

**Wesknight Mining Pty Ltd**

**EL 12/2011 – Mangana**

**Year 1 Annual Report**

Ken Morrison  
29 December 2012

## CONTENTS

	Page
SUMMARY	1
INTRODUCTION & TENEMENT DETAILS	1
GEOLOGY	3
EXPLORATION AIMS & PHILOSOPHY	3
SUMMARY OF PREVIOUS EXPLORATION	4
EL 12/2011 EXPLORATION RESULTS	6
EXPENDITURE	10
ENVIRONMENTAL ACTIVITIES	10
FUTURE WORK	10
REFERENCES	11

Table 1	Tailings Sand Channel Sampling Results
Table 2	Argyle-Golden Entrance Underground Bulk Sampling Results
Table 3	Expenditure
Figure 1	Location Map
Figure 2	Site Survey Plan
Figure 3	Argyle-Golden Entrance Long Section
Appendix A	Historic Cultural Heritage Survey Report
Appendix B	Botanical & Fauna Habitat Survey Report
Appendix C	Notice of Intent – Mineral Processing Works

## SUMMARY

EL 12/2011 is a 4 km<sup>2</sup> Category 1 licence centred approximately 2 km SE of the Mangana township. The EL was awarded to Wesknight Mining Pty Ltd in December 2011, as the successful tenderer for a portion of Exploration Release Area 852.

Current exploration on the EL is aimed at demonstrating the viability of developing an adit accessed, small scale, high grade narrow quartz vein gold mining operation on the Argyle-Golden Entrance reef. The reef is a 500 metre long NW-SE trending mineralised structure centred on Sailors Gully and extending from Sharkeys Gully to Irvines Gully in the central part of the EL.

Apart from upgrading vehicle track access, drainage, signage and the installation of water tanks and facilities for processing bulk samples and storing equipment, most exploration activities in the past year have been underground.

In accordance with an MRT approved work program, underground access to some Argyle - Golden Entrance drives was upgraded and made safe. A program of underground sampling recovered samples ranging from 30-1000 kg, which returned grades ranging from 0.1-864ppm Au (mean 32ppm Au).

Channel sampling battery tailings sand from abandoned early workings returned grades ranging from 0.46-1.68ppm Au (mean 1.01ppm Au), indicating some potential for local reprocessing.

A survey of surface and underground infrastructure was completed and a set of maps and sections was produced. Cultural heritage and botany and fauna habitat surveys were also undertaken by consultants.

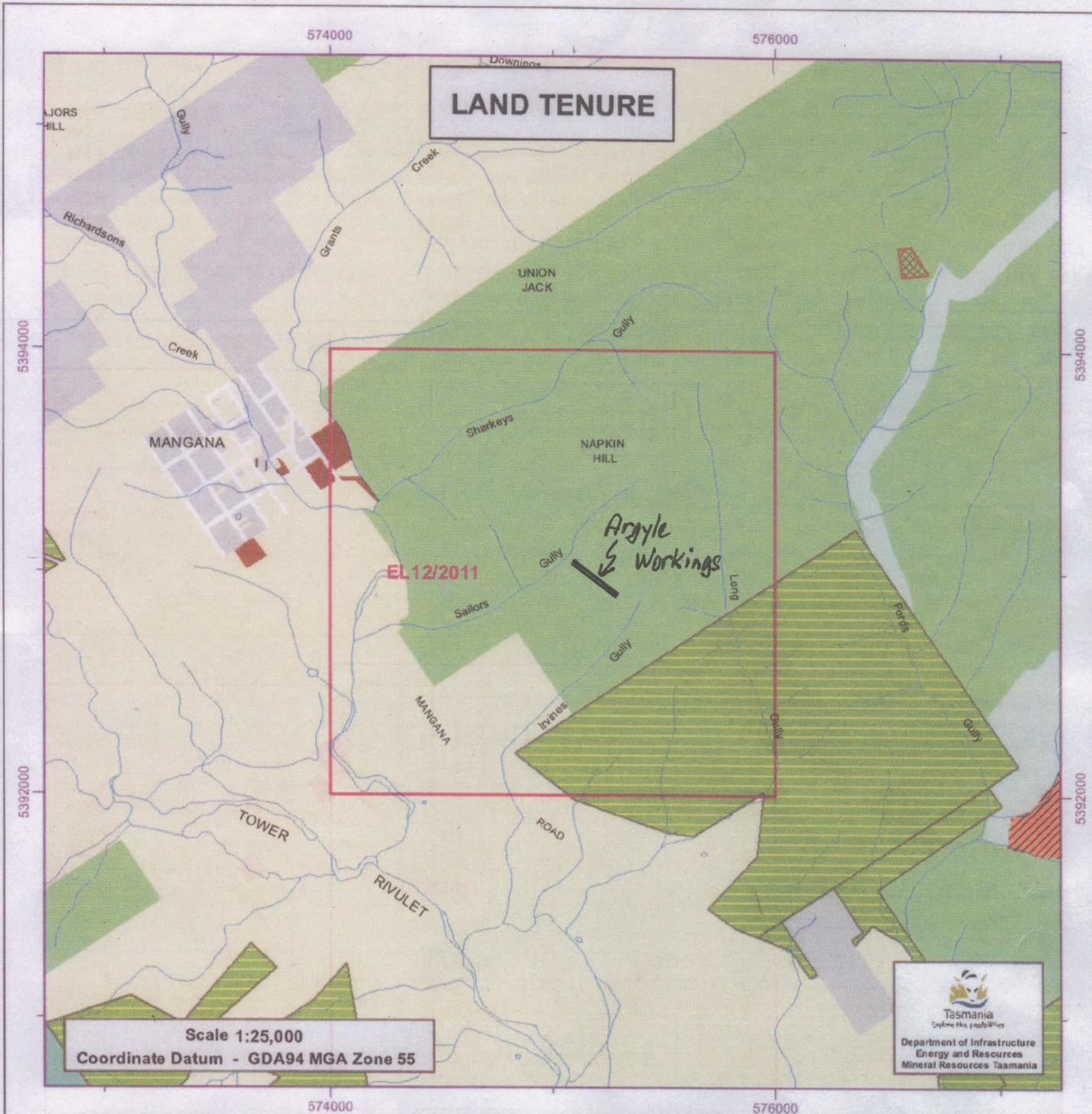
A Notice of Intent for a Mineral Processing Works was submitted to the Environmental Protection Authority and preparation for a Mining Lease application is in progress.

## INTRODUCTION & TENEMENT DETAILS

EL 12/2011 is a 4 km<sup>2</sup> Category 1 licence centred approximately 2 km SE of the Mangana township (Figure 1). The EL was awarded to Wesknight Mining Pty Ltd (Wesknight) in December 2011, as the successful tenderer for a portion of Exploration Release Area 852.

The application was focused on acquiring tenure over the abandoned Mangana narrow vein quartz reef workings, in particular the partly mined Argyle-Golden Entrance structure and its adit infrastructure. Wesknight has substantial experience and expertise in mining small tonnages of relatively high grade ore in narrow steeply dipping structures and the work program currently in progress is aimed specifically at determining the feasibility for a specialised small scale underground gold mine

Figure 1 shows that the land tenure across EL12/2011 comprises a combination of State Forest, Private Land, Private Reserve and Public Reserve, with the workings



Land Tenure / Special Management Areas (Guide Only)		
	Mining Lease	
	Administratively Excluded Areas	
	Fossicking Area	
	Fossil Site	
	RAMSAR Site	
	Gas Pipeline Corridor	
	Forest Communities Managed by Prescription	
	Aurora / Hydro / Transend Lands	
	Commonwealth Land	
	Private Land	
	Private Reserve	
	Private Reserve - Availability Unknown	
	Private Reserve - Unavailable under MRDA	
	Informal Reserve (Forestry Operations) - Private Land	
	Public Reserve	
	Proposed Public Reserve - CLAC	
	Aboriginal Administered Land	
	Indigenous Protected Areas	
	Protected Area	
	Wellington Park	
	Conservation Area - Unavailable under MRDA	
	Conservation Area	
	Proposed Conservation Area - CLAC	
	Game Reserve	
	Proposed Game Reserve - CLAC	
	Historic Site	
	Proposed Historic Site - CLAC	
	National Park	
	Proposed National Park - CLAC	
	Nature Recreation Area	
	Proposed Nature Recreation Area - CLAC	
	Nature Reserve	

Relevant tenement land tenure / land management area indicated \*  
 Note: Land Tenure is derived from the LIST and other sources and may be incomplete. Not all Land Tenure depicted in legend may appear on the map.  
 CROWN COPYRIGHT RESERVED

Figure 1

being located on State Forest. All weather access to most parts of the EL is available via 2WD roads to the southern part of the tenement and a combination of 4WD and walking tracks around the workings. All services and equipment needed for year round exploration are available in the Esk Valley-Launceston region.

This report covers all exploration and feasibility study activities conducted in licence year 1, ending 5 December 2012. During the year, cultural heritage and botanical and fauna habitat surveys were conducted by specialist consultants and their reports are included as appendices. The exploration program is somewhat unusual for an EL, in that the majority of the work comprised underground sampling and the development of safe and effective access to facilitate the sampling and evaluate the mining potential of the reef.

## **GEOLOGY**

The deposit is one of several Devonian structurally controlled orogenic quartz vein style gold-silver-sulphide reefs which comprise the Mangana goldfield. The regional geology hosting all known mineralised structures in the Mangana area consists of folded and faulted greenschist metamorphosed turbiditic sandstones and black shales (mainly now slates), within the Siluro-Devonian Mathinna Supergroup (Tasmanian Geological Survey 1:25,000 Mangana Sheet).

The Argyle-Golden Entrance structure is a 500 metre long shear trending NW-SE from Sharkeys Gully to Irvines Gully, with most of the abandoned workings and known mineralization in the central part of the structure around Sailors Gully (Figure 1). The strike of the structure is normal to the strong NE-SW trending tectonic fabric controlling the ridge and gully topography of the area hosting the reef. This geometry is consistent with a late stage compressional shear structure and the banded and laminated nature of the quartz fill, together with the locally intense folding and brecciation at the reef-wall rock contacts, indicated several stages of dilation and fluid fill during the compression.

Exposures within the Argyle workings indicate a reef width ranging from 20 cm to 2 metres, and a steep dip to the NE. Remnant stopes show a lenticular shape to the mineralised shoots within the reef but there is no obvious structural control which could be used to predict the spacing of these wider, higher grade shoots.

## **EXPLORATION AIMS & PHILOSOPHY**

The potential for a viable modern mine appears to rely on narrow vein hand held development of the adits, with continuous drilling and bulk sampling to delineate ore zones. Given the deformation style it is also likely that the reef may buckle and locally change dip direction with depth, so a consistent NE dip cannot be assumed. This should not be a problem in the early years of the mine life, as the sampling to date in both the Argyle and Golden Entrance adits, indicates better grades above the base of oxidation. The base of oxidation occurs at about the lower adit level in Sailors Gully and below this level there is a substantial increase in sulphide and ground water. Above this position the rocks are oxidised, mainly dry and most importantly enriched in gold, albeit with an erratic and nuggety distribution, including some coarse visible gold.

From a mining and metallurgical perspective, the geology indicates a strong case to

initially concentrate the mine on the supergene enriched upper level workings either side of Sailors Gully.

The aims and philosophy of the current exploration program are to test the grade variability, metallurgy and ground conditions along strike within the old adits, and evaluate the economics of the project in terms of applying modern geological control and mining skills and equipment to more traditional manual mining methods. This approach best utilises the Wesknight skills and experience and creates the opportunity for a viable business based on relatively small production tonnages, which would not be possible if the capital costs and overheads associated with a typical mid tier mining company operation were required.

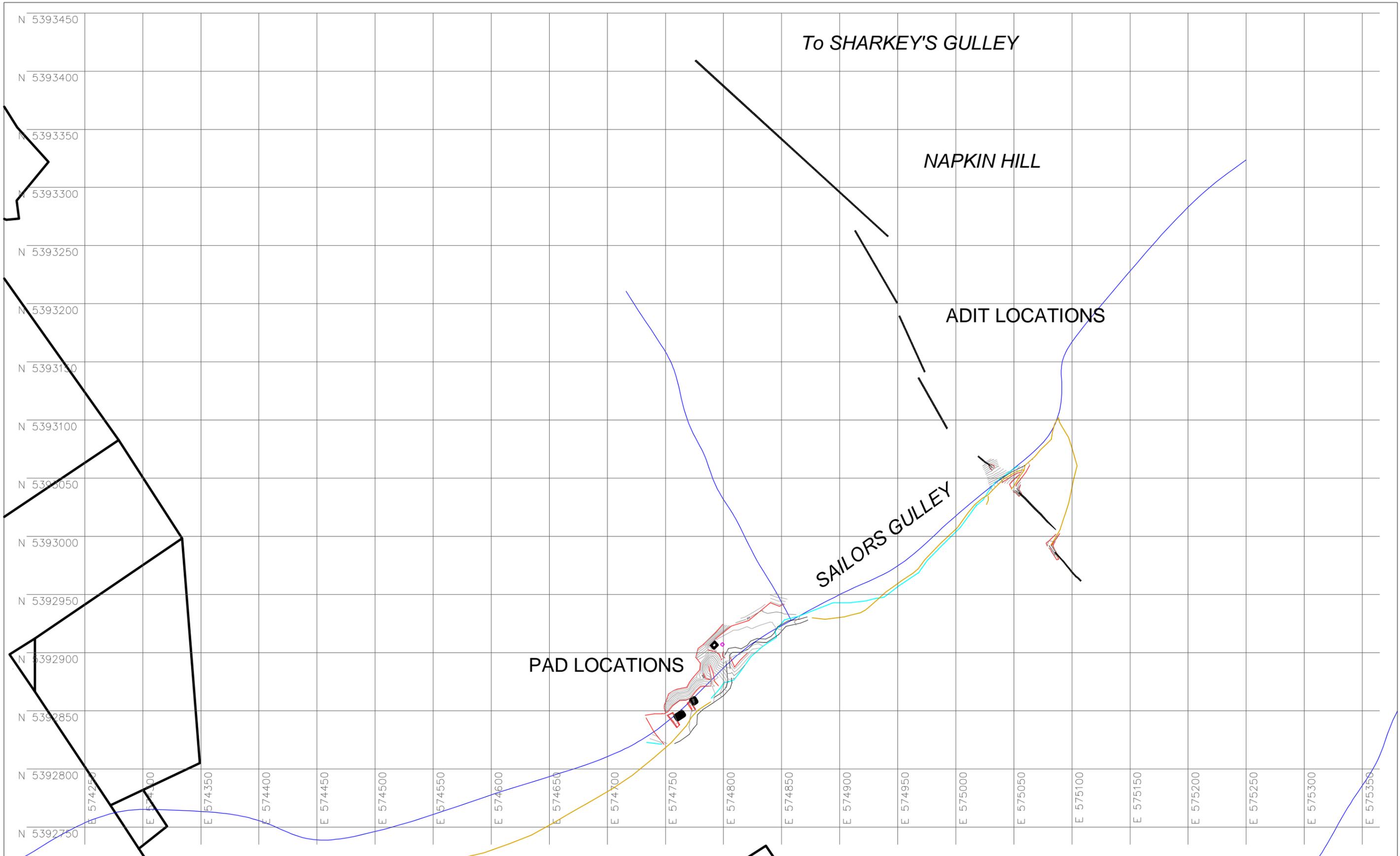
## **SUMMARY OF PREVIOUS EXPLORATION**

Tasmanian Geological Survey Bulletin No1 (Twelvetrees, 1907) and Unpublished Typed Reports (Reid, 1929, Blake, 1939 and Finucane, 1932) record the history of prospecting and mining on the Mangana goldfield. The main deposit, Mangana Reefs, was discovered in 1859 and was probably the first quartz vein gold reef to be mined in Tasmania, following sporadic alluvial mining in Richardsons Creek and Majors Gully by Chinese and European miners from 1852 onwards. The Golden Entrance reef was discovered in 1896 and worked intermittently until the mid 1920s and the Argyle, a southeasterly strike extension of the Golden Entrance, was discovered in 1927.

Despite substantial underground development only one small shoot appears to have been mined on the Argyle reef. Sampling by government geologist Finucane in 1932, Tasminex NL in 1981 and Alcaston Mining NL in 1988, all produced grades in the range BLD-31 g/t gold from vein widths ranging from 20-100 cm, indicating that remnant ore grade mineralisation remains in the old stopes but the grade distribution is very nuggety. This interpretation is also supported by Finucane (1932) reporting systematic ore dump sampling returning an average gold grade of 1.2 g/t, much less than the average of hand picked channel samples from underground.

In 1988 Alcaston Mining NL drilled 8 inclined open hole percussion (RAB) drill holes under the Argyle workings. This program appears to be the only attempt to assess the overall grade of the vein system and the results were disappointing. All holes intersected intervals of geochemically anomalous but very much sub economic gold (Morrison, 1988). All intersections were <1 g/t Au.

The previous work has demonstrated that patchy high grade gold remains in the Golden Entrance-Argyle vein structure and that an opportunity exists for selective low tonnage mining utilising renovated existing underground access infrastructure.



REV	DATE	DESCRIPTION
1	18/5/2012	First Issue

**Northern Surveying Services**  
 495 Melrose Road , Eugenena 7310  
 Telephone (03) 6427 2765      Fax (03) 6427 3040  
 Mobile 0418 141 244      e-mail : surveyns@bigpond.com

**Mangana Mine**  
 Overall Site With GDA Grid

Drawn By : DM      Scale 1:3000 (A3)      Contour Interval

NOTES:  
 Surveyed using RTK GPS & UTS  
 DATUM:  
 Coordinates are GDA/AHD  
 based on a 'Fix Here' solution  
 Drawing No.  
**Mangana-2**

Figure 2

## EL 12/2011 YEAR 1 EXPLORATION RESULTS

Apart from a small sampling project on the old battery tailings sands, all work to date has been associated with refurbishing and sampling the Golden Entrance and Argyle adits and stopes. Figure 2 shows the survey plan of surface based infrastructure and the traces of the underground adits.

The tailings sand sampling on Table 1 consisted of 12 evenly spaced channel samples, taken from top to bottom through the dune shaped body of sand located at the southern end of the EL. The deposit is roughly estimated at approximately 7,000 tonnes, by tape measurement of the dimensions and assuming a bulk density of 1.6 t/bcm. The sampling returned a mean grade of 1 g/t gold and a fairly tight range of 0.46-1.68 g/t gold, by fire assay/AAS. These results are too low to contemplate trucking the sands to operating mills at Beaconsfield or Henty but indicate potential to reprocess the sand onsite, as part of the head feed to a crusher/gravity separation mill primarily treating oxide zone quartz vein ore from underground.

**Table 1**

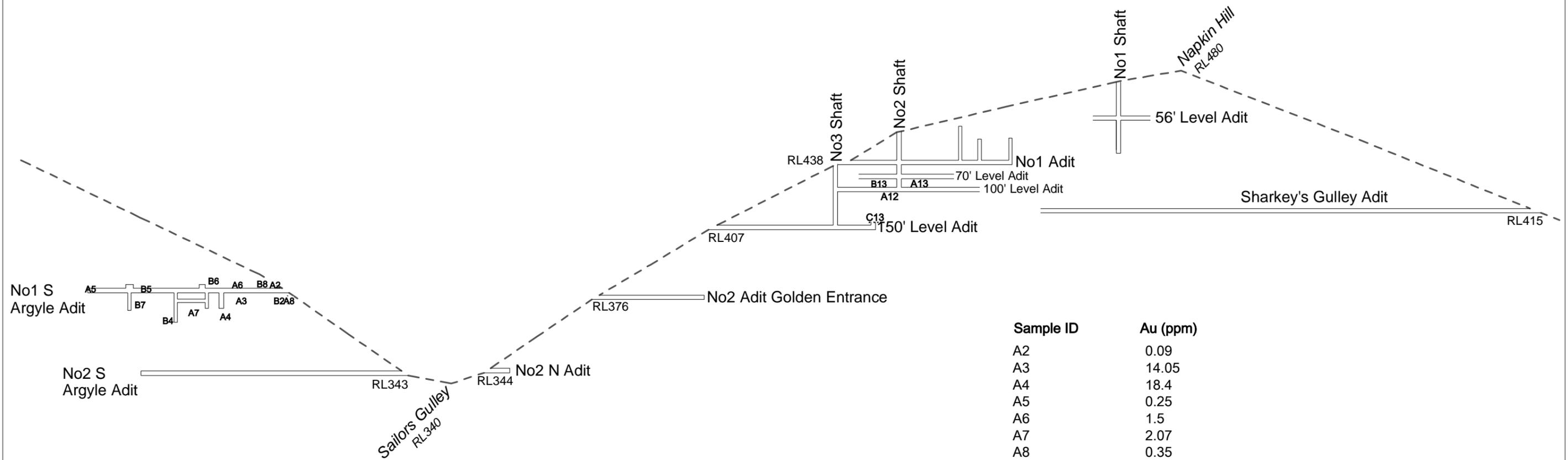
Tailings Sand Channel Sampling-July 2012  
(\*GDA 94 by hand held GPS)

Sample ID	Easting*	Northing*	Au ppm
WR0001	574408	5392655	1.68
WR0002	574403	5392645	1.18
WR0003	574402	5392638	0.46
WR0004	574404	5392633	1.31
WR0005	574393	5392629	0.94
WR0006	574397	5392634	1.04
WR0007	574405	5392631	0.86
WR0008	574410	5392628	1.49
WR0009	574408	5392624	0.88
WR0010	574409	5392601	0.51
WR0011	574416	5392590	1.10
WR0012	574419	5392583	0.66

The main activity involved refurbishing drives and stopes with hand held drills and a small bobcat and taking samples from the reef using ladders and percussion hammers. Figure 3 is a long section through the workings, reconstructed from the 2012 survey, and shows the location of underground sampling. Sample size ranged from 30-1000 kg and all samples were crushed onsite to sand size, then manually split for analytical sub samples, which were assayed at the Burnie Research Lab (now part of the ALS group).

South East

North West



Sample ID	Au (ppm)
A2	0.09
A3	14.05
A4	18.4
A5	0.25
A6	1.5
A7	2.07
A8	0.35
B2	1.8
B4	25.1
B5	0.47
B6	69.2
B7	2.55
B8	0.7
A12	864
A13	247
B13	221
C13	116



REV	DATE	DESCRIPTION
1	18/5/2012	First Issue

## Northern Surveying Services

495 Melrose Road , Eugenena 7310  
 Telephone (03) 6427 2765      Fax (03) 6427 3040  
 Mobile 0418 141 244      e-mail : surveyns@bigpond.com

## Mangana Mine

### Sailor's Gulley Long Section

Drawn By : DM      Scale 1:1750 (A3)      Contour Interval

NOTES:  
 Surveyed using RTK GPS & UTS  
 DATUM:  
 Coordinates are GDA/AHD  
 based on a 'Fix Here' solution

Drawing No.  
**Mangana-8**

Figure 3

Table 2 shows the extreme range of gold concentration which resulted from samples of vein quartz plus minor wall rock, all showing no visible differences between samples and no reliable indicators for visually discriminating high and low grades during sampling. Grades range from 0.1 to 864 g/t gold, with a mean value of 32 g/t gold (n=17 samples). With such extreme variation the mean value is somewhat meaningless but if the 7 x 1000 kg samples are considered as potentially being more representative of the reef from a run of mine perspective, the range tightens to 0.5-25.1 g/t, with a mean of 9.2 g/t gold.

Silver is generally low and correlates well with the gold grade, which is consistent with the near absence of visible base metal sulphides in the concentrates. Only 5 samples (A12, A13, B6, B13 and C13) returned silver grades of  $\geq 5$  ppm and they are the 5 samples with highest gold grades. More detailed metallurgical tests are needed but at the current stage of investigation the gravity concentrate mineralogy, at least from the oxide zone, appears to be a simple gold-silver electrum in a fine pyrite>>arsenopyrite black sand.

Overall the results demonstrate that substantial gold of probable ore grade remains exposed in the old workings and that bulk sampling is an effective technique for evaluating the reef, especially if the samples are of the order of 1000 kg rather than a few tens of kg.

**Table 2**Argyle-Golden Entrance Underground Bulk Sampling Results  
Feb-April 2012

Sample ID	Adit	Metres from entrance	Bulk Sample Wt (kg)	Assay Sample Wt (kg)	Lab	Au ppm (AA25)	Ag ppm (AA52)
A 2	Top Argyle	10-20m of backs	250	0.93	BRL	0.09	2
A 3	Top Argyle	first winze 23m	1000	0.91	BRL	14.05	2
A 4	Top Argyle	2nd winze 29m	1000	1.22	BRL	18.4	3
A 5	Top Argyle	68m end of drive face	250	1.38	BRL	0.25	1
A 6	Top Argyle	backs above winze 1	250	1.3	BRL	1.5	1
A 7	Top Argyle	floor between 2&3 winze	1000	1.04	BRL	2.07	1
A 8	Top Argyle	0-10m of floor	500	0.74	BRL	0.35	1
A 12	Golden Entrance		30	0.52	BRL	864	138
A 13	Golden Entrance		30	0.47	BRL	247	45
B 2	Top Argyle	10-20m of floor	1000	1.06	BRL	1.8	1
B 4	Top Argyle	3rd winze 43m	1000	1.07	BRL	25.1	4
B 5	Top Argyle	62m to 68m backs	1000	1.22	BRL	0.47	1
B 6	Top Argyle	above 3rd winze backs	500	1.17	BRL	69.2	14
B 7	Top Argyle	4th winze 58m	1000	0.85	BRL	2.55	1
B 8	Top Argyle	0-10m of backs	250	0.93	BRL	0.7	1
B 13	Golden Entrance		30	1.12	BRL	221	35
C 13	Golden Entrance		30	0.46	BRL	116	5

## **EXPENDITURE**

Total expenditure on EL 12/2011 up to 5 December, 2012 was \$136,500 (rounded to the nearest \$500), comprising the following categories.

<b>Table 3</b>		<b>Expenditure</b>
<b>Geoscientific Costs</b>		
Geology		\$6,000
Metallurgy		\$7,500
Analytical/assays		\$2,500
<b>Drilling &amp; Gridding Costs</b>		
Sampling		\$31,500
Drilling/plant hire		\$14,500
<b>Land Access and Surveying Costs</b>		<b>\$18,000</b>
<b>Rehabilitation Costs</b>		
<b>Feasibility Study Costs</b>		<b>\$6,000</b>
<b>Sampling and site infrastructure, water storage</b>		<b>\$48,000</b>
<b>Administration Costs</b>		<b><u>\$2,500</u></b>
<b>TOTAL</b>		<b>\$136,500</b>

## **ENVIRONMENTAL ACTIVITIES**

Most direct exploration activity was conducted underground but upgrading of surface vehicle tracks and drainage and some safety fencing and signage was required prior to re-entering the old adits. Cultural heritage and botanical/fauna habitat surveys were completed by consultants Parry Kostoglou and Philip Milner respectively and their reports are enclosed in Appendices A and B. Three sites with heritage values related to the early mine settlement and a section of the original access track to one of the Argyle adits were identified (Appendix A), and the recommended actions to preserve these sites will be followed.

No plant or animal species or community listed as threatened or endangered under State or Federal Acts was encountered during the field survey in the area of the proposed works. No recommendations for specific actions were required (Appendix B).

## **FUTURE WORK**

Year 2 exploration will continue underground bulk sampling portions of the reef and determine the alternative concentrate products which can economically be produced onsite. The overall priority in Year 2 is to achieve a mining lease and finalise the optimum mining method and business plan to best utilise the Argyle-Golden Entrance deposit. A Notice of Intent for developing a mineral processing works has been prepared by John Miedecke (Appendix C) and submitted to the Environmental Protection Authority, in preparation for an ML application to MRT.

## **REFERENCES**

Blake, F., 1939. Geological Survey Typed Reports, Tasmanian Department of Mines Unpublished Report.

Finucane, K. J., 1932. Geological Survey Typed Reports, Tasmanian Department of Mines Unpublished Report.

Morrison, K., 1988. Alcaston Mining NL, EL 55/83 (Mangana), Annual Report-Year 5.

Reid, A. M., 1929. Geological Survey Typed Reports, Tasmanian Department of Mines Unpublished Report.

Twelvetrees, W. H., 1907. Geological Survey Bulletin No 1, Tasmanian Department of Mines.

# Appendix A

## Historic Cultural Heritage Survey Report



**ARCHAEOLOGICAL  
SERVICES**

433 Dorans Road  
Sandford  
Hobart  
Tasmania

Mobile: 0408561934

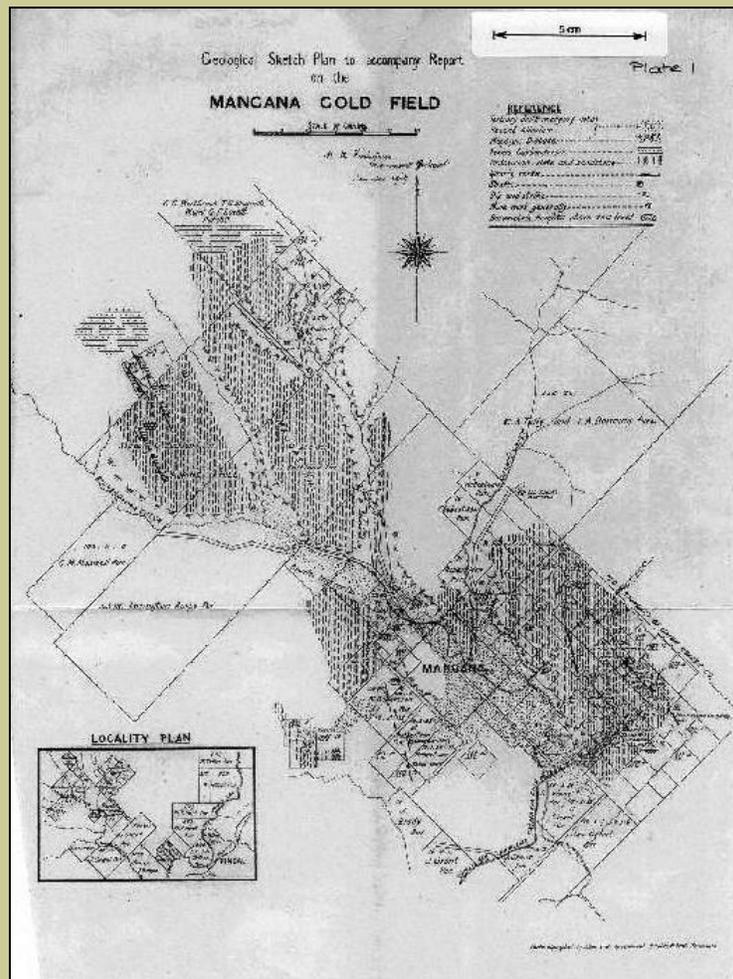
Email: [parryk@netspace.net.au](mailto:parryk@netspace.net.au)

Web site [www.arctas.com.au](http://www.arctas.com.au)

# HISTORIC CULTURAL HERITAGE SURVEY

## MANGANA GOLD MINE

### FINAL REPORT



Prepared For Wesknight Mining Pty Ltd.  
Parry Kostoglou  
August, 2012

## **CONTENTS**

<b>1.0</b>	<b>INTRODUCTION</b>	<b>3</b>
1.1	Background	3
1.2	Previous work	3
1.3	Location of site	3
1.4	Objectives	3
1.5	Methodology	3
<b>2.0</b>	<b>SUMMARY OF RESULTS</b>	<b>4</b>
<b>3.0</b>	<b>SIGNIFICANCE &amp; RECOMMENDATIONS</b>	<b>4</b>
<b>4.0</b>	<b>HISTORICAL SUMMARY</b>	<b>7</b>
<b>5.0</b>	<b>FEATURE SUMMARIES TABLE</b>	<b>9</b>
<b>9.0</b>	<b>BIBLIOGRAPHY</b>	<b>13</b>

## 1.0 INTRODUCTION

### 1.1 Background

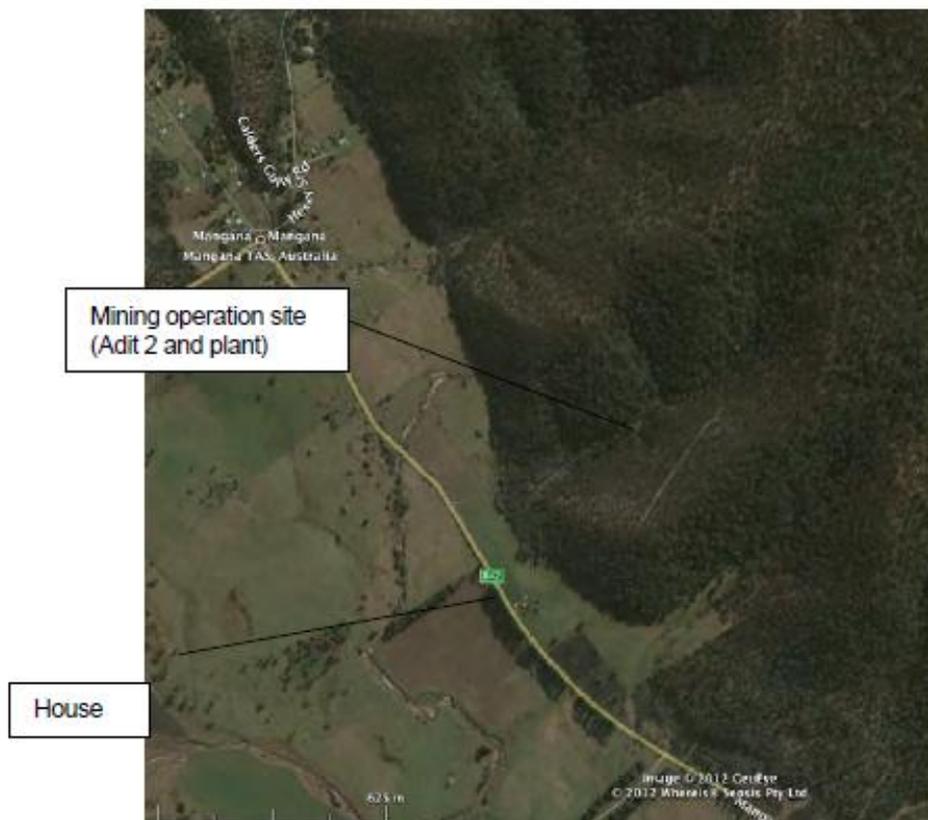
Wesknight Mining Pty Ltd is currently in possession of Mineral Exploration Licence 12/2011 which is situated on Sailors Gully some 400 metres south of Mangana Township. This vicinity hosts several historic mining adits which Wesknight have sampled and found to be sufficiently rich to encourage limited underground mining. As part of their statutory obligations this firm are required to sponsor a historic cultural heritage assessment of the former workings in order to identify any potential impacts on sites of significance. This document seeks to fulfil this obligation by assessing the attributes and significance of all known historic features within the licence area.

### 1.2 Previous work

No previous cultural heritage assessments have been undertaken in regard to this property.

### 1.3 Location of site

This licence area is situated in Sailors Creek Gully less than 500 metres south east of Mangana Township in north eastern Tasmania. More specifically the target mine adits occur on both sides of the creek within native forest flanking the parent gully. Cleared pasture adjoins the licence area to the west.



### 1.4 Objectives

The stated objectives of the survey were to collate the cultural contents of the site and make recommendations as to their management during future works.

### 1.5 Methodology

The consultant visited the site over a three hour period during early August, 2012.

## 2.0 SUMMARY OF RESULTS

This consultant recorded a total of eleven features at this site. These were:

Feature number	Feature name
01	Number 1 south adit
02	Old south adits track section
03	Number 2 south adit
04	Number 2 north adit
05	Number 2 adit 'Golden Entrance'
06	150' Level adit
07	Vertical timbered shaft
08	Partially collapsed drive
09	Long tunnel
10	Mangana mine settlement timber bridge
11	Mangana mine settlement

All sites are described individually in Section 5.0 of this report.

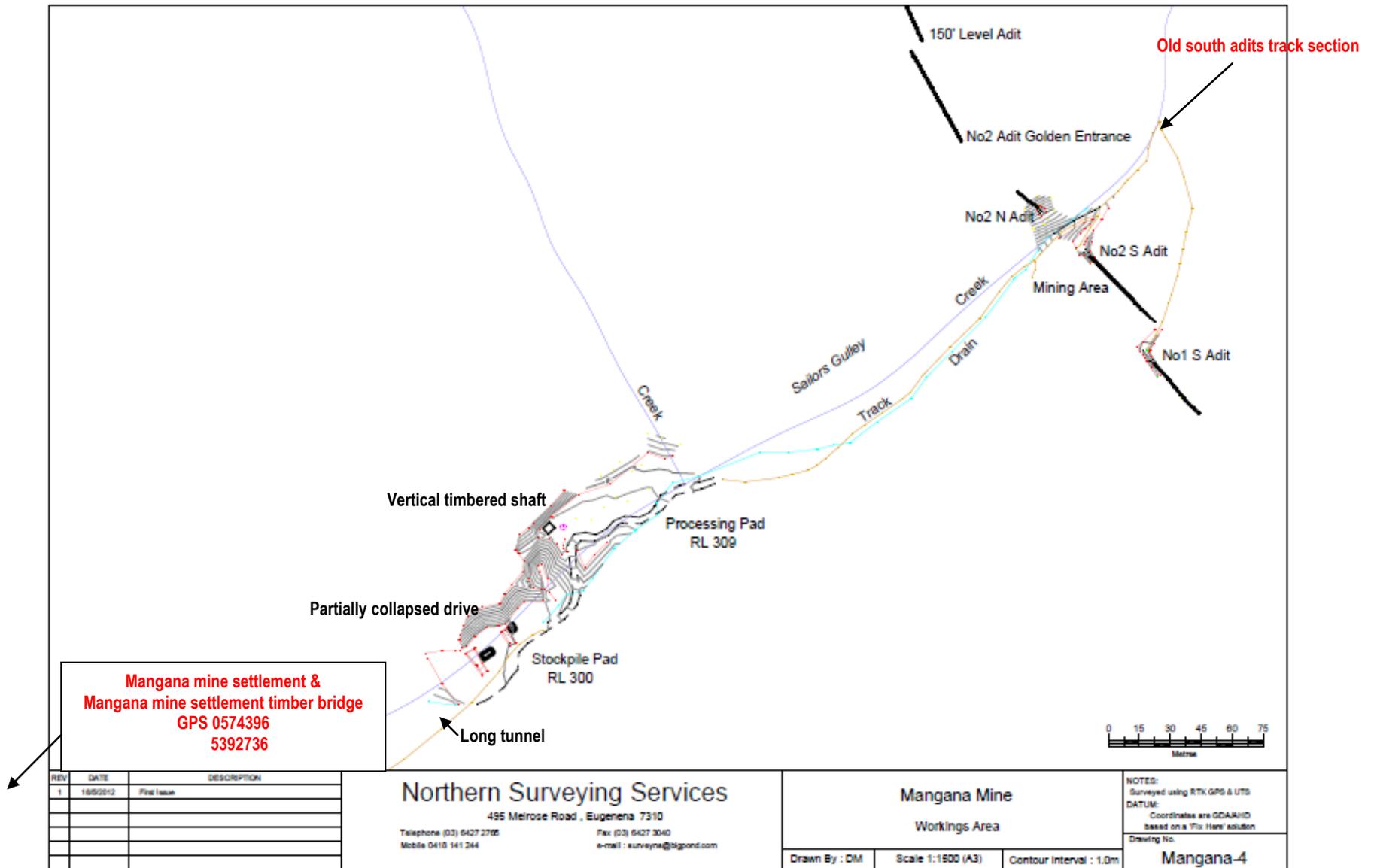
## 3.0 SIGNIFICANCE & RECOMMENDATIONS

Of the eleven features recorded and described overleaf, three are deemed to have sufficient significance to warrant further management related activities. These are:

- Old south adits track section
- The Mangana mine settlement
- Mangana mine settlement timber bridge

All three sites appear to be vestiges of the mine's occupancy between c1896 and 1940.

- Although all but destroyed by 20<sup>th</sup> century vehicular access, the remnant section of track remains well defined beside the current one. Given that the two tracks occur beside each other, it should be easy to protect this remnant vestige of the original track.
- The settlement complex will undoubtedly include sub surface remains related to dwellings, a blacksmith's shop and old rubbish deposits. As this complex seems undisturbed, the integrity of these sites is expected to be high. However, as both of these sites occur on the very boundary between the forested gully and the cleared pasture (and thus well away from the target historic adits), no conflict with the subject development is anticipated. It is therefore merely recommended that the development proponents be mindful of the two significant sites when proposing any deviation to the existing mine access track which passes 20 metres to the south of both entities.



Feature number	Feature name	Cultural Significance	Recommendations	Reason/s
01	Number 1 south adit	Low	None made	Unremarkable example of horizontal drive
02	Old south adits track section	Medium	Protect if possible	Sole surviving section of original 19 <sup>th</sup> century track to this mine
03	Number 2 south adit	Low	None made	Unremarkable example of horizontal drive
04	Number 2 north adit	Low	None made	Unremarkable example of horizontal drive
05	Number 2 adit 'Golden Entrance'	Low	None made	Unremarkable example of horizontal drive
06	150' Level adit	Low	None made	Unremarkable example of horizontal drive
07	Vertical timbered shaft	Low	None made	Unremarkable example of vertical shaft
08	Partially collapsed drive	Low	None made	Unremarkable example of horizontal drive
09	Long tunnel	Low	None made	Unremarkable example of horizontal drive
10	Mangana mine settlement timber bridge	Medium	Protect from all impacts	The remains of this settlement appear to be undisturbed
11	Mangana mine settlement	High	Protect from all impacts	This feature forms part of the Mangana settlement

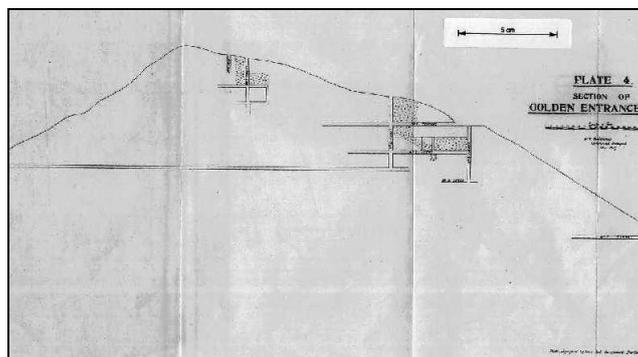
#### 4.0 HISTORICAL SUMMARY

Originally known as "The Nook", Mangana was the site of the first payable gold discovery in February 1852 when a local servant Keeling Richardson found alluvially washed gold in Richardsons Creek. Two hundred miners quickly assembled to stake out and work the creek and its tributaries such as Majors Gully before they gradually dissipated as the gold proved elusive. However another nearby strike in 1859 proved longer lived when a gold bearing quartz reef was discovered half a mile south of Mangana. Over the ensuing forty years to 1900 other reefs were discovered including the 'Golden Entrance' reef (which is the subject of this report) in 1896 by J.S. Goodall.

During January and April 1900, the relevant sections were acquired by B & J. E. Smith and were transferred to the Golden Entrance Company. Between 1900-1902 a total of 224 tons of quartz yielded 1427 ounces of gold before it was worked on tribute producing 2415 ounces of gold from 565.5 tons of quartz

This company's leases were abandoned in 1909 as part of a larger mining down turn affecting the state until the late 1920's, although some prospecting was undertaken during the interim. In 1927, a prospector named C.E. Chesshire located a southern continuation of the Golden Entrance reef and formed a new company called the Argyle Gold Development Company to re-work it in 1929.

Between 1929 and c1935 twenty five miners were additionally lured back to the alluvial field before both the alluvial and deep lead gold mines at Mangana closed down again. Periodic but limited prospecting has occurred up to the present day.



Section drawing of Golden Entrance workings from Blake, 1939.



Photo showing nearby Mangana Reefs battery from Twelvetrees, 1907.



**5.0 FEATURE SUMMARIES TABLE**

A tabular summary of all located features appears below. A scaled plan of the site showing the locations of these features likewise appears overleaf.

Feature number	Feature name	Description	Comment/s	Photograph
01	Number 1 south adit	Adit portal and horizontal drive	Unremarkable mine entrance	
02	Old south adits track section	Section of original track to the workings.	Relatively well preserved. Should be protected.	

03	Number 2 south adit	Adit portal and horizontal drive	Unremarkable mine entrance	
04	Number 2 north adit	Adit portal and horizontal drive	Unremarkable mine entrance	
05	Number 2 adit 'Golden Entrance'	Collapsed adit portal and horizontal drive	Unremarkable mine entrance	
06	150' Level adit	Collapsed adit portal and horizontal drive	Unremarkable mine entrance	

07	Vertical timbered shaft	Vertical shaft and remnant timbering	Unremarkable vertical mine shaft	
08	Partially collapsed drive	Adit portal and horizontal drive	Unremarkable mine entrance	
09	Long tunnel	Adit portal and horizontal drive	Unremarkable mine entrance	

10	Mangana mine settlement timber bridge	Remnant timbers but no decking	Element of Settlement site described below. As such should be protected.	
11	Mangana mine settlement	Sequential low earthen mounds with associated brick scatters	Well preserved archaeological site which should be protected.	

**9.0 BIBLIOGRAPHY**

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- Blake, F. 1939. Mangana Goldfield.
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## Appendix B

### Botanical & Fauna Habitat Survey Report

**MANGANA GOLD MINE**  
**SAILORS GULLY, MANGANA**  
**BOTANICAL & FAUNA HABITAT SURVEY**  
**For WESKNIGHT MINING PTY LTD**  
**31<sup>st</sup> July 2012**



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## **CONTENTS**

### **1.0 Introduction**

#### **1.1 Objectives**

#### **1.2 Location of Study Area**

#### **1.3 Site Description**

### **2.0 Desktop Survey of Natural Values**

#### **2.1 Desktop Survey Results**

### **3.0 Field Survey**

#### **3.1 Field Survey Results**

### **4.0 Recommendations**

### **APPENDIX 1: Vegetation Communities and Species Recorded**

### **References**

### **PHOTOS**

## 1.0 Introduction:

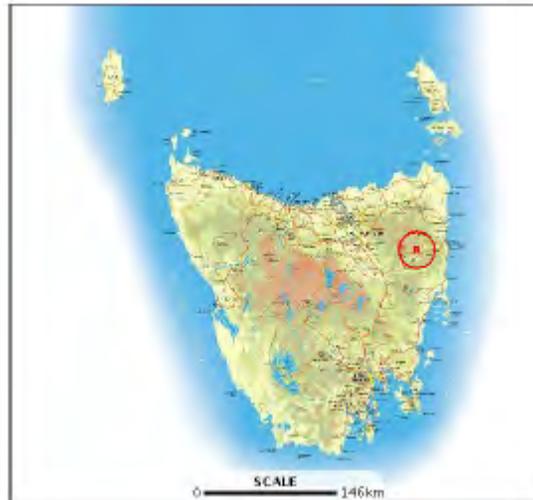
Wesknight Mining Pty Ltd holds exploration licence EL12/2011 over the old gold mining area located in Sailors Gully near Mangana. The company is planning to reopen the mine by accessing a number of the existing adits.

A botanical and fauna habitat survey is required as part of the licence conditions in order to determine any likely impacts on the natural values present in the proposed mining area including threatened species, threatened vegetation communities and environmental weeds.

**1.1 Objectives:** The objectives of this survey were to;

- Undertake a desktop survey to confirm the known biological records and the natural values present in the lease areas and in the vicinity.
- Undertake a field survey of the lease area to observe and record the natural values present including the vegetation types and plant communities, the flora and in particular any threatened species and potential habitat for species of threatened fauna, as well as the presence of environmental weeds.
- Determine the possible impacts of the proposed mining operation on the natural values present and make recommendations on how those impacts can be minimised.

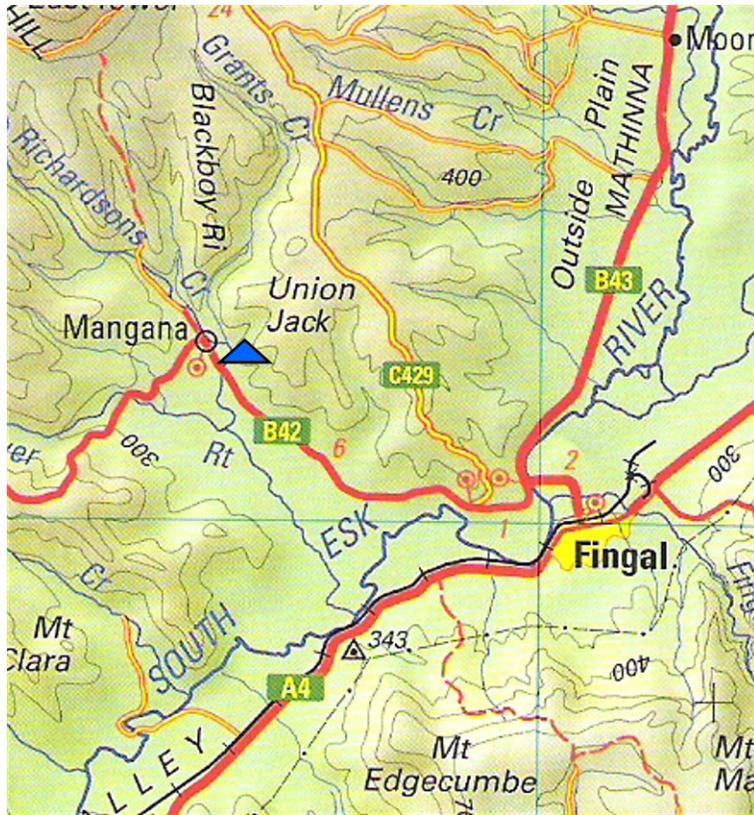
## 1.2 Location of Study Area:



MAP REF: Tasmap 1:25,000, Sheet No. 5639, Mangana

BIOREGION: Ben Lomond

GRID REF: 574800E – 5392900N  
(All Grid References MGA Zone 55 GDA94)



MAP 1: Location of study area near Mangana

### 1.3 Site Description:

The location is within a steep sided valley called Sailors Gully located to the south-east of the Mangana township. Sailors Gully creek only flows intermittently into Richardsons Creek and then into Tower Rivulet before entering the South Esk River to the west of Fingal.

An existing vehicular track which extends off Mangana Road (B52) provides access to the site. The land tenure is State Forest and both sides of the valley and adjacent slopes and ridgelines are well forested. Freehold land mainly consisting of established pasture extends along both sides of Mangana Road south-west of the site and the township of Mangana is within a few hundred metres of the entrance to the site.

The area has a history of previous mining with a number of existing adits and shafts on both sides and floor of the gully and mullock heaps on previously cleared areas. The valley floor and creek has also been subject to alluvial mining in the past. The areas of past disturbance however are relatively localized and limited in area and have regenerated naturally. The proposed plant will have a relatively small footprint and will be located within the existing cleared area.



**MAP 2: Topographical map of Sailors Gully and adjacent landform with Mangana township in the north-west corner.**



**2.0 Desktop Survey of Natural Values:**

The DPIW database “The Natural Values Atlas” was accessed for the known biological records of the locality and environs. Records of threatened species of flora and fauna known to occur within a 5,000 metre radius of the location were also accessed. Data sourced included the vegetation types and plant communities, the occurrence of any threatened vegetation communities, the recorded locations of any threatened species of plants and threatened fauna known or expected to occur in the vicinity.

REFERENCE POINT for the locality: 574800E – 5392900N

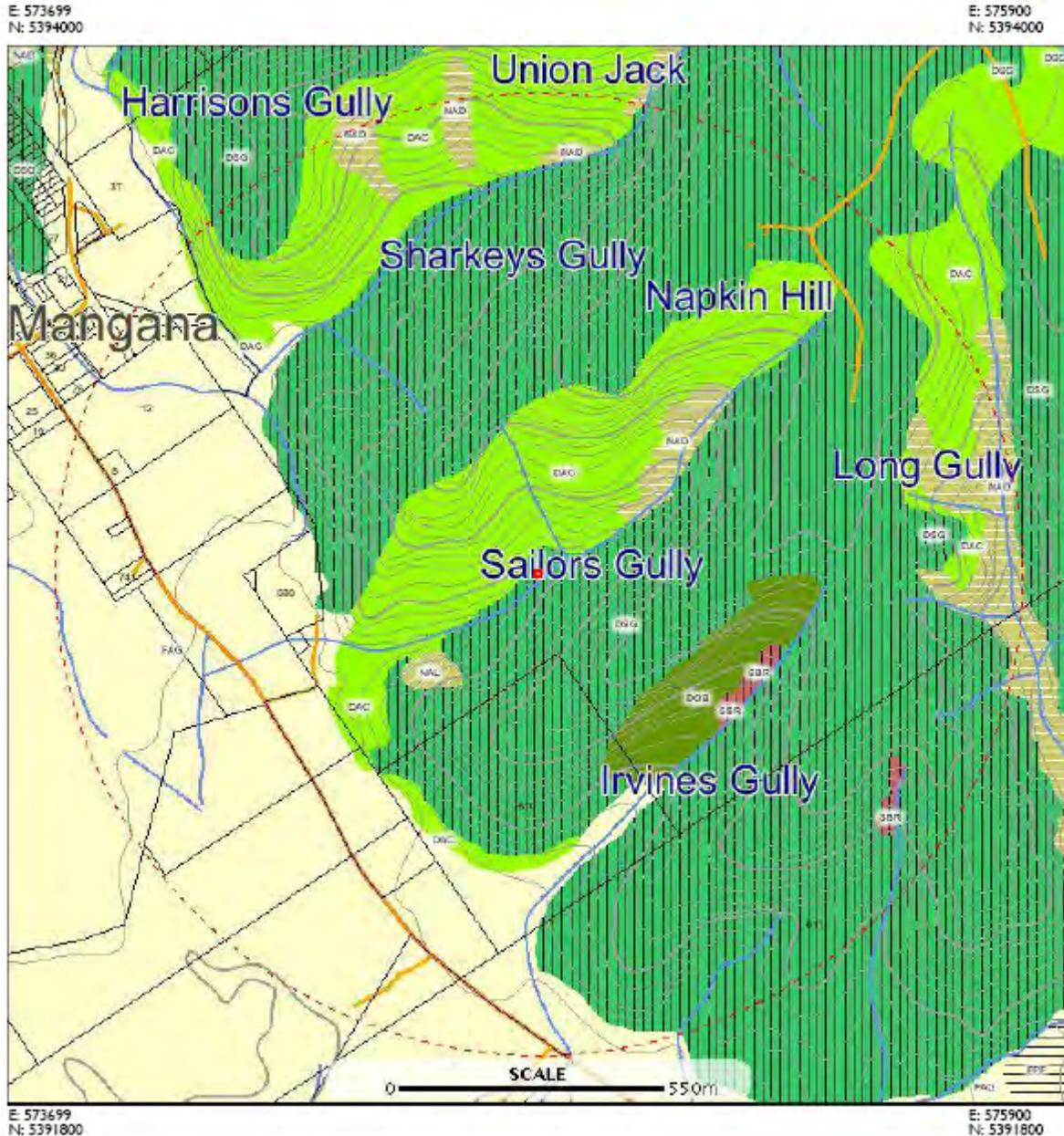
**2.1 Desktop Survey Results:**

**VEGETATION COMMUNITIES:**

The following vegetation communities are mapped under the TasVeg mapping program as occurring within 1,000 metres of the three study area reference points.

VEGETATION COMMUNITY	TasVeg Code / Map colour	EXTENT IN STUDY AREA
<i>Eucalyptus amygdalina</i> Coastal Forest & Woodland	DAC / bright green	South-eastern facing slopes of Sailors Gully and Napkin Hill. Also similar slopes to the north-west and east.
<i>Eucalyptus sieberi</i> Forest & Woodland on Granite	DSG / Medium green with vertical lines	Most of the remaining forest within the study area.
<i>Eucalyptus obliqua</i> Dry Forest & Woodland	DOB / Dark green	One area on the south-eastern facing slope of the adjacent Irvines Gully, south of Sailors Gully.
<i>Acacia dealbata</i> Forest	NAd / Olive Green with horizontal white lines	One small patch along the creek of Sailors Gully. A larger patch along creek to the east and 3 small patches about 1km NNW of reference point.
<i>Allocasuarina littoralis</i> Forest	NAL / Olive green with diagonal white lines	One small patch near the south-west corner of the lease.
Broadleaf Scrub	SBR / Cerise with vertical lines	One small patch in the adjacent Irvines Gully and another small patch east of that.
Agricultural Land	FAG / cream	The south-western portion of the study area is cleared farming land across the valley floor.

**TABLE 1: Vegetation Communities and extent within the study area as per TasVeg mapping program.**



**FIGURE 1: Vegetation communities as per TasVeg mapping program within 1,000 metres of reference point: GRID REF: 574800E – 5392900N.**

- CODE:**
- DAC .....*Eucalyptus amygdalina* Coastal Forest & Woodland
  - DSG .....*Eucalyptus sieberi* Forest & Woodland on Granite
  - DOB .....*Eucalyptus obliqua* Dry Forest & Woodland
  - NAD ..... *Acacia dealbata* Forest
  - NAL ..... *Allocasuarina littoralis* Forest
  - SBR ..... Broadleaf Scrub
  - FAG ..... Agricultural Land

VEGETATION COMMUNITIES:

**DAC** *Eucalyptus amygdalina* Coastal Forest and Woodland is a community usually dominated by the Black Peppermint *Eucalyptus amygdalina* less than 25 metres tall although other species such as *Eucalyptus viminalis* or *Eucalyptus obliqua* can also be present as co-dominants. The community is characterized by its high floristic and structural diversity with an understorey typically heathy to shrubby. The low shrub layer is typically dense and diverse and bracken can be prevalent on sites with a high fire frequency. Grasses are usually not prevalent in the ground stratum.

This community is mainly found on siliceous soils in coastal or sub-coastal areas of northern and eastern Tasmania although it does extend inland in some locations up to about 450 metres altitude.

It is mapped under TasVeg as occurring on the south-eastern facing slopes of Sailors Gully and Napkin Hill as well as other similar slopes and aspects within 1,000 metres of the site.

**DSG** *Eucalyptus sieberi* Forest and Woodland on Granite is a dry sclerophyll community which usually has an understorey of tall shrubs. The low shrub layer and the ground stratum is usually sparse. *Eucalyptus sieberi* is often the only Eucalypt present within the community and trees are usually less than 30 metres in height.

The community is restricted to dry sites where the substrate is present usually on knolls and ridges in the north-east of the state between Friendly Beaches and Ansons Bay. This community can be easily confused with *Eucalyptus sieberi* Forest and Woodland not on Granite (DSO) where such forest occurs on substrates such as Mathinna Beds.

Most of the slopes and ridges in the location are mapped by TasVeg as this vegetation type.

**DOB** *Eucalyptus obliqua* Dry Forest is easily distinguished from other forest communities by the dominant Eucalypt and the dry shrubby or heathy understorey. Trees typically have a well formed trunk and trees are generally up to 30 metres in height. Other Eucalypts are often present within the community. Typically the understorey is shrubby and diverse and the ground layer usually sparse although on frequently fired sites bracken may be predominate in the ground layer.

The community can be associated with dolerite, mudstones and siliceous substrates such as granites and sandstones. The community is widespread and extensive across the north, east and south-east of the state from sea level up to about 600 metres.

There is a single patch of this community mapped by TasVeg in the adjacent Irvines Gully to the south of the site.

**NAD** *Acacia dealbata* Forest is usually associated with sites which have been subject to past disturbance, both natural or man-induced but particularly along stream banks and riparian corridors. Often the Acacia is the only tree present as a dense canopy up to 20 metres high although the understorey can vary depending on the situation and the disturbance history of the location but could be bracken or wet forest or riparian species. The community is widespread across the state although less common in the west and south-west.

There is one small patch of this community within Sailors Gully as well as a larger area along a creek-line to the east of the study area and a few very small patches on slopes about one kilometre to the north.

**NAL** *Allocasuarina littoralis* Forest usually occurs as small patches within areas of Dry Eucalypt Forest throughout the drier parts of the state. It typically has a dense canopy dominated by the one species although emergent Eucalypts can also be present. The trees produce a deep litter layer which inhibits any understorey vegetation so it is usually quite sparse, but may include widely spaced shrubs, bracken or graminoids such as *Lepidosperma spp.* Because of its limited distribution this community is listed under the Tasmanian *Nature Conservation Act 2002* as a threatened native vegetation community.

**SBR** Broadleafed Scrub is a closed scrub community with a dense canopy which occurs on sites with a low fire frequency. The dominant species of small trees can include *Beyeria viscosa*, *Nematolepis squamea*, *Pomaderris apetala*, *Bedfordia salicina* or *Olearia argophylla*. This community is prevalent as scattered patches throughout much of Tasmania but often in gullies and other fire-protected situations from sea-level and up to at least 500 metres. The understorey is usually open and often rocky with a covering of mosses in the heavy shade cast by the dense canopy. Some shade tolerant shrubs can be present.

#### THREATENED VEGETATION COMMUNITIES:

- One natural vegetation community mapped within the study area is listed as threatened under the Tasmanian *Nature Conservation Act 2002*. *Allocasuarina littoralis* Forest (NAL) is listed as a rare community under the Act due to its limited and scattered occurrence. A small patch of this community is located to the south of the creek and to the immediate south of the access track into Sailors Gully, which is outside of the proposed mining area.

#### VEGETATION COMMUNITIES OF CONSERVATION SIGNIFICANCE

The following vegetation communities are considered to be under-reserved in the state particularly areas of forest types in an old-growth condition and have been targeted under the Tasmanian Community Forest Agreement for further reservation in some bio-regions.

- *Eucalyptus amygdalina* Coastal Forest and Woodland (DAC)
- *Eucalyptus obliqua* Dry Forest (DOB)
- *Eucalyptus sieberi* Forest and Woodland on Granite (DSG)
- Broad-leafed Scrub usually occurs as relatively small patches which are protected from fire by topography or landform and it is this susceptibility to fire which restricts the distribution of this community particularly in the eastern half of Tasmania. It is a closed (canopy) community and as such is considered to be a form of relict rainforest.

#### THREATENED FLORA:

One species of threatened flora listed under the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* is recorded on the “Natural Values Atlas” database as occurring within 1,000 metres of the study area reference point.

No species of threatened flora is recorded on the database from within 500 metres of the study area reference point.

- *Bossiaea obcordata* the Spiny Bossia is listed as being rare under the Tasmanian Act. There are three records on the database from 1991 (x2) and 2007. *Bossiaea obcordata* is a prostrate, rigid, woody shrub with spreading branches that end in a spine. It is known to occur in the north-east and east coast on very dry sites within dry Eucalypt forest and is often recorded with *Eucalyptus sieberi*. It has been recorded on both dolerite and granite substrates. The nearby Tower Hill is considered to be a key location for the species, and it is considered to be relatively well reserved within its range.

The following species of threatened flora are recorded on the database as occurring from between 1,000 and 3,000 metres of the study area reference point.

- *Bossiaea obcordata* There are a further 17 records of this species from within this radius of the reference point.
- *Hierochloe rariflora* Cane Holygrass is listed as being rare under the Tasmanian Act. There is a single 1990 record at Grid Ref: 575052E – 5394165N (100m +/-). This grass grows to about one metre tall and can be found in forested gorge and riparian habitats in the north-east and east of the state usually on granite or dolerite substrates. The notesheet on the species sourced from the DPIPWE website states that the species could be reassessed for delisting as recent observations have extended the species known frequency.

The following species of threatened flora are recorded on the database as occurring from within 3,000 to 5,000 metres.

- *Bossiaea obcordata* There are a further 49 records of this species from within this radius.
- *Caladenia congesta* the Black-tongue Finger-orchid is listed as being endangered under the Tasmanian Act.

There are three records on the database, all dated from the 1980's. The 1986 record from Grid Ref: 579012E – 5390483N (100m +/-).

This orchid is restricted to the central north and north-east of Tasmania, in habitat such as heathy woodland or open forest, on dry sites of sandy, loamy or gravelly soils.

#### THREATENED FAUNA:

Four species of threatened fauna listed under the above Acts are recorded on the database as occurring within 3,000 metres of the study area reference point.

- The Tasmanian subspecies of Wedge-tailed Eagle *Aquila audax* subsp *fleayi*. The bird is listed as being endangered under both State and Commonwealth Acts and requires large trees within tracts (>10ha) of old-growth forest for nesting. The birds are extremely sensitive to disturbance during the nesting season. Nests are traditional, with some having been used for at least 50 years. More than one nest can be present within a pair's territory but only one is used in any one year.

There are three known nest tree sites recorded within 3,000 metres. Two within a closed valley about 2500 metres east south-east of the site and the third about 2,800 metres east north-east and to the east of Tower Hill Road. Nest Identification numbers 212, 1156 and 1629. Nest No 1156 was occupied during the 2010 breeding season. There is a further known nest tree within 5,000 metres, about 3,300 metres to the north-east, Nest Id. No. 1628. There are also three sighting records on the database from within 5,000 metres.

- The White-bellied Sea-eagle *Haliaeetus leucogaster*. There is a recorded nest tree about 3,000 metres south of this site on the flood plain of the Tower Rivulet, Nest Id. No.734 . The nest was last recorded in 2007.

White-bellied Sea-eagle *Haliaeetus leucogaster* is listed as being vulnerable under the Tasmanian Act. It inhabits the coast and larger inland water bodies and will also follow the larger rivers. It usually nests in heavily branched trees adjacent to river banks or lakesides, but will also nest on rock ledges on cliff tops in coastal environments.

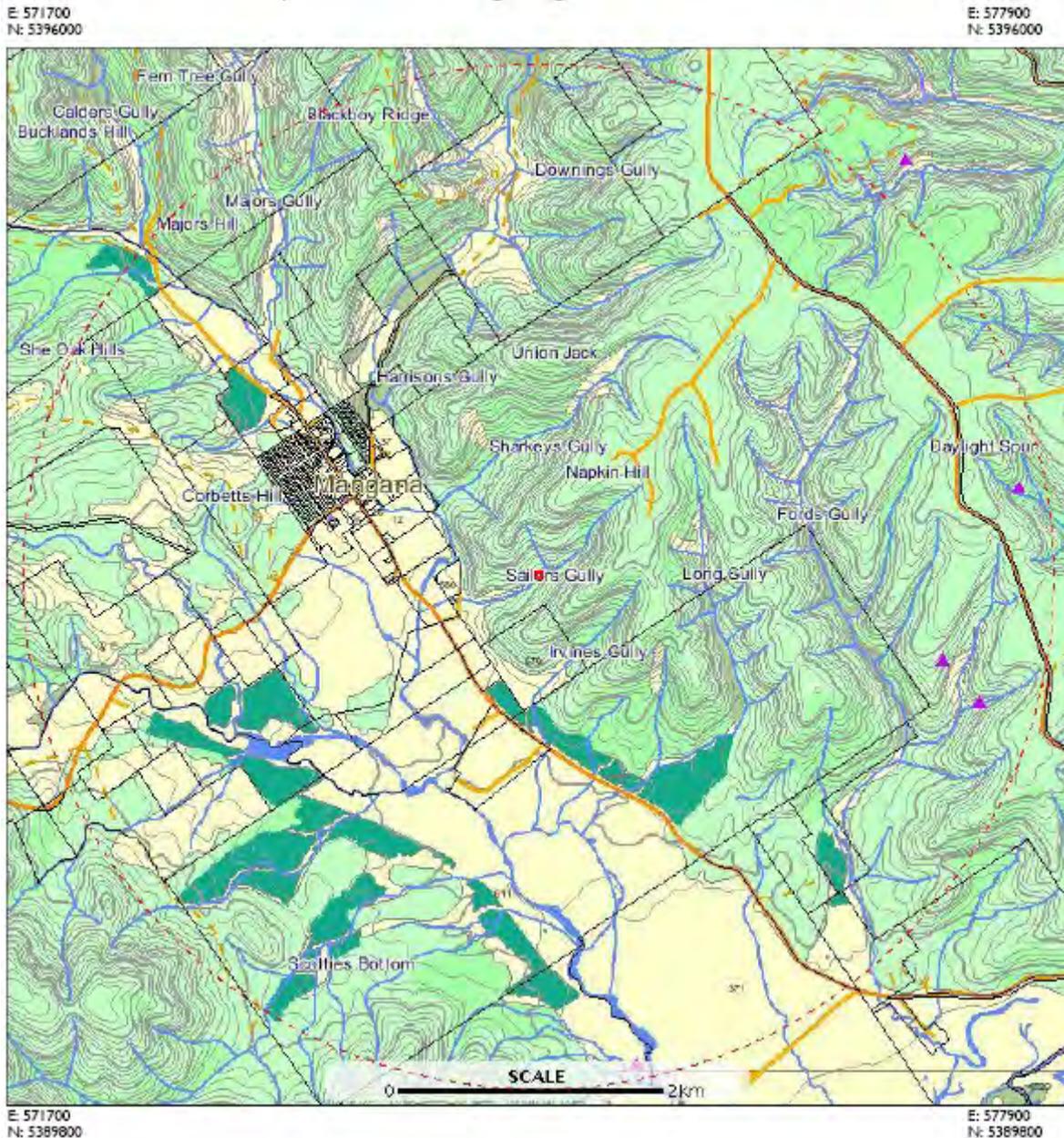


FIGURE 2: Plotted location of nest trees of Wedge-tailed Eagle, *Aquila audax subsp fleayi* and White-bellied Sea-eagle *Haliaeetus leucogaster* within 3,000 metres of the study area reference point.

- The Tasmanian Devil *Sarcophilus harrisii* is listed as being endangered under both State and Commonwealth Acts. There are 2 sight records on the database from within 3,000 metres, one dated from the late 1970's and the other from about 1996. There are three further records of the Devil from between 3,000 and 5,000 metres of the site.
- The Spotted-tailed Quoll, *Dasyurus maculatus* subsp *maculatus* is listed as a rare species under the Tasmanian Act and vulnerable under the Commonwealth Act. It inhabits a range of forest types although it prefers the wetter and denser forest types and will hunt and forage on adjacent farmland and pasture, travelling up to 20km at night. The animal will shelter in dens located in rocks, logs or thick vegetation. There is a single undated record of this species on the database.

No other species of threatened fauna are recorded on the database from within 5,000 metres of the site reference point.

The following seven species of threatened fauna could occur in the locality based on habitat mapping and on the known geographical range of each.

- The Tasmanian subspecies of the Masked Owl *Tyto novaehollandiae* subsp *castinops* is listed as being endangered in Tasmania and considered to be vulnerable under the Commonwealth Act. This bird requires large tree hollows for nesting, usually in White Gums and prefers mature forest as habitat.
- The White (Grey) Goshawk *Accipiter novaehollandiae* is endangered in Tasmania. The species requires mature wet forest with Blackwoods as habitat and old-growth trees for nesting.
- Eastern-barred Bandicoot *Parameles gunnii* is relatively widespread in Tasmania but is rare on the mainland and is listed as being vulnerable under the Commonwealth Act.
- Glossy Grass Skink *Pseudomoia rawlinsii* is listed as being rare under the Tasmanian Act. The Tussock Skink *Pseudemoia pagenstecheri* is a grassland species which is considered to be vulnerable in Tasmania. It inhabits some types of native grasslands.
- The Swan Galaxia *Galaxias fontanus* is a small native fish considered to be endangered in Tasmania and nationally, and is found only within the catchments of the Esk Rivers. The species is endemic to Tasmania.
- Australian Grayling *Prototroctes mareana* is a fish which moves between fresh and salt water localities. The species is listed as being vulnerable both in Tasmania and nationally.
- The Green and Gold Frog *Litoria raniformis* is considered to be vulnerable in Tasmania and Nationally. It is found mainly in the north and north-east of the state.

### 3.0 Field Survey:

The field survey was undertaken on Tuesday the 17<sup>th</sup> July 2012.

Methodology: The survey area was divided into three sections based firstly on the proposed work areas and access road and secondly on the topography of Sailors Gully.

Area 1: Existing and proposed works areas and the existing access road from Mangana Road to the work site and including No.2 S Adit. Ref: Map No.3.

Area 2: The valley slopes to the south-east of the creek-line and No.1 S Adit. Ref: Map No.2.

Area 3: The valley slopes and Napkin Hill to the north-west of the creek-line. Ref: Map No.2. A transect of the hillside followed the adits as detailed on Map No.3.

Each of the three target areas was surveyed on foot.

Vascular plant species were recorded, vegetation communities were observed and cross-referenced with the TasVeg map sourced from the Natural Values Atlas database.

Limitations: This survey was conducted in winter when many species are dormant and not flowering, particularly ground layer flora within grasslands. No botanical survey can guarantee that all flora will be observed and recorded in a single survey in one year due to seasonal and annual variation in abundance and the possible absence of flowers and fertile material for identification. Ephemeral species which may have been present includes species of orchids, lilies, herbs, grasses and other graminoids. However all significant species known to occur in the study areas and their environs have been considered in this report.

### 3.1 Field Survey Results:

**AREA No.1** Existing and proposed work areas and existing access road from Mangana Road to the work site and including No.2. S Adit.

The area of the lease within which the mining operation and the associated plant and work areas are to be located are detailed on Map No. 3 included with this report. The access road from Mangana Road initially passes through rough pasture land before entering Sailors Gully itself. The road follows the floor of the gully which becomes more closed with steeper slopes and heavier forest as the road extends into the middle reaches of the gully and the site of the proposed plant and storage areas. No.2 S Adit is located within this survey area and No.1 S Adit is located upslope in Survey Area No.2.

The initial 150 - 200 metres or so of the access road from Mangana Road passes through rough pasture and it is in this location that most environmental weeds were observed, including English Broom *Cytisus scoparius*, Hawthorn *Crataegus monogyna*, Briar Rose *Rosa rubiginosa* and a single Holly *Ilex aquifolium*. A strategy will be needed to manage these weeds as they have the potential to extend into and colonize the operations area. None of these weeds were present in the proposed mining and plant areas at the time of the survey.

The vegetation around the periphery of the Stockpile Pad and Processing Pad has regenerated since the area was originally cleared during the early mining days and is predominantly open forest with *Acacia dealbata* the Silver Wattle as the main tree species and with a ground layer of mainly Silver Tussock Grass *Poa labillardierei*. As the track extends further along the creek-line the vegetation becomes more dense and shaded and typical of Broad-leafed Scrub (SBR) dominated by Musk *Olearia argophylla*. The floor and lower (north-western) slopes of the gully also supports a patch of *Acacia dealbata* Forest (NAD) and this community intergrades with the Broad-leafed Scrub which forms the understorey of the Acacia community. Both communities are located along the creek-line and on the lower slopes to the north of the creek and will not be affected by the proposed mining operation unless at a later stage the adits which are located on this slope toward Napkin Hill are to be accessed.

The only significant weed observed within the works areas was Spear Thistle *Cirsium vulgare* and this weed will require management during the operations and life of the mine. No mature or old-growth trees were observed in this survey area.

**AREA No.2** The slopes of Sailors Gully located to the south-east of the creek-line.

The slopes of the gully to the south-east of the creek-line rise quite steeply from the gully floor and from the existing track, and the vegetation also changes abruptly from a leafy valley floor type community to dry forest dominated by a relatively dense stand of mainly semi-mature Tasmanian Ironbarks, *Eucalyptus sieberi*. Very few other species of Eucalypt were observed on this hill slope and the understorey also had a low diversity of species with shrubs such as *Oxylobium ellipticum* predominating. In some locations there was no understorey present and the groundcover was just leaf litter and fallen debris. An occasional mature Eucalypt was present but none with significant hollows were observed. The geology of the location is mapped as Mathinna Beds which then dictates that the vegetation community in the location is *Eucalyptus sieberi* Not on Granite (NOS) which is in contrast to that mapped on TasVeg (Figure 1) which was the Eucalypt on Granite. However both vegetation types are of very similar appearance and it is only the substrate which separates them from each other.

A localized area of the community *Allocasuarina littoralis* Forest (NAL) was observed within this Eucalypt community and towards the southern end of the hill slope not far from the entrance road, and is in accordance with that mapped under TasVeg, Ref Figure 1.. The community was composed of an almost pure stand of *Allocasuarina littoralis* with almost no understorey and a ground cover of She-oak needles. The community is listed as a threatened community under the Tasmanian *Nature Conservation Act 2002* however it is remote from the area proposed for mining operations and sufficiently distant from the entrance road and will not be impacted by either.

**AREA No.3** The slopes of Sailors Gully and Napkin Hill located to the north-west of the creek-line:

The valley on the north-western side of the creek-line also rises steeply towards towards Napkin Hill at the highest point. A survey transect extended from the creek to each of the five mapped adits. The vegetation along the valley floor to No.2 N Adit and up to No2 Adit Golden Entrance on the lower slopes was an intergrading of *Acacia dealbata* Forest (NAD) and Broad-leafed Scrub (SBR) as discussed in Survey Area 1, which typically had a heavily shading canopy of predominantly Musk *Olearia argophylla* and emergent trees of Silver Wattle. There were very few plants in ground layer being composed mainly of leaf litter and fallen debris due to the heavy shade.

The middle and upper slopes however were covered in a mixed age and relatively open Eucalypt forest which had little understorey, except for an occasional Silver Wattle sapling and had a ground layer dominated by the tussock grass *Poa rodwayi* with some associated herb species. A number of rocky outcrops were present across the slope and surface rock and small boulders were common. The vegetation and the geology gave the appearance of the community *Eucalyptus viminalis* Forest and Woodland on Dolerite however the mapped geology in the location is Mathinna Beds as is the substrate on the opposite side of the valley. *Eucalyptus viminalis* the White Gum was plentiful right across the hill slopes including a number of mature and old-growth trees. *Eucalyptus amygdalina* the Black Peppermint was also present in good

numbers as a subdominant tree. The grassy ground layer and the preponderance of White Gum distinguishes this community from *Eucalyptus amygdalina* Coastal Forest and Woodland as is shown in the area on the TasVeg map Figure 1. *E. amygdalina* Coastal Forest and Woodland usually presents with a heathy ground layer vegetation rather than being dominated by native grasses.

For the purpose of this survey the vegetation community is described as *Eucalyptus viminalis* Grassy Forest and Woodland (DVG).

Evidence of the Wombat *Vombatus ursinus* was observed across the slopes of Napkin Hill where the grassy groundlayer predominated. The Wombat is a non-threatened species in Tasmania.

#### VEGETATION COMMUNITIES:

The following vegetation communities were observed during the field survey.

- *Eucalyptus viminalis* Grassy Forest in survey area 3, the mid and upper slopes to the north-west of the creek-line and Napkin Hill. The community had the appearance of Eucalypt Forest on Dolerite although the substrate is mapped as Mathinna Beds on the current geology map.
- *Eucalyptus sieberi* Forest not on Granite (DSO) was present in survey area 2, the slopes to the south-east of the creek-line, including the area around the upper adit on that side of the creek which is to be re-opened, No.1 S Adit. The appearance and structure of *Eucalyptus sieberi* Forest on granite or other substrates such as the Mathinna beds is very similar, and it is only the type of substrate which distinguishes them.
- *Acacia dealbata* Forest (NAD) occurred along the creek-line and vehicular access track, and the lower slopes to the north-west of the creek-line, particularly in the vicinity of No.2 N Adit and No.2 Adit Golden Entrance. (Ref: Map 3) where the community graded into Broadleafed Scrub with emergent trees of *Acacia dealbata*.
- Broadleafed Scrub (SBR) occurred along the middle reaches of the creek-line of Sailors Gully and across the lower slopes on the northern side of the gully below Napkin Hill. It occurred in association with *Acacia dealbata* Forest and formed the understorey of that community on the lower slopes. The predominant trees were Musk, *Olearia argophylla* and Dogwood *Pomaderris apetala*.
- *Allocasuarina littoralis* Forest (NAL) was present as a small localized patch within the *Eucalyptus sieberi* community, outside of the proposed mining area and sufficiently distant from the access road. See further note under threatened Vegetation Communities.

#### THREATENED VEGETATION COMMUNITIES:

One vegetation community listed under the Tasmanian *Nature Conservation Act 2002* was observed during the field survey.

- *Allocasuarina littoralis* Forest (NAL) was observed in the location as mapped under TasVeg, Ref: Figure 1 of this report. It is limited in extent, however it is located to the south of the access road and outside of any proposed work or mining area. There will be no impact on this community from the proposed mining operation.

THREATENED FLORA:

No plant species listed under the Tasmanian *Threatened Species Conservation Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was observed and recorded during the field survey.

A targeted search for *Bossiaea obcordata* did not locate any plants of the species within the survey area. The proposed mining operation will not impact on any potential habitat of this species.

Although it is out of flowering and fruiting season for the Cane Holygrass *Hierochloa rariflora* no tall grass was observed along or adjacent to the valley floor which may be potential habitat for the species. The habitat may not be sufficiently rocky and gorge-like for the species.

*Caladenia conjesta* the Black-tongue Finger Orchid can flower between October and January but usually has a peak in late November and so the species would not be evident at this time of the year. The proposed mining operation however will not impact on any potential habitat for this species in the location.

THREATENED FAUNA:

No species of fauna listed under the above Acts was observed during the field survey.

No evidence of the presence of Tasmanian Devils or Spotted-tailed Quolls such as scats were observed during the survey however it is likely that both species would be present in the wider location albeit in small numbers.

THREATENED FAUNA HABITAT:

No critical habitat for any species of threatened fauna which is known from the wider location or has the potential to occur in the area was observed during the survey.

No nest trees or potential nest tree sites for the Wedge-tailed Eagle *Aquila audax* subsp *fleayi* was observed during the survey.

Mature and old-growth Eucalypts with basal hollows which could be potential den sites for Tasmanian Devils *Sarcophilus harrisii* and Spotted-tailed Quolls *Dasyurus maculatus* subsp *maculatus* were observed on the middle and upper slopes of Napkin Hill although no dens were confirmed during the survey.

Mature and old-growth Eucalypts with upper trunk and branch hollows were also observed on the middle and upper slopes of Napkin Hill which would be potential habitat or nesting sites for species of fauna, including threatened species. No large hollows which may be suitable nest sites for Masked Owls were observed however there is potential for larger hollows to be present within the wider location.

The proposed mining operation will not directly impact the middle and upper slopes of Napkin Hill and no hollow trees will be affected.

Potential habitat for other threatened species of fauna which are known or expected to occur in the locality was observed within the three survey areas but none of this habitat will be affected by the proposed mining operation.

The grassy understorey of the *Eucalyptus viminalis* Forest on the slopes of Napkin Hill may be suitable habitat for the Tussock Skink *Pseudemoia pagenstecheri*, and the Eastern-barred Bandicoot *Parameles gunnii*. The Bandicoot could also inhabit the rough pasture along the first 150 metres adjacent to the entrance road.

The White (Grey) Goshawk *Accipiter novaehollandiae* generally prefers heavier forest as habitat than is present in Sailors Gully. If other gullies within the wider area contained denser forest with more Blackwoods and suitable nesting habitat then Sailors Gully could form part of a pair's hunting and foraging territory.

As the creek within Sailors Gully only flows intermittently and there is no other water body in the location there was no suitable habitat for the Green and Golden Frog *Litoria raniformis*, the Grayling *Prototroctes mareana* or the Swan Galaxia *Galaxia fontana*.

#### ENVIRONMENTAL WEEDS:

Six species of environmental weeds were observed during the field survey.

- Spear Thistle, *Cirsium vulgare* was the only species of environmental weed observed within the work, plant and storage areas. It is a common biennial weed of pasture and cultivation which responds to ground disturbance and will become more of an issue during mining and related operations if left unmanaged. It initially develops as a leafy and prickly rosette flush with the ground and then forms a flower spike with the typical pink-purple flower of the thistle. The weed will need to be addressed and managed as it appears, and ideally should be controlled while in the rosette stage before flowering or seeding.

The other five environmental weeds were observed within the rough pasture adjacent to the access road and within the first 150 metres from the gate.

- English Broom *Cytisus scoparius* is a serious environmental weed which has the potential to invade undisturbed bushland. It is a shrub with green stems and few leaves, yellow pea-like flowers and pods with small hard coated seeds which can remain dormant in the ground for many years. Plants were observed along the verge of the road and elsewhere in the rough pasture. This is a priority weed for management as it could invade the work site in the course of the maintenance or upgrading of the access road.
- Hawthorn *Crateagus monogyna* is a widespread weed of rough pasture and was also widely planted as a garden and hedging plant in the past. It can also establish within some types of natural vegetation. It is a small deciduous tree with lobed leaves and sharp spines which makes it very difficult to handle. It produces reddish berries in winter which can be spread widely by birds. Plants of this weed within 10 metres of the road verge should be controlled in order to prevent seed within fallen fruit being taken into the site during road maintenance operations. Cut and paste is the best method of control.
- Briar Rose, *Rosa rubiginosa* is a very thorny woody shrub with single bright pink rose flowers in spring and orange berry-like hips in winter. The hips are eaten by birds which spreads the seeds. Briar Rose was observed as an occasional plant in the rough pasture and observed to be usually associated with the Hawthorn trees.
- Periwinkle *Vinca major* is a leafy groundcover which usually spreads by creeping stolons rather than seeds. It has blue open petalled flowers in late spring and early summer. A single patch of this plant was observed about 30 metres to the north of the access road and at this distance there should be little risk of it being inadvertently introduced to the work site.
- Holly, *Ilex aquifolium*. A single juvenile plant was observed adjacent to the access road at GRID REF: 5374403E – 5392710N. Mature plants produce berries upon which birds

feed and thereby spread the seeds. There is potential for this species to invade the moister valley floor vegetation within Sailors Gully.

- Great Mullein *Verbascum thapsus*. This is a perennial plant which has a grey downy leafed rosette in the first season and produces a tall spike of light yellow flowers in the second season. The plant is a prolific seeder and has the potential to further establish along the roadside and wherever there is ground disturbance. A single patch of this weed was observed adjacent to the gate.

PHYTOPHTHORA: There was no symptomatic field evidence observed of the root pathogen *Phytophthora cinnamomi* during this field survey.

#### **4.0 Recommendations:**

##### VEGETATION COMMUNITIES:

- The proposed mining operation will be mainly restricted to previously disturbed areas within Sailors Gully. These areas however are in close proximity to the creek and measures should be taken to ensure there is no additional disturbance to the banks and bed of the creek. Measures should also be taken to effectively manage any water run-off from work, storage and stockpiling areas into the creek.
- There will be limited impact on the *Eucalyptus sieberi* community in the vicinity of the two adits to be reopened, No.1 S Adit and No.2. S Adit.
- There will be no impact on the vegetation on the northern side of the creek outside of the surveyed work areas by the proposed mining operation. No specific action is required.

##### THREATENED VEGETATION COMMUNITIES:

- The threatened vegetation community, *Allocasuarina littoralis* Forest was present in the location as mapped under the TasVeg mapping program Ref Figure 1 of this report. The small patch of this community is located well outside the proposed mining and work areas but to the immediate south of the access road. The proposed mining operation including the access road will have no direct or indirect impact on this community and no specific action is required.

##### THREATENED FLORA:

- No threatened species of plants were observed during the survey and no potential habitat for the threatened species known to occur within 5,000 metres of the location was observed in areas likely to be impacted by the proposed mining operations. No specific action is required.

##### THREATENED FAUNA:

- No species of threatened fauna or evidence of their presence was observed or recorded during the field survey. No specific action is required.

##### THREATENED FAUNA HABITAT:

- The mining operation as proposed will not impact on any specific threatened fauna habitat, providing disturbance is restricted to the previously cleared and disturbed areas.

- Should the mining operation be extended at some future time to the old adits which are located upslope towards Napkin Hill then a targeted fauna habitat survey of tree hollows should be undertaken in that location.

#### ENVIRONMENTAL WEED MANAGEMENT:

- The priority weeds for management and control are Spear Thistle, English Broom and Hawthorn as well as the single plant of Holly.
- The areas being disturbed during the mining operations should be monitored for establishment of Spear Thistle and other weeds and necessary action taken as needed.

The most appropriate methods of weed control in this area near and adjacent to natural vegetation will be either manual removal or targeted herbicide applications such as cut and paste with woody weeds.

The cut and paste method of herbicide application involves the cutting of woody stems or trunk close to the ground and applying herbicide to the cut surface within 15 seconds. The herbicide is used undiluted or at a high concentration for effective control. The application to larger stumps should target the perimeter of the cut stump just below the bark where the cambium layer is located. This is the preferred method of woody weed control within areas of natural vegetation.

Recommended herbicides and rates of application for each species of weed detailed in this report have been sourced from the Department of Primary Industry, Parks, Water and Environment website under “invasive species”. [www.dpipwe.tas.gov.au](http://www.dpipwe.tas.gov.au) and further details can be accessed from this site.

Commonly used herbicides for the control of woody weeds includes Glyphosate, Garlon, Brushoff and Grazon, however numerous formulations of most of the herbicides are available.

Spear Thistle can be controlled with Glyphosate, MCPA or Lontrel.

- All herbicides should be used in accordance with the product label and in accordance with its registration of use.
- The implementation of weed control plans, including the recognition or identification of the specific weeds, and in particular the use and application of herbicides should be undertaken by suitably experienced and qualified personnel.

#### WEED MANAGEMENT :OPERATIONS AND WORK AREAS:

- Monitor all works areas and the verge of the access road on a regular basis, suggest 4 monthly September / October, December and April / May when many weeds are likely to be germinating and becoming established and at other times if necessary.
- Each monitoring should be followed by control measures if any weeds are observed.
- The priority weed for work and operational areas will be the Spear Thistle which should not be allowed to flower or set seed.
- As a precautionary measure and in order to prevent the introduction of weeds into weed free areas all equipment and machinery should be subject to a wash-down procedure to remove any soil or mud which could contain weed seeds before being transported into the site.

**WEED MANAGEMENT: ACCESS ROAD:**

- Control specified weeds within 10 metres either side of the access road prior to commencement of mining operations.
- All maintenance or upgrading of the access road such as grading and spreading gravel, or slashing of verges which involves machinery or equipment should be undertaken only in an outwards direction from the work and operational area towards Mangana Road to ensure that soil borne weed seeds are not carried in to the site.
- Ensure that all gravels brought onto the site are sourced from pits or quarries which are certified to be clear of environmental weeds.

**WEED MANAGEMENT: SPECIFIED WEEDS:**

- **Spear Thistle** *Cirsium vulgare* can be manually removed or spot sprayed with one of the recommended herbicides.
- **Great Mullein** *Verbascum thapsus*. Can be manually removed or spot sprayed with one of the recommended herbicides.

**Spot Spraying Foliar Application.**

Herbicide (Active Ingredient)	Commercial Product	Application Rate	Withholding Period	Comments
Glyphosate	Roundup 360	75 – 100ml per 15 litres water	Nil	Non-selective and can damage or kill adjacent plants and grasses that come into contact with spray drift.
MCPA Sodium Salt	Nufarm MCPA 250	350ml in 15litres water	7 Days	Can affect other broad-leafed plants that come into contact with spray or vapour drift.
Clopyralid	Lontrel	10gms in 10 litres water	7 days	Can affect other broad-leafed plants, particularly legumes, which come into contact with spray drift. Residual and remains active in the soil for a period.

- **English Broom** *Cytisus scoparius*
  - **Hawthorn** *Crataegus monogyna*
  - **Briar Rose** *Rosa rubiginosa*
  - **Holly** *Ilex aquifolium*
- Step 1: Survey and flag the occurrences of each weed within 10 metres of both sides of the access road.
  - Step 2: Hand pull any observed seedlings or juvenile plants of each weed species.
  - Step 3: Treat each mature weed by the cut and paste method. Dispose of any branches holding fruit or seed capsules into landfill.
  - Step 4: Monitor results and undertake follow-up treatment where necessary.

**Cut Stump Application**

Herbicide (Active Ingredient)	Commercial Product	Application Rate	Withholding Period	Comments
Glyphosate	Roundup 360	Undiluted to 1:5	Nil	Apply when in active growth Cut stems as close to the ground as possible Apply immediately, within 15 seconds of top growth removal
Triclopr	Garlon 600	1:30 with diesel	Nil	Apply immediately after cut is made.
Picloram	Vigilante Herbicide Gel	Apply a 3 – 5mm layer over cut surface	Nil	Cut stems 20 mm above ground. Immediately apply gel to cut surface. Do not use near desirable plants. Picloram remains active in the soil for extended periods.

**PHYTOPHTHORA:**

- Accepted protocols in regard to hygiene and wash-down procedures for all machinery and equipment entering the work site should be followed, to ensure that the pathogen is not inadvertently introduced into disease free locations by way of extraneous soil, mud and gravel adhered to tyres, work-boots and equipment.

Philip Milner

Vegetation Consultant

**APPENDIX 1:**

22/31

## Vegetation Communities and Species Recorded

### 1. *Eucalyptus viminalis* Grassy Forest and Woodland (TasVeg Code DVG)

The mid and upper valley slopes on the north-western side of Sailors Gully and Napkin Hill was predominantly a grassy forest community dominated by White Gum *Eucalyptus viminalis* with Black Peppermint *Eucalyptus amygdalina* present as a subdominant tree. The community has all the appearance of the community *Eucalyptus viminalis* Grassy Forest on Dolerite however the author is unable to confirm the substrate as it is mapped as Mathinna Beds on the geological map of the area. The understorey vegetation was quite open with occasional understorey trees, few shrubby species and a low and often relatively thin groundlayer of grasses, predominately *Poa rodwayi*. The forest in this area was intact and relatively mature with a number of trees observed with both basal and branch/ upper trunk hollows which were potential habitat for fauna. These slopes do not appear to have been subject to fires as frequently as the opposite slopes.

DOMINANT TREES	COMMON NAME	FREQUENCY
<i>Eucalyptus viminalis</i>	White-gum	common
SUBDOMINANT TREE		
<i>Eucalyptus amygdalina</i>	Black Peppermint	common
UNDERSTOREY TREES AND TALL SHRUBS		
<i>Acacia dealbata</i>	Silver wattle	occasional
<i>Acacia melanoxylon</i>	Blackwood	uncommon
<i>Bursaria spinosa</i>	Prickly Box	occasional
<i>Exocarpus cupressiformis</i>	Native Cherry	occasional
<i>Olearia argophylla</i>	Musk	occasional
<i>Pomaderris apetala</i>	Dogwood	lower slopes
MEDIUM SHRUBS		
<i>Lomatia tinctoria</i>	Guitar Plant	occasional
SMALL SHRUBS		
<i>Acrotriche serrulata</i>	Ant's Delight	occasional
<i>Astroloma humifusa</i>	Cranberry Heath	occasional
<i>Bossia prostrata</i>	Creeping Bossia	occasional
<i>Indigofera australis</i>	Native Indigo	occasional
CLIMBERS (cont)		
<i>Clematis aristata</i>	Southern Clematis	occasional
HERBS & HERB-LIKE PLANTS		
<i>Acaena novaezelandiae</i>	Buzzy	occasional
<i>Asperula sp.</i>	A Woodruff	occasional
<i>Cardamine sp.</i>	A Bittercress	occasional

APPENDIX 1 (cont)

*Eucalyptus viminalis* Grassy Forest & Woodland (cont)

HERBS & HERB-LIKE PLANTS (cont)

<i>Dichondra repens</i>	Kidneyweed	occasional
<i>Euchiton sp.</i>	A Cudweed	occasional
<i>Geranium potentilloides</i>	Mountain Geranium	occasional
<i>Lagenophora stipitata</i>	Bluebottle Daisy	occasional
<i>Oxalis perennans</i>	Grassland Woodsorrel	common
<i>Veronica calycina</i>	Hairy Speedwell	occasional
<i>Viola hederaceae</i>	Ivy-leafed Violet	common

ORCHIDS

*Chiloglottis sp.*

GRASSES & GRAMINOIDS

<i>Dianella tasmanica</i>	Tasman Flax-lily	occasional
<i>Poa labillardierei</i>	Silver Tussockgrass	occasional
<i>Poa rodwayi</i>	Velvet Tussockgrass	common
<i>Lomandra longifolia</i>	Mat-rush	occasional

FERNS & ALLIED PLANTS

<i>Asplenium flabellifolium</i>	Necklace Fern	occasional
<i>Polystichum proliferum</i>	Mother Shieldfern	occasional
<i>Pteridium esculentum</i>	Bracken	uncommon

ENVIRONMENTAL WEEDS

<i>Cirsium vulgare</i>	Spear Thistle	uncommon
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**2. *Eucalyptus sieberi* Forest & Woodland not on Granite (TasVeg Code DSO)**

The main occurrence of this community in the areas surveyed was in the Area No.2. where it was present on the rises and small hills where the dolerite substrate was exposed. Some of the community has been subject to selective logging but the area on the main hill has been retained intact as a buffer to the known Wedge-tailed Eagle nest near the creek. The understory and ground layer vegetation varied from shrubby to grassy.

Two very small patches of the community occurred on a dolerite outcrop in survey area No.1 which is surrounded by Eucalypt plantation. The groundlayer in this location is grassy with very few shrubs.

DOMINANT TREES	COMMON NAME	FREQUENCY
<i>Eucalyptus sieberi</i>	Tasmanian Ironbark	very common
SECONDARY TREES		
<i>Eucalyptus viminalis</i>	White Gum	uncommon

APPENDIX 1 (cont)

*Eucalyptus sieberi* Forest & Woodland Not on Granite (cont)

UNDERSTOREY TREES & LARGE SHRUBS

<i>Acacia melanoxylon</i>	Blackwood	uncommon
<i>Allocasuarina littoralis</i>	Black Sheoak	occasional
<i>Exocarpus cupressiformis</i>	Native Cherry	occasional

MEDIUM SHRUBS

<i>Acacia terminalis</i>	Sunshine Wattle	occasional
<i>Cassinia aculeata</i>	Dolly Bush	uncommon
<i>Oxylobium ellipticum</i>	Golden Shaggypea	common

SMALL SHRUBS

<i>Acacia gunnii</i>	Ploughshare Wattle	localised
<i>Davesia ulicifolia</i>	Spiky Bitterpea	uncommon
<i>Tetratheca labillardierei</i>	Glandular Pinkbells	uncommon

HERBS & HERB-LIKE PLANTS

<i>Goodenia lanata</i>	Trailing Native-primrose	uncommon
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GRASSES & GRAMINOIDS

<i>Dianella revoluta</i>	Spreading Flax-lily	occasional
<i>Lomandra longifolia</i>	Mat-rush	occasional

FERNS & ALLIED PLANTS

<i>Pteridium esculentum</i>	Bracken	common
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**3. *Acacia dealbata* Forest (TasVeg Code NAD) including Broad-leafed Scrub and Work areas and along access road.**

The main area of this community was located on the middle reaches and lower northern slopes of the valley floor in association with the Broad-leafed Scrub. Regrowth Silver Wattle was however present along the length of the gully where the original vegetation had been disturbed by previous mining activities.

**4. Broadleafed Scrub (TasVeg Code SBR)**

This community occurred in association with the *Acacia dealbata* community and also formed the understorey of the Acacia community in the middle reaches of the gully.

DOMINANT TREES	COMMON NAME	FREQUENCY
<i>Acacia dealbata</i>	Silver Wattle	common
EMERGENT TREES		
<i>Eucalyptus amygdalina</i>	Black Peppermint	uncommon
<i>Eucalyptus viminalis</i>	White Gum	uncommon

APPENDIX 1 (cont)

*Acacia dealbata* Forest  
Broad-leaved Scrub (cont)  
SECONDARY TREES

<i>Acacia melanoxylon</i>	Blackwood	uncommon
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UNDERSTOREY TREES OR TALL SHRUBS

<i>Beyeria viscosa</i>	Pinkwood	occasional
<i>Bursaria spinosa</i>	Prickly Box	uncommon
<i>Nematolepis squamea</i>	Satinwood	occasional
<i>Olearia argophylla</i>	Musk	common
<i>Pittosporum bicolor</i>	Cheesewood	occasional
<i>Pomaderris apetala</i>	Dogwood	common
<i>Prostanthera lasianthos</i>	Mintbush	occasional

MEDIUM SHRUBS

<i>Cassinia aculeata</i>	Dollybush	occasional
<i>Coprosma quadrifida</i>	Native Currant	occasional
<i>Olearia lirata</i>	Forest Daisybush	occasional
<i>Pimelea pauciflora</i>	Poison Riceflower	localised
<i>Pultenaea juniperina</i>	Prickly Beauty	occasional

HERBS & HERB-LIKE PLANTS

<i>Cardamine sp.</i>	A Bittercress	occasional
<i>Oxalis perennans</i>	Grassland Woodsorrel	occasional
<i>Viola hederaceae</i>	Ivy-leaved Violet	occasional

GRASSES & GRAMINOIDS

<i>Juncus sp.</i>	A Rush	occasional
<i>Lomandra longifolia</i>	Matrush	occasional
<i>Poa labillardierei</i>	Silver Tussockgrass	common

FERNS & ALLIED PLANTS

<i>Dicksonia antarctica</i>	Soft Treefern	occasional
<i>Polystichum proliferum</i>	Mother Shieldfern	common
<i>Pteridium esculentum</i>	Bracken	common

ENVIRONMENTAL WEEDS

<i>Cirsium vulgare</i>	Spear Thistle	occasional
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ENVIRONMENTAL WEEDS IN ROUGH PASTURE NEAR ENTRANCE

<i>Crataegus monogyna</i>	Hawthorn	occasional
<i>Cytisus scoparius</i>	English Broom	occasional
<i>Ilex aquifolium</i>	Holly	single plant
<i>Rosa rubiginosa</i>	Briar Rose	occasional

APPENDIX 1 (cont)

ENVIRONMENTAL WEEDS IN ROUGH PASTURE NEAR ENTRANCE (cont)

<i>Verbascum thapsus</i>	Great Mullein	localised
<i>Vinca major</i>	Periwinkle	localised

**5 *Allocasuarina littoralis* Forest (TasVeg Code NAL)**

A localized patch of this community was present and as mapped under TasVeg Figure 1. The community was surrounded by the *Eucalyptus sieberi* Forest community. Almost a pure stand of the Black Sheoak.

This community is listed as threatened under the Tasmanian *Nature Conservation Act 2002*. It will not be affected by the proposed mining operation.

EMERGENT TREES	COMMON NAME	FREQUENCY
<i>Eucalyptus sieberi</i>	Tasmanian Ironbark	occasional
DOMINANT SPECIES		
<i>Allocasuarina littoralis</i>	Black Sheoak	common
LARGE SHRUBS		
<i>Exocarpus cupressiformis</i>	Native Cherry	uncommon
GRASSES & GRAMINOIDS		
<i>Lepidospermum sp.</i>	A Sword Sedge	uncommon
FERNS & ALLIED PLANTS		
<i>Pteridium esculentum</i>	Bracken	uncommon

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**PHOTO 1: Middle reaches of Sailors Gully vicinity of No.2 S Adit. Vegetation community Broad-leaved Scrub on right along floor of gully.**



**PHOTO 2: View of Napkin Hill from south-east side of gully. Vegetation community *Acacia dealbata* Forest as blue-green foliage canopy within the gully.**



**PHOTO 3: South-eastern facing slopes of Napkin Hill. Vegetation community *Eucalyptus viminalis* Grassy Forest.**



**PHOTO 4: Napkin Hill vegetation community *Eucalyptus viminalis* Grassy Forest**



**PHOTO 5: Slopes to the south-east of Sailors Gully. Vegetation community of *Eucalypts sieberi* Forest and Woodland on Mathinna Beds substrate. Note shrubby understorey.**



**PHOTO 6: Proposed operations area and access road. Note *Acacia dealbata* regrowth and bracken and grassy ground layer.**



**PHOTO 7: Access road to provide access between plant and operations area and the reopened Adits. Vegetation community Broad-leafed Scrub along creek to the left.**



**PHOTO 8: Entrance to Sailors Gully site. Existing vehicular track on right. Note environmental weeds, Hawthorn and Briar Rose in winter deciduous state.**

## Appendix C

### Notice of Intent – Mineral Processing Works

***Wesknight Mining Pty Ltd. (ACN 130300631) 23 Blaydon St Kings Meadows  
Tasmania 7249***

24 May 2012

The Chairperson  
Board of Environmental Protection Authority  
Department of Primary Industries, Parks, Water and Environment  
GPO Box 44  
Hobart, Tas 7001.  
Via email att Damian Blackwell

Dear Sir,

**Re : Mangana Gold Mine – Mangana Tasmania**

**Notice Of Intent - Level 2 Mineral Processing Works**

## **1 Proponent**

This submission is made by Wesknight Mining Pty Ltd. (ACN 130300631)

Contact details are; David Wessely Director, Wesknight Mining, 23 Blaydon Street Kings Meadows Tasmania 7249. Phone 0488764696.

Email Wesknight Mining <wesknightmining@gmail.com>

## **2 Project name and location**

The project name is the Mangana Gold Mine. The location of the project is shown in **Figures 1 and 2.**

## **3 Background**

Wesknight Mining currently holds Exploration Licence 12/2011 near Mangana, North – East Tasmania. The licence was granted in August 2011 as part of an Exploration Tender Area process. Since granting, Wesknight Mining has accessed several old adits (notably the Argyle No1 and No 2 Adits) and conducted underground geological sampling and mapping. These results have been very encouraging, although highly variable. The variability means that underground drilling is not likely to be a feasible method of confirming a mining reserve.

Wesknight Mining propose to apply for a mining lease to reopen the old workings and commence small-scale underground mining with a small gravity plant constructed on site (above ground) to recover gold as a concentrate for processing elsewhere. This will also require compliance with mine safety laws Wesknight Mining will comply with all applicable regulations and will consult with Workplace Safety Officers regarding the requirements. This will include the designation of the mine operator.

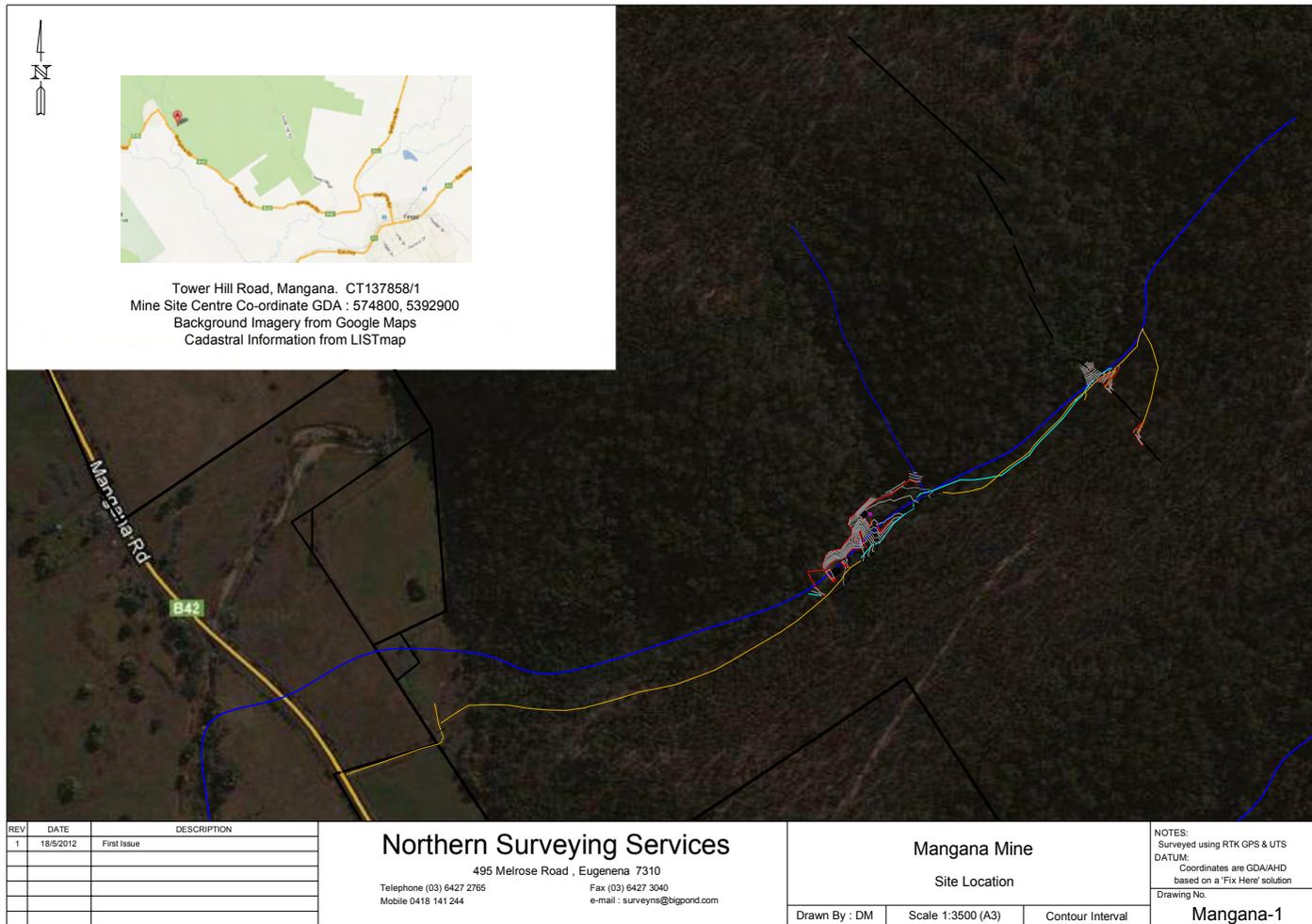
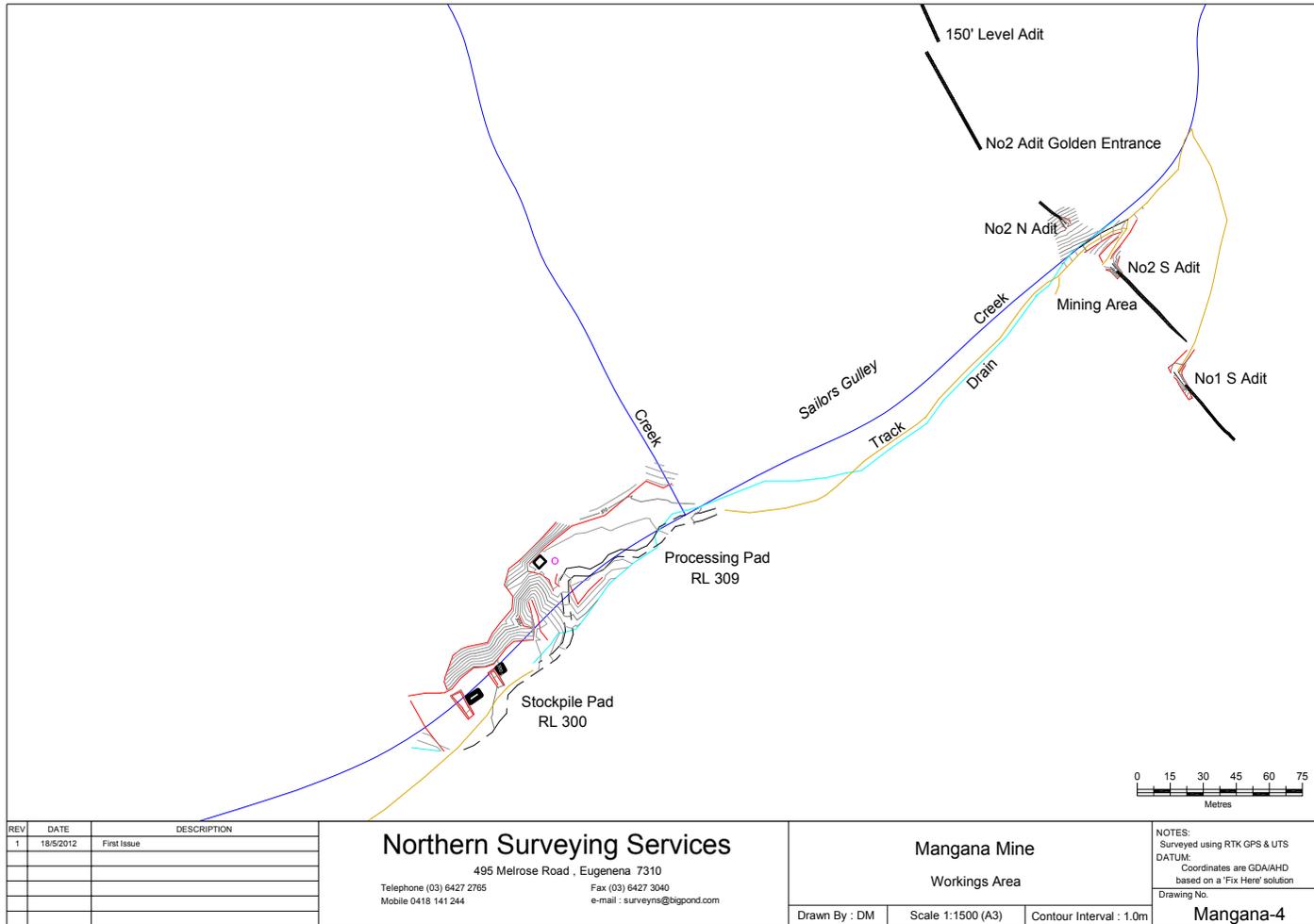


Figure 1 Mangana Gold Mine – Location Plan.



**Northern Surveying Services**  
 495 Melrose Road, Eugenea 7310  
 Telephone (03) 6427 2765      Fax (03) 6427 3040  
 Mobile 0418 141 244          e-mail: surveys@bigpond.com

**Mangana Mine**  
 Workings Area

NOTES:  
 Surveyed using RTK GPS & UTS  
 DATUM:  
 Coordinates are GDA/AHD  
 based on a 'Fix Here' solution  
 Drawing No.

Drawn By : DM      Scale 1:1500 (A3)      Contour Interval : 1.0m      **Mangana-4**

Figure 2 Mangana Gold Mine – Site Plan.

Wesknight Mining is a private company incorporated in WA. The Company was awarded EL 12/2011 on the basis of an exploration tender area process with a budget commitment of approximately \$300,000. To date the Company has spent approximately \$150,000

Wesknight Mining is currently applying for a Mining Lease over the majority of the Exploration Licence area and is required to supply financial details including asset backing and financing. This is being provided to Mineral Resources Tasmania. The Managing Director is an experienced mine foreman who has associates with mining engineering, geotechnical, geological and environmental engineering expertise.

## **4 Project Description**

### **4.1 Resource**

The variable nature of the quartz veining hosting the gold, and the “nuggety” nature of the gold makes any systematic estimation of the gold resource difficult, with traditional drilling and assaying. However, the sampling program conducted by Wesknight Mining has resulted in the sampling and representative assaying of some 9000 kilograms. The assays average over 32 gms/ tonne. These results are sufficient to indicate that a small scale hand held mining method can be sustainable and economic at today's gold price.

### **4.2 Mining plans**

The project will consist of small scale hand held airleg mining methods using cut and fill. Only small scale machinery will be used – bidders etc. The ore will initially be mined by accessing the Argyle No 2 Adit (see **Figure 2**) at the lower levels. Mining will be highly selective with minimal waste rock generated and that generated will be replaced as mine fill (with tailings). All waste rock (slates and sediments) and ore are expected to be non sulphidic (ie not reactive) and have little or no acid producing capacity. This is also demonstrated by previous mining mullock and tailings where there has been no evident oxidation or acid drainage generation.

The mine will be accessed by an adit above the water table and no mine dewatering will be required. A mine plan is currently being developed which will include both a geotechnical and ventilation component.

Access for mining purposes will be via existing tracks where possible, with a cleared area of approximately 20 m<sup>2</sup> at each adit entrance for working platforms.

Annual production is currently uncertain but is expected to be in the vicinity of 5- 20,000 tonnes per year.

### **4.3 Processing**

Processing will involve a simple gravity separation plant with no cyanide or chemicals involved. The plant will consist of a jaw crusher, fine crusher, ball mill, spiral classifier, centrifugal separator and shaking table, with final product a gold ore concentrate and tailings (**Figure 3** shows the process flow sheet). The tailings will be relatively coarse and permeable. The plant will be located on the surface near the Adit (**Figure 3**). It will be in an existing previously disturbed (cleared) area and have small footprint (approx 25m x25m). A likely layout is shown in **Figure 4**.

The concentrate will be processed elsewhere.

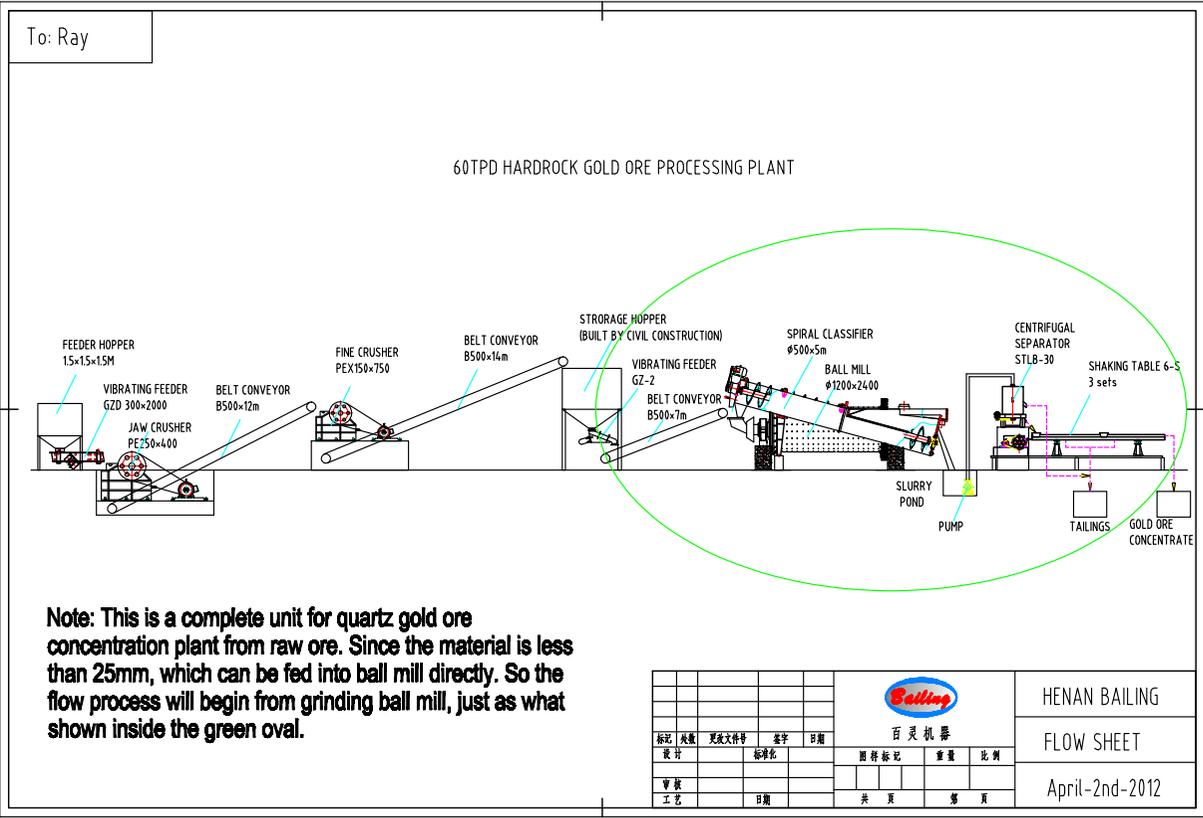


Figure 3 Mangana Gold Mine Process Flow Sheet

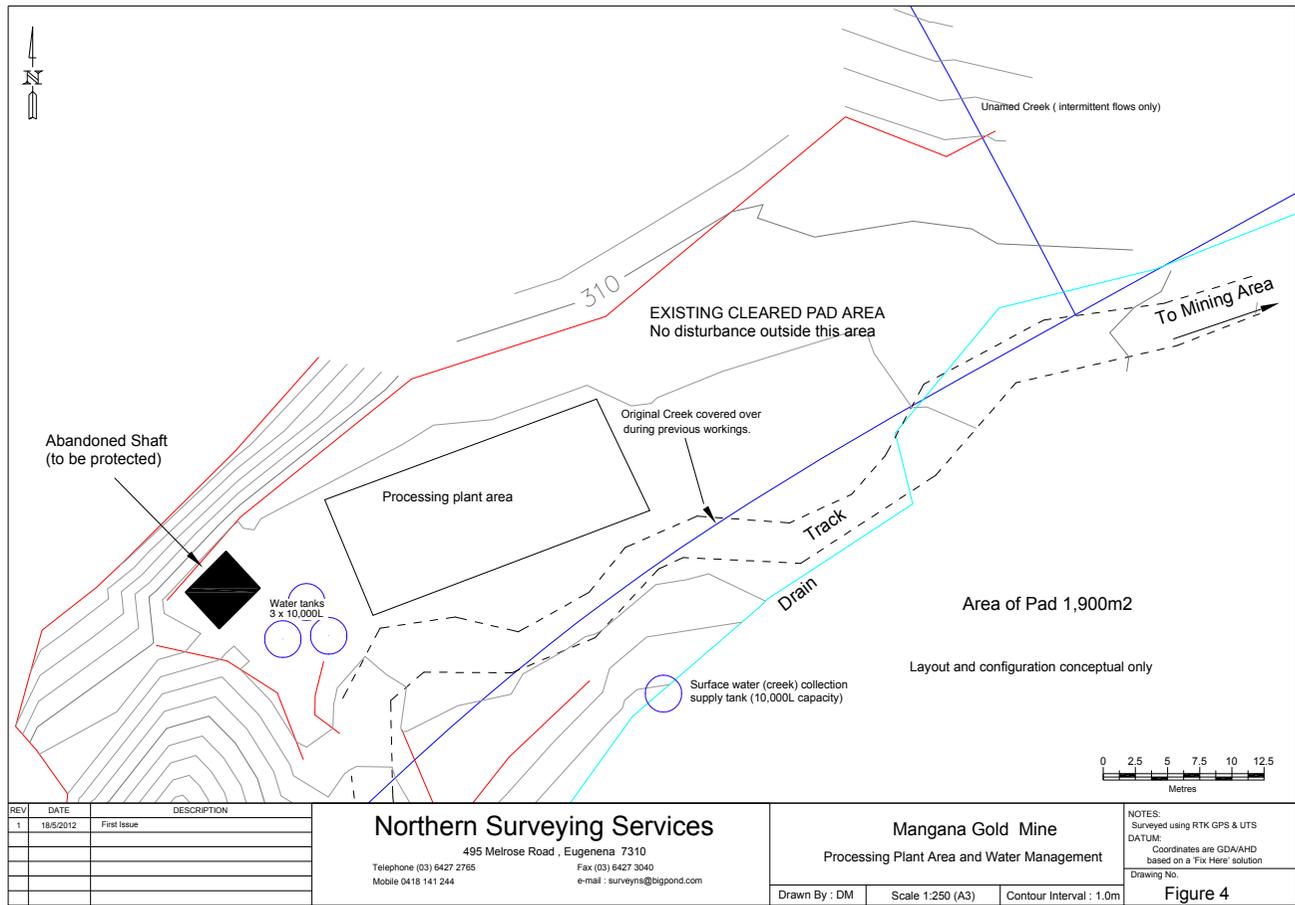


Figure 4 Plant Area possible layout

There is also the possibility that ore would be trucked directly to the Beaconsfield Gold Mine for processing.

#### **4.4 Wastes**

No mine dewatering will be required and all process waters will be recycled and a net water consumer. No discharges are anticipated.

Water required in the processing circuit is estimated at between 4 to 15 kL per hour when operating and is expected to be recycled and made up with external sources. These will be either surface waters and/or a ground water well into the underground workings.

A conceptual layout for water tanks is shown in **Figure 4**.

All tailings will be recovered after dry stacking and placed underground as fill.

All waste rock generated in mining will also be used as mine backfill.

#### **4.5 Transport**

Access is via Mangana Road from Fingal. The existing access road from Mangana Road to the site will require minor upgrading (culverts etc). There will be no significant transport impacts as production of gold concentrate will be low (less than 100kg) and transported via light vehicles.

### **5 Project location**

The location of the project is shown in **Figures 1 and 2**. A google image is also included.

### **6 Stakeholder consultation**

It is proposed that consultation meetings will be held with the Mangana community to discuss the project.

The results will also be discussed with Break O'Day Council and Forestry Tasmania. EPA and MRT have been consulted.

Workplace Safety have previously been contacted prior to the exploration program commencing but no request for further information or for a site visit has been received, probably because of the nature of the works to date.

### **7 Environment Description**

The Exploration Licence (and proposed mining lease) is situated in Sailors Gully, immediately south of Mangana, in an extensive area of native forest owned by the Crown (Forestry Tasmania). The topography is quite steep on each side of an incised valley floor. To the east is the South Esk Valley.

There is one residence approx 800m away from the mine and likely processing site and to the south of Sailors Gully (see **Figure 5** - google image).

The house is shielded by the valley walls. There are no views into the site due to the native forest and the steep valley topography where the project is located.

Sailors Gully was the site of extensive underground gold mining in the late 1800’s and early 1900’s. This includes shaft mining (Mangana Gold Reefs Mine) and a number of adits (Golden Entrance Mine). There are little remaining remnants of this mining evident, except for adit entrances, shafts, and tailings. All the adits are above the valley ground level and no groundwater is expected.

Geology of the area is the Mathinna beds which consist of folded and faulted greenschist metamorphosed turbiditic sandstones and slates. None of these materials are acid generating.

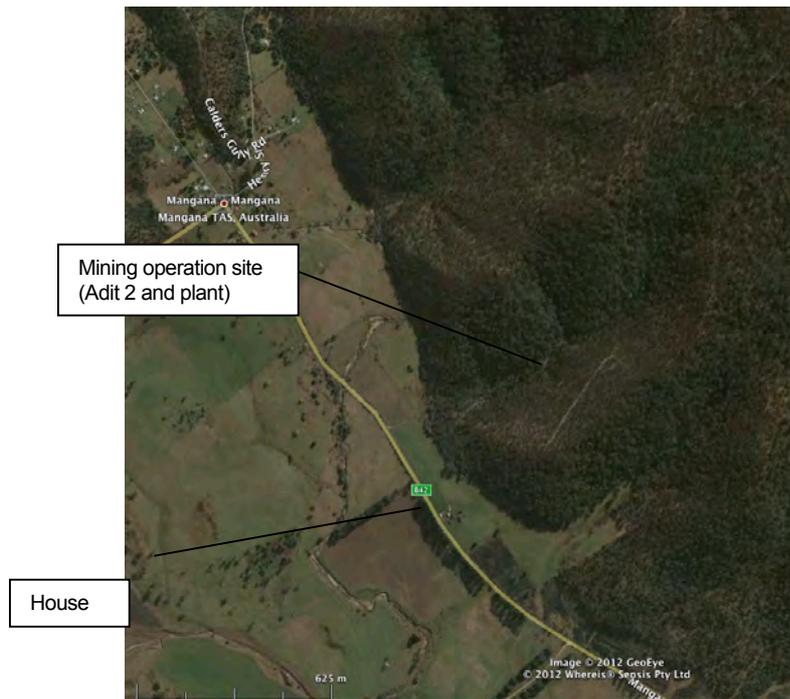


FIGURE 5 Land Use – Mangana TASMANIA – Source Google Maps

The site has been heavily disturbed with numerous adits, mullock dumps and the results of former alluvial mining in the valley floor. The floor of Sailors Gully has had numerous mining sites in the past but there are no remaining foundations, structures or items of historical interest, other than the mine shaft and adit entrances. The only other evidence is the mullock dumps and tailings which have been used by the Council as a source of fill.

Sailors Gully Creek drains to Richardsons Creek, then Tower Rivulet and the South Esk River, several kilometres to the west of Fingal. It only flows intermittently and there are no permanent waters in the proposed lease area. Water quality appears quite good, as the site is now extensively regenerated.

The vegetation in the gully has regenerated and is mapped as *Eucalyptus amygdalina* coastal forest and woodland (DAC). Minimal vegetation clearing will be required as the plant footprint is small and will be located in an existing cleared area and all mining is underground.

Zoning is Rural Agricultural under the Break O’Day Planning scheme (1996). Extractive industry is a discretionary use in the Zoning.

## 8 Issues

The principal environmental issues related to the mine and gravity processing are well understood, based on experience elsewhere.

Due to the isolation from residences, there are few issues relating to potential affects on the amenity and lifestyle of the area. Mining is liable to be welcomed as a source of employment and income.

The main issues are related to the waste rock and tailings characteristics (geochemistry), water quality, water supplies and reuse during mining and processing, flora and fauna, weeds and heritage.

## 9 Studies

It is proposed that the following studies will be conducted in the Mining Lease and area of the mine and processing works.

- Natural values/ flora and fauna Assessment (including weeds);
- Geochemical assessment of ore and tailings;
- Heritage;
- Water management (including water quality) and
- Waste management.

## 10 Timetable

It is intended that the EER will be completed within 2-3 months. Mining is proposed to start almost immediately on obtaining the Permit.

## 11 Environmental Approvals Process

It is our understanding that the following approvals process is required;

- A level 2 planning permit application to the Break O'Day Council,

The project will not require approval under the *Environment Protection and Biodiversity Conservation Act 1999*, as there is no potential to impact upon matters of national environmental significance or upon Commonwealth land.

If you have any questions relating to the proposal please contact the undersigned, or John Miedecke our consultant. (0418130672).

Yours sincerely



for

David Wesseley , Director.