

ECOLOGY REVIEW

Abel Upgrade Modification Environmental Assessment

APPENDIX I



Donaldson Coal
c/- Resource Strategies
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27 November 2012

Attention: Tony Sutherland

Dear Tony

Abel Upgrade Modification Ecology Assessment

The following is an assessment of the ecological impacts associated with the proposed Abel Upgrade Modification (the Modification), which involves changes to the mine plan approved in 2007 for the Abel Underground Mine (Project Approval 05_0136). There are several components to the proposed Modification. However, only three of these have the potential to impact surface ecology:

1. Construction of an additional downcast ventilation shaft.
2. An overland conveyor for transferring coal from Abel to the nearby Bloomfield Coal Handling and Preparation Plant (CHPP) was part of the original approval. A slightly varied route for this conveyor is now preferred.
3. Changes in the mining method in three locations, from bord and pillar extraction to shortwalls and longwalls.

This assessment evaluates these three components to determine whether they could have substantially different ecological impacts to those described in the original and subsequently approved proposal.

It is concluded that ecological impacts would be essentially the same as those described in, and approved by, the original proposal.

Yours Faithfully
HUNTER ECO

A handwritten signature in black ink that reads "Colin Driscoll". The signature is written in a cursive, flowing style.

Colin Driscoll
Environmental Biologist
NPWS Scientific Licence S10565



Proposed Downcast Shaft

It is proposed that a downcast ventilation shaft be placed just inside the western boundary of the Abel mining lease as shown in the following figure. Existing fire trails provide access to the proposed shaft site. To construct the shaft, an area approximately 40 by 40 metres (m) (i.e. approximately 0.16 hectares) would be cleared of vegetation.

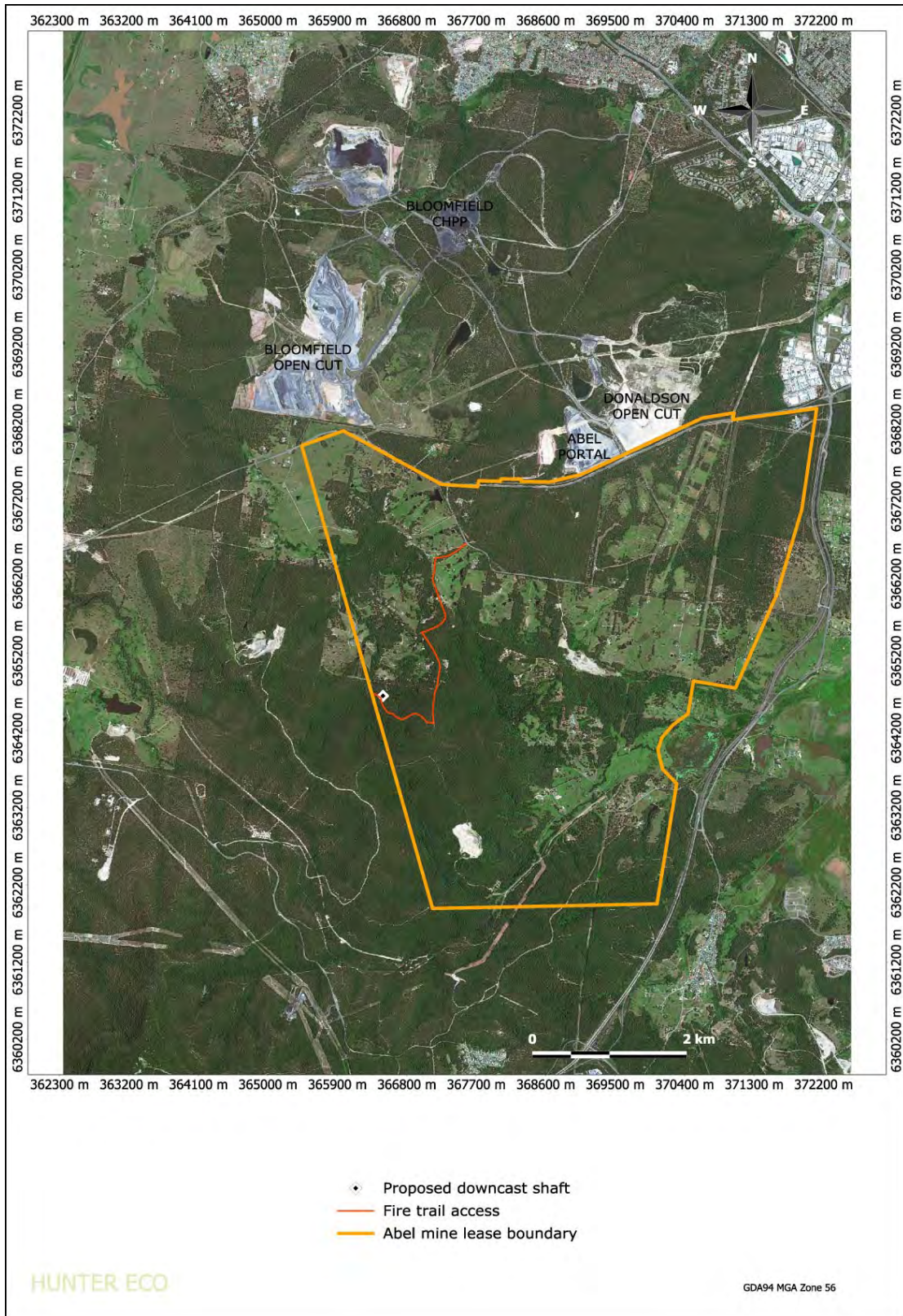
The site of the proposed shaft (Plate A1) was inspected on 14 August 2012 during which floristic data were collected from one 20 m square sample plot along with a thorough search of an area of about 50 m around the proposed shaft site. The purpose of the inspection was to locate any flora species listed as threatened in the New South Wales (NSW) *Threatened Species Conservation Act, 1995* (TSC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*. The combination of species was matched with vegetation community profiles provided in NSW National Parks and Wildlife Service (2000) to determine the vegetation community type represented. Also, the floristic content was assessed against endangered ecological community (EEC) determinations listed in the TSC Act.

The vegetation was typical of MU12 *Hunter Valley Moist Forest* and this community does not fit the description of any EEC. Floristic tables are attached (Table A1) showing that 74 species were recorded, 57 of which occurred in the sample plot (Table A2). No threatened flora species were found. The vulnerable plant *Tetratheca juncea* is known to occur within the Abel mine lease boundary (Donaldson Coal, 2006) however, Driscoll (2003) reported that the species was unlikely to be present in *Hunter Valley Moist Forest*. *Tetratheca juncea* is a cryptic species only clearly visible during flowering. This inspection was carried out at the beginning of the flowering season so if present it would have been found.

A summary description of the habitat follows:

- Canopy: dominated by *Eucalyptus acmenoides* and *Eucalyptus fergusonii* along with *Eucalyptus placita* and *Corymbia maculata*.
- Mid layer and shrubs: dominated by *Melaleuca styphelioides* and *Lantana camara* along with scattered *Syncarpia glomulifera*, *Elaeodendron australe*, *Cryptocaria microneura*, *Elaeocarpus reticulatus* and *Pittosporum undulatum*.
- Ground: sparse because of the amount of lantana but contained *Poa labillardieri*, *Oplismenus imbecilus*, *Imperata cylindrica*, *Pellaea paradoxa* and *Hibbertia empetrifolia*.

There were no trees with habitat hollows.





Abel to Bloomfield Conveyor

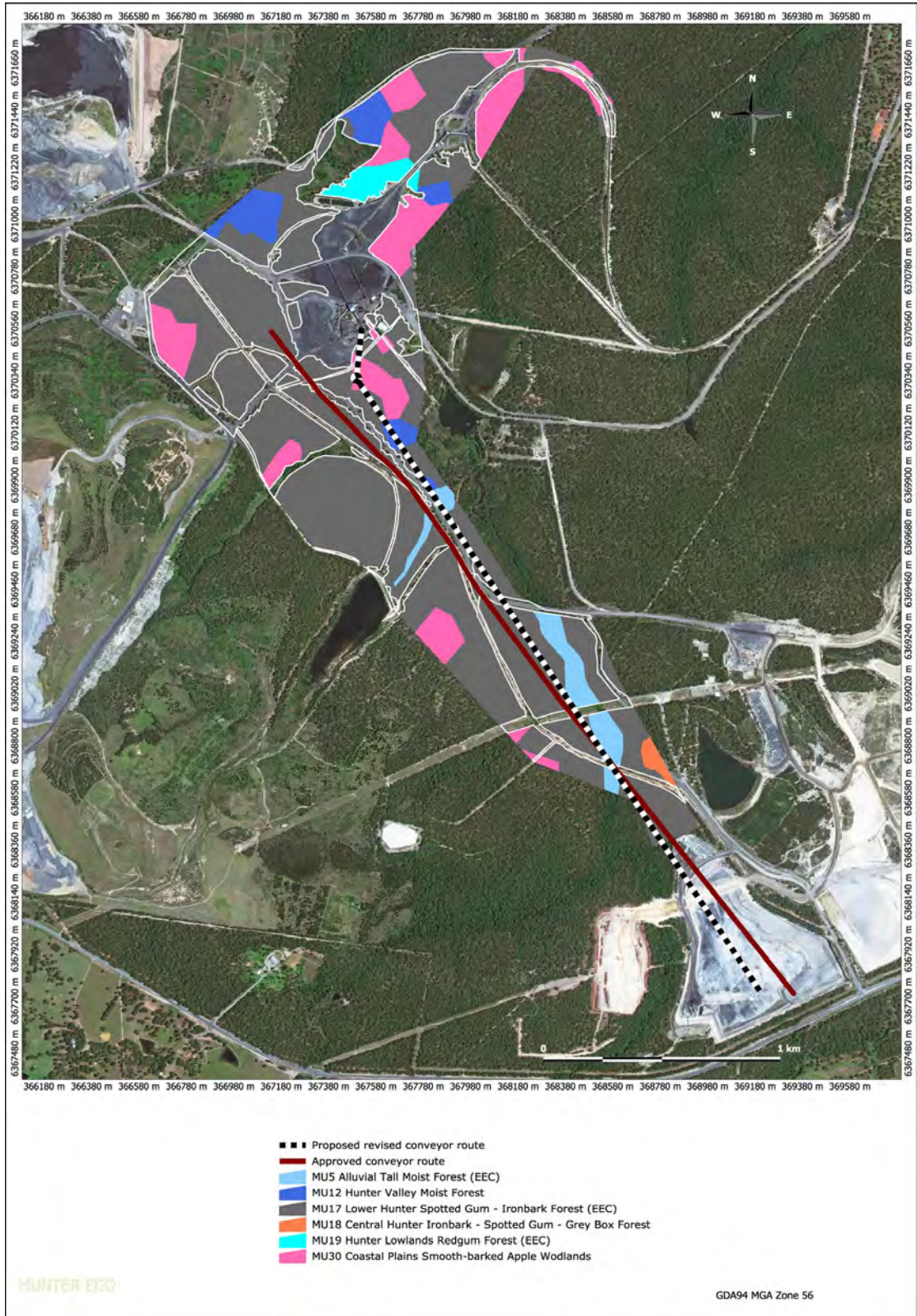
Approval of the Abel Mine included construction of a coal conveyor to move coal from the mine to the nearby Bloomfield CHPP, ultimately to be loaded on to trains for transport to the port of Newcastle. The variation under present consideration includes a minor modification of the conveyor route as shown the following figure.

The revised route would have a slightly different impact on vegetation compared with that of the currently approved route. The following table shows that there would be less clearing of *Lower Hunter Spotted Gum – Ironbark Forest* EEC and a small additional loss of *Hunter Valley Moist Forest* and *Coastal Plains Smooth-barked Apple Woodland* both of which are not EEC.

Community	Area Cleared (ha)	
	Approved Route	Proposed Route
MU5 Alluvial Tall Moist Forest	0.13	0.16
MU12 Hunter Valley Moist Forest		0.25
MU17 Lower Hunter Spotted Gum - Ironbark Forest	2.0	1.62
MU30 Coastal Plains Smooth-barked Apple Woodland		0.17
Total	2.13	2.2

The floristic composition of the community *Alluvial Tall Moist Forest* is variable, dependent upon edaphic and topographic factors. In some circumstances the composition will match with that of either a rainforest or flood plain EEC. The floristic content of *Alluvial Tall Moist Forest* through which the proposed corridor will pass does not match any EEC. The area was inspected on 8 August 2012. Dominant canopy species were *Eucalyptus resinifera*, *Eucalyptus siderophloia*, *Syncarpia glomulifera* and *Corymbia maculata*. The main components of an open midstorey were *Melaleuca styphelioides*, *Allocasuarina torulosa*, *Glochidion ferdinandi* and *Clerodendrum tomentosum*.

The impact on habitat of the proposed revised conveyor route would not be significantly different to that of the currently approved route. All current protocols including pre-clearing inspection of habitat and weed monitoring and management plans would remain in place.





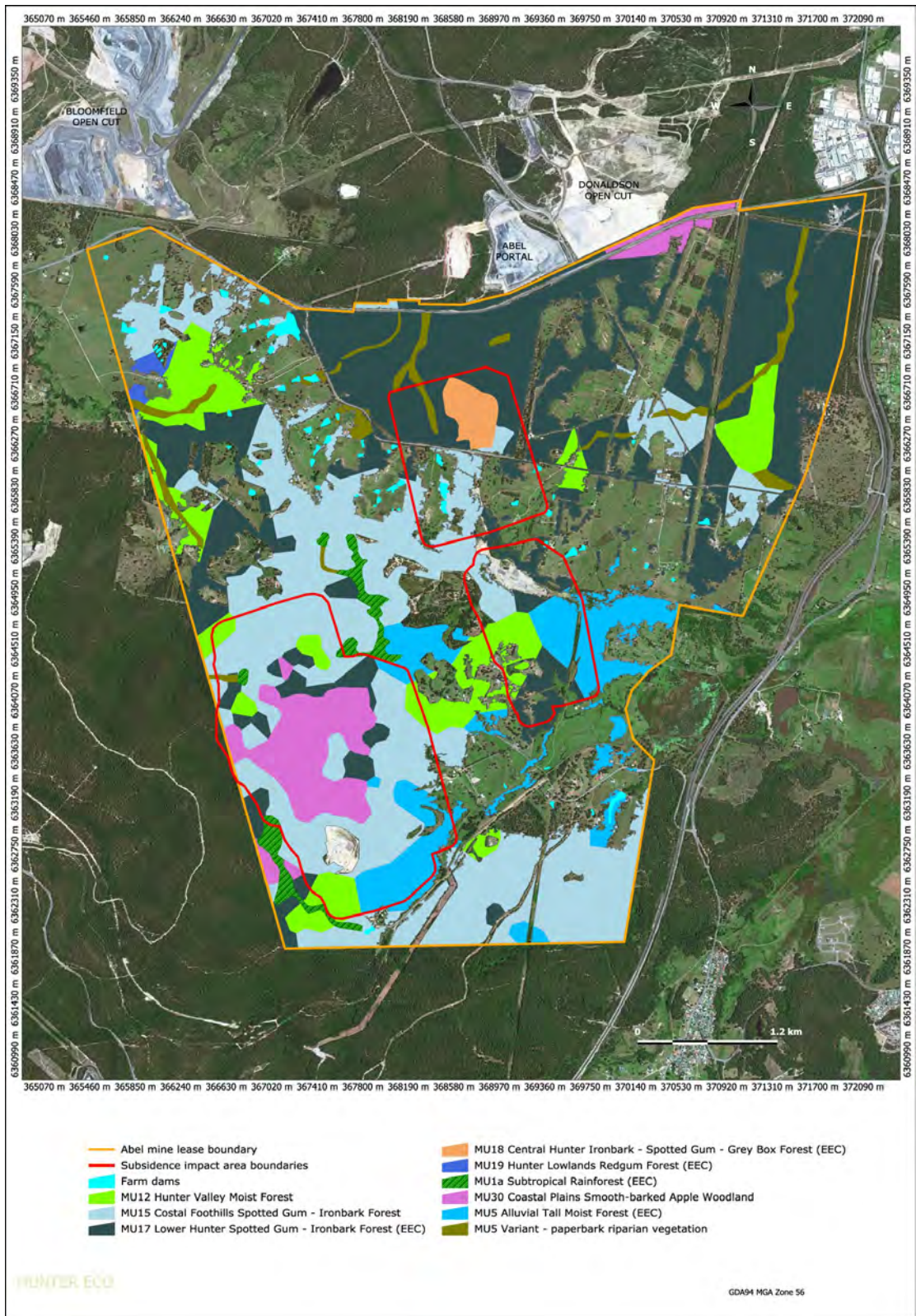
Subsidence Impacts on Surface Habitat

It was demonstrated in the environmental assessment for the current approval that subsidence would not have a significant impact on surface flora, fauna or vegetation communities (Donaldson Coal, 2006). The approved mine plan incorporated measures to minimise subsidence impacts on sensitive areas such as major gullies, streams, exposed escarpments and cliff lines. Under the proposed modification these sensitive areas would retain the same level of protection and therefore would not be impacted. The following figure shows the boundaries within which levels of subsidence would differ from those predicted for the currently approved mine plan.

A subsidence prediction and impact assessment for the proposed modification has been prepared by MSEC (2012). Final surface impacts result from a variety of circumstances including seam height, depth of cover and geological structure. As a mined panel is subsided the surface is subjected to vertical subsidence, tilts, curvature and strains. Surface impacts can primarily take the form of rises, depressions and cracking which, depending on their extent, have the potential to impact on surface vegetation, mainly through altered hydrology.

The MSEC (2012) report notes that while absolute subsidence will increase because of more coal being removed, tilts, strains and curvature will not vary greatly from those predicted for the original mine plan. This means that the proposed modified mine plan would not have a greater impact on surface habitat than the currently approved mine plan.

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References

Donaldson Coal Pty Limited (2006) Abel Underground Mine Part 3A Environmental Assessment.

Driscoll C. (2003) The pollination ecology of *Tetraloche juncea* Smith (Tremandraceae): finding the pollinators. *Cunninghamia* 9(1) 133-140.

MSEC (2012) Abel Underground Mine: Proposed Modification of Workings in ML1618 Subsidence Predictions and Impact Assessments for the Natural Features and Surface Infrastructure in Support of the section 75W Modification Application. Draft Revision B June 2012.

NSW National Parks and Wildlife Service (2000) *Vegetation Survey, Classification and Mapping Lower Hunter and Central Coast Region*. Version 1.2. A project undertaken for The Lower Hunter and Central Coast Regional Environment Management Strategy CRA Unit Sydney Zone National Parks and Wildlife Service.

ATTACHMENTS



Plate A1: Habitat at the proposed downcast shaft site

Table A1: Floristic list showing with scientific names grouped by family

Acanthaceae	Malvaceae
<i>Pseuderanthemum variabile</i>	<i>Abutilon oxycarpum</i>
Adiantaceae	Menispermaceae
<i>Adiantum formosum</i>	<i>Stephania japonica var. discolor</i>
<i>Pellaea falcata</i>	Myoporaceae
Apiaceae	<i>Eremophila debilis</i>
<i>Hydrocotyle laxiflora</i>	Myrsinaceae
Apocynaceae	<i>Myrsine howittiana</i>
<i>Parsonsia straminea</i>	<i>Myrsine variabilis</i>
Araceae	Myrtaceae
<i>Gymnostachys anceps</i>	<i>Callistemon shiressii</i>
Araliaceae	<i>Corymbia maculata</i>
<i>Polyscias sambucifolia</i>	<i>Eucalyptus acmenoides</i>
Asteraceae	<i>Eucalyptus fergusonii</i>
<i>Senecio madagascariensis</i>	<i>Eucalyptus fibrosa</i>
<i>Senecio vagus subsp. eglandulosus</i>	<i>Eucalyptus placita</i>
<i>Sigesbeckia orientalis</i>	<i>Eucalyptus umbra</i>
<i>Vittadinia cuneata</i>	<i>Melaleuca styphelioides</i>
Bignoniaceae	<i>Rhodamnia rubescens</i>
<i>Pandorea pandorana</i>	<i>Syncarpia glomulifera</i>
Celastraceae	Oleaceae
<i>Elaeodendron australe</i>	<i>Notelaea venosa</i>
<i>Maytenus silvestris</i>	Orchidaceae
Convolvulaceae	<i>Pterostylis sp.</i>
<i>Cuscuta australis</i>	Passifloraceae
<i>Dichondra repens</i>	<i>Passiflora aurantia var. aurantia</i>
Cyperaceae	Phormiaceae
<i>Lepidosperma laterale</i>	<i>Dianella caerulea</i>
Dilleniaceae	Pittosporaceae
<i>Hibbertia empetrifolia</i>	<i>Pittosporum revolutum</i>
Dioscoreaceae	<i>Pittosporum undulatum</i>
<i>Dioscorea transversa</i>	Poaceae
Elaeocarpaceae	<i>Entolasia stricta</i>
<i>Elaeocarpus reticulatus</i>	<i>Imperata cylindrica</i>
Euphorbiaceae	<i>Oplismenus imbecillis</i>
<i>Glochidion ferdinandi</i>	<i>Poa labillardierei</i>
Fabaceae (Faboideae)	Ranunculaceae
<i>Daviesia ulicifolia</i>	<i>Clematis glycinoides</i>
<i>Desmodium gunnii</i>	Rubiaceae
<i>Glycine microphylla</i>	<i>Galium binifolium</i>
<i>Hardenbergia violacea</i>	Rutaceae
<i>Swainsona galegifolia</i>	<i>Melicope micrococca</i>



Floristic list continued

Fabaceae (Mimosoideae)	Scrophulariaceae
<i>Acacia fimbriata</i>	<i>Veronica plebeia</i>
<i>Acacia maidenii</i>	Smilacaceae
Geraniaceae	<i>Smilax glycyphylla</i>
<i>Geranium solanderi</i>	Solanaceae
Haloragaceae	<i>Solanum elegans</i>
<i>Gonocarpus teucrioides</i>	<i>Solanum prinophyllum</i>
Lamiaceae	Verbenaceae
<i>Plectranthus parviflorus</i>	<i>Clerodendrum tomentosum</i>
Lauraceae	<i>Lantana camara</i>
<i>Cryptocarya microneura</i>	Vitaceae
Lobeliaceae	<i>Cayratia clematidea</i>
<i>Pratia purpurascens</i>	<i>Cissus antarctica</i>
Lomandraceae	Zamiaceae
<i>Lomandra longifolia</i>	<i>Macrozamia reducta</i>
<i>Lomandra multiflora</i>	
Luzuriagaceae	
<i>Eustrephus latifolius</i>	
<i>Geitonoplesium cymosum</i>	



Table A2: Vegetation Plot data (CA = Cover abundance)

Common Name	Family Name	Scientific Name	CA
Pastel Flower	Acanthaceae	<i>Pseuderanthemum variabile</i>	1
Giant Maidenhair	Adiantaceae	<i>Adiantum formosum</i>	1
Sickle Fern	Adiantaceae	<i>Pellaea falcata</i>	1
Stinking Pennywort	Apiaceae	<i>Hydrocotyle laxiflora</i>	2
Settler's Flax	Araceae	<i>Gymnostachys anceps</i>	2
Fuzzweed	Asteraceae	<i>Vittadinia cuneata</i>	1
	Celastraceae	<i>Elaeodendron australe</i>	1
Narrow-leaved Orangebark	Celastraceae	<i>Maytenus silvestris</i>	1
Australian Dodder	Convolvulaceae	<i>Cuscuta australis</i>	1
Kidney Weed	Convolvulaceae	<i>Dichondra repens</i>	2
	Cyperaceae	<i>Lepidosperma laterale</i>	1
	Dilleniaceae	<i>Hibbertia empetrifolia</i>	2
Native Yam	Dioscoreaceae	<i>Dioscorea transversa</i>	1
Cheese Tree	Euphorbiaceae	<i>Glochidion ferdinandi</i>	1
	Fabaceae (Faboideae)	<i>Desmodium gunnii</i>	2
	Fabaceae (Faboideae)	<i>Glycine microphylla</i>	1
False Sarsaparilla	Fabaceae (Faboideae)	<i>Hardenbergia violacea</i>	1
Smooth Darling Pea	Fabaceae (Faboideae)	<i>Swainsona galegifolia</i>	1
Fringed Wattle	Fabaceae (Mimosoideae)	<i>Acacia fimbriata</i>	1
Native Geranium	Geraniaceae	<i>Geranium solanderi</i>	1
Raspwort	Haloragaceae	<i>Gonocarpus teucrioides</i>	1
	Lamiaceae	<i>Plectranthus parviflorus</i>	2
Murrogon	Lauraceae	<i>Cryptocarya microneura</i>	1
Whiteroot	Lobeliaceae	<i>Pratia purpurascens</i>	2
Many-flowered Mat-rush	Lomandraceae	<i>Lomandra multiflora</i>	1
Scrambling Lily	Luzuriagaceae	<i>Geitonoplesium cymosum</i>	2
Muttonwood	Myrsinaceae	<i>Myrsine variabilis</i>	1
Spotted Gum	Myrtaceae	<i>Corymbia maculata</i>	2
	Myrtaceae	<i>Eucalyptus acmenoides</i>	4
	Myrtaceae	<i>Eucalyptus fergusonii</i>	2
Red Ironbark	Myrtaceae	<i>Eucalyptus fibrosa</i>	1
A Grey Ironbark	Myrtaceae	<i>Eucalyptus placita</i>	2
	Myrtaceae	<i>Eucalyptus umbra</i>	1
Prickly-leaved Tea Tree	Myrtaceae	<i>Melaleuca styphelioides</i>	3
Scrub Turpentine	Myrtaceae	<i>Rhodamnia rubescens</i>	1
Turpentine	Myrtaceae	<i>Syncarpia glomulifera</i>	1
Veined Mock-olive	Oleaceae	<i>Notelaea venosa</i>	1
	Orchidaceae	<i>Pterostylis sp.</i>	1
	Passifloraceae	<i>Passiflora aurantia var. aurantia</i>	1
Blue Flax-lily	Phormiaceae	<i>Dianella caerulea</i>	1
Rough Fruit Pittosporum	Pittosporaceae	<i>Pittosporum revolutum</i>	1
Sweet Pittosporum	Pittosporaceae	<i>Pittosporum undulatum</i>	1



Vegetation plot data continued

Wiry Panic	Poaceae	<i>Entolasia stricta</i>	2
	Poaceae	<i>Imperata cylindrica</i>	2
	Poaceae	<i>Oplismenus imbecillis</i>	3
	Poaceae	<i>Poa labillardierei</i>	4
Headache Vine	Ranunculaceae	<i>Clematis glycinoides</i>	1
	Rubiaceae	<i>Galium binifolium</i>	1
Hairy-leaved Doughwood	Rutaceae	<i>Melicope micrococca</i>	1
Trailing Speedwell	Scrophulariaceae	<i>Veronica plebeia</i>	1
Sweet Sarsparilla	Smilacaceae	<i>Smilax glycyphylla</i>	1
Forest Nightshade	Solanaceae	<i>Solanum prinophyllum</i>	1
Hairy Clerodendrum	Verbenaceae	<i>Clerodendrum tomentosum</i>	1
Lantana	Verbenaceae	* <i>Lantana camara</i>	4
Slender Grape	Vitaceae	<i>Cayratia clematidea</i>	2
Water Vine	Vitaceae	<i>Cissus antarctica</i>	1
Burrawang	Zamiaceae	<i>Macrozamia reducta</i>	2