

# Tenement EL17/2006 surrender report TASMANIA

Tenement EL17/2006 surrender report

Proto Resources & Investments Ltd

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On behalf of Proto Resources & Investments Ltd

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Proto Resources & Investments Ltd

Note: All figures and grids are according to the GDA94 datum and MGA94 grid systems.

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### 3 GEOLOGY

The Barnes Hill tenement sits within the Badger Head region of Northern Tasmania, an important structural location, considered to be the area in which the Tamar Fracture System separates the Western and Eastern Tasmanian terrains. The area has a complex geological history, a result of thrusting during the Devonian and later normal faulting in the Jurassic and Tertiary. The Precambrian Badger Head Block possibly overlies younger units of the Cambrian Port Sorell Block. The Anderson Creek Complex is considered to be a thrust slice caught up in this deformation (*Zengerer, 1999*)

The regional magnetic data over the area is dominated by the response of the Anderson Creek Complex with much of the surrounding geology having only subtle responses (see Figure 3). Regional gravity, which was generated by the Tasmanian mines department is also dominated by the considerable differences in density between the Precambrian, Cambrian, late Devonian and Permian units. The Devonian geology also contains granites with stark density contrasts to surrounding units especially the Anderson Creek ultramafic.

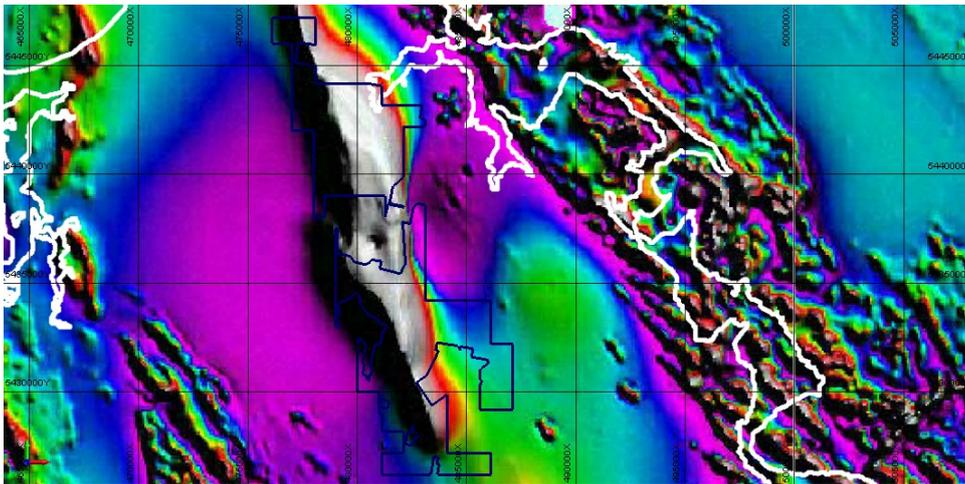


Figure 3: Map of the Total Magnetic intensity of Barnes Hill showing the extent of the Anderson Creek Ultramafic Complex, sourced from mineral resources of Tasmania online database

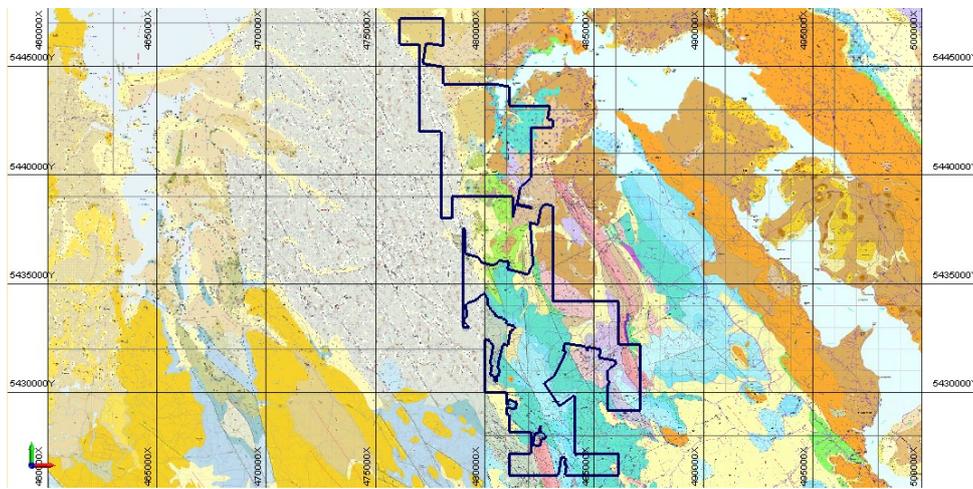
To the East of the Anderson Creek ultramafic complex lies the Cabbage Tree Formation which is Ordovician in age and is thrust over the Anderson Creek Complex. Further East again, is the Beaconsfield Gold fields on the western side of the Tamar River in the Devonian aged Mathinna beds. The Beaconsfield gold mineralisation has a similar nature to the gold fields of central Victoria.

#### 3.1 Tenement Geology

**Precambrian** metamorphosed greywackes and sub-greywackes outcrop along the Western extremities of previous tenement EL17/2006.

**Cambrian** aged schist's and micaceous sandstone are found faulted against the Precambrian Badger Head stratigraphy and Anderson Creek Complex to the East.

**The Andersons Creek Complex** is a layered wedge of Cambrian ultramafic stratigraphy consisting mainly of serpentinite, pyroxenite and gabbro with minor dunites (see Figure 4 for Cambrian Ultramafics distribution). The Anderson Creek Complex has been thrust into a sequence of Cambrian sediments (known as the Dazzler Range, and consisting of metasediments) lying on the Eastern margin of the Badger Head Precambrian Block. The Anderson Creek Complex is Cambrian in age and one of fifteen discrete ultramafic/mafic complexes found predominantly on the North-west and West coasts of Tasmania.



**Figure 4: Geology of the Barnes Hill area. The Ultramafics of the Anderson Creek Ultramafic complex can clearly be seen in green within the Protos mining tenement**

Aero-magnetics show the Anderson Creek Complex as being a NNW trending lozenge shaped body approximately 20 km long and up to 3 km wide (see Figure 3). It outcrops over a NNW length of 6.5 km, a width of 1.5 km, and plunges to the North and South beneath Permian sediments.

The Anderson Creek Complex has been extensively and variably altered. Serpentinisation is pervasive and probably reflects alteration of previously mapped peridotites, gabbros and pyroxenites. In the Scott's Hill area, a geologically mapped pyroxenite has been described as having been replaced by amphibole and then altered to talc, magnetite and calcite.

In the Barnes Hill South area a rock called rodingite has been formed as the result of lime metasomatism of coarse hornblende gabbro prior to serpentinisation.

Various weathering profiles with differing mineral assemblages and metal concentrations are developed within the ultramafic complex. An appreciation of the ultramafic weathering profile is paramount because it contains most of the higher grade Ni-Co mineralisation. Within the tenement the weathering profile consists of an upper zone of secondary iron oxides (goethite, hematite and limonite) overlying a clay rich zone dominated by smectite, weathered serpentinite and chlorite, which, in turn overlies fresh serpentinite. Meteoric waters periodically leached soluble ions from the surface (lateritic) zone and enriched these ions (Ni) in the clay zone at the

base of the weathering profile, producing distinctive material types (see Table 1).

**Table 1.** Idealised Barnes Hill lateritic weathering profile identified from geological logging of the Barnes Hill laterite.

<b>Laterites</b>	Pisolitic Zone	Hard ironstone with red clay matrix
	Ferruginous (red zone)	Soft red clay, pisolitic grains and black ironstone
	Limonitic Zone	Soft yellow-orange clays with minor red clays (saprolite zone)
	Mottled Zone	Soft bright red, brown, yellow, purple clays with black and white specks, (probably chromite)
<b>Clays</b>	Transition Zone	Soft decomposed green serpentinite with minor red clays
	Bleached Zone	Soft, pale yellow green serpentinite with minor magnetite
<b>Serpentinite</b>	Fresh zone	Moderately hard, dark green serpentinite

Most of the Ni>1% occurs in the transition zone and to a slightly lesser extent in the mottled and bleached zones (however, most of the Barnes Hill resources occurs within the Saprolite zone). The nickel is largely contained in clay (smectite), serpentinite and chlorite.

**Permian Sediments** are reasonably abundant throughout the tenements lying unconformably over older stratigraphy. Units include the Quamby, Golden Valley, Mersey, Woodbridge and Ferntree groups and Cygnet Coal measures.

**Tertiary Sediments** consist mainly of sandy clays and sandstones and North of Beaconsfield white quartz gravels. The laterite that has formed over the Andersons Creek Ultramafics Complex was formed in the Tertiary.

**Igneous Rocks** other than the Anderson Creek Complex, igneous rocks include minor Jurassic dolerite and Tertiary basalts. Tertiary basalts overly Tertiary sediments in most cases. Both dolerites and basalts form magnetic features in the regional magnetic data, however, their responses are much less significant than the dominant Anderson Creek Complex magnetic response.

## 4 EXPLORATION PHILOSOPHY

Proto is targeting nickel and Cobalt mineralisation in EL17/2006 which is associated with the underlying Anderson Creek Ultramafic Complex. Anderson Creek Complex is a NNW trending lozenge shaped body approximately 20 km long and up to 3 km wide. It outcrops over a NNW length of 6.5 km, a width of 1.5 km, and plunges to the North and South beneath Permian

sediments which suggests that the Anderson Creek ultramafic Complex is a broad open fold. Protos exploration was undertaken as a consequence of previous drilling over the Anderson Creek Complex which targeted the laterite which had show elevated nickel and cobalt concentrations.

## 5 EXPLORATION HISTORY

A substantial amount of exploration has been undertaken over the tenement area over the last 90 years. A summary table below has been compiled by assessing and reviewing historical geological data.

**Table 2** Summary of historic exploration activities

Company	Start	Finish	Focus	Work Completed	Significant results	Report/EL
Proto Resources & Investments Ltd	2008	2011	Lateritic Ni, Co	Resource drilling at Barnes Hill laterite deposit	6.6 million tonne JORC compliant indicated resource at 0.84% Nickel and 0.055% Cobalt (no cut-offs applied)	EL17/2006
Jervois Mining	2001	2004	Ni, Co	Re-assaying, campsite sampling for met work	12.5 Mt at 1.07%Ni combined (Ni Co)	ETA 504
Allegiance	1996	2000	Ni, Co	Historical data compilation, Shallow drilling, Resource calculation environmental studies, metallurgical studies, 116 air core and 8 diamond holes		97_4013
CRA Exploration	1994	1995	NiS	Rock Chip surveys and IP survey	Rock chip sample 1.7% Ni in Serpentinite	EL35/92
Placeco Australia	1988	1988	PGEs, Au	Rock Chips composite sand samples	Failed to detect economic quantities of target minerals	EL 18/87
Northern Chromite	1969	1981	Cr	Cr production on western flank of Barnes hill, drilling at Rifle Range south	660,000t at 12% Cr defined at Rifle Range and Barnes Hill	
Department of Mines	1979	1980	Cr	16 percussion holes, serpentinite clays intersected but not tested		
Allstate Exploration	1971	1972	Asbestos	15 Core holes and trenching	top weathered section (Laterite not	

					sampled)	
King Island Scheelite	1968	1969	Ni, Co, Cr	37 Holes , metallurgy test work resource calculation, environmental studies	6.014 long tonnes @1.04%ni and 0.06% Co	69_544
BHP Minerals	1965	1967	Fe, Ni, Cu Zn, Mb, Cr, limestone	Stream sediment sampling, aero magnetic survey, Drilling, trenching, 99 - 3m deep pits	Drilling intersected magnetite bearing serpentinite. (CRA re-sampling in 1994 assayed 3m at 1g/t Au)	67_465
Consolidated Zinc	1957	1958	Ni	Series of auger samples at 100ft and 200ft intervals focused on previous work by Ben Lomond mining	Intersected Ni grades between 1.2 to 1.8%	58_0195
Ben Lomond Mining	1955	1956	Ni	Reconnaissance Sampling	Results showed Ni rich clays developed on mafics/serpentinites were more wide spread than previously known.	
Department of Mines	1929	1929	Ni	13 holes - location information sketchy	Difficulty in locating holes	

## 5.1 Proto Resources exploration over tenement EL17/2006

Exploration completed by Proto since the granting of EL17/2006 has included:

- A diamond drilling program (17 holes for 462m) completed to validate historic drilling results and to provide samples for metallurgical test work,
- 30 RC holes to acquire a iron ore bulk sample,
- Detailed flora and fauna assessment of the resource areas by North Barker Ecosystem Services,
- Cutting and assaying of some historic diamond core holes held at the MRT Rock store in Mornington, (*MRT registration numbers G400593 and G400594*), *drill hole BEA-A6, 375ft, Easting\_GDA94\_55 480723, Northing\_GDA94\_55 5439274 and drill hole BEA-A17, 195ft, Easting\_GDA94\_55 479963, Northing\_GDA94\_55 5438864*),
- Metallurgical test work at HRL Testing in Brisbane,
- A regional soil sampling program consisting of 864 samples,
- The first phase of a resource drilling program which consisted of 75 air core drill holes (BHA001 – 075) for 1,080m,
- A second phase of the resource air core drilling program consisting of 549 drill holes for a total of 4,839m. The hole numbers completed were BHA076 through to BHA625. Hole number BHA288 was not drilled. A close-spaced programme (10m spaced) of grade control drilling along an East-west and North-south line was also completed to verify grade and thickness variations at the deposit (holes BHA478 – BHA582),
- Aboriginal heritage and European heritage surveys of the proposed mining area,
- Column leach test work on further air core drilling samples from the Barnes Hill deposit.

- European and Aboriginal heritage surveys were conducted by Cultural Heritage Management Australia during November 2011, and the final assessment reports completed in December 2011,
- A detailed flora and fauna survey over the proposed drilling areas was conducted by North Barker Ecosystem Services in October 2011, and a final assessment report completed in November 2011.

For a more detailed description of Protos previous exploration activities at the Barnes Hill EL17/2006 project please refer to previous annual reports by the company.

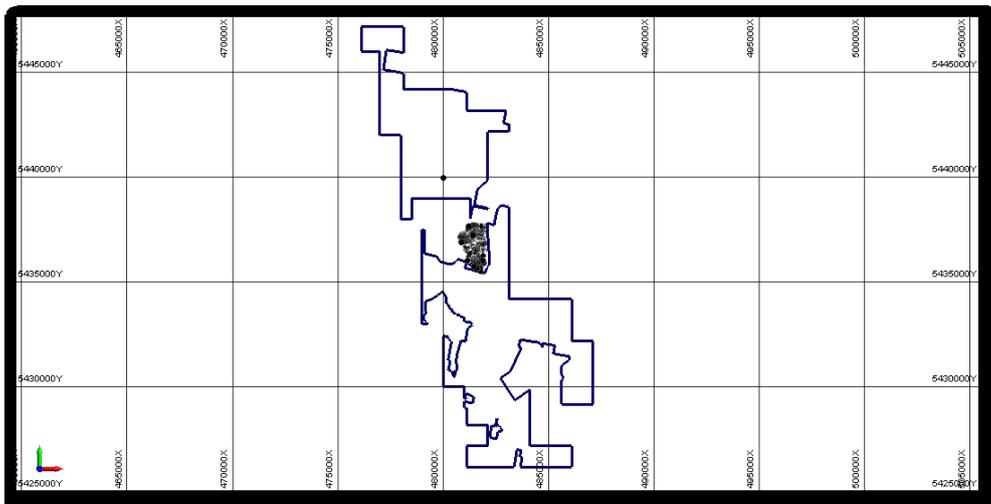


Figure 5: Overview of the drilling undertake within tenement EL17/2006

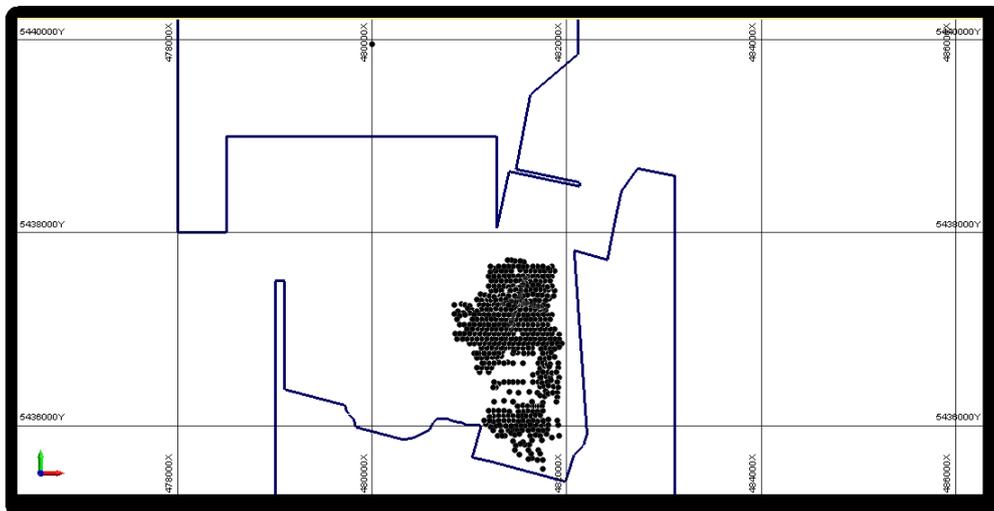


Figure 6: Closer view of drilling. The area of drilling has now been converted to mining license 1872P/M

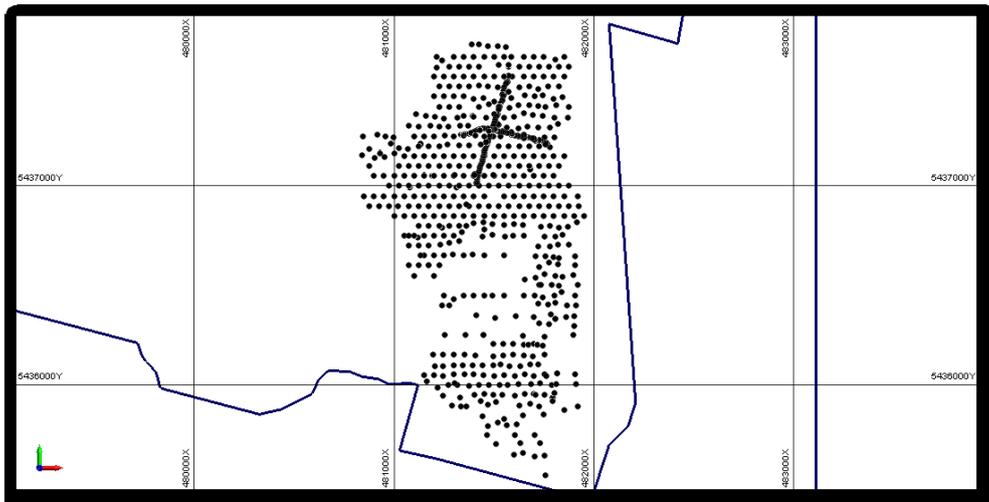


Figure 7: Close up view of the drilling undertake within tenement EL17/2006 which has now been converted into a mining tenement 1872P/M

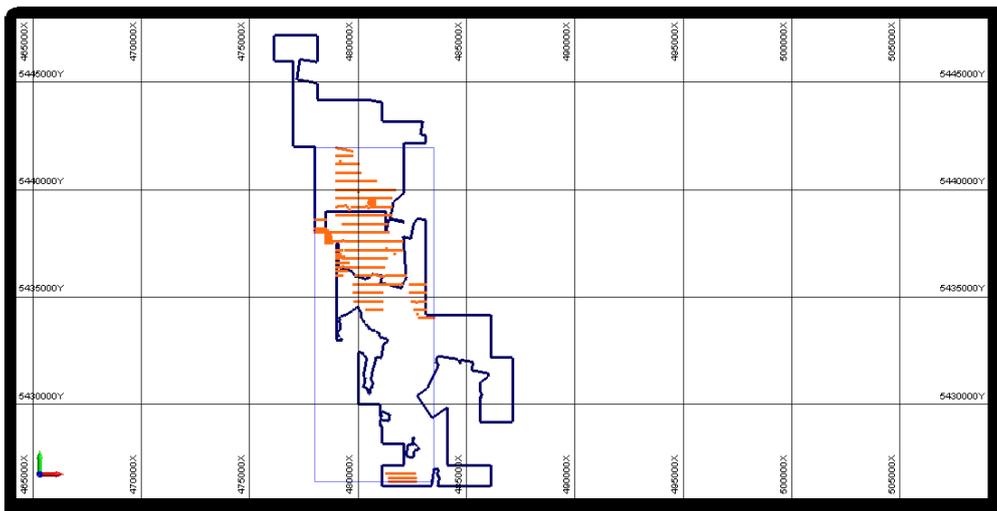


Figure 8: Overview of the soils samples taken throughout tenement EL17/2006

## 5.2 Exploration undertaken during final reporting period

The only exploration that has been undertaken within the final reporting period is, Protos geologists visited the MRT Mornington core shed and discussed with Tasmanian mines department mineralogist-petrologist Mr. Ralf Bottrill the geology of the Anderson Creek Complex and his thoughts on the geology.

During this visit it was decided to ask Mr Bottrill to undertake geological analysis of 2 old core samples (*MRT registration numbers G400593 and G400594*), drill hole BEA-A6, 375ft, Easting\_GDA94\_55 480723, Northing\_GDA94\_55 5439274 and drill hole BEA-A17, 195ft, Easting\_GDA94\_55 479963, Northing\_GDA94\_55 5438864.

The samples were all prepared in the Minerals Resources Tasmania Laboratories, Mornington, Tasmania. They were examined microscopically (low powered stereomicroscopy and high power polarised transmitted light microscopy (PTLM) and polarised reflected light microscopy (PRLM)).

The first sample (G400593) returned a rock identification of serpentinised pyroxenite probably websterite and the second sample returned a rock identification of a completely serpentinised peridotite or dunite.

## 6 CONCLUSION

Exploration by Proto has focused mainly on the drilling of the nickel laterite and soil anomalies.

As a result of Proto being unable to fill the required tenement expenditure and not undertaking the submitted exploration program the tenement was forfeited at the beginning of May 2015.

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