JESSICA VTEM - FINAL REPORT

Taragon Valley Pty Limited | ABN 85 623 574 603

Regional Scale Geophysics - Jessica Project

EL's 32493, 33332, 33334 & 33742

Project Operator: Taragon Valley Pty Ltd (A wholly owned subsidiary of South32 Limited)

Tenement Holder: Baudin Resources Pty Ltd

Date of Compilation: 02 February 2026

Period: Round 18 2025

Application Number: GDC1800054

Target Commodities: Zn & Cu

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Datum / Zone: WGS84 (Zone 53)

Map Sheets: 1: 250,000 Mount Drummond

1: 250,000 Ranken

1:100,000 Boxer

1:100,000 Benmara

1:100,000 Mittiebah

1:100,000 Mitchiebo

1:100,000 Lulu

Distribution:

Northern Territory Government

South32 Exploration

ABSTRACT

Taragon Valley Pty Ltd (A wholly owned subsidiary of South32 Ltd) has successfully completed the regional scale airborne electromagnetic VTEM survey over the northeastern portion of the Jessica Project as part of the Geophysics and Drilling Collaborations Program Regional Scale Geophysics Round 18, 2025–2026.

The Geophysics and Drilling Collaborations program co-funds industry exploration programs to advance geological understanding and resource development in the Territory. The outcomes of the program are expected to improve geological knowledge and mineralisation targeting within a region, particularly at depth.

The aim of the Jessica VTEM survey was to collect high resolution magnetic and electromagnetic data over the northeastern portion of the Jessica project considered prospective for sediment hosted Zn & Cu mineralization to aid with interpreting and mapping favorable geological lithologies and structures. The survey was flown UTS Geophysics Pty Ltd between 18th September – 14th October 2025.

Principal geophysical sensors included a versatile time domain electromagnetic (VTEM™ Max) system, and a cesium magnetometer. Ancillary equipment included a GPS navigation system and a radar altimeter. A total of 2,765 line-kilometres of geophysical data over two blocks—Western Block and Eastern Block (approx.. 1268km2) at 800m & 400m line spacing respectively — was acquired during the survey.

Northern Australia sediment hosted Zn / Cu systems are hosted by / associated with carbonaceous shales and siltstones which can be mapped using electromagnetics (EM). The copper ore and gangue mineral assemblage also often have a significant EM response. Within the survey area the Paleoproterozoic rocks of interest are concealed beneath younger, and often resistive sediments. The VTEM data is considered a useful tool for identifying structures, prospective conductive lithologies and more discrete accumulations of sulphides within the top 300m of surface.

The newly acquired VTEM data compliments and builds on the available regional datasets in the area while assisting South32 with future exploration targeting.

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INTRODUCTION

Location and Access

The Jessica Project is located in the Barkly Tablelands, approximately 240km ENE of Tennant Creek, 650km Southeast of Katherine and 570km Northeast of Alice Springs (Figure 1).

Access to the project area is via either the Stuart Highway from Alice Springs north to the Three ways Roadhouse, then via Barkly Highway east to the Barkly Homestead Roadhouse, or from Mount Isa via the Barkly Highway west to the Barkly Homestead Roadhouse.

Topographically, the project area is flat and is typified by open black soil seasonally grassy plains and low rocky outcrops (Figure 2). Pastoral fence lines and bore field tracks provide a network of unsealed tracks. The area is often inaccessible during the wet season with travel only possible by helicopter.

Tenure

The Jessica Project comprises eleven (11) tenements with a total area of 8,759km2 (Figure 3). EL32273 was the first one to be granted on 23rd July 2020, followed by EL32317, EL32338 and EL32339 granted on 2nd June 2021, EL32386, EL32387 & EL32388 granted on the 30th July 2021, EL32493, which was previously reported as the Playford tenement before being amalgamated into Jessica in May 2023 was granted on the 31st August 2021, EL33332 and EL33334 were granted on the 3rd April 2023 and amalgamated into Jessica in May 2023, and EL33742 which was granted on 23 August 2024 and amalgamated into Jessica in September that same year. All Jessica tenements were granted to Baudin Resources Pty Ltd a wholly owned subsidiary of Encounter Resources Ltd (Encounter) for a period of 6 years. On the 23rd June 2022, South32 and Encounter entered into a Farm-in Agreement covering the Jessica Copper Project (see ASX:ENR announcement on the 23rd of June 2022). During the 10-year farm in period South32 will be the operator for all work programmes and will propose annual budgets.

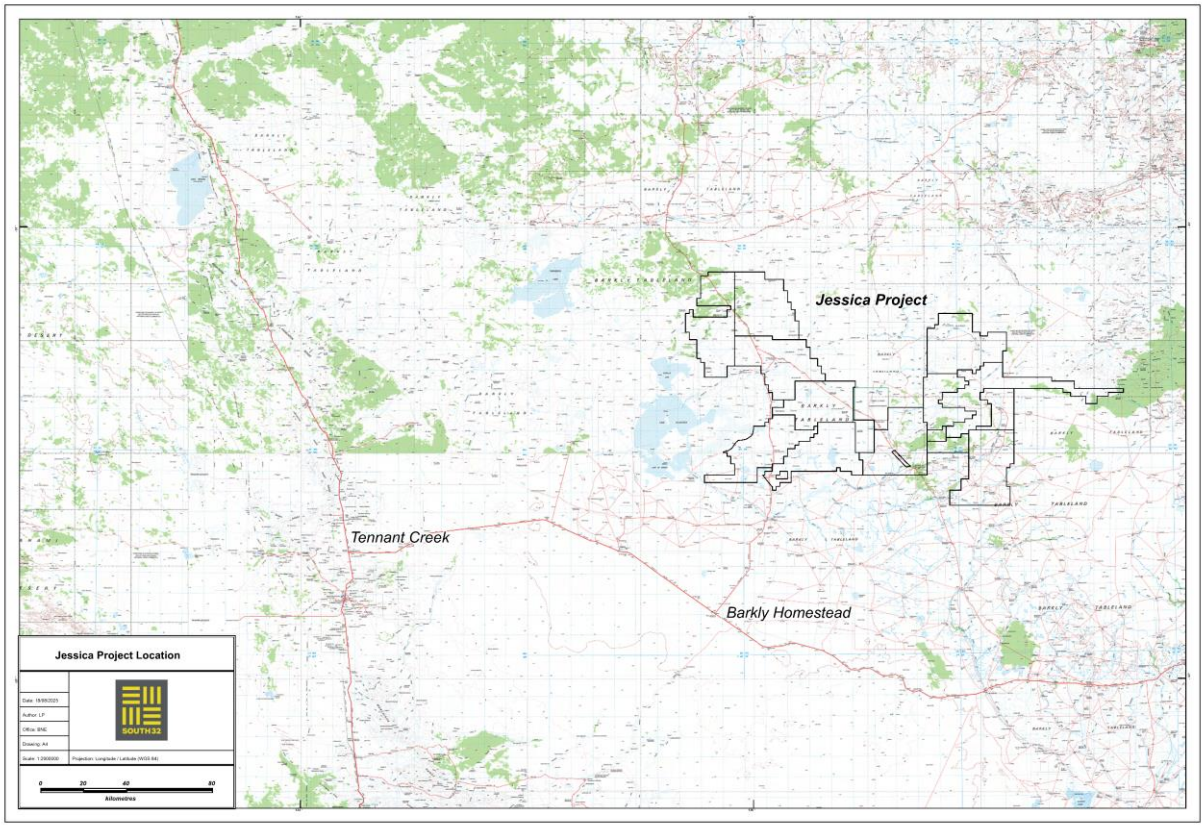

Figure 1. Jessica Project Location Map.

Tenement details for the Jessica Project are shown in Table **1**.

Table 1. Jessica Project Tenement Details

Title	Reporting Period	Year	Title Holder	Expiry Date
EL32273	30 July 2024 to 29 July 2025	5	Baudin Resources Pty Ltd	22/07/2026
EL32317	30 July 2024 to 29 July 2025	4	Baudin Resources Pty Ltd	01/06/2027
EL32338	30 July 2024 to 29 July 2025	4	Baudin Resources Pty Ltd	01/06/2027
EL32339	30 July 2024 to 29 July 2025	4	Baudin Resources Pty Ltd	01/06/2027
EL32386	30 July 2024 to 29 July 2025	4	Baudin Resources Pty Ltd	29/07/2027
EL32387	30 July 2024 to 29 July 2025	4	Baudin Resources Pty Ltd	29/07/2027
EL32388	30 July 2024 to 29 July 2025	4	Baudin Resources Pty Ltd	29/07/2027
EL32493	30 July 2024 to 29 July 2025	4	Baudin Resources Pty Ltd	30/08/2027
EL33332	30 July 2024 to 29 July 2025	3	Baudin Resources Pty Ltd	02/04/2029
EL33334	30 July 2024 to 29 July 2025	3	Baudin Resources Pty Ltd	02/04/2029
EL33742	23 August 2024 to 29 July 2025	1	Baudin Resources Pty Ltd	23/08/2030

Figure 2. Barkly Tablelands Landscape (Photo courtesy of Geoscience Australia.)

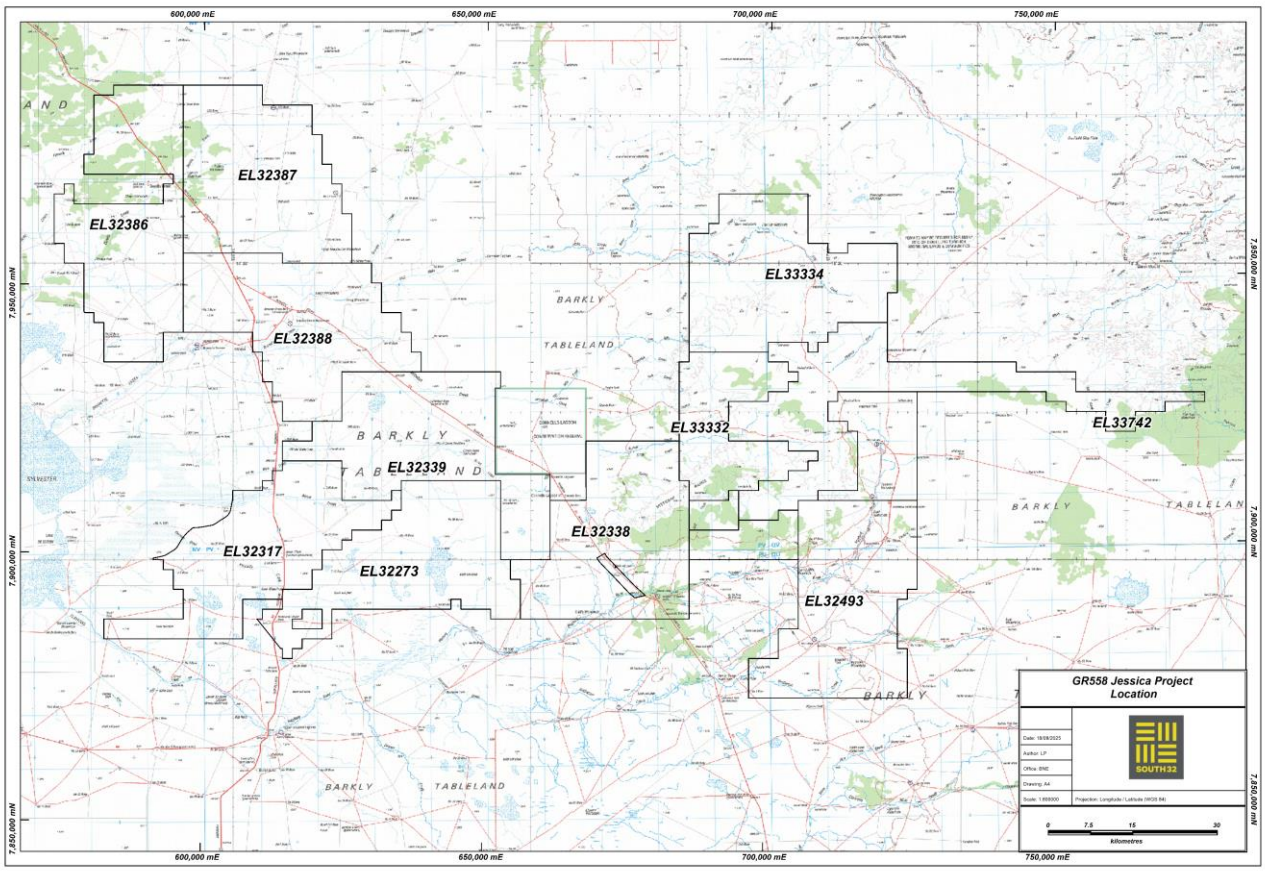

Figure 3. Jessica Project - Tenement Location Map.

REGIONAL CONTEXT

Geology

The Jessica Project tenure sits on the Neoproterozoic-Palaeozoic Georgina Basin and encompasses three major Proterozoic Geological Regions; the South Nicholson Basin, McArthur Basin and the Mount Isa Province (Figure 4).

Georgina Basin

The Georgina Basin comprises of rocks ranging in age from Neoproterozoic to Devonian and covers an area of approximately 330,000km^2 in the central-eastern NT and extends into western Queensland (Ahmad et al., 2013). The sedimentary succession of the Georgina Basin comprises: Neoproterozoic to Early Cambrian glacial, siliciclastic sediments overlain by marine or continental siliciclastic sediments; Middle Cambrian to Ordovician mainly carbonate sequences; Ordovician to Devonian predominantly siliciclastic rocks developed mainly in the southern part of the Basin.

Deposition in the Georgina Basin was initiated in the Neoproterozoic in grabens formed during regional northeast-southwest directed extension. Tholeiitic basalts (Kalkarindji Province) volcanic rocks were emplaced in the center and north of the basin during the middle Cambrian. Elsewhere, the basal units

of the Georgina Basin comprise conglomerates, sandstones, shales and glacial and fluvial sediments.

The Barkly Tableland area, where the Jessica Project sits, coincides closely with the north-central and northern parts of the Georgina Basin. Exposures of the Basin's sediments in the area are rare, but where present, are typically composed of middle Cambrian carbonate sedimentary rocks. Locally overlying the Palaeozoic rocks of the Georgina Basin are thin deposits of flat lying late Palaeogene limestone.

South Nicholson Basin

The South Nicholson Basin represents a succession of predominantly sandstone and siltstone in an area up to 50km wide and 200km long, east trending belt outcropping to the south of the Murphy Inlier (Ahmad et al., 2013). The Basin is Mesoproterozoic in age, and is composed of the siliciclastic, dominantly fluvial and shallow-marine South Nicholson Group (equivalent to the Roper Group of the McArthur Basin, using the superbasin nomenclature of Sweet et al., 1999; Abbott and Sweet, 2000).

The South Nicholson Group unconformably overlies late Paleoproterozoic volcanic rocks, mixed carbonates and siliciclastic rocks of the Benmara, McNamara and Fickling groups.

Parts of the South Nicholson Basin (including the Jessica Project area) are unconformably overlain by the Neoproterozoic–Devonian northern Georgina Basin, the Mesozoic Carpentaria Basin and a thin Cenozoic cover (Rawlings et al., 2008; Sweet, 2017). The South Nicholson Basin crops out to the east of the Jessica Project Area.

McArthur Basin & Mount Isa Province

The Paleo–Mesoproterozoic McArthur Basin is exposed over an area of about 180,000km^2 in the northeastern Northern Territory. It unconformably overlies Paleoproterozoic metamorphosed and deformed rocks of the Pine Creek Orogen (PCO) to the west, the Murphy Province to the south and the Arnhem Province to the northeast. To the southeast the McArthur Basin succession extends to the Mount Isa Province (Ahmad et al., 2013).

There have been broad approaches to subdividing the successions of the McArthur Basin and correlative terranes (Mount Isa Province and Murphy Province) as proposed by Rawlings (1999) and Jackson et al. (1999, 2000) which is shown in Figure 5.

Interpretation of recent seismic and drilling data collected through Geoscience Australia's Exploring for the Future Program (EFTF) highlights the correlation of prospective stratigraphic units from the Isa Superbasin into the Carrara Sub-basin and eastern extents of the Jessica Project area that extend from the Mount Isa Province.

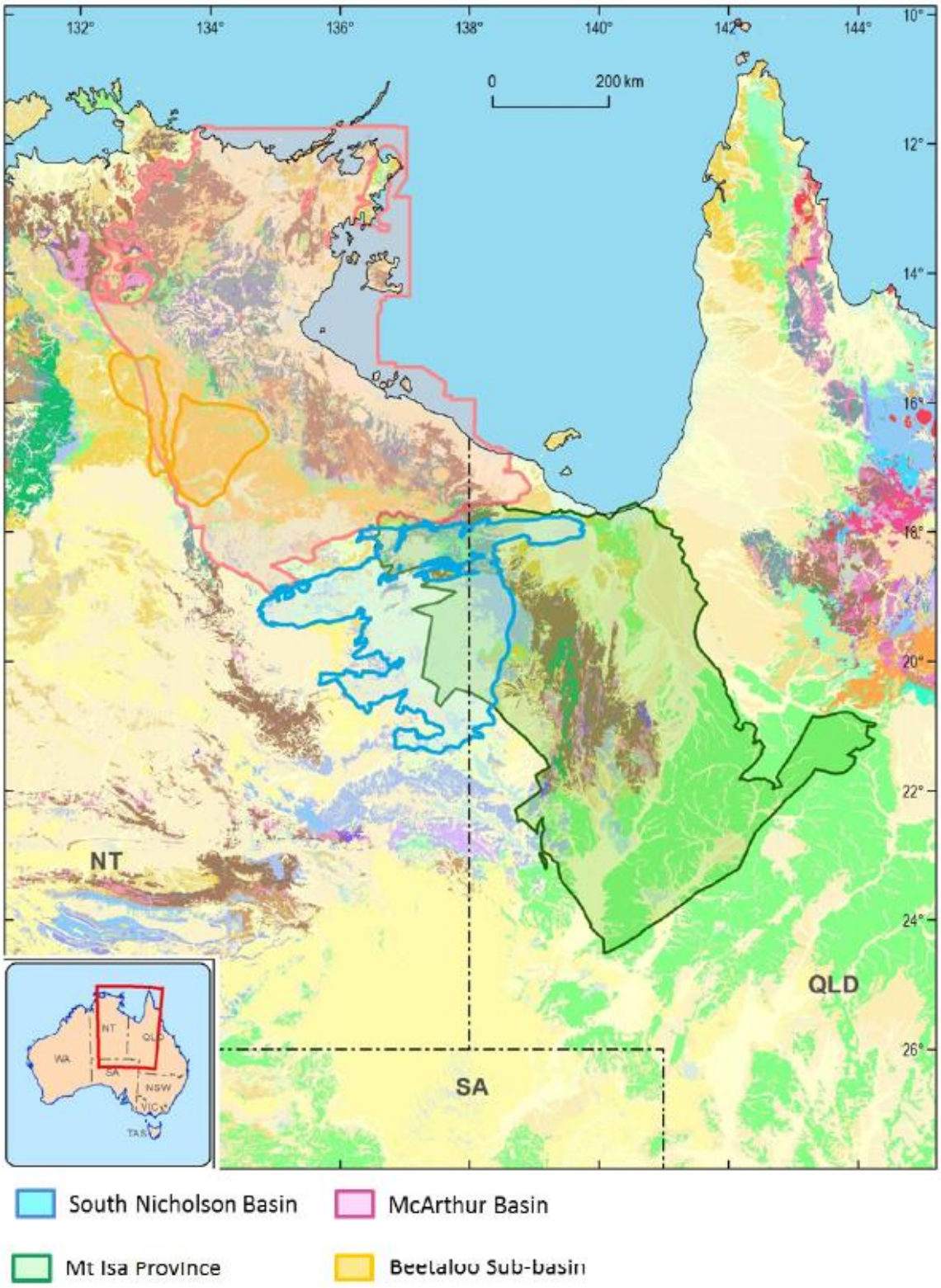

Figure 4. Map showing the surface geology and province outline of the South Nicholson Basin, McArthur Basin and the Mount Isa Province (Raymond et al, 2009 & 2018).

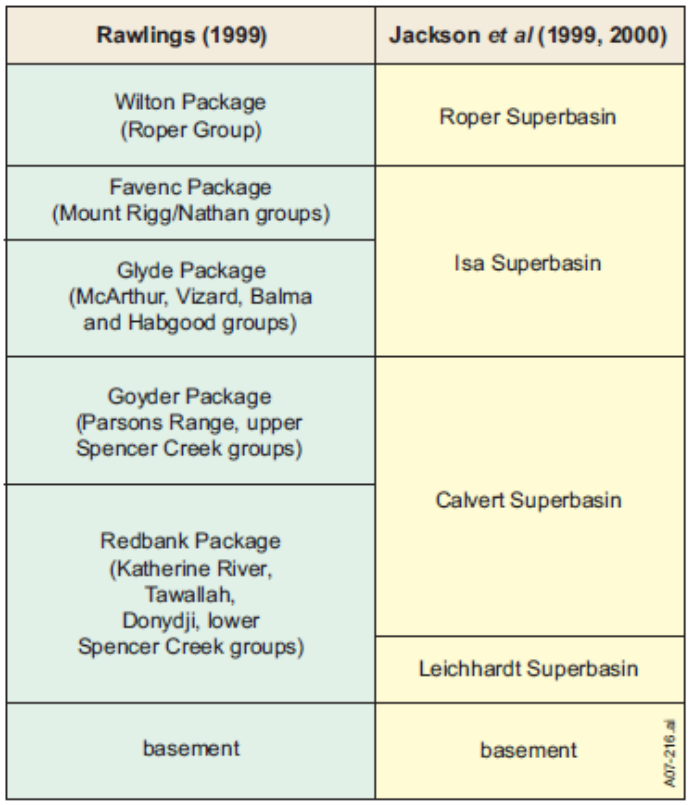

Figure 5. Subdivisions of the McArthur Basin and Mount Isa Province by Rawlings (1999) and Jackson et al (1999, 2000).

PREVIOUS EXPLORATION

Previous minerals exploration over the Jessica Project region dates back to the early 1980s. The target commodities were predominantly diamonds, uranium, base metals, phosphate and minor gold. No systematic exploration for sediment hosted base metals and iron oxide copper mineralisation has been conducted within the project area. A list of open file companies' reports is provided in Table 2 below.

Table 2. List of Open File Company Reports.

Historical Title	Report Number
EL30925; EL30926; EL30927	CR2017-0262; CR2017-0074
EL27647, EL29644, EL29753, EL29722 & EL29720	CR2013-0851
EL29391	CR2016-0104; CR2015-0303; CR2014-0311; CR2014-0310; CR2013-0457; CR2016-0104; CR2015-0303; CR2014-0310; CR2014-0311; CR2013-0457
EL28791	CR2016-0102; CR2015-0303; CR2013-1184; CR2013-1174
EL28790	CR2016-0101; CR2015-0303; CR2014-0318; CR2014-0312; CR2013-0403;
EL28726	CR2013-0207

Historical Title	Report Number
EL28582	CR2013-0210
EL28523	CR2013-0209
EL28331	CR2013-0203
EL27819	CR2013-0202
EL27666, EL27665	CR2013-0202
EL27193	CR2012-1017; CR2011-1018; CR2011-0879; CR2010-0740; CR2012-1017
EL26701	CR2013-0837; CR2013-0174; CR2013-0098
EL26314	CR2013-0460; CR2013-0098
EL26312, EL26311	CR2013-0837; CR2013-0098; CR2012-0380; CR2012-0283; CR2011-0341; CR2011-0157; CR2010-0192; CR2009-0435; CR2013-0837; CR2013-0098
EL25600	CR2014-0772; CR2013-0751; CR2013-0749
EL24196	CR2019-0566; CR2018-0617; CR2017-0611; CR2016-0670; CR2015-0776; CR2014-0968; CR2013-1202; CR2012-0959
EL23685, EL23683	CR2009-0300; CR2009-0281; CR2008-0545
AP1540	CR1966-0018
AP1766	CR1968-0030, CR1968-0031, CR1969-0022, CR1970-0037, CR1970-0038, CR1970-0039, CR1970-0082, CR1969-0025
AP1788	CR1968-0030, CR1968-0057
AP2159	CR1969-0022, CR1970-0038, CR1970-0083
EL1082	CR1977-0040
EL22977	CR2004-0044
EL22978	CR2004-0044
EL25600	CR2008-0421, CR2009-0765, CR2009-0819, CR2010-0692, CR2010-0693, CR2011-0781, CR2012-0584, CR2013-0749, CR2013-0751, CR2014-0772
EL26018	CR2008-0916, CR2009-1059, CR2010-0921, CR2010-1123, CR2011-1118, CR2011-1119, CR2012-1056
EL26019	CR2008-0916, CR2009-1059, CR2010-0921, CR2010-1124, CR2011-1118, CR2011-1201, CR2012-1057
EL26309	CR2009-0435, CR2010-0192, CR2011-0157, CR2011-0333, CR2012-0283, CR2012-0430, CR2013-0098, CR2013-0459
EL26763	CR2009-1043
EL27668	CR2011-0270, CR2012-0461, CR2013-0202
EL28525	CR2012-0694, CR2013-0201
EL28793	CR2013-0404, CR2014-0309
EL29557	CR2014-0063, CR2015-0075, CR2015-0920, CR2016-0075, CR2017-0047, CR2017-0122, CR2018-0043, CR2019-0064, CR2019-0066, CR2019-0504
EL29720	CR2013-0851
EL3077	CR1982-0330

Historical Title	Report Number
EL30816	CR2016-0075, CR2017-0047, CR2018-0043, CR2019-0066, CR2019-0504
EL4373	CR1985-0026, CR1985-0246, CR1988-0224
EL4530	CR1986-0111
EL6576	CR1990-0605
EL7203	CR1992-0214
AP1540	CR1966-0018
AP1766	CR1968-0030, CR1968-0031, CR1969-0022, CR1970-0037, CR1970-0038, CR1970-0039, CR1970-0082
AP1776	CR1969-0025
EL1082	CR1977-0040
EL1125	CR1977-0039
EL22978	CR2004-0044
EL23576	CR2003-0423
EL24847	CR2007-0189, CR2008-0157, CR2008-0287, CR2009-0293
EL25600	CR2008-0421, CR2009-0765, CR2009-0819, CR2010-0692, CR2010-0693, CR2011-0781, CR2012-0584, CR2013-0749, CR2013-0751, CR2014-0772
EL26018	CR2008-0916, CR2009-1059, CR2010-0921, CR2010-1123, CR2011-1118, CR2011-1119, CR2012-1056
EL26019	CR2008-0916, CR2009-1059, CR2010-0921, CR2010-1124, CR2011-1118, CR2011-1201, CR2012-1057
EL26311	CR2009-0435, CR2010-0192, CR2011-0157, CR2011-0340, CR2012-0283, CR2012-0428, CR2013-0098, CR2013-0837
EL26312	CR2009-0435, CR2010-0192, CR2011-0157, CR2011-0341, CR2012-0283, CR2012-0380, CR2013-0098, CR2013-0837
EL27640	CR2011-0504, CR2012-0369, CR2012-0636, CR2013-1043, CR2013-1044
EL27647	CR2011-0270, CR2012-0461, CR2012-0808, CR2013-0851
EL27668	CR2011-0270, CR2012-0461, CR2013-0202
EL29557	CR2014-0063, CR2015-0075, CR2015-0920, CR2016-0075, CR2017-0047, CR2017-0122, CR2018-0043, CR2019-0064, CR2019-0066, CR2019-0504
EL29720	CR2013-0851
EL30485	CR2016-0337
EL30816	CR2016-0075, CR2017-0047, CR2018-0043, CR2019-0066, CR2019-0504
EL30890	CR2017-0073
EL30926	CR2017-0074, CR2017-0262
EL31802	CR2019-0198
EL4351	CR1986-0110, CR1988-0223
EL4353	CR1984-0237, CR1986-0001, CR1987-0007, CR1989-0166, CR1989-0288, CR1989-0289
EL4361	CR1985-0011, CR1986-0062, CR1989-0135, CR1989-0288, CR1989-0289

Historical Title	Report Number
EL4372	CR1985-0025, CR1985-0269, CR1986-0302, CR1989-0165, CR1989-0288, CR1989-0289
EL4373	CR1985-0026, CR1985-0246, CR1988-0224
EL4530	CR1986-0111
EL7203	CR1992-0214

In 2016 Geoscience Australia launched the Exploration for the Future Program (EFTF), a multi-million-dollar exploration initiative funded by the Australian Government. Under the Program Geoscience Australia, in collaboration with key State and Territory partners, acquired a diverse range of pre-competitive geoscience datasets across northern Australia, focusing on frontier or 'greenfield' regions in Northern Australia. As a part of the EFTF program the South Nicholson 2D Deep Crustal Reflection Seismic Survey was acquired in 2017, followed by the Barkly 2D Deep Crustal Reflection Seismic Survey in 2019. The seismic data was acquired across the underexplored and (mostly) undercover South Nicholson and Barkly Tablelands regions in the north-eastern Northern Territory. Lines from both Seismic surveys run across and at immediate vicinity of the Jessica Project area. Geoscience Australia's current interpretation of line 17GA – SN1 which runs through the center of the Jessica Project is shown in Figure 6.

The EFTF datasets also include data from the Australian Airborne Electro-Magnetic (AusAEM) survey, and the Australian Lithospheric Architecture Magneto-telluric Project (AusLAMP).

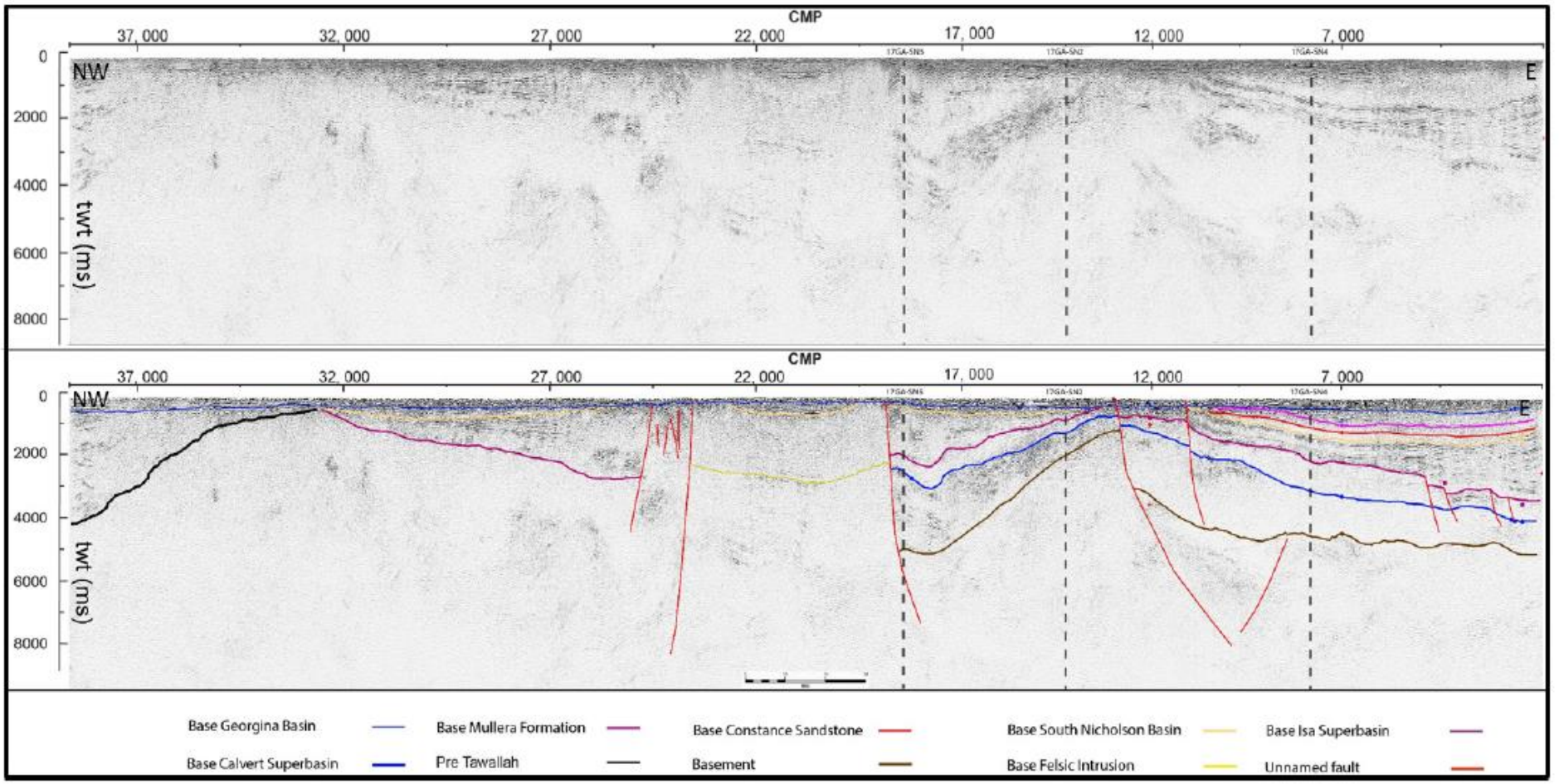

Figure 6. Seismic line 17GA – SN1 with interpreted horizons and major structures. Dashed lines represent the intersections of South Nicholson Survey lines SN5, SN4 and SN2.

EXPLORATION CONCEPT

The Jessica Project comprises basement rocks of the South Nichlson Basin and Isa Supergroup / McArthur Basin sediments overlain by Georgina Basin sediments. In the northeastern portion of the Jessica Project area the Paleoproterozoic Isa supersequences have been thrust to the near surface environment and are the primary target for sediment hosted Cu & Pb – Zn mineralisation.

South32 is targeting carbonaceous shales and siltstones of Paleoprotoerozic age (e.g. McNamara Group). Specific target areas are focussed on structural architecture such as major north – north west to north east faults and anticline and synclines adjacent to these regional faults within favourable host stratigraphy.

Recent drilling by South32 intersected pyritic and carbonaceous shales within 55m of surface under youger cover sediments. The proposed AEM survey is designed to map carbonaceous sediments in the near surface environment (<300m from surface) and identify any discrete conductors that maybe associated with sediment hosted Cu mineralisation.

DETAILS OF COLLABORATIVE PROGRAM

UTS Geophysics Pty Ltd performed a helicopter-borne geophysical survey over the Jessica Project near Mittiebah Station, Northern Territory (Figure 7).

The geophysical surveys consisted of helicopter borne EM using the versatile time-domain electromagnetic (VTEM™) Max system with Full-Waveform processing. Measurements consisted of Vertical (Z), In-line(X), and Cross-line Horizontal (Y) components of the EM fields using an induction coil, and the aeromagnetic total field using a cesium magnetometer. A total of 2,765 line-kilometers of geophysical data were acquired during the survey. The final data is attached as Appendix A.

The crew was based out of Mittiebah Station (Figure 2) in Northern Territory for the acquisition phase of the survey. Survey flying occurred from September 16th to October 14th, 2025.

Data quality control and quality assurance, and preliminary data processing were carried out on a daily basis during the acquisition phase of the project. Final data processing followed immediately after the end of the survey. Final reporting, data presentation and archiving were completed from the Aurora office of UTS Geophysics Pty Ltd. October 2025.

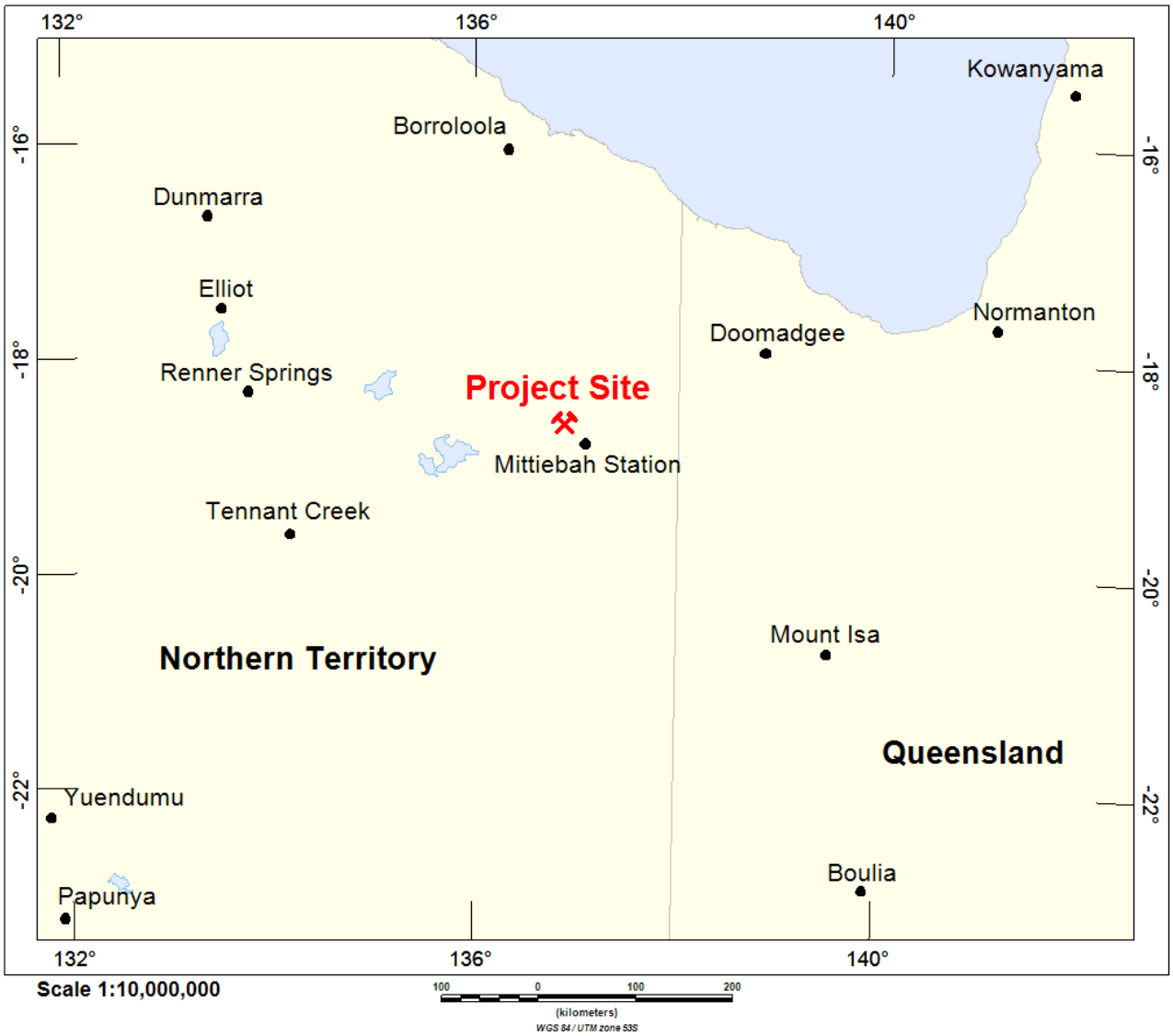

Figure 7. Survey Property Location Map

Survey and Systems Specifications

The survey comprised two blocks, the Eastern Block survey area is located approximately 9 km west of Mittiebah Station, while the Western Block survey area is located approximately 27 km west of Mittiebah Station (Figure 8).

Figure 8. Survey Area Location on Google Earth

Both blocks were flown in north-south (N 0° E / N 180° E azimuth) direction with traverse line spacing of 400 and 800 metres as depicted in Figure 9 and Figure 10.

Figure 9. Flight path over Eastern Block on Google Earth Image

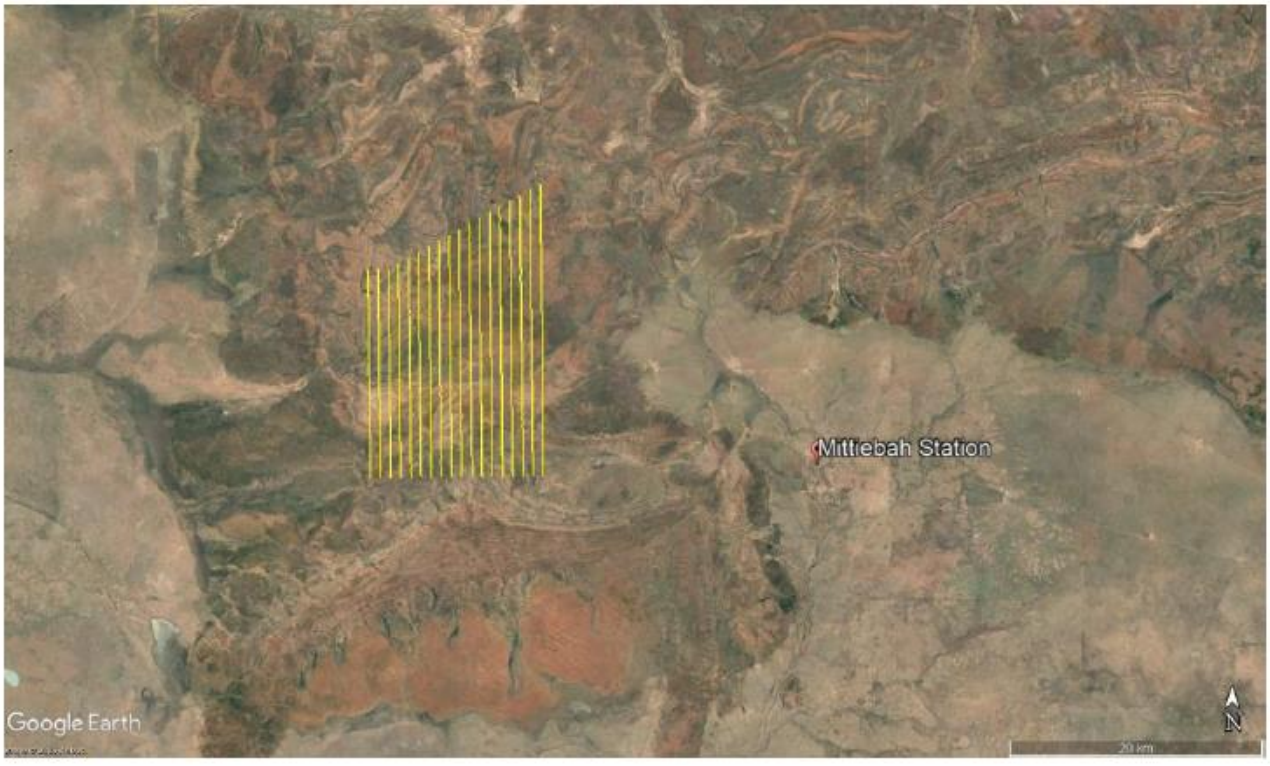

Figure 10. Flight path over Western Block on Google Earth Image

For more detailed information on the flight spacing and line direction, see Table 3 below.

Table 3. Survey Specifications

Survey block	Line spacing (m)	Area (km^2)	Planned[1] Line-km	Actual Line-km	Flight direction	Line numbers
Eastern Block	Traverse: 400 Ties: N/A	988	2,300	2,420	Traverse: N 0° E / N 180° E Ties: N/A	Traverse: L1000-L1170 Ties: N/A
Western Block	Traverse: 800 Ties: N/A	280	340	345		Traverse: L2000-L2600 Ties: N/A
TOTAL		**1,268**	**2,640**	**2,765**		

Flight Specifications

Over the survey area, the helicopter was maintained at the following mean altitudes above the ground with average survey speeds for the blocks as shown in Table 4. The average transmitter-receiver loop terrain clearance of and magnetic sensor clearance are shown as well.

Table 4. Flight Specifications

Survey block	Mean Altitude (metres)	Average Survey Speed (km/hour)	Transmitter-Receiver Loop Terrain Clearance (metres)	Magnetic Sensor Clearance (metres)
Eastern Block	86	70	38	76
Western Block	87	72	39	77

The on-board operator was responsible for monitoring the system integrity. He also maintained a detailed flight log during the survey, tracking the times of the flight as well as any unusual geophysical or topographic features.

On return of the aircrew to the base camp the survey data was transferred from a compact flash card (PCMCIA) to the data processing computer. The data were then uploaded via ftp to the Geotech office in Aurora for daily quality assurance and quality control by qualified personnel.

Aircraft and Equipment

Survey Aircraft

The survey was flown using Eurocopter Aerospatiale (A-Star) 350 B3 helicopter, registration VH-VIM. The helicopter is owned and operated by United Aero Helicopters. Installation of the geophysical and ancillary equipment was carried out by UTS Geophysics Pty Ltd crew.

Electromagnetic System

The electromagnetic system was a UTS Time Domain EM (VTEMTM Max) full receiver-waveform streamed data recording system. The "full waveform VTEMTM system" uses the streamed half-cycle recording of transmitter and receiver waveforms to obtain a complete system response calibration throughout the entire survey flight. The VTEMTM Max system with the serial number 35 had been used for the survey. The VTEM™ transmitter current waveform is shown diagrammatically in Figure 11.

The VTEMTM Max receiver coils are at the centre of the transmitter loop, in central loop (or in-loop) configuration. The Z-component receiver coil and the transmitter loop are oriented in the vertical direction. The receiver system for the project also included coincident-coaxial X & Y-direction coils to measure the in-line (X) and cross-line (Y) dB/dt responses and calculate B-Field responses. The EM transmitter-receiver loop was towed at a mean distance of 38 and 39 metres below the aircraft, as shown in Figure 12. VTEM Max system specifications are shown in Table 5.

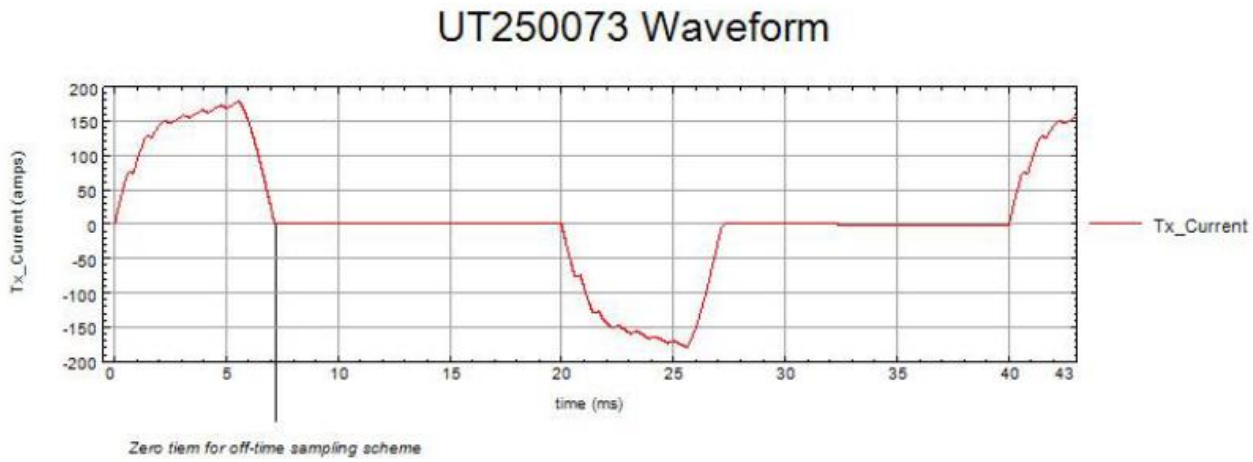

Figure 11. VTEM Transmitter Current Waveform

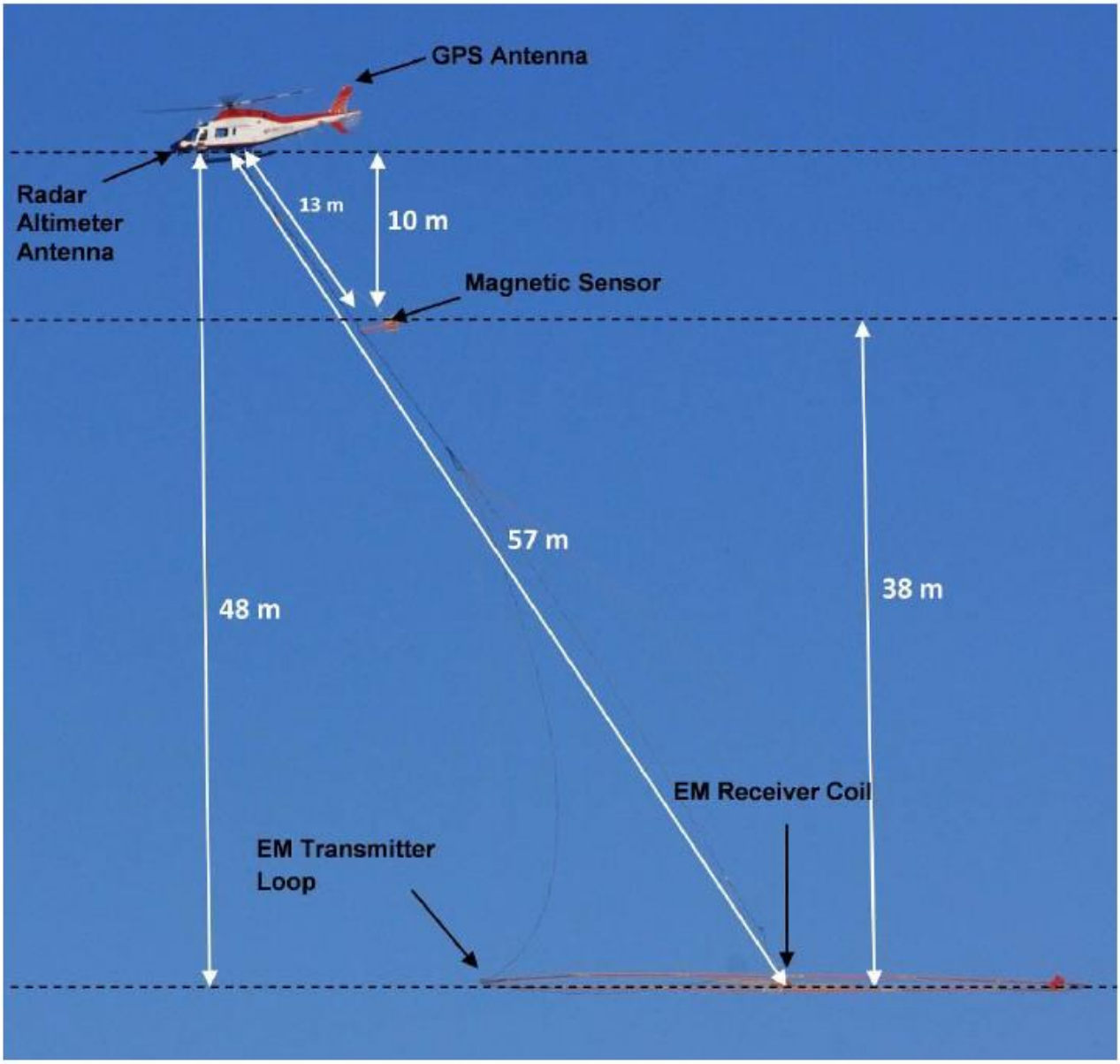

Figure 12. VTEM Max System Configuration

Table 5. VTEM Max System Specifications

Component		Parameter	Specification
Transmitter		Transmitter loop diameter	34.6 m
		Effective transmitter loop area	3760.99 m²
		Number of turns	4
		Base frequency	25 Hz
		Peak current	179.1 A
		Pulse width	7.16 ms
		Waveform shape	Trapezoid
		Peak dipole moment	673592.57 nIA
		Avg. Tx–Rx terrain clearance	38–39 m
Receiver	X Coil	Coil diameter	0.32 m
		Number of turns	245
		Effective coil area	19.69 m²
	Y Coil	Coil diameter	0.32 m
		Number of turns	245
		Effective coil area	19.69 m²
	Z Coil	Coil diameter	1.2 m
		Number of turns	100
		Effective coil area	113.04 m²

Airborne Magnetometer

The magnetic sensor utilized for the survey was Geometrics optically pumped cesium vapour magnetic field sensor mounted 10 metres below the helicopter, as shown in Figure 6. The sensitivity of the magnetic sensor is 0.02 nanoTesla (nT) at a sampling interval of 0.1 seconds.

Fullwaveform VTEM Sensor calibration

The calibration is performed on the complete VTEM™ system installed in and connected to the helicopter, using special calibration equipment. This calibration takes place on the ground at the start of the project prior to surveying.

The procedure takes half-cycle files acquired and calculates a calibration file consisting of a single stacked half-cycle waveform. The purpose of the stacking is to attenuate natural and man-made magnetic signals, leaving only the response to the calibration signal.

This calibration allows the transfer function between the EM receiver and data acquisition system and the transfer function of the current monitor and data acquisition system to be determined. These calibration results are then used in VTEMTM full waveform processing.

Radar Altimeter

A Terra TRA 3000/TRI 40 radar altimeter was used to record terrain clearance. The antenna was mounted beneath the bubble of the helicopter cockpit (Figure 12).

GPS Navigation System

The navigation system used was a UTS PC104 based navigation system utilizing a NovAtel WAAS (Wide Area Augmentation System) enabled GPS receiver, UTS navigate software, a full screen display with controls in front of the pilot to direct the flight and a NovAtel GPS antenna mounted on the helicopter tail (Figure 6). As many as 11 GPS and two WAAS satellites may be monitored at any one time. The positional accuracy or circular error probability (CEP) is 1.8 m, with WAAS active, it is 1.0 m. The co-ordinates of the block were set-up prior to the survey and the information was fed into the airborne navigation system.

Digital Acquisition System

A UTS data acquisition system recorded the digital survey data on an internal compact flash card. Data is displayed on an LCD screen as traces to allow the operator to monitor the integrity of the system. The data type and sampling interval as provided in Table 6.

Table 6. Acquisition Sampling Rates

Data Type	Sampling
TDEM	0.1 sec
Magnetometer	0.1 sec
GPS Position	0.2 sec
Radar Altimeter	0.2 sec

Base Station

A combined magnetometer/GPS base station was utilized on this project. A Geometrics Cesium vapour magnetometer was used as a magnetic sensor with a sensitivity of 0.001 nT. The base station was recording the magnetic field together with the GPS time at 1 Hz on a base station computer.

The base station magnetometer sensor was installed near the landing zone at 018° 48.4571' S, 137° 04.8852' E; away from electric transmission lines and moving ferrous objects such as motor vehicles. The base station data were backed-up to the data processing computer at the end of each survey day.

RESULTS AND INTERPRETATIONS

The northeast and eastern portions of the Jessica Project are considered prospective for sediment hosted Zn & Cu mineralisation. Several economic stratiform Zn – Pb & Cu deposits are known within northern Australia including McArthur River (HYC), Century and the Mount Isa Mines. The setting and characteristics of these deposits in conjunction with updated data and interpretations from the Exploring for the Future (EFTF) and MINEX CRC Programs were used to generate the Jessica Project and develop targeting criteria.

The VTEM survey successfully mapped conductive stratigraphy across the survey area, resolving a range of early-, mid-, and late-time EM anomalies (Figure 13). The final data is attached as Appendix A.

A total of 14 target areas have been identified from preliminary internal interpretations of the final data (Figure 14). These VTEM targets are located within interpreted favourable lithostructural setting and will be the focus for future exploration work starting with EM anomaly picking, prioritisation, and Maxwell plate modelling. The targets range from interpreted stratigraphic horizons of favourable lithology adjacent to regional and cross cutting faults and interpreted folds to more discrete responses that may represent massive sulphide accumulations. Drill testing is proposed to test these targets and aid with further interpretations and understanding of the subsurface geology within the survey area.

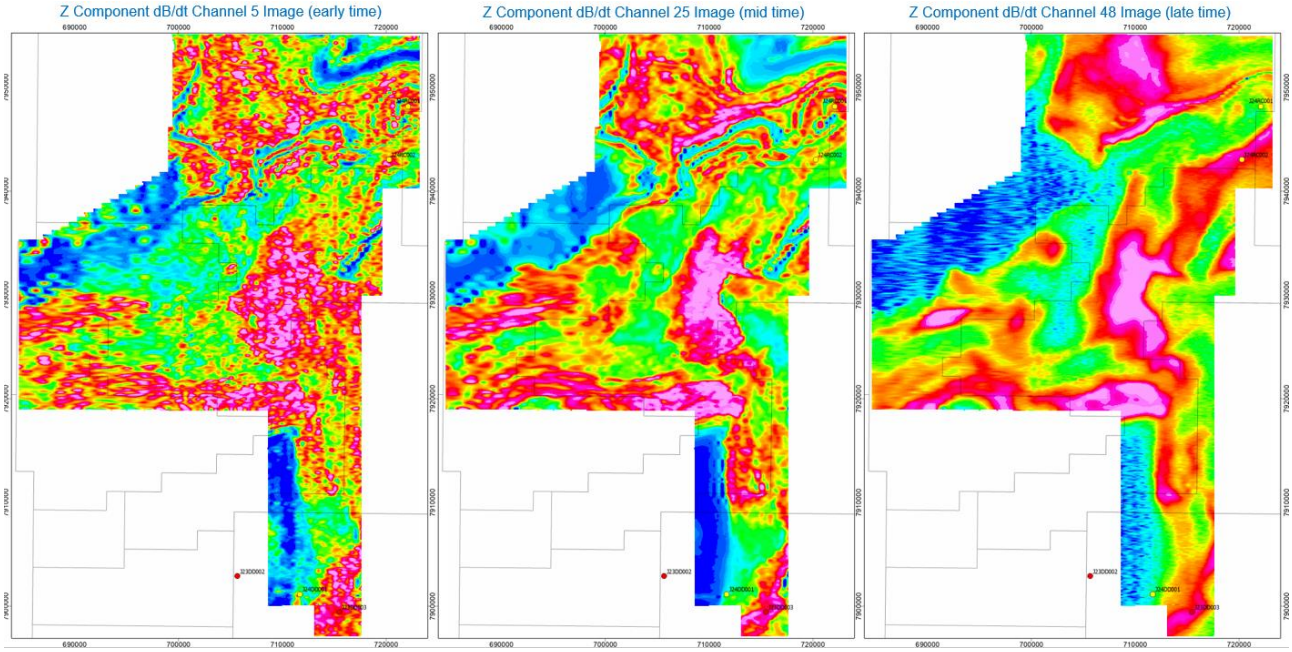

Figure 13. VTEM Channel Imagery showing dB/dt Z-Component for Channels 5, 25, and 48.

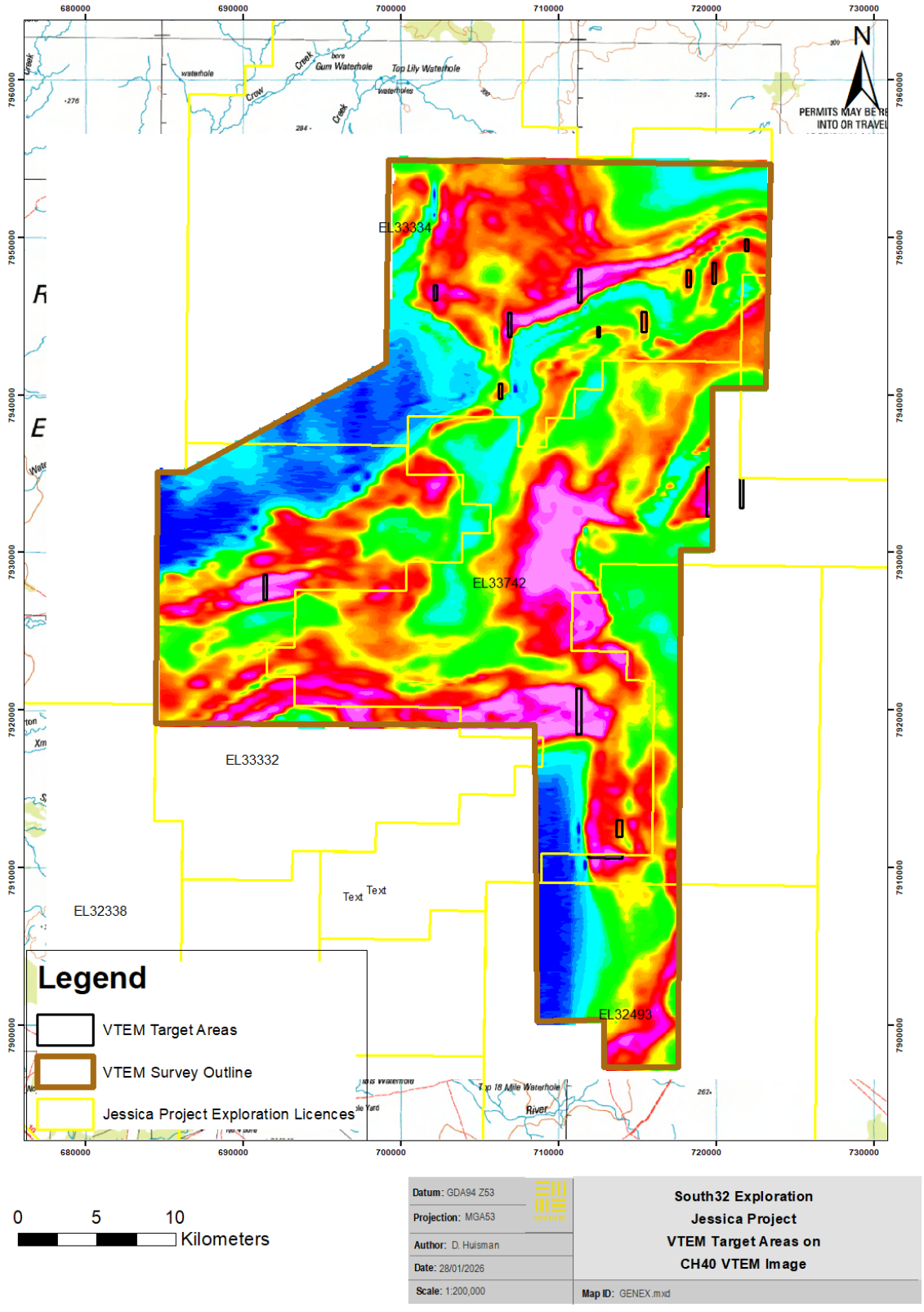

Figure 14. Target Areas on VTEM dB/d Z Component Channel 40 Image.

CONCLUSIONS

The northeast and eastern portions of the Jessica Project are considered prospective for sediment hosted Zn & Cu mineralisation. Several economic stratiform Zn – Pb & Cu deposits are known within northern Australia including McArthur River (HYC), Century and the Mount Isa Mines. The setting and characteristics of these deposits in conjunction with updated data and interpretations from the Exploring for the Future (EFTF) and MINEX CRC Programs were used to generate the Jessica Project and develop targeting criteria.

A helicopter-borne versatile time domain electromagnetic (VTEMTM Max) geophysical survey has been completed on behalf of Taragon Valley Pty Ltd., over the Jessica Project near Mittiebah Station, Northern Territory. This approach aimed to enhance understanding of the mineral potential at depth within the study area by systematically focusing on key structural and geophysical features, and guiding future exploration efforts.

The total area coverage is 1,268 km2 and the total survey line coverage is 2,765 line-kilometres over two (2) survey blocks. The principal geophysical sensors included a Full Waveform Time Domain electromagnetic system, and a magnetometer.

Based on the geophysical results obtained, a number of electromagnetic and magnetic anomalies of interest have been identified over the project area including several mid-late-channel conductive signatures. South32 plans to complete follow up exploration over these areas in search for sediment hosted Zn & Cu mineralisation.

References

Abbott S. T. & Sweet I. P., 2000. Tectonic control on third-order sequences in a siliclastic ramp-style basin: an example from the Roper Superbasin (Mesoproterozoic), northern Australia. *Australian Journal of Earth Sciences* 47:637–57.

Ahmad M, Dunster JN and Munson TJ, 2013. Chapter 15: McArthur Basin: in Ahmad M and Munson TJ (compilers). *'Geology and mineral resources of the Northern Territory'. Northern Territory Geological Survey, Special Publication 5.*

Ahmad M and Munson TJ, 2013. Chapter 19: South Nicholson Basin: in Ahmad M and Munson TJ (compilers). *'Geology and mineral resources of the Northern Territory'. Northern Territory Geological Survey,Special Publication 5.*

Carson C, et. al., 2022. *Exploring the Future - SHRIMP U-Pb zircon geochronology from NDI Carrara 1 and implications for regional stratigraphic correlations, resource potential and geological evolution of the Carrara Sub-basin.* AGES Proceedings, Northern Territory Geological Survey

Nailwal G and Shirzaditabar F, 2025. *UT250073 – Report on Airborne Geophysical Survey for Taragon Valley Pty Ltd.* UTS Geophysics Pty Ltd.

Kruse PD, Dunster JN and Munson TJ, 2013. Chapter 28: Georgina Basin: in Ahmad M and Munson TJ (compilers). *'Geology and mineral resources of the Northern Territory'. Northern Territory Geological Survey, Special Publication 5.*

Jackson M.J., Sweet I.P., Page R.W. & Bradshaw B.E., 1999. The South Nicholson and Roper Groups: evidence for the early Mesoproterozoic Roper Superbasin. In: Bradshaw B.E. & Scott D.L., (eds). Integrated basin analysis of the Isa Superbasin using seismic, well-log and geopotential data: an evaluation of the economic potential of the northern Lawn Hill Platform. *Record 1999/19. Australian Geological Survey Organisation, Canberra 36-45.*

Jackson M.J., Scott D.L. & Rawlings D.J., 2000. Stratigraphic framework for the Leichhardt and Calvert superbasins: review and correlation of the pre-1700 Ms successions between Mt Isa and McArthur River. *Australian Journal of Earth Sciences, 47, 381-403.*

Rawlings D.J., 1999. Stratigraphic resolution of a multiphase intracratonic basin system: the McArthur Basin, northern Australia. *Australian Journal of Earth Sciences, 46, 703-723.*

Rawlings D.J., Sweet I.P. & Kruse P.D., 2008. Mount Drummond, Northern Territory (Second Edition) 1:250 000 geological map series explanatory notes, SE 53-12. N*orthern Territory Geological Survey, Darwin.*

Raymond O.L., (Coordinator). 2009. Surface geology of Australia 1:1 million scale digital geology data. *Geoscience Australia, Digital Geology Map.*

Sweet I. P., et al., 1999. The South Nicholson and Roper Groups: evidence for the early Mesoproterozoic Roper Superbasin. In: Bradshaw B. E. & Scott D. L. (eds.), Integrated basin analysis of the Isa Superbasin using seismic, well-log and geopotential data: an evaluation of the economic potential of the northern Lawn Hill Platform, Record 1999/19, *Australian Geological Survey Organisation, Canberra, 36–45.*

Sweet I.P., 2017. The geology of the South Nicholson Group, northwest Queensland. *Queensland Geological Record 2017/07.*

Appendix A – Final Data