

**R. A. Gregory**  
**Exploration Licence 9/2013 Priory**  
**Annual Report Licence Year 4**



**Ken Morrison**  
**1 November 2017**

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## SUMMARY

Exploration continued at Logans prospect during the 2016-2017 licence year, with excavator prospect pits in two areas designed to test the extent of gemstone accumulation upstream from previous sampling sites. These pits exposed overburden thickness of up to three metres and basal gravels with low concentrations of spinel indicator heavy mineral, effectively down grading the upstream section of the prospect. No bulk sampling was conducted from these sites and they were rehabilitated on the same day they were excavated.

An estimated 8 cubic metres of alluvial gravel was sampled from an extension of the previous Pit 4 and processed on site by a combination of hydraulic sluice box gravity separation and manual sieving, to produce a +3mm washed concentrate. The concentrate was spread on to tables and manually inspected for sapphires. 68 fragments of rough sapphire were recovered for a total weight of 106.6 carats. Three stones weighed >8 carats each but they were of non gem quality. 8 stones were cut, producing small decent quality gems ranging from 0.13 to 0.60 carats, for a total weight of 2.58 carats. The yield of one cuttable stone in 8.5 is consistent with the overall result achieved at Logans to date.

The 3km access track to Bells Marsh was upgraded and additional earthworks completed preparation for a processing site and water recycling dam at Bells Marsh. The stockpile of previously excavated Littlechilds bulk sample gravel was relocated to the new processing site at Bells Marsh.

All disturbed ground at the Logans sites was rehabilitated and their access tracks have also been rehabilitated and made unusable by light vehicles.

Further bulk sampling at Logans and Bells Marsh prospects are planned for licence Year 5 in 2017-2018.

Total Year 4 expenditure on EL 9/2013 was \$72,960.

### 1. INTRODUCTION

#### 1.1 *Report Map Datum*

GDA94 – MGA Zone 55 (Figures 1-5).

#### 1.2 *Exploration Rationale*

The rationale for exploring this EL was originally 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 4. 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 4 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 are relatively enriched in apatite, nepheline and some rare elements (data provided courtesy of John Everard, MRT), in comparison to northeast Tasmanian Tertiary 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. 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).

The EL area originally covered 205 km<sup>2</sup> but partial relinquishment at the end of Year 1 and Year 2 reduced it to the current area of 11 km<sup>2</sup>, comprising two parts.

Categories 1 and 5.

Holder: R. A. Gregory.

Licence Year 4: 7 November 2016 to 7 November 2017.

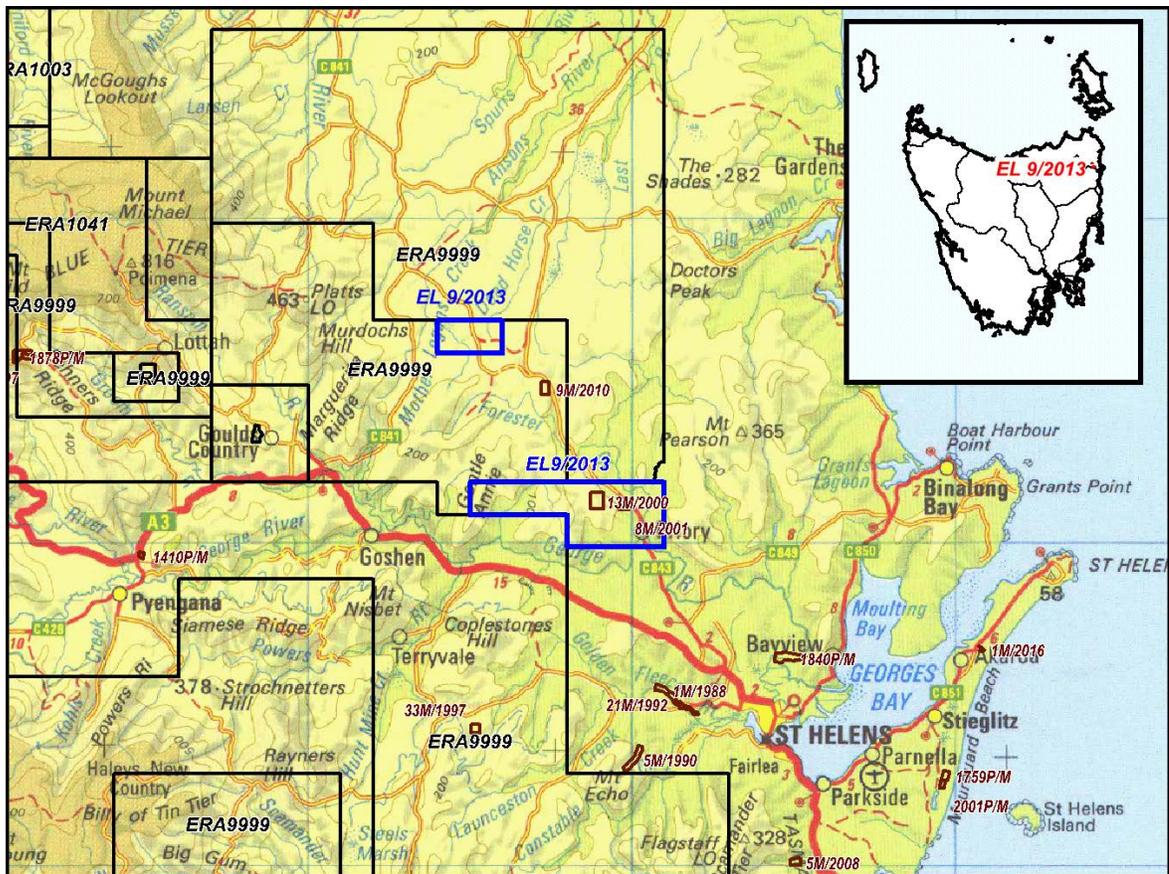
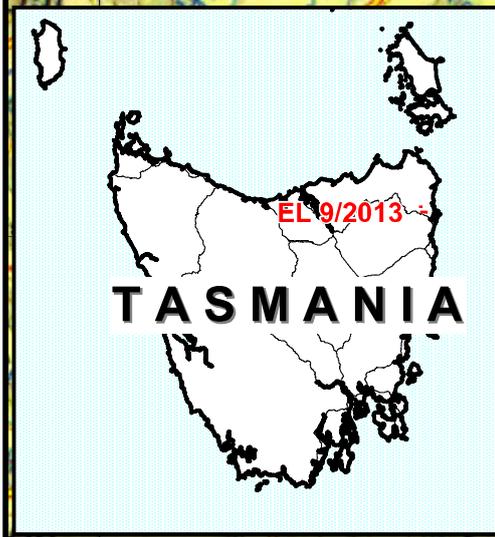
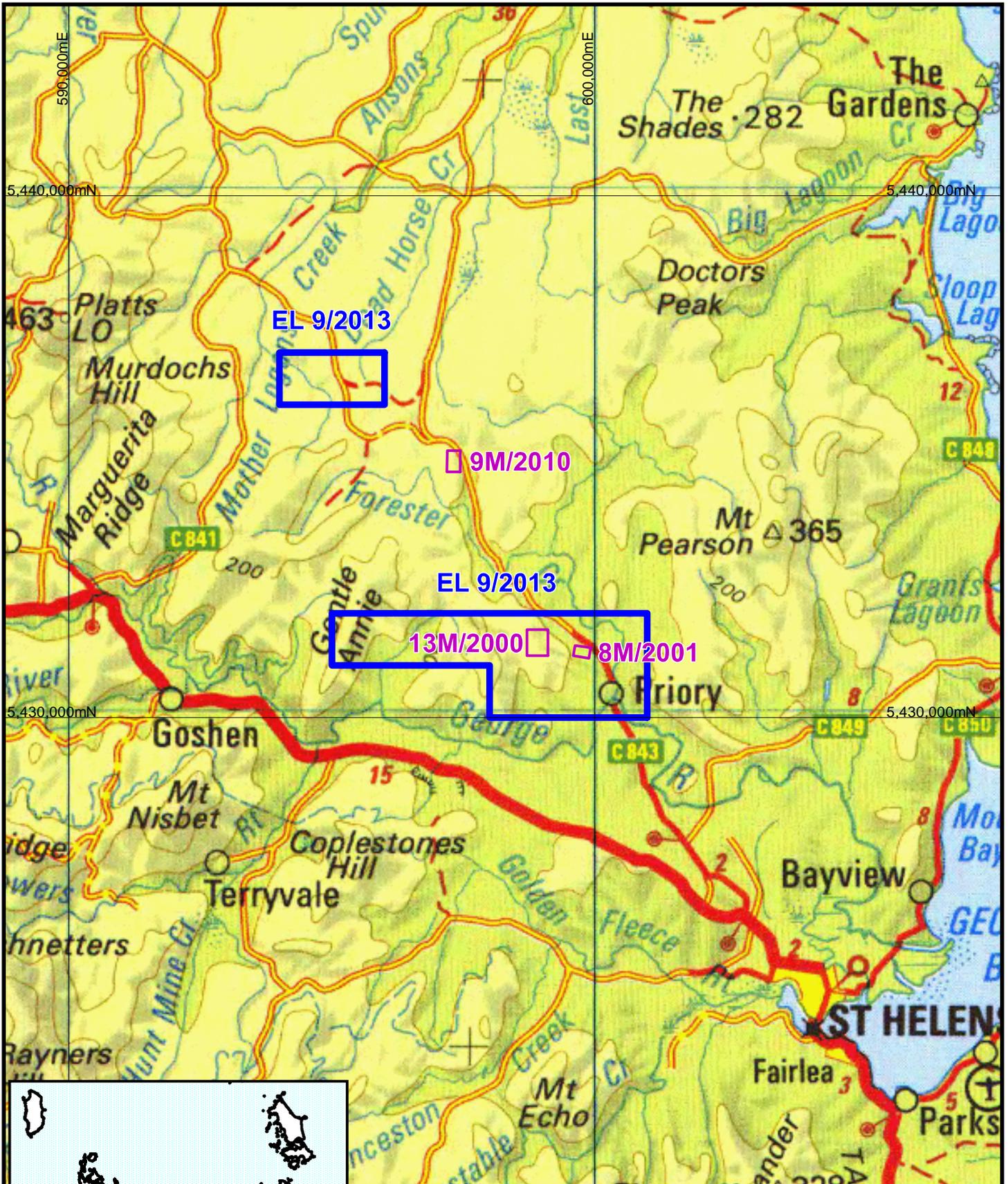


Figure 1 Regional Location Map

## 2. PREVIOUS EXPLORATION

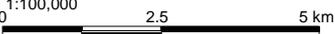
Exploration prior to the current licence year is summarized in the Year 1 annual report (Gregory, 2015) and the subsequent partial relinquishment reports and Years 2 and 3 annual report for EL 9/2013 (Morrison, 2015a, b, c). No records of gemstone exploration within the area currently covered by EL 9/2013 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). Duncan and Lloyd (2013) compiled a succinct overview of sapphire geology in the Blue Tier region and around Priory in particular.

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 Figures 3 & 4) warrant bulk sampling to determine sapphire grade and quality. Additional sites remained to be field checked. Based on a combination of geology, access and land use considerations, part of the EL was relinquished in early 2015.

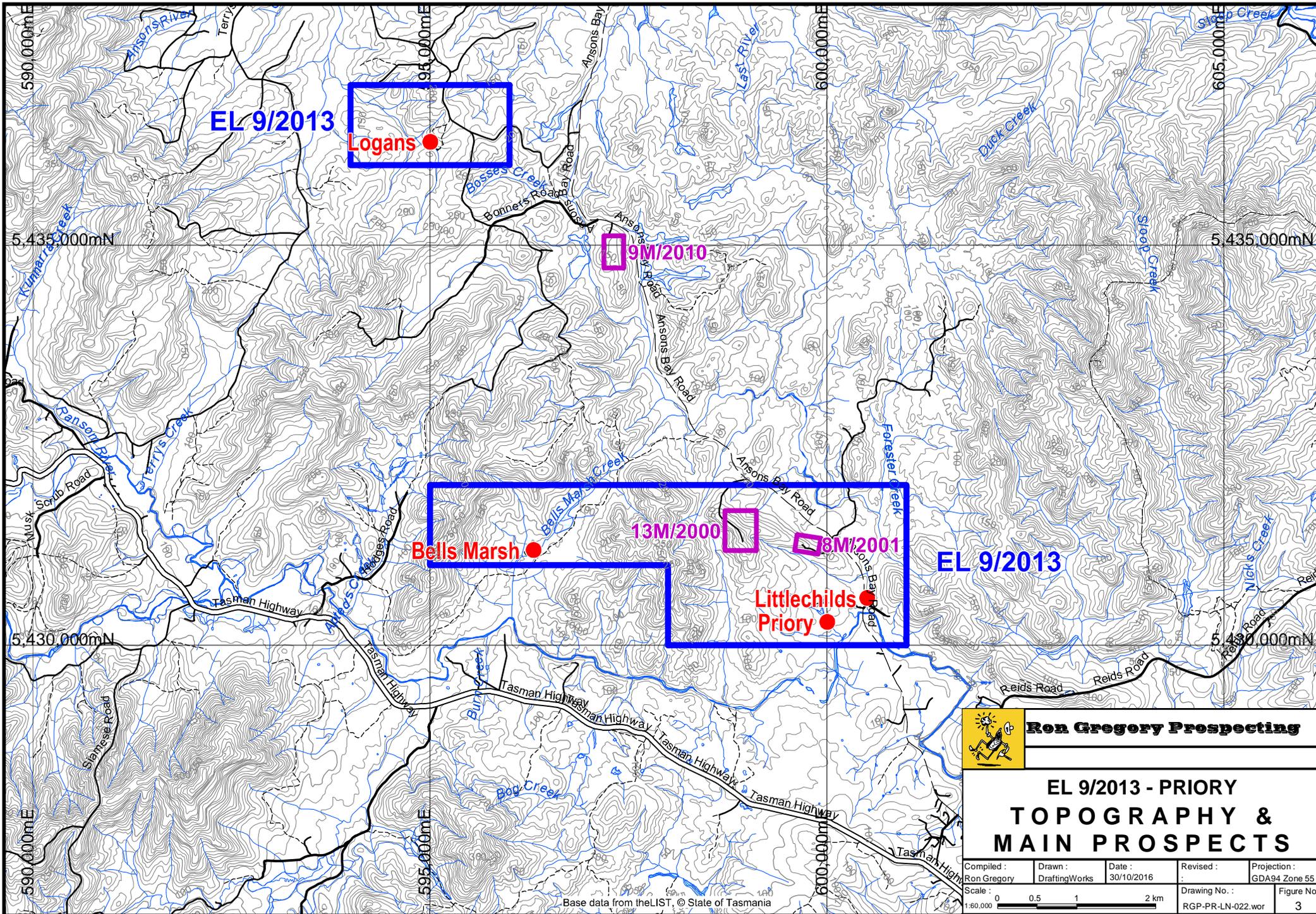


 **Ron Gregory Prospecting**

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

Compiled : Ron Gregory	Drawn : DraftingWorks	Date : 28/10/2016	Revised : :	Projection : GDA94 Zone55
Scale : 1:100,000 (A4) 		Drawing No. : RGP-PR-LN-008	Figure No. 2	

Base image by TASMAP,  
© State of Tasmania.

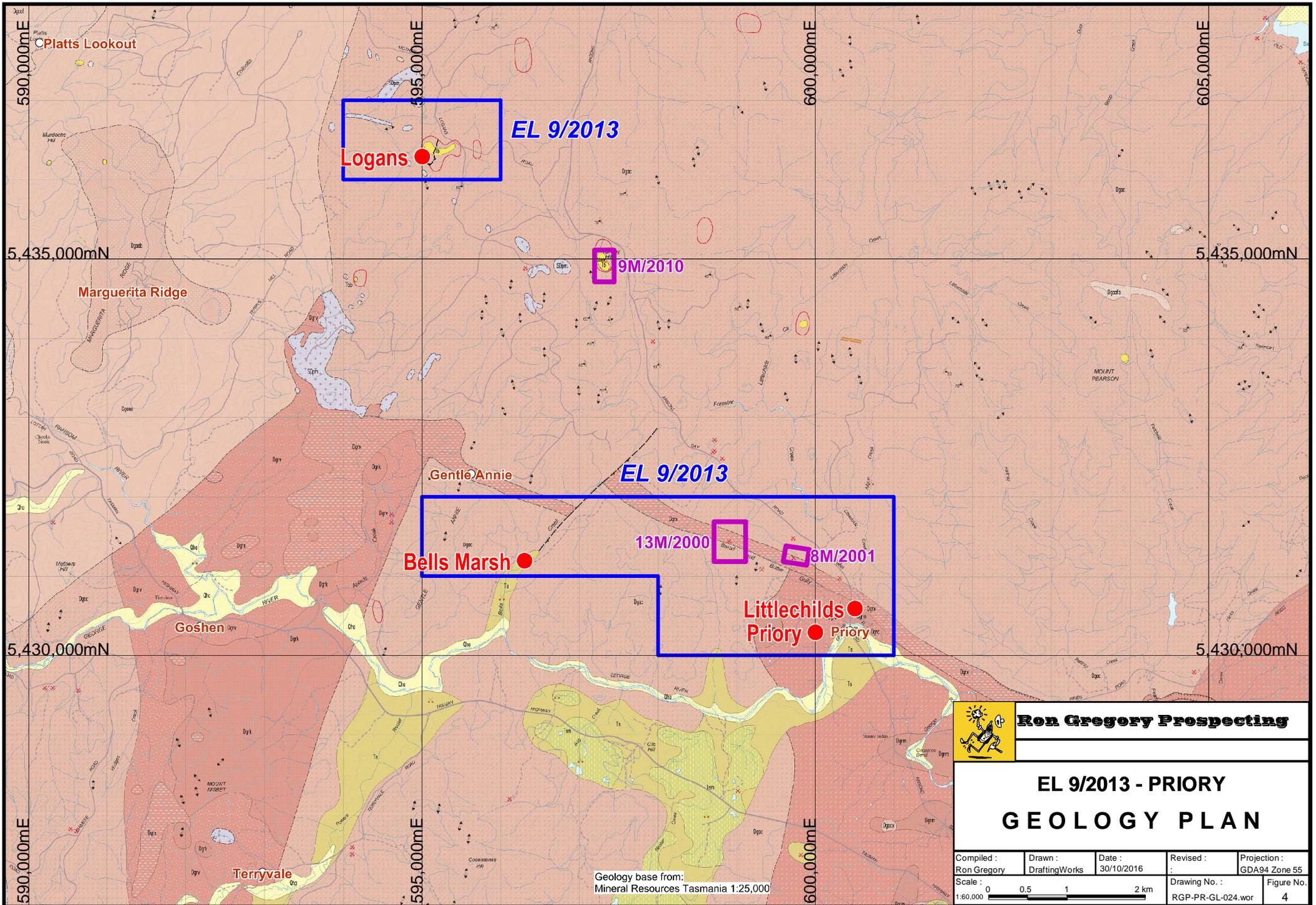


**Ron Gregory Prospecting**

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

Compiled : Ron Gregory	Drawn : DraftingWorks	Date : 30/10/2016	Revised : :	Projection : GDA94 Zone 55
Scale : 1:60,000			Drawing No. : RGP-PR-LN-022.wor	Figure No. 3

Base data from theLIST, © State of Tasmania



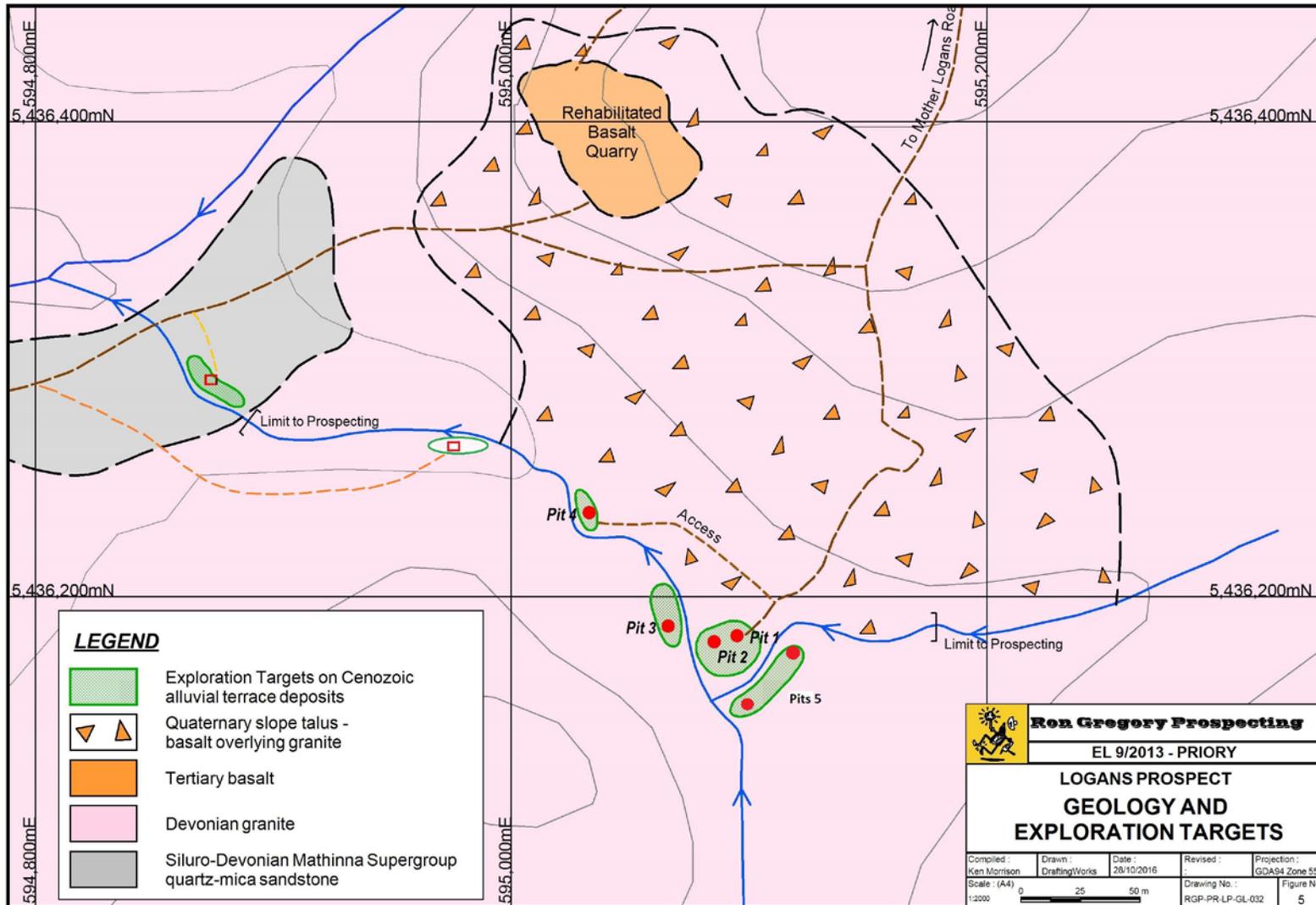
Geology base from:  
Mineral Resources Tasmania 1:25,000



**Ron Gregory Prospecting**

## EL 9/2013 - PRIORY GEOLOGY PLAN

Compiled : Ron Gregory	Drawn : DraftingWorks	Date : 30/10/2016	Revised : :
Scale : 1:60,000			Projection : GDA94 Zone 55
		Drawing No. : RGP-PR-GL-024.wor	Figure No. 4



In licence Year 2 terrace gravels were bulk sampled with two pits at Logans prospect and work commenced on the first pit at Littlechilds Creek near Priory (Morrison, 2015b). At Logans, an estimated total 15 cubic metres of basal alluvial gravel, representing previous generations of the drainage system, was sampled and processed on site by wet screening, manual sieving and visual inspection of the resulting +3mm concentrate. Approximately 150 rough sapphire fragments, plus a further hundred or so slightly smaller stones, were recovered, yielding 25 cut stones ranging in size from 0.1 to 1.4 carats.

Completion of the magnetic anomaly screening in Year 2 resulted in a further partial relinquishment (Morrison, 2015c).

Most of the work at Littlechilds Creek was undertaken in licence Year 3 and a stockpile of Littlechilds terrace sediment was transported to Bells Marsh where a dam and processing facility is being established, away from private farm land and river water, and by utilizing old abandoned tin workings. Bulk sampling continued from two new pits (Pits 3 and 4) at Logans in Year 3 (Morrison, 2016). Approximately 190 fragments of rough sapphire 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 dull and cloudy to warrant cutting. No stones of cuttable quality were recovered from Pit 3 but 18 stones classed as potential cutters were recovered from Pit 4. A yield of approximately 10% cuttable quality stones is consistent with the earlier results in Pit 2. Only 11 stones were actually cut, as the other 7 were considered too small despite their acceptable quality.

### **3. EXPLORATION COMPLETED IN THE CURRENT YEAR**

Exploration during the 2016-2017 licence year consisted of excavating two prospecting pits and developing one bulk sampling pit at Logans prospect, and upgrading the access road and additional earthworks to develop a sample processing site at the Bells Marsh prospect. All earthworks, including subsequent rehabilitation at Logans, was conducted, as with all previous campaigns at Logans, by Jason Rattray from Pyengana, using a 8 tonne tracked excavator.

The bulk sample gravel from Pit4 extended was processed on site at Logans by a combination of gravity separation in a portable sluice box and manual sieving, ie the same process used for Year 3 sampling (Morrison, 2016). Washed and sized +3mm concentrate was spread out on white tables and visually examined for sapphire. 68 pieces of +3mm sapphire were recovered with a total rough stone weight of 106.55 carats. Three stones weighed >8 carats each, the largest being 16.45 carats, but all three were heavily fractured and lacked sufficient clarity to be considered for cutting. 8 stones were cut by John DeRuyter in Hobart, producing small decent quality gems ranging from 0.13 to 0.60 carats, for a total weight of 2.58 carats. The yield ratio of 1/8.5 is consistent with the overall yield achieved at Logans to date. The cut stones are held in safe storage until exploration is advanced enough to make a decision on the potential for small scale mining.

Details of all trenches and pits excavated to date are shown on Table 1 and an updated list of conclusions regarding the optimum exploration method and geological controls on significant sapphire concentration at Logans is set out in Section 4 below. More bulk sampling on untested targets downstream from the confluence of the two branches of Logans Creek (at the Pit#5b site – Figure 5) will be targeted in licence Year 5, to try and better understand the reasons for the variable grade problem shown on Table 1.

The 3 km access track to Bells Marsh was improved by removing fallen limbs, filling eroded gutters and improving drainage to reduce erosion and to allow light vehicle creek crossing at two locations. Further earthworks at Bells Marsh completed a stockpile pad and process plant site and refurbished an old overgrown tin mining dam, which will become a water storage and recycling facility for all future sampling campaigns at Bells Marsh.

The 10 cubic metre sample from Littlechilds prospect, which was trucked to a stockpile site at Bells Marsh in 2016, was moved to the new processing site at Bells Marsh. The stockpile has not yet been processed.

Table 1 Bulk Sampling Summary to October 2017

EL 9/2013 Priory - Register of Exploration Pits & Trenches											
Prospect	ID	Date	gda East	gda North	Depth	Width	Length	Azi gda	Process Gravel	Cut Stones	Carats
Logans	Trench#1	Jun-15	595094	5436184	1.5m	1.0m	9m	244	5m3	1	1.4
Logans	Trench#2	Oct-15	595080	5436178	1.5m	1.2m	9m/6m	254	10m3	24	8.1
Logans	Pit#3	Nov-15	595080	5436175	1.5m	3.0m	3m	n/a	3m3	0	0
Littlechilds	Pit#1	Jan-16	600558	5430637	3.0m	1.2m	14m	184	10m3	**	
Logans	Pit#4	Sep-16	595034	5436230	1.5m	2.0m	8m	139	10m3	11	6.9+
Logans	Pit#4ext	Jun-17	595034	5436230	1.5m	3.0m	3m	n/a	8m3	8	2.6
Logans	Pit#5a	Jun-17	595024	5436230	3.0m	3.0m	3m	n/a	0	n/a	n/a
Logans	Pit#5b	Jun-17	595088	5436176	2.0m	3.0m	30m	n/a	0	n/a	n/a

(\*\* nb Littlechilds Pit#1 material has not yet been processed.)

#### 4. CONCLUSIONS & RECOMMENDATIONS

(including conclusions which remain unchanged since Year 2)

- Excavator trenching or pitting 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 restricted enrichments at encouraging grades in discontinuous pockets of relatively rounded siliceous gravel and relatively low basalt cobble content. Much of the coarser basalt clasts appear to be angular talus fragments, effectively diluting the better sorted basal alluvial gravel. 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 volcanoclastic basalt, now

totally eroded from the site of the basalt pipe immediately upslope from the alluvial prospect.

- Current indications of sapphire grade and quality from Logans suggest that within the relatively high grade pockets of gravel, approximately 10-20 rough sapphires per cubic metre of gravel were recovered at a 3 mm minimum size cut off, and approximately 10% of these are of sufficient size and quality to yield cut stones in the 0.1-1.5 carat range. These numbers have been updated and remained fairly constant in bulk sampling since Year 2.
- Exploration bulk sampling to date indicates that grade is more important than deposit volume. The best indications of potential economic viability are associated with restricted sites close to bends in the current creek. These sites are characterized by better sorted gravel enriched in heavy minerals, are relatively free of matrix clay and contained in pothole-like depressions in the granite basement. The most prospective part of the gully extends for about 300 metres downstream from the junction of the two branches of Logans Creek.

## **5. ENVIRONMENT**

The disturbed areas surrounding and including the pits have been rehabilitated (Photo 1) and the main access track to the Logans sites has been rehabilitated and made unusable by light vehicles.

No contamination of Logans Creek water, or damage to the creek banks, occurred due to the bulk sampling and no litter or hydrocarbon residue remains on any of the sites. Substantial modification to the creek morphology is resulting from non approved and non permitted industrial scale fossicking

Healthy, weed-free regrowth of the riverine vegetation is progressing well on the sites of Pits 1 and 2 at Logans, following rehabilitation in 2015. It is noted that 2017 winter and early spring conditions in the area have been unusually dry and cool, resulting in a slower than normal start to regrowth.



Photo 1            Rehabilitated Pit 4 extension site, Logans prospect

## **6.        PROPOSED YEAR 5 EXPLORATION**

Bulk sampling and sediment processing to determine the potential sapphire and tin grades in gravels and tin tailings at the Bells Marsh prospect will proceed during 2017-2018. This will include processing the stockpile of gravel sampled from Littlechilds prospect in early 2016 and which has now been moved to a pad next to the processing site for Bells Marsh bulk samples.

Further sampling at Logans prospect is need to follow up the previous results and this will remain the highest priority target on the EL. The main aim during Year 5 will be to sample terrace sediments further downstream from all previous sampling (Figure 5).

Expenditure of approximately \$50,000 is anticipated to complete the Year 5 work.

## **7.        EXPENDITURE**

For the 12 month period ending on the 30<sup>th</sup> September 2017, total expenditure on field exploration, including, earthworks, geology and sample processing, and minor tenement and administration costs, was \$42,206 including GST. Detailed breakdown of expenditure categories is submitted on the quarterly returns for the calendar year.

## 8. REFERENCES

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