Appendix VII

Environmental Reports

Contents

Great South Land Minerals Ltd

ONSHORE SEISMIC SURVEY ADDENDUM 2 (CENTRAL HIGHLANDS) TO ENVIRONMENTAL MANAGEMENT PLAN

March 2007

Project No. 1377.001

GREAT SOUTH LAND MINERALS

SEMF

SCIENTISTS
ENGINEERS
MANAGERS &
FACILITATORS

PREFACE

LIMITATIONS STATEMENT

Addendum 2 (Central Highlands) to the Environmental Management Plan (EMP) has been prepared in accordance with the scope of services agreed upon between SEMF Pty Ltd (SEMF) and Great South Land Minerals Ltd (GSLM) (the client). To the best of SEMF's knowledge, the report presented herein represents the Client's intentions at the time of printing of the report. However, the passage of time, manifestation of latent conditions or impacts of future events may result in the actual project and its impact differing from that described in this report.

In preparing this report SEMF has relied upon data, surveys, analysis, designs, plans and other information provided by the client, and other individuals and organisations referenced herein. Except as otherwise stated in this report, SEMF has not verified the accuracy or completeness of such data, surveys, analysis, designs, plans and other information.

No responsibility is accepted for use of any part of this report in any other context or for any other purpose by third parties.

This report does not purport to provide legal advice. Readers should engage professional legal advisers for this purpose.

DOCUMENT CONTROL

Project Name:	GSLM Seismic Addendum 2 to EMP
Project No.	1377.001
Prepared For:	Great South Land Minerals Ltd

Prepared & Published By:	SEMF Pty Ltd
Contact:	John McCambridge
Phone No:	(03) 6231 1211
Facsimile:	(03) 6234 8709
Email:	semf@semf.com.au

Authors:	FKP		
Reviewed/Approved By:	JMC	Review Date:	

Draft Rev 0	Draft Rev 1	Draft Rev 2	Final

FOREWORD

Function of the Addendum to the Environmental Management Plan

Addendum 2 (Central Highlands) to the Environmental Management Plan (EMP) has been prepared to satisfy the requirements outlined in the letter of 30 March 2007 issued by the Conservation Assessment Section of the Department of Primary Industries and Water (DPIW) (refer to Appendix A), regarding Great South Land Minerals Ltd (GSLM) proposal for several additional lines, and the extension of previously approved lines, of onshore seismic survey over the Central Highlands of Tasmania.

The additional and extended lines will be part of the largest onshore seismic survey ever conducted in Tasmania. In February 2006, GSLM submitted its Onshore Seismic Survey Environmental Management Plan (EMP) for approximately 1,446 kilometres of onshore seismic lines. This Addendum provides site-specific information on the proposed new and extended lines, and coincides with the original EMP' aims and commitments.

The proposed seismic survey and associated activities fall under the jurisdiction of Mineral Resources Tasmania (MRT) and the *Mineral Resources Development Act 1995*.

EXECUTIVE SUMMARY

In February 2006, GSLM submitted an Onshore Seismic Survey Environmental Management Plan (EMP) covering approximately 1,446km of existing roads in eastern Tasmania. The EMP was approved and the work commenced. However, due to poor weather and equipment problems, the majority of the survey was not completed in 2006, as had been planned.

GSLM is proposing to resume the survey in the first quarter of 2007, and is aiming to add 18 seismic lines and to extend 3 previously approved lines as part of the overall survey coverage within the Central Highlands area.

The survey techniques used will be the same as those used for the other seismic lines and described in the February 2006 EMP.

Roadside vegetation communities can provide important habitat for threatened species. The Resource Management and Conservation section of DPIW has previously granted GSLM in-principle approval for undertaking the seismic survey in the State Road reservation areas, with the requirement for GSLM to identify areas where threatened species could be adversely impacted by the seismic survey.

This Addendum to the EMP, reviews the known records of threatened species that occur along the proposed additional and extended seismic lines and provides management techniques to ensure that the seismic survey will not have an adverse impact on threatened species.

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

ABBREVIATIONS

DIER	Department of Infrastructure, Energy and Resources
DPIWE	Department of Primary Industries, Water and Environment
DPIW	Department of Primary Industries and Water
EMP	Environmental Management Plan
GSLM	Great South Land Minerals Ltd
km	kilometre
MRT	Mineral Resources Tasmania
RMC	Resource Management and Conservation (section of DPIW)
SEMF	SEMF Pty Ltd
TSU	Threatened Species Unit

1 INTRODUCTION

1.1 THE PROPONENT

The proponent is Great South Land Minerals Ltd (GSLM). GSLM is a fully owned subsidiary company of Empire Energy Corporation International (Empire Energy). GSLM is a Tasmanian onshore oil and gas exploration company. Contact details for the proponent are:

Great South Land Minerals Ltd
cliveburrett@gmail.com

Project Manager: Clive Burrett (Managing Director)

Terrex Seismic Pty Ltd (Terrex) will be contracted by GSLM to undertake the seismic survey.

1.2 HISTORY OF THE PROJECT

In 2006, GSLM obtained approval to carry out a large onshore seismic survey, covering approximately 1,446km in eastern Tasmania. The survey built on the information obtained during an earlier survey by GSLM in 2001. The survey was begun but was abandoned early due to poor weather and equipment problems.

GSLM is aiming to resume its survey in 2007 and to add 18 lines and extend 3 previously approved lines situated within the Central Highlands of Tasmania. The locations of these additional and extended lines are shown in Figure 1 in yellow.

1.3 PROJECT TIMEFRAMES

GSLM aims to start the survey at the end of March or early April 2007. The entire survey over all proposed lines in Tasmania will take approximately 4 months to complete, with approximately 2 weeks additional preparatory works at the onset, and approximately 2 weeks demobilisation at the close of the survey. The additional lines proposed within this Addendum, will be surveyed as part of the overall seismic survey within the Central Highlands area. Data interpretation will occur throughout the data acquisition periods of the survey.

1.4 APPROVALS

The main legislation that applies to the approval of this activity is the *Mineral Resources Development Act 1995*. All operations fall under the jurisdiction of MRT, and will follow the *Mineral Exploration Code of Practice* and Special Exploration License conditions. Furthermore, MRT has indicated that GSLM must liaise with all other relevant authorities, including DPIWE (now DPIW) and DIER.

1.5 CONSULTATION

The public are advised of Seismic Programs by notification in the local press publications and by mailbox distribution of a general information Leaflet. Further planning is being undertaken in terms of public relations.

1.5.1 State Government Consultation

Several State Government departments have been consulted regarding the proposed additional onshore seismic survey lines proposed by GSLM. The departments, which have been consulted, and some of which have provided comments, include but are not limited to:

- Mineral Resources Tasmania (MRT) (David Gatehouse and John Pemberton);
- Central Highlands Council;
- Forestry Tasmania;
- Department of Primary Industries and Water (DPIW) (Brad Arkell and Fionna Bourne); and
- Department of Infrastructure, Energy and Resources (DIER) (Brian Watson).

At the time of writing, the details of the 18 additional and 3 extended lines are as per Table 2, and comprise a total of 216.5 kilometres.

1.5.2 Local Government Consultation

GSLM's Chief Operations Manager, Allan Steel, has contacted Central Highlands Council via phone and email, in order to ensure that the Council is informed about the seismic survey planned for March/April 2007. The Council has been provided with information on the seismic survey and how the survey will be carried out.

1.5.3 Community Consultation

Press notification is planned for the 3 extended seismic lines and the additional 18 seismic lines. At this stage no consultation is planned as the routes are aligned with existing public roads.

1.6 STRUCTURE OF THIS REPORT

A brief description of the structure of this report is provided in Table 1 below.

Table 1: Brief Description of the Addendum Report Structure

Section Heading	Brief Description of the Information Provided
Foreword	A brief description of the function of the EMP and the information it contains.
Executive Summary	A summary of the proposed seismic survey and information provided in the report in support of the environmental and planning approvals.
1.0 Introduction	Description of the proponent, the project history, project timeframes, approvals required, and consultation undertaken by the proponent.
2.0 Addendum to Environmental Management Plan	Summary of the seismic survey logistics. Description of the existing environment, with identification of significant features, potential impacts arising from the survey, and addresses the concerns of DPIW.
3.0 Conclusions and Commitments	Summing up of the Addendum to the EMP, and how the requirements of DPIW have been addressed.
4.0 References	As indicated.

2 ADDENDUM TO ENVIRONMENTAL MANAGEMENT PLAN

2.1 INTRODUCTION

The Resource Management and Conservation section (RMC) of DPIW has granted GSLM in-principle approval to undertake the proposed new seismic survey lines (listed in Table 2, below and totalling 216.5 kilometres) within the road formation areas (road surface and gravel shoulders), and has noted that no permits for the survey will be required under the *Threatened Species Protection Act 1995*, with the proviso that the following requirements be met (refer to Appendix A):

- GSLM should continue to observe the management guidelines and commitments specified in the Environmental Management Plan;
- the traffic diverted around trucks during operations should be diverted over road formations and not over road edges containing vegetation;
- GSLM should notify relevant authorities prior to changes to proposed seismic lines;
- the Conservation Assessment Section of DPIW should be notified the project extend into the wedge-tailed eagle breeding season (August 2007 to January 2008); and
- GSLM submit a brief Addendum to the Environmental Management Plan.

To satisfy the requirements of the RMC section regarding threatened flora, a botanist has reviewed the seismic lines; this is discussed in detail in Section 2.4.

The DIER environmental screening requirements are reviewed in Section 2.5.

A summary of the action(s) required for each seismic line, to ensure protection of threatened species, is provided in Section 2.6 and is further summarised in Section 3.

Table 2: GSLM Proposed Additional Seismic Lines – Central Highlands

Line	Length (km)	Roads	DIER	Location From	Location To
TB02b_BJ	18.92	WADDAMANA ROAD		WADDAMANA ROAD beginning at HERMITAGE	ending at INTERSECTION WITH BASHAN ROAD
TB02b_BK	13.66	MEADSFIELD ROAD, UN_NAMED TRACK		MEADSFIELD ROAD beginning 500m before TOR HILL ROAD INTERSECTION, UN_NAMED TRACK beginning at NORTHERN END OF MEADSFIELD ROAD	heading toward HILL OF BLAZES for 3.4km
TB02b_BL1	4.93	UN-NAMED ROAD, McGUIRES MARSH ROAD		UN_NAMED ROAD beginning at BASHAN ROAD 600m north of VICTORIA VALLEY ROAD INTERSECTION, McGUIRES MARSH ROAD	for 1.2km
TB02b_BL2	3.51	VICTORIA VALLEY ROAD		VICTORIA VALLEY ROAD from STRICKLAND ROAD	to BASHAN ROAD
TB02b_BM	13.11	VICTORIA VALLEY ROAD, PORTAL ROAD		VICTORIA VALLEY ROAD beginning at DEE DAM, PORTAL ROAD	ending at LYELL HIGHWAY
TB02b_BN	14.10	MENTMORE ROAD, VICTORIA VALLEY ROAD		MENTMORE ROAD beginning at ECHO DAM, VICTORIA VALLEY ROAD,	ending at LYELL HIGHWAY
TB02b_BP	5.75	UN-NAMED ROAD		UN-NAMED ROAD beginning on BASHAN ROAD 500m SOUTH OF GLENGOWAN	heading west, following KENMERE CREEK until NORTHERN MOST POINT OF THIS ROAD
TB02b_BQ1	11.05	UN-NAMED ROAD		UN-NAMED ROAD beginning on OPPOSITE SIDE OF BRIDGE AT END OF MONPEELYATA ROAD	following course along northern end of LAKE ECHO for 11km
TB02b_BQ2	8.82	UN-NAMED ROAD		UN-NAMED ROAD beginning 2km NE of ROSCARBOROUGH on MARLBOROUGH HIGHWAY travelling SOUTH past THOMPSONS MARSH for 9km	until INTERSECTION SOUTH OF HARRYS MARSH
TB02b_BR	8.77	SIMONS ROAD		SIMONS ROAD from VICTORIA VALLEY ROAD	until SHARP BEND WHERE ROAD BEGINS HEADING EAST
TB02b_BS1	7.03	PINE TIER ROAD		PINE TIER ROAD beginning at INTERSECTION WITH MARLBOROUGH HIGHWAY	
TB02b_BS2	15.00	GOWAN BRAE ROAD		GOWAN BRAE ROAD west of PINE TIER LAGOON	ending 2.3km SOUTHEAST OF OLIVE LAGOON
TB02b_BX	8.54	WAYATINAH ROAD		WAYATINAH ROAD starting at LYELL HIGHWAY	to WAYATINAH POWER STATION
TB02b_BZ	15.24	ECHO LINK FORESTRY ROAD		From ECHO DAM, ECHO LINK FORESTRY ROAD	running EAST OF LAKE ECHO along SUKES TIER for 15.2km to INTERSECTION
TB02b_HA	31.9	DAWSON ROAD, JUNGLE ROAD, FLORENTINE ROAD		DAWSON ROAD beginning at INTERSECTION WITH LAKE REPULSE ROAD, JUNGLE ROAD, FLORENTINE ROAD	ending at REPULSE ROAD INTERSECTION
TB02b_HB	5.91	UN-NAMED ROADS		Series of UN_NAMED ROADS beginning at DAWSONS ROAD between JUDY'S MARSH and ISLET CREEK	taking most direct southerly course to DUNROBIN ROAD.

Line	Length (km)	Roads	DIER	Location From	Location To
TB02b_HC	17.95	PILLIES ROAD, UN-NAMED ROADS, BROWN MOUNTAIN ROAD, UN-NAMED ROAD		PILLIES ROAD for 300m, UN-NAMED ROADS heading north west and connecting with PILLIES ROAD 3.7km from beginning of line	PILLIES ROAD, BROWN MOUNTAIN ROAD, UN-NAMED ROAD WEST AT FORK for 3km
TB02b_AA1	7.00	MACCLESFIELD ROAD		MACCLESFIELD ROAD start at WADDAMANA ROAD INTERSECTION	for 7km from WADDAMANA ROAD INTERSECTION
Extension of TB02b_BN	2.00	LYELL HIGHWAY	A0197	LYELL HIGHWAY from VICTORIA VALLEY ROAD INTERSECTION	for 2km in north westerly direction
Extension of TB02B_HA	1.3	DAWSON ROAD		DAWSON ROAD from LAKE REPULSE ROAD INTERSECTION	for 1.3km in south easterly direction
Extension of TB02b_BK	2.00	LAKE HIGHWAY	A2100	LAKE HIGHWAY from DENNISTOUN ROAD INTERSECTION	for 2km in easterly direction
Total	**216.5**				

2.2 SEISMIC SURVEY METHODOLOGY

This section is taken from the original EMP for GSLM's onshore seismic survey.

Onshore seismic surveys use seismic energy generated through dropping or vibrating a heavy mass on the earth's surface or through detonation of explosive charges. GSLM will use vibroseis trucks, whereby a vibrating baseplate is lowered to the ground and the weight of the truck is then placed over the vibrating baseplate. No explosive charges will be used during the proposed seismic survey.

The energy from the vibration radiates outwards in all directions from the vibrating baseplate. When the seismic waves reach geological formations with different structural properties the seismic waves are reflected or refracted. The seismic waves are recorded at the surface by geophones placed on the ground. The configuration of subsurface geological structures is mapped by interpreting the variations in the times taken for the seismic waves to return to different points along the surface after reflection, or refraction from the geological structures. Seismic lines can be easily deviated to avoid affecting environmental values such as threatened species of plants or animals, or significant native vegetation.

2.3 WEDGE-TAILED EAGLES

The Tasmania Wedge-tailed eagle, *Aquila audax fleayi*, is listed as vulnerable under the Tasmanian *Threatened Species Protection Act 1995*, and listed as endangered under the *Commonwealth Endangered Species Protection Act 1992*. This unique subspecies of Wedge-tailed eagle only occurs in Tasmania and its larger near offshore islands. Wedge-tailed eagles only nest in old-growth trees in native forest, with approximately 80% of eagle nests occurring on private land or State forest, and few being protected in formal reserves. Eagles are very timid while breeding and are likely to desert a nest if disturbed. They breed from August to January and are particularly sensitive to disturbance early in this period (Bryant and Jackson, 1999). GSLM and Terrex are committed to avoiding any

impacts on the breeding success of the Wedge-tailed eagles resulting from the seismic survey.

The preparations for the seismic survey over the additional and extended lines within the Central Highlands are planned to start around mid-March 2007, with the survey beginning in late-March to early-April 2007 and being completed within approximately 6 weeks. As a result, there will be no overlap between the breeding times of Wedge-tailed eagles and the proposed seismic survey, hence impacts from the survey on this species will be unlikely.

2.4 THREATENED FLORA

Tasmania is home to numerous unique plant species, and roadsides can provide important habitat for threatened plant species.

The Threatened Species Unit (TSU) of the former Department of Primary Industries Water and Environment (DPIWE) had set a number of requirements for the main portion of the seismic survey in eastern Tasmania. The requirements of TSU regarding the protection of threatened flora during the seismic survey were as follows:

- That a botanist be present during exploration where the traverse is within areas of native vegetation known to contain significant threatened flora sites **or** where the traverse will go through areas or native vegetation types identified as potential habitat for threatened species;
- That a botanist is not required during the exploration where the traverse is restricted to the sealed/gravel section of the road **or** where the traverse goes through cleared land that contains improved pastures.

To ensure that the planned seismic survey will not impact on any threatened species, a consultant was engaged to undertake a desktop review of vegetation community types to determine areas of high environmental sensitivity, or risk, based on the likely presence of threatened plant species or potential habitat along the proposed seismic lines. A copy of the report is provided in Appendix B.

A summary of the consultant's (GHD, 2007) findings is provided below.

- The data used included flora species information from the Natural Values Atlas (DPIW web-based search tool).
- Given the lack of field checking and the digital source of the data, the accuracy of the threatened species location data obtained varies from 10m to 5,000m and should therefore be considered indicative only.
- Given the extent of the seismic survey, it is possible that more threatened species occur along or near the proposed seismic survey lines that are yet to be identified.
- Nine of the proposed survey lines showed areas containing threatened species (as defined by the Tasmanian *Threatened Species Protection Act 1995* (TSPA) and the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC). A total of 15 areas, some including several individual threatened species locations, were identified within the proposed additional lines; each was assigned an individual area number. These are listed in Table 3, below and locations are shown in Figure 2.
- It should be noted that GHD was given an preliminary version of the proposed additional lines; the lengths and numbers of lines have since been cut down to the lines discussed in this report, hence only the GHD-identified areas pertaining to the final list of additional lines are discussed in this report.

- The list of threatened species documented for those areas relevant to this Addendum is provided in Table 4 below.

Table 3: Threatened Species Sites (from GHD, 2007)

Survey Line	Area Number*	Description	GPS Coordinates (Start) (AGD94)	GPS Coordinates (finish) (AGD94)
TB02B_BS2	Area 1	2 sites in close proximity	453712mE, 5345283mN	453912mE, 5344883mN
	Area 2	1 single site	456312mE, 5341383mN	-
TB02B_BN	Area 3	3 individual sites	459117mE, 5329797mN	460112mE, 5328983mN
TB02B_BJ	Area 4	2 sites in close proximity	479412mE, 5334483mN	479412mE, 5334183mN
	Area 5	1 single site	481912mE, 5333683mN	-
	Area 6	2 sites in close proximity	488312mE, 5327483mN	488312mE, 5327583mN
TB02B_AA1	Area 7	2 sites in close proximity	479212mE, 5330283mN	479212mE, 5330383mN
TB02B_BL1	Area 8	1 single site	479762mE, 5316433mN	-
	Area 9	2 single sites	479012mE, 5315383mN	-
TB02B_BL2	Area 10	1 single site	473712mE, 5316683mN	-
TB02B_BX	Area 11	4 sites in close proximity	460212mE, 5308583mN	460212mE, 5307548mN
	Area 12	3 sites in close proximity	460712mE, 5306683mN	460762mE, 5306183mN
	Area 13	1 single site	461712mE, 5302583mN	-
TB02B_HA	Area 14	2 single sites	456012mE, 5296683mN	455612mE, 5296683mN
TB02B_HC	Area 15	2 single sites	468212mE, 5286083mN	467977mE, 5285943mN

Table 4: Threatened Species (from GHD, 2007) (*refer also to Appendix A of GHD's report provided in Appendix B of this report***)**

Species	Common Name	TSPA Status	EPBC Status	Area Recorded
Asperula scoparia var. scoparia	Prickly woodruff	Rare	Not listed	4
Barbarea australis	Native wintercress	Endangered	Critically endangered	11
Brachyscome rigidula	Hairy cutleaf daisy	Vulnerable	Not listed	6
Discaria pubescens	Hairy anchor plant	Endangered	Not listed	4, 6, 7
Eucalyptus gunnii subsp divariacata	Miena cider gum	Endangered	Not listed	5
Grevillea australis	Narrow leaf southern grevillea	Rare	Not listed	1, 13
Monotoca submutica var. autumnalis	Roundleaf broom heath	Rare	Not listed	9, 15
Pimelea curviflora	Curved rice flower	Rare	Not listed	11, 12
Rhodanthe anthemoides	Chamomile sunray	Rare	Not listed	7
Scelranthus brockiei	Brock knawel	Rare	Not listed	3
Uncinia elegans	Handsome hook sedge	Rare	Not listed	3
Viola cunninghamii	Variable sallow wattle	Rare	Not listed	1
Viola hederacea subsp. Curtisiae	Curtis' violet	Rare	Not listed	8, 9, 10, 11, 12, 13, 14
Westringia angustifolia	Scabrous westringia	Rare	Not listed	2

The recommendations made, by the consultant (GHD, 2007), to protect the threatened species for these additional lines are essentially similar to those made in the original EMP, namely:

1. The start and end point of threatened species areas should be flagged by surveyors;

2. All flagging should be removed after the survey has been completed;
3. Due to the low accuracy of the location data, flagging should allow a buffer of at least 20m either side of any threatened flora areas;
4. Within the flagged areas a 200m buffer zone should be established either side of the road;
5. No trucks or vehicles should leave the formed roads within the flagged areas and foot traffic in the area should be minimised;
6. In cases where it is essential that vehicles leave the road within the flagged sections or close to individual threatened species records, a botanist should be present to check for threatened species;
7. All seismic crew should be familiar with the maps provided and the significance of threatened species; and
8. If the timing of the survey is moved to within the Wedge-tailed Eagles' breeding season (August – January), impacts to the species will need to be further assessed.

2.4.1 Extension of Lines

Since commissioning GHD to carry out the threatened species review of the additional lines in the Central Highlands, GSLM has resolved to extend several previously approved seismic survey lines to fit in with seismic modelling requirements. SEMF carried out a search of the Natural Values Atlas web site for those lines and noted that there were no threatened flora species within these proposed line extensions.

These line extensions included:

- Extension to line BN, 2kms on the Lyell Highway (DIER code A0197),
- Extension to line BK, 2kms on the Lake Highway (DIER code A2100), and
- Extension to line HA, 1.3kms on Dawson Road.

All these are shown in Figure 2.

2.5 ENVIRONMENTAL SCREENING REPORTS

Environmental screening reports provide information regarding threatened species, archaeological sites, habitat values, and environmental threats for the land within the road reserve. The reports also identify any vegetation communities that are managed by DIER.

DIER is responsible for the management of large areas of land incorporated in its roadside reserve system. Roadside reserves vary due to factors such as shape, size, variety of users and impacts, tenure and primary use as a transport corridor. Many of DIER's roadsides contain patches of remnant vegetation that represent valuable populations of rare and threatened plant species, priority vegetation communities, corridors for wildlife movement, wildlife habitat, and old growth or heritage trees. DIER is obliged to protect and conserve plant and animal species listed as threatened species or critical habitat under State and Federal legislation.

DIER's environmental database contains data pertinent only to State roads; none of the proposed additional survey routes coincided with any of DIER-managed 43 nominated Conservation Sites.

2.6 ENVIRONMENTAL MANAGEMENT OF ADDITIONAL SEISMIC LINES

To assist GSLM in planning and thereby facilitating the protection of threatened species during all seismic-survey related operations, a reference table has been generated that provides an indication of whether there are any threatened species present for each of the additional seismic lines, what action is required, and a contact person should any vehicles need to leave the road surface for any reason (Table 5).

It is the responsibility of GSLM to ensure that the management measures provided in this report are followed during the seismic survey, and the setup and demobilisation stages to ensure that there are no detrimental impacts on threatened species. Furthermore, it is the responsibility of GSLM to make certain that all people involved with the seismic survey are familiar with this document and with the significance of threatened species.

Wedge-Tailed Eagles

As noted above, the planned survey and associated setup and demobilisation will occur outside of the wedge-tailed eagle's nesting season, hence no specific management methods are needed regarding this threatened species. However, if the planned survey timing is moved to or extends to between August and January, during the eagle's breeding season, then a site survey will be required to locate eagles' nests.

Threatened Flora Species

GHD's desktop study of the Tasmanian Natural Values Atlas database, listed a number of threatened species (refer to Table 4). These include:

- *Acacia mucronata ssp dependens* (variable sallow wattle);
- *Barbaria australis* (native wintercress);
- *Brachyscome radicata* (rooted daisy);
- *Brachiscome rigidula* (hairy cutleaf daisy);
- *Discaria pubescens* (hairy anchor plant);
- *Dianella longifolia var. longifolia* (pale flax lily);
- *Eucalyptus globulus (ssp pseudoglobulus)* ((Gippsland) blue gum);
- *Eucalyptus gunnii subsp divariacata* (Miena cider gum);
- *Euphrasia collina* (eyebright) (now classified into 3 separate subspecies);
- *Glycine latrobeana* (clover glycine);
- *Grevillea australis* (southern grevillea);
- *Hovea montana* (mountain hovea);
- *Lachngrostis punicea spp punicea (formally Agrostis aemula)* (bristle blown-grass);
- *Monotoca submutica var. autumnalis* (roundleaf broom heath);
- *Muehlenbeckia axillaris* (matted lignum);
- *Persoonia muelleri ssp. Angustifolia* (Mueller's geebung);
- *Pimelea curviflora* (curved rice flower);

- *Rhodanthe anthemoides* (chamomile sunray);
- *Uncinia elegans* (handsome hook sedge);
- *Viola haderacea subsp. Curtisiae* (Curtis' violet);
- *Vittadinia cuneata* (fuzzy New Holland daisy); and
- *Westringia angustifolia* (scabrous westringia).

Terrex's surveyors will clearly mark all conservation areas with flagging tape during the set up and pegging stage. Surveyors will identify these areas from:

- Table 3, above, and
- Figure 2.

GSLM will ensure that all Terrex personnel are aware of the significance of these areas and that they follow the management measures indicated in Sections 2.6 and 3.

Table 5: Summary of conservation and threatened species issues for each seismic line

Seismic Line	DIER Road	Threatened Flora	Action Required	Contact Person
TB02b_BJ	n/a	yes	Follow management measures 1-9 outlined in Section 3. Use Figure 2, Table 3 and Table 5.	Brad Arkell (DPIW)
TB02b_BK	n/a	none documented	Follow management measures 1-3 and 6-9 outlined in Section 3.	Brad Arkell (DPIW)
TB02b_BL1	n/a	yes	Follow management measures 1-9 outlined in Section 3. Use Figure 2, Table 3 and Table 5.	Brad Arkell (DPIW)
TB02b_BL2	n/a	yes	Follow management measures 1-9 outlined in Section 3. Use Figure 2, Table 3 and Table 5.	Brad Arkell (DPIW)
TB02b_BM	n/a	yes	Follow management measures 1-9 outlined in Section 3. Use Figure 2, Table 3 and Table 5.	Brad Arkell (DPIW)
TB02b_BN	n/a	yes	Follow management measures 1-9 outlined in Section 3. Use Figure 2, Table 3 and Table 5.	Brad Arkell (DPIW)
TB02b_BP	n/a	none documented	Follow management measures 1-3 and 6-9 outlined in Section 3.	Brad Arkell (DPIW)
TB02b_BQ1	n/a	none documented	Follow management measures 1-3 and 6-9 outlined in Section 3.	Brad Arkell (DPIW)
TB02b_BQ2	n/a	none documented	Follow management measures 1-3 and 6-9 outlined in Section 3.	Brad Arkell (DPIW)
TB02b_BR	n/a	none documented	Follow management measures 1-3 and 6-9 outlined in Section 3.	Brad Arkell (DPIW)
TB02b_BS1	n/a	none documented	Follow management measures 1-3 and 6-9 outlined in Section 3.	Brad Arkell (DPIW)

Seismic Line	DIER Road	Threatened Flora	Action Required	Contact Person
TB02b_BS2	n/a	yes	Follow management measures 1-9 outlined in Section 3. Use Figure 2, Table 3 and Table 5.	Brad Arkell (DPIW)
TB02b_BX	n/a	yes	Follow management measures 1-9 outlined in Section 3. Use Figure 2, Table 3 and Table 5.	Brad Arkell (DPIW)
TB02b_BZ	n/a	none documented	Follow management measures 1-3 and 6-9 outlined in Section 3.	Brad Arkell (DPIW)
TB02b_HA	n/a	yes	Follow management measures 1-9 outlined in Section 3. Use Figure 2, Table 3 and Table 5.	Brad Arkell (DPIW)
TB02b_HB	n/a	none documented	Follow management measures 1-3 and 6-9 outlined in Section 3.	Brad Arkell (DPIW)
TB02b_HC	n/a	yes	Follow management measures 1-9 outlined in Section 3. Use Figure 2, Table 3 and Table 5.	Brad Arkell (DPIW)
TB02b_AA1	n/a	yes	Follow management measures 1-9 outlined in Section 3. Use Figure 2, Table 3 and Table 5.	Brad Arkell (DPIW)
Extension of TB02b_BN	n/a	No	Follow management measures 1-3 and 6-9 outlined in Section 3.	Brad Arkell (DPIW)
Extension of TB02b_HA	n/a	No	Follow management measures 1-3 and 6-9 outlined in Section 3.	Brad Arkell (DPIW)
Extension of TB02b_BK	n/a	No	Follow management measures 1-3 and 6-9 outlined in Section 3.	Brad Arkell (DPIW)

3 CONCLUSIONS AND COMMITMENTS

The seismic survey proposed by GSLM has the potential to impact on threatened species present within roadside communities. Some of the locations of the species are known and documented here, however these are not necessarily a true reflection of the actual distribution, and threatened species may occur outside of the documented areas. In order to avoid detrimental impacts on threatened species, GSLM will therefore undertake to implement the following mitigation measures:

1. Seismic trucks and associated vehicles will operate within the dedicated road formation (road surface and gravel shoulders); traffic diverted around trucks operations will be diverted over road formations and not over road edges containing vegetation;
2. Seismic trucks and associated vehicles will only use existing gravelled or sealed pull off areas. These areas will be identified by the surveyors and used to plan each seismic line;
3. Should the seismic trucks or associated vehicles need to leave the road formation at any time, the relevant authorities (RMC section of DPIW and DIER) will be notified prior to survey operations commencing; in the event that it is essential for vehicles to go off the formed road surface (which includes gravel shoulders) in areas where threatened species are not known to occur, GSLM will consult with the RMC regarding the need for a botanist to be present;
4. The following measures will be implemented in areas documented as containing threatened species identified in this report:
   - The start and end point of clusters of threatened species will be flagged by surveyors;
   - All flagging will be removed immediately after the survey has been completed;
   - Within the flagged areas, a 200m buffer zone will be established either side of the road;
   - No trucks or vehicles will leave the formed roads within the flagged areas and foot traffic in the area will be minimised;
   - In cases where it is essential that vehicles leave the road within the flagged sections or close to individual threatened species records, a botanist will be present to check for threatened species;
5. GSLM will inform the relevant authorities of any issues regarding threatened species if they arise during the seismic survey;
6. The management measures listed within this report and associated documents will be followed;
7. The relevant authorities will be notified of any changes to the proposed seismic lines prior to the survey commencing or of any changes made during the survey;
8. If the survey timing is to move to sometime between August and January, then a survey for eagle's nests would be required and GSLM would liaise with RMC; and
9. All personnel associated with the seismic operation will be familiar with the contents of this report, the importance of protecting threatened species, the meaning of the flagged areas and the appropriate actions to take when working near these areas.

4 REFERENCES

GHD (2007). Great South Land Minerals Ltd, Report for Central Highlands Seismic Survey, Desktop Flora Survey, February 2007, Rev. No. 2.

SEMF Pty Ltd (2006). Great South Land Minerals Ltd, Onshore Seismic Survey Environmental Management Plan, February 2006, Project No. 1377.001.

FIGURES

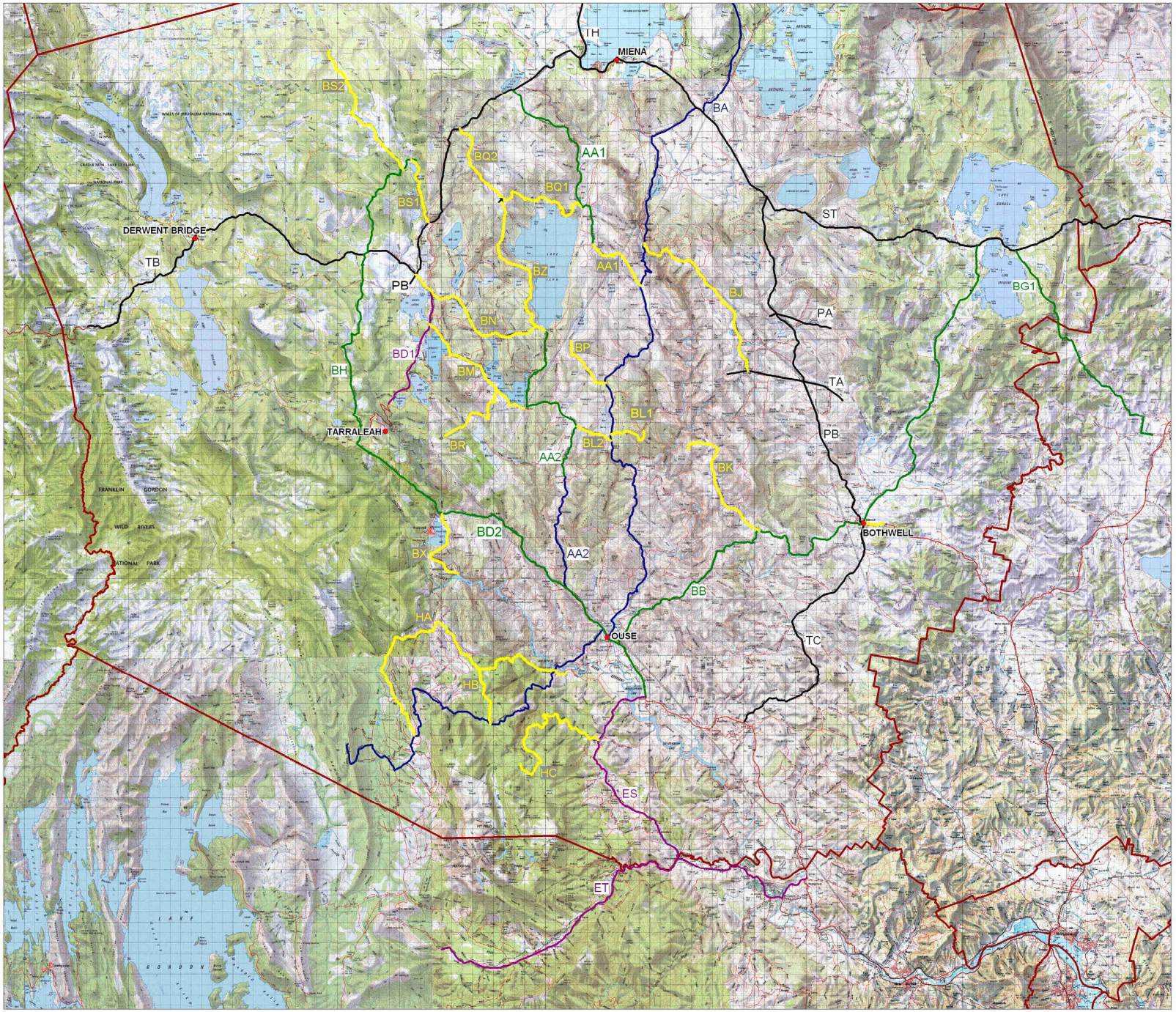


Figure 1
Survey Location Map

LEGEND

Proposed Seismic Lines 2007:

- Approved and Pegged in 2006
- Approved in 2006
- Unapproved

Previous Seismic Lines:

- 2001 Lines
- 2006 Lines

Local Government Area Boundaries

0 5 10 15 20

Kilometres

GREAT SOUTH LAND MINERALS

DATUM: AGD66 (ZONE 55)

Figure 2
Threatened Species Location Map

LEGEND

Seismic Lines

Threatened Species

Area 1: *Viola cunninghamii, Grevillea australis*
Area 2: *Westringia angustifolia*
Area 3: *Uncinia elegans, Scleranthus brockiei*
Area 4: *Discaria pubescens, Asperula scoparia*
Area 5: *Eucalyptus gunnii*
Area 6: *Discaria pubescens, Brachyscome rigidula*
Area 7: *Rhodanthe anthemoides, Discaria pubescens*
Area 8: *Viola hederacea*
Area 9: *Viola hederacea, Monotoca submutica*
Area 10: *Viola hederacea*
Area 11: *Barbarea australis, Viola hederacea, Pimelea curviflora*
Area 12: *Viola hederacea, Pimelea curviflora*
Area 13: *Grevillea australis, Viola hederacea*
Area 14: *Viola hederacea*
Area 15: *Monotoca submutica*

0 5 10 15 20
Kilometers

GREAT SOUTH LAND MINERALS

DATUM: AGD66 (ZONE 55)

APPENDICES

Appendix A: DPIW Notification Letter

Appendix B: Desktop Flora Survey

Appendix A: DPIW Notification Letter

Department of Primary Industries and Water
Resource Management and Conservation

Hobart GPO Box 44, Hobart TAS 7001
Launceston PO Box 46, Kings Meadows TAS 7249
Devonport PO Box 303, Devonport TAS 7310
Ph 1300 368 550
Web www.dpiw.tas.gov.au

Tasmania

30 March 2007

Dr Clive Burrett
Director
GSLM Ltd
GPO Box 1603
Hobart TAS 7001

Attn: Diego Gonzalez

Dear Dr Burrett

ASSESSMENT FOR CENTRAL HIGHLANDS SEISMIC SURVEY

Thankyou for the notification of your intention to carry out additional seismic surveys in the Central Highlands area in March and April 2007 and for the map of the proposed routes.

A desktop assessment of the proposed lines for threatened species records, and a review of the management measures and commitments outlined in the *Onshore Seismic Survey Environmental Management Plan* (February 2006), has been carried out.

The Conservation Assessment Section of DPIW is satisfied that the additional seismic surveys in the Central Highlands area will not adversely impact on any conservation values. Further, no permits for the survey will be required under the *Threatened Species Protection Act 1995.* GSLM should continue to observe the management guidelines and commitments specified in the original Environmental Management Plan for the survey, which includes Addendum 1 to the EMP (March 2007).

In particular, GSLM must ensure that the seismic trucks and associated vehicles will operate within road formations (road surface and gravel shoulders) and that traffic diverted around trucks during operations be diverted over road formations and not over road edges containing vegetation. GSLM should notify relevant authorities prior to changes to proposed seismic lines. In addition, the Conservation Assessment Section would require notification should the project extend into the wedge-tailed eagle breeding season (August 2007 to January 2008).

In light of GSLM's intention to extend its seismic survey program, a brief addendum to the Environmental Management Plan should be prepared to cover these new seismic surveys in the Central Highlands area. The format of the addendum should be similar to Addendum 1 to the Environmental Management Plan, which was recently prepared by

SEMF for the additional survey lines in the Zeehan area (March 2007). Once the addendum has been prepared, please forward it to the Conservation Assessment Section.

Further inquiries may be directed to Brad Arkell on 6233 6587.

Yours sincerely,

Fionna Bourne
Senior Conservation Assessment Officer
Conservation Assessment Section

cc.
Fiona Keserue-Ponte, Senior Environmental Consultant, SEMF
David Gatehouse, Environmental Field Officer, MRT

Appendix B: Desktop Flora Survey

Note: All coordinates supplied in this Appendix are in AGD94 format.

CLIENTS | PEOPLE | PERFORMANCE

Great Southern Land Minerals Ltd

Report for Central Highlands Seismic Survey

Desktop Flora Survey

February 2007

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

Contents

Table Index

Figure Index

Appendices

1. Introduction

Great South Land Minerals Limited (GSLM), as part of their exploration for oil and gas reserves in the Tasmania Basin regularly undertake seismic surveys to determine the likelihood of resources being present within particular areas. In late March 2007, GSLM intend to commence such a survey along a series of roads in the Tasmanian Central Highlands. In addition to the survey lines assessed in this report, several other survey lines have previously been assessed, and approved, and will be included in the March survey, though these are outside the scope of this report.

As part of the approvals required for this seismic survey, GSLM have engaged GHD Pty Ltd to undertake a brief desktop assessment of threatened flora recorded along the survey lines.

The scope and methodology for this desktop assessment is as per the previous assessments undertaken on behalf of GSLM by Andrew Welling in February 2006.

This report includes data from the Natural Values Atlas (NVA), which was current at the 20th of February 2007.

2. Methodology

The following methodology has been used and modified from the previous reports provided to GSLM.

Due to the nature of the survey, and that vehicles will remain on formed roads, the direct impact to flora and fauna as a result of the survey is thought to be minimal. Vehicles will, in many places, need to pull off to the side of the road, and as such only threatened flora on the roadside was considered to be at risk.

As with previous reports produced for GSLM, the Treatened Species Unit requested that and impacts on Wedge-tailed Eagle nest sites be considered. Wedge-tailed Eagles are very sensitive to disturbance during the breeding season (August – January). The Threatened Species Unit advised GSLM that Wedge-tailed Eagle nesting sites should be included in assessments when seismic surveys will occur during the breeding season. Nesting sites were not considered during this assessment, as the survey will be undertaken outside the breeding season.

Using the GIS program MapInfo, the survey lines provided by GSLM were overlain onto tasmap 1:100,000 scale topographic maps. Information on flora species within the area was downloaded from the NVA in the form of a Microsoft excel spreadsheet, and imported into MapInfo to be plotted on the maps (see Figure 1). The author has previously consulted with Kristy Goddard from the Threatened Species Unit regarding NVA data. None of the roads that are to be utilised as part of this seismic survey are under the jurisdiction of the Department of Infrastructure, Energy and Resources (DIER), and as such DIER environmental records were not included in this report.

The sites where threatened flora has been recorded are allocated an area number. Depending on the distance to the next nearest point, the area location is the same as the GPS coordinates of the site, or the area of the survey line between two threatened flora locations. Where multiple records for threatened species were in close proximity they were all assigned a single site number (e.g. Area 1). Area numbers, relevant survey lines, geographic coordinates (mapped in AGD 94) and brief location descriptions are listed in Table 1.

The data used to construct the maps was not verified by a field survey, though this was considered sufficient for the purposes of this study. The data from the NVA system may not include all of the most recent data, as much of this may not have yet been added to the system. The accuracy of the locations from the NVA varies, but will range from approximately 10 m to 5000 m, and as such the locations of species are indicative only.

In addition, the background imagery utilised in Figure 1 may not indicate all roads that are present in the survey area due to the constant construction of new roads, especially for forestry purposes. All seismic survey routes indicated in this report, and depicted on Figure 1, have been ground surveyed by GSLM and are restricted to formed roads.

3. Desktop Survey Results

Of the 18 proposed seismic survey lines in the Central Highlands, 9 have threatened flora records within close proximity of the survey line (refer Figure 1).

A total of 39 records indicate that 14 threatened species have been have been recorded within 200m of the survey lines identified in this report. The threatened species adjacent to the proposed survey lines are listed in Appendix A, including their common name and status under both the Tasmanian *Threatened Species Protection Act 1995* (TSPA) and the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBCA) and the area that they are within.

Table 1 provides a list of threatened flora areas along the proposed seismic lines.

Table 1 Areas containing threatened species

Survey Line	Area number	Number of records	Description	GPS coordinates (start)	GPS coordinates (finish)
BS2	1	3	2 sites in close proximity, one with 2 records.	E - 453712 N - 5345283	E - 453912 N - 5344883
	2	1	Single site	E - 456312 N - 5341383	N/A
BN	3	3	3 individual sites	E – 459117 N – 5329797	E - 460112 N -5328983
BJ	4	4	2 sites, one with 3 records	E - 479412 N – 5334483	E - 479412 N -5334183
	5	1	1 single site	E - 481912 N - 5333683	N/A
	6	5	2 sites, one with 3 records	E - 488312 N – 5327483	E - 488312 N - 5327583
AA1	7	3	2 sites, one with 2 records	E - 479212 N – 5330283	E - 479212 N -5330383
BL1	8	1	Single site	E - 479762 N - 5316433	N/A
	9	2	Single site	E - 479012 N - 5315383	N/A

Survey Line	Area number	Number of records	Description	GPS coordinates (start)	GPS coordinates (finish)
BL2	10	1	Single site	E - 473712 N - 5316683	N/A
BX	11	5	4 sites in close proximity, one with 2 records	E - 460212 N - 5308583	E - 460212 N - 5307548
	12	4	3 sites in close proximity, one with 2 records	E - 460712 N - 5306683	E - 460762 N - 5306183
	13	2	Single site	E - 461712 N - 5302583	N/A
HA	14	2	2 single sites	E - 456012 N - 5296683	E - 455612 N - 5296683
HC	15	2	2 single sites	E - 468212 N - 5286083	E - 467977 N - 5285943

As the survey will be undertaken outside the breeding season of the Wedge-tailed Eagle (August – January), the nesting sites of this species were not included in these results. If the timing of the survey is to be moved to the breeding season of the Wedge-tailed Eagle, the impacts to this species will need to be further assessed.

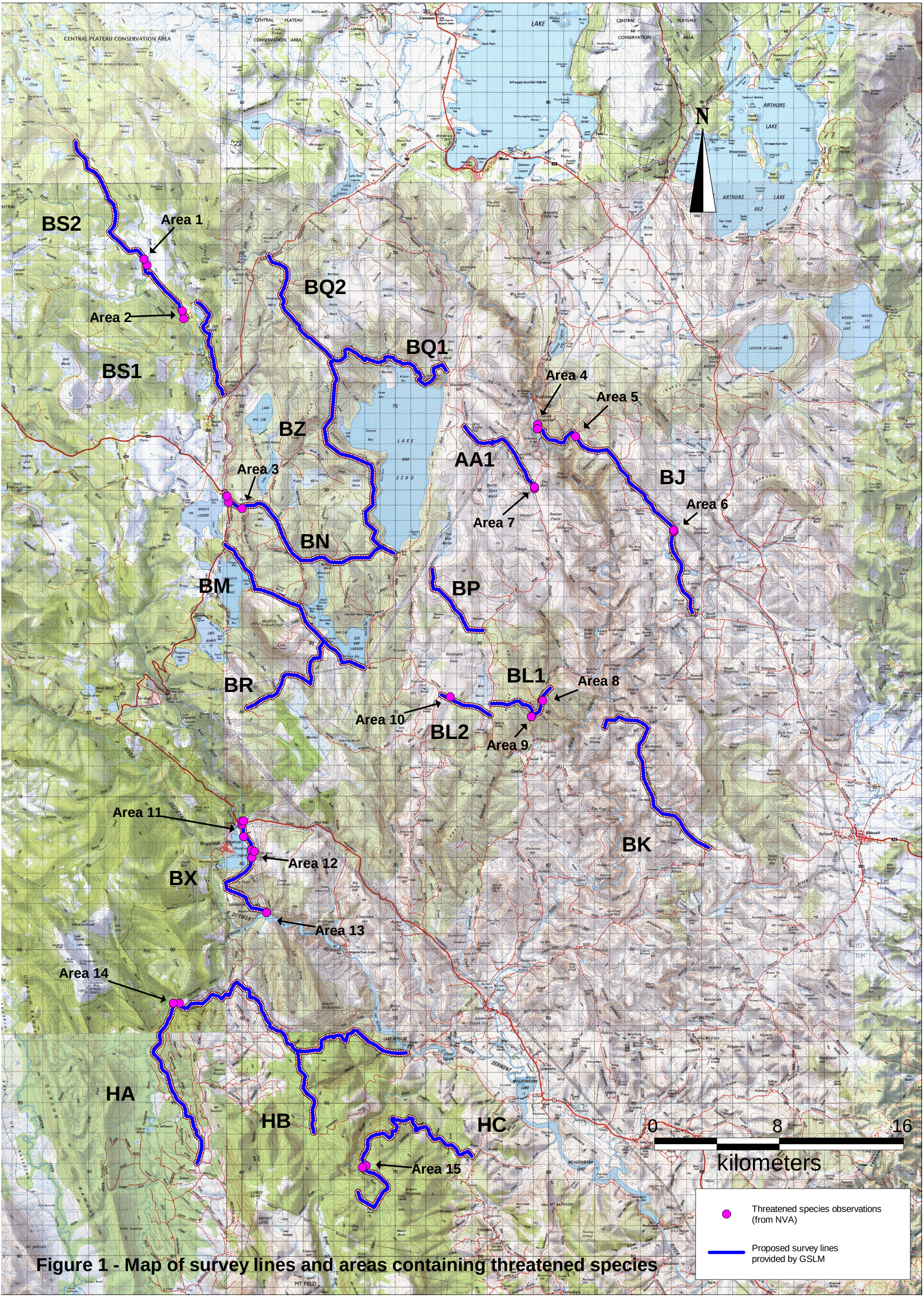


Figure 1 - Map of survey lines and areas containing threatened species

4. Summary and Recommendations

A total of 39 threatened species records were identified as being within the study area including 14 different threatened species, and adjacent to 9 of the proposed survey routes. The study area contains a total of 15 separate areas that have threatened species within them.

While it is recommended that a botanist be present for areas where vehicles must leave formed roads, it is not anticipated that a botanist will be required to be present for the survey lines in this study, as the survey lines are formed roads.

The following recommendations have been made for previous seismic surveys undertaken by GSLM, and are still relevant for the proposed survey lines.

» The start and end point of threatened species areas should be flagged by surveyors;

» All flagging should be removed at the completion of the survey;

» Flagging of threatened species areas should take into account the accuracy of the data and allow a buffer of at least 20 m either side of any threatened flora areas;

» Within the flagged areas a 200 m buffer zone should be established either side of the road;

» No trucks or vehicles should leave the road (even on the verge) within the flagged areas, and foot traffic in the area minimised;

» In cases where it is essential that vehicles leave the road within the flagged areas, or close to individual threatened species records are indicated, a botanist should be present to check for threatened species;

» All seismic crew should be familiar with the maps provided, and the significance of the threatened species; and

» The impact to Wedge-tailed Eagles was not assessed in this report as the seismic survey is to be conducted outside of the breeding season. If the timing of the survey is moved to within the breeding season (August – January), impacts to the species will need to be further assessed.

Appendix A

Threatened Species Identified Within Proposed Seismic Survey Lines

Area recorded	Species Name	Common Name	TSPA Status	EPBC Status	Easting	Northing
Area 1	*Viola cunninghamii*	Variable Sallow Wattle	Rare	Not Listed	453712	5345283
	Grevillea australis	Narrow Leaf Southern Grevillea	Rare	Not Listed	453912	5344883
	Grevillea australis	Narrow Leaf Southern Grevillea	Rare	Not Listed	453712	5345283
Area 2	*Westringia angustifolia*	Scabrous westringia	Rare	Not Listed	456312	5341383
Area 3	*Uncinia elegans*	Handsome Hook Sedge	Rare	Not Listed	460112	5328983
	Scleranthus brockiei	Brock Knawel	Rare	Not Listed	459225	5329374
	Scleranthus brockiei	Brock Knawel	Rare	Not Listed	459117	5329797
Area 4	*Discaria pubescens*	Hairy Anchor Plant	Endangered	Not Listed	479412	5334483
	Discaria pubescens	Hairy Anchor Plant	Endangered	Not Listed	479412	5334183
	Discaria pubescens	Hairy Anchor Plant	Endangered	Not Listed	479412	5334183
	Asperula scoparia var. scoparia	Prickly Woodruff	Rare	Not Listed	479412	5334183
Area 5	*Eucalyptus gunnii subsp. divaricata*	Miena Cider Gum	Endangered	Not Listed	481912	5333683
Area 6	*Discaria pubescens*	Hairy Anchor Plant	Endangered	Not Listed	488312	5327483
	Brachyscome rigidula	Hairy Cutleaf Daisy	Vulnerable	Not Listed	488312	5327583
	Discaria pubescens	Hairy Anchor Plant	Endangered	Not Listed	488312	5327483
	Brachyscome rigidula	Hairy Cutleaf Daisy	Vulnerable	Not Listed	488312	5327583

Area recorded	Species Name	Common Name	TSPA Status	EPBC Status	Easting	Northing
	Discaria pubescens	Hairy Anchor Plant	Endangered	Not Listed	488312	5327583
Area 7	*Rhodanthe anthemoides*	Chamomile Sunray	Rare	Not Listed	479212	5330283
	Discaria pubescens	Hairy Anchor Plant	Endangered	Not Listed	479212	5330383
	Discaria pubescens	Hairy Anchor Plant	Endangered	Not Listed	479212	5330383
Area 8	*Viola hederacea*	Curtis' Violet	Rare	Not Listed	479762	5316433
Area 9	*Viola hederacea*	Curtis' Violet	Rare	Not Listed	479012	5315383
	Monotoca submutica	Roundleaf Broom Heath	Rare	Not Listed	479012	5315383
Area 10	*Viola hederacea*	Curtis' Violet	Rare	Not Listed	473712	5316683
Area 11	*Barbarea australis*	Native Wintercress	Endangered	Critically Endangered	460112	5308333
	Barbarea australis	Native Wintercress	Endangered	Critically Endangered	460112	5308583
	Viola hederacea	Curtis' Violet	Rare	Not Listed	460212	5308583
	Pimelea curviflora	Curved Rice Flower	Rare	Not Listed	460212	5307548
	Pimelea curviflora	Curved Rice Flower	Rare	Not Listed	460212	5307548
Area 12	*Viola hederacea*	Curtis' Violet	Rare	Not Listed	460762	5306183
	Viola hederacea	Curtis' Violet	Rare	Not Listed	460712	5306683
	Pimelea curviflora	Curved Rice Flower	Rare	Not Listed	460912	5306583
	Viola hederacea	Curtis' Violet	Rare	Not Listed	460912	5306583

Area recorded	Species Name	Common Name	TSPA Status	EPBC Status	Easting	Northing
Area 13	*Grevillea australis*	Narrow Leaf Southern Grevillea	Rare	Not Listed	461712	5302583
	Viola hederacea	Curtis' Violet	Rare	Not Listed	461712	5302583
Area 14	*Viola hederacea*	Curtis' Violet	Rare	Not Listed	456012	5296683
	Viola hederacea	Curtis' Violet	Rare	Not Listed	455612	5296683
Area 15	*Monotoca submutica var. autumnalis*	Roundleaf Broom Heath	Rare	Not Listed	468212	5286083
	Monotoca submutica var. autumnalis	Roundleaf Broom Heath	Rare	Not Listed	467977	5285943

GHD Pty Ltd ABN 39 008 488 373

162 Macquarie Street Hobart 7000
GPO Box 667 Hobart 7001
T: 03 6210 0600 F: 03 6223 8246 E: hbamail@ghd.com.au

Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	M.McMinn	A.Jungalwalla	*	A.Jungalwalla	*	26/2/07
1	M.McMinn	A.Jungalwalla	*	A.Jungalwalla	*	8/3/07
2	M.McMinn	A.Jungalwalla	*	A.Jungalwalla	*	16/3/07

* Denotes a signature on the original document

Arc Tas Pty. Ltd.

SENIOR CONSULTANT :
PARRY KOSTOGLOU

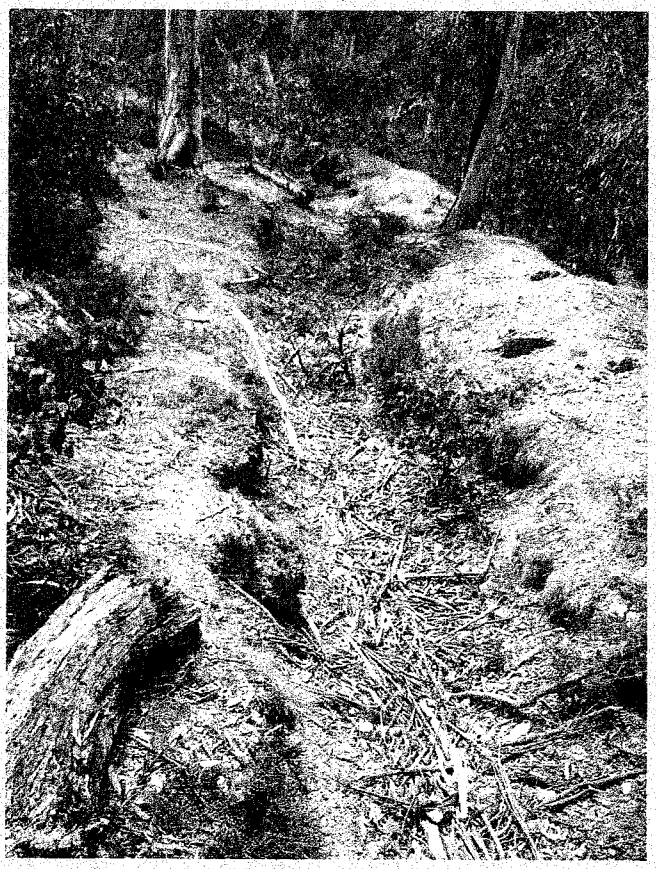
21a Seymour St.
New Town
Hobart
Tas.
7008

Phone: 03 62789598
Mobile: 0408 561934
Email: parryk@netspace.net.au

PROPOSED DRILL SITE LOCALITIES

CENTRAL MIDLANDS, TASMANIA

CULTURAL HERITAGE SURVEY



Prepared by Parry Kostoglou
ArcTas Pty Ltd.

For Great South Land Minerals Ltd.
February 2007

1.0 BACKGROUND

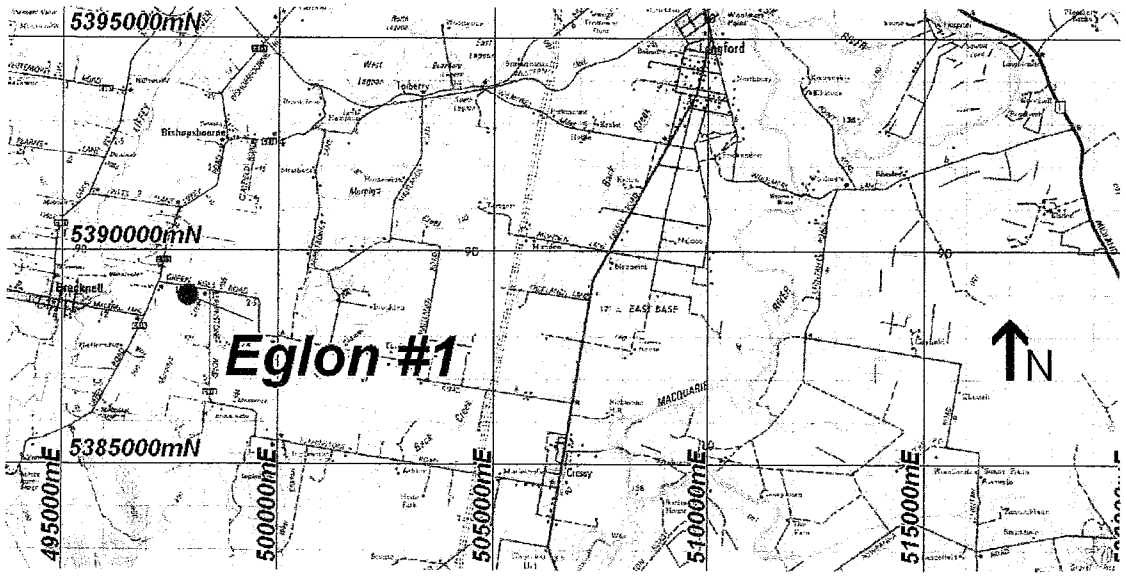
As a part of its oil exploration program throughout the Tasmanian Midlands, Great South Lands Minerals Limited is currently seeking to undertake exploratory drilling at four separate localities in order to better quantify its target resource. This cultural heritage assessment has accordingly been commissioned in order to assess the potential impact of the drilling program upon any resident historic archaeological sites.

2.0 LOCATION AND EXTENT OF SURVEY AREA

The current program requires drilling at four localities which are spread out across the Midlands region of central Tasmania. The four drill sites occur in the following localities.

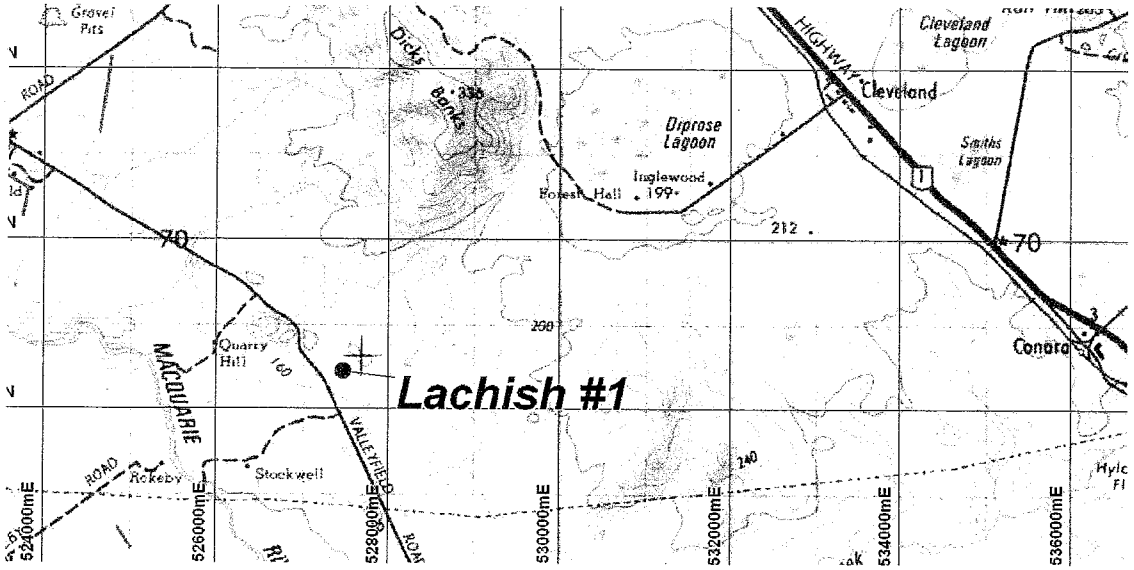
Eglon No. 1

This site is situated 25 kilometres south west of Launceston. More specifically the site lies on private property along Green Rises road some three kilometres east of Bracknell Township.



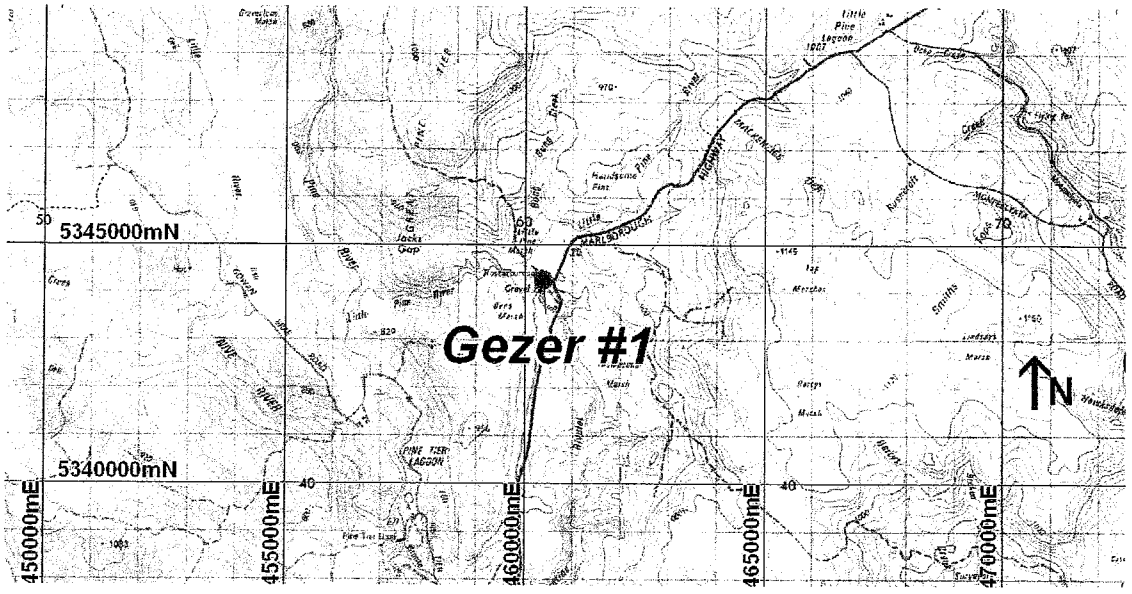
Lachish Number 1

This site is situated 50 kilometres south of Launceston. More specifically the site lies on private property beside Valleyfield road some eight kilometres south west of Epping Forest Township.



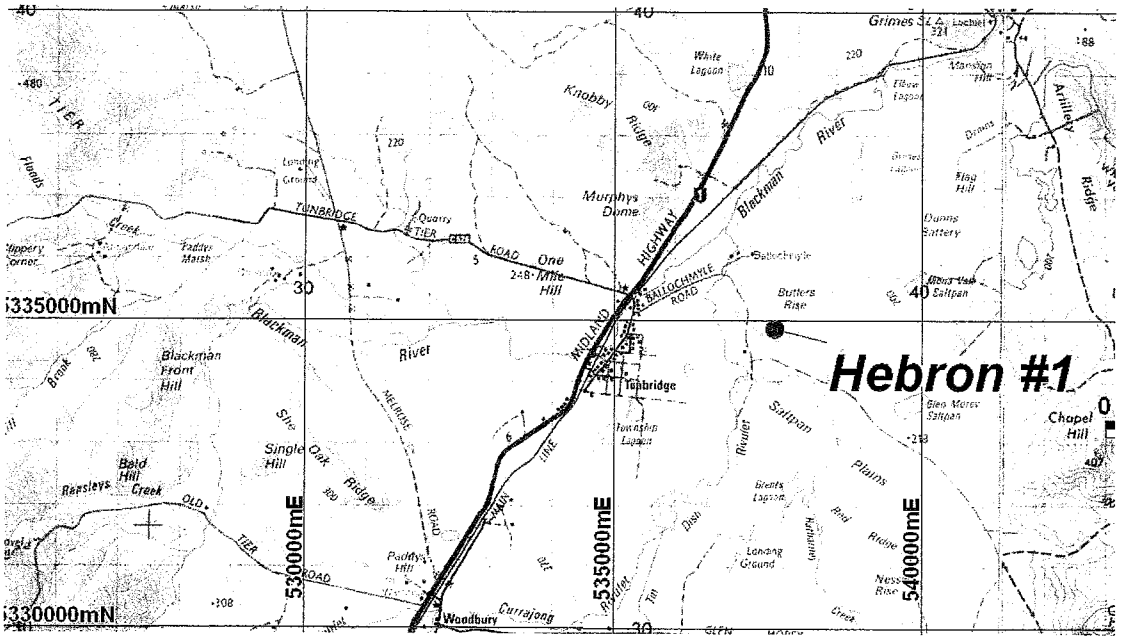
Gezer Number 1

This site is situated 85 kilometres south west of Launceston. More specifically the site lies on private property beside the Marlborough Highway some fifteen kilometres south west of Miena Township.



Hebron Number 1

This site is situated 82 kilometres south of Launceston. More specifically the site lies on private property near Ballochmyle road some three kilometres north east of Tunbridge Township.



3.0 METHODOLOGY

All four localities were examined on foot using hand held GPS technology to pin point the drill site locations provided by the client. Archaeological sites subsequently located were recorded photographically and notes entered into a standard pro forma site record form. This fieldwork was undertaken over a two day period in late January, 2007.

4.0 SUMMARY OF RESULTS

During the assessment of all four localities, two historic features were found.

- **Roscarborough water race** (Gezer No. 1 drill site)
- **Butlers Rise machinery scatter** (Hebron No. 1 drill site)

No further action on behalf of the client is deemed necessary unless further cultural remains are located in the vicinity of these features during subsequent expansion or movement of the drill site.

5.0 KNOWN SITES WITHIN THE SURVEY AREA

Three sites situated within one kilometre of the newly discovered Roscarborough water race appear on historic heritage data bases. These are:

- Roscarborough Homestead (THPI No. 8213-010)
- Serpentine Homestead (THPI No. 8213:009)
- Serpentine Hut 1 (THPI No. 8213:032)

These sites are documented in a report commissioned by Forestry Tasmania (Kostoglou 2000) which sought to assess the historic cultural heritage of the Tasmanian southern central highlands. All three sites are situated beyond 2 kilometres of the newly discovered site. As such the associated prescriptions are not relevant to this study.

6.0 RECOMMENDATIONS

As a result of this assessment, it is recommended that:

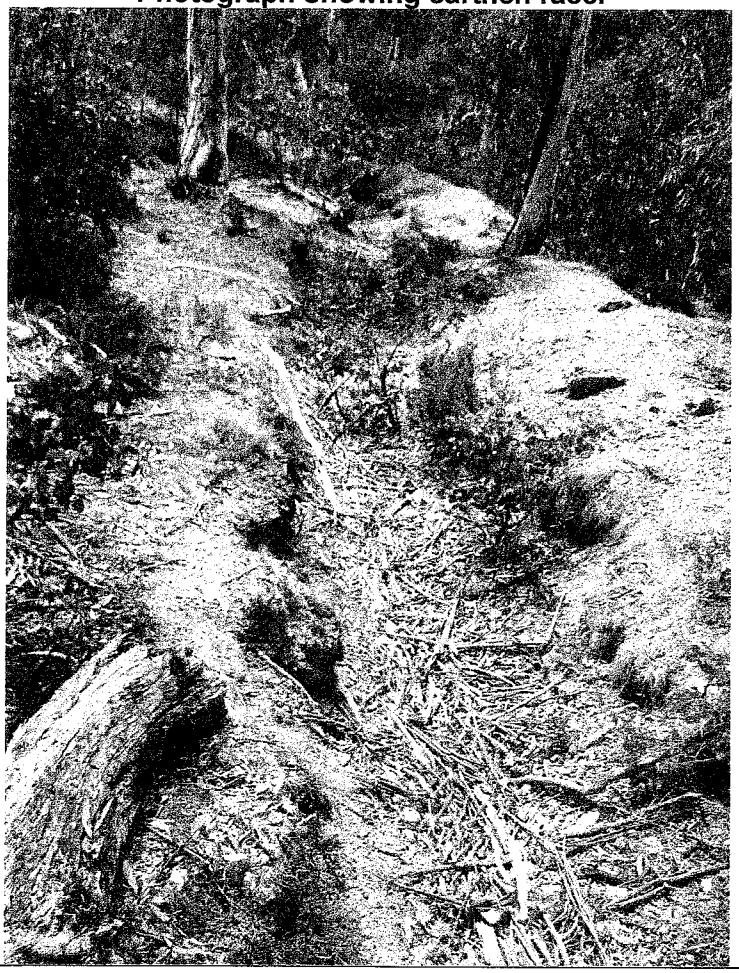
- **The site designated as the Roscarborough Water Race should be avoided by the proposed drilling activities. If crossing of the race is required, this consultant should be contacted for advice as to the whether the feature can be bridged.**

7.0 RESULTS OF FIELD WORK

The following two sites were located during the field work component.

HISTORIC CULTURAL HERITAGE ASSESSMENT. ADDITIONAL SURVEY AREAS.		
Site/Feature name: Roscarborough water race		**Site number:** 01
Associated drill site: Gezer Number 1		
Location (AGD 1966) E 460324 N 5344323	**Land tenure:** Private property	**Historic theme:** Pastoralism?
Description of remains: This site consists of a linear earthen excavation measuring 1.5 x 1 metres in depth. It is oriented roughly north/south and heads northerly in the general direction of the Little Pine River. Although not traversed, this linear site should measure in excess of 500 metres.		
Interpretation of site: Earthen race for conveyance of water away from Little Pine river to unknown locality.		
Significance: Due to its perceived rarity in the Southern Highlands region, this site is deemed to have Medium to High Local Significance. This may have further applicability at the regional level also.		
Recommendations: This site should not be disturbed by the proposed development. If crossing of the site is required, this consultant should be contacted first in order to obtain the relevant advice.		

Photograph showing earthen race.



HISTORIC CULTURAL HERITAGE ASSESSMENT. ADDITIONAL SURVEY AREAS.		
Site/Feature name: Butlers Rise machinery scatter		**Site number:** 02
Associated drill site: Hebron Number 1		
Location (AGD 1966) E 537564 N 5334848	**Land tenure:** Private property	**Historic theme:** Pastoral
Description of remains: This site consists of a 10 x 8 metre scatter of assorted agricultural debris including iron sheeting, tubular sheet iron piping, tractor parts and wire fencing.		
Interpretation of site: Agricultural machinery dump/scatter.		
Significance: This site is deemed to have Minimal Significance.		
Recommendations: None made.		

Photograph showing machinery scatter.

7.0 REFERENCES

Kostoglou, P. 2000. An archaeological survey of historic sites in the South Central Highlands of Tasmania. Forestry Tasmania.

A Survey for Aboriginal Heritage

at

Epping Forest, Bracknell,
Tunbridge & Great Lake

for

Great South Land Minerals Limited

by

Rocky Sainty,
Aboriginal Heritage Consultant
1 Hillcot Place,
Glenorchy 7010
Phone: 62 741834
Mobile: 0417 016 598

3rd February 2007

Section 1 INTRODUCTION

This report describes the results of a Survey for Aboriginal Heritage of four areas (referred to in this report as Epping Forest, Bracknell, Tunbridge & Great Lake) with regard to a proposed Exploration Drilling Program to be undertaken by Great South Land Minerals. The purpose of the surveys was to identify and note any previously recorded Aboriginal sites within each of the four Survey Areas.

The survey was carried out at the request of Allan Steel, chief Operations Officer for Great South Land Minerals as part of an Exploration Drilling Program.

The survey was undertaken by the writer, Rocky Sainty in January 2007.

Consultation with the Tasmanian Aboriginal Land and Sea Council (TALSC) and the Aboriginal Heritage Office of the Department of Tourism, Arts and the Environment was undertaken. It is important to inform and consult with the Aboriginal community on all matters concerning Aboriginal cultural heritage. The Tasmanian Aboriginal Land and Sea Council has established policies, protocols and procedures with various government agencies and other parties in terms of ensuring that the Aboriginal community's cultural heritage interests are maintained and protected. All Aboriginal sites are significant to the Aboriginal community.

Section 2 BACKGROUND INFORMATION

All four of the Survey Areas are located in what is now known as the Midlands, with one area being in the vicinity of the Great Lakes.

The Midlands is a colloquial term used by non indigenous people to refer to the lowland area between Hobart and Launceston.

The Midlands area is a complex set of climatic, geological, hydrological, floral and faunal interactions. The area has undulating plains, aeolian lunettes, lakes, hills, rivers and source bordering dunes. All these make up a complex area where Aboriginal people used the available resources to live and prosper until the European invasion.

Animal resources consist of small marsupials, such as wallabies, wombats, possums, native cats, platypus, echidnas, Tasmanian Tigers, devils, bandicoots, mice and native rats to name a few. Larger marsupials also existed such as the grey kangaroo. All these animals were hunted by Aboriginal people, along with snakes, lizards, frogs and a wide range of insects. Birds such as water birds, ducks and black swans were used and the eggs were considered to be especially important. Plants were an important part of people's diet and were available on a seasonal basis. The peoples of the area consisted of small clans or family groups, who frequented specific sites within the surrounding country for food harvesting, camping, trade and ceremonial purposes. Aborigines occupied lands across the whole state and utilised resources from surrounding waters and lands. Consequently the Midlands area is rich in Aboriginal history and the Aboriginal community still has strong connections. There will always be concerns when works of any kind are to be undertaken, particularly given the significance of these places to our community.

The information on Aboriginal occupation within the Survey Areas is based on a disjointed collection of observations by Europeans during the invasion of Tasmania. There was no real interest in Aboriginal life styles or cultures during the invasion of Tasmania in the early 1800s. This means that the information available on Aboriginal peoples during this period is limited and subsequent information gained by Archaeologists is at best conjecture, although based on years of discussion and scientific testing. The Tasmanian Aboriginal community is the best source of information on their ancestors and how they utilized the landscape and its resources.

The Aboriginal peoples of this area aggressively tried to keep their country but were defeated by the never ending numbers of non indigenous Europeans. Roving bands of Europeans were organised by the local authorities and were used to kill as many Aboriginal people as they could.

George Augustus Robinson who travelled around the state negotiating the removal of Aboriginal peoples from their homelands recorded at least 6 groups of Aborigines whose country was around the area now known as Campbell Town, and the surrounding country. They were the: MAR.WE.MAIR.RE.NER, the TARE.ER.NO.TEM.ME.TER, the TRUE.MAIR.RE.NER, the ROLE.MAIR.RE, the TY.ER.RER.NO.TE.PAN.NER and the PYER.NOO.HE.PER.NEL.LE. The TY.ER.RER.NO.TE.PAN.NER were also known by the Europeans as the Stony Creek Tribe.

These groups of Aborigines made up the population of the Survey Areas and used the resources available within the land. The sites that are found in the area were created by these peoples over many generations. Aboriginal peoples have been living in Tasmania for at least the last 35,000 years. Aboriginal peoples had a rich and varied social and cultural life and had a complex trading network. This can be seen in the varied types of stone used to make artefacts, some of which have been transported many kilometres from its original source.

Site type found in the Survey Areas will consist of artefact scatters, isolated artefacts, stone and ochre quarries, burials, camping places, rock shelters and major meeting places. All these sites have protection under state legislation, the *Aboriginal Relics Act 1975*. To impact an Aboriginal "relic" as they are termed under the Act requires a permit form the Minister administering the *Aboriginal Relics Act 1975*. A permit can be applied for via the Aboriginal Heritage Office in the Department of Tourism, Arts and the Environment.

The Tasmanian Aboriginal Site Index (TASI) at the Aboriginal Heritage Office of the Department of Tourism, Arts and the Environment was inspected in order to determine if any Aboriginal sites had previously been recorded within any of the four Survey Areas or surrounding areas. This research assists in developing an understanding of the nature of any sites in the general area and also allows a review of any previous studies in the area of field survey. An inspection of the TASI by the Aboriginal Heritage Office revealed that no Aboriginal sites have previously been recorded within either of the four survey areas (see Section 4 below).

Section 3 FIELD METHODS

Each of the following survey areas measured approximately 30m x 30m.

Epping Forest: Lachish #1

The Lachish #1 well site is located near the Valleyfield Road approximately 9 km west of Conara on the property named 'Stockwell' belonging to Mr. James Muirhead (see attached map). The writer walked the entire survey area in transects approximately 1-5 metres apart. Ground visibility was good.

Bracknell: Eglon #1

The Eglon #1 well site is located near Green Rises road on a domal structure in the Longford sub-basin about 3 km east of Bracknell, close to the property named 'Eastbourne' (see attached map). The writer walked the entire survey area in transects approximately 1-5 metres apart. Ground visibility was good.

Tunbridge: Hebron #1

The Hebron #1 well site is located near the Ballochmyle Road approximately 2 km east of Tunbridge on a property named 'Ratharney'. The writer walked the entire survey area in transects approximately 1-5 metres apart. Ground visibility was good.

Great Lakes: Gezer#1

The Gezer#1 well site is located near Little Pine Marsh off Marlborough Road between the towns of Milena and Bronte Park. The well site is about 10km north of Bronte Park and about 0.7 km west of Marlborough highway on the property referred to as 'Serpentine & Roscarbro' belonging to Gunns Limited. The writer walked the entire survey area in transects approximately 1-5 metres apart. Ground visibility was good.

Section 4 RESULTS

Epping Forest: Lachish #1: No Aboriginal sites were found within the study area. However there are a number of sites previously recorded and registered on the TASI (see attached paperwork).

Bracknell: Eglon #1: No Aboriginal sites were found within the study area. However there are a number of sites previously recorded and registered on the TASI (see attached paperwork).

Tunbridge: Hebron #1: No Aboriginal sites were found within the study area. However there are a number of sites previously recorded and registered on the TASI (see attached paperwork).

Great Lakes: Gezer#1: No Aboriginal sites were found within the study area. The closest Aboriginal site to this study area is approximately 6 km away. No paperwork provided.

Section 5 DISCUSSION

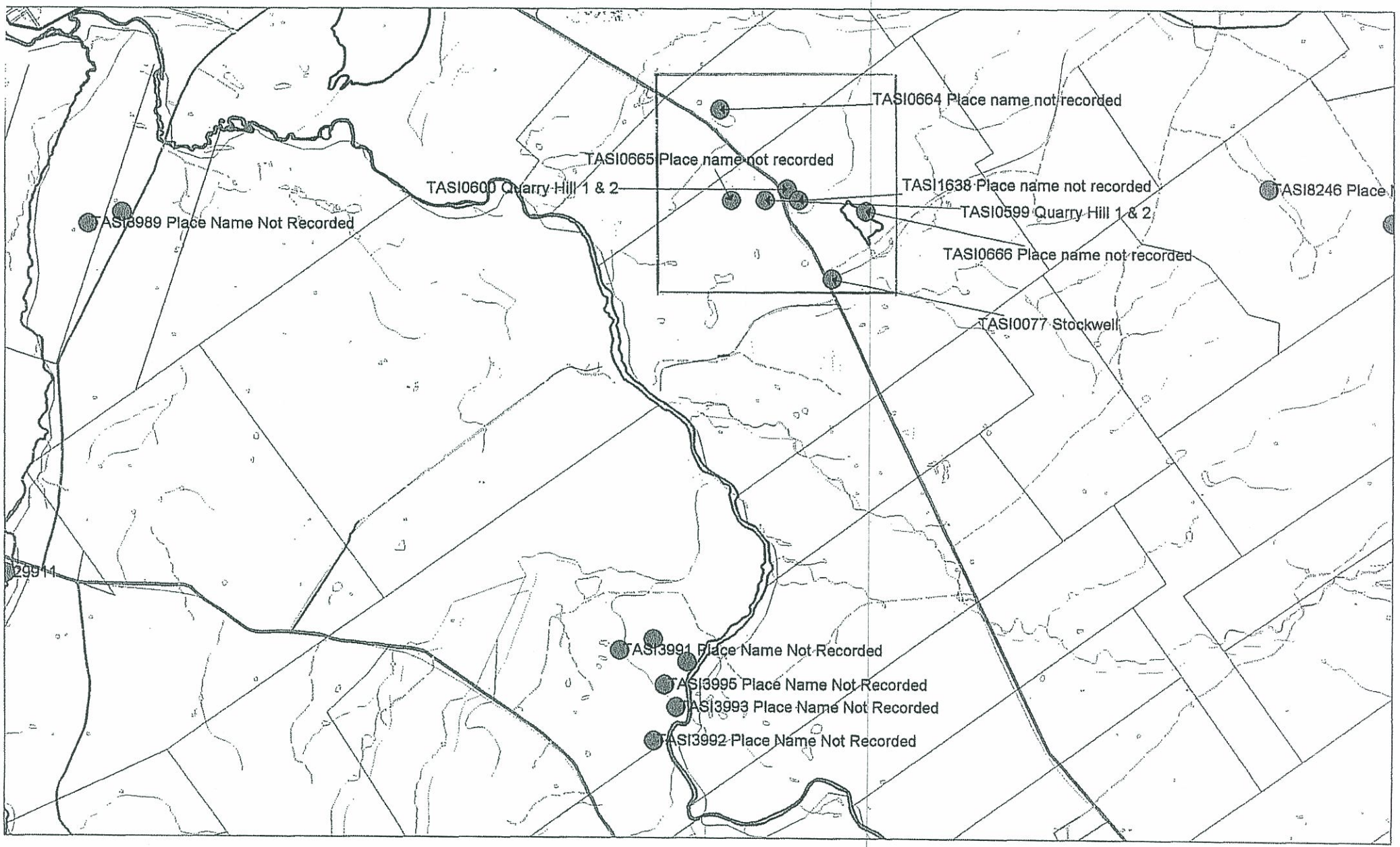
Given the Aboriginal occupation of these areas prior to European invasion there is always the possibility of Aboriginal sites being found. The Aboriginal community will always have concerns when works of any kind are to be undertaken within close proximity to waterways and cultural resources, particularly given the significance of these places to our community, both past and present, and the continued connection the Aboriginal community still has with these areas. All Aboriginal sites are significant to the Aboriginal community.

Section 6 RECOMMENDATIONS

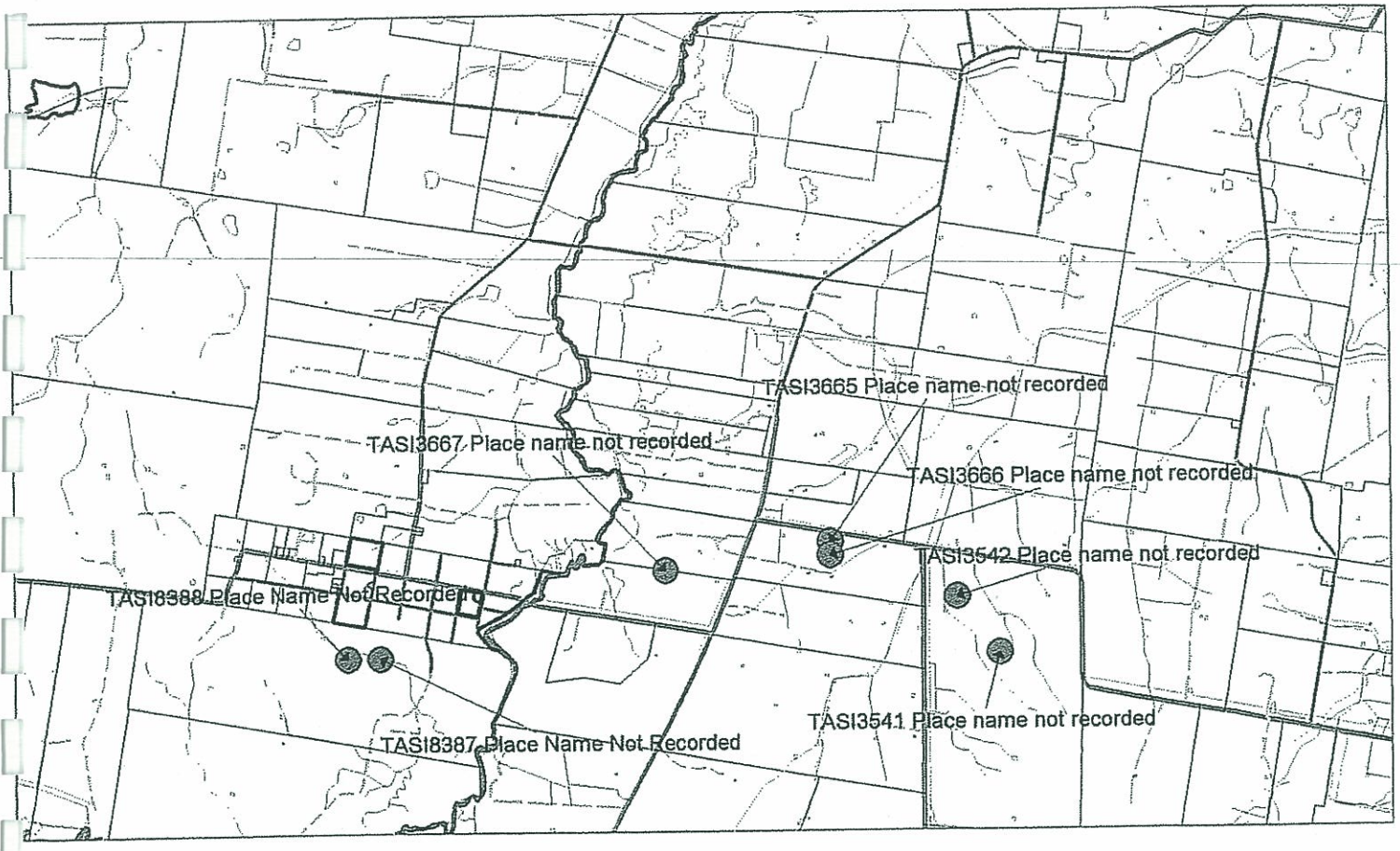
Although no Aboriginal sites were found within either of the four study areas, the writer notes the number of Aboriginal sites already registered on the TASI that are within close proximity to the first three study areas (see Section 4 above). Given the prior occupation and use of these lands, and the results of the TASI search, works should proceed with caution. If any artefacts or cultural material should appear within either of the survey areas as a result of works of any kind, then work is to cease immediately and the TALSC be contacted. Great Southland Minerals Limited should brief the Foremen and Plant Operators with regard to procedures to follow in the event of artefacts or cultural material being unearthed. More information can be obtained by contacting the TALSC.

As contained under Section 14 (1) of the *Aboriginal Relics Act 1975:*

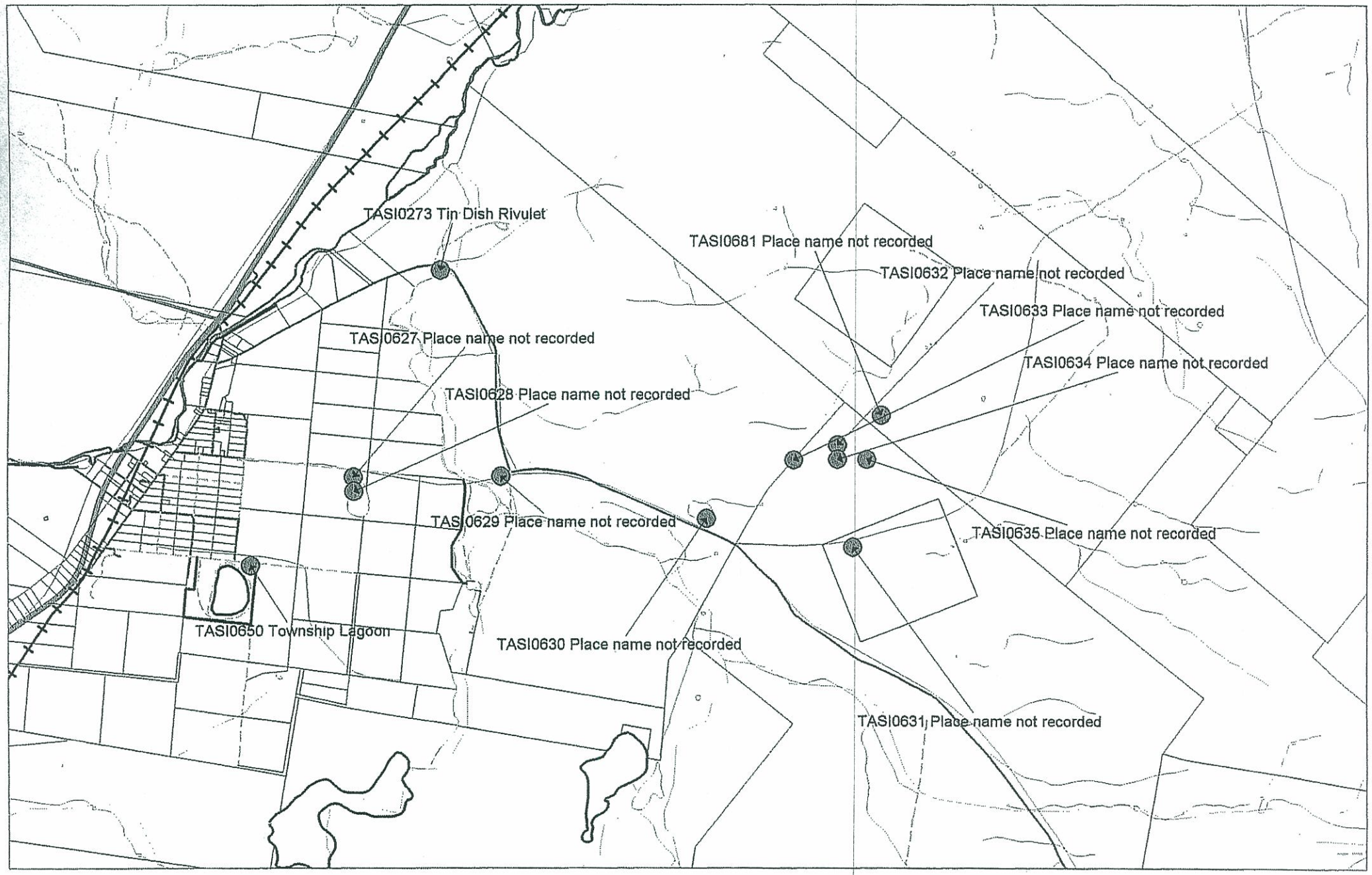
> "Except as otherwise provided in this Act. No person shall, otherwise than in accordance with the terms of a permit granted by the Minister on the recommendation of the Director –
>
> (a) destroy, damage, deface, conceal or otherwise interfere with a relic."

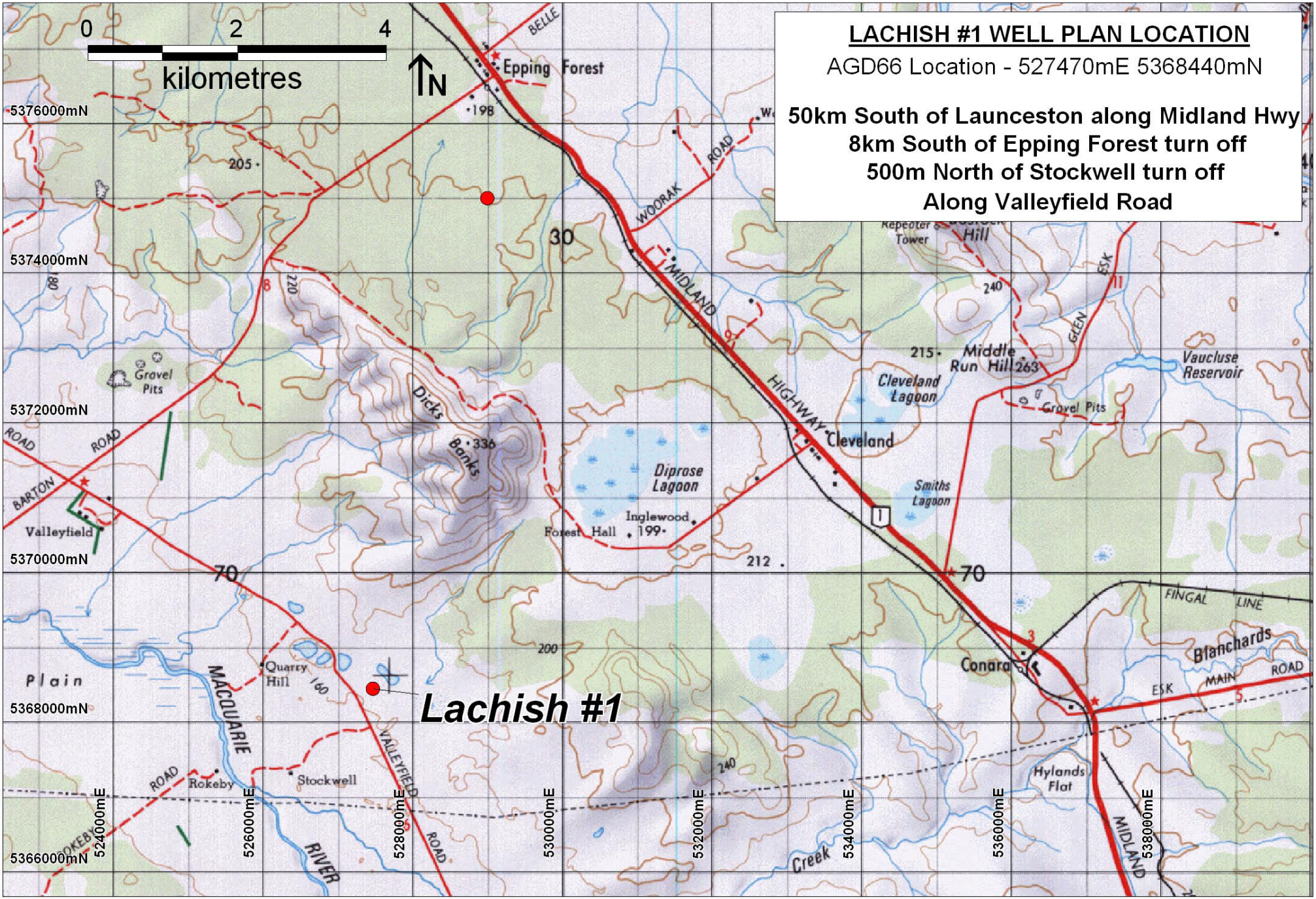

TASI0664 Place name not recorded
TASI0665 Place name not recorded
TASI0600 Quarry Hill 1 & 2
TASI1638 Place name not recorded
TASI8246 Place
TASI0599 Quarry Hill 1 & 2
TASI8989 Place Name Not Recorded
TASI0666 Place name not recorded
TASI0077 Stockwell
29911
TASI3991 Place Name Not Recorded
TASI3995 Place Name Not Recorded
TASI3993 Place Name Not Recorded
TASI3992 Place Name Not Recorded

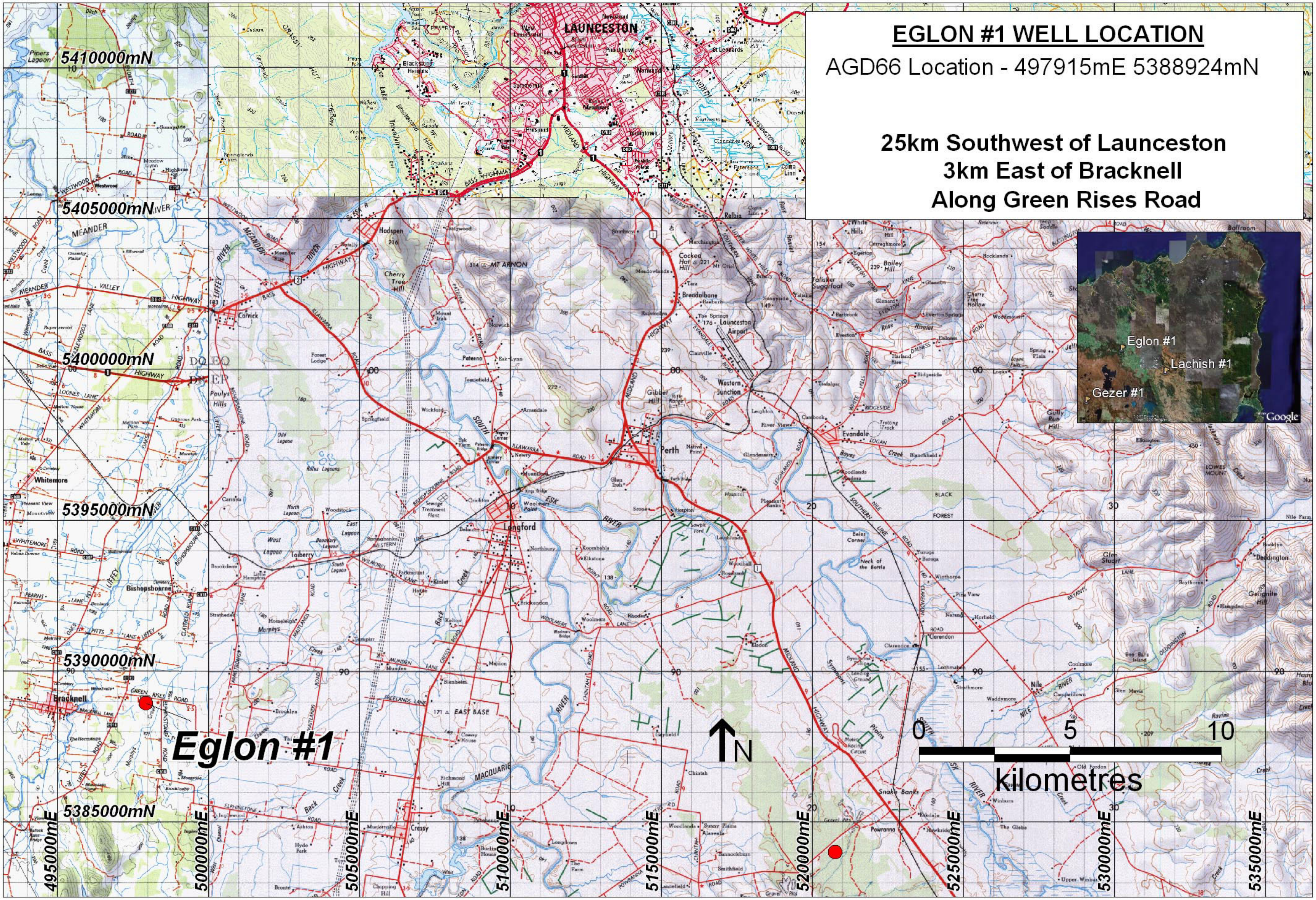
Liffey


TASI3665 Place name not recorded
TASI3667 Place name not recorded
TASI3666 Place name not recorded
TASI3542 Place name not recorded
TASI8388 Place Name Not Recorded
TASI3541 Place name not recorded
TASI8387 Place Name Not Recorded

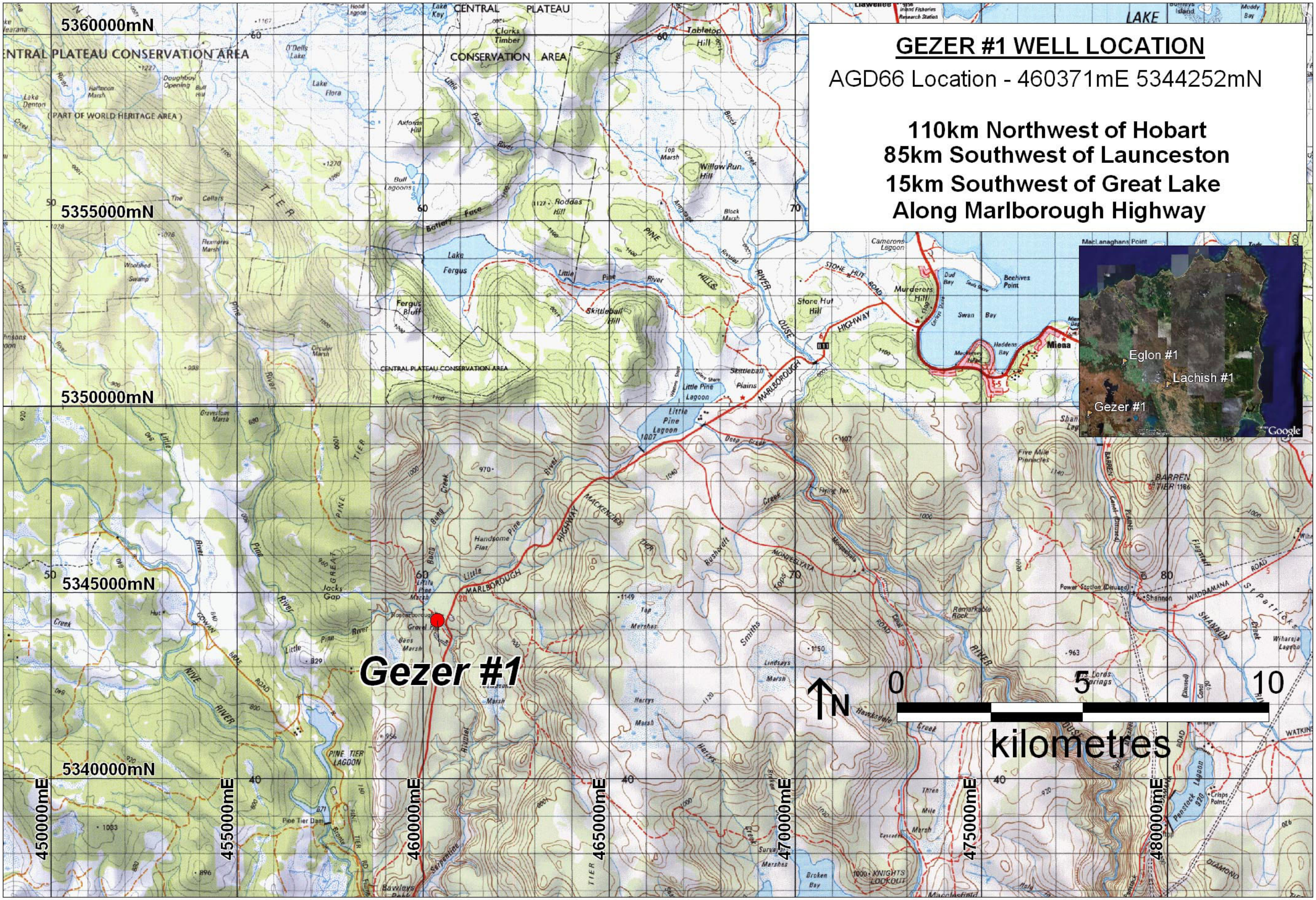
Tonbridge 5253



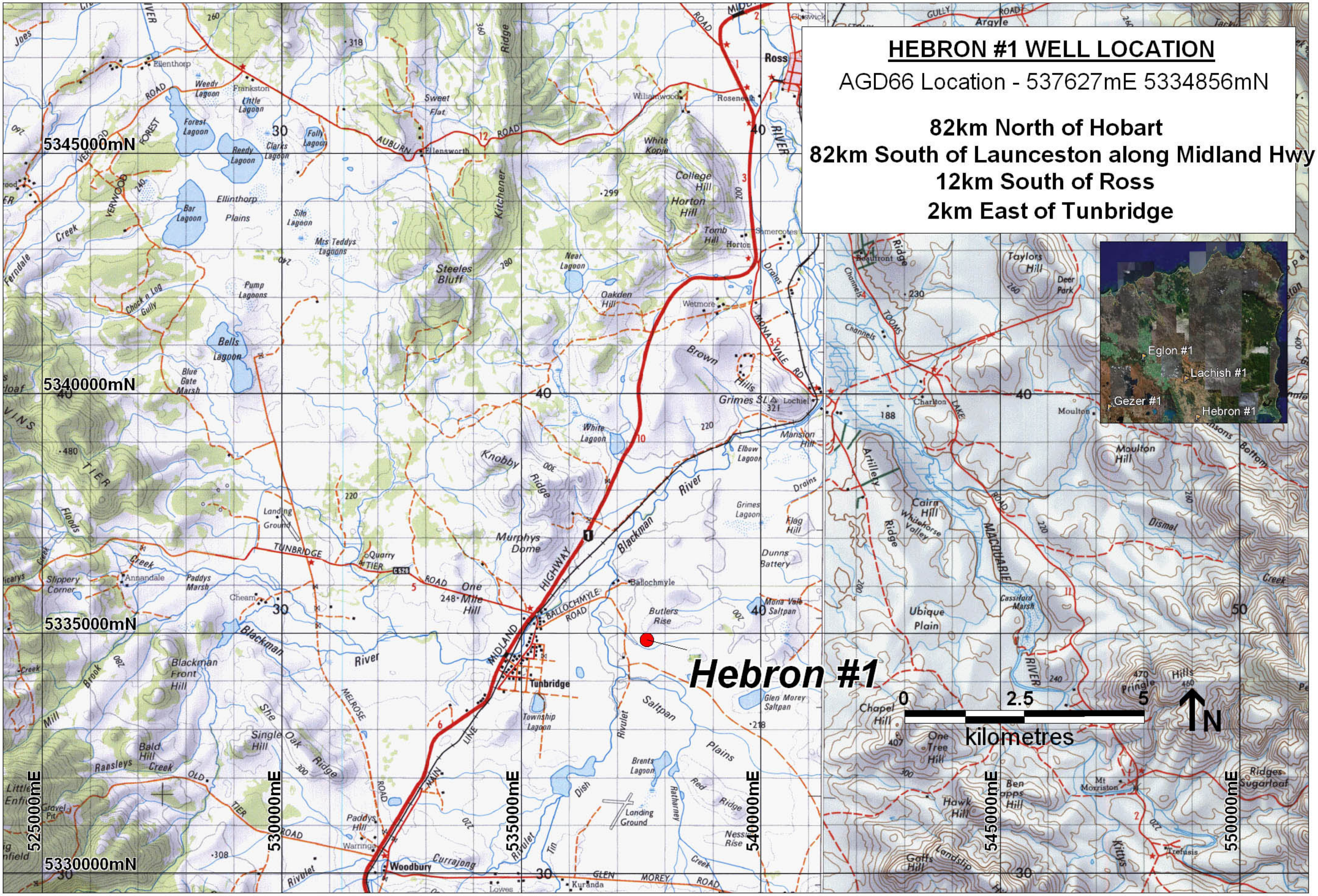

LACHISH #1 WELL PLAN LOCATION
AGD66 Location - 527470mE 5368440mN
50km South of Launceston along Midland Hwy
8km South of Epping Forest turn off
500m North of Stockwell turn off
Along Valleyfield Road
0
2
4
kilometres
N
Lachish #1
5376000mN
5374000mN
5372000mN
5370000mN
5368000mN
5366000mE
524000mE
526000mE
528000mE
530000mE
532000mE
534000mE
536000mE
538000mE
Epping Forest
Gravel Pits
Dicks Banks
Valleyfield
Rokeby
Stockwell
Quarry Hill
Plain
Inglewood
Forest Hall
Diprose Lagoon
Cleveland
Cleveland Lagoon
Middle Run Hill
Smiths Lagoon
Vaucluse Reservoir
Conara
Blanchards
Hylands Flat
Creek
MIDLAND HIGHWAY
WOORAK ROAD
BARTON ROAD
ROKEBY ROAD
MACQUARIE RIVER
VALLEYFIELD ROAD
FINGAL LINE
ESK MAIN ROAD
GLEN ESK



EGLON #1 WELL LOCATION
AGD66 Location - 497915mE 5388924mN
25km Southwest of Launceston
3km East of Bracknell
Along Green Rises Road
Eglon #1
Lachish #1
Gezer #1
Eglon #1
0
5
10
kilometres
N
LAUNCESTON
Perth
Longford
Evandale
Bracknell
Carrick
Hadspen
Cressy
5410000mN
5405000mN
5400000mN
5395000mN
5390000mN
5385000mN
495000mE
500000mE
505000mE
510000mE
515000mE
520000mE
525000mE
530000mE
535000mE



GEZER #1 WELL LOCATION
AGD66 Location - 460371mE 5344252mN
110km Northwest of Hobart
85km Southwest of Launceston
15km Southwest of Great Lake
Along Marlborough Highway
Gezer #1
Eglon #1
Lachish #1
Gezer #1
N
0
5
10
kilometres
5360000mN
5355000mN
5350000mN
5345000mN
5340000mN
450000mE
455000mE
460000mE
465000mE
470000mE
475000mE
480000mE
CENTRAL PLATEAU CONSERVATION AREA
MARLBOROUGH HIGHWAY
Little Pine Lagoon
Lake Fergus
Miena


HEBRON #1 WELL LOCATION
AGD66 Location - 537627mE 5334856mN
82km North of Hobart
82km South of Launceston along Midland Hwy
12km South of Ross
2km East of Tunbridge
Hebron #1
Eglon #1
Lachish #1
Gezer #1
Hebron #1
0
2.5
5
kilometres
N
5345000mN
5340000mN
5335000mN
5330000mN
525000mE
530000mE
535000mE
540000mE
545000mE
550000mE
Ross
Tunbridge
Woodbury
MIDLAND
HIGHWAY
TUNBRIDGE
ROAD
Blackman
River
MACQUARIE
RIVER

FLORA ASSESSMENT OF THE EGLON #1 DRILL SITE, BRACKNELL, TASMANIA

Report prepared by Brian French (B.Sc.) for Great South Land Minerals Pty Ltd.

PO Box 648, Sunbury, Victoria, 3429

Australia

(03) 9318 3161

SUMMARY

A botanical assessment of the Eglon #1 proposed drillsite was conducted by Brian French on the 4th January 2007. The assessment was conducted at the request Great South Land Minerals Pty Ltd.

No plant species, listed as threatened (Vulnerable) on the Tasmanian *Threatened Species Protection Act 1995* or priority species, as listed under the *Regional Forest Agreement* and the *Forest Botany Manual for the Midlands Region* (Module 2), was recorded from the property. No species listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was recorded within the area assessed.

The proposed coupe area supports no RFA forest communities.

The proposed coupe area supports one non-forest community (Agricultural land). This community is not listed as threatened.

No sites of significance listed in tables 4A or 4B in the *Forest Botany Manual – Midlands Region* (Forest Practices Authority 2005) were located on the property.

The recent drought reflected in the number of different vascular plant species recorded on the property. Due to the drought conditions, many species that are usually abundant during the spring period were sparse or absent.

INTRODUCTION

Great South Land Minerals Pty Ltd is investigating the potential for a drill site (Eglon #1) at Bracknell in the central north of Tasmania. The site is located on the southern side of Green Rises Road, Bracknell (Figure 1).

Currently, the area is comprised of agricultural land. The property is used for sheep/cattle grazing and crops.

An assessment was conducted by Brian French (Environmental Consultants International) on the 4th January 2007. The assessment was conducted to record the presence of threatened plant species in the area and record the vegetation types present and their conservation status.

QUALIFICATIONS

The qualifications to this report are:

- Fieldwork and analysis have been undertaken thoroughly, taking into account the resources available. However, the author and Environmental Consultants International (ECI) do not take responsibility for misidentification of species or plant communities, or incorrect determination of their extent and conservation status.
- The species list provided is comprehensive, but not exhaustive. Many Tasmanian species (e.g. orchids) are short-lived annuals or have their flowering times outside the survey period. It is likely that other plant species could be recorded at other times of the year.
- The Nature Conservation Branch of DPIW has detailed requirements for flora and fauna assessments of proposed developments (DPIWE 2004). These include providing DPIW with plot details of the assessed site and collating information on any threatened species located. Samples of threatened species have to be collected and forwarded to the Tasmanian Herbarium.
- The report gives an outline of the legislative and policy requirements related to the conservation and management of native vegetation. If required, further information can be obtained from DPIW specialists dealing with flora conservation and management.
- It is not the responsibility of the author or ECI to make decisions about land management at the site, or to liaise with DPIW or other agencies or individuals on behalf of the proponents.

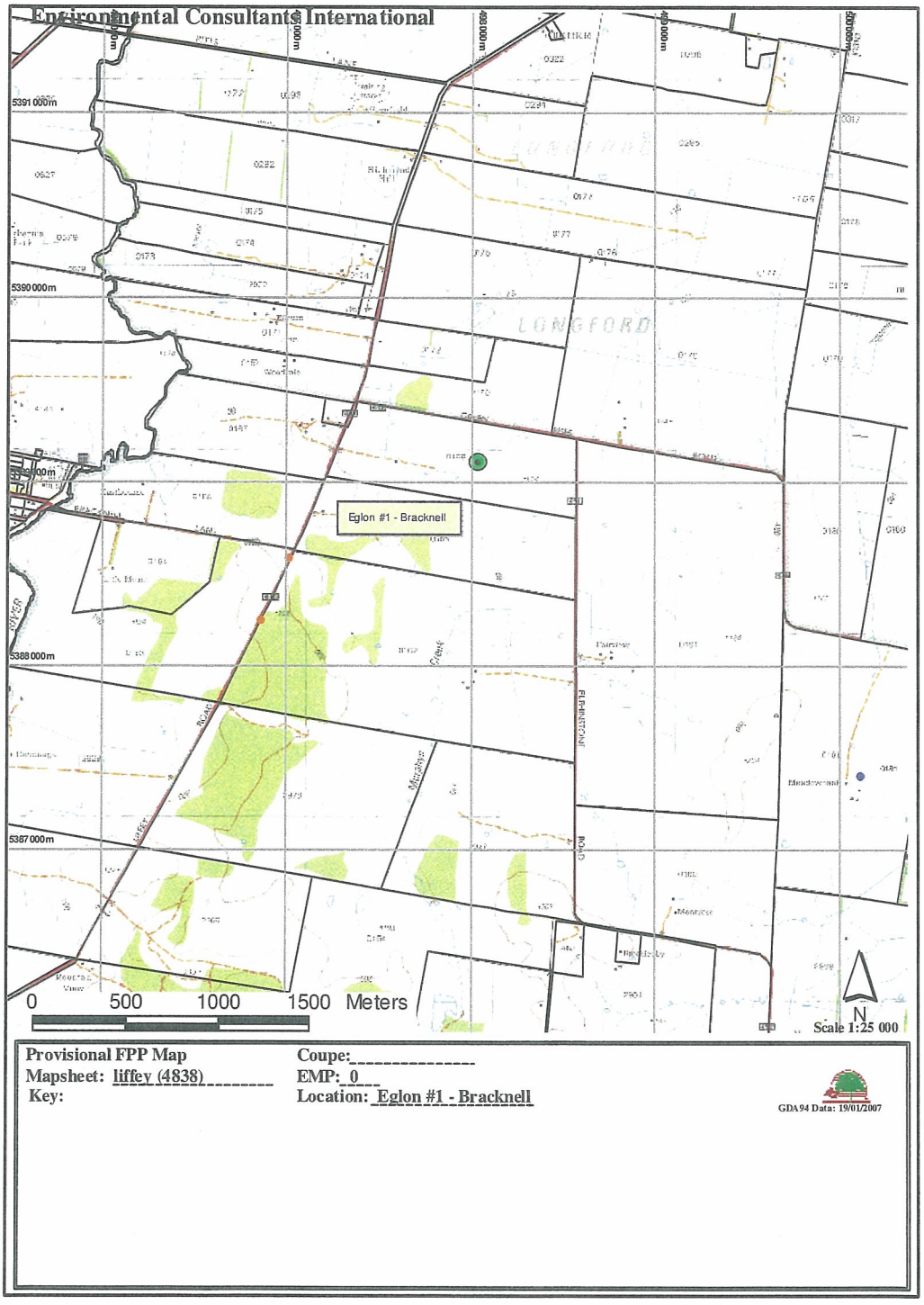


Figure 1: location of the study area.

METHODS

Desktop Assessment

Literature containing information on the vegetation of the area was examined. Databases held by DPIW, containing records of vegetation and threatened species occurring in the general area were also reviewed.

The following maps containing information on the composition and structure of the vegetation were examined:

- The RFA forest communities map (RFA 1996);
- TASVEG communities map accessed via the DPIW GIS server Natural Values Atlas (Accessed 15th December 2006).

Fieldwork

The assessment covers the existing native vegetation on the property, concentrating on the areas of native vegetation where the possibility of threatened flora and vegetation communities that could occur.

A database search (Natural Values Atlas) was conducted to determine the extent and potential of threatened flora species occurring on or near the property. A field assessment was conducted by Brian French (ECI) to determine if the presence of threatened flora occurring on the property.

Non-permanent plots were located within representative vegetation. The plots had a nominal area of approximately 30 m. Detailed information on vegetation structure and composition (vascular species) was recorded. A running species list was used to record additional species observed outside the plots. For each plot, information was also collected on the condition of the vegetation and broad environmental variables (drainage, aspect, rock type etc). The location of the sites was determined by GPS.

ANALYSIS

Vascular Plant Species

Species nomenclature, identification and inventory

A species list was prepared for the study area (see appendix 1). Species nomenclature in this report is based on Buchanan (2005) for species nomenclature and Wapstra *et. al* (2005) for common nomenclature. Specimens were collected for later identification under DPIW permit TFL 06467. It is a requirement of the permit that distribution data for threatened flora and the report to be supplied to DPIW. This will be undertaken by the consultant.

Species of conservation significance

No plant species listed on schedules of the Tasmanian *Threatened Species Protection Act 1995* were identified from the area surveyed.

Details of the classification systems and legislative requirements relating to listed species are given in the Act, or can be obtained from the Threatened Species Section of DPIW. Some of the main points relevant for the development proponents are given below.

- Plant species are listed on Schedules of the Tasmanian *Threatened Species Protection Act* according to their perceived level of threat, as determined by

botanists and conservation specialists. Listing is based on the distribution of the species and its susceptibility to various forms of disturbance. The schedules are:

  - Schedule 3: Species considered to be extinct or endangered in Tasmania;
  - Schedule 4: Species considered to be vulnerable in Tasmania;
  - Schedule 5: Species considered to be rare and at risk in Tasmania.

- Species on Schedule 3 generally have a higher priority for conservation that those on Schedule 4, and those on Schedule 4 generally have higher priority for conservation that those on Schedule 5. However, other factors also need to be taken into account in assessing the conservation value of a listed species at a particular site. These factors include the population size of the threatened species at the site; the condition and context of the vegetation at the site; the tenure of the site; the regional context (e.g. if the population is outlying or very unusual within a region); and the reservation status of the species.
- A permit is required for any activity that will knowingly disturb or destroy any individuals of a plant species listed on the Tasmanian *Threatened Species Protection Act*. The permit is issued by the Threatened Species Section of DPIW. If a listed species will be affected by a proposed activity, specialists from DPIW, in conjunction with the land managers, will try to develop prescriptions to avoid or reduce adverse effects on threatened species. If appropriate, these prescriptions would be incorporated into the permit conditions.

Plant Communities

Community classification, identification and inventory

Information on structure and composition of vegetation was used to allocate the vegetation at each plot site to a plant community. Field notes and other information were then used to map the extent of the plant communities on the property.

There have been many classifications of Tasmanian plant communities. The main reasons are to identify the extent and conservation status of different communities, and to help prioritise conservation and management planning. It is important to recognise that each plant community represents the whole suite of plant species, animal species and other values that occur within that unit, and not just the dominant species (e.g. *Eucalyptus amygdalina*) that may give its name to a particular community (e.g. *Eucalyptus amygdalina* sedgy woodland).

There are currently two levels of classification of Tasmanian plant communities, and both have been used in this report.

The broadest level of classification are the non-forest communities used in the current TASVEG Vegetation Mapping Project (Harris & Kitchener 2005) and the forest communities used in the 1996 forest community mapping undertaken during the Regional Forest Agreement (Regional Forest Agreement 1997). The vegetation maps of the study areas map the vegetation at this broad community level.

At the finer level of community classification are the communities identified by various classifications of Tasmanian vegetation types. These finer communities are termed floristic communities. The floristic communities present at each plot site have been determined, but they are not presented in the vegetation maps. However, table 3 in the following section indicates which floristic communities are present within the broad

communities used for each area. By considering floristic communities, a better picture is often gained of the diversity and conservation significance of the vegetation in an area.

The classifications of floristic communities are based on the following sources:

- Forest Practices Authority (2005): forest communities;
- Harris and Kitchener (2005): non-forest vegetation types;

Communities of conservation significance

The conservation status of broad communities and floristic communities recorded from the study areas have been determined by reference to:

- Statewide analyses of past and current extent and conservation status of forest communities, as determined by studies undertaken as part of the Tasmanian RFA process.
- Analyses undertaken during the current Tasmanian Vegetation Mapping Project (TASVEG), which give an indication of the distribution and conservation status of non-forest communities.
- Assessment of the reservation status if floristic communities at a Statewide level (Kirkpatrick *et al.*1995, Forest Practices Authority 2005) and regional level (Forest Practices Authority 2005).

Information from the above sources has been augmented by recent knowledge available to the author, as a result of fieldwork, reference to other published and unpublished studies, and discussions with other botanists familiar with the general area.

Communities categorised in this report as being of statewide conservation significance are those that have been identified as endangered, vulnerable or rare at a statewide scale. Communities categorised as being of regional conservation significance are those that are not identified as endangered, vulnerable or rare in Tasmania as a whole, but which have localised distributions in central Tasmania, or have been substantially cleared from the Woolnorth region.

The vegetation analyses and mapping have been conducted thoroughly, taking into account the time and resources available. There are inevitably some shortcomings and qualifications that need to be recognised (some of these have been alluded to). They are:

- the vegetation maps are only a representation of the distribution of the broad communities within the area;
- the boundaries between communities generally diffuse;

A reasonable indication of the extent of each broad community within the area is provided, with the general extent of the floristic communities also indicated.

RESULTS

Site characteristics

The Eglon #1 drill site is located at Bracknell in the central north of Tasmania (see figure 1). The area is characterised flat pasture with drainage channels and small dams occurring within the paddocks.

The property is comprised of agricultural land with small areas of remnant vegetation located on the roadside. Altitude is approximately 175 m a.s.l. Geology is dominated by Tertiary sediments.

No native vegetation exists on the property and the property is used for sheep/cattle grazing and crops. The only native species near the property are remnant species on the roadsides.

No other sites of significance for flora listed in tables 4A or 4B in the *Forest Botany Manual – Midlands Region* (Forest Practices Authority 2005) are located within the property area.

Flora and vegetation communities are discussed in more detail in the following sections with reference to their extent and conservation status.

Flora

34 species were recorded from drill site area. Of the 34 plants, none are species are endemic to Tasmania and 19 species are introduced species (65 %) (see Table 1 for a summary of the species recorded). Appendix 1 indicates the plant species recorded on the property. One different vegetation type was recorded from within the drill site area.

Threatened species

No threatened plant species were located from within the area assessed.

Species of conservation significance

No species listed on the schedules of the Tasmanian *Threatened Species Conservation Act 1995* were recorded from the area assessed. Priority species and Sites of Potential Significance for Flora, as listed in Sections 3 and 4 of the *Forest Botany Manual – Woolnorth Region* (Forest Practices Authority 2005) are used in this section.

TABLE 1: Summary of the vascular plant species recorded on the property.

Group	Native species		Exotic species	**Total**
	Endemic	Other		
Ferns & fern allies	0	0	0	**0**
Gymnosperms	0	0	0	**0**
Monocotyledons	0	7	13	**20**
Dicotyledons	0	5	9	**14**
Total	**0**	**12**	**22**	**34**

Other Threatened Flora

The Natural Values Atlas Report (Dept of Primary Industries and Water, GIS Web Server) indicated the presence of three different threatened plant species within 5000 m

of the study area (Table 2). Due to the time of the year that the assessment was conducted and the effect of the drought, some of the annual (e.g. orchid species) may not of have been evident during this assessment. However, due to the area being improved pasture that is intensively managed; it is unlikely that any of the species in Table 2 occur in the proposed drill site area.

TABLE 2: Threatened flora species recorded within 5 km of the study area.

Botanical name	Common name	Comments
Arthropodium strictum	Chocolate lily	Not seen during assessment.
Brunonia australis	Blue pincushion	Not seen during assessment.
Viola cunninghamii	Alpine violet	Not seen during assessment.

PLANT COMMUNITIES

The plant community present is a factor of the past intensive agriculture that occurs at the site. Plant community structure is indicated in appendix 2 (dominant species). Table 3 summarizes the TASVEG, RFA, Floristic community classifications of the community and the conservation status.

The non-forest community description follows Harris and Kitchener (2005). The following plant community was observed in the drill site area:

TABLE 3: Summary of the plant communities and their conservation status.

TASVEG community	RFA community	Floristic community(s)	Conservation Status
Agricultural land (FAG)	Non-forest	N/A	Non-priority

Non-forest communities

Agricultural land (TASVEG code FAG)

Agricultural land dominates the property. This mapping unit is best allocated to the TASVEG mapping unit Agricultural land (FAG) due to the dominance of pasture species and the presence of crops.

This community is not listed as a community of conservation significance under the *Regional Forest Agreement,* or as a priority floristic unit for conservation management in the *Woolnorth* module of the *Forest Botany Manual* (Forest Practices Authority 2005). This community is not is not listed as threatened (DPIWE 2005).

REFERENCES

Buchanan, A.M. (editor) (2005). *A Census of the Vascular Plants of Tasmania & Index to The Student's Flora of Tasmania Fourth Edition.* Tasmanian Herbarium Occasional Publication No. 7, Tasmanian Museum and Art Gallery, Hobart.

Commonwealth of Australia and the State of Tasmania (1997) Regional Forest Agreement between the Commonwealth of Australia and the State of Tasmania.

Curtis, W.M. (1963). *The Student's Flora of Tasmania.* Part 2. Government Printer Tasmania, Hobart.

Dept of Primary Industries, Water GIS Web Server. (Natural Values Atlas) *http://www.naturalvaluesatlas.dpiw.tas.gov.au/* Accessed December 15th 2006.

DPIWE (2004), *A brief for consultants, Reporting on the impact of proposed activities on the natural values and providing recommendations for mitigating impacts on these values.* Nature Conservation Branch, Department of Primary Industries, Water and Environment.

DPIWE (2005). *Threatened Native Vegetation Communities List (Version 6), November 2005.* http://www.dpiwe.tas.gov.au/inter.nsf/WebPages/AWAH-6547ZL?open.

Forest Practices Authority (2005). *Forest Botany Manual.* Forest Practices Authority, Hobart, Tasmania.

Harris, S and Kitchener, A (2005). From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation. Department of Primary Industries, Water and Environment, Printing Authority of Tasmania. Hobart.

Kirkpatrick, J.B., Barker, P., Brown, M.J., Harris, S. & Mackie, R. (1995). *The Reservation Status of the Tasmanian Vascular Plant Communities. Wild. Sci. Rep.* 95/4. Parks & Wildlife Service, Tasmania

Lazarus, E., Lawrence, N. and Potts, W. (2003). *Threatened Flora of Tasmania.* Threatened Species Unit, Department of Primary Industries, Water and Environment.

Wapstra, H., Wapstra, A., Wapstra, M. and Gilfedder, L. (2005). *The Little Book of Common Names for Tasmanian Plants.* Department of Primary Industries Water and Environment, Hobart.

APPENDIX 1: Vascular plant species recorded Eglon #1 drillsite.

Nomenclature follows Buchanan (2005)

i – introduced/naturalised species

e – Tasmanian endemic species/subspecies

DICOTYLEDONAE

ASTERACEAE
- *i Cirsium vulgare*
- *i Hypochoeris glabra*
- *i Hypochoeris radicata*
- *i Leontodon taraxacoides*
- *i Taraxacum officinale*

FABACEAE
- *i Ulex europaeus*

GENTIANACEAE
- *i Centaurium erythraea*

MYRTACEAE
- *Eucalyptus ovata*

PLANTAGINACEAE
- *Plantago varia*

POLYGONACEAE
- *i Acetosella vulgaris*

ROSACEAE
- *Acaena echinata*
- *Acaena novae-zelandiae*
- *i Rubus fruticosus* agg.

VIOLACEAE
- *Hymenanthera dentata*

MONOCOTYLEDONAE

CYPERACEAE
- *Carex appressa*

JUNCACEAE
- *i Juncus articulatus*
- *Juncus australis*
- *Juncus pallidus*
- *Juncus pauciflorus*

POACEAE
- *i Agrostis stolonifera*
- *i Aira elegans*
- *i Aira caryophyllea*
- *i Anthoxanthum odoratum*
- *i Bromus diandrus*
- *i Bromus willdenowii*
- *i Cynosurus echinatus*
- *i Dactylis glomerata*
- *Echinopogon ovatus*
- *i Holcus lanatus*
- *i Lolium perenne*
- *i Phalaris aquatica*
- *Poa labillardierei*
- *i Vulpia* spp.

XANTHORRHOEACEAE
- *Lomandra longifolia*

APPENDIX 2: Plant community structure

Note: The tables below indicate the dominant species occurring within the communities recorded on the property. Refer to appendix 1 for a complete list of species occurring on the property.

Agricultural land (RFA code Non-forest, TASVEG code FAG)		
Stratum	**Cover %**	**Species**
Grasses/Graminoides	80%	*Ehrharta distichophylla*
		Lolium perenne
		Dactylis glomeratus
		Anthoxanthum odoratum
		Holcus lanatus
		Aira caryophyllea
Herbs	20%	*Hypochoeris radicata*
		Trifolium repens
		Acaena novae-zelandiae

FLORA ASSESSMENT OF THE HEBRON #1 DRILL SITE, TUNBRIDGE, TASMANIA

Report prepared by Brian French (B.Sc.) for Great South Land Minerals Pty Ltd.

PO Box 648, Sunbury, Victoria, 3429

Australia

(03) 9318 3161

SUMMARY

A botanical assessment of the Hebron #1 proposed drill site was conducted by Brian French on the 4th January 2007. The assessment was conducted at the request Great South Land Minerals Pty Ltd.

No plant species, listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* or priority species, as listed under the *Regional Forest Agreement* and the *Forest Botany Manual for the Midlands Region* (Module 2), were recorded from the area. No species listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was recorded within the area assessed.

The proposed coupe area supports no RFA forest communities.

The proposed coupe area supports one non-forest community (Agricultural land). This community is not listed as threatened.

No sites of significance listed in tables 4A or 4B in the *Forest Botany Manual – Midlands Region* (Forest Practices Authority 2005) were located on the property.

The recent drought reflected in the number of different vascular plant species recorded on the property. Due to the drought conditions, many species that are usually abundant during the spring period were sparse or absent.

INTRODUCTION

Great South Land Minerals Pty Ltd is investigating the potential for a drill site (Hebron #1) at Tunbridge in the southern Midlands of Tasmania. The site is located approximately 3 km to the east of the Tunbridge township (Figure 1).

Currently, the area is comprised of agricultural land. The property is used for sheep/cattle grazing and crops.

An assessment was conducted by Brian French (Environmental Consultants International) on the 4th January 2007. The assessment was conducted to record the presence of threatened plant species in the area and record the vegetation types present and their conservation status.

QUALIFICATIONS

The qualifications to this report are:

- Fieldwork and analysis have been undertaken thoroughly, taking into account the resources available. However, the author and Environmental Consultants International (ECI) do not take responsibility for misidentification of species or plant communities, or incorrect determination of their extent and conservation status.
- The species list provided is comprehensive, but not exhaustive. Many Tasmanian species (e.g. orchids) are short-lived annuals or have their flowering times outside the survey period. It is likely that other plant species could be recorded at other times of the year.
- The Nature Conservation Branch of DPIW has detailed requirements for flora and fauna assessments of proposed developments (DPIWE 2004). These include providing DPIW with plot details of the assessed site and collating information on any threatened species located. Samples of threatened species have to be collected and forwarded to the Tasmanian Herbarium.
- The report gives an outline of the legislative and policy requirements related to the conservation and management of native vegetation. If required, further information can be obtained from DPIW specialists dealing with flora conservation and management.
- It is not the responsibility of the author or ECI to make decisions about land management at the site, or to liaise with DPIW or other agencies or individuals on behalf of the proponents.

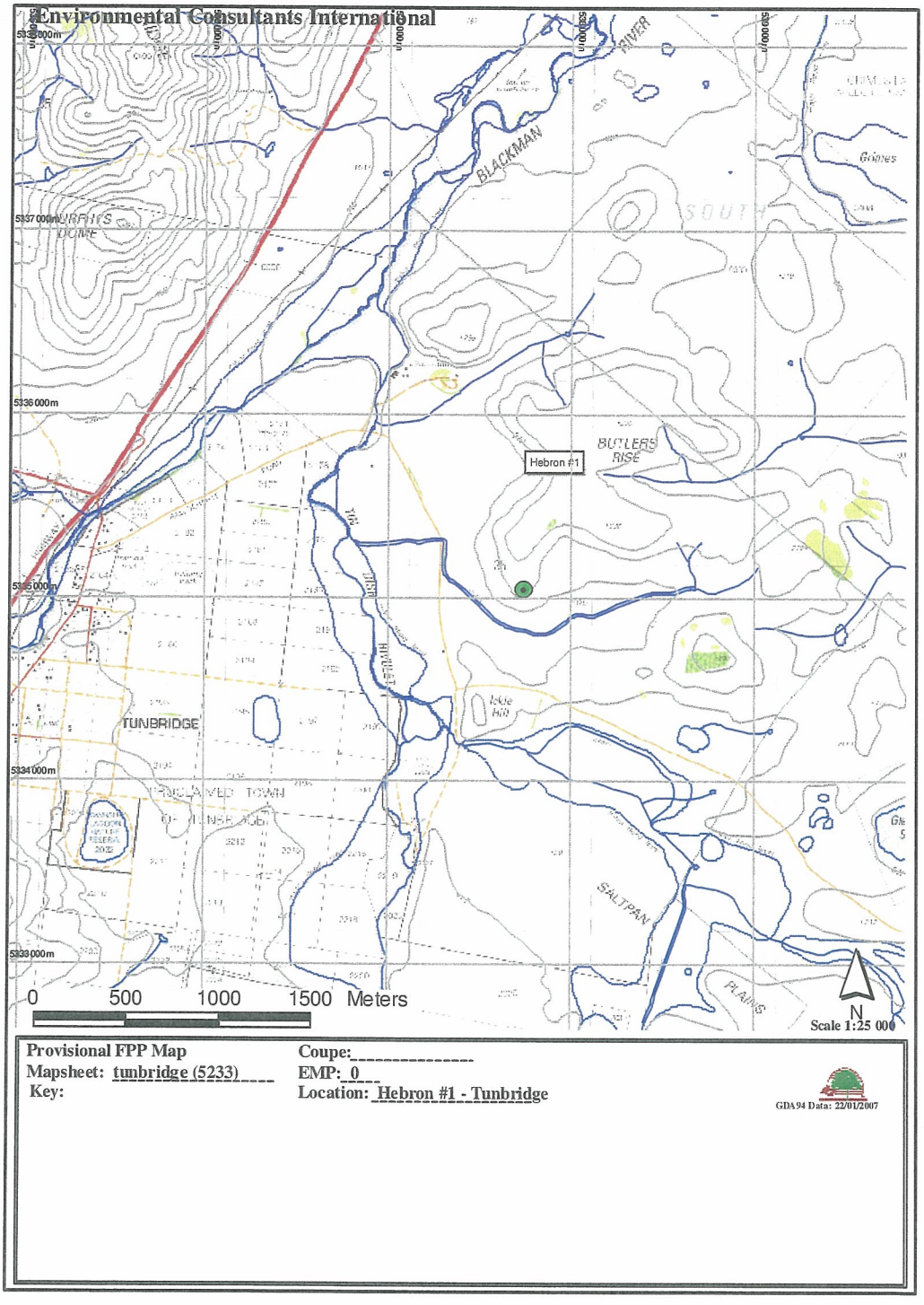


Figure 1: location of the study area.

METHODS

Desktop Assessment

Literature containing information on the vegetation of the area was examined. Databases held by DPIW, containing records of vegetation and threatened species occurring in the general area were also reviewed.

The following maps containing information on the composition and structure of the vegetation were examined:

- The RFA forest communities map (RFA 1996);
- TASVEG communities map accessed via the DPIW GIS server Natural Values Atlas (Accessed 15th December 2006).

Fieldwork

The assessment covers the existing native vegetation on the property, concentrating on the areas of native vegetation where the possibility of threatened flora and vegetation communities that could occur.

A database search (Natural Values Atlas) was conducted to determine the extent and potential of threatened flora species occurring on or near the property. A field assessment was conducted by Brian French (ECI) to determine if the presence of threatened flora occurring on the property.

Non-permanent plots were located within representative vegetation. The plots had a nominal area of approximately 30 m. Detailed information on vegetation structure and composition (vascular species) was recorded. A running species list was used to record additional species observed outside the plots. For each plot, information was also collected on the condition of the vegetation and broad environmental variables (drainage, aspect, rock type etc). The location of the sites was determined by GPS.

ANALYSIS

Vascular Plant Species

Species nomenclature, identification and inventory

A species list was prepared for the study area (see appendix 1). Species nomenclature in this report is based on Buchanan (2005) for species nomenclature and Wapstra *et. al* (2005) for common nomenclature. Specimens were collected for later identification under DPIW permit TFL 06467. It is a requirement of the permit that distribution data for threatened flora and the report to be supplied to DPIW. This will be undertaken by the consultant.

Species of conservation significance

No plant species listed on schedules of the Tasmanian *Threatened Species Protection Act 1995* were identified from the area surveyed.

Details of the classification systems and legislative requirements relating to listed species are given in the Act, or can be obtained from the Threatened Species Section of DPIW. Some of the main points relevant for the development proponents are given below.

- Plant species are listed on Schedules of the Tasmanian *Threatened Species Protection Act* according to their perceived level of threat, as determined by

botanists and conservation specialists. Listing is based on the distribution of the species and its susceptibility to various forms of disturbance. The schedules are:

  - Schedule 3: Species considered to be extinct or endangered in Tasmania;
  - Schedule 4: Species considered to be vulnerable in Tasmania;
  - Schedule 5: Species considered to be rare and at risk in Tasmania.

- Species on Schedule 3 generally have a higher priority for conservation that those on Schedule 4, and those on Schedule 4 generally have higher priority for conservation that those on Schedule 5. However, other factors also need to be taken into account in assessing the conservation value of a listed species at a particular site. These factors include the population size of the threatened species at the site; the condition and context of the vegetation at the site; the tenure of the site; the regional context (e.g. if the population is outlying or very unusual within a region); and the reservation status of the species.
- A permit is required for any activity that will knowingly disturb or destroy any individuals of a plant species listed on the Tasmanian *Threatened Species Protection Act*. The permit is issued by the Threatened Species Section of DPIW. If a listed species will be affected by a proposed activity, specialists from DPIW, in conjunction with the land managers, will try to develop prescriptions to avoid or reduce adverse effects on threatened species. If appropriate, these prescriptions would be incorporated into the permit conditions.

Plant Communities

Community classification, identification and inventory

Information on structure and composition of vegetation was used to allocate the vegetation at each plot site to a plant community. Field notes and other information were then used to map the extent of the plant communities on the property.

There have been many classifications of Tasmanian plant communities. The main reasons are to identify the extent and conservation status of different communities, and to help prioritise conservation and management planning. It is important to recognise that each plant community represents the whole suite of plant species, animal species and other values that occur within that unit, and not just the dominant species (e.g. *Eucalyptus amygdalina*) that may give its name to a particular community (e.g. *Eucalyptus amygdalina* sedgy woodland).

There are currently two levels of classification of Tasmanian plant communities, and both have been used in this report.

The broadest level of classification are the non-forest communities used in the current TASVEG Vegetation Mapping Project (Harris & Kitchener 2005) and the forest communities used in the 1996 forest community mapping undertaken during the Regional Forest Agreement (Regional Forest Agreement 1997). The vegetation maps of the study areas map the vegetation at this broad community level.

At the finer level of community classification are the communities identified by various classifications of Tasmanian vegetation types. These finer communities are termed floristic communities. The floristic communities present at each plot site have been determined, but they are not presented in the vegetation maps. However, table 3 in the following section indicates which floristic communities are present within the broad

communities used for each area. By considering floristic communities, a better picture is often gained of the diversity and conservation significance of the vegetation in an area.

The classifications of floristic communities are based on the following sources:

- Forest Practices Authority (2005): forest communities;
- Harris and Kitchener (2005): non-forest vegetation types;

Communities of conservation significance

The conservation status of broad communities and floristic communities recorded from the study areas have been determined by reference to:

- Statewide analyses of past and current extent and conservation status of forest communities, as determined by studies undertaken as part of the Tasmanian RFA process.
- Analyses undertaken during the current Tasmanian Vegetation Mapping Project (TASVEG), which give an indication of the distribution and conservation status of non-forest communities.
- Assessment of the reservation status if floristic communities at a Statewide level (Kirkpatrick *et al.*1995, Forest Practices Authority 2005) and regional level (Forest Practices Authority 2005).

Information from the above sources has been augmented by recent knowledge available to the author, as a result of fieldwork, reference to other published and unpublished studies, and discussions with other botanists familiar with the general area.

Communities categorised in this report as being of statewide conservation significance are those that have been identified as endangered, vulnerable or rare at a statewide scale. Communities categorised as being of regional conservation significance are those that are not identified as endangered, vulnerable or rare in Tasmania as a whole, but which have localised distributions in central Tasmania, or have been substantially cleared from the Woolnorth region.

The vegetation analyses and mapping have been conducted thoroughly, taking into account the time and resources available. There are inevitably some shortcomings and qualifications that need to be recognised (some of these have been alluded to). They are:

- the vegetation maps are only a representation of the distribution of the broad communities within the area;
- the boundaries between communities generally diffuse;

A reasonable indication of the extent of each broad community within the area is provided, with the general extent of the floristic communities also indicated.

RESULTS

Site characteristics

The Hebron #1 drill site is located at Tunbridge in the southern Midlands of Tasmania (see figure 1). The area is characterised by pasture and cropping land with localised sandstone outcrops in a number of locations. Altitude is approximately 220 m a.s.l. Geology is dominated by Sandstone.

No native vegetation exists on the property and the property is used for sheep/cattle grazing and crops. The only native species near the property are remnant species on the paddock above the proposed drill site.

No sites of significance for flora listed in tables 4A or 4B in the *Forest Botany Manual – Midlands Region* (Forest Practices Authority 2005) are located within the property area.

Flora and vegetation communities are discussed in more detail in the following sections with reference to their extent and conservation status.

Flora

13 species were recorded from drill site area. Of the 13 plants, none are species are endemic to Tasmania and 19 species are introduced species (65 %) (see Table 1 for a summary of the species recorded). Appendix 1 indicates the plant species recorded on the property. One different vegetation type was recorded from within the drill site area.

Threatened species

No threatened plant species were located from within the area assessed.

Species of conservation significance

No species listed on the schedules of the Tasmanian *Threatened Species Conservation Act 1995* were recorded from the area assessed. Priority species and Sites of Potential Significance for Flora, as listed in Sections 3 and 4 of the *Forest Botany Manual – Woolnorth Region* (Forest Practices Authority 2005) are used in this section.

TABLE 1: Summary of the vascular plant species recorded on the property.

Group	Native species		Exotic species	**Total**
	Endemic	Other		
Ferns & fern allies	0	0	0	**0**
Gymnosperms	0	0	0	**0**
Monocotyledons	0	7	13	**20**
Dicotyledons	0	5	9	**14**
Total	**0**	**12**	**22**	**34**

Other Threatened Flora

The Natural Values Atlas Report (Dept of Primary Industries and Water, GIS Web Server) indicated the presence of 32 different threatened plant species within 5000 m of the study area (Table 2). Due to the time of the year that the assessment was conducted and the effect of the drought, some of the annual (e.g. orchid species) may not of have been evident during this assessment. However, due to the area being improved pasture that is intensively managed; it is unlikely that any of the species in Table 2 occur in the proposed drill site area.

TABLE 2: Threatened flora species recorded within 5 km of the study area.

Botanical name	Common name	Comments
Amphibromus macrorhinus	Longnosed swampgrass	Not seen during assessment.
Arthropodium strictum	Chocolate lily	Not seen during assessment
Asperula scoparia var. *scoparia*	Prickly woodruff	Not seen during assessment.
Austrostipa nodosa	Knotty speargrass	Not seen during assessment.
Austrostipa scabra	Rough speargrass	Not seen during assessment
Bolboschoenus caldwellii	Sea clubsedge	Not seen during assessment.
Bolboschoenus medianus	Marsh clubsedge	Not seen during assessment.
Brachyscome rigidula	Cutleaf daisy	Not seen during assessment
Calocephalus lacteus	Milky beautyheads	Not seen during assessment.
Carex gunniana	Mountain sedge	Not seen during assessment.
Colobanthus curtisiae	Grassland cupflower	Not seen during assessment
Cryptandra amara	Pretty pearlflower	Not seen during assessment.
Danthonia procera	Tall wallaby-grass	Not seen during assessment.
Dianella amoena	Grassland flaxlily	Not seen during assessment
Dianella longifolia var. *longifolia*	Pale flax lily	Not seen during assessment.
Hypoxis vaginata	Sheathing yellow-star	Not seen during assessment.
Isoetopsis graminifolia	Grass cushion	Not seen during assessment
Lepidium hyssopifolium	Soft peppercress	Not seen during assessment.
Leucochrysum albicans subsp. *albicans* var. *tricolor*	Grassland paperdaisy	Not seen during assessment
Pimelea curviflora var. *sericea*	Silky curved rice flower	Not seen during assessment.
Prasophyllum tunbridgense	Tunbridge leek-orchid	Not seen during assessment.
Pultenaea prostrata	Silky bushpea	Not seen during assessment
Ranunculus prasinus	Midlands buttercup	Not seen during assessment.
Scleranthus diander	Tufted knawl	Not seen during assessment.
Scleranthus fasciculatus	Spreading knawel	Not seen during assessment.
Scutellaria humilis	Dwarf skullcap	Not seen during assessment
Stackhousia gunnii	Grassland candles	Not seen during assessment.
Velleia paradoxa	Spur velleia	Not seen during assessment.
Vittadinia cuneata	Fuzzy new holland daisy	Not seen during assessment.
Vittadinia gracilis	Woolly new holland daisy	Not seen during assessment.
Vittadinia muelleri	Narrow leaf new holland daisy	Not seen during assessment.
Wilsonia rotundifolia	Roundleaf wilsonia	Not seen during assessment.

PLANT COMMUNITIES

The plant community present is a factor of the past intensive agriculture that occurs at the site. Plant community structure is indicated in appendix 2 (dominant species). Table 3 summarizes the TASVEG, RFA, Floristic community classifications of the community and the conservation status.

The non-forest community description follows Harris and Kitchener (2005). The following plant community was observed in the drill site area:

TABLE 3: Summary of the plant communities and their conservation status.

TASVEG community	RFA community	Floristic community(s)	Conservation Status
Agricultural land (FAG)	Non-forest	N/A	Non-priority

Non-forest communities

Agricultural land (TASVEG code FAG)

Agricultural land dominates the property. This mapping unit is best allocated to the TASVEG mapping unit Agricultural land (FAG) due to the dominance of pasture species and the wheat crop that dominates the drill site.

This community is not listed as a community of conservation significance under the *Regional Forest Agreement,* or as a priority floristic unit for conservation management in the *Woolnorth* module of the *Forest Botany Manual* (Forest Practices Authority 2005). This community is not is not listed as threatened (DPIWE 2005).

REFERENCES

Buchanan, A.M. (editor) (2005). *A Census of the Vascular Plants of Tasmania & Index to The Student's Flora of Tasmania Fourth Edition.* Tasmanian Herbarium Occasional Publication No. 7, Tasmanian Museum and Art Gallery, Hobart.

Commonwealth of Australia and the State of Tasmania (1997) Regional Forest Agreement between the Commonwealth of Australia and the State of Tasmania.

Curtis, W.M. (1963). *The Student's Flora of Tasmania.* Part 2. Government Printer Tasmania, Hobart.

Dept of Primary Industries, Water GIS Web Server. (Natural Values Atlas) *http://www.naturalvaluesatlas.dpiw.tas.gov.au/* Accessed December 15th 2006.

DPIWE (2004), *A brief for consultants, Reporting on the impact of proposed activities on the natural values and providing recommendations for mitigating impacts on these values.* Nature Conservation Branch, Department of Primary Industries, Water and Environment.

DPIWE (2005). *Threatened Native Vegetation Communities List (Version 6), November 2005.* http://www.dpiwe.tas.gov.au/inter.nsf/WebPages/AWAH-6547ZL?open.

Forest Practices Authority (2005). *Forest Botany Manual.* Forest Practices Authority, Hobart, Tasmania.

Harris, S and Kitchener, A (2005). From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation. Department of Primary Industries, Water and Environment, Printing Authority of Tasmania. Hobart.

Kirkpatrick, J.B., Barker, P., Brown, M.J., Harris, S. & Mackie, R. (1995). *The Reservation Status of the Tasmanian Vascular Plant Communities. Wild. Sci. Rep.* 95/4. Parks & Wildlife Service, Tasmania

Lazarus, E., Lawrence, N. and Potts, W. (2003). *Threatened Flora of Tasmania.* Threatened Species Unit, Department of Primary Industries, Water and Environment.

Wapstra, H., Wapstra, A., Wapstra, M. and Gilfedder, L. (2005). *The Little Book of Common Names for Tasmanian Plants.* Department of Primary Industries Water and Environment, Hobart.

APPENDIX 1: Vascular plant species recorded Hebron #1 drillsite.

Nomenclature follows Buchanan (2005)

i – introduced/naturalised species

e – Tasmanian endemic species/subspecies

DICOTYLEDONAE

ASTERACEAE
- *i Cirsium vulgare*
- *i Hypochoeris radicata*
- *i Taraxacum officinale*

GENTIANACEAE
- *i Centaurium erythraea*

MYRTACEAE
- *Eucalyptus pauciflora*

OXALIDACEAE
- *Oxalis corniculata*

PLANTAGINACEAE
- *Plantago varia*

POLYGONACEAE
- *i Acetosella vulgaris*

MONOCOTYLEDONAE

POACEAE
- *i Aira elegans*
- *i Aira caryophyllea*
- *i Cynosurus echinatus*
- *i Dactylis glomerata*
- *Echinopogon ovatus*
- *i Holcus lanatus*
- *i Lolium perenne*
- *i Phalaris aquatica*
- *Poa labillardierei*
- *i Triticum aestivum*
- *i Vulpia* spp.

APPENDIX 2: Plant community structure

Note: The tables below indicate the dominant species occurring within the communities recorded on the property. Refer to appendix 1 for a complete list of species occurring on the property.

Agricultural land (RFA code Non-forest, TASVEG code FAG)		
Stratum	**Cover %**	**Species**
Grasses/Graminoides	90%	*Triticum aestivum*
		Anthoxanthum odoratum
		Aira caryophyllea
Herbs	5%	*Hypochoeris radicata*

FLORA ASSESSMENT OF THE GEZER #1 DRILL SITE, MARLBOROUGH, TASMANIA

Report prepared by Brian French (B.Sc.) for Great South Land Minerals Pty Ltd.

PO Box 648, Sunbury, Victoria, 3429

Australia

(03) 9318 3161

SUMMARY

A botanical assessment of the Gezer #1 proposed drill site was conducted by Brian French on the 5th January 2007. The assessment was conducted at the request Great South Land Minerals Pty Ltd.

No plant species, listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* or priority species, as listed under the *Regional Forest Agreement* and the *Forest Botany Manual for the Central Highlands Region* (Module 2), was recorded from the property. No species listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was recorded within the area assessed.

The proposed coupe area supports one RFA forest community (*Eucalyptus pauciflora* forest on sediments).

The proposed coupe area supports one non-forest community (Extra-urban miscellaneous) which is the old quarry area that dominates the site that has some native vegetation recolonising the quarry area.

No potential sites of significance listed in table 4A or table 4B in the *Forest Botany Manual – Central Highlands Region* (Forest Practices Authority 2005) were located in the drill site area.

The recent drought reflected in the number of different vascular plant species recorded on the property. Due to the drought conditions, many species that are usually abundant during the spring period were sparse or absent.

INTRODUCTION

Great South Land Minerals Pty Ltd is investigating the potential for a drill site (Gezer #1) at Marlborough in the Central Highlands of Tasmania. The site is located on the western side of Roscarborough Road (Figure 1).

Currently, the area is comprised of an old gravel quarry and native forest around the perimeter of the quarry.

An assessment was conducted by Brian French (Environmental Consultants International) on the 5th January 2007. The assessment was conducted to record the presence of threatened plant species in the area and record the vegetation types present and their conservation status.

QUALIFICATIONS

The qualifications to this report are:

- Fieldwork and analysis have been undertaken thoroughly, taking into account the resources available. However, the author and Environmental Consultants International (ECI) do not take responsibility for misidentification of species or plant communities, or incorrect determination of their extent and conservation status.
- The species list provided is comprehensive, but not exhaustive. Many Tasmanian species (e.g. orchids) are short-lived annuals or have their flowering times outside the survey period. It is likely that other plant species could be recorded at other times of the year.
- The Nature Conservation Branch of DPIW has detailed requirements for flora and fauna assessments of proposed developments (DPIWE 2004). These include providing DPIW with plot details of the assessed site and collating information on any threatened species located. Samples of threatened species have to be collected and forwarded to the Tasmanian Herbarium.
- The report gives an outline of the legislative and policy requirements related to the conservation and management of native vegetation. If required, further information can be obtained from DPIW specialists dealing with flora conservation and management.
- It is not the responsibility of the author or ECI to make decisions about land management at the site, or to liaise with DPIW or other agencies or individuals on behalf of the proponents.

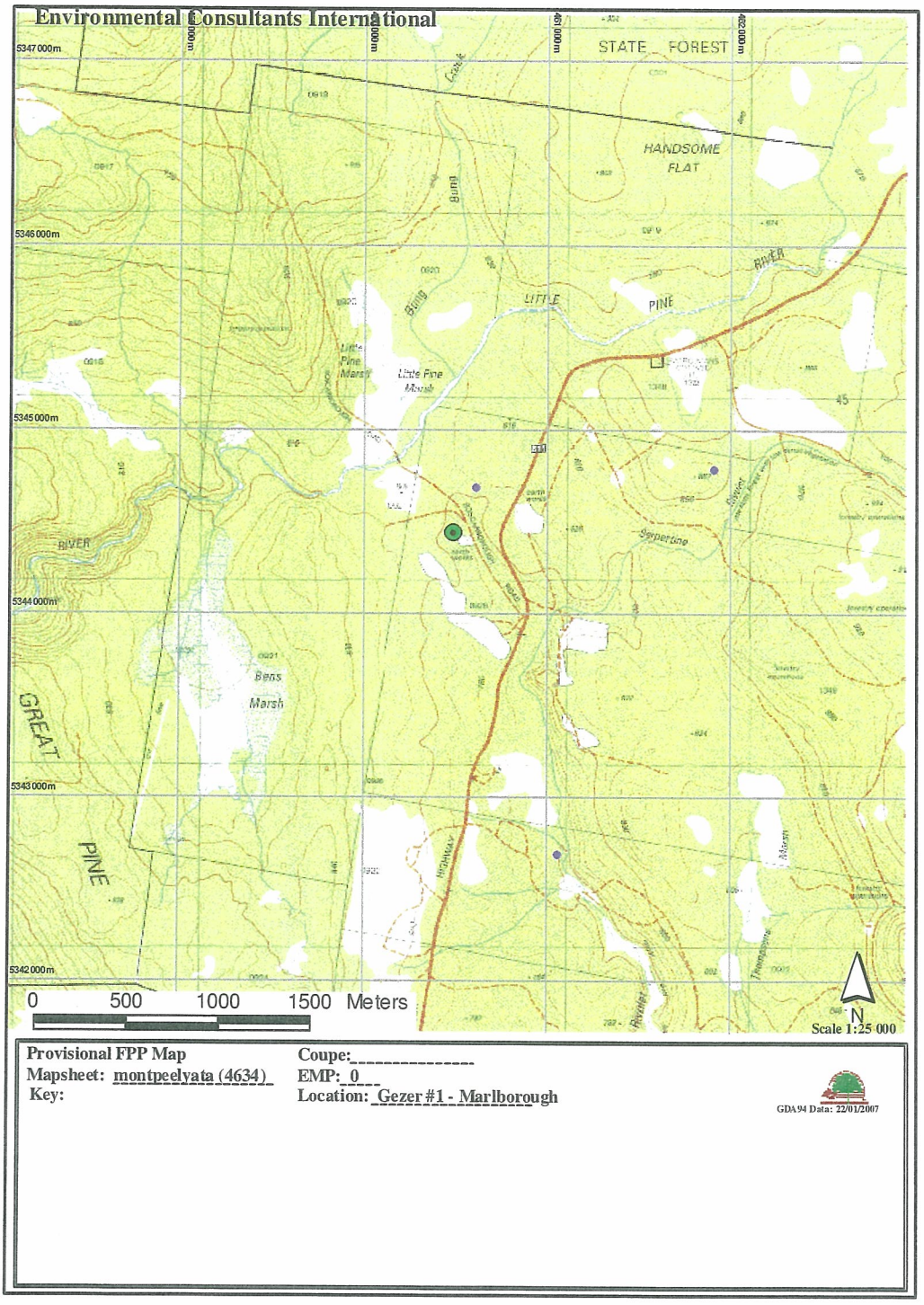


Figure 1: location of the study area.

METHODS

Desktop Assessment

Literature containing information on the vegetation of the area was examined. Databases held by DPIW, containing records of vegetation and threatened species occurring in the general area were also reviewed.

The following maps containing information on the composition and structure of the vegetation were examined:

- The RFA forest communities map (RFA 1996);
- TASVEG communities map accessed via the DPIW GIS server Natural Values Atlas (Accessed 15th December 2006).

Fieldwork

The assessment covers the existing native vegetation on the property, concentrating on the areas of native vegetation where the possibility of threatened flora and vegetation communities that could occur.

A database search (Natural Values Atlas) was conducted to determine the extent and potential of threatened flora species occurring on or near the property. A field assessment was conducted by Brian French (ECI) to determine if the presence of threatened flora occurring on the property.

Non-permanent plots were located within representative vegetation. The plots had a nominal area of approximately 30 m. Detailed information on vegetation structure and composition (vascular species) was recorded. A running species list was used to record additional species observed outside the plots. For each plot, information was also collected on the condition of the vegetation and broad environmental variables (drainage, aspect, rock type etc). The location of the sites was determined by GPS.

ANALYSIS

Vascular Plant Species

Species nomenclature, identification and inventory

A species list was prepared for the study area (see appendix 1). Species nomenclature in this report is based on Buchanan (2005) for species nomenclature and Wapstra *et. al* (2005) for common nomenclature. Specimens were collected for later identification under DPIW permit TFL 06467. It is a requirement of the permit that distribution data for threatened flora and the report to be supplied to DPIW. This will be undertaken by the consultant.

Species of conservation significance

No plant species listed on schedules of the Tasmanian *Threatened Species Protection Act 1995* were identified from the area surveyed.

Details of the classification systems and legislative requirements relating to listed species are given in the Act, or can be obtained from the Threatened Species Section of DPIW. Some of the main points relevant for the development proponents are given below.

- Plant species are listed on Schedules of the Tasmanian *Threatened Species Protection Act* according to their perceived level of threat, as determined by

botanists and conservation specialists. Listing is based on the distribution of the species and its susceptibility to various forms of disturbance. The schedules are:

  - Schedule 3: Species considered to be extinct or endangered in Tasmania;
  - Schedule 4: Species considered to be vulnerable in Tasmania;
  - Schedule 5: Species considered to be rare and at risk in Tasmania.

- Species on Schedule 3 generally have a higher priority for conservation that those on Schedule 4, and those on Schedule 4 generally have higher priority for conservation that those on Schedule 5. However, other factors also need to be taken into account in assessing the conservation value of a listed species at a particular site. These factors include the population size of the threatened species at the site; the condition and context of the vegetation at the site; the tenure of the site; the regional context (e.g. if the population is outlying or very unusual within a region); and the reservation status of the species.
- A permit is required for any activity that will knowingly disturb or destroy any individuals of a plant species listed on the Tasmanian *Threatened Species Protection Act*. The permit is issued by the Threatened Species Section of DPIW. If a listed species will be affected by a proposed activity, specialists from DPIW, in conjunction with the land managers, will try to develop prescriptions to avoid or reduce adverse effects on threatened species. If appropriate, these prescriptions would be incorporated into the permit conditions.

Plant Communities

Community classification, identification and inventory

Information on structure and composition of vegetation was used to allocate the vegetation at each plot site to a plant community. Field notes and other information were then used to map the extent of the plant communities on the property.

There have been many classifications of Tasmanian plant communities. The main reasons are to identify the extent and conservation status of different communities, and to help prioritise conservation and management planning. It is important to recognise that each plant community represents the whole suite of plant species, animal species and other values that occur within that unit, and not just the dominant species (e.g. *Eucalyptus pauciflora*) that may give its name to a particular community (e.g. *Eucalyptus pauciflora* heathy woodland).

There are currently two levels of classification of Tasmanian plant communities, and both have been used in this report.

The broadest level of classification are the non-forest communities used in the current TASVEG Vegetation Mapping Project (Harris & Kitchener 2005) and the forest communities used in the 1996 forest community mapping undertaken during the Regional Forest Agreement (Regional Forest Agreement 1997). The vegetation maps of the study areas map the vegetation at this broad community level.

At the finer level of community classification are the communities identified by various classifications of Tasmanian vegetation types. These finer communities are termed floristic communities. The floristic communities present at each plot site have been determined, but they are not presented in the vegetation maps. However, table 3 in the following section indicates which floristic communities are present within the broad

communities used for each area. By considering floristic communities, a better picture is often gained of the diversity and conservation significance of the vegetation in an area.

The classifications of floristic communities are based on the following sources:

- Forest Practices Authority (2005): forest communities;
- Harris and Kitchener (2005): non-forest vegetation types;

Communities of conservation significance

The conservation status of broad communities and floristic communities recorded from the study areas have been determined by reference to:

- Statewide analyses of past and current extent and conservation status of forest communities, as determined by studies undertaken as part of the Tasmanian RFA process.
- Analyses undertaken during the current Tasmanian Vegetation Mapping Project (TASVEG), which give an indication of the distribution and conservation status of non-forest communities.
- Assessment of the reservation status if floristic communities at a Statewide level (Kirkpatrick *et al.*1995, Forest Practices Authority 2005) and regional level (Forest Practices Authority 2005).

Information from the above sources has been augmented by recent knowledge available to the author, as a result of fieldwork, reference to other published and unpublished studies, and discussions with other botanists familiar with the general area.

Communities categorised in this report as being of statewide conservation significance are those that have been identified as endangered, vulnerable or rare at a statewide scale. Communities categorised as being of regional conservation significance are those that are not identified as endangered, vulnerable or rare in Tasmania as a whole, but which have localised distributions in central Tasmania, or have been substantially cleared from the Woolnorth region.

The vegetation analyses and mapping have been conducted thoroughly, taking into account the time and resources available. There are inevitably some shortcomings and qualifications that need to be recognised (some of these have been alluded to). They are:

- the vegetation maps are only a representation of the distribution of the broad communities within the area;
- the boundaries between communities generally diffuse;

A reasonable indication of the extent of each broad community within the area is provided, with the general extent of the floristic communities also indicated.

RESULTS

Site characteristics

The Gezer #1 drill site is located at Marlborough in the Central Highlands of Tasmania (see figure 1). The area is characterised by native forest surrounding an old quarry area. Altitude is approximately 800 m a.s.l. Geology is dominated by Permian/Triassic sediments.

The proposed coupe area supports one RFA forest community (*Eucalyptus pauciflora* forest on sediments).

The proposed coupe area supports one non-forest community (Extra-urban miscellaneous) which is the old quarry area that dominates the site that hassome native vegetation recolonising.

One site of significance listed in table 4B in the *Forest Botany Manual – Central Highlands Region* (Forest Practices Authority 2005) was located in the drill site area. No potential sites of significance listed in table 4A in the *Forest Botany Manual – Central Highlands Region* (Forest Practices Authority 2005) were located in the drill site area.

Flora and vegetation communities are discussed in more detail in the following sections with reference to their extent and conservation status.

Flora

36 species were recorded from drill site area. Of the 36 plants, 3 are endemic to Tasmania (8%) and 7 species are introduced species (19%) (see Table 1 for a summary of the species recorded). Appendix 1 indicates the plant species recorded on the property. Two different vegetation types were recorded from within the drill site area.

Threatened species

No threatened plant species were located from within the area assessed.

Species of conservation significance

No species listed on the schedules of the Tasmanian *Threatened Species Conservation Act 1995* were recorded from the area assessed. Priority species and Sites of Potential Significance for Flora, as listed in Sections 3 and 4 of the *Forest Botany Manual – Woolnorth Region* (Forest Practices Authority 2005) are used in this section.

TABLE 1: Summary of the vascular plant species recorded on the property.

Group	Native species		Exotic species	**Total**
	Endemic	Other		
Ferns & fern allies	0	0	0	**0**
Gymnosperms	0	0	0	**0**
Monocotyledons	0	4	3	**7**
Dicotyledons	3	22	4	**29**
Total	**3**	**26**	**7**	**36**

Other Threatened Flora

The Natural Values Atlas Report (Dept of Primary Industries and Water, GIS Web Server) indicated the presence of five different threatened plant species within 5000 m of the study area (Table 2). Due to the time of the year that the assessment was conducted and the effect of the drought, some of the annual (e.g. orchid species) may not of have been evident during this assessment. However, due to the area being an old quarry area and highly disturbed; it is unlikely that any of the species in Table 2 occur in the proposed drill site area.

TABLE 2: Threatened flora species recorded within 5 km of the study area.

Botanical name	Common name	Comments
Glycine latrobeana	Clover glycine	Not seen during assessment.
Hovea tasmanica	Rockfield purplepea	Not seen during assessment.
Ranunculus pumilio var. *pumilio*	Ferny buttercup	Not seen during assessment
Viola cunninghamii	Alpine violet	Not seen during assessment.
Westringia angustifolia	Narrowleaf westringia	Not seen during assessment

PLANT COMMUNITIES

The plant communities present are a factor of the past intensive quarry activities that have occured at the site. Plant community structure is indicated in appendix 2 (dominant species). Table 3 summarizes the TASVEG, RFA and Floristic community classifications of the communities and their conservation status.

The non-forest community description follows Harris and Kitchener (2005). The following plant community was observed in the drill site area:

TABLE 3: Summary of the plant communities and their conservation status.

TASVEG community	RFA community	Floristic community(s)	Conservation Status
Eucalyptus pauciflora forest and woodland not on dolerite (DOW)	*Eucalyptus pauciflora* forest on sediments (PS)	Heathy *Eucalyptus pauciflora* forest (DRY-hPAUC)	Non-priority
Extra-urban miscellaneous (FUM)	Non-forest	N/A	Non-priority

Forest Communities

***Eucalyptus pauciflora* forest and woodland not on dolerite (DOW)**

Eucalyptus pauciflora forest and woodland not on dolerite dominates the forest area all around the quarry. Floristically, this community is best described as dry heathy *E. pauciflora* woodland (DRY-hPAUC).

This community has been largely disturbed in the past by logging and fire. Most of the vegetation within the community is regrowth due the past disturbance. This mapping unit is in good condition with few weed species present.

This community is not is not listed as a community of conservation significance under the *Regional Forest Agreement,* or as a priority floristic unit for conservation management in the *Woolnorth* module of the *Forest Botany Manual* (Forest Practices Authority 2005)

Non-forest communities

Extra-urban miscellaneous (FUM)

Extra-urban miscellaneous (the old quarry site) dominates the drill site location. The area has been extensively quarried for gravel in the past. Some native plant species are re-colonizing the area, however, the area is 80-90% bare gravel.

This community is not listed as a community of conservation significance under the *Regional Forest Agreement,* or as a priority floristic unit for conservation management in the *Woolnorth* module of the *Forest Botany Manual* (Forest Practices Authority 2005). This community is not is not listed as threatened (DPIWE 2005).

REFERENCES

Buchanan, A.M. (editor) (2005). *A Census of the Vascular Plants of Tasmania & Index to The Student's Flora of Tasmania Fourth Edition.* Tasmanian Herbarium Occasional Publication No. 7, Tasmanian Museum and Art Gallery, Hobart.

Commonwealth of Australia and the State of Tasmania (1997) Regional Forest Agreement between the Commonwealth of Australia and the State of Tasmania.

Curtis, W.M. (1963). *The Student's Flora of Tasmania.* Part 2. Government Printer Tasmania, Hobart.

Dept of Primary Industries, Water GIS Web Server. (Natural Values Atlas) *http://www.naturalvaluesatlas.dpiw.tas.gov.au/* Accessed December 15th 2006.

DPIWE (2004), *A brief for consultants, Reporting on the impact of proposed activities on the natural values and providing recommendations for mitigating impacts on these values.* Nature Conservation Branch, Department of Primary Industries, Water and Environment.

DPIWE (2005). *Threatened Native Vegetation Communities List (Version 6), November 2005.* http://www.dpiwe.tas.gov.au/inter.nsf/WebPages/AWAH-6547ZL?open.

Forest Practices Authority (2005). *Forest Botany Manual.* Forest Practices Authority, Hobart, Tasmania.

Harris, S and Kitchener, A (2005). From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation. Department of Primary Industries, Water and Environment, Printing Authority of Tasmania. Hobart.

Kirkpatrick, J.B., Barker, P., Brown, M.J., Harris, S. & Mackie, R. (1995). *The Reservation Status of the Tasmanian Vascular Plant Communities. Wild. Sci. Rep.* 95/4. Parks & Wildlife Service, Tasmania

Lazarus, E., Lawrence, N. and Potts, W. (2003). *Threatened Flora of Tasmania.* Threatened Species Unit, Department of Primary Industries, Water and Environment.

Wapstra, H., Wapstra, A., Wapstra, M. and Gilfedder, L. (2005). *The Little Book of Common Names for Tasmanian Plants.* Department of Primary Industries Water and Environment, Hobart.

APPENDIX 1: Vascular plant species recorded Eglon #1 drillsite.

Nomenclature follows Buchanan (2005)

i – introduced/naturalised species

e – Tasmanian endemic species/subspecies

DICOTYLEDONAE

APIACEAE

e Oreomyrrhis gunnii

ASTERACEAE

Cassinia aculeata
i Cirsium vulgare
Euchiton collinus
Helichrysum scorpioides
i Hypochoeris radicata
Olearia algida
Senecio minimus
Senecio sp.

CARYOPHYLACEAE

Scleranthus biflorus

EPACRIDACEAE

e Leptecophylla juniperina
Leucopogon montanus
Leucopogon stuartii

FABACEAE

Bossiaea cordigera
Bossiaea riparia
Pultenaea juniperina

GENTIANACEAE

i Centaurium erythraea

GERANIACEAE

Geranium potentilloides

HALORAGACEAE

Gonocarpus montanus

MYRTACEAE

e Eucalyptus coccifera
Eucalyptus dalrympleana
Eucalyptus pauciflora

RANUNCULACEAE

Ranunculus lappaceus

ROSACEAE

Acaena echinata
Acaena novae-zelandiae
i Rubus fruticosus agg.

SCROPHULARIACEAE

Veronica calycina

VIOLACEAE

Hymenanthera dentata
Viola betonicifolia

MONOCOTYLEDONAE

JUNCACEAE

Juncus pallidus

POACEAE

i Aira caryophyllea
i Anthoxanthum odoratum
Austrodanthonia spp.
i Holcus lanatus
Poa gunnii
Poa labillardierei

XANTHORRHOEACEAE

Lomandra longifolia

APPENDIX 2: Plant community structure

Note: The tables below indicate the dominant species occurring within the communities recorded on the property. Refer to appendix 1 for a complete list of species occurring on the property.

***Eucalyptus pauciflora* forest and woodland not on dolerite (DOW)** **DRY-hPAUC**		
Stratum	**Cover %**	**Species**
Trees	15%	*Eucalyptus pauciflora*
		Eucalyptus dalrympleana
Shrubs	30%	*Leptecophylla juniperina*
		Bossiaea riparia
		Olearia algida
Grasses/Graminoides	30%	*Poa gunnii*

Extra-urban miscellaneous (RFA code Non-forest, TASVEG code FUM)		
Stratum	**Cover %**	**Species**
Grasses/Graminoides	10%	*Poa gunnii*
		Austrodanthonia spp.
Herbs	20%	*Hypochoeris radicata*
		Euchiton collinus
Bare ground	80%	

FLORA ASSESSMENT OF THE LACHISH #1 DRILL SITE, EPPING FOREST, TASMANIA

Report prepared by Brian French (B.Sc.) for Great South Land Minerals Pty Ltd.

PO Box 648, Sunbury, Victoria, 3429

Australia

(03) 9318 3161

SUMMARY

A botanical assessment of the Lachish #1 proposed drill site was conducted by Brian French on the 5th January 2007. The assessment was conducted at the request Great South Land Minerals Pty Ltd.

No plant species, listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* or priority species, as listed under the *Regional Forest Agreement* and the *Forest Botany Manual for the Midlands Region* (Module 2), were recorded from the property. No species listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was recorded within the area assessed.

The proposed coupe area supports no RFA forest communities.

The proposed coupe area supports one non-forest community (Regenerating cleared land). This community is not listed as threatened.

No sites of significance listed in tables 4A or 4B in the *Forest Botany Manual – Midlands Region* (Forest Practices Authority 2005) are located on the property.

The recent drought reflected in the number of different vascular plant species recorded on the property. Due to the drought conditions, many species that are usually abundant during the spring period were sparse or absent with up to 80% bare ground evident in the area.

INTRODUCTION

Great South Land Minerals Pty Ltd is investigating the potential for a drill site (Lachish #1) at Valleyfield Road, Epping Forest in the Midlands of Tasmania (Figure 1). Currently, the area is comprised of agricultural land. The property is used for sheep and cattle grazing. The geology is dominated by Triassic sandstone.

An assessment was conducted by Brian French (Environmental Consultants International) on the 5th January 2007. The assessment was conducted to record the presence of threatened plant species in the area and record the vegetation types present and their conservation status.

QUALIFICATIONS

The qualifications to this report are:

- Fieldwork and analysis have been undertaken thoroughly, taking into account the resources available. However, the author and Environmental Consultants International (ECI) do not take responsibility for misidentification of species or plant communities, or incorrect determination of their extent and conservation status.
- The species list provided is comprehensive, but not exhaustive. Many Tasmanian species (e.g. orchids) are short-lived annuals or have their flowering times outside the survey period. It is likely that other plant species could be recorded at other times of the year.
- The Nature Conservation Branch of DPIW has detailed requirements for flora and fauna assessments of proposed developments (DPIWE 2004). These include providing DPIW with plot details of the assessed site and collating information on any threatened species located. Samples of threatened species have to be collected and forwarded to the Tasmanian Herbarium.
- The report gives an outline of the legislative and policy requirements related to the conservation and management of native vegetation. If required, further information can be obtained from DPIW specialists dealing with flora conservation and management.
- It is not the responsibility of the author or ECI to make decisions about land management at the site, or to liaise with DPIW or other agencies or individuals on behalf of the proponents.

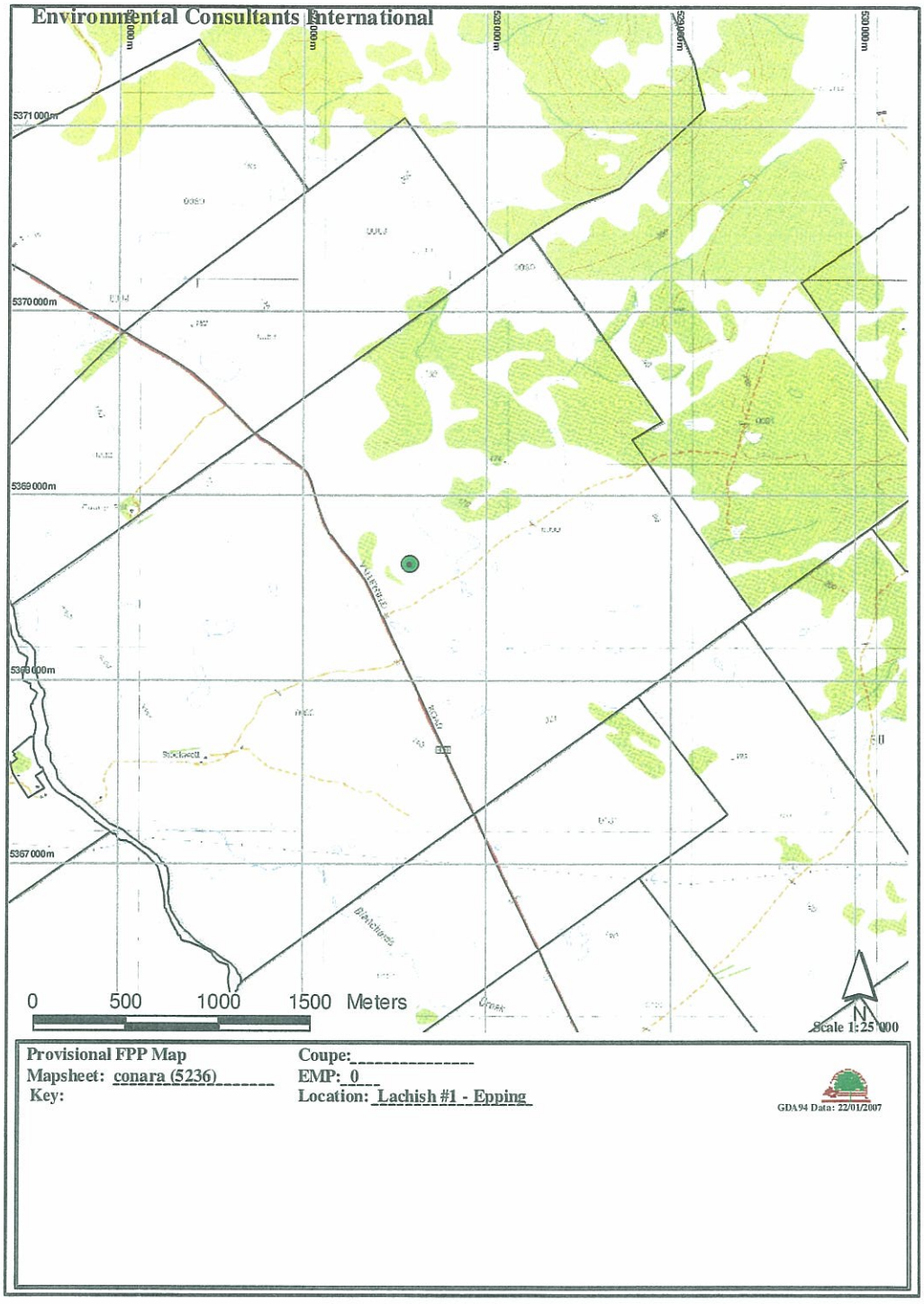


Figure 1: location of the study area.

METHODS

Desktop Assessment

Literature containing information on the vegetation of the area was examined. Databases held by DPIW, containing records of vegetation and threatened species occurring in the general area were also reviewed.

The following maps containing information on the composition and structure of the vegetation were examined:

- The RFA forest communities map (RFA 1996);
- TASVEG communities map accessed via the DPIW GIS server Natural Values Atlas (Accessed 15th December 2006).

Fieldwork

The assessment covers the existing native vegetation on the property, concentrating on the areas of native vegetation where the possibility of threatened flora and vegetation communities that could occur.

A database search (Natural Values Atlas) was conducted to determine the extent and potential of threatened flora species occurring on or near the property. A field assessment was conducted by Brian French (ECI) to determine if the presence of threatened flora occurring on the property.

Non-permanent plots were located within representative vegetation. The plots had a nominal area of approximately 30 m. Detailed information on vegetation structure and composition (vascular species) was recorded. A running species list was used to record additional species observed outside the plots. For each plot, information was also collected on the condition of the vegetation and broad environmental variables (drainage, aspect, rock type etc). The location of the sites was determined by GPS.

ANALYSIS

Vascular Plant Species

Species nomenclature, identification and inventory

A species list was prepared for the study area (see appendix 1). Species nomenclature in this report is based on Buchanan (2005) for species nomenclature and Wapstra *et. al* (2005) for common nomenclature. Specimens were collected for later identification under DPIW permit TFL 06467. It is a requirement of the permit that distribution data for threatened flora and the report to be supplied to DPIW. This will be undertaken by the consultant.

Species of conservation significance

No plant species listed on schedules of the Tasmanian *Threatened Species Protection Act 1995* were identified from the area surveyed.

Details of the classification systems and legislative requirements relating to listed species are given in the Act, or can be obtained from the Threatened Species Section of DPIW. Some of the main points relevant for the development proponents are given below.

- Plant species are listed on Schedules of the Tasmanian *Threatened Species Protection Act* according to their perceived level of threat, as determined by

botanists and conservation specialists. Listing is based on the distribution of the species and its susceptibility to various forms of disturbance. The schedules are:

  - Schedule 3: Species considered to be extinct or endangered in Tasmania;
  - Schedule 4: Species considered to be vulnerable in Tasmania;
  - Schedule 5: Species considered to be rare and at risk in Tasmania.

- Species on Schedule 3 generally have a higher priority for conservation that those on Schedule 4, and those on Schedule 4 generally have higher priority for conservation that those on Schedule 5. However, other factors also need to be taken into account in assessing the conservation value of a listed species at a particular site. These factors include the population size of the threatened species at the site; the condition and context of the vegetation at the site; the tenure of the site; the regional context (e.g. if the population is outlying or very unusual within a region); and the reservation status of the species.
- A permit is required for any activity that will knowingly disturb or destroy any individuals of a plant species listed on the Tasmanian *Threatened Species Protection Act*. The permit is issued by the Threatened Species Section of DPIW. If a listed species will be affected by a proposed activity, specialists from DPIW, in conjunction with the land managers, will try to develop prescriptions to avoid or reduce adverse effects on threatened species. If appropriate, these prescriptions would be incorporated into the permit conditions.

Plant Communities

Community classification, identification and inventory

Information on structure and composition of vegetation was used to allocate the vegetation at each plot site to a plant community. Field notes and other information were then used to map the extent of the plant communities on the property.

There have been many classifications of Tasmanian plant communities. The main reasons are to identify the extent and conservation status of different communities, and to help prioritise conservation and management planning. It is important to recognise that each plant community represents the whole suite of plant species, animal species and other values that occur within that unit, and not just the dominant species (e.g. *Eucalyptus amygdalina*) that may give its name to a particular community (e.g. *Eucalyptus amygdalina* sedgy woodland).

There are currently two levels of classification of Tasmanian plant communities, and both have been used in this report.

The broadest level of classification are the non-forest communities used in the current TASVEG Vegetation Mapping Project (Harris & Kitchener 2005) and the forest communities used in the 1996 forest community mapping undertaken during the Regional Forest Agreement (Regional Forest Agreement 1997). The vegetation maps of the study areas map the vegetation at this broad community level.

At the finer level of community classification are the communities identified by various classifications of Tasmanian vegetation types. These finer communities are termed floristic communities. The floristic communities present at each plot site have been determined, but they are not presented in the vegetation maps. However, table 3 in the following section indicates which floristic communities are present within the broad

communities used for each area. By considering floristic communities, a better picture is often gained of the diversity and conservation significance of the vegetation in an area.

The classifications of floristic communities are based on the following sources:

- Forest Practices Authority (2005): forest communities;
- Harris and Kitchener (2005): non-forest vegetation types;

Communities of conservation significance

The conservation status of broad communities and floristic communities recorded from the study areas have been determined by reference to:

- Statewide analyses of past and current extent and conservation status of forest communities, as determined by studies undertaken as part of the Tasmanian RFA process.
- Analyses undertaken during the current Tasmanian Vegetation Mapping Project (TASVEG), which give an indication of the distribution and conservation status of non-forest communities.
- Assessment of the reservation status if floristic communities at a Statewide level (Kirkpatrick *et al.*1995, Forest Practices Authority 2005) and regional level (Forest Practices Authority 2005).

Information from the above sources has been augmented by recent knowledge available to the author, as a result of fieldwork, reference to other published and unpublished studies, and discussions with other botanists familiar with the general area.

Communities categorised in this report as being of statewide conservation significance are those that have been identified as endangered, vulnerable or rare at a statewide scale. Communities categorised as being of regional conservation significance are those that are not identified as endangered, vulnerable or rare in Tasmania as a whole, but which have localised distributions in central Tasmania, or have been substantially cleared from the Woolnorth region.

The vegetation analyses and mapping have been conducted thoroughly, taking into account the time and resources available. There are inevitably some shortcomings and qualifications that need to be recognised (some of these have been alluded to). They are:

- the vegetation maps are only a representation of the distribution of the broad communities within the area;
- the boundaries between communities generally diffuse;

A reasonable indication of the extent of each broad community within the area is provided, with the general extent of the floristic communities also indicated.

RESULTS

Site characteristics

The Lachish #1 drill site is located at Bracknell in the central north of Tasmania (see figure 1). The area is characterised flat pasture with a large dam on the northeastern side of the drill site.

The property is comprised of rough pasture with small areas of remnant vegetation located on the roadside. Altitude is approximately 170 m a.s.l. Geology is dominated by Triassic sandstone.

Native vegetation exists on the property, however these species exist in the *Lomandra longifolia* (sags) and *Pteridium esculentum* (Bracken) clumps that are protected from grazing by sheep. The area has been ploughed on numerous occasions and the property is used for sheep grazing.

No other sites of significance for flora listed in tables 4A or 4B in the *Forest Botany Manual – Midlands Region* (Forest Practices Authority 2005) are located within the property area.

Flora and vegetation communities are discussed in more detail in the following sections with reference to their extent and conservation status.

Flora

34 species were recorded from drill site area. Of the 34 plants, none are species are endemic to Tasmania and 19 species are introduced species (65 %) (see Table 1 for a summary of the species recorded). Appendix 1 indicates the plant species recorded on the property. One different vegetation type was recorded from within the drill site area.

Threatened species

No threatened plant species were located from within the area assessed.

Species of conservation significance

No species listed on the schedules of the Tasmanian *Threatened Species Conservation Act 1995* were recorded from the area assessed. Priority species and Sites of Potential Significance for Flora, as listed in Sections 3 and 4 of the *Forest Botany Manual – Woolnorth Region* (Forest Practices Authority 2005) are used in this section.

TABLE 1: Summary of the vascular plant species recorded on the property.

Group	Native species		Exotic species	**Total**
	Endemic	Other		
Ferns & fern allies	0	0	0	**0**
Gymnosperms	0	0	0	**0**
Monocotyledons	0	6	7	**13**
Dicotyledons	0	11	8	**19**
Total	**0**	**17**	**15**	**32**

Other Threatened Flora

The Natural Values Atlas Report (Dept of Primary Industries and Water, GIS Web Server) indicated the presence of 21 different threatened plant species within 5000 m of the study area (Table 2). Due to the time of the year that the assessment was conducted and the effect of the drought, some of the annual (e.g. orchid species) may not of have been evident during this assessment. However, due to the area being improved pasture that is intensively managed; it is unlikely that any of the species in Table 2 occur in the proposed drill site area.

TABLE 2: Threatened flora species recorded within 5 km of the study area.

Botanical name	Common name	S
Agrostis sp. aff. *scabra*		Not seen during assessment.
Amphibromus macrorhinus	Longnosed swampgrass	Not seen during assessment.
Aphelia pumilio	Dwarf fanwort	Not seen during assessment.
Austrodanthonia popinensis	Blue wallabygrass	Not seen during assessment.
Austrostipa nodosa	Spear grass	Not seen during assessment.
Bolboschoenus caldwellii	Sea clubsedge	Not seen during assessment.
Brachyscome sieberi var. *gunnii*	Forest daisy	Not seen during assessment.
Caesia calliantha	Blue grasslilly	Not seen during assessment.
Caladenia anthracina	Blacktip spider-orchid	Not seen during assessment.
Centaurium spicatum	Spike centaury	Not seen during assessment.
Colobanthus curtisiae	Grassland cupflower	Not seen during assessment.
Dianella longifolia var. *longifolia*	Pale flax lily	Not seen during assessment.
Glycine latrobeana	Clover glycine	Not seen during assessment.
Lepidium hyssopifolium	Soft peppercress	Not seen during assessment.
Leptorhynchos elongatus	Lanky buttons	Not seen during assessment.
Leucopogon virgatus var. *brevifolius*	Shortleaf beard heath	Not seen during assessment.
Myriophyllum integrifolium	Tiny watermilfoil	Not seen during assessment.
Puccinellia stricta var. *perlaxa*	Spreading saltmarsh grass	Not seen during assessment.
Stenanthemum pimeleoides	Propeller plant	Not seen during assessment.
Viola cunninghamii	Alpine violet	Not seen during assessment.
Wilsonia rotundifolia	Roundleaf wilsonia	Not seen during assessment.

PLANT COMMUNITIES

The plant community present is a factor of the past intensive agriculture that occurs at the site. Plant community structure is indicated in appendix 2 (dominant species). Table 3 summarizes the TASVEG, RFA, Floristic community classifications of the community and the conservation status.

The non-forest community description follows Harris and Kitchener (2005). The following plant community was observed in the drill site area:

TABLE 3: Summary of the plant communities and their conservation status.

TASVEG community	RFA community	Floristic community(s)	Conservation Status
Regenerating cleared land (FRG)	Non-forest	N/A	Non-priority

Non-forest communities

Regenerating cleared land (FRG) (TASVEG code FRG)

Regenerating cleared land dominates the drill site area. This area has been ploughed in the past and is grazed by sheep. Native vegetation exists on the property, however these species exist in the *Lomandra longifolia* (sags) and *Pteridium esculentum* (Bracken) clumps that are protected from grazing by sheep. This mapping unit is best allocated to the TASVEG mapping unit Agricultural land (FAG) due to the dominance of pasture species.

This community is not listed as a community of conservation significance under the *Regional Forest Agreement,* or as a priority floristic unit for conservation management in the *Woolnorth* module of the *Forest Botany Manual* (Forest Practices Authority 2005). This community is not is not listed as threatened (DPIWE 2005).

REFERENCES

Buchanan, A.M. (editor) (2005). *A Census of the Vascular Plants of Tasmania & Index to The Student's Flora of Tasmania Fourth Edition*. Tasmanian Herbarium Occasional Publication No. 7, Tasmanian Museum and Art Gallery, Hobart.

Commonwealth of Australia and the State of Tasmania (1997) Regional Forest Agreement between the Commonwealth of Australia and the State of Tasmania.

Curtis, W.M. (1963). *The Student's Flora of Tasmania*. Part 2. Government Printer Tasmania, Hobart.

Dept of Primary Industries, Water GIS Web Server. (Natural Values Atlas) *http://www.naturalvaluesatlas.dpiw.tas.gov.au/* Accessed December 15th 2006.

DPIWE (2004), *A brief for consultants, Reporting on the impact of proposed activities on the natural values and providing recommendations for mitigating impacts on these values*. Nature Conservation Branch, Department of Primary Industries, Water and Environment.

DPIWE (2005). *Threatened Native Vegetation Communities List (Version 6), November 2005.* http://www.dpiwe.tas.gov.au/inter.nsf/WebPages/AWAH-6547ZL?open.

Forest Practices Authority (2005). *Forest Botany Manual.* Forest Practices Authority, Hobart, Tasmania.

Harris, S and Kitchener, A (2005). From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation. Department of Primary Industries, Water and Environment, Printing Authority of Tasmania. Hobart.

Kirkpatrick, J.B., Barker, P., Brown, M.J., Harris, S. & Mackie, R. (1995). *The Reservation Status of the Tasmanian Vascular Plant Communities. Wild. Sci. Rep.* 95/4. Parks & Wildlife Service, Tasmania

Lazarus, E., Lawrence, N. and Potts, W. (2003). *Threatened Flora of Tasmania.* Threatened Species Unit, Department of Primary Industries, Water and Environment.

Wapstra, H., Wapstra, A., Wapstra, M. and Gilfedder, L. (2005). *The Little Book of Common Names for Tasmanian Plants.* Department of Primary Industries Water and Environment, Hobart.

APPENDIX 1: Vascular plant species recorded Lachish #1 drillsite.

Nomenclature follows Buchanan (2005)

i – introduced/naturalised species

e – Tasmanian endemic species/subspecies

DICOTYLEDONAE

ASTERACEAE
- *i* *Cirsium vulgare*
- *Euchiton collinus*
- *i* *Hypochoeris glabra*
- *i* *Hypochoeris radicata*
- *i* *Leontodon taraxacoides*
- *i* *Taraxacum officinale*

EPACRIDACEAE
- *Lissanthe strigosa*

FABACEAE
- *i* *Ulex europaeus*

GENTIANACEAE
- *i* *Centaurium erythraea*

MYRTACEAE
- *Eucalyptus viminalis*

OXALIDACEAE
- *Oxalis perennans*

PLANTAGINACEAE
- *Plantago varia*

POLYGONACEAE
- *i* *Acetosella vulgaris*

ROSACEAE
- *Acaena echinata*

VIOLACEAE
- *Hymenanthera dentata*

XANTHORRHOEACEAE
- *Lomandra longifolia*

MONOCOTYLEDONAE

CYPERACEAE
- *Carex appressa*
- *Lepidosperma concavum*

JUNCACEAE
- *Juncus pauciflorus*

POACEAE
- *i* *Aira elegans*
- *i* *Aira caryophyllea*
- *i* *Anthoxanthum odoratum*
- *Austrodanthonia* sp.
- *Austrostipa* sp.
- *i* *Dactylis glomerata*
- *Echinopogon ovatus*
- *i* *Holcus lanatus*
- *i* *Lolium perenne*
- *Poa labillardierei*
- *i* *Vulpia* spp.

APPENDIX 2: Plant community structure

Note: The tables below indicate the dominant species occurring within the communities recorded on the property. Refer to appendix 1 for a complete list of species occurring on the property.

Regenerating cleared land (RFA code Non-forest, TASVEG code FRG)		
Stratum	**Cover %**	**Species**
Shrubs	10%	*Ulex europaeus*
Grasses/Graminoides	30%	*Aira caryophyllea*
		Anthoxanthum odoratum
		Dactylis glomeratus
		Austrodanthonia sp.
Herbs	10%	*Hypochoeris radicata*
Bare ground	70%	