



SANDFIRE RESOURCES NL

Sandfire Resources NL

Mineralisation Potential of the Paspaley Tenements

McArthur Basin Borroloola District Northern Territory



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Borrooloola District, Northern Territory.

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1.0 Overview

Sandfire Resources NL (Sandfire) and Nicholas Paspaley have entered into an agreement whereby Paspaley monitor tenement relinquishments in the Northern Territory McArthur Basin district and acquire ground they consider may be prospective for base metal mineralisation (*see Figure 1*). Under the terms of the Agreement Sandfire undertakes to evaluate the prospectivity of the tenement applications with respect to previous exploration and recent advances in the understanding of the geology and structural framework of the Batten Trough area of the McArthur Basin.

Prior to the commencement of this review Sandfire and Paspaley had acquired eight exploration licences in the district (*see Figure 1 & Table 1*).

The review of previous exploration carried out in the Batten Trough from the late 1960's through to 2002 has shown that whilst there have been numerous mineralized occurrences discovered no economic mineral deposits have been located by the iterative and overlapping phases of airborne EM surveys, stream sediment sampling, ground EM surveys and follow-up rock chip and soil surveys.

A key driver (hurdle) for commitment to ongoing exploration in the district was the delineation of 'conductors' by the airborne surveys. A considerable number of companies 'walked away' if no first pass conductors were returned. An exception to the rule was the programs carried out by CEC/MIM's which for the most part were pursued as geochemical targets even if no conductors were present.

The review has indicated that the area is under-drilled in terms of following up geochemical and conceptual targets.

The primary objective of assessing specific tenements subject to Sandfire/Paspaley agreement for the potential to host HYC-type mineralisation has highlighted EL 25070 (application) located over the Emu Fault zone to the north of Borroloola.

An adjunct to the primary objective was to determine the presence and prospectivity of Barney Ck Fm (the host to the HYC deposit) within each tenement. The review indicated that within all of the tenements outcropping, to shallow (<500 metres) to deep (>500 metres) Barney Creek Fm was present.

A second objective of the review was to assess the potential of the tenements to host replacement Cu, Cu-Co-Ag, Cu-Zn and MVT Pb-Zn mineralisation. Widespread base metal anomalism was highlighted in all of the tenements (except EL 25070). A number of anomalies for follow-up have been identified from a first-pass look at the geochemical data. The list is not considered

exhaustive given the total amount of geochemical data available for review in the district.

In summary, over 30 years of intense base metal exploration by numerous companies, but mainly by CEC/MIM's and BHP has effectively tested the surface and near-surface expressions of mineralisation as geochemical anomalies and/or shallow conductors (100-300m).

The next phase of exploration within the district requires a commitment to drilling as there exists numerous follow-up targets to the previous programs within the tenements.



2.0 Database Summary

2.1 Regional Geology

The mapping and stratigraphic nomenclature developed by the Northern Territory Geologic Survey (NTGS) for the McArthur Basin as presented for the Bauhinia Downs and Mt Young 1:250,000 Sheets, and the Batten and Tawallah Range 1:100,000 sheets has been used to describe the regional and project/prospect scale geology for each tenement (*see Figure 2 & 2A*).

Geoscience Australia also used the NTGS's stratigraphic nomenclature and mapping in their reinterpretation of the structural setting of the Batten Trough resulting from a 2002 seismic survey (The 2002 Southern McArthur Basin Seismic Reflection Survey Report). In their interpretation of the seismic data Geoscience Australia recognised specific 'seismic reflectors' as representing key lithological units in the stratigraphic column as mapped by NTGS and used this data as an aid to understanding the development of the complex thrust architecture of the Batten Trough.

The informal structural domains listed below are used throughout this review by the author in order to identify the main regional/structural setting of each tenement area.

From west to east these domains are:

1. Western Thrust Zone
2. Batten Fault Zone
3. Western Borroloola Basin
4. Eastern Borroloola Basin

With respect to the major regional faults formally named by the NTGS, these names are retained; however the faults are now clearly identified as thrusts. An exception is the Emu Fault which remains as the dominant vertical - strike slip structure controlling development of the McArthur Basin with key units thickening towards the basin centre.

- o **Western Thrust Zone:** A zone of west dipping (5-20°) thrust sheets to the west of the Tawallah Fault. Within the western tenement area the Tawallah Thrust Sheet is overthrust from the west by the Scrutton and Limmen Thrust Sheets. They form simple arcuate NS thrusts continuous over 50-100km and best exemplified by the linear retreating Roper Group scarp face of the Limmen Thrust Sheet.

The Western Thrust Zone is mainly underlain by McArthur Group and Nathan/Roper Group lithologies.

- o **Batten Fault Zone:** This is the complexly faulted area between the Tawallah Fault and the Hot Springs Fault on the Bauhinia Downs Sheet and the between Tawallah Fault/Four Archers Fault and the Rosie Creek Fault on the Mt Young Sheet.

The basal Tawallah Group dominates outcrop with basement Scrutton Volcanics (felsic volcanic and intrusives) also being exposed. The McArthur Group rocks are present as fault (thrust) bounded 'pockets' with the Tawallah Group.

The 'ramp up' of thrust sheets to form the Batten Fault Zone is explained by the presence of a basement high represented in the gravity and magnetic modelling as depicted in Figures 21 and 22 of the Seismic Survey report.

- o **Borrooloola Basin:** East of Rosie Creek Fault and the Hot Springs Fault comprises the main McArthur Group Basin containing the HYC deposit. In this report the main basin has been geographically divided into the **Western Borrooloola Basin** to the west of the Emu Fault and the **Eastern Borrooloola Basin** east of the Emu Fault.

The Borrooloola Basin is underlain predominantly by the McArthur Group capped in places by Nathan and Roper Groups in preserved basins. The much younger Cambrian Bukalara Sandstone and Cretaceous sandstones are also preserved in parts of the basin.

The above informal structural domains as used in this review are shown in [Figure 2B](#).

2.2 Geochemical Database

The Northern Territory Geological Survey (NTGS) undertakes regional geochemical and drill collar data capture. Data collected includes stream sediments, soils, rock chips, drill hole collars, and drill hole sampling. Data is drawn from open and closed file statutory company reports in Mineral Industry Report Management System (IRMS), as well as NTGS projects that generate litho-geochemical and exploration geochemical analyses.

Public release of the data is by dedicated geochemical datasets or as part of GIS data packages incorporating only open-file data. Data is compiled in the Explorer 3 database application developed by TerraSearch to store open file geochemical data.

The datasets for the Batten Trough district were acquired from the NTGS and viewed in MapInfo software. The stream sediment data (SSD) was by far the most comprehensive and relevant dataset covering the tenements under review.

A subset of the SSD (6002 sample sites) was produced to display sample points occurring within the tenement review area only [\(see Figure 3\)](#).

Primary 'ore' elements* Cu, Pb and Zn were selected as pathfinders as they were assayed for by all companies over the +30 years of exploration in the district. In order to screen out false anomalies due to scavenging, Fe and Mn were also plotted for each sample site. The data for each element was separated out into spreadsheets and cumulative frequency plots were produced for each element. These plots were interpolated to deduce the relevant background versus anomalous values in stream sediment samples.

The anomalous (threshold) level for each of the elements is shown in the table below.

Cu	Pb	Zn	Fe	Mn
30 ppm	30 ppm	30 ppm	2%	300 ppm

**Although several laboratories, analytical techniques and detection levels are incorporated in the datasets it is assumed that there is some quantitative parity across the results on an intra-company basis.*

Over a base map of regional geology each element set was plotted at 1:100,000 scale showing all stream data points within each of the tenements being reviewed. The anomalous points were coloured and labelled with their respective value.

Anomalous results deemed worthy of further evaluation are described in the 'Previous Exploration' sections for each tenement reviewed and are annotated [Anomaly 1 to Anomaly 21](#) in the text, listed in Table 2 and shown in [Figure 5](#).

2.3 Base Metal Targets

2.3.1 HYC Style Stratiform Pb – Zn Mineralisation

Introduction

The HYC deposit discovered in 1955 is one of the largest sediment hosted stratiform sulphide deposits in the world with a pre-mining resource of 227 Mt grading 9.2% Zn, 4.1% Pb, 41g/t Ag and 0.2% Cu.

The shallow-dipping stratiform deposit is hosted by the HYC Pyritic Shale Member which comprises inter-bedded pyritic siltstone, sedimentary breccia and tuffs. Seven stacked sulphide ore bodies are separated by dolomitic siltstones and sedimentary breccias.

A MIM (75%) led consortium commenced underground mining of the deposit in 1995. As of mid-2003, the now Xstrata led consortium stated that McArthur River had proved reserves of 4.6Mt grading 13% Zn, 5.6% Pb and 60g/t Ag,

and 31Mt of probable reserves with 12% Zn, 5.1% Pb and 52g/t Ag. Measured, indicated and inferred resources totalled 124Mt of 13% Zn, 6% Pb and 60g/t Ag.

In August 2005 the consortium announced that it was planning to commence open pit mining at HYC stating that it had resources for 85 years of mining. Annual concentrate figures are available for the open pit; however finding reserve figures has proven very difficult.

Deposit Geology

"The HYC mineralisation is hosted by the HYC Pyritic Shale Member of the Barney Creek Formation. The latter was deposited in a restricted area of the Batten Trough – the Bulburra Depression – caused by local subsidence. Areas of localized deepening within the Bulburra Depression are termed sub-basins or synclines. The HYC Pyritic Shale Member contains base metals with abundant sulphides only within these sub-basins, and outside these it is usually represented by a sequence of thin-bedded, weakly pyritic dolomitic bituminous shales.

The HYC mineralisation covers an area of 1.05 x 1.65 km and has a stratigraphic thickness of about 50 metres. The ore sequence is divided into seven ore bodies separated by low grade intervals of poorly bedded or fragmented pyritic and dolomitic slump breccia.

The major sulphides are pyrite (of two generations), sphalerite and galena, with minor chalcopryite, arsenopyrite and marcasite. Pyrite occurs as euhedral to rounded grains up to about 20 µm, and is often bedded or framboidal. Sphalerite and galena occur as laminae or disseminated grains, which in more pyritic areas form the matrix to the pyrite. Chalcopryite occurs as inclusions in sphalerite, while the other sulphides form isolated grains and minor late stage, crosscutting veins. Discrete silver minerals, with the exception of a small area of tetrahedrite-galena-chalcopryite mineralisation in the northern section of the lower parts of the deposit have not been identified.

In addition to the fine grained stratiform HYC deposit, minor discordant and coarse grained copper, lead and zinc mineralisation occurs at several locations in the region. This mineralisation was the focus of attention by the early prospectors, and is typically of Mississippi Valley type, occurring as disseminations, irregular small bodies and crosscutting veins, in brecciated dolomite adjacent to the Emu Fault.

Ore Genesis

The origin of the HYC deposit has been debated since its discovery. Early workers linked carbonaceous pyritic siltstone, volcanic debris and the stratiform nature of mineralisation, to conclude that the sulphides formed by a simple syngenetic volcanic process, in which the base metals were exhaled into a relatively deep water anoxic environment containing bacterially reduced sulphur. With the availability of sulphur isotope data it became necessary to adopt dual sulphur source models. These involved in the diagenetic formation of pyrite and the introduction of base metals into the depositional basin as sulphides or sulphide complexes, again by syngenetic mechanisms as described below.

“The sulphides are associated with thinly laminated beds of dark bituminous and tuffaceous shale. The mineralisation consists predominately of pyrite, galena and sphalerite along with minor arsenopyrite and chalcopyrite. Two generations of pyrite have been identified. The earlier generation (Py1), is present as 1-15 μm -size euhedral and spherical grains and the later generation (Py2) as overgrowths on Py1 or infillings within it. Sphalerite occurs as monomineralic layers up to 1mm thick, as elongate bodies up to 0.2mm in diameter and as fine disseminations. Galena is observed as monomineralic layers up to 0.05mm thick, as streaks in sphalerite layers and as fine disseminations. Chalcopyrite is present as minute elongate bodies in sphalerite. Mutual relationships suggest a paragenetic sequence in which Py1 was followed by Py2, with galena and sphalerite forming later than Py2.

The earlier genetic models for the deposit emphasized syngenetic characteristics and postulated metal precipitation on the seafloor from metalliferous exhalations. The contrasting behaviour of $\delta^{34}\text{S}$ values of pyrite and base metal sulphides suggested a dual source for sulphur: one for pyrite and the other for galena and sphalerite. They suggested that pyrite formed diagenetically, while galena and sphalerite were precipitated elsewhere and accumulated syngenetically at the sites of diagenetic pyrite formation. This was model modified by postulating that Py2 formed after Py1, galena and sphalerite by post depositional reactions.

However, has been shown that Py2 formed before galena and sphalerite and that $\delta^{34}\text{S}$ values of galena, sphalerite and pyrite are in some way related. An epigenetic model is proposed in which Py1 formed during early diagenesis. Later mineralizing fluids were introduced from the Western and/or Emu faults and precipitated Py2 galena and sphalerite through reduction of SO_4^{2-} in solution and oxidation of organic matter in the sediments. Williams (1990) has modified the above model and suggested a two-fluid ‘permeation model’ in which two fluids passed into and spread through the unconsolidated sediments beneath the HYC lake or lagoon. The uppermost iron-rich, reduced fluid deposited iron monosulphides. The lower fluid was rich in Pb and Zn but poor in reduced sulphur and dissolved iron monosulphide to precipitate galena and sphalerite”..

Contemporary genetic hypotheses consider the mineralisation to be syngenetic or diagenetic, or more likely a combination of both processes. The palaeogeography of the HYC area is believed to have played a critical role in

the formation of the mineralisation in both time and space. The Emu Fault is thought to have acted as a channelway for the introduction of metalliferous brines.

Recent Developments

The results of the 2002 seismic survey over the Batten Trough led to a reinterpretation that the rift controlled depositional trough west of the Emu Fault is a complex thrust sheet accretion to the west of the Emu Fault which is now interpreted as a strike-slip fault rather than a basin controlling rift providing downthrow and thickening of units east towards the fault. The primary basin hosting the prospective Barney Creek Fm/HYC Pyritic Shale Member is interpreted (and drilled) to continue east of the Emu Fault

“The seismic data suggest that the potential for McArthur style base metal deposits is expanded within and east of the Batten Fault Zone. Some reasons include:

- *Segments of the Emu Fault now under cover north and south of the McArthur River deposit. The seismic data have strengthened the interpreted strike slip geometry of the Emu Fault with probable stratal growth of the upper McArthur Group with some flower structures (e.g. at the McArthur River deposit and at Ryan Bend). This means that other sub-basins must have developed along the 150km length of the fault and are prospective for base metals. The likely economics of any discoveries are also enhanced by the probability that mineralized sub-basins (typically subsidence features and therefore structurally ‘deep’) have been later inverted to sit at structurally ‘shallow’ positions.*
- *Areas east of the Emu Fault under cover. Contrary to most literature, the McArthur Group continues east of the Emu Fault with considerable thickness and largely parallel reflections, indicating that this fault did not have first order control on deposition or post-deformational distribution. Therefore, the exploration potential of covered area to the east is improved, as there is a much broader distribution of appropriate and thick trap rocks (Barney Creek Formation appears to be a wide high-amplitude reflection set) and other blind syn-sedimentary structures like the Emu Fault could be present. There is, however, a perception that any mineralized system will be too deep for economic exploitation, particularly under the Roper Group.*
- *Within the Batten Fault Zone. The current structure and thickness estimates of packages in the Batten Fault Zone do not reflect the architecture at Barney Creek time. Thrust sheets elsewhere in the fault zone may contain a thicker McArthur Group succession or may conceal an Emu-like strike slip fault that had earlier tapped fluids from deep in the basin.*

- *Seismic acquisition and processing was successful. Thus, direct detection of SEDEX deposits by the acquisition of shallow (1 second) reflection seismic data along the length of the Emu Fault Zone may be an economically viable option for explorers, particularly under Cainozoic cover”..*

2.3.2 Replacement Copper and Mississippi Valley Pb – Zn Mineralisation

Replacement base metal occurrences in the district are invariably extremely localized or are patchy or sparsely disseminated and low grade. Five main types of mineralisation are represented:

- o Discordant fault-hosted copper within coarsely recrystallised dolomite (e.g. Gordons, Sly Creek, Hammers Hut and Apollo-in part).
- o Discordant fault-hosted lead and/or copper in breccia zones within siltstone or chert (Johnston’s Pb-Cu and Apollo-in part).
- o Stratabound, and dolomite/barite vein-hosted lead, zinc or copper in bedded dolomite. Occurrences are usually confined within a particular stromatolitic horizon (e.g. Mariner East, Great Scott, Eastern Creek and many of the very minor occurrences).
- o Unconformity-associated (regolithic) lead, zinc or copper occurrences separating Proterozoic dolomite and younger clastic sequences (e.g. Mariner and Mariner North)
- o Stratiform lead or copper (and barite) mineralisation in chert (e.g. Mariner Cu-Ba, Apollo, Hammers – Cu, and a minor Pb-Ba occurrence at Limestone Creek).

A further type was recognized in metadolerite of the Scrutton Volcanics which contains uniform, sparsely disseminated pyrite and traces of chalcopyrite.

Discordant, fault-hosted copper within coarsely recrystallised dolomite.

At both Gordon’s and Sly Creek, faults with a large east-west directional component are associated with broad (around 100m wide) recrystallised zones within bedded dolomite. Discontinuous silicified zones occur along the fault trace. Chalcopyrite is largely confined to the dolomites close to the fault trace but may persist in very patchy disseminations across the recrystallised zone. The large dimensions of these mineralised structures (> 1000m x 100m) suggest some potential for these deposits, but grades appear consistently very low.

Discordant fault-hosted lead and/or copper in breccia zones within siltstone or chert.

This type of mineralisation might normally be expected to have some potential to host base-metal deposits of moderate size. However, the two examples recognized (Johnston's and Apollo) both occupy very narrow structures (< 1m wide), and one (Apollo) has been extensively drill tested.

Stratabound, and dolomite/barite vein-hosted lead, zinc or copper in bedded dolomite.

Stratabound vein-hosted mineralisation in dolomites is by far the dominant type of sulphide mineralisation in the area. All but a few of the more minor occurrences belong to this group, as well as some of the more persistent sulphide-bearing horizons such as Great Scott and Mariner East. Sulphides normally accompany dolomite or barite (or both) in thin (few mm) to hairline veins confined within a particular stromatolite unit. The cause of this control is not obvious, particularly as there is no consistency of favourable stromatolite type between occurrences. Yet the control is marked and mineralisation may persist intermittently in one layer, for tens of kilometres. This suggests that higher organic (algal) content of certain stromatolitic layers may give rise to collapse of stromatolites during diagenesis and algal decay.

This type of occurrence is characterized by low vein to wallrock volume ratios and shows little potential to generate economically viable deposits. Their significance probably lies in indicating the existence of hydrothermal mineralising systems.

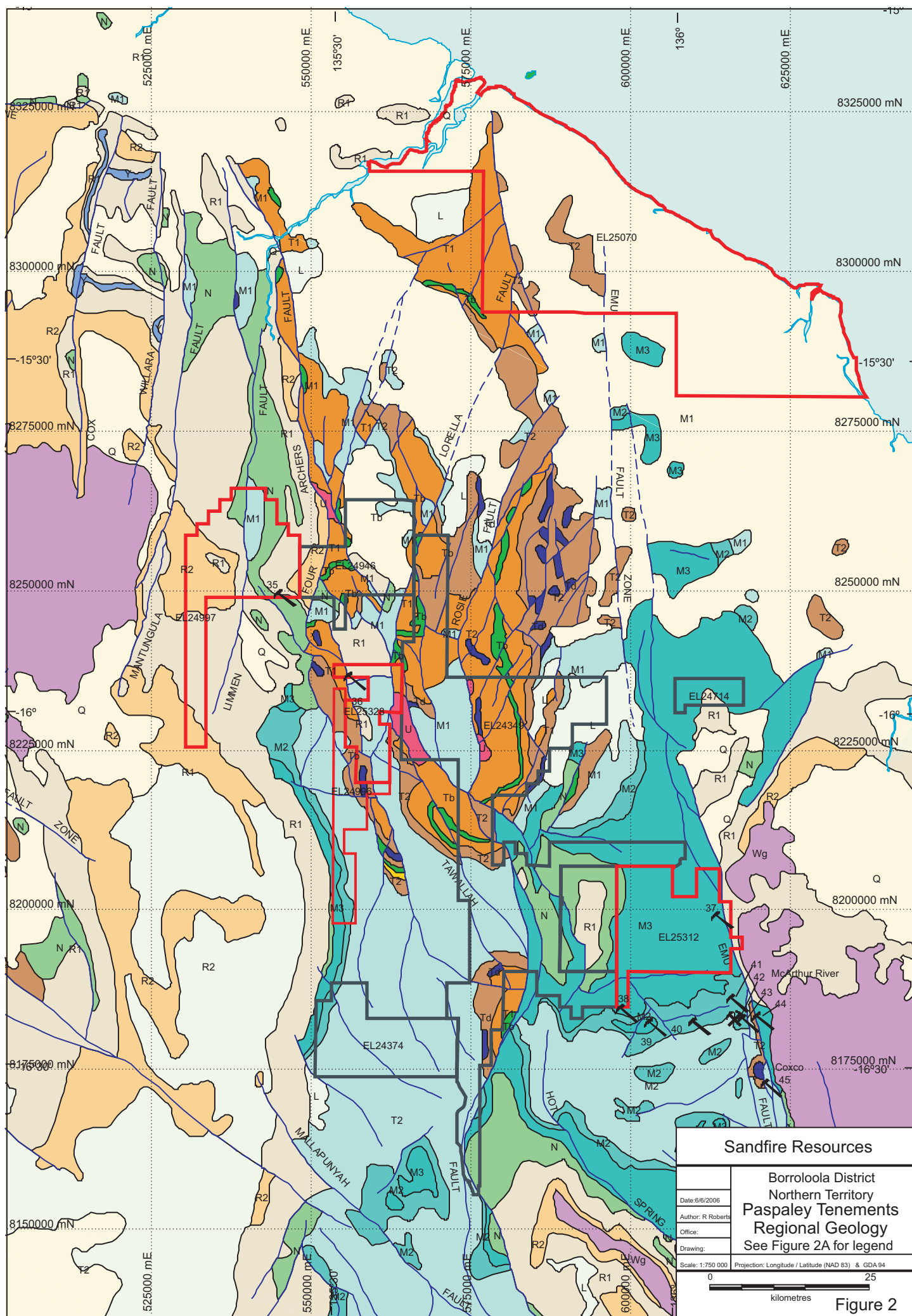
Unconformity-associated (regolithic) lead, zinc or copper occurrences separating Proterozoic dolomite and younger clastic sequences.

Regolith-hosted mineralisation has been extensively drill tested by CEC and BHP at Mariner where it underlies Cretaceous (or Roper Group) conglomerates. It is suspected in such cases that base metals from the underlying sequences have been remobilized by groundwaters into available open space in the regolith. Whilst such regolith development generally appears to be limited, these deposits may be considered to be of Mississippi Valley type and probably should not be dismissed without due examination.

Stratiform mineralisation in chert.

Mineralisation of this type is invariably associated with bedded chert (surficially replacing dolomite) which is thought to reflect a silicification event in a Cretaceous weathering profile. Such chert is widespread in the north of the Batten Trough (Mt Young 1:250000 sheet area). The stratiform mineral occurrences known are invariably small-scale, lens shaped bodies of 0.1 to 0.2m thick and up to several metres in length. They tend to be high grade and commonly coexist with barite lenses. They are interpreted to represent Cu,

Pb and Ba occurrences remobilized by weathering and segregated along bedding planes. Although their ultimate origin is not always clear, at Apollo a composite deposit of this type is partly fault-hosted. This type of stratiform mineralisation is considered most unlikely to form a major deposit, although it could conceivably be related to one.



McARTHUR BASIN

RAWLINGS, D.J., 2001.



Albert Equal Area Projection, Central Meridian 133°30' EAST
Standard Parallels 13°30' and 23°30' SOUTH
Geocentric Datum of Australia 1994 (GDA94)

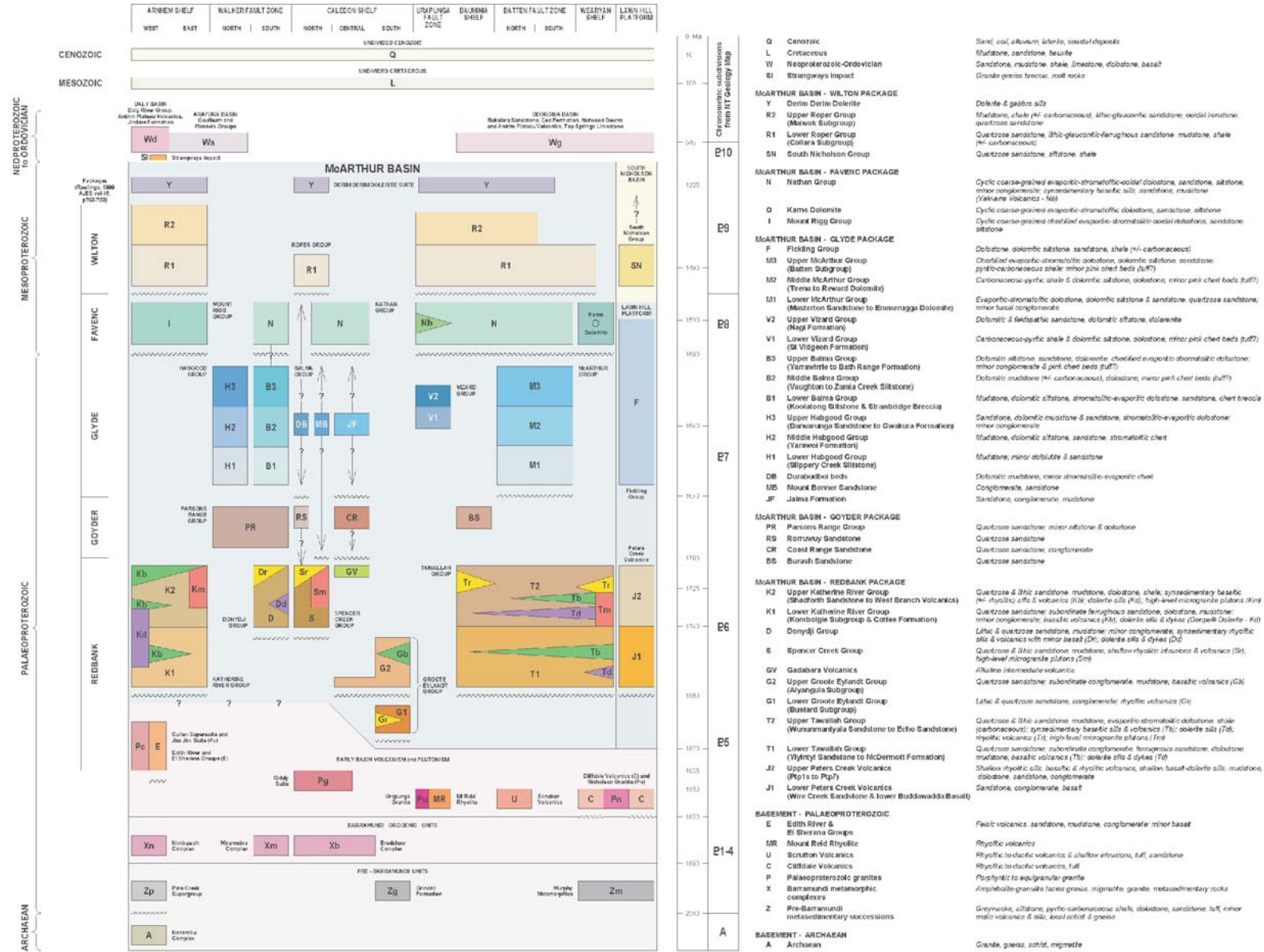
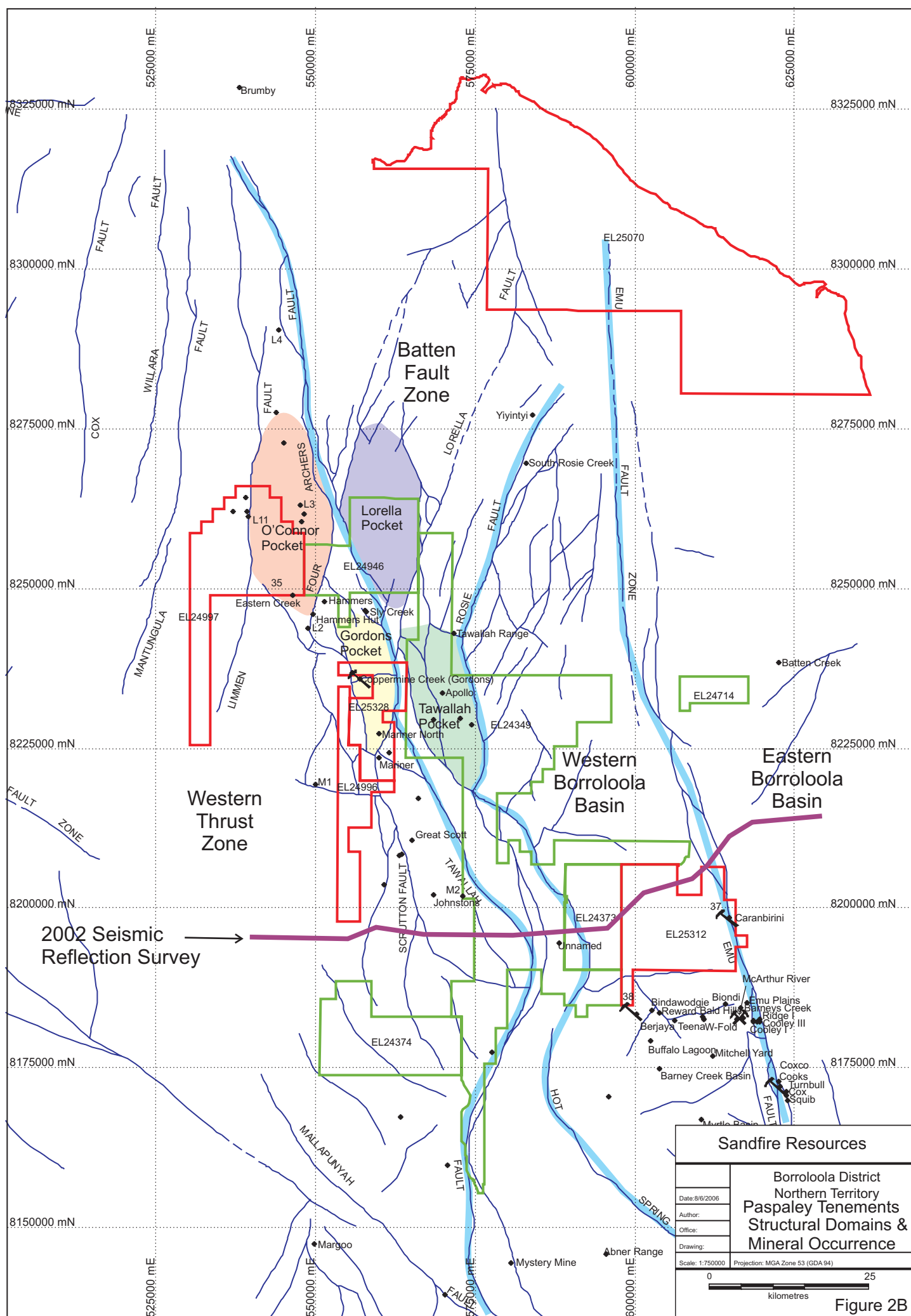
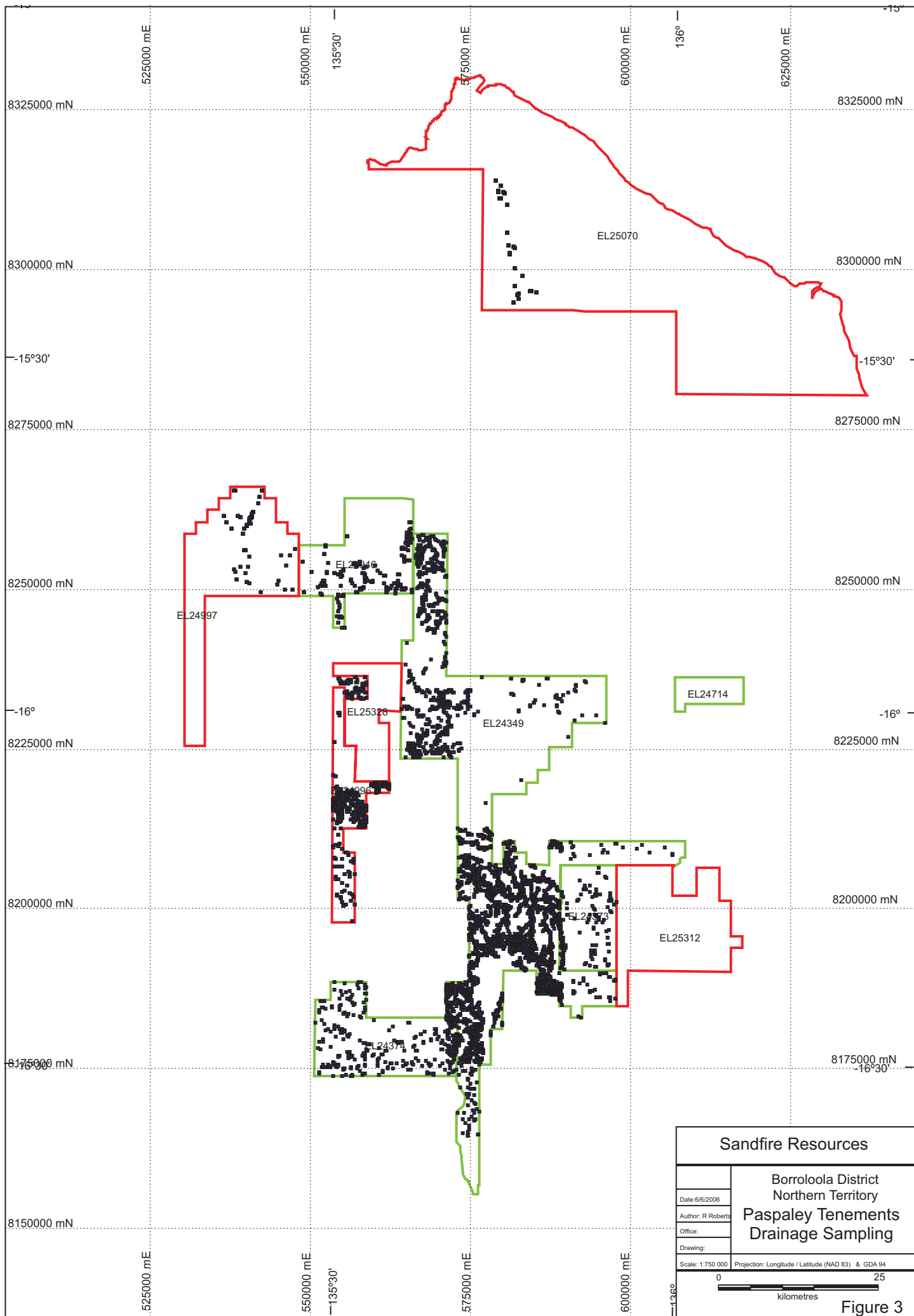
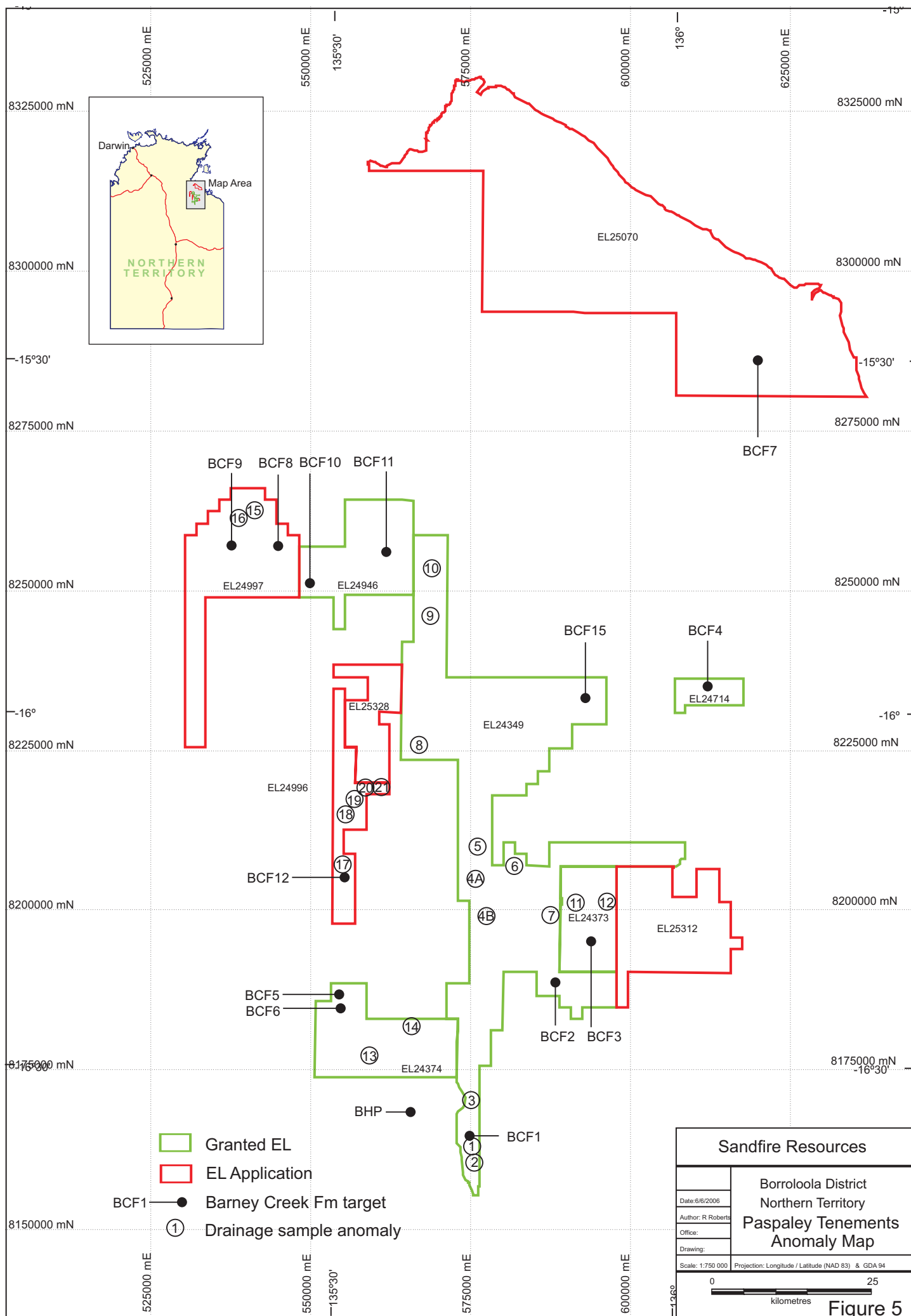


Figure 2A







3.0 Tenement Review

3.1 Previous Exploration and Mineralisation Potential

The single most outstanding fact to come out of +30 years of extensive exploration in the Batten Trough is that there have been no economic discoveries made subsequent to the discovery of the HYC Pb-Zn-Ag deposit in 1955.

Whilst early work by CRAE, CEC et al (1970s) led to the discovery of several small late stage replacement Pb-Zn-Ba and Cu prospects additional stratiform 'syn-sedimentary' Pb-Zn-Ag prospects discovered have been small and located close to the Emu Fault.

In the past, the general approach to exploration in the district comprised flying of airborne EM, follow-up of conductors by stream sediment sampling and ground EM surveys. A great number of the conductors located were due to regolith/lithology with only a few genuine deep sulphide responses.

The search for HYC type mineralisation focused on identifying the host Barney Creek Fm in outcrop, at shallow depth or in some cases +500metres depth. The early programs delineated a series of sub-basins through the district. These were assumed to be 'primary basins' and hence may have accumulated base metals through ponding of metaliferous brine solutions.

A number of HYC type mineralised occurrences with relatively narrow intercepts were discovered during the 1960-70s e.g. W-Fold, Emu Plains, Berjaya, Mitchell Yard, Myrtle Sub-Basin, Barney Creek Sub-Basin, Caranbirini, Ridge and Buffalo Lagoon. None of these deposits are currently viable.

Although anomalous base metal intercepts have been made in Barney Creek Fm (i.e. 40-80 metres at 400-800ppm Pb/Zn), no economic intersections have been sighted in the data reviewed. Proximity to the Emu Fault seems to be a key factor even in the distribution of the anomalous Barney Creek Fm zones. This observation is probably biased owing to the fact that a lot of exploration was focussed on the Emu Fault Zone as part of the mineralisation model.

In addition to the HYC type mineralisation discussed above, exploration 'along' the Emu Fault led to the discovery of a number of Cu-silica breccias and/or coarse grained Cu-Pb-Zn + carbonate bodies similar to the known Coxco and Squid deposits. These were the Ridge, Cooley and Darcy's deposits.

The search for HYC type mineralisation in the early 1970s also led to the discovery of a string of replacement Pb - rich deposits in the Western Thrust Zone, e.g. Eastern Creek, Apollo, Hammers, Mariners, Mariners North and Great Scott, none of which are economically viable.

No new copper prospects similar to the known Gordon's, Sly Creek, Hammers Hut, Apollo-in part, and Johnstons occurrences have been discovered in over 30 years of exploration.

The tenements subject to this review are listed below in **Table 1** and shown in **Figure 1**.

Tenement	Holder	Application	Grant	Blocks	Area(km²)
EL 24349	Paspaley	-	10/04/05	367	1199
EL 24373	Paspaley	-	10/04/05	45	148
EL 24374	Paspaley	-	10/04/05	79	244
EL 24714	Paspaley	-	01/12/05	18	58
EL 24946	Paspaley	-	18/04/06	70	224
EL 24996	Paspaley	20/10/05	-	39	125
EL 24977	Paspaley	20/10/05	-	106	340
EL 25070	Paspaley	25/11/05	-	488	1562
EL 25130	NAD #	-	28/12/05	-	-
			Total	1212	3900

Table 1. Borroloola Tenements

Paspaley application EL 25130 declined in favour of North Australian Diamonds Ltd - Merlin Diamond Mine EL 25122

Paspaley have subsequently applied for two further ELs which are both conflicting applications with Sirius Resources Ltd(ELs 25312 and 25328).

3.2 Granted Tenements

Exploration Licence 24349

Regional setting: The tenement covers approximately 85km north-south of the central Batten Trough area and is underlain by Tawallah and McArthur Group rocks in a complex thrust and fault zone bounded by the Tawallah Fault to the west and the Hot Springs Fault to the east (Batten Fault Zone).

West of the tenement the Scrutton and Tawallah Thrust Sheets dip 10-20° W with stratigraphy essentially striking NS. Several open folds may represent nappe structures developed within basal sequences on the thrust plane.

East of the Hot Springs Fault within the Borroloola Basin a series of relatively undisturbed 'sub-basins' are preserved through to the Emu Fault Zone (HYC, Myrtle, Buffalo Creek, Teena, Emu and Barney Creek Sub-Basins).

Between the Tawallah Fault and the Hot Springs Fault there are a number of west over east thrusts which coalesce to form single structures or bifurcate with back thrust development forming 'structural basins' or 'pockets' of McArthur Group rocks bounded east and west by Tawallah Group rocks. The 'pockets' in many cases include unconformable Nathan/Roper rocks indicating 'post-Roper' deformation. This complex zone of thrusting and faulting has historically been referred to as the 'Batten Fault Zone' (as in this report).

To the north of the tenement the west over east thrusting is further complicated by a series of NE faults (Lorella Fault- Rosie Fault) which were probably active pre and post the thrusting. As 'post-thrust' structures they are evident as normal block faults. Interpretation of data from the seismic survey on the Bauhinia Downs Sheet has led to the modelling of a basement high in the centre of Batten Trough. This high appears to have deflected upwards successive thrust sheets resulting in the complex repetition of stratigraphy through the central Batten Fault Zone.

The NNE faults possibly represent reactivation of the basement structures post thrusting.

Geological Setting: The most dominant structure in the tenement area is the arcuate Tawallah Fault which can be traced for 60km. To simplify the description of geology and past exploration over the 85km of the tenement it has been divided into South Leg, Central Batten Creek, North Central and North Leg areas.

South Leg: In the southern tenement area the Tawallah Fault trends NNE. West of the fault, lower McArthur Group Masterson Sandstone and Mallapunyah Fm outcrop and are overlain by Tooganinie Fm in contiguous (to the west) EL 24373.

East of the Tawallah Fault the northern closure of the Abner Range Basin is in direct contact with the fault. An east facing and dipping sequence mapped as Reward Dolomite to Lynott Fm outcrops within the tenement. This sequence is overlain by Nathan Group rocks to the SE tenement boundary. To the NW of the Tawallah Fault logic would say that the east dipping west flank of the Abner Basin should be preserved below the thrust plane.

Central Batten Creek: To the east of the Tawallah Fault, Nathan Group (over McArthur) outcrops through to the Hot Springs Fault which has thrust Nathan Group over Roper Group within contiguous (to the east) EL 24373. Immediately to the west of the Tawallah Fault the tenement is underlain by west facing Mallapunyah Fm and Amelia Dolomite.

The 2002 seismic survey passes through the tenement in the central area. Interpretation of the data shows a series of thrusts moving west block over east stepping through the tenement area. Interpretation of the seismic data places Barney Creek Fm at depths in excess of 1000m beneath the Tawallah Thrust Sheet and within the central east area of EL 24349.

North Central: In this area the Tawallah Fault swings NW thrusting Tawallah Group and Scrutton Volcanics over the lower McArthur Group rocks of the Tawallah Pocket, which in turn is in the faulted contact (Rosie Fault) with east facing basal Tawallah Group Rocks. The Tawallah Pocket is underlain by lower McArthur Group Masterson Sandstone to Tatoola Sandstone sequence. Cretaceous capping occurs throughout the 'pocket'.

The eastern boundary of EL 24349 steps NE in the Central North area to the north of Yalco Creek, where extensive alluvial cover and outliers of Cretaceous sandstone cover a 5km wide valley underlain by an east facing succession of McArthur Group rocks from basal Masterson Sandstone (west) to Lynott Fm /Nathan Group in the east.

North Leg: This area is underlain by lower Tawallah and McArthur Group rocks in a complex NE trending structural corridor between Lorella Fault and the Rosie Fault.

Previous Exploration: Within the tenement area only one prospect, the Apollo Pb-Zn-Ba occurrence is known. None of the exploration programs carried out since the late 1970's has located any further mineralisation within the tenement area.

The Apollo Prospect was discovered by CEC in 1977 (CR 1978/0022). An 80# stream sample returned 560ppm Pb, 100ppm Zn with a corresponding -20+40# assay of 0.14% Pb and 480ppm Zn. Follow-up mapping and rock-chip sampling lead to the discovery of the Apollo Prospect outcrop (containing galena, cerussite, chalcopyrite and malachite). Rock-chip assays peaked at 2500ppm Cu, 18.5% Pb, 19ppm Zn, 23ppm Ag. Composite chip samples over 10-15m peaked at 470ppm Cu and 4.4% Pb. A separate zone of Cu and low

Pb (1400ppm Cu, 40ppm Pb) indicates the possibility of two mineralising events in the district.

A description of the Apollo Prospect is given in full in the CEC report CR1978/0022 – page 12. The prospect comprises a 'window' of Amelia Dolomite (500 x 700 metres) surrounded by laterite in which three mineralized units were mapped and sampled.

Bedded galena and cerussite ($\pm$ barite) with minor malachite was located in several chert outcrops. The mineralisation is stratiform within cherty units (silicification) intercalated with siltstones/mudstones of the Amelia Dolomite (Pma). The chert units are flat-lying at 10° and strike 240°. Intense leaching of the outcrop area lead to the concept that base metals would also have been leached and hence drilling to test for higher grade mineralisation should be undertaken.

One diamond hole DDH78-TP1 (99m) and 27 percussion holes (800m) tested the area. Four of these percussion holes tested an area of 500ppm Pb 1.5km south of the Apollo Prospect.

Excessive core loss in the diamond hole over the first 30m (target zone) led to a decision to continue the program with percussion drilling only. The drill results listed in Table 1 of the report (CR 1979/0040) are singularly disappointing returning only 1 metre mineralized intervals. Cavities and the very weathered 20-40 metre interval lead to most holes being abandoned. An exception was hole Apollo 2 RDH which intersected 15m at 2.15%Pb – 5.6glt Ag from surface (including 2m at 8.4% Pb and 1m at 5.6%Pb) and 1m at 1.1%Pb from 24m and 1 m at 1.25%Pb from 38m. CEC relinquished the property in 1982.

Petrological studies (CR1982/0388) indicated that the mineralisation was post the silicification (chert) event.

Information on diamond hole DDH 84 7P-1 (CR 1985/0087) drilled by CRA (1984) just north of the Apollo project has not been sighted. The hole is reported to have intersected 47m of 0.03% (300ppm) Cu within Amelia Dolomite (Bauhinia Downs Explanatory Holes).

With respect to other programs over the wider tenement area 'layers' exploration by several companies (CEC, MIM's in joint venture with BHP, Ashton in joint venture with BHP) have covered the tenement with multiple geochemical surveys and airborne geophysical (EM) surveys. Although numerous 'anomalous' leads were followed up there is no record of drilling within the tenement area (except for the Tawallah pocket).

The focus of MIM's exploration (as follow-up to CEC work) was in the Mariners trend to the west of the tenement and within the main sub-basins adjacent to Emu Fault (and in the Mallapunyah Sub-Basin/Abner Range area to the south (not subject to this report).

The Sandfire SSD plot pulls together all stream sediment data for the tenement and can be used with confidence in assessment of the prospectivity in the outcrop areas. The extensive alluvial valleys of the Central Batten Creek area are not deemed to have been adequately tested by the stream sediment programs.

South Leg: In the southern tenement area to the east of the Tawallah Fault, above threshold Cu-Zn values (30ppm Cu, 30-40ppm Zn) occur over an east facing Coxco Dolomite to Lynott Fm sequence on the NW margin of the Abner Basin. Barney Creek Fm if present would dip out of the tenement to the east. [Anomaly 1, BCF – 1. See Figure 6. Image24349A.](#)

The unconformity with the Nathan Group of the Abner Range is masked by extensive alluvium. Two isolated Pb values (58 and 37ppm) were returned from the Nathan outcrop areas. This area has not been fully evaluated for replacement style mineralisation. [Anomaly 2. See Figure 6. Image24349A.](#)

West of the Tawallah Fault several Cu highs in Amelia Dolomite have been returned to the SE of the 'BHP anomaly' (south of EL 24374). [Anomaly 3. See Figure 6. Image24349A.](#)

Central Batten Creek: To the west of the Tawallah Fault the SSD highlights four anomalous copper areas associated with lower McArthur Group Masterson and Mallapunyah rocks.

Two distinct clusters of copper-only values occur on the south bank of the east flowing Shady Camp Creek, a tributary to Batten Creek. Both anomalous areas sit below a NW splay off the Tawallah Fault. Source rocks appear to be faulted Mallapunyah Fm. To the south of the above area, copper values to 80ppm were returned from a fault bounded block of Mallapunyah Fm. The anomalous values are from streams draining into Batten Creek. [Anomaly 4A and 4B. See Figure 7. Image24349B.](#)

A robust copper anomaly is developed in a stream through Tawallah Group - Rosie Creek Sandstone. Copper values peak at 60ppm with associated zinc values to 40ppm. [Anomaly 5. See Figure 7. Image24349B.](#)

A copper anomalous area (to 40ppm) occurs on the north side of Batten Creek. The samples appear to have been collected from an alluvial area below an outcrop of Mallapunyah Fm. All of the above anomalies are west of the Tawallah Fault. [Anomaly 6. See Figure 7. Image24349B.](#)

A large Zn-Pb anomalous zone, +40ppm Zn and Pb over 3km strike associated with Nathan Group occurs immediately east of the Tawallah Fault. The anomalous area is contiguous over the Hot Springs Fault with

Nathan/Roper Group anomalies within EL 24373 to the east. [*Anomaly 7. See Figure 8.*](#)

Ashton/BHP held EL 7302 from 1991 -95. They flew a QUESTEM survey over the tenement and returned seven conductors. Within EL 24349 anomaly B208 at 593870nE /8185712mN (AMG) estimated to be at 250-300 metres depth was not drilled (CR 1995/0645). The conductor is interpreted to be hosted by Lynott Fm above the Barney Creek Fm position. [*BCF – 2. Image24349B.*](#)

North Central: Cu-Pb-Zn anomalous values were returned from sampling programs over McArthur Group rocks within the Tawallah Pocket. In the southern sector of the pocket no sampling is recorded due to the presence of extensive Cretaceous outliers and alluvial cover. In the northern sector of the pocket no sampling was undertaken over mapped Mullapunya Fm and Cretaceous cover.

The stream sediment data for the Apollo area has been discussed previously. An obvious anomaly in the data is that the high Pb-Zn values reported by CEC are not plotted within the 'pocket' which means that not all geochemical data for the district has been entered by the Terra Search program.

The Scrutton Volcanics immediately to the west of the Tawallah pocket returned anomalous Cu-Zn-Pb values in streams draining north and south into Tawallah Creek. Perilya reported uniform, sparsely disseminated pyrite and trace chalcopyrite as occurring in 'dolerite' units within the volcanics. This is backed up by the stream sediment sampling with copper values to 60ppm, Zn to 70ppm and Pb to 120ppm. The lead value may be associated with Tooganinie Fm in faulted contact with the volcanics. The Cu-Zn values are certainly attributable to the Scrutton Volcanics. [*Anomaly 8. See Figure 9.*](#)

To the east of the Tawallah pocket an extensive outcrop area of the Tawallah Group – Yiyinti Sandstone has not been sampled. Further east, there is an area of extensive Cretaceous cover and alluvium overlying McArthur Group that has not been sampled. [*BCF – 15. See Figure 10 Image24349C.*](#)

Northern Leg: Two areas of Cu-Zn anomalies are outlined. The first area is coincident with a zone of complex faulting through Tawallah Group Seigel Volcanics/Sly Creek Sandstone with copper values to 85ppm and Zn to 60ppm. [*Anomaly 9. See Figure 11. Image24349D.*](#)

The second area similarly is associated with faulted Seigel Volcanics and Sly Creek Sandstone along the Lorella Fault line. The anomalous zone is within tributaries draining east into an alluvial valley. [*Anomaly 10. See Figure 11. Image24349D.*](#)

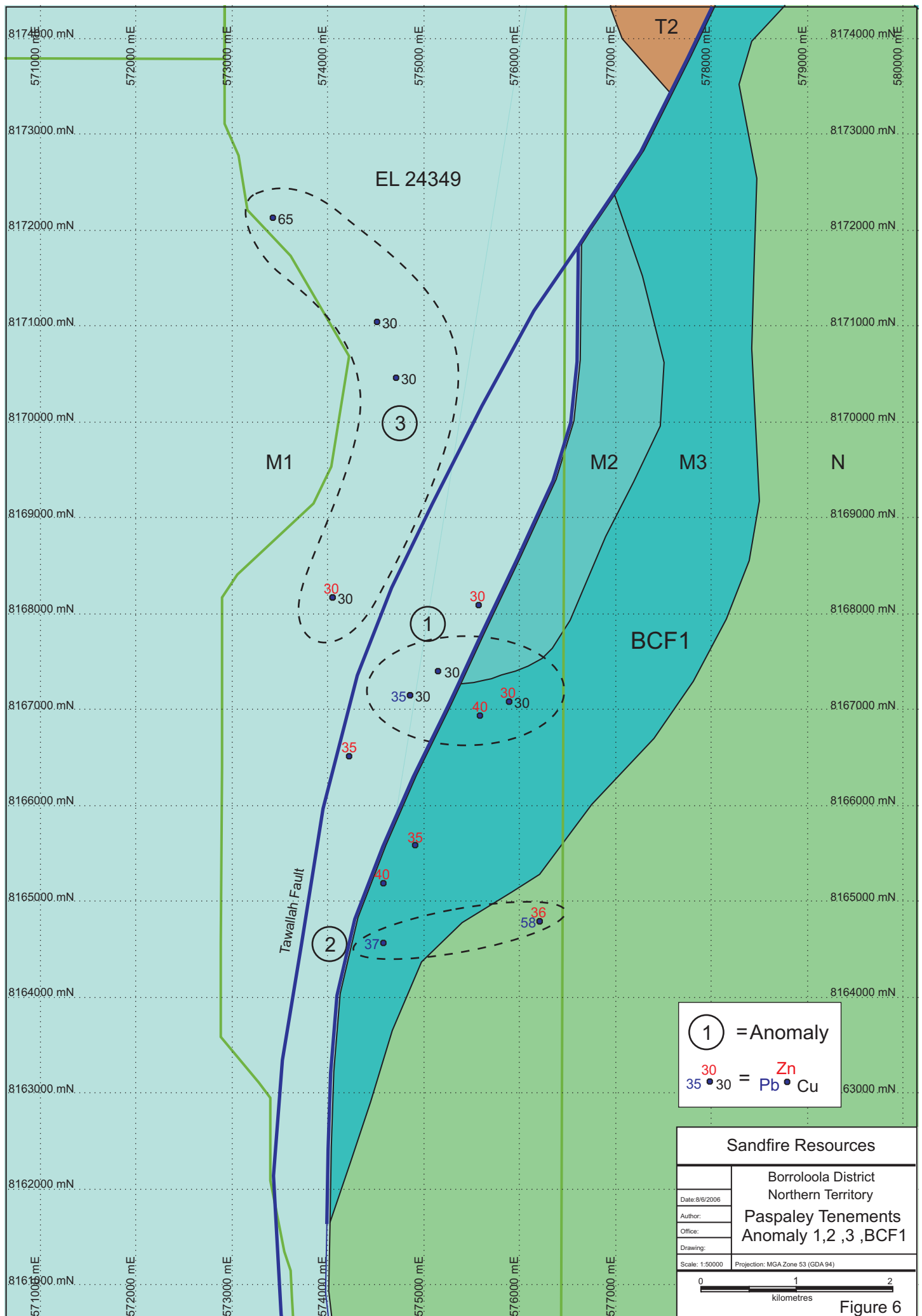
Conclusions: The previous stream sediment sampling programs carried out within the boundaries of EL 24349 are deemed to be a good test of the tenement area.

Large areas of 'no sampling' are still considered to be unprospective eg; the extensive outcrops of Tawallah Group – Yiyinti Sandstone surrounding the Tawallah Pocket. The Apollo Prospect within the Tawallah Pocket has not been drilled to depth. Mapping indicates patchy mineralisation underlying the area. As a Pb only prospect it is difficult to recommend any further work, however, the presence of 'separate' copper areas needs to be further evaluated.

In the eastern part of the **North Central** tenement area extensive Cretaceous outliers and alluvial flats were not sampled. This area should now be reviewed as it is interpreted to be underlain by McArthur Group.

Within the **Central Batten Creek** area intensive sampling of lower McArthur Group Masterson Sandstone and Mallapunyah Fm proved for the most part negative. A few exceptions are four areas of discrete copper anomalism that warrant a follow-up. The Pb-Zn anomalism in Nathan Group rocks in the central tenement require following-up in conjunction with work on EL 24373.

Within the **Southern Leg** tenement area elevated Cu-Zn values east of the Tawallah Fault need to be followed-up as do a number of Pb-Zn anomalies in the Nathan Group rocks of the Abner Basin.



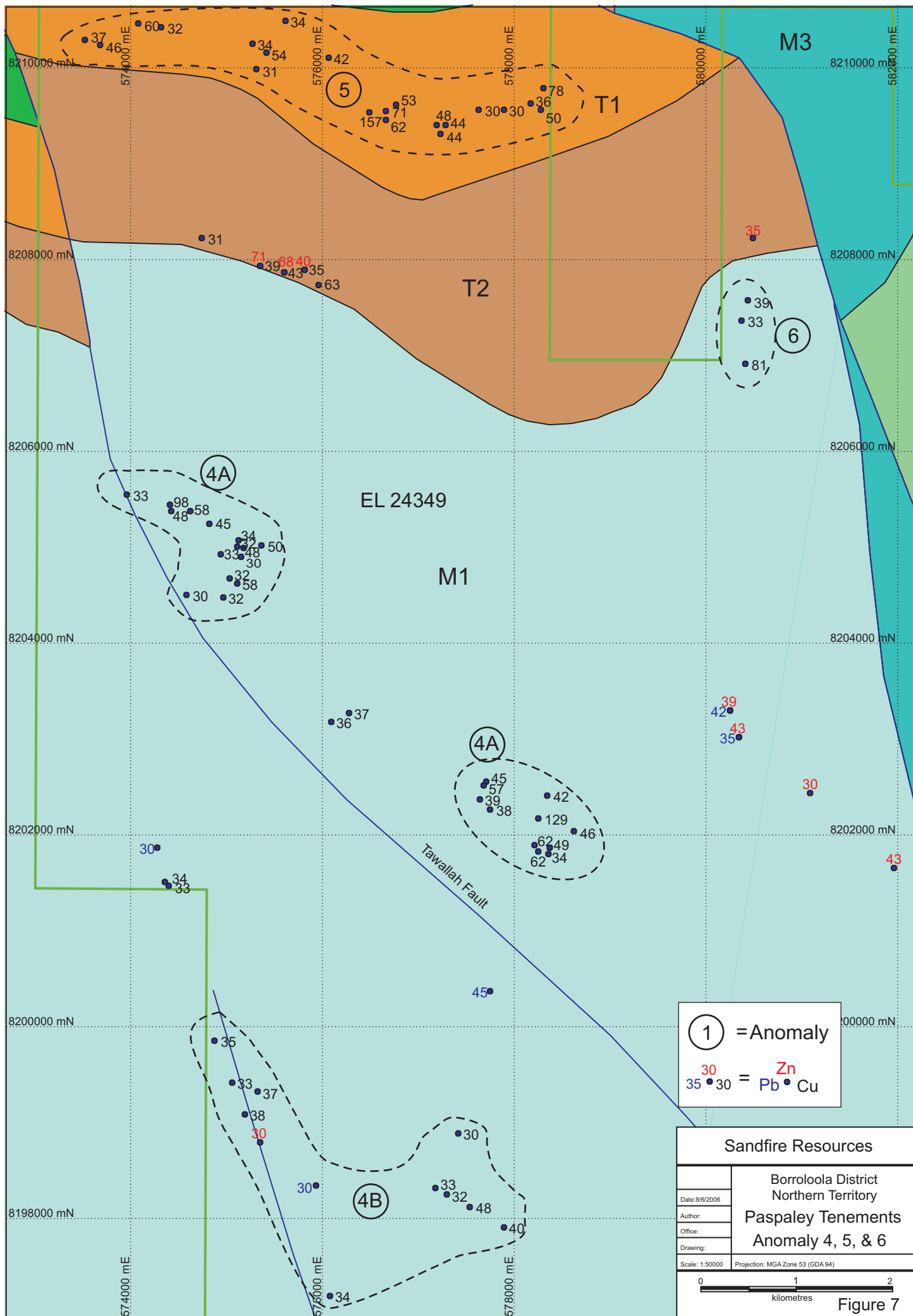
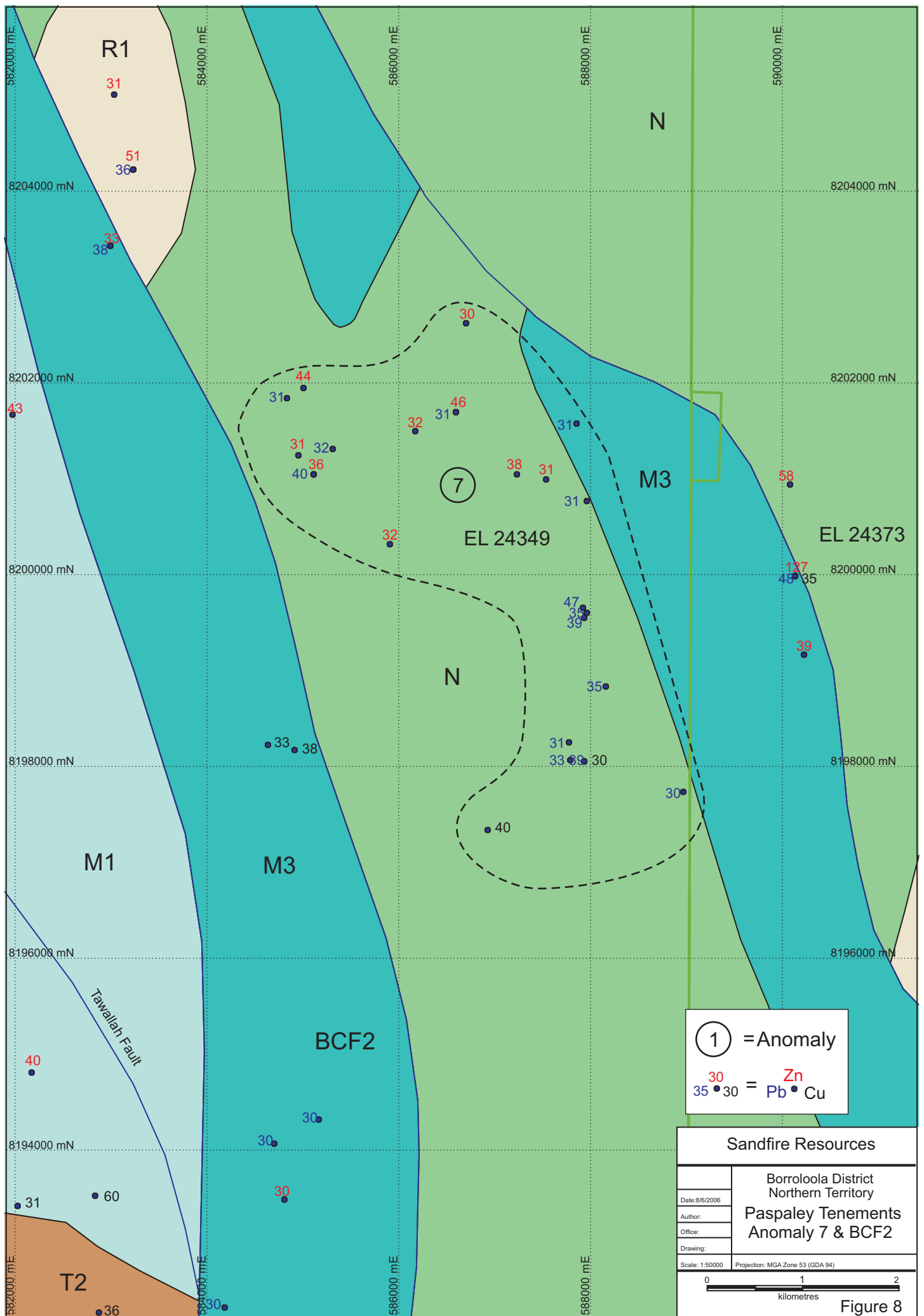


Figure 7



① = Anomaly

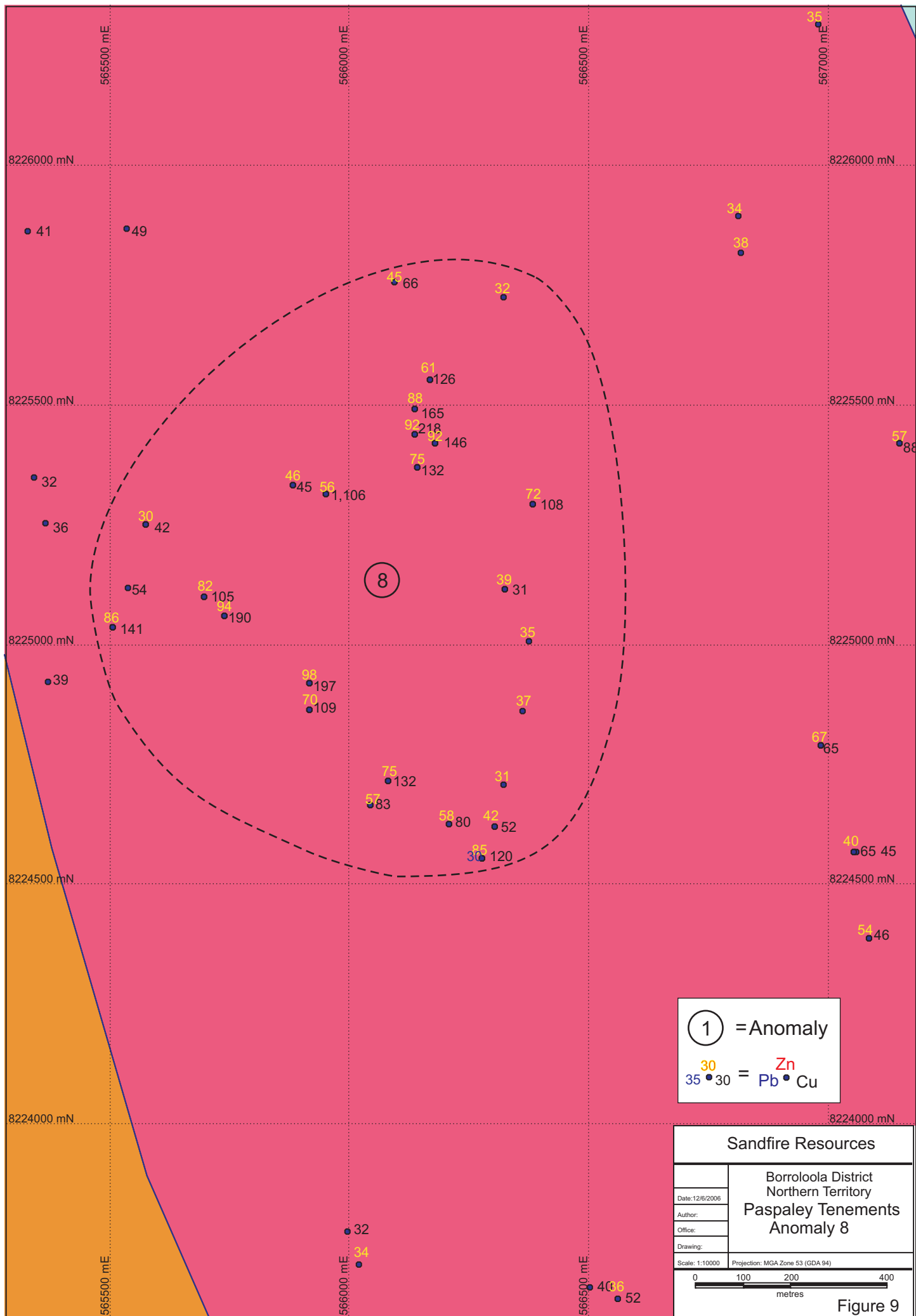
30 (red dot) = Zn

35 (blue dot) = Pb

30 (black dot) = Cu

Sandfire Resources	
Borroloola District Northern Territory	
Paspaley Tenements Anomaly 7 & BCF2	
Date: 8/6/2006	
Author:	
Office:	
Drawing:	
Scale: 1:50000	Projection: MGA Zone 53 (GDA 94)
0 1 2 kilometres	

Figure 8



① = Anomaly

30 = Zn

35 = Pb

30 = Cu

Sandfire Resources	
Date: 12/6/2006	Borroloola District Northern Territory Paspaley Tenements Anomaly 8
Author:	
Office:	
Drawing:	
Scale: 1:10000	Projection: MGA Zone 53 (GDA 94)

0 100 200 400 metres

Figure 9

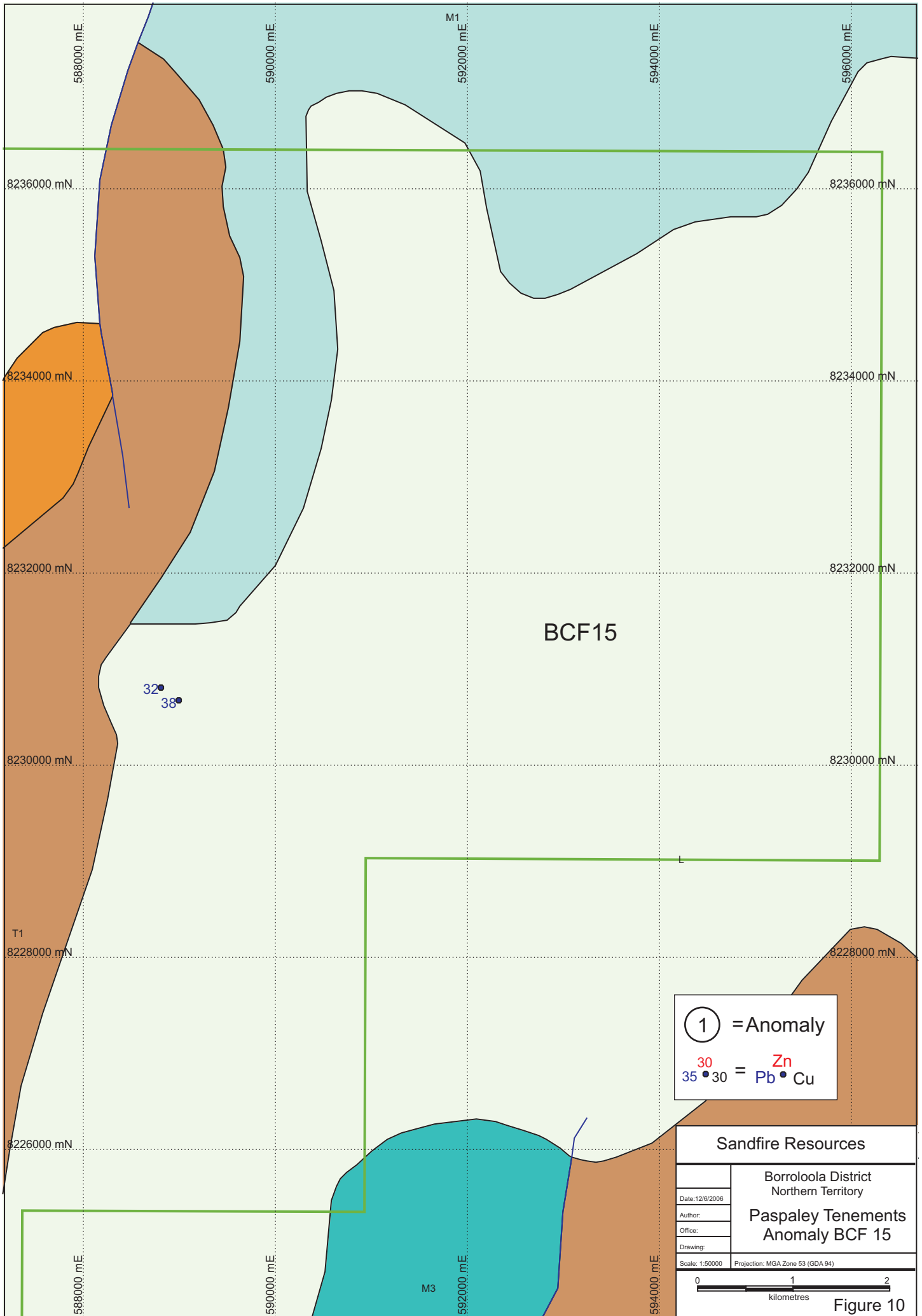


Figure 10

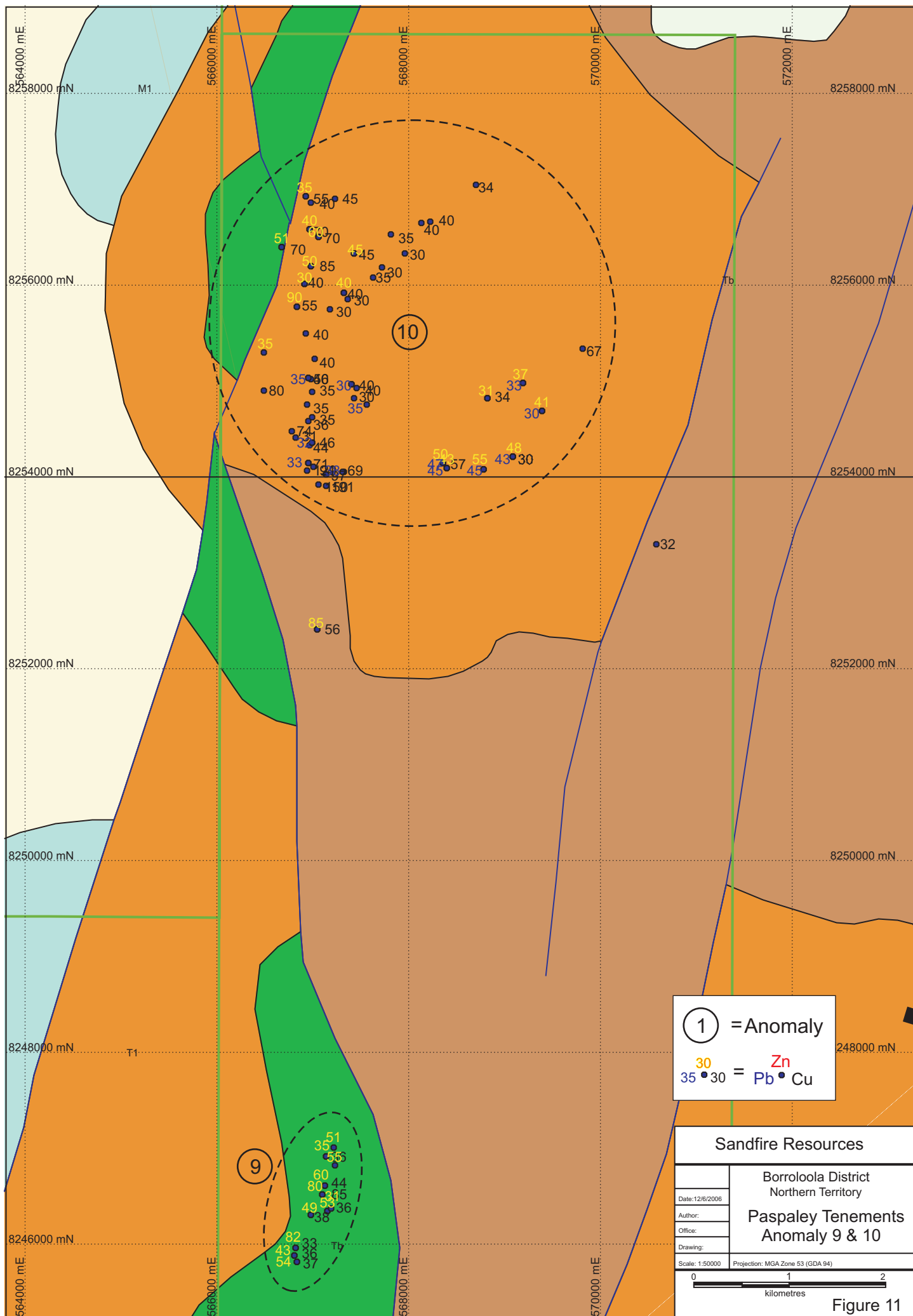
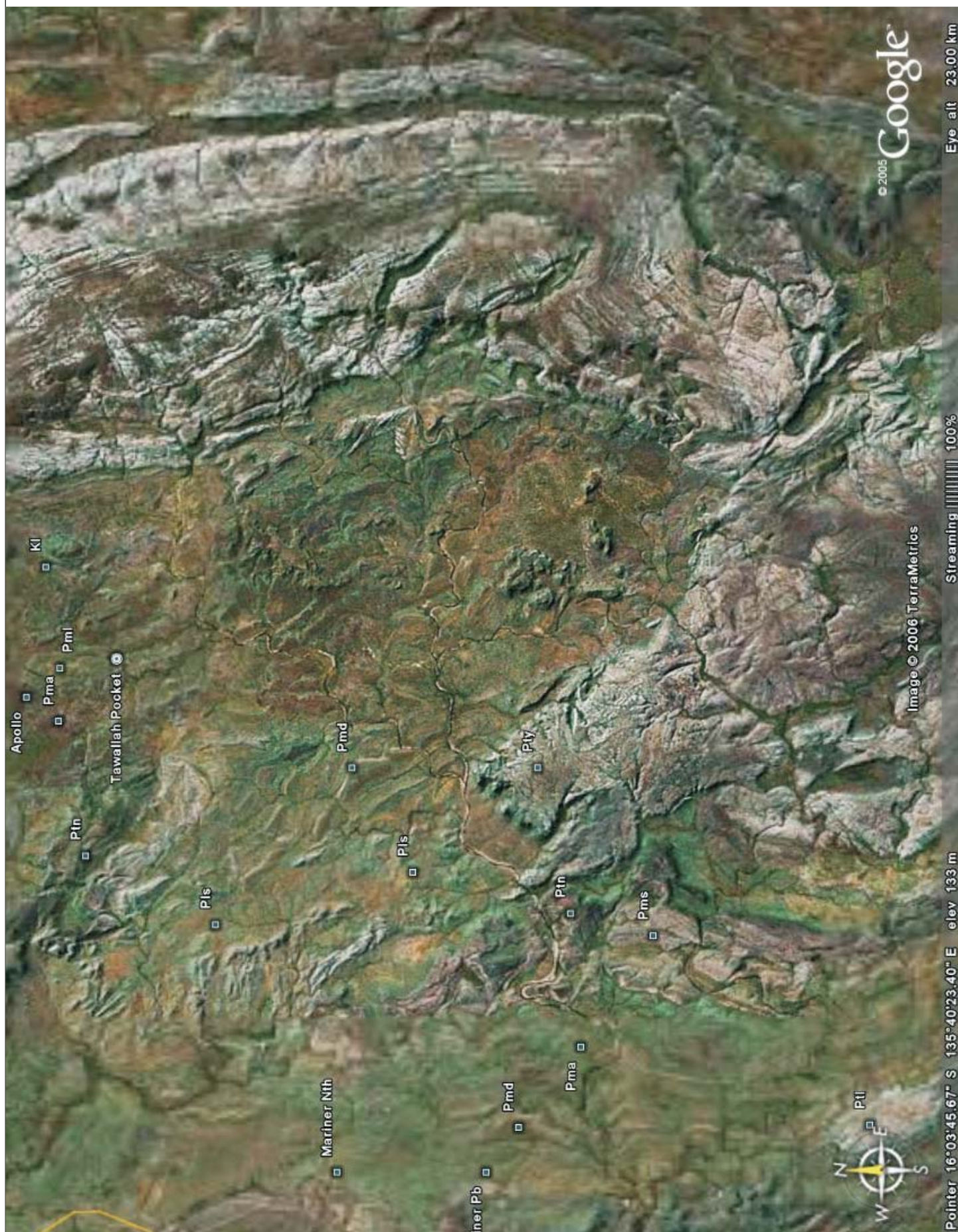


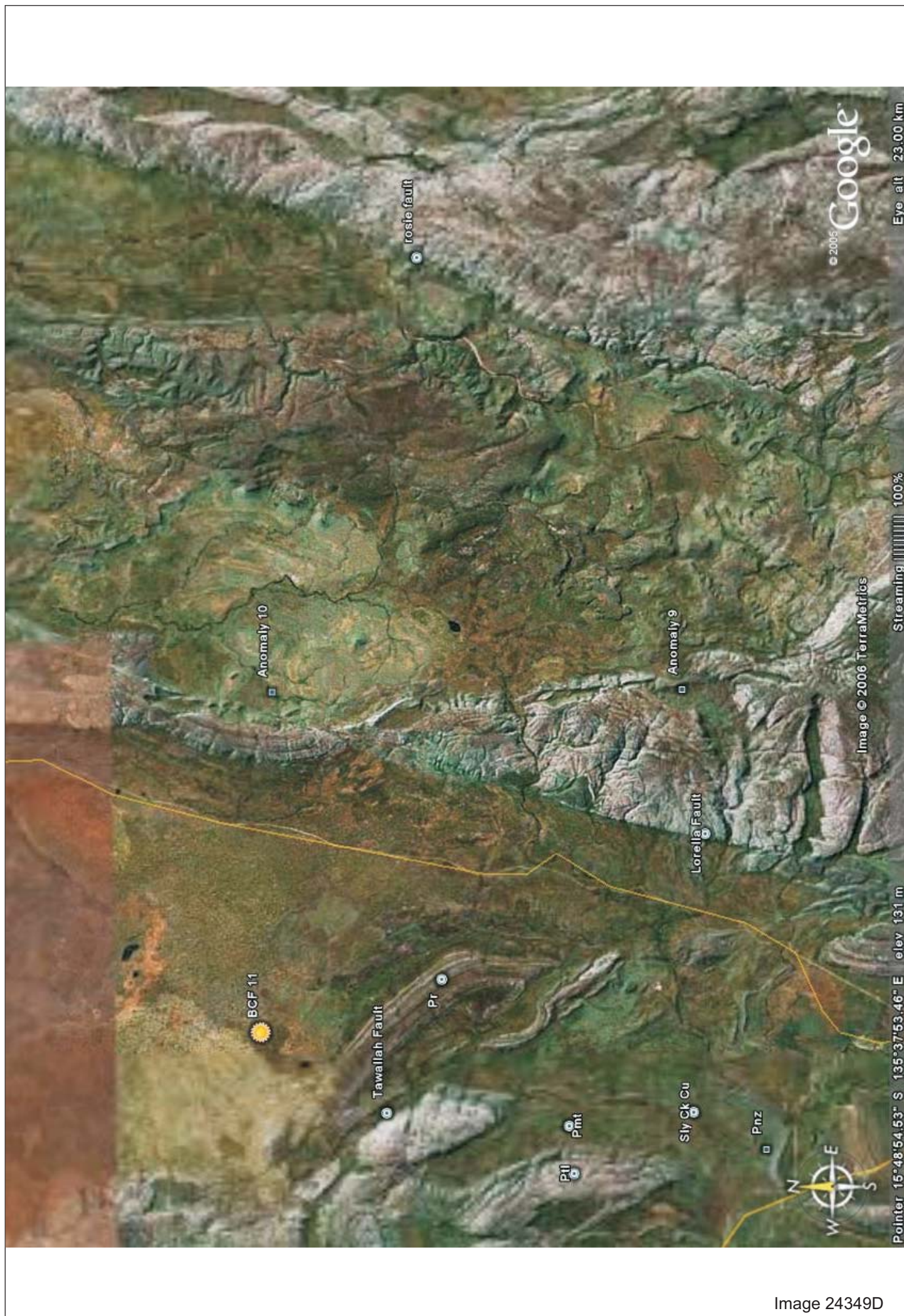


Image 24349A



Image 24349B





Exploration Licence 24373

Regional Setting: EL24373 is located 30km NW of the HYC deposit. The tenement is underlain almost entirely by Nathan/Roper Group sediments which cap McArthur Group rocks of the Western Borroloola Basin.

McArthur Group rocks comprise almost 100% outcrop east of the tenement through to the Emu Fault. The basin rocks comprise a complete sequence from the Coxco Dolomite to Looking Glass Fm. The contact between the McArthur Group and the Nathan Group sediments is one of disconformity as is the case of the Nathan-Roper contact. The McArthur and the Nathan/Roper sequences dip west at 20° -30°.

The tenement area and EL 24349 to the west is depicted in the Schematic Section (B-C accompanying the Batten 1:100,000 sheet. The section shows the units to be dipping west towards the Tawallah Fault.

The ridge forming Limmen Sandstone (Pri) of the Roper Group outlines an elongate (N-S) basin structure cored by recessive Mainoru Fm. The Hot Spring Fault is the main structure traversing the tenement close to the west boundary. The east-west (BT1) and north-south (BT2) Seismic Survey lines run through EL24373.

To the east of Tawallah Fault a series of thrust structures have been interpreted as a west over east thrusting bringing Nathan Group and Lynott Fm to surface again west of the tenement. The mapped Hot Springs Fault coalesces with the Tawallah Fault to the north within EL 24349. Previous interpretations had the fault trending SE to the east of the Abner Range possibly being represented by NW trending structures in the Coxco Valley. Interpretation from the seismic data now shows the Hot Springs Fault as an arcuate thrust structure (in front of the Tawallah Fault) trending SSW through the Kilgour River valley and is responsible for overthrusting the Nathan/Roper Abner Range and associated Mallapunyah Sub-Basin rocks onto the lower McArthur Group rocks east of the Kilgour River.

Geologic Setting: The tenement area comprises 50% alluvial (Cz) cover underlain at shallow depth by Nathan Group sediments. Outcropping Nathan and Roper Group sediments comprise a further 30% of the tenement area, with 20% Upper McArthur Group making up the remainder. As described above the Nathan/Roper Group forms an elongate basin structure that is overthrust by the Nathan/McArthur Group from the west along the Hot Springs Fault, which is linear NNW trending structure along the west boundary of the tenement.

Barney Creek Fm outcrops close to the Emu Fault approximately 15km to the SE of the tenement. With gentle dips of 15-25° this places the Barney Creek Fm at +1000 metres depth below the tenement as depicted in the Schematic

Section B-C of the Batten 1:100,000 Sheet. [*BCF – 3. See Figure 12. Image24373.*](#)

The seismic line BT1 passes east-west through EL24373 and an interpretive section through the EL24373 and EL24349 is given as Figure 14 of the report. The 'reflector' representing the base of the Barney Creek Fm is interpreted to be gently west dipping (5-10°) at between 1000-1500 metres depth below the tenement. The Barney Creek Fm within this area of the basin is 500-600 metres thick. This would place the top of the Barney Creek Fm at +500 metres depth within EL 24373.

Upper McArthur Group, Looking Glass Fm (Pmo) and Stretton Sandstone (Pmr) are exposed around the 'basin margin' with the ridge forming Stretton clearly defining the basinal structure. In the SW corner of the tenement Yalco Fm (Pmj) has been overthrust onto the Nathan Group along the Hot Springs Fault.

Previous Exploration: A review of the historic reports returned two main periods of exploration over the tenement area.

- | | | |
|-----------------------|---------|-----------|
| • Ashton Minerals/BHP | EL 7302 | 1991-1995 |
| • MIMS | EL 7736 | 1992-1996 |

Several other historic EL's overlap EL 24373 however the focus of exploration on these tenements are surrounding Tawallah and McArthur group rocks within EL 24349. The MIM's exploration programs (CR1994/0579) comprised stream sediment sampling which defined low order anomalies (Pb, Zn, Au) mainly within the Tawallah Group (EL 24349) to the NW of the tenement. In 1992 a QUESTEM survey was flown over the northern half of EL 7736 locating a number of weak conductors. The Yalco Creek anomaly was followed up by a SIROTEM survey and subsequently drilled as hole YD01 (YPD-1) to 150 metres. No significant base metal values were returned and no explanation for the EM conductor was made. The stream sediment sampling by MIM's 'touched' the northern point of EL 24373 and covered the 'east area' of EL 24349.

Ashton/BHP applied for EL 7302 in 1991. As was the usual approach in the district Ashton carried out intensive diamond exploration in the first two years with no success. This was followed by a BHP managed base metal search. BHP completed a 450km line QUESTEM survey over the tenement. This located a series of conductors, two of which are associated with Nathan Group – Balbirini Dolomite in EL24373.

Anomaly 52 – 593830mE/8206705mN

Anomaly 59 – 595887mE/8205721mN

(AMG cords not GDA)

The anomalies are listed in full in Table 2 of CR 1995/0645. A third anomaly 'B208' falls within EL 24349 to the south of EL 24373.

BHP collected 238 stream sediment samples over EL 7302. Threshold values of 20ppm Cu, 55ppm Pb and 32ppm Zn were calculated. As per the SSD plotted by Sandfire, BHP noted elevated Cu and Pb associated with Roper Group - Mainoru Fm (Pru) and anomalous Zn associated with Balbirini Dolomite (Pnz) and Lynott Fm (Pmnh). Anomalous Mn to 2.72% was collected from the Crocodile Creek which drains Stretton Sandstone (Pmr) to the east of the tenement. A total of 102 soil samples were collected as follow-up to the stream samples. Values were considered to be low and were not followed up.

Rock chip sampling produced best values of 436ppm Cu, 116ppm Pb and 2070ppm Zn. The high Zn value was attributed to iron scavenging. High Mn rock chips (best 5%Mn/30%Fe) were associated with a Cretaceous outlier.

The SSD plots clearly identify the central Roper Group basin as anomalous in Pb with high Fe and elevated Mn. The best Pb value is 259ppm, 13.3% Fe, 3206ppm Mn, 40ppm Cu. Of particular interest is the cluster of Pb/Mn/Fe and weak Cu values associated with an interpreted fault structure cutting through outcropping Mainoru Fm (Pru). [*Anomaly 11. See Figure 12.*](#)

A number of isolated above threshold values are shown as being collected from NE flowing creeks through the broad alluvial valley in the centre of the Nathan/Roper basin. These values are all downstream of the west limb of the basin. There is no recorded drilling in EL 24373.

To the NE of the Roper outcrop area a Pb-Zn anomalous unit with values to 130ppm Pb, 200ppm Zn and +4000ppm Mn over 3km strike was returned within Nathan Group – Balbirini Dolomite. [*Anomaly 12. See Figure 12.*](#)

Conclusions: The association of Roper Group – Mainoru Fm and Nathan Group – Balbirini Dolomite and anomalous Pb – Mn values is similar to the drilled Eastern Creek Pb occurrences.

The alluvial cover through the tenement masks for the most part the Hot Springs Fault and any localized splay structures through Balbirini Dolomite/Mainoru Fm over a large area of the tenement.

Potential exists to locate replacement Pb mineralisation within the covered areas. It is unlikely that further stream sediment sampling would help in defining the potential of the area due to the extensive alluvial cover. Further evaluation should be by RAB/Aircore drilling if warranted. The stream sediment database for the tenement area should be revisited to look at effects of Fe/Mn scavenging.

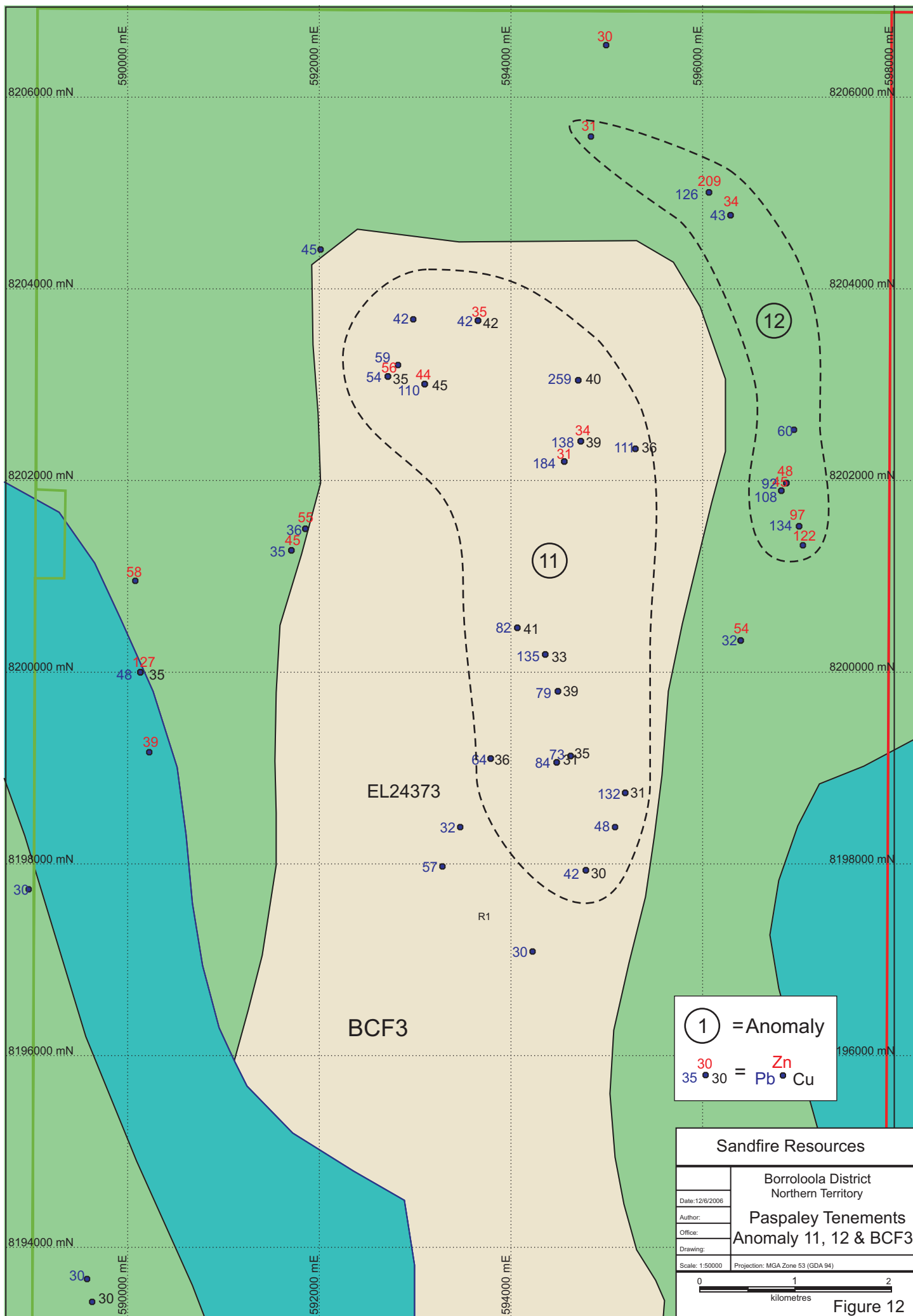


Figure 12

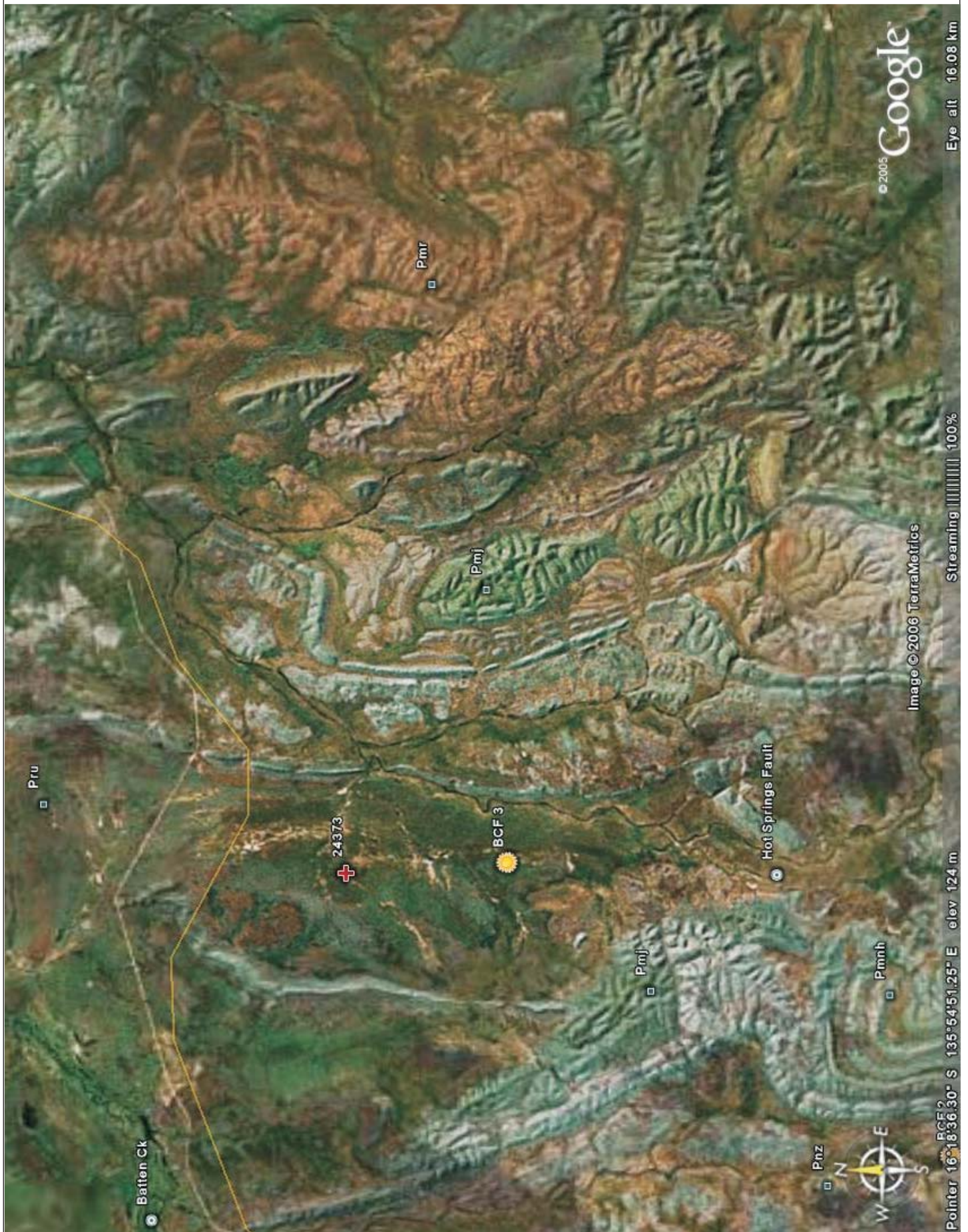


Image 24373

Exploration Licence 24714

Regional Setting: The tenement is located in the Eastern Borroloola Basin (3km east of the Emu Fault) and covers the northern closure of the 'Yalco Basin' (an informal name) a 30 north-south basin marked by the prominent outcrop of ridge forming Yalco Fm rocks (see Fig 24714A). Yalco Ck marks a well defined ENE trending lineament through the centre of the basin which closes to the south against a major NE trending fault and the Emu Fault.

The Yalco Basin is possibly the surface expression of the well documented Pine Creek Sub-Basin to the north of the exploration licence (see CR1994/0572)

Tenement Geology: The Yalco Basin synclinal axis bisects the tenement area with Yalco Fm rocks dipping at 5-15° into the basin on both limbs. The central tenement area comprises outcropping basal Roper Group sediments and patchy Cretaceous cover (Fig 24714B). The unconformity between the Yalco Fm and the Roper Group is marked by streams and the colluvial filled valleys. Nathan Group has not been mapped below the Roper Group.

Previous Exploration: Interrogation of the stream sediment database and previous reports show no record of sampling or drilling over the tenement area. The tenement was covered by an Ashton Minerals (diamonds) aeromagnetic survey (CR 1996/0907) and a follow-up Protem Survey (BHP) – targeting base metals.

Barney Ck Fm rocks outcrop approximately 10km northeast of the tenement in the Pine Creek Sub-Basin ([Image24714](#)). Drilling by BHP (1983) intersected Barney Ck Fm from 40-400 metres down hole in McA 5 returning 66 m at 760 ppm Zn, 169 ppm Pb. Extensive RC percussion drilling by BHP returned numerous low level Cu – Zn values at shallow depths, eg 40m at 406 ppm Cu, 30m at 795 ppm Zn.

Mapping and drilling indicates that the complete McArthur Group succession dips gently southwest off Tawallah Group outcrops towards the Emu Fault and EL 24714.

Conclusions: No record of exploration over EL 24714 has been sighted (other than a 1996 aeromagnetic survey) however, given its proximity to the Emu Fault and to the major exploration programs in the Pine Creek sub-basin to the north it is likely that the extensive and prominent outcrop area of the tenement has been prospected (without success?).

The McArthur/Roper unconformity is well exposed and hence the presence of replacement mineralisation associated with the unconformity would have been easy to prospect.

Barney Ck Fm is interpreted to be present at a depth of +1000 metres below the tenement area. The extensive drill programs within the Pine Creek Sub-

Basin whilst proving the presence of a thick Barney Ck Fm unit failed to return any significant base metal values above background at a distance of 10km from the Emu Fault. The possibility of there being an increase in mineralisation potential of the Barney Creek Fm at depth towards the Emu Fault should be considered. The limited size of the tenement and its geographic/stratigraphic position would make such a target high risk. [BCF – 4.](#)
[Figure 13. Image24714.](#)

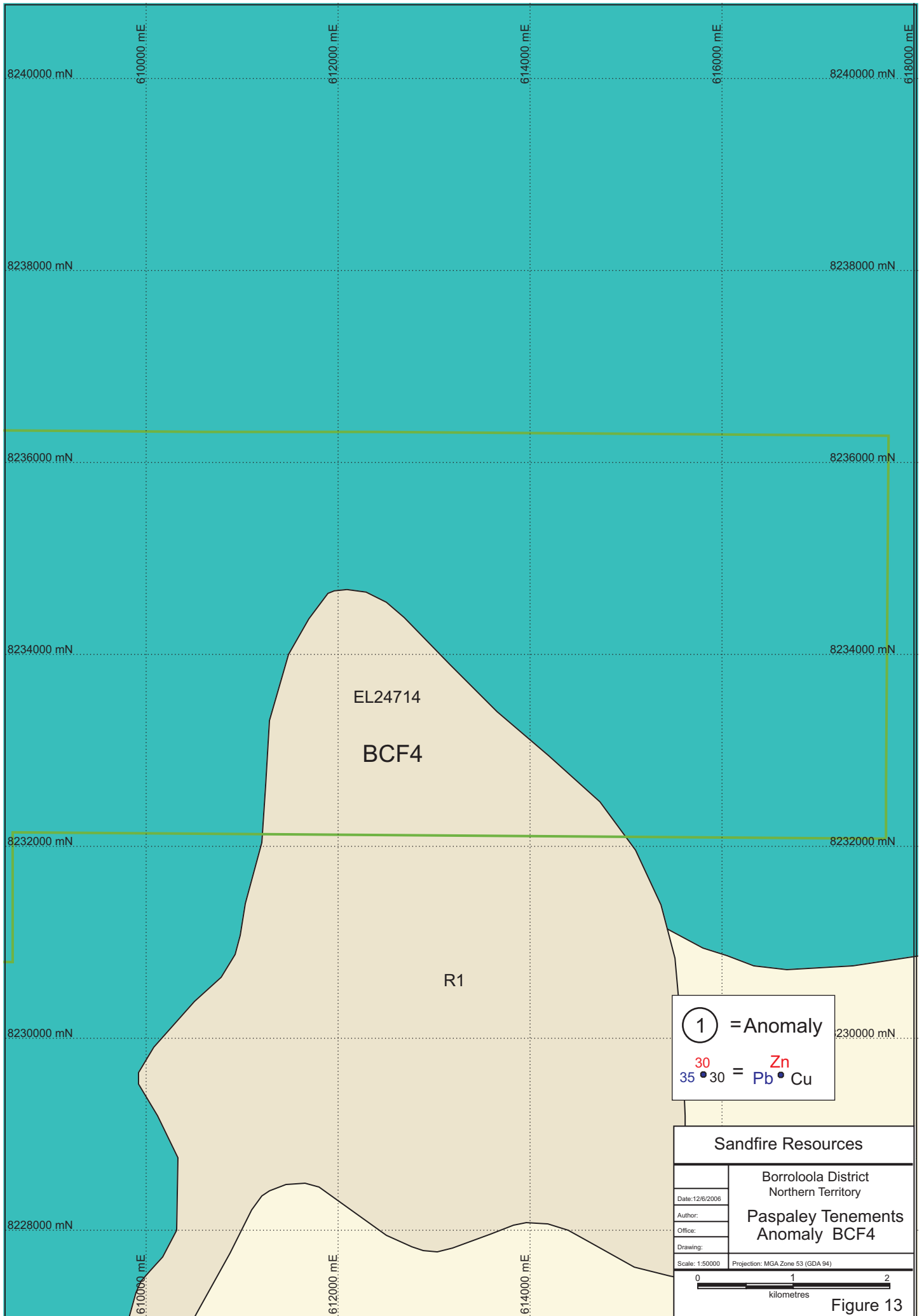


Figure 13



Image 24714

Exploration Licence 24374

Regional Setting: The tenement is located between the Tawallah Fault to the east and the Roper/Nathan Group unconformity in the west.

The Tawallah Fault within the tenement area forms an arcuate structure thrusting west facing McArthur Group and Tawallah Group rocks east onto Upper McArthur /Roper Group. The majority of the tenement area is underlain by lower McArthur Masterson Sandstone, Mallapunyah Fm, Amelia Dolomite, Tatoola Sandstone, Tooganinie Fm and Myrtle Shale units of the Tawallah Thrust Sheet typified by open, nappe-like folds (8-10km amplitude). Above the Myrtle Shale a major discontinuity separates west facing, relatively undeformed Barney Creek Fm and Yalco Fm Rocks from the lower McArthur Group. The unconformity between Yalco Fm and the Nathan/Roper Groups is a simple planar contact over a 50 km strike north and south of tenement.

The outcropping Barney Creek FM within the tenement area [BCF-6](#) is interpreted as being part of the Scrutton Thrust Sheet. If this is the case the Barney Creek of the Tawallah Thrust Sheet would occur at depth to the west of the tenement. [BCF – 5. Figure 14. Image24374.](#)

The folded lower McArthur Group sediments are also characterized by well developed NW-SE normal faults. The sandstone units exhibit radial fault sets associated with the open folds. Figures 21 and 29 in the seismic survey reports represent basement interpretation beneath EL 24374.

Geologic Setting: Except for an outlier of Cretaceous rocks the tenement area comprises almost 100% outcrop of McArthur Group Rocks from Amelia Dolomite in the eastern boundary area to Barney Creek Fm on the western tenement boundary. Approximately 80% of the tenement area is underlain by Tooganinie Fm dipping gently to the southwest at 5-20°. The regional 'nappe style' folding is well demonstrated by the Tatoola Sandstone in the north central tenement area.

Barney Creek Fm (200-400 metres thick) outcrops intermittently over 8 km strike within the tenement close to the western boundary. It dips west at 10-20° and occupies an alluvial valley below the Nathan Group unconformity.

The discontinuity between the folded lower units and the upper western units is interpreted to be the southern extension of the Scrutton Fault which to the north in the Mariners area repeats stratigraphy by thrusting the Scrutton Thrust Sheet over the Tawallah Thrust Sheet.

Within EL 24374 this would infer that the outcropping Barney Ck Fm is part of the Scrutton Thrust Sheet and that the Barney CK Fm of the Tawallah Thrust Sheet occurs below the Scrutton Thrust in the western tenement area.

Previous Exploration: The majority of exploration reports sighted were related to diamond exploration by CRA and Ashton/BHP.

BHP did however, evaluate the base metal potential of the tenement area (CR1993/0482B) collecting -150# and +20# - 2mm size fraction stream sediment samples. Threshold values for +20# - 2mm data for the district were established at Cu – 55ppm, Pb – 70ppm and Zn – 70ppm. Thirteen samples were highlighted as anomalous. They all occur in an area 3km to the south of the tenement referred to in this report as the 'BHP Anomaly'.

Anomalous results included 118ppm Pb/91ppm Zn, 143ppm Pb and 98 ppm Pb/74ppm Zn. The area comprises a synclinal fold closure marked by Leila Sandstone and cored by Myrtle Shale. A dark brown fault trace cuts the structure and trends NW into EL 24374. [*BHP Anomaly Figure 15. Image24374.*](#)

The Sandfire SSD clearly shows above threshold Pb/Zn and Cu values adjacent to the above fault structure within EL 24374. [*Anomaly – 13. Figure 15. Image24374.*](#)

The SSD also highlights a tight group of Pb-Zn-Cu anomalous values with a NW orientation at 16°29'S/135°36'E. Values include, 110ppm Zn, 120ppm Pb and 40ppm Cu. The Google scene indicates a large area of ferruginous material within Tooganinie Fm 9km west of the Bauhinia Downs Road. [*Anomaly 14. Figure 15. Image24374.*](#)

There is no record of any drilling within the tenement area.

Ashton/BHP carried out QUESTEM survey over the district including EL24374. BHP recorded a conductor associated with Roper Group sediments west of the tenement area. There is no record of any conductors being located in the tenement area.

Conclusions: Regionally the Tooganinie Fm which underlies most of the tenement area hosts the majority of the small replacement Pb, Pb/Zn and Cu deposits located to date in the Western Thrust Zone area. The known deposits are closely (spatially) associated with the main thrust structures – Tawallah Fault and Limmen Fault and east-west faults.

Within the tenement area no major regional faults occur, however, the NNW to NW trending 'normal faults' are clearly identified from the seismic data as listric structures (including reverse thrusts) with linkage to the main underplating structures. As such these secondary the tertiary structures could provide channel ways for fluid flow.

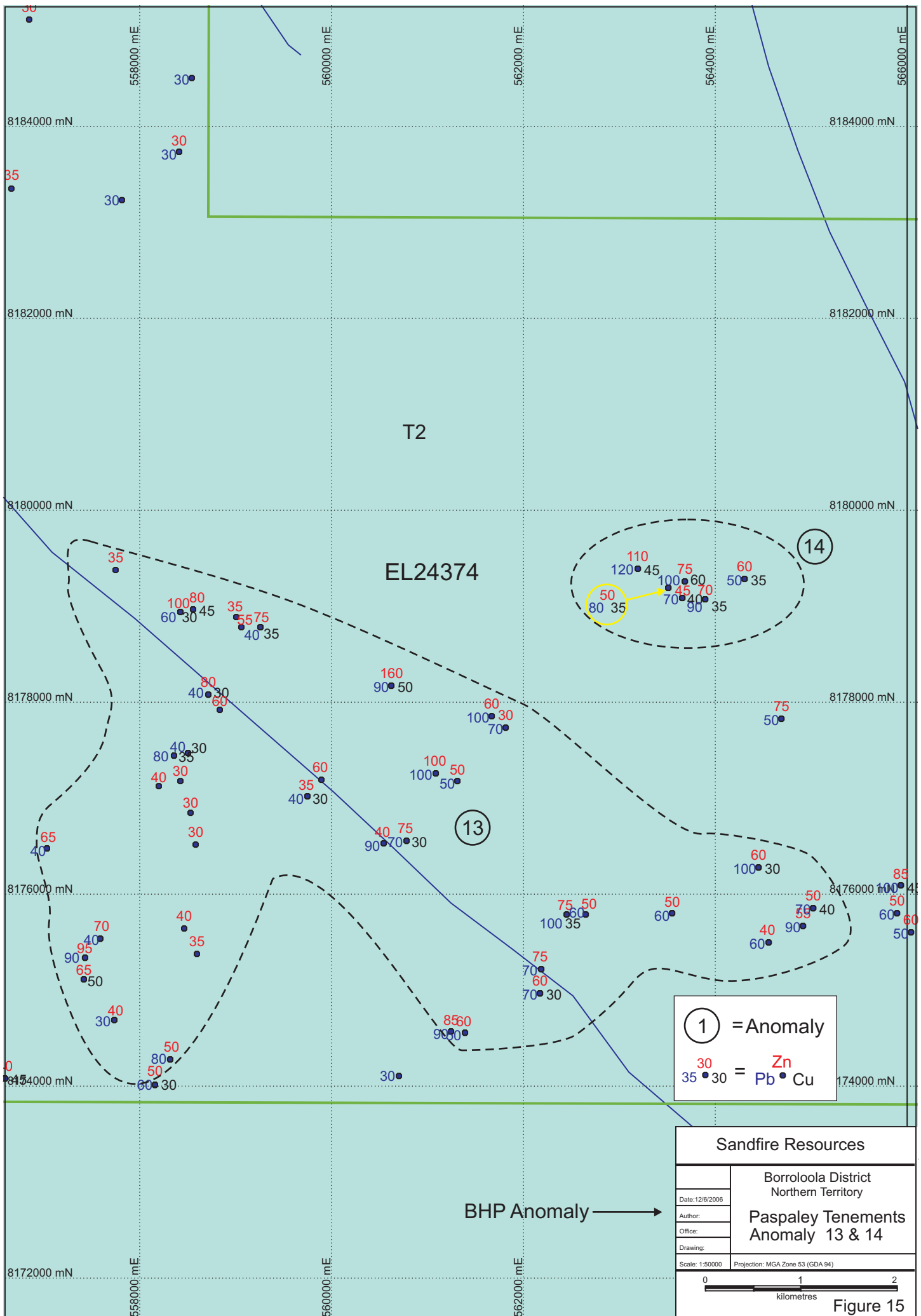
The ferruginous faults and geochemical anomalous areas evident on the Google maps most likely represent altered ferruginous zones with potential to host Pb-Zn replacement deposits.

The widespread Cu-Pb-Zn above threshold values within the Tooganinie Fm is typical 'background' for the Mariners mineralized trend. Further evaluation of the geochemical data is warranted with field checking of the obvious 'ferruginous' areas to be highlighted in the Google map.

The Barney Creek Fm forms a prominent outcrop (ridge) within an alluvial valley (Billengarra Ck) which is the main drainage sitting below the Nathan/Roper contact. It is likely that stream sediment samples in this area would have been significantly diluted by the Nathan/Roper Group detritus so as not to be representative with respect to outcropping Barney Creek Fm.

BCF – 6. Figure 14. Image 24374.

The Barney Creek Fm outcrops should be prospected along the 8km strike within the tenement.



Sandfire Resources

Borroloola District
Northern Territory

Date: 12/6/2006

Author:

Office:

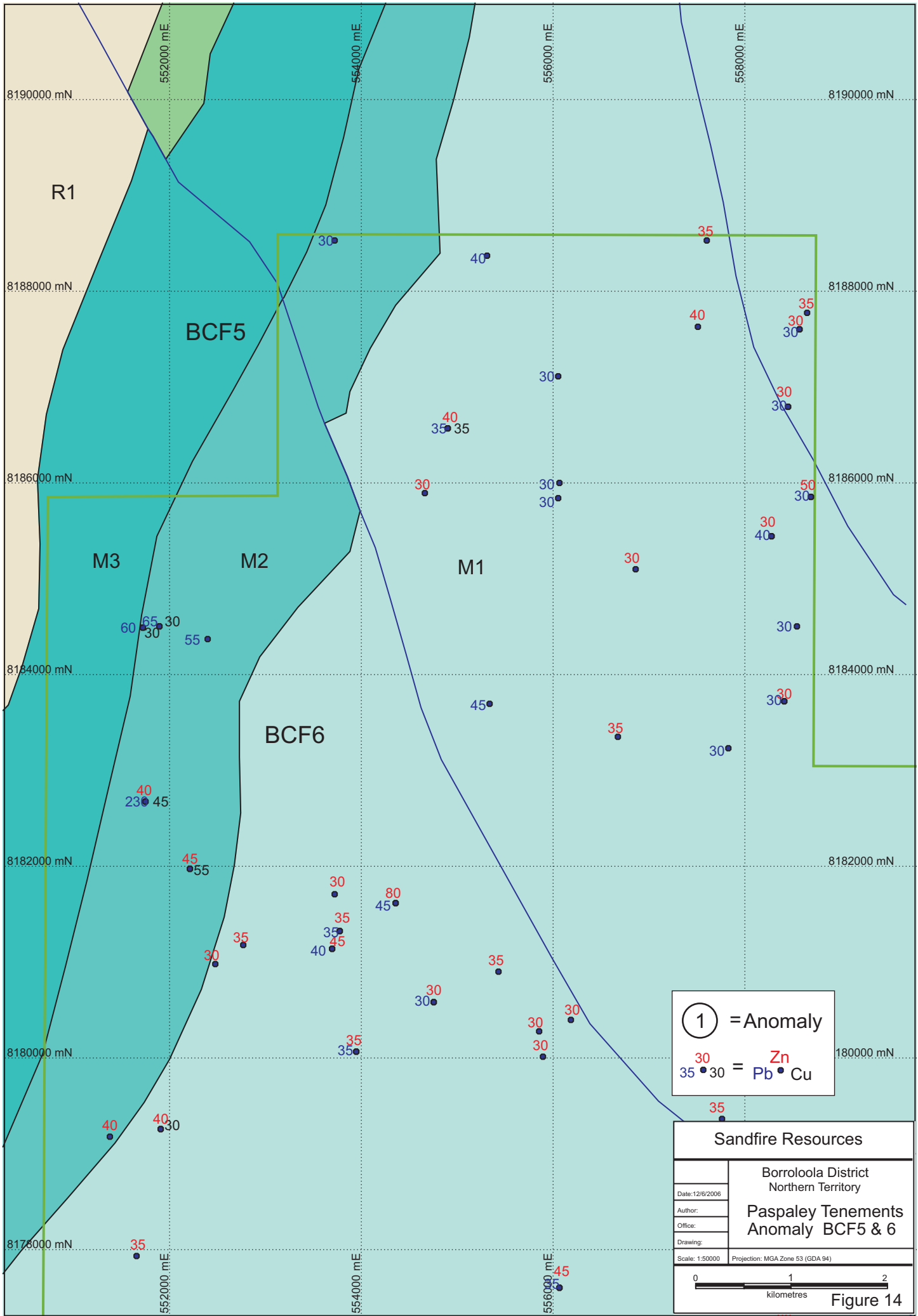
Drawing:

Scale: 1:50,000

Projection: MGA Zone 53 (GDA 94)

**Paspaley Tenements
Anomaly 13 & 14**

Figure 15



① = Anomaly

30 (red) = Zn

35 (blue) = Pb

30 (blue) = Cu

Sandfire Resources	
Borrooloola District Northern Territory	
Paspaley Tenements Anomaly BCF5 & 6	
Date: 12/6/2006	
Author:	
Office:	
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Scale: 1:50000	Projection: MGA Zone 53 (GDA 94)
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Figure 14

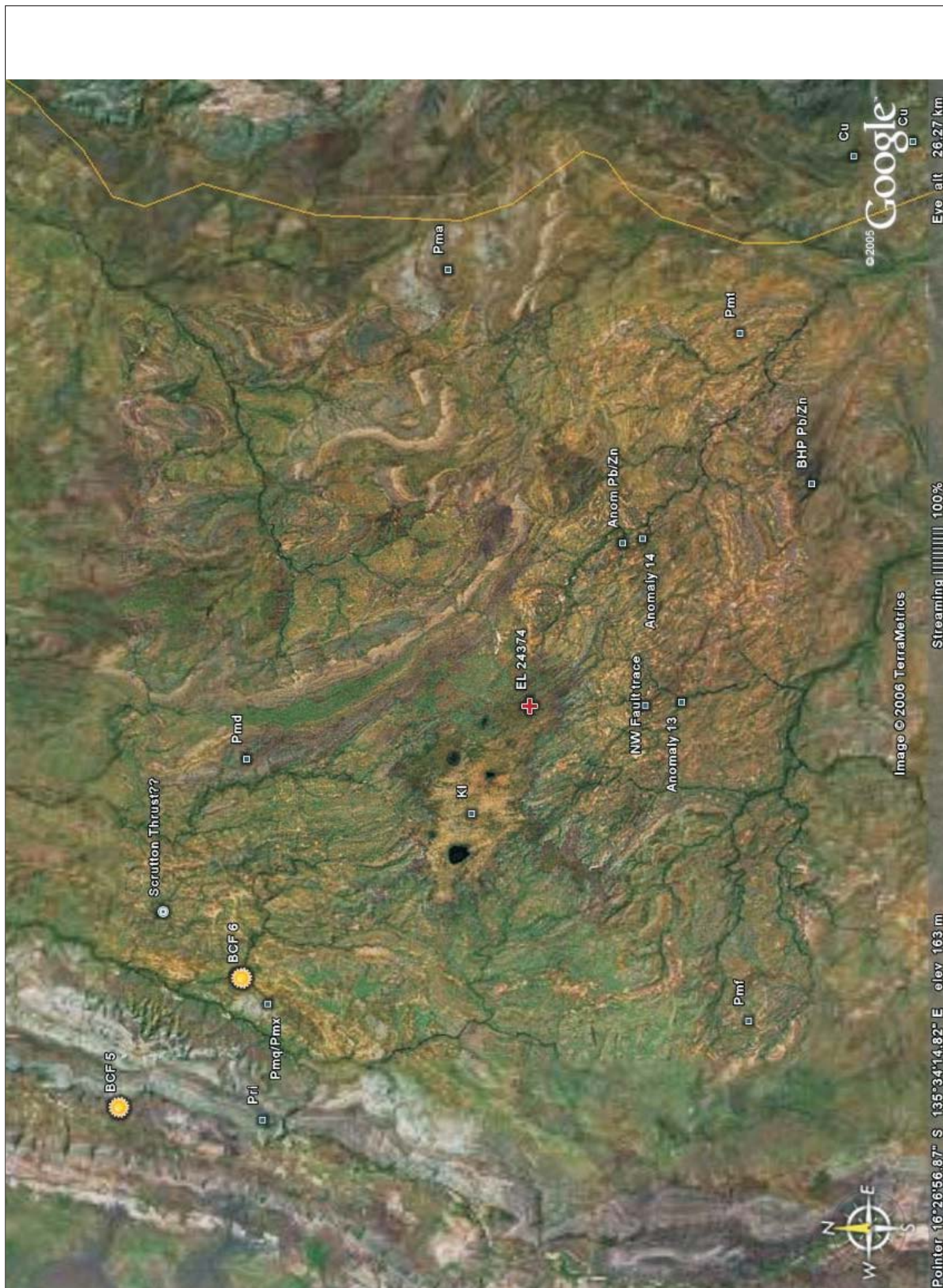


Image 24374

3.3 Tenement Applications

Exploration Licence 25070

Regional Setting: EL 25070 covers the coastal plains east from the Limmen Bight River to the Pine Creek estuary. The tenement area comprises approximately 90% Quaternary cover with basement outcrops restricted to the Tawallah Group – Yiyinti Sandstone on the western tenement boundary. Several smaller outcrops of Tawallah Group rocks occur in the west-central tenement area.

The Quaternary cover is underlain by extensive Cretaceous sandstones and mudstones varying from 30 – 100 metres thick over the Proterozoic basement rocks. The Emu Fault is interpreted to strike north-south through the tenement. To the west of the Emu Fault the tenement is underlain by basal Tawallah Group with the Yiyinti Sandstone (Pty) forming a prominent range of hills. To the east of the Emu Fault the tenement is underlain by McArthur Group rocks, with outcrop being restricted to an area of Lynott Fm (Hot Spring Member - Pmnh) just to the south of the tenement boundary. A north-south lineament, the Pine Creek Fault is mapped from aeromagnetic data in the eastern tenement area.

Tenement Geology: The Emu Fault bisects the tenement with the western area being underlain by Tawallah Group rocks. The basal Yiyinti Sandstone Member forms a prominent range of hills the 'Yiyinti Range' which is in faulted contact with upper Tawallah Group - Warramana Sandstone to the east.

To the south of the tenement lower McArthur Group, Masterson Sandstone to Amelia Dolomite outcrop (or have been drilled) over distances of 3 to 4 kilometres between the Tawallah Group and the Emu Fault. It is reasonable to assume that McArthur Group of the West Borrooloola Basin do occur west of the Emu Fault in EL 25070 as evidenced by hole McA3 which returned Tooganinie Fm and Mallapunyah Fm west of the Emu Fault just to the south of the tenement boundary.

To the northwest of the Yiyinti Range through to the Limmen Bight River outcrop is restricted to Cretaceous rocks and Quaternary cover. It is interpreted that the area is underlain by Tawallah Group basement rocks.

To the east of the Emu Fault the tenement area is interpreted to be underlain by McArthur Group of the East Borrooloola Basin below 50 to 100 metres of Quaternary and Cretaceous cover.

South of the tenement in the Rosie Ck area, drill hole McA 20 intersected Barney Ck Fm from 270 to 430 metres downhole indicating a northern continuation of the Pine Creek Sub-Basin into the area. Immediately south of the tenement boundary, DDH McA2 intersected Lynott Fm – Caranbirini Member to 228 metres depth.

The above drill intersections allow for the interpretation that Barney Ck Fm should occur within the eastern tenement area above 500 metres depth.

Previous Exploration: Previous exploration within EL 25070 targeted diamonds and manganese. The entire tenement area is covered by an Ashton Minerals QUESTEM Survey. Numerous manganese occurrences hosted by Cretaceous sediments have been reported for the tenement area. All occurrences were reported as non-economic (1990's) and have not been followed up at this stage.

The Sandfire SSD shows a series of sample sites on drainages flowing east off the Yiyinti Range (Tawallah Group). A single site annotated SS Cu 33 in Fig 25070 returned 33 ppm Cu and 15.2% Fe. This above threshold copper value most likely results from iron scavenging.

The majority of information indicating the presence of extensive Barney Ck Fm as a 'substantial' unit within EL 25070 comes from diamond drilling outside the tenement area, (see Mt Young 1:250.000 sheet) e.g. McA 20 – Pmq from 270 – 430 m; WM6 – Pmq from 92 -545 m.

Hole McA2 intersected the 'Caranbirini Member' from 60 to 228 metres indicating that the Barney Ck Fm should be present at relatively shallow depths below the Caranbirini.

In the Rosie Ck – Pine Ck coastal area straddling the 'eastern fault structure' Geopeko drilled five diamond holes into Lynott Fm (Hot Springs – Pmnh and Caranbirini – Pmnc) rocks to 250 to 400m depth (see Figure 25070). No anomalous values were returned and downhole EM logging did not return any conductive units.

Exploration over the Tawallah Group sediments in the western half of the tenement exploration is mainly restricted to diamond and manganese programs. Several core holes have been drilled to the south/southwest of the tenement in the Nathan River area. The holes were primarily testing the northern extensions of the 'Pm/Pn basins' bounded by the Limmen, Four Archers Faults, Lorella Fault and the Rosie Fault north from the Tawallah Pocket and Eastern Ck areas.

Holes NRD-1 and NRD-2 (WMC 1983) drilled through Nathan Group rocks into basal McArthur Group Mallapunyah Fm and Masterson Sandstone units (overlying Yiyinti Sandstone). Drilling by BHP in 1995 confirmed the WMC work (CR 1995/0664).

Conclusions: Previous drilling to the south of EL 25070 together with 1993/94 drilling by Geopeko within the tenement indicate that the East Borrolloola Basin area of EL 25070 is underlain by approximately 200 km² of prospective Barney Creek Fm at 300 – 500 metres depth. [BCF-7. Figure 22. Image 25070.](#)

Research to date indicates that drilling to depth is restricted to the Geopeko program within former EL 7313. Final reports on EL 7313 indicate that two further core holes were drilled to 120 and 220 metres into Nathan Group rocks. These reports were not sighted and should be followed up. The significance of the Bing Bong Fault as a possible equivalent to the Emu Fault should be investigated.

The western tenement area comprises Tawallah Group rocks. All previous exploration is negative with respect to base metal potential. A single stream sediment assay of 33 ppm Cu in a stream draining the Yiyinti Range is attributed to iron scavenging (15.2% Fe). In the southwest tenement area lower McArthur Group Masterson Sandstone is interpreted to unconformably overlie the Tawallah rocks. No information is available for the northwest area of the tenement through to the Limmen Bight Rv other than that Cretaceous cover rocks are present over Tawallah basement.

Reprocessing of Ashton Minerals QUESTEM survey over the entire tenement area may help define structural complexity within the McArthur Group rocks to the east of the EFZ. [BCF-7. Figure 22. Image 25070.](#)

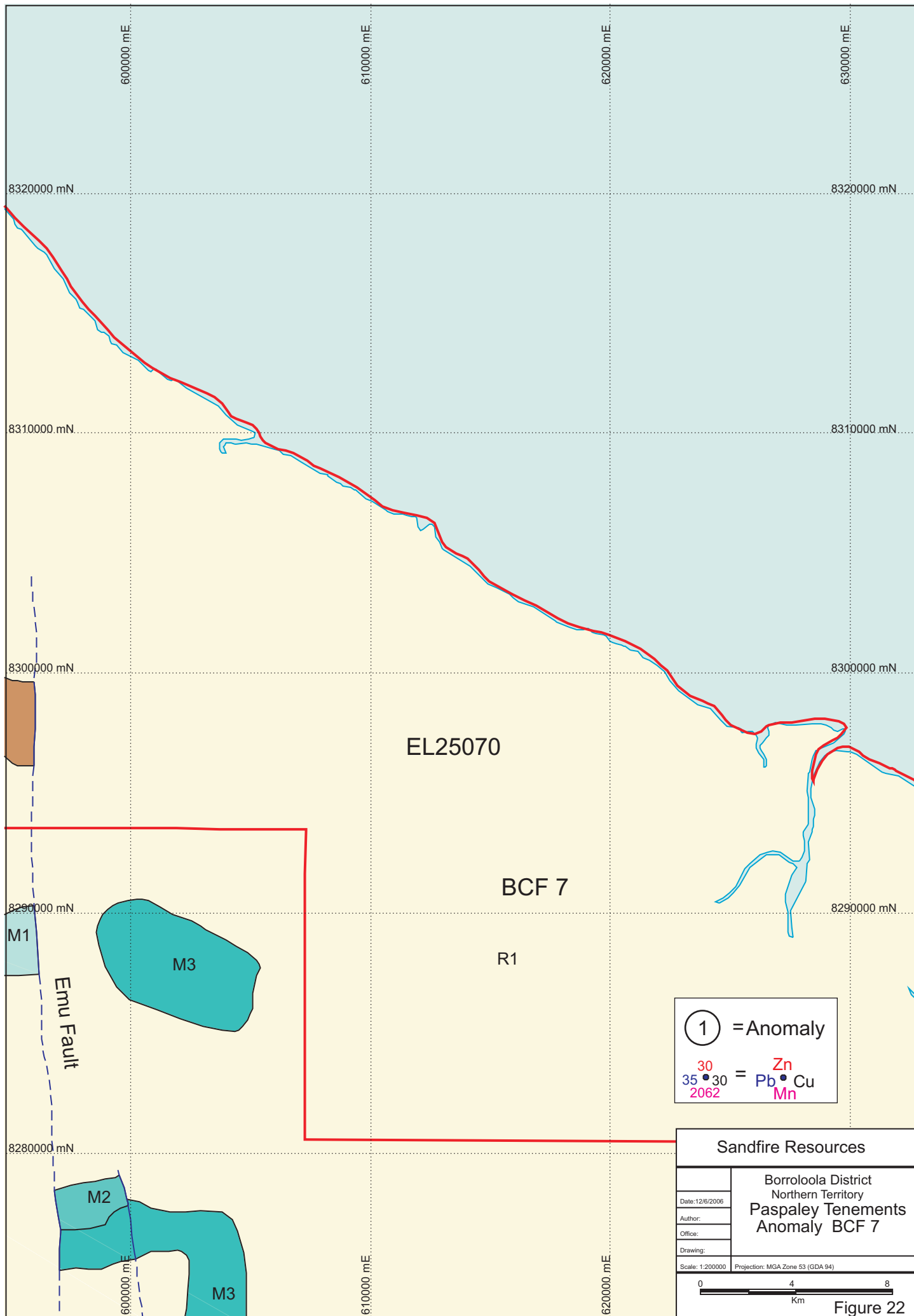


Figure 22

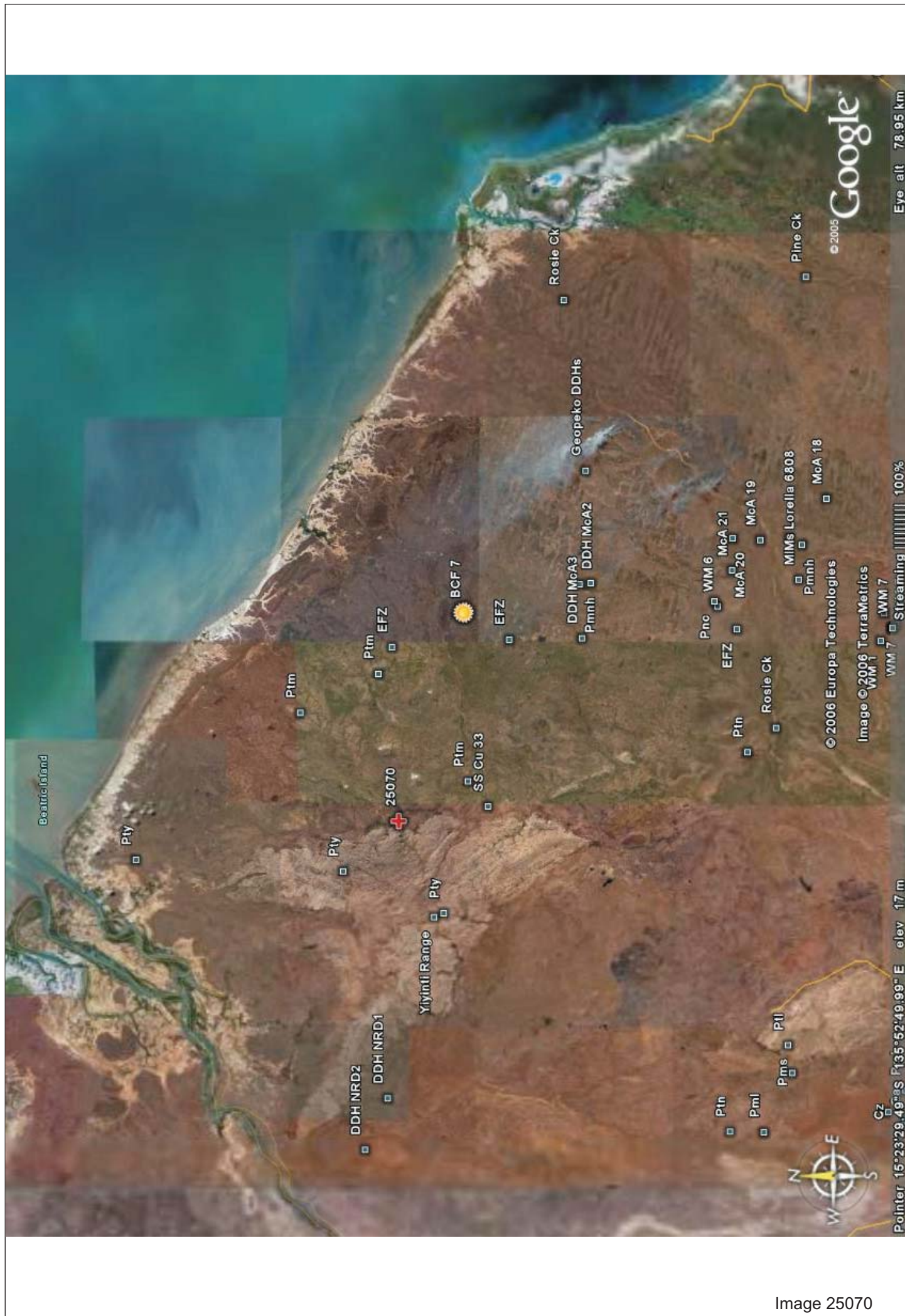


Image 25070

Exploration Licence 24997

Regional Setting: EL 24997 straddles the NS Limmen Fault a structure that was considered to be one of the several western boundary faults to the Batten Trough.

Interpretation of the seismic survey data from the Bauhinia Downs area to the south together with the regional mapping indicate that the Limmen Fault and the Mantungala Fault (to the west of the tenement) now represent overthrusting of the Scrutton Thrust Sheet the host to the Eastern Ck prospect.

The Four Archers Fault the northern continuation of the Scrutton Fault marks the eastern boundary of the tenement.

The Schematic Section A-B-C depicted on the Mt Young 1:250,000 shows that west of the Limmen Fault a complete McArthur to Roper Group sequence dipping gently to the west. To the east of the Limmen Fault the McArthur Nathan/Roper sequences dip to the east into the Four Archers Fault.

Geologic Setting: Outcrop within the tenement area to the west of the Limmen Fault comprises Nathan and Roper Group sequences. The SW 'leg' of the tenement is underlain by Roper Group. The main tenement block is bisected by the Limmen Fault and comprises about 50% alluvial cover in the Limmen Bright River Valley. The main tenement area is referred to as the O'Conner Pocket.

To the west of the Limmen Fault Nathan and Roper Group sequences dip west. East of the fault McArthur Group Tooganinie Fm and Emmerugga Dolomite outcrop over about 10 km² and are capped by Nathan Group Balbirini Dolomite then by an almost complete sequence of Roper Group rocks closing as an elongate NS basin against the Four Archers Fault.

In the eastern half of the tenement the McArthur Group although present at relatively shallow depths against the Limmen Fault is interpreted to dip steeply east towards the Four Archers Fault.

In the western half of the tenement the top of the McArthur Group is interpreted to be 500 to 1,000 metres depth. Although no drilling is available to confirm the thickness the McArthur Group it is interpreted to have thinned <1,000m towards the western margin of the 'Batten Trough'. [BCF-9. Figure 16. Image 24997.](#)

The O'Connor Pocket together with the Mariners trend on the Bauhinia Downs sheet to the south is the type area for replacement style Pb-Cu-Ba and Cu-Ag mineralisation hosted by karstified/brecciated Balbirini Dolomite of the Nathan Group.

The Eastern Ck Pb-Cu-Ba deposit lies 500 metres south of the tenement boundary. The main mineralized zone in Balbirini Dolomite comprises veins, small pods and disseminated blebs of galena within an 8m thick solution collapse breccia over 1300m strike. The best intersection is 8.3m at 2.55% Pb, incl. 2m at 4.5% Pb (CRAE 1974) in hole DDH ECI just south of the tenement boundary. Two holes DDH EC3 and DDH BMRI fall within the tenement at the southern boundary. They bottomed in Balbirini Dolomite at 66 and 77m respectively.

A series of barite occurrences hosted by Balbirini Dolomite are 'localised' along the Limmen Fault. The occurrences are described as stratabound replacements in karstic (solution breccia) dolstones associated with chert (silicified dolstone). A copper show to the north of the tenement is described as diagenetic/regolithic in origin.

To the south of the tenement the Hammers Hut Copper prospect is hosted by Balbirini Dolomite adjacent to the Four Archers Fault. The small but high grade occurrence in 'bedded cherts' assayed up to 41% Cu and 668 g/t Ag.

Previous Exploration: The majority of reports sighted cover early uranium work and extensive diamond exploration with associated airborne geophysical surveys over the Roper Group rocks to the west of the tenement.

The early reports (1970s) for the Eastern Ck area were not available for review. The Mt Young explanatory notes however gave a summary of drilling in the area.

A summary report by Perilya Mines Ltd. (CR 1992/05640) gives a good description of mineralisation and exploration in the areas (specifically former EL 4939 [held by Top End Resources] which covers the part of EL 24997 (and most of EL 24946 and EL 10121 Gordons Area). Programs on EL 4939 commenced in 1989 with most of the known deposits being flown (EM). The majority of work on EL4939 covers EL 24946 to the west of EL 24997 with the Pb-Ba mineralisation in the O'Connor Pocket not being followed up.

The SSD plots show 'anomalous' Cu-Pb-Mn values associated with sample sites in Nathan Group rocks adjacent to the Limmen Fault and along the eastern McArthur Group/Nathan Group contact. [Anomaly 15. Figure 16. Image 24997.](#)

Some isolated Cu-Mn values 30ppm Cu with 2062ppm Mn and 72ppm Pb occur within Roper Group to the west of the Limmen Fault. [Anomaly 16. Figure 16. Image 24997.](#)

Stream sediment sample density within the tenement is low. This reflects the broad alluvial terraces developed through the Nathan River valley.

Conclusions: No drilling has been carried out within the tenement area except for that reported in the Mt Young Explanatory notes (CRAE, CEC and the BMR) for the Eastern Creek deposit. Hole ECI drilled at Eastern Ck bottomed in Emmerugga Dolomite at 258m. There is no mention of Barney Ck Fm rocks in the hole. The remaining holes were relatively shallow. They targeted Nathan Group – Balbirini Dolomite. Intercepts were not reported in the ‘notes’ and were all presumably less than the peak value of 8.3m at 2.55%Pb in hole ECI.

Perilya’s review of the Pb mineralisation in the area was that the prospectivity for locating a major Mississippi Valley Type (MVT) deposit was limited owing to the lack of extensive ‘ground’ preparation by karst development within Balbirini Dolomite to generate ‘open space’ for sulphide deposition. The silicification of the dolstones at Cretaceous times also limited the development of ‘regolith’ deposits in later weathering (lateritisation) events.

Within EL 24997 there is an extensive area of Nathan Group-Balbirini Dolomite present below Roper Group in the eastern half of the tenement (east of the Nathan River road). Similarly to the west of the Limmen Fault, Balbirini Dolomite is present below Roper Group unconformity which outcrops and dips shallowly to the west.

The McArthur Group is shown to occur at +1000m depth in Schematic Section A-B. Drill hole DDH 82-3 (Amoco 1982) just to the NW of the tenement bottomed in Roper Group at 479m. This indicates that the depth to Nathan Group along the western boundary of the tenement is ± 500 metres.

To the east of the Limmen Fault outcropping Emmerugga Dolomite in the central tenement area is mapped as dipping 15°E and is unconformably overlain by Nathan Group. To the south of the tenement the Lynott Fm is overlain by Nathan Group indicating that Barney Ck Fm should be present at depth in the eastern half of the tenement through to the Four Archers Fault.
[BCF – 8. Figure 16. Image 24997.](#)

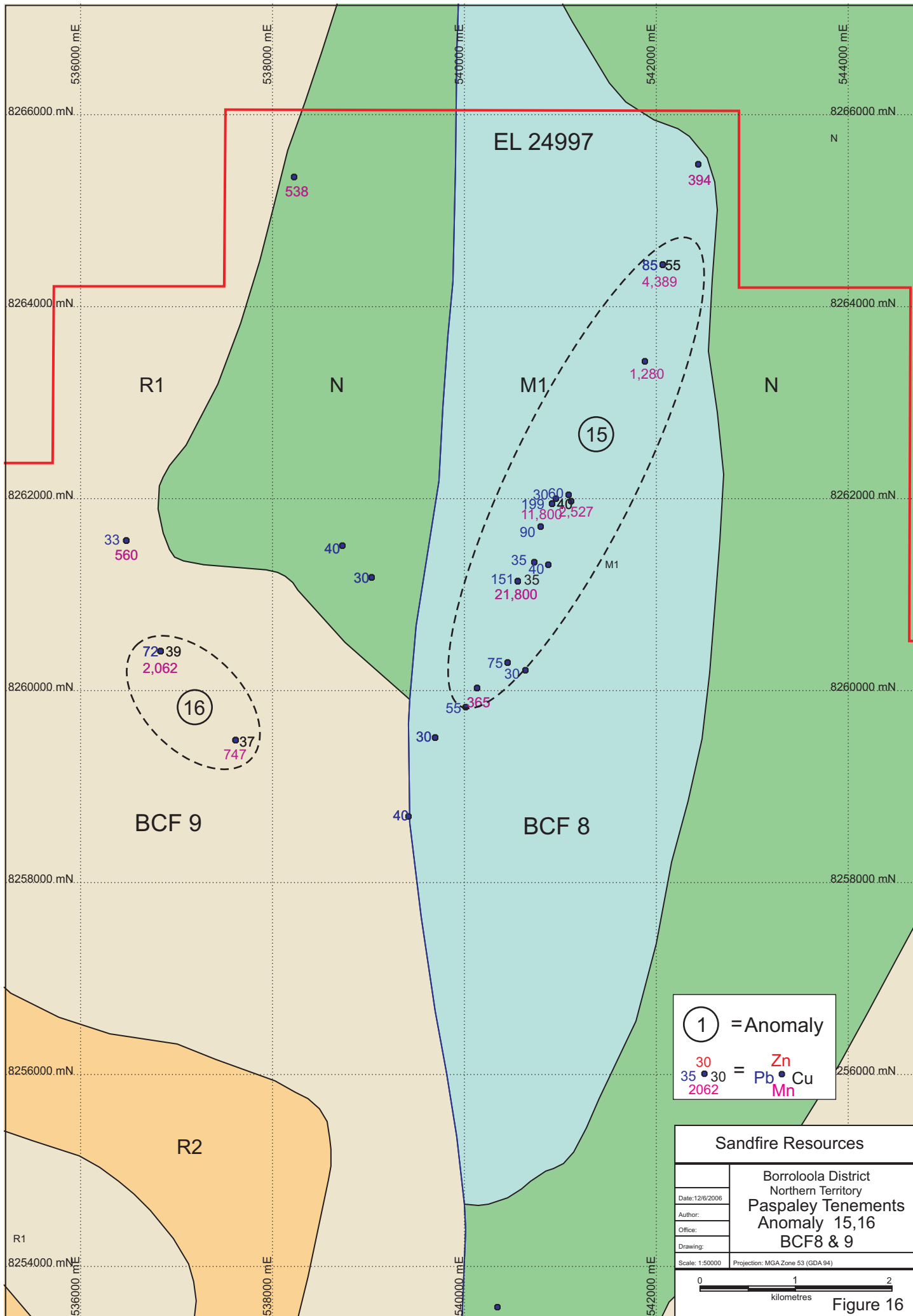
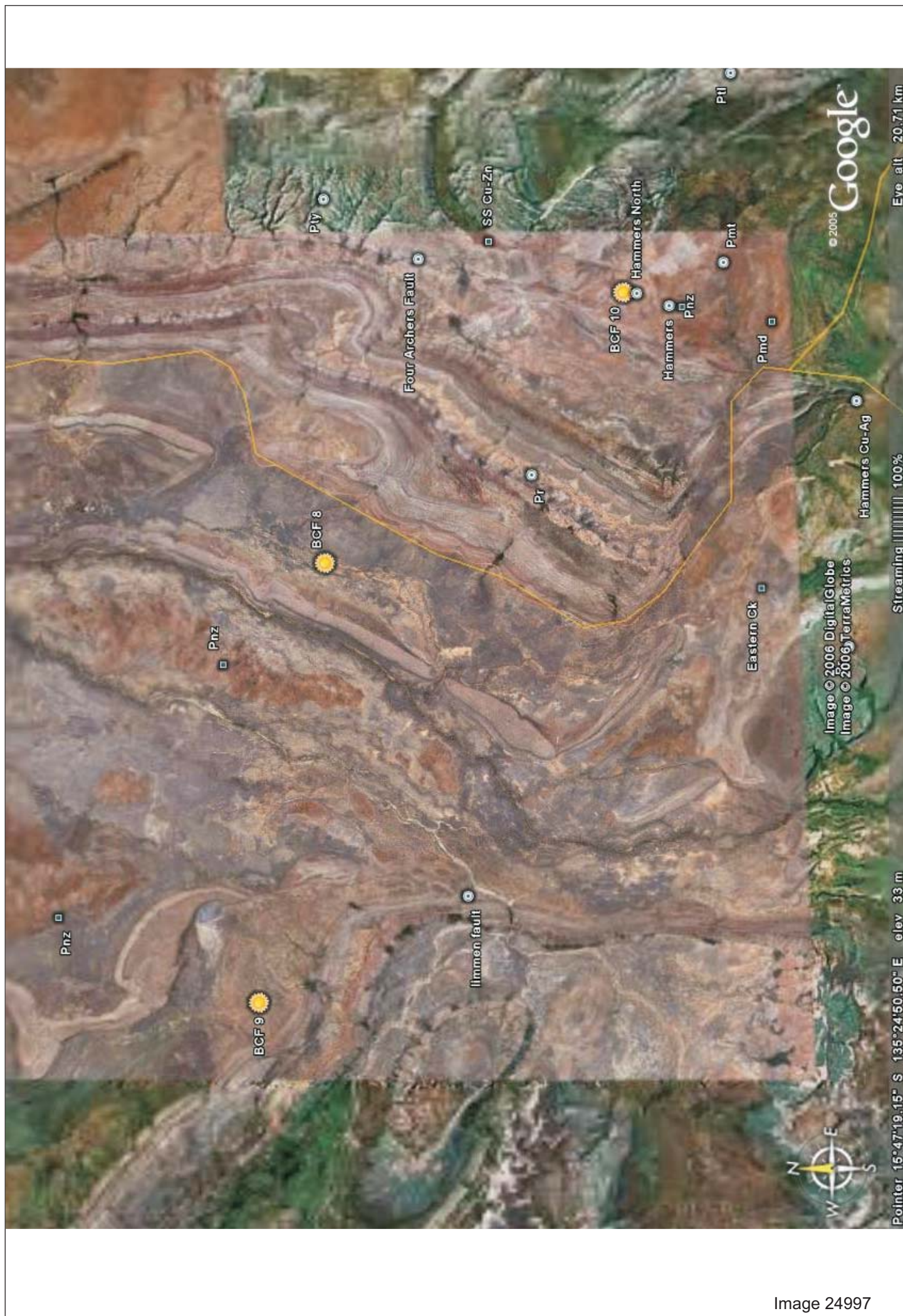


Figure 16



Exploration Licence 24946

Regional setting: the tenement contiguous to the west with EL 24997 covers a structurally complex area of the Batten Fault Zone where the Scrutton Fault coalesces with the Four Archers Fault at Eastern Creek and the Tawallah Fault merges with the Four Archers Fault 20km north of Eastern Creek in the Costello Ranges. The NE trending Lorella Fault marks the east boundary of the tenement as it trends SW into the Tawallah Fault.

The merging of the Scrutton Fault, Four Archers Fault with the Tawallah Fault has formed the 'Gordon's Pocket' which is the northern extension/termination of the Mariners Trend.

The 'Gordon's Pocket' dominated by Tooganinie Fm/Amelia Dolomite hosts the Gordon's, Sly Creek, Hammers Pb-Zn and Hammers North Pb-Zn prospects.

The Schematic Section B-C-D for the Mt Young 1:250,000 Sheet illustrates the intense faulting through the tenement area. The northern closure of the 'Gordon's Pocket' is shown as a 'central graben' of lower McArthur Group.

To the north of 'Gordon's Pocket' i.e. north of the Tawallah Fault a 10km wide alluvial valley developed between the Four Archers and Lorella Faults is underlain by west dipping McArthur Group sediments. This area has been termed the 'Lorella Pocket'.

Geological Setting: In the SW of the tenement the McArthur rocks of the 'Gordon's Pocket' 'terminate' against the Four Archers Fault. The McArthur Group at this location comprises Amelia Dolomite (Pma) to Emmerugga Dolomite sequence. Perilya also reported Barney Ck Fm in the extreme north of the pocket.

To the west of the Four Archers Fault an elongate synclinal basin of Roper Group abuts the fault (as described for EL 24997). The 'Gordon's Pocket' is developed as a NE extension of the Mariners Trend. Within the 'pocket' lower McArthur Mallapunyah Fm (Pmc) outcrops along the east side against the Lorella Fault and dips 'west' at 5-10°. The west side of the 'pocket' is marked by in-part fault bounded Tawallah Group with an extensive outcrop of Roper Group in the centre of the pocket separating the northern area containing then Hammers and Sly Creek prospects from the Gordon's prospect. Hole McA 15 drilled by BHP (1984) to test mineralisation below the Roper was stopped at 300 metres in Roper Group indicating major downthrow north of the 'controlling' east-west fault at Gordon's.

Along the Lorella Fault immediately to the south of the tenement a west facing sequence of Mallapunyah Fm to Tooganinie Fm (schematic Section B-C) suggests that a similar interpretation can be made for the Lorella Pocket area within the tenement

Previous Exploration: Although a number of historic exploration licences are recorded over the position of EL24946 no drill programs or major streams programs were carried out in the tenement except for work by Perilya (1987-92) in the Hammers Hut, Hammers Pb-Zn and Hammers North area in the SW corner of the tenement.

The Hammers Pb-Zn prospect is a stratabound Pb-Zn replacement body in Nathan Group-Balbirini Dolomite approximately 1km south of the tenement boundary. Hammers North is a reported gossanous outcrop of Barney Ck Fm just within the southern tenement boundary.

Perilya's RC percussion drilling program was reported as failing to fully test all three of the Hammer Prospects due to continual 'blocking off' in broken cherts making sampling difficult.

At the Hammers Prospect elevated Pb-Zn values (up to 1630ppm Pb and 630 ppm Zn) in the top 40 metres drilled were associated with limonitic clays interpreted to represent metal enrichment in the laterite profile.

At the Hammers North, prospecting returned rock chip values from 'gossanous' Barney Creek Fm peaking at 185ppm Cu, 1620ppm Pb 3940ppm Zn and 2500ppm Ba. The gossanous unit was exposed over 500 metres strike and was between 10-20 metres wide and unconformably overlain by Nathan Group - Balbirini Dolomite. [BCF – 10. Figure 17. Image 24946.](#)

Two RC percussion holes were drilled into Balbirini Dolomite and abandoned due to broken ground and high water flows. A regolith horizon with the Nathan group was interpreted to be responsible for the airborne EM target at Hammers North. The Barney Creek Fm target was not tested by the drilling.

The Sandfire SSD plots show some isolated anomalies in the 'south leg' of the tenement associated with scattered Balbirini Dolomite outcrops. Within the central tenement area a number of elevated Mn values (± 300 ppm) have been returned from the 'Roper' outlier.

An isolated Cu-50ppm, Zn-85ppm, Mn-420ppm anomalous sample was returned from a Tawallah Group-Seigel volcanics drainage north of the Hammers Prospect.

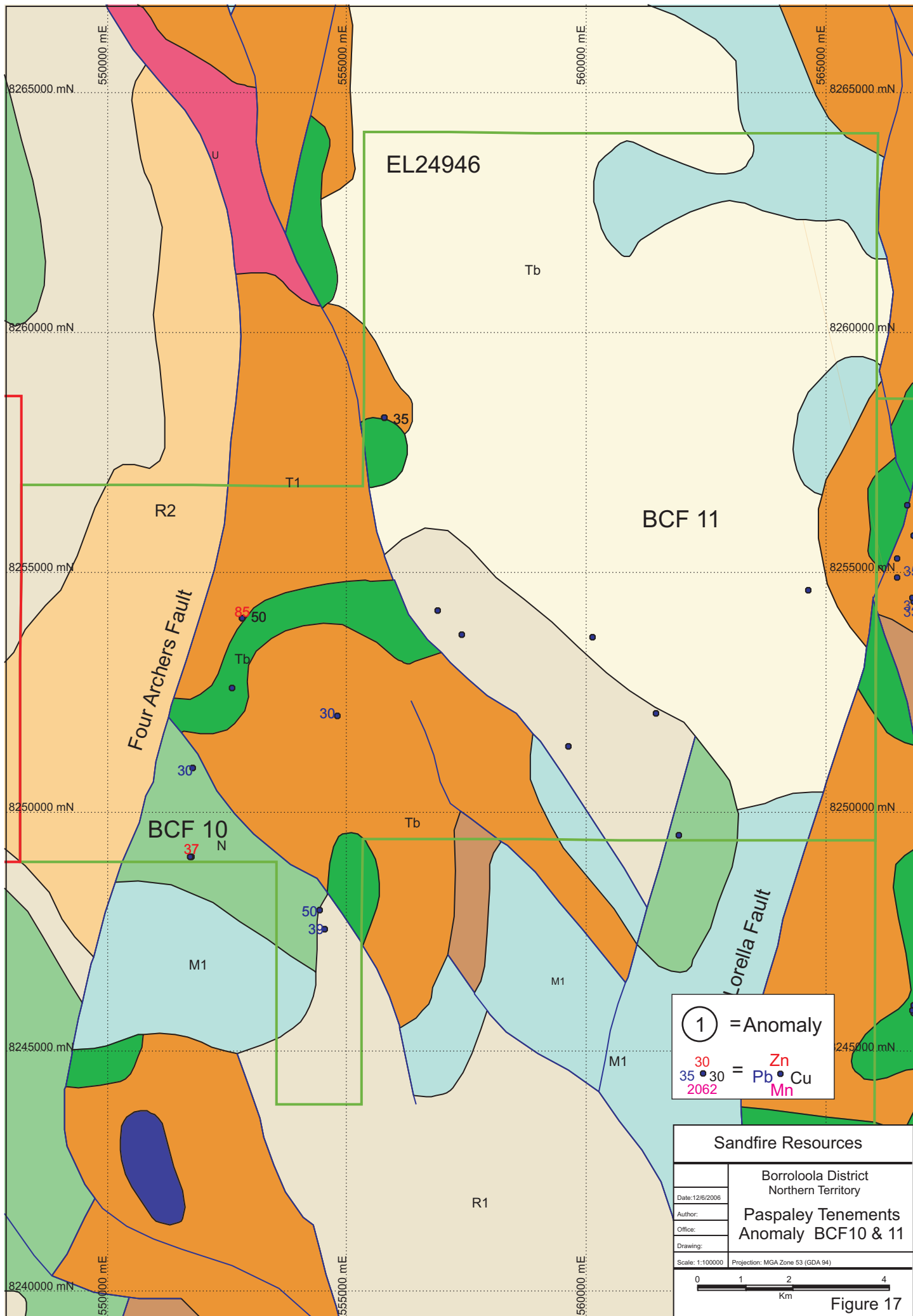
Conclusions: There is potential to locate replacement –style Pb-Zn and Cu mineralization within EL 24946 hosted by Lower McArthur group dolomitic units. There is also evidence that Eastern Ck style MVT mineralisation may have developed with Balbirini Dolomite. Both styles of mineralisation have so far proven to be too small to be given economic consideration.

Notwithstanding the above statement the extensive 'Lorella Pocket' remains untested (by drilling /geochemistry) with respect to replacement mineralisation

styles. The best intersection for this style of mineralisation was 16m at 7.9% Pb at the Mariners Prospect to the south of the tenement. Along the Lorella Fault immediately to the south of the tenement a west facing sequence of Mallapunyah Fm to Tooganinie Fm (schematic Section B-C) suggests that a similar interpretation can be made for the Lorella Pocket area. This would place prospective Amelia Dolomite host to Gordons and Sly Ck copper mineralisation in the central basin area.

As mentioned previously in discussions for EL24997, current interpretations show that the McArthur Group is relatively 'thin' (± 1000 ppm) in the western areas compared to Emu Fault area (± 3000 metres) and local thinning and disconformities may have resulted in poorly developed to absent Barney Ck Fm rocks in the area. The Perilya 'discovery' of Barney Ck Fm at Hammers North suggest that it may be present (but its thickness unknown).

There is also a possibility that Barney Ck Fm rocks may occur within the SW sector of the 'Lorella Pocket' towards the faulted/thrust contact with the Tawallah Group and Roper Group unconformity. [BCF – 11. Figure 17. Image 24946.](#)





Exploration Licence 24996

Regional Setting: EL 24996 is located on the western margin of the 'Batten Trough' and is underlain by the 'Scrutton Thrust Sheet'.

The Scrutton Thrust has placed McArthur-Tawallah Group of the Scrutton Thrust Sheet over the McArthur-Tawallah Group rocks of the Mariners-Gordon's Pocket area (the Tawallah Thrust Sheet) resulting in a repeat of the stratigraphy in the northern sector of the Bauhinia Downs Sheet.

South from the Johnson's Pb-Cu prospect the Scrutton Thrust has no obvious displacement; however, a discontinuity described in the section on EL 24374 possibly represents the southern continuation of the Scrutton Thrust.

The Scrutton and Tawallah Thrust Sheets represent the most westerly and simplest of the complex thrust sets highlighted by the seismic survey data. In the tenement area the Tawallah Fault (the Scrutton Fault) and the Nathan-Roper unconformity form parallel arcuate structures reflecting differential erosion over 100km strike of the structures.

Geologic Setting: The tenement lies west of the Scrutton Fault with the northern half being underlain by Tawallah Group rocks and Lower McArthur Masterson Sandstone and Mallapunyah Fm, and the southern half by McArthur Group Amelia Dolomite through to Stretton Sandstone, including numerous outcrops of Barney Creek Fm.

As previously mentioned, the Scrutton Fault has repeated the lower McArthur Tooganinie Fm and Amelia Dolomite units that host a string of base metal prospects along the 'Mariner's Trend' east of the Fault.

There is one recorded base metal occurrence within the Tooganinie Fm of the tenement area namely 'M1' which is 4km west of the central tenement boundary. The M1 Pb-Zn prospect is recorded as a stratabound occurrence of galena, chalcopyrite, pyrite and cerussite. Its position can be correlated with the Eastern Creek mineralisation to the north along strike.

Within the central tenement area Tooganinie Fm outcrops over 5km strike. The east-west fault structure which appears to control the position of the M1 prospect trends through this area over 2-3km strike.

Barney Creek Fm outcrops along Billengarrah Ck for about 10km south from the Bauhinia Downs Station road. It varies from 600 to 200 metres wide in outcrop, dipping west at 10-15°. It is underlain by Coxco Dolomite and overlain by Reward Dolomite. [BCF – 12. Figure 18. Image 24996.](#)

In the south of the tenement the Barney Ck Fm outcrop is approximately 2km from the west tenement boundary. Going north the unit swings NNW out of the tenement 2km north of the Bauhinia Downs road.

Previous Exploration: Multiple overlapping historic exploration licences cover the EL24996 position. A review of the annual reports from the past tenements indicate numerous stream sediment, soil and rock chip sampling programs were carried out over large areas which now cover the EL 24996 position. There are no reported drill holes within the tenement area.

The Sandfire SSD plot is the best representation of the historic data which for the most part are presented as barely legible hard copy plans in the scanned hard copy reports. Most of the reports reviewed have focussed on the Tooganinie Fm west of the Tawallah Fault where numerous base metal anomalies are reported associated with the Mariners, Great Scott and Johnston's prospects.

For reasons of expediency the Sandfire SSD plot does not cover these areas of competitor ground, however a review of the background levels and threshold/anomalous values in these areas will help 'quantify' the anomalies within ELs 24349,24996 and 24374.

The SSD plot for the tenement area highlights three areas of anomalous samples (see above statement). Over the Barney Creek Fm in the south of the tenement Pb-Zn values peaking at 70ppm Pb /50ppm Zn were returned mainly from streams draining Tooganinie Fm east of the outcropping Barney Creek which outcrops in an alluvial valley. [Anomaly 17. Figure 18. Image 24996.](#)

Rock chip sampling / soil lines rather than stream sediment sampling would be a better test of this area.

The central tenement area is underlain by Tooganinie Fm. The outcrop over 5km strikes NW and is terminated by the east-west 'M1Fault'. A strong Pb-Zn response was returned from the sampling, however, sample density is such that over-writing of results makes reading the data difficult. Peak Pb values are 40-50ppm and Zn 70-80ppm. [Anomaly 18. Figures 19/20. Image 24996.](#)

Also of interest is a copper response in the same area which is restricted to Masterson Sandstone south from the M1 Fault with peak values of 80-90ppm being returned. [Anomaly 19. Figure 19. Image 24996.](#)

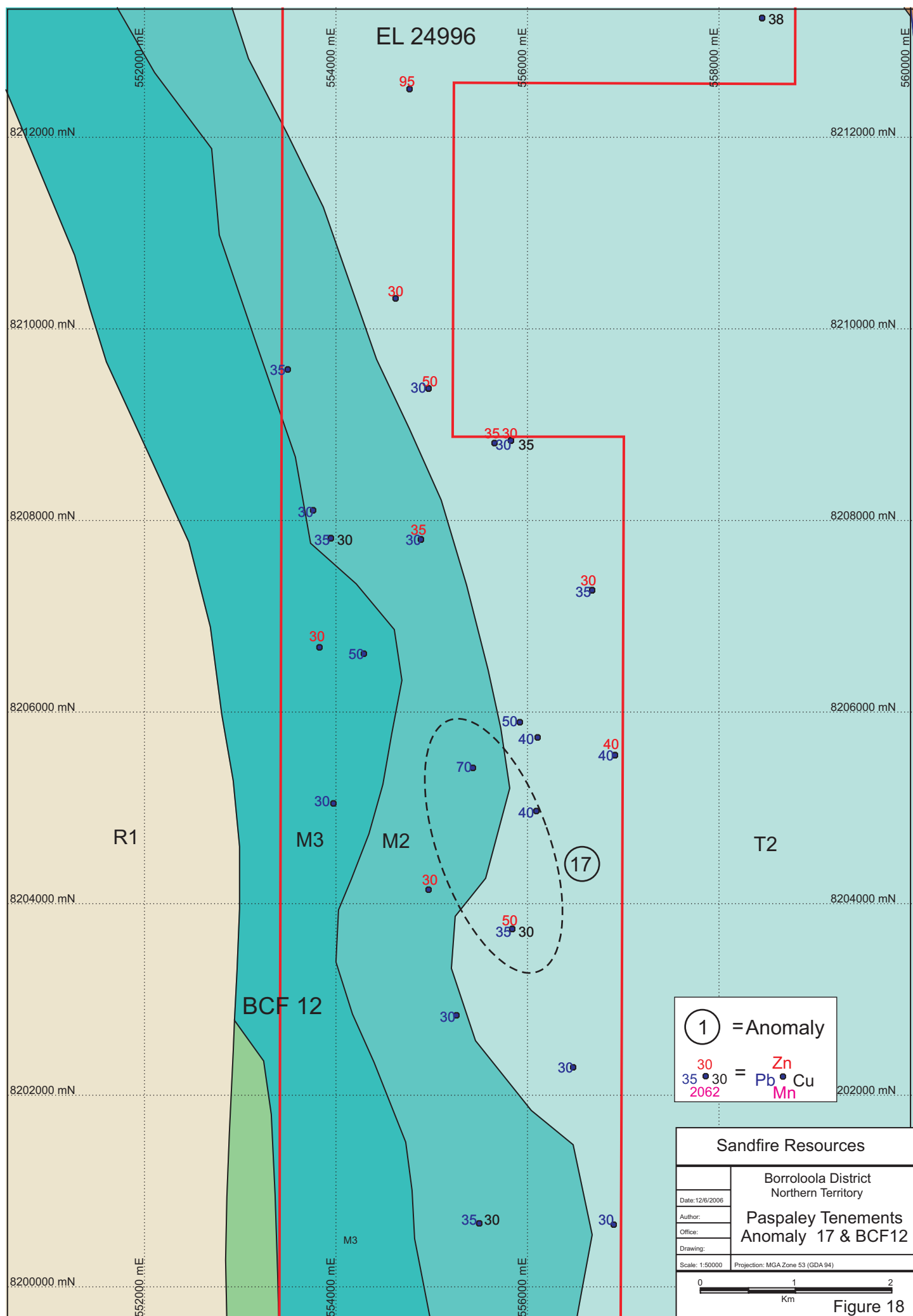
The third anomalous area within the tenement comprises the 'eastern arm' north of the M1 Fault and east of the Scrutton Fault. The area is underlain by Tooganinie Fm of the 'Mariner's Trend' returning peak values of 75-80ppm Pb and 120ppm Zn. [Anomaly 20. Figure 19. Image 24996.](#)

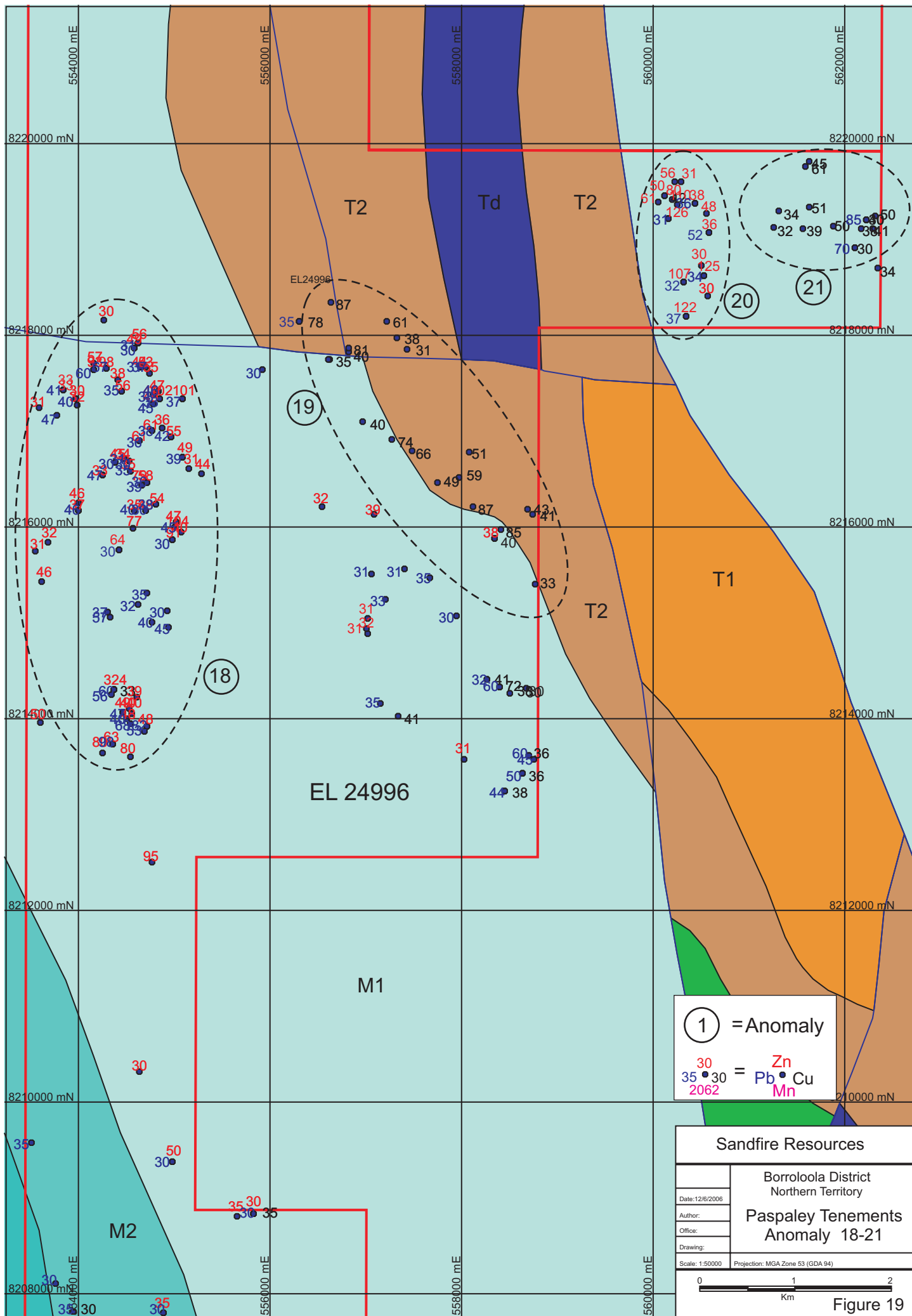
A separate lithological copper anomaly is evident with values to 95ppm Cu in Mallapunyah Fm. [Anomaly 21. Figure 19. Image 24996.](#)

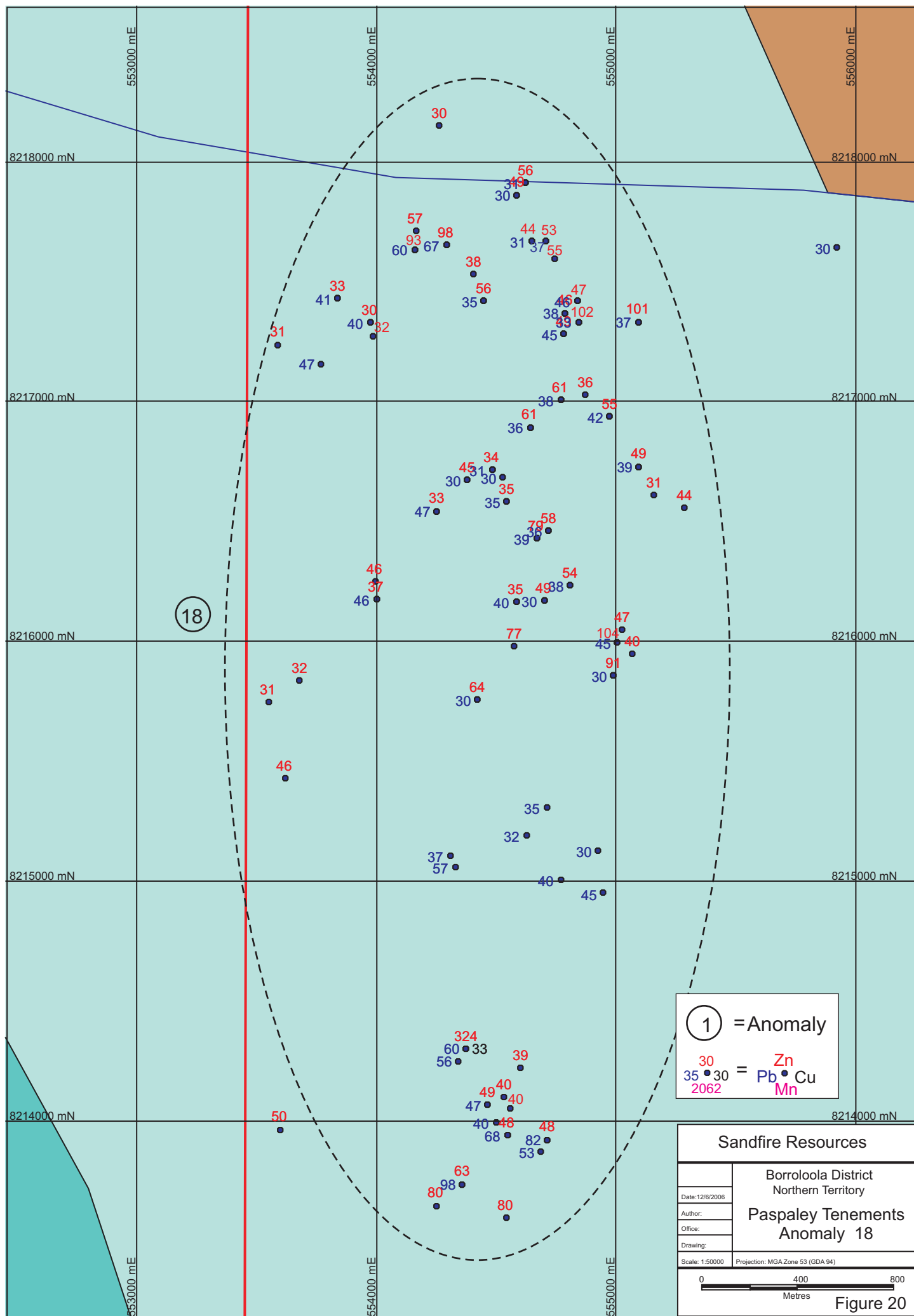
Conclusions: Stream sediment sampling programs within EL24996 clearly outline Pb-Zn anomalism associated with the target Tooganinie Fm which is host to a number of Pb-Zn and Cu prospects in the district. Although the results clearly outline an anomalous zone, the absolute Pb-Zn values may not be significant when compared with values from the known prospects.

The Barney Creek Fm outcrops in the south of the tenement appear not to have generated any significant anomalous stream sediment values. Most of the anomalous values appear to be upstream of the Barney Creek Fm position in sites draining Tooganinie Fm. Further research is required to try and track down any soil lines or rock chip samples from the Barney Ck Fm outcrops.

The copper anomalies in Masterson Sandstone and Mallapunyah Fm need to be followed-up in the light of similar anomalies in EL 24349 to the east.







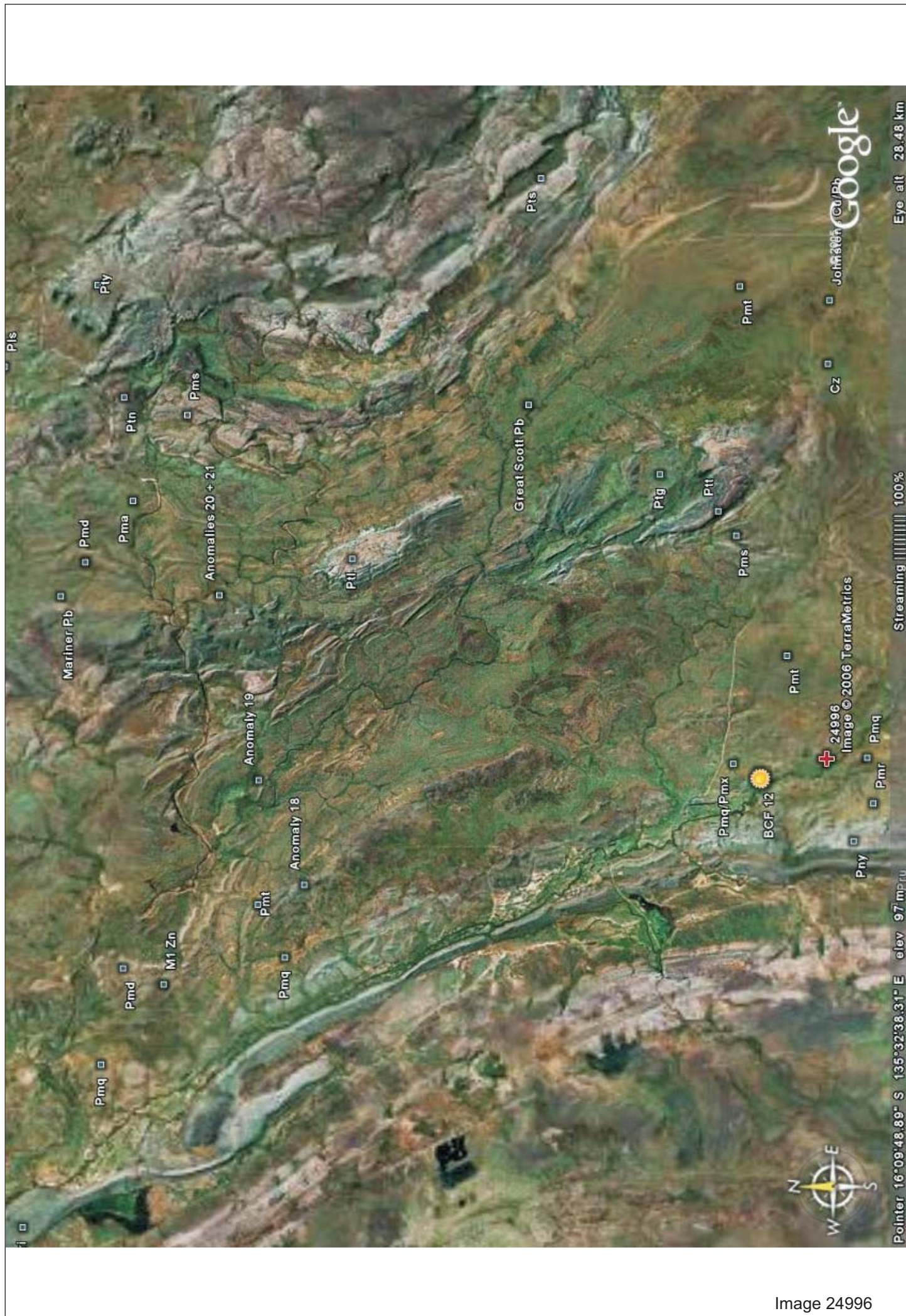


Image 24996

Exploration Licence 25130*

Regional Setting: The tenement is located approximately 45 kilometres south of the HYC Mine. It is bounded to the west by the Hot Springs Fault (marked by the Kilgour River and to the east by the Emu Fault Zone.

The Merlin Diamond Mine is located 10 kilometres east of tenement on a major structure which parallels the Emu Fault.

Within the district the McArthur Group rocks comprise a series of domes and basins of 4-5 kilometres amplitude. On a district scale the Mallapunyah and Myrtle sub-basins have been recognized separated by the Abner Range an outlier of flat laying Nathan Group and Roper Group sediments.

In the Coxco Valley area immediately to the north of the tenement Tawallah Group basement rocks have been upfaulted in 'horst-graben' type structure.

Most of EL 25130 is covered by Cambrian Bukalara Sandstone. Inliers of McArthur Group are exposed in the north and south of the tenement including the Emmerugga Dolomite and Tooganinie Fm. Major southeast and north trending faults exist in the area, exhibiting post-Cambrian movement.

Tenement Geology: Outcrop within the tenement area is almost 100% comprising 90-95%, flat lying Cambrian-Bukalara Sandstone with the balance being McArthur Group basement rocks exposed as inliers (erosional windows) through the Bukalara Sandstone. To the north of the tenement area Nathan/Roper Groups are present below the Bukalara; there is however no evidence of the Nathan/Roper Group beneath the Bukalara within the tenement.

In the southwest of the tenement area a sequence comprising McArthur Group Tooganinie Fm through to Stretton Sandstone is exposed below the Bukalara unconformity. A small outcrop of Reward Dolomite is also mapped immediately west of the tenement boundary. Barney Creek Fm has not been mapped in this area.

Within the central tenement area Tooganinie Fm and the Mora Dolomite Member are exposed as inliers through the Bukalara. Further to the east in Glyde River Valley upper McArthur Group rocks are exposed (Lynott Fm and Yalco Fm) over approximately 10 kilometres strike.

In the head waters of the Glyde River at Baker Creek in a 5 km² inlier of Barney Creek Fm is exposed. This area is 'along' strike to the south of the Coxco Valley 'horst-graben' structure. Well defined parallel linear fractures in the Bukalara Sandstone are interpreted as representing the Emu Fault zone and associated 'horst' block of the Coxco valley.

Previous Exploration: Amoco Minerals Australia commenced exploration north and south of the HYC deposit in 1978. Their work led to the discovery of the Caranbirini prospect to the north of the HYC Mine. In the Glyde River valley inlier immediately to the north of EL 25130. Amoco drilled four deep diamond holes through Bukalara Sandstone and Lynott Fm to test for the presence of Barney Creek Fm adjacent to the Emu Fault. The holes were also targeting a deep conductor (M12) returned from an Input EM Survey (see CR1981/0028). The four deep holes (2,400 metres) were drilled on an 8 km 'east-west' section. The cross-section (Figure 6 in the report) shows Barney Creek Fm at 300 metres depth in the west dipping into the Emu Fault with 900 metres of Barney Creek Fm being intersected in hole GR-7 one kilometer from the mapped Emu Fault position. Although a number of pyritic units were intersected no significant base metal values were returned. To the south of the above area at Baker Ck and Homebound Ck a further two holes were drilled just to the north of tenement boundary. These holes (GR-8 and 9) intersected pyritic and bituminous shales close to the Emu Fault. Gas flows (methane) were returned at depth in GR-9. [BCF – 13. Figure 21. Image 25130.](#)

Amoco withdrew from the area in 1981 stating that no significant base metals were associated with the pyritic shale units of the Barney Creek Fm.

Between 1991 and 1995 MIM's held EL 7217 which covered part of the Abner Range and Southern Mallapunyah Sub-Basin. MIMs 'rediscovered' the Glyde River Valley and carried helicopter supported by lag sampling over the valley and surrounding Bukalara Sandstone cover. MIMs also carried out a QUESTEM Survey over the tenement area which failed to return any conductors. Several scattered moderate Cu and Au anomalies were returned with few weak Pb-Zn values that were not considered worthy of follow-up. Report CR 1993/0140 details the MIMs geochemical and QUESTEM surveys over the Amoco M-12 anomaly, the Lamont Fault and the Emu Fault areas.

MIMs stream sediment surveys covered the extensive outcrop area of Tooganinie Fm in the southwest corner of the tenement as well as the central inlier of Tooganinie/Mara Dolomite and the window of Barney Creek Fm to west of the Emu Fault. No significant results were returned from the program.

The Sandfire SSD highlights a single isolated sample at 30 ppm Cu , 30 ppm Zn, 2.4% Fe and 470 ppm Mn on the SW tenement boundary. The sample site is on a tributary of the Kilgour River draining Tooganinie Fm rocks forming the divide with William Ck. No other samples in the area register above threshold.

The data should be revisited to check background for the -80# Survey.

Conclusions: EL 25130 whilst is almost entirely covered by Cambrian Bukalara Sandstone it is underlain by Barney Creek Fm dipping east towards the Emu Fault in the central and northern parts of the tenement. A series of well developed fractures in the Bukalara cover represent faults which locally probably central the depth to Barney CK Fm beneath the cover sequence

rocks. Towards the EFZ drilling by Amoco returned significant widths of pyritic Barney Ck shales with only background base metal values.

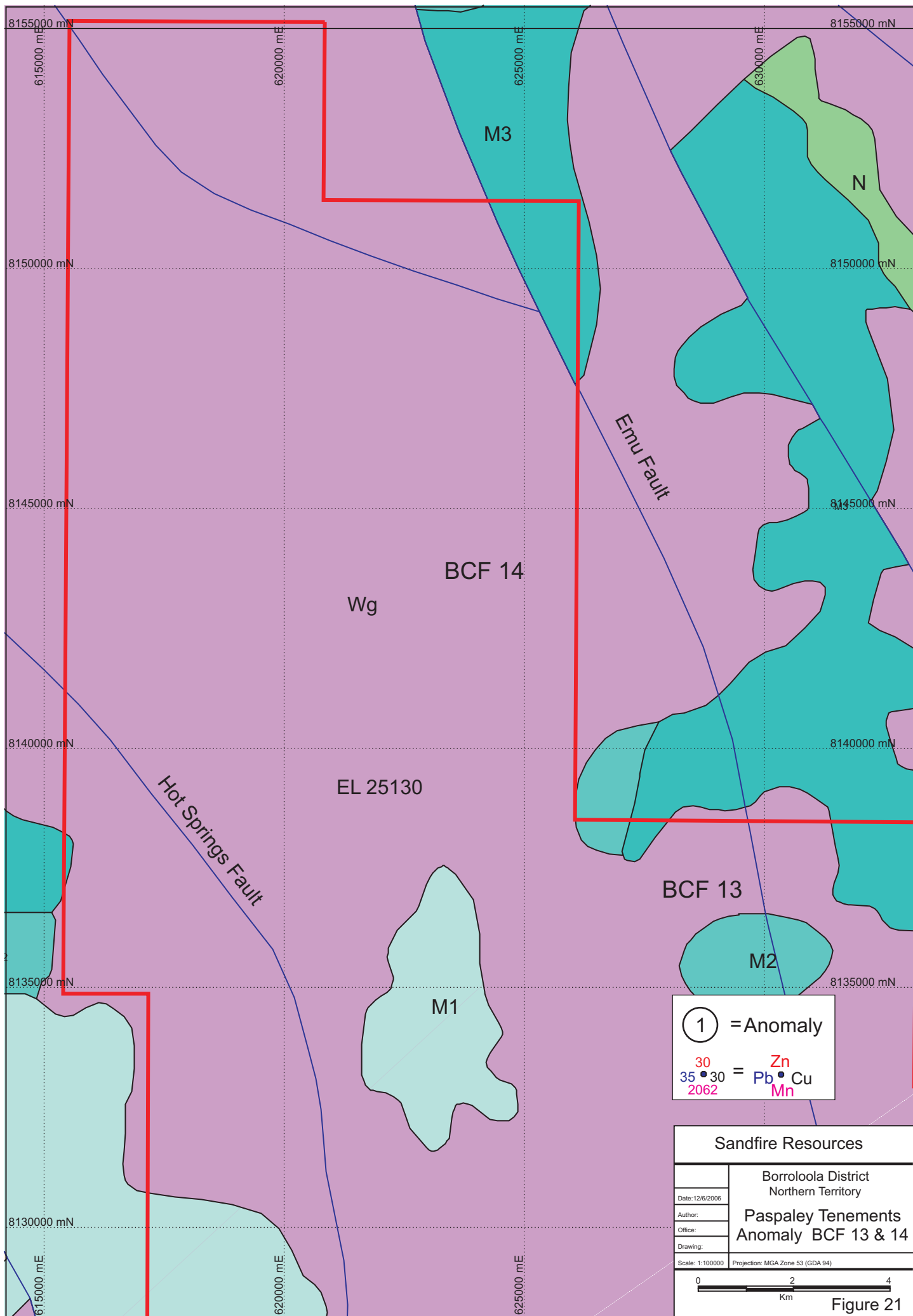
In the central to northern tenement area well developed WNW trending fractures in the Bukalara are interpreted to represent fault structures associated with the Hot Springs Fault System.

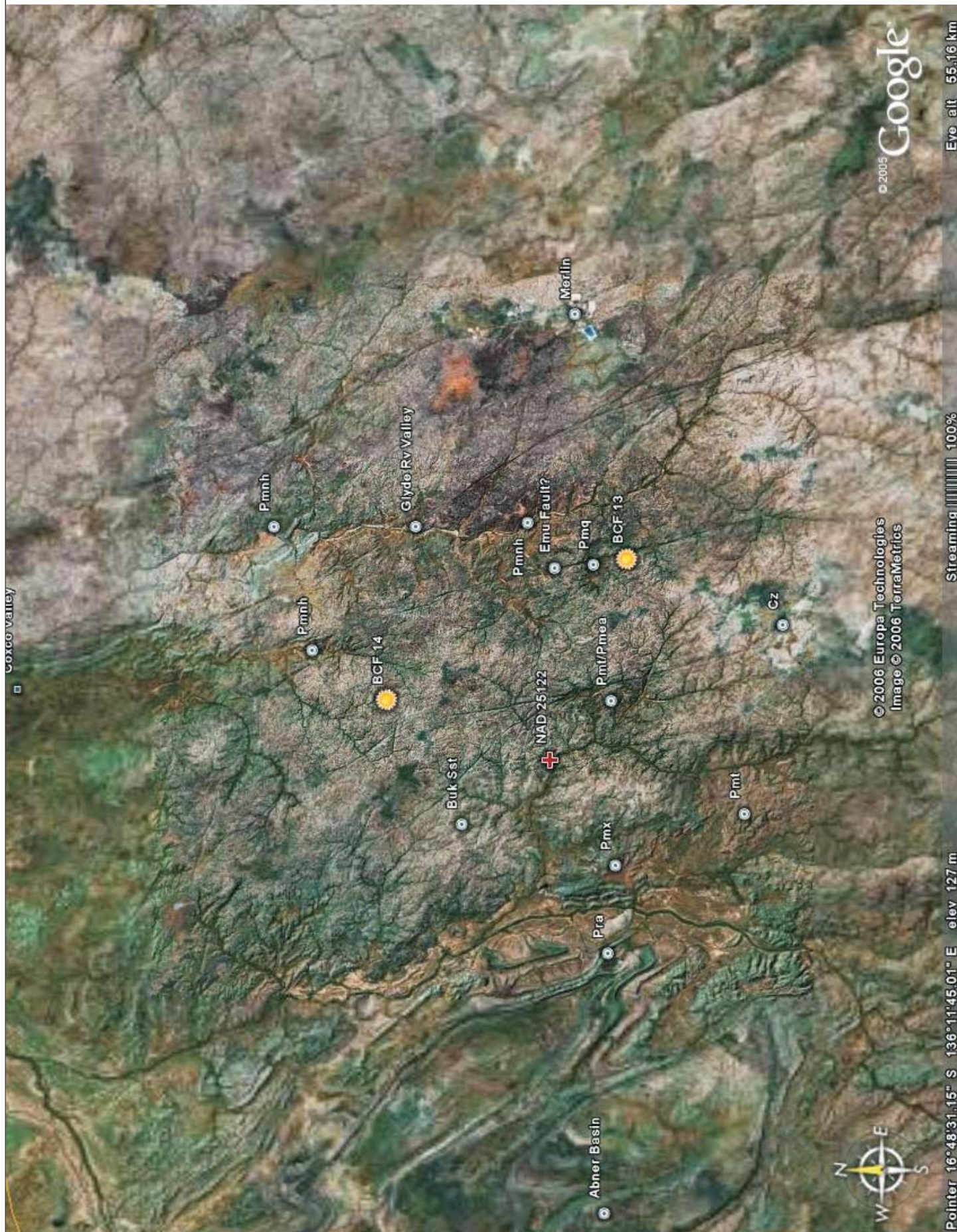
The intersection of the WNW structures with the Emu Fault and parallel breaks in central to northern tenement area represent targets for 'replacement' Cu and Pb/Zn mineralisation (Coxco, Cooley and Ridge styles) that are worthy of follow-up providing suitable host lithologies are present. *BCF – 14. Figure 21. Image 25130.*

Previous airborne geophysical surveys have failed to return any conductors away from Emu Fault. A review of the geophysical surveys should be undertaken in order to assess the prospectivity of the tenement.

The stream sediment geochemical data from the SW Kilgour River area should also be reviewed as the -80# data may need to be reassessed prior to downgrading the area.

** During the review period the contested application for this tenement was granted to North Australian Diamonds Ltd.*





3.4 Mineralisation Potential

The objective of the review was to evaluate the prospectivity of the Paspaley tenements with respect to:

- The presence in outcrop or at depth of the Barney Creek Fm member of the Palaeoproterozoic McArthur Group in the Batten Trough. Consideration of the previous exploration in the area of the tenements was an integral part of the assessment of the prospectivity to host HYC type mineralisation.
- The potential of the tenements to host a range of late stage replacement deposits comprising Mississippi Valley Type (Pb-Zn, Pb - Ba) and Cu /Cu-Ag/Cu-Zn and Pb-Zn mineralization associated with silica-carbonate alteration and brecciation.

HYC Targets

Only one tenement [EL 25070](#) is considered to have the potential to host HYC type mineralisation. Within this tenement the top of the Barney Creek Fm is interpreted (to be ± 500 metres depth) and sub-horizontal. The area underlies the coastal plains with the top ± 100 m comprising coastal sands/gravels (10-20 m) and Cretaceous sandstones.

Granted [EL 24714](#) east of the Emu Fault is underlain by Barney Creek Fm at an estimated depth of 1000 metres. Extensive drilling 5-10km to the NE located anomalous intercepts in the 'Pine Creek Sub-Basin'. Further review of the data is warranted.

Tenement application [EL 25130](#) lies immediately west of the Emu Fault. Drilling by the Amoco/Kennecott JV in the 1970's located extensive pyritic and bituminous Barney Creek Fm up to 900m thick in the Glyde River Valley to the NE of the tenement. Further work is warranted especially in the central-north of the tenement as structures parallel to the Emu Fault can be mapped through Cambrian cover and the potential to locate replacement Cu-silica and Pb-Zn mineralisation has not been tested.

Outcropping Barney Creek Fm in [EL 24374 and EL 24996](#) within the Western Thrust Zone represent a relatively thin ± 500 metres distal equivalent of the ± 3000 metres thick unit close to the Emu Fault. As both units outcrop, it is assumed they have been prospected without any significant results being returned (sighted).

At the Hammers North prospect anomalous Barney Creek Fm remains undrilled in [EL 24946](#). The Barney Creek stratigraphic position within the 'southern leg' of [EL 24349](#) remains untested.

Barney Creek Fm is also present at depth within [EL 24373](#) (+500 metres) and [EL 24977](#) (300-500 metres)

The Barney Creek Fm 'occurrences' are annotated [BCF – 1 to BCF – 15](#) in the text of the report and are shown in [Figure 5](#) and listed below in Table 3.

Replacement – Breccia Targets

The remaining tenements (including the above mentioned [EL 24374 and EL 24996](#)) all have potential to discover further replacement style Pb-Zn and Cu-Ag mineralisation as follow-up to a number of undrilled targets generated by the historic stream sediment sampling programs.

The 1970's – 1995 period of 'screening' ground with airborne EM needs to be reviewed in the light of current 'state of the art' airborne and ground EM techniques giving deeper penetration and recognition 'metal' as distinct from regolith and lithological conductors.

The possibility of locating MVT mineralisation developed within a 'karstified' Balbirini Dolomite exists within [EL 24997](#) beneath Roper Group outcrops and within granted EL's 24373 and 24349 where significant Pb-Zn-Mn anomalies in areas of extensive alluvial cover occur adjacent to outcropping Balbirini Dolomite.

'What you see is what you get' is a term that can be applied to the mineralisation associated with Tooganinie Fm and Amelia Dolomite sequences as none of the surface mineralized occurrences have been bettered at depth by drilling.

Notwithstanding the above statement there is potential to locate further replacement style Pb-Ba, Pb-Zn and Cu mineralisation hosted by Tooganinie Fm and Amelia Dolomite within [EL 24374, EL 24996, EL 24946 and EL 24349 \(Tawallah Pocket\)](#).

A style of mineralisation not previously followed up is Cu/Cu-Zn anomalism associated with fault zones through Masterson Sandstone/Mallapunyah Fm and Scrutton Volcanics in [EL 24349](#). In addition, Cu-Zn anomalies are also developed in Seigel Volcanics/ Tawallah Group – Sly Creek Sandstone in the northern part of [EL 24349](#).

The Gordons mineralisation within [EL 10121](#) has been extensively drilled by previous companies (and by Sandfire) without any significant economic widths/grade being returned. Further exploration within the southern part of the tenement does not seem justified based on the lack of anomalism from stream sediment samples over Tooganinie Fm. There is a reported Fe –Ba anomaly 3 km south of Gordons which may not been followed up(?)

In summary, untested geochemical targets derived from stream sediment sampling programs exist in all of the tenements except for [EL 25070](#) (HYC target only).

A view can be taken that the prospect of the discovery of a major sulphide body within the tenements is considered to be low based on the previous lack of conductors generated by numerous, overlapping airborne EM surveys. Sandfire need to take a view on the effectiveness of this early data. Has new technology improved so significantly that deeper mineralisation may be present beneath the numerous mineralised occurrences and significant geochemical indicators.

Table 2. Stream Sediment Anomaly Summary – Paspaley Tenements

Anomaly	Tenement	Geology	Type	Description	Comment
Anomaly 1	EL 24349	Pmpc-Pmml	Cu, Zn	30ppm Cu 40ppm Zn	Outcrop Pmq?
Anomaly 2	EL 24349	Pn	Zn, Mn	40ppm Zn +1000ppm Mn	Outcrop Pn
Anomaly 3	EL 24349	Pma	Cu	65ppm Cu	Outcrop Pma
Anomaly 4	EL 24349	Pml	Cu	80ppm Cu	Cu only
Anomaly 5	EL 24349	Ptlr	Cu	60ppm Cu 40ppm Zn	3km creek through Ptlr
Anomaly 6	EL 24349	Pml	Cu	40ppm Cu 60ppm Zn	Alluvium below outcrop
Anomaly 7	EL 24349	Pn	Pb, Zn	+40ppm Pb +40ppm Zn	Hot Springs Fault
Anomaly 8	EL 24349	Pls	Cu, Pb, Zn	60ppm Cu 70ppm Pb 120ppm Zn	Scrutton Volc
Anomaly 9	EL 24349	Pts/Ptl	Cu, Zn	40ppm Cu 60ppm Zn	Recessive volcanics NW fault
Anomaly 10	EL 24349	Ptl/Cz	Cu, Pb, Zn	+80ppm Cu +30ppm Pb +50ppm Zn	2km Strike
Anomaly 11	EL 24373	Pr	Pb, Mn	250ppm Pb 1%Mn	High Mn area
Anomaly 12	EL 24373	Pn	Pb, Zn, Mn	130ppm Pb 200ppm Zn 4000ppm Mn	3km strike
Anomaly 13	EL 24374	Pmt	Cu, Pb, Zn	+50ppm Cu +70ppm Pb +100ppm Zn	NW fault
Anomaly 14	EL 24374	Pmt	Cu, Pb, Zn	65ppm Cu 120ppm Pb 110ppm Zn	1kmm strike
Anomaly 15	EL 24997	Pn/Pm	Cu, Pb, Mn		alluvial valley
Anomaly 16	EL 24997	Pr	Cu, Pb, Mn	30ppm Cu 2062 ppm Mn 72ppm Zn	Roper outcrop
Anomaly 17	EL 24996	Pma	Cu, Pb, Zn	30ppm Cu 60ppm Pb 50ppm Zn	alluvial valley
Anomaly 18	EL 24996	Pmt	Pb, Zn	+40ppm Pb +60ppm Zn	3km strike
Anomaly 19	EL 24996	Pms	Cu	80-90ppm Cu	3km strike

Anomaly 20	EL 24996	Pmt	Pb, Zn	80ppm Pb 120ppm Zn	1km strike
Anomaly 21	EL 24996	Pml	Cu	Peak 95ppm Cu	1km strike

Table 3. Barney Creek Fm Targets

Anomaly	Tenement	Geology	Depth	Description
BCF 1	EL 24349	Pmpc-Pmnh	0-500m	Alluvium/Under Tawallah Thrust
BCF 2	EL 24349	Pnz	>500-1000m	Batten Creek Central Area
BCF 3	EL 24373	Pru/Pn	>1000m	Batten Creek Central /Borrooloola Basin
BCF 4	EL 24714	Pru/Pmj	>1000m	Eastern Borrooloola Basin
BCF 5	EL 24374	Pri/Pnz	<500	Below Scrutton Thrust
BCF 6	EL 24374	Pmg	0	Outcropping – 8km Strike
BCF 7	EL 25070	Kl/Pm	±500m	+200 km² aerial extent
BCF 8	EL 24997	Pr/Pn	200-500m	North of Eastern Creek
BCF 9	EL 24997	Pr/Pn	>500m	500m of Pr/Pn to top of Pm
BCF 10	EL 24946	Pmq	0	Outcropping gossanous Pmq
BCF 11	EL 24946	Cz	>500m	Conceptual Target
BCF 12	EL 24996	Pmq	0	Outcropping 6km alluvial valley
BCF 13	EL 25122	Pmq	0-1000m	Inlier drilled to 900m
BCF 14	EL 25122	Bukalara	100 – 500m	HYC and Cu breccia targets
BCF 15	EL 24349	Pmpc-Pmnh	100 – 500m	Alluvium / Cretaceous cover

4.0 Review of Previous Airborne Geophysical Surveys

The airborne geophysical surveys of most interest to this review are the airborne electromagnetic (AEM) surveys. Those available on open file are shown on [Figure 4.](#)

In general, only those surveys flown using 25Hz are of interest in the current program. However, other surveys are also of interest as they can still provide some information on the earth conductivity. Sandfire has commissioned Fugro Airborne Systems to reprocess 6 of these surveys (fig.xx2) to produce CDI (Conductivity Depth Image) sections for the following reasons:

Surveys A & B – large data sets survey at 75Hz but which can provide information on the earth conductivity. Fugro are reprocessing every 10th line.

Surveys C, D, E and F were done at 25Hz and are likely to provide a reasonable insight into the type of result that can expected from re-surveying using current technology.

Survey C – the area is near (over) the Gordons area.

Survey D & E – these surveys are over the McArthur River deposit area.

Survey F – this survey is over the Glyde Valley area.

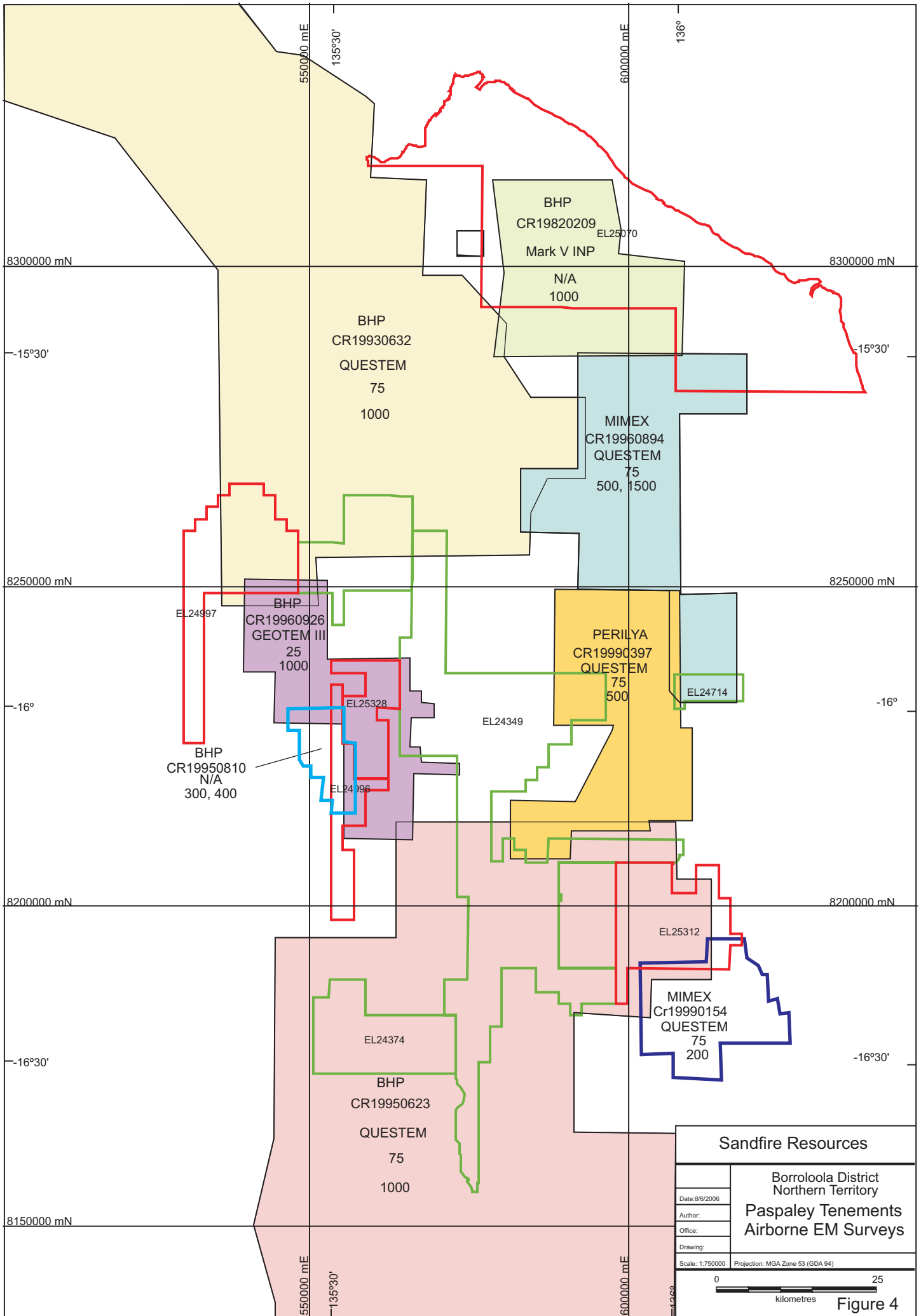


Figure 4

4.0 Conclusions and Recommendations

5.1 Conclusions

The prime objective of demonstrating the presence at depth of undrilled Barney Ck Fm within the Paspaley tenements was achieved. The prospective formation is present in outcrop and at depth in all of the tenements.

The fact that over 30 years of intensive exploration in the district has failed to locate any significant HYC type mineralisation or anomalous intercepts away from the Emu Fault highlights the potential of EL 25070 where the Emu Fault / Barney Creek Fm 'intersection' remains untested at depths of 300-500m over 10 kilometres strike.

EL 25130 to the south of the HYC mine has significant potential to host Cu and Pb-Zn replacement styles of mineralisation in the southern extension of the Coxco Valley mineralized area beneath Cambrian Bukalara Sandstone. The tenement is subject to a conflicting by North Australian Diamonds Ltd. It may be possible to joint venture the base metal rights to the tenement.

Barney Ck Fm in the remaining tenements is 'distal' from the perceived mineralizing Emu Fault and as such has low potential to host HYC type mineralisation.

The potential of the Balbirini Dolomite of the Nathan Group to host MVT mineralisation is low to moderate based on size potential. There are however numerous targets to follow-up in the district.

The potential to locate Gordon's style copper-cobalt mineralisation is low within the areas where stream sediment sampling has been carried out. The 'Lorella Pocket' however within EL 24946 should be drilled to test for Gordon's style of mineralisation in the Amelia Dolomite position under extensive alluvial cover.

There are a series of Cu and Pb-Zn anomalies within the Sandfire Stream Sediment Database (SSD) compilation that require further evaluation/field checking in order to see if they warrant follow-up.

5.2 Recommendations

It is recommended that Sandfire/Paspaley accept the grant of EL 25070 when offered and move to evaluation of the Emu Fault zone/Barney Ck Fm 'intersection' at depths of 300-500m.

Conflicted tenement EL 25130 has also been applied for by North Australian Diamonds (NAD) (the new owners of the Merlin mine). An approach should be

made to NAD to secure the 'base metal' rights of the tenements through a JV deal if Paspaley are not granted the tenement.

The grant of EL 24946 should be accepted when offered. There is significant prospectivity to locate Amelia Dolomite/Tooganinie Fm, units beneath alluvial cover in the 'Lorella Pocket' and an undrilled anomalous Barney Creek Fm gossan.

The numerous targets/anomalies generated by the SSD database need further review mainly through a relatively slow process of reading historic reports in the NTGS database.

Appendix 1

SANDFIRE RESOURCES BATTEN TROUGH PROJECT**EL 10121**

REPORT	COMPANY	FORMATION	STRUCTURE	PROSPECTS	DRILLING	GEOCHEM	GEOPHYS	COMMENT
1979/0040	CEC EL 1372	Pt → Pm→ Pr Key Units Lower Pm Pmi - Mallapunyah Pma - Amelia Dolom	Thrust repeated blocks west facing from Roper u/c in west to Tawallah Pocket (Window) and ramping up onto Rosie Ck -Tawallah Block Scutton Volcanics	Discovery of Apollo Gordons, Eastern Ck Tawallah Window or Pocket used for inlier of Pm	Details Apollo DDH - 1 abandoned 27 RCP holes, logs and assays	1080 streams -80# Detail documentation of work	Trial airborne EM	Good description of discovery includes drill logs and assays Documents geochem with hard copy plans and assays
1980/0046	CEC EL 1372	As Above	As Above	Details on Gordons EW fault in Amelia Dol.	17m @0.5% Cu	Follow up soil grid 310 ppm in -80# 427 samples		Details on Gordons 17m @0.5% Cu
1997/0561	Biddlecomb EL 7730	As Above	As Above	Gordons 1992 to 1998 Review	None	CEC data review Soils gave 550 x 50 m at +1000 ppm Cu Rock chips to 0.71% Co and 0.66% As	None	High cobalt and arsenic not reported by CEC
1998/0513	EL 8011	As Above	As Above	Details on Gordons EW fault in Amelia Dol.	None			BHP hole 3km north to 350 m still in Roper Sketch Map of Gordons
1997/0157	EL 8011	As Above	As Above	BHP JV	MYD - 007 to 345 m See section minor Cu at depth below workings and CEC hole (17 m @ 0.0.5% Cu) 8 m @ 0.28% Cu best however 148 m @ 1ppm Ag	None	Geotem anomaly conductor at 280 m at Roper u/c 2 m @ 0.57% Cu returned see section	
1987/0193	Top End EL 4939	Lower Pmt to Pn	Fault bounded block Pt - Pn-Pr. Pr down faulted to south separating inlier from Mariners area	Sampling to south of EI 24946. Gordons, Ba-Fe to south; Sly Ck Eastern Ck Pb - Ba	None	Rockchip and soils anom values Using Wo, Te, Hg as pathfinders	None	Follow-up of early phases of CEC. Hammers Hut Cu not located
Summary EL 8011:	Prospector Biddlecomb reapplied for EL (formerly 7730). JV to BHP. Well documented follow-up including Geotem. DDH failed to upgrade prospect.							
Summary EL 1372: Above reports detail 6 years work over the Tawallah Pocket area with Pb+Ag and Cu mineralisation being interpreted as replacement bodies Work mainly geochem with follow-up drilling. CEC happy that -80# stream sed sampling effectively tested near surface area.								
Summary EL 7730: Prospector Bob Biddlecomb reviewed previous work at Gordons and carried out rock chip sampling 12 samples averaged 9% Cu, 0.32% Co and 0.53% As.								

SANDFIRE RESOURCES BATTEN TROUGH PROJECT**EL 24349**

REPORT	COMPANY	FORMATION	STRUCTURE	PROSPECTS	DRILLING	GEOCHEM	GEOPHYS	COMMENT
1994/0643 Looking Glass Ck	Ashton/BHP EL 7302	Pm → Pn → Pr	Thrust Fault west block up. Sinuous trace	None	None	107 Stream samples 1992/1993 Peak: 28 Cu, 117 Pb 57 Zn. Au/Ag ND	100% QTEM coverage	Multi element work 50% relinquishment
1995/0645	Ashton/BHP EL 7302	Pm → Pn → Pr	TMI contours show basement NNW fault See Report	3 - 5% Mn Nathan Group - Cretaceous u/c	None	Total 238 streams Sample 1 km ² Cu-Pb in Pru Zn in Lynott Fm Mn rockchips Zn 2070 ppm + Fe See Report	7 TEM anom 4 off tenement see EL24349 TMI contours show structure	Final Report BHP Base Metals See Report
1995/0505 Covers NE part of EL24349	MIMs EL 7736	Pt → Pm → Pn	East facing seq of Pt up faulted block Pms → Pmj includes Pmq o/c		Yalco Ck YD 01 150 m Cret cover No geochem Target Pmq/ GTEM Outside EL		Geotem/Mag 11 anomalies not located	YD 01 in approx Pmq position Report area mainly N-NE of tenement See Report
1993/0491	MIMs EL 7736	Pt → Pm → Pn		Covers NE part of EL24349		Streams thru alluvial area of EL		Summary report Good description of area N -NE of EL 24373/349
1994/0048	MIMs EL 5605 West part	Pt → Pm → Pn → Pr	Tawallah Fault and northern Hot Springs fault	Covers south central EL 24349 and 24996	3 QTEM targets 6 RCP all holes abandoned drilling problems in cover ?		QTEM Litholoical Roper U/C conductive cover	JV with Perilya QTEM follow up by MIMs
1993/0561	MIMs EL 5605 West part	Pt → Pm → Pn → Pr	Tawallah Fault and northern Hot Springs fault	Covers south central EL 24349 and 24996	Reviews earlier work by Perilya/Noranda	No geochem reviews of previous work		
1990/0682	Perilya JV EL 5605	Pt → Pm → Pn → Pr	Tawallah Fault and northern Hot Springs fault	Covers south central EL 24349 and 24996	Reviews earlier work by Perilya/Noranda			General overview
Summary EL 7302: TEM anomaly B208 interp as flat lying conductor 250 - 300 metres depth within or below Lynott Fm in EL 24349 at 593870mE / 8185712mN Summary EL 5605: EL covers main Roper U/C to west, Barney Ck Fm within EL 24996. Lower Pm units thru to Tawallah Fault. East of TF - thrust block of Lynott Fm then Nathan Grp								
Summary EL4200:								

SANDFIRE RESOURCES BATTEN TROUGH PROJECT**EL 24349**

REPORT	COMPANY	FORMATION	STRUCTURE	PROSPECTS	DRILLING	GEOCHEM	GEOPHYS	COMMENT
1980/0047	CEC EL 1371	West facing Pm → Pt repeated 3 blocks Central Pt block Pmq in west	Three thrust blocks ramping on Tawallah Fault overthrust Nathan Grp at Batten Ck area	Mariners, Great Scott Pb Johnstons Cu	none	Stream sampling no discussion		EL 1371 mainly covers ground between EL 24996 and 24349 Good review of discoveries Mariners Great Scott - Pb Johnstons Cu
1979/0036	CEC EL 1371	As Above	As Above	As Above Great Scott Rock chips 3% Pb 2% Cu see report	Mariners Pb RCP 14 holes - 568m 16 m @ 7.9% Pb best Drill summary all holes	-80# streams all hard copy plans and assay data Cu - 3.45% not located	none	Stratbound Pb mineralisation Full account of Mariners discovery
1983/0134	CEC EL 1371	As Above	As Above	Mariners, Mariners Nth	Details on strat hole south of EL 10121 Target Pmq 500m Abandoned in Pr bx at 163m (McA 6)		EM 37 Reg lines data not copied see report for summary	DDH McA 6 - 163 m see report Coloured Plans copied
1983/0135	CEC EL 1371	As Above	As Above	Mariners, Mariners Nth	Summary of MARD 1 further info in BHP rpt Pyritic black shale with cpy veining	Stream sampling only located Mariner (-80#)	Details of EM 37 IP and trial QTEM	Summary to 1983 Pyritic black shale with cpy veining
1979/0212	CEC EL 1371	As Above	As Above	Mariners, Eastern Ck-ELA 24997 Apollo - EL 24349			Trial INPUT over mineralisation	see report for summary
Summary EL 1371: Majority of work completed is focussed in area between EL 24996 and EL 24349 with a string of Pb and Cu discoveries in Tooganinie Fm								

SANDFIRE RESOURCES BATTEN TROUGH PROJECT

EL 24349

REPORT	COMPANY	FORMATION	STRUCTURE	PROSPECTS	DRILLING	GEOCHEM	GEOPHYS	COMMENT
1978/0022	CEC EL 1372	Pt → Pm → Pr Key Units Lower Pm Pmi - Mallapunyah Pma - Amelia Dolomite	Thrust repeated blocks west facing from Roper u/c in west to Tawallah Pocket (Window) and ramping up onto Rosie Ck - Tawallah Block Scutton Volcanics	Discovery of Apollo Gordons, Eastern Ck	Eastern Ck 8.3 m @ 2.55% Pb	470 streams -80# Secondary tribs 560 Pb/100 Zn best Coarse fraction -20+40 0.14% Pb/480 Zn Barite in samples Eastern Ck 225 Pb 60 - 140 Pb at 2.5 km downstream	None	Good description of discovery 8.3 m @ 2.55% Pb Classed as MVT mineralisation Zones of silicification in Pm
1979/0040	CEC EL 1372	Pt → Pm → Pr Key Units Lower Pm Pmi - Mallapunyah Pma - Amelia Dolomite	Thrust repeated blocks west facing from Roper u/c in west to Tawallah Pocket (Window) and ramping up onto Rosie Ck - Tawallah Block Scutton Volcanics	Discovery of Apollo Gordons, Eastern Ck Tawallah Window or Pocket used for inlier of Pm	Details Apollo DDH - 1 abandoned 27 RCP holes, logs and assays	1080 streams -80# Detail documentation of work	Trial airborne EM	Good description of discovery includes drill logs and assays Documents geochem with hard copy plans and assays
1980/0046	CEC EL 1372	As Above	As Above	Details on Gordons EW fault in Amelia Dol.	17m @0.5% Cu	Follow up soil grid 310 ppm in -80# 427 samples		Details on Gordons 17m @0.5% Cu
1982/0388	CEC EL 1372	As Above	As Above	Apollo, Eastern Ck - Pb Gordons, Sly Ck - Cu	Apollo 15 m @ 2.15% Pb and 5.6 ppm Ag.	See above	INPUT 21 lines at Apollo, 5 at East Ck IP at Apollo No anomalies in EM or IP	Relinquishment Report Good Summary
1997/0561	Biddlecomb EL 7730	As Above	As Above	Gordons 1992 to 1998	None	CEC data review Soils gave 550 x 50 m at +1000 ppm Cu Rock chips to 0.71% Co and 0.66% As	None	High cobalt and arsenic not reported by CEC
1995/0623	Ashton/BHP EL 7266 EL 7300 EL 7301	As Above Off tenure	As Above Pmq o/c	Gordons	EL 7301 - 2 RC Holes see logs and report best 2m @ 1490 Pb 1070 Zn	NSR in geochem Follow-up of open file data EL 7301 good geochem		AMGs for drill holes West of Mariners
1984/0220	BHP EL 2567	As Above	As Above	Gordons	McA 15 to 300 m see Tawallah 1:100000 Pr all the way wk Zn		EM 37 over Gordons	Hole did not reach u/c
Summary EL 1372: Above reports detail 6 years work over the Tawallah Pocket area with Pb+Ag and Cu mineralisation being interpreted as replacement bodies. CEC interp Eastern Ck as being stratabound Pb in Balbirini Dolomite - Nathan Group associated with u/c between Pm and Pn/P Exploration mainly geochem with follow-up drilling. CEC happy that -80# stream sed sampling effectively tested near surface area. Trial INPUT may not have fully tested area. IP over Apollo - no anomaly. Review of Google Earth scene shows geochem stream sed sampling effective +75% area with only broad alluvial channels not effectively tested. Plus the alluvial flats.								
Summary EL 7730: Prospector Bob Biddlecomb reviewed previous work at Gordons and carried out rock chip sampling 12 samples averaged 9% Cu, 0.32% Co and 0.53% As.								

SANDFIRE RESOURCES BATTEN TROUGH PROJECT

EL 24373

REPORT	COMPANY	FORMATION	STRUCTURE	PROSPECTS	DRILLING	GEOCHEM	GEOPHYS	COMMENT
1994/0643 Looking Glass Ck	Ashton/BHP EL 7302	Pm → Pn→ Pr	Normal Fault west block up. Sinuous trace	None	None	107 Stream samples 1992/1993 Peak: 28 Cu, 117 Pb 57 Zn. Au/Ag ND	100% QTEM coverage	Multi element work 50% relinquishment
1996/0723	Ashton/BHP EL 7302	Pm → Pn→ Pr		None	None			Final Report Diamonds
1992/0389	Ashton/BHP EL 7302	Pm → Pn→ Pr		None	None			First Year Desktop
1995/0645	Ashton/BHP EL 7302	Pm → Pn→ Pr	TMI contours show basement NNW fault See Report	3 - 5% Mn Nathan Group - Cretaceous u/c	None	Total 238 streams Sample 1 km² Cu-Pb in Pru Zn in Lynott Fm Mn rockchips Zn 2070 ppm + Fe See Report	7 TEM anom 4 off tenement see EL24349 TMI contours show structure	Final Report BHP Base Metals See Report
1995/0501	Ashton/BHP EL 7302	Pm → Pn→ Pr				70 soils follow up NSV	Ground EM over B 208 profiles	Copy of EM section
1994/0425	Ashton/BHP EL 7302	Pm → Pn→ Pr				Details soils over TEM anomalies No significant values		
1995/0505	MIMs EL 7736	Pt → Pm→ Pn	East facing seq of Pt up faulted block Pms → Pmj includes Pmq o/c		Yalco Ck YD 01 150 m Cret cover No geochem Target Pmq/ GTEM		Geotem/Mag 11 anomalies not located	YD 01 in approx Pmq position Report area mainly N-NE of tenement See Report
1993/0491	MIMs EL 7736	Pt → Pm→ Pn						Summary report Good description of area N -NE of EL 24373/349
Comment: Tenement east of Tawallah Fault. Outcrop mainly Nathan Group and Roper Group. Along the western tenement margin McArthur Group is upfaulted to expose Lynott Fm, Yalco Fm and Stretton Sst (Batten Subgroup) dipping west into EL 24349. Along the eastern tenement boundary the Nathan Group is underlain by Batten Subgroup dipping west into the tenement. TEM anomaly B208 interp as flat lying conductor 250 - 300 metres depth within or below Lynott Fm in EL 24349 at 593870mE / 8185712mN Siesmic survey thru tenement shows Hot Springs fault zone as linked to Tawallah Fault (listric to west) The Schematic Section C-D from the Batten 1:100,000 sheet indicates estimated depth to Barney Ck Fm to be +1000 metres ?? The Hot Springs fault (NNW) in the alluvial valley is now interp as listric structure off the Tawallah Fault and should be targeted for leakage geochem. Previous sampling is sparse to non existant in the valley.								

SANDFIRE RESOURCES BATTEN TROUGH PROJECT

EL 24374

REPORT	COMPANY	FORMATION	STRUCTURE	PROSPECTS	DRILLING	GEOCHEM	GEOPHYS	COMMENT
93/0482B	Ashton/BHP EL 7300	Pma → Pmj uncon Pr	Flat lying to shallow W/SW dipping	None	None	Streams over Pmt Low Pb/Zn	100% QTEM coverage	7- 8 km strike of Pmq. No sampling recorded Copy Report
94/0594	Ashton/BHP EL 7300	Pmf		None	None	26 streams low Cu/Pb/Zn/As	As above	Follow-up to 1993
94/0434	Ashton/BHP EL 7300	Pmf		None	None	56 Streams NW low Cu/Pb/Zn/As	As above	Copy Report Assays available
92/0398	Ashton/BHP EL 7300	Pma → Pmj uncon Pr		None	None		None	Diamond Expl.
93/0606	Ashton/BHP EL 7300	Pr		None	None		QTEM/Ground	flat lying conductor 522400E 818300N
96/0741 Final	Ashton/BHP EL 7300	Pma → Pmj uncon Pr		None	None	Two soil lines as follow up to earlier streams Plan copied Copy of Summary	100% QTEM coverage	Low order anomalies in Myrtle Shale Pmf east of Barney Ck outcrops
1984/0136	CRAE EL 4200	Pmt		None	None	Diamonds 59 streams	100% coverage aeromag + radiometrics 2580 km	Diamonds No other work No results Copy Report
1985/0159 Final	CRAE EL 4200	Pmt		None	None	None	As above	Relinquished No further work Copy Report
Summary EL24374: 80-90% tenement area older than Myrtle Shale member -Pmf. Majority of area underlain by W to SW shallow dipping Tooganinie Fm NW corner 7-8 km strike 10 -25° W dipping Barney Ck Fm sub-cropping through alluvial filled valley. No record of sampling. Area covered by QTEM. Barney Ck Fm dips out of tenement to NW over ± 1 km, limiting tonnage potential to strike direction. Stratigraphic section illustrated on Batten 1:100,000 sheet, Section A to B. Tenement west of Tawallah Fault, strongly developed NNW normal faults. Low order stream seds ~40 Cu, 120 Pb, 110 Zn, 90 As in Pmt/Pmf. No sampling over Barney Ck Fm in alluvial filled valley.								
Summary EL4200: Low level high sensitivity aeromag and radiometrics, no data supplied. 300 metre line spacing, 80 metre terrain clearance NE -SW flight lines No base metal data								

SANDFIRE RESOURCES BATTEN TROUGH PROJECT**EL 24374**

REPORT	COMPANY	FORMATION	STRUCTURE	PROSPECTS	DRILLING	GEOCHEM	GEOPHYS	COMMENT
1980/0148 EL 2178	Kennecott etc	Pmq	No comment	None	None	None	None	No Report Pmq poorly developed'
1997/0061 EL 5649	MIM	No comment	No comment	None	None	None	None	No data for EL 24374
1995/0153 EL 5649	MIM		No comment	None	None	None	None	No data for EL 24374
1995/0669 EL 5649	MIM	No comment	No comment	None	None	None	None	Reviewed previous geochem selected east area to follow up
Summary EL 5649: MIMs reviewed early geochem and worked mainly to south of EL 24373 discovered Berjaya and Leila Prospects in Hot Springs / Lynett Fm								

EL 24714

SANDFIRE RESOURCES BATTEN TROUGH PROJECT

EL 24946

REPORT	COMPANY	FORMATION	STRUCTURE	PROSPECTS	DRILLING	GEOCHEM	GEOPHYS	COMMENT
1987/0193	Top End EL 4939	Lower Pmt to Pn	Fault bounded block Pt - Pn Pr. Pr down faulted to south separating inlier from Mariners area	Sampling to south of EL 24946. Gordons, Ba-Fe to south; Sly Ck Eastern Ck Pb - Ba	None	Rockchip and soils anom values Using Wo, Te, Hg as pathfinders	None	Follow-up of early phases of CEC. Hammers Hut Cu not located
1988/0458	Top End EL 4939	Lower Pmt to Pn fault bounded Pt Pmq reported	Fault bounded block Pt - Pn Pr. Pr down faulted to south separating inlier from Mariners area	Hammers-Pmq?? 500 x 20 m goss zone Not Hammers Hut	None	Ba-Fe 3 km south of Gordons	None	Hammers Pb-Zn Prospect covered by Pn just inside 24946. Ba-Fe sth of Gordons
1991/0491	Top End EL 4939 Perilya JV	As Above	As Above	Hammers	None	None	None	Map of Prospect
1989/0587	Top End EL 4939	As Above	As Above	Hammers	None	Summary sheet geochem sampling	None	Cu 13-99, Pb 240-1620 Zn 285-3940, Ba 135-2500
1992/0564	Top End EL 4939 Perilya JV	As Above	As Above	Hammers Hut/Copper? 41%Cu - 668ppm Ag chert in Pn Hammers Nth EM Hammers Pb-Zn	Hammers Nth - 2 holes Hammers - 3 holes HammersCu -3 holes	No sign values in drilling Hammers Cu concept. target	QTEM 32kms 500 m spacing	Hammers Pb-Zn / North Em just in 24946 see sections

SANDFIRE RESOURCES BATTEN TROUGH PROJECT

EL 24996

REPORT	COMPANY	FORMATION	STRUCTURE	PROSPECTS	DRILLING	GEOCHEM	GEOPHYS	COMMENT
1983/01354	CEC EL 1371	Pt → Pm → Pn → Pr - regional Pr/Pmt/Pmd/Pma at prospect scale	Tawallah Thrust Sheet	Mariners Prospect Mariners North Prospect	McA 6 Target Pmq below Pr Abandoned ar 163m Target depth 500m	Results not discussed	EM 37 targets	Good description of Mariners West of tenement
1983/0135	CEC EL 1371	Pt → Pm → Pn → Pr Scrutton Volcanics	Tawallah Thrust Sheet	Johnsons Lead Prospect Pb-Cu veins Mariners Prospect	Mariners 14 RC holes 588 m 16m at 8% Pb in Hole 1 MAR-DI Blk shale minor cpy See above report for map	Results not discussed	AEM trial over Mariner located new anomalies IP and EM 37	CEC historic expl. Listed West of tenement
1994/0594	Ashton EL 7300 EL 7301	Pt → Pm → Pn → Pr - regional	Scrutton and Tawallah thrust sheets	Tobacco Yard	2 RCP holes Pmq and Pmx no sig results anomalous Pmq explains soil values	peak soil geochem B250 81 ppm Cu, 50ppm Zn 17ppm Pb	AEM Anomaly B250 TEM follow up	Drilling on Pmq just to south of 24996. V good geochem 2m at 1490 Pb, 1070 Zn Pmq trends into 24996
1995/0181A	Ashton BHP EL 7947 EL 7944 EL 7578	Pt → Pm → Pn → Pr	Scrutton and Tawallah thrust sheets	Mulholland Ck Johnsons Prospect area Great Scott	BDP 3	Soils peak 343 Pb 682 Zn located outcrop 2.96% Pb/0.63% Zn	PROTEM conductors in Cret.	Part of regional geochem dataset Good background on Pmt gechem EL 7578 Billengraph v anom Cu Zn with high Fe/Mn 1.3% Cu (11% Fe 5% Mn)
No direct exploration detailed on EL 24996 other than soil sampling in district as part of geochem database Very background info for exploring Toogannie Fm.								

SANDFIRE RESOURCES BATTEN TROUGH PROJECT**EL 24997**

REPORT	COMPANY	FORMATION	STRUCTURE	PROSPECTS	DRILLING	GEOCHEM	GEOPHYS	COMMENT
1972/0087	Kratos AP 2589	Cambrian Sst over Pr	NS Mantungula Fault and Limmen Fault		DDH 3 - 11 No info	No Info	aeromag and radiometrics?	Uranium exploration Report not available AP south of Ba occurrences on Limmen Fault
1985/0184	CRAE EL 4547	Cambrian Sst over Pr	NS Mantungula Fault and Limmen Fault					No Info Diamond exploration
1983/0198	Negri Rv EL 3499	Cambrian Sst over Pr. Pn and some Pm	NS Mantungula Fault and Limmen Fault to Four Archers Fault					Diamond exploration No Info
1974/0075	EL 891	Pr/Pn and northern Pm inlier	Limmen Fault	Covers Ba prospects in 24997				Report not available
1969/0003	AP 2228	Pr/Pn west of Four Archers Fault Pt with Lower Pm block to lorella fault	Covers all major faults from west to east	Covers northern blocks of 24996 and 24997				Large AP east to Rosie Ck Report not available
1996/0242	Rennison BHP EL 8975	Pr/Pn	Pn block between Limmen and Four Archers Faults	Known Ba cluster				Report not available
1983/0067	EL 2993	Pm inlier bounded by Pt and Pn	Four Archers Fault	Hammers Cu, L2 - Cu Hammers Pb-Zn, Eastern Ck Pb-Ba				Report not available Encouraging results
1980/0024	EL 1422 EZ/Shell Penarroja	Pm inlier to north of 24997	Limmen and Mantungula Faults					Reports Barney Ck with Cu-Zn anomalism

SANDFIRE RESOURCES BATTEN TROUGH PROJECT

EL 25070

REPORT	COMPANY	FORMATION	STRUCTURE	PROSPECTS	DRILLING	GEOCHEM	GEOPHYS	COMMENT
1984/0082	WMC EL 3486	KI → Pn/Pm	Pm basin west of Yiyinti Range	None	NRD 1/2 and NRP 3 KI → Pn/Pm tentative interp NSR		Sirotem anomalies	West of 25126 Drill holes on Mt Young map
1992/0092	MIM EL 6808	Cz → Pm Cz - 20 m	?? 10 - 30° dips	None	7 DDH - 2917 m holes 200 to 620 m Centred on McA 17 see map sheet	NSR Trace fluorite in DDH	QTEM x 2 EM 37 follow up Drill targets 1 - 7	First Report Conductors mass py in Lynott Fm. Weak Pb/Zn
1981/0230	Shell EL 2072	Pm/Pmq	flat laying beds stradlling Emu Fault		7 DDH		Gravity inconclusive	200 - 300 m Barney Ck To south of 25070 MIMs Lorella Proj el 6808
1994/0274	Geopeko EL 7313 EL 8084	Cz → Pm Cz - 80 m	Flat laying	Barney Ck Fm at depth	4 holes 250 to 400 m No sig. values Good description of Stopped above Pmq Caranbirini Fig 9		Sirotem Discussion on downhole work Figs 8	Geopeko- potential for sub-basin development Pmq at 200-300 m Good Interp map Fig 3
1996/0894	MIM EL 6808	Pm/Pmq	flat laying beds stradlling Emu Fault	None	None Info on previous work	Orientation work incl gas vapour to detect oxidising sulphides thru Cz/KI Vegetation sampling		Tenement to SW of 25070 good background info on stratigraphy Summary of early drilling in area
1994/0868	MIM EL 6808	Cz → Pm Cz - 20 m	?? 10 - 30° dips	None	LD 25 353 m Native Cu at 297-306m v anom results 9 m at 0.4% and 0.21% Pb	Multi-element suite on core	DHEM work on drill holes. No anom	Drilling into Caranbirini above Pmq position
1995/0844	MIM EL 6808	Pm/Pmq	flat laying beds stradlling Emu Fault	None	6 DDHs			Drill Sections usefull for interp in 25070 Summary Report
1995/0664	Ashton BHP EL 7260	Cz → Pm Cz - 60 m	West of Yiyinti Range Lower Pm to north of Lorella Pocket	None	MYD1 310 m	No sig. results	QUESTEM anomaly	Target Pmt and Pmq to south of this hole

SANDFIRE RESOURCES BATTEN TROUGH PROJECT

EL 25130

REPORT	COMPANY	FORMATION	STRUCTURE	PROSPECTS	DRILLING	GEOCHEM	GEOPHYS	COMMENT
1997/0756	Ashton EL 8133	Bukalara Sst over Pm Williams Ck o/c Pmt	Several thrust blocks includes Emu Fault and Merlin structure	West of Merlin -diamonds Several Cu prospects in area	None	Diamond stream seds	320 line km Geotem No conductors	BHP exploring for basemetals withdrew from JV
1996/0918	BHP EL 8629	Bukalara Sst over Pm Williams Ck o/c Pmt	Several thrust blocks includes Emu Fault and Merlin structure	West of Merlin -diamonds Several Cu prospects in area	None	None	Geotem over central south area No conductors	With above covers 70% of EL 25126
1994/0189	MIMs EL 7217	As above	As above	As above	None	686 streams 26 lag low level Pb-Zn 220 Cu 195 Zn 81 Pb max in lag Also diamond work		Anomalies not considered worthy of follow up 1994 reduction retained east part of 25126
1995/0279	MIMs EL 7217	As above	As above	As above	None	178 streams, 21 rock 126 lag Lag plots over central 25126 low values NB Bukalara Sst o/c		Good summary of previous exploration Lag over 25126 low values
1993/0140	MIMs EL 7217	As above	As above	As above	None		Details various surveys testing Emu fault zone Questem/sirotem	Summary report lags over centrl north of 25126 Amocos M-12 anomaly on Emu Fault not resolved
1981/0028	Amoco Kennecott EL 1330	As above	As above	As above	4 deep DDHs - Pm Glyde Rv basin Amoco 4 deep DDh by Kennecott Gas flows-methane	Hg in soils	Input EM - M12 anomaly Very deep?	Immediately north of 25126 No significant mineralisation plenty py and low Pb/Zn
Comment: At first look seemed to have some upside due to extensive Bukalara Sandstone cover. Emu Fault on east boundary or internal depending on interp. Glyde Rv Basin to north well tested Pm/Pmq inliers in not drilled. Cu lag anomaly in central area. Extensive Tooganinie Fn in SW corner - lag and soil Coverage. All recent airborne and ground geophysical surveys negative. Still extensive areas with 30 -50 m(?) Bukalara Sst cover that have not been tested by geochem/drilling								