



**MARMOTA**



**Aurora Tank**

*Gawler Craton*

# **MARMOTA'S GOLD FOCUS –**

## Implementing a New **GAWLER CRATON** Exploration Strategy

***SAREIC CONFERENCE***

*MAY 2017*

**KEVIN WILLS**, Chief Consulting Geologist

# OUTLINE

- Corporate snapshot
- Gold discovery in the NW Gawler Craton
- Marmota's gold exploration strategy
- Gold discovery at Aurora Tank
- Future milestones



# CORPORATE SNAPSHOT

# ASX: MEU

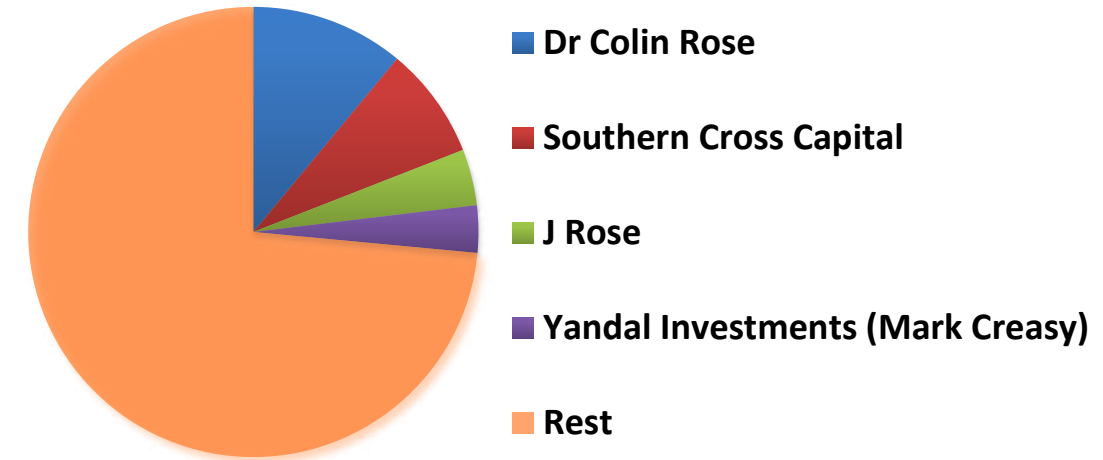
Capital Structure	
Shares on issue	517 m
Options	0
Unlisted options	7 m
<b>Market Cap</b> (at 1.4 cents per share)	~ \$7.2 m
<b>Cash</b> (as at 31 March 2017)	\$1,328,000
<b>Zero Debt</b>	

Board & Management	
<b>Chairman</b> (non-exec)	Dr Colin Rose
<b>Managing Director</b>	Ian Warland
<b>Technical Director</b> (non-exec)	Peter Thompson
<b>Chief Consulting Geologist</b>	Dr Kevin Wills

Marmota runs the entire non-exec Board for a cash cost of \$17,001 p.a.

\* As at 31 March 2017

## Largest Shareholders\*



Top Shareholders	
<b>Top 20</b>	~ 45%
<b>Top 50</b>	~ 62%
<b>Top 100</b>	~ 73%

Lower costs

Less dilution

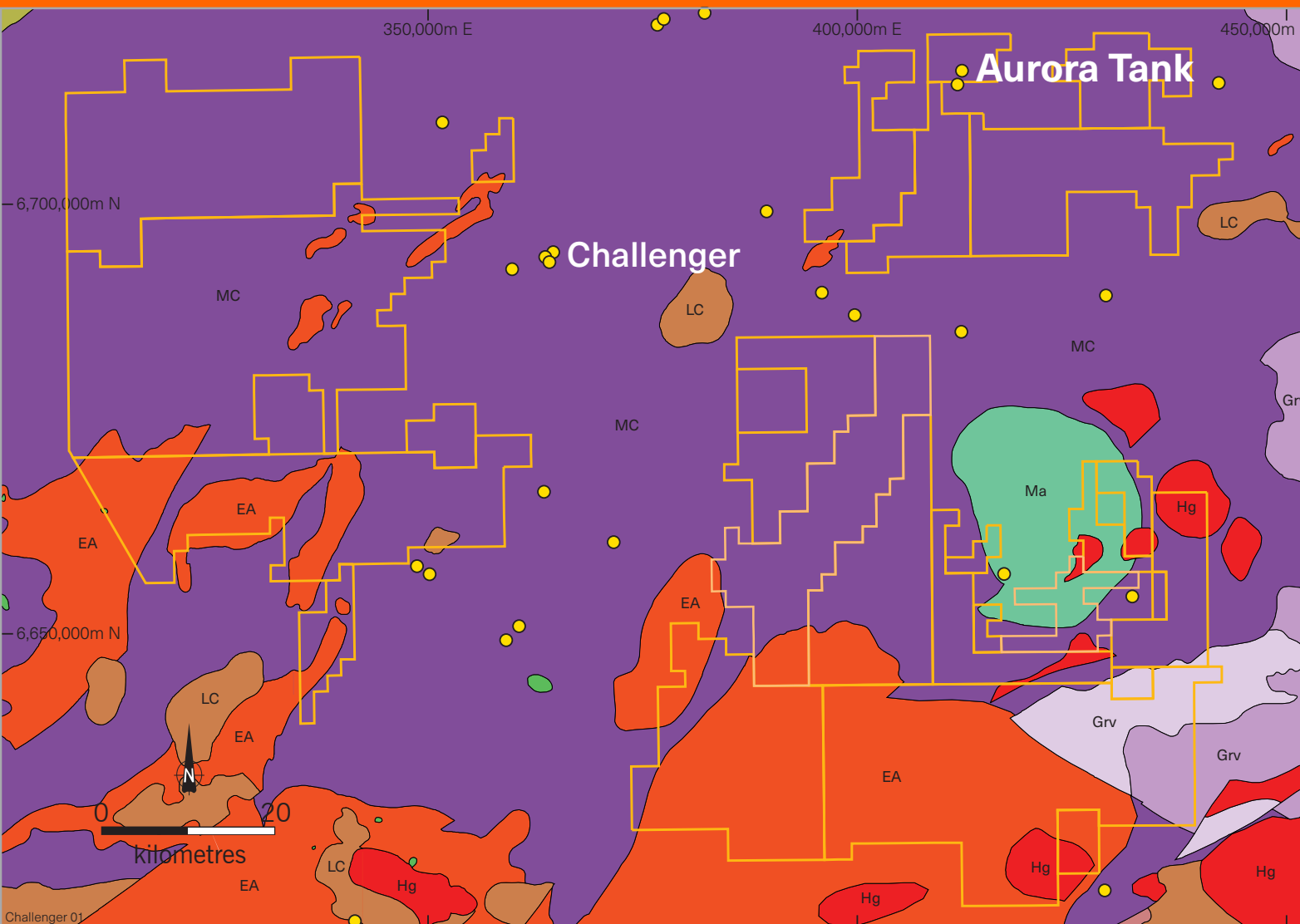
MORE exploration

# GOLD DISCOVERY IN THE NW GAWLER CRATON

- Archaean rocks of NW Gawler Craton highly prospective for gold
- ‘Old timers’ found a few deposits such as Earea Dam & Malbooma by prospecting
- No drainage or exposure over most of Craton so prospecting is generally ineffective
- Recognition in 1992 that calcrete enabled gold to be found under shallow cover
- This led to the Challenger discovery in 1995
- A period of intense calcrete sampling followed with many new gold systems discovered
- Generally agreed that area is underexplored
- Now in a second exploration phase following up second order anomalies
  - not for smaller orebodies – they could be bigger
  - just a different surface expression

# GOLD DISCOVERY IN THE NW GAWLER CRATON

## Marmota's Gawler Craton Gold Tenements



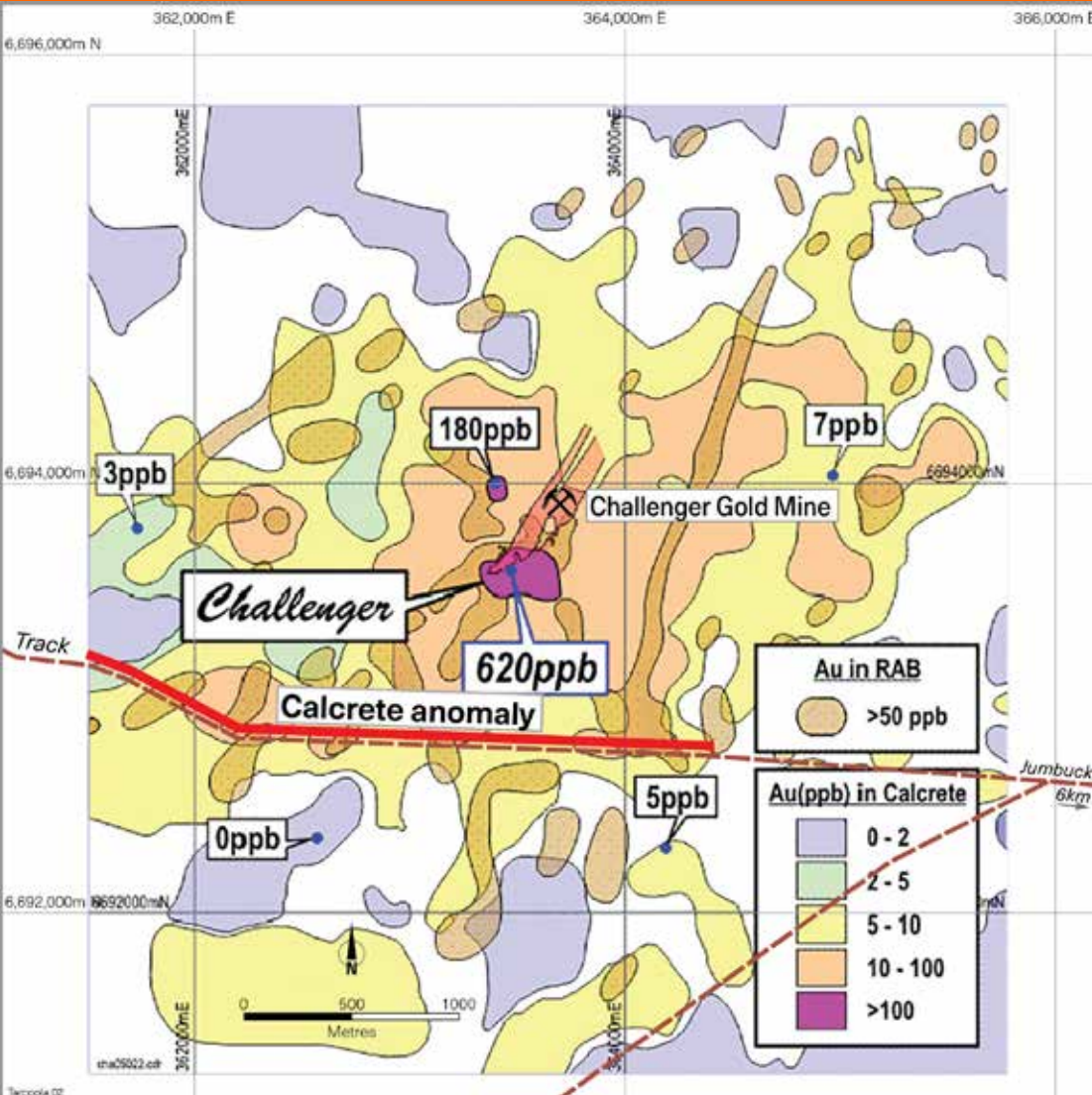
**Marmota's tenements in the Gawler Craton, South Australia around the Challenger Gold Mine**

- Total area 5,700km<sup>2</sup>
- Centred on the Challenger Gold Mine
- Large coverage of prospective Archaean Mulgathing Complex–Christie Gneiss
- Numerous gold prospects – gold province remains underexplored
- New gold deposit recently discovered at Aurora Tank

- Gold mineralisation
- Marmota licence
- MC Archaean Mulgathing Complex
- LC EA Paleoproterozoic Lincoln Complex/Engenia Adamelite
- Ma Mesoproterozoic Muckanippie Anorthosite
- Hg Mesoproterozoic Hiltaba Granites
- Grv Mesoproterozoic Gawler Range Volcanics

# GOLD DISCOVERY IN THE NW GAWLER CRATON

## Challenger Discovery Geochemistry



- October 1994 1.6km spaced sampling gave 180ppb gold anomaly with 3-7ppb halo
- Infill located a major anomaly peaking at 620ppb
- Drilling confirmed Challenger discovery in May 1995
- If original sample was 200m away it would have assayed less than 10ppb (fishing net analogy)
- Note 3km of anomalous bedrock about 8km west of Jumbuck Station
- Could have been found by PIRSA's TTBDP if Jumbuck 100,000 sheet covered  
*TTBDP = Tarcoola-Tallaringa Bedrock Drilling Program*

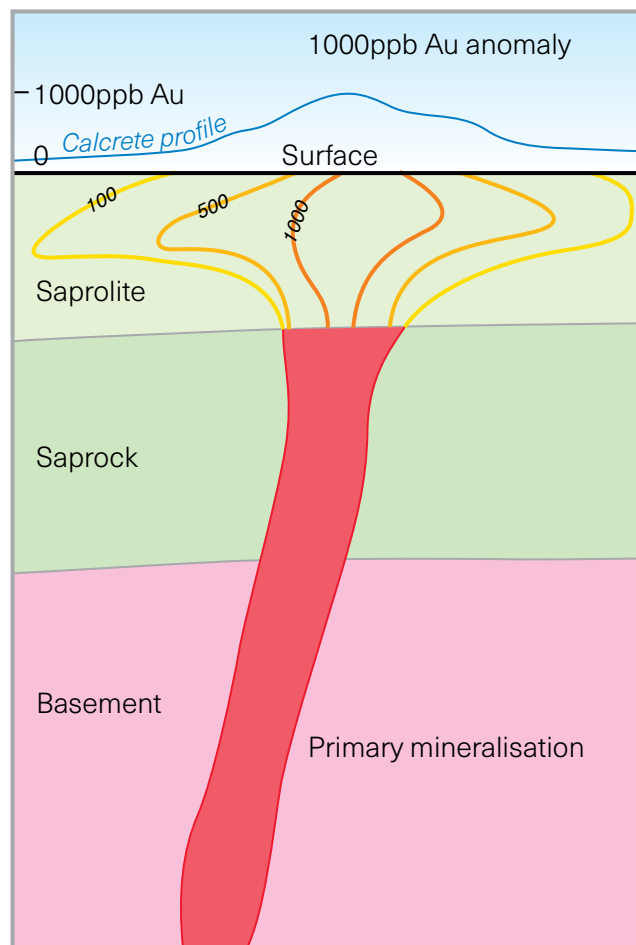
*Data from a talk by Tony Poustie to Adelaide AusIMM, September 2005*

# GOLD DISCOVERY IN THE NW GAWLER CRATON

## Gold-in-Calcrete Anomalies Depend on Thickness of Cover

### Gold-in-Calcrete:

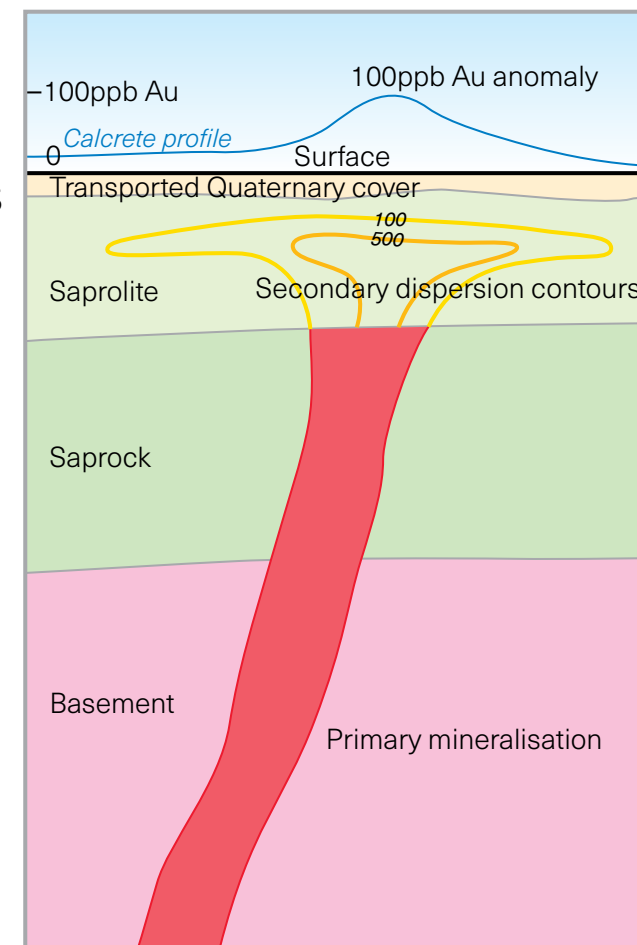
Where there is no sedimentary cover anomalies peak at 500–1000ppb gold



a. Weathered basement at/near surface  
Gold present near surface, e.g. Challenger

### Gold-in-Calcrete:

10-20m of sedimentary cover causes lower calcrete gold anomalies peaking at 100ppb gold



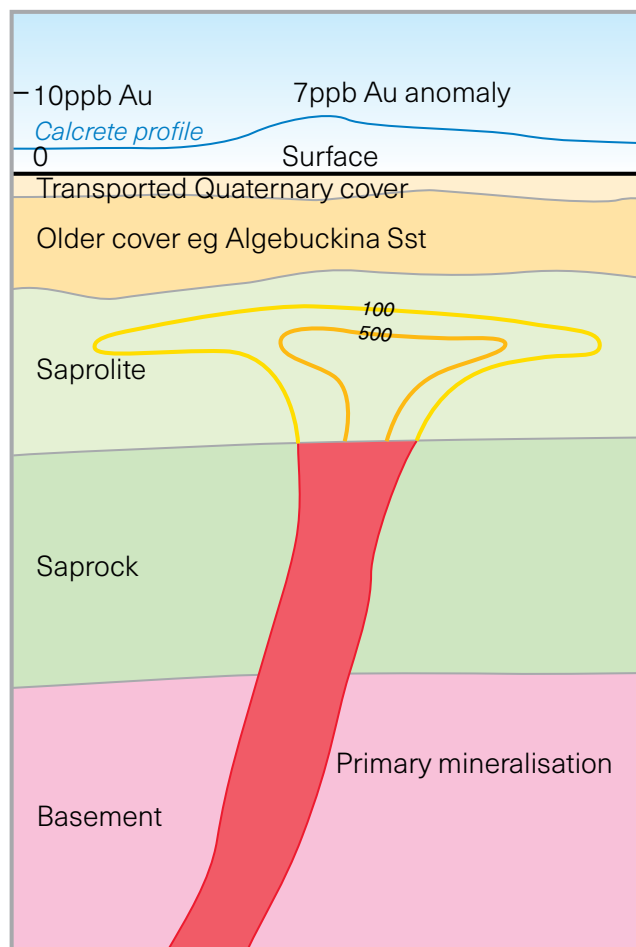
b. Mineralisation under thin transported Quaternary cover, e.g. Aurora Tank

# GOLD DISCOVERY IN THE NW GAWLER CRATON

## Gold-in-Calcrete Anomalies Depend on Thickness of Cover

### Gold-in-Calcrete:

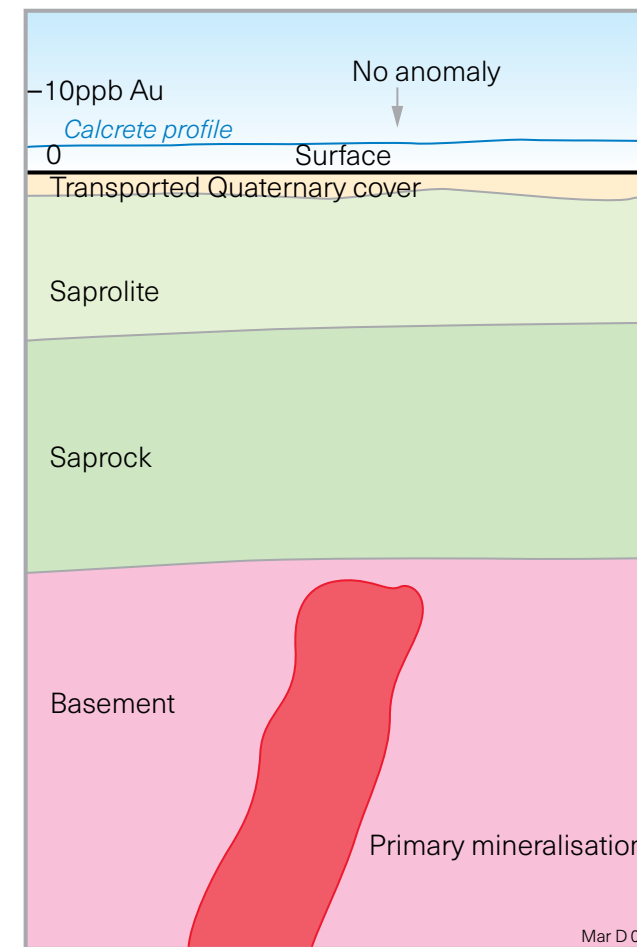
Where there is thicker sedimentary cover anomalies peak at only 5–10ppb gold



c. Mineralisation under Mesozoic cover

### Gold-in-Calcrete:

With blind mineralisation below weathered basement no anomaly may be present – even under thin transported cover



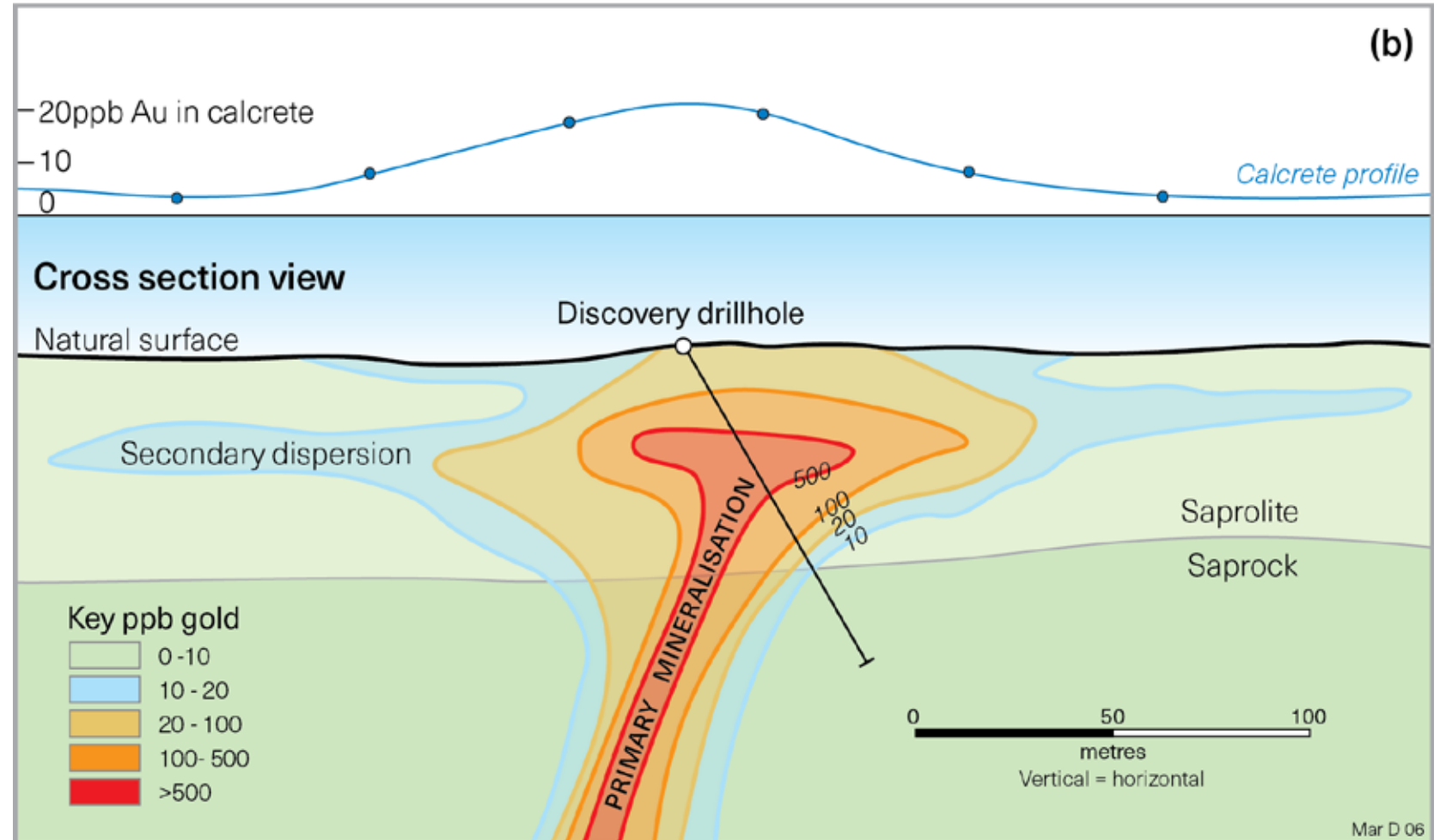
d. Blind mineralisation



# GOLD DISCOVERY IN THE NW GAWLER CRATON

## Law of Secondary Gold Dispersion

- Shallow drilling to 50 metres depth provides a 3D understanding of the geometry of gold dispersion
- The “Law of Secondary Dispersion” says: grades decrease as you move away from the primary mineralisation
- So, if you follow the grade increase, it will lead you to the orebody



Model of geochemical dispersion around Western Gawler Craton gold mineralisation.

# MARMOTA'S GOLD EXPLORATION STRATEGY

- Seeking the next Challenger – or something new – with higher ounces per vertical metre
- Challenger (right) has produced over 1 million ounces of high-grade profitable gold
- Marmota has a highly prospective tenement holding of 5700 sq km around Challenger
- Marmota's strategies have been refined and updated
- Calcrete sampling remains most cost effective method of locating anomalies & defining drill targets
  - Sample areas where anomalies can fit between existing sites (fishing net analogy)
  - Sample areas with suspect previous sampling e.g. dune covered areas
  - Follow up low order anomalies which can be over thicker cover



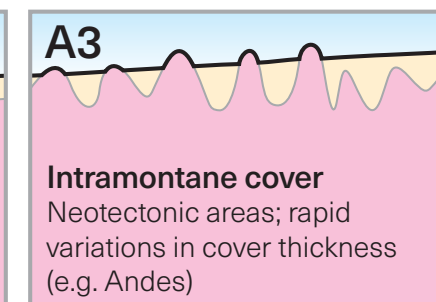
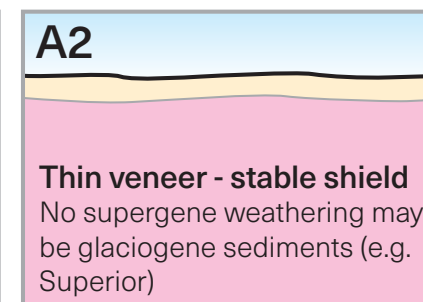
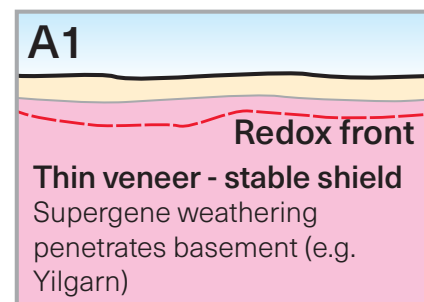
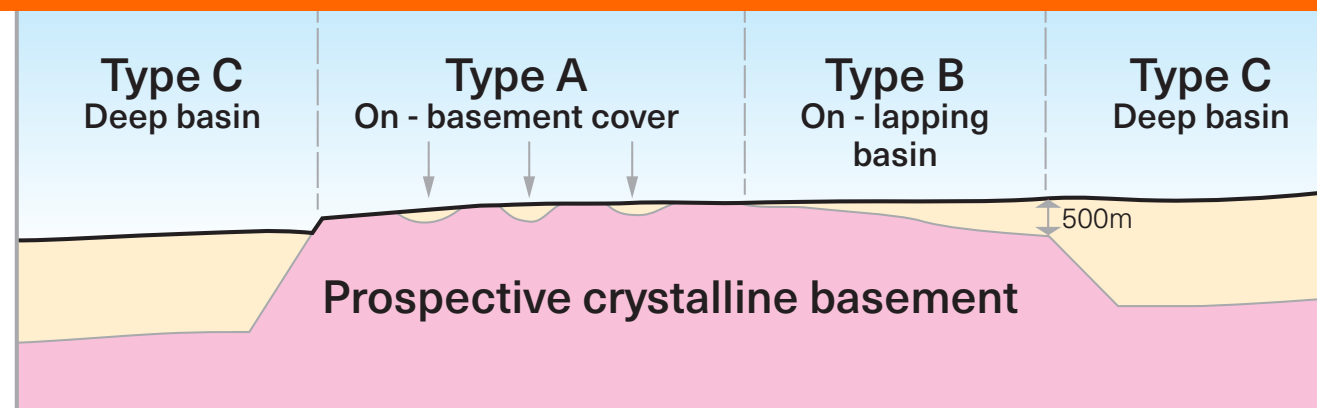
**Challenger Pit**

Source: Kingsgate Consolidated Limited

# MARMOTA'S GOLD EXPLORATION STRATEGY

## How Regolith Cover Affects Attractiveness for Exploration

- Marmota wants to find orebodies at shallow depth – to improve economics
- i.e. under shallow regolith cover that has been hiding gold from the 'old timers'
- Western Gawler Craton is well-known for having shallow regolith cover
- Hronsky at the AESC in 2016 in Adelaide subdivided different types of cover
- Type A1 with thin cover and deep basement weathering is the most attractive for exploration



Cover type
A1
A2
A3
B1
B2
C

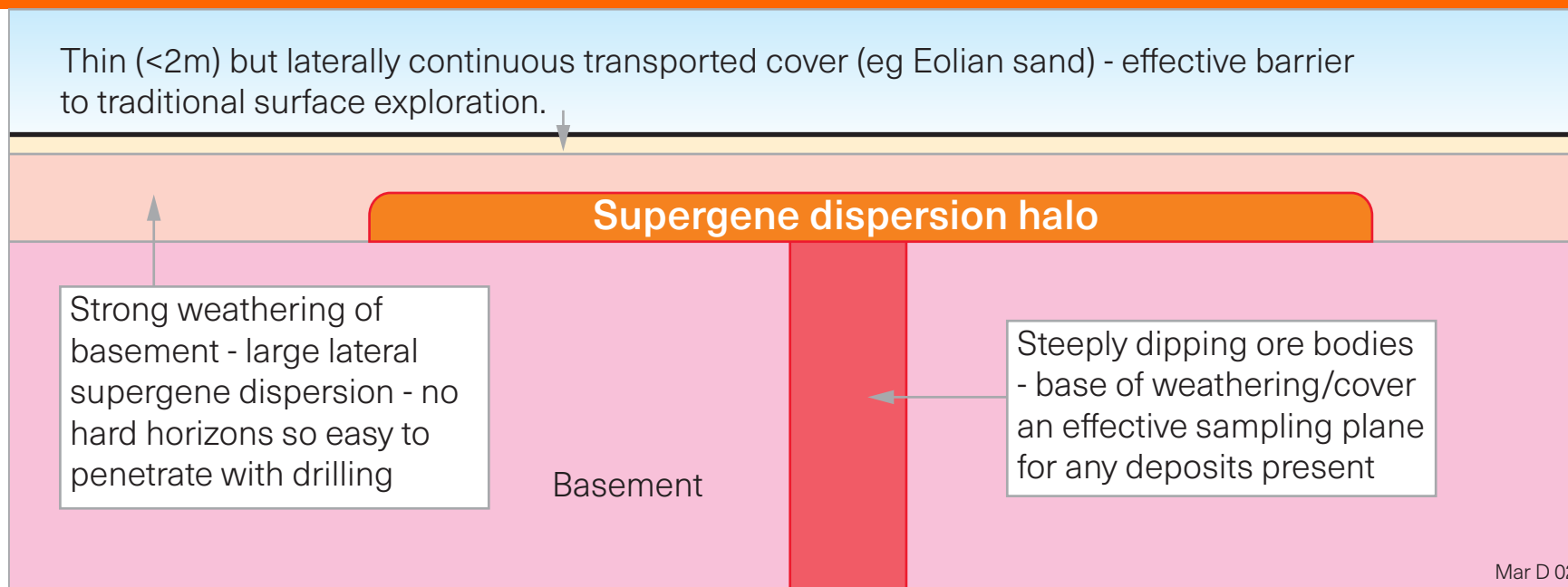
Attractiveness for exploration
High
Moderate
Low
High
Moderate
Zero

**Zones of Type A cover can be further subdivided**

Type B cover can also be divided on basis of presence (B1) and absence (B2) of supergene weathering

# MARMOTA'S GOLD EXPLORATION STRATEGY

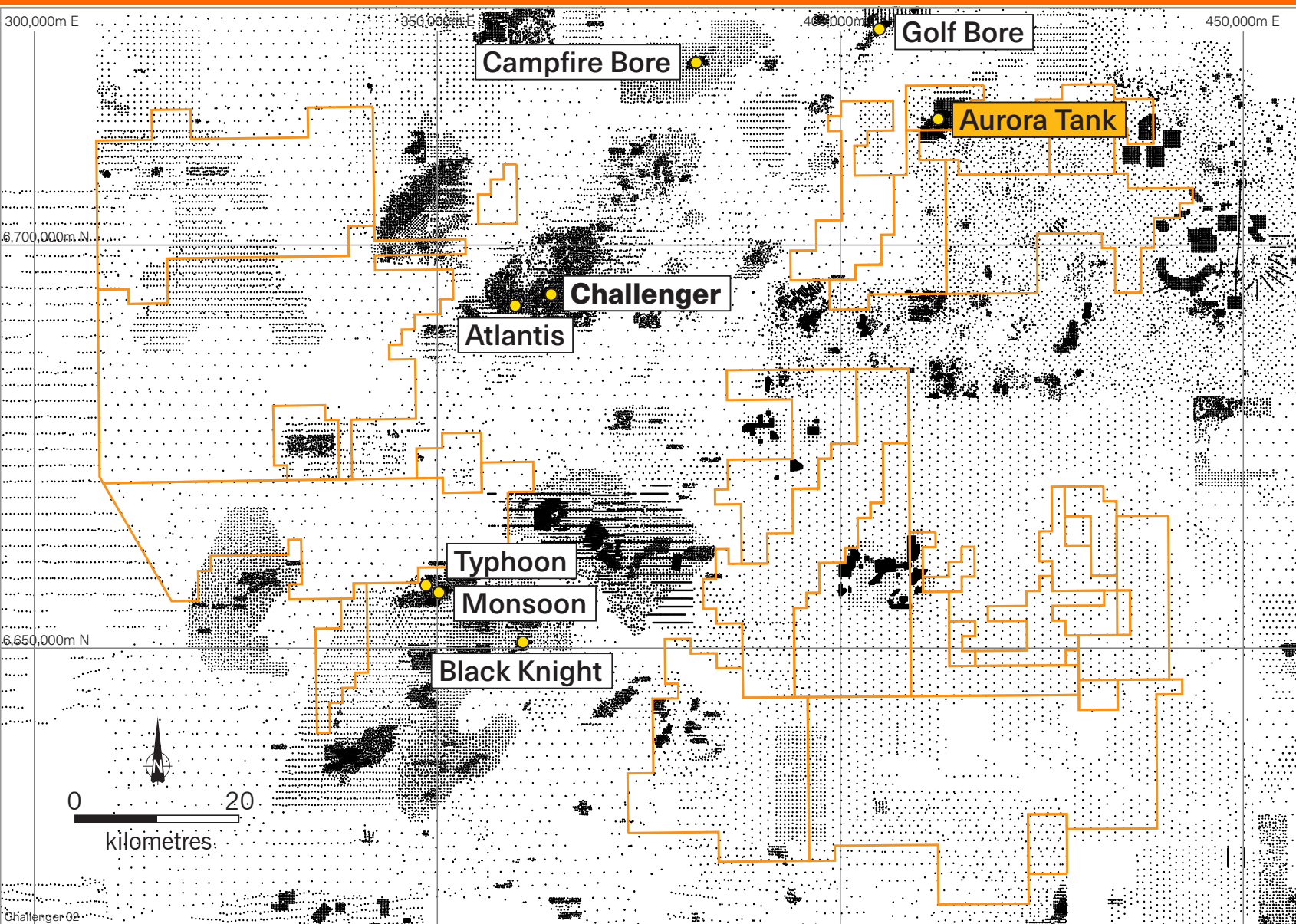
## The Perfect Under-Cover Exploration Scenario



- Hronsky's perfect under-cover scenario present in Western Gawler Craton
- Thin and continuous cover is an effective barrier to traditional exploration
- Supergene halos are developed in underlying zones of strongly weathered basement
- May host supergene orebodies
- Understanding the supergene dispersion halo leads to the primary mineralisation

# MARMOTA'S GOLD EXPLORATION STRATEGY

## Previous Regional Calcrete Sampling

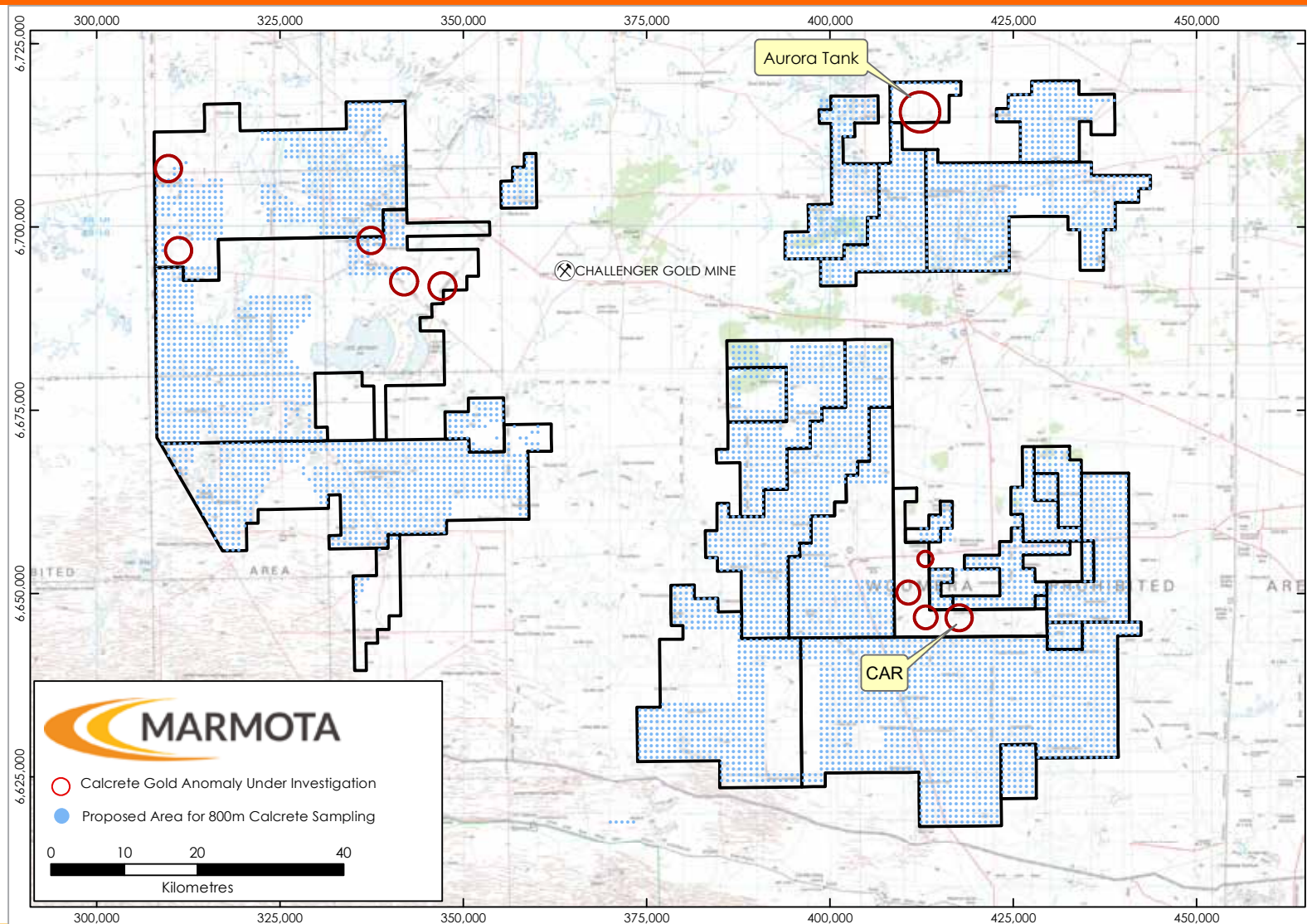


*Mines Department data showing calcrete sample locations in the Challenger area*

- Most of Marmota's tenements have only been sampled at 1.6 or 1.0km spacing
- This can miss significant anomalies
- Closer spaced sampling to at least 400m necessary to locate new mineralisation under shallow cover
- In areas of sedimentary cover lower-order anomalies need to be followed up

# MARMOTA'S GOLD EXPLORATION STRATEGY

## Proposed Calcrete Infill Sampling and Targets

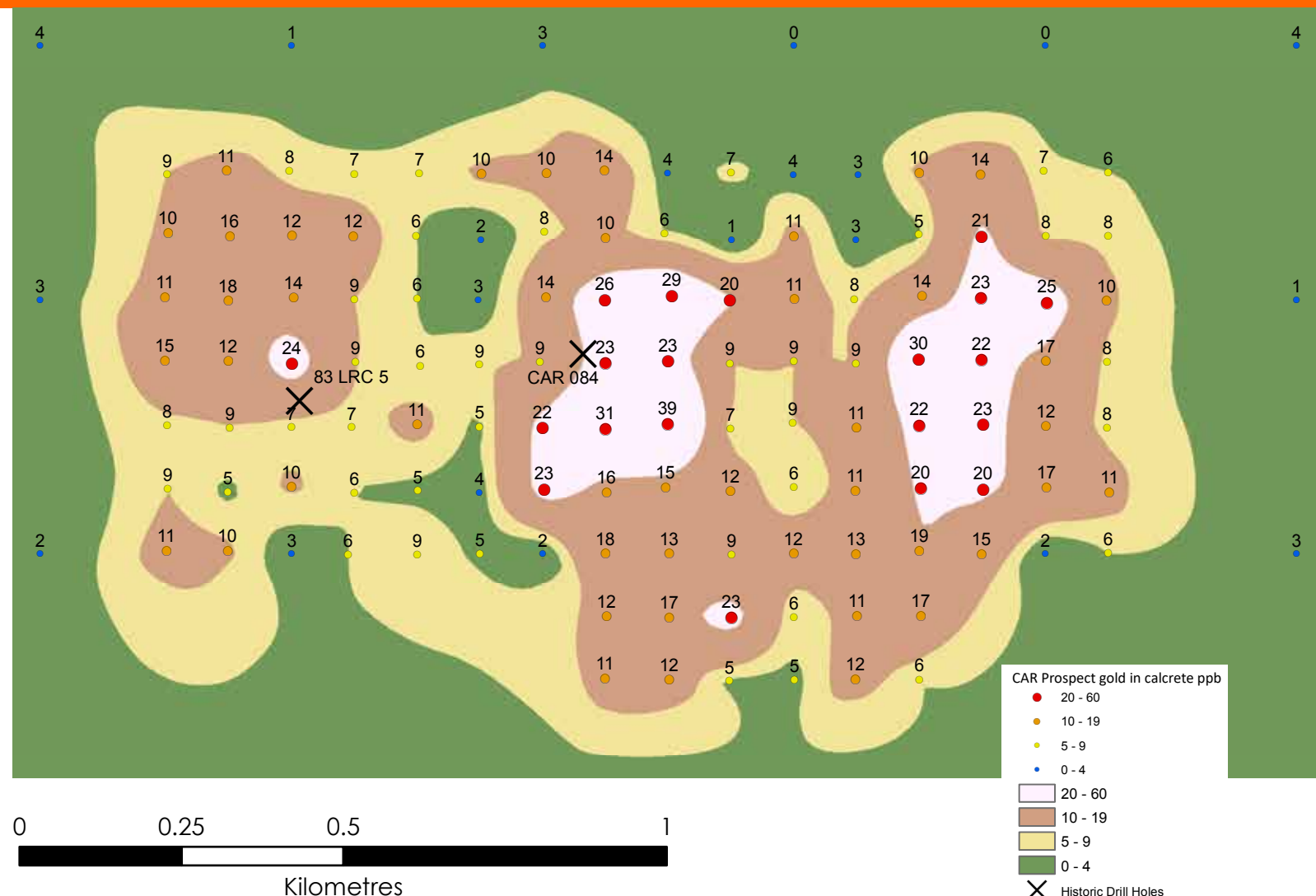


- Large area of 800m spaced infill sampling planned by auger sampling
- To be followed up by 400m and more detailed infill sampling to define drill targets
- Multiple targets are currently under investigation, e.g. CAR Prospect
- Shallow drilling of selected targets will look for shallow supergene orebodies and
- Define primary zone targets

# MARMOTA'S GOLD EXPLORATION STRATEGY

## CAR Prospect Gold-in-Calcrete Distribution

- One of Marmota's interesting targets is the CAR Prospect
- Located by infill calcrete sampling around a gold-anomalous hole drilled in October 1991 in the TTBDP
- This hole, CAR 84, drilled 22m of cover then went directly into gold-anomalous basement for 25m to the end of the hole at 47m.
- Gold assays peaked at 53 ppb from 22-24m
- The prospect is located near the contact of Gawler Range Volcanics, Hiltaba Granites and Archaean Gneiss with anomalous Cu, Pb and Zn in nearby holes
- The calcrete gold distribution is nicely coherent and has an interesting shape possibly representing a mineralised Hiltaba suite intrusive



# AURORA TANK PROSPECT

## Gold Discovery

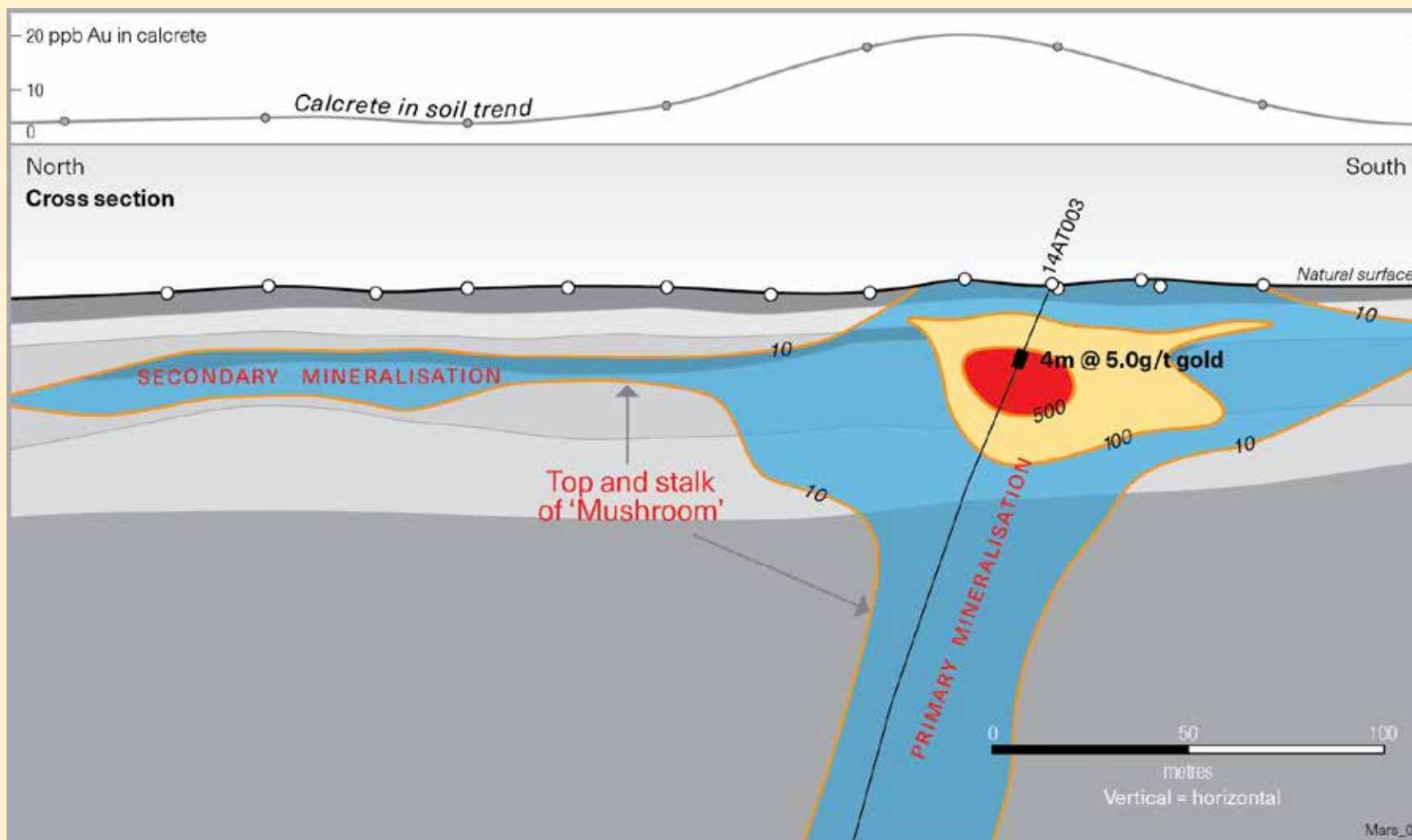


- Aurora Tank has been known as a gold prospect since it was discovered by calcrete sampling in 1997
- Intermittent historical exploration consisted of calcrete sampling between 1997 and 2013 and drilling between 1999 and 2015
- Historical drill holes were too widely spaced (fishing net analogy)
- Did show elevated gold at shallow depths
- After a review, Marmota decided to carry out a program of more intense shallow drilling on an 80 by 40m grid over the best calcrete anomalies
- This program was carried out in September 2016 and led to a number of significant intersections and follow up drilling – which is continuing



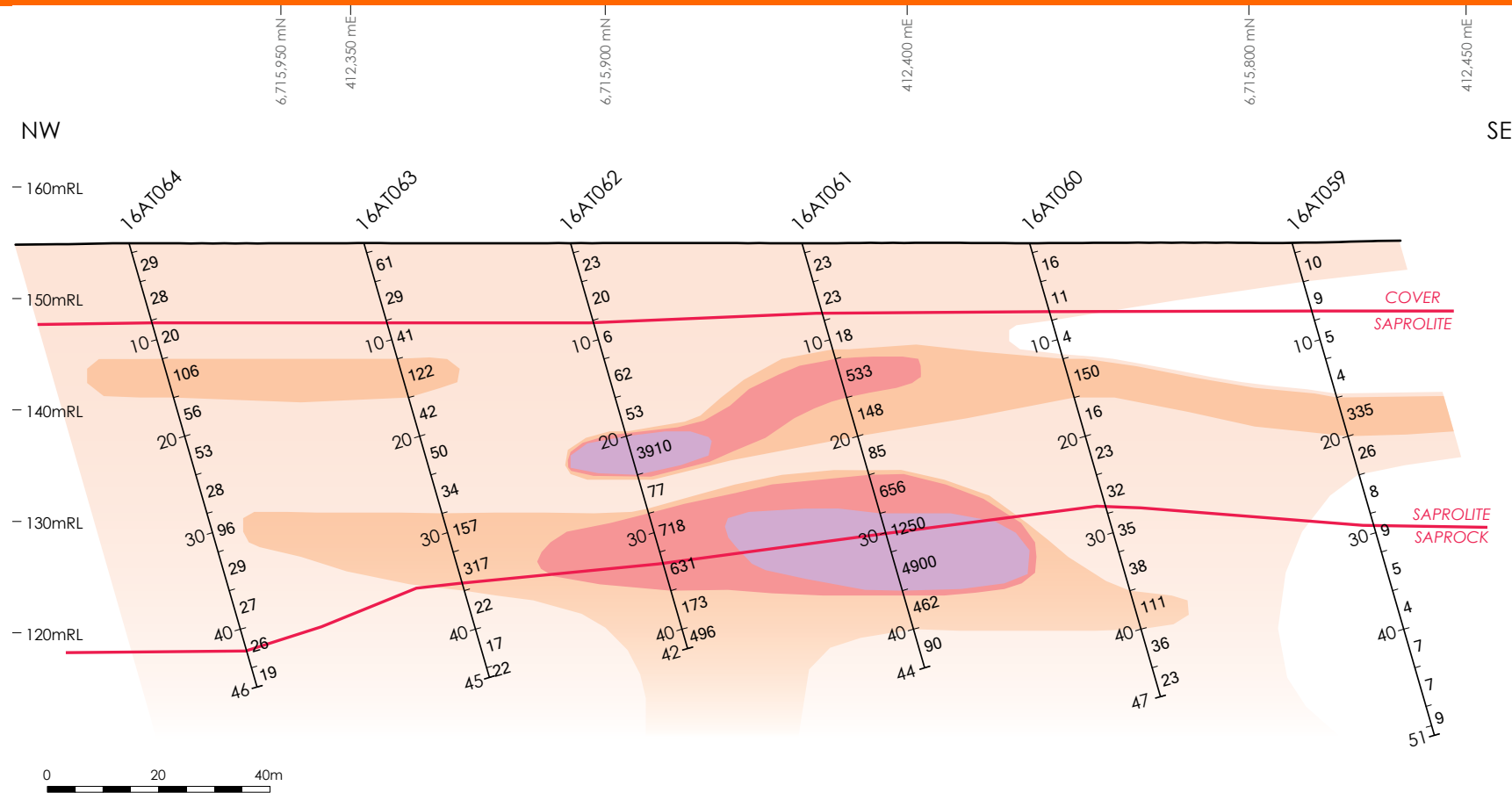
# AURORA TANK PROSPECT

## Predicted Pre-drilling 'Supergene Mushroom' Model



- Model created from pre-2015 drilling of the Goshawk zone at Aurora Tank
- Note lateral extent of secondary dispersion and
- Potentially economic bulls eye zone of 20 by 10 metres over 0.5g/t gold
- Note surface calcrete anomaly centred over best mineralisation

# AURORA TANK PROSPECT CROSS SECTION 35



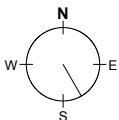
- Gold results from 2016 drilling
- Note similarity to the 2015 model
- Most of the mineralisation is flat lying between 10 and 35m deep



GOSHAWK  
EL 5589  
2016 DRILLING

LINE 13

ORIENTATION = 150°



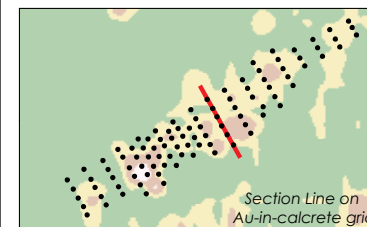
SCALE: 1:1,000  
UTM GDA 94 z53  
VERTICAL EXAG. 2

### SECTION LEGEND

- 10-100 ppb Au
- 100-500 ppb Au
- 500-1000 ppb Au
- >1000ppb Au

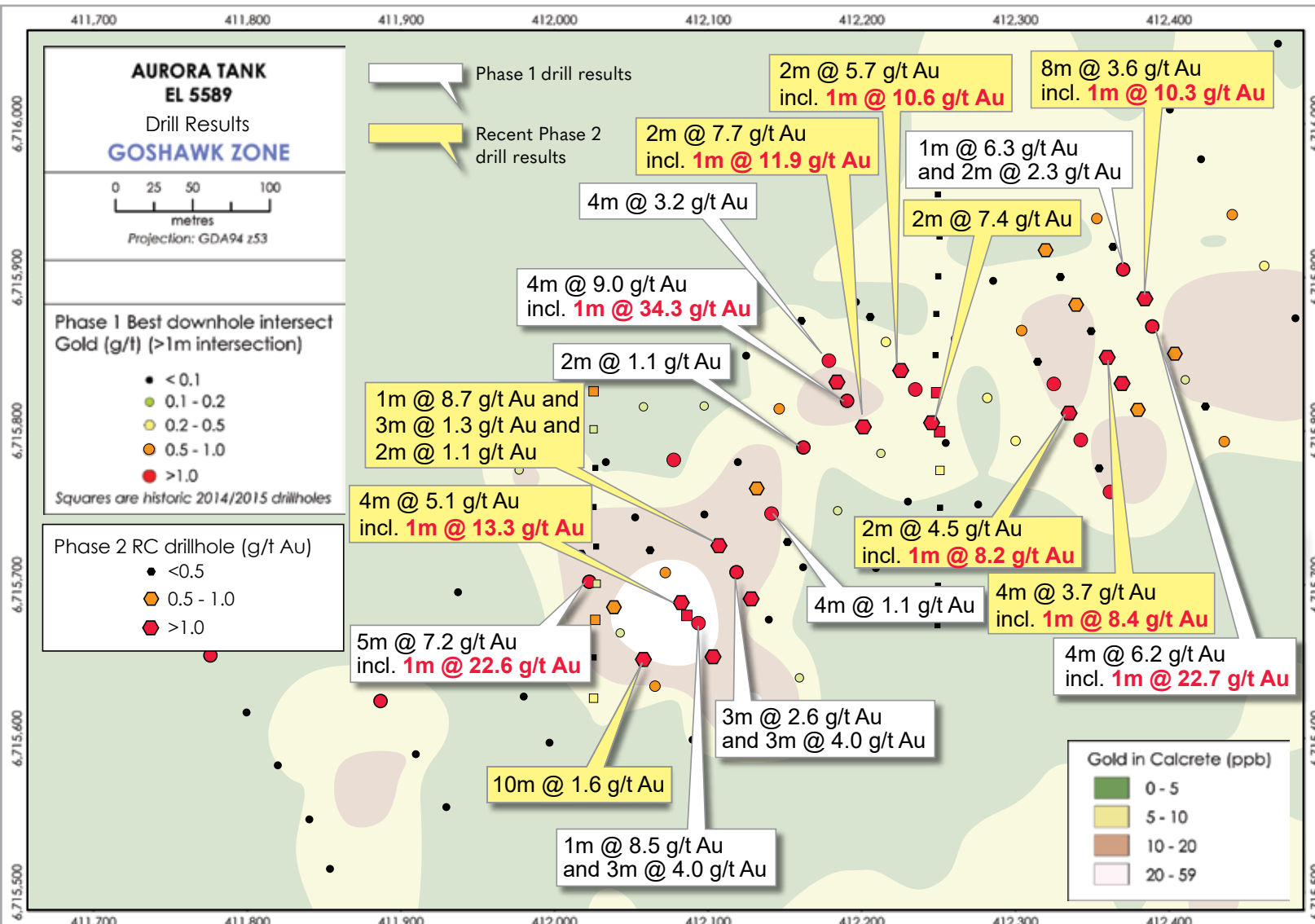
### HOLE TRACE

Downhole depth (m)  
Au assay (ppb)



# AURORA TANK PROSPECT

## 2016 Goshawk Drill Results

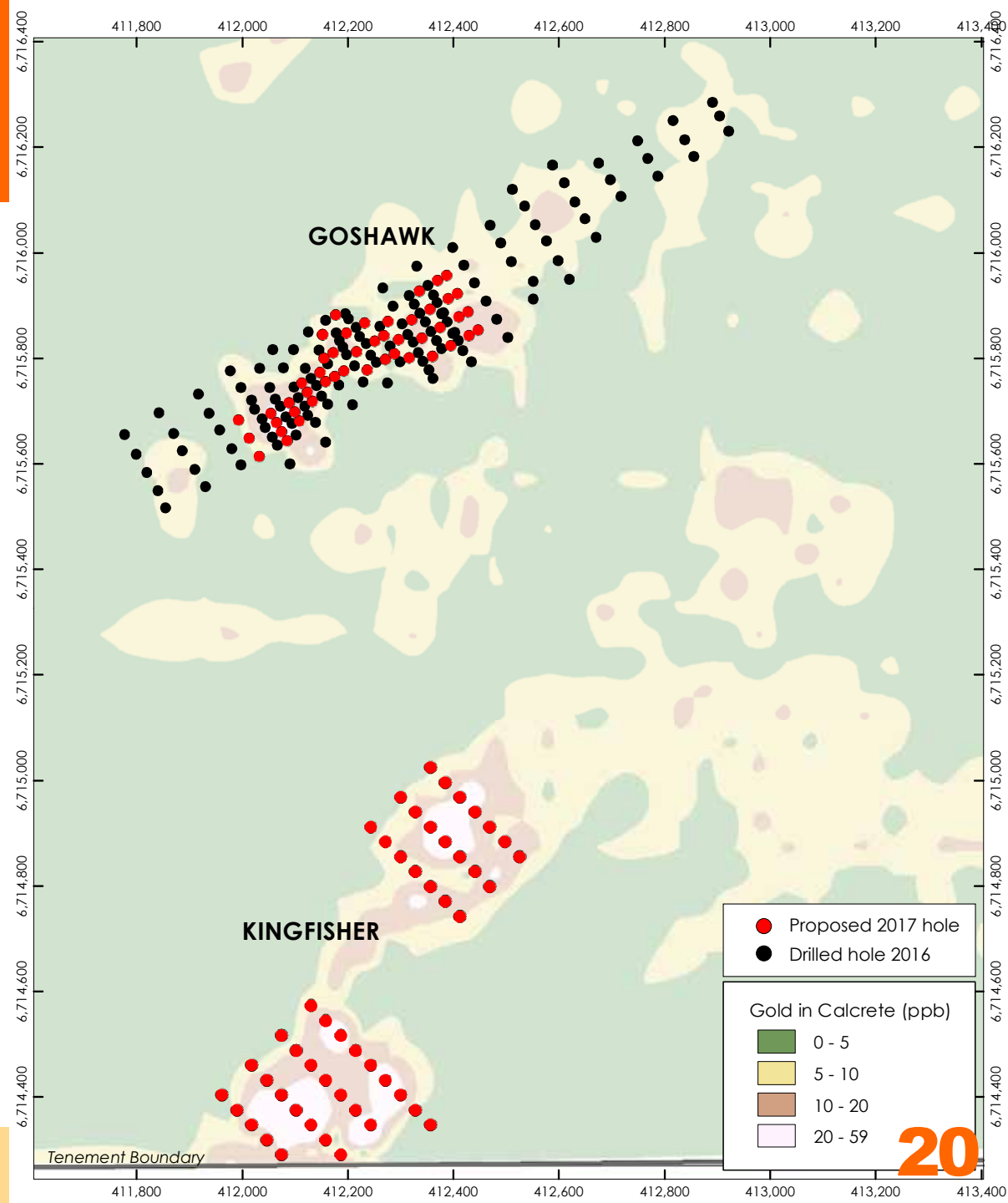


- Map shows all holes drilled to date – phase 1 circles (white bubbles), phase 2 hexagons (yellow bubbles)
- Plus 1g/t intersections over zone at least 500m long
- Most significant intersections are between 10 and 40 metres depth
- Mineralised zones generally underlie calcrete anomalies – but not exactly

# AURORA TANK PROSPECT

## Proposed 2017 Drilling

- Proposed infill drilling for June 2017 to complete program
- Designed to provide sufficient information to estimate a JORC compliant Inferred Resource
- Cyanide recoverable gold and mineragraphic work planned to define geometallurgical characteristics
- Reconnaissance drilling over similar calcrete anomalies at nearby Kingfisher Prospect to be carried out



# FUTURE MILESTONES

## AURORA TANK

- June: Expanded Phase 2 drilling at Goshawk
- Commence metallurgical testwork
- Estimate Inferred Resource in third quarter
- Commence drilling over Kingfisher Prospect

## GAWLER EXPLORATION TASKFORCE (GET)

- May 2017: Calcrete sampling has commenced
- Regional assessment, identification of targets and initial drill testing to continue



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## Competent Persons Statement

Information in this exploration update relating to, Exploration Results is based on information compiled by Dr Kevin Wills, who is a Fellow of the Australasian Institute of Mining and Metallurgy. He has sufficient experience which is relevant to the styles of mineralisation and types of deposits under consideration and to the activities being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the “Australasian Code of Reporting of Exploration Results, Mineral Resources and Ore Reserves.” Dr Wills consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.

**FOR FURTHER  
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