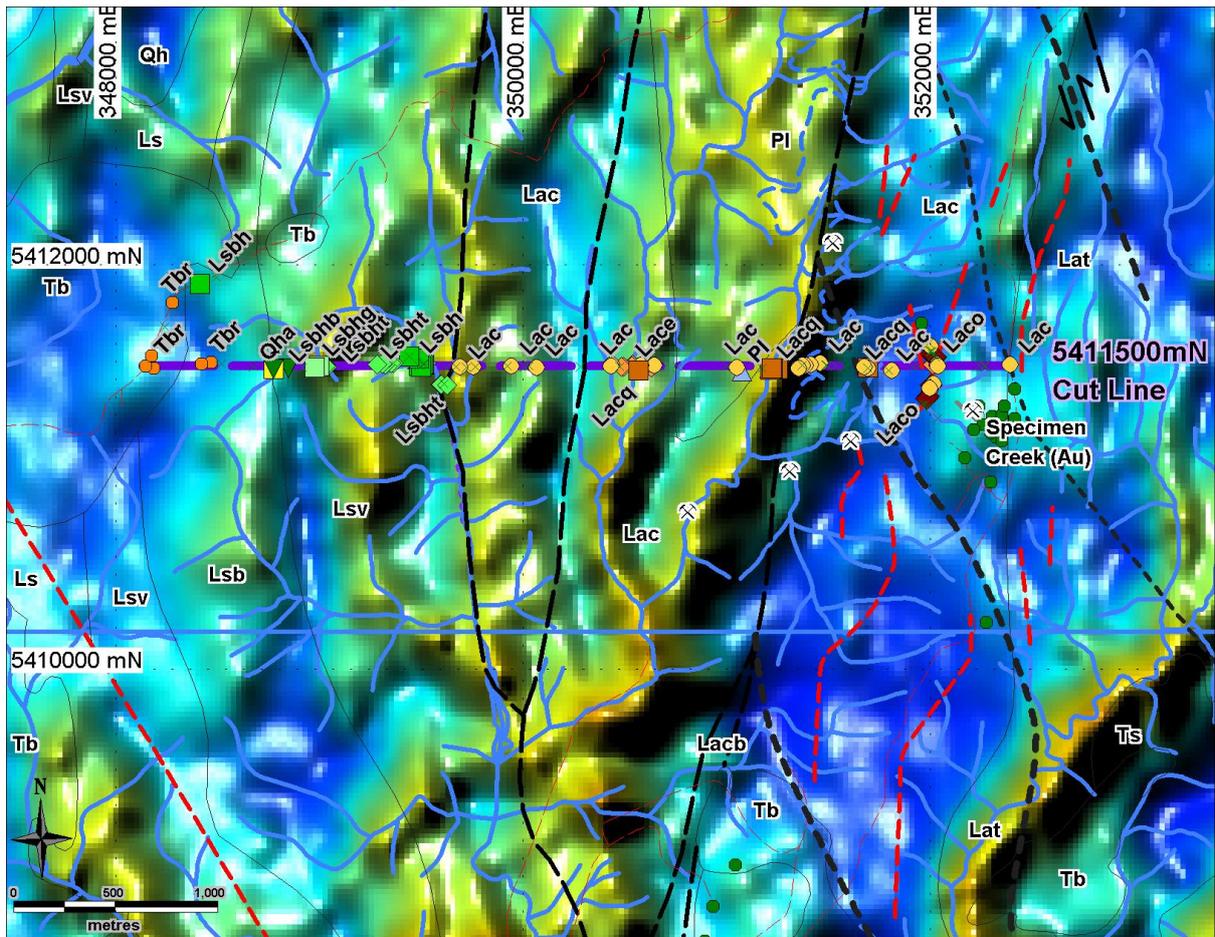


Figure 5: Total Count radiometrics (WTRMP, 2001) Line 5411500mN area, overlain by Specimen Creek aeromagnetics, showing inferred NNW orientated faults (short dark grey dashed lines) and magnetic high lineaments (red dashed lines).

## Cambrian

Shearing and foliation intensity appears strongest north and east of the Mine Sequence strike and weakens to become variable and locally strong towards the west on line 5411500mN.

Mafic volcanoclastics on the western end of line 5411500mN are superficially of similar deformation style and high density turbidite facies (eg. Photo 2 & 3) when compared to those evident in East Wall Association (EWA) NPUG program drill core (i.e. UDDH2020\_12 & 14), located east of the North Pit magnetite. Elsewhere, a distinctly moderately feldspar-phyric chloritic mafic was interpreted in the field as a coherent unit.

The 1:25k lithcode “Lace” is evident in the EWA within UDDH2020\_14, being logged as a sequence of chlorite altered high density turbiditic mafic volcanoclastic units, bearing mostly very thin to laminar bedded fine grained mafic volcanoclastic sandstone to siltstone, with lesser massive fine grained volcanoclastic sandstone and occasionally finely laminar bedded siltstone. Locally where less altered these rocks verge to grey siltstone. The EWA description is essentially a more altered version of Lsbh.

When comparing to WTRMP total magnetic intensity (Figure 3 & 4), mafic volcanoclastics mapped in the west of line 5411500mN are weakly magnetic, which questions the distribution of apparently less magnetic coherent mafic units, inferred from MRT 250k mapping and vegetation changes at the

western extent of Line 5411500mN. Mapping showing Psbhb (metabasalt) in this waypoint 420 area requires review in light of observed elevated magnetics in mafic intrusives and basalts from NPUG program drill core logging.

Minor occurrences of weakly micaceous schist are noted from the west of line 541500mN; not sure where assigned as yet.



Photo 2: Isoclinal folding in laminar bedded chloritic mafic volcanoclastics. Waypoint 407.



Photo 3: Mafic volcanoclastic siltstone; Lsbhg (waypoint 418).

### Eastern Aeromagnetics Anomaly

Surface field investigation in the centre of the magnetic anomaly located near 30m (28.6m) approximate true width of outcropping highly weathered and Iron and Manganese oxidised magnetitic outcrop (Figure 6). Notably weathered and oxidised but non magnetic outcrop extends the mineralised potential to 40m width. Strongly magnetic chlorite schist was mapped a further 220m SSW (Photo 4), coincident with the aeromagnetic anomalies southern strike extent. Further exploration considering IOCG models is warranted near this anomaly and the proximal Specimen Reef Au Mine. The core of the anomaly could be readily drill targeted from the ridge to the west.

Magnetics have previously been targeted to the NNW of the anomaly peak. Historic drill hole NS001 (Callaghan, 2103; see Figure 6) drilled west at a steep angle ( $-75^{\circ}$ , EOH 245.8m) targeting IOGC style mineralisation, related to a 1VD aeromagnetic high feature coincident with a linear 565ppm Cu in soil anomaly. The hole intersected strongly foliated magnetite – chlorite schist, particularly between 50 and 150m, returning a best intersection of 2m @ 0.01% Cu. Fe content has not been assessed, but further investigation is warranted as it appears that NS001 did not test the main magnetite zone.

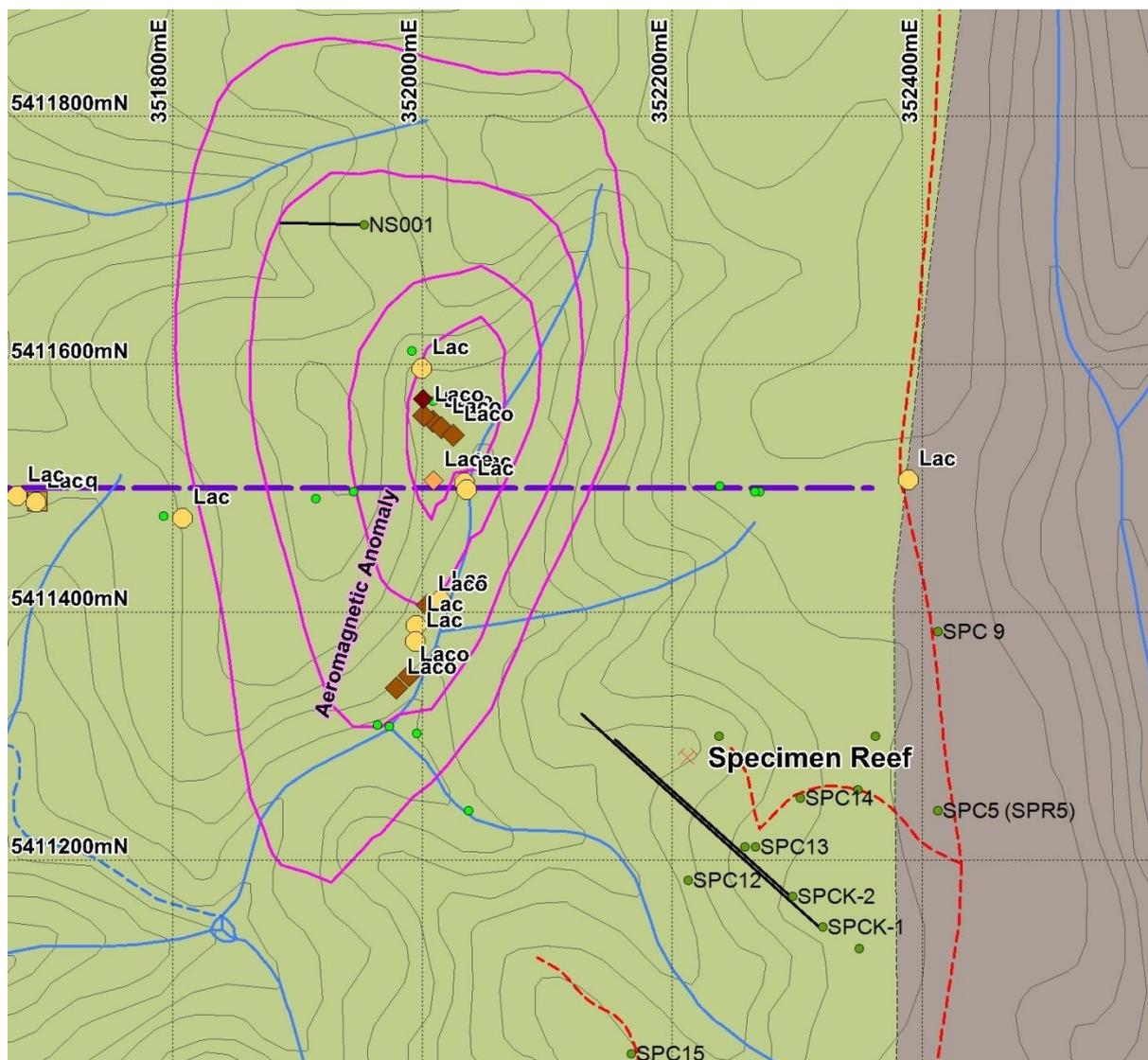


Figure 6: Select aeromagnetic anomaly contours (pink) and field mapping locations with MRT 1:25,000 rock codes highlighting magnetite occurrence.



Photo 4: dark green chlorite - magnetite schist; Eastern Aeromagnetics Anomaly area.

## Structure

Given GIS display resolution problems related to local high density of structure points, a subset was added to MRT's 1:250,000 scale structure point data (appended). This did not include fractures, joints and veins, which are not recorded in MRT 250, 000 structure data format. However, all recorded structure from the current mapping project is included in field data appended.

The Savage River magnetite deposits clearly lie within a complex strongly deformed zone, possibly at a structural inflection point, whereby late transcurrent fault movements have influenced the current mineralisation form. Structure is dominated by the NE to NNE orientated Arthur Metamorphic Complex. Potential for later more NW orientated structures is largely unknown / undocumented, although one fault of this orientation is mapped approximately 5km north of North Pit at ~5414000mN. Potential NW aligned dislocations of magnetic bodies are also apparent in the 1VD aeromagnetics and could be investigated (Figure 4). A key inferred structure is reflected in complex magnetic patterns immediately north of and possibly offsetting the North Pit magnetite. Sigmoidal patterns here are suggestive of enechelon type magnetite vein arrays or replacement zones. These hypothetically could relate to sinistral extension following an apparent dominant dextral offset evident in the regional mapping. Notably sinistral offset with east block displaced to the north is a repeated theme from ramped slickensides in EWA (East Wall Association) drill core.

Identifying intersection lineations of structure could potential aid understanding of Specimen Reef Au controls. The Specimen Reef 50m spaced aeromagnetics survey (Figures 3 & 4) clearly demonstrates that enhanced structural and lithological interpretation is possible from closer flight line spacings. An extended 50m spaced high resolution survey across the area could be warranted to directly aid resource definition as well as more regional interpretation. Structures roughly identified

in Figure 4 highlight magnetite mineralisation potential as well as late (Tertiary?) faults with associated magnetite destruction.

### **Cataclasite Breccia**

A significant cataclasite fault (Photo 5) was located on a small tributary of McAulliffe Creek. A pronounced ~N-S spur extends through the outcrop area, but the faults orientation is not inferred to be related to this feature. Strong milky quartz veining and pervasive silica – pyrite is evident immediately upstream. Both features may be related to a low angle / “Thrust” fault; possibly analogous to the ~25degree east dipping basal surface to cataclasite evident in the EWA; NPUG development drive Anhydrite vein occurrence area. NB: another cataclasite is evident deep in UDDH2020\_14, within the west wall (WBS).

Possible support for a thrust in the area is a notable regular 8cm west dipping ( $10^0$ ) relatively flat parting at wp410 upslope to the west of the cataclasite. Proximity to a strongly deformed zone is indicated by structurally deformed outcrop nearby at wp411, possibly in the sole of a thrust. Here sub gossanous [MnO(w/m) + FeOx(w/m)] dark grey finely laminar bedded phylite displays a siliceous foliation / bedding parallel lensoidal zone(w/m), with foliation commonly exhibiting wavy to folded and angular half chevron folded form locally.

The McAulliffe Creek area fault, mapped in the 250k geology, could be moved west to reflect the inferred thrust fault, matching to a boundary indicated by 1VD aeromagnetics. Conversely, the current mapped fault placement is compatible with FeOx(m) brecciated? schist with fine grey chlorite?(w) veinlets at wp399. This McAulliffe Creek area needs further examination.



Photo 5: Indurated cataclasite breccia in outcrop (top) and broken up (below).

## References

Callaghan, T., 2013. EL11/2005 Specimen Reef NW Tasmania Final Exploration Report June 2013. Nimrodel Resources Ltd. Tasmanian Company Report for Mineral Resources Tasmania (TCR14-6804).

Cumming, G. V., Jackman, C. J. And Everard, J. L. (compilers) 2019. Digital Geological Atlas 1:25 000 Scale Series. Sheet 3440 Savage River. Mineral Resources Tasmania.

Turner, N. J., 1997. Exploration Licence No. 26/95 Specimen Creek, Western Tasmania. Annual Report to 6/3/97. Goldstream Mining NL & Titan Resources NL. Tasmanian Company Report for Mineral Resources Tasmania (TCR97-4075).

## Appendix

List of appended data files:-

| Exploration Work Type  | Filename                                  | File format |
|--|---|-------------|
| <b>Report</b>  | EL082014_202004_01_Report.pdf             | <i>pdf</i>  |
| Field Location Data; zipped Excel and Mapinfo format files       | EL082014_202004_02_FieldLocationData.zip  | <i>zip</i>  |
| LIST Topographic Data; various zipped Mapinfo format files       | EL082014_202004_03_LISTdata.zip           | <i>zip</i>  |
|  | EL082014_202004_04_GeolLine250.zip        | <i>zip</i>  |
|  | EL082014_202004_05_GeolPoly250.zip        | <i>zip</i>  |
| Structure Data; various zipped 250k scale Mapinfo format files   | EL082014_202004_06_GeolStructure250.zip   | <i>zip</i>  |
| Magnetics Grids WTRMP Area C; zipped Mapinfo format grid files   | EL082014_202004_07_WTRMP2001Grids.zip     | <i>zip</i>  |
| Magnetics Grids Specimen Creek; zipped Mapinfo format grid files | EL082014_202004_08_SpecimenCreekGrids.zip | <i>zip</i>  |
| Android Magnetics field survey                                   | EL082014_202006_09_AndroidMagGDA.csv      | <i>csv</i>  |
| <b>File Verification Listing</b> ( <i>this file</i> )            | EL082014_202004_10_FileListing.xls        | <i>xls</i>  |