



Tomography constrained gravity inversion at East Tennant

ASX: ASE



Mitre Geophysics Pty Ltd
Mineral Exploration and Engineering Consultants

FLEET



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This presentation has been approved for release by Astute's Board of Directors.

OVERVIEW

BACKGround

- Regional Geology
- Project Location

Leichhardt east prospect

- Exploration work to date

AMBIENT NOISE TOMOGRAPHY

- Data acquisition
- Results

Geophysical modelling

- Stripping back the cover
- Constrained inversion – Windisp Model
- Constrained inversion – Parametric Model

conclusions

NEXt STEPS



BACKGROUND

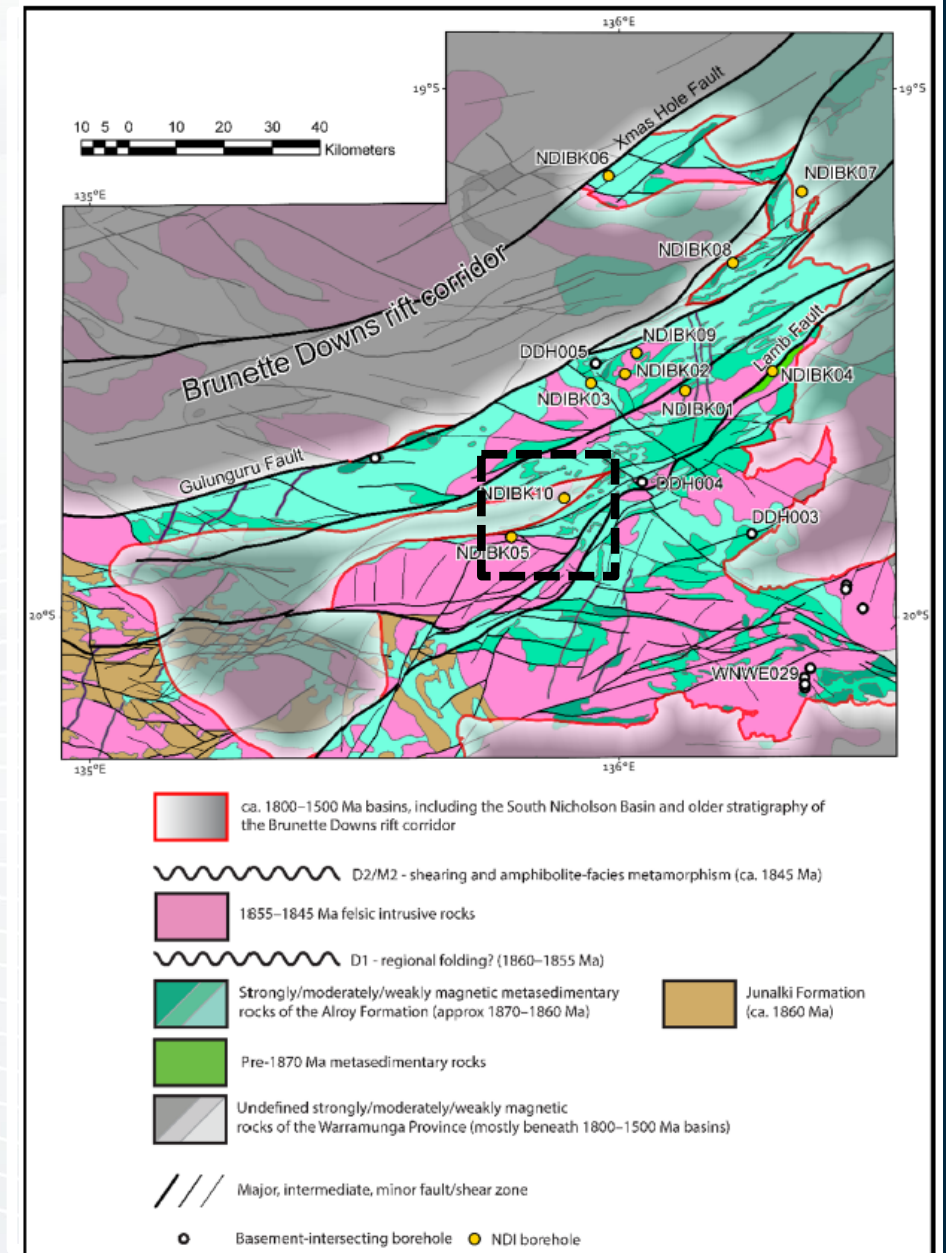
REGIONAL GEOLOGY

The Warramunga Formation is characterised by turbiditic felsic volcanic derived sediments and felsic tuffs (deposited about 1862 Ma) under Georgina Basin cover sequences

Syn-tectonic intrusive rocks of the Tennant Creek Suite comprising granites and quartz porphyries and lesser mafic to intermediate intrusions focused along pre-existing structures (1851-1847 Ma)

Alroy formation in East Tennant thought to be correlative, at least in part, to the Warramunga and Junalki formations as exposed in Tennant Creek (Kositcin et al, 2022)

High-grade deposits of copper and gold mineralisation associated with magnetite and/or hematite bearing ironstones hosted within the Warramunga Formation have been mined in the Tennant Creek Inlier since the 1930s



BACKGROUND

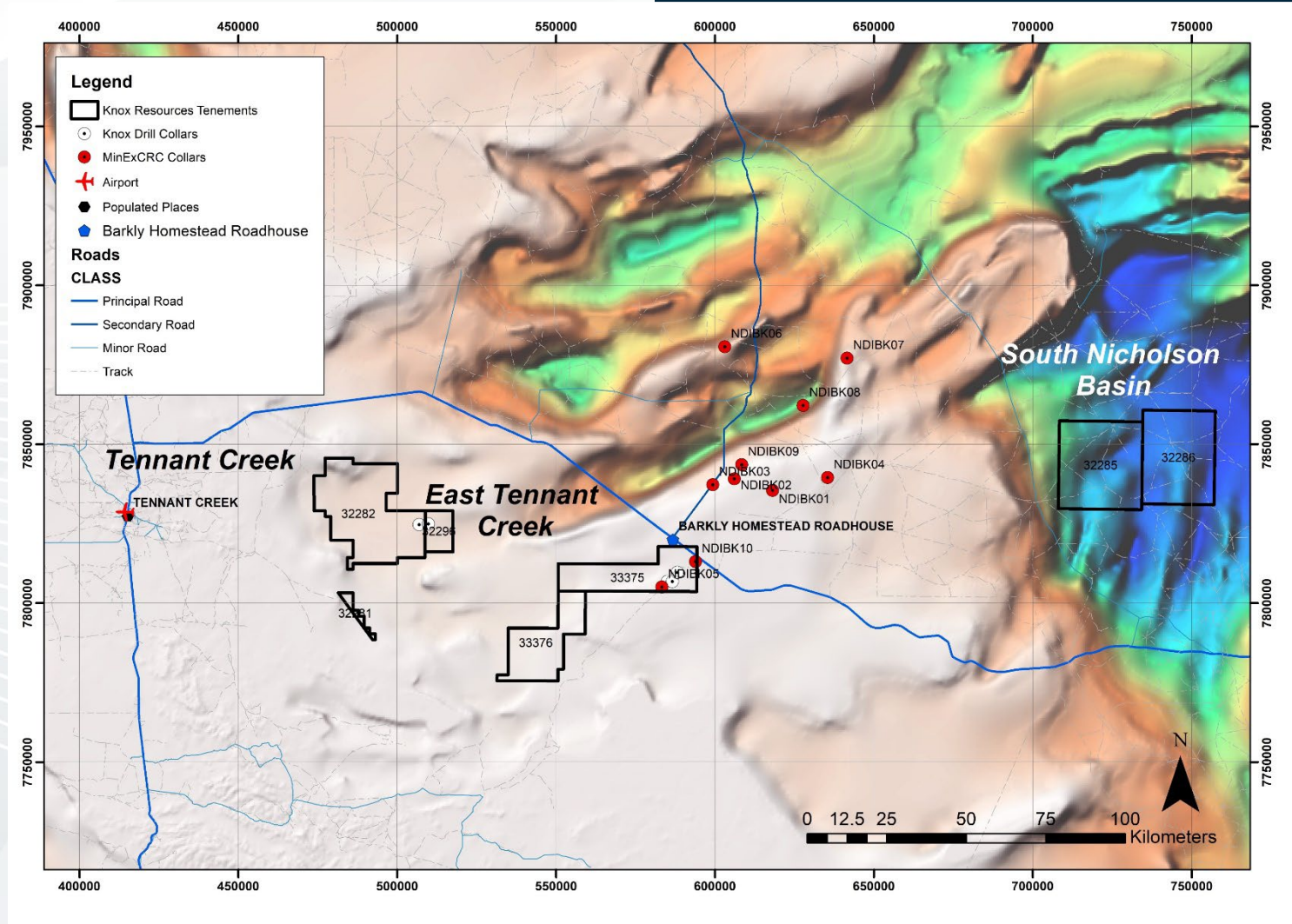
PROJECT LOCATION

Location:

- Between historic mining districts of Tennant Creek and Mount Isa
- Ten granted tenements, three under application - 4,522km²
- East Tennant subject of the first National Drilling Initiative (NDI) Drill campaign

IOCG deposits an attractive exploration target:

- Iron oxide copper gold (IOCG) deposits are large and economically attractive deposit styles
 - Olympic Dam (SA)
 - Ernest Henry (Qld)
 - Juno (NT)
- IOCGs account for 35% of Australia's domestic copper production¹



A new frontier for mineral exploration

5 March 2021

The first results from the National Drilling Initiative have highlighted exciting new opportunities for the resources industry in the Northern Territory.

The collaboration between Geoscience Australia, MinEx CRC and the Northern Territory Geological Survey completed their first stratigraphic drilling campaign approximately 200 kilometres east of Tennant Creek in December 2020.

The 10 drill holes are in an area that had been overlooked for mineral exploration in the past because of the uncertainty, risk and expense of exploring through the overlying cover of the Barkly Tablelands.

However, data from the Australian Government's [Exploring for the Future program](#), which is being led by Geoscience Australia, showed the area warranted closer investigation.

Geoscience Australia's Chief of Minerals, Energy and Groundwater Division, Dr Andrew Heap, said early analysis of the drilling data confirmed the East Tennant region had the right geology for a range of minerals, in particular copper and gold.



Australian Government

Geoscience Australia



The Hon Keith Pitt MP

Archived content

National drilling initiative reveals golden opportunity for northern Australia

4 March 2021



New data uncovering gold and copper sets East Tennant as 'exciting exploration frontier'

By Roxanne Fitzgerald

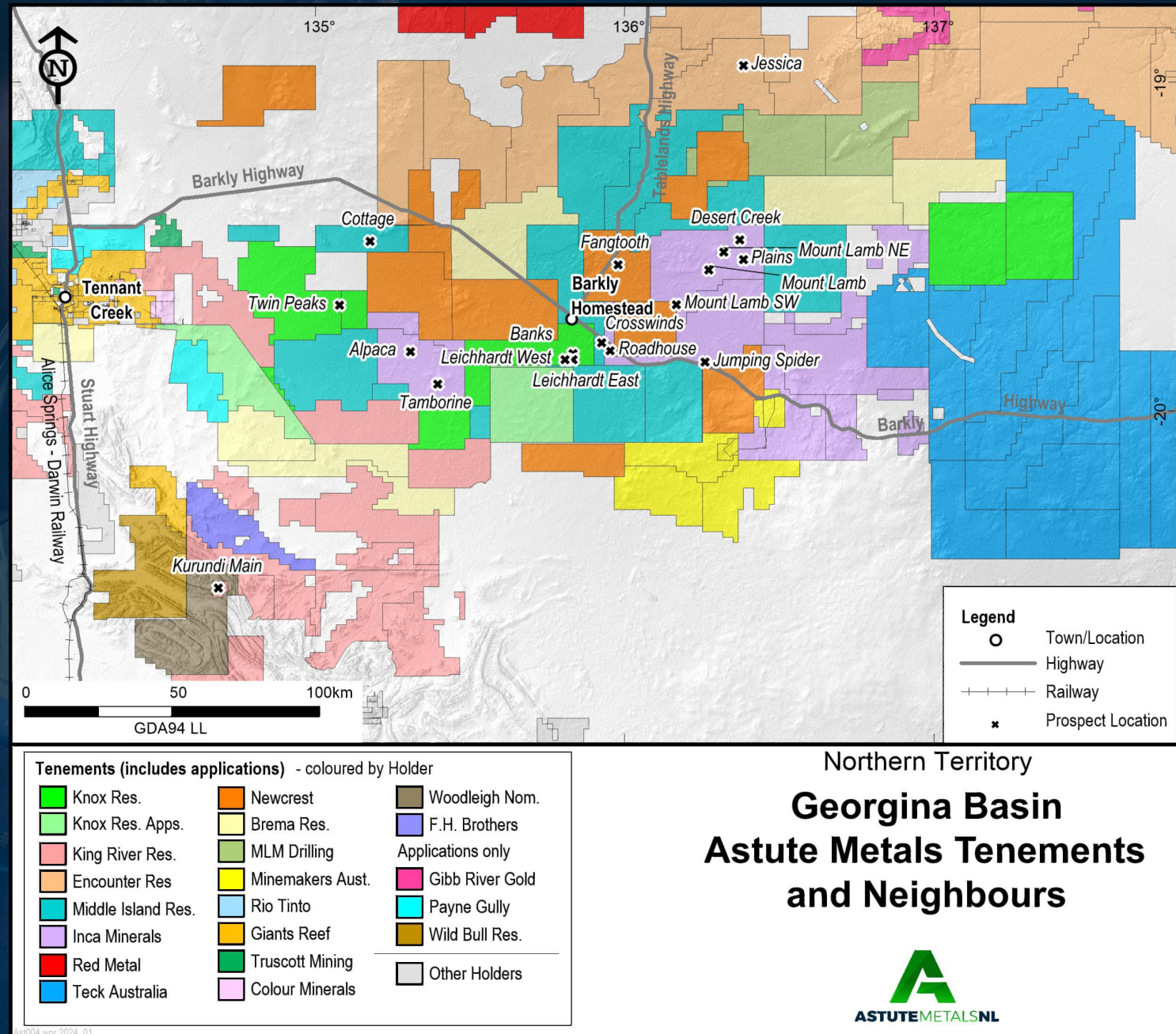
Updated March 5 2021 - 11:42am, first published 7:56am



Katherine Times
YOUR TOWN & COUNTRY WEEKLY

A NEW COPPER-GOLD EXPLORATION FRONTIER

- Staking hot-spot with tenure tightly-held by Majors and Junior Explorers
- Prospective for world-class IOCG-style copper-gold deposits
 - 100% Astute-owned*



Note:

*Subject to Shareholder Approval – see ASX: ASE 29 January 2024 'Astute to acquire 100% ownership of Georgina Basin Project'

LEICHHARDT EAST

EXPLORATION TO DATE

SRK Data Compilation and Project Area Study

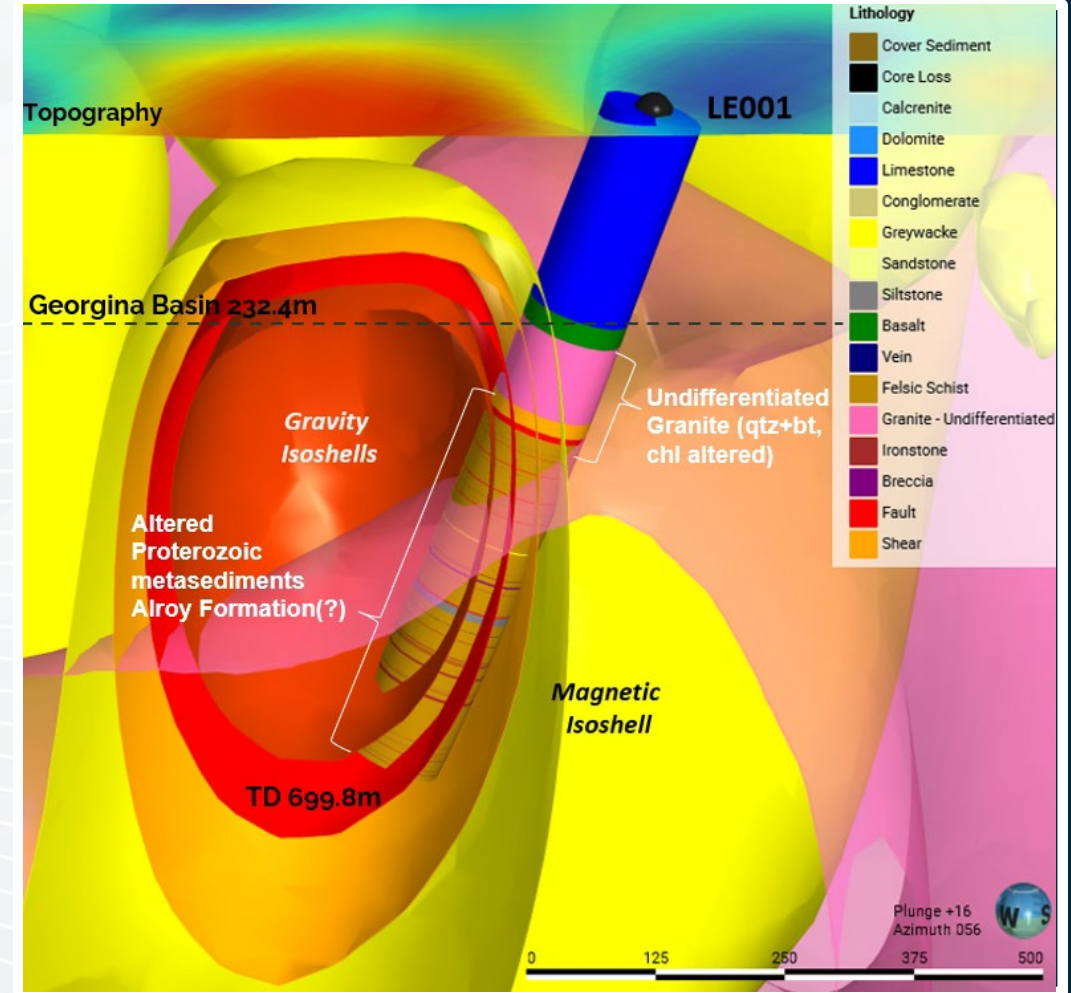
- Prospectivity review, solid geology & structural interpretations
- Mineral systems analysis and fuzzy logic exploration targeting

Geophysical Surveying and Modelling

- Airborne magnetic surveying 4,995 line km – 100m line spacing
- Gravity surveying 2,223 stations – 200x200m station spacing (2021, 2023)
- Unconstrained magnetic and gravity inversions

Drilling

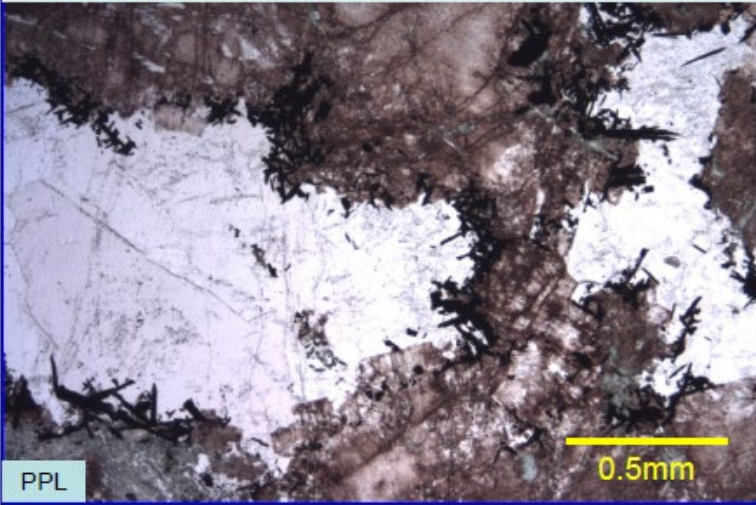
- One diamond hole for 699.8m (two other holes at Banks, LW)
- Intersected granite, turbiditic silt/sandstone, hematitic ironstones
- Geochemical anomalism in Cu, U, Bi, Ag
- Alteration assemblages of hematite, chlorite and sericite



Drillhole co-funded under NT GDC Grants program

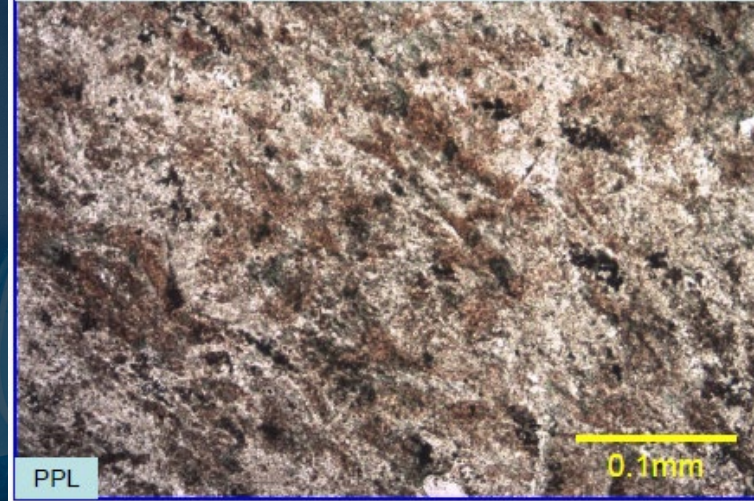
LEICHHARDT EAST PETROGRAPHY

Bladed crystals of hematite decorate contacts between internally recrystallized quartz and red, altered feldspars

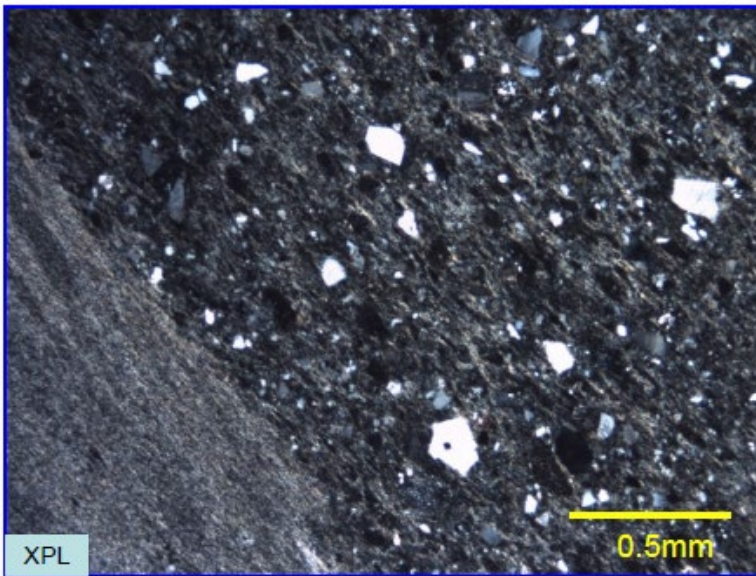


237m – Intensely hematite-chlorite altered and fractured medium-grained granite

Both images: Delicate shapes of glass shards replaced by reddish albite(?) in paler recrystallized quartzo-feldspathic intergrowth with tiny spots of chlorite

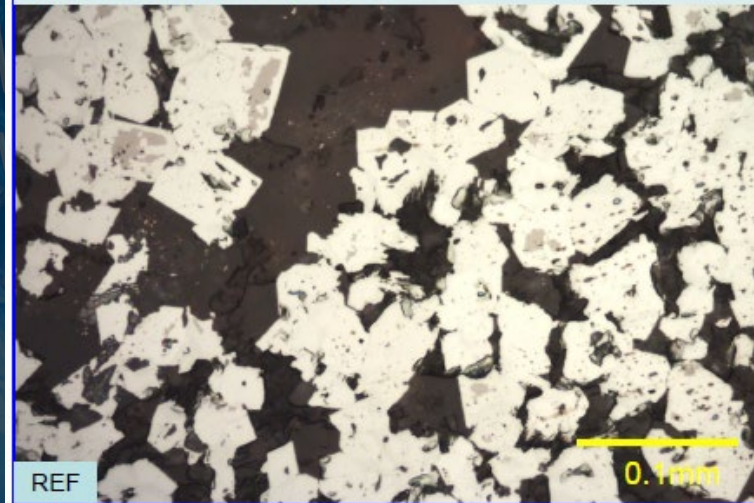


635m – Strongly albite-sericite-chlorite-quartz-altered rhyolitic vitric crystal tuff

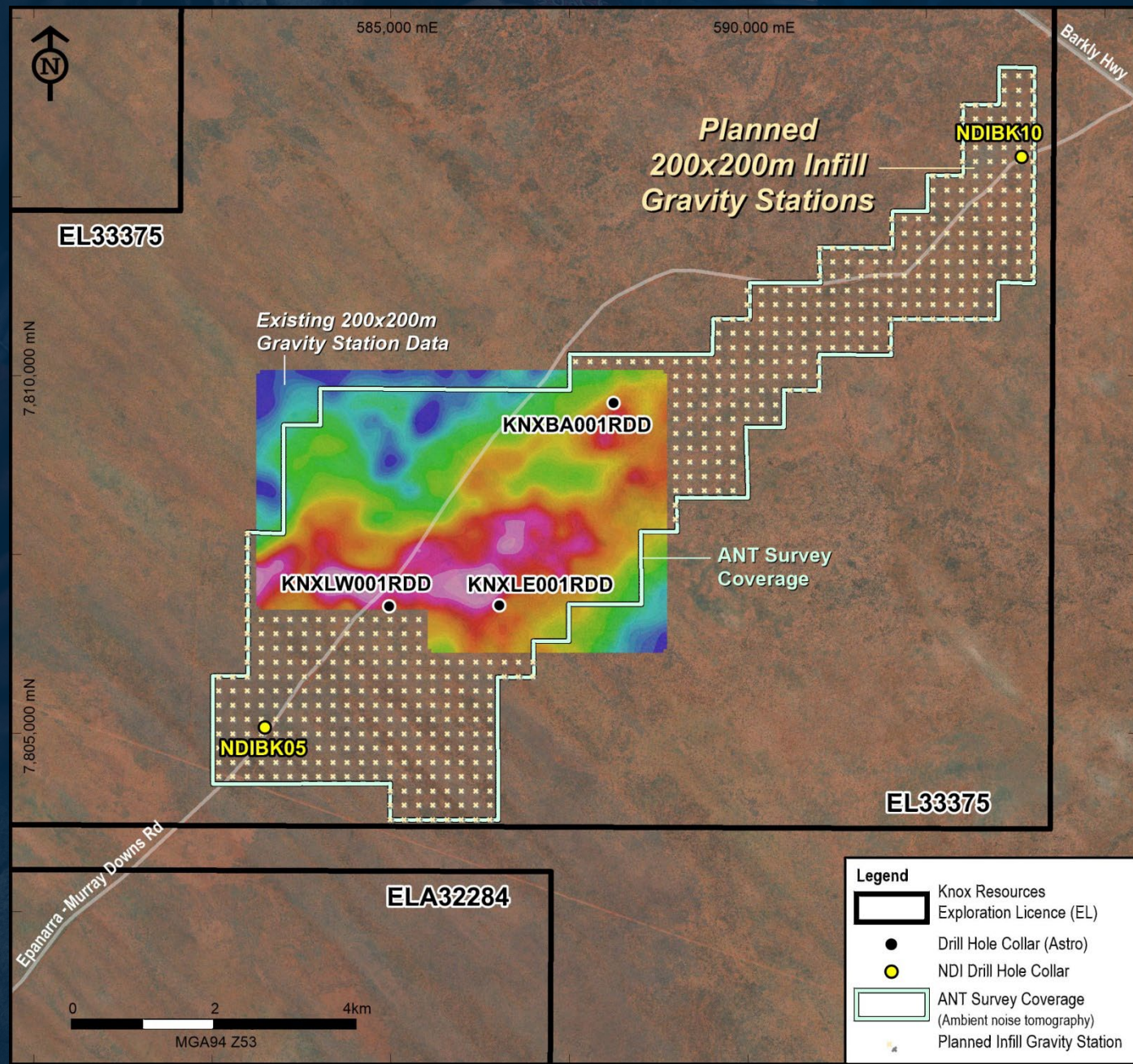


360m – Interbedded series of medium-grained, matrix supported and poorly-sorted greywacke and mudstone

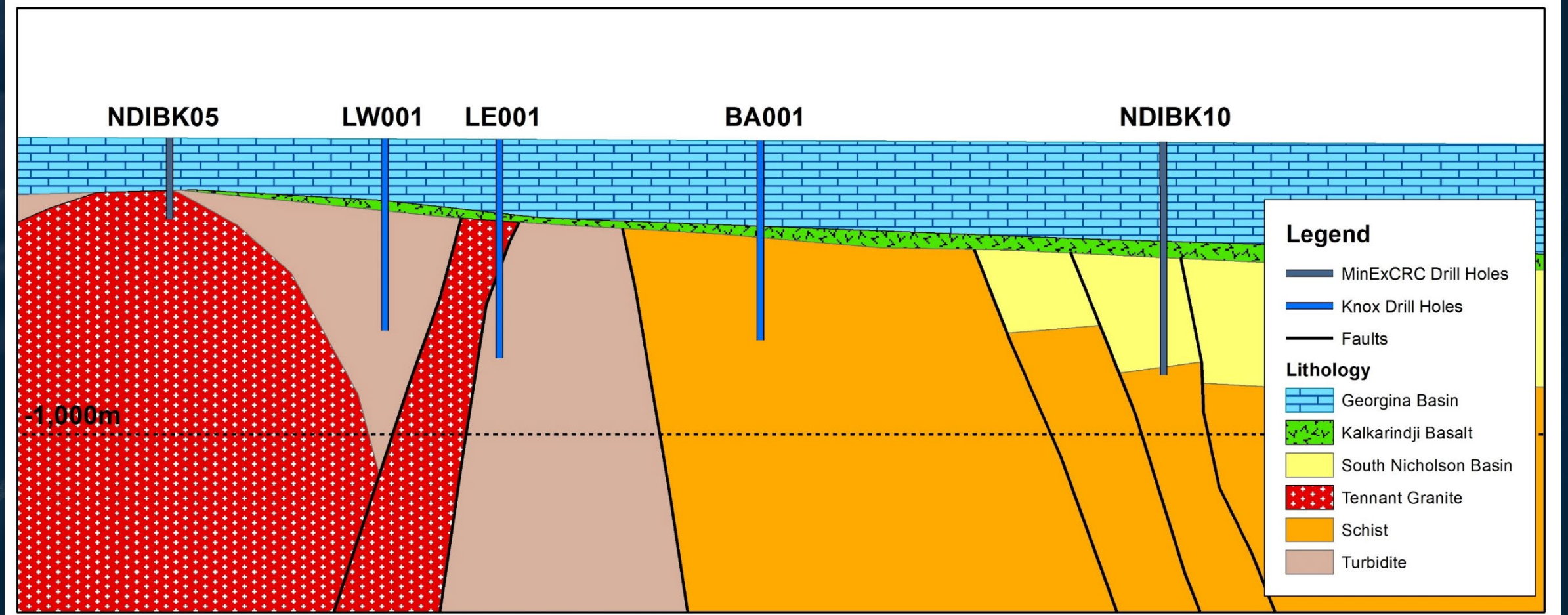
Preservation of fresh pinkish magnetite in cores of some martitized magnetite crystals, now composed largely of hematite



678.88m – Ironstone/strongly ferruginous meta-mudstone. Martite-dominant with 1-2% residual magnetite cores



LEICHHARDT EAST – SCHEMATIC SECTION



What can be done to account for the gravitational effect of cover?

Ambient Noise Tomography constrained gravity inversion

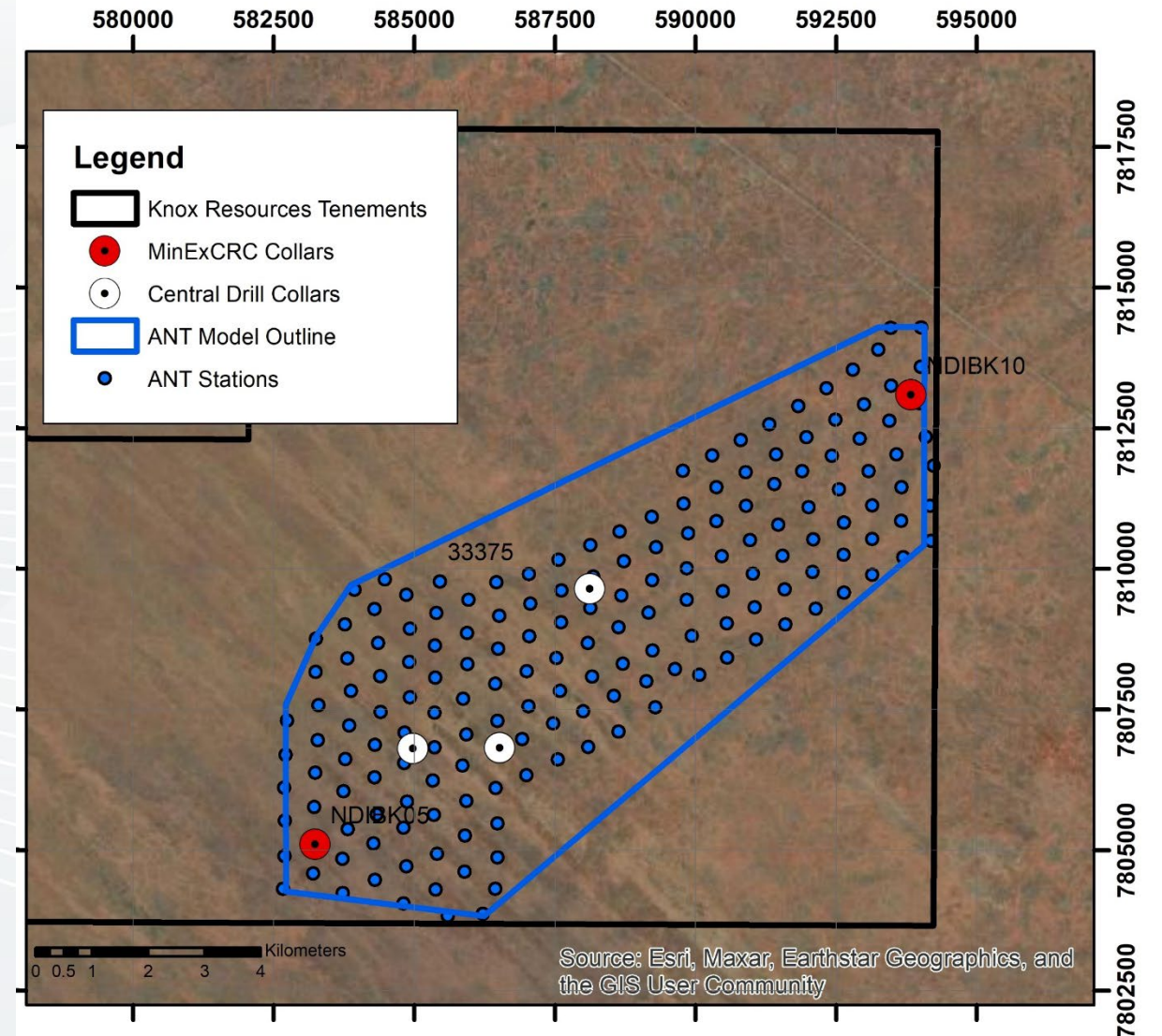
AMBIENT NOISE TOMOGRAPHY

DATA ACQUISITION

Fleet Space Technologies (Fleet) Ambient Noise Tomography

- Passive Seismic Method
- Direct-to-satellite technology allows for review processing and analysis of data in close to real time
- 64 Geodes provided by Fleet, 600x600m spacing
- Geodes deployed by Astute staff and contract field technicians
- Survey conducted in three parts, with Geodes initially deployed in west of survey area and moved progressively east
- Actual survey time 19 days, with additional days before and after for receipt and dispatch of geodes and other logistics

Survey co-funded under NT GDC Grants program



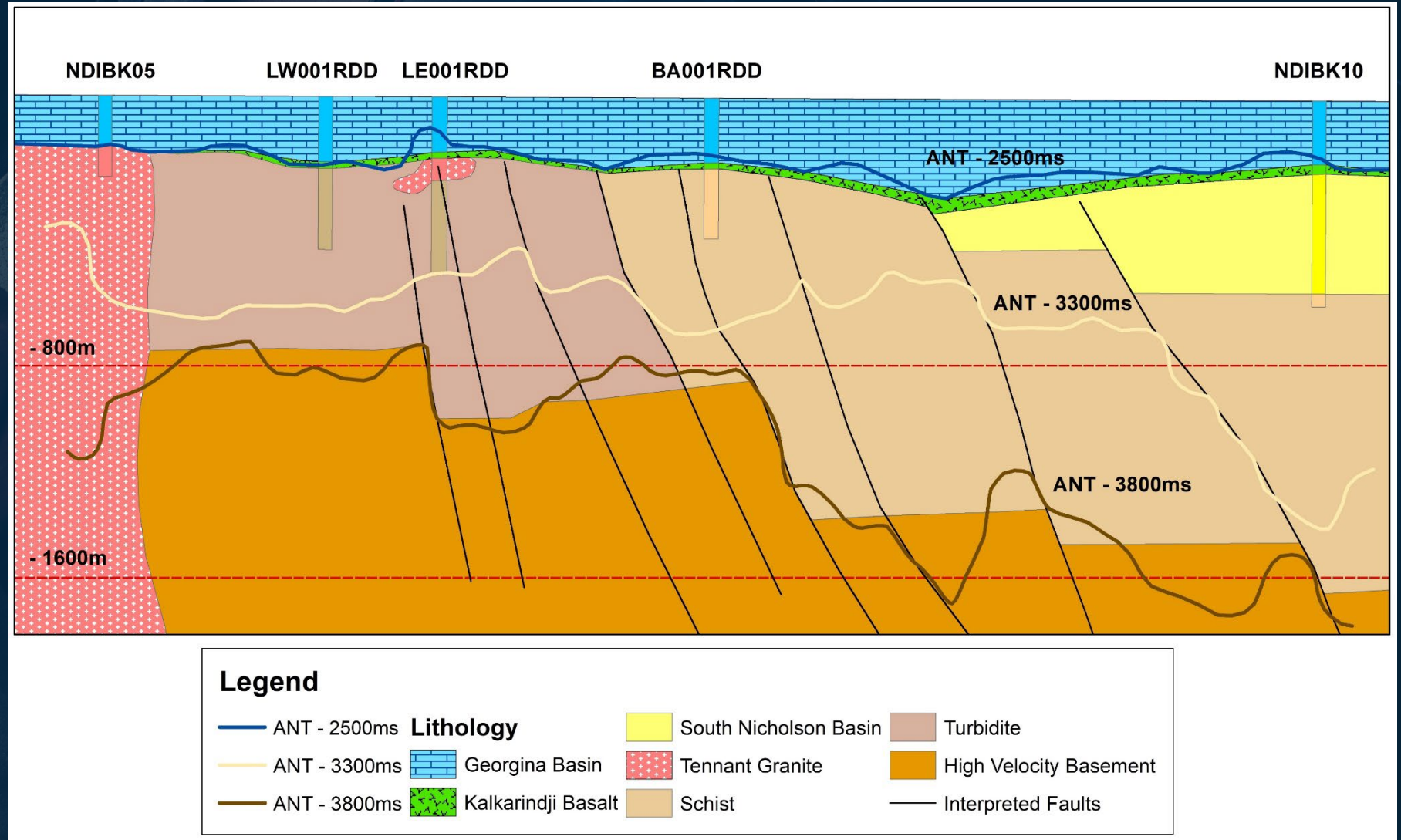
AMBIENT NOISE TOMOGRAPHY - RESULTS

Three zones of spatially coherent velocity identified

- Low-velocity (2300-2500m.s⁻¹)
- Mid-velocity (2500-3300m.s⁻¹)
- High-velocity (3500-3800m.s⁻¹)
- Fourth zone of (2700-3200m.s⁻¹) internal to mid-velocity zone

Low-velocity zone situated immediately below surface – interpreted to be a proxy for the Georgina Basin/Thorntonia Limestone

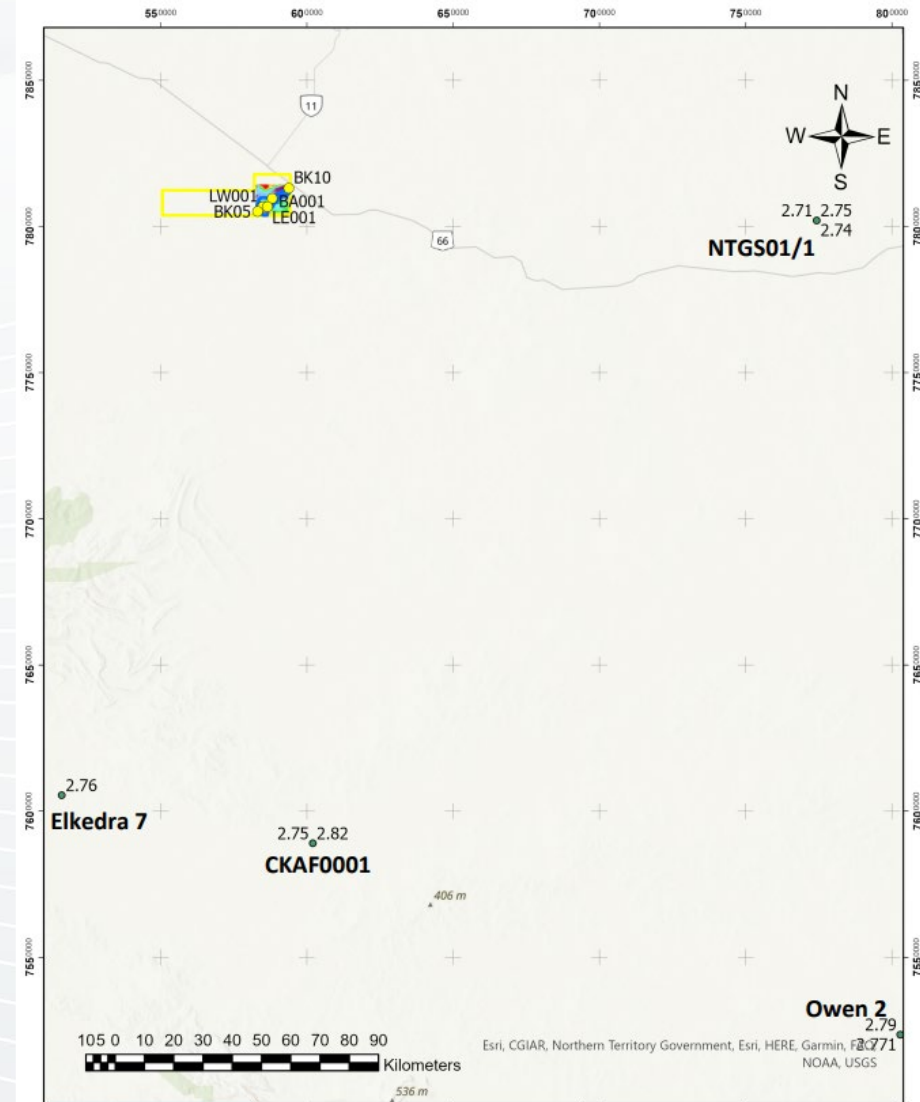
ANT results considered fit for purpose to constrain gravity survey data at Leichhardt East, and other prospects



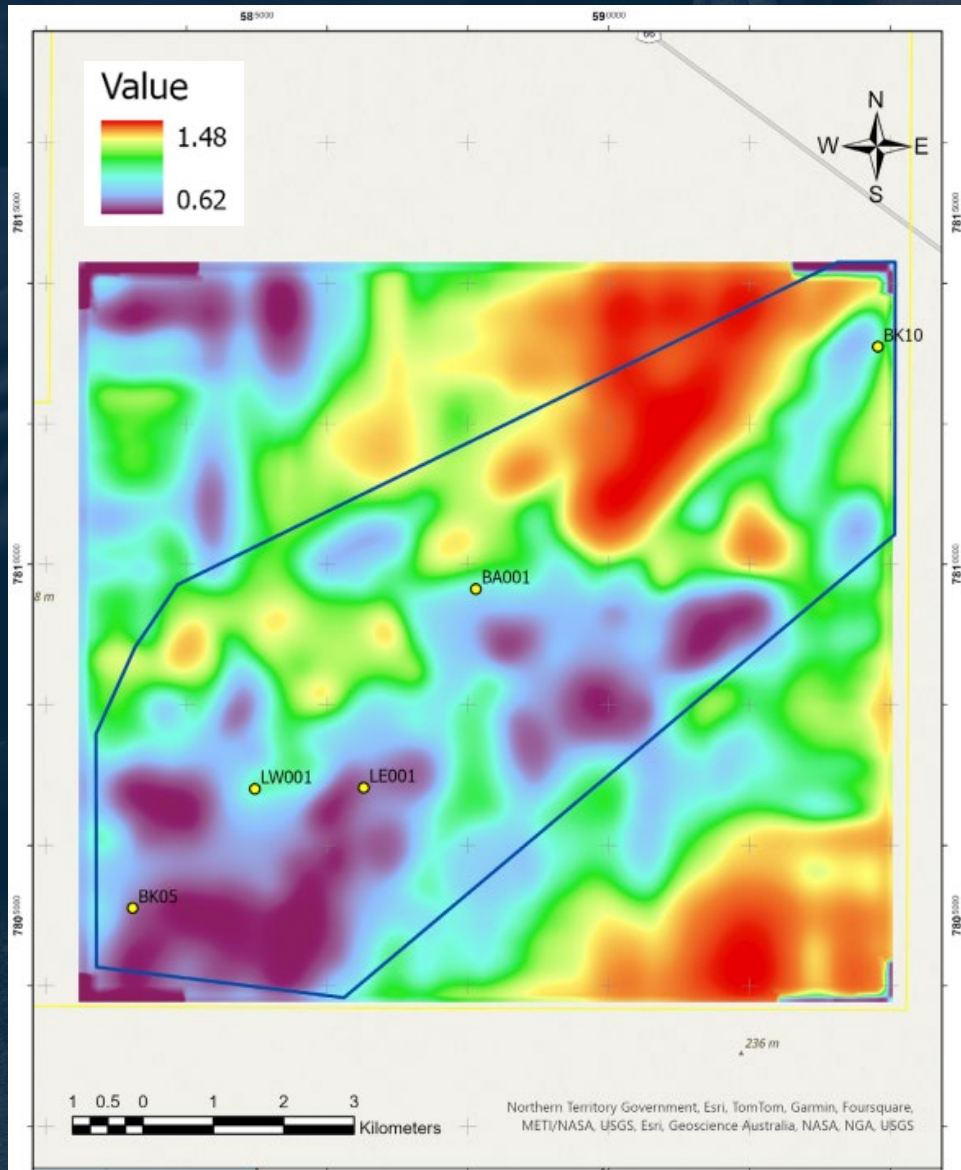
GEOFYSICAL MODELLING

STRIPPING BACK THE COVER

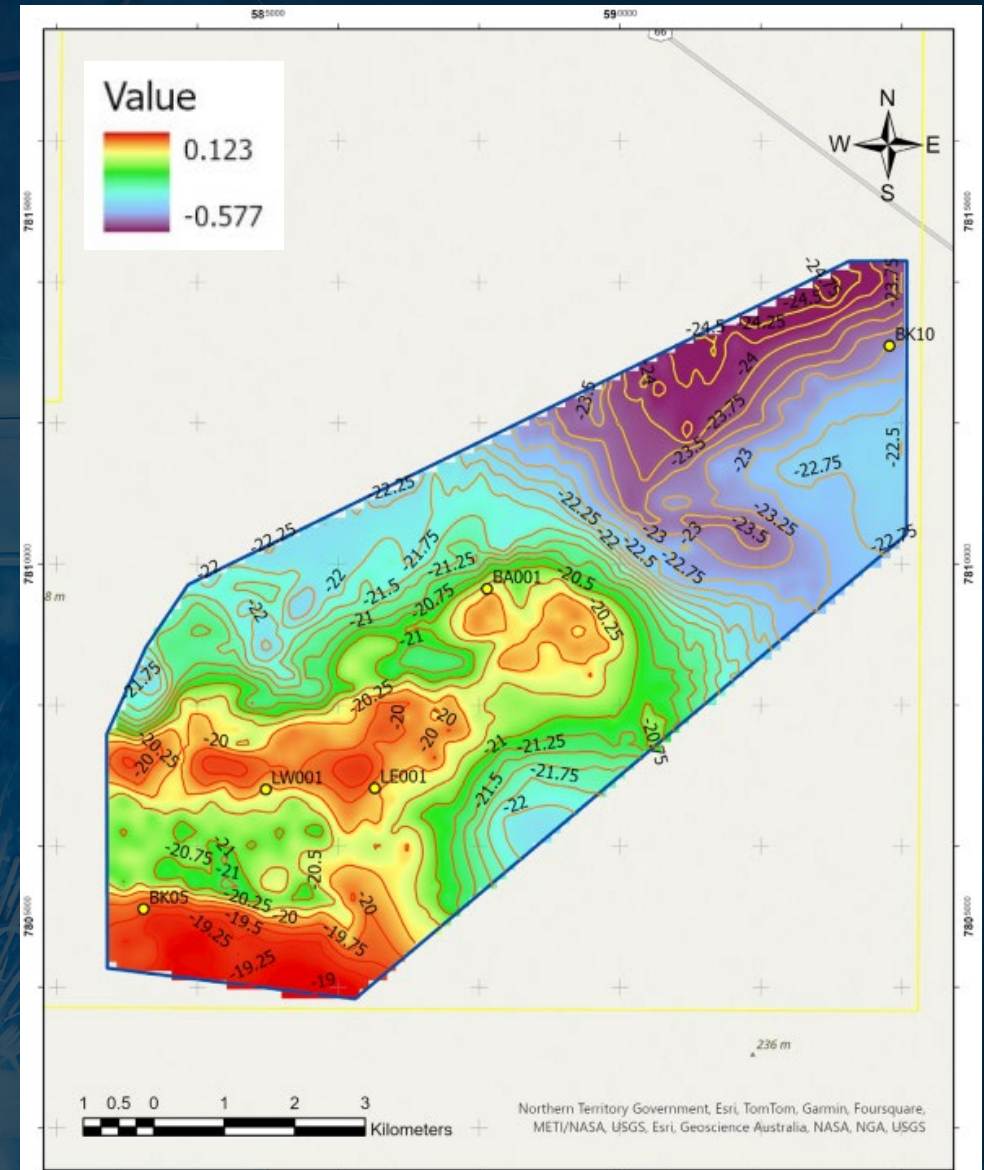
1. Merge 2021 and 2023 gravity datasets
2. Merged geoidal Bouguer gravity anomaly (GBGA) calculated at 2.67g/cm^3 and gridded at 65m
3. ANT 'base of Georgina Limestone' (BOGL) points (i.e. $2300\text{-}2500\text{ms}^{-1}$ velocities) extracted from ANT point cloud deliverable and gridded to a 65m cell size
4. ANT Surface bulk-shifted downward to best fit with observed base BOGL in five drillholes in survey area
5. Topographical surface generated from gravity station data, gridded at 65m
6. 3d Geobody created between adjusted BOGL and Topo surface in ModelVision
7. Density of 2.78g/cm^3 assigned to Geobody based on bulk wet density data for the Thornton limestone of four drill holes in NTGS open file data
8. 3d Bouguer anomaly response of the Geobody calculated
9. 3d Bouguer anomaly response of the Geobody subtracted from the GBGA (see 2) resulting in a residual **basement** GBGA
10. Residual basement GBGA contoured to identify closed features
11. A NNE-trending 0.5mgal anomaly of $1600\text{x}900\text{m}$ dimensions was identified



GEORGINA GEOBODY RESPONSE & RESIDUAL BASEMENT

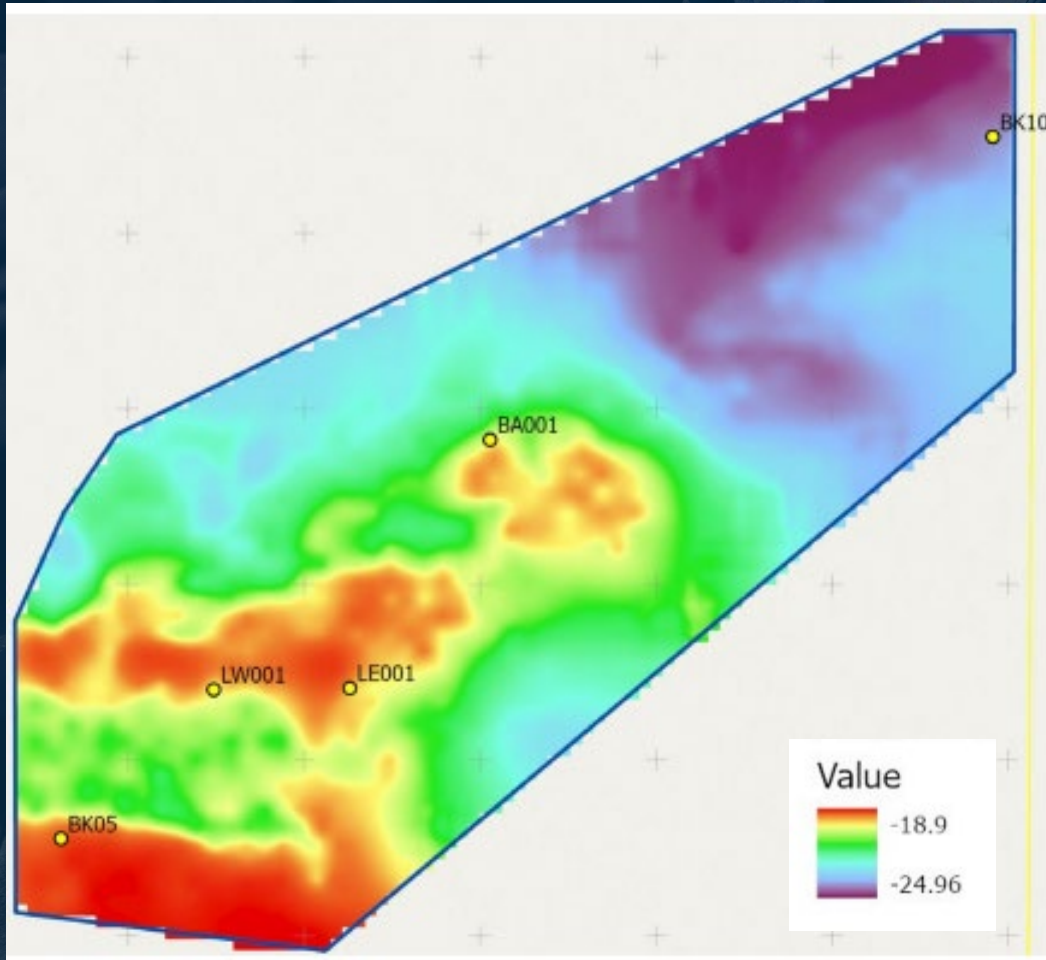


Bouguer Gravity Response of the Georgina Geobody

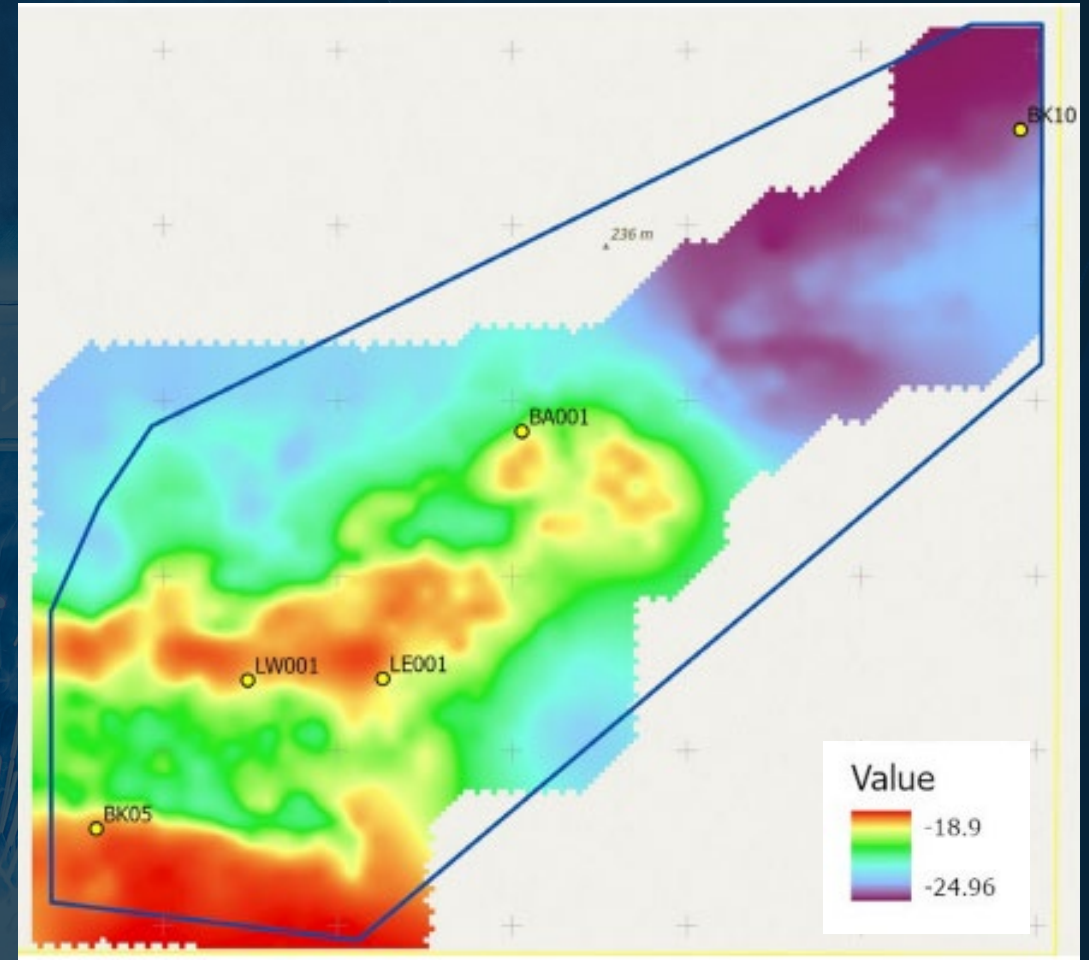


Residual basement geoidal Bouguer gravity anomaly

RESIDUAL BASEMENT vs TOTAL GBGA



Residual basement geoidal Bouguer gravity anomaly



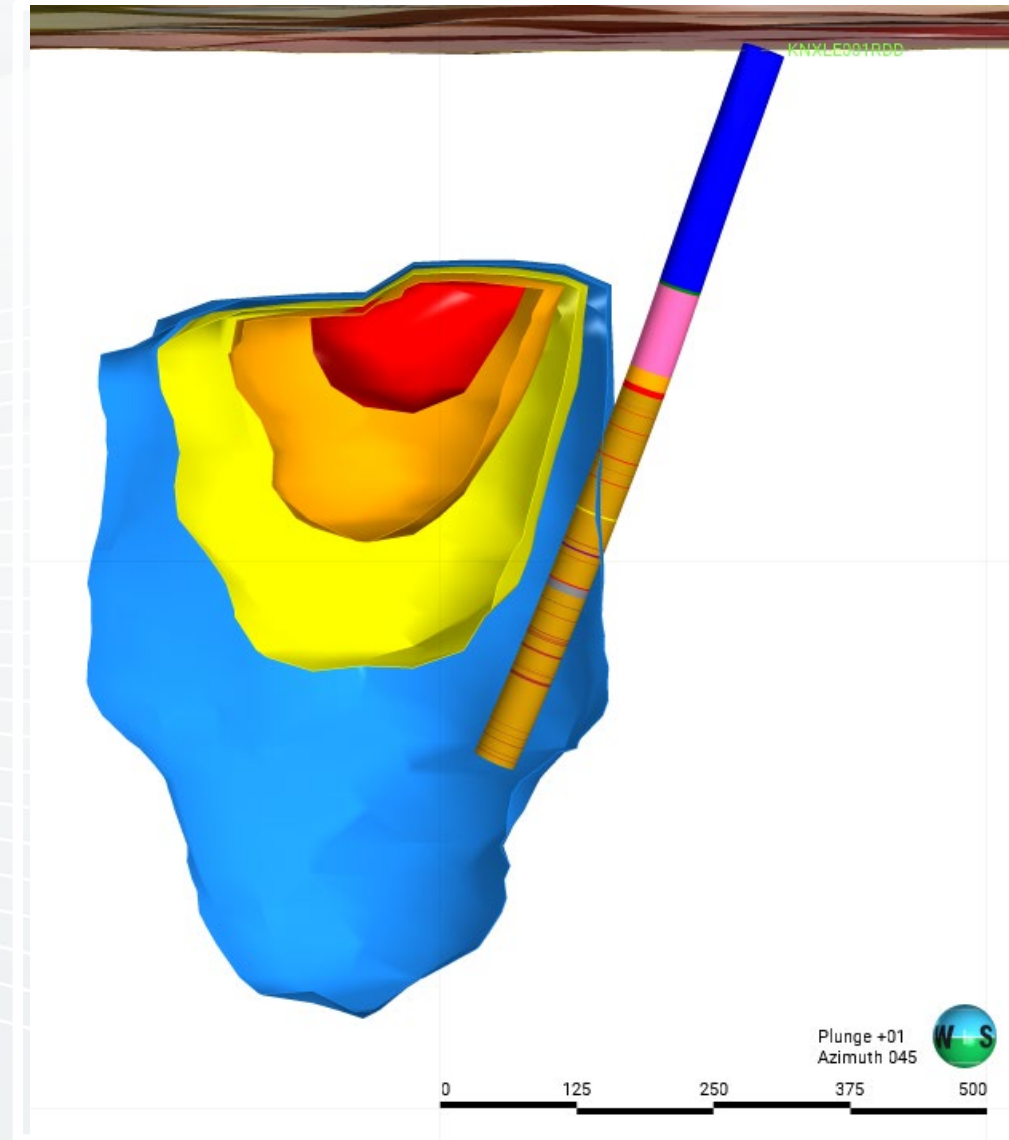
Geoidal Bouguer gravity anomaly

GEOFYSICAL MODELLING

CONSTRAINED INVERSIONS

Windisp Model

- Model solution forced beneath the adjusted base of Georgina Basin surface
- No further constraints in basement
- Density cannot be assigned due to regional background removal
- The average drillhole core density of 2.77g/cm^3
- However contains 17 intervals of $>3\text{g/cm}^3$ density possessing hematite jasper alteration and in some cases sulfide mineralisation
- The average density of these sections is 3.40g/cm^3

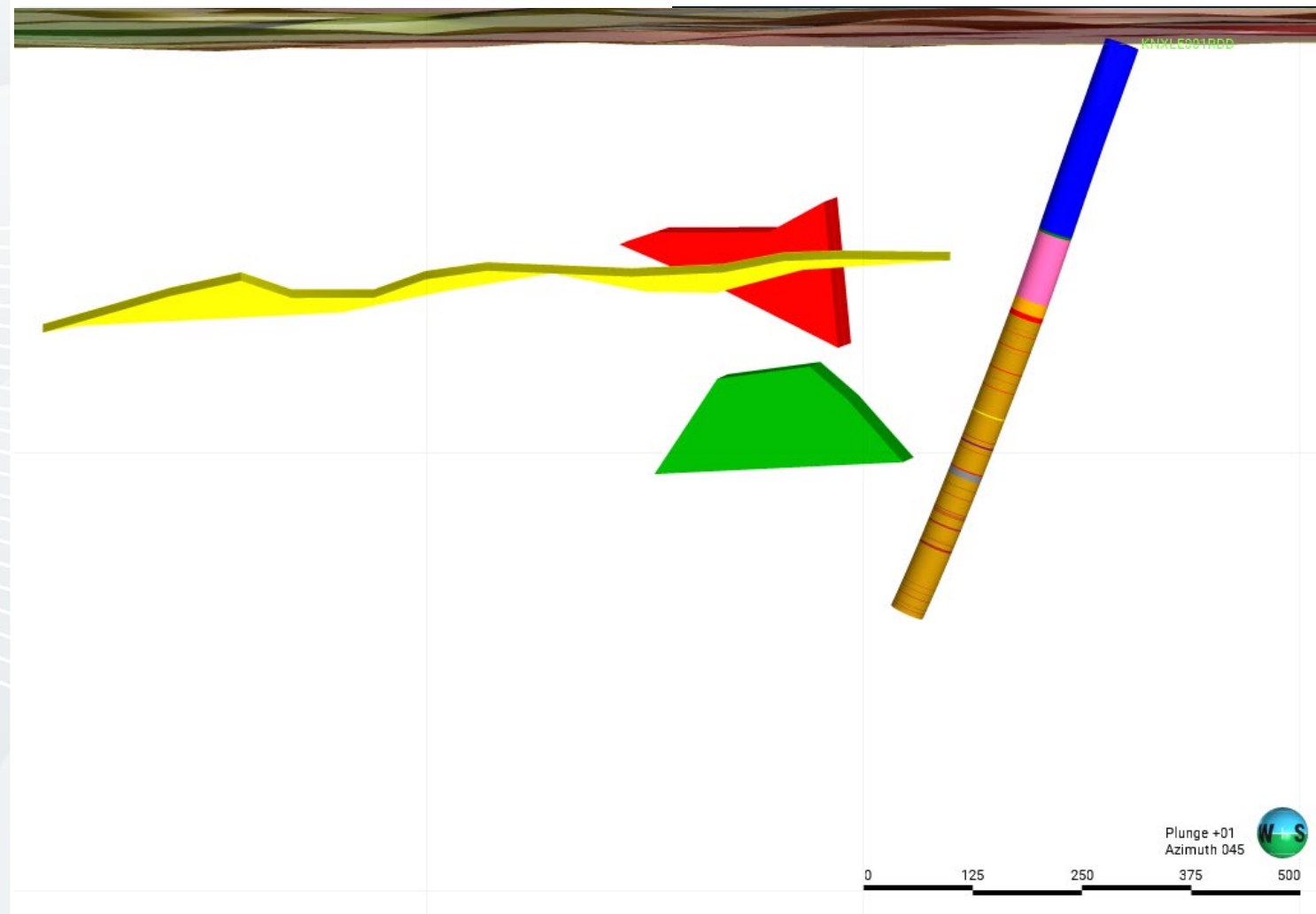


GEOFYSICAL MODELLING

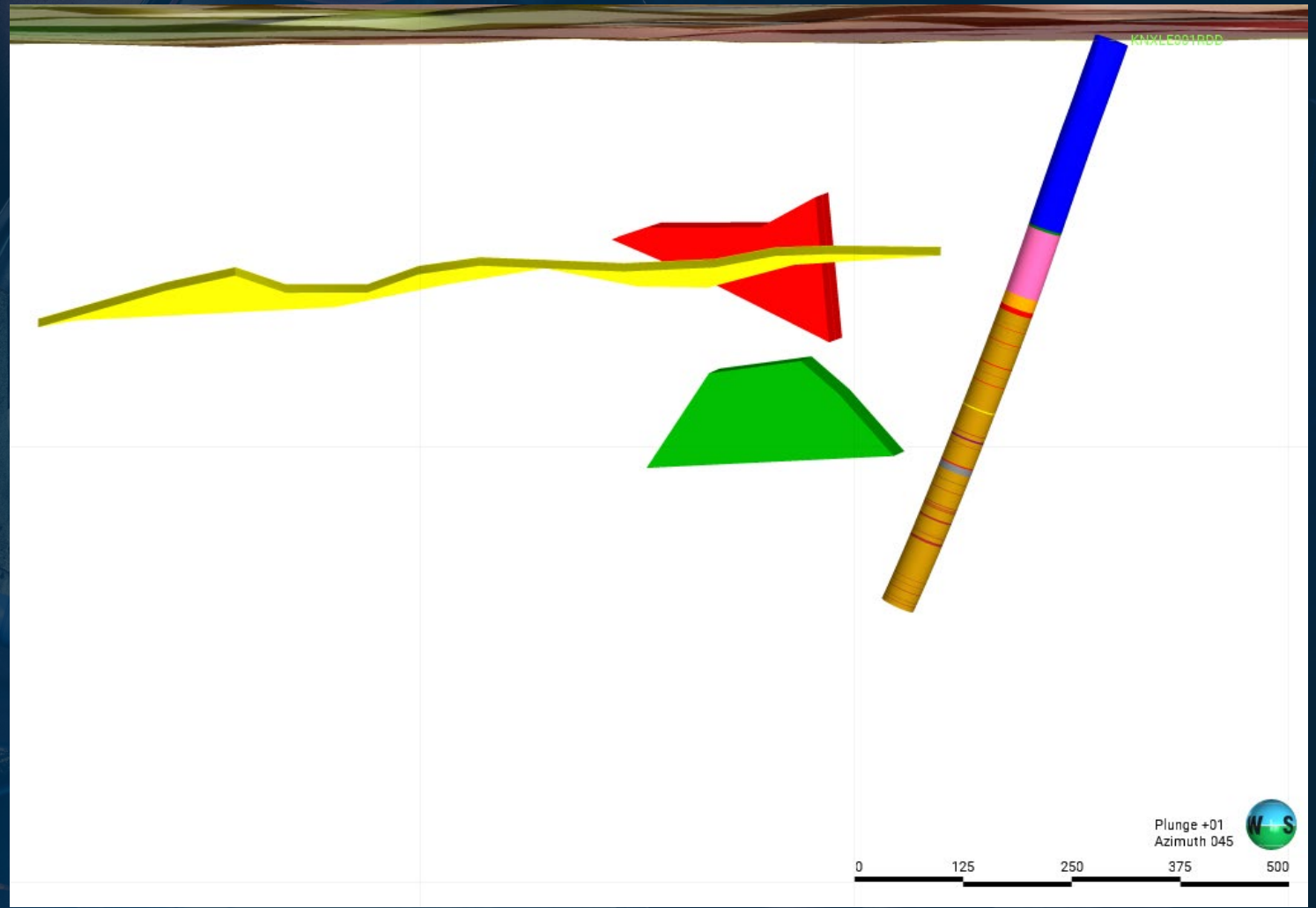
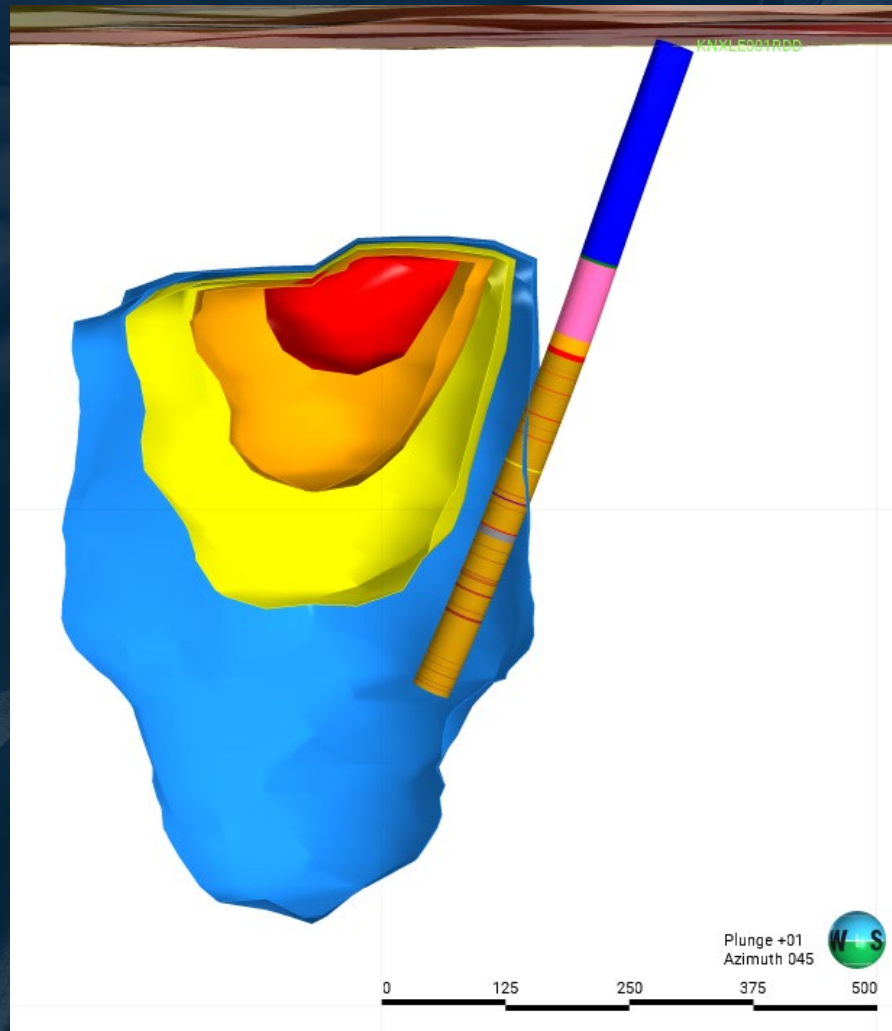
CONSTRAINED INVERSION

ModelVision Parametric Model

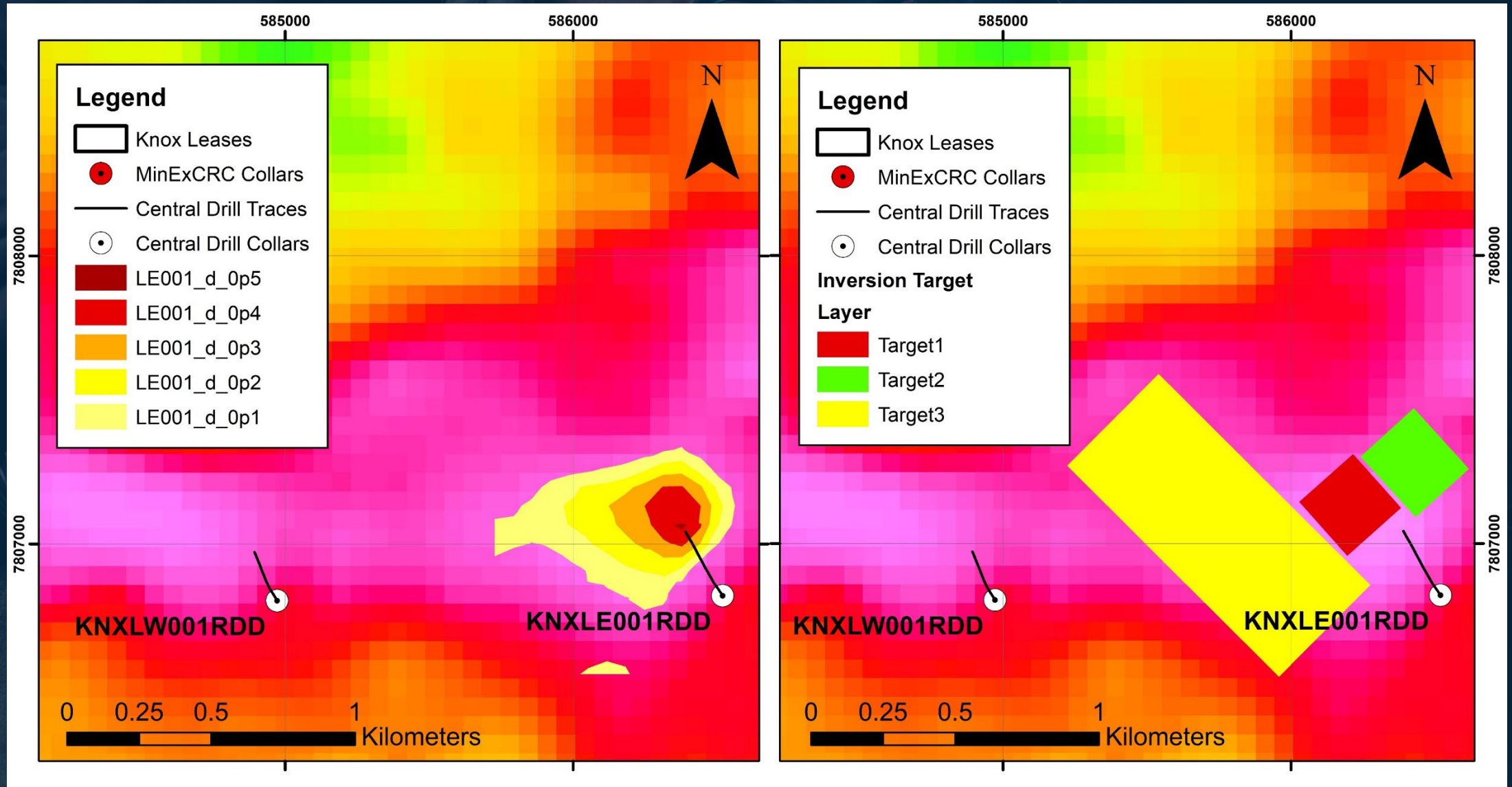
- Serial models comprising 2.5D polygonal prisms to fit gravity feature
- 3 prisms that fit the anomaly have densities of 3.5, 3.5 and 3.7g/cm³
- These densities exceed that of dense mafic rocks such as metagabbro/metaperidotite/pyroxenites (max 3.3g/cm³)
- However, these densities are in the range of hematite-chlorite altered rocks ± sulfide from IOCG deposits such as Carrapateena
- As such, the gravity models at Leichhardt East warrant further drill testing



MODELLING SOLUTIONS – WINDISP (RHS) & PARAMETRIC

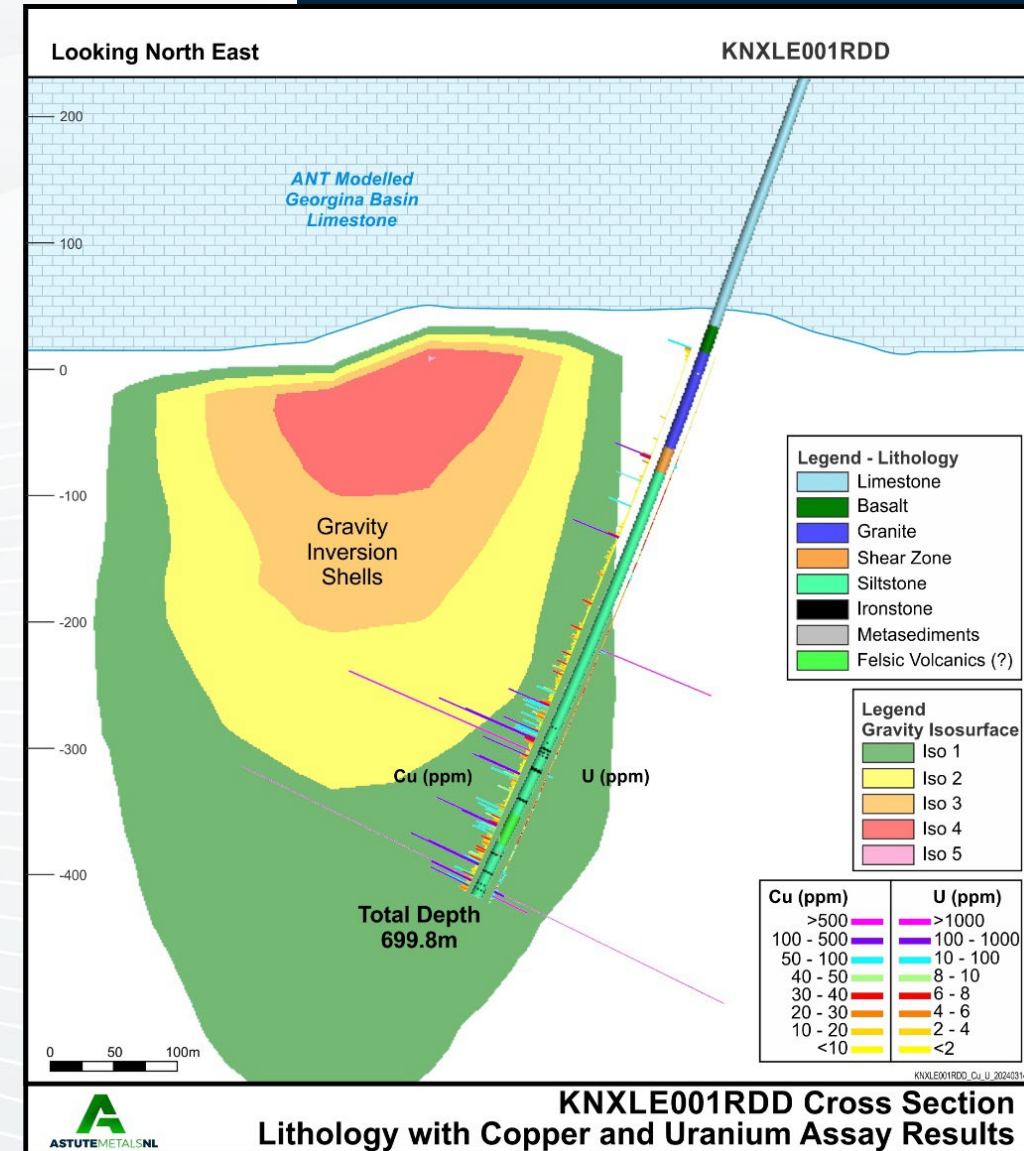


MODELLING SOLUTIONS – WINDISP (RHS) & PARAMETRIC



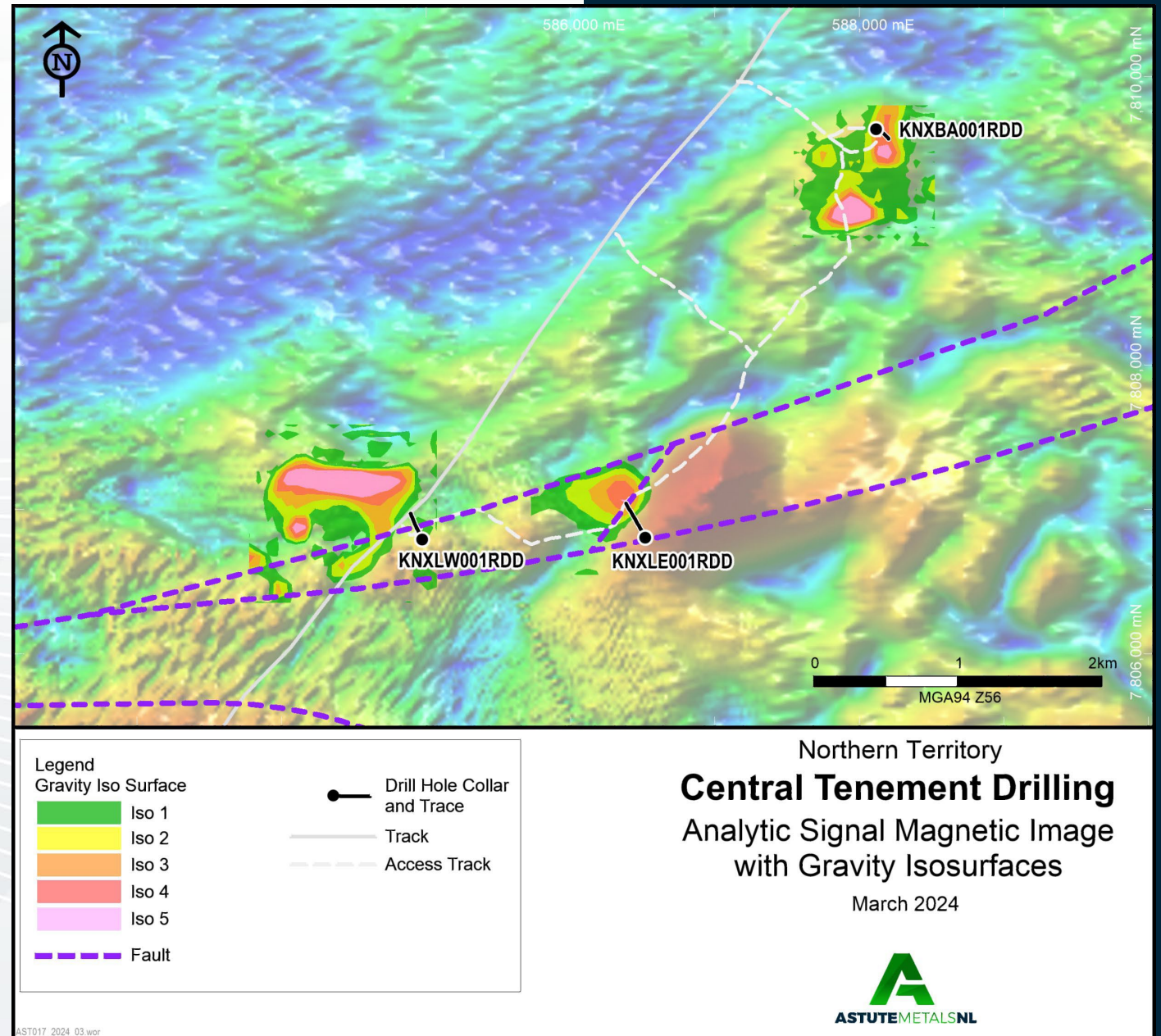
CONCLUSIONS

- Exploration under cover remains a technical challenge
- Being able to constrain the extents and characteristics of cover rocks enables the effects of them to be subtracted from gravity survey data
- The extent to which cover can obscure the gravitational signal from a dense body depends on thickness and density characteristics of the cover, and the size and density of the conceptual target
- Constraining a gravity inversion to beneath the lower extent of cover rocks has produced a more realistically located high-density drill target
- ANT-constrained gravity survey data at Leichhardt East has generated a compelling drill target proximal to altered rocks with elevated Cu, U, Bi, Ag
- NT GDC Grants have been critical to this body of work



NEXT STEPS

- Leichhardt East target to be drill tested in June-July 2024
- Success will provide proof of concept to test other targets (generated using the same workflow) at Leichhardt West and Banks



Footnotes and Previous Announcements

1. Wood Mackenzie Copper Research, 2022

The information contained within this presentation that relate to exploration results of Astro have been extracted from the following ASX announcements (ASX: ASE) and previously (ASX: ARO):

- Additional high-priority targets identified at Georgina Project: 19th March 2024
- Astute to acquire 100% ownership of Georgina Basin Project: 29th January 2024
- December 2023 Quarterly Activities and Cashflow Report: 25th January 2024.
- Strong IOCG Target Identified – Georgina Project: 11th January 2024.
- September 2023 Quarterly Activities and Cashflow Report: 27th October 2023.
- Significant Polymetallic Mineralisation Intersected at Georgina: 6th April 2023.
- Assay Results Strengthen IOCG Credentials: 10th February 2023.
- IOCG-style mineralisation intersected at Georgina Project: 12th December 2022.
- Market Update and Exploration Strategy: 1st August 2022.

Competent Person Statement

The information in this presentation that relates to Exploration Results associated with the Georgina project, and the information related in this report that relates to Nevada Lithium Exploration is in-part based on information compiled by Mr Matthew Healy, a Competent Person who is a Member of The Australasian Institute of Mining and Metallurgy (AusIMM Member number 303597). Mr Healy is a full-time employee of Astute Metals NL. Mr Healy has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Healy consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.



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