

R. A. Gregory
Exploration Licence 9/2013 Priory
Annual Report Licence Year 2



Ken Morrison
1 November 2015

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SUMMARY

Exploration during the 2014-2015 licence year consisted of excavating two trenches at Logans prospect, testing basal alluvial gravels preserved under shallow overburden sediments on terraces bordering the current Mother Logans Creek. An estimated total 15 cubic metres of alluvial gravel, representing previous generations of the drainage system, was sampled and processed on site. The gravel is composed of variable proportions of basalt, granite, Mathinna Supergroup contact metamorphic rocks and vein quartz, in a heavy clay matrix. Sediment composition and size ranges from coarse basalt cobbles to coarse granite sand and both trenches were excavated down to a partly weathered, free digging granite basement, at depths ranging from 0.5 - 1.5 metres.

The gravel was processed on site by wet screening through a portable dual deck vibrating screen plant, which concentrated a middling product in the 3-10 mm range and rejected oversize and undersize as tailings. The concentrate was spread on to tables and manually inspected for sapphires. Approximately 150 fragments of rough sapphire weighing 190 carats were recovered, along with numerous spinel and small zircon indicator minerals. Generally the sapphire colours are reasonable but the majority of the stones are either too small or too fractured and/or cloudy to warrant cutting. Twenty stones have been chosen by visual inspection for a cutting trial by a qualified gemologist, and the trial is currently underway.

The highest concentration of sapphires and indicator minerals was encountered in gravel with a high content of rounded siliceous pebbles and a low content of basalt cobbles.

The disturbed area surrounding and including the two trenches has been rehabilitated and the access track to the site will be rehabilitated, and made unusable by light vehicles, in November 2015. Further trenching at Logans is planned but the priority for the 2015-2016 year is to test the Bells Marsh and Littlechilds prospects.

Total expenditure for the current year was \$55,270.

1. INTRODUCTION

1.1 *Report Map Datum*

GDA94 – MGA Zone 55 (Figures 1 & 2).

1.2 *Exploration Rationale*

The rationale for exploring this EL is based on the observation that a number of pipe-like basalt occurrences are known in the Priory area, as are several recorded sites yielding basalt-derived sapphires, zircons and spinels from restricted local occurrences of alluvial sediments and tin mine tailings. The Priory area provides an opportunity to explore for small scale

sapphire deposits close to the eroded remnants of the source extrusions. Because the targets are shallow, near surface alluvial sediments, and the indicator minerals are easily recognised, they can be explored using low cost, low impact traditional prospecting methods, combined with the benefit of modern regional geology maps and aeromagnetic data.

1.3 Geological Setting

The regional geology of the EL is covered by MRT Digital Atlas 1:25,000 scale Blue Tier and Binalong Sheets, extracts from which (minus a legend) are shown on Figure 3. The dominant rock type covering the EL is felsic granite, a part of the Devonian I-type Mt Pearson pluton within the Blue Tier Batholith (Black et al, 2005). Small patches of contact hornfelsed Mathinna Supergroup sandstone and shale overlie the granite, as remnants of the erosional unroofing of the pluton.

The granites and metasedimentary rocks represent basement to the Cenozoic basalts and alluvial sediments which are the important materials for sapphire exploration. Figure 3 and the Blue Tier geology sheet show that the basalts are a very minor part of the regional geology and they often outcrop as small, roughly circular in plan view, pipe-like intrusions. The best exposures of olivine-spinel inclusion-rich amygdaloidal basalt pipes, which appear to be spatially linked to detrital sapphires, are in rehabilitated and active quarries at Logans prospect and Halfway Hill inside ML 9M/2010 respectively (Figures 3 and 4). These basalts are classed as basanites and relatively enriched in apatite, nepheline and some rare elements (data provided courtesy of John Everard, MRT), in comparison to northeast Tasmanian basalts generally.

At the regional scale Tertiary and Quaternary alluvial sediments are restricted to narrow terraces of the George River and at the mouths of some tributary creeks, mainly south of the EL boundary (Figure 3). However, in detail a number of gemstone prospects are recognised (Figure 4) in gravels of undifferentiated Cenozoic age, either associated with abandoned placer tin mines (Priory and Bells Marsh) or close to basalt but with no previous mining (Logans and Littlechilds). A basalt source rock has not been located at Littlechilds prospect but is inferred due to the common coarse angular black spinel in the creek gravel.

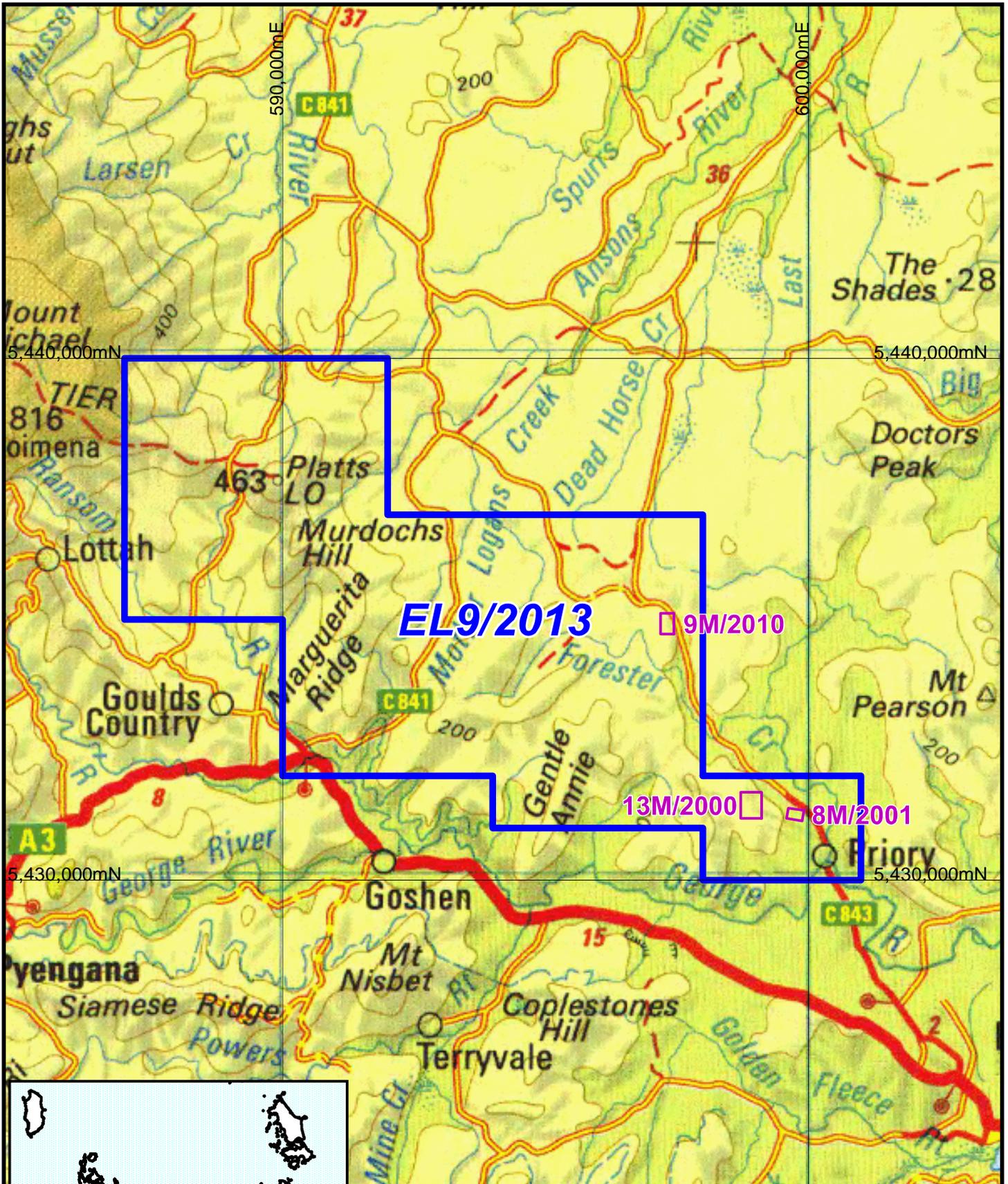
1.4 Licence Information

EL 9/2013 Priory (see Figures 1-4).

Categories 1 and 5.

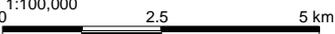
Holder: R. A. Gregory.

Licence Year 2: 7 November 2014 to 7 November 2015.

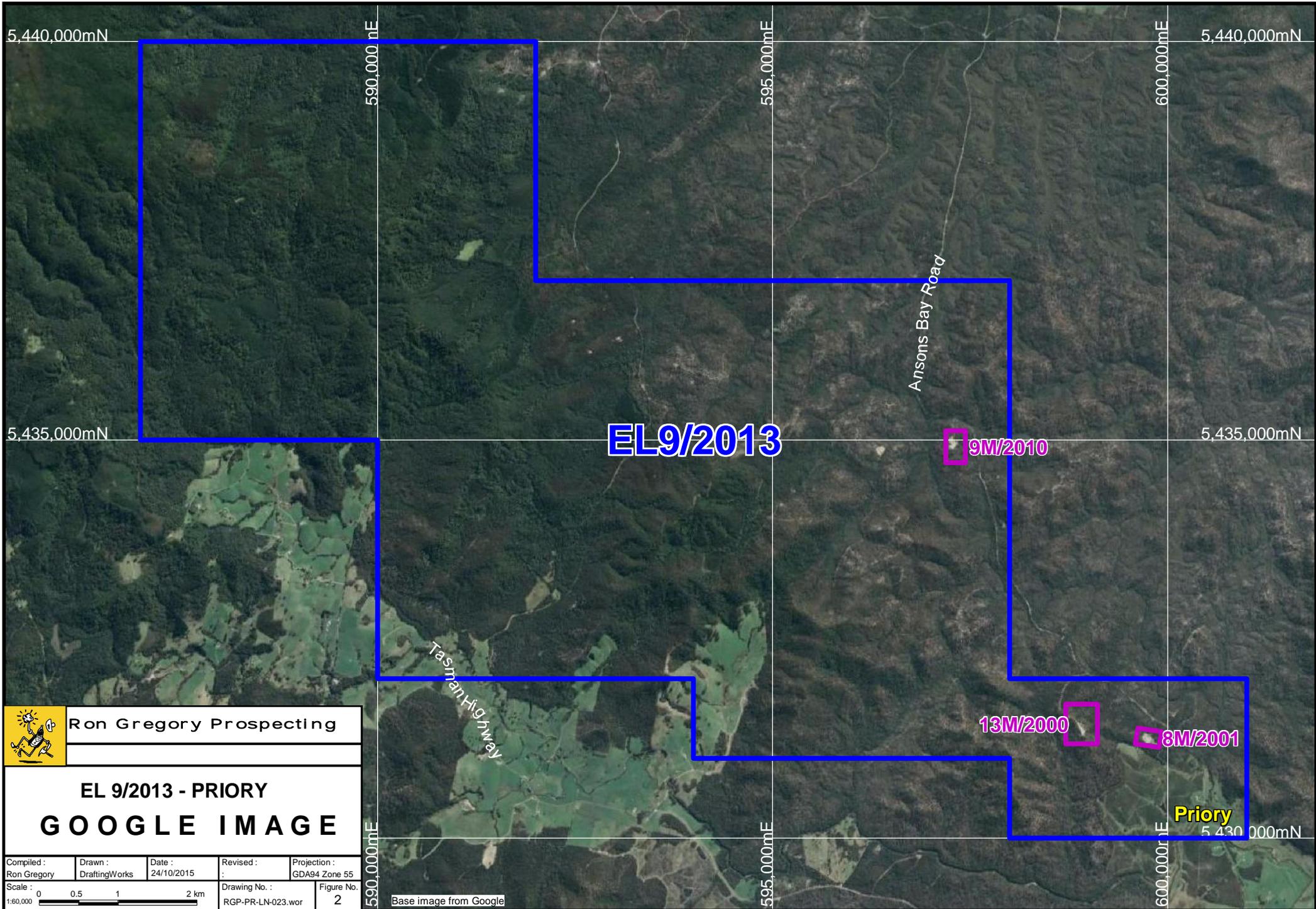


 **Ron Gregory Prospecting**

**EL 9/2013 - PRIORY
LOCATION PLAN**

Compiled : Ron Gregory	Drawn : DraftingWorks	Date : 25/10/2015	Revised : :	Projection : GDA94 Zone55
Scale : 1:100,000 (A4) 		Drawing No. : RGP-PR-LN-008	Figure No. 1	

Base image by TASMAR,
© State of Tasmania,



EL 9/2013

9M/2010

13M/2000

8M/2001

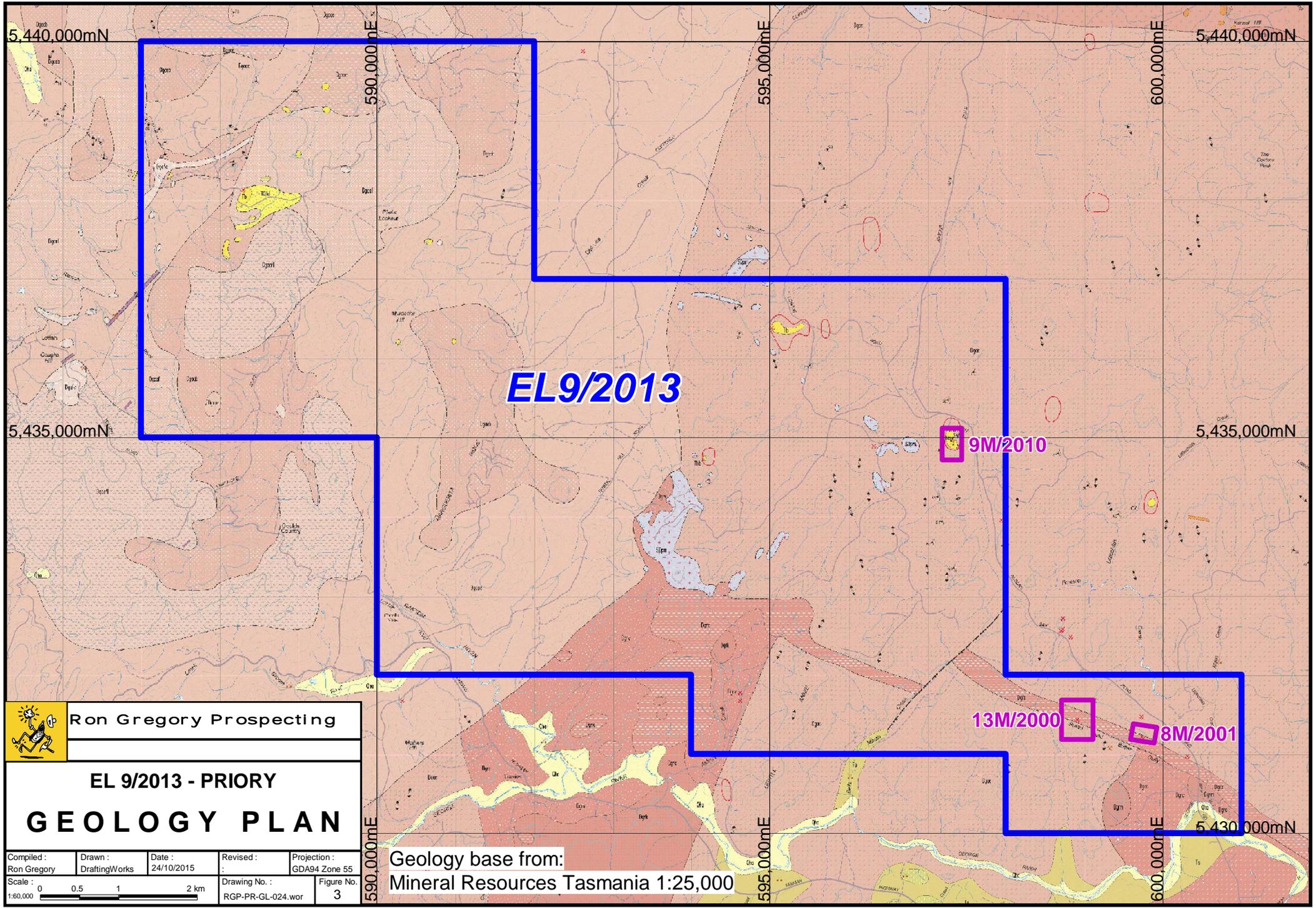
Priori

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EL 9/2013 - PRIORY
GOOGLE IMAGE

Compiled : Ron Gregory	Drawn : DraftingWorks	Date : 24/10/2015	Revised : :	Projection : GDA94 Zone 55
Scale : 1:60,000	0 0.5 1 2 km		Drawing No. : RGP-PR-LN-023.wor	Figure No. : 2

Base image from Google



EL9/2013

9M/2010

13M/2000

8M/2001

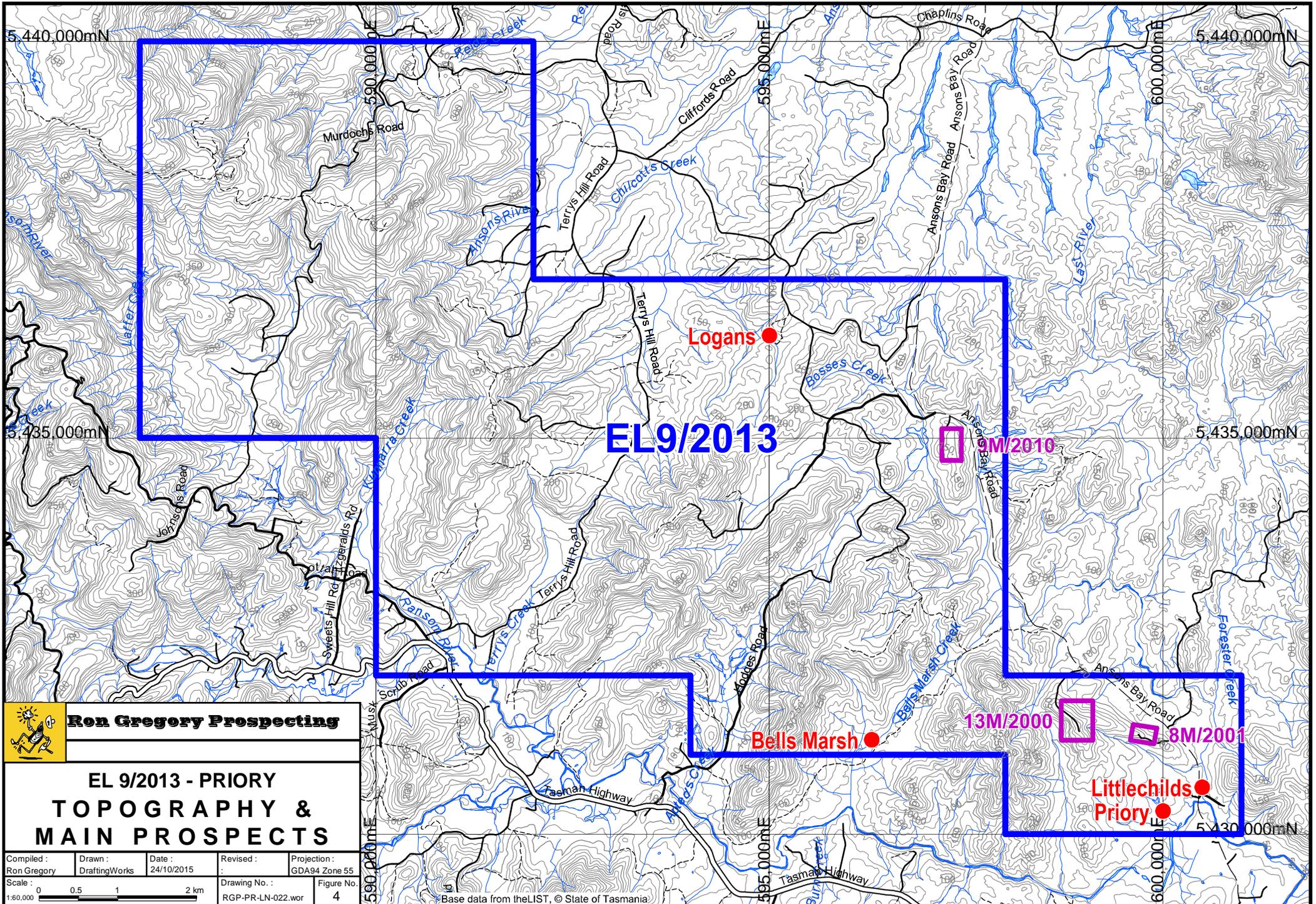


Ron Gregory Prospecting

**EL 9/2013 - PRIORY
GEOLOGY PLAN**

Compiled : Ron Gregory	Drawn : DraftingWorks	Date : 24/10/2015	Revised : :	Projection : GDA94 Zone 55
Scale : 0 0.5 1 2 km 1:60,000			Drawing No. : RGP-PR-GL-024.wor	Figure No. : 3

Geology base from:
Mineral Resources Tasmania 1:25,000



Ron Gregory Prospecting

**EL 9/2013 - PRIORY
TOPOGRAPHY &
MAIN PROSPECTS**

Compiled : Ron Gregory	Drawn : DraftingWorks	Date : 24/10/2015	Revised : :	Projection : GDA94 Zone 55	
Scale : 0 0.5 1 2 km		Drawing No. : RGP-PR-LN-022.wor	Figure No. : 4		

Base data from theLIST, © State of Tasmania

2. PREVIOUS EXPLORATION

Exploration prior to the current licence year is summarized in the Year 1 annual report (Gregory, 2015) and the subsequent partial relinquishment report for EL 9/2013 (Morrison, 2015). No records of gemstone exploration within the area currently covered by EL 9/2013 have been located. Van Dieman Mines Pty Ltd, under SEL 22/1999, conducted some exploration for sapphires in the Priory area but their work was located south of Priory and immediately outside of EL9/2013 (Gregory, 2015).

EL 9/2013 exploration in Year 1 consisted of reconnaissance gemstone prospecting and ground checking aeromagnetic features interpreted to potentially by responses from basalt pipes (Gregory, 2015). No new basalt outcrop was discovered and the prospecting work concluded that four high priority targets (Logans, Littlechilds, Priory and Bells Marsh – see Figure 4) warrant bulk sampling to determine sapphire grade and quality. Additional sites remain to be field checked. Of the four high priority targets, Bells Marsh also has tin potential and Priory has land use/environmental obstacles to exploration bulk sampling.

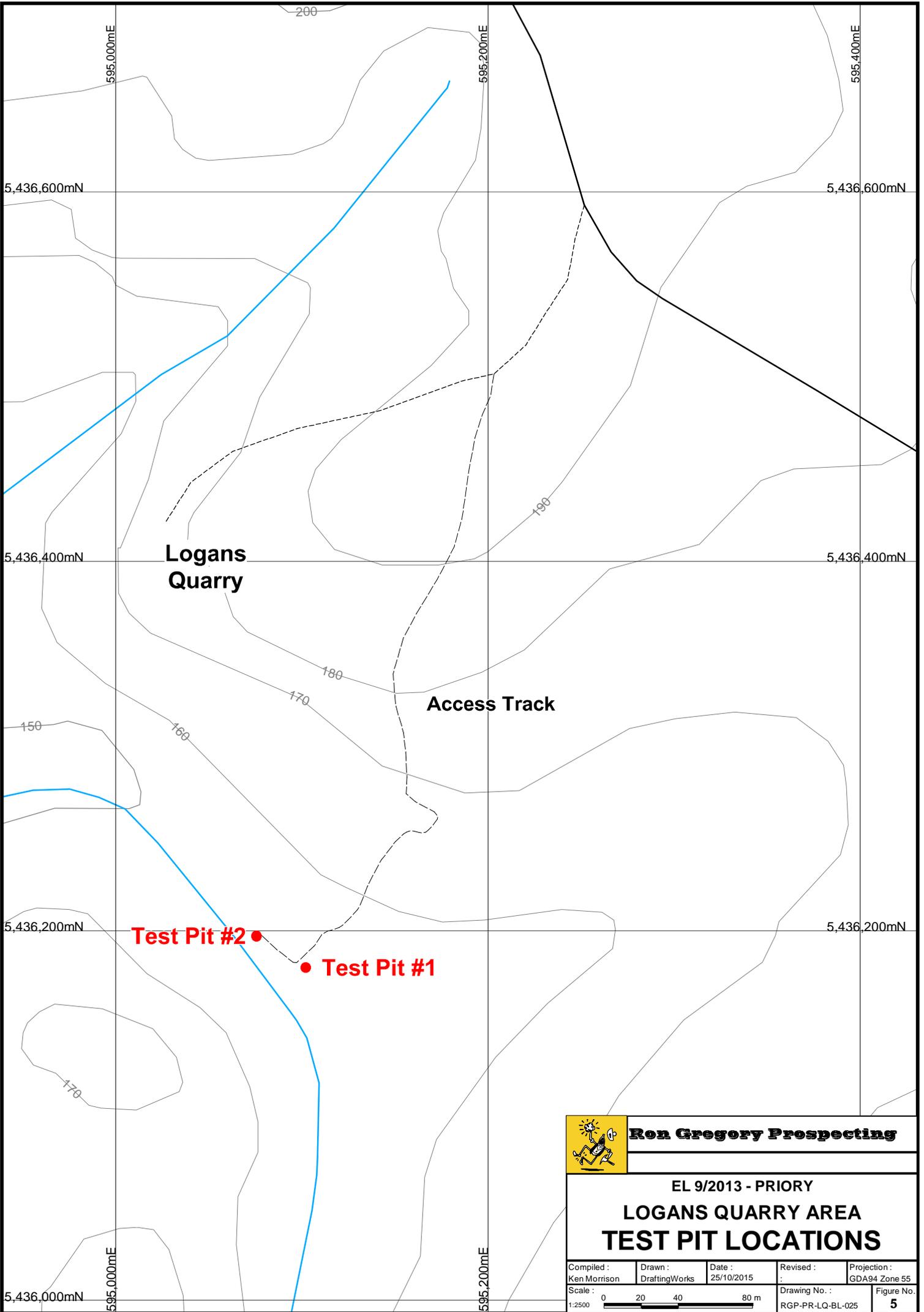
Based on a combination of geology, access and land use considerations, part of the EL was relinquished in early 2015 (Morrison, 2015).

3. EXPLORATION COMPLETED IN THE CURRENT YEAR

Exploration during the 2014-2015 licence year consisted of excavating two trenches at Logans prospect, testing basal alluvial gravels preserved under shallow overburden sediments on terraces bordering the current Mother Logans Creek (Figure 5). An estimated total 15 cubic metres of basal alluvial gravel, representing previous generations of the drainage system, was sampled and processed on site. The trenching earthworks and subsequent rehabilitation was conducted by Jason Rattray, from Pyengana, using a 7 tonne tracked excavator.

The gravel is composed of variable proportions of basalt, granite, Mathinna Supergroup contact metamorphic rocks and vein quartz, in a heavy wet clay matrix. Sediment composition and size ranges from sub angular coarse basalt cobbles to coarse granite sand and both trenches were excavated down to a partly weathered, free digging granite basement, at depths ranging from 0.5 - 1.5 metres (Photo 1). The gravel layer ranges in thickness from 10-30 cm and appears to be thickest in local basement depressions.

The gravel was processed on site by wet screening through a portable dual deck vibrating screen plant (Photo 2), which concentrated a middlings product in the 3-10 mm range and rejected oversize and undersize as tailings. The concentrate was spread on to tables and manually inspected for sapphires (Photo 3). Approximately 150 fragments of rough sapphire weighing 190 carats were recovered, along with numerous spinel and small zircon indicator minerals. Generally the sapphire colours are reasonable but the majority of the stones are either too small or too fractured and/or cloudy to warrant cutting. Twenty stones have been chosen by visual inspection for a cutting trial by a qualified gemologist, and the trial is currently underway.



**Logans
Quarry**

Access Track

Test Pit #2

Test Pit #1



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**EL 9/2013 - PRIORY
LOGANS QUARRY AREA
TEST PIT LOCATIONS**

Compiled : Ken Morrison	Drawn : DraftingWorks	Date : 25/10/2015	Revised : :	Projection : GDA94 Zone 55
Scale : 1:2500				Drawing No. : RGP-PR-LQ-BL-025
				Figure No. 5



Photo 1. Basal alluvial gravel on decomposed granite basement, Trench #2.



Photo 2. Washing and screening gravel using recycled water from Trench #2.



Photo 3. Manually inspecting screened gravel product for gemstones.



Photo 4. Rehabilitated site overlying Trenches #1 and #2. The flagged and undisturbed ground in centre right of photo is due to spotted pardalotes nesting in the ground.

Most of the gravel exposed in Trench #1 was composed of basalt cobbles, of similar size and degree of roundness to the surficial talus derived from the outcropping basalt upslope from Logans prospect. In contrast, the gravel composition of Trench #2, located only some 25 metres downstream from Trench #1, was derived mainly from quartzite, hornfels, granite and vein quartz, with a slightly higher degree of pebble roundness and deficient in basalt cobbles. The concentration of sapphire, zircon and spinel was much greater in Trench #2, and even within that trench it appears that the best trapping sites for concentrating gemstones correlate with gravels composed of the most siliceous and most rounded pebbles. Whilst it is expected that the concentration of heavy minerals will increase with greater alluvial transport and winnowing, it was surprising to observe such major changes in the pebble composition and the apparent correlation with gemstone grade. Further trenching is needed to confirm these indications but the current interpretation is that one or more earlier generations of alluvial sedimentation have concentrated heavy minerals at a time when the basalt lava facies currently outcropping at Logans was not a major part of the provenance geology.

4. CONCLUSIONS & RECOMMENDATIONS

- Trenching to basement on alluvial terraces is the only effective exploration method for testing the sapphire potential of prospects defined to date in EL 9/2013.
- Exploration at Logans indicates local enrichments at encouraging grades in pockets of relatively rounded siliceous gravel and relatively low basalt cobble content. This suggests at least two generations of alluvial sedimentation and the possibility that most of the gemstones were sourced from an early erupted facies of basalt now totally eroded from the outcropping Logans basalt, immediately upslope from the prospect.
- Early indications of sapphire grade and quality from Logans suggest that within the relatively high grade pockets of gravel, approximately 15 sapphires per cubic metre of gravel were recovered at a 3 mm minimum size cut off, and approximately 15% of these are of sufficient size and quality to yield cut stones in the 0.4-1.5 carat range. Further work is needed to firm up these early indications and generate more rigorous numbers.
- The major challenge encountered to date is how to predict the locations of the higher grade gravel deposits underlying the terraces. There may be potential to use the morphology of the current creek to predict optimum trapping sites in the sub surface palaeo drainage sediments.
- It is recommended in future, at Logans and new prospects to be tested, that additional effort be applied to “grade control” classification of waste and process gravels at the trench excavation stage. It should be possible to recognize the relatively high grade gravel freshly exposed in trench walls, from a combination of spinel abundance and pebble composition and roundness.

5. ENVIRONMENT

The disturbed area surrounding and including the two trenches has been rehabilitated (Photo 4) and the access track to the site will be rehabilitated and made unusable by light vehicles, in early November 2015. Further trenching at Logans is planned but the priority for the 2015-2016 year is to test the Bells Marsh and Littlechilds prospects, so it is necessary to

temporarily close off the Logans access track and facilitate new plant growth over the area disturbed by the previous trenching.

A small area was excluded from the rehabilitation earthworks due to a pair of spotted pardalotes establishing a nesting tunnel in the excavated bank, whilst the sampling operation was in progress (Photo 4).

No contamination of Logans Creek water or damage to the creek banks occurred due to the trenching completed in 2015.

6. PROPOSED YEAR 3 EXPLORATION

Bulk sampling and sediment processing to determine the potential sapphire grade in gravels at the Bells Marsh and Littlechilds prospects will be the priority for the 2015-2016 licence year.

Reconnaissance field work to check old alluvial tin workings and potential basalt occurrences based on aeromagnetic features, with the aim of generating additional prospects, will continue. A western portion of EL 9/2013 will be relinquished as a result of down grading by reconnaissance prospecting during 2015. A separate report detailing the relinquishment will be submitted to MRT.

Expenditure of approximately \$50,000 is anticipated to complete the Year 3 work.

7. EXPENDITURE

Expenditure for the 12 months ending 30 September 2015 is tabulated below.

Rental	\$3,951
Geoscientific	\$43,286
Land Access	\$2,464
Administration	\$5,569
TOTAL	\$55,270

8. REFERENCES

Black, L. P., McClenaghan, M. P., Korsch, R. J., Everard, J. L. and Foudoulis, C., 2005. The Significance of Devonian-Carboniferous igneous activity in Tasmania, as derived from U-Pb SHRIMP dating of zircon. *Australian Journal of Earth Sciences* 52, 807-829.

Gregory, R., 2015. EL 9/2013 Priory Annual Report 2014, Ron Gregory Prospecting.

Morrison, K., 2015. Exploration Licence 9/2013 Priory, Partial Relinquishment Report.