



<b>Titleholder</b>	Minemakers Australia Pty Ltd
<b>Operator</b>	Minemakers Australia Pty Ltd
<b>Tenements</b>	EL29841 (Wonarah)
<b>Project name</b>	Partial Relinquishment Report for period ending 14 April 2016
<b>Personal authors</b>	A. Pellatt and R. Fulton
<b>Corporate author</b>	Minemakers Australia Pty Ltd
<b>Target commodity</b>	Phosphate
<b>Date of report</b>	17 April 2016
<b>Datum/Zone</b>	GDA94, Zone 53
<b>250,000 mapsheet</b>	Alroy
<b>100,000 mapsheet</b>	Wonarah
<b>Contact details</b>	Fulton, R. Avenira Limited PO Box 1704 West Perth WA 6874 Fax: (08) 9264 7099 Ph: (08) 9264 7000
<b>Email for technical details</b>	<a href="mailto:apellatt@avenira.com">apellatt@avenira.com</a>
<b>Email for expenditure</b>	<a href="mailto:rfulton@avenira.com">rfulton@avenira.com</a>

## ABSTRACT

EL29841 (Wonarah Project) is located approximately 220 km ESE Tennant Creek and approximately 25 km south of the Barkly Highway on the Alroy 1: 250,000 and the Wonarah 1:100,000 map sheets in the Northern Territory. The tenement occurs within the central western part of the Georgina Basin where flat-lying, phosphate-bearing Cambrian sediments have been deposited. The lower part of this sequence, the Gum Ridge Formation, is considered prospective for phosphate mineralization overlying either carbonates or basalts of the Middle Cambrian. The tenement was formed by the amalgamation of several tenements in early 2013. A total of 89 RC drill holes, an Exploration Activities Site Audit and a Rehabilitation Procedures Manual were conducted on the relinquished part of the historic tenements, with significant results from RC drilling including 10m @ 15.9 % P<sub>2</sub>O<sub>5</sub>, 16 m @ 11.36% P<sub>2</sub>O<sub>5</sub> and 14m @ 11.74% P<sub>2</sub>O<sub>5</sub>. Since 19 March 2013 when EL29840 was granted, no work has been completed. A partial relinquishment of what was deemed to be the least prospective part of the tenement was made in March 2015. A partial cancellation of 40 blocks was made on 14 April 2016 pursuant to section 105 (1) (b) of the Mineral Titles Act.

## CONTENTS

1.	INTRODUCTION .....	1
2.	LOCATION .....	1
3.	TENURE AND TITLE HISTORY .....	1
4.	GEOLOGY .....	5
	4.1 Deposit style and model.....	5
	4.2 Regional Geology .....	5
	4.3 Local Geology .....	6
5.	WORK COMPLETED.....	9
6.	CONCLUSIONS.....	9
7.	REFERENCES.....	10

## FIGURES

<i>Figure 1: Location of EL29841.</i> .....	2
<i>Figure 2: Historical work completed</i> .....	6
<i>Figure 3: Location of EL29841 in the Barkly Sub-Basin of the Georgina Basin.</i> .....	8
<i>Figure 4: Regional Stratigraphic Column.</i> .....	8
<i>Figure 5: Schematic Regional Geology Section</i> .....	8

### Copyright

This document, the data it contains and its attachments are submitted under the *NT Mineral Titles Act*. As such, the copyright normally reserved by Minemakers Ltd is controlled by that Act as well as the Commonwealth Copyright Act, as may be applicable. This statement authorises the NT Department of Mines and Energy to copy, store and distribute this document, data and attachments subject to the confidentiality restrictions of the relevant NT Acts.

## **1. INTRODUCTION**

This report describes exploration activities on a cancelled portion comprising 40 blocks of EL29841 (Wonarah Project), part of Minemakers Australia Pty Ltd's (MAPL) Wonarah Project. These blocks were cancelled on 14 April 2016 due to not meeting the expenditure condition over two consecutive years.

MAPL is a wholly owned subsidiary of Minemakers Limited which listed on the ASX on 10 October 2006. Exploration was aimed at the discovery and development of economic phosphate deposits proximal to the Alice Springs-Darwin railway and associated with shallow marginal sediments at the western edge of the Georgina Basin.

## **2. LOCATION**

EL29841 is located approximately 220 km east-southeast of Tennant Creek in the Northern Territory (Figure 1). The tenement lies on the Alroy SF5315 and the 1:100,000 Wonarah 6158 map sheets.

Access to the project is via the Barkly Highway, the main paved freight link between Queensland and the Northern Territory. The nearest town is Camooweal in western Queensland, approximately 180 km to the east. Access within the tenement is via a gravelled road and a network of dozed tracks suitable for 4WD only.

## **3. TENURE AND TITLE HISTORY**

EL29841 comprising 189 blocks (559 km<sup>2</sup>) was granted on 19 March 2013 to Minemakers Australia Pty Ltd for a period of six years. The tenement was reduced to 94 blocks (272 km<sup>2</sup>) on 18 March 2015 and a Partial Relinquishment Report was submitted (Pellatt and Fulton, 2015).

The tenement was formed by the amalgamation of EL26185, EL9979, EL26585, EL26586, EL29507 and part of EL26452 (formerly SEL26452). These were all surrendered on 19 March 2013 in order to be amalgamated into EL29841.

EL29841 is located on NT Freehold Land (NT Portions 03747-03756) owned by the Arruwurra Aboriginal Corporation. ATC's NT Portion 1413 is excluded from EL29841.

EL29841 is subject to a confidential Deed For Exploration (19 March 2009) between MAPL, the Arruwurra Aboriginal Corporation and the Central Land Council (CLC).

Exploration drilling programs on the pre-amalgamation tenements were authorised by the Department of Mines and Energy through approval of a Mining Management Plan; Wonarah Project Authorisation 0413-01, 0413-02, 0413-03, 0413-04 and 0417-02.

MAPL obtained sacred site clearances through the Central Land Council: Sacred Site Clearance Certificate C2008-008, C2008-087, C2009-003, C2010-032 and C2012-094.

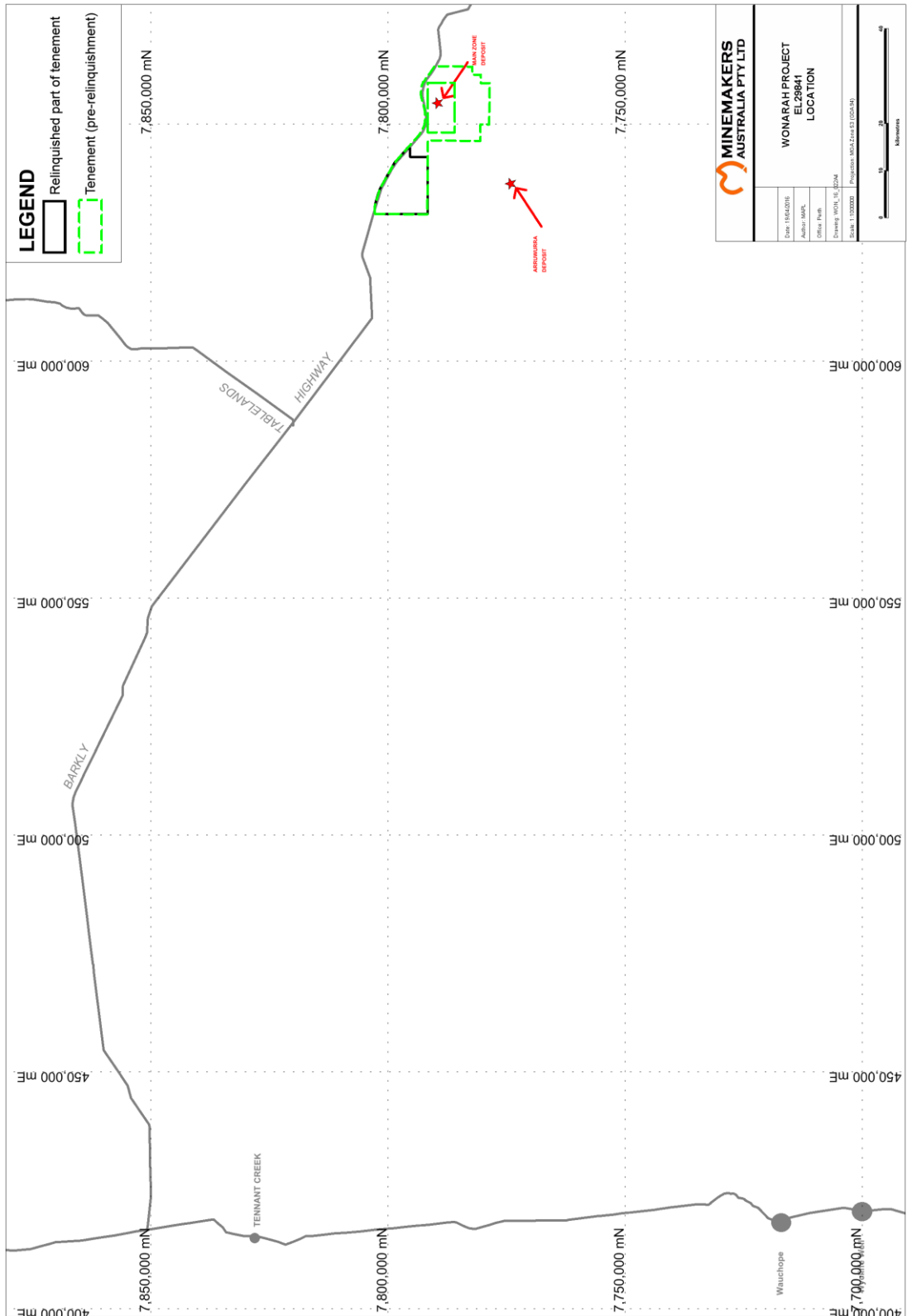


Figure 1: Location of EL29841.

Minemakers commenced fieldwork in 2008 and the following work was carried out on the relinquished areas, but on previous tenements prior to their amalgamation to form EL29841 (Figure 2):

During the year ended January 2011 the following work was carried out:

- During August-November 2010, a total of 38 RC holes for a total of 1628 metres were drilled as part of a scout drilling program on 2-4 km spaced grids (Figure 2). Samples were sent to Amdel, Mt Isa for submitted for XRF analysis of major oxide elements. The RC samples were measured for radioactivity using a RadEye PRD device. The device measures gamma radiation and the purpose of the exercise was to detect high uranium samples and to help with geological logging. Best results included 10m @ 15.9% P<sub>2</sub>O<sub>5</sub> from 9 m in WNRC1546.

During the year ended January 2012 the following work was carried out:

- An Exploration Activities Site Audit conducted by Coffey Environments Australia Pty Ltd, Darwin to satisfy requirements specified in the Exploration Operations Management Plan (EOMP) and to assess the effectiveness of the environmental management of the project. The scope of the audit was to assess the compliance with the EOMP, assess compliance with government guidelines and the consideration of best practice environmental management for mineral exploration activities. Coffey Environments Australia were also commissioned to provide a Rehabilitation Procedure Manual for the Wonarah Project.

During the year ended January 2013 the following work was carried out:

- During September 2012, a total of 51 RC holes for 2333 m was drilled to further test the area around mineralised holes in the south-west part of the project area. This mineralisation was discovered in 2010 by a very wide-spaced drill program and indicated the potential for significant phosphate mineralisation albeit deeper than mineralisation in the Main Zone. Samples were sent to Amdel, Mt Isa for submitted for XRF analysis of major oxide elements. Best results included 16m @ 11.36% P<sub>2</sub>O<sub>5</sub> from 17 m in WNRC1705 and 14m @ 11.74% P<sub>2</sub>O<sub>5</sub> from 34 m in WNRC1736.

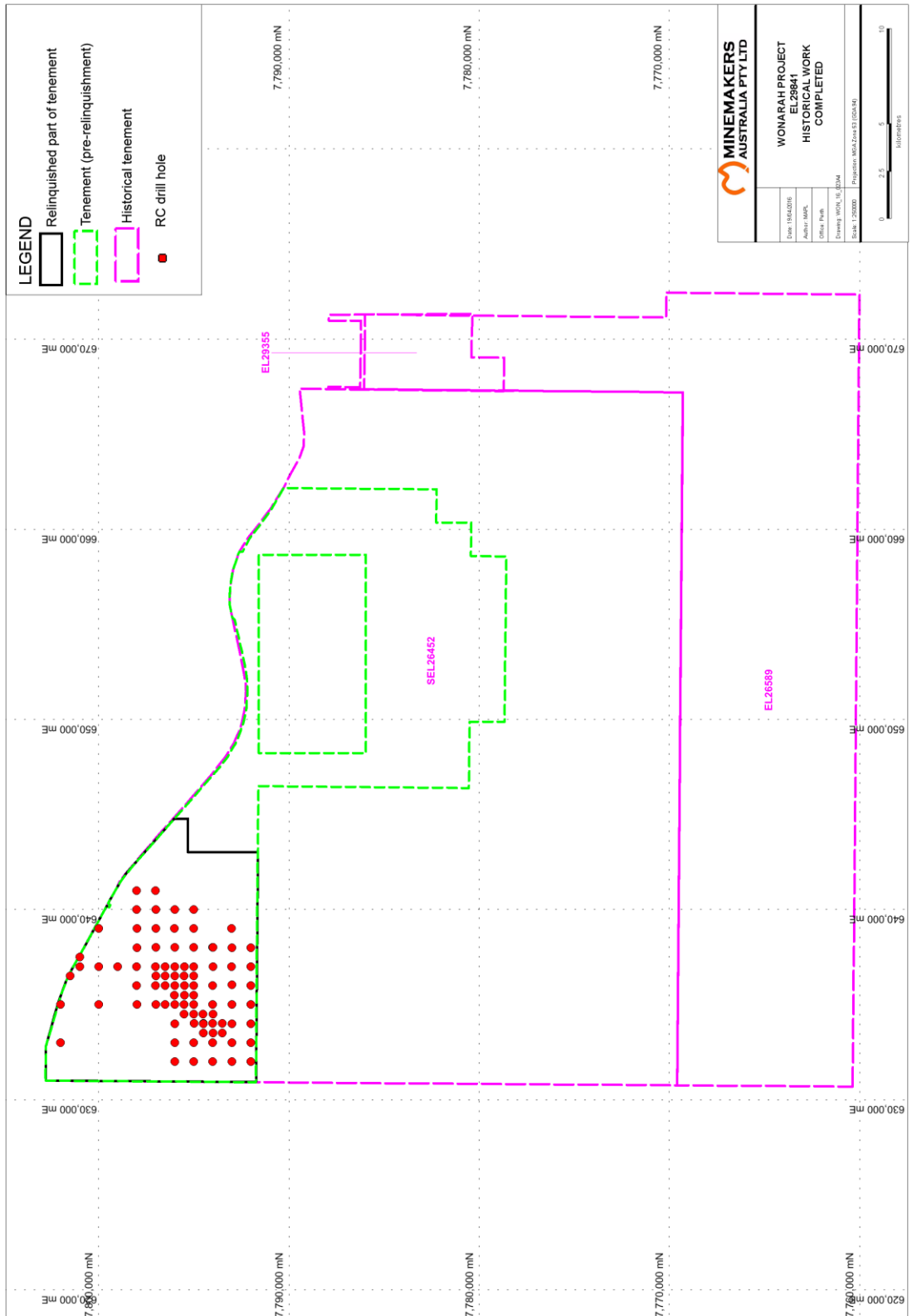


Figure 2: Historical work completed.

## 4. GEOLOGY

### 4.1 Deposit style and model

Minemakers Australia is seeking to develop a large sedimentary phosphate deposit within the Georgina Basin. The Georgina Basin is an extensive late Proterozoic to early Palaeozoic basin that extends from northwestern Queensland through much of the eastern Northern Territory area and which hosts several large sedimentary phosphate deposits. A map representing the regional geological setting is presented in Figure 3.

Sedimentary phosphate deposits are restricted in their occurrence globally. The model for phosphate deposition requires upwelling, cold phosphate-saturated water depositing phosphate onto the continental shelf where the required narrow pH range is locally present. Co-deposition with carbonate occurs at slightly higher pH values. Carbonate deposition becomes dominant at higher pH. Post-depositional reworking and replacement of carbonate facies by phosphatic mineralisation is probably an important factor in upgrading phosphorite grades to economic levels.

### 4.2 Regional Geology

The Wonarah phosphate project is situated in the central western Georgina Basin, a large late Proterozoic to early Palaeozoic basin that extends from northwestern Queensland through much of the eastern Northern Territory.

Basement rocks in this part of the Georgina Basin are comprised of granites of unknown age. They are possibly correlates of the Palaeo-proterozoic rocks of the Tennant Creek region. Mesoproterozoic sediments and volcanics are overlain by the Early Cambrian Helen Springs Volcanics (formerly Peaker Piker Volcanics). A northeast-southwest trending basement high runs through the Wonarah project area.

Overlying Middle Cambrian sediments are divided into two basin-wide sequences. Sequence One deposited clastics, carbonates, organic shales and minor phosphorites during gradual transgression which was abruptly terminated by rapid regression. In the Wonarah region, basement highs are flanked by onlapping dolomitic rocks equivalent to the Thornton Limestone. An erosional unconformity is represented by the development of a karst surface.

Sequence Two deposited shallow clastics, carbonates, grainstones, peritidal phosphorites and phosphatic limestones in a transgressive tract system. At Wonarah dolostone, mudstone and phosphorite of the lower Middle Cambrian Upper Gum Ridge Formation overlie Sequence One rocks and basement highs. This formation contains major phosphorite mineralisation and is equivalent to the Beetle Creek Formation on the eastern Margin of the basin which hosts Phosphate Hill and Lady Annie-D-Tree phosphate deposits. The overlying Wonarah Beds are Middle Cambrian mudstone, siltstone and dolostones. Silcrete, ferricrete and calcrete regolith are extensively developed and large areas are covered by stabilised aeolian sand.



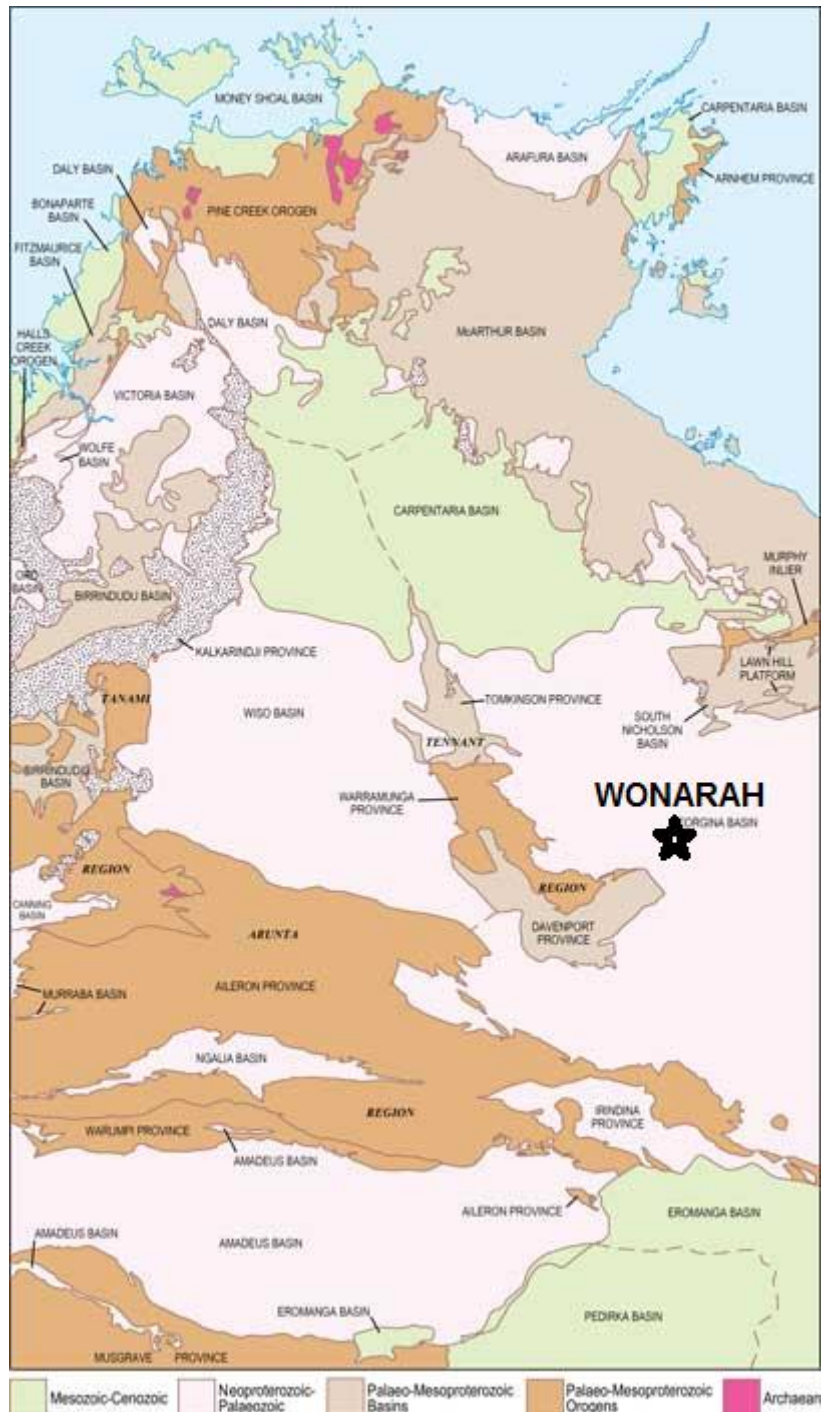


Figure 3: Regional geological setting (from the NTGS)

### 4.3 Local Geology

Basement in the Main Zone area is alkali feldspar granite of possible Palaeo-proterozoic age. These are overlain by the Helen Springs Volcanics. The top of the basalt is extremely weathered and a ferruginous and manganiferous duricrust is developed locally. Where less weathered, the basalt is vesicular, amygdaloidal and irregularly porphyritic. Dolomitic rocks of the Thornton Limestone equivalent are present above the basalt at the southeastern extremity of the Main Zone. To the east and the south the carbonate rocks are developed extensively.

The overlying phosphate-bearing Upper Gum Ridge Formation is divided into five main units: a basal, indurated high grade phosphorite; muddy to sandy, clay-rich transitional sediments; a chert breccia phosphorites; a mudstone phosphorite; and a convolute mudstone.

The basal Transitional Phosphorite is a laterally discontinuous high grade indurated phosphorite up to 3m thick developed throughout the eastern and southern part of the Main Zone.

The Transition Sediments (TUN) are laterally continuous, 4-6m thick and comprised of clay-rich mudstone and siltstone with minor phosphorite, dolomite, sandstone and basal epiclastic.

The Chert Breccia Phosphorite forms a distinctive, laterally continuous horizon, 1-10 m thick, and comprised of yellow, grey or pink, variably friable or indurated, low to high grade phosphorite with abundant dark grey chert. Chert averages 50-60%.

The Mudstone Phosphorite is the main phosphate-bearing unit at Wonarah and is comprised of 1-10m of yellow and pink mudstone phosphorite with trace to minor dark grey chert. The mineralogy is dominated by (carbonate)-fluorapatite –  $\text{Ca}_5(\text{PO}_4, \text{CO}_3)_3\text{F}$ . The MPH is variably friable or indurated with the indurated phosphorite typically being high to very high grade (30-40%  $\text{P}_2\text{O}_5$ ).

The Convolute Mudstone is a 1-10m thick unit of white, light grey and yellow clay-rich variably convolute mudstone with minor siltstone and fine sandstone interbeds. It generally contains minor (<10%)  $\text{P}_2\text{O}_5$ .

The Wonarah Beds overlie the Convolute Mudstone and are comprised of mudstone and siltstone with minor chert, the Hangingwall Mudstone. The Wonarah Beds thicken towards the east and south away from the basement high that defines the western fringe of the Main Zone. Dolomitic units, the Hangingwall Dolostone, are present east and south of the Main Zone.

Regolith is extensively developed throughout the Main Zone with silcrete and ferricrete present in most holes. Low silcrete ridges are prominent features. Colluvial and alluvial deposits are common and extensive stabilised aeolian deposits cover much of the regolith. The phosphatic units thin and peter out towards the basement high which trends in a northeast-southwest direction towards Arruwurra. To the east and south the phosphatic units, although still present with grade and thickness, are too deep to be of economic interest at this time.

A stratigraphic column and schematic section are presented in Figure 4 and Figure 5 respectively.

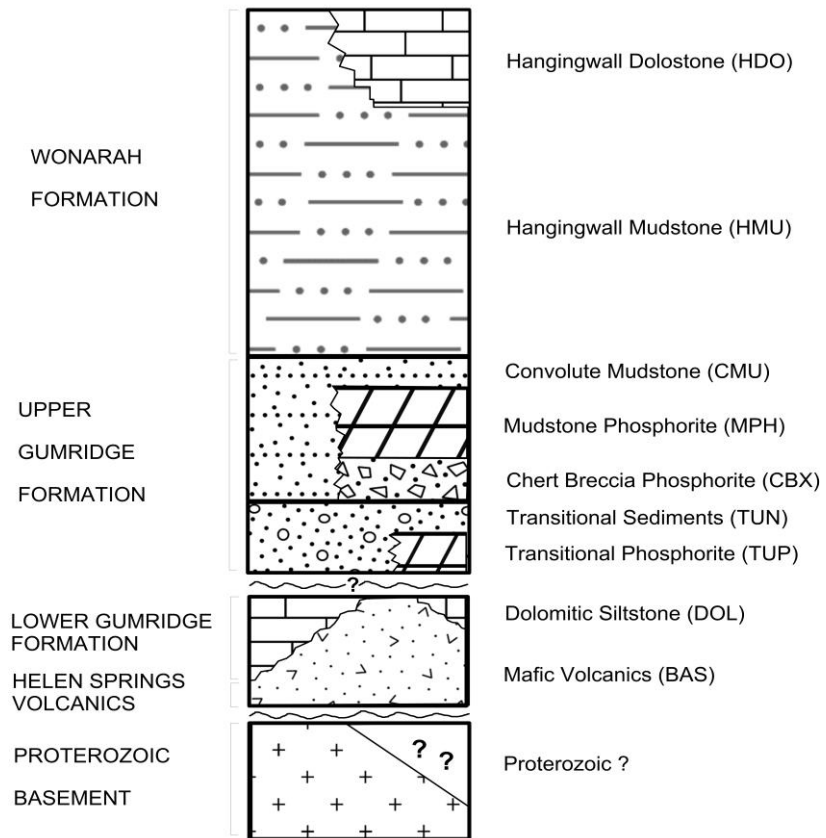


Figure 4: Regional Stratigraphic Column

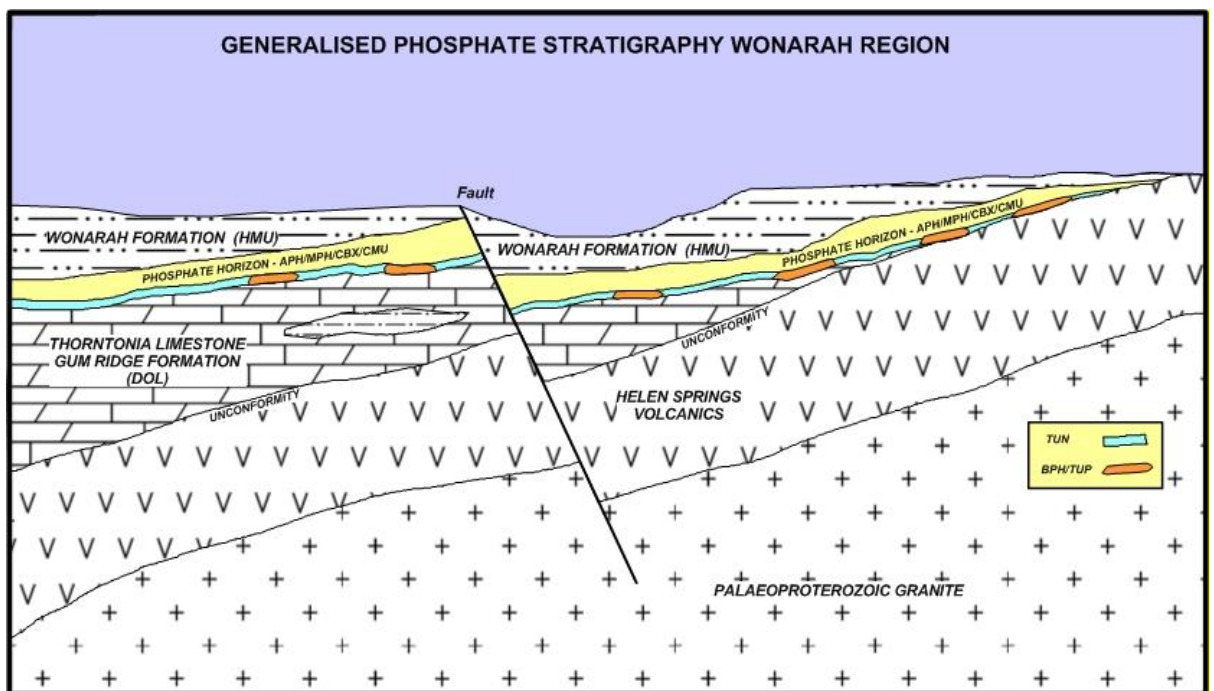


Figure 5: Schematic Regional Geology Section

## **5. WORK COMPLETED**

No work has been completed on EL29841 since it was granted in March 2013.

## **6. CONCLUSIONS**

MAPL was required to nominate blocks for cancellation due to successive years of significant under-expenditure. The least prospective part of EL29841 was nominated.

## 7. REFERENCES

**Fulton, R., 2013.** Annual and Final Report for EL26452 (Wonarah) for the period 09 January 2008 to 19 March 2013.

**Fulton, R.L., Drummond, A., Hepburn-Brown, D. and Hitchcox, A. 2009.** Combined Annual Report on EL9979, SEL26451, SEL26452, EL26583, EL26584, EL26585, EL26586, EL26589 and EL26588. Wonarah Phosphate Project. Annual Report to 8<sup>th</sup> January 2009. Minemakers Australia.

**Fulton, R.L., Pellatt, A. and Varley, R. 2010.** Combined Annual Report on EL9979, SEL26451, SEL26452, EL26583, EL26584, EL26585, EL26586, EL26589 and EL26588. Wonarah Phosphate Project. Annual Report to 8<sup>th</sup> January 2010. Minemakers Australia.

**Fulton, R.L., Pellatt, A. and Varley, R. 2011.** Combined Annual Report on EL9979, SEL26451, SEL26452, EL26583, EL26584, EL26585, EL26586, EL26589 and EL26588. Wonarah Phosphate Project. Annual Report to 8<sup>th</sup> January 2011. Minemakers Australia Pty Ltd.

**Pellatt, A. and Fulton R.L. 2012.** Grouped Annual Report (GR-097/09) for EL9979, EL24607, EL26185, EL26584, EL26585, EL26586, EL26589, EL28233, SEL26451 and SEL26452 (Wonarah Phosphate Project) for the period ending 8 January 2012. Minemakers Australia Pty Ltd.

**Pellatt, A. and Fulton R.L. 2013.** Grouped Annual Report (GR-097/09) for EL9979, EL24607, EL26185, EL26584, EL26585, EL26586, EL26589, EL28233, EL26451 and EL26452 (Wonarah Phosphate Project) for the period ending 8 January 2013. Minemakers Australia Pty Ltd.

**Pellatt, A. and Fulton R.L. 2014.** Grouped Annual Report (GR-097/09) EL 24607, EL 29840, EL 29841 and EL 29849 (Wonarah Phosphate Project) for the period ending 8 January 2014. Minemakers Australia Pty Ltd.

**Pellatt, A. and Fulton R.L. 2015.** Grouped Annual Report (GR-097/09) EL 24607, EL 29840, EL 29841 and EL 29849 (Wonarah Phosphate Project) for the period ending 8 January 2015. Minemakers Australia Pty Ltd.

**Pellatt, A. and Fulton R.L. 2015.** Partial Relinquishment Report for EL29841 for the period ending 19 March, 2015. Minemakers Australia Pty Ltd.

**Pellatt, A. and Fulton R.L. 2016.** Grouped Annual Report (GR-097/09) EL 24607, EL 29840, EL 29841 and EL 29849 (Wonarah Phosphate Project) for the period ending 8 January 2015. Minemakers Australia Pty Ltd.