Rio Tinto Exploration Pty Limited

ABN 76 000 057 125 / ACN 000 057 125

A member of the Rio Tinto Group

Group Annual Report

for the period 30 April 2022 to 29 April 2023

Tenement(s) No(s). EL32230, 32231 & 32232 – Tennant 1-3 –

Tennant Project (Group Report Number GR573)

Report Title:	Annual Group Report for Tennant GR573
Tenement Number(s):	EL32230, 32231 & 32232
Project:	Tennant Project
Tenement Holder:	Rio Tinto Exploration Pty Limited
Tenement Operator:	Rio Tinto Exploration Pty Limited
Commodity:	Cu, Au
Author:	Lachlan Huxley
Date of report:	09 June 2023
Map sheet:	Tennant Creek 250k, Short Range & Kelly and Tennant Creek 100k
RTX Internal Report Number:	32187
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EL32230, EL32231 & EL32232

1 Abstract

Exploration Licences (**EL**) 32230, 32231 and 32232 were acquired by Rio Tinto Exploration Limited (RTX) in 2021. These **ELs** were granted on the 20th of April 2021 and were amalgamated into a grouped annual reporting project, the group reporting number being GR573.

No fieldwork has been conducted within this reporting period. RTX has been engaging with the Central Land Council in order to develop an agreement with the traditional owners to allow RTX to conduct exploration activities. On the 26th July 22, the first meeting to discuss deed was held in Tennant Creek, RTX were asked to attend and present, RTX have continued to engage in order to progress the agreement.

During this reporting period RTX has begun organising and planning the drill testing operations. This operation looks to utilise a small aircore drill crew to drill test the highest priority targets produced from the pre-grant SkyTEM survey.

Variation of the Condition has been submitted & approved by the government for EL32230, 32231 and 32232.

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3 Introduction

Exploration Licences (ELs) within the Tennant Creek region, were acquired by Rio Tinto Exploration Pty Ltd (RTX) to target the 1660Ma shear-hosted Copper & Gold metallogenic event, This was identified by age dating in-situ Monazites (Skirrow et al., 2019). RTX has combined the following exploration licences into a combined reporting package (EL32230, EL32231 and EL32232) into the group reporting ID GR573. The GR573 is referred to as the South Project Area (**SPA**).

This combined report records the exploration work completed on these ELs during the SPA combined reporting period from 20th April 2021 to 19th April 2022. On the 8th of April 2022, the Manager of Customer Services – Minerals & Energy Titles (**DPIFM**) approved the RTX's request to combine the exploration licences into two project areas for purposes of combined annual reporting. The 2 areas are divided into the Northern and Southern regions.

The aim of creating the two tenement groups is to simplify tenement statutory reporting and project management, and also more clearly convey exploration expenditure aligned to the Company's project work areas, which are not restricted to individual tenements. The Company also includes expenditures on mineral leases and claims within each EL, but separately to the qualifying EL expenditures.

EL32230, EL32231 & EL32232

3.1 Location

Exploration Licences covered by the SPA covers an area of some 570.52 km^2 southwest of the Tennant Creek Township.

The principal access to ELs in the SPA from Tennant Creek is via travelling north or south via Stuart Highway then west via the Warrego Road or Kunayungka Road depending on which area of the licence needs accessing, then by various unsealed roads, tracks, and fence line tracks. However, unsealed tracks become impassable during the wet season.

Figure 1 shows the location of the Licences within the SPA and with respect to the town of Tennant Creek.

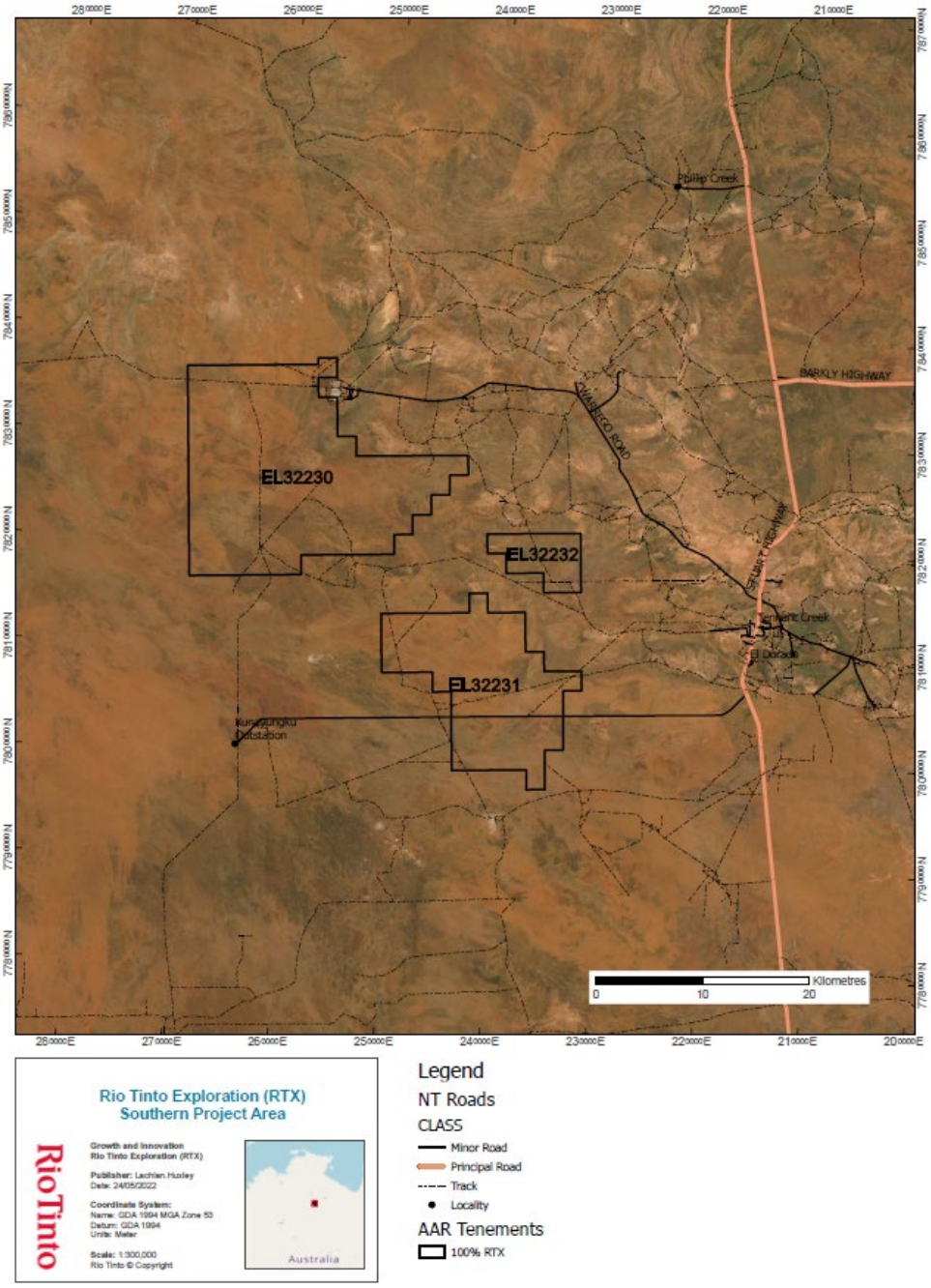


Figure 1:Southern Project Area with Territory supplied roads and tracks.

3.1.1 EL32230 Tennant 1

Exploration licence 32230 Tennant 1 is located approximately 36km northwest of the Tennant Creek town. The licence falls on the Short Range (**5659**) & Kelly (**5658**) 1:100,000 scale map sheets.

Access is via the sealed Warrego Road. Access to the licence area from Warrego Road is via secondary unsealed tracks and fence line tracks leading south as seen in Figure 1.

3.1.2 EL32231 Tennant 2

Exploration licence 32231 Tennant 2 is located approximately 18km northwest of the Tennant Creek town. The licence falls on the Kelly (**5658**) & Tennant Creek (5758) 1:100,000 scale map sheets.

Access to the licence area from Kunayungka Road is via secondary unsealed tracks and fence line tracks leading north or south as seen in Figure 1.

3.1.3 EL32232 Tennant 3

Exploration licence 32232 Tennant 3 is located approximately 18km northwest of the Tennant Creek town. The licence falls on the Kelly (**5658**) & Tennant Creek (5758) 1:100,000 scale map sheets.

Access to the licence area from Warrego Road is via secondary unsealed tracks and fence line tracks leading west as seen in Figure 1.

3.2 Title History

Exploration Licences (**EL**) 32230, 32231 and 32232 were granted to Rio Tinto Exploration Limited (RTX) 20th of April 2021. These **EL**'s were amalgamated into a grouped annual reporting project, the group reporting number being GR573. The ELs are 100% owned by RTX and details will be outlined in Table 1 &Table 2.

Table 1: Summary of Tenement details.

Tenement Number	Tenement Name	Tenement Status	Tenement Holder	Tenement Operator	Project
EL 32230	Tennant 1	Granted	Rio Tinto Exploration Pty Ltd (100%)	Rio Tinto Exploration Pty Ltd	Tennant Creek Project
EL 32231	Tennant 2	Granted	Rio Tinto Exploration Pty Ltd (100%)	Rio Tinto Exploration Pty Ltd	Tennant Creek Project
EL 32232	Tennant 3	Granted	Rio Tinto Exploration Pty Ltd (100%)	Rio Tinto Exploration Pty Ltd	Tennant Creek Project

Table 2: Summary of EL32230, EL32231 & EL32232 Tenure (part 2)

Tenement Number	Grant Date	Sub blocks	Area (km^2)	Total Expenditure
EL32230	20 April 2021	109	350.59	$ 266,535.09
EL32231	20 April 2021	57	184.21	$ 115,999.82
EL32232	20 April 2021	11	35.47	$ 37,482.28
TOTAL			570.27	$ 420,017.19

EL32230, EL32231 & EL32232



Figure 2: GR573 – EL32230, EL32231 & EL32232 Tenement map with details.

3.3 Physiography

The Tennant region has two main landforms, Dissected uplands (remnant of the Ashburton surface) and the surrounding plains (Tennant Creek Surface). With the Ashburton surface raising to about 60m above the Tennant Creek surface. The Tennant Creek township itself is 330m above sea level. The area generally consists of an arid, tropical climate with long, hot summers and short winters.

The Tennant Creek surface has a thin cover of Cainozoic sediment which predates lateralisation which is dated mid-Miocene. Major outcrops of Palaeoproterozoic volcano-sedimentary rocks in the region coincide with the residual Ashburton surface.

3.4 Access

Since the Exploration licences were granted in 2021. RTX has been in engagements with the central land council to develop an agreement both parties can accept. Various face to face meetings has been held to date. On the 26th July 22, the first meeting to discuss deed was held in Tennant Creek, RTX were asked to attend and present. Once the agreement and the clearance certificate have been received RTX will look to conduct the planned exploration activities.

4 Geology

4.1 Geological setting

The Palaeoproterozoic Tennant Creek Inlier is elongated in a north northwest to northwest direction, covering an area of ~44,000 km^2, ~500km west of the Mount Isa Inlier (Le Messurier et al., 1990). The inlier can be divided into three elements, the central segment, the Warramunga Province, hosts all of the mineralisation, Figure 3. The mineralised province is bounded to the north and south by overlying sequences of the Ashburton and Davenport provinces respectively, while the inlier as a whole is surrounded by carbonate facies Cambrian rocks of the Wiso and Georgina basins to the west and east respectively, and by Mesozoic and younger cover (Myers et al., 1996).

The exposed Warramunga Province is the central portion of a largely concealed block of Palaeoproterozoic rocks that extends over an area of ~350 x 60 km (Myers et al., 1996). Deposition within the Warramunga Province commenced with a thick turbidite succession. The Warramunga Formation is unconformably overlain by sedimentary and felsic volcanic rocks of the Ooradidgee Group.

The Warramunga Formation, which is ~3000 m thick, was deposited in a rift basin at ~1.86 to 1.85 Ga and hosts the bulk of the known mineralisation of the Tennant Creek Inlier (Compston, 1995; Donnellan et al., 1999). The angular unconformity at the top of the Warramunga Formation corresponds to the Tennant Event when the sequence was metamorphosed to greenschist facies and the ~1850 Ma. Tennant Creek Super-suite was emplaced, comprising syn- to post-tectonic I-type granitoids, quartz-feldspar porphyry and minor mafic intrusions. This magmatism and tectonic activity represent the early stages of the Barramundi Orogeny, which is recognised across northern Australia (Compston, 1995; Skirrow, 2000).

The up to 5000 m thick Ooradidgee Group immediately overlies the Tennant Event unconformity and comprises a suite of felsic volcanic rocks, predominantly dacitic to rhyolitic ignimbrites, (but with broadly coeval basalts, representing bimodal volcanism) with associated felsic sills and a possible monzodiorite, emplaced between 1845±4 and 1827±9 Ma (Compston, 1995). The sequence also includes sandstones, siltstones, shales, cherts and tuff. Deposition ceased soon after the emplacement of the ~1820 Ma Treasure Suite granites, granophyre, and monzodiorite-diorite (and comagmatic volcanic rocks) and the variably developed 1810 Ma Murchison Event unconformity which separates the Ooradidgee and the Tomkinson Creek and Hatches Creek groups.

The temporally equivalent Tomkinson Creek and Hatches Creek groups are composed of thick, well-stratified sequences, respectively comprising ~6 km of silicified marine sandstone in the Ashburton Province to the north, and in the Davenport Province to the south, up 10 000 m of sandstone, siltstone and shale, with felsic volcanic rocks and basaltic lava towards the base. Both of these groups were terminated by the ~1720 Ma Davenport Event which was accompanied by a suite of post-mineralisation 1720 to 1710 Ma S-type granites (Compston, 1995).

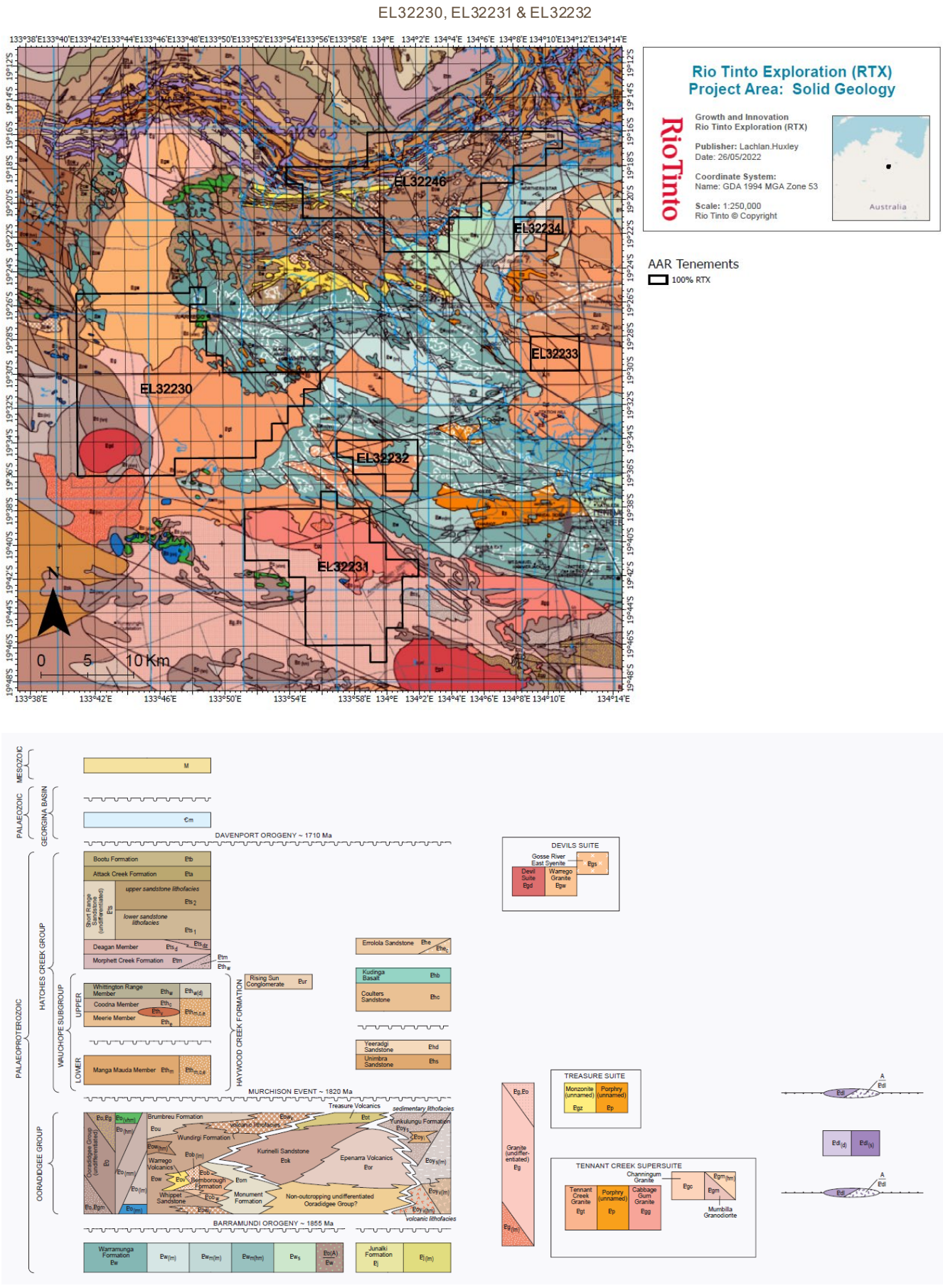


Figure 3: Regional Solid Geology with Tennant Creek Licences

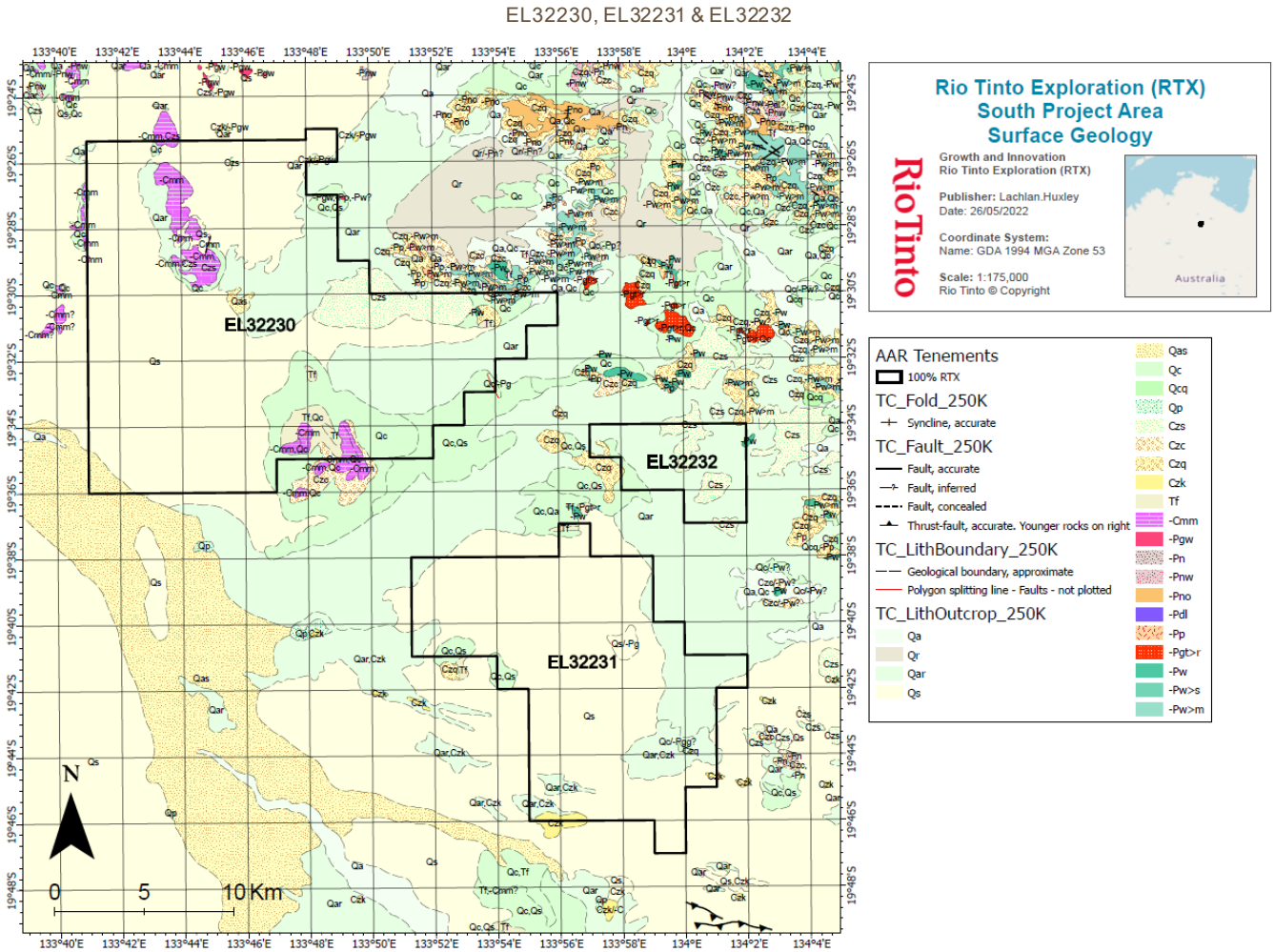


Figure 4: Southern Project Area Surface Geology Map.

4.2 Exploration History

Numerous explorers have planned and conducted various exploration programmes across the Tennant Creek region. Previous explorers have systematically focused on Copper and Gold systems within the Warramunga formation. Due to the nature of these systems, Geophysical surveys have prevailed and is currently the preferred targeting method for these systems. Historical exploration activities outside of the Warramunga formation have returned negligible results and therefore been determined as un-prospective terrains.

Geophysics

In the last two decades, there has been an Influx in exploration activities within the Tennant Creek region. Recent academic studies have aided in the understanding of the critical controls that form these epigenetic gold & copper mineral systems within the region. Historical exploration companies have focused geophysical targeting and screening methods as seen in Table 3.

Table 3: Historical Geophysical Activities Catalogue

Report ID	Geophysical Type	Client	Acquisition Year	Line Direction	Line Spacing	Tie Line Spacing	Total Km/ Stations
CR2015-0309	Magnetics	Australia China Corporation of Coal Geology	2015	180	100	1000	6089.04
CR2012-1039	Magnetics	SIPA Resources	2012	180	50	500	940.95
CR2011-1038	Magnetics	SIPA Resources	2011	180	50	500	4962.75
CR2011-0295	Magnetics	Emmerson Resources	2011	180	100	1000	739.963
CR2010-0883	Grav/ Mag/ Electrical	Emmerson Resources	2008	180	75	750	29166.2
CR2008-0311	Magnetics	Rum Jungle Uranium	2007	0	100	1000	1470
CR2008-0060	Gravity	Prosperity Resources	2006	0	200		492
CR2007-0008	Ground Gravity	Bungarra Resources Pty Ltd	2006	Grid	200	200	2356 Stations
CR2002-0006	Ground Gravity	Giants Reef Exploration Pty Ltd	2001	GRID	1000	1000	648 Stations
CR2000-0264	Magnetics	Normandy Tennant Creek	1998	0	50		140
CR1999-0506	Magnetics	Normandy Tennant Creek Pty Ltd	1998	90	50	500	868
CR1999-0148	Magnetics	Normandy Tennant Creek	1998	0	50	500	8200
CR2000-0245	Magnetics	Normandy Exploration	1997	180	50		29
CR1998-0448	Magnetics	Normandy Exploration	1996	0	50		126

EL32230, EL32231 & EL32232

4.2.1 Surface Geochemistry

The Southern Project Area has had a frequent number of explorers collecting and analysing surface geochemistry, with the majority of the surface geochemistry being captured between 1990 to 2000. All Surface geochemical exploration has fixated around the extremity of the Warramunga formation. Table 4 captures the various difference explorers and how many samples were taken. Figure 5 & Figure 6 display both the location of sampling and the results produced from these surveys. All Geochemical surveys failed to identify any anomalous geochemistry.

Table 4: Historical Surface Geochemical Samples collected over licence areas

Samples Taken	Tenement	Rock	Stream	Soil
2010 - Current		**6**		**1**
Rum Jungle Resources	EL27128	**2**		**1**
Truscott Mining	EL29883	**4**		
2000-2010		**26**		**11**
Giants Reef Exploration Pty Ltd.	EL9309, SEL8665	**22**		**11**
Sipa Exploration Nl	EL23992	**4**		
1990-2000		**932**	**55**	**6580**
Asarco Australia Ltd	EL5304, EL6196, EL7181, EL7325	**53**		**390**
Delta Gold Exploration Pty	EL8106, EL8469	**213**		**290**
Giants Reef Exploration Pty Ltd.	EL7465	**40**		
Ivanhoe Northwest	EL7651	**226**		**306**
M.I.M Exploration Ltd	EL9303, SEL9214	**13**		
Newmont Australia Ltd	EL5069, EL6433	**24**		**141**
Normandy Gold Pty Limited	EL9222, SEL8701	**106**		
North Flinders Mine Ltd/ Roebuck Resources Nl	EL7408, EL7431, EL7441, EL7445	**79**		**415**
Poseidon Gold Limited	EL7099, EL7451, EL7535, SEL8701	**7**		**397**
Roebuck Resources NL	EL6099, EL6205, EL7446, EL7447, EL8777, SEL8276, ERL86	**49**		**1646**
Western Mining Corporation Limited	EL5467, EL5494, EL5495, EL5496, EL5497, EL5498, EL7527	**60**	**55**	**409**
Poseidon Gold; Newmont Australia Ltd Australia	EL5133	**6**		**36**
Australian Development; Newmont Australia Ltd Australia	EL5074, EL5133	**53**		**737**
Newmont Australia Ltd Australia Ltd	EL6205	**3**		**100**
Western Mining Corporation Limited Ltd	EL7413			**1713**
1970-1990		**160**	**20**	**1264**
Asarco Australia Ltd	EL5223			**954**
Australian Ores And Minerals; Marathon Petroleum Australia	EL1388, EL1389	**87**		
Giants Reef Exploration Pty Ltd.	EL5408			**13**
Marathon Petroleum Australia	EL1668	**66**		**130**
Metana Minerals N.L.	EL5623, EL5625, EL6199		**20**	**167**
Newmont Australia Ltd	EL5076	**7**		
Grand Total		**1124**	**75**	**7856**

EL32230, EL32231 & EL32232

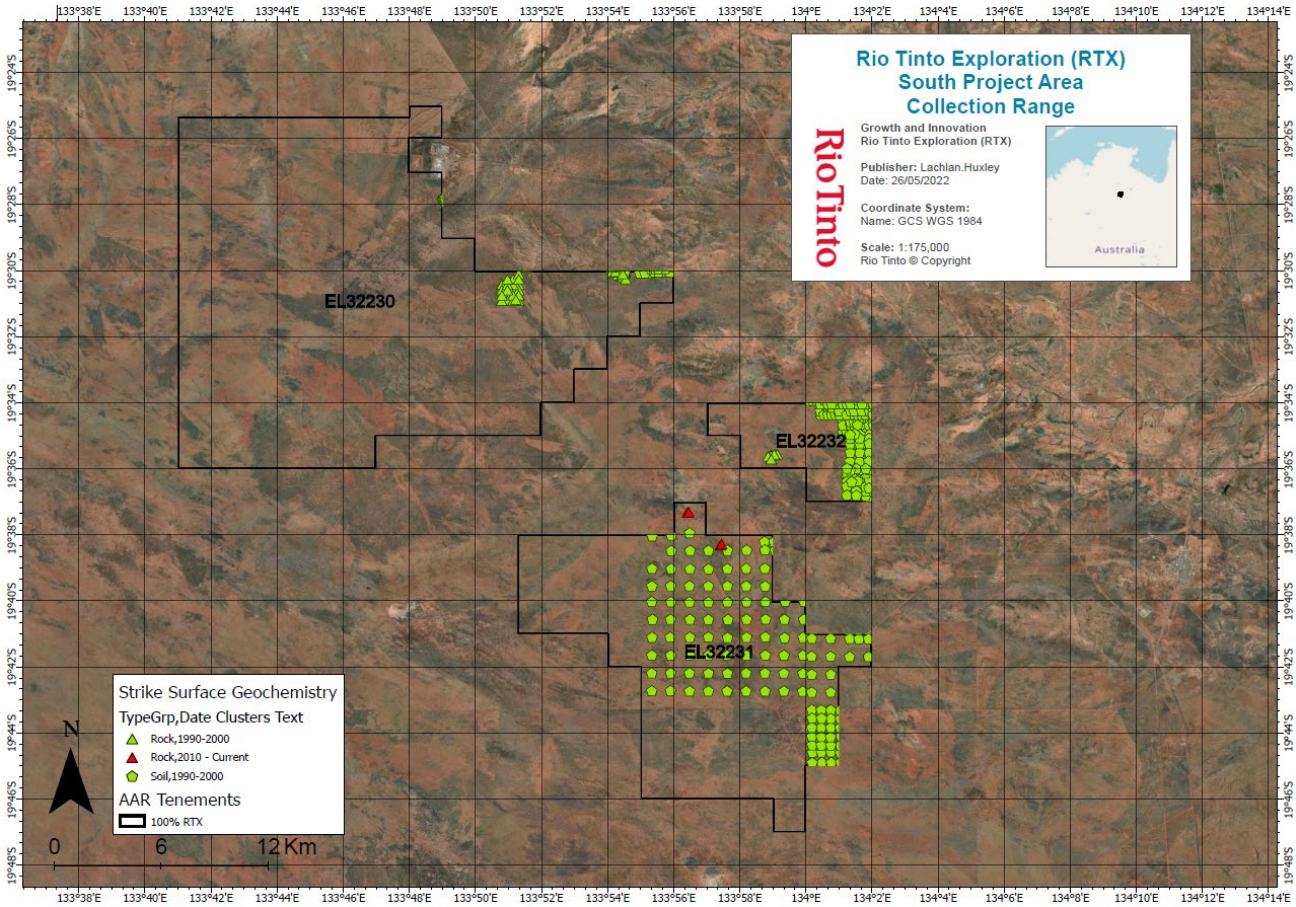


Figure 5:Strike Captured Surface Geochemistry over the Southern Project Area

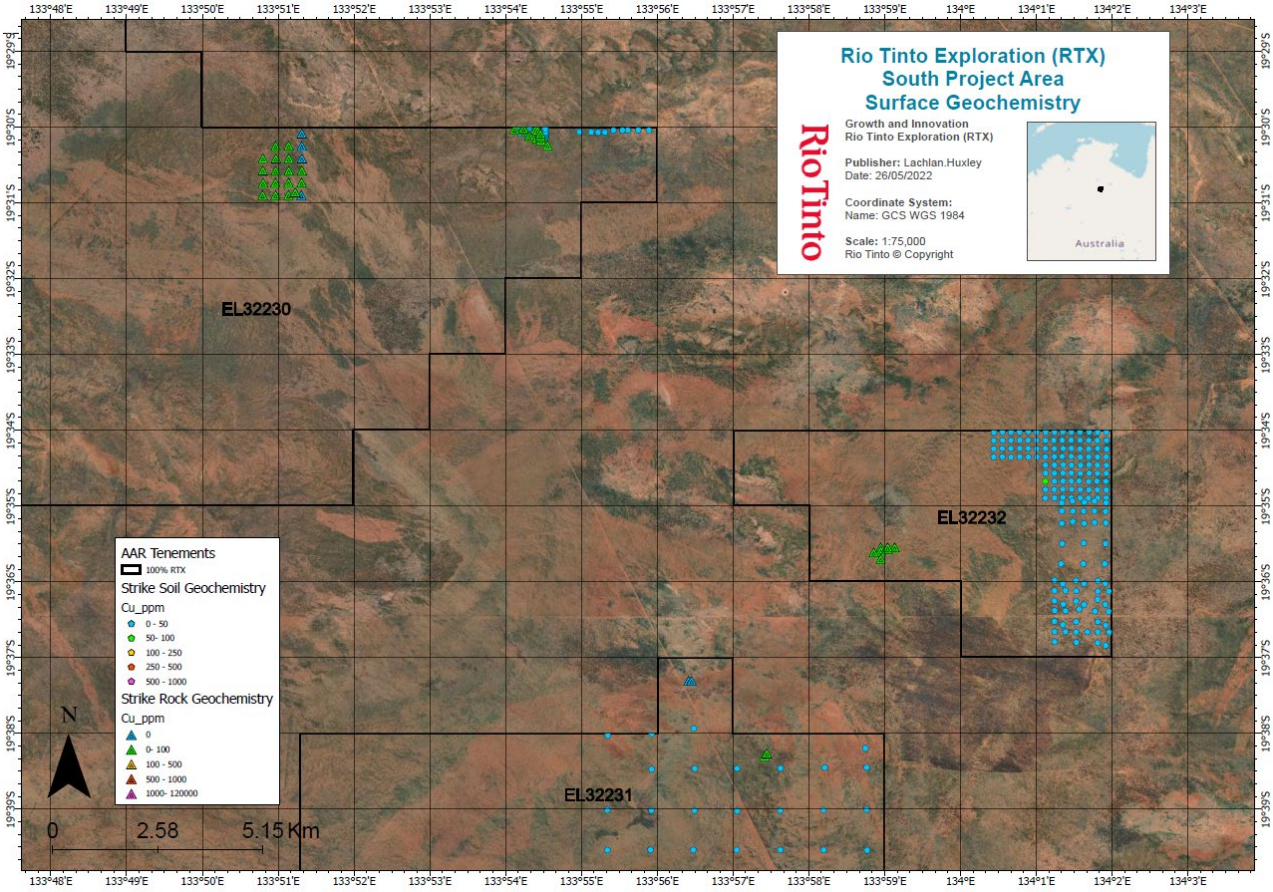


Figure 6: Strike Geochemical Results over the Southern Project Area

EL32230, EL32231 & EL32232

4.2.2 Drilling

A capture of historical drill holes was completed, the capture outlined several areas of focus by previous explorers. Majority of the drilling focus on shallow subsurface tests for mineralisation along with the major fault systems or magnetic features, Table 5 & Figure 7 detail the amount of drilling which has been conducted over the Southern Project Area. All historical drills conducted within the southern project area failed to identify any mineralisation.

Table 5: Historical data capture of drill holes within the southern project area.

		Drill Type		
Reports	Company	Diamond	RAB	Vacuum
CR1992-0622	North Flinders Mines		179	
CR1993-0608	North Flinders Mines		21	51
CR1993-0691	North Flinders Mines			328
CR1994-0424	North Flinders Mines	2		
CR1994-0468	Poseidon Gold			154
CR1995-0136	North Flinders Mines			81
CR1995-0318	Poseidon Gold			78
CR1995-0540	Poseidon Gold			115
CR1995-0688	Poseidon Gold			19
CR1996-0238	North Flinders Mines		2	
CR1996-0261	North Flinders Mines			5
CR1996-0519	Poseidon Gold			1
CR1996-0702	Poseidon Gold			176
Grand Total		4	202	1008

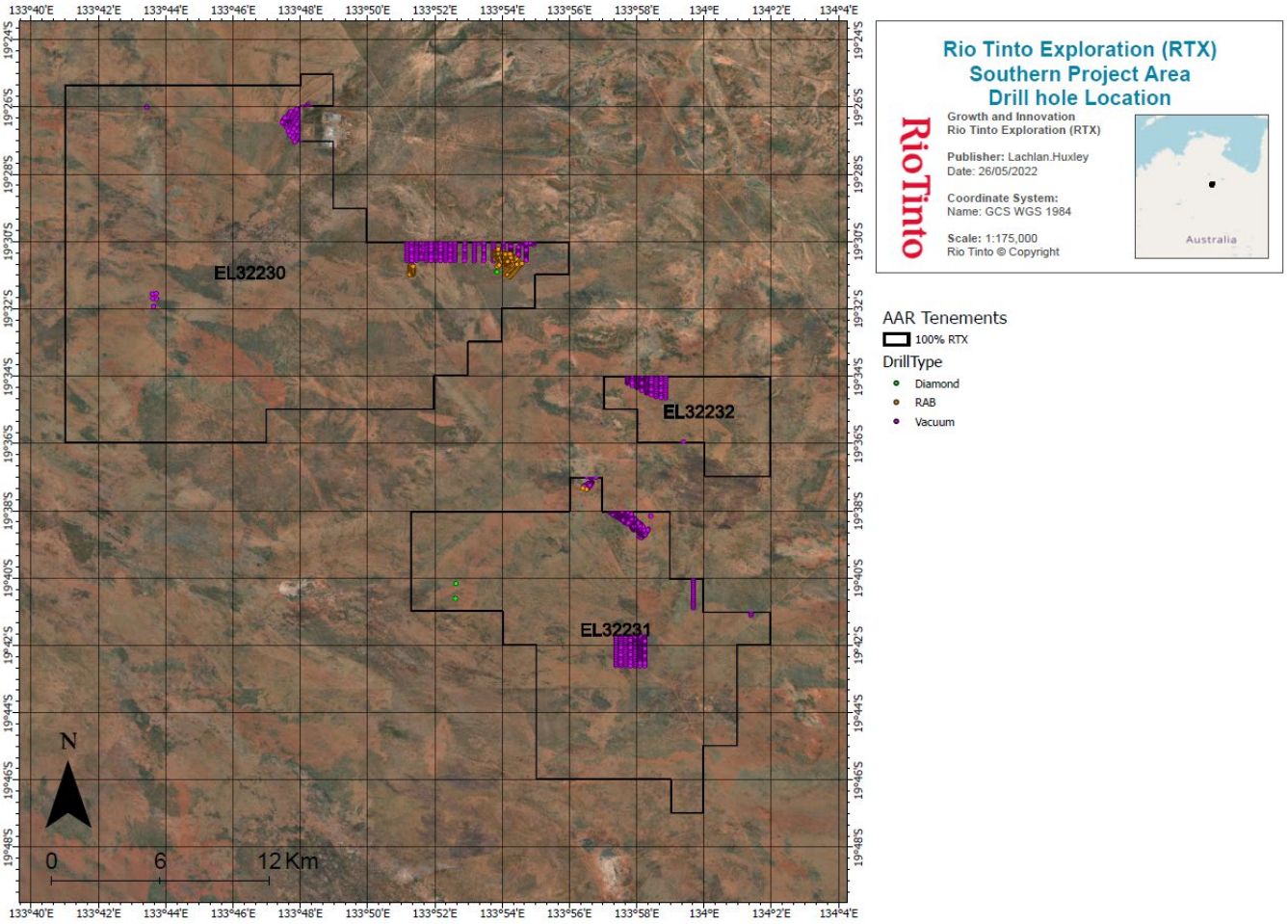


Figure 7:Southern Project Area, Historical drill sites and method

4.3 Exploration Rationale

RTX is exploring the Warramunga provenance based on the following criteria:

- The Previous exploration has focussed on either detailed magnetic surveys and or geochemical soil / RAB sampling. There has been much more limited use of EM techniques.
- There are significant areas of the province that are covered by recent alluvium, including transported cover and thicker Cambrian sediments (limestone) of the Wiso / Georgina basin. This inert cover may hide mineralisation if the magnetic signature is not obvious as per the typical ironstone hosted deposits.
- The age dating of mineralisation within the province is a major consideration in the justification. The mineralisation has been generally accepted to be old and restricted to a narrow time range around 1850 to 1840 million years. Many of the units and intrusives of the Proterozoic Province are younger than this time and therefore have been considered to be less prospective and hence have had less exploration focus. There is however some data (*Skirrow and Cross – GA publication*) that yield age dates for gold mineralisation at about 1660Ma which is approximately 200 million years younger and about the same age as the younger granites of the region. Another paper by McInnes et al, 2008 shows age dates for copper mineralisation at the Gecko mine as 1665 Ma based on Re-Os dating of chalcopyrite, coincidently similar in age to the new GA dates. This emerging younger mineralisation dating leads to the potential for large areas of the field to be prospective rather than the previous narrow search range of the Warramunga ironstones.
- The characteristics of the known mineralisation has resulted in magnetics being employed as the primary detection technique for areas both outcropping and undercover. Airborne EM surveys have not been widely used in the region. Emmerson Resources (in conjunction with Ivanhoe) have flown smaller areas with EM. One of the major justifications for these applications is the potential to locate conductive bodies (potential supergene / oxidised) copper systems undercover in a setting that is not strongly magnetic.

5 Geological Activities and Office Studies

Office Studies for this reporting period have focused on historical data capture and target generated from the SkyTEM survey RTX flown before grant Figure 8. The SkyTEM survey was lodged to the NTGS with the lodgement ID being PE009-2020. RTX has undergone a target review and has been designed an operational plan to test the conductive features.

EL32230, EL32231 & EL32232

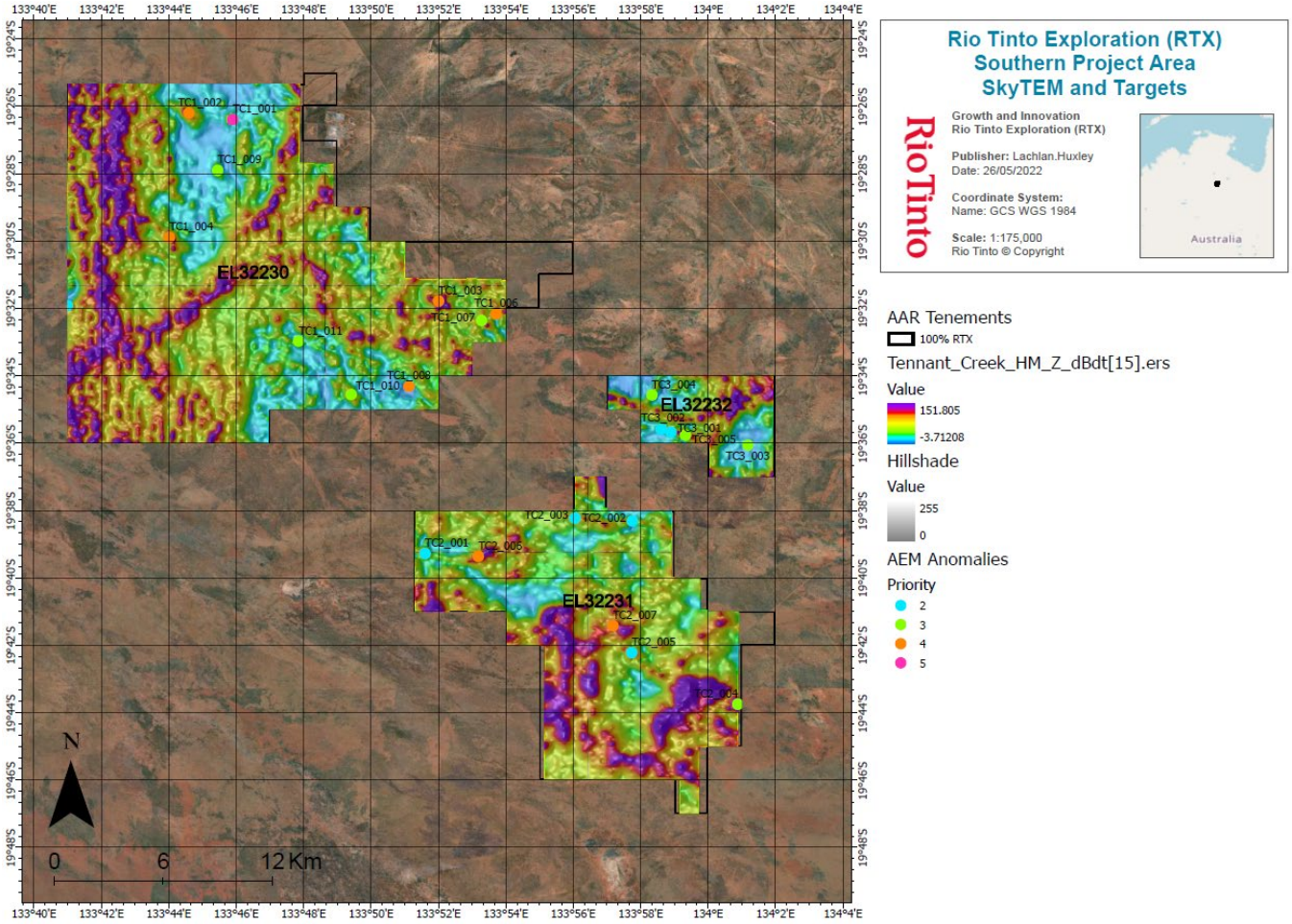


Figure 8: Southern Project Area, with AEM targets and SkyTEM raster

6 Conclusions and Recommendations

RTX has been engaging with both the Central Land Council and station owners in order to finalise an agreement to conduct early exploration activities, once completed RTX will look to initiate ground-truthing for the upcoming drill season. RTX has planned to Aircore several of the higher priority to test the conductive response.

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