2008

SEL 13/98 Annual Report

Great South Land
Minerals Limited

Great South Land Minerals

August 2008

GREAT SOUTH LAND MINERALS LTD
ANNUAL REPORT 2008

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Great South Land Minerals

SEL 13/98

Annual Report

August, 2008

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Environment

-Acoustic

-Environmental Management Plan

-FPP SVA

-Hydrogeology

VIPAC ENGINEERS & SCIENTISTS

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Great South Land Minerals
GPO Box 1603
Hobart Tasmania 7001

25 August, 2008

3149_03

Attention: Paul Heath

Bellevue – Noise Level Assessment

Great South Land Minerals (GSLM), is proposing to conduct exploration drilling at Bellevue in the Central Highlands. As part of the development application a noise assessment of the area is required. This letter describes the noise survey conducted by Vipac during the previous 4 weeks.

SITE DESCRIPTION

The exploration drilling will use a mobile drill rig similar to that shown in Figure 2. The rig comprises a drill mounted on the back of a truck, with an auxillialry air compressor unit providing additional air for the drilling operation.
The drilling site is nominally located at 465 660E, 5 338 904N (AGD66), which places it on a relatively level area adjacent to Serpentine Road at the southern extremity of Gunns Ltd. property bearing North North West of Lake Echo. The ridge slopes down on the south east quarter to Lake Echo. Six eagle nests have been identified within around 5 km of the drill site. Five of the nests are on steeply sloping hill sides and as such have no direct view of the drill site. A single nest 3.2km to the south west is on a gently sloping hill and may have direct view of the drill site. Figure 3 shows the general area surrounding the drill site.

NOISE LEVELS

Two sets of noise measurements have been made, one at the drill site to establish what the background or ambient noise levels are in the absence of any drilling, and a second set around the drill rig proposed for use at the site to enable calculation of the drill rig sound power level. An acoustic model of the Bellevue drill site has then been built using contour levels at 10m spacing to describe the local terrain and the calculated drill rig sound power level as the source noise level. The model then predicts the sound pressure level in the surrounding area, the output being a noise level contour map of the area. For this work, the most favourable noise propagation weather conditions were assumed, ie. a light wind from source to receiver.

The background measurements were made over a period of 4 days, the sound level meter logging full statistical data and 1/3 octave spectra using a 15 minute interval time. The measured data is summarised in Figure 1 and Table 1.

Sound Pressure Level, **dBA**		
L10	L90	Leq
34	30	33

Table 1: Summary of Ambient Noise Levels at Bellevue

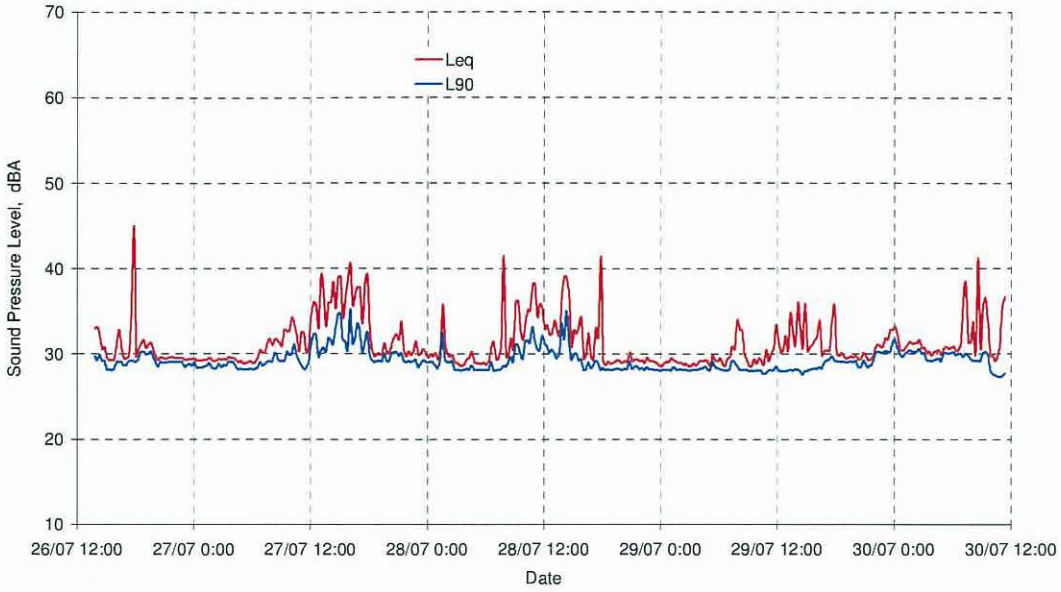

Figure 1: Bellevue Ambient Noise Trend

The predicted noise levels from the acoustic model are shown in Figure 4. ***The drill rig noise at the eagle nest locations are predicted to be 25 dBA or less*** which is below the existing ambient noise levels of 30 to 33 dBA.

Noise levels from the drilling operation will be clearly perceivable by humans when they are 5 dB above background, which at Bellevue will be around 35 dBA. This contour is highlighted on the contour map by a solid red line. All Eagle locations are outside this area.

Should you have any queries, please do not hesitate to call this office directly.
Yours faithfully
VIPAC ENGINEERS & SCIENTISTS LTD

Bill Butler

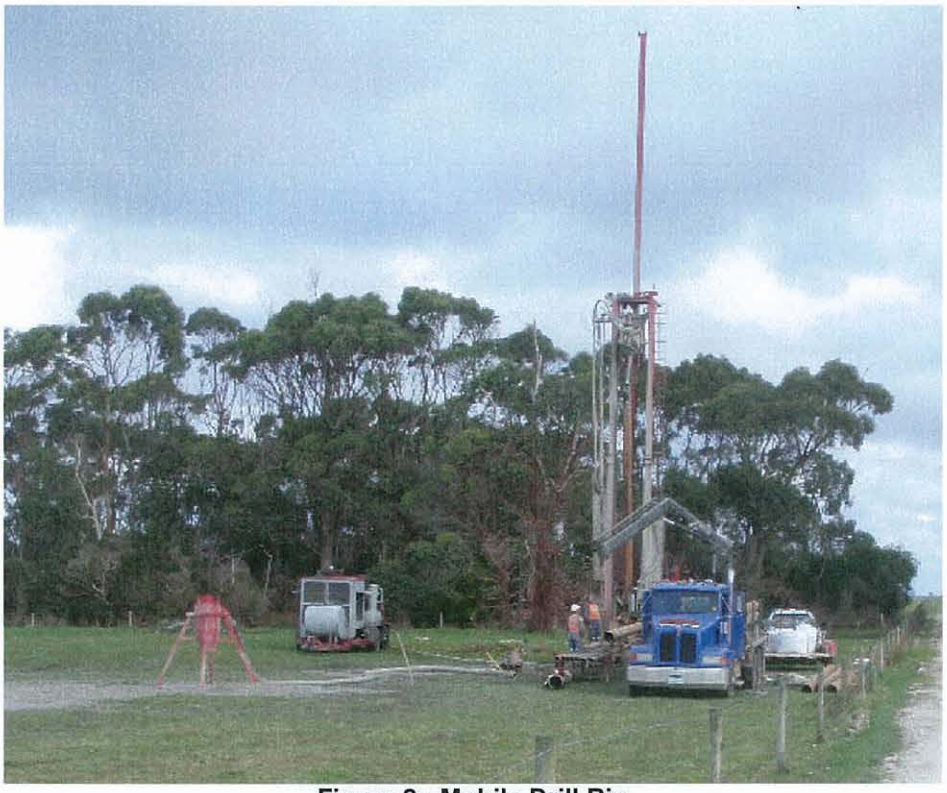

Figure 2: Mobile Drill Rig

Figure 3: Ariel View of the Drill Site

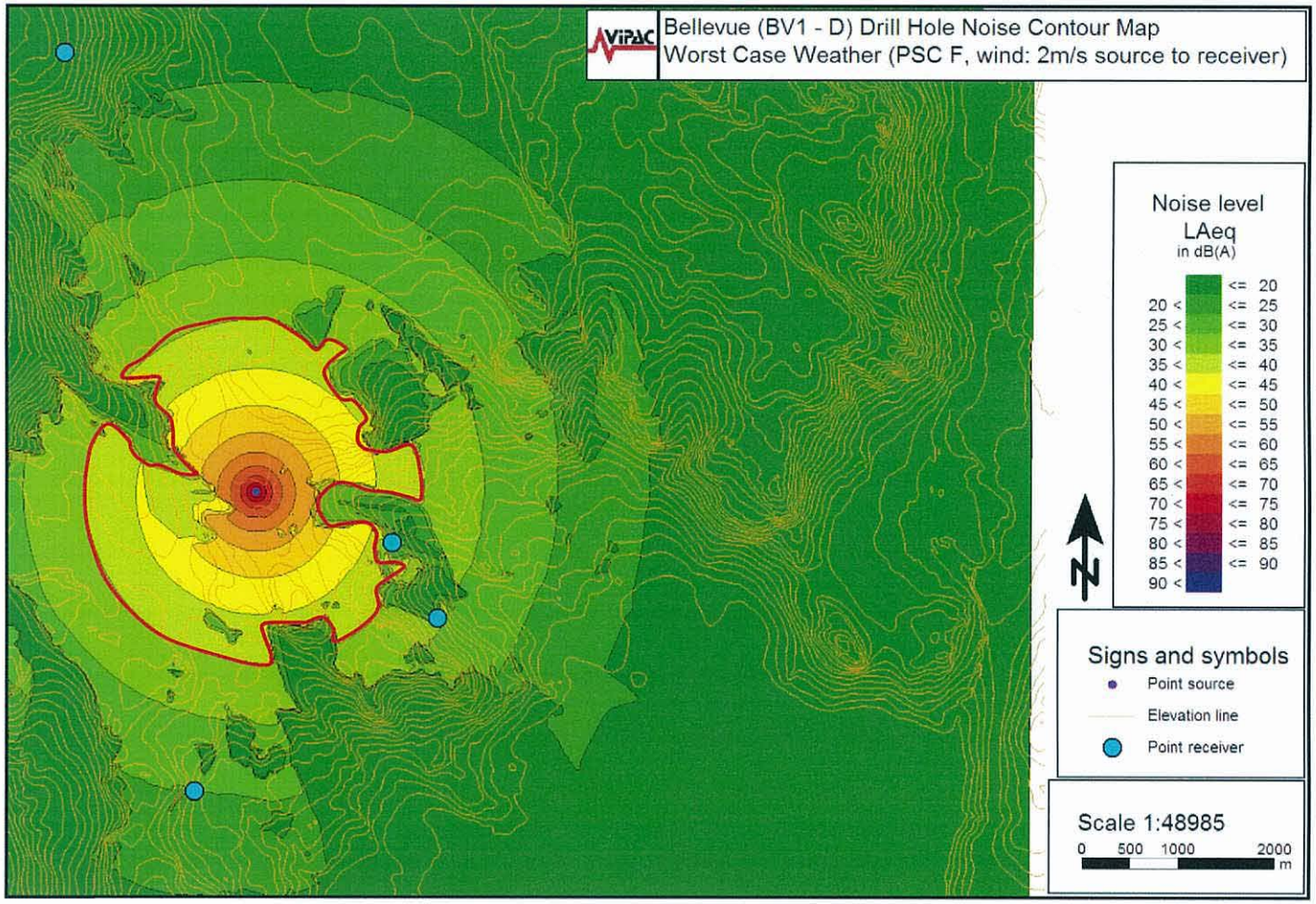

Figure 4: Noise Contour Map – Predicted Drill Rig Noise Levels

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ARCHITECTURAL ACOUSTICS
NOISE CONTROL

S M M A R Y

Measurements and analysis of noise at proposed drill sites during the night and day indicate that noise mitigation measures are un-necessary, except possibly at the Bracknell site.

CLIENT: Great South Land Minerals Limited
GPO Box 1603
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Tasmania 7001

Tel 6231 9339

BRIEF: Examine acoustic impact of drilling operations on nearest neighbours at various proposed drilling sites and recommend noise mitigation measures to minimize environmental noise nuisance..

INTRODUCTION Noise annoyance depends on the following factors:

1. the level of the existing ambient noise
2. the level of the new noise
3. whether the new noise has tonal components
4. whether the new noise has impact/impulsive components
5. the time of the day the new noise occurs
6. whether the new noise carries unwanted intelligence such as warning announcements or signals
7. the level of noise annoyance is also dependent on the listener's perception of wether the noise is regretfully caused, imposed in ignorance or inflicted as an act of aggression.

Noise measurements were conducted at the proposed drilling sites at various times. Noise measurements and analysis were also conducted at the Moomba region in SA, in the vicinity of an operating drill rig similar to the one proposed for the Tasmanian operations.

INSTRUMENTS The main instruments used for the noise measurements are described in the field notes, pages A 2 and B 2.

RESULTS

The main results are given in the appendix on pages A 5, a 9, A 10, B 9 and B 10.

In the tables, Ln is the noise level exceeded for n % of the sampling time. For example, L10 = 49.3 dB(A) as in top table, page A 5. This means that for 1.5 minutes out of 15 minutes, the noise level was 49.3 dB(A) or more. For 1 % of the time, that is, 9 seconds, the noise level was 51.3 dB(A). L10 is a good descriptor of the average of the higher noise levels encountered. It is used in traffic noise studies. L90 is a good indicator of the base or background noise level. L90 = 40 dB(A) means that for 13.5 minutes, the noise level was 40 dB(A) or more.
Leq is the equivalent 'A' weighted noise level. A fluctuating noise having a Leq = 45.6 dB(A) has the same acoustic energy as a steady noise of 45.6 dB(A).

From the drill rig noise measurements and analysis, the likely noise levels were calculated for the nearest houses at the various proposed drilling sites. See page C 1 The calculated results are compared to the ambient and background noise levels measured at the various Tasmanian drilling sites and recorded on page B 9. See page C 1

The Moomba region measurements were conducted at 0814 h and again at 0842h at a distance of 850 m. The first set of noise levels was higher than the second set during which the noise from the drill site was close to the ambient noise level. See Page A 5. The drill was operating on both occasions. We believe the variation in levels to be due to ".... temperature gradients close to the groun... and these gradients are greatest in the early morning soon after sunrise" (Fricke. F and Treagus. R "Sound Attenuation Rates Near The Ground', Proceedings Australian Acoustical Society, Annual Conference, November 1987, page 59).
"Temperature inversions have been found to increase sound levels... " (ibid, page 61).

Page C 1 therefore contains two sets of noise level calculations, one for inversion conditions and one for stable calm conditions, which are more likely in Tasmania compared to the climate near Moomba.

Page C 2 shows the results of calculations to determine the reduction in noise levels at Bracknell, for various distances and barrier heights. We assume the barrier consists of 2 or 3 vertical layers of shipping containers.

Due to the proximity of the nearest house (573 m), a noise barrier may be necessary if atmospheric conditions involving inversions occur. However, in the absence of unusual conditions, no barrier is indicated.

Page A 9 gives the results of 1/3 spectrum analysis of the noise at the drill site. The spectra shows a low frequency tonal component in the 63 Hz band. However, this tone was not subjectively annoying and in my opinion does not attract a penalty.

A noise dose meter worn by a site supervisor for 177 minutes indicated an 8 h noise dose of 193%. However, 115 dB(A) was not exceeded. The maximum noise he was exposed to was 105.4 dB(A). Hearing protection is recommended.

ENVIRONMENTAL NOISE GUIDELINES

The World Health Organization (WHO) guidelines for Community Noise suggest that where outdoor living areas are subject to Leq = 50 dB(A), the noise levels are judged to cause moderate annoyance. The Guidelines recommend that for bedrooms, Leq should not exceed 30 dB(A) and that the maximum noise level should not exceed 45 dB(A).

The Tasmanian Environmental Guidelines have adopted the WHO Guidelines. For outside bedrooms at night(8 h), Leq should not exceed 45 dB(A) and the maximum noise level should not exceed 60 dB(A)

CONCLUSION

Of all the proposed drill evaluated, the Bracknell drill site may need a noise barrier if temperature inversions occur frequently. The WHO guidelines are likely to be met.

RECOMMENDATIONS

1. It is recommended that where possible, the drill lease be orientated so as to radiate least noise in the direction of occupied houses.
2. It is also recommended that noisy activities be conducted during the daytime. Out of sight out of mind is a strategy that often works in noisy areas. I would suggest that lighting fixtures be fitted with screens to prevent glare to the nearest residents and to make the drill site less prominent at night.
3. About 40 shipping containers be reserved for possible use at Bracknell.

4. Vehicles be fitted with 'intelligent 'reversing alarms or alarms that generate a broadband noise rather than a discrete frequency or tone.

Pearu Terts
2/7/2008

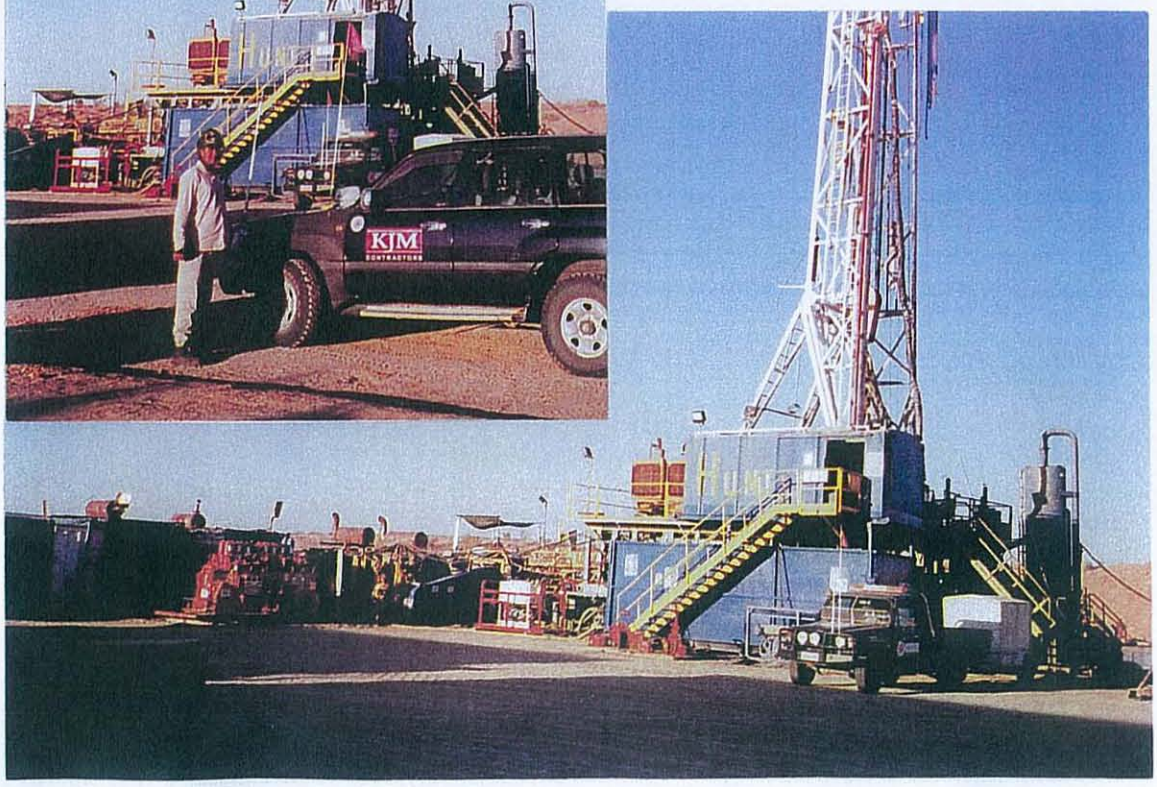
Appendix A

Noise Monitoring of Moomba (SA) Drill Site,

A 3 (ii) 7/3/2008

Moomba region SA

850 m from drill rig



Great South Land Minerals oil/gas drilling project 2007-2008

Field report for noise monitoring of Moomba (SA) drillsite locations

General

Great South Land Minerals Limited has proposed a drilling program in search of oil/gas resources in Tasmania. Current drilling operations in the Cooper Basin oil/gas fields west of Moomba, SA provided a preview opportunity for assessing likely noise incursion that may be expected in Tasmanian operations. Hunt Energy Rig #2 was in operation, and the subject of this examination. Local staff advised that Rig #3 was to be used in Tasmania, and that it was regarded as being a quieter unit than Rig #2.

Field noise monitoring locations (140 km drive west of Moomba) were visited 6-7/3/2008 for operational noise measurements, and included site, weather and noisescape observations. Fieldwork was undertaken over the times: 18:00-22:00, 22:20-23:20, 06:30-07:00 and 07:40-09:10.

Unfortunately, the Rig was not fully operational for much of the window of opportunity of this visit. Furthermore, the site visit was truncated due to sudden vehicle transport shortage and necessity of meeting airline timetable for travelling drilling staff. These constrained the scope of measurements and observations.

Acknowledgements

Great South Land Minerals Limited (Duncan New) kindly arranged the logistics for this valuable opportunity. While we failed to note all names and affiliations, we are indebted to the Hunt Energy camp staff and site crew for considerate hosting. We appreciate discussions with foreman Michael Coleman and geologist Les Burgess (who also loaned us his 4WD), and cooperation of Mick Ommundson (OH&S). We thank the camp staff for comfortable accommodation, and the chef/cook for excellent fare, and Peter Slade for safe driving from Moomba. We also enjoyed hospitality of Santos cafeteria staff at Moomba.

Instruments used

- Brűel & Kjær Statistical Noise Analyser Type 4426 s/n 957489, Laboratory Certified October 2007;
- Brűel & Kjær Level Recorder Type 2306;
- Brűel & Kjær Precision Integrating Sound Level Meter Type 2218 s/n 784345, with
  Brűel & Kjær Octave Filter Set Type 1613 s/n 643248, both Laboratory Certified December 2006;
  Brűel & Kjær 1/3 Octave Filter Set Type 1616 s/n 661719, Laboratory Certified December 2006;
- Brűel & Kjær Sound Level Calibrator Type 4230 s/n 1207368, Laboratory Certified December 2006;
- Brűel & Kjær Precision Sound Level Meter Type 2232 s/n 1129761, Lab. Certified December 2006;
- Brűel & Kjær Noise Dose Meter Type 4436 s/n 1628859, Laboratory Certified June 2006;
- Weather Instruments (Aneroid barometer, Zeal Wet/Dry bulb Psychrometer, Suunto KB-14/360R compass, Kaindl Windmaster 2 wind speed meter);
- Fibreglass measuring tape

A 3 (i) 6/3/2008 Moomba region SA

Notes on individual noise monitoring locations - Hunt Energy Rig #2

Location 1 (850 m south of Rig #2)

This was a line-of-sight location part way up a dune 850 m from the drill rig at 170° magnetic bearing, separated by low sandy flats. The Rig and Location were some 5 m above the flats.
Detailed measurements are tabulated and graphed.
Noises noted include:

- Drilling operations
- Pump and generator operations
- Tanker and other vehicles
- Crickets
- Breeze at times

Location 2 (250 m south of Rig #2)

This was a line of sight location on the far side of a trench on the flats 250 m south of the drill rig.
Detailed measurements are tabulated and graphed.
Noises noted include:

- Clangs – 50 dB(A) Impulse, 60 dB(A) Impulse
- Horn toot – 62 dB(A) Impulse
- Crane lifting – 50 dB(A)
- Pump and generator operations
- Crickets
- Breeze

Location 3 (12.5 m east of Compressor)

The release of air was measured, facing the compressor 12.5 m away:

- Initial burst Lmax=101.3 dB(A)
- Average of release Lmax=93.6 dB(A)

Location 4 (40 m east of line of main motors)

Various noise events were measured at this monitoring site, located 40 m from the main rig motors, mud pumps and generators, 30 m from the sub base of the rig.
Noise events:

- Clank – Lmax exceeded 94 dB(A) instrument limit
- Air tugger – Lmax 80.5 dB(A)
- Average operating noise - 72.6 dB(A)
- Drilling friction noise - 74.3 dB(A)
- Loader start (20 m away) – 95.2 dB(A)
- Tanker
- Vehicles

Main noise sources operating continuously:

- 2 x rig drive motors
- 2 x mud pumps
- 2 x generators
- compressor

Detailed measurements included noise dose analysis; tabulated and graphed.

Statistical distribution summary table of noise and event data
Hunt Drill Rig #2, Moomba western exploration area, SA, 6-7/3/2008

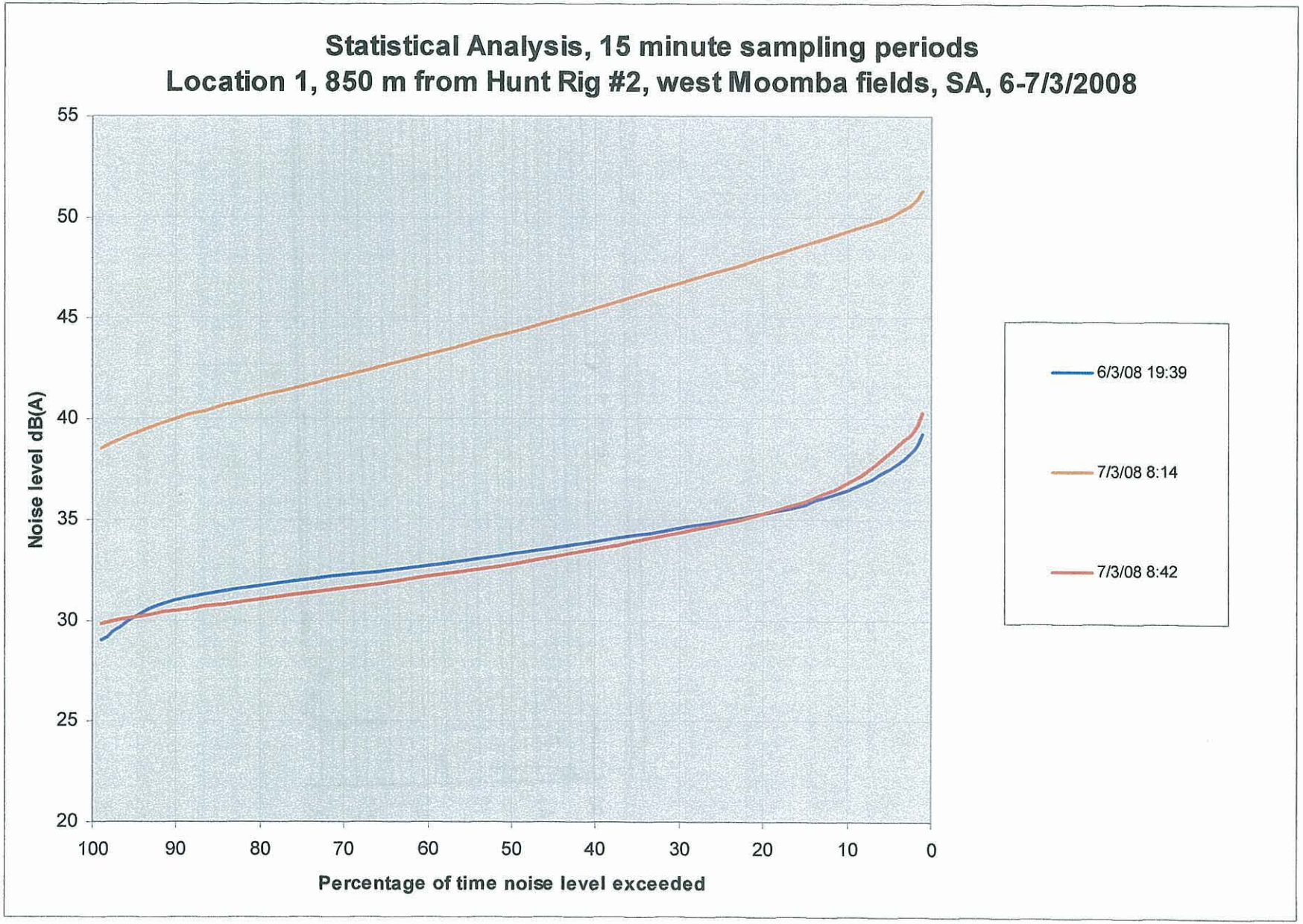
Location	1	2	1	1
Location distance from Rig #2	850	250	850	850
Date	6/3/08	6/3/08	7/3/08	7/3/08
Time	19:39	21:01	8:14	8:42
Duration, minutes	15	1	15	15
Samples	9000	1	9000	9000
Drill operating	no	no	yes	yes
Mud pumps	yes	yes	yes	yes
Generators	yes	yes	yes	yes
Compressor	yes	yes	yes	yes
Noise level, dB(A)				
L1	39.3		51.3	40.3
L2	38.5		50.8	39.5
L5	37.5		50	38.3
L10	36.5		49.3	36.8
L20	35.3		48.0	35.3
L50	33.3		44.3	32.8
L90	31.0		40.0	30.5
L99	29.0		38.5	29.8
Leq	33.9	42.6	45.6	34

Partial log of movements – Mick Ommundson 6/3/2008

Time	Situation (Hunt Energy Rig #2)
19:00	Drill floor running in drill collars1
19:07	Draw works Engine # 1 lifting elevators
19:18	Draw works Engine #1 lifting D/C
19:20	Standing in front of shale shakers
19:22	Agitator motor
19:24	Mud pump #2 idle
19:25	Mud pump #1 idle
19:26	Gen #1 back of
19:27	Gen #1 front of
19:28	Gen #1 besides
19:29	Screw compressor
19:30	Smoke stack

Weather records for site visits

Date	6/3/2008	7/3/2008	7/3/2008
Location	1	1	Moomba
Time	19:40	8:20	14:30
Temp °C	33	24	36
Relative Humidity %	21	37	21
Pressure hPa	1012	1017	
Wind speed average m/s	1.0	calm	
Wind speed maximum m/s	2.2		
Wind direction	SE		
Cloud cover x/8	0	0	0


Statistical Analysis, 15 minute sampling periods
Location 1, 850 m from Hunt Rig #2, west Moomba fields, SA, 6-7/3/2008
Noise level dB(A)
55
50
45
40
35
30
25
20
100
90
80
70
60
50
40
30
20
10
0
Percentage of time noise level exceeded
6/3/08 19:39
7/3/08 8:14
7/3/08 8:42

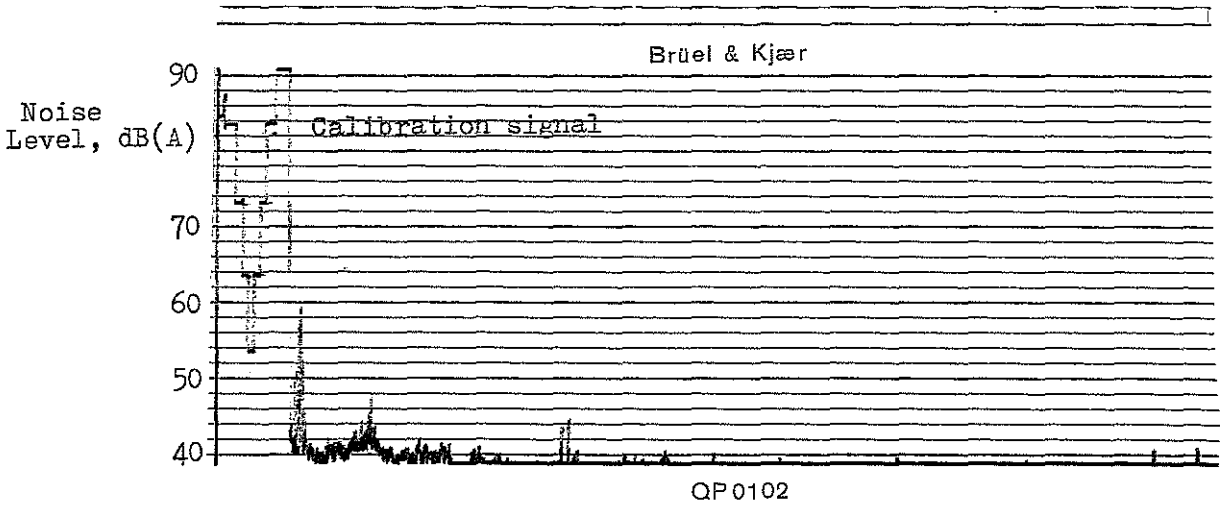
Time recording of noise at Location 1, Hunt Rig 2.

Trace of period commencing 08:42, 7/3/2008

Chart speed 0.3 mm/s. Scale 18 mm = 1 minute.

Note decline of levels to below scale minimum
within short period of sunrise over flats.

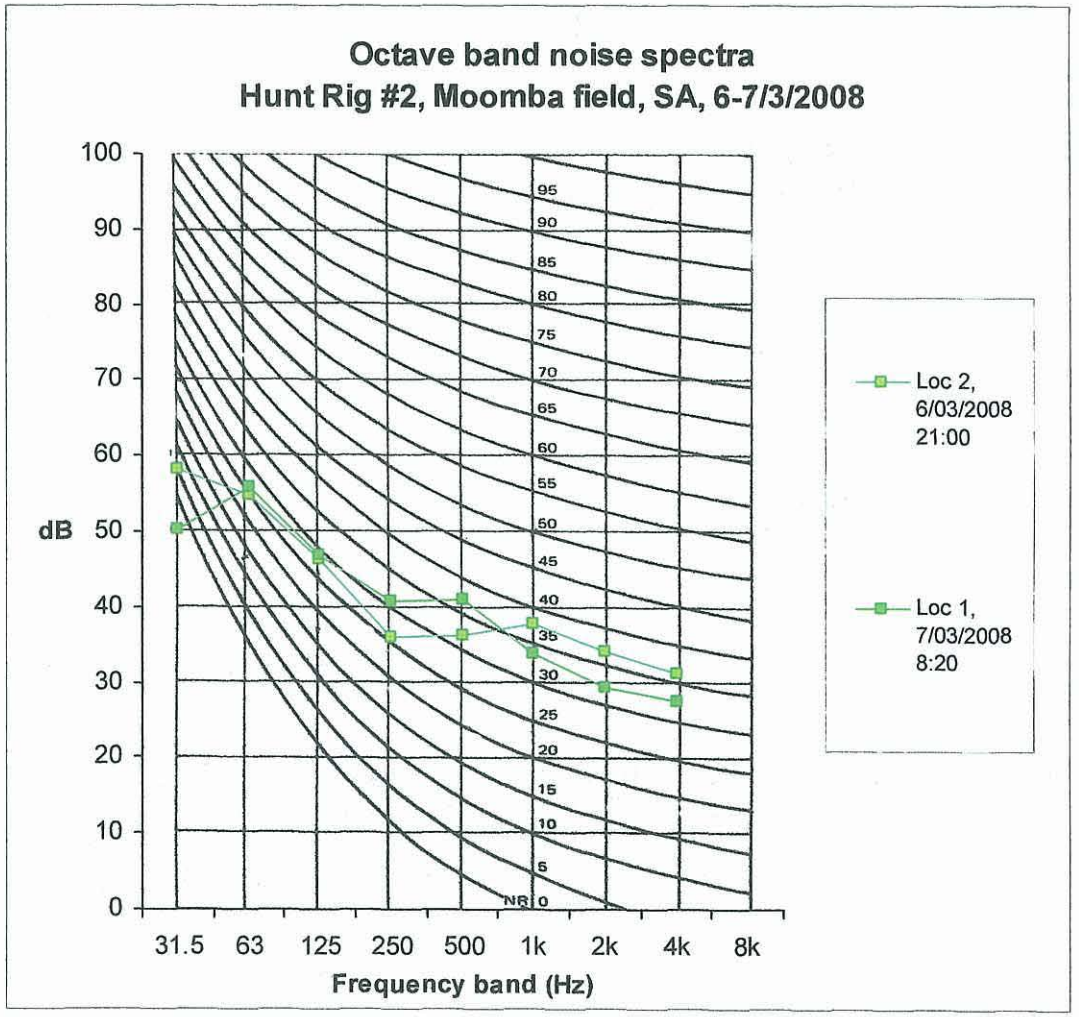
Drill rig was operating during this time.



Octave spectral distribution – Hunt Rig #2

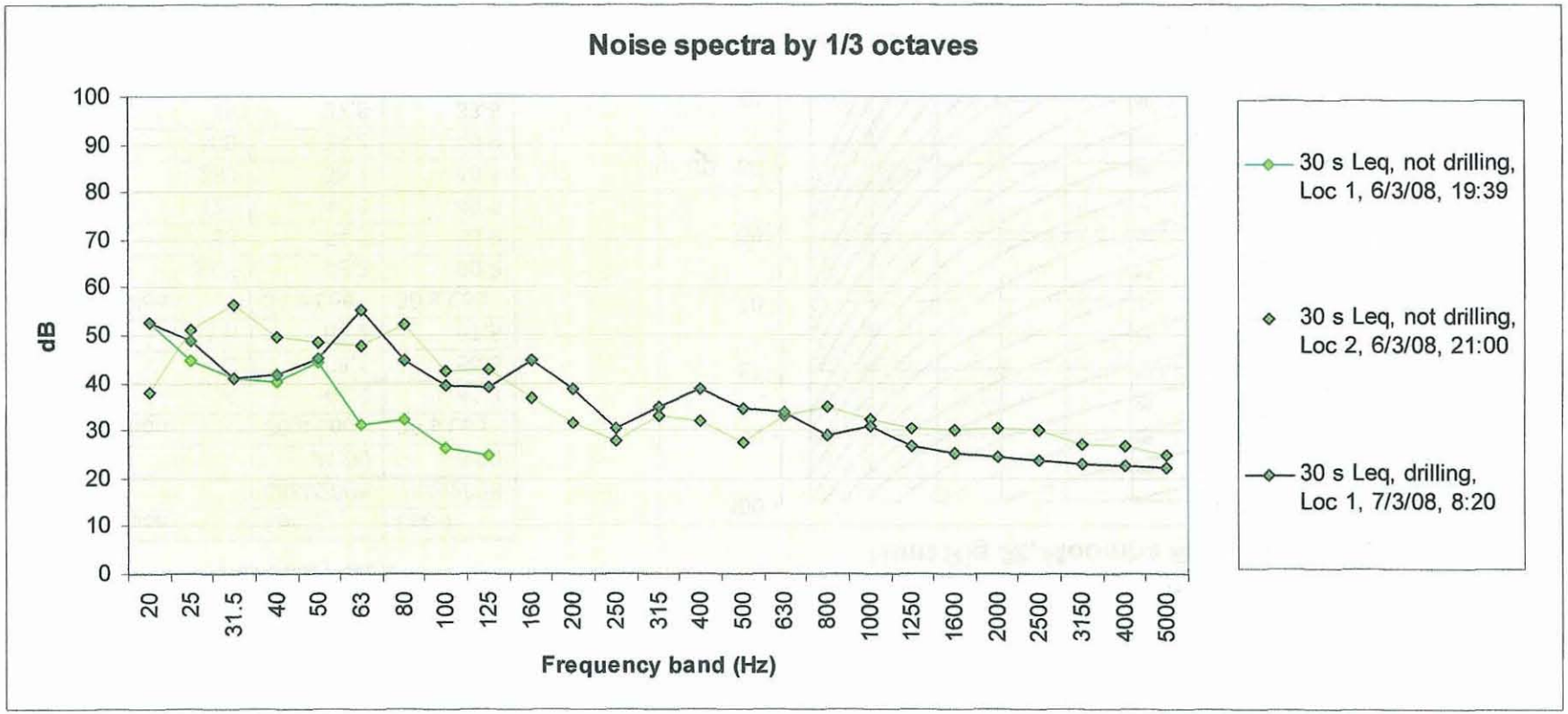
Summary table

Location	Loc 2,	Loc 1,
Date	6/03/2008	7/03/2008
Time	21:00	8:20
Duration	30 s Leq	30 s Leq
A	41.9	41.3
C	58.1	56.5
Lin	60.2	57.5
Duration	30 s Leq	30 s Leq
31.5	58.3	50.2
63	54.8	55.9
125	46.3	46.9
250	36.1	40.8
500	36.2	40.9
1k	37.8	33.8
2k	34.2	29.3
4k	31.1	27.4
8k		



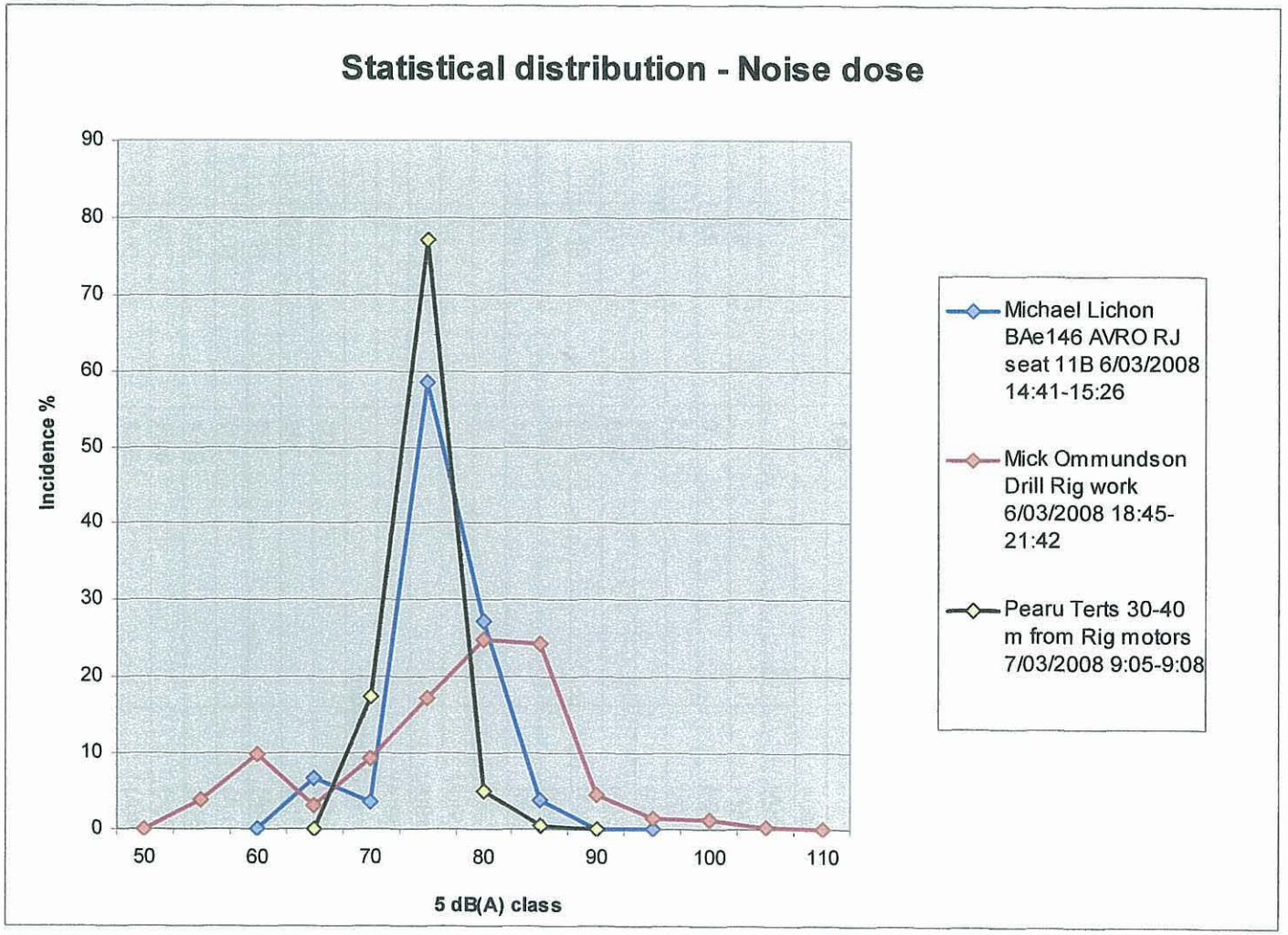
Noise spectral distribution by ⅓ octave bands

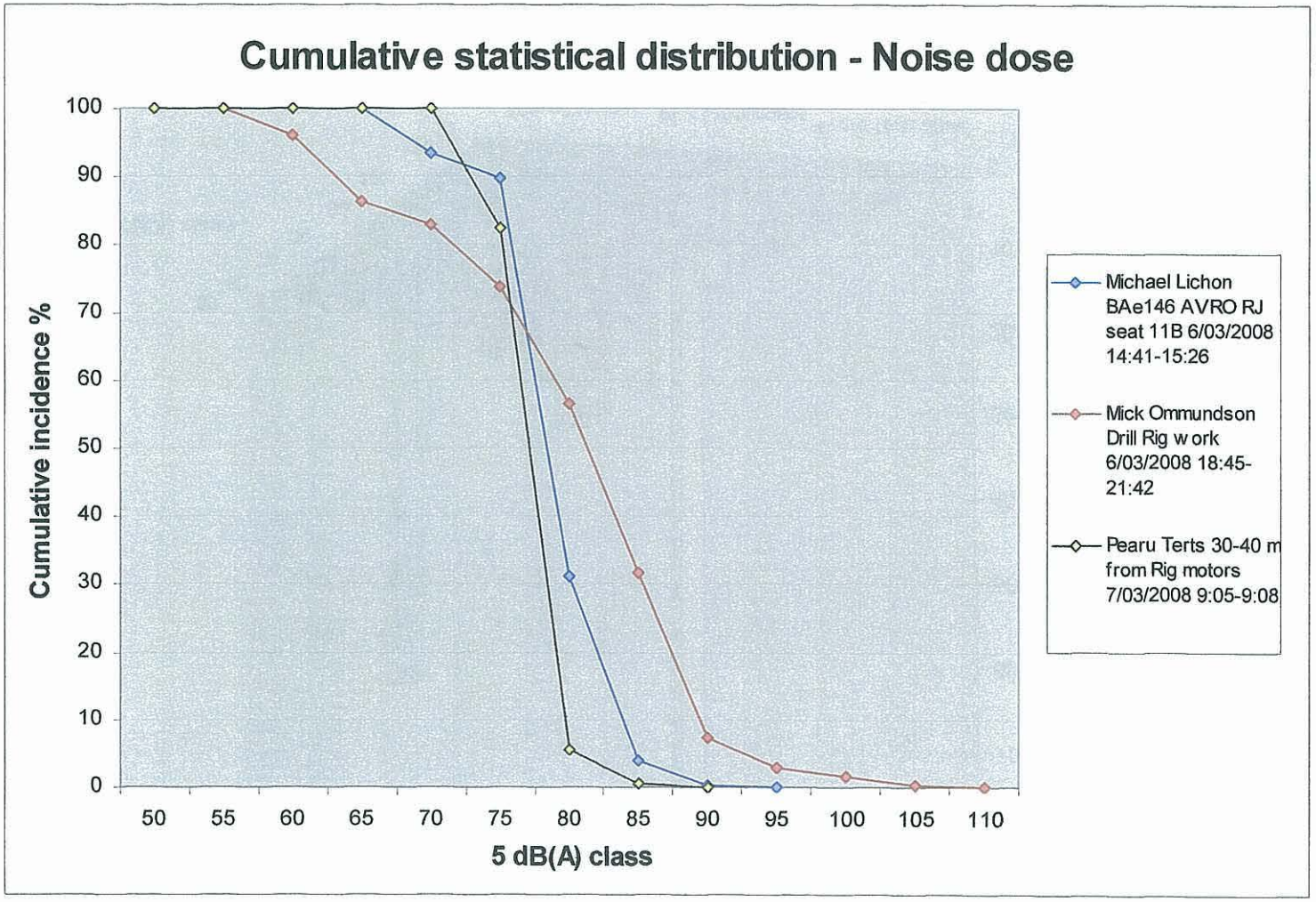
	Frequency band Hz	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	A	L
30 s Leq, not drilling,	Loc 1, 6/3/08, 19:39	52.8	44.7	41.1	40.3	44.5	31.2	32.4	26.2	25																		
30 s Leq, not drilling,	Loc 2, 6/3/08, 21:00	37.9	51.2	56.5	49.6	48.5	47.9	52.4	42.6	42.9	36.8	31.7	27.7	32.9	31.9	27.3	33.2	34.9	32.5	30.5	30.1	30.5	30.1	27	26.6	25	42.6	60.5
30 s Leq, drilling,	Loc 1, 7/3/08, 8:20	52.7	48.9	41	41.7	45.2	55.1	44.8	39.6	39.2	44.7	38.9	30.5	35.1	38.6	34.5	33.7	28.8	30.8	26.6	25.3	24.5	23.6	23	22.6	22.2	38.4	51.5

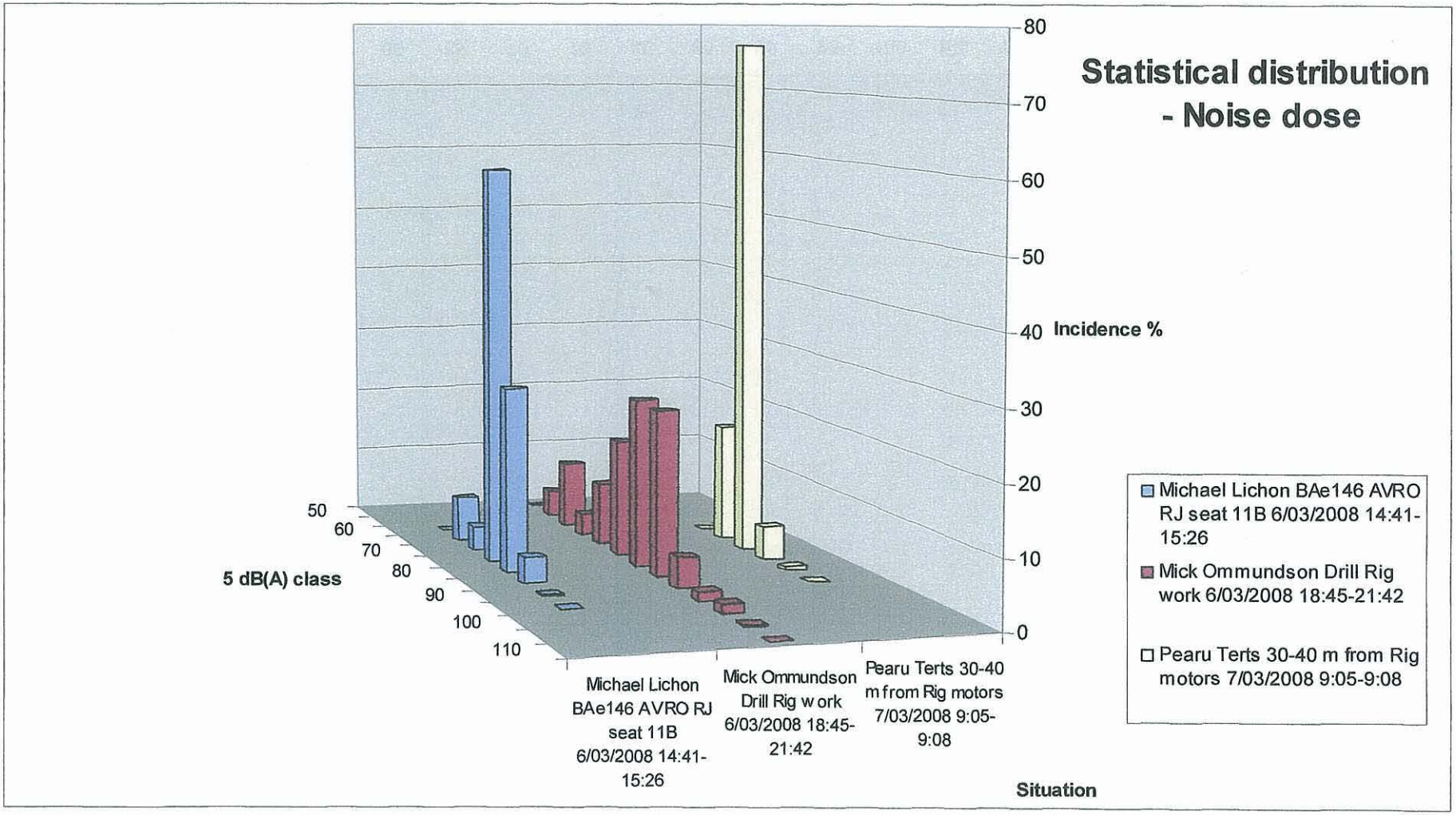


Statistical distribution of noise – noise dose measurements

Person	Michael Lichon	Mick Ommundson	Pearu Terts
Area	BAe146 AVRO RJ seat 11B	Drill Rig work	30-40 m from Rig motors
Date	6/03/2008	6/03/2008	7/03/2008
Time	14:41-15:26	18:45-21:42	9:05-9:08
Duration minutes	45	177	3
Leq dB(A)	79.6	87.8	76.9
Exceed 140 dB(A)	no	no	no
Exceed 115 dB(A)	no	no	no
Lmax	90.8	105.4	85.9
Pmax	117.1	134.3	117.9
SEL	113.7	127.9	99.8
Dose % daily	3	71	0
Dose % 8 hour	29	193	15
$P_a{}^2h$	0.03	0.72	0
$P_{a(8\ hour)}{}^2h$	0.29	1.95	0.16
LEP,d	79.6	87.8	76.9
PSEL	69.1	83.3	55.2
Distribution			
% 50 dB(A)		0	
% 55 dB(A)		3.9	
% 60 dB(A)	0	9.8	
% 65 dB(A)	6.6	3.2	0
% 70 dB(A)	3.6	9.3	17.5
% 75 dB(A)	58.6	17.3	77
% 80 dB(A)	27.2	24.8	5
% 85 dB(A)	3.8	24.3	0.5
% 90 dB(A)	0.1	4.5	0
% 95 dB(A)	0	1.4	
% 100 dB(A)		1.3	
% 105 dB(A)		0.3	
% 110 dB(A)		0	
Cumulative Distribution			
% 50 dB(A)	100	100	100
% 55 dB(A)	100	100	100
% 60 dB(A)	100	96.1	100
% 65 dB(A)	100	86.3	100
% 70 dB(A)	93.4	83.1	100
% 75 dB(A)	89.8	73.8	82.5
% 80 dB(A)	31.2	56.5	5.5
% 85 dB(A)	4	31.7	0.5
% 90 dB(A)	0.2	7.4	0
% 95 dB(A)	0	2.9	
% 100 dB(A)		1.5	
% 105 dB(A)		0.2	
% 110 dB(A)		0	


Statistical distribution - Noise dose
Incidence %
90
80
70
60
50
40
30
20
10
0
50
60
70
80
90
100
110
5 dB(A) class
Michael Lichon BAe146 AVRO RJ seat 11B 6/03/2008 14:41-15:26
Mick Ommundson Drill Rig work 6/03/2008 18:45-21:42
Pearu Terts 30-40 m from Rig motors 7/03/2008 9:05-9:08


Cumulative statistical distribution - Noise dose
Cumulative incidence %
100
90
80
70
60
50
40
30
20
10
0
50
55
60
65
70
75
80
85
90
95
100
105
110
5 dB(A) class
Michael Lichon BAe146 AVRO RJ seat 11B 6/03/2008 14:41-15:26
Mick Ommundson Drill Rig w ork 6/03/2008 18:45-21:42
Pearu Terts 30-40 m from Rig motors 7/03/2008 9:05-9:08


Statistical distribution - Noise dose
80
70
60
50
40
30
20
10
0
Incidence %
50
60
70
80
90
100
110
5 dB(A) class
Michael Lichon BAe146 AVRO RJ seat 11B 6/03/2008 14:41-15:26
Mick Ommundson Drill Rig work 6/03/2008 18:45-21:42
Pearu Terts 30-40 m from Rig motors 7/03/2008 9:05-9:08
Situation
Michael Lichon BAe146 AVRO RJ seat 11B 6/03/2008 14:41-15:26
Mick Ommundson Drill Rig work 6/03/2008 18:45-21:42
Pearu Terts 30-40 m from Rig motors 7/03/2008 9:05-9:08

Notes on noise monitoring - Hunt Energy Camp

Various positions around the camp were examined. The camp is home to workers for 2-3 weeks at a time. Sound sleep is conducive to safe work.

Situation	Distance from Generator housing, m	Noise level, dB(A)
Inside generator housing	-1	101.5
Outside generator housing door	1	85.0
Camp corridor	5	74.4
Road side of generator	5	70.2
Rear side of generators – exhaust direction	5	80.5
Trench side of generators	5	70.4
Camp corridor - start of dormitory	18	66.0
Camp corridor – outside dormitory room "O"	38	61.5
Inside centre room "O" – aircon ON		47.5
Inside centre room "O" – aircon OFF		37.0
Inside centre room "O" – aircon OFF, snoring ON		48
Inside crib room – ambient – refrigeration, radio, fans, outside hum incursion etc		57
Inside crib room – chef whipping cream		69

Sleeping areas exceed noise levels expected for a rural/remote location.

Measures recommended for reducing camp noise from generators

1. Install Secondary mufflers or replace with Residential muffler
2. Line inside of housing with acoustic materials
3. Increase Generators distance from camp
4. Place Generators behind mound to provide intervening barrier
5. Install wooden skirt under front of housing

Notes on noise monitoring – aircraft travel

Workers commute by air to Moomba from Adelaide each 2-3 weeks. Noise dose analysis was undertaken during the National Jet flight which included a turnaround before landing. Results are tabulated and graphed.

Appendix B

Noise Monitoring of Proposed Tasmanian Drill Sites,

Great South Land Minerals oil/gas drilling project 2007-2008

Field report for noise monitoring of Tasmanian drillsite locations

General

Great South Land Minerals Limited has proposed a drilling program in search of oil/gas resources at 4 initial sites as outlined in a series of 4 documents "Exploration Drilling Program" sequentially subtitled "Gezer #1", "Lachish #1", "Hebron #1", and "Eglon #1", dated Sept-Oct 2006. Further A3 map reproductions supplied are based on 1:100000 Tasmaps show the proposed oil/gas exploratory drilling locations.

Field noise monitoring locations were visited 1-2/2/2007, 13-15/3/2007, 15/4/2007 and 17/3/2008 for background and ambient noise measurements, and included site, weather and noisescape observations.

Instruments used

- Brűel & Kjær Statistical Noise Analyser Type 4426 s/n 722799, Laboratory Certified December 2006;
- Brűel & Kjær Statistical Noise Analyser Type 4426 s/n 957489, Laboratory Certified October 2007;
- Brűel & Kjær Level Recorder Type 2306;
- Brűel & Kjær Precision Integrating Sound Level Meter Type 2218 s/n 784345, with Brűel & Kjær Octave Filter Set Type 1613 s/n 643248, both Laboratory Certified December 2006;
- Rion Precision Integrating Sound Level Meter Model NL-11, s/n 150321, with Rion Octave Band Filter Model NX-01A, s/n 10851228;
- Brűel & Kjær Sound Level Calibrator Type 4230 s/n 1207368, Laboratory Certified December 2006;
- Brűel & Kjær Sound Level Calibrator Type 4230 s/n 1655635, Laboratory Certified June 2006;
- Brűel & Kjær Precision Sound Level Meter Type 2232 s/n 1129761, Lab. Certified December 2006;
- Weather Instruments (Aneroid barometer, Zeal Wet/Dry bulb Psychrometer, Suunto KB-14/360R compass, Kaindl Windmaster 2 wind speed meter);
- Hengstler Geotech M10 measuring wheel;
- Fibreglass measuring tape;
- Clicker counter;

Notes on individual noise monitoring locations

Hebron#1 (Tunbridge area)

This is the approximate location of the drillsite, by a hillside hut ruin at GR 3763 3488 (Tunbridge 1:25000 map). General background noise is dominated by Midland Highway traffic occupying a large arc to the west, just behind Tunbridge township.

The volume of the 24-hour highway traffic lessens during the night, but becomes dominated by trucks at these times. Significant additional noise is generated by train traffic running approximately parallel to the highway. While train noise is only an intermittent occurrence, it is noteworthy that some trains pass during sensitive night-time hours. Further noise contributors around Tunbridge include farm activity, barking dogs, livestock, town traffic, and wind in this exposed landscape.

Ballochmyle (Tunbridge township)

The bulk of Tunbridge town dwellings are in direct line of sight from the Hebron#1 drillsite location, at distances from 2.1-3.2km. The Ballochmyle homestead is closer (1.3km) to the drillsite, but is out of direct line of sight, shielded by local topography. The Ballochmyle Rd monitoring location is by the nearest of those township houses, at GR 3555 3522 (Tunbridge 1:25000 map), at 2.1 km (in line of sight) from the Hebron #1 drill site. The location is 260 m from the railway, and 300 m from the highway at their nearest points. The highway exposure is approximately 3.5 km in length, with typical vehicle speeds estimated at 90-110 km/h over this almost level section.

The traffic, train, dog and wind noises are all more immediate at this site. Also noted during visits are noises from crows, clangs from empty trucks, crickets, small birds and training (trotting) horses.

Lowes (Tunbridge township)

The Lowes monitoring location is at the junction of Lowes St and Maclanachan St, at GR 3513 3505 (Tunbridge 1:25000 map), 6 m east of HEC pole 3 - 346793. Lowes is 2.6km from the drillsite, in direct line of sight. The highway lies at a minimum distance of 650 m from the location, covering a visual arc of 143°, for a length of about 4 km. The train line approaches 500 m of the location.

The more diffuse noise of traffic, train, dog and wind are all encountered at this site. Other features noted includes northbound overhead jets measuring 40 and 45 dB(A), propeller aircraft measuring 38 dB(A) and crows.

Lachish#1 (Stockwell, Valleyfield Rd)

This monitoring site is located at GR 275 683 (South Esk 1:100000 map), nearby the actual drillsite location. The site is an open, level location 200m northeast of gate opposite Stockwell entrance, exposed to wind. The nearest dwellings are Stockwell, 1.5km, in line of sight, and Quarry Hill, 1.8km. A dairy facility is located a shorter distance to the north. The Midland Highway and rail line lie 7 km to the east, but are obscured by a line of hills, thus providing a diffuse background noise source.

This is a generally quiet location, with observed additional noise contributions from wind, infrequent Valleyfield Road traffic, livestock, irrigation equipment, dogs, possums, and high level jet airline flightpath.

Eglon#1 (Bracknell area)

The monitoring site is in the corner of a narrow paddock, GR 9845 8884 (Liffey 1:25000 map). The drillsite lies 300m to the NW, in a paddock holding numerous sheep at the time of visits. There are a

number of farm buildings and dwellings within 600m-2km of the drillsite (Unknown to E 600m, unknown to W 700m, unknown to NW 1.0km, unknown to W 1.1km, Fairview to S 1.2km, unknown to S 1.3km) all just out of sightline due to undulations. Bracknell township lies 3 km to the west, topographically shielded by a low ridge.

Significant daytime noise is generated by traffic along both Green Rises Rd and Elphinstone Rd, with less noticeable contributions from Liffey Rd. Further noise contributions were observed from wind, a variety of birds, flies, farm machinery, livestock, crop-dusting aircraft. Night-time noise is dominated by irrigation pumps (63Hz drone) and crickets (4000Hz).

Gezer#1 (Bronte area)

The monitoring site is at Roscarborough gate #2, GR 6035 4440 (Montpeelyata 1:25000 map). The wooded site is within 250 m of the Gezer#1 drillsite. As the Roscarborough homestead is a ruin and there is only a temporary hunters' shelter; it can be considered that there are no neighbours in the vicinity of the drillsite. The nearest neighbours are anglers' shacks at Little Pine Lagoon 9 km to the northeast, and Bronte Park village 10 km to the south, both areas topographically well isolated from Gezer#1. While the site is 750m up the Roscarborough Rd, a bend in the gravelled Marlborough Highway approaches within 300m of the site.

Traffic is a significant contributor to the noise to the site, and was better monitored at the Marlborough Hwy site. Other noise contributors observed include wind in the trees, birds (including crows, currawongs, kookaburras), flies, possums, wallabies, thunder and frogs.

Marlborough Hwy (Bronte area)

The monitoring site is at Roscarborough gate #4, GR 6348 4647 (Montpeelyata 1:25000 map). There are no neighbours in the vicinity of the site. While the wooded site is 65m up the logging road, the gravelled Marlborough Highway approaches within 40m of the site.

Highway traffic is a significant contributor to the noise to the site, with an observed mix of log trucks, cars including heavier 4WDs and trailers, and other goods trucks. Log trucks were measured at 66dB(A), and cars measured at 50-55dB(A). Other noise contributors observed include wind in the trees, birds (including crows, currawongs, kookaburras), flies, light aircraft and crickets.

Hebron #1
2/2/2007

Lachish #1

2/2/2007

Eglon #1 monitoring location
2/2/2007

Gezer #1 monitoring location

1/2/2007

Weather records for site visits

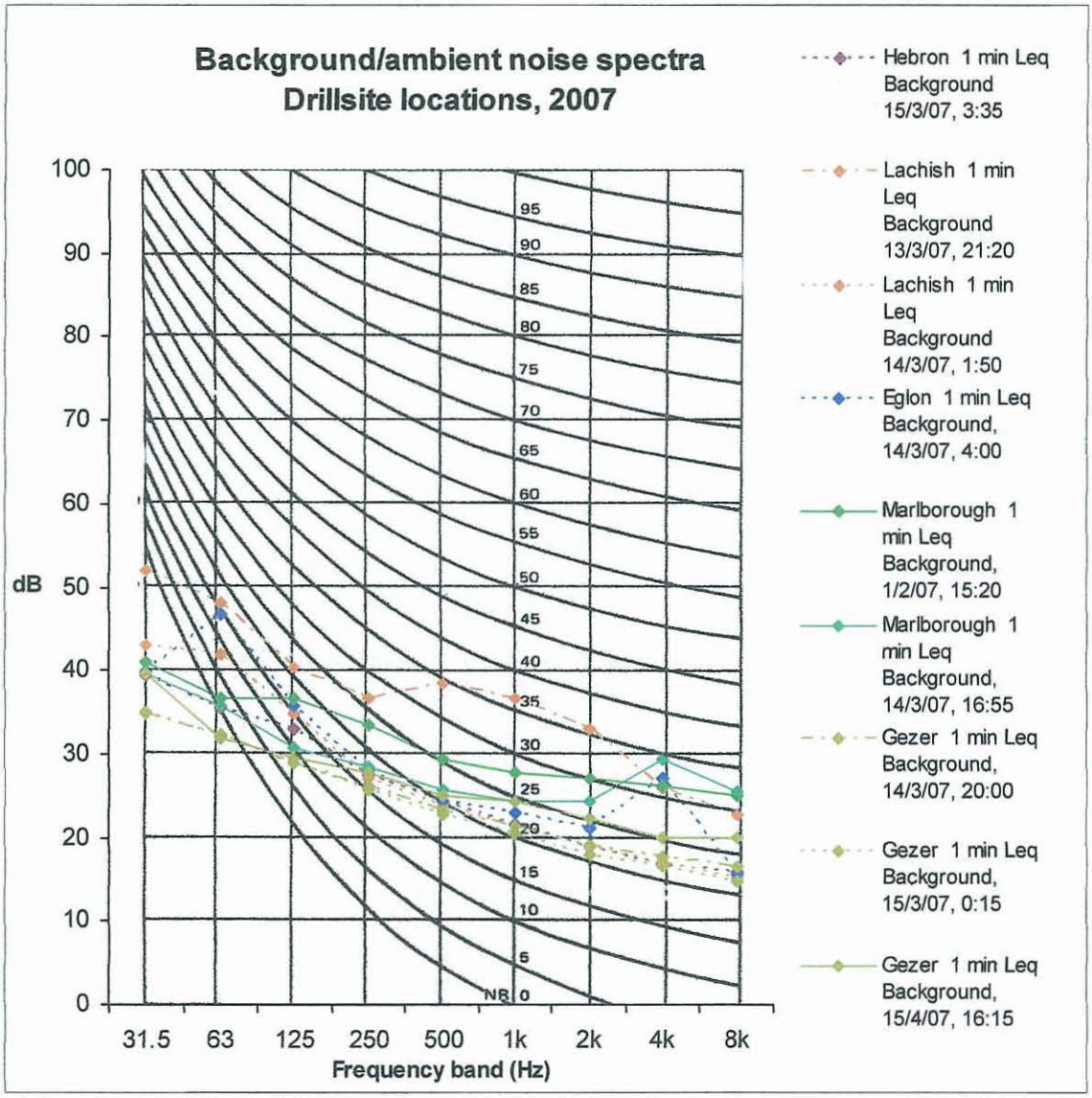
Date	1/2/2007	2/2/2007	13/3/2007	13/3/2007	14/3/2007	14/3/2007	14/3/2007	14/3/2007	15/3/2007	15/3/2007	15/4/2007	17/3/2008	17/3/2008
Location	Marlborough	Eglon	Ballochmyle	Lachish	Lachish	Eglon	Marlborough	Gezer	Gezer	Hebron	Gezer	Ballochmyle	Lowes
Time	14:50	9:40	17:45	20:40	1:30	3:30	16:45	19:30	0:15	3:30	16:15	9:50	10:50
Temp °C	20.5	19.5	21	15	9	8.5	24.5	16	7.5	11.5	est 15	25	27
Relative Humidity %	38	62	42	61	76	81	32	63	93	94	est 70	47	47
Pressure hPa	926	1000	993	999	1000	999	919	930	931	989		994	994
Wind speed average m/s	1.1	2.8	2.5	2.4	0.6	0.1	1	0.1	0	1.3	est 0.5	1.5	0.5
Wind speed maximum m/s	3.8	8.2	6.8	5.5	1.5	0.8	3	1.2	0.8	3	est 1.5	2.5	2.1
Wind direction	W	WNW	SSW	SSE	ESE	ESE	W	W	W	WNW	SW	SSW	SW
Cloud cover x/8	1	3	0	0	0	0	0	0	0	0	3	1	1

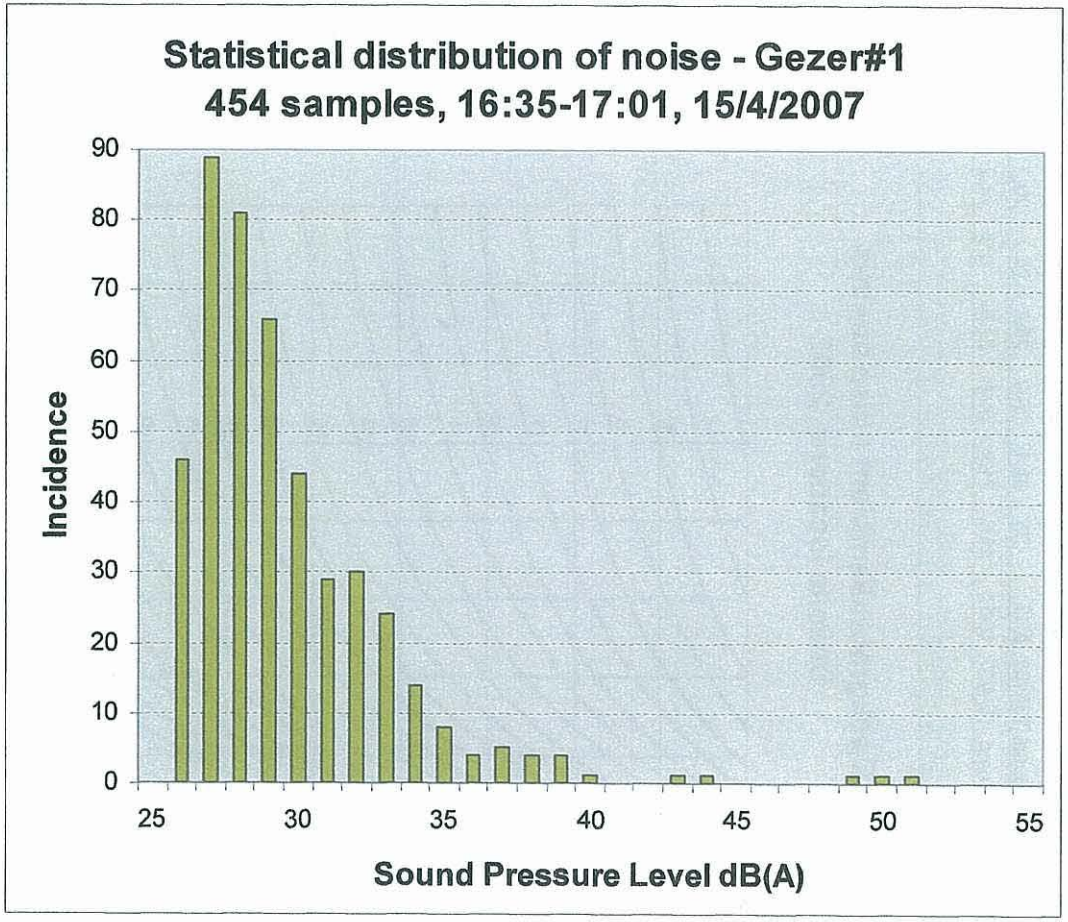
Statistical distribution of noise - summary table

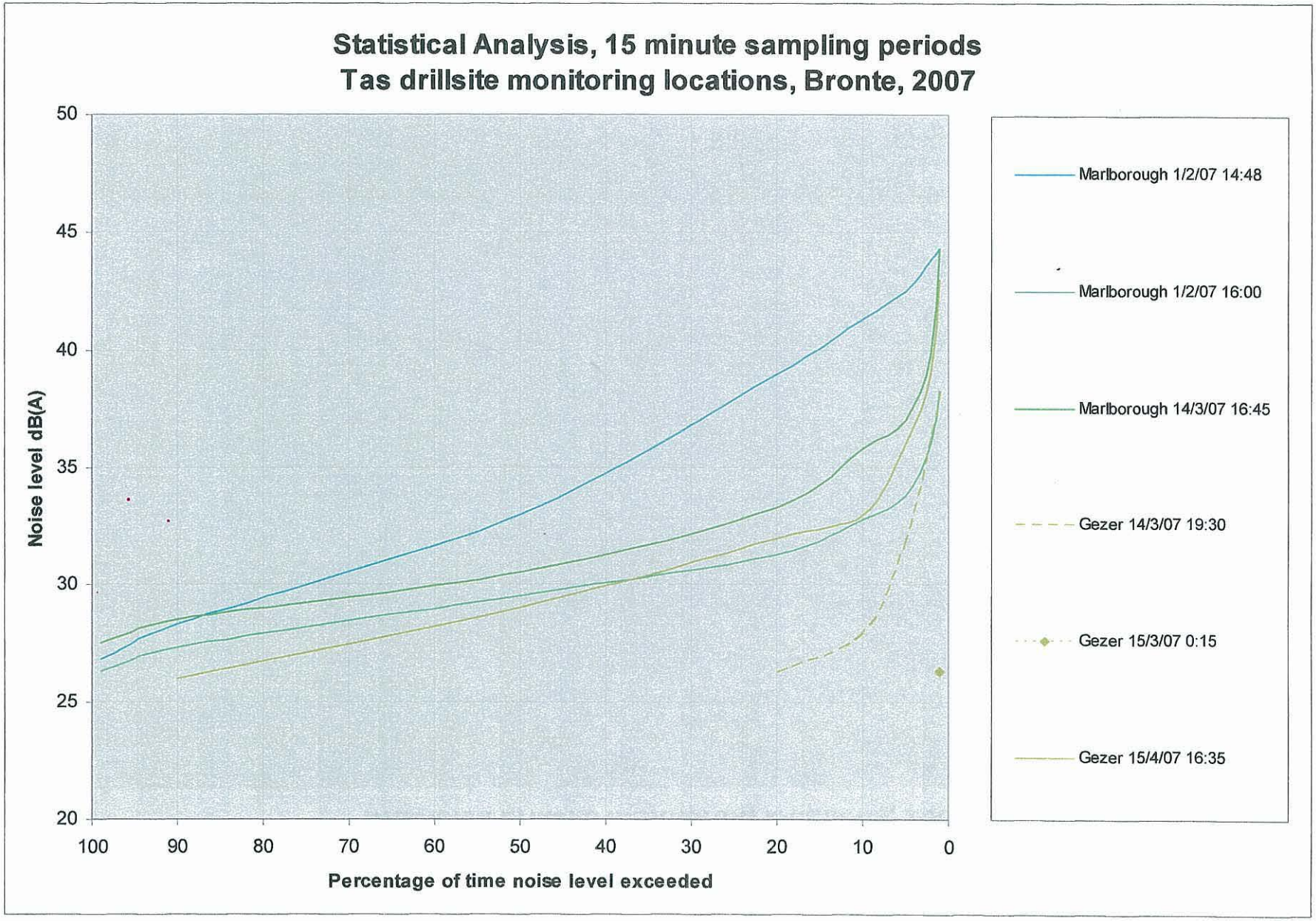
Location	Marlborough	Marlborough	Eglon	Eglon	Ballochmyle	Lachish	Lachish	Eglon	Marlborough	Gezer	Gezer	Hebron	Ballochmyle	Gezer	Ballochmyle	Lowes
Date	1/2/07	1/2/07	2/2/07	2/2/07	13/3/07	13/3/07	14/3/07	14/3/07	14/3/07	14/3/07	15/3/07	15/3/07	15/3/07	15/4/07	17/3/08	17/3/08
Time	14:48	16:00	9:40	10:10	17:45	20:40	1:25	3:30	16:45	19:30	0:15	3:25	4:20	16:35	9:32	10:24
Duration	15	15	15	15	15	15	15	15	15	15	15	15	15	26	15	15
Samples	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	454	9000	9000
Wind speed avg m/s	1.1	0.7	2.8	3.3	2.5	2.4	0.6	0.1	1	0.1	0	1.3	1.8	0.5	1.5	0.5
Wind speed max m/s	3.8	1.5	8.2	7.5	6.8	5.5	1.5	0.8	3	1.2	0.8	3	3.6	1.5	2.5	2.1
Misc												train				
Cars			4	3	49			1	1	1		1	1	2	88	80
Trucks					8					1		2	4		19	20
Aircraft																
L1	44.3	38.3	45.8	54.3	54.3	46.8	30.3	54.3	44.3	38.3	26.3	42.3	57.3	43	52.8	43.3
L2	43.8	36	44.3	50.3	51.8	45.8	26.3	48.3	39.8	36.3		40.5	56	39	52	41.5
L50	42.5	33.8	42	46.5	49.8	43.5		38	37	32		37	51.8	36	50.3	39.5
L10	41.3	32.8	39.8	44.3	48	41.8		33.8	35.8	28		34.5	46.3	33	48.5	38
L20	39	31.3	37.5	41.8	45.3	40.3		32.5	33.3	26.3		32.3	39	32	47	36.3
L50	33	29.5	33.3	36	41	38		31.8	30.5			26.3	28.5	29	41.8	33
L90	28.3	27.3	28.8	29.5	35.8	35.5		31	28.5				26.3	26	36.3	29.3
L99	26.8	26.3	26.8	26.8	31.8	34.3		30	27.5						31.8	27
Leq	36.6	30.8	36.4	43.9	45.9	39.6	26.8	40.6	34.1	29.7	26.1	31.6	44.3		44.8	35.7
Leq(Lin)															55.8	56.3
PeakH(Lin)															76	71

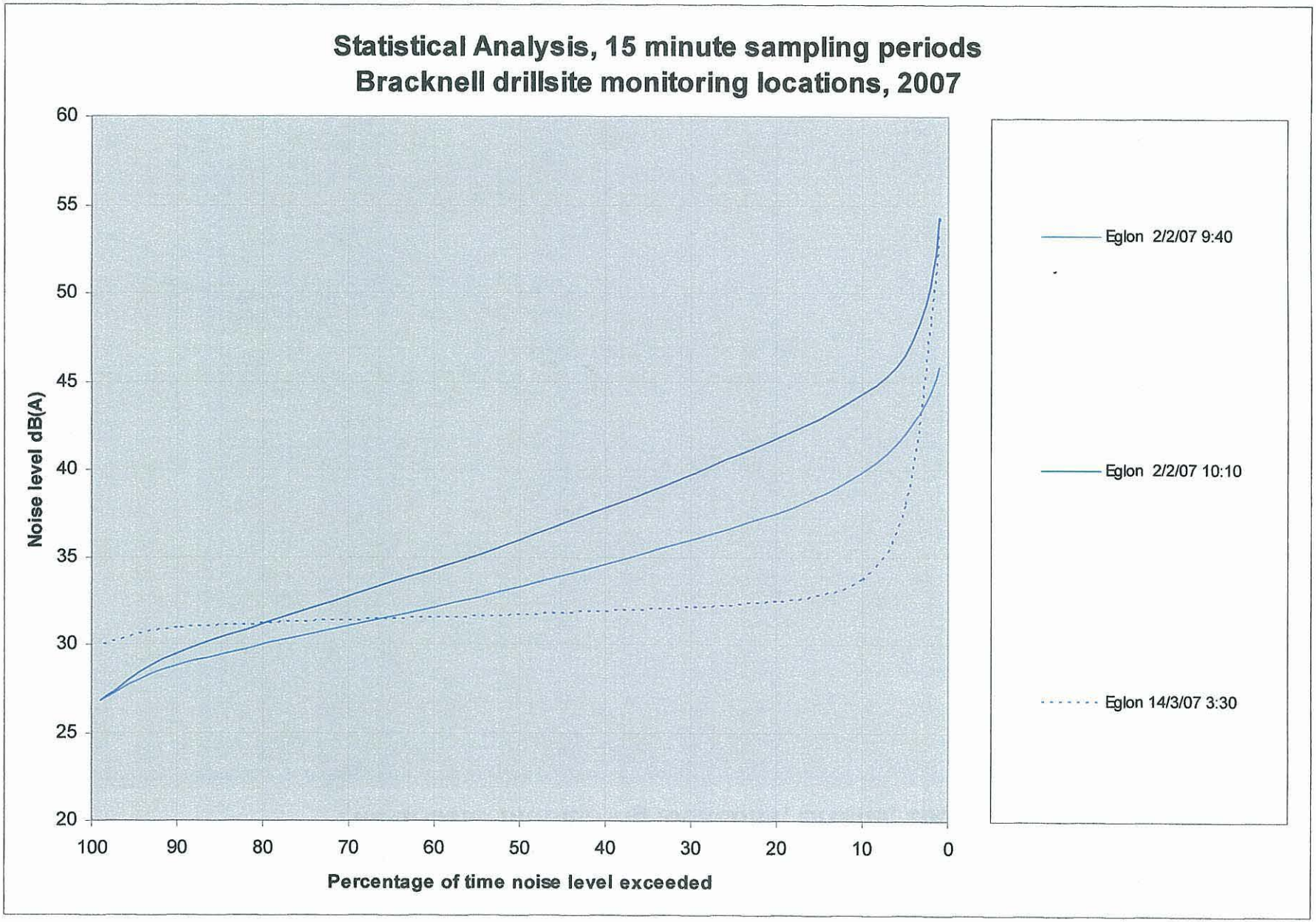
Spectral distribution of noise

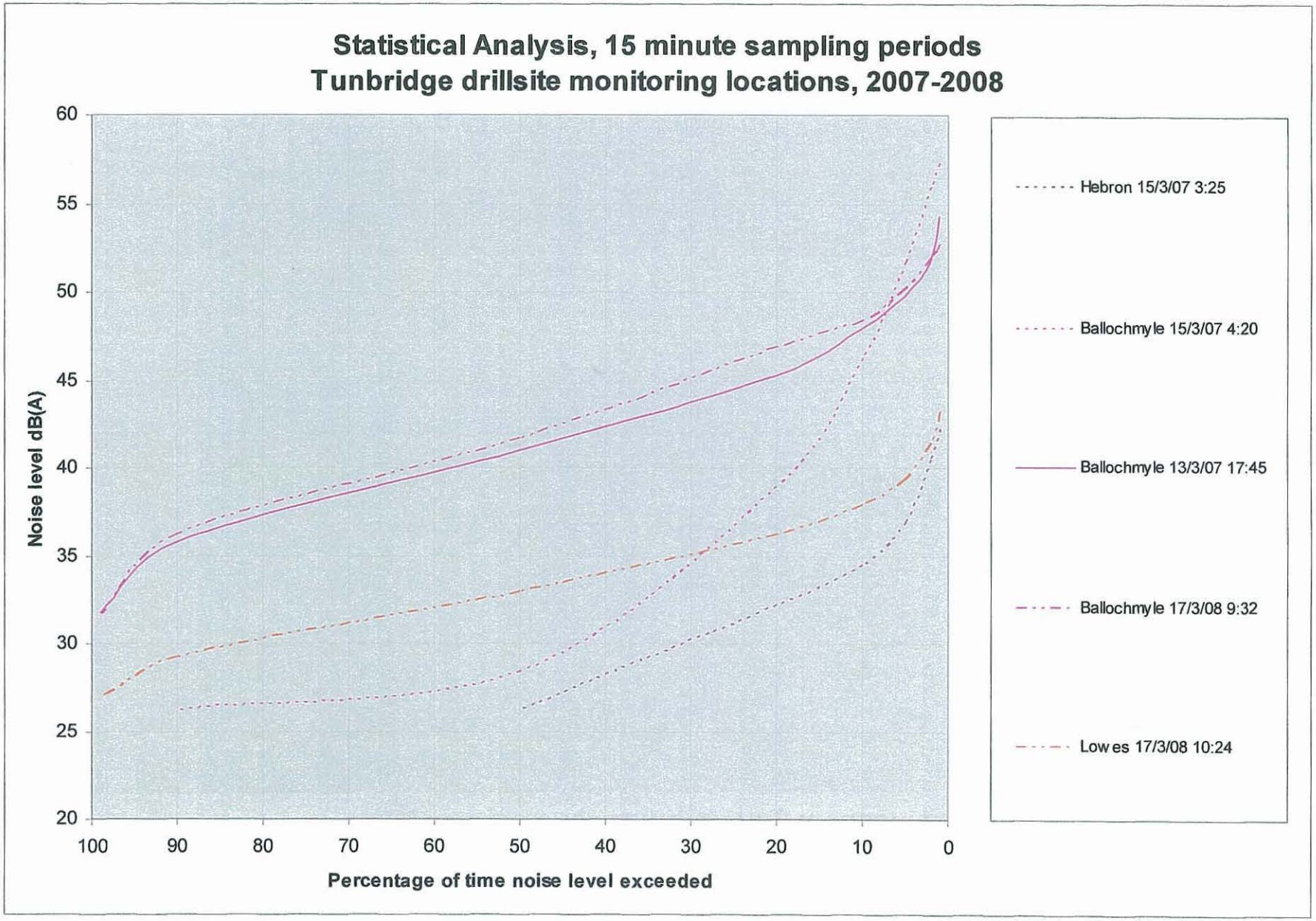
Location	Situation	frequency band (Hz)	31.5	63	125	250	500	1k	2k	4k	8k	dB(A)	dB(C)	dB(Lin)
Hebron	1 min Leq	Background 15/3/07, 3:35	39.3	35.5	32.9	27.4	24.3	21.5	18.7	16.8	15.9	27.2	40.2	49.1
Lachish	1 min Leq	Background 13/3/07, 21:20	52	48.1	40.2	36.7	38.4	36.6	33	25.8	22.7	39.2	59.3	76.5
Lachish	1 min Leq	Background 14/3/07, 1:50	43	41.9	34.8	27.1	23.7	21.2	18.8	16.9	15.2	27.7	44.9	56.3
Eglon	1 min Leq	Background, 14/3/07, 4:00	39.9	46.6	35.7	27.9	24.3	22.8	21	27	15.5	31.9	48.3	53.2
Marlborough	1 min Leq	Background, 1/2/07, 15:20	41	36.5	36.6	33.4	29.2	27.8	26.9	26.2	25	30.2	45.8	55.2
Marlborough	1 min Leq	Background, 14/3/07, 16:55	39.5	35.8	30.6	28.3	25.6	24.2	24.2	29.4	25.4	32.3	41.8	52.8
Gezer	1 min Leq	Background, 14/3/07, 20:00	34.8	32.3	28.9	26.2	23.1	21.2	18.9	17.6	16.4	26.7	37.5	44.4
Gezer	1 min Leq	Background, 15/3/07, 0:15	35	32.1	28.9	25.7	22.7	20.3	17.8	16.5	14.6	26.2	37.3	44
Gezer	1 min Leq	Background, 15/4/07, 16:15	39.6	31.9	29.6	27.8	25	24.2	22.3	20	19.8	31.4	41.4	64.8

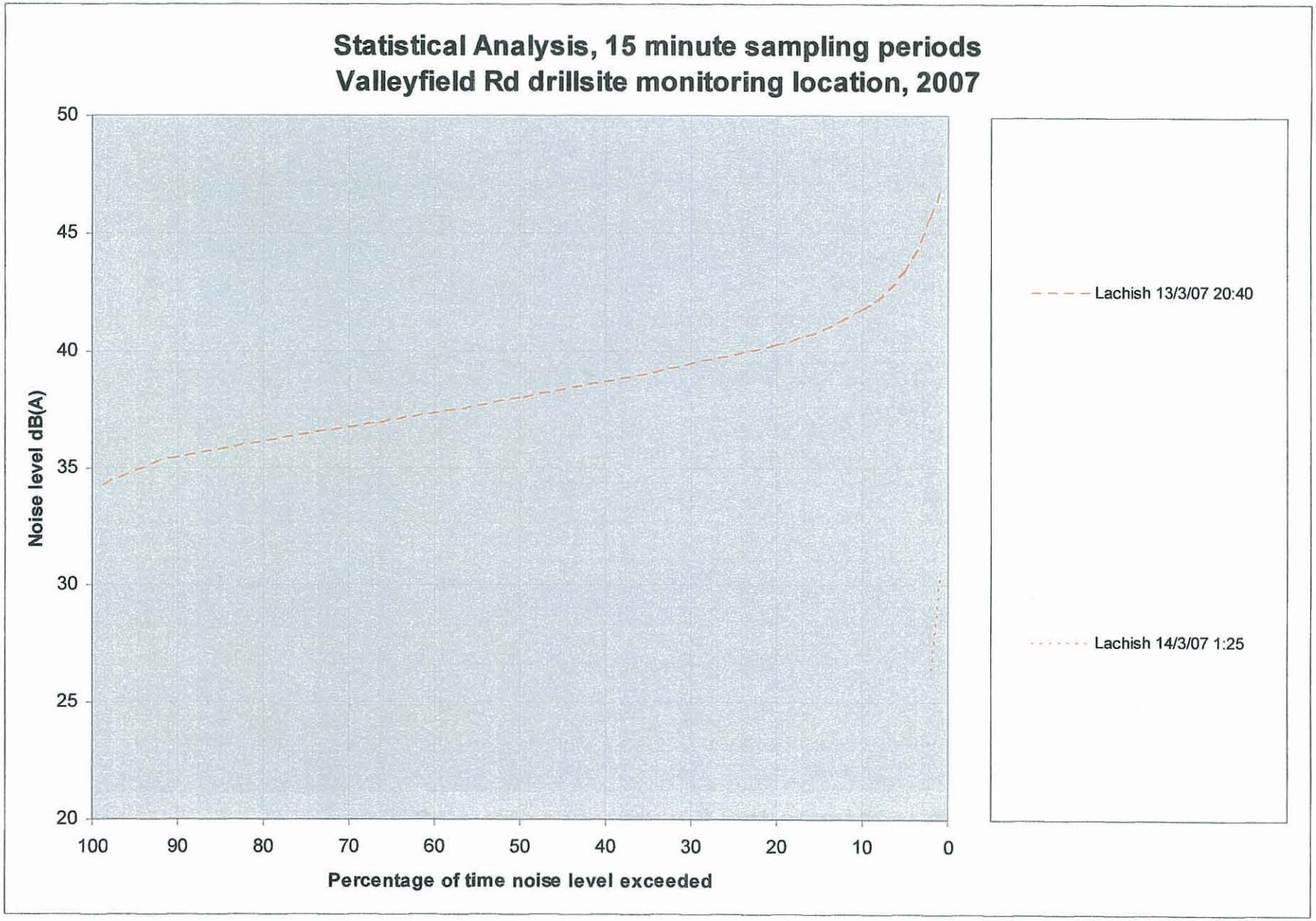



Statistical distribution of noise - Gezer#1
454 samples, 16:35-17:01, 15/4/2007
Incidence
90
80
70
60
50
40
30
20
10
0
25
30
35
40
45
50
55
Sound Pressure Level dB(A)


Statistical Analysis, 15 minute sampling periods
Tas drillsite monitoring locations, Bronte, 2007
Noise level dB(A)
50
45
40
35
30
25
20
100
90
80
70
60
50
40
30
20
10
0
Percentage of time noise level exceeded
Marlborough 1/2/07 14:48
Marlborough 1/2/07 16:00
Marlborough 14/3/07 16:45
Gezer 14/3/07 19:30
Gezer 15/3/07 0:15
Gezer 15/4/07 16:35


Statistical Analysis, 15 minute sampling periods
Bracknell drillsite monitoring locations, 2007
Noise level dB(A)
60
55
50
45
40
35
30
25
20
100
90
80
70
60
50
40
30
20
10
0
Percentage of time noise level exceeded
Eglon 2/2/07 9:40
Eglon 2/2/07 10:10
Eglon 14/3/07 3:30


Statistical Analysis, 15 minute sampling periods
Tunbridge drillsite monitoring locations, 2007-2008
Noise level dB(A)
60
55
50
45
40
35
30
25
20
100
90
80
70
60
50
40
30
20
10
0
Percentage of time noise level exceeded
Hebron 15/3/07 3:25
Ballochmyle 15/3/07 4:20
Ballochmyle 13/3/07 17:45
Ballochmyle 17/3/08 9:32
Lowes 17/3/08 10:24

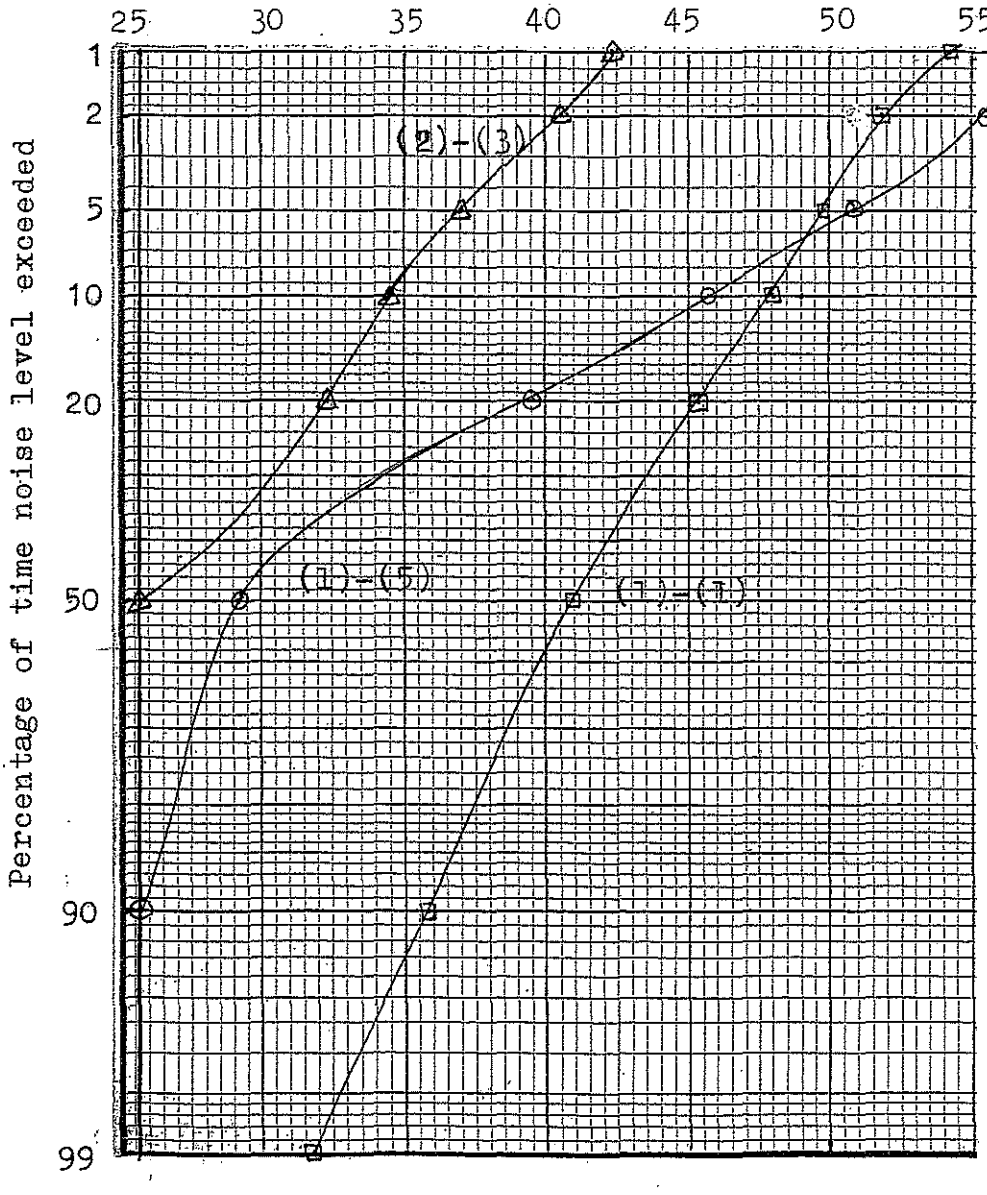

Statistical Analysis, 15 minute sampling periods
Valleyfield Rd drillsite monitoring location, 2007
Noise level dB(A)
50
45
40
35
30
25
20
100
90
80
70
60
50
40
30
20
10
0
Percentage of time noise level exceeded
Lachish 13/3/07 20:40
Lachish 14/3/07 1:25

STATISTICAL NOISE ANALYSIS

Location: Tunbridge (Hebron≠1) (1) GR355352 Ballochmyle Rd
(2) GR377348 Hut ruins drill site
Survey Date: 13,15/3/2007 Eng/Tech: M.Lichon

dB(A)

Comments	Time	L_1	L_2	L_5	L_{10}	L_{20}	L_{50}	L_{90}	L_{99}	L_{eq}
(1)-(1) 13/3/07	1745-1800	54.3	51.8	49.8	48.0	45.3	41.0	35.8	31.8	45.9
(2)-(3) 15/3/07	0325-0340	42.3	40.5	37.0	34.5	32.3	26.3	26.3	26.3	31.6
(1)-(5) 15/3/07	0420-0435	57.3	56.0	51.8	46.3	39.0	28.5	26.3	26.3	44.3



NOTES
(1)-(1)
49 cars 8 trucks hwy
2 cars Ball.Rd

(2)-(3)
1 car 2 trucks hwy
½ train

WEATHER:

		13/3	15/3
Temp.	C	21	11.5
Press.	hPa	993	989
Rel.Hum	%	42	94
Wind speed	m/s	2.5	1.8
Wind. Dir.		SSW	WNW
Cloud		0/8	0/8

INSTRUMENTS:
B&K Statistical Noise Analyser Type 4426 s/n 722799
B&K Calibrator Type 4230 s/n 1207368
Both laboratory calibrated Dec 2006

NOTES
(1)-(5)
1 car 4 trucks hwy

Pearu Terts,
Consulting Engineer

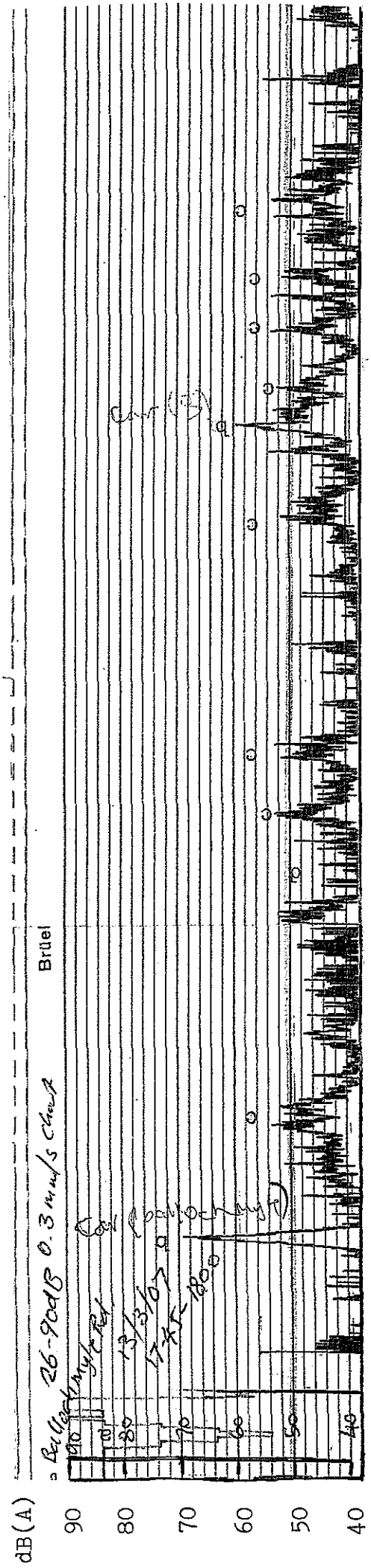
CHART RECORDING

Location: Tunbridge at
Ballochmyle Rd.,
GR355 352
Tunbridge 1: 25000 map

13/3/2007

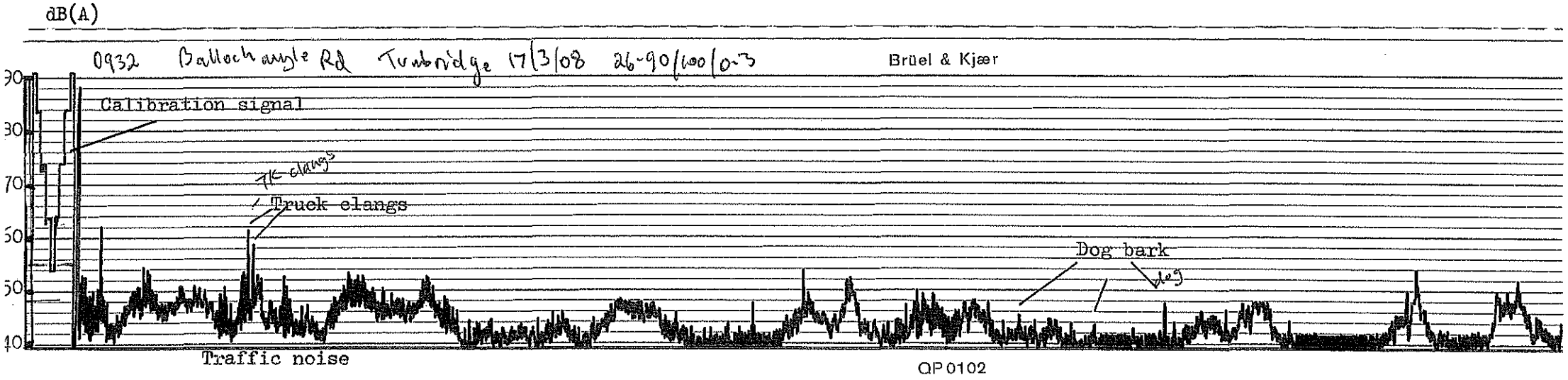
Trace started 1745 h
paper speed = 0.3 mm/s

a - calibration trace
b - passing car, Ballochmyle Rd
c - Highway traffic example
d - dog barking



Time recording of noise at Ballochmyle Rd, Tunbridge, 9:32-9:47, 17/3/2008.

Chart speed 0.3 mm/s. Approx. scale, A4 original: 1 minute = 18 mm.

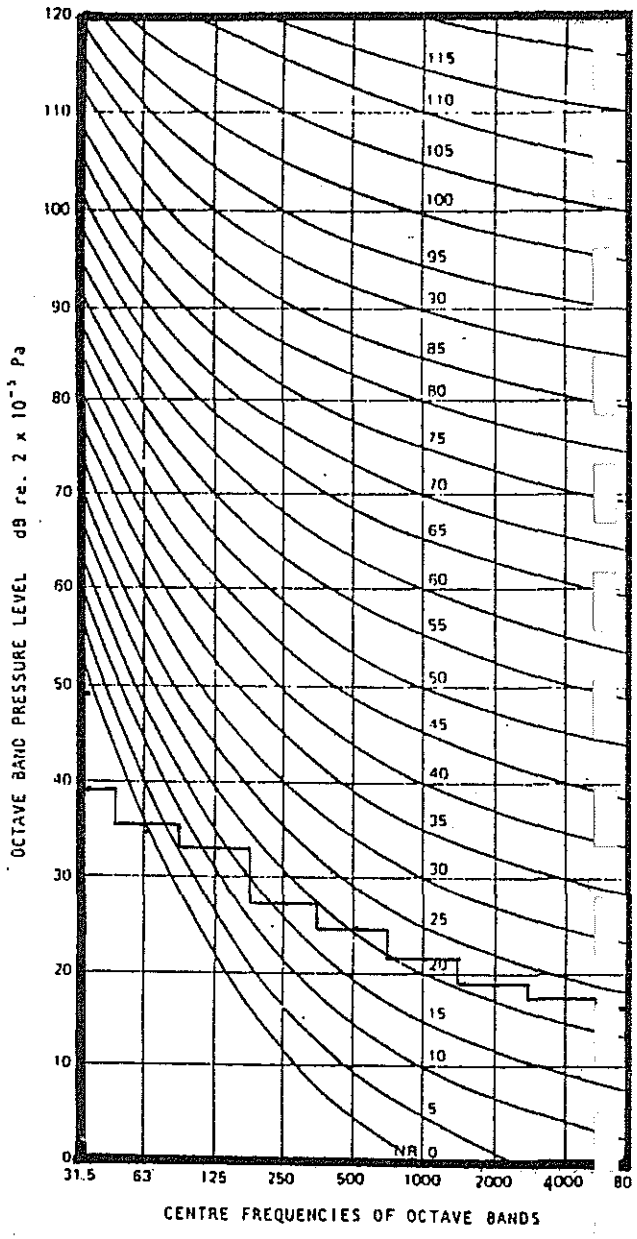


SPECTRAL NOISE DISTRIBUTION

Tunbridge (Hebron≠1)
Hut ruins, drillsite
GR377348 Tunbridge 1:25000

15/3/2007
1 minute Leq's starting 03:35am

27.2 dB(A)
40.2 dB(C)
49.1 dB(Lin)



PEARU TERTS
Consulting Engineer

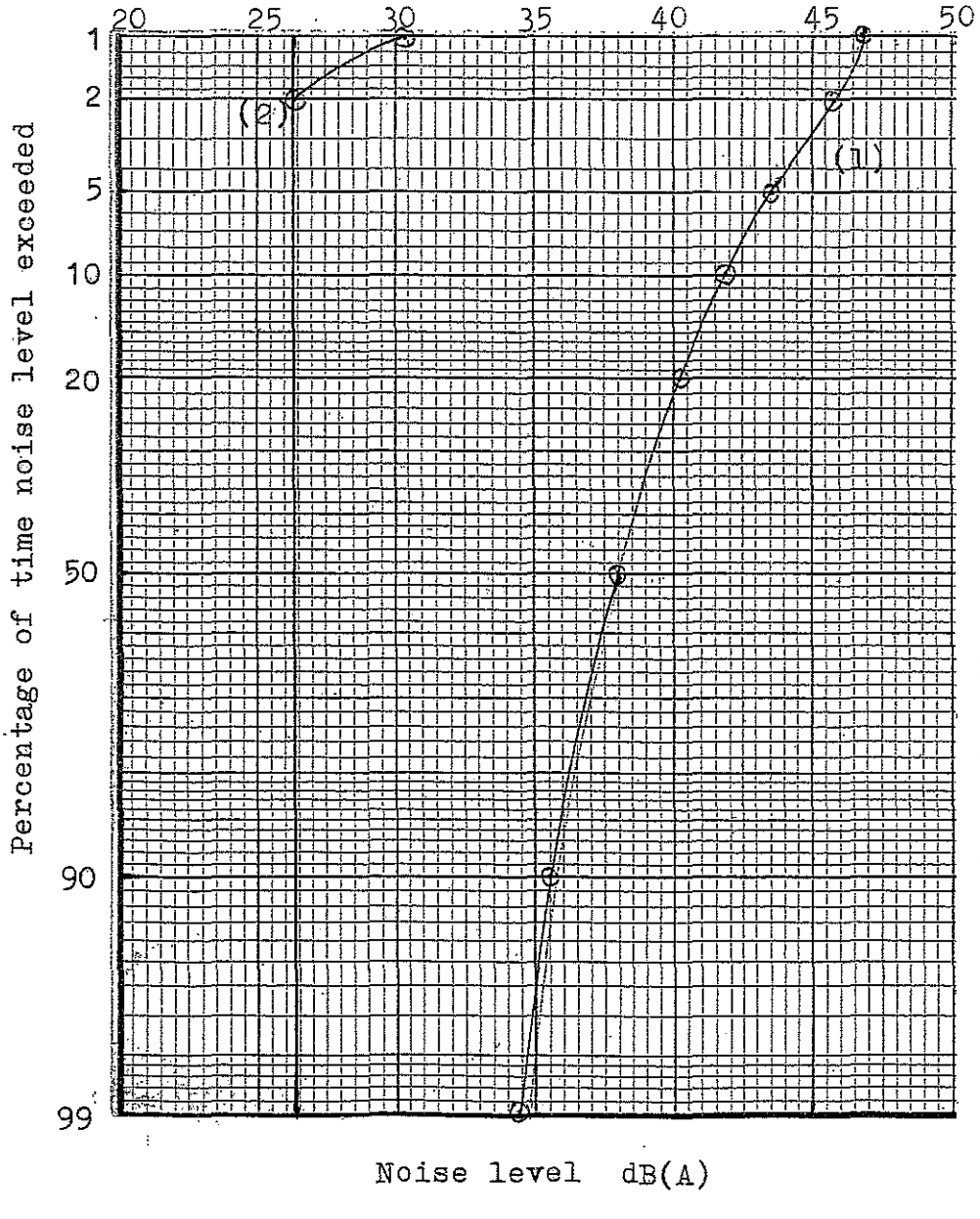
STATISTICAL NOISE ANALYSIS

Location: Lachish≠1 - "Stockwell" (1:100000 South Esk 275683)
Survey Date: 13-14/3/2007 Eng/Tech: M.Lichon

dB(A)

Comments	Time	L_1	L_2	L_5	L_{10}	L_{20}	L_{50}	L_{90}	L_{99}	L_{eq}
13/3/07 (1)	20:40-20:55	46.8	45.8	43.5	41.8	40.3	38.0	35.5	34.3	39.6
14/3/07 (2)	01:25-01:40	30.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.8

(Lower limit of instrument measurement)



WEATHER:

		(1)	(2)
Temp.	C	16	7.5
Press.	hPa	1063	1064
Rel.Hum	%	63	93
Wind speed	m/s	0.1	0.0
Wind. Dir.		W	W
Cloud		o/8	0/8

INSTRUMENTS:

B&K Statistical Noise Analyser Type 4426 s/n 722799
B&K Calibrator Type 4230 s/n 1207368

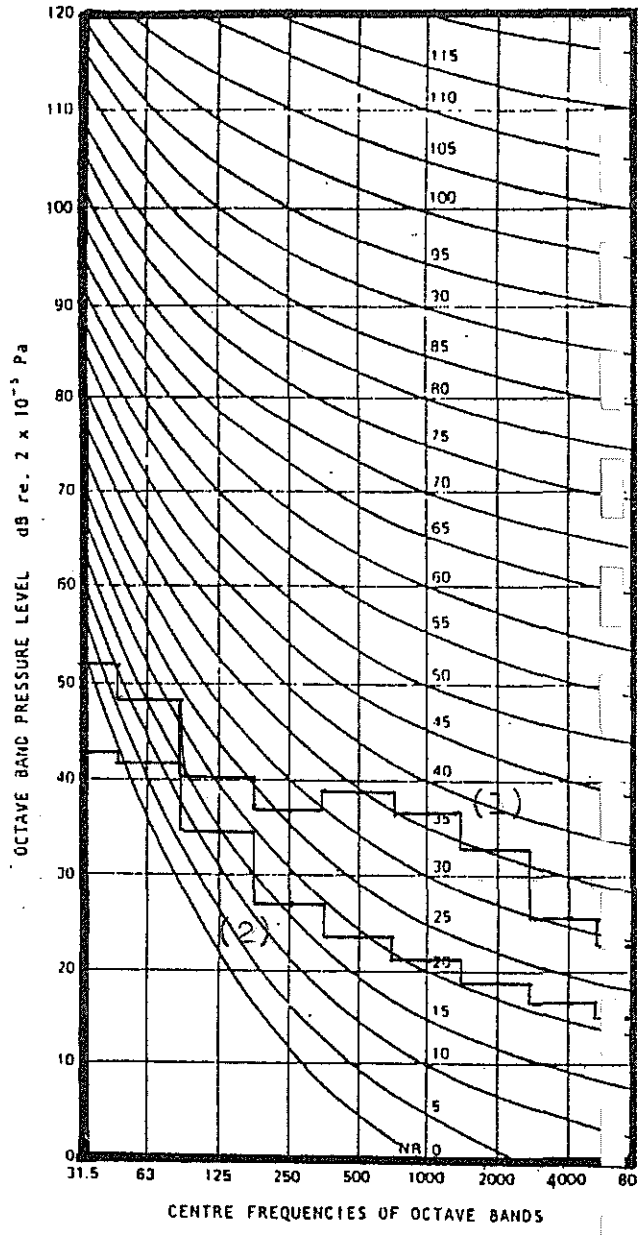
Both laboratory calibrated Dec 2006

Pearu Terts,
Consulting Engineer

SPECTRAL NOISE DISTRIBUTION

Lachish≠1 - "Stockwell"
GR275683 South Esk 1:100000
13/3/2007 21:20 (1)
14/3/2007 01:50 (2)
1 minute Leq's

(1) 39.2 dB(A)
59.3 dB(C)
76.5 dB(Lin)
(2) 27.7 dB(A)
44.9 dB(C)
56.3 dB(Lin)



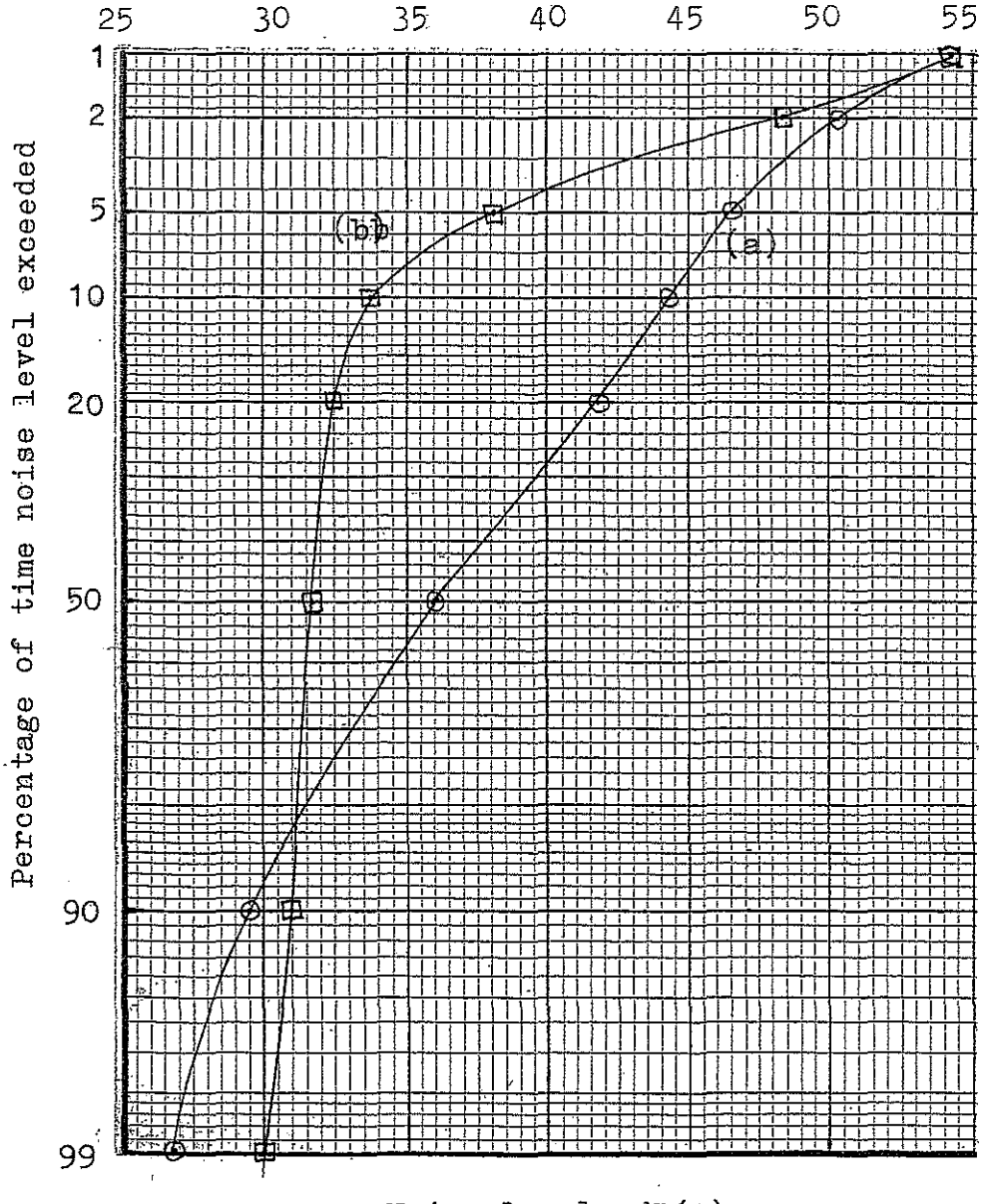
PEARU TERTS
Consulting Engineer

STATISTICAL NOISE ANALYSIS

Location: Eglon≠l Bracknell (Green Rises Rd / Elphinstone Rd)
GR984887 Liffey 1:25000
Survey Date: 1/2/2007 & 14/3/2007 Eng/Tech: M.Lichon

dB(A)

Comments	Time	L_1	L_2	L_5	L_{10}	L_{20}	L_{50}	L_{90}	L_{99}	L_{eq}
(a) 2/2/07 3 vehicles passing	1010-1025	54.3	50.3	46.5	44.3	41.8	36.0	29.5	26.8	43.9
(b) 14/3/07 1 vehicle; Irrigation pumps in operation	0330-0345	54.3	48.3	38.0	33.8	32.5	31.8	31.0	30.0	40.6



WEATHER:

		(a)	(b)
Temp.	C	19.5	8.5
Press.	hPa	1000	999
Rel.Hum	%	62	81
Wind speed	m/s	3.3	0.1
Wind. Dir.		WNW	ESE
Cloud		3/8	0/8

INSTRUMENTS:

B&K Statistical Noise Analyser Type 4426 s/n 722799
B&K Calibrator Type 4230 s/n 1207368
Both laboratory calibrated Dec 2006

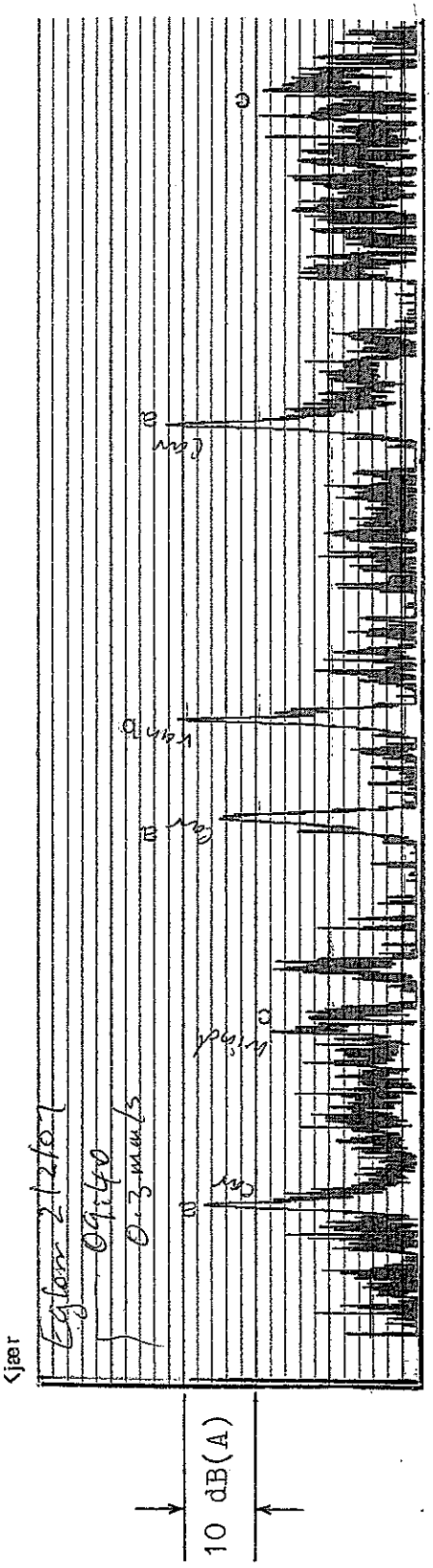
Pearu Terts,
Consulting Engineer

CHART RECORDING

Location: Eglon #1 Bracknell
Green Rise Rd.-Elphinstone Rd.
GR984 887 Liffey 1:25000 map

2/2/2007
Trace started 0940 h
paper speed = 0.3 mm/s

a - passing car
b - passing van
c - wind
also birds.



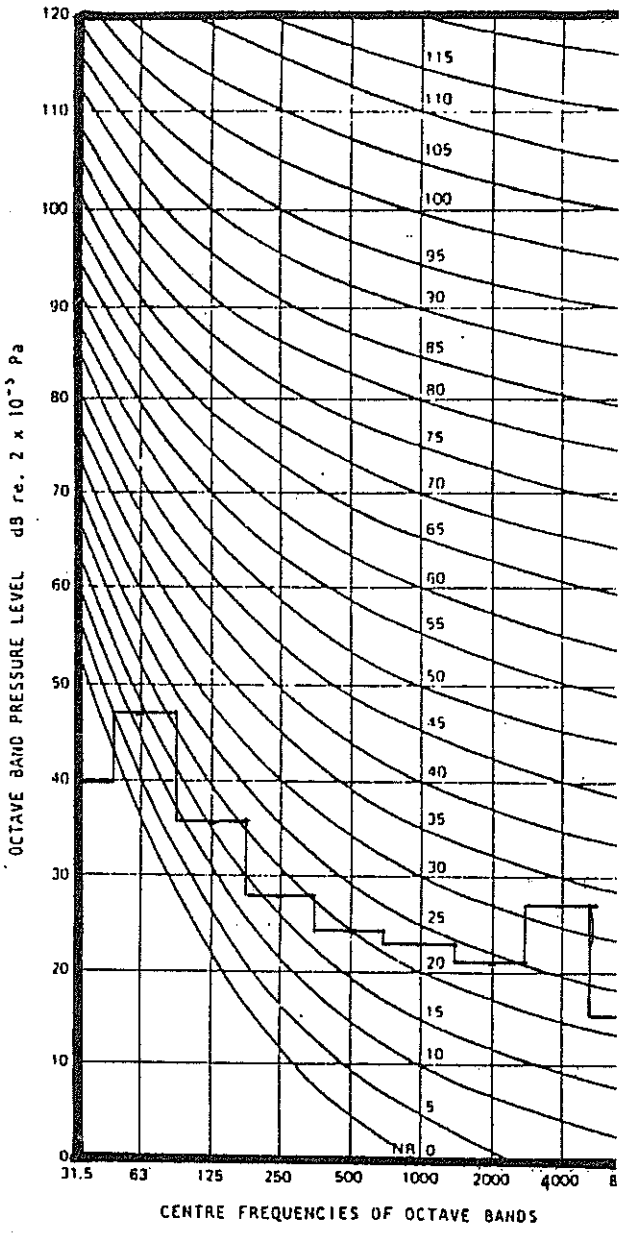
SPECTRAL NOISE DISTRIBUTION

Bracknell (Eglon≠1)
(Green Rises Rd / Elphinstone Rd)
GR984887 Liffey 1:25000

14/3/2007
1 minute Leq's starting 04:00am

31.9 dB(A)
48.3 dB(C)
53.2 dB(Lin)

Notes
no cars passed by
peak at 63Hz - irrigation pumps
peak at 4000Hz - crickets



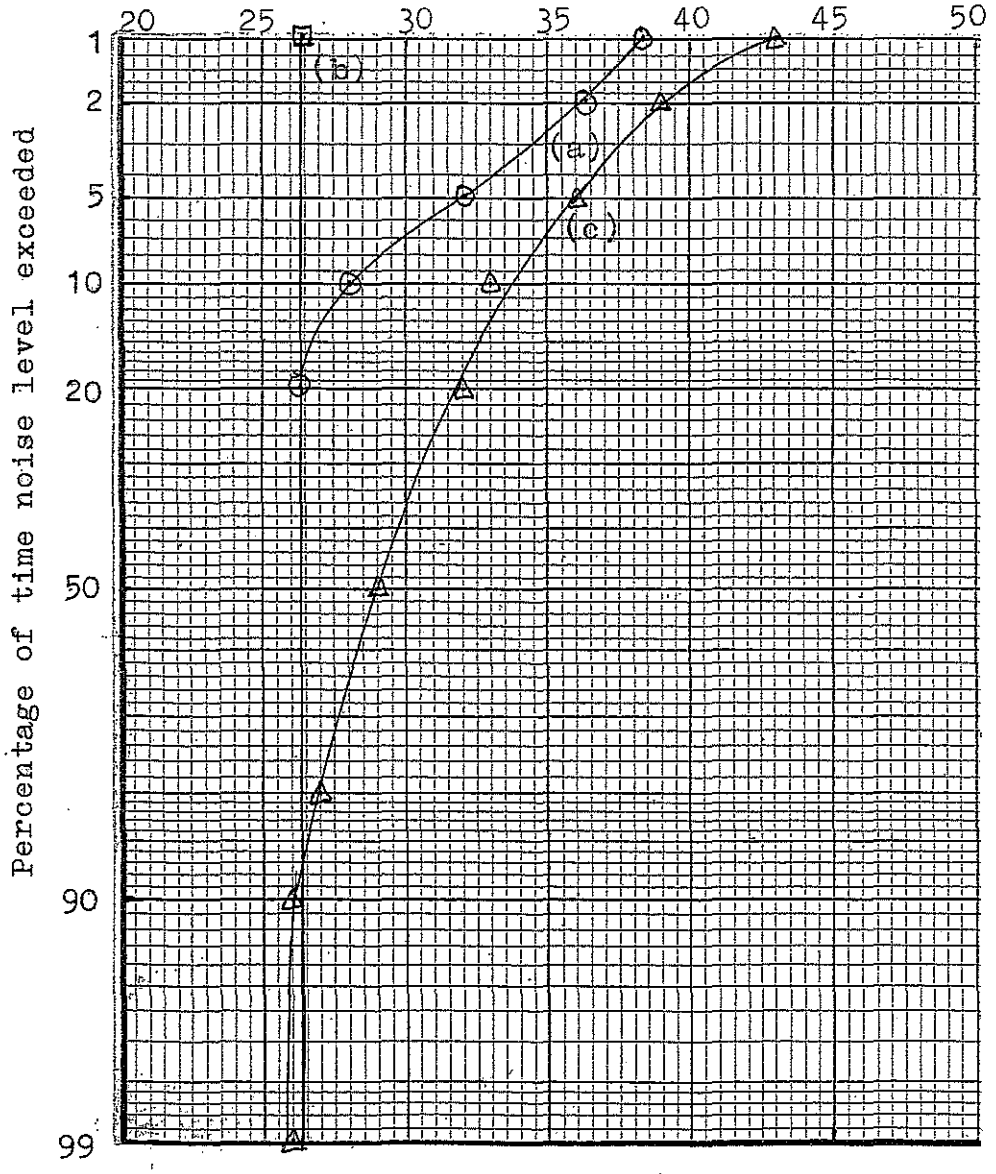
PEARU TERTS
Consulting Engineer

STATISTICAL NOISE ANALYSIS

Location: Roscarborough2 at gate Gezer≠1
Survey Date: Montpeelyata 1:25000 GR603444
14-15/3/2007
15/4/2007
Eng/Tech: M.Lichon

dB(A)

Comments	Time	L_1	L_2	L_5	L_{10}	L_{20}	L_{50}	L_{90}	L_{99}	L_{eq}
(a) 14/3/07 1 truck 1 car	1930-1945	38.3	36.3	32.0	28.0	26.3	26.3	26.3	26.3	29.7
(b) 15/3/07	0015÷0030	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.1
		(Lower limit of instrument measurement)								
(c) 15/4/07 2 cars	1635-1701 (R)	43	39	36	33	32	29	26 L80:27	26	



WEATHER:

		(a)	(b)	(c)
Temp.	C	16	7.5	1
Press.	hPa	1063	1064	–
Rel.Hum	%	63	93	7
Wind speed	m/s	0.1	0.0	0.5
Wind. Dir.		W	W	SW
Cloud		0/8	0/8	3/8

INSTRUMENTS:

B&K Stastical Noise Analyser Type 4426 s/n 722799
B&K Calibrator Type 4230 s/n 1207368

Both laboratory calibrated Dec 2006

(R) Rion with calibrator

Pearu Terts,
Consulting Engineer

SPECTRAL NOISE DISTRIBUTION

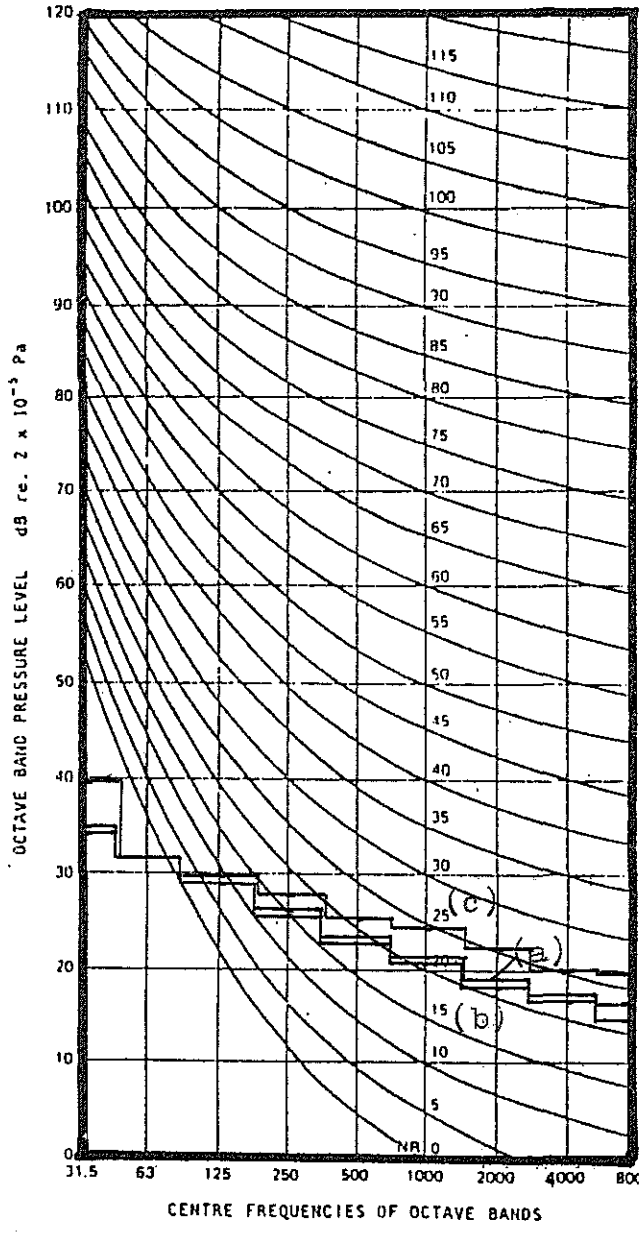
Roscarborough2 at gate, Gezer≠1
GR603444 Montpeelyata 1:25000

14/3/07 (a)
1 minute Leq's starting 20:00
26.7(5 minutes) dB(A)
37.5 dB(C)
44.4 dB(Lin)

15/3/07 (b)
1 minute Leq's starting 00:15
26.2 dB(A) (5 minute)
37.3 dB(C)
44.0 dB(Lin)

15/4/07 (c)
1 minute Leq's starting 16:15
31.4 dB(A)
41.4 dB(C)
64.8 dB(Lin)

17:05
27.4 dB(A)
36.7 dB(C)
45.2 dB(Lin)

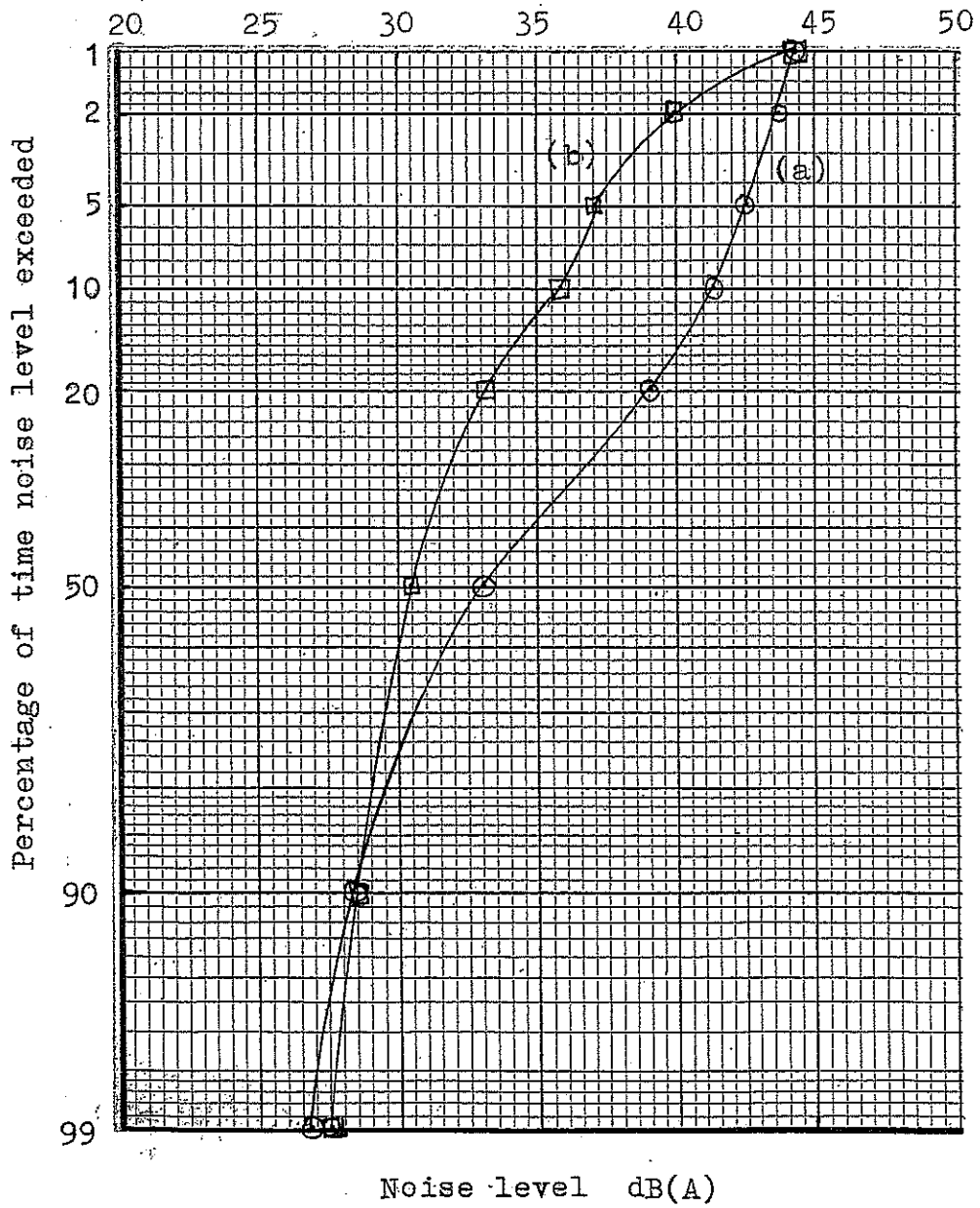


PEARU TERTS
Consulting Engineer

STATISTICAL NOISE ANALYSIS

Location: Marlborough Hwy site 65m from road at gate
Survey Date: GR635465 Montpeelyata 1:25000
1/2/07, 14/3/07 dB(A)
Eng/Tech: M.Lichon

Comments	Time	L_1	L_2	L_5	L_{10}	L_{20}	L_{50}	L_{90}	L_{99}	L_{eq}
1/2/07(a)	1448÷1503	44.3	43.8	42.5	41.3	39.0	33.0	28.3	26.8	36.6
14/3/07(b) lighter traffic	1645-1700	44.3	39.8	37.0	35.8	33.3	30.5	28.5	27.5	34.1



WEATHER:

		(a)	(b)
Temp.	C	20.5	24.5
Press.	hPa	1059	1052
Rel.Hum	%	38	32
Wind speed	m/s	1.1	1.0
Wind. Dir.		W	W
Cloud		1/8	0/8

INSTRUMENTS:
B&K Statistical Noise Analyser Type 4426
B&K Calibrator Type 4230
s/n 722799,1207368
Both laboratory calibrated Dec 2006

Pearu Terts,
Consulting Engineer

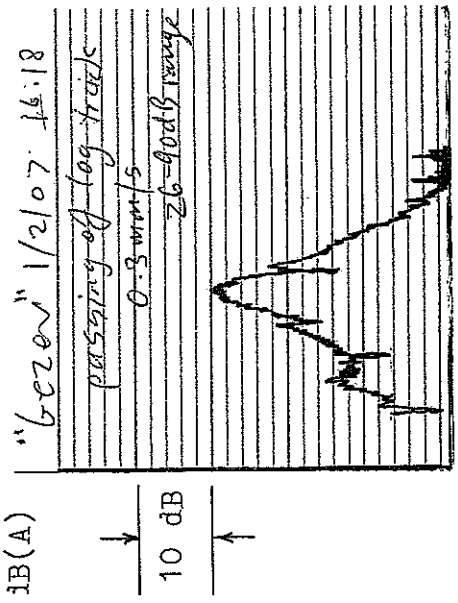
CHART RECORDINGS

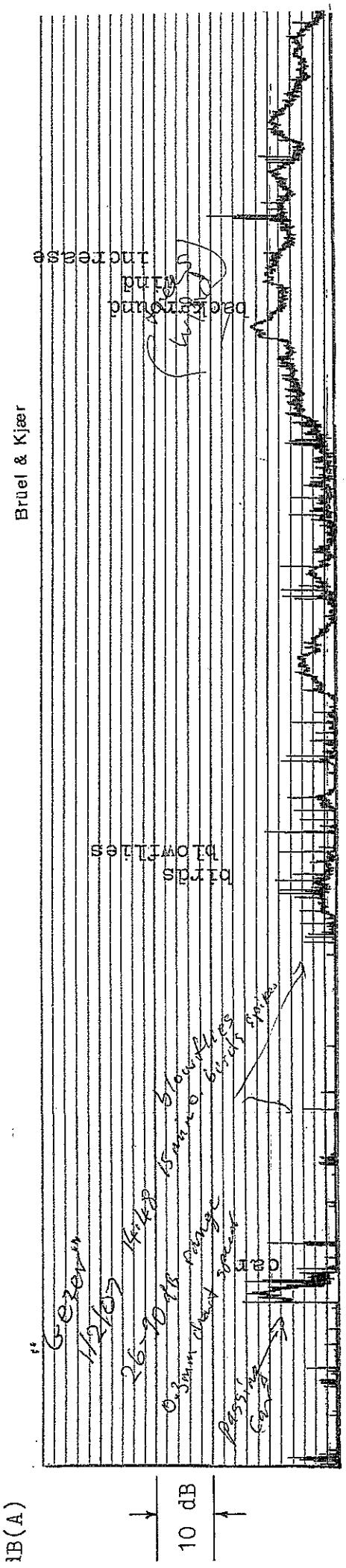
Location: GR635465 Montpeelyata
1:25000 map

Marlborough Highway site at gate
65 metres from main road.

Main Trace: 1/2/2007 start at 1448 h
paper speed = 0.3 mm/s

Small trace: 1/2/2007 start 1618 h
paper speed = 0.3 mm/s
passing log truck





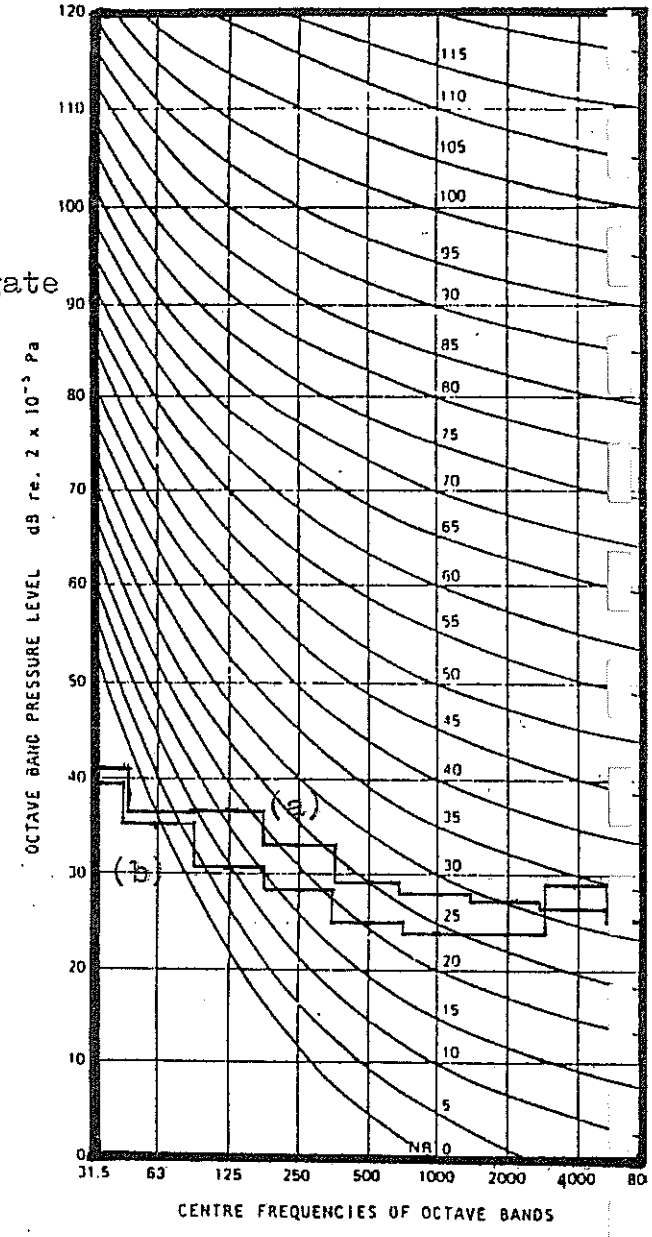
SPECTRAL NOISE DISTRIBUTION

Marlborough Hwy site 65m from rd at gate
GR635465 Montpeelyata 1:25000

1/2/2007 (a)
1 minute Leq's starting 1520
30.2 dB(A), 29.9 dB(A)
45.8 dB(C), 46.4 dB(C)
55.2 dB(Lin), 53.2 dB(Lin)

L_{max} car 1612; 55.6
car 1615; 49.7
car 1617; 51.4
log truck 1618; 66.4
car 1623; 50.7
goods truck 1637; 61.1
log truck 1639; 66.3
car 1642; 52.0

14/3/2007 (b)
1 minute Leq's starting 1655
32.3 dB(A) 5 minute
41.8 dB(C) 5 minute
52.8 dB(Lin) 5 minute



PEARU TERTS
Consulting Engineer

Calculated noise levels drill operating and not operating

inver. = inversion or unstable sunrise/sunset conditions
normal = normal calm atmospheric conditions,

			Drill Rig operating Based on page A 5				Drill Rig not Operating See page B 9		
			dB(A)				dB(A)		
Drill Site	Distance nearest house (km)	L1	L10	L90	Leq	L1	L10	L90	Leq
Hebron #1 (Tunbridge)	1.4 No Line of sight	inver. 47	45	35.7	41.3	42.3	34.5	≤26	31.6
		normal 36	32.5	26.2	29.7				
Ballochmyle (Tunbridge)	1.3 No Line of sight	inver. 47.6	45.6	36.3	41.3	57.3	46.3	26.3	44.3
		normal 36.6	33.1	26.8	30.3				
Lowers (Tunbridge)	2.6	inver. 41.6	39.6	30.3	35.9	43.3	38.0	29.3	35.7
		normal 30.6	27.1	20.8	24.3				
Lacish #1 (Stockwell)	1.5	inver. 46.4	44.4	35.1	40.7	30.3	-	-	26.8
		normal 35.4	31.9	25.6	29.1	46.8	41.8	35.5	39.6
Eglon (Bracknell)	573	inver 49.7	47.7	38.4	44.0*	54.3	33.8	31.0	40.6
		normal 38.7	35.2	28.9	32.4*				
		* = includes noise barrier							
Gezer #1 (Bronte)	none					26.3	-	-	26.1
Marlborough (Bronte)	none					38.3	32.8	27.3	30.8

Noise Barriers
Bracknell, nearest house 573 m

Barrier height metres	Source height metres	Receiver height metres	Source-barrier metres	Barrier-receiver metres	Noise reduction dB(A)
5.1	5.1	1.8	15	558	-5
5.1	5.1	1.8	20	553	-5
5.1	4.8	1.8	15	558	-5.7
5.1	4.8	1.8	20	553	-5.6
5.1	3.6	1.8	20	553	-8.6
7.65	5.1	1.8	15	558	-11.1

Barrier height of two containers one on top of other = 5.1 m
Barrier " " three containers on top of each other = 7.65 m

Arc Tas Pty. Ltd.

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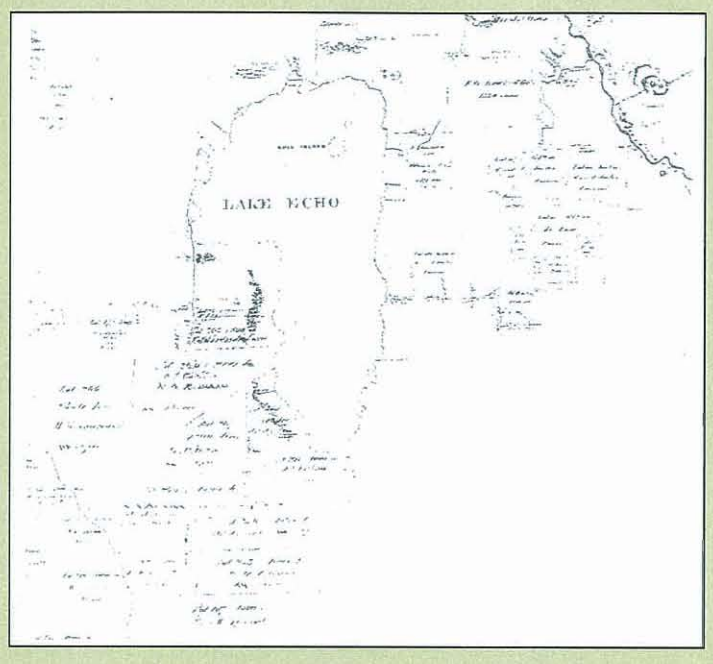
DESKTOP HISTORIC CULTURAL HERITAGE ASSESSMENT

PROPOSED DRILL SITE
LAKE ECHO VICINITY

SOUTH CENTRAL HIGHLANDS



Prepared by Parry Kostoglou
ARCTAS Pty Ltd.

For Great South Land Minerals Ltd.
August 2008

CONTENTS

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 in the Lake Echo vicinity in the Tasmanian south central highlands of Tasmania.

2.0 LOCATION AND EXTENT OF ASSESSMENT AREA

The current program requires drilling at a single locality approximately two kilometres north west of Lake Echo adjacent to Snarers Creek.

3.0 METHODOLOGY

This consultant reviewed relevant documentation held by the majority land manager (Forestry Tasmania).

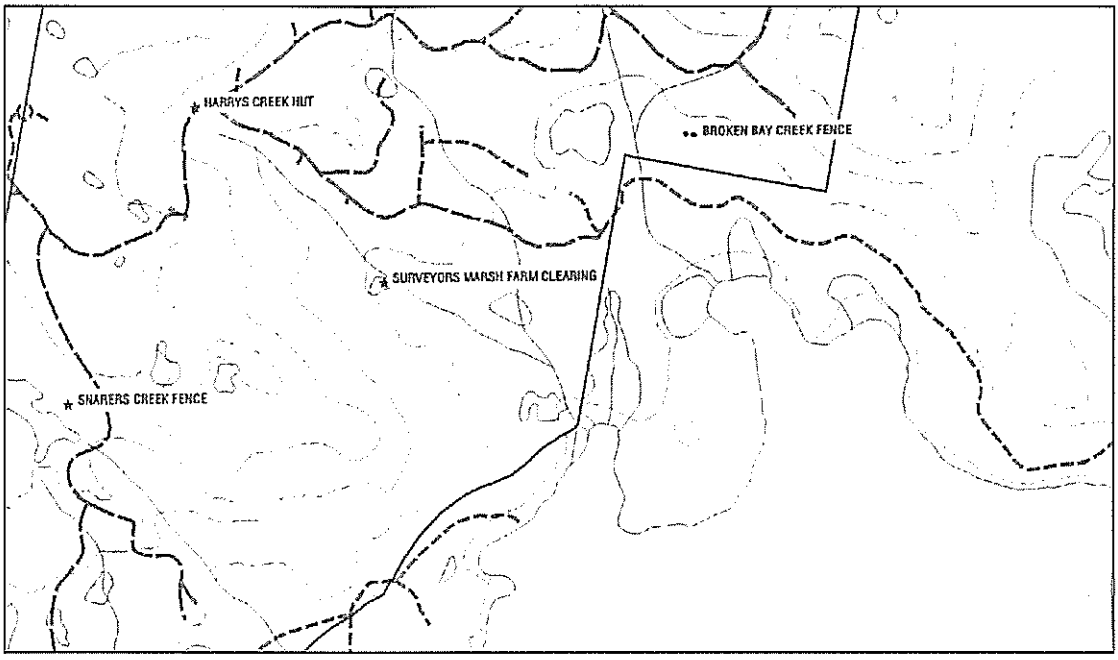
4.0 PREVIOUS WORK

The principal source of information for this area is a report titled 'An archaeological survey of historic sites in the South Central Highlands of Tasmania by Kostoglou undertaken for Forestry Tasmania in 2000. The location based information for this investigation was derived from extensive field work. Although this was expedited without the use of GPS

the grid co-ordinates for located sites are considered accurate to 25 metres.

5.0 SUMMARY OF RESULTS

Based on research conducted for this desktop based investigation, four sites are known to occur within proximity (1 kilometre) to the proposed impact area. Relevant location based information appears below while site summaries appear in Section 6.0 overleaf.



1:25,000 scale map of immediate area surrounding proposed impact zone showing known historic sites (from Kostoglou 2000)

Tabular summary of known sites (from Kostoglou 2000)				
Site Name	**Grid ref.**	**Site type**	**Significance**	**Source**
Harrys Creek hut	E 0466800 N 05338950	Pastoral	Medium Local	Kostoglou 2000
Surveyors Marsh farm clearing	E 0468000 N 5338100	Pastoral	Low Local	Kostoglou 2000
Snarers Creek fence	E 0466150 N 5337350	Pastoral	Low Local	Kostoglou 2000
Broken Bay Creek fence	E 469800 N 5338950	Pastoral	Medium Local	Kostoglou 2000

6.0 HISTORICAL CONTEXT

After its initial location by assistant surveyor Thomas Scott in 1823, the area surrounding Lake Echo was successively travailed by several colonial explorers throughout the following 25 or so years. During the early to mid 1850's this land was surveyed into large scale allotments over 500 acres which were only selectively taken up by a small number of large landholders. Associated improvements appear to have been lacklustre and the resident archaeological remains appear to date from the late 19th to early 20th century when these lots were further sub divided and leased by lessees who undertook assorted pastoral and hunting activities. Such marginal activities prevailed until the mid 20th century when selective logging associated with sawmilling was undertaken in the now vacant land. Since the 1970's the relevant Exclusive Forest Permits have been succeeded by large scale logging concessions granted to large scale corporate entities.

7.0 PREDICTIVE SUMMARY

Based on previous work the following predictive statements are considered applicable to the development area.

The resident historical archaeology consists of sites and features associated with small scale pastoral and hunting/snaring activities dating from the late 19th/early 20th centuries. These activities were often undertaken by the same individuals who moved sheep into the highlands vicinity seasonally and trapped game such as wallabies and possums for pelts to supplement their meagre incomes. The mid 20th century saw the incursion of selective timber harvesting and activities related to hydro electricity generation at nearby Lake Echo. The physical archaeological vestiges of such activities include:

- Assorted style timber fences (chock & log or post & rail)
- dry-stone walls erected as lease boundary markers
- dry-stone chimney butts
- dry-stone circular fireplaces
- Small single roomed timber huts

- Timber or dry-stone livestock corrals
- Logging roads and snig tracks

These sites and features have varying levels of cultural significance.

8.0 RECOMMENDATIONS

As a result of this assessment, it is recommended that the drilling program consisting of a single drill hole be allowed to proceed providing that:

- **The drill rig accesses the site on existing roading**
- **That the drilling and associated activities avoid any of the documented historic cultural sites and features described in this report.**
- **That the drilling and associated activities avoid any previously un-documented site and feature types alluded to in Section 7.0 of this report.**
- **That a field inspection of the proposed drill site be undertaken by a qualified archaeologist if any such remains are located prior to drilling.**

9.0 REFERENCES

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

northbarker
ECOSYSTEM SERVICES

Proposed drill site - Lachish

BOTANICAL SURVEY AND FAUNA HABITAT ASSESSMENT – reconnaissance survey and summary report

25 June 2007

For GSLM

Andrew North anorth@northbarker.com.au **Philip Barker** pbarker@northbarker.com.au
163 Campbell Street Hobart TAS 7000 Telephone 03. 6231 9788 Facsimile 03. 6231 9877

Summary

An exploration drill hole is proposed for a site in the northern midlands of Tasmania. An area of 500 m radius around the proposed site was surveyed for flora and fauna values.

As the drill site is very limited in extent and sited in exotic pasture, there are no obvious impacts upon any natural values of significance. A stand of *Eucalyptus pauciflora* forest in the northern part of the study area has some potential to support threatened plant species and fauna species as indicated in the assessment below. Drilling should be excluded from the stand.

ACKNOWLEDGMENTS

Fieldwork: David Ziegeler

Report preparation: Philip Barker and David Ziegeler

Mapping: Sue Jungalwalla

Client: GSLM

Date of Survey: 21st June 2007

Method: Botanical survey was carried out on foot. All perceivable habitats were covered. All areas containing at least some native vegetation were investigated and any variations within these were examined. Native species encountered were recorded. All native and introduced species that have naturalised were recorded. All environmental and 'declared'[1] weeds were considered.

Botanical nomenclature follows the current census of Tasmanian plants [2].

Purpose: The survey was designed to assess the flora and fauna values of the Lachish drill site and a 500 m radius of it to document the values and to predict potential impacts and how these may relate to threatened flora, fauna and vegetation conservation legislation.

As well as native plant species, all non-native species have been recorded with emphasis on 'declared weeds' listed in the *Weed Management Act 1999* plus any environmental weeds.

Limitations: The survey was undertaken in early winter. There is likely to be some herb, grass, orchid and graminoid species present but because of being outside of their flowering season, were overlooked.

Study Area: The study area occurs in the Tasmania Northern Midlands bioregion. It is situated within the 500 mm to 600 mm annual rainfall zone with a dry subhumid cool climate. The site is situated on the North Midlands Plain and consists of gently undulating terrain with a varied geological makeup of Triassic sandstone, Cainozoic sedimentary deposits and Tertiary basalt.

[1] Tasmanian *Weed Management Act 1999*

[2] Buchanan (2002)

Vegetation:

The larger part of the vegetation of the study area is exotic pasture and the lesser balance consists of native vegetation remnants in various environmental conditions depending mainly on the level of impacts of grazing, weed infestation and timber getting (Figure 1).

Two native vegetation communities persist within the route – these being as follows:-

***Eucalyptus pauciflora* forest and woodland not on dolerite substrates (DPO)** This community covers about the northern third of the of the study area. It is dominated by the tree species cabbage gum *Eucalyptus pauciflora* with some white gum trees *E. viminalis*. The stand consists entirely of mature regrowth. It is floristically structurally relatively simple. There is a sparse small tree and tall shrub layer dominated by *Banksia marginata* over a moderately dense ground cover of bracken fern *Pteridium esculentum*. Grasses are frequent with *Ehrharta stipoides* being the most common species and *Austrodanthonia* species and *Poa* species also being frequent. The prostrate shrub *Hibbertia fascicularis* is also frequent.

Lowland grassland complex (GCL) This community occurs as one patch near the south west boundary of the study area which is portrayed as marsh by Tas Veg mapping. It consists of a mixture of the grasses *Austrodanthonia* sp., *Ehrharta stipoides* and *Poa labillardierei*. Exotic pastoral herbs such as *Acetosella vulgaris* and *Plantago coronopus* are also common also occur which may indicate that the site is exotic pasture regenerating back to native grassland.

Table 1: Native vegetation communities in study area

Equivalent described floristic community	Equivalent Mapped Community	State Wide Conservation Priority	Regional Conservation Priority[3,4]
Cabbage gum (*Eucalyptus pauciflora*) forry woodland			
Grassy *E. pauciflora* forest and woodland DRY-grPAU	*Eucalyptus pauciflora* forest and woodland not on dolerite **DPO**	Not threatened and well reserved	Endangered
Austrodanthonia sp.–Ehrharta stipoides–Poa labillardierei - grassland			
Community not ascertained	Lowland grassland complex **GCL**	Not threatened but Inadequately reserved	Not threatened but inadequately reserved

[3] Flinders Bioregion – IBRA 5 - CARSAG (2000) Forest conservation priorities for use outside of CARSAG and the RFA Private Land Reserve Program. An unpublished report to the RFA Private Land Reserve Program, Hobart.

[4] DPIWE 2003 Tasmanian Native Non-forest Conservation Priorities.

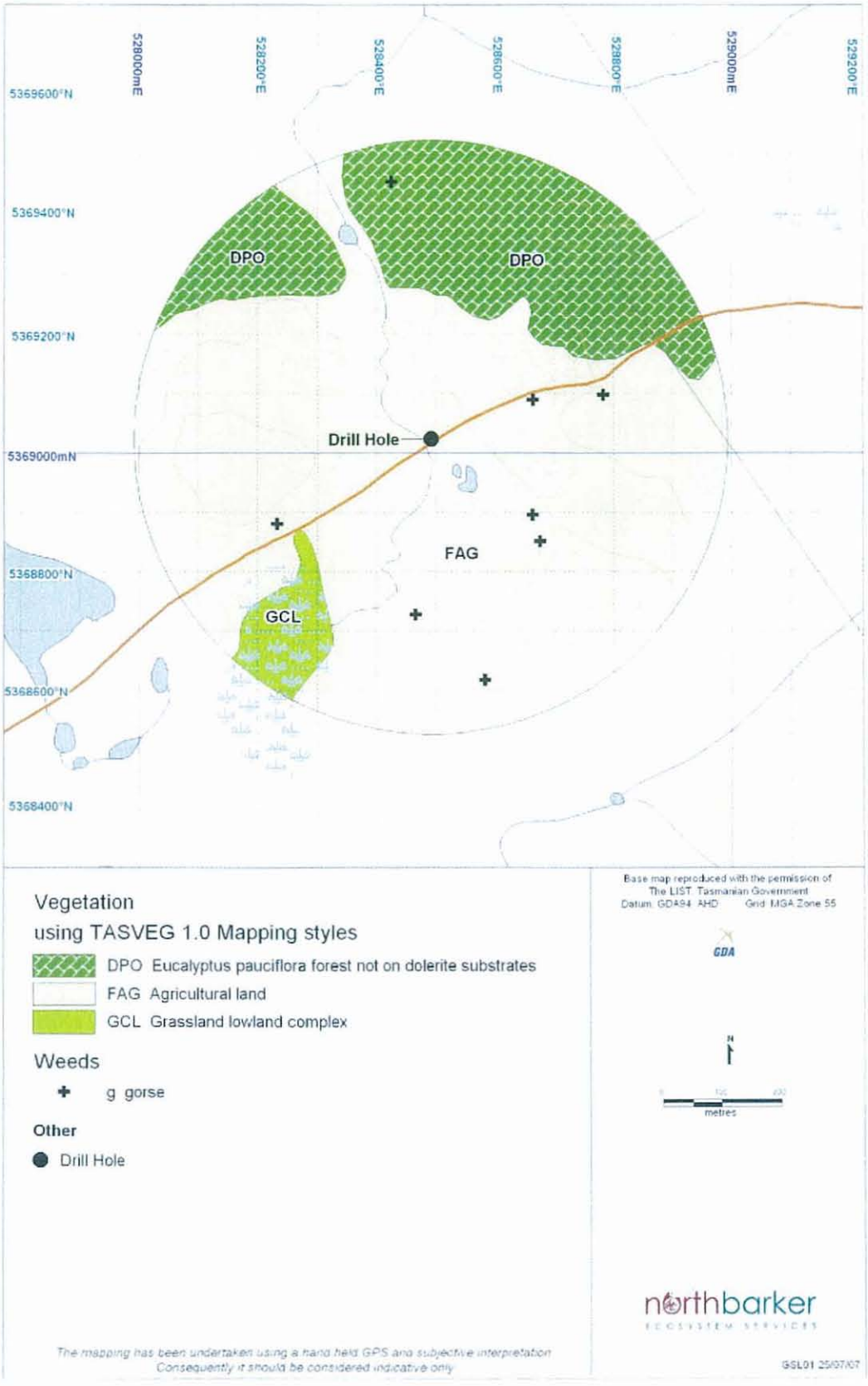


Figure 1 – Distribution of vegetation

Exotic pasture dominates the area.

Eucalyptus pauciflora forest.

Threatened plant species:

No vascular plant species of National conservation significance, listed in the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* were recorded.

No vascular plant species of state conservation significance listed on the schedules of the *Tasmanian Threatened Species Protection Act 1995*.

Table 2: Flora Species of Conservation Significance Previously Recorded in the Vicinity or Possibly Occurring in the native vegetation in the Study Area

Species	Conservation Status[5]		Observations
	State	National	
Amphibromus macrorhinus Long-nosed swamp wallaby grass	Endangered	-	Occurs in water holes and low-lying wet areas. Marginal habitat present but species not observed.
Aphelia pumilio Dwarf aphelia	Rare		Occurs in wet grassland. Marginal habitat present but species not observed.
Arthropodium strictum Chocolate lily	Rare	-	Occurs in grassy woodland on fertile soils – may be present but not observed. More readily recorded in spring flowering season.
Austrodanthonia popinensis Roadside wallaby grass	Endangered	ENDANGERED	Occurs in dry grassland. Study area heavily grazed so species not observed if present. Outside of the core range for this species.
Austrostipa nodosa Knotty speargrass	Rare	-	Occurs in dry grassland and grassy woodland – may occur but only

[5] Tasmanian *Threatened Species Protection Act 1995*

Species	Conservation Status		Observations
	State	National	
			identifiable in summer months.
Bolboschoenus caldwellii Sea club-rush	Rare	-	Occurs in marshland. No suitable habitat present.
Brachyscome sieberi var. *gunnii* Sieber's daisy	Rare	-	Occurs in open forest. May be present but only likely to be recognised in flowering season.
Caesia calliantha Blue grass lily	Rare		Occurs in native grassy habitats. May be present but only likely to be recognised in flowering season.
Caladenia anthracina Black-tipped spider orchid	Endangered	ENDANGERED	Occurs in woodlands on sandy soil. May be present but only likely to be recognised in spring flowering season.
Caladenia filamentosa var. *filamentosa*	Rare	-	Occurs in heathy open forest and heathland. May be present but only likely to be recognised in spring flowering season.
Centaurium spicatum Australian centaury	Rare	-	Occurs in rocky/grassy habitat – low probability of being present.
Colobanthus curtisiae Curtis' colobanth	Rare	VULNERABLE	Occurs in dry grassy habitat. May be present but species not observed.
Glycine latrobeana Clover glycine	Vulnerable	VULNERABLE	Occurs in grassy habitat – may be present but species not observed.
Leucopogon virgatus var. *brevifolia* Short-leaf beard heath	Rare	-	Occurs in woodland. May be present but not observed.
Myriophyllum integrifolium Tiny water milfoil	Vulnerable	-	Occurs in swampy sites. Probably low possibility of being present.
Puccinellia stricta var. *perlaxa* Spreading saltmarsh grass	Rare	-	Occurs in salt marshes and saline flats – no suitable habitat present.
Pultenaea humilis Dwarf bush pea	Vulnerable	-	Occurs in dry gravely soils in *E. amygdalina* forest – no suitable habitat present.
Stenanthemum pimeleoides Spreading stenanthemum	Vulnerable	ENDANGERED	Occurs in dry gravely soils in open forest – no suitable habitat present.
Viola cunninghamii Cunningham's violet	Rare	-	Occurs in montane grasslands – local record in error.
Wilsonia rotundifolia Roundleaf wilsonia	Rare	-	Occurs in saltmarsh – no suitable habitat present.

Introduced Plants:

Being partly agricultural land, exotic vascular plants are a significant part of the vegetation. The native vegetation types have largely retained their native floristic character.

One Declared Weed species which is listed under the *Weed Management Act 1999 Section 9.*, occurs in the study area. This is Gorse (*Ulex europaeus*) which forms scattered infestations mainly in exotic pasture.

Fauna Conservation Values:

The study area supports significant habitat or potentially significant habitat for two species of listed threatened fauna listed under the *Tasmanian Threatened Species Protection Act 1995* and the *Environmental Protection and Biodiversity Conservation Act 1999*. These species are eastern barred bandicoot (*Perameles gunnii*) and catadromus carabid beetle (*Catadromus lacordairei*). These and a number of other species recorded within 5000 m of the study area are discussed in the table below.

Table 3: Fauna of conservation significance previously recorded within a 5 km radius of the study area or likely to occur

Species	Conservation Status[6]		Observations
	State	National	
Perameles gunnii Eastern-barred bandicoot	-	Vulnerable	Occurs in open forests, woodlands and pasture where substantial ground cover is present. May be present in study area.
Aquila audax fleayi Wedge-tailed eagle	Endangered	-	No suitable nesting habit present within study area of 1 km vicinity but site has some foraging potential.
Pseudomoia pagensterii Tussock skink	Endangered	-	Occurs in dry *Poa* grasslands. No suitable habitat present.
Litoria raniformis Green and gold frog	Vulnerable	-	Occur in weedy water-bodies. No suitable habitat present.
Catadromus lacordairei Catadroma carabid beetle	Rare	-	Occurs in dry woodlands. Local woodland habitat may be suitable.

Comment of impact of proposed drill site:

As the drill site is very limited in extent and sited in exotic pasture, there are no obvious impacts upon any natural values of high significance which might occur in the study area. The stand of *Eucalyptus pauciflora* forest in the northern part of the study area has some potential to support the threatened plant species and fauna species as indicated in the table above. If drilling activity is relocated into this stand there is potential for impact.

[6] Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* including JAMBA, CAMBA and Migratory species; Tasmanian *Threatened Species Protection Act, 1995*

Legislative Implications:

The works as they are proposed appear to have no implications for commonwealth or state nature conservation legislation.

The works appear to offer no potential for the spread of the 'declared weed' species – gorse however quarantine measures such as wash-down of vehicles and machinery used in other sites is advisable to prevent the risk of weed spread to sites such as the current work site.

References:

CARSAG (2003). Revision of CARSAG Forest Scores. Internal Memorandum from R. Knight to CARSAG 29th January 2003

Commonwealth of Australia (1999). *Environment Protection and Biodiversity Conservation Act 1999. No. 91, 1999*

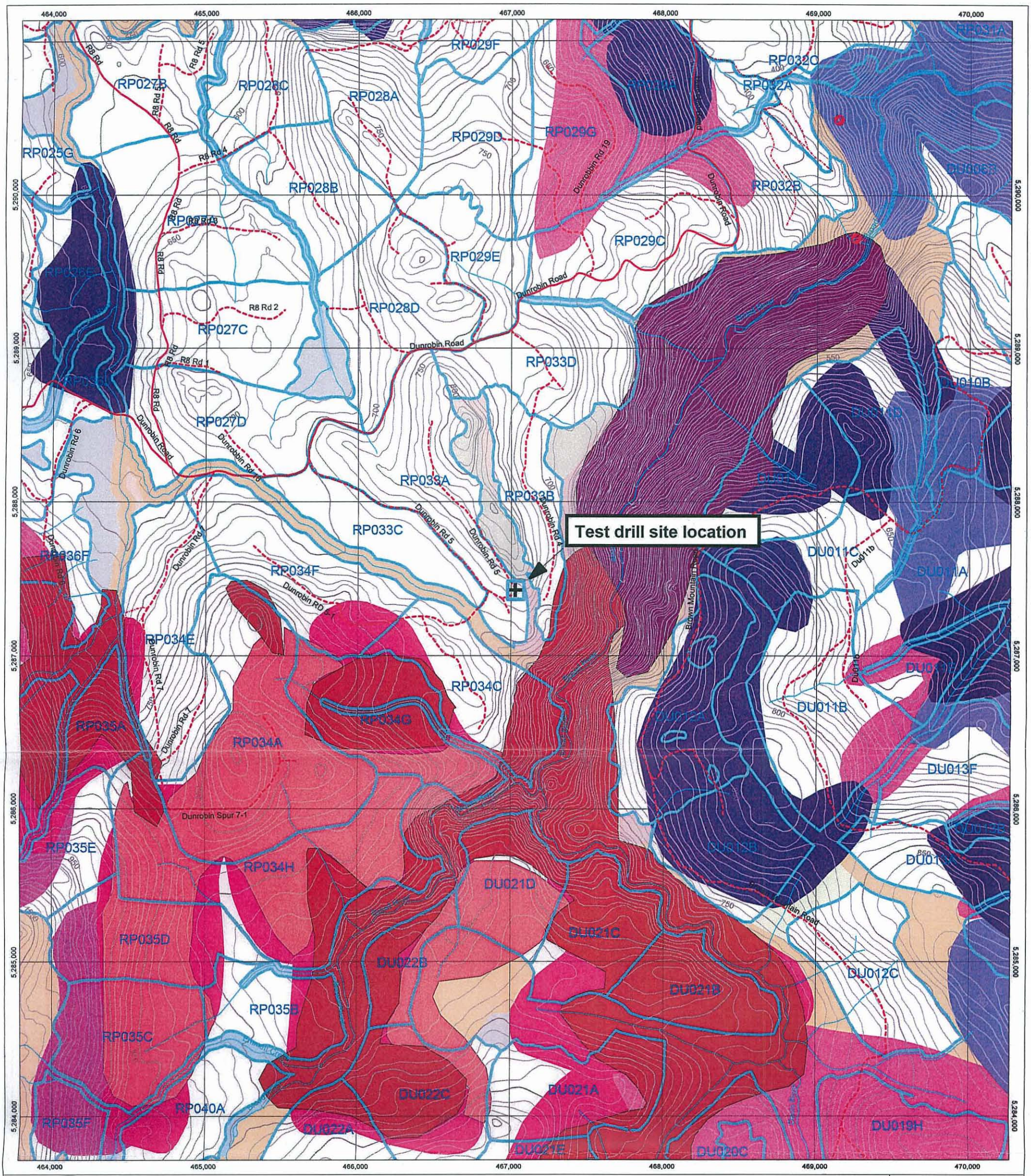
Goff, F.G, Dawson, G.A. and Rochow, J.J. (1982). Site examination for threatened and endangered plant species. *Environmental Management 6 (4) pp 307-316.*

Land Use Planning And Approvals Act (1993). Tasmanian State Government, No.70 of 1993. Government Printer, Hobart, Tasmania

North, A.J., Johnson, K., Ziegler, K., Duncan, F., Hopkins, K, Ziegeler, D., Watts, S. (1998). *Flora of Recommended Areas for Protection and Forest Reserves in Tasmania.* Forestry Tasmania / Forest Practices Board / Parks & Wildlife Service, Hobart.

Threatened Species Protection Act 1995. Tasmanian State Government, No.83 of 1995. Government Printer, Hobart, Tasmania

Tasmanian State Government (1999). *Tasmanian Weed Management Act 1999. No. of 1999.* Government Printer, Hobart, Tasmania



drill text
RP033 Drill Site
Threatened Fauna
Sigificant all weather 2 lane feeder road
Single lane all weather minor road
Single lane minor road

50 Metre Contour (25K)
10 Metre Contour (25k)
Coupe Live (Boundary)
2008 SEARCH (Polygons)
2007 Search (Polygons)
2007 search unsuitable (Polygons)

2006 eagle searched areas
2005 eagle searched areas
2004 eagle searched areas
2003 eagle searched areas
2002 eagle searched areas
Inaccessible

Unloggable
MDC protection
Non commercial
Regen problems
Steep
Streamside reserve

Not to be logged
Uneconomic
Wildlife habitat clump
Protection Informal Reserve

NOTE: Co-ordinates on this map are based on GDA94.

Any topographic data on this map has been supplied by DPIWE.

Data has been captured at differing scales & boundaries may not always coincide

LOCATION MAP

4431	4631	4831
4430	4630	4830
4429	4629	4829
4428	4628	4828
4427	4627	4827
4426	4626	4826

GDA
GEOCENTRIC DATUM OF AUSTRALIA

GSLM Drill Site

WTE Nest Searching
2002 to 2008

Plot identifier:	Prepared by: bsp	Scale 1:25,000
Date: Thursday, 31 July 2008	Prepared for:	0 0.5 km

A3P

Forestry Tasmania
GROWING OUR FUTURE

GSLM Drill Site

RP033A

Eagle Nest Management

Test drill site location

drill text

RP033 Drill Site

Threatened Fauna

Eagle 500m Buffer

Plan Coupe Base (Boundary)

Sigificant all weather 2 lane feeder road

Single lane all weather minor road

Single lane minor road

Pitype

50 Metre Contour (25K)

10 Metre Contour (25k)

Eagle 1km Line of Sight of Nests

Unloggable

Non commercial

Regen problems

Steep

Streamside reserve

Uneconomic

Wildlife habitat clump

Protection Informal Reserve

NOTE: Co-ordinates on this map are based on GDA94.

Any topographic data on this map has been supplied by DPIWE.

Data is continual as adjoining sheets & boundaries may not always be correct.

Scale 1:25,000

0 500 m

Date: Tuesday, 29 July 2008

Plot identifier:

LOCATION MAP

4430	4630
4429	4629
4428	4628
4427	4627
4426	4626

Prepared by: bsp

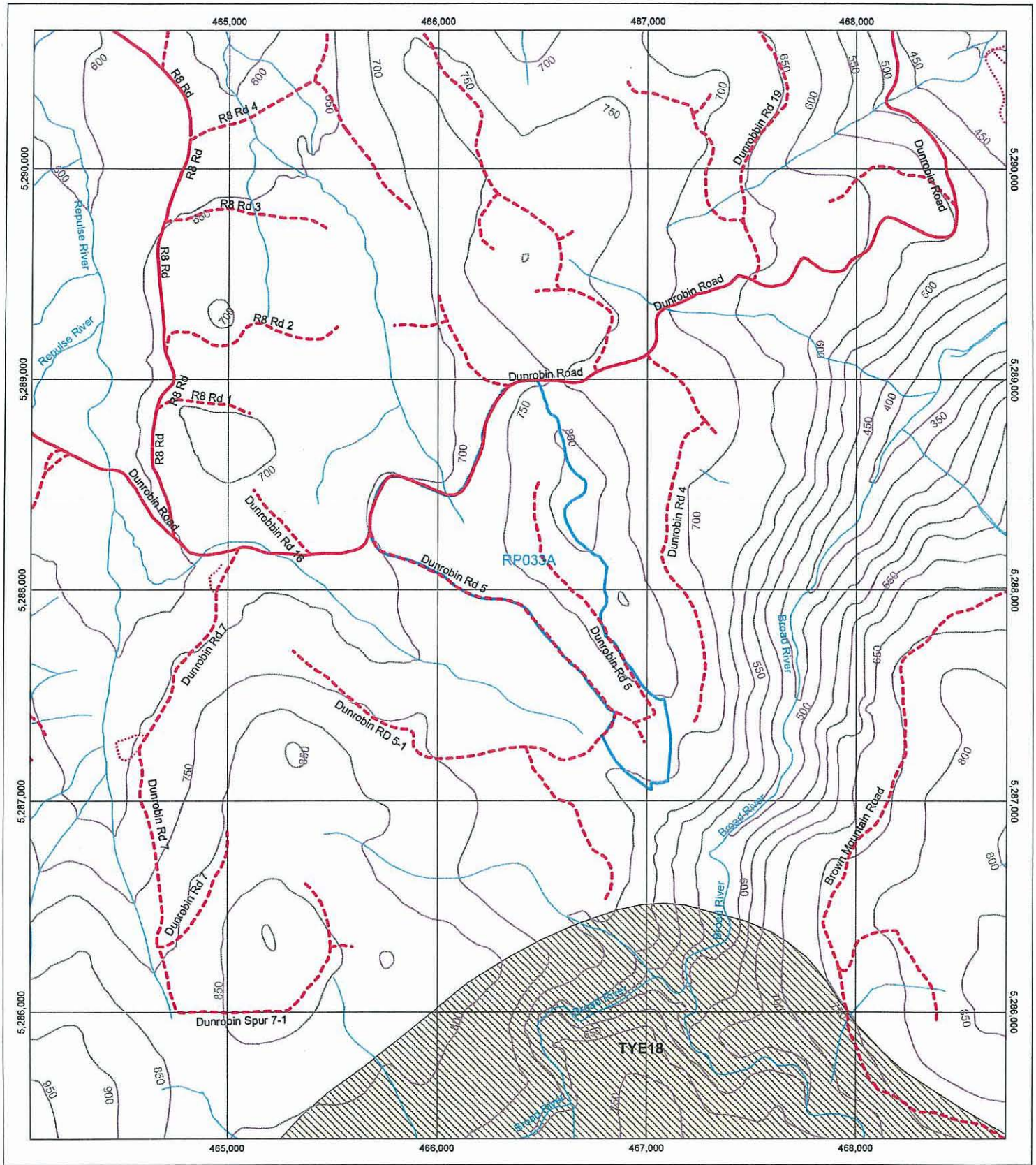
Prepared for:

A3L

GDA

Forestry Tasmania

GROWING OUR FUTURE



Sigificant all weather 2 lane feeder road

Single lane all weather minor road

Single lane minor road

Plan Coupe Base (Boundary)

50 Metre Contour (25K)

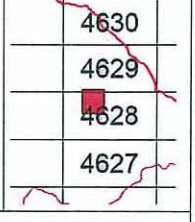
Vulnerability 4

Vulnerability 5

Vulnerability 6

Vulnerability 10

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94

Topographic map data is supplied by DPIWE

Boundaries may not co-incide due to different capture scales

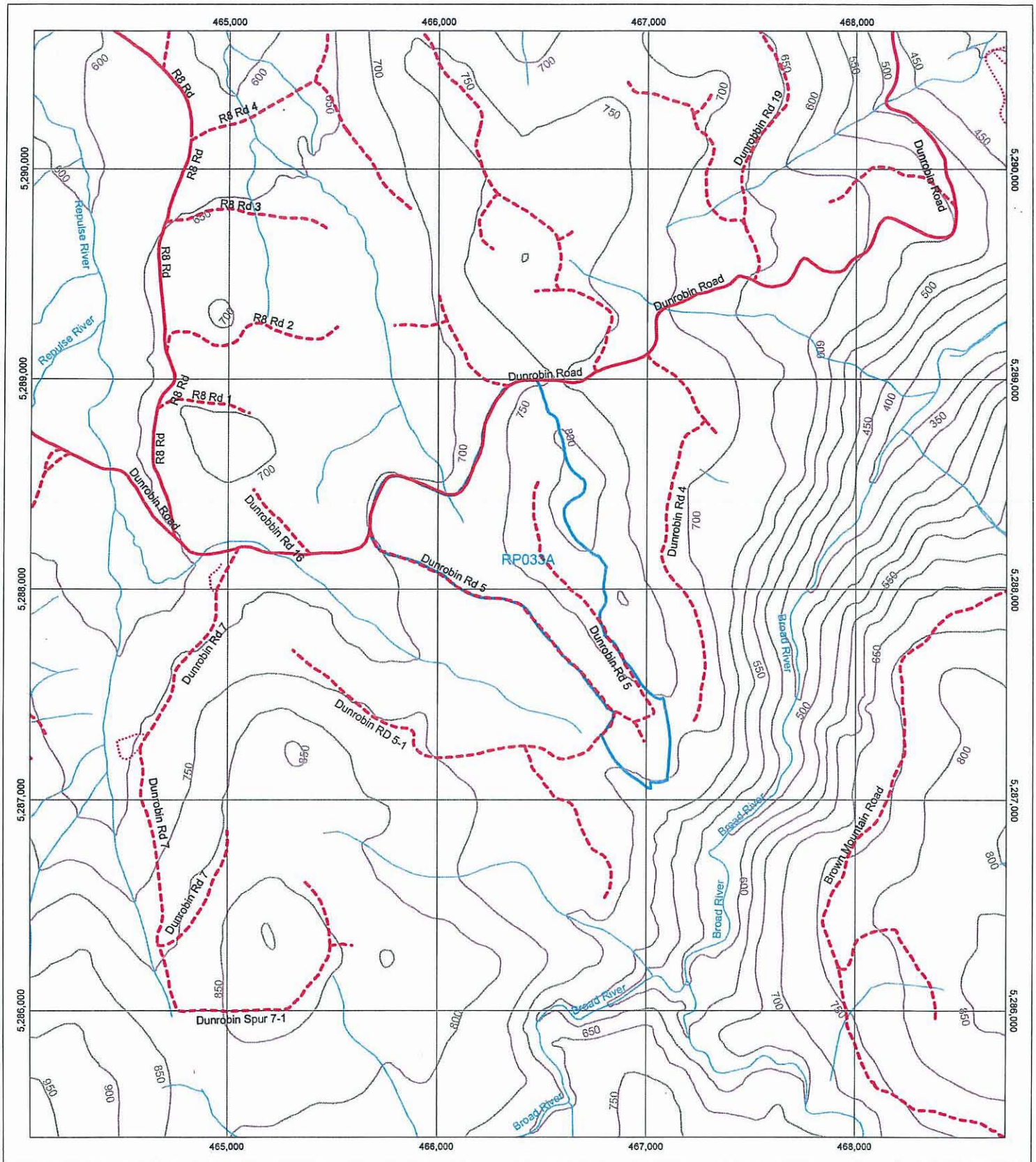
Geoconservation
By RP033A

A4P

GDA
GEOCENTRIC DATUM OF AUSTRALIA

Forestry Tasmania
GROWING OUR FUTURE

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:25,000
Plot identifier: vntmcgeocp2008.07.28.05.47.280	Prepared for:	0 500 m



Sigificant all weather 2 lane feeder road

Single lane all weather minor road

Single lane minor road

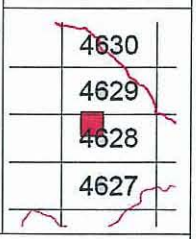
Plan Coupe Base (Boundary)

50 Metre Contour (25K)

Category A Karst

Karst - Catchment

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

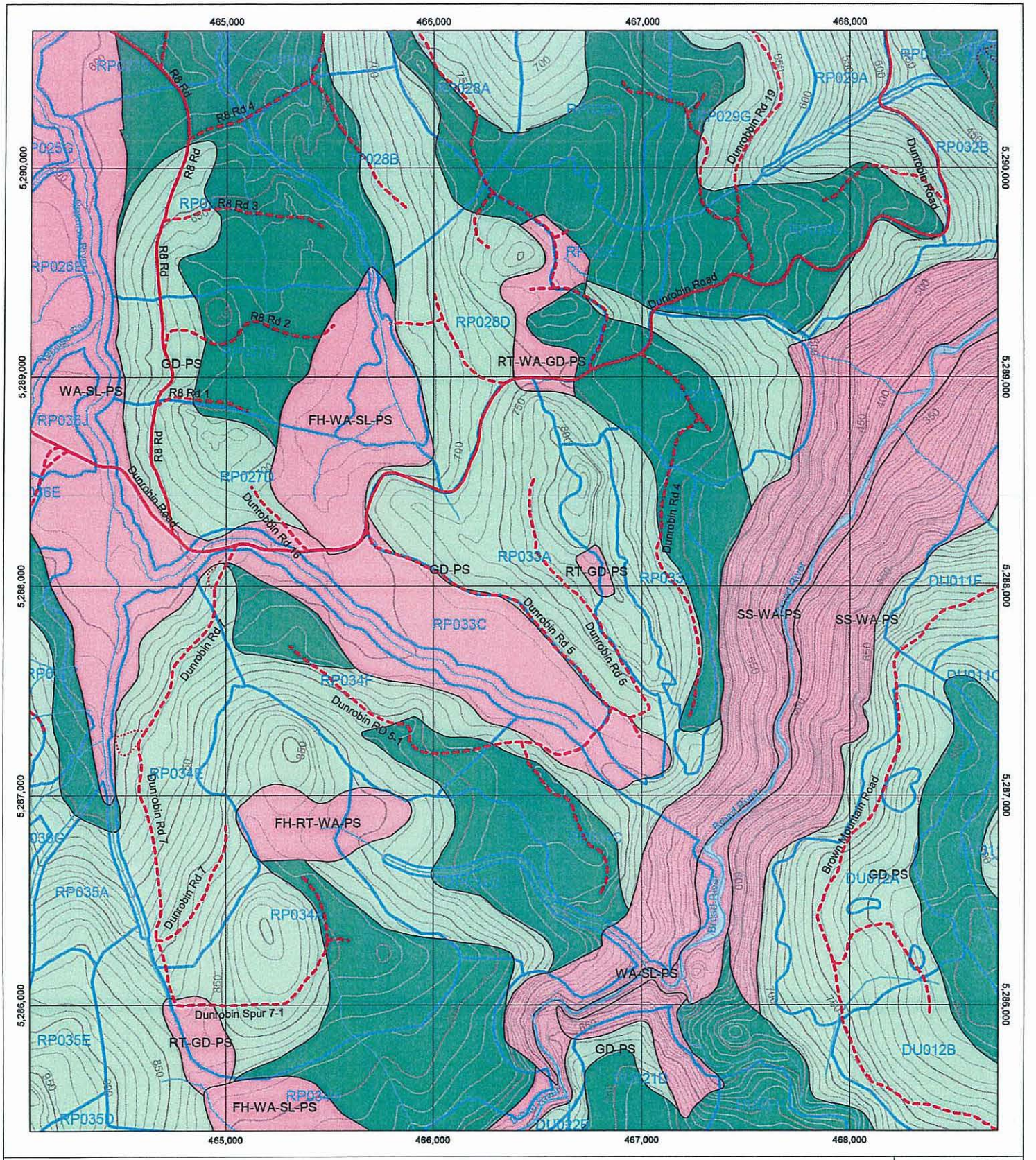
GDA GEOCENTRIC DATUM OF AUSTRALIA

Karst Area/Catchment
RP033A

A4P

Forestry Tasmania
GROWING OUR FUTURE

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:25,000
Plot identifier: vntmcdtkst2008.07.28.05.46.44	Prepared for:	0 500 m



Sigificant all weather 2 lane feeder road

Single lane all weather minor road

Single lane minor road

APZ Boundary

Plan Coupe Base (Boundary)

50 Metre Contour (25K)

10 Metre Contour (25k)

Water

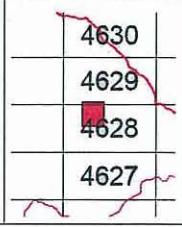
High Density or Highly Significant Site (H)

Low density of sites or low archaeological significance (L)

Potential of area unknown (U)

Unzoned areas (outside SF) (Z)

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

APZ Map for RP033A

A4P

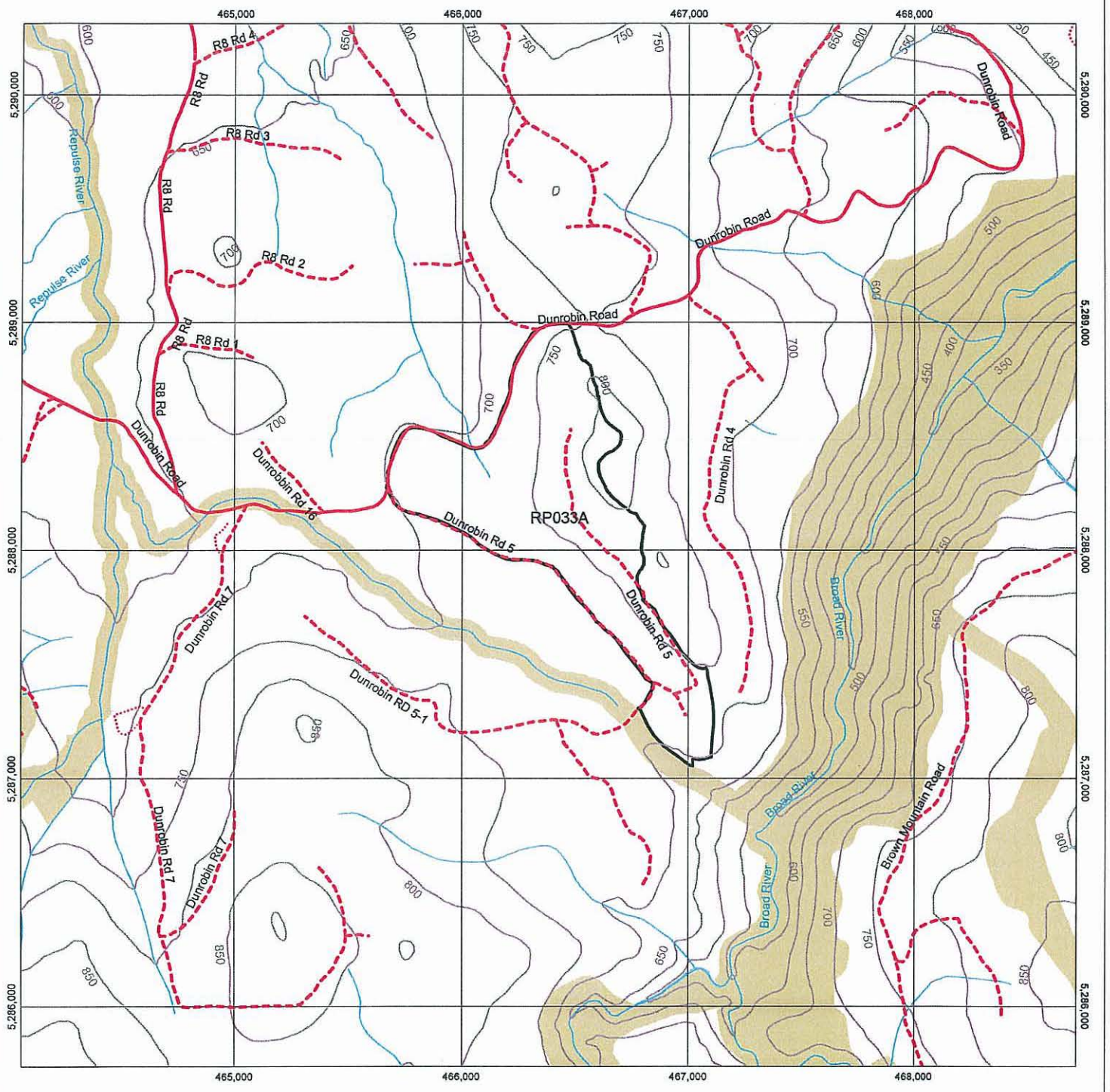
GDA GEOCENTRIC DATUM OF AUSTRALIA

Forestry Tasmania GROWING OUR FUTURE

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:25,000
Plot identifier: vntmcapzpc2008.07.28.05.46.42	Prepared for:	0 500 m

Aboriginal Sites Enquiry RP033A

Date: Monday, 28 July 2008



- Sigificant all weather 2 lane feeder road
- Single lane all weather minor road
- Single lane minor road
- 50 Metre Contour (25K)
- Plan Coupe (Boundary)
- State Forest Boundaries
- Informal Reserves - MDC (distlib)
- Water

Important Notes:

For forest planning purposes ONLY.

All Aboriginal site data are confidential.
Please refer to the Aboriginal Sites Enquiry Report associated with this map for site information.

Scale 1:25,000

0 500 m

A4P

NOTE: Any base data on this map is supplied by DPIWE.
Coordinates on this map are based on GDA94.

Map Centre Coordinates: 466392 mE, 5288024 mN

Plot identifier: vntmcabpc2008.07.28.05.46.43	Prepared for:	Prepared by: Vanessa Thompson

GDA

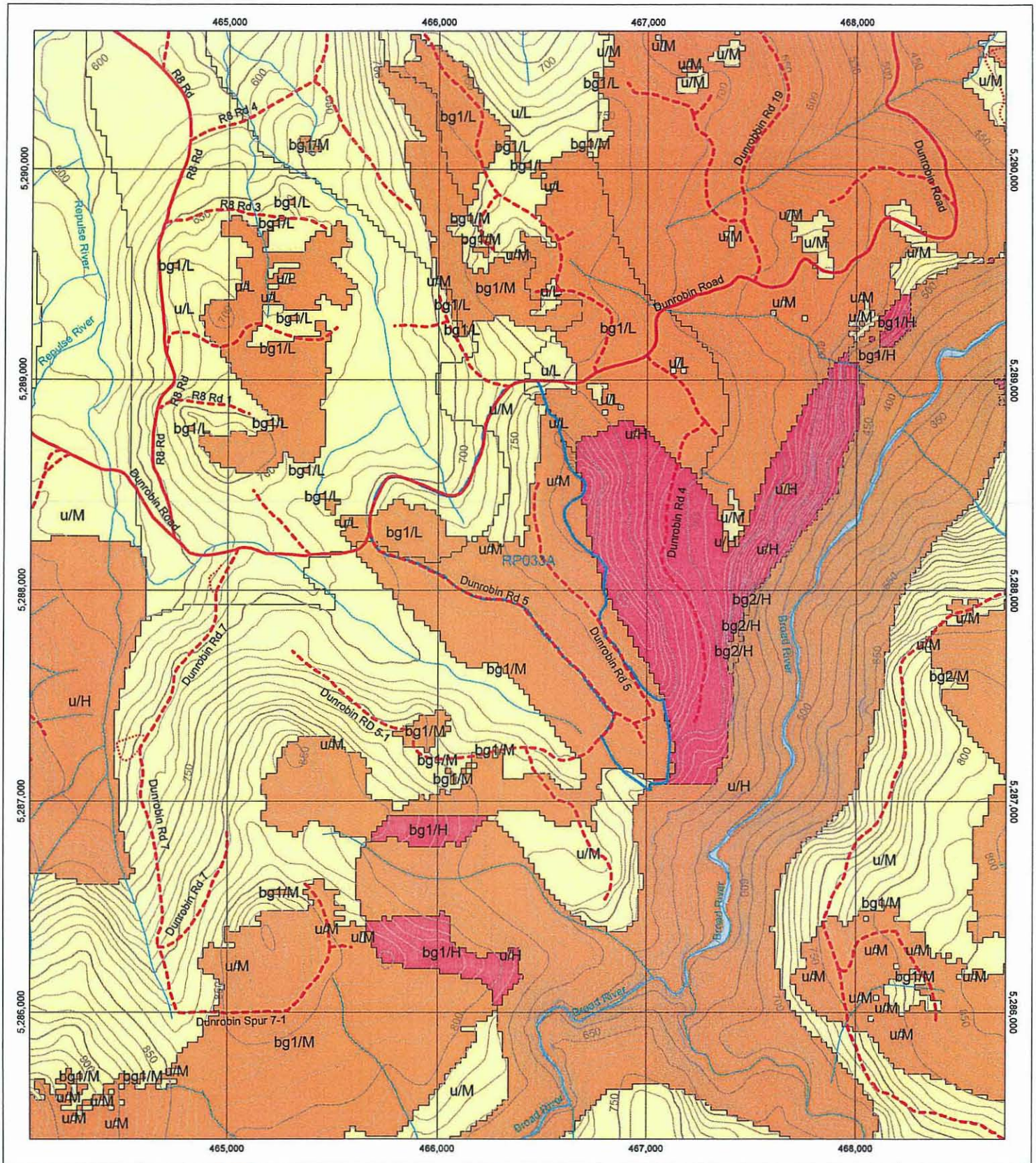
Forestry Tasmania
GROWING OUR FUTURE

Aboriginal Sites Enquiry Report

Location: Provcoupe - RP033A

Generated Monday, 28th of July 2008 - 17:46:57

Aboriginal Sites Database					
TASI	EASTING	NORTHING	SITE TYPE 1	SITE TYPE 2	SITE TYPE 3
There are no records for this theme within this area.					



Sigificant all weather 2 lane feeder road

Single lane all weather minor road

Single lane minor road

Plan Coupe Base (Boundary)

State Forest Boundaries

50 Metre Contour (25K)

10 Metre Contour (25k)

Water

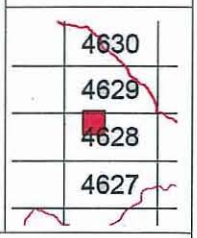
Zone A

Zone B

Zone C

State Forest

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

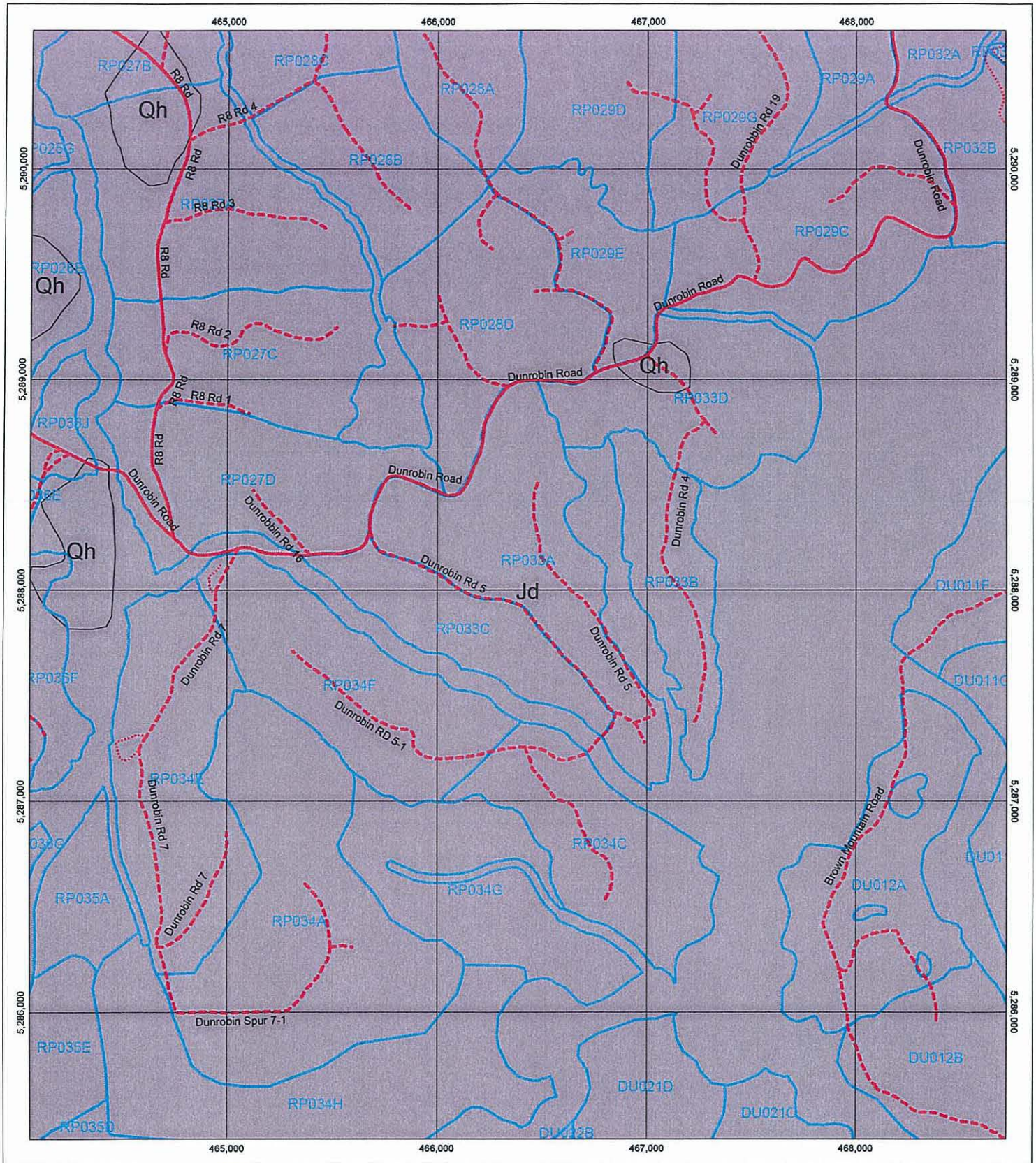
GDA GEOCENTRIC DATUM OF AUSTRALIA

Landscape Management Objective
RP033A

A4P

Forestry Tasmania
GROWING OUR FUTURE

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:25,000
Plot identifier: vntmclmo_p2008.07.28.05.46.44	Prepared for:	0 500 m



Sigificant all weather 2 lane feeder road

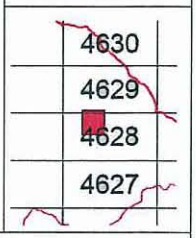
Single lane all weather minor road

Single lane minor road

Plan Coupe Base (Boundary)

Geology

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94

Topographic map data is supplied by DPIWE

Boundaries may not co-incide due to different capture scales

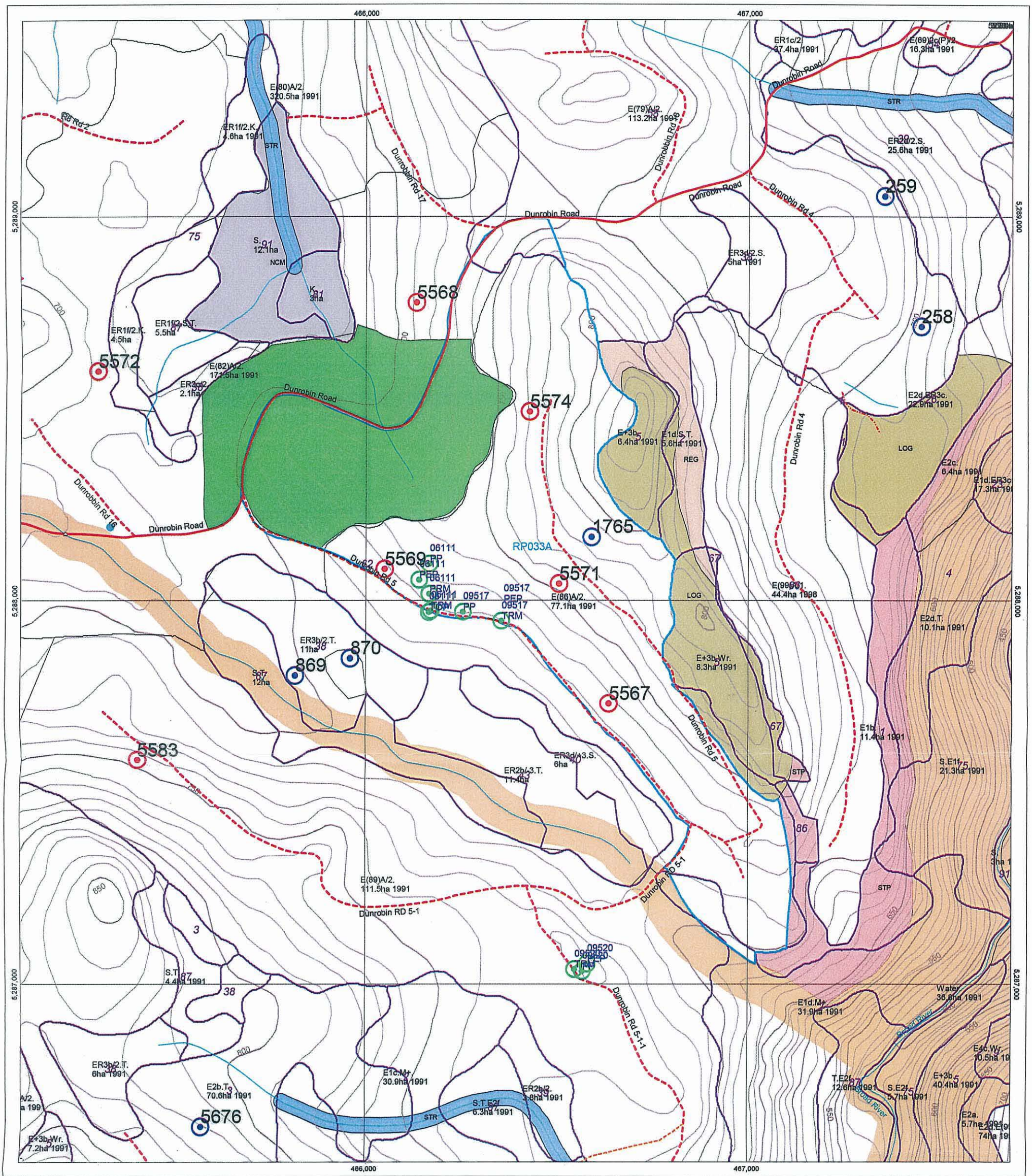
Geology (1:250,000 dataset)
RP033A

A4P

GDA GEOCENTRIC DATUM OF AUSTRALIA

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:25,000
Plot identifier: vntmcdtgly2008.07.28.05.46.44	Prepared for:	0 500 m

Forestry Tasmania
GROWING OUR FUTURE



NFT Priority 1
NFT Completed
Active
Log Culvert
Water point

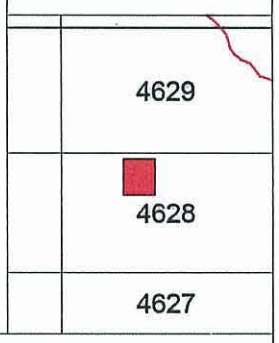
Located or marked out roads
Provisional mapped roads
Located or marked out roads
Provisional mapped roads
Sigificant all weather 2 lane feeder road

Single lane all weather minor road
Plan Coupe Base (Boundary)
Forest Class 2005 (Boundary)
Pitype (Boundary)
50 Metre Contour (25K)

10 Metre Contour (25k)
Protection Informal Reserve
Unloggable
Non commercial
Regen problems

Steep
Streamside reserve
Intensive Native Forest

LOCATION MAP



NOTE: Co-ordinates on this map are based on GDA94.

Any topographic data on this map has been supplied by DPIWE.

Data has been captured at differing scales & boundaries may not always coincide

Temp & Permanent Strategic Inventory Plots

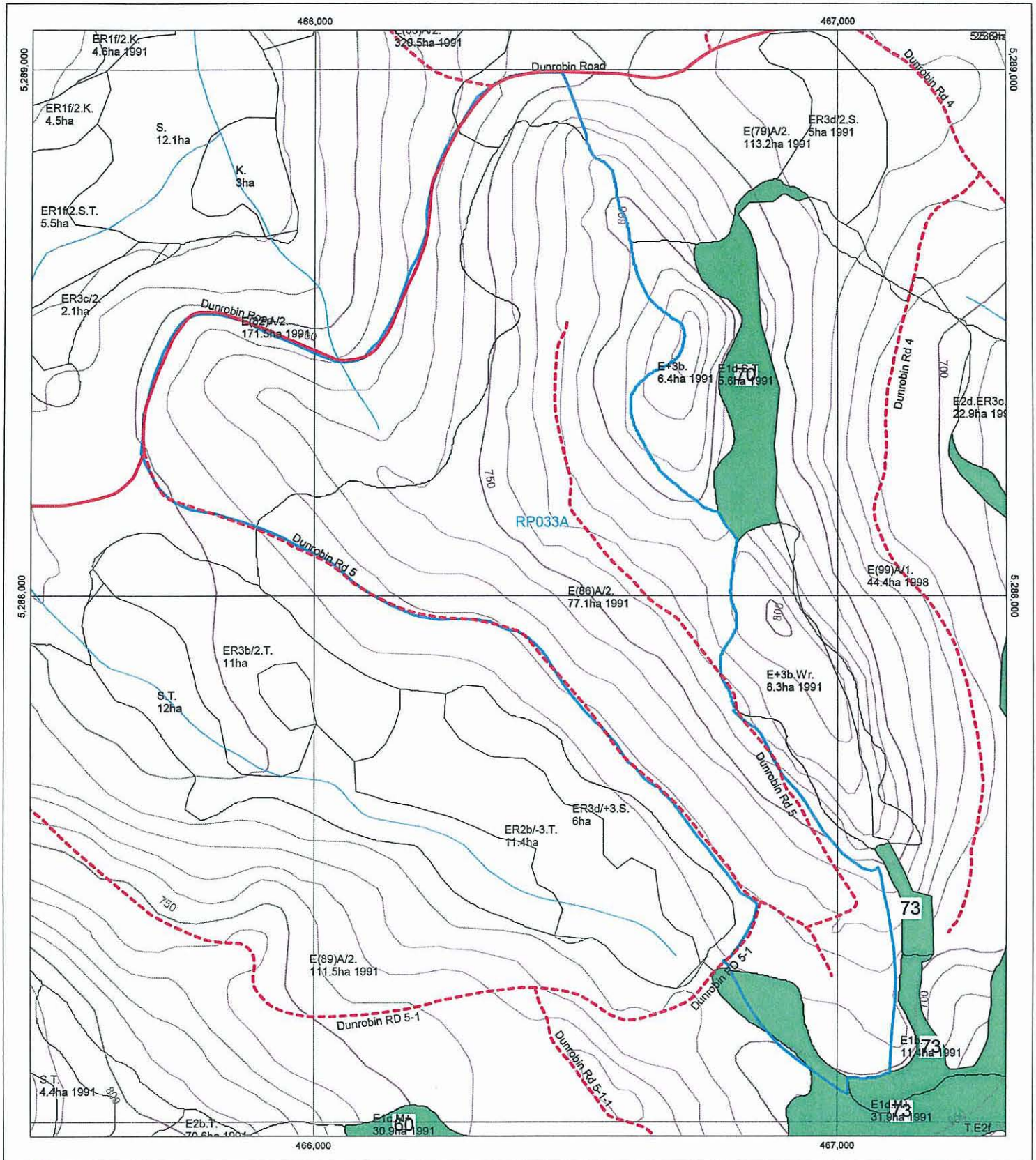
RP033A

A3P

Forestry Tasmania
GROWING OUR FUTURE

GDA
GEOCENTRIC DATUM OF AUSTRALIA

Plot identifier: vntmcrpp2008.07.29.09.15.150	Prepared by: Vanessa Thompson	Scale 1:10,000
Date: Tuesday, 29 July 2008	Prepared for:	0 — 500 m



Sigificant all weather
2 lane feeder road

Single lane
all weather minor road

Plan Coupe Base (Boundary)

Pitype (Boundary)

50 Metre Contour (25K)

10 Metre Contour (25k)

Water

Tall Stands

LOCATION MAP

4629

4628

NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

Giant Tree Check
RP033A

A4P

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:10,000	
Plot identifier: vntmcgiantp2008.07.28.05.46.44	Prepared for:	0 250 m	

GDA GEOCENTRIC DATUM OF AUSTRALIA

Forestry Tasmania
GROWING OUR FUTURE

THREATENED FAUNA MAPSHEET DISPLAY
ELLENDALE 4628
Current as at 29/Jul/2008
Please note, coordinates use map datum GDA94

Known localities

Species	Tenure	Locality		Notes
tussock grass skink	P	479612 5282683	Water Palls Hill 1km SE	
wedge-tailed eagle	SF	463451 5288103	Repulse River N	nest (#724) active 99
wedge-tailed eagle	SF	472203 5286034	Brown Mountain, Ellendale 2.2km NE	nest (#578)
wedge-tailed eagle	SF	472569 5285968	Brown Mountain, Ellendale 2.4km NE	nest (#571)
wedge-tailed eagle	SF	463712 5287683	Repulse River mid	nest gone (#723)
wedge-tailed eagle	SF	463962 5287433	Repulse River S	nest (#722)
wedge-tailed eagle	SF	469254 5289719	Broad River	nest (#1067)
wedge-tailed eagle	P	471820 5282889	Ironstone Creek	nest (#344)
wedge-tailed eagle	SF	472641 5282764	Ironstone Creek	nest (#345)
white-bellied sea eagle	P	478300 5289140	Mike Howes Gully Lake Meadowbank	nest # 1536

Habitat which may contain threatened species

Species	Habitat
eastern barred bandicoot	Grassy woodlands, native grasslands, mosaics of pasture and ground cover, including shrubby weeds
grey goshawk	Wet eucalypt forest with blackwood/myrtle understorey, blackwood swamp, E. brookeriana wet forest, melaleuca and leptospermum forest.
masked owl	Lowland dry sclerophyll forest with old growth components
quoll (spotted-tailed, eastern)	All wetter forest types, coastal heath and bush-pasture interfaces
tussock grass skink	Lowland *Poa* tussock grassy woodland and open grassland where there is a good cover of tall to medium tussocks
wedge-tailed eagle	Large tracts (more than 10 ha) of eucalypt or mixed forest
white-bellied sea eagle	Forest with significant old-growth eucalypt component within 5 km of the coast (nearest coast including shores, bays, inlets and peninsulas), rivers, lakes or complex of farm dams

Back

EASTERN BARRED BANDICOOT

Perameles gunnii gunnii

Status

VULNERABLE (Commonwealth *Endangered Species Protection Act 1992*), due to habitat loss and predation.

Description

The eastern barred bandicoot is rabbit-sized and greyish to light brown in colour with three or four very distinctive pale bands or stripes across the rump. The hind legs are longer than the fore legs, producing a bounding gait and enabling the animal to sit upright. Signs of bandicoots being present include small conical nose holes dug in soft soil.

Distribution and Habitat

The eastern barred bandicoot is found in Victoria and Tasmania. In Victoria, its range is restricted to a small number of sites. However, the eastern barred bandicoot is relatively widespread and abundant in some parts of Tasmania, although it has significantly declined in its natural habitat throughout the Midlands. It is most common in the southeast and northwest of Tasmania but less common in the northeast, Midlands and east coast. There are no records of the species from the southwest or from altitudes above 950 m.

Eastern barred bandicoots prefer open grassy areas for foraging but require some form of thick ground cover for shelter and nesting. Their native habitat is grassland and grassy woodland dominated by tussocks, reeds and grasses. Eastern barred bandicoots particularly flourish in areas of good quality agricultural land (deep soils, high rainfall) bordered by native bush.

Management Objectives for Production Forest Areas

Any regional management plans should take this species into account.

Any native habitats e.g. grasslands, tussock, grassy paddocks, reeds, heath, etc. with eastern barred bandicoots have high conservation value. Retain as much undisturbed native bush as possible, especially the understorey plants needed for cover and nesting.

Maintain and encourage ground cover. Weeds such as gorse and blackberries provide shelter for bandicoots. However, native plants which form a dense ground cover i.e. saggs (*Lomandra* and *Lepidosperma* spp.), *Gahnia* spp., species of *Acacia*, *Grevillea*, *Hakea*, *Correa*, long native grasses and reeds are particularly suitable.

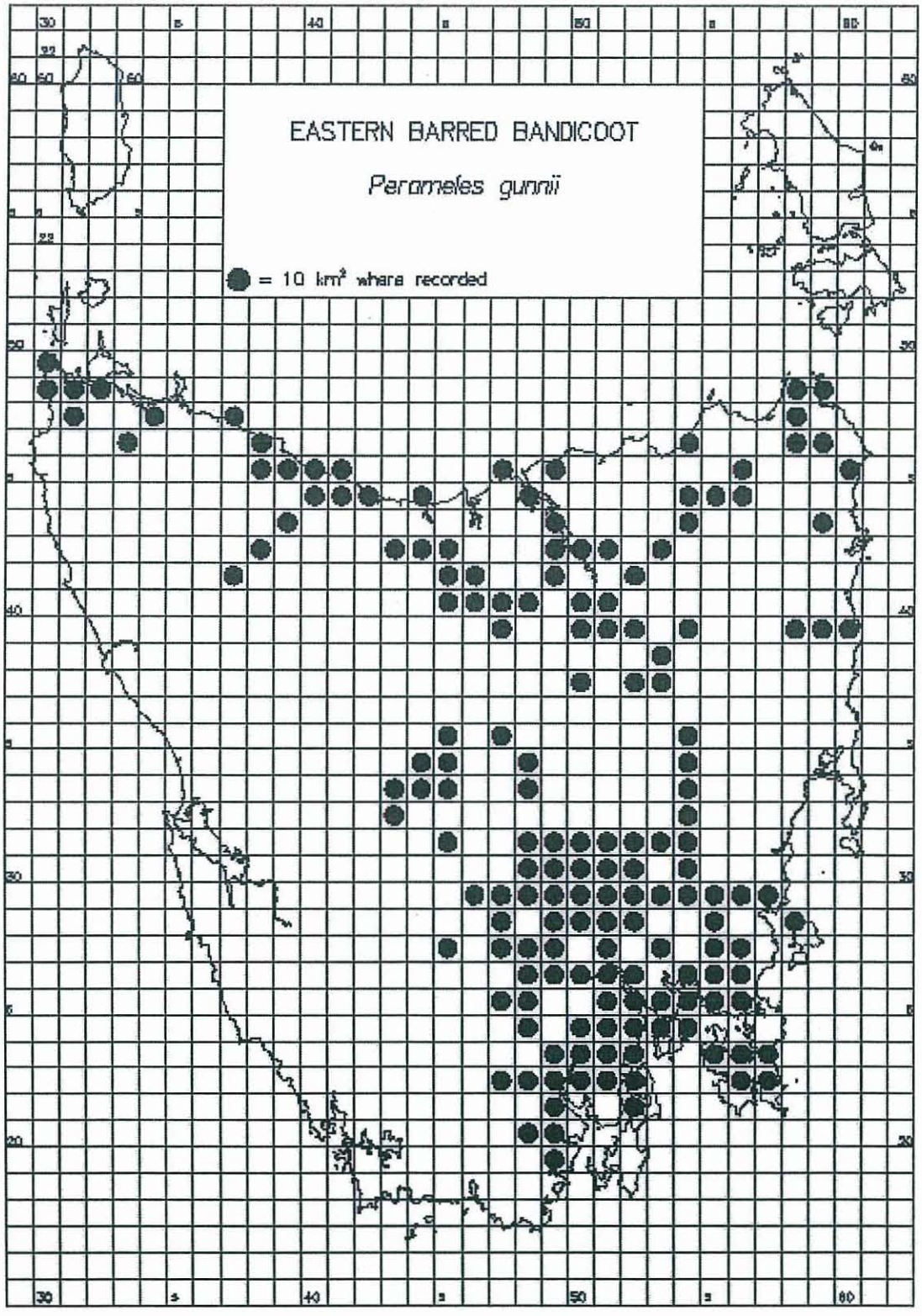
Reading

Mallick, S.A., Driessen, M.M. and Hocking, G.J. (1997). *Biology and conservation of the eastern barred bandicoot* (Perameles gunnii) *in Tasmania.* Wildlife Report No. 97/1. Parks and Wildlife Service, Tasmania.

Parks and Wildlife Service (1997). *Eastern barred bandicoot.* Threatened Species Information Sheet. Macquarie Street, Hobart, Tasmania.

Specialist

Mike Driessen (Nature Conservation Branch, DPIWE) Ph 62 33 3751, fax 62 33 3477



Source: Bryant and Jackson 1999

GREY GOSHAWK
Accipiter novaehollandiae

Status

ENDANGERED (Tasmanian *Threatened Species Protection Act 1995*), due to low densities and limited breeding distribution. A high proportion of core habitat is in unprotected areas.

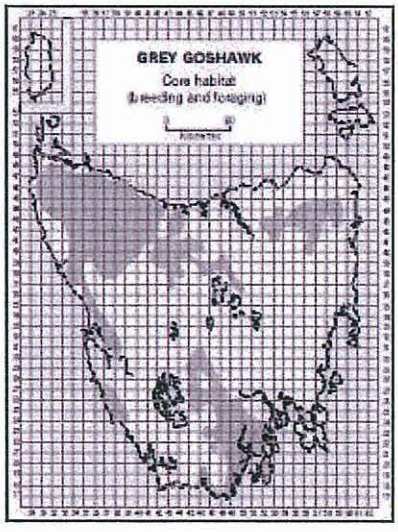
Description

Medium-sized bird of prey. Also called the white goshawk, all Tasmanian specimens are pure white, with yellow legs and black beak. Immature birds have yellow eyes, adults red. Females are cockatoo-sized; males are much smaller.

Distribution and Habitat

This species occurs in mature blackwood swamp forest, wet forest and mixed forest, primarily at lower altitudes. In general, forest with a closed canopy and low stem density is favoured by the birds for nesting. There are less than 110 breeding pairs in Tasmania. Breeding densities are greatest in blackwood swamps and riparian blackwood forest in the north-west. Other areas where breeding occurs are in the north-east, the south-east (including wet parts of Bruny Island), the Mount Field area, the northern side of the Western Tiers, south of Macquarie Harbour and in coastal forest between Macquarie Harbour and the Pieman River.

Potential nesting habitat occurs along watercourses in wet forest with old growth or regrowth older than 50 years, particularly where blackwoods (*Acacia melanoxylon*) occur. Blackwood is a preferred nest tree species followed by *Melaleuca*, myrtle, tea tree and eucalypt. Outside of blackwood swamp forests most nests are in riparian areas, but nests may occasionally be up to 100 m from a watercourse. Nests are always in forest (sometimes in patches less than 5 ha); isolated trees are not used for breeding.



Grey goshawks hunt from a perch in the canopy, so probably require forest with an open structure under the canopy. The precise habitat requirements for foraging are not known, except in blackwood swamp forests where suitable areas have older blackwood and tea-tree with a closed canopy and an open structure under the canopy. Females eat mainly mammals (rodents, ringtail possums, rabbits) and birds such as rosellas, herons and currawongs. The smaller male catches mainly small birds, rodents and insects. Carrion is sometimes eaten.

Management Objectives for Production Forest Areas

- Identify, manage and protect priority breeding habitat.
- Protect known nest sites.
- Identify and maintain networks of foraging habitat.

Reading

Brereton, R. and Mooney, N.J. (1994). Conservation of the nesting habitat of the grey goshawk *Accipiter novaehollandiae* in Tasmanian State forests. *Tasforests* 6: 79-91.

Mooney, N. and Holdsworth, M. (1988). Observations on the use of habitat by the grey goshawk in Tasmania. *Tasmanian Bird Report* 17: 1-12.

Specialist

Nick Mooney (Nature Conservation Branch, DPIWE) Ph 6233 3083, fax 6233 3477

DRAFT FOR COMMENT ONLY 2002

MASKED OWL

Tyto novaehollandiae castenops

Status

ENDANGERED (Tasmanian *Threatened Species Protection Act 1995*), due to the small population size and ongoing habitat loss.

Description

A large owl, weighing up to 1260g, with a wingspan of up to 129cm. Females are larger (43-57cm), than males (35-42cm) and considerably darker. The upperparts of this species are dark brown to light chestnut with white speckling. The prominent facial disc is buff to chestnut coloured with a darker margin and chestnut shading around the eyes. The legs are fully feathered and the feet powerful with long talons (Higgins 1999).

The masked owl is a secretive, relatively silent and strictly nocturnal species, which feeds predominately on introduced rodents and rabbits (on agricultural land) and marsupials and native birds in less disturbed habitats.

Masked owls form monogamous pairs, nesting in tree hollows with decaying debris. The female is fed by the male and incubates 2-4 eggs, which hatch in about 42 days. Young are covered in white down, then a creamy down, and are fledged in 10-12 weeks. Fledged masked owls have only traces of down and remain in the nest vicinity for several weeks. Breeding is seasonal in Tasmania with most egg laying in late October to early November (Higgins 1999).

Distribution and Habitat

T. n. castenops is endemic to Tasmania and has been recorded from all areas apart from the southwest. Most records are from lowland, dry sclerophyll forest in the south east and central north of the state, although the masked owl has been recorded in wet eucalypt forest, non-eucalypt dominated forest, scrub and urban environments. The preferred habitat is close to the forest edge where there is a complex mosaic of understorey components. Home range is large and may be in excess of 1000ha (Bell *et al.* 1997).

Eucalypt forests and woodland containing old growth trees or isolated old-growth trees containing large hollows are essential for breeding. Roost sites are usually in trees (among dense foliage or in tree hollows), cliffs (overhangs, potholes and caves) and occasionally human-made structures such as farm sheds and open buildings (Bell *et al.* 1997).

Important Locations

The east coast between St Marys and Hobart, the Huon and Derwent Valleys, mid north coast and small fragmented patches in the Tamar Valley and the northeast coast have been identified as important for breeding (Bell *et al.* 1997).

Threats, Limiting Factors and Management Issues

There is some evidence that indicates a decline in masked owl numbers may have occurred since European settlement. The preferred habitat of the masked owl is dry forest and woodland on the coastal and sub-coastal lowlands in the north, north-east, east and south-east. These vegetation communities have been extensively cleared in the past for agriculture, forestry and residential development.

This habitat is also poorly reserved, less than 10% of the masked owls' preferred habitat is in dedicated reserves (Bell *et al.* 1997).

A significant threat to the masked owl is ongoing loss of old growth eucalypt forest, nesting habitat, from commercial timber harvesting, land clearance, tree felling for firewood and natural attrition of old growth trees. Competition for nest hollows by feral honeybees, introduced kookaburras, and increasing numbers of brushtail possums may contribute to the decline in breeding success (Bell *et al.* 1997).

Deaths from collisions with vehicles, fences or power poles and electrocution on powerlines may also be a significant source of mortality for this subspecies (Bell *et al.* 1997).

Conservation Assessment

Historical Distribution

The Tasmanian masked owl has been recorded from throughout northern, eastern and north-western Tasmania, including Maria and Bruny Islands.

Population Estimate

The number of masked owls present in Tasmania based on estimates of home range size and the area of suitable owl habitat is estimated at 1300 mature individuals (Bell *et al.* 1997).

Assessment Criteria

T. n. castenops meets the criteria for listing as Endangered on the *Threatened Species Protection Act 1995* because the population is less than 2500 individuals and there is an ongoing loss of habitat.

Recovery Program

Objectives

- Maintain the size of the existing population of the masked owl and to improve the quantity and quality of habitat.

Actions Needed

- Undertake surveys throughout preferred habitat, including production forest on private and public land, to identify distribution, density, nest sites, assess home range size and habitat utilisation.
- Protect known nesting, roosting and priority foraging habitat from clearing, particularly old growth forest.
- Place all Masked Owl known nesting sites that are on public land under secure conservation management.
- Control and reduce firewood collection from areas occupied by masked owls.
- Undertake a public information and education.
- Promote revegetation and land reclamation that recreates woodland habitat with a full complement of biodiversity, including the owl.
- Investigate changes in prey abundance resulting from habitat fragmentation and forestry operations in the core range of the species.
- Prepare and implement a recovery plan for the species.

Management Objectives in Production Forest Areas

- Maintain nesting habitat in areas considered to be important for this species.
- Maintain a network of foraging and nesting habitat throughout the range of the masked owl.

- Standardised surveys for masked owls and suitable nesting habitat should be undertaken prior to logging within the species' preferred range (i.e. old-growth lowland dry sclerophyll forest and woodlands in the southeast, east, northeast and north) to identify the species' presence and locality of nest sites.

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QUOLL SPECIES

Dasyurus viverrinus (eastern quoll)
Dasyurus maculatus maculatus (spotted-tailed quoll)

Status

Spotted-tailed quoll

VULNERABLE (Commonwealth *Endangered Species Protection Act 1992*), due to habitat loss, predation and persecution. While it occurs throughout Tasmania, the spotted-tailed quoll is uncommon and naturally occurs at very low densities.

Eastern quoll

The eastern quoll has been listed in the Regional Forest Agreement as a Priority Species Requiring Consideration (Attachment 2 Part B), due to due to habitat loss, and persecution. While it occurs throughout Tasmania, the eastern quoll is uncommon and naturally occurs at very low densities.

Description

Spotted-tailed quoll

The spotted-tailed quoll is a medium-sized carnivore, weighing between 1.6-5.0 kg. The thick, short fur is golden to red to dark chocolate brown on the back and pale cream on the belly. There are distinct white spots of varying size over the back, head and along the long tail. The Tasmanian spotted-tailed quoll is genetically distinct from the mainland species and therefore needs to be managed as a separate entity.

Eastern quoll

The eastern quoll is smaller (0.7-2.0 kg) and more finely built than the spotted-tailed quoll. Fur colour is either grey to brown or a jet black with both colour types having white spots covering the head and body, but not the tail.

Distribution and Habitat

Spotted-tailed quoll

Spotted-tailed quolls occur throughout Tasmania and also in eastern Australia from Queensland to Victoria. On mainland Australia, they have declined dramatically and now Tasmania remains their stronghold. The spotted-tailed quoll is primarily a forest-dwelling species, most abundant in higher rainfall areas containing rainforest, wet forest and blackwood swamp forest. They are known to utilise regrowth forest. The spotted-tailed quoll is solitary and territorial with a large home range.

The area of highest probability of occurrence is a broad band across northern Tasmania from the northwest corner to the Waterhouse area, north of the escarpment of the Central Plateau. This areas correlates with high seasonality of rainfall (i.e. the species appears dependent on the most productive environments).

Important habitat components appear to be structurally complex forest, old growth forest with tree hollows and coastal scrub (such areas provide opportunities for arboreal hunting and avoidance of Tasmanian devils which compete for prey). Spotted-tailed quolls appear to disappear in highly fragmented environments and where canopy cover is reduced by over 50%.

Home ranges (non-mating season) are large (in the order of 20 square kilometres for males and 10 square kilometres for females) and female ranges virtually exclusive for large parts of the year. These two attributes contribute to low natural population densities and natural rarity. This means this species is vulnerable to population decline.

The following areas are regarded as key sites for the species: forested areas of the north bounded by Wynyard, Gladstone and the central and northeastern highlands; northwest wet forests, encompassing the entire catchments of the Arthur and Montagu Rivers; dry eucalypt forests in the central north coast area bounded by the Tamar, Devonport and the Western Tiers (Dazzler Range, Wurra Wurra Hills); patches between the King River and Strahan; the Gordon River and Huon River catchments; and the coastal strip from Strahan to Temma.

Eastern quoll

Eastern quolls became extinct on mainland Australia by the mid 1960s but remain locally abundant in a wide range of habitats in Tasmania. They are most common in the dry eastern half of Tasmania at low to medium altitudes. The species has a patchy distribution across Tasmania but is more predominant in the eastern half of the State in areas of lower mean annual rainfall. They particularly flourish in agricultural areas where there is a bush-pasture interface, coming onto pastures at night to hunt for rodents and insects. Eastern quolls do use wetter forests but mainly for denning. Cover is probably important for predator protection, especially in juveniles. "Hot" spots include the Huon, Cygnet, Cradoc area, the Buckland, Triabunna, Lake Leake area, and the northeast around Scottsdale and Ringarooma.

The eastern quoll is solitary and non-territorial with a home range varying from 50 ha on agricultural land to several square kilometres.

Management Objectives for Production Forest Areas

Spotted-tailed quoll

One of the key threats for the species is widespread native vegetation clearance, especially clearfelling and conversion to plantation leading to loss of high quality, structurally complex old growth forest. This can eliminate den sites and the diversity of prey items. Regeneration forest and plantations are not likely to provide high quality habitat. The species may be susceptible to secondary poisoning from small 1080 poisoned carcasses (e.g. rabbits, small possums).

Retention of some high quality habitat requirements has been achieved on public land through the Regional Forest Agreement and current Forest Practices Code provisions for State forest.

Conservation requirements need to be addressed at the landscape level due to the low population densities and large home range requirements. Regional management planning should be developed for both species to ensure that large corridors, on the scale of 100 square kilometres (e.g. biodiversity spines) of suitable native forest habitat are retained across the landscape, particularly in key sites.

The network of contiguous informal reserves (i.e. wildlife habitat strips, wildlife habitat clumps, streamside reserves and goshawk habitat reserves) throughout these areas should provide some habitat for this species.

Areas with a natural diversity of refuge sites such as fallen logs, dense understorey and rocks represent suitable habitat. Such areas can be retained in a network of contiguous informal reserves (e.g. wildlife habitat strips, wildlife habitat clumps, streamside reserves).

Eastern quoll

One of the key threats for the eastern quoll is widespread native vegetation clearance, especially clearfelling and the conversion of pasture to plantation. This can eliminate den sites and the diversity of prey items. Road deaths in areas of high densities can also have a significant effect.

The principle management for these species should be to ensure that large corridors (on the scale of 100 square kilometres) of suitable native forest habitat are retained across the landscape, particularly in key sites.

In addition areas with a natural diversity of refuge sites such as fallen logs, dense understorey, rocks and wombat burrows should be protected or left undisturbed. Such areas can be retained in a network of contiguous informal reserves (i.e. wildlife habitat strips, wildlife habitat clumps, streamside reserves).

Reading

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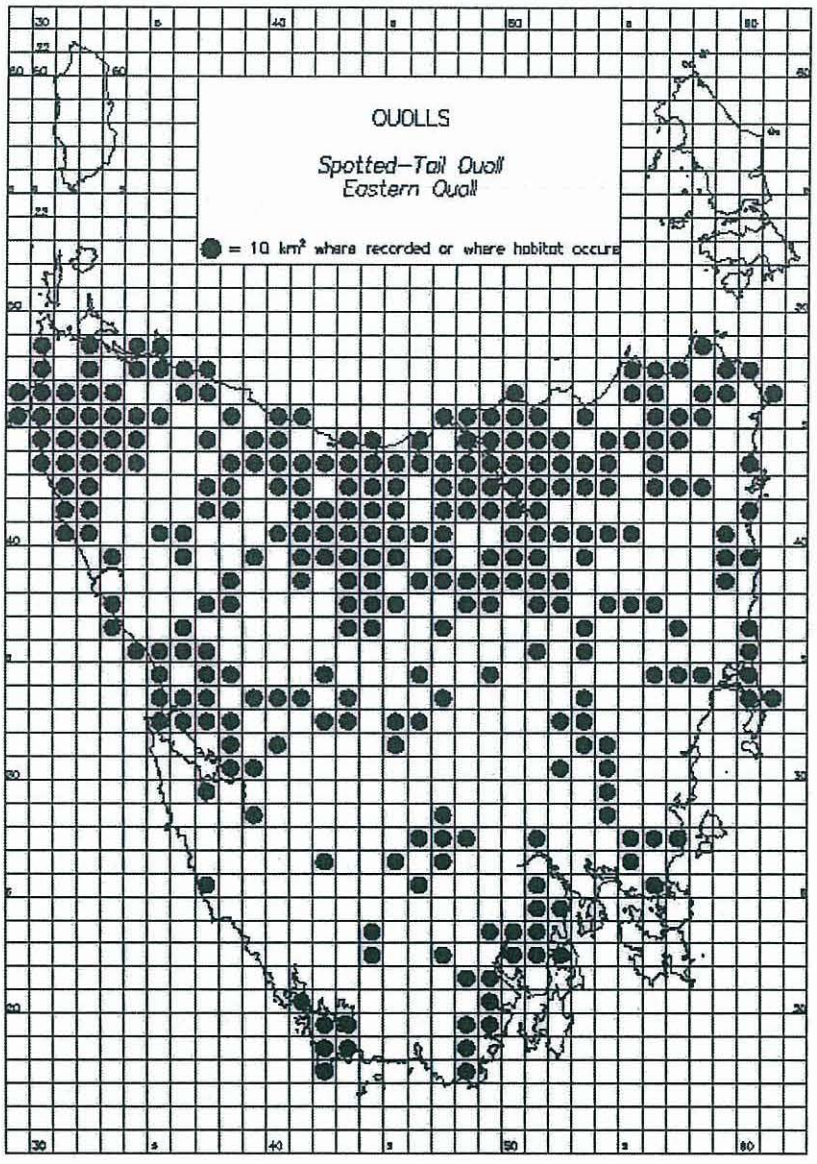

Source: Bryant & Jackson 1999

DRAFT FOR COMMENT ONLY

TUSSOCK GRASS SKINK
Pseudemoia pagenstecheri

Status

ENDANGERED (Tasmanian *Threatened Species Protection Act 1995*), due to the severely fragmented population, low number of individuals and habitat loss and degradation.

Description

A smooth scaled skink with rather short legs and paired frontoparietal shields. Males have a head and body length of up to 55mm and females up to 68mm. This species pale grey, grey-brown to olive dorsally without metallic lustre. A narrow, but distinct vertebral line is always present, with an additional pair of narrow dark lines on each side of the back in some specimens. There is also a narrow straw coloured-white dorsolateral line which forms the upper margin of a dark brown upper lateral zone, which fades ventrally to be edged by an off-white (orange in males) midlateral line which lacks a distinct dark lower edge. The underside is white to pale yellow (Hutchinson *et al* 2001).

P. pagenstecheri mates in late summer to autumn and gives birth to 3-11 live young (Hutchinson *et al.* 2001).

Distribution and Habitat

P. pagenstecheri is known from NSW, Victoria and Tasmania. In Tasmania it is known from only 7 remnant grassland areas in the midlands, from a single population on the Hobart Domain, and a single population on private property near Ellendale.

P. pagenstecheri is restricted to lowland *Poa* tussock grassy woodland and open grassland, where there is a good cover of medium to tall tussocks. It shelters inside the bases of tussocks and basks inconspicuously in the spaces between them (Hutchinson *et al.* 2001).

Important Locations

- Australian Defence Force Small Arms Range Complex, Pontville.
- Lake Dulverton, Oatlands.

- Township Lagoon, Tunbridge.
- "Fosterville" Ross.

Threats, Limiting Factors and Management Issues

Degradation of Tasmania's native grasslands appears to be the primary cause of decline in this species. Many native grasslands have been destroyed or severely degraded since European settlement and most of those grasslands that remain are on private land and are subject to heavy grazing pressure (Kirkpatrick 1999). Trampling and grazing of tussocks by sheep and cattle has the effect of shortening the grasses between the tussocks and may lead to loss of habitat and increase risk of predation of this species due to the lack of cover. Some very small remnants do survive clearance on soils too rocky to plough. However, even these remnants can be severely degraded by fertilising and sowing with preferred species such as clover, inappropriate fire regimes and invasion by introduced weeds such as gorse.

There is only one known reserved population of *P. pagenstecheri* in the Tunbridge Township Nature Reserve, a 16 hectare area of native grassland including an ephemeral lagoon.

In addition, *P. pagenstecheri* appears to have disappeared from areas where it previously occurred; 2 of the 11 populations present in 1983 could not be relocated during surveys in 1999 (Redburn 1999), suggesting that there is a continuing decline in this species.

Conservation Assessment

Historical Distribution
Unknown.

Population Estimate
There are currently nine known populations containing an unknown number of individuals.

Assessment Criteria
P. pagenstecheri meets the criteria for listing as Endangered on the *Threatened Species Protection Act 1995* given that the population is severely fragmented, contains a low number of individuals and the remaining pockets of suitable habitat are vulnerable to clearing and degradation.

Recovery Program

Objectives

- Protect existing populations.
- Locate further populations.

Actions Needed

- Manage, protect and secure remaining habitat.
- Determine the current distribution, abundance and threats.
- Measure population size and trends.

Management Objectives in Production Forest Areas

- To protect all known existing sub-populations and adjacent areas of suitable habitat.

Reading

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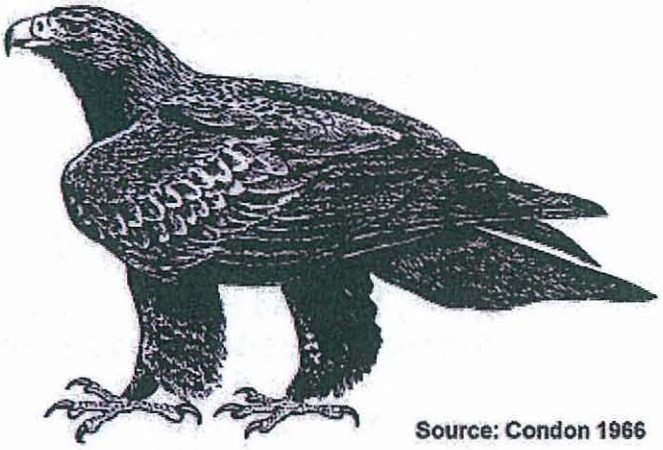
WEDGE-TAILED EAGLE
Aquila audax fleayi

Status

VULNERABLE (Tasmanian *Threatened Species Protection Act 1995*), ENDANGERED (Commonwealth *Endangered Species Protection Act 1992*), due to a low number of successful breeding pairs (about 95), loss and disturbance of breeding habitat and high mortality due to persecution and human-related accidents.

Description



Source: Condon 1966

A large, powerful bird of prey. Almost black when mature, with legs feathered to the feet and a long, wedge-shaped tail. Wingspan is about 2 m. Females are larger than males.

Distribution and Habitat

This subspecies is found only in Tasmania, and occurs throughout the State including large offshore islands. It hunts over a wide range of habitats, but nests only in old-growth trees in native forests. Densities range from one pair per 400 km^2 or more to one pair per 60 km^2, with distances of 5-20 km between active nests in adjacent territories. Densities are highest in areas with mosaics of forest, farmland, grassland, wetlands and rivers. The eagles feed mainly on rabbits, hares, wallabies, possums, birds such as native hens and ravens and carrion.

Nests are usually in tall eucalypt trees in large tracts (more than 10 ha) of old-growth eucalypt or mixed forest. Nest trees are amongst the largest in a locality. They are in sheltered positions on leeward slopes, between the lower and mid slopes and with the top of the tree usually lower than the ground level of the top of the ridge. Nests are not constructed close to sources of disturbance such as quarries or houses. Nests are traditional, with some having been used for at least 50 years. More than one nest may occur within a territory but only one is used in any one year. Breeding failure often promotes a change of nest in the next year.

Wedge-tailed eagles are very timid nesters and are likely to desert a nest if logging or roading occurs nearby. The breeding season occurs between August and January inclusive with eagles being particularly sensitive to disturbance early in this period. If a nest is deserted due to forestry disturbance, the eagles will usually build another nest nearby, adding to management problems. Thus, it is important to keep them where they were first found. With proper conservation disturbed nests may be reused in later years.

Management Objectives for Production Forest Areas

- Identify potential nesting habitat and conduct nest surveys.
- Protect known nest sites, through application of a viable reserve.
- Protect breeding birds from disturbance.

Reading

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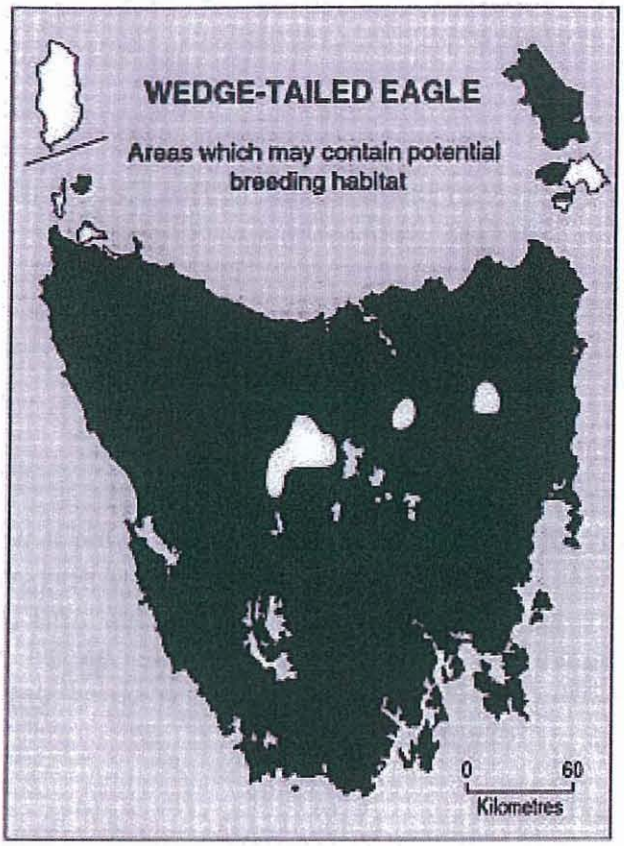
WEDGE-TAILED EAGLE
Areas which may contain potential breeding habitat
0
60
Kilometres

WHITE-BELLIED SEA EAGLE
Haliaeetus leucogaster

Status

The white-bellied sea eagle has been listed in the Regional Forest Agreement as a Priority Species Requiring Consideration (Attachment 2 Part B) and has been nominated for listing under the Tasmanian *Threatened Species Protection Act 1995* due to a low number of successful breeding pairs and loss and disturbance of breeding habitat.

Description

Adult white-bellied sea eagles are black and white with a white belly and grey over the wings. Wingspan may exceed 2 m and weight is up to 4.5 kg. Immature birds are mottled pale brown and take five years to reach adult plumage. A juvenile sea eagle can be confused with a wedge-tailed eagle but the sea eagle has a short white tail and strongly patterned underwing.

Distribution and Habitat

The white-bellied sea eagle is widely distributed from India to Australia. Key sites in Tasmania include the Tamar River estuary, Tasman Peninsula and the Bass Strait Islands. They nest and forage mainly near the coast but will also live near large rivers and lakes inland, often moving on a seasonal basis. The nest of the white-bellied sea eagle is similar in construction to the wedge-tailed eagle and when resources are limited, competition for nest sites between the two species can occur.

As with the wedge-tailed eagle, the white-bellied sea eagle nests are traditional. More than one nest may occur within a territory, but only one is used in any one year. They are very timid nesters and are likely to desert a nest if logging or roading occurs nearby. The breeding season occurs between August and January inclusive with eagles being particularly sensitive to disturbance early in this period. If a nest is deserted due to forestry disturbance, the eagles will usually build another nest nearby, adding to management problems. Thus, it is important to keep them where they were first found. With proper conservation disturbed nests may be reused in later years.

Management Objectives for Production Forest Areas

- Identify potential nesting habitat and conduct nest surveys.
- Protect known nest sites, through application of a viable reserve.
- Protect breeding birds from disturbance.

Reading

Green, R.H. (1995). *The Fauna of Tasmania: Birds*. Potoroo Publishing, Tasmania.

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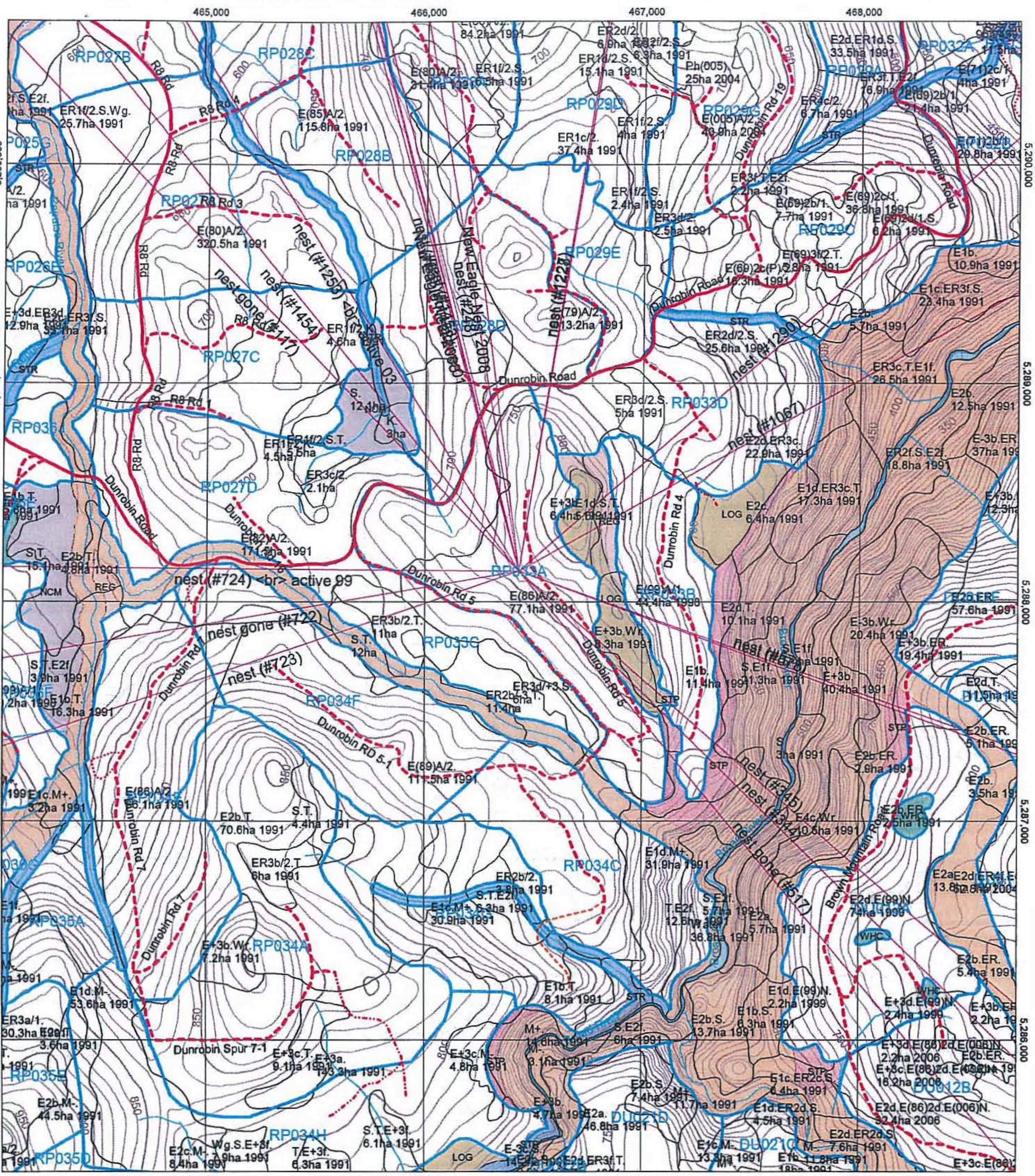
Wedge-tail Eagle Nest Search Results

Location: Provcoupe - RP033A

Generated Monday, 28th of July 2008 - 17:49:00

Coordinates of Origin Point: 466435mE, 5288141mN (Provcoupe Centroid)

Print Note	Bearing (dms)	Distance (km)	Easting	Northing	Location
nest gone (#517)	140° 09' 34"	12.717	474582	5278377	Mount Field East 4 km E
nest gone (#117)	315° 58' 22"	13.271	457212	5297683	Florentine River 7.5 km E of Wylds Craig
nest (#344)	134° 17' 07"	7.522	471820	5282889	Ironstone Creek
nest (#345)	130° 54' 28"	8.211	472641	5282764	Ironstone Creek
nest gone (#722)	260° 26' 58"	2.761	463712	5287683	Repulse River mid
nest (#724) active 99	270° 24' 57"	3.145	463289	5288164	Repulse River N
nest (#723)	251° 19' 53"	2.661	463913	5287289	Repulse River S
nest (#248)	350° 17' 13"	14.243	464032	5302181	Lake Catagunya
nest (#578)	110° 04' 07"	6.141	472203	5286034	Brown Mountain; Ellendale 2.2km NE
nest (#571)	109° 30' 31"	6.506	472569	5285968	Brown Mountain; Ellendale 2.4km NE
nest (#1067)	60° 45' 43"	3.229	469254	5289719	Broad River
nest (#1453)	345° 52' 56"	12.102	463483	5299879	Gulf Creek NE
nest (# 1452)	344° 57' 55"	12.121	463291	5299847	Gulf Creek NW
nest (#1454)	320° 47' 07"	12.343	458631	5297705	Misery Creek
nest (#1228)	9° 10' 47"	9.326	467923	5297348	Lake Repulse N
nest (#1227)	8° 56' 53"	9.250	467874	5297279	Lake Repulse S
nest (#1253) active 03	328° 15' 29"	14.564	458773	5300527	Florentine River Bridge 640m SW
nest (#1290)	49° 03' 56"	3.580	469140	5290487	Broad River N
nest (#683) active 01	345° 05' 10"	11.571	463457	5299323	Golf Creek
New Eagle Nest 2008	344° 30' 44"	12.762	463027	5300441	RP011G
New Eagle Nest 2008	352° 35' 57"	9.759	465178	5297820	RP014B



Wedge-tail Eagle Nest Lines
Located or marked out roads
Provisional mapped roads
Sigificant all weather 2 lane feeder road
Single lane all weather minor road
Single lane minor road
Provcoupe Live Boundary
Pitype (Boundary)
50 Metre Contour (25K)
10 Metre Contour (25k)
Water
Protection Informal Reserve
Unloggable
Non commercial
Regen problems
Steep
Streamside reserve
Uneconomic
Wildlife habitat clump

LOCATION MAP
4630
4629
4628
4627

NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

A4P

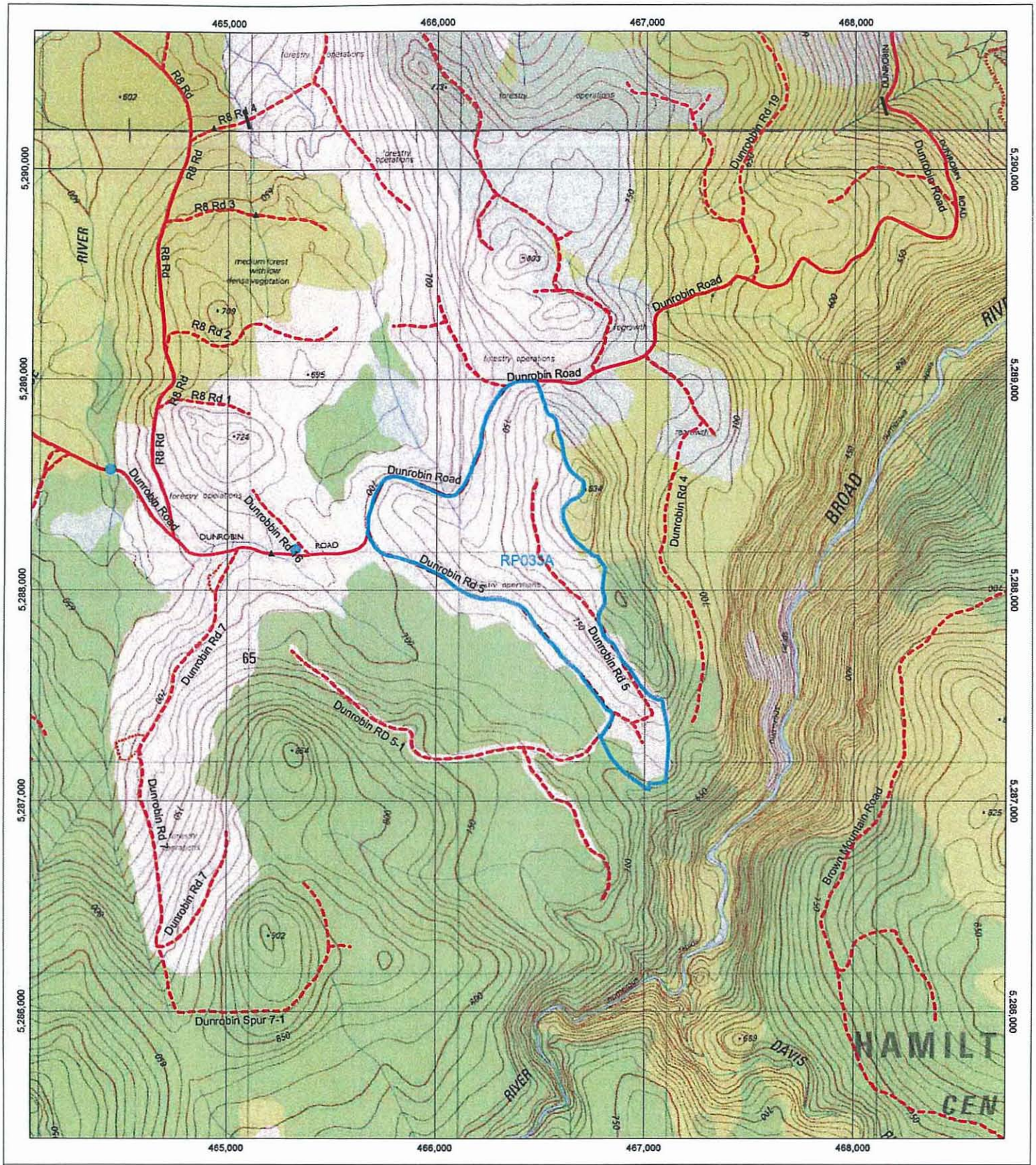
GDA

Wedge Tail Eagle Habitat Search
RP033A

For internal Forestry Tasmania use only. Do not distribute.

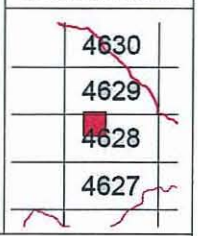
Date: Monday, 28 July 2008
Plot identifier: vntmcbdwte2008.07.28.05.49.080
Prepared by: Vanessa Thompson
Prepared for:
Scale 1:25,000
0 500 m

Forestry Tasmania
GROWING OUR FUTURE



Bridge
Log Culvert
Water point
Provcoupe & Info (Boundary)
Sigificant all weather 2 lane feeder road
Single lane all weather minor road
Single lane minor road
DPIW 25K Topo Map Image

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

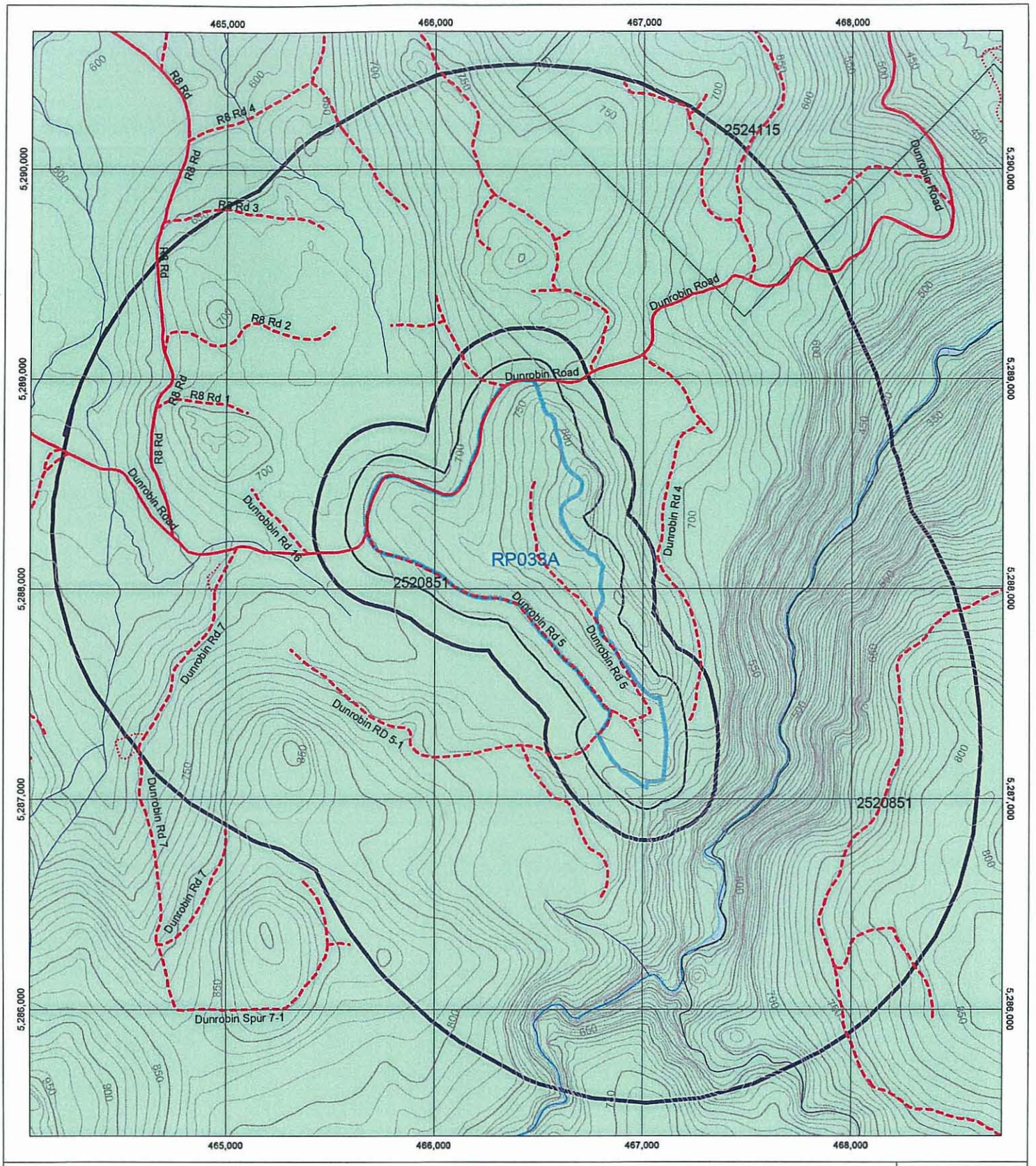
GDA GEOCENTRIC DATUM OF AUSTRALIA

TasMap Base by Provcoupe
Coupe id: RP033A
Mapsheet: ELLENDALE 4628

A4P

Forestry Tasmania
GROWING OUR FUTURE

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:25,000
Plot identifier: vntmcbsemp2008.07.28.05.46.46	Prepared for:	0 500 m



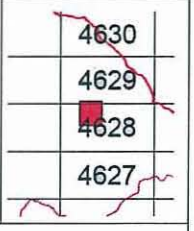
Transend Transmission Lines
Sigificant all weather 2 lane feeder road
Single lane all weather minor road
Single lane minor road

Rivers (Class 1 and 2)
50 Metre Contour (25K)
10 Metre Contour (25k)
Coupe Live (Boundary)
Cadastre of Tasmania (DPIWE)
Forest Operations (100m)
Shooting (250m)

Burning (1500m)
WHA - Boundary
World Heritage Area
Water
HEC land - Vested or Private
National Park, Historic Site & Nature/State Reserve

Private Property
State Forest

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

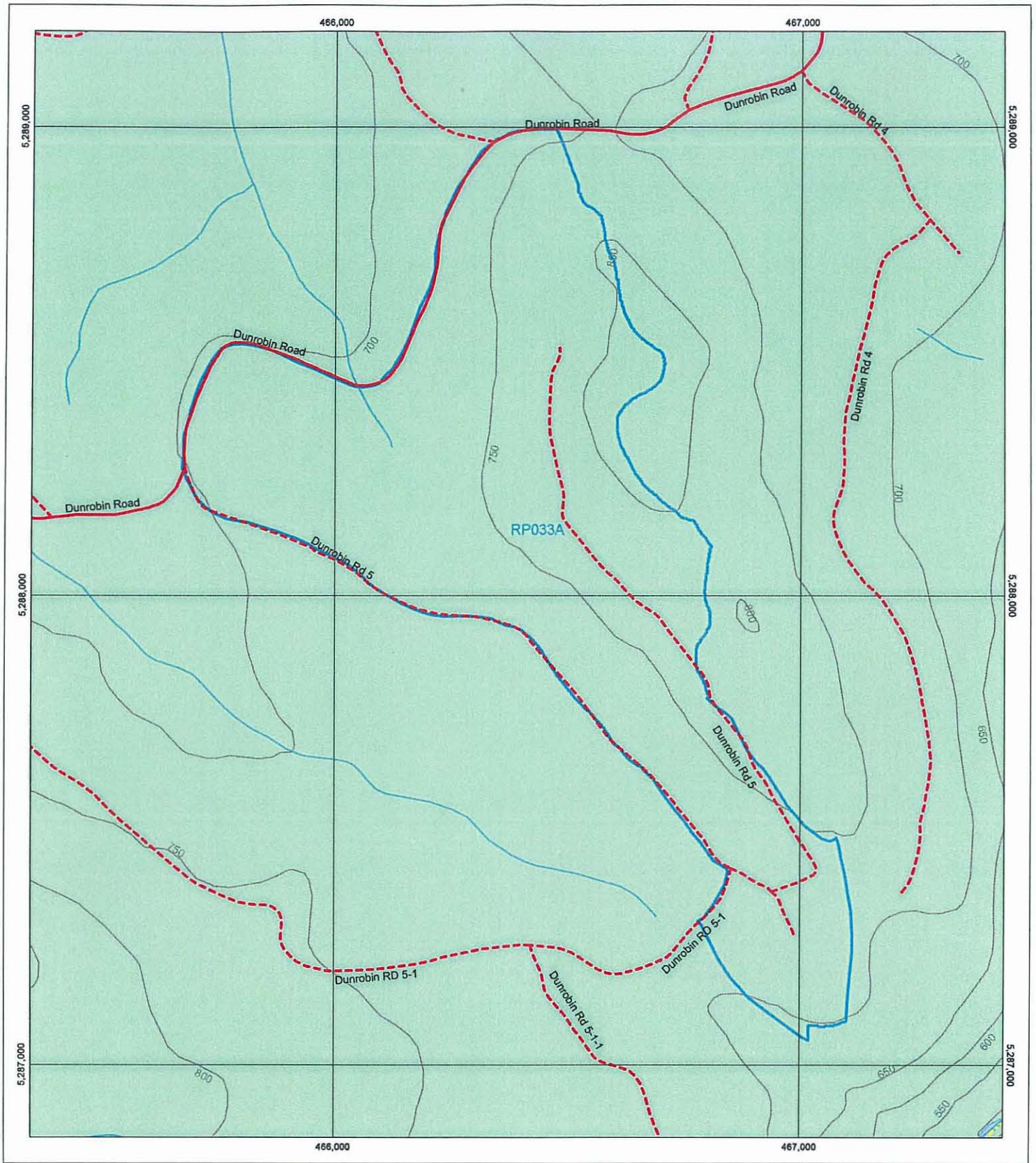
GDA
GEOCENTRIC DATUM OF AUSTRALIA

Notification Map
RP033A

A4P

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:25,000
Plot identifier: vntmcnot_p2008.07.28.05.46.51	Prepared for:	0 500 m

Forestry Tasmania
GROWING OUR FUTURE

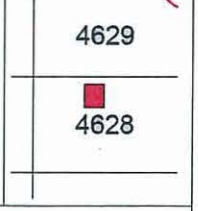


Sigificant all weather 2 lane feeder road
Single lane all weather minor road
Plan Coupe Base (Boundary)
50 Metre Contour (25K)

Land owned by the crown
Land owned by Forestry Tasmania
WHA - Boundary
World Heritage Area
Water
HEC land - Vested or Private

National Park, Historic Site & Nature/State Reserve
Private Property
State Forest

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

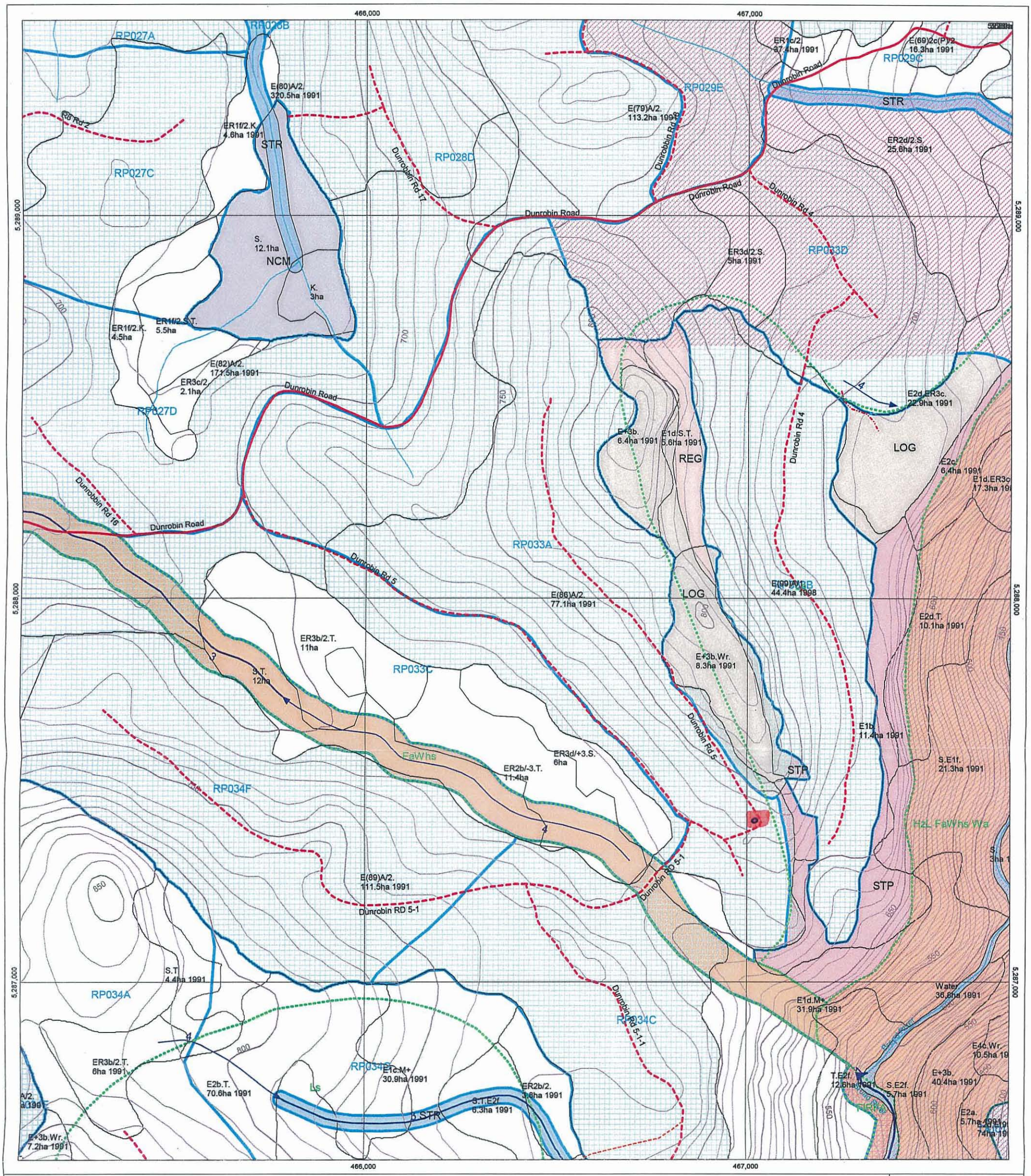
Property Rights
RP033A

A4P

GDA GEOCENTRIC DATUM OF AUSTRALIA

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:11,225
Plot identifier: vntmcpr_p2008.07.28.05.46.45	Prepared for:	0 250 m

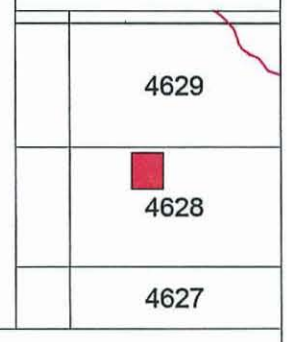
Forestry Tasmania
GROWING OUR FUTURE



Located or marked out roads
Provisional mapped roads
Sigificant all weather 2 lane feeder road
Single lane all weather minor road
Class 1 stream
Class 3 stream
Class 4 stream
Transend Transmission Lines
50 Metre Contour (25K)
10 Metre Contour (25k)
Pitype (Boundary)
MDC (SMZ Type Labels)
Provcoupe & Info (Boundary)
Biodiversity Spine Native Forest
Pitype - Regen
Water
TCFA Informal Reserves
Protection Informal Reserve
Unloggable
Non commercial
Regen problems
Steep
Streamside reserve

DRILL 2.16 LOCATION

LOCATION MAP



NOTE: Co-ordinates on this map are based on GDA94.

Any topographic data on this map has been supplied by DPIWE.

Data has been captured at differing scales & boundaries may not always coincide

Planning map based on RP033A

Mapsheet: ELLENDALE 4628 , Area of RP033A is 90.1 hectares

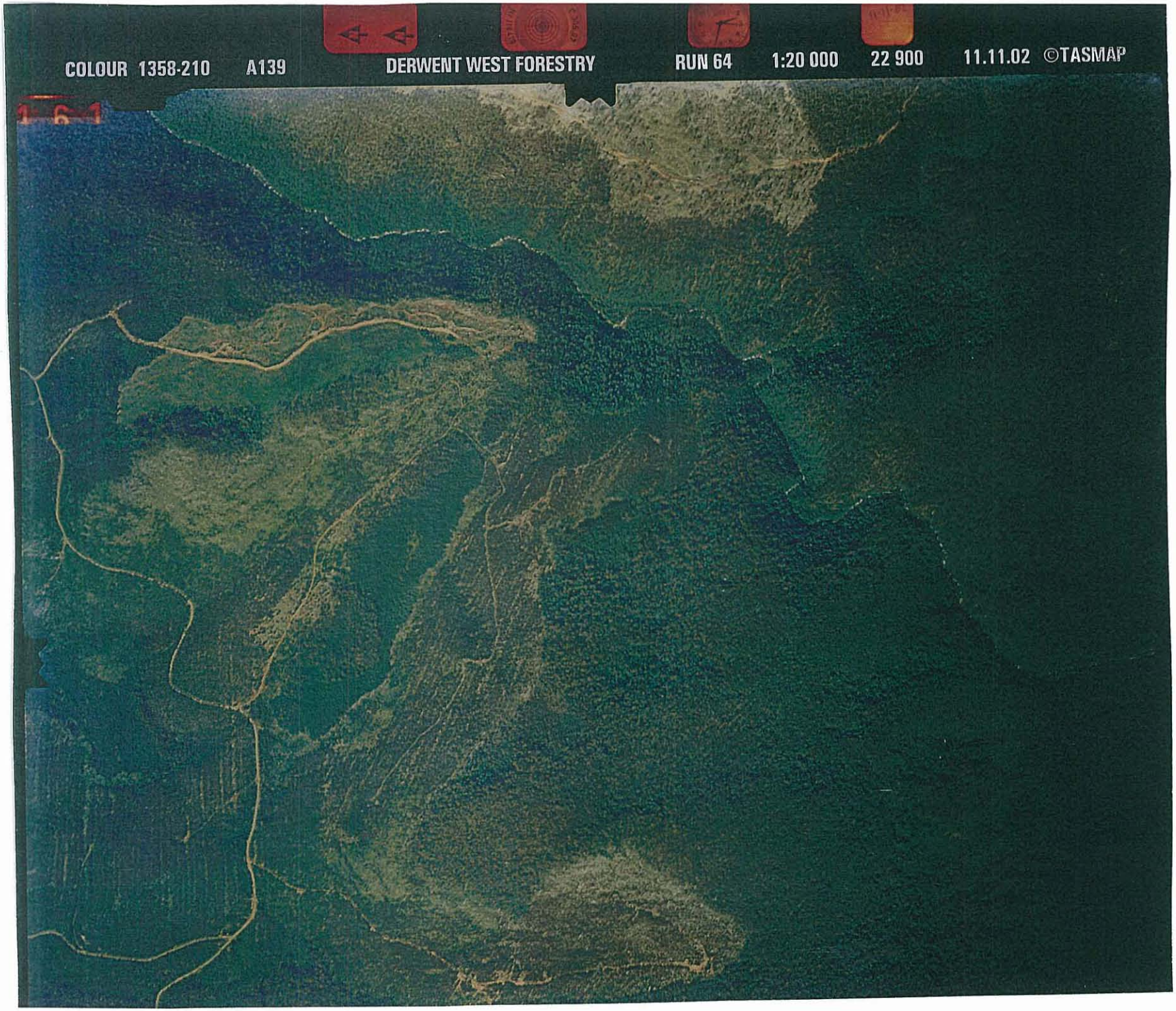
Map Centre Coordinates: 466392 mE, 5288024 mN

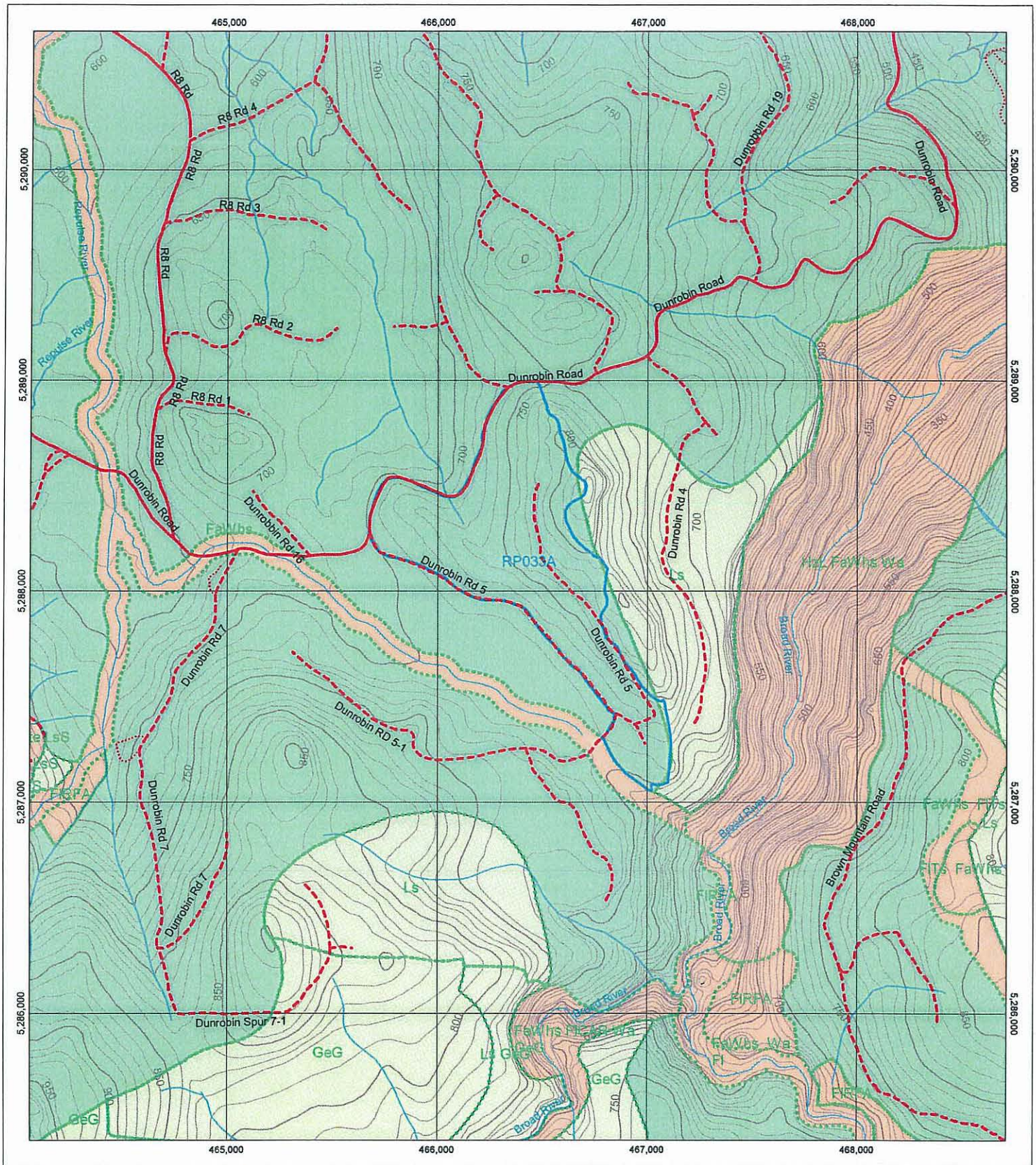
Plot identifier: vntmodfpm2008.07.28.05.46.45	Prepared by: Vanessa Thompson	Scale 1:10,000
Date: Monday, 28 July 2008	Prepared for:	0 — 500 m

A3P

GDA GEOCENTRIC DATUM OF AUSTRALIA

Forestry Tasmania
GROWING OUR FUTURE


COLOUR 1358-210 A139
DERWENT WEST FORESTRY
RUN 64
1:20 000
22 900
11.11.02 ©TASMAP



Sigificant all weather 2 lane feeder road

Single lane all weather minor road

Single lane minor road

Plan Coupe Base (Boundary)

MDC (SMZ Type Labels)

50 Metre Contour (25K)

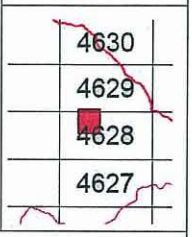
10 Metre Contour (25k)

Production with addtional Special Management

Production

Protection Informal Reserve

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94

Topographic map data is supplied by DPIWE

Boundaries may not co-incide due to different capture scales

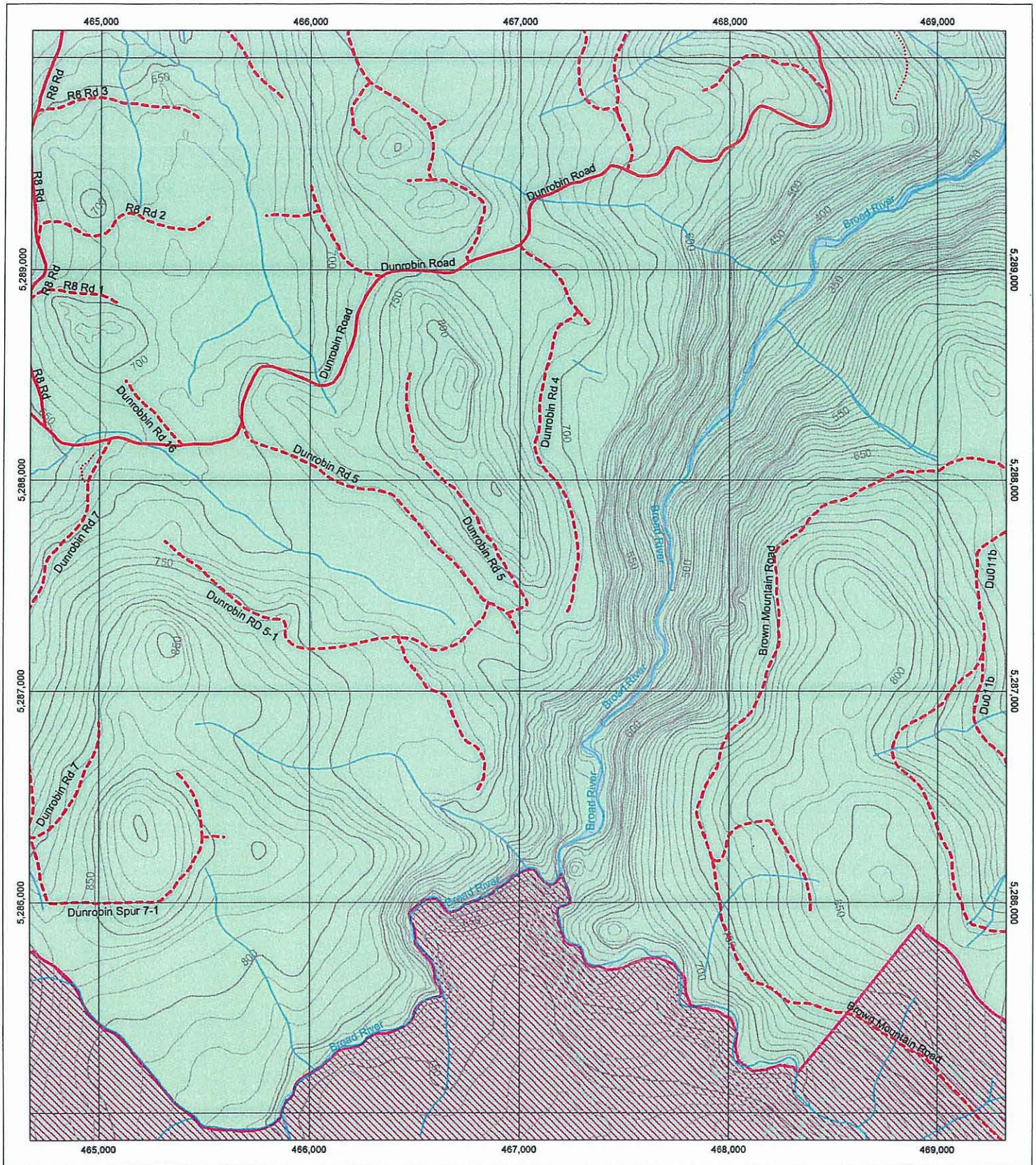
MDC by Coupe id
RP033A

A4P

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:25,000
Plot identifier: vntdtmdca4p2008.07.28.05.46.44	Prepared for:	0 500 m

GDA GEOCENTRIC DATUM OF AUSTRALIA

Forestry Tasmania
GROWING OUR FUTURE

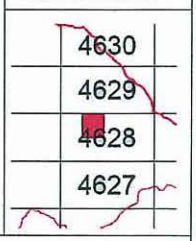


Sigificant all weather 2 lane feeder road
Single lane all weather minor road
Single lane minor road

50 Metre Contour (25K)
10 Metre Contour (25k)
High Quality Wilderness
WHA - Boundary
World Heritage Area
Water

HEC land - Vested or Private
National Park, Historic Site & Nature/State Reserve
Private Property
State Forest

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

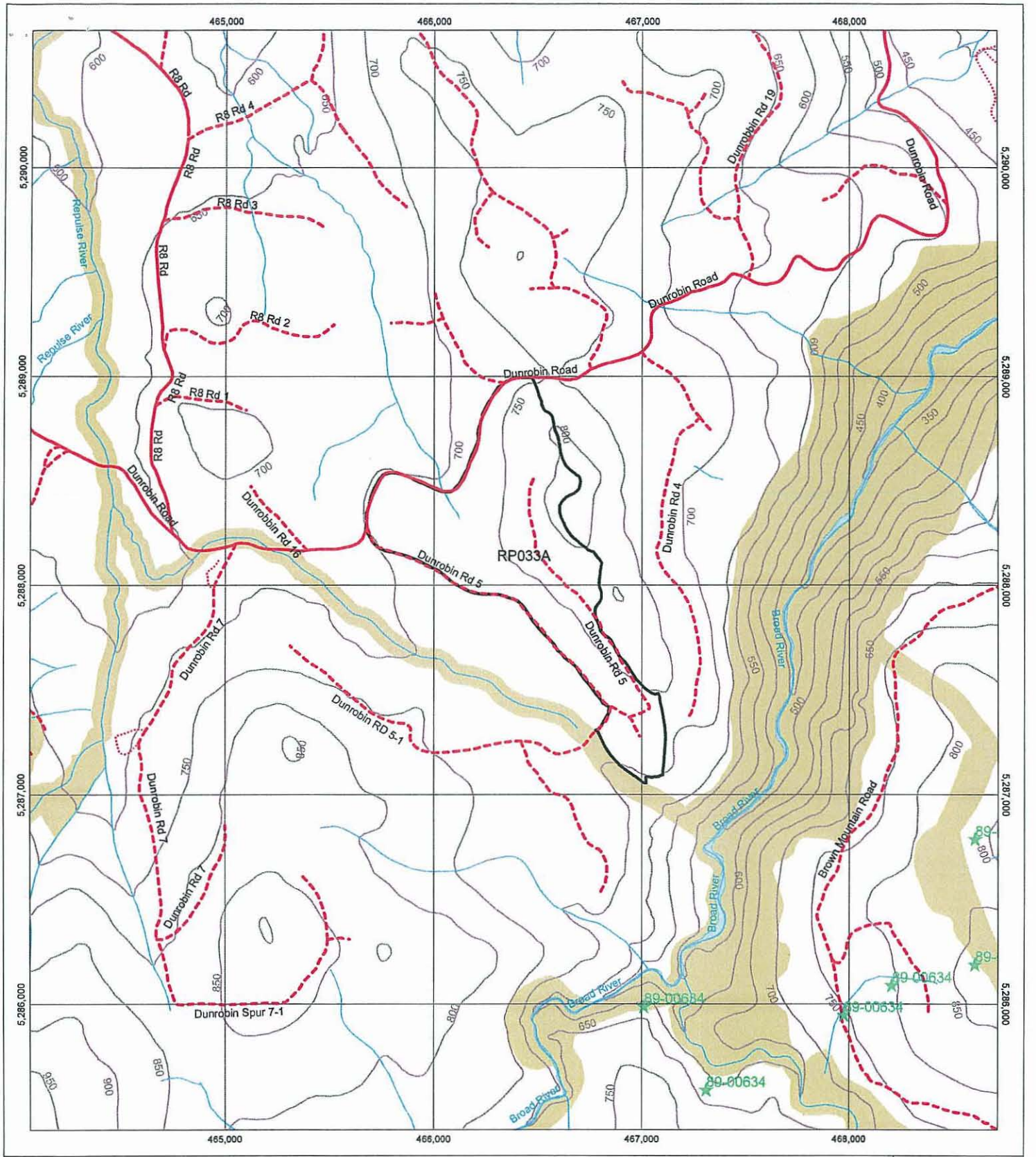
GDA GEOCENTRIC DATUM OF AUSTRALIA

High Quality Wilderness by Coordinates

A4P

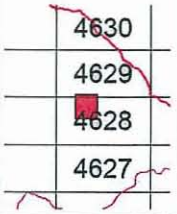
Forestry Tasmania GROWING OUR FUTURE

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:25,000
Plot identifier: vntmchqwc2008.07.28.05.48.000	Prepared for:	0 500 m



- Threatened Flora
- Sigificant all weather 2 lane feeder road
- Single lane all weather minor road
- Single lane minor road
- Provcoupe Live Boundary
- State Forest Boundaries
- 50 Metre Contour (25K)
- Water
- Informal Reserves - MDC (distlib)

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

Conservation Inventory Map
RP033A

A4P

Forestry Tasmania
GROWING OUR FUTURE

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:25,000
Plot identifier: vntcnsrvplc2008.07.28.05.46.43	Prepared for:	0 500 m

Conservation Enquiry Report

Location: Provcoupe - RP033A

Generated Monday, 28th of July 2008 - 17:46:57

Please Note:

1. Conservation Enquiry Maps & Reports are to be used for forest planning purposes only and are not for publication.
2. While based on the best available information, this inventory may not be comprehensive.
3. The absence of recorded sites is not evidence that such sites do not exist in this area.
4. The significance of recorded sites should be interpreted by an appropriate expert.
5. Positional accuracy generally not better than 100 metres.
6. Geoconservation sensitivity scores are ranked from 1 to 10, 1 being the most sensitive to disturbance, 10 being the least sensitive
7. Priority communities identified on Conservation Enquiry Maps are those communities identified in the RFA as a priority for protection on Public Land.
8. The location of PC Management Areas can be identified via MDC or PC Managemet map compositions.
9. This report does not query Aboriginal data.

Threatened Fauna - 25k Mapsheet

RECORD TYPE	SPECIES NAME	25,000 MAPSHEET NUMBER	25,000 MAPSHEET NAME	LOCATION	SPECIAL COMMENTS
Habitat which may contain threatened species	Quolls (Spotted-tailed, Eastern)	4629	OUSE	All wetter forest types coastal heath and bush-pasture interfaces	
Habitat which may contain threatened species	Wedge-tailed Eagle	4629	OUSE	Large tracts (more than 10 ha) of eucalypt or mixed forest	
Habitat which may contain threatened species	Masked Owl	4629	OUSE	Lowland dry sclerophyll forest with old growth components	
Habitat which may contain threatened species	White-bellied Sea Eagle	4629	OUSE	Forest with significant old-growth eucalypt component within 5 km of the coast (nearest coast including shores bays inlets and peninsulas) rivers lakes or complex of farm dams	
Habitat which may contain threatened species	Grey Goshawk	4629	OUSE	Wet eucalypt forest with blackwood/myrtle understorey blackwood swamp E. brookeriana wet forest melaleuca and leptospermum forest.	
Habitat which may contain threatened species	Eastern Barred Bandicoot	4629	OUSE	Grassy woodlands native grasslands mosaics of pasture and ground cover including shrubby weeds	

Habitat which may contain threatened species	Tussock Grass Skink	4628	ELLENDALE	Lowland *Poa* tussock grassy woodland and open grassland where there is a good cover of tall to medium tussocks	
Habitat which may contain threatened species	Eastern Barred Bandicoot	4628	ELLENDALE	Grassy woodlands native grasslands mosaics of pasture and ground cover including shrubby weeds	
Habitat which may contain threatened species	White-bellied Sea Eagle	4628	ELLENDALE	Forest with significant old-growth eucalypt component within 5 km of the coast (nearest coast including shores bays inlets and peninsulas) rivers lakes or complex of farm dams	
Habitat which may contain threatened species	Masked Owl	4628	ELLENDALE	Lowland dry sclerophyll forest with old growth components	
Habitat which may contain threatened species	Grey Goshawk	4628	ELLENDALE	Wet eucalypt forest with blackwood/myrtle understorey blackwood swamp E. brookeriana wet forest melaleuca and leptospermum forest.	
Habitat which may contain threatened species	Wedge-tailed Eagle	4628	ELLENDALE	Large tracts (more than 10 ha) of eucalypt or mixed forest	
Habitat which may contain threatened species	Quolls (Spotted-tailed, Eastern)	4628	ELLENDALE	All wetter forest types coastal heath and bush-pasture interfaces	

PC Management Areas

PC MANAGEMENT AREA NUMBER	NAME	AREA (Hectares)
There are no records for this theme within this area.		

Threatened Flora

SPECIES CODE	SPECIES NAME	EASTING	NORTHING	ACCURACY	LISTING STATUS
89-00634	Monotoca submutica var. autumnalis (roundleaf broomheath)	467012	5285983	100	rare
89-00634	Monotoca submutica var. autumnalis (roundleaf broomheath)	467312	5285583	100	rare
89-00634	Monotoca submutica var. autumnalis (roundleaf broomheath)	467977	5285943	25	rare
89-00634	Monotoca submutica var. autumnalis (roundleaf broomheath)	468212	5286083	100	rare
89-00634	Monotoca submutica var. autumnalis (roundleaf broomheath)	468612	5286183	100	rare
89-00634	Monotoca submutica var. autumnalis (roundleaf broomheath)	468612	5286783	100	rare

Threatened Fauna

SPECIES CODE	SPECIES NAME	EASTING	NORTHING	LOCATION	PRINTING NOTE

There are no records for this theme within this area.

Phytopthora Cinnamomi

ACCESSION NO.	EASTING	NORTHING

There are no records for this theme within this area.

Geoconservation Points

GIS CODE	NAME	EASTING	NORTHING	FEATURE SIZE	OVERALL VUNERABILITY

There are no records for this theme within this area.

Historical Sites

SITE ID	SITE NAME	SITE TYPE	EASTING	NORTHING	ACCURACY

There are no records for this theme within this area.

Historical Line Features

FEATURE ID	FEATURE TYPE	DESCRIPTION

There are no records for this theme within this area.

Karst - Catchment

KARST AREA NO.	NAME	KARST CATCHMENT	CONFIRMED
SE 3	Junee - Florentine	A	Y

Karst - Category

KARST AREA NO.	NAME	CATEGORY	CONFIRMED	KLITH
SE 3	Junee - Florentine	A	Y	Ordovician limestones (Gordon Group) undifferentiated

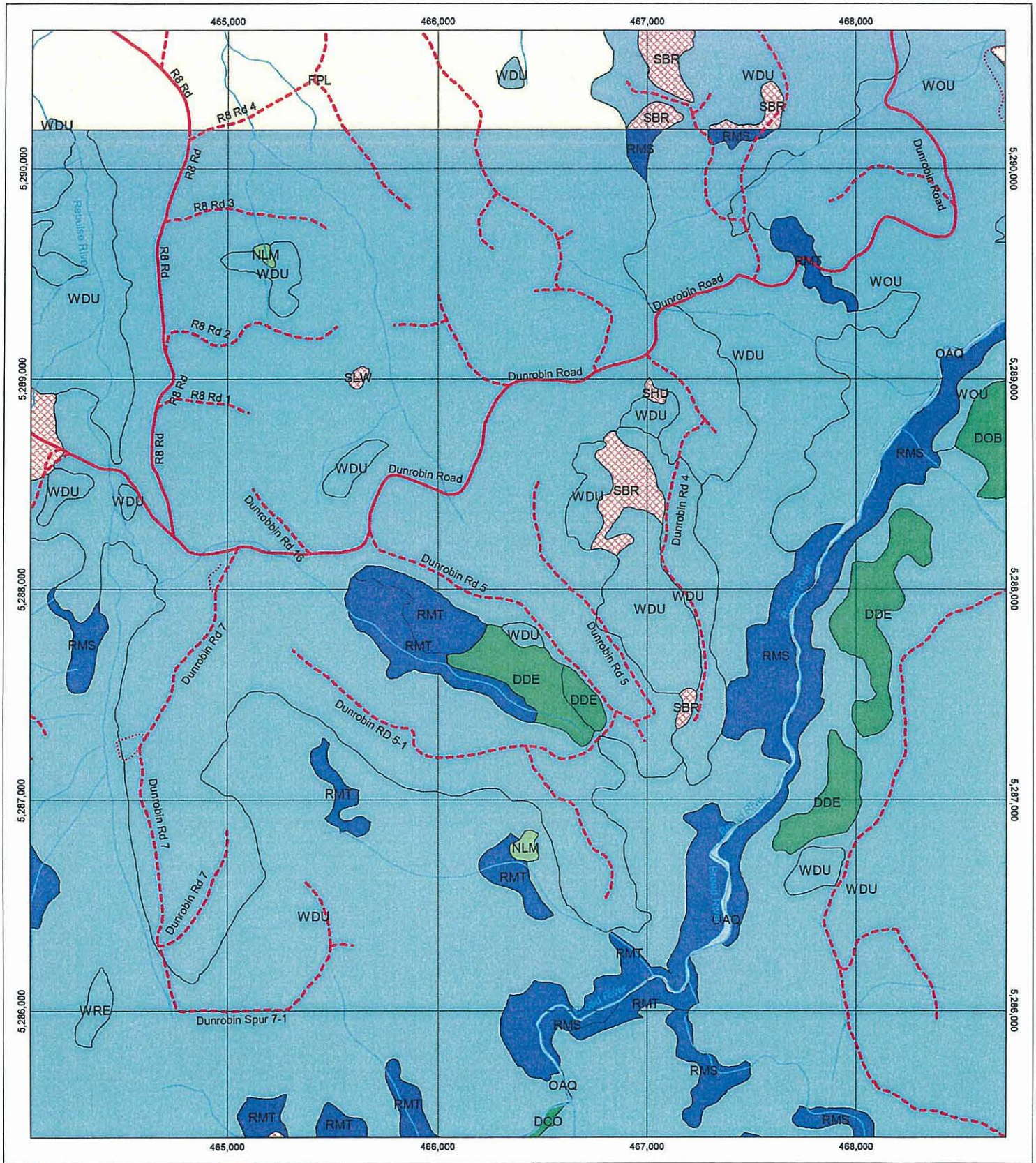
Geoconservation Vulnerability

GIS CODE	NAME	FEATURE TYPE	MAP NO.	FEATURE SIZE	VULNERABILITY
SOP19	Central Highlands Cainozoic Glacial Area	POLYGON	ZZZZZZZ	Very large/terrain	5
WED34	Junee - Florentine Karst Systems	POLYGON	ZZZZZZZ	Large/region	4
TYE18	Mt Field Massif Glacial Area	POLYGON	ZZZZZZZ	Large/region	6
WED33	Tyennan Region	POLYGON	ZZZZZZZ	Very large/terrain	10

Giant Trees - Protected

TREE ID	SPECIES CODE	EASTING	NORTHING	VOLUME	HEIGHT	POPULAR NAME

There are no records for this theme within this area.



Sigificant all weather 2 lane feeder road

Single lane all weather minor road

Single lane minor road

Water

Agricultural Urban and Exotic Vegetation

Dry Eucalypt Forest and Woodland

Non-Eucalypt Forest and Woodland

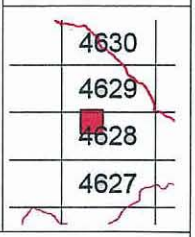
Other Natural Environments

Rainforest and Related Scrub

Scrub Heathland and Coastal Complexes

Wet Eucalypt Forest and Woodland

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94

Topographic map data is supplied by DPIWE

Boundaries may not co-incide due to different capture scales

Tasmanian Vegetation Map
RP033A

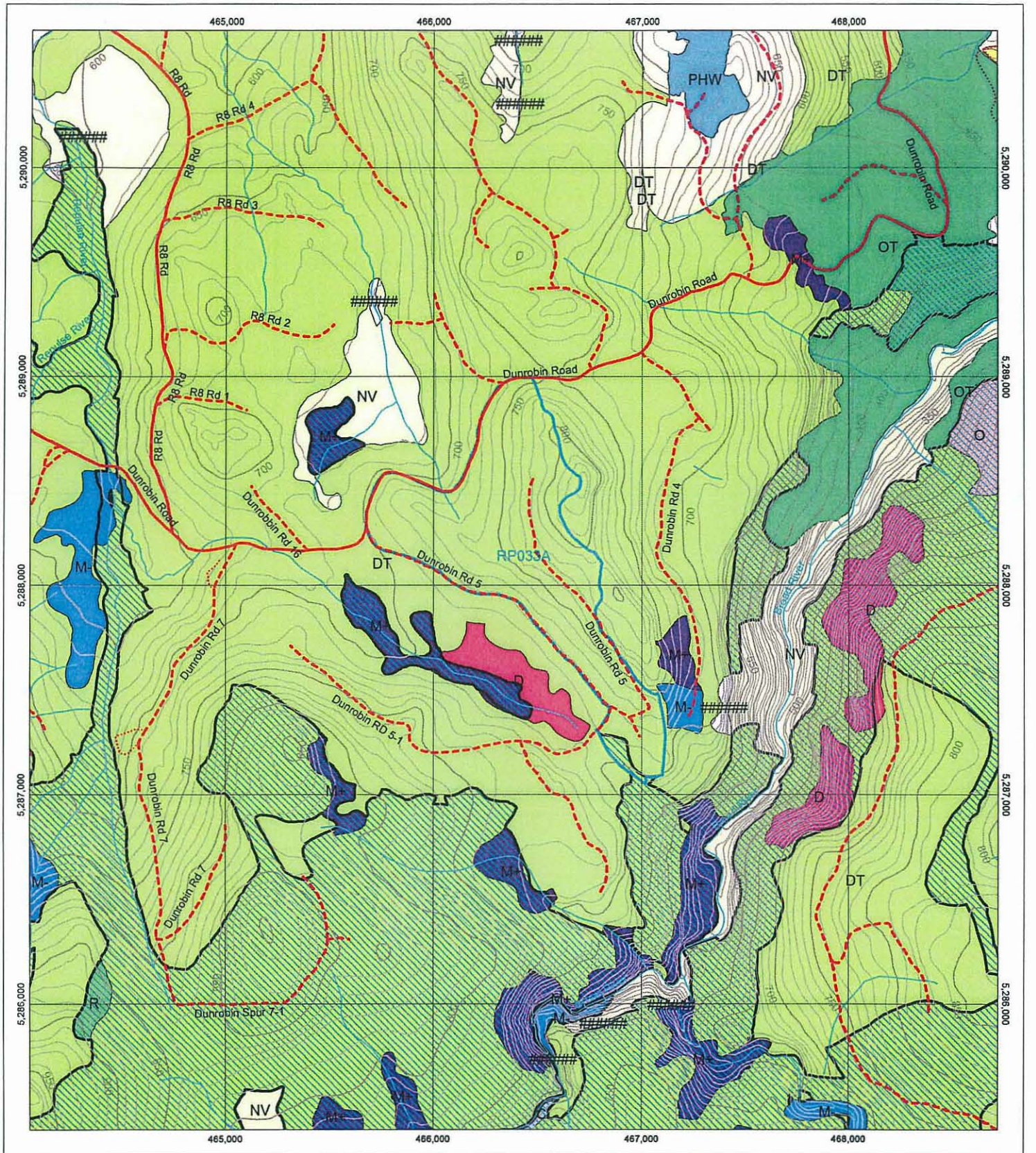
Map Centre Coordinates: 466392 mE, 5288024 mN

A4P

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:25,000
Plot identifier: vntmctvgmap2008.07.28.05.48.520	Prepared for:	0 500 m

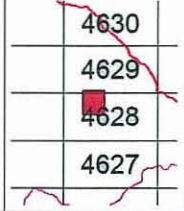
GDA GEOCENTRIC DATUM OF AUSTRALIA

Forestry Tasmania
GROWING OUR FUTURE



- Sigificant all weather 2 lane feeder road
- Single lane all weather minor road
- Single lane minor road
- Plan Coupe Base (Boundary)
- 50 Metre Contour (25K)
- 10 Metre Contour (25k)
- Oldgrowth
- Unknown
- E. coccifera dry forest
- Dry E. delegatensis forest
- Tall E. delegatensis forest
- Thamnic rainforest on less fertile sites
- Callidendrous and thamnic rainforest on fertile sites
- Not Forest
- Dry E. obliqua forest
- Tall E. obliqua forest
- Hardwood Plantation
- Softwood Plantation
- E. regnans forest

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

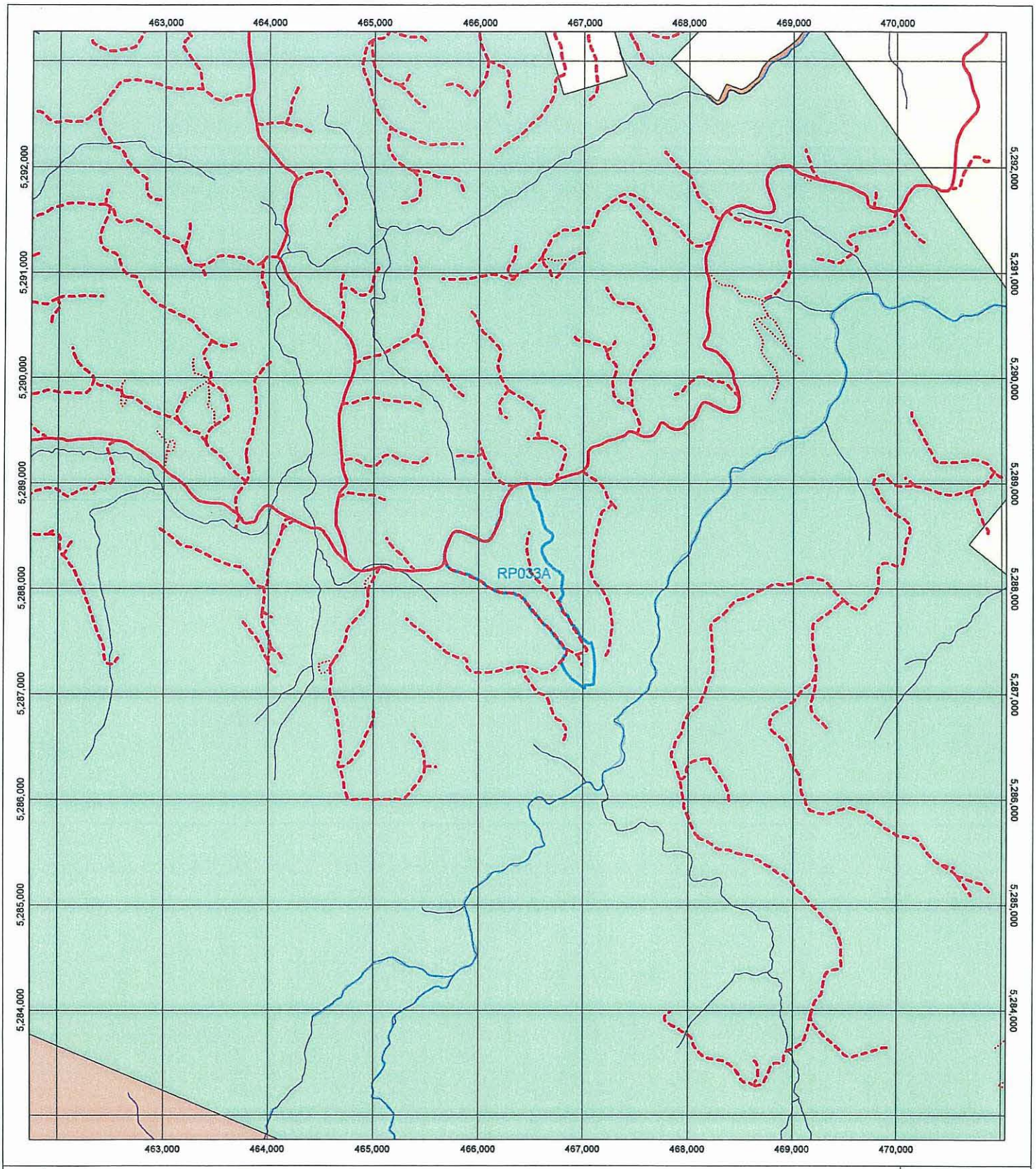
RFA Communities Coupe Map
RP033A

A4P

GDA GEOCENTRIC DATUM OF AUSTRALIA

Forestry Tasmania
GROWING OUR FUTURE

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:25,000
Plot identifier: vntmcdfrfa2008.07.28.05.46.45	Prepared for:	0 500 m

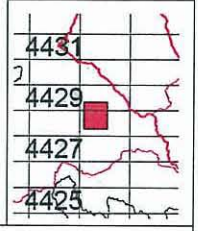


Sigificant all weather 2 lane feeder road
Single lane all weather minor road
Single lane minor road

Rivers (Class 1 and 2)
Plan Coupe Base (Boundary)
WHA - Boundary
World Heritage Area
Water
HEC land - Vested or Private

National Park, Historic Site & Nature/State Reserve
Private Property
Public Reserve
State Forest

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

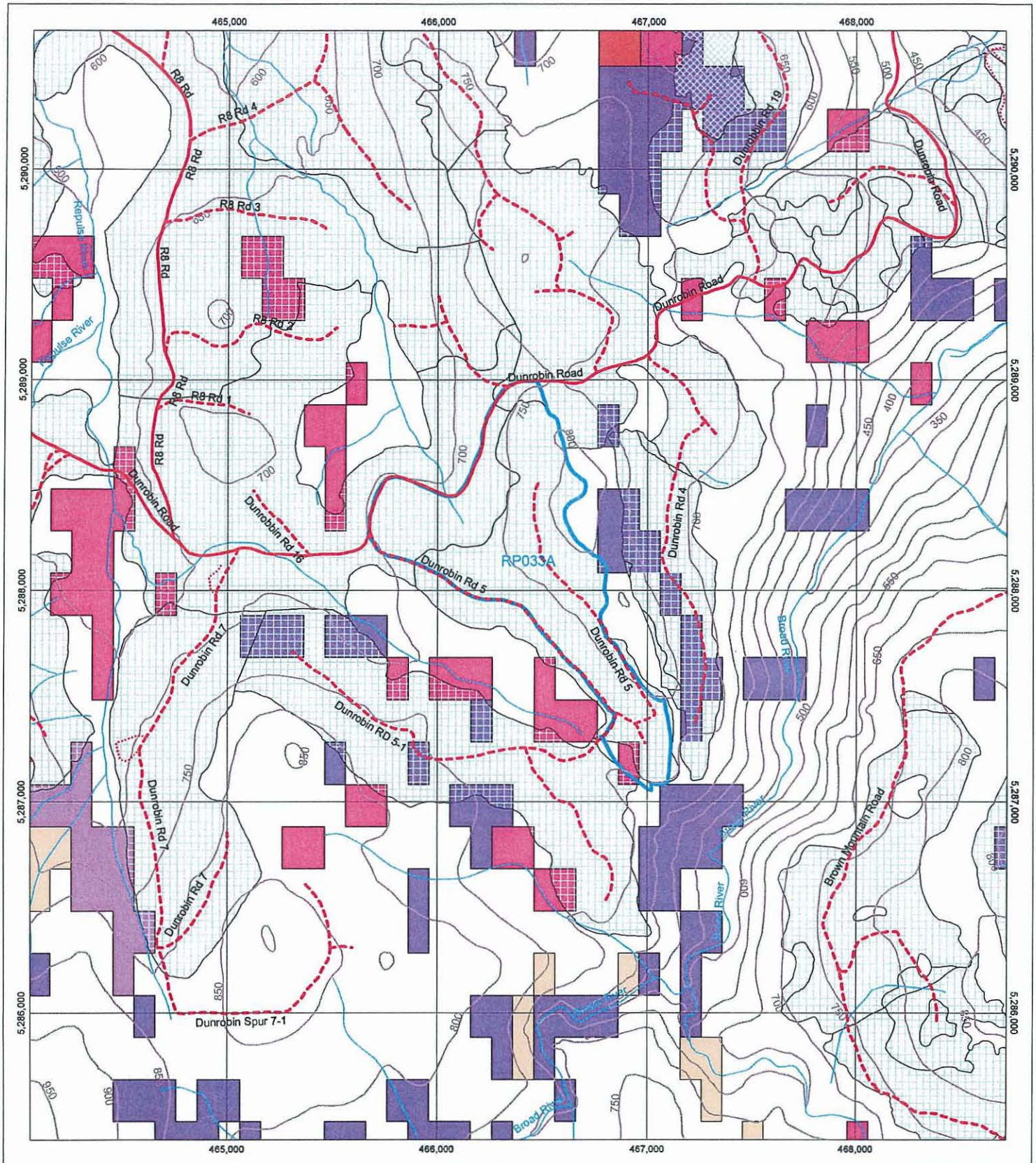
PC Management Area
RP033A

A4P

GDA GEOCENTRIC DATUM OF AUSTRALIA

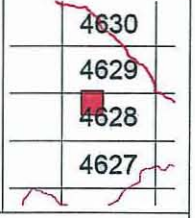
Forestry Tasmania
GROWING OUR FUTURE

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson	Scale 1:50,000
Plot identifier: vntmcpcmc2008.07.28.05.46.45	Prepared for:	0 1.25 km



- Significant all weather 2 lane feeder road
- Single lane all weather minor road
- Single lane minor road
- 50 Metre Contour (25K)
- Provcoupe & Info (Boundary)
- State Forest Boundaries
- Pitype - Plantations
- Pitype - Regen
- Oldgrowth eucalypt forest with myrtle in the rainforest understory: 12 Kg/ha
- Olgrowth eucalypt foret with an understory of secondary species: 9 Kg/ha
- Second species rainforest (i.e. eucalypt of myrtle): 6 Kg/ha
- Unstocked forest with myrtle or secondary species: 3 Kg/ha

LOCATION MAP



NOTE: Map co-ordinates are based on GDA94 Topographic map data is supplied by DPIWE Boundaries may not co-incide due to different capture scales

Apiary Management
RP033A

A4P

Date: Monday, 28 July 2008	Prepared by: Vanessa Thompson
Plot identifier: vntmcapmnp2008.07.28.05.46.43	Prepared for:

Scale 1:25,000

0 500 m

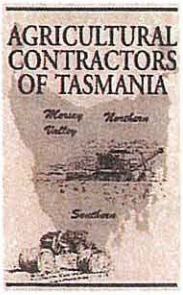
GDA GEOCENTRIC DATUM OF AUSTRALIA

Forestry Tasmania
GROWING OUR FUTURE

Farm HYGIENE
Your Future

Tasmanian
Washdown Guidelines
for Weed and Disease Control

Machinery, Vehicles & Equipment
Edition 1



Forestry Tasmania
GROWING OUR FUTURE

Tasmania
DEPARTMENT of
PRIMARY INDUSTRIES,
WATER and ENVIRONMENT

Tasmanian
Washdown Guidelines
For Weed and Disease Control

Edition 1
April 2004

ACKNOWLEDGEMENTS
The Queensland Weed Seed Project kindly allowed their washdown procedures to be used as a basis for these guidelines. This document was prepared by Tim Rudman (Department of Primary, Industries Water and Environment), David Tucker (Forestry Tasmanian) and Doug French (Agricultural Contractors Association of Tasmania) with the input from councils, industry and State government. Cover photograph David Tucker.

REVIEW OF THE GUIDELINES
The Washdown Guidelines will be reviewed in April 2005. Any comments on the guidelines may be forwarded to:

David Tucker
Forestry Tasmania,
79 Melville St
Hobart Tas. 7000

Doug French
Agricultural Contractors
334 Hazelwoods Lane
Whitemoore Tas. 7303

Tim Rudman
Nature Conservation Branch
GPO box 44
Hobart Tas. 7001

CONTENTS

INTRODUCTION

We all have a responsibility not to spread weeds and disease when visiting or working on private or Crown land. In some cases this may be a legal requirement specified under provisions of the *Plant Quarantine Act 1997, Animal Health Act 1995* or as detailed in a Weed Management Plan. In other cases industries may have standard operating procedures or codes of practice governing washdown requirements for weed and disease control.

Weed seed, some insects and plant pathogens may travel almost sight unseen in mud or lodged in nooks and crannies on machinery, vehicles and other equipment. It is easy to overlook the risk of carrying weeds and diseases; the consequences however, are not so subtle. Failure to washdown can result in crop losses or permanent environmental damage, often incurring substantial cost to the land owner or manager. For example, crop-destroying diseases such as onion white rot and club root may be spread in soil adhering to farm machinery, while in the bush, the introduction of *Phytophthora* root rot may reduce the biodiversity of heathlands and potentially lead to the extinction of some plants.

These guidelines establish a standard for washdown and provide a guide to prescribing its application where codes of practice or other environmental management plans are not in place.

Always consult the land owner or manager for any specific washdown requirements and approval to proceed with any washdown procedures outlined in these guidelines.

WHEN TO WASHDOWN

Many industries have, or are developing, standard operating procedures for vehicle and machinery washdown. Consult your industry code of practice or environmental management system for determining the washdown requirements that apply.

Major developments are also subject to environmental management plans that will specify washdown requirements applying to the project.

For other situations, as a general guide washdown is advisable after:

- operating in an area affected by a weed or disease that is under containment
- transporting weeds or soil known to be infected with weed seed or a plant pathogen and

or before:

- moving machinery out of a local area of operation
- moving machinery between properties
- moving vehicles or machinery to an island
- using machinery along roadsides or along river banks
- using machinery to transport soil and quarry materials
- using controlled-access vehicle tracks
- visiting remote areas where access is only by boat, helicopter or light plane

EQUIPMENT

Personal and small tool wash equipment

Portable wash baths are recommended for use when travelling in vehicles and helicopters for washing footwear and small tools. Washbaths can be made from a fish box (or other suitably sized plastic box) fitted with an open weave plastic doormat, a scrubbing brush, pair of safety gloves, glasses, detergent or fungicide, and a container of clean water. For backpacking, a 2 litre bottle, scrubbing brush, safety gloves and glasses can be used for small tools and boot washing.

The fungicide Phytoclean ™ should be added to washbaths to control the spread of *Phytophthora cinnamomi* if:

- sterilising tools used for *P. cinnamomi* sampling
- entering or washing down within a *Phytophthora cinnamomi* management zone
- entering a population of threatened species that is susceptible to *P. cinnamomi*

Portable vehicle wash equipment

Where field wash down is a regular practice facilities should be obtained and carried for the purpose. Large commercial wash units are available, though in many instances small self-assembled systems will be adequate. In industries that use bushfire slip-on units, these are ideal, allowing more flexible choice of washdown sites. Small fire pumps or portable high pressure wash units are suitable. A shovel, crow bar and stiff brush are also required. Farm workshops should also have suitable wash down equipment. Where a blowdown only is required, compressors or portable blower vacs may be used along with a small brush.

Vehicle wash bays

Purpose built wash bays should be used when ever possible. These washdown facilities include effective effluent management systems to protect the environment. Commercial washdown facilities are available for vehicles and small trucks at most large towns.

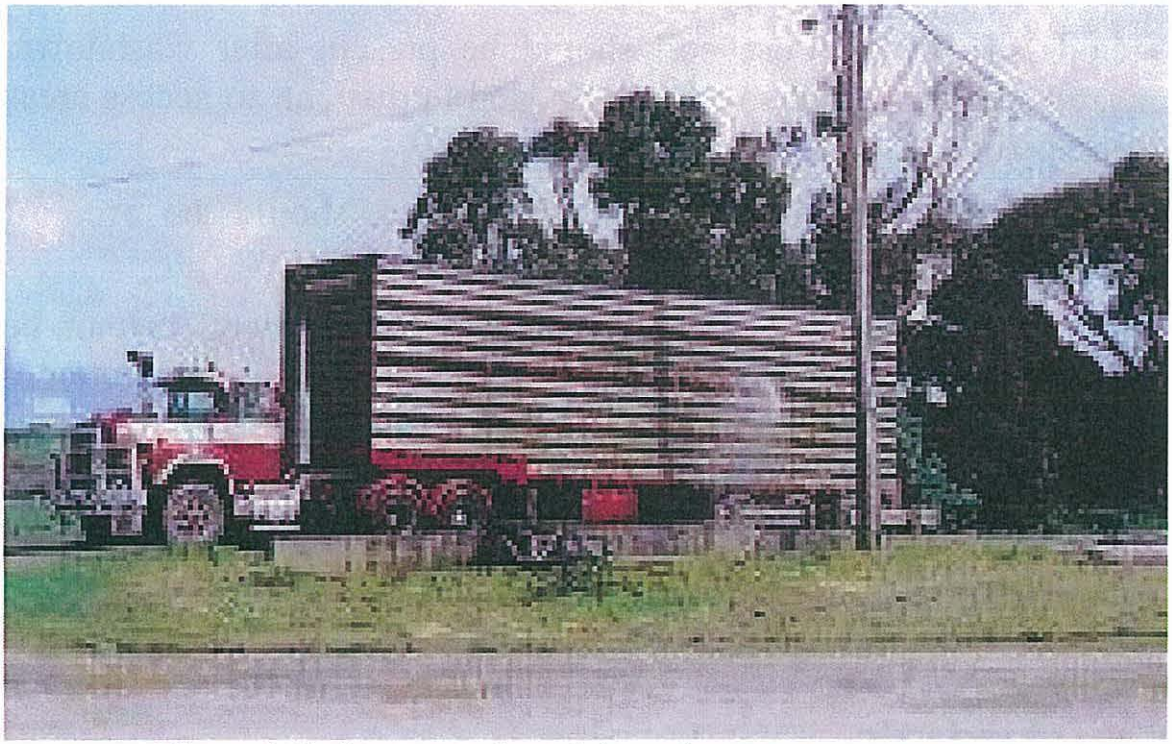


Figure 1 Smithton truckwash in action (Photo: Sue Jennings)

WASHDOWN STANDARDS

General standard

For general cleaning procedures the following standard applies:

- remove only those cover plates etc that can be quickly and easily removed and replaced
- no clods of dirt or loose soil should be present after washdown. Smeared soil stains and soil firmly lodged in difficult to access areas are acceptable
- radiator, grills and the interior of vehicles should be free of accumulations of seed and other plant material

Note that some machinery, such as harvesting equipment, cannot be washed with water because of potential damage to sensitive electronic equipment. Always consult and comply with the manufacturers recommended cleaning method.

Cleaning and inspection should be undertaken in accordance with the general washdown procedure (page 9) and machinery checklists (page 10 on)

Custom standards

Customised washdown standards may be applied under environmental management plans or job specifications where the control of a serious weed or pathogen is required. For instance, particular disinfectants may need to be applied and greater attention to soil accumulations behind protective plates and covers may be specified. Similarly landholders and managers may wish to apply specific washdown requirements.

PROCEDURES

Small tools & portable washbaths

These are used in the management of *Phytophthora* root-rot in native vegetation or can be established as temporary washdown points to contain the spread of soil by foot traffic in other diseased areas.

1. Site the washbath just outside the infected area or at the departure point for the vehicle or aircraft.
2. Remove all loose mud and dirt from the object to be cleaned.
3. Use the recommended safety equipment if washing with a fungicide (safety gloves and glasses).
4. Part fill the washbath with clean water, a depth of about 4 cms is adequate for boot washing. Mix a solution of detergent or fungicide as required (see page 3).
5. Clean boots, gaiters and equipment with the scrubbing brush.
6. Effluent containing registered products such as fungicides must be disposed of in accordance with label recommendations.
7. A final rinse or wipe with fungicide or methylated spirits can be used for sterilisation of scientific equipment.

Selecting a field washdown site.

Field washdown of may be required to contain weeds or plant pathogens to a particular area or where machinery is moved directly between field sites. Always consult the landholder. In selecting a washdown site, consideration should be given to:

- siting the washdown at the edge, or nearby, any areas where weeds or pathogens need to be contained, choose sites where the land slopes back into an infested area or an adjacent area not susceptible to the problem

- ensuring run-off will not enter any watercourse or waterbody, a buffer of at least 30m is desirable
- avoiding sensitive vegetation or wildlife habitat eg remnant native vegetation and threatened species sites.
- selecting mud-free sites (e.g. well grassed, gravel, bark or timber corded) which are gently sloped to drain effluent away from the washdown area
- allow adequate space to move tracked vehicles
- potential hazards, eg powerlines

Note that low loaders are not a suitable platform for washing machinery.

Where there will be large quantities of effluent or there is a risk of extensive run-off, the washdown area should be bunded and a sump constructed to safely dispose of the effluent Take particular care where the effluent is likely to be contaminated with oils.

Mark or record washdown sites with the landowner or manager for subsequent monitoring and weed control.

Figure 2 Washing down (Photograph: D. Tucker)

General washdown procedure

Note: Do NOT apply water to harvesters or other equipment that may be damaged by water.

1. Locate washdown site and prepare the surface or construct bunding as required.
2. Safely park the vehicle free of any hazards (eg electrical), ensure the engine is off and the vehicle is immobilised.
3. Look over the vehicle, inside and out, for where dirt, plant material including seeds are lodged. Pay attention to the underside, radiators, spare tyres, foot wells and bumper bars.
4. Remove any guards, covers or plates if required being careful of any parts that may cause injury.
5. Knock off large clods of mud, use a crow bar if required and sweep out the cabin.
6. Use a vacuum or compressed air where available for removing dried plant material like weed seeds and chaff in radiators and other small spaces where this material lodges. Brush off dry material if no other facilities are available.
7. Clean down with a high pressure hose and stiff brush/crowbar. Use only freshwater if washing down in the field.
8. Start with the underside of the vehicle, wheel arches, wheels (including spare). Next do the sides, radiator, tray, bumper bars etc and finally upper body. Some vehicles may need to be moved during washdown eg tracked machinery.
9. Clean any associated implements, eg buckets.
10. Check there is no loose soil or plant material that could be readily dislodged or removed.
11. In wash bays, steam treat or rinse off vehicle with clean water.
12. Wash effluent away from vehicle, do not drive through wash effluent.

Machinery checklists

Trucks and vehicles

For small vehicles in the field where washdown facilities can not be provided the minimum requirement is:

all loose and large clods of dirt should be physically knocked off the vehicle at the desired washdown point before driving back to a suitable wash facility.

Systematically inspect and clean including:

Cabin	floor, mats and under seats
Engine	radiators
	engine bay and grill
Body	hollow channels
	inside bumper bars
	crevices and ledges
	underside
Wheels	inside and outside
	between dual wheels if fitted
	spare wheel
Tray	hollow channels
	chassis

Wheeled machinery (skidders, tractors, loaders etc)

Systematically inspect and clean including:

Cabin	floor and under seats
Engine	Grill, radiator, oil cooler etc
	around sound deadening panels
	engine compartment grill
Body	chassis
	axle housing, hollow sections
	guards
	cab steps
	around fuel tank
	hollow sections in drawbars and retractable/extendable type three point linkages
	general holes, ledges, gaps and crevices in body including damaged boots, cover plates where trash may lodge
Wheels	inside and outside wheels and rims
	spaces between dual wheels
	chains if fitted
Attached equipment	buckets/ blades including teeth and adaptor plates
Hydraulic arms	crevices where trash can lodge

Bulldozers

Systematically inspect and clean including:

Cabin	floor and under seats
	below transmission coverplates
Engine	radiator, oil cooler etc
	airfilters (for seeds)
	around engine bay
Tracks	lift inspection/coverplates to gain inside access
	idler wheels
	track frame
Body Plates	knock lose material out from belly plates and rear plates as far as is feasible without dismantling
Body	fuel cells
	battery box
Blade	check all hollow sections
	pivot points and adaptors at rear of blade where soil can compact
Tines	crevices where trash can lodge
Ripper	ripper frame support which is usually hollow
	compacted soil underneath ripper points

Excavators

Systematically inspect and clean including:

Cabin	floor and under seats
Engine	grill, radiator, oil cooler etc
	around engine bay
Tracks	idler wheels
	track frame
	tracks
	removable track adjustor guards and lubrication points
Body Plates	glacier plate near radiator
Body	ledges and channels
Blade	check all hollow sections
	between teeth of adaptors
	wear plates
Booms	crevices
Turret pivot	under and around mechanism

Ground engaging equipment

Ploughs tillage equipment, discs, drills, seeders, posthole diggers, planting and harvesting equipment.

Always consult the landowner or manager on requirements and suitable clean down site.

Remove the bulk of the soil by knocking off and scrapping as far as practical. Depending on the type of contamination, wet or dry, use water or an air compressor.

Systematically inspect and clean including:

Frame	hollow channels
	chassis crevices and ledges
	bearing housings
Wheels/ tyres	inside and outside
	lifting mechanism
	axles
Mechanism	holding bins
	discs, tines, cutters and shears
	behind safety guards
	conveyors

Fodder and grain production equipment.

(Rakes, headers, windrowers, conditioners, tedders, bailers etc)

Always consult the landowner or manager on requirements and suitable clean down site. Clean down may be required to control variety contamination in addition to weed and disease control. For certified crops clean down prior to leaving each crop and discharge headers 50m into next crop in accordance with the certification guidelines (see Agricultural Contractors of Tasmania Handbook) or the instructions of a Seed Certification Inspector.

Use only compressed air or a large vacuum cleaner. Cleaning with high pressure water could seriously damage harvesting equipment.

1. Blow down the outside of the machine first.
2. Remove or open easily accessed shields and covers and systematically inspect then clean.
3. For harvesters, increase the wind and run the machine at high speed.
4. Complete with a final blow down of the outside after closing covers.

Pay particular attention to:

Body and frame	Hollow channels, ledges and crevices
Cabin	in and under the cabin
Engine	radiator and grill
	around engine bay
Stone trap	if fitted
Mechanisms	elevators, slides, augers, drum and concaves
	gearboxes, pulleys
Headers	straw spreader or choppers
	grain bin, trays
	fan housing, sieves and screens
Bailers	pickup and around bale chamber and knotters area

Note: For certified crops, headers must be comprehensively cleaned which will take ½ to 1 day.

Slashers and mowers.

Slashers are major contributors to roadside weed spread through carriage of seed. cleaning may be required after passing through significant weed infestations or prior to slashing weed free areas.

When used in dry conditions they are best cleaned by blowing down. An on-board or portable compressor can be used and a stiff broom or shovel may be helpful.

1. disengage power take off or other cutter power system.
2. inspect and clean paying particular attention to:

Linkages	all places seeds may lodge
Body	underside including any sills
	safety chain
	cutters
	topside including any sills
Wheels	inside and outside
Tractor	inspect and blow down or sweep out as per washdown checklist

Water disinfection for *Phytophthora* root rot management

Where water is transported into *Phytophthora* management zones or other areas of native vegetation sensitive to *Phytophthora* root-rot the water should be disinfected to prevent the introduction of *Phytophthora* root-rot. This situation will normally only occur during fire fighting operations where water is drawn from a different catchment.

Disinfection of water is most easily undertaken using granulated pool chlorine products. Handle in accordance with the manufacturer's safety instructions and mix at the rate of:

6ml (0.05% NaOCl) per 10L water

The mixed solution should be allowed to stand a few minutes for disinfection to be completed. Fire fighting need not be delayed as there will be adequate time for disinfection on route to the fire. As chlorine is corrosive, equipment should be adequately rinsed with fresh water following use.

Note: Fire fighting foams or detergents will neutralise chlorine treatments. This will not be a problem provided that tanks do not become contaminated with foam or detergent is not added to the tanks to make "wet water". Sterilisation will occur in the tank prior to foam induction.

APPENDIX 1: CLEANING AGENTS AND DISINFECTANTS

Truck cleaning agents

These may be used to improve soil removal and to degrease. They are best limited to use in washdown stations where effluent disposal systems are in place to limit grease and detergent contamination. A number of products are on the market, including products specifically designed for fungal control.

Specific cleaning agents for *Phytophthora* root rot.

Phytoclean™

Phytoclean™ is registered for the sterilisation of equipment and machinery in Tasmania for the control of *Phytophthora cinnamomi*. It is used at a rate of 200ml per 10L of water for washing surfaces cleaned of mud, and at a rate of 1000ml per 10L water in washbaths. Solution should remain in contact with surfaces for at least 30 seconds before rinsing. It is available in 20L or 200L drums and is manufactured by Avis Chemicals, Dandenong (Ph: 03 9794 5585, fax 03 9706 9206). Use only in accordance with the label directions and when prescribed in the job specifications for the control of *Phytophthora* root rot.

Sodium Hypochlorite

Sodium hypochlorite is recommended for sterilising water in fire-fighting units. However it needs to be used carefully. Once mixed the compound is not stable and quickly degrades, particularly in water with a high organic content. It also corrodes metal. 2 mg/l chlorine is required to kill zoospores in water with a 1 minute exposure time.

Pure alcohol and methylated spirits

These may be used for surface sterilisation of equipment once dirt has been washed off. Its application is limited to small implements and items used in disease survey work such as sampling for *Phytophthora* root-rot.

APPENDIX 2 WASHDOWN LEDGER

Date	Operator	Machine	Location

WASHDOWN LEDGER

Date	Operator	Machine	Location

WASHDOWN LEDGER

Date	Operator	Machine	Location

PROCEDURE STEPS	RESPONSIBILITY	FOR WHAT?	KEY DOCUMENTS	LEGAL REQ.
This procedure covers the planning process for non-FPP and reserve activities. It is not intended that this procedure include activities that are covered by a Forest Practices Plan, an existing SOP or an external process (e.g. Dams).				
1. Planning for proposed activity				
1.1 Preparation and planning	Coordinator (Planning)	• Will the proposed activity occur as part of a Forest Practices Operation? → YES (and outside Reserve) – Utilise the Forest Practices System → NO (or inside Reserve) – See below • Does the proposed activity have an established Standard Operating Procedure? → YES (and outside Reserve) – Utilise the existing Standard Operating Procedure → NO (or inside Reserve) – See below • Will the proposed activity occur within a production zone or an informal reserve? → YES – This is a **Non-FPP Activity** → NO – See below • Will the proposed activity occur within a formal reserve? → YES – This is a **Reserve Activity** → NO – Contact Planning Branch for activities not on State forest • Consult "Guidelines for planning non-FPP and reserve activities" to determine activity level and **assessment process**. • Routine activities **do not** require further assessment under this SOP. See 2.1 for approval process for routine activities. • For Level A and B activities use Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan to record details about the activity, including: → Activity level (Level A or Level B); → Details about other options considered; → Reserve Management Objectives; → Compliance of proposed activity with legislation and FT Policy. • Determine requirement for external approvals. Refer to "Non-FPP activities occurring on State forest which require external approval".	Forest Management Plan Huon Pine Policy King Billy Pine Policy Rainforest Policy Giant Tree Policy Landscape Management Policy Guidelines for planning non-FPP and reserve activities. Non-FPP activities occurring on State forest which require external approval. Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2 Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan. Principles of Dam Works on State forest	Land Use Planning and Approvals Act (1993) Environmental Management and Pollution Control Act (1994) Water Management Act (1999) Environment Protection and Biodiversity Conservation Act (1999) Threatened Species Protection Act (1995) Aboriginal Relics Act (1975) Forestry Act Schedule 3 Regional Forest Agreement Tasmanian Community Forest Agreement Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2

PROCEDURE STEPS	RESPONSIBILITY	FOR WHAT?	KEY DOCUMENTS	LEGAL REQ.
1.2 Conduct desktop analysis, collating existing information	Coordinator (Planning)	• Consult "Guidelines for planning non-FPP and reserve activities, Planning Task Matrix" which outlines information needed for Non-FPP or Reserve Level A and Level B activities. • Use Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan, Natural and Cultural Values, to record site values identified through desktop assessment and research into relevant reserve information. Collate map products identified in documentation checklist.	Guidelines for planning non-FPP and reserve activities. Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan. Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2	Regional Forest Agreement Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2
1.3 Conduct site reconnaissance	Coordinator (Planning)	• Consult "Guidelines for planning non-FPP and reserve activities, Planning Task Matrix" which outlines assessments needed for Level A and Level B activities. • Use Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan, Natural and Cultural Values, to identify, confirm and document values (including reserve values) identified during field assessments, that are likely to be impacted by the activity, including: → Physical attributes (terrain, soils, drainage, water); → Vegetation communities, threatened flora or fauna; → Geology and Geodiversity; → Landscape attributes (how view points will be affected and visual amenity impacted); → Aboriginal and Historic sites; → Environmental Quality (pre-activity) of air, water and noise; → Presence or evidence of fire, weeds, *Phytophthora cinnamomi*, soil erosion, grazing, etc. • Use information from field assessment to identify need for specialist input or requirements for additional information. • If known threatened species sites or habitats, priority forest or non-forest communities, sites of geomorphic, cultural or historical significance, RAMSAR sites, locations of listed migratory species are within the proposal or the site is within a Formal reserve, consult relevant specialists and/or Planning Branch.	Guidelines for planning non-FPP and reserve activities. Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan. Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2	Regional Forest Agreement Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2 Environment Protection and Biodiversity Conservation Act (1999) Threatened Species Protection Act (1995) Aboriginal Relics Act (1975) JAMBA/CAMBA Bonn Convention

PROCEDURE STEPS	RESPONSIBILITY	FOR WHAT?	KEY DOCUMENTS	LEGAL REQ.
1.4 Assess current conditions, potential impacts of proposed activity and develop management prescriptions to avoid/mitigate impact	Coordinator (Planning)	• Use Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan, Natural and Cultural Values, to document potential impacts and management prescriptions to be implemented for each of the **natural values** identified in the assessment. Consult appropriate planning tools, manuals or seek specialist advice. • Use Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan, Natural and Cultural Values, to document current conditions, potential impacts and management prescriptions of the proposed activity on **cultural values**, including: → Traditional and current Aboriginal and historical uses; → Traditional and current recreational uses; and → Traditional and current social uses. • For Reserve Activities, consult Reserve Management Code of Practice for relevant standards for a) the proposed activity and b) managing the values likely to be affected. • Consult with relevant parties where appropriate. • Use Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan, Natural and Cultural Values, to identify and document recommended management prescriptions to minimise impacts or, consider alternatives if impacts are likely to be significant.	Guidelines for planning non-FPP and reserve activities. Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan. Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2 Forest Practices Authority Manuals and Notes Procedures for the management of threatened species in wood production forests under the forest practices system	Regional Forest Agreement Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2 Environment Protection and Biodiversity Conservation Act (1999) Threatened Species Protection Act (1995) Aboriginal Relics Act (1975) JAMBA/CAMBA Bonn Convention

PROCEDURE STEPS	RESPONSIBILITY	FOR WHAT?	KEY DOCUMENTS	LEGAL REQ.
1.5 Consult relevant parties	Coordinator (Planning)	• Use Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan, Community Consultation, to identify parties likely to be affected by the activity, document contact with relevant stakeholders/users of the area and outcomes from consultation which include: → Neighbours; → Communities; → Recreational groups (bush walkers, orienteering groups); → Apiarists; → Property Rights (Leases, Licences, Access rights); and/or → Tourism operators. • Consult with other internal Forestry Tasmania departments with an interest in the activity, where applicable (i.e. Planning Branch, Land Property Section, Tourism and Community Services). • Level A RESERVE activities, conduct appropriate notifications where relevant. • Level B RESERVE activities, advertise the project on Forestry Tasmania's web page for a two-week period or within a local newspaper for public comment. Document and consider comments in the Community Consultation section of the assessment.	Guidelines for planning non-FPP and reserve activities. Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan. Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2 Principles of Dam Works on State forest	Regional Forest Agreement Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2
1.6 External Approvals	Coordinator (Planning)	• Apply for external approvals, where required. Refer to "Non-FPP activities occurring on State forest which require external approval."	Non-FPP activities occurring on State forest which require external approval. Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2	Land Use Planning and Approvals Act (1993) Environmental Management and Pollution Control Act (1994) Water Management Act (1999) Environment Protection and Biodiversity Conservation Act (1999) Threatened Species Protection Act (1995) Aboriginal Relics Act (1975)

PROCEDURE STEPS	RESPONSIBILITY	FOR WHAT?	KEY DOCUMENTS	LEGAL REQ.
2. Obtaining authorisation				
2.1 Obtain relevant FT authorisation	Works Supervisor Coordinator (Planning) District Forest Manager Senior Forest Planner (SFP) Planning Manager Executive	• Routine Activities – approval required from relevant planner/works supervisor. • Level A or B Activities – approval required from Coordinator (Planning), District Forest Manager, Senior Forest Planner and Planning Manager. Some Level B Activities may require executive approval. • SFP to ensure information on impact assessment and management controls link to Aspect and Impact Register.	Guidelines for planning non-FPP and reserve activities. Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan. Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2	Regional Forest Agreement Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2
2.2 Obtain formal approvals under relevant legislation	Coordinator (Planning) District Forest Manager	• Obtain approvals from relevant organisation for activities requiring external authorisation under legislation.	Non-FPP activities occurring on State forest which require external approval. Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2	Land Use Planning and Approvals Act (1993) Environmental Management and Pollution Control Act (1994) Water Management Act (1999) Environment Protection and Biodiversity Conservation Act (1999) Threatened Species Protection Act (1995) Aboriginal Relics Act (1975)
3. Monitoring				
3.1 Monitoring results	Coordinator (Planning) District Safety and Environment Coordinators	• Use Non-FPP and Reserve Activity Monitoring to undertake monitoring of prescriptions, guidelines and management actions identified in the Non-FPP and Reserve Activity Assessment Sheet and Activity Plan. This is also to be used as a signoff for completion. • For Reserve Activities, a selection of activities will be independently audited via Reserve Activity Audit. • Monitor effectiveness of prescriptions in protecting reserve values. • Report on reserve activities annually.	Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2 Non-FPP and Reserve Activity Monitoring Reserve Activity Audit	Regional Forest Agreement Reserve Management CoP, 2003 Pt 1 Reserve Management CoP, 2003 Pt 2

END OF PROCEDURE

Forestry Tasmania

GROWING OUR FUTURE

Guidelines for Planning Non-FPP and Reserve Activities

For use in conjunction with the Standard Operating Procedure for Non-FPP and Reserve Activities.

June 2008

Planning Branch

1 Introduction

Forestry Tasmania manages 1.5 million hectares of forest across Tasmania. Most of Forestry Tasmania's core activities are undertaken within the Forest Practices System (harvesting, roading, site preparation), however there are a number of activities carried out on State forest that do not fall under the Forest Practices System. Some of these activities already have a Standard Operating Procedure (SOP) in place (e.g. low intensity fuel reduction burning, building construction) which outlines how these activities will be planned and carried out when being conducted in a Production Zone.

There is still a range of activities that fall outside of the Forest Practices System and do not have a SOP. Those activities, where planned in a Production Zone or within Informal Reserve, fall into the category of a non-Forest Practices Plan (non-FPP) activity and where planned in a Formal Reserve, fall into the category of a reserve activity.

An assessment of activities in both of these categories is required so the potential impact of the activity can be considered. This is required, irrespective of the proponent, in order to meet requirements under the Regional Forest Agreement, Australian Forestry Standard and so that reserve activities can be undertaken in accordance with the Reserve Management Code of Practice (2003).

2 Who needs to use these guidelines?

These guidelines need to be used for any Non-FPP or Reserve Activity on State forest. This includes external proponents wishing to obtain a lease or a licence on State forest (as per Property Lease Procedure), or those wishing to conduct an activity or event on State forest.

3 What is a Non-FPP Activity and a Reserve Activity?

A non-FPP activity is one which occurs on State forest (production zone or informal reserve) and is not included as part of an FPP or existing SOP. A Reserve Activity is any activity proposed for a formal (Forest) reserve.

4 Determining level of activity

Activities vary dramatically in their potential to impact on natural and cultural values. Activities not associated with an FPP on State forest have been divided into three broad categories:

- Routine activities;
- Level A activities; and
- Level B activities.

Each level has an associated amount of planning required before the activity can proceed, and each has a different level of approvals required.

4.1 Definitions and Planning Requirements

4.1.1 Routine Activities

Activities where **no impacts** to natural or cultural values are anticipated. i.e. NO ground or native vegetation disturbance, construction or demolition, loss of fauna or habitat, use of dangerous chemicals, change in public access and no requirement for external planning approval.

The level of planning required prior to undertaking a routine activity is low. Routine activities only require approval from the relevant planner/works supervisor.

4.1.2 Level A Activities

Activities where **minimal impact** to natural or cultural values are anticipated. i.e. activities that are likely to involve MINIMAL native vegetation clearance (<50m^2), interference with a waterway, potential for introduction of declared weeds or diseases, change in public access and short duration disturbance. They may also require external approvals.

Level A activities require the Non-FPP and Reserve Activity Assessment Sheet and Activity Plan (Appendix 1) and the Non-FPP and Reserve Activity Monitoring Sheet (Appendix 2) to be completed. Refer to Planning Task Matrix for planning requirements. Approvals for these activities are required from the Manager, Planning and the District Forest Manager.

4.1.3 Level B Activities

Activities with **significant potential** to impact natural or cultural values. i.e. activities involving substantial ground disturbance (>50m^2), clearance of native vegetation, changes to drainage, construction (including buildings, walking tracks, bridges or other infrastructure) or demolition, long duration disturbance and construction not requiring statutory approval. These activities may also require external approvals.

Level B activities require the Non-FPP and Reserve Activity Assessment Sheet and Activity Plan (Appendix 1) and the Non-FPP and Reserve Activity Monitoring Sheet (Appendix 2) to be completed. Refer to Planning Task Matrix for planning requirements. Approvals for these activities are required from the Planning Manager and the District Forest Manager.

4.1.4 Example Activity Levels

Indicative Activity Levels are given in Table 1 for some common activities carried out on State forest. Activity Level may change according to degree of disturbance and/or values at the site.

Table 1: Example Activity Levels for Common Activities

Activity	Level	Activity	Level
Maintenance of existing visitor facilities	Routine	Scientific Research	A or B
Fixing a sign, erecting new sign (single)	Routine	Rehabilitation of sites/structures	A or B
Apiary – Existing Sites	Routine	Rehabilitation of land/areas	B
Multiple interpretive signs or a series of interpretive signs	A	Construction of visitor facilities	B
Car rallies/mountain bike events/horse rides	A	Walking track construction	B
Apiary – New Sites	A	Fuel reduction burning	B
Pre-Commercial Thinning (Stem Injection)	A	Agistment/Agriculture/Fencing	B
Native Plant Harvesting	A or B	Communication & Transmission Towers/Lines	B

4.1.5 Planning Task Matrix

Planning requirements for Non-FPP and Reserve activities for each level are given in Table 2. The required map products should be used to assess the need for further planning and/or specialist advice including the need for site inspections.

Table 2: Planning Task Matrix

Planning Task	Routine Activities		Level A Activities		Level B Activities	
	Non-FPP	*Reserve*	*Non-FPP*	*Reserve*	*Non-FPP*	*Reserve*
Non-FPP and Reserve Activity Assessment Sheet	X	X	✓	✓	✓	✓
Check reserve objectives in Forest Reserve Register	X	X	X	✓	X	✓
Check legislative/external approval requirements	X	X	✓	✓	✓	✓
Check FT Policies	X	X	✓	✓	✓	✓
Review library/files for relevant reserve information	X	X	X	✓	X	✓
MDC Map (1:25,000)	X	X	✓	✓	✓	✓
Planning Map (1:10,000)	X	X	✓	✓	✓	✓
Conservation Map and Report (1:25,000)	X	X	✓	✓	✓	✓
Aboriginal Sites Enquiry Map and Report (1:25,000)	X	X	✓	✓	✓	✓
Tasveg Communities Map (1:25,000)	X	X	✓	✓	✓	✓
Wedge-tailed Eagle Map (1:25,000)	X	X	X	X	✓	✓
Karst Area/Catchment Map (1:25,000)	X	X	X	X	✓	✓
Aboriginal APZ Map (1:25,000)	X	X	X	X	✓	✓
Landscape Management Objective Map (1:25,000)	X	X	X	X	✓	✓
Tasmanian Geoconservation Map (1:25,000)	X	X	X	X	✓	✓
Geology Map (1:25,000)	X	X	X	X	✓	✓
High Quality Wilderness/Undisturbed Rivers Map (1:25,000)	X	X	X	X	X	✓
Property Rights Map (1:25,000)	X	X	X	X	✓	✓
Giant Trees Map (1:10,000)	X	X	X	X	✓	✓
Town Water Intakes	X	X	X	X	✓	✓
Field Surveys – record and/or confirm site information	X	X	✓	✓	✓	✓
Assess impacts of proposed activity and develop prescriptions	X	X	✓	✓	✓	✓
Assessment of social and recreational values	X	X	X	✓	X	✓
Consult with relevant parties	X	X	✓	✓	✓	✓
Apply for external approvals	X	X	✓	✓	✓	✓
Obtain FT approvals	✓	✓	✓	✓	✓	✓
Obtain external approvals	X	X	✓	✓	✓	✓

5 Using Appendix 1 – Non-FPP and Reserve Activity Assessment Sheet and Activity Plan

Using the little numbers in the headings on the Assessment Sheet, the following information provides guidelines on how to fill out the sections, and where to find relevant information.

1. Compliance with Legislation:

This section provides a mechanism to check that the proposed activities will not be contrary to any of the legislation. If they are likely to be non-compliant, for example, removal of threatened species, this will trigger the requirement for external approvals (permits). Two documents that can be used to help assess whether the proposed activity will comply with legislation are the Register of Legal and Other Requirements and Non-FPP activities occurring on State forest which require external approval. If in doubt please contact Planning Branch for confirmation. The undertaking of a new activity may also identify new legislation/legal requirements to which FT has to subscribe.

2. Compliance with FT Policy:

This section provides a mechanism to check that the proposed activities will not be contrary to any of Forestry Tasmania's policies. The Forest Reserve Register can be consulted by clicking on the hyperlink to the database. The Reserve Management Objectives are generally outlined in Forest Reserve Register. There are a number of Forest Reserve Management Plans in existence for individual reserves, and these should be in district libraries. If the proposed activity is within a CAR Reserve (all Forest Reserves and Informal Reserves are CAR Reserves), contact the Senior Forest Management Planner who will check the values in the CAR Reserve Database. Property rights can be checked by producing a Property Rights Map within Map Composer. Rainforest Policy, Giant Tree Policy, Huon Pine Policy and King Billy Pine Policy are only applicable if any of these values are present. The Landscape Management Policy, Forest Management Plan and MDC should all be consulted to assess consistency of the proposed activity with these management tools.

3. Natural and Cultural Values:

The proposed activity needs to be assessed in terms of the predicted impact on natural and cultural values. Ensure this assessment takes place for the entire activity, including peripheral disturbance that may occur, i.e. access tracks to a new activity, additional clearing for fire breaks or fence lines, etc. For each value, the existing conditions present on site need to be identified. This includes all site specific information, not just identification of special values. This is initially done via a desktop exercise (driven by the map products required in the documentation checklist). The information gathered from the desktop exercise is then confirmed through an on-site inspection. Where identified special values exist, specialists may need to become involved in assessing impacts, providing prescriptions and developing controls for the proposed activity to proceed.

The potential impacts of the proposed activity (including cumulative effects) need to be assessed. Where specialists have been involved in the assessment because of an identified special value, then their expertise can be utilised in assessing the potential impacts for that particular value. The Senior Forest Management Planner is able to assist with this process if required.

4. Community Consultation/Notifications:

While "Recreation and Social Values" are identified in natural and cultural values, these purely recognise traditional and past uses, not specific users. Community consultation may have some overlap where the users perform some of the traditional uses, however this section purely identifies stakeholders who may have an interest in the proposed activity. In this section, the obvious stakeholders should be identified and contacted, as well as any stakeholders who identify themselves as a result of advertising of the proposed activity.

5. Documentation Checklist:

The documentation checklist provides a process to document that all the steps have been taken, and who carried out each of the steps.

6. Approvals:

Approvals that the proposed activity can proceed in accordance with any management actions identified in the planning process. Remember, Planning Branch must approve all level A and B activities.

6 Using Appendix 2 – Non-FPP and Reserve Activity Monitoring Sheet

The monitoring sheet must be used throughout the development and implementation of the activity. The monitoring process serves to ensure that identified control measures/prescriptions necessary for the protection of identified values are being implemented and are being effective in mitigation of any environmental impacts.

The monitoring sheet must also be used to record decisions made on the ground that are different to what is in the plan, e.g. the need to fall hazardous trees, make slight changes to plans, record problems encountered, monitoring environmental issues raised during planning - i.e. weeds, PC, Myrtle wilt, water monitoring. This monitoring form should also act as a completion certificate, so on completion of the activity, a monitoring form must be the final signoff that the activity is finished.

7 Using Appendix 3 – Non-FPP and Reserve Activity Variation Form

A variation to a Non-FPP or Reserve Activity Assessment should be carried out if there have been moderate to significant changes to the original Plan or if the original assessment is past its validity date. If a variation form is used, it must be attached to the original Non-FPP or Reserve Activity Assessment Activity Plan. A variation is provided in Appendix 3 of these guidelines.

8 Frequently Asked Questions

8.1 Other than the activity, what else should the assessment cover?

When planning a Non-FPP or Reserve Activity and assessing the impacts, ensure that the assessment covers all likely areas of disturbance. This is related to the entire activity and includes any access/peripheral disturbance likely to occur. Rehabilitation also needs to be considered for the activities that have peripheral disturbance associated with it. This needs to be documented in the "management actions to be taken to avoid/mitigate impact" part of the assessment.

8.2 What about external proponents wanting to conduct activities on State forest?

The proponent needs to be advised that they need to have a Non-FPP and Reserve Activity Assessment Activity Plan done. The District needs to use their discretion as to whether the District provides this service to the proponent (either at a cost or as in-kind sponsorship) or tells the proponent they must engage a consultant. A list of consultants who have carried out Non-FPP and Reserve Activity Assessment Activity Plans on State forest is available from Planning Branch (Senior Forest Management Planner).

This applies to people applying for a lease or a licence on State forest and people wishing to conduct activities on State forest not associated with leases or licences (e.g. car/motor bike rallies, orienteering events, etc). When an activity plan is completed for a lease or licence, it is very important that prescriptions and management actions are written into conditions of the lease or licence.

8.3 How long is a Non-FPP or Reserve Activity Assessment good for?

A Non-FPP or Reserve Activity Assessment is valid for 12 months in production forest, and 24 months in reserves (informal and formal). After this time, a Non-FPP or Reserve Activity Assessment can be updated by filling out a variation form where any new associated environmental values are unlikely to be found e.g. new Wedge-tailed Eagle nests, new cultural heritage or threatened flora records, etc.

APPENDIX 1
NON-FPP AND RESERVE ACTIVITY ASSESSMENT SHEET AND ACTIVITY PLAN (LEVEL A AND B ACTIVITIES)

Activity Details:

Project Title:			
Reserve Name:		**Block Name:**	
Contact Officer:			
District:			
Planned Activity:			
Location (GDA Ref):		**Activity Level:**	
Proposed timing of activity:		**Proposed duration of activity:**	
Extent/Area (ha):		**FOD Operation ID:**	
JRA Number & Details:			
Other options considered:			
District File Number:		**Head Office File Number:**	
Information on the works proposed:			
Summary of prescriptions required:			

Compliance with Legislation [1]:

Does the activity comply with the following statutes/policies?	Yes (compliant)	Maybe (further assessment reqd)	No (non-compliant)	N/A	Details of compliance/ approvals required
Environmental Protection and Biodiversity Conservation Act 1999 Nationally threatened species, threatening processes.					
Threatened Species Protection Act 1995 Threatened species.					
Aboriginal Relics Act 1975 Aboriginal sites.					
Historical Cultural Heritage Act 1995 Heritage listed sites.					
Environmental Management and Pollution Control Act 1994 Any non-FPP operation eg. building or track construction. Environmental harm and pollution.					
Land Use Planning and Approvals Act 1993 Developments/Structures.					
Water Management Act 1999 Protection of water resources.					
Fire Services Act 1979 Fuel reduction or ecological burning.					
Forestry Act 1920 All activities on State forest.					
RFA, Permanent Native Forest Estate					

Compliance with FT Policy [2]:

Does the activity comply with the following statutes/policies?	Yes (compliant)	Maybe (further assessment reqd)	No (non-compliant)	N/A	Details of compliance/ approvals required
Forest Reserve Register/Reserve Objectives Permitted activities, reserve values, reserve objectives (Forestry Act, Sched 3), old reserve management plans.					
CAR Reserve Values Protection levels for forest communities at bioregional level.					
Property Rights					
Rainforest Policy					
Giant Tree Policy					
Huon Pine Policy					
King Billy Pine Policy					
Landscape Management Policy					
District Forest Management Plan					
MDC					

Natural and Cultural Values [3]: (Make sure you consider all aspects of the activity including peripheral disturbance associated with the activity e.g. access to site, construction disturbance, etc.)

Value	Existing conditions (record all values present on site, N/A if values not present)	Site surveys (who conducted field surveys, specialists involved, references consulted)	Impact of activity on value (including cumulative effects)	Management action to be taken to avoid/mitigate impact (including ongoing monitoring and rehabilitation)
FLORA (vegetation communities present, threatened species, priority communities, critical habitats)	Vegetation communities present are:			
FAUNA (threatened species habitats or potential threatened species, management agreements)	Threatened species habitat is present for:			
GEOLOGY/GEODIVERSITY (Geological substrate, Tas Geocon Dbase, Karst)	The primary geological substrate is:			
SOILS (description of soil type present, erosivity)	Primary soil types are:			
WATER/STREAMS (Water intakes, water quality and quantity)				
LANDSCAPE (visual impact and management)				
WILDERNESS and WILD RIVERS (High Quality Wilderness, Wild River Catchment)				
ABORIGINAL VALUES (Relics, Artefacts, Sites, Traditional use, APZ Zone)				
HISTORIC VALUES (Relics, Sites, Items)				
RECREATION (known recreational uses/users e.g. walking, motorbike riding, fishing, etc.)				
SOCIAL (Traditional uses, as evident in field e.g. grazing, recreation, firewood collection, mining, etc.)				
ENVIRONMENTAL QUALITY – AIR, WATER, NOISE (usually all good quality prior to activities)	Air: Water: Noise:			
GENERAL PROTECTION MEASURES (fire, weeds, PC, soil, rehabilitation, spills)				
OTHER (property rights issues, access, etc)				

Community Consultation/Notifications [4]:

Stakeholders include neighbours, community groups, recreationists, tourists, licensees/leasees (apiarists, agistment, communication towers, research), etc.

Stakeholder	Consulted? (Yes/No)	Interest Level (Low, Med, High)	Concern Level (Low, Med, High)	Details on consultation

Documentation Checklist [5]:

Activity Level	SOP Step	Responsibility (Nominated Officer)	Compilation of information	Date Completed	By Who
A and B	1.1		Identify if proposed activity fits within:		
A and B			♦ Reserve objectives (Forest Reserve Register)		
A and B	1.1		♦ Legislative/external approval requirements		
A and B			♦ FT Policies		
A and B	1.2		Collate existing information (desktop analysis):		
B			♦ Review library/files for relevant Reserve information		
A and B			♦ MDC Map (1:25,000)		
A and B			♦ Planning Map (1:10,000)		
A and B			♦ Conservation Map and Report (1:25,000)		
A and B			♦ Aboriginal Sites Enquiry Map and Report (1:25,000)		
A and B			♦ Tasveg Communities Map (1:25,000)		
B			♦ Wedge-tailed Eagle Map (1:25,000)		
B			♦ Karst Area/Catchment Map (1:25,000)		
B			♦ Aboriginal Archaeological Potential Zone Map (1:25,000)		
B			♦ Landscape Management Objective Map (1:25,000)		
B			♦ Tasmanian Geoconservation Map (1:25,000)		
B			♦ Geology Map (1:25,000)		
B			♦ High Quality Wilderness and Undisturbed Rivers Map (1:25,000)		
B			♦ Property Rights Map (1:25,000)		
B			♦ Giant Trees Map (1:10,000)		
B			♦ Town Water Intakes check		
A and B	1.3		Field Surveys – record and/or confirm site information		
A and B	1.4		Assess impacts of proposed activity and develop management prescriptions		
A and B	1.5		Consult with relevant parties		
A and B	1.6		Apply for external approvals		
A and B	2.1		Obtain FT approvals		
A and B	2.2		Obtain external approvals		

Approvals [6]:

Name	Signature	Date	Position
			Planner/Works Supervisor
			District Forest Manager
			Senior Forest Management Planner
			Manager, Planning
			External Approvals Received (signed by planner)

APPENDIX 2
NON-FPP AND RESERVE ACTIVITY MONITORING SHEET

Activity Details:

Date of Assessment:		**Assessor Name:**	
Project Title:			
Reserve Name:			
District:		**Activity Type:**	
Extent/Area (ha):		**Activity Level:**	
District File Number:		**Head Office File Number:**	

Monitoring comments: (Comment/record new unidentified impacts or issues and management actions to deal with these and carry these through to the CAR system where appropriate)

Completion checks:

Item	Yes	No	N/A	Comments
Geodiversity: Have geodiversity values (including karst) been protected and maintained?				
Flora and Fauna: Has the activity ensured protection of flora and fauna values to the greatest possible extent?				
Landscape: Has particular care been taken to protect landscape values?				
Wilderness and Wild Rivers: Has disturbance been minimised to the hydrological, geomorphological and biological processes of wild rivers?				
Cultural Values: Have cultural heritage values been protected?				
Social Values: Has the activity prevented people from exercising their social values associated with the reserve?				
Recreational Values: Have recreational opportunities in the reserve been diminished as a result of the activity?				
Environmental Quality (Air, Water, Noise): Has the natural quality of air, water and noise been restored?				
Environmental Monitoring (Water): Has water monitoring been carried out?				
Protecting Reserve Values: Has restoration/rehabilitation been undertaken?				
Legislation and Policy: Has activity complied with legislation and policy?				
Legislation and Policy: Have permit conditions been met?				
Impacts on values: Have all decisions about activities been recorded?				
Impacts on values: Have any additional impacts been identified?				
Impacts on values: Have any additional impacts been documented?				
Impacts on values: Have management actions to avoid/mitigate impacts been implemented?				
Impacts on stakeholders: Have there been any complaints about the activity to FT?				
System requirements: Have identified environmental aspects and impacts and associated control measures been addressed?				
System requirements: Have identified safety and health hazards and risks and associated controls been addressed?				

Sign off (for completion):

Completion compliance assessed by: _____ Signed: _____

Date: _____ Copy of completion sign off send to Planning Branch: **Yes/No** Date: _____

APPENDIX 3
NON-FPP AND RESERVE ACTIVITY VARIATION FORM

Activity Details:

Project Title:			
Reserve Name:		**Block Name:**	
Contact Officer:			
District:			
Planned Activity:			
Location (GDA Ref):		**Activity Level:**	
Proposed timing of activity:		**Proposed duration of activity:**	
Extent/Area (ha):		**FOD Operation ID:**	
Information on the works proposed:			
Summary of prescriptions required:			
Does the activity still comply with legislative requirements?			
Does the activity still comply with FT Policies?			
Does this variation require any additional community consultation/notifications?			
Has the District Forest Manager approved this variation?			
Has Planning Branch approved this variation?			

Natural and Cultural Values: (Make sure you consider <u>all</u> aspects of the activity including peripheral disturbance associated with the activity e.g. access to site, construction disturbance, etc.)

Value	Existing conditions (<u>record all values present on site</u>, N/A if values not present)	Site surveys (<u>who conducted field surveys</u>, specialists involved, references consulted)	Impact of activity on value (including cumulative effects)	Management action to be taken to avoid/mitigate impact (including ongoing monitoring and rehabilitation)
FLORA (**vegetation communities present,** threatened species, priority communities, critical habitats)	Vegetation communities present are:			
FAUNA (threatened species habitats or potential threatened species, management agreements)	Threatened species habitat is present for:			
GEOLOGY/GEODIVERSITY (Geological substrate, Tas Geocon Dbase, Karst)	The primary geological substrate is:			
SOILS (description of soil type present, erosivity)	Primary soil types are:			
WATER/STREAMS (Water intakes, water quality and quantity)				

Value	Existing conditions (record all values present on site, N/A if values not present)	Site surveys (who conducted field surveys, specialists involved, references consulted)	Impact of activity on value (including cumulative effects)	Management action to be taken to avoid/mitigate impact (including ongoing monitoring and rehabilitation)
LANDSCAPE (visual impact and management)				
WILDERNESS and WILD RIVERS (High Quality Wilderness, Wild River Catchment)				
ABORIGINAL VALUES (Relics, Artefacts, Sites, Traditional use, APZ Zone)				
HISTORIC VALUES (Relics, Sites, Items)				
RECREATION (known recreational uses/users e.g. walking, motorbike riding, fishing, etc.)				
SOCIAL (Traditional uses, as evident in field e.g. grazing, recreation, firewood collection, mining, etc.)				
ENVIRONMENTAL QUALITY – AIR, WATER, NOISE (usually all good quality prior to activities)	Air: Water: Noise:			
GENERAL PROTECTION MEASURES (fire, weeds, PC, soil, rehabilitation, spills)				
OTHER (property rights issues, access, etc)				

Approvals:

Name	Signature	Date	Position
			Planner/Works Supervisor
			District Forest Manager
			Senior Forest Management Planner
			Manager, Planning

APPENDIX 1
NON-FPP AND RESERVE ACTIVITY ASSESSMENT SHEET AND ACTIVITY PLAN (LEVEL A AND B ACTIVITIES)

Activity Details:

Project Title:	Great South Land Minerals – Drill Site RP033A		
Reserve Name:	Not applicable		
Contact Officer:	Vanessa Thompson (Planning)		
District:	Derwent District		
Planned Activity:	Clearing of an area of regeneration within State forest coupe RP033A established in 1986 to allow the establishment of a test drill site on behalf of Great South Land Minerals.		
Location (GDA Ref):	467028 mE : 5287423 mN (GDA) The envelope for the site will be approximately 70 metres in depth and 130 metre in width. The site will be located in the top side of the road	**Activity Level:**	B
Proposed timing of activity:	Operations are likely to commence in early August 2008 and continue through until late October 2008.	**Proposed duration of activity:**	Estimate three months to complete the required works in this area. It will take between 3 to four weeks to move equipment to and from the site with a further month to undertake the required drilling.
Extent/Area (ha):	Estimated 1.0 to 1.3 hectares	**Job Number:**	Not applicable No cost attributed to District
JRA Number & Details:	Not applicable		
Other options considered:	Not applicable		
District File Number:		**Head Office File Number:**	
Information on the works proposed:	The proposal will see the clearing of vegetation to allow the establishment of a drill rig site on approximately 1.3 hectares. Following the completion of drilling activity the drill pad and associated infrastructure will be completely removed from the site. Vegetation debris created as a result of this operation will heaped adjoining the road edge to allow possible burning of this material post operation. The placement of these debris however will not interfere with the effective use of the road including associated drainage structures. The site will be scarified to allow for the development of a suitable seedbed. Forestry Tasmania will provide seed from the appropriate seed zone to be spread over the operation area.		

Prescriptions required:	Recreation • Appropriate safety signs will be established by Great South Land Minerals to ensure appropriate notification of activity in this area to the general public during operations. General Measures • As a measure to reduce the spread of Weeds and or Pathogens in State Forest, all machinery will be washed down before being transported to this operation and washed down again, prior to leaving this operation. Wash down will be carried out in accordance with the "Tasmanian Washdown Guidelines for weed and disease control". • All rubbish will be removed to an approved municipal tip site. • Weed establishment will be monitored and appropriate action taken where necessary. • Great South Land Minerals will notify Forestry Tasmania of the intent to commence operations and prior to the completion of operations to ensure rehabilitation works have been conducted to a satisfactory standard. Rehabilitation and Reforestation • Following the completion of drilling activity the drill pad and associated infrastructure will be completely removed from the site. • Vegetation debris created as a result of this operation will heaped adjoining the road edge to allow possible burning of this material post operation. The placement of these debris however will not interfere with the effective use of the road including associated drainage structures. • The site will be scarified to allow for the development of a suitable seedbed. • Forestry Tasmania will provide seed from the appropriate seed zone to be spread over the operation area.

Compliance with Legislation [1]:

Does the activity comply with the following statutes/policies?	Yes (compliant)	Maybe (further assessment reqd)	No (non-compliant)	N/A	Details of compliance/ approvals required
Environmental Protection and Biodiversity Conservation Act 1999 Nationally threatened species, threatening processes.	✓				
Threatened Species Protection Act 1995 Threatened species.	✓				
Aboriginal Relics Act 1975 Aboriginal sites.	✓				
Historical Cultural Heritage Act 1995 Heritage listed sites.	✓				
Environmental Management and Pollution Control Act 1994 Any non-FPP operation eg. building or track construction. Environmental harm and pollution.				✓	
Land Use Planning and Approvals Act 1993 Developments/Structures.				✓	
Water Management Act 1999 Protection of water resources.	✓				
Fire Services Act 1979 Fuel reduction or ecological burning.	✓				
Forestry Act 1920 All activities on State forest.	✓				
RFA, Permanent Native Forest Estate	✓				

Compliance with FT Policy [2]:

Does the activity comply with the following statutes/policies?	Yes (compliant)	Maybe (further assessment reqd)	No (non-compliant)	N/A	Details of compliance/ approvals required
Forest Reserve Register/Reserve Management Objectives Permitted activities, reserve values, reserve management objectives (Forestry Act, Sched 3), reserve management plans.	✓				
CAR Reserve Values Protection levels for forest communities at bioregional level.	✓				
Property Rights	✓				
Rainforest Policy				✓	
Giant Tree Policy				✓	
Huon Pine Policy				✓	
King Billy Pine Policy				✓	
Landscape Management Policy	✓				
District Forest Management Plan	✓				
MDC	✓				

Natural and Cultural Values [3]:

Value	Existing conditions (record all values present on site, N/A if values not present)	Site surveys (who conducted field surveys, specialists involved, references consulted)	Impact of activity on value (including cumulative effects)	Management action to be taken to avoid/mitigate impact (including ongoing monitoring and rehabilitation)
FLORA (vegetation communities present, threatened species, priority communities, critical habitats)	Vegetation communities present are: • Wet *E. delegatensis* *Note however as the project area was harvested in 1985 employing clearfell silvicultural techniques and now consists of regeneration artificially sown in 1986 the original floristic composition for this area is unable to be accurately determined.* No known or identified flora values within planned operation area. The attached conserve map indicated no priority species in this area. No known Phytophthora cinnamomi records in this area	• Conserve Report • Threatened Flora C/D.	No known or identified threatened flora species, priority communities or critical habitats within the operation area. No anticipated impact under this proposal.	Not required.

Natural and Cultural Values [3]: (Continued)

Value	Existing conditions (record all values present on site, N/A if values not present)	Site surveys (who conducted field surveys, specialists involved, references consulted)	Impact of activity on value (including cumulative effects)	Management action to be taken to avoid/mitigate impact (including ongoing monitoring and rehabilitation)
FAUNA (threatened species habitats or potential threatened species management agreements)	Threatened species habitat is present for : *The site evaluated under this proposal occurs on the Ellendale mapsheet. This mapsheet indicates the potential for the following species.* **Eastern Barred bandicoot** There is no known habitat suitable to support this species within the proposed operation area or immediate vicinity. No specific management actions are recommended for this species. **Grey Goshawk** There is no known habitat suitable to support this species within the proposed operation area or immediate vicinity. While the Broad River system does contain habitat suitable to support this species the distance between this potential habitat and the proposed operation area mean that no specific management actions are recommended in this instance. **Masked Owl** An isolated patch of forest suitable to support the Masked occurs to the north of the proposed operational area. In addition the Broad River system also contains potential habitat suitable to support this species. The nature of the operation proposed however and the lack of suitable within the operation area mean that no specific management actions are recommended in this instance. **Eastern and Spotted Tailed Quoll** Strategic state forest fauna management planning for the Eastern and Spotted Tailed quoll has resulted in the retention of large tracts of high quality habitat necessary to support these species. No specific management actions are recommended in this instance.	• Conserve Report • Threatened Fauna Mapsheet • Threatened Fauna Adviser • Wedge-tailed Eagle Search History Map	No known or identified threatened fauna species, critical habitats or areas under management agreement. No anticipated impact under this proposal.	Not required.

Natural and Cultural Values [3]: (Continued)

Value	Existing conditions (record all values present on site, N/A if values not present)	Site surveys (who conducted field surveys, specialists involved, references consulted)	Impact of activity on value (including cumulative effects)	Management action to be taken to avoid/mitigate impact (including ongoing monitoring and rehabilitation)
FAUNA (threatened species habitats or potential threatened species management agreements)	Threatened species habitat is present for : *The site evaluated under this proposal occurs on the Ellendale mapsheet. This mapsheet indicates the potential for the following species.* **Tussock grass skink** There is no suitable habitat within or adjoining the prosed operation area to support this species. No specific management actions are recommended in this instance. **Wedge-tailed Eagle** There are no known Wedge-tailed Eagle nest sites located within 500 metres or 1.0 kilometre line of sight of the operation area proposed under this document. In addition there is generally little suitable potential habitat located within 500 metres of the proposed operation area. The attached documentation details search activity conducted within this general locality over time The majority of suitable habitat in this area has been searched previously. As a result there is no specific requirements for the management of this species in relation to the proposed operation area. **White Bellied Sea Eagle** There is generally little suitable potential habitat located within 500 metres of the proposed operation area. The attached documentation details search activity conducted within this general locality over time The majority of suitable habitat in this area has been searched previously. As a result there is no specific requirements for the management of this species in relation to the proposed operation area.	• Conserve Report • Threatened Fauna Mapsheet • Threatened Fauna Adviser • Wedge-tailed Eagle Search History Map	No known or identified threatened fauna species, critical habitats or areas under management agreement. No anticipated impact under this proposal.	Not required.

Natural and Cultural Values [3]: (Continued)

Value	Existing conditions (record all values present on site, N/A if values not present)	Site surveys (who conducted field surveys, specialists involved, references consulted)	Impact of activity on value (including cumulative effects)	Management action to be taken to avoid/mitigate impact (including ongoing monitoring and rehabilitation)
GEOLOGY/ GEODIVERSITY (Geological substrate, Tas Geocon Dbase, Karst)	The primary geological substrate is : • Jurassic Dolerite The project area is not located within any site of level 1 – 8 sensitivity on the Geoconservation Database. In addition the operational are is not within any known or karst boundary.	• Geoconservation Map • Geology Map	No known or potential sites of geological or geodiversity significance within the operation area. No anticipated impact under this proposal.	Not required.
SOILS (Description of soil type present, erosivity)	Primary soil types are : One soil type is known within this area and includes Jurassic origin dolerite soils of moderate erodibility rating. The combination of these soil types and slope across the project area mean that the area is considered to be of moderate erodibility with low erosion hazard potential.	• Geology Map	No soil impact anticipated under this proposal.	Not required.
WATER/STREAMS (Water intakes, water quality and quantity)	No identified streams occur within the planned operation area. Two (2) Class four streams however are located approximately four hundred metres to the south of the planned operation area. In regard to the Class 4 The distance of these streams from the planned operation area combined with the proposed operation should not have result in any water quantity or quality changes. There is no registered water intake point in the operation area.	Not applicable	No water quality or quantity impact anticipated under this proposal.	Not applicable

Natural and Cultural Values [3]: (Continued)

Value	Existing conditions (record all values present on site, N/A if values not present)	Site surveys (who conducted field surveys, specialists involved, references consulted)	Impact of activity on value (including cumulative effects)	Management action to be taken to avoid/mitigate impact (including ongoing monitoring and rehabilitation)
LANDSCAPE (visual impact and management)	The skyline area to the north of the proposed drill site is visible from level 1 (Lyell Highway) sensitivity viewpoints. The location of the drill site should however not be evident from identified viewpoints. The duration of the proposed operation combined with the restricted project envelope should manage visual concerns. There is however a possibility depending on the height of the drill rig site that for the duration of the operation this structure may be evident from identified viewpoint. However given the lack of permanence to the use of this equipment on site in the short term this should not unduly impact on the current scenic quality of this area.	• LMO Map	No visual impact anticipated under this proposal.	Not required.
WILDERNESS and WILD RIVERS (High Quality Wilderness, Wild River Catchment)	The site is not located within an area of high quality wilderness	• Wilderness Map	No impact anticipated	Not required
ABORIGINAL VALUES (Relics, Artefacts, Sites, Traditional use, APZ Zone)	No known or identified aboriginal values on site. Site inspection found conditions would not allow visual inspection for any unidentified aboriginal artefacts. The area is zoned as low sensitivity for geology dolerite (GD) and poorly surveyed (PS)	• Aboriginal Enquiry Map • APZ Map	No known or potential sites of aboriginal significance within the operation area. No anticipated impact under this proposal.	Not required.
HISTORIC VALUES (Relics, Sites, Items)	There are no known historic sites located within or adjoining the planned operation area.	• Conserve Report	No impact anticipated	Not required

Natural and Cultural Values [3]: (Continued)

Value	Existing conditions (record all values present on site, N/A if values not present)	Site surveys (who conducted field surveys, specialists involved, references consulted)	Impact of activity on value (including cumulative effects)	Management action to be taken to avoid/mitigate impact (including ongoing monitoring and rehabilitation)
RECREATION (known recreational uses/users eg walking, motorbike riding, fishing, etc)	Limited access is available to this area of state forest to general users. While access to the area is gated this gate is not always closed.	Not applicable	No impact anticipated	• Appropriate safety signs will be established by Great South Land Minerals to ensure appropriate notification of activity in this area to the general public during operations.
SOCIAL (Traditional uses, as evident in the filed eg grazing, recreation, firewood collection, mining, etc.)	Not applicable	Not applicable	No impact anticipated	Not required
ENVIRONMENTAL QUALITY – AIR, WATER, NOISE (usually good quality prior to activities)	Not applicable	Not applicable	No impact anticipated	Not required

Natural and Cultural Values [3]: (Continued)

Value	Existing conditions (record all values present on site, N/A if values not present)	Site surveys (who conducted field surveys, specialists involved, references consulted)	Impact of activity on value (including cumulative effects)	Management action to be taken to avoid/mitigate impact (including ongoing monitoring and rehabilitation)
GENERAL PROTECTION MEASURES (fire, weeds, PC, soil, rehabilitation, spills)	No known or identified values on site. The area is not within an identified PC management area. Following the completion of drilling activity the drilling pad and associated infrastructure will be completely removed from the site. Debris created as a result of this clearing operation will heaped adjoining the road edge to allow possible burning of this material post operation. The site will be scarified to allow for the development of a suitable seedbed. Forestry Tasmania will provide seed for the appropriate seed zone to be spread over the operation area.	Not applicable	No impact anticipated	• **As a measure to reduce the spread of Weeds and or Pathogens in State Forest, all machinery will be washed down before being transported to this operation and washed down again, prior to leaving this operation. Wash down will be carried out in accordance with the "Tasmanian Washdown Guidelines for weed and disease control".** • **All rubbish will be removed to an approved municipal tip site.** • **Weed establishment will be monitored and appropriate action taken where necessary.** • **Great South Land Minerals will notify Forestry Tasmania of the intent to commence operations and prior to the completion of operations to ensure rehabilitation works have been conducted to a satisfactory standard.** • **Following the completion of drilling activity the drill pad and associated infrastructure will be completely removed from the site.** • **Vegetation debris created as a result of this operation will heaped adjoining the road edge to allow possible burning of this material post operation. The placement of these debris however will not interfere with the effective use of the road including associated drainage structures.** • **The site will be scarified to allow for the development of a suitable seedbed.** • **Forestry Tasmania will provide seed from the appropriate seed zone to be spread over the operation area.**

Natural and Cultural Values [3]: (Continued)

Value	Existing conditions (record all values present on site, N/A if values not present)	Site surveys (who conducted field surveys, specialists involved, references consulted)	Impact of activity on value (including cumulative effects)	Management action to be taken to avoid/mitigate impact (including ongoing monitoring and rehabilitation)
OTHER (property rights issues, access, etc.)	No known or identified values on site.	Not applicable	No impact anticipated	Not required

Community Consultation/Notifications [4]:

Stakeholders include neighbours, community groups, recreationists, tourists, licensees/leasees (apiarists, agistment, communication towers, research), etc.

Stakeholder	Consulted? (Yes/No)	Interest Level (Low, Med, High)	Concern Level (Low, Med, High)	Details on consultation
Not applicable				

Documentation Checklist [5]:

Activity Level	SOP Step	Responsibility (Nominated Officer)	Compilation of information	Date Completed	By Who
A and B	1.1		Identify if proposed activity fits within:		
A and B		Vanessa Thompson	♦ Reserve objectives Forest Reserve Register	28/07/2008	Vanessa Thompson
A and B		Vanessa Thompson	♦ Legislative / external approval requirements	28/07/2008	Vanessa Thompson
A and B		Vanessa Thompson	♦ FT Policies	3028/07/2008	Vanessa Thompson
A and B	1.2		Collate existing information (desktop analysis):		
B			♦ Review library/files for relevant Reserve information	28/07/2008	Vanessa Thompson
A and B		Vanessa Thompson	♦ MDC Map (1:25,000)	28/07/2008	Vanessa Thompson
A and B		Vanessa Thompson	♦ Planning Map (1:10,000)	28/07/2008	Vanessa Thompson
A and B		Vanessa Thompson	♦ Conservation Map and Report (1:25,000)	28/07/2008	Vanessa Thompson
A and B		Vanessa Thompson	♦ Aboriginal Site Enquiry Map and Report (1:25,000)	28/07/2008	Vanessa Thompson
A and B		Vanessa Thompson	♦ Tasveg Communities Map (1:25,000)	28/07/2008	Vanessa Thompson
B		Vanessa Thompson	♦ Wedge-tailed Eagle Map (1:25,000)	28/07/2008	Vanessa Thompson
B		Vanessa Thompson	♦ Karst Area/Catchment Map (1:25,000)	28/07/2008	Vanessa Thompson
B		Vanessa Thompson	♦ Aboriginal Archaeological Potential Zone Map (1:25,000)	28/07/2008	Vanessa Thompson
B		Vanessa Thompson	♦ Landscape Management Objective Map (1:25,000)	28/07/2008	Vanessa Thompson
B		Vanessa Thompson	♦ Tasmanian Geoconservation Map (1:25,000)	28/07/2008	Vanessa Thompson
B		Vanessa Thompson	♦ Geology Map (1:25,000)	28/07/2008	Vanessa Thompson
B		Vanessa Thompson	♦ High Quality Wilderness and Undisturbed Rivers Map (1:25,000)	28/07/2008	Vanessa Thompson
B		Vanessa Thompson	♦ Property Rights Map (1:25,000)	28/07/2008	Vanessa Thompson
B		Vanessa Thompson	♦ Giant Trees Map (1:10,000)	28/07/2008	Vanessa Thompson
B		Vanessa Thompson	♦ Town Water Intakes check	29/07/2008	Vanessa Thompson
			Additional Maps		
		Vanessa Thompson	♦ Apiary Management Map (1:25,000)	28/07/2008	Vanessa Thompson
		Vanessa Thompson	♦ Notification Map (1:25,000)	28/07/2008	Vanessa Thompson
		Vanessa Thompson	♦ RFA Communities Map (1:25,000)	28/07/2008	Vanessa Thompson
		Vanessa Thompson	♦ PC Management Map (1:50,000)	28/07/2008	Vanessa Thompson
			♦ Tas Map (1:25,000)	28/07/2008	Vanessa Thompson
			♦ Inventory Map (1:10,000)	29/07/2008	Vanessa Thompson
A and B	1.3	Vanessa Thompson	Field Surveys – record and/or confirm site information	Based on previous visits and knowledge of the area	Vanessa Thompson and Bernard Plumpton
A and B	1.4	Vanessa Thompson	Assess impacts of proposed activity and develop management prescriptions	28/07/2008 and 29/072008	Vanessa Thompson
B	1.5	Vanessa Thompson	Consult with relevant parties		Not applicable
B	1.6	Vanessa Thompson	Apply for external approvals		Not applicable
B	2.1	Vanessa Thompson	Obtain FT approvals	30/07/2008	Vanessa Thompson
B	2.2	Vanessa Thompson	Obtain external approvals		Not applicable

Approvals [6]:

Name	Signature	Date	Position
Vanessa Thompson		4/8/2008	Senior Forest Planner
~~Steve Whiteley~~ Dave Brown.		4/8/08. A/	District Forest Manager
~~Judy Alexander~~ TIM LEAMAN		4/8/08	~~Senior Forest Planner~~ CONSERVATION PLANNER
John Hickey		4/8/08	Manager, Planning
Not required			External Approvals Received (signed by planner)

APPENDIX 2
NON-FPP AND RESERVE ACTIVITY MONITORING SHEET

Activity Details:

Date of Assessment:		**Assessor Name:**	
Project Title:	Great South Land Minerals – Test Drill Site (RP033A)		
Reserve Name:	Not Applicable		
District:	Derwent	**Activity Type:**	Non FPP Activity
Extent/Area (ha):	1.0 to 1.3 hectares	**Activity Level:**	B
District File Number:		**Head Office File Number:**	

Monitoring comments: (Comment/record new unidentified impacts or issues and management actions to deal with these and carry these through to the CAR system where appropriate)

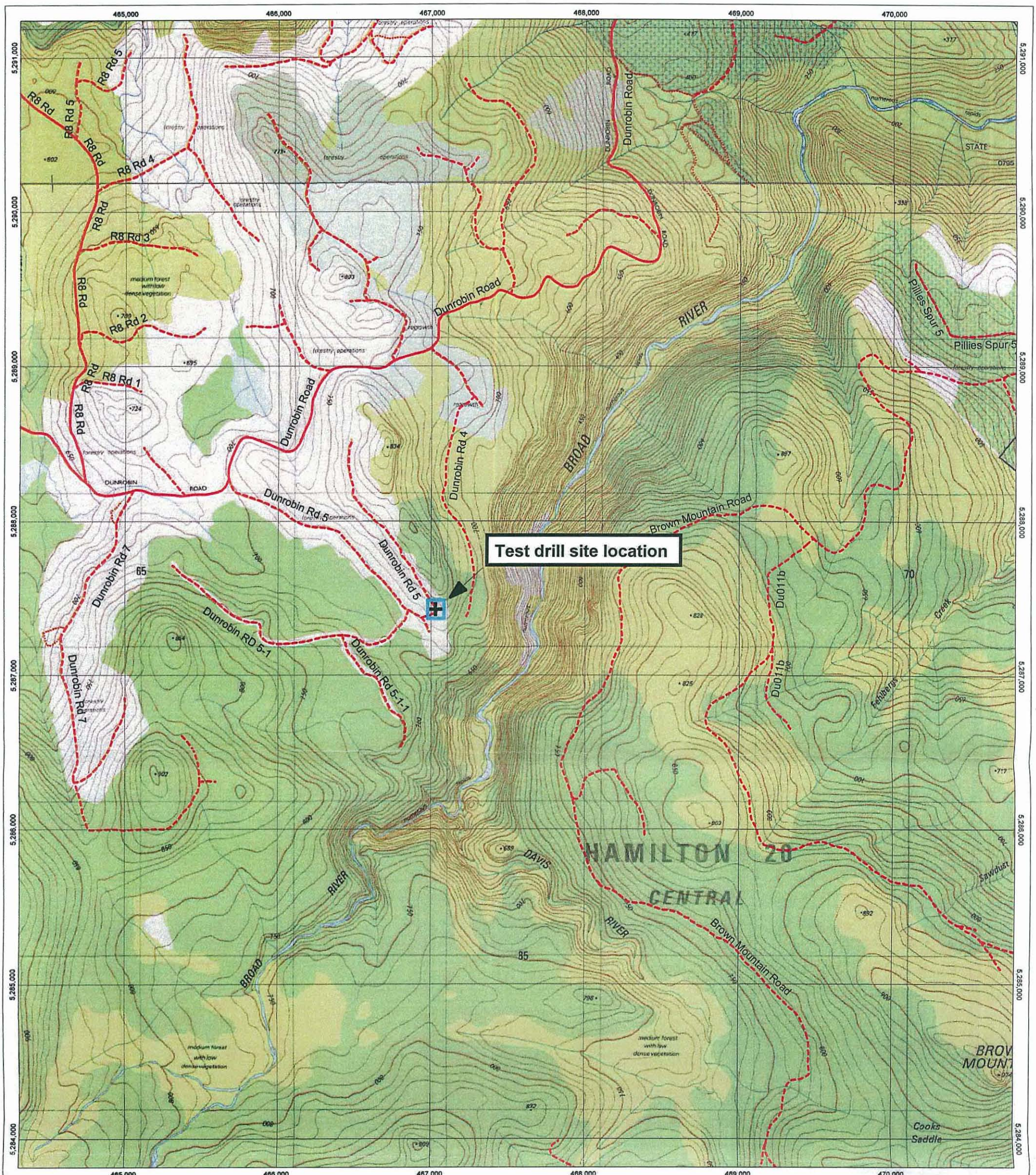
Completion checks:

Item	Yes	No	N/A	Comments
Geodiversity: Have geodiversity values (including karst) been protected and maintained?				
Flora and Fauna: Has the activity ensured protection of flora and fauna values to the greatest possible extent?				
Landscape: Has particular care been taken to protect landscape values?				
Wilderness and Wild Rivers: Has disturbance been minimised to the hydrological, geomorphological and biological processes of wild rivers?				
Cultural Values: Have cultural heritage values been protected?				
Social Values: Has the activity prevented people from exercising their social values associated with the reserve?				
Recreational Values: Have recreational opportunities in the reserve been diminished as a result of the activity?				
Environmental Quality (Air, Water, and Noise): Has the natural quality of air, water and noise been restored?				
Environmental Monitoring (Water): Has water monitoring been carried out?				
Protecting Reserve Values: Has restoration/rehabilitation been undertaken?				
Legislation and Policy: Has activity complied with legislation and policy?				
Legislation and Policy: Have permit conditions been met?				
Impacts on values: Have all decisions about activities been recorded?				
Impacts on values: Have any additional impacts been identified?				
Impacts on values: Have any additional impacts been documented?				
Impacts on values: Have management actions to avoid/mitigate impacts been implemented?				
Impacts on stakeholders: Have there been any complaints about the activity to FT?				
System requirements: Have identified environmental aspects and impacts and associated control measures been addressed?				
System requirements: Have identified safety and health hazards and risks and associated controls been addressed?				

Sign off (for completion):

Completion compliance assessed by: _____ Signed: _____

Date: _____ Copy of completion sign off send to Planning Branch: **Yes/No** Date: _____



drill text

DPIW 25K Topo Map Image

RP033 Drill Site

Sigificant all weather 2 lane feeder road

Single lane all weather minor road

Single lane minor road

NOTE: Co-ordinates on this map are based on GDA94.

Any topographic data on this map has been supplied by DPIWE.

Data has been captured at differing scales & boundaries may not always co-incide

LOCATION MAP

4431	4631	4831
4430	4630	4830
4429	4629	4829
4428	4628	4828
4427	4627	4827
4426	4626	4826

GSLM drill site location

A3P

GDA GEOCENTRIC DATUM OF AUSTRALIA

Forestry Tasmania
GROWING OUR FUTURE

Plot identifier:	Prepared by: bsp	Scale 1:25,000
Date: Thursday, 31 July 2008	Prepared for:	0 0.5 km

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SUPPLEMENT TO EXPLORATION DRILLING PROGRAM DOCUMENT

SPECIFICATION AND RECOMMENDATIONS
MATTERS OF AQUIFER PROTECTION AND HOLE COMPLETION

BELLEVUE LAKE ECHO (BV#1)

Prepared for Great South Land Minerals Limited by D. F. Leaman for Leaman Geophysics. August 2008.

The following specifications are based on a well prognosis prepared by Great South Land Minerals as supplied to Leaman Geophysics in August 2008, and are in accord with guidelines for hole abandonment and aquifer protection published for Western Australia (November, 2002) and Victoria (December, 2002) Where appropriate, these guidelines have been modified so as to be conservative in the unknown conditions applying at the site. These specifications represent expansion of items within, and including the Abandonment Procedure, of the current Exploration Drilling Program draft document as prepared by Great South Land Minerals Limited Engineering Division.

The well, to be spudded in Jurassic dolerite (northwest of Lake Echo at 465 660 mE, 5 338 904 mN), is expected to encounter Triassic rocks at perhaps 400 m, and Late Permian coal measures between 640 and 680 m (possible source rocks). A complete and representative section of Permian rocks is then anticipated to a depth of perhaps 1550m. This suite will include various sandstones, siltstones and mudstones, and tillite, typical of north Tasmanian Tiers sections.

Late Permian coal measures between 640 and 680 m are regarded as possible source or reservoir rocks. Other possible source rocks are the carbonaceous rocks expected at 1100 to 1150 m and oil shales at perhaps 1320 m. Possible reservoir rocks may be present at various levels: 800 m, 880 m, 1100 m.

Possible seal rocks of the Eldon Group (Silurian) are inferred to depths of about 2200 m beneath a major unconformity. Potential reservoir rocks (Crotty Quartzite) are inferred from 2200 m, and Gordon Group limestones from 2410 m.
Planned total depth of drilling is 2600 m.

Water conditions will be normal and unconfined at surface and quite fresh (perhaps <300-500 mg/L). Some water recovery is anticipated throughout the first 100 m of the

well, but there is also potential to lose water and fluids from the drilling in this zone due to regional fracture systems. Flows to, or from, the hole should be carefully monitored whilst drilling the dolerite. Lesser risks apply to the Triassic section from 400 to 600 m.
Much of the Permian segment of the hole may be tight with very low yields. No significant flows are expected generally. It is not known what behaviour may be expected of the deeper Permian rocks at the depths predicted (600-1500 m) since cement retention, joint closure or absence, are variable factors, and some units may also act as modest aquifers. Confined conditions could apply in such circumstances, depending on flow paths from the surrounding, more elevated region, but flows will be small unless a large fracture system (or fault) is encountered. In such cases sub-artesian conditions could well occur and the water itself may have raised temperature. No realistic estimate of water quality can be offered at this stage.

Since some of the Permian formations may possess significant porosity water gain, or water loss may occur. This should be monitored and any zones noted should be sealed to avoid contamination – since lateral flow at modest depth is possible from this site.

No significant flows or changes in aquifer conditions have ever been recorded at the base Permian unconformity irrespective of the underlying lithology (whether Cambrian volcanics, Precambrian dolomite, Mathinna Beds, - or Silurian-Ordovician groups for which there is very little deep experience). None of these materials have been associated with high flows at the predicted depths.
There is, however, potential for a sequence of confined aquifer conditions with variable water volumes and quality. Given the location of the site it is highly unlikely that confined conditions will prove artesian and any water level changes will be retained within the well.

Possible seal rocks of the Dell Shale (Devonian) are inferred to depths of about 1880 m beneath a major unconformity. Potential reservoir rocks (Crotty Quartzite) are inferred at 2450 m, and Gordon Group limestones from 2700 m.

The well will be established with safeguards as described in the principal specification document in order to control any run off and seepage at surface. No significant risk, or expectation of flow from the well, exists.

The designed collar configuration should provide adequate retention in essentially unconfined conditions (see Well Plan for casing specifications).

In view of these expectations the well will be completed in the following manner.

a) Chip and mud logging will be undertaken in association with wire-line logging to identify lithology and unit thickness at those sites where water is either lost or gained during drilling.
b) Wireline logging observations will be used to estimate porosity and aquifer character – fracture type, grain size or other relevant features.
c) Water quality will be determined where possible and where samples can be separated.

d) All significant aquifers, or groups of aquifers in which quality is comparable, will be sealed and separated with plugs. This condition may arise in the Permian section.
e) Plugs will be placed from bottom up and set from 2 m below the relevant zone to at least 5 m above all confined water, and have a minimum length of 20 m irrespective of aquifer thickness. Bridging plugs will be used to set the main block.
Plugs may be composed of concrete, clay grout or cement as required to suit aquifer type of conditions. Low viscosity grouts will be used in fine-grained, low permeability units – as expected in all rock sequences at some stage (especially parts of the Permian and Silurian). Fresh water will be used for all grouts and clay mixes.
f) Cement grouts will be used for any significant aquifer. Bentonite grouts may be used in other cases.
g) If no, or negligible, confined water is encountered (as expected) then surface casing will be removed (if possible) and replaced with a cement plug at least 2 m long with a mounded cap about .03 m above ground level. This form of capping will also be used where water is flowing from a shallow, unconfined aquifer, but this condition is not anticipated at this site.
h) If the water quality is found to vary markedly (salinity variation in excess of 100%) due to the presence of several confined beds or structural zones, then it will be necessary to plug and isolate those which differ, in order to minimise or prevent mixing. Specification of plugs: at least 4 m long across interfaces. This condition is considered unlikely at Bellevue-Lake Echo BV #1.
j) The hole will be tagged on completion of capping.
k) The hole report will describe aquifers encountered. Details will include aquifer type, lithology, salinity, depth, yield if known, standing levels, nature of completion (plug locations and capping style).

D. Leaman

Dr. D. E. Leaman

Date: 21/8/08

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SUPPLEMENT TO EXPLORATION DRILLING PROGRAM DOCUMENT

SPECIFICATION AND RECOMMENDATIONS
MATTERS OF AQUIFER PROTECTION AND HOLE COMPLETION

BELLEVUE #1

Prepared for Great South Land Minerals Limited by D. E. Leaman for Leaman Geophysics. December 2007.

The following specifications are based on the well prognosis prepared by Great South Land Minerals in December 2007, and are in accord with guidelines for hole abandonment and aquifer protection published for Western Australia (November, 2002) and Victoria (December, 2002). Where appropriate, these guidelines have been modified so as to be conservative in the unknown conditions applying at the site. These specifications represent expansion of items within, and including the Abandonment Procedure, the current Exploration Drilling Program draft document as prepared by Great South Land Minerals Limited Engineering Division.

The well, to be spudded in Jurassic dolerite (northwest of Lake Echo at 467 141 mE, 5 339 284 mN), is expected to encounter Upper Permian rocks between 400 and 420 m, Permian presumed source rocks at about 1000 m and 1250 m, and basal Permian rocks near 1320 to 1350 m. Possible reservoir rocks are inferred at approx 700, 950 and 1100 m. A major unconformity is implied at about 1350 m with Silurian-Early Devonian Eldon Group to about 2200 m (which may include possible reservoir rocks), and Ordovician Gordon Group rocks, including limestones with both source and reservoir potential to final depth of about 3800 m.

Water conditions will be normal and unconfined at surface and probably quite fresh (perhaps 300-500 mg/L). Some water recovery is anticipated throughout the first 200 m of the hole.
Much of the Permian segment of the hole may be tight with very low yields. No significant flows are expected generally. It is not known what behaviour may be expected of the deeper Permian rocks at the depths predicted (1000-1300 m) since cement retention, joint closure or absence, are variable factors, and some units may also act as modest aquifers. Confined conditions could apply in such circumstances but flows will be small unless a large fracture system (or fault) is encountered. In such cases sub-artesian conditions could well occur and the water itself may have raised temperature. No realistic estimate of water quality can be offered at this stage.

No significant flows or changes in aquifer conditions have ever been recorded at the base Permian unconformity irrespective of the underlying lithology (whether Cambrian volcanics, Precambrian dolomite, Mathinna Beds, - or Silurian-Ordovician groups for which there is very little deep experience). None of these materials have been associated with high flows at the predicted depths.
There is, however, potential for a sequence of confined aquifer conditions with variable water volumes and quality. Given the elevation of the site it is highly unlikely that confined conditions will prove artesian and any water level changes will be retained within the well.

The well will be established with safeguards as described in the principal specification document in order to control any run off and seepage at surface. No significant risk, or expectation of flow from the well, exists.

The designed collar configuration should provide adequate retention in essentially unconfined conditions (see Well Plan for casing specifications).

In view of these expectations the well will be completed in the following manner.

a) Chip and mud logging will be undertaken in association with wire-line logging to identify lithology and unit thickness at those sites where water is either lost or gained during drilling.
b) Wireline logging observations will be used to estimate porosity and aquifer character – fracture type, grain size or other relevant features.
c) Water quality will be determined where possible and samples can be separated.
d) All significant aquifers, or groups of aquifers in which quality is comparable, will be sealed and separated with plugs.
e) Plugs will be placed from bottom up and set from 2 m below the relevant zone to at least 5 m above all confined water, and have a minimum length of 20 m irrespective of aquifer thickness. Bridging plugs will be used to set the main block.
Plugs may be composed of concrete, clay grout or cement as required to suit aquifer type of conditions. Low viscosity grouts will be used in fine-grained, low permeability units – as expected in all rock sequences at some stage (especially parts of the Permian and Ordovician). Fresh water will be used for all grouts and clay mixes.
f) Cement grouts will be used for any significant aquifer. Bentonite grouts may be used in other cases.
g) If no confined water is encountered (as expected) then surface casing will be removed (if possible) and replaced with a cement plug at least 2 m long with a mounded cap about .03 m above ground level. This form of capping will also be used where water is flowing from a shallow, unconfined aquifer.
h) If the water quality is found to vary markedly (salinity variation in excess of 100%) due to the presence of several confined beds or structural zones, then it will be necessary to plug and isolate those which differ, in order to minimise or prevent mixing. Specification of plugs: at least 4 m long across interfaces. This condition is considered unlikely at Bellevue #1.
j) The hole will be tagged on completion of capping.

k) The hole report will describe aquifers encountered. Details will include aquifer type, lithology, salinity, depth, yield if known, standing levels, nature of completion (plug locations and capping style).

D. Leaman

Dr. D. E. Leaman

14/12/07

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SUPPLEMENT TO EXPLORATION DRILLING PROGRAM DOCUMENT

SPECIFICATION AND RECOMMENDATIONS
MATTERS OF AQUIFER PROTECTION AND HOLE COMPLETION

THUNDERBOLT (TB#1)

Prepared for Great South Land Minerals Limited by D. E. Leaman for Leaman Geophysics. August 2008.

The following specifications are based on a well prognosis prepared by Great South Land Minerals as supplied to Leaman Geophysics in June 2008, and are in accord with guidelines for hole abandonment and aquifer protection published for Western Australia (November, 2002) and Victoria (December, 2002). Where appropriate, these guidelines have been modified so as to be conservative in the unknown conditions applying at the site. These specifications represent expansion of items within, and including the Abandonment Procedure, of the current Exploration Drilling Program draft document as prepared by Great South Land Minerals Limited Engineering Division.

The well, to be spudded in Jurassic dolerite (in the range southwest of Lake Repulse at 466 844 mE, 5 287 200 mN), is expected to encounter Triassic rocks at about 500 m, and Late Permian coal measures between 730 and 810 m (possible source rocks). A complete and representative section of Permian rocks is then anticipated to a depth of perhaps 1750 m. This suite will include various sandstones, siltstones and mudstones, and tillite, typical of south Tasmanian sections (including Ferntree Formation, Malbina Formation, Cascades Group, Faulker Group – with possible coal measures at 1250-1300 m, Bundella Formation, Woody Island Formation and Truro Formation – with tillite).
A major unconformity is predicted at 1770-1800 m with underlying rocks of Gordon Group including paleokarst at the erosional boundary and limestone members to at least 2500 m. Other limestone members have been inferred to depths of at least 3150 m. Planned total depth of drilling is 2500 m.

Water conditions will be normal and unconfined at surface and may be quite fresh (perhaps 500 mg/L). Some water recovery is anticipated throughout the first 50-100 m of the hole, but there is also potential to lose water and fluids from the drilling in this zone due to regional fracture systems. Flows to, or from, the hole should be

carefully monitored whilst drilling the dolerite. Much reduced risks apply to the Triassic section from 500 m.
Most of the Permian segment of the hole may be tight with very low yields. No significant flows are expected generally. It is not known what behaviour may be expected of the deeper Permian rocks at the depths predicted (>800 m) since cement retention, joint closure or absence, are variable factors, and some units may also act as modest aquifers. Confined conditions could apply in such circumstances but are highly unlikely. No realistic estimate of water quality can be offered at this stage.
Since some of the Permian formations may possess significant porosity water gain, or water loss may occur but contamination is most unlikely given the heads feasible and depths involved.

No significant flows or changes in aquifer conditions have ever been recorded at the base Permian unconformity irrespective of the underlying lithology (whether Cambrian volcanics, Precambrian dolomite, Mathinna Beds, - or Silurian-Ordovician groups for which there is very little deep experience). None of these materials have been associated with high flows at the predicted depths.
There is, however, potential for a sequence of confined aquifer conditions with variable water volumes and quality in this case given the prediction of karst conditions below the unconformity. Careful drilling and monitoring will be essential once the hole leaves the Woody Island Formation (assuming it to be present) to ensure control of any hydrological changes.
The well will be established with safeguards as described in the principal specification document in order to control any run off and seepage at surface. No significant risk, or expectation of flow from the well, exists.

The designed collar configuration should provide adequate retention in essentially unconfined conditions (see Well Plan for casing specifications).

In view of these expectations the well will be completed in the following manner.

a) Chip and mud logging will be undertaken in association with wire-line logging to identify lithology and unit thickness at those sites where water is either lost or gained during drilling.
b) Wireline logging observations will be used to estimate porosity and aquifer character – fracture type, grain size or other relevant features.
c) Water quality will be determined where possible and samples can be separated.
d) All significant aquifers, or groups of aquifers in which quality is comparable, will be sealed and separated with plugs.
e) Plugs will be placed from bottom up and set from 2 m below the relevant zone to at least 5 m above all confined water, and have a minimum length of 20 m irrespective of aquifer thickness. Bridging plugs will be used to set the main block.
Plugs may be composed of concrete, clay grout or cement as required to suit aquifer type of conditions. Low viscosity grouts will be used in fine-grained, low permeability units – as expected in all rock sequences at some stage (especially parts of the Permian and Ordovician). Fresh water will be used for all grouts and clay mixes.

f) Cement grouts will be used for any significant aquifer. Bentonite grouts may be used in other cases.
g) If no, or negligible, confined water is encountered (as expected) then surface casing will be removed (if possible) and replaced with a cement plug at least 2 m long with a mounded cap about .03 m above ground level. This form of capping will also be used where water is flowing from a shallow, unconfined aquifer.
h) If the water quality is found to vary markedly (salinity variation in excess of 100%) due to the presence of several confined beds or structural zones, then it will be necessary to plug and isolate those which differ, in order to minimise or prevent mixing. Specification of plugs: at least 4 m long across interfaces. This condition is considered unlikely at Thunderbolt TB #1.
j) The hole will be tagged on completion of capping.
k) The hole report will describe aquifers encountered. Details will include aquifer type, lithology, salinity, depth, yield if known, standing levels, nature of completion (plug locations and capping style).

D. Leaman

Dr. D. E. Leaman

Date: 1/8/08