



<b>Titleholder</b>	Minemakers Australia Pty Ltd
<b>Operator</b>	Minemakers Australia Pty Ltd
<b>Tenements</b>	EL26589 (Wonarah South)
<b>Project name</b>	Annual and Final Report for period ending 9 January, 2012 to 30 October 2012
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<b>Target commodity</b>	Phosphate
<b>Date of report</b>	18 December, 2012
<b>Datum/Zone</b>	GDA94, Zone 53
<b>250,000 mapsheet</b>	Frew River and Avon Downs
<b>100,000 mapsheet</b>	Joildung and Barry Caves
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## **ABSTRACT**

EL26589 (Wonarah South) is located 44km NE Tennant Creek and 40km east of Three Ways immediately south of the Barkly Highway on the Frew River and Avon Downs 1:250,000 and the Joildung and Barry Caves 1:100,000 map sheets in the Northern Territory. The tenement occurs on the western margin of the Georgina Basin where flat-lying Cambrian sediments have been deposited. The basal part of this sequence, the Gum Ridge Formation, is considered prospective for phosphate mineralization overlying either carbonates or basalts of the Middle Cambrian. EL26589 comprising 150 blocks was granted on 27 May 2008 to Minemakers Australia Pty Ltd and was part of the Wonarah Phosphate Project, Grouped Annual Report (GR-097/09). The tenement was surrendered on 30 October, 2012 and this report details work completed during the life of the tenement. A total of three water bore drill holes, a LiDAR and an electromagnetic survey was conducted on a portion of the tenement, but no significant results were received and so the tenement was surrendered on 30 October, 2012.

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## **1. INTRODUCTION**

This annual and final report describes exploration activities on EL26589, Wonarah South prospect which is part of Minemakers Australia Pty Ltd's (MAPL) Wonarah Project containing 9 tenements with a Combined Reporting Status date of 8 January.

MAPL is a wholly owned subsidiary of Minemakers Limited which listed on the ASX on 10 October 2006. Exploration is aimed at the discovery 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**

EL26589 is located 240 km east of Tennant Creek in the Northern Territory (*Figure 1*). The tenement lies on the 1:250,000 Frew River SF5303 and Avon Downs SF5304 and the 1:100,000 Joildung 6157 and the Barry Caves 6257 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 network of dozed tracks suitable for 4WD only through other tenements within the Wonarah project.

## **3. TENURE**

EL26589 comprising 150 blocks (495 km<sup>2</sup>) was granted on 27 May 2008 to Minemakers Australia Pty Ltd for a period of four years. A partial surrender was completed on 20 July 2011.

The tenement is located on NT Freehold Land (NT Portions 03747-03756) owned by the Arruwurra Aboriginal Corporation.

EL26589 is one of five tenements that form part of the Wonarah Project subject to a confidential Deed For Exploration (19 March 2009) between MAPL and the Central Land Council (CLC).

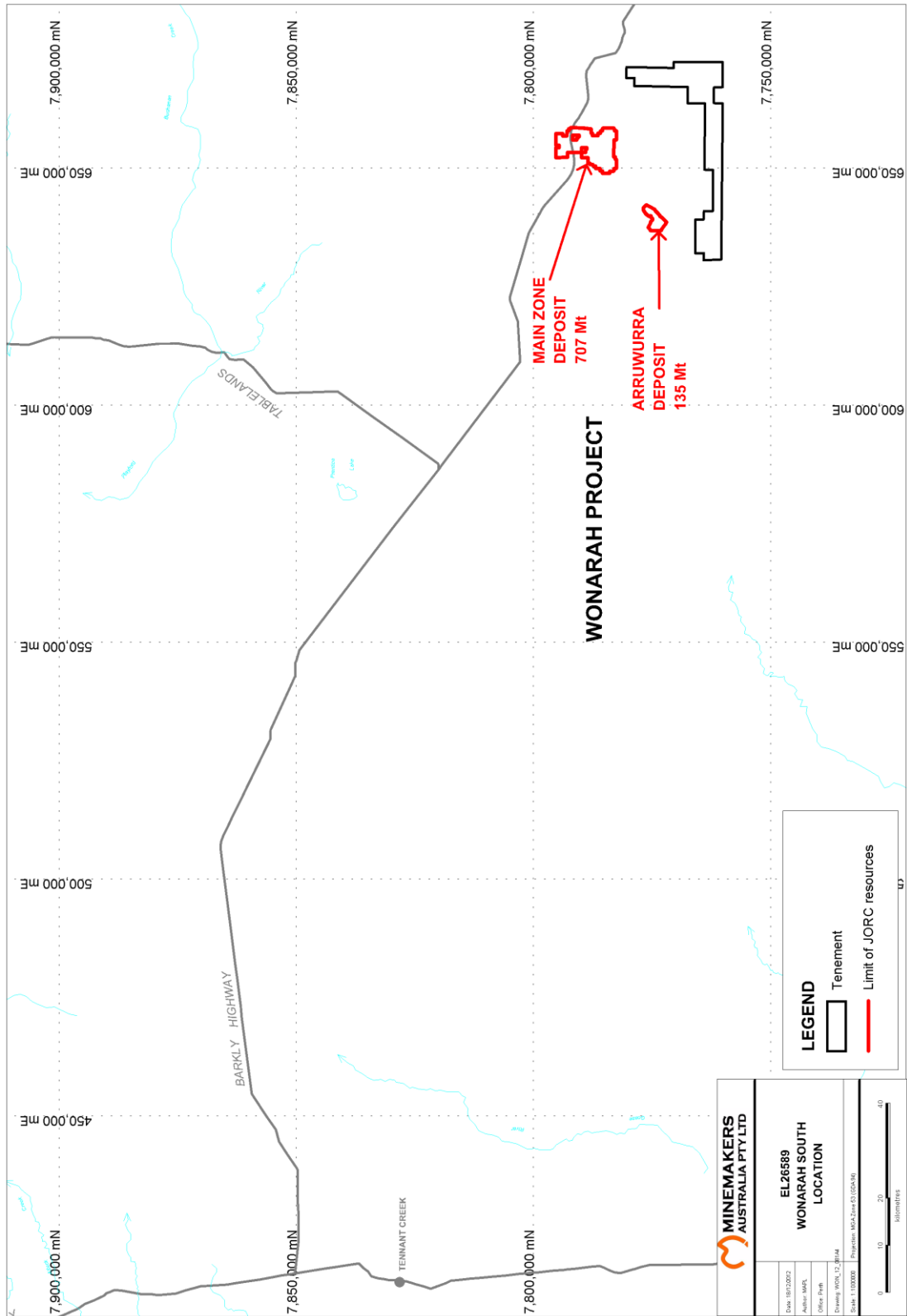


Figure 1: Location of EL26589.

## **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 2*.

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.

Gravity and magnetic data suggests that basement rocks in this part of the Georgina Basin are comprised of both felsic and mafic rocks of probably Proterozoic age. 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.

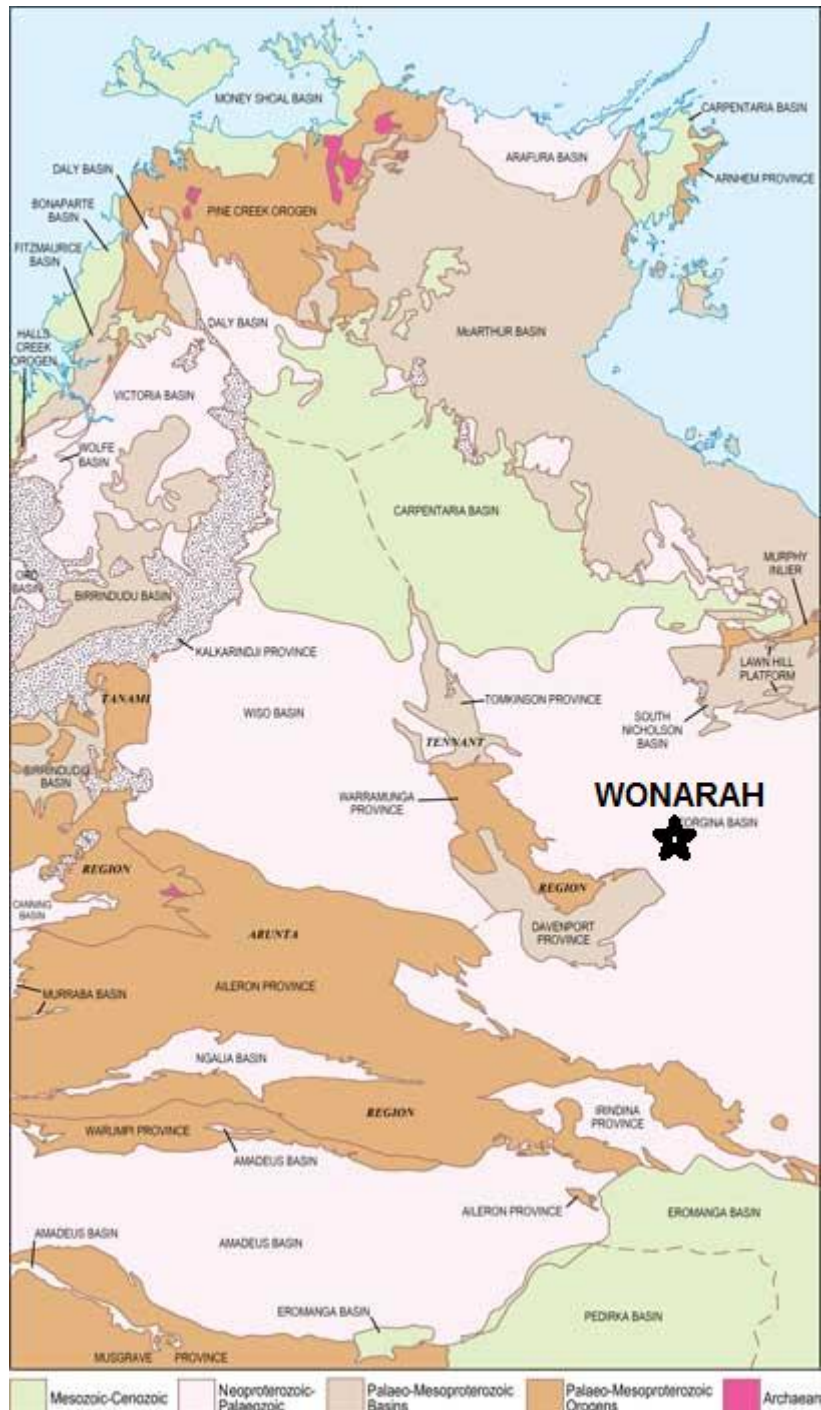


Figure 2: Location of EL26589 in the Barkly Sub-Basin of the Georgina Basin

### 4.3 Local Geology

Basement within EL26589 is unknown but it is likely to be overlain by the widespread Helen Springs Volcanics. Within Minemakers adjacent tenements 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.

Minemakers' two main phosphate deposits, Arruwurra and Main Zone are shown in Figure 1.

A stratigraphic column is presented in Figure 3.



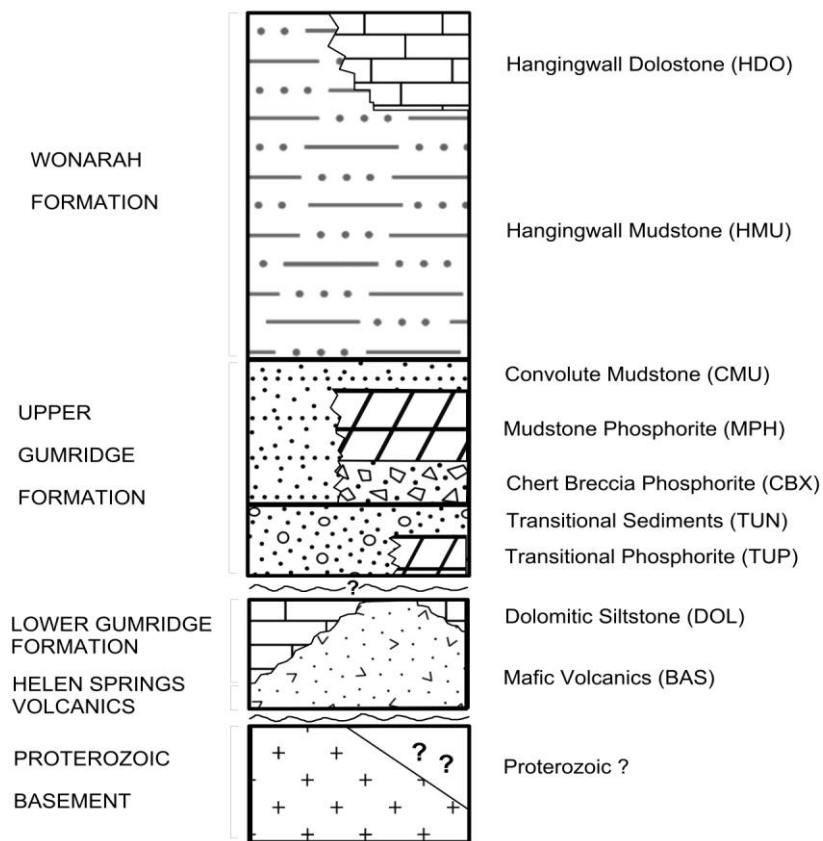


Figure 3: Regional and Local Stratigraphic Column

## 5. WORK COMPLETED

### 5.1 RESOLVE Airborne Geophysics Survey

Fugro Airborne Surveys, Ontario, Canada were contracted to complete a RESOLVE airborne electromagnetic survey over the Wonarah Project in October, 2008. The purpose of the survey was to provide information that could be utilized to map the geology and structure of the survey area. The survey was completed using a RESOLVE multi-coil, multi-frequency electromagnetic system, supplemented by a high sensitivity cesium magnetometer. The data from these sensors was processed to create maps that display the magnetic and conductive properties of the survey area.

The instrumentation was installed in an AS250-FX2 (Squirrel) turbine helicopter supplied by HeliAust and flew at an average speed of 131 km/hr with an EM sensor height of approximately 35 metres.

Flight lines were flown with a separation of 100 metres and tie lines were flown orthogonal to the traverse lines with a line separation of 1000 metres.

One survey block (GEA2) was within EL26589 (Figure 5) and comprised a region with the bounding co-ordinates:

<b>Corners</b>	<b>East (GDA94, Zone 53)</b>	<b>North (GDA94, Zone 53)</b>
1	634401	7768548
2	637469	7768547
3	637472	7765963
4	634399	7765962

The survey specifications were as follows:

<b>Parameter</b>	
Traverse line direction	90 <sup>0</sup> /270 <sup>0</sup>
Traverse line spacing	100 m
Tie line direction	0 <sup>0</sup> /180 <sup>0</sup>
Tie line spacing	1000 m
Survey line coverage	93.3 km
Tie line coverage	8.3 km
Sample interval	10 Hz, 3.3 m @ 120 km/hr
Aircraft mean terrain clearance	58 m
EM sensor mean terrain clearance	30 m
Mag sensor mean terrain clearance	30 m
Navigation (guidance)	±5 m, Real-time GPS
Post-survey flight path	±2 m, Differential GPS

The full report from Fugro Airborne Surveys is supplied separately.

## 5.2 Water bore drill holes

During March 2009, a total of 3 water bore holes (WNWE013-WNWE015) for a total of 456 metres were drilled on EL26589 to test groundwater quality and properties (Figure 5). The drilling was planned and logged by Groundwater Management Pty Ltd, Fremantle. The holes were RC holes drilled to a maximum depth of 156 metres and were completed by Tom Browne Drilling Services, Dubbo using a UDR650 rig and a 5 ½" bit. The holes encountered sand, clay, siltstone, dolomite, quartzite and ended in basalt.

Significant airlift rates (greater than 1L/s) were seen in these holes and groundwater was encountered in fractured quartz and chert at depth, consistent with the deepening of the Georgina Basin in this area. Although the airlift rates were good, the water was highly turbid and construction of a usable production bore would be problematic.

## 5.3 LiDAR Survey

A detailed LiDAR survey of the area was contracted to Fugro and was due to be completed in late 2008 but was delayed due to technical issues with the contractor until 2009.

The survey was aimed at providing a DEM for the area containing the major phosphate deposits on EL26452 and ML27244 and the survey's overlap onto EL26589 was essentially incidental.

## **6. RESULTS**

The water bores encountered good airlift rates, however the water was quite turbid and construction of a bore for the Arruwurra deposit would be problematic. No significant results were received from the RESOLVE EM survey.

## **7. CONCLUSIONS AND RECOMMENDATIONS**

Due to the fact that no significant results were encountered, it was recommended that the tenement be surrendered.

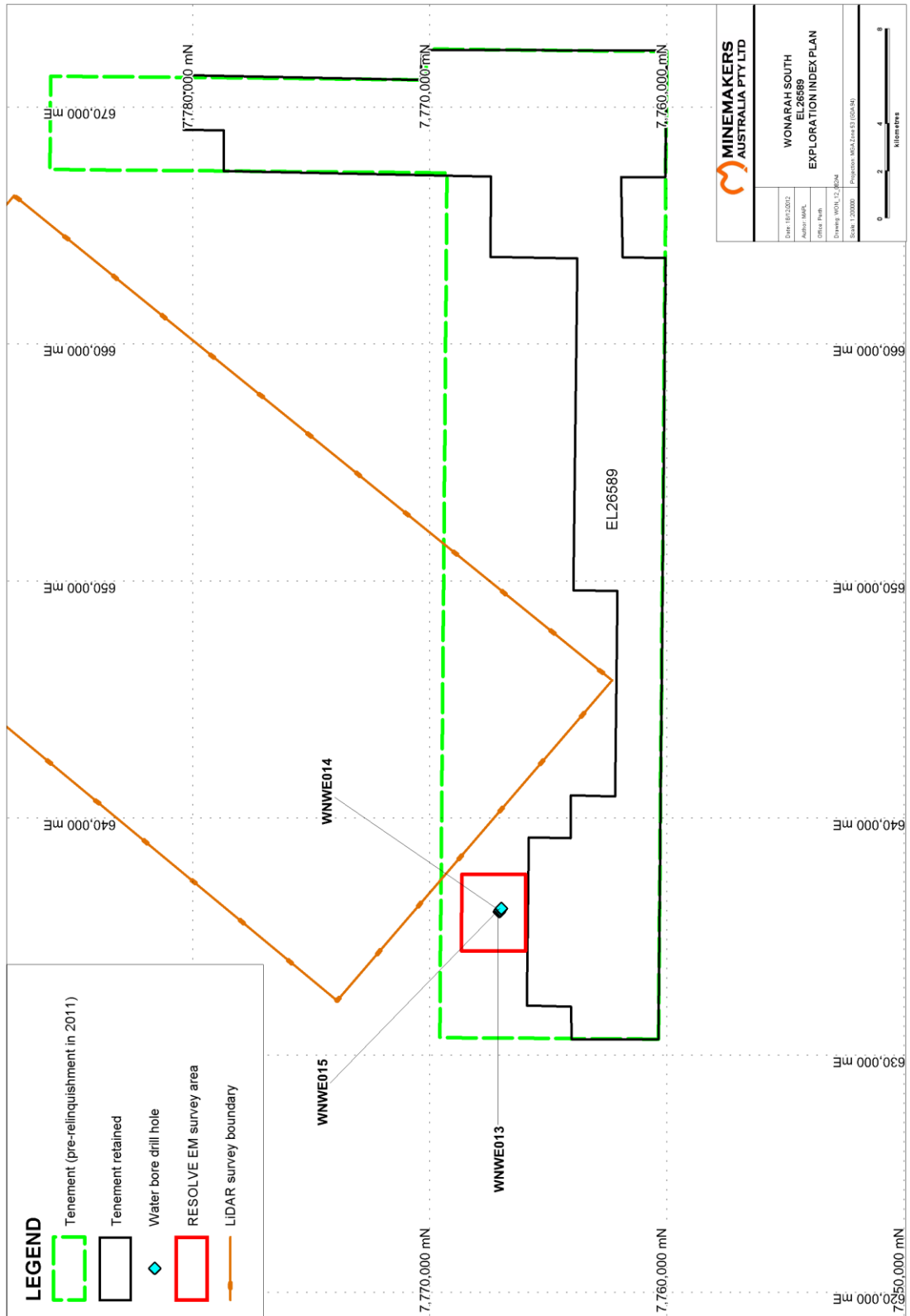


Figure 4: Exploration Index Plan

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