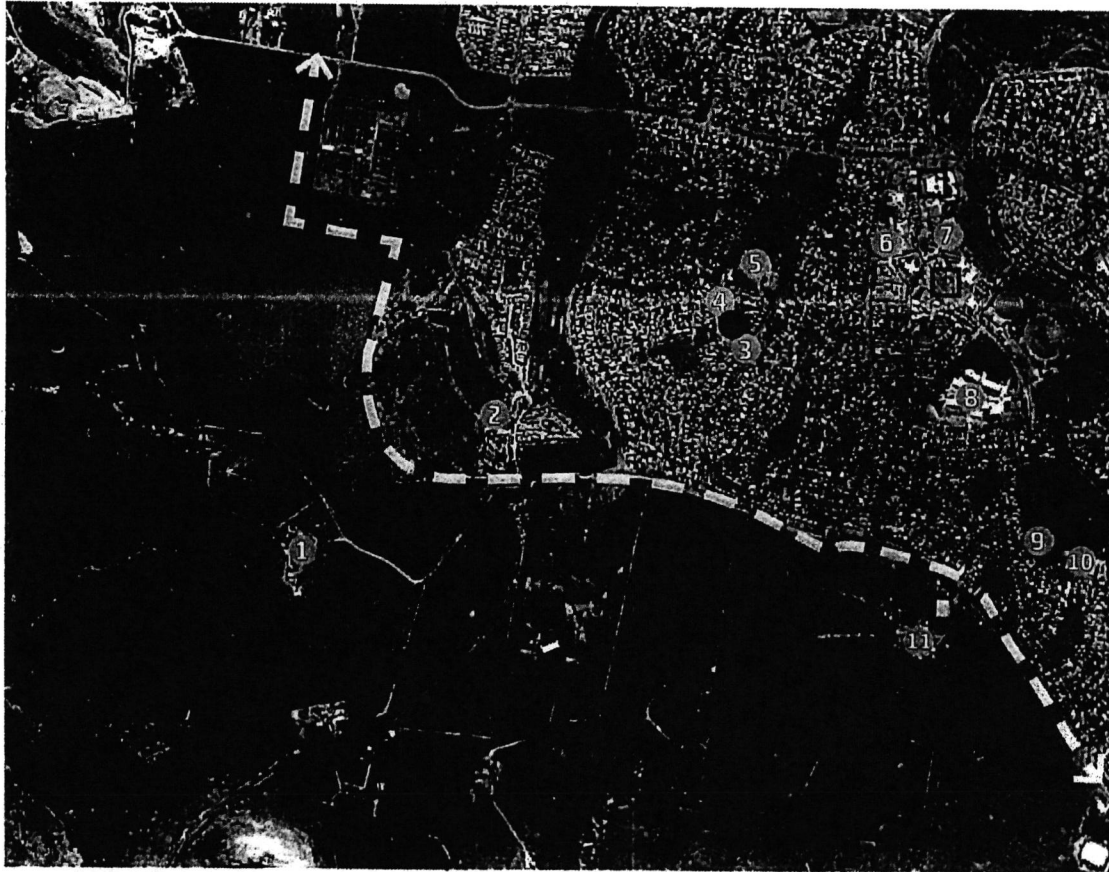


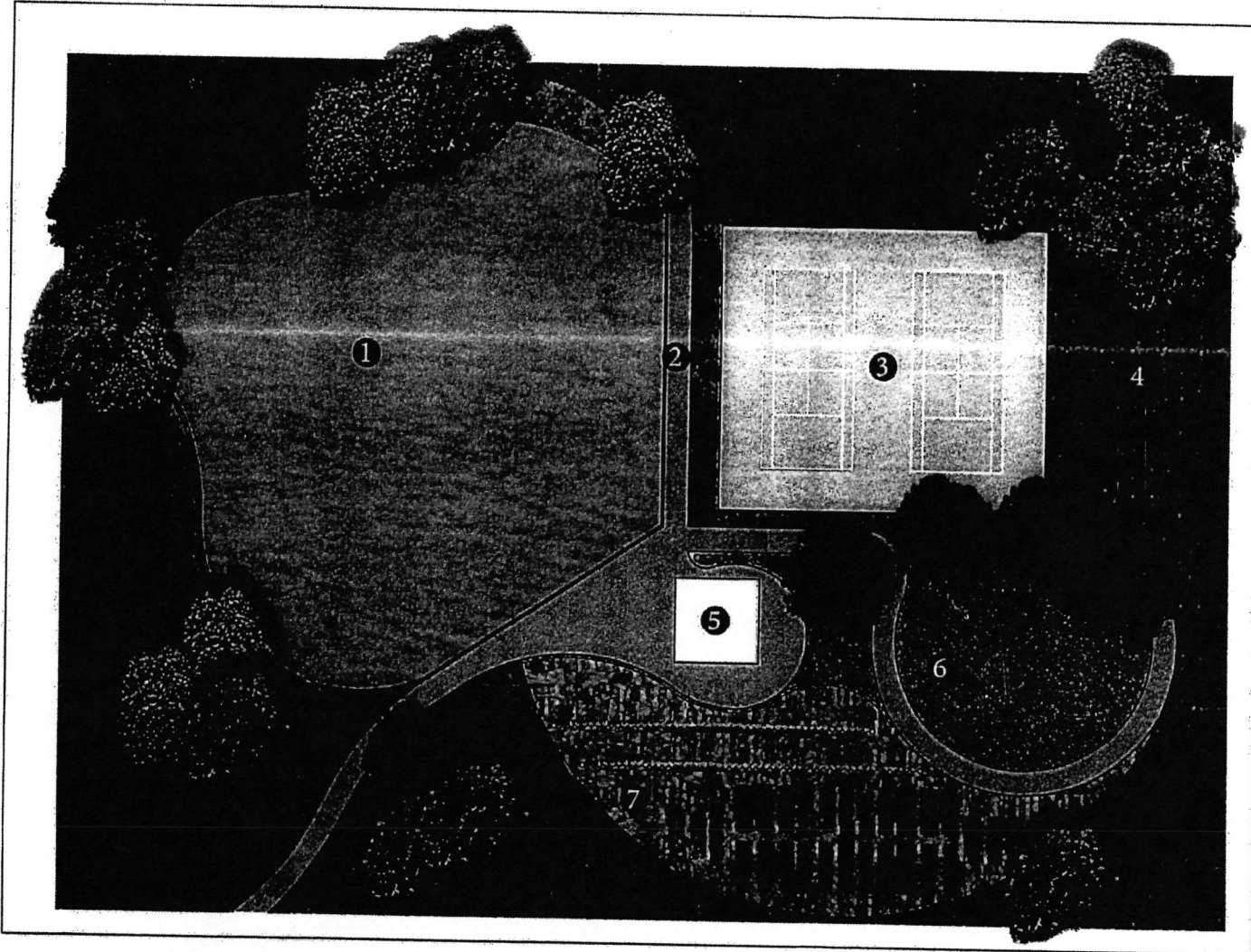
Holt Affordable Housing - Adjacent Existing Facilities



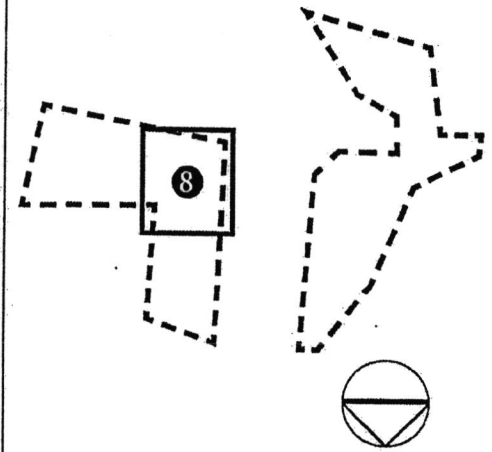
-  Holt Affordable Housing
-  - Community Facilities Location
-  Existing Local Shops
-  Existing District Shops
-  Existing Open Space
-  Existing Local Playgrounds
-  Existing Open Space Pedestrian Network
-  NBT Equestrian Trail

Existing Community Facilities

- 1- Strathnairn
- 2- Golf Club
- 3- Anglican Church
- 4- Holt Community Hall
- 5- Carers Centre
- 6- Kippax Group Centre
- 7- Kippax Group Centre
- 8- Kingsford Smith School
- 9- Child Care Centre
- 10- Higgins Primary School
- 11- Pegasus



- ① Pond
- ② Pond Boardwalk
- ③ Tennis Courts and Community Space
- ④ Irrigated grass surrounds
- ⑤ Shelter BBQ and Picnic Facilities
- ⑥ Childrens Playground and Outdoor Exercise Equipment
- ⑦ Community Garden
- ⑧ Community Facility Location



14 Hannah Place, Deakin ACT, 2600
02 6285 1955 dsb@dsbla.com.au www.dsblla.com.au



Childrens Playground and Exercise Equipment

14 Hannah Place, Deakin ACT, 2600
02 6285 1955 dsb@dsbla.com.au www.dsbla.com.au

 **dsb**
Landscape Architects



BBQ Shelter, Tennis Court, Children's Playground, Exercise Equipment and Community Garden

14 Hannah Place, Deakin ACT, 2600
02 6285 1955 dsb@dsbla.com.au www.dsbla.com.au

 **dsb**
Landscape Architects

**Katy Gallagher MLA****CHIEF MINISTER**

MINISTER FOR HEALTH

MINISTER FOR TERRITORY AND MUNICIPAL SERVICES

MEMBER FOR MOLONGLO

Mr Bob Winnel AM
Managing Director
Village Building Company
PO Box 211
CIVIC SQUARE ACT 2608

Dear Mr Winnel

Thank you for your letter of 20 August 2012 regarding the availability of land for affordable housing and your request for a meeting to discuss your proposal to develop the Holt vineyard.

I acknowledge that pent up demand for detached housing sites in greenfield locations continues to impact on housing affordability, while the multi-unit sector is being satisfied by a number of recently completed developments and those under construction.

As you appreciate, the release of detached greenfield housing sites continues to be subject to lengthy environmental assessment and clearance processes. However, I can advise that the ACT Government has been in close consultation with the Commonwealth in an effort to accelerate the approval process. As a result significant progress is being made in securing approvals for the Gungahlin suburbs of Kenny, Throsby and Moncrieff. These suburbs have the potential capacity to offer in the order of 2,500 detached dwelling sites as well as a range of medium and higher density housing. These sites are in addition to land releases in Casey, Crace, Coombs, the next Molonglo suburb of Denman Prospect and the Belconnen suburb of Lawson.

The Government will consider your proposal to develop the vineyard near Holt in early September 2012. Unfortunately, there will not be an opportunity to meet to discuss your proposal prior to its consideration.

Thank you again for bringing forward this proposal.

Yours sincerely

Katy Gallagher MLA
Chief Minister

ACT LEGISLATIVE ASSEMBLY

London Circuit, Canberra ACT 2601 GPO Box 1020, Canberra ACT 2601
Phone (02) 6205 0840 Fax (02) 6205 3030 Email: gallagher@act.gov.au



ACT
Government
Economic Development

FILE COPY

<p><i>Date due with Minister's Office</i></p> <p>04/09/2012</p>	<p><i>Date due with CE Office at least 2 working days before Minister's Office</i></p> <p>31/08/2012</p>	<p><i>Tracking Numbers</i></p> <p>BM12/1743</p>
<p><i>Any other critical date and reason</i></p>		

Subject: Affordable Housing

Reply to correspondence from: Mr Bob Winnel AM

Contact Officer: Damien McNamara
Phone: x76045

Cleared by Director: Greg Ellis

Date:

Cleared by Executive Director: Dan Stewart

Date: 03.09.12

Cleared by Director-General: David Dawes

Date:

McNamara, Damien

From: John Kenworthy [jkenworthy@villagebuilding.com.au]
Sent: Friday, 5 October 2012 9:48 AM
To: McNamara, Damien
Subject: RE: Holt

Thanks Damien,

Regards

John Kenworthy

John Kenworthy
Housing Policy & Sustainability

The Village Building Co. Limited

Level 10 221 London Circuit | P.O. Box 211 Civic ACT 2608
Phone 02 62463406 | Fax 02 62463499 | Mobile [REDACTED]
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Cc: Ellis, Greg
Subject: RE: Holt

John

All of the properties adjoining the Holt winery are leased. The owners are:



Damien McNamara | Senior Manager
Land Release | Economic Development | ACT Government
Phone 620 76045 | Fax 620 70123
Level 6 TransACT House, 470 Northbourne Avenue, Dickson ACT 2602 |
GPO Box 158 Canberra ACT 2601 | www.economicdevelopment.act.gov.au

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AUSTRALIAN CAPITAL TERRITORY

TITLE SEARCH

Belconnen Block 1582 on Deposited Plan 9497
 Belconnen Block 1599 on Deposited Plan 9608
 Lease commenced on 27/05/2002, granted on 24/09/2003, term of 30 years
 Area is 1 square kilometres 26 hectares 3400 square metres or thereabouts

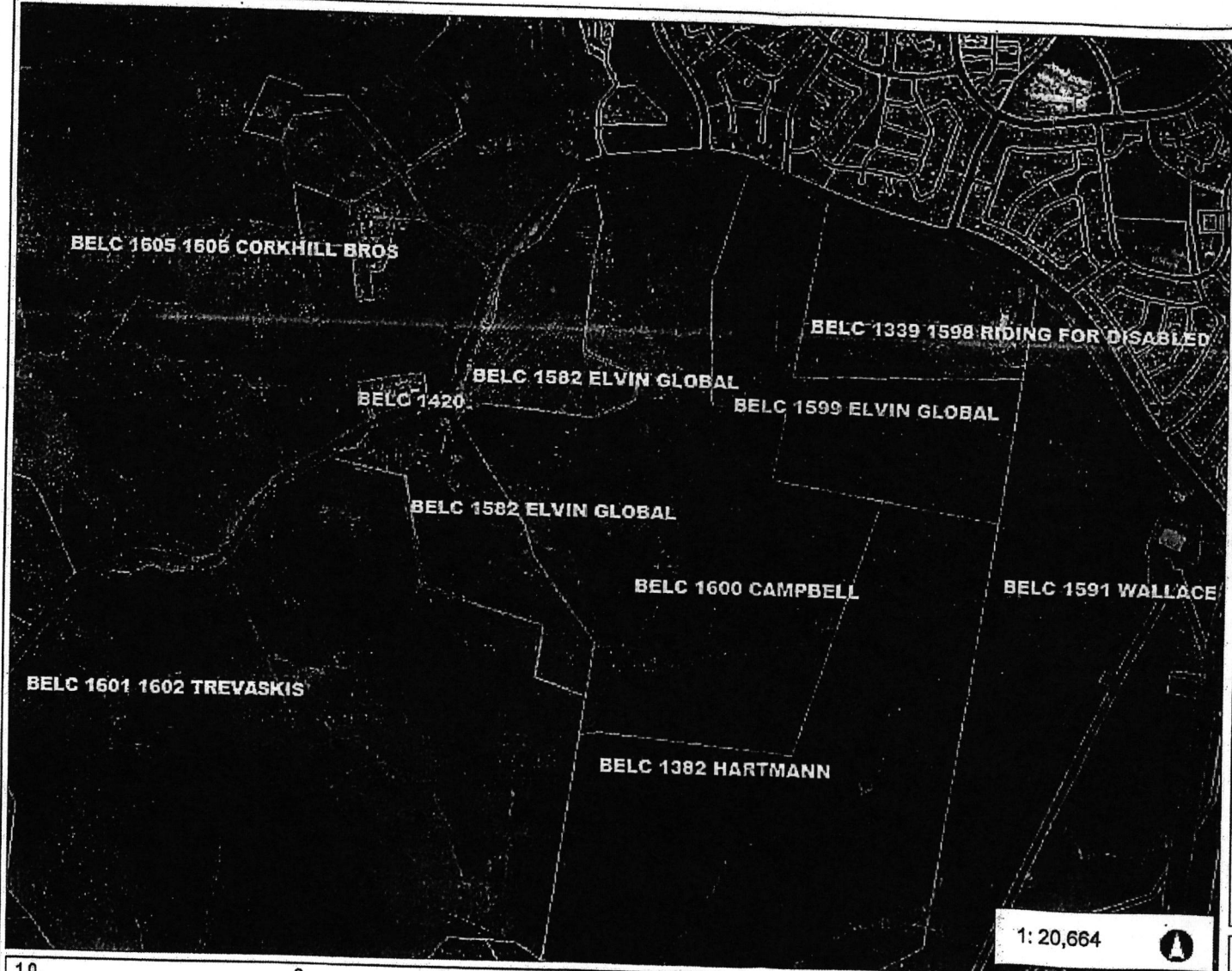
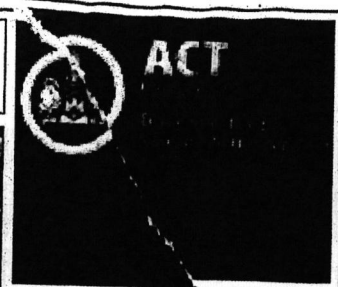
Sole Proprietor:
 Elvin Global Pty Limited
 of 7 Cheney Place ACT 2911

Registered Date	Dealing Number	Description
		Original title is Volume 1764 Folio 61 Purpose Clause: Refer Crown Lease S.167(5) Land Act 1991: Applies For Term Of Lease S.186C & D Land Act 1991: Refer Crown Lease Easement In Crown Lease: Current Easement Affecting: BELCONNEN B1600 CREATED BY TG1211342
16/07/2001	1211342	Transfer and Grant of Easement (refer instrument)(continued by S.91A/91B/91C Land Titles Act 1925)
04/02/2008	1565823	Requisition - Application to Register a Crown Lease lodged on 01/02/2008 - instrument number of 1565545
21/04/2008	1569762	Mortgage to National Australia Bank Limited
01/05/2008	1579056	Withdrawal Requisition of Lodged Dealings (REQ1565823)
03/04/2009	1618937	Requisition - Application to Register a Crown Lease lodged on 27/02/2009 - instrument number of 1618937
28/05/2009	1631020	Withdrawal Requisition of Lodged Dealings (REQ1618937)
11/09/2012	1820057	Production - AVCL

End of interests



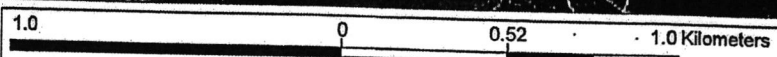
ACTMAPi Online Maps



Legend

- ACT Border
- Districts
- Divisions
- Water Feature Polygons
- Rural Registered
- Rural Approved
- Rural Proposed
- Rural Occupied

Notes



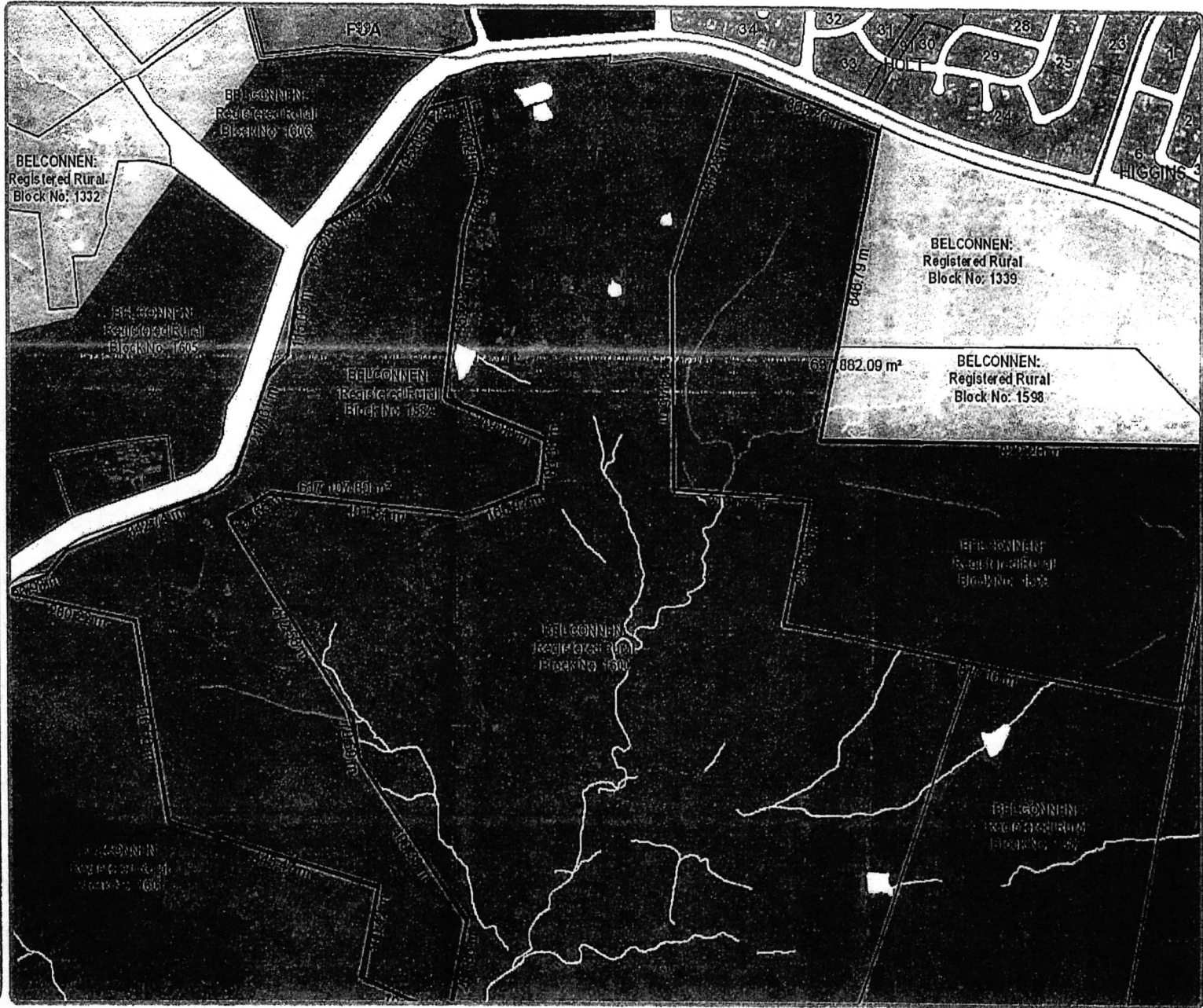
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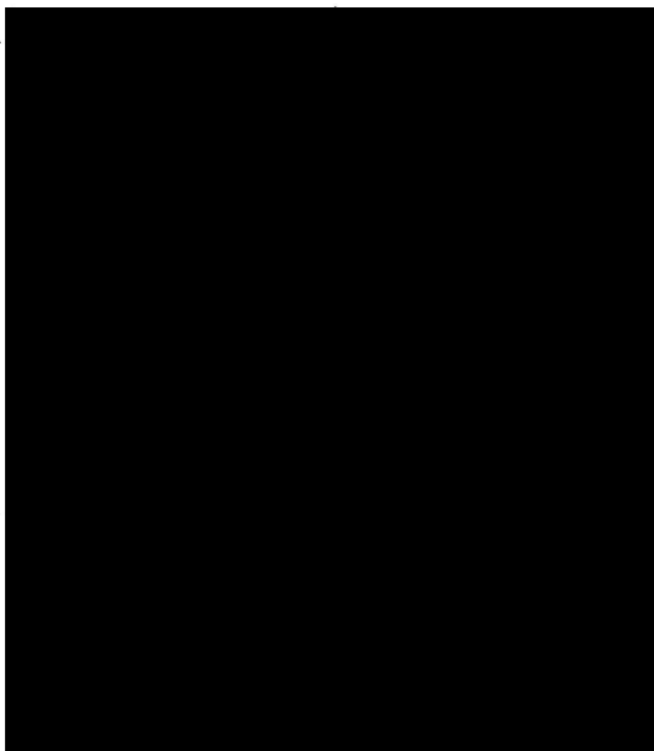
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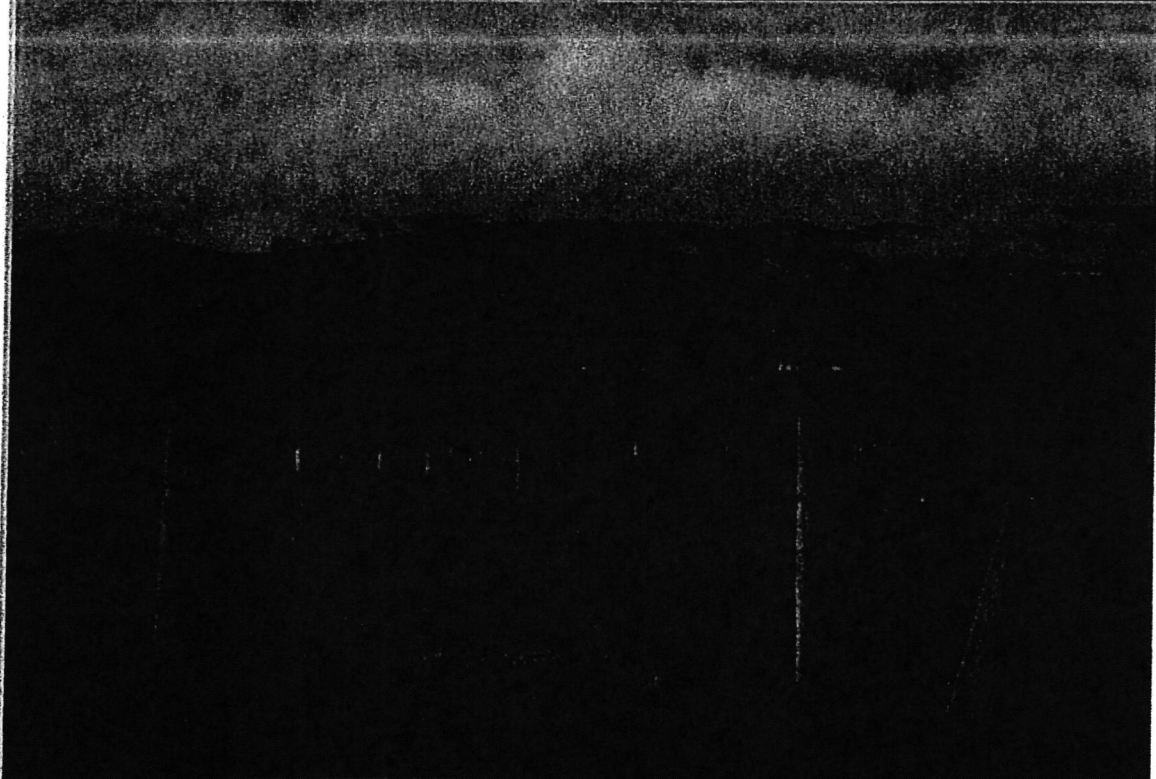
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cd

**FLORA AND FAUNA ASSESSMENT
ELVIN GROUP VINEYARD LAND, BELCONNEN
AUSTRALIAN CAPITAL TERRITORY**



prepared by
KEVIN MILLS & ASSOCIATES ABN 346 816 238 93
ECOLOGICAL AND ENVIRONMENTAL CONSULTANTS
12 HYAM PLACE, JAMBEROO NSW 2533

for
THE VILLAGE BUILDING COMPANY LIMITED
GPO BOX 178, MITCHELL ACT 2911

DECEMBER 2012
12/23

Document Reference

Kevin Mills & Associates (2012). Flora and Fauna Assessment, Elvin Group Vineyard Land, Belconnen, Australian Capital Territory. Prepared for The Village Building Company Pty Limited, December.

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*Kevin Mills & Associates Pty Limited ACN 003 441 610
as trustee for Kevin Mills & Associates Trust*

Cover Photographs: Top left: Several dams occur on the study area. Top right: Remnant old trees are scarce in the area. Lower: The majority of the area is planted with grape vines.

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1 Introduction

The project area is a parcel of land covering about 130 hectares on the western side of Belconnen. The land is primarily used for a vineyard. The study area encompasses the project area and the adjoining land, including the valley to the southwest of the project area. The purpose of this investigation is to describe the flora and fauna on the study area, identify any conservation values and whether these features constitute a constraint on developing any part of the land.

This report covers the following key matters:

- i. a description of the vegetation in the study area, including a plant species list for the project area;
- ii. a description of the fauna habitats in the study area, including a list of the animals observed;
- ii. relevant photographs and maps illustrating the findings of the study;
- iii. identification of significant features known or likely to occur on the land, particularly those matters listed under the ACT *Nature Conservation Act 1980* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- vi. a discussion of constraints to development in the study area.
- vii. an assessment of the impact of proposed urbanisation of the project area.

2 Location and Character Study Area

The project area is a parcel of land covering about 130 hectares on the western side of the suburb of Holt at Belconnen. The land is currently used for a vineyard that covers about 80 hectares of the property (62 percent). The land is to the south of Drake Brockman Drive and east of Stockdill Drive; see Figure 1.

The land is generally undulating country with a few minor watercourses. The vineyard is divided into four areas, number one to four in a clockwise manner from the south-western part of the land; the four areas are obvious on Figure 1. The land not occupied by the vineyard is almost entirely exotic grassland, most of which is slashed regularly. Except for a few localised sites, the land is treeless. There are three earth dams on the property. The underlying rocks are Silurian sediments.

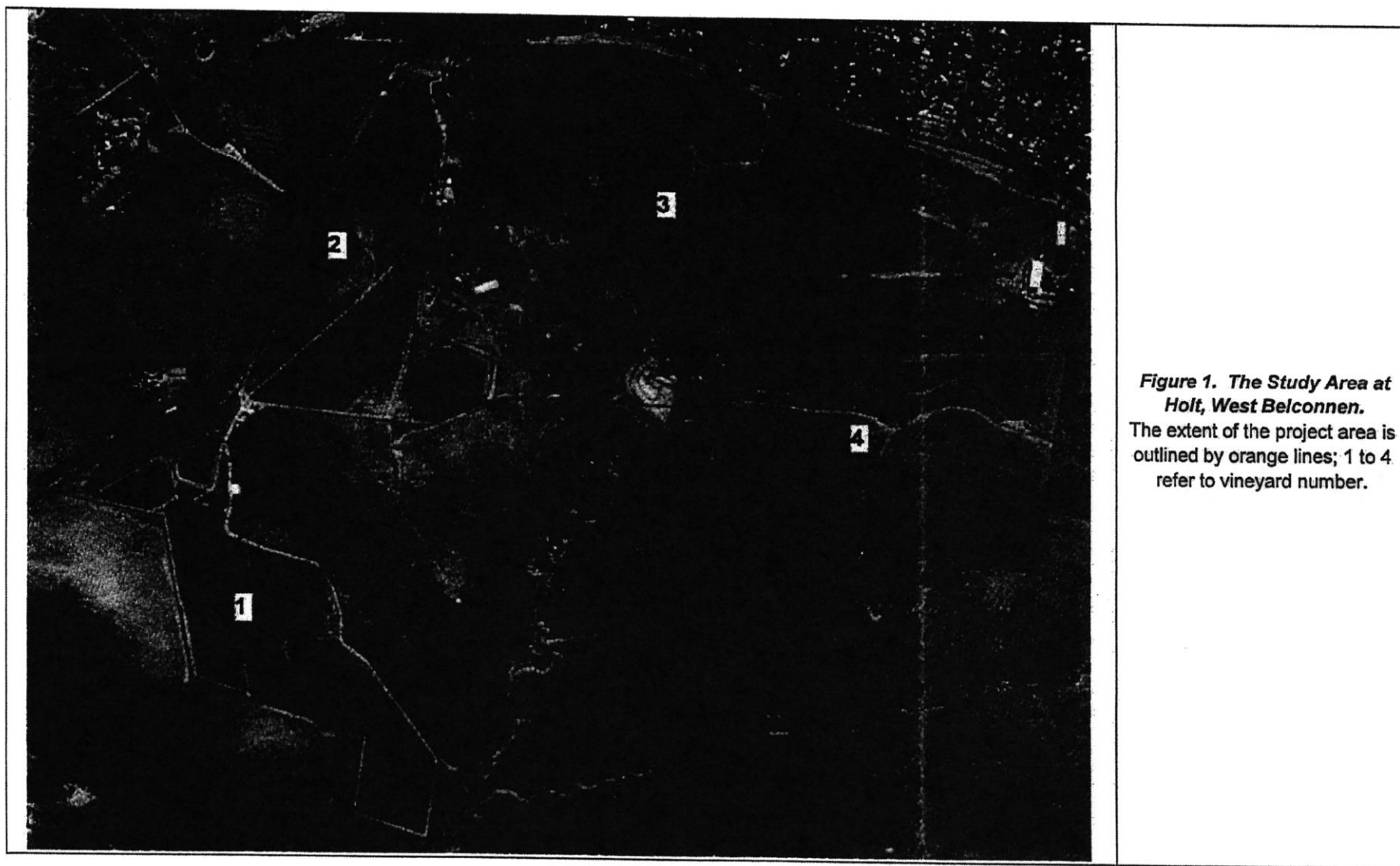
3 Survey Methods

Preliminary diurnal flora and fauna surveys were undertaken during site visits on 8 and 9 November 2010. More detailed investigations were undertaken on 25 September 2012, 17, 18, 23, 24, 25, 30, 31 October, and 1, 13, 14 November 2012.

Bearings were taken from a colour aerial photograph showing the extent of the study area, and the site manager initially showed us the site. The *project area* is that area identified for residential development; this is essentially the existing vineyards. The extent of the project area is obvious from the aerial photograph and on the ground. The *study area* extends beyond the project area to encompass any areas potentially impacted by the development of the vineyard land. This most particularly includes the corridor of land along the valley to the southwest that could take the sewer line.

Flora

The main purpose of the flora survey was to classify and describe the vegetation, to map the distribution of the plant communities, to record as many as possible of the plant species present and to search for threatened plant species and identify significant vegetation types.



The vegetation survey technique combined multiple traverses of the study area, with targeted searches and sampling where native vegetation was located. Vegetation survey guidelines have been issued by the Land Management and Planning (April 2012); those guidelines form the basis of the investigations undertaken in the study area.

Plant species found on the project area were sought throughout the land, with particular searches being carried out wherever indigenous plants were likely to be found. Both indigenous (native) and exotic (weed) species were identified and recorded. The native vegetation occurring in the study area was marked onto a copy of the colour aerial photograph in the field.

Fauna

Mammals were identified by sight and by interpreting their distinctive signs. The mammal survey involved a ground search for scats, tracks and diggings. No nocturnal surveys were carried out because no likely local threatened species are detectable at night. The birds in the study area were also identified by sight and by interpreting their calls. Searches for reptiles were conducted wherever timber or other ground debris was encountered and in rocky areas. Frogs in the study area were identified by interpreting their distinctive calls. A search was conducted for frogs in moist areas and habitat niches, especially under rocks, wood and debris. Notes were made on habitat features in the study area that were important for fauna, most particularly for listed threatened animals.

Hollow-bearing trees are important for many native animals, including some listed threatened species. A survey of hollow-bearing trees was undertaken in the project area. All likely trees were inspected and those trees with hollows were numbered, identified, the dch measured and the hollows recorded. Each tree was labelled with a unique number at the time of the survey, its GPS location recorded and its location marked onto a colour aerial photograph.

Targeted Surveys

In addition to general flora and fauna surveys in the study area, the survey program carried out targeted surveys for threatened species and their habitats, and ecological communities. The species and communities listed in Table 1 were selected for targeted field surveys and/or assessment as they are known from the general district within which the study area is located.

The particulars of the methods used for the targeted surveys for certain listed species are set out below. Previous records of all species were sought for the locality.

Listed plants

The species were searched for in all likely locations. Background information on each of the species was sought, including appearance, flowering time, habitat and local occurrences.

Natural Temperate Grassland and Yellow Box - Blakely's Red Gum Woodland

The vegetation that could be part of these listed communities was assessed. The criteria used by the Commonwealth were used where relevant.

Pink-tailed Wom Lizard

Rocky areas were searched for and if found the "rock-rolling" technique was employed to look for the lizards or their sloughed skins. Very few rocky areas occur in the project area and then there is almost no loose surface rock.

Woodland Birds

Brown Treecreeper, Hooded Robin, Painted Honeyeater, Varied Sittella, White-winged Triller

Targeted bird surveys were undertaken on several occasions in the study area at appropriate times of the day; mostly before 10.30 am and after 4.00 pm. Habitat was also assessed as to its suitability for these woodland birds. A species accumulation curve was used to ensure that adequate survey time was spent on the site.

Table 1
Listed Threatened Species and Communities and Rare Species

Species, etc.	NCA ¹	EPBC ¹
Listed Flora		
<i>Lepidium ginninderrense</i>	E ²	V ²
<i>Pomaderris pallida</i>	listed in NSW	V
<i>Swainsona sericea</i>	listed in NSW	-
Listed Communities		
Natural Temperate Grassland	E	E
Yellow Box - Blakely's Red Gum Woodland	E	E
Listed Fauna		
Reptiles Pink-tailed Worm Lizard	V	V
Birds Brown Treecreeper	E	-
Hooded Robin	V	-
Painted Honeyeater	V	-
Superb Parrot	V	V
Varied Sittella	V	-
White-winged Triller	V	-
Invertebrates		
Golden Sun Moth	E	CE
Perunga Grasshopper	V	-
Rare Fauna³		
Birds Diamond Firetail	listed in NSW	-
Dusky Woodswallow	of concern	-
Little Eagle	listed in NSW	-

1. The above species and communities are listed under one or more of the following pieces of legislation: NCA - *Nature Conservation Act 1980* (ACT); EPBC - *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). 2. CE – critically endangered; E – endangered; V – vulnerable. 3. Animals considered rare but not listed in the ACT.

Little Eagle and other diurnal birds of prey

Large sticks nest were searched for, assessed and their location recorded; the targeted bird surveys recorded the location of all birds of prey observed.

Superb Parrot

The targeted bird surveys recorded observations of this species, which bred last season just to the south of the study area. The hollow-bearing tree survey identified any trees of potential use by the parrot on the project area. All species observed were followed if possible, their activity recorded and any habitat being used identified, described and assessed.

Golden Sun Moth, Perunga Grasshopper

These invertebrates occur in grasslands, most likely native temperate grassland but also some exotic dominated grassland. Initially, habitat assessment identified any sites likely to be inhabited by either species. Targeted surveys were undertaken if apparently suitable habitat was identified.

Definitions

The following definitions used in this report are widely accepted in the botanical literature; most of those relating to grasslands are largely from the report by Rehwinkel (1997).

Forest: a community of relatively closely spaced trees (projective foliage cover >30%) growing taller than 10 metres.

Woodland: a community of well spaced trees (projective foliage cover 10-30%) growing to a height of 4 to 30 metres.

Open Woodland: a community of scattered trees (projective foliage cover <10% growing to a height of 4 to 30 metres.

Grassland: vegetation dominated by grasses and forbs, with <10% tree and/or shrub cover.

Native Grassland: grassland with >50% of vegetation cover composed of indigenous species, >50% of all species are native, and the minimum vegetation cover, alive or dead, is >10%.

Natural Grassland: native grassland considered to have had <10% tree and/or shrub cover at the time of European settlement.

Secondary Grassland: a native grassland remaining after the removal or dieback of previously occurring trees and/or shrubs, where these occupied >10% cover.

Native Pastures: containing native and introduced species, where introduced species occupy >50%, but <75% of both cover and species present, where pasture species have often been mechanically sown.

Exotic Grassland: where >75% of species and cover are composed of introduced plants.

Sown Pasture: where the dominant plants are sown exotic species (>75% cover), usually fertilised land used for grazing (e.g. Ryegrass and Clover).

Cropland: a species that is sown, usually following ploughing, for commercial harvest (e.g. Wheat) or stock feed.

Natural Temperate Grassland: a threatened grassland community listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act*. The Recovery Plan for Natural Temperate Grassland (Environment ACT 2006) provides the following information:

"The community is dominated by moderately tall (25-50cm) to tall (50cm – 1.0m), dense to open tussock grasses with up to 70% of the species being forbs. The community may be treeless or contain up to 10% cover of trees, shrubs or sedges. In the Southern Tablelands, Natural Temperate Grasslands are located at altitudes between 560 and 1200 metres in valleys influenced by cold air drainage and in broad plains. The community occurs within the geographical region of the Southern Tablelands of NSW and ACT, which extends southwards from the Abercrombie River to the Victorian Border, from Boorowa and Jindabyne to the west and Goulburn to Braidwood and Bombala to the east."

"Natural Temperate Grassland is a native ecological community that is dominated by native species of perennial tussock grasses. The dominant grasses are *Themeda triandra [australis]*, *Austrodanthonia* species, *Bothriochloa macra* and *Poa* species. The upper canopy stratum generally varies in height from mid-high (0.25-0.5m) to tall (0.5-1.0m). There is also a diversity of native herbaceous plants (forbs), which may comprise up to 70% of species present. The community is naturally treeless or has less than 10% projective foliage cover of trees or shrubs in its tallest stratum. The ecological community that makes up NTG-ST [Natural Temperate Grassland – Southern Tablelands] is defined by the vegetation structure thought to have been present at the time of European settlement."

4 Flora

4.1 Description of the Vegetation

The vegetation in the study area originally consisted of woodland, as demonstrated by the remnants that exist on the surrounding land today. The gentler topography across this part of the region supported Yellow Box *Eucalyptus melliodora* - Blakely's Red Gum *Eucalyptus blakelyi* woodland to open woodland. As evidenced by remnant trees, the woodland on the steeper topography in the southwest was dominated by *Eucalyptus dives*, *Eucalyptus rossii* and/or *Eucalyptus macrorhyncha*. The Box-Gum woodland/open woodland would have had a grassy understorey, while the other woodland would often have a shrubby understorey. Natural Temperate Grassland did not occur in this area.

Vegetation patches in the Project Area

Several small stands of native vegetation occur in the project area; these are individually described below and their location is shown on Figure 2. The survey information for each of these sites is provided in Appendix 7.

Site A – Eastern Woodland

Location: Far eastern corner of Vineyard 4.

Vegetation: Stand of *Eucalyptus blakelyi* with an exotic understorey. Little eucalypt regeneration. Death of tree branches common, probably due to several years of severe drought. Stand possibly planted.

Habitats: No trees with hollows, ground cover exotic.

Site C – Central Grassland

Location: On southern edge of Vineyard 2, below high voltage transmission line.

Vegetation: Treeless grassland, with one patch of Speargrass *Austrostipa scabra* dominated grassland. Native plant species diversity is low and cover of Speargrass is not consistent.

Habitats: A very small area of native grassland of relatively low species diversity, weeds common.

Site D – Western Woodland

Location: Around dam on western side of land, near sheds, between Vineyards 1 and 2.

Vegetation: Stand of mainly Blakely's Red Gum *Eucalyptus blakelyi*. The understorey is exotic and there are thickets of the shrub *Leptospermum brevipes*. Contiguous with similar habitat on adjoining land.

Habitats: Three trees with occasional hollows, shrubby thickets, otherwise exotic understorey. Dam present.

Site G – Above Large Dam

Location: Northeast of large dam on western side of Vineyard 4.

Vegetation: Old trees and regenerating *Eucalyptus blakelyi*, plus areas of planted local trees. Dense to moderately dense patches of Kangaroo Grass *Themeda australis* grassland moderately common.

Habitats: No trees with hollows, native grassland present. Dam present.

Elsewhere on the Project Area

The land is largely devoid of native trees. Occasional *Eucalyptus melliodora* and *Eucalyptus blakelyi* occur here and there, including some large old trees. Plantings of local trees have been undertaken in broad areas along drainage lines in several places. All trees with hollows were recorded and assessed.

Site B – Valley Woodland

A large area of woodland occurs in the broad gully between the Vineyards 2 and 3. This woodland contains many large trees and much eucalypt regeneration, but the understorey is essentially exotic grassland. The dominant tree is *Eucalyptus blakelyi*, with a few scattered *Eucalyptus bridgesiana* and *Eucalyptus melliodora*. There are two watercourses through the woodland, but these are mostly dry.

Sites E and F – Southern Valley

The lower part of the valley to the south of the vineyard supports large areas of native grassland. This is secondary grassland, originating from woodland that was primarily dominated by *Eucalyptus dives* and *Eucalyptus macrorhyncha*, with *Eucalyptus pauciflora* in the valley.

4.2 Plant Species Recorded

The plant species recorded in the project area in 2010 and 2012 are listed alphabetically under family name in **Appendix 1**. The list contains the names of indigenous species and exotic (introduced) species. No listed threatened plant species or rare species were found in the study area. In total, 57 native species and 62 exotic (naturalised) species were recorded within the project area.

4.3 Threatened Plant Species

No listed threatened plant species have been recorded in the locality. The following species listed in the ACT and/or NSW have been recorded from the broader region: *Lepidium ginninderrense*, *Pomadouris pallida* and *Swainsona sericea*. Given the highly modified character of the project area, and the absence of these species in the flora surveys of the site, it is very unlikely that these species occur in the study area.

5 Fauna

5.1 Fauna Habitat

The habitats available for animals in the study area can be conveniently discussed under several habitat types; these are summarised below.

Project Area

Vineyard

The vineyard is an intensively managed area planted closely with grape vines. There are almost no native plants present and the area is slashed and sprayed with herbicides regularly. The vineyard is of little use to native animals, although the grapes are eagerly sought as a food source.

Tree Plantings

There are several copses of planted local native trees within the study area. These contain trees up to eight metres or so tall, and have an exotic grassland understorey. Some areas are grazed while others are not.

Remnant Woodland

There are several remnants of woodland in the project area, all are remnants of Box-Gum Woodland (Sites A, B, D and G). By far the most common tree is *Eucalyptus blakelyi*. Occasional large old trees also occur elsewhere in the project area, but these are few (see **Table 2**). The native plant species recorded in each remnant on the project area are listed in **Appendix 8**.

Rocky Areas

There are very few rock outcrops in the vineyard land, these are tiny and have almost no loose surface rock under which reptiles could shelter.

Native Grassland

There is almost no native grassland in the project area. A small area occurs in the central part of the land (Site C), but this is very small and not terribly diverse. Another small area occurs below the woodland at Site G, which despite disturbance has reasonable plant species diversity.

Wetlands

The project area contains three dams, one of which is quite large (Site G). These dams have varying amounts of native wetland vegetation along their edges. All dams attract native wetland fauna, particularly birds and frogs; and add to the diversity of local habitats.

Hollow-bearing Trees

A survey for hollow-bearing trees was undertaken throughout the project area. All trees with obvious hollows were identified to species, the hollows counted and placed in a size class, the girth of the tree measured and the health of the tree assessed. The trees identified are tabulated in **Appendix 3** and summarised in **Table 2**.

Tree hollows were recorded as large, medium or small; this is a subjective assessment, the hollows were not measured. Large hollows are significant hollows in the trunk of the tree. Small hollows were mainly in small dead and broken branch ends, although some were in larger branches and the trunk.

Table 2
Summary of Hollow-bearing Trees in the project area

Tree Species	No. of Trees	Total no hollows	Average no. hollows/tree	Range in dch (cm)	Average dch ¹ (cm)
<i>Eucalyptus blakelyi</i>	14	41	2.9	42-218	104
<i>Eucalyptus bridgesiana</i>	1	1	1	105	105
<i>Eucalyptus melliodora</i>	2	3	1.5	78-213	146
<i>Eucalyptus rossii</i>	1	6	6	98	98
dead tree	3	16	5.3	32-93	85
Totals	21	67	3.2	32-218	108

1. Diameter at chest height, a measure of tree size/age.

In all, 21 trees of four species and dead trees were found to contain 67 hollows. The locations of the identified trees summarised in **Table 2** are shown on **Figure 2**; the tree numbers used are consistent between **Figure 2** and **Appendix 3**.

Some tree hollows were being utilised for breeding by birds. The following hollow-nesting native birds were observed to be investigating or sitting in tree hollows: Crimson Rosella, Galah, Striated Pardalote and Sulphur-crested Cockatoo. Also observed using hollows were the introduced Common Myna and Common Starling.

Southern Valley

Most of the potential sewer route is almost treeless; remnant woodland occurs in the broad gully between Vineyard areas 2 and 3 (Site B); see **Figure 3**. That woodland is of high habitat importance, although the understorey is almost entirely exotic grassland. Many trees with hollows occur in this woodland.

In the lowest part of the valley, above the existing sewer pipeline, large areas of native grassland are found (Sites E and F); see **Figure 4**. The grassland is not terribly diverse although exotic species are not common. Rocky areas common; these are sedimentary and probably not likely to support the listed Pink-tailed Worm Lizard.

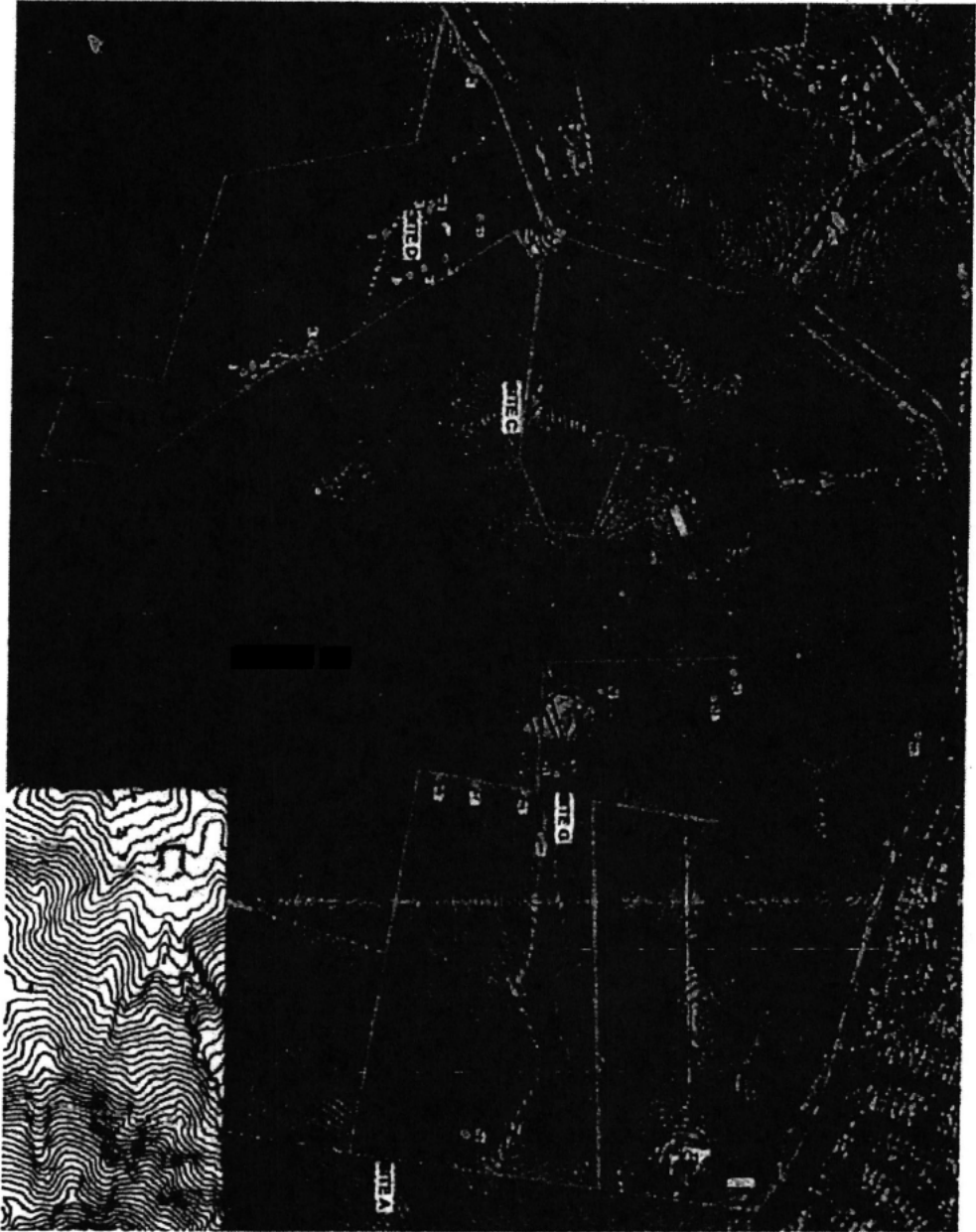


Figure 2. Habitat Information.

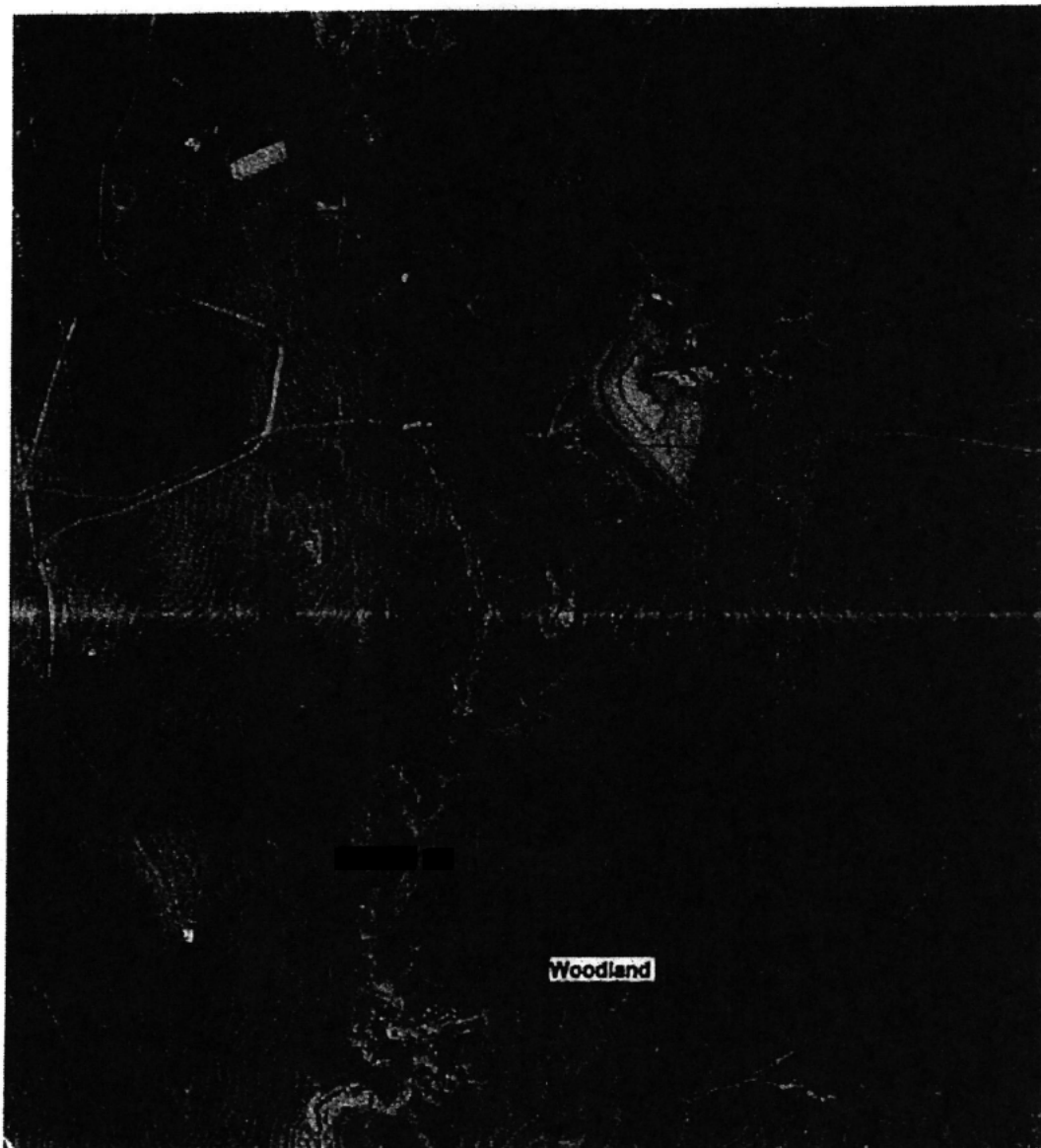


Figure 3. Woodland between Vineyards 2 and 3.

5.2 Fauna Species Recorded

The fauna species recorded in the study area are listed in **Appendix 2**. Where available, fauna records from other studies in the locality are also provided in the appendix to provide a more comprehensive perspective on the district's fauna. The fauna list at **Appendix 2** therefore provides a reasonable inventory of the fauna known and expected to occur in the local area.

The bird species accumulation curve indicates that most species have been recorded in the surveys that have been undertaken; see **Figure 4**. Twelve bird counts were carried out; each time the whole project area was searched on a total of 23.8 hours of observation time. The number of species recorded per count was relatively consistent, irrespective of the time of day; counts ranged from 35 to 41 species. The total number of individual bird observations was 2372. In all, 73 bird species were recorded in the surveys, 68 native species and five introduced species. A significant proportion of the species recorded, 19 species (26%), are waterbirds and were primarily associated with the three dams.



Figure 4. The Southern Valley Native Grassland

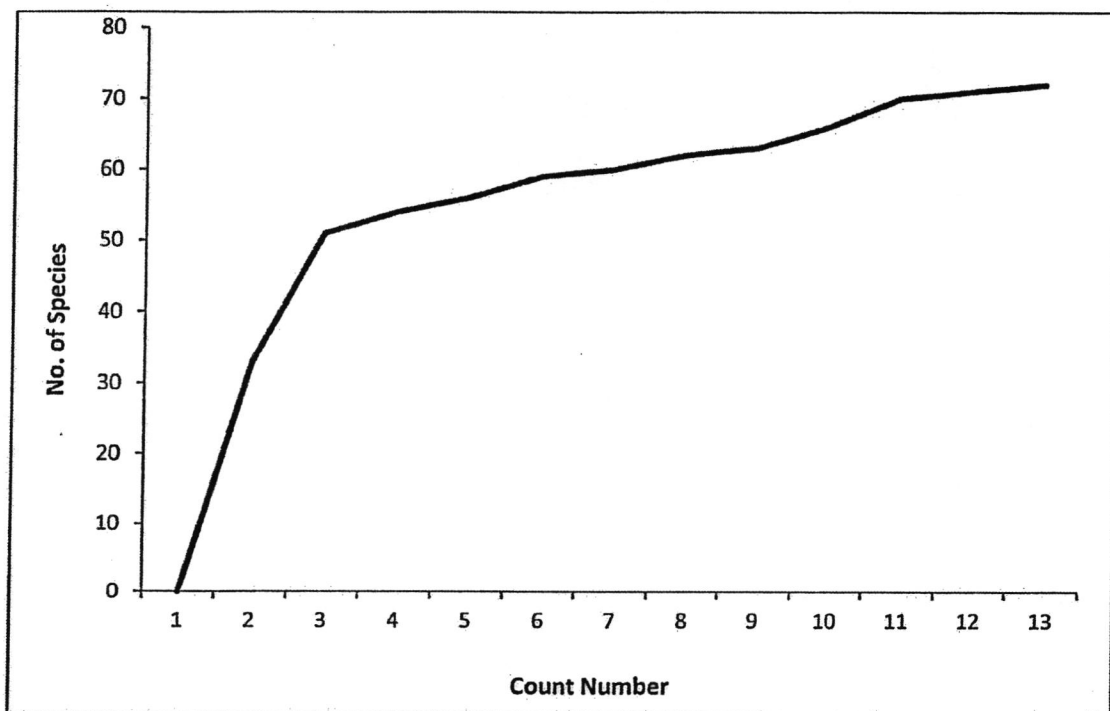


Figure 5. Bird Species Accumulation Curve.

Nine mammal species were recorded, four native and five introduced, four frogs and three reptiles were also found.

5.3 Threatened and Rare Species

The threatened and rare species of animal recorded on and near the study area are summarised in Table 3. All species, particularly the species actually recorded in the study area, are discussed below.

Table 3

Records of Threatened and Rare Animal Species In the Locality

Pink-tailed Worm Lizard	Occurs on northern side of Stockdill Drive and to the west in the river corridor.
Brown Treecreeper	Recorded to south by Davey (2012).
Diamond Firetail	Recorded twice on the project area. Recorded to south by Davey (2012).
Dusky Woodswallow	Recorded twice on the project area. Recorded to south Davey (2012).
Hooded Robin	Apparently no local records.
Little Eagle	Recorded over the project area in October/November 2012; nest and birds recorded nearby by Davey (2012).
Painted Honeyeater	Apparently no local records.
Superb Parrot	Recorded in study area and nearby in spring 2012 (this study). Breeding in 2011/12 recorded just to south Davey (2012).
Varied Sittella	Recorded to the south by Davey (2012).
White-winged Triller	Recorded to the south by Davey (2012).
Golden Sun Moth	No local records.
Perunga Grasshopper	No local records.

6 Results of Threatened Species Surveys and Assessments

6.1 Threatened Plant Species

Threatened Plant Species

No threatened plant species were found in the study area. Given the level of field survey, the character of the habitats found there and the lack of records of such species locally, it is reasonable to assume that such species do not occur in the project area.

Box-Gum Woodland Listed Community

The vegetation survey identified and delineated several sites on the project area and nearby that support remnants of this threatened community, as listed in the ACT and by the Commonwealth. The quality of the community at these sites was assessed and found that their condition is generally poor.

Assessment using EPBC criteria

The native vegetation in the project area was part of the White Box – Yellow Box – Blakely's Red Gum Woodlands and Derived Native Grasslands community (Box-Gum Woodland) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Policy Statement prepared by DEH (2006) describes the procedure for identifying the community as listed under the Commonwealth legislation. That document explains the criteria to be used in identifying the listed community and includes a convenient flow-chart summarising the methods used to confirm the presence or otherwise of the listed community, based on the lowest condition class.

According to the DEH (2006), stands of native vegetation that are included in the ecological community as recognised by the Commonwealth must have either:

- an intact tree layer and a predominantly native ground layer; or
- an intact native ground layer with a high diversity of native plant species but no remaining tree layer.

We have assessed the woodland and native grassland sites in the project area in terms of the above Policy Statement and have reached the following conclusions:

Site A

The site does not meet the minimum native ground cover criteria, so is not the listed community.

Site B

The site does not meet the minimum native ground cover criteria, so is not the listed community. This woodland is identified in *Action Plan No. 10 – Yellow Box/Red Gum Grassy woodland, An endangered Ecological Community* as being of "High Conservation Value".

Site C

Meets the predominantly native understorey criteria. Does not meet the minimum area criteria, nor does it meet the minimum number of native understorey species (other than grasses); area is therefore not the listed community.

Site D

The site does not meet the minimum native ground cover criteria, so is not the listed community.

Sites E and F

The native grassland here was never Box-Gum Woodland.

Site G

This woodland stand meets the native understorey criteria (other than grasses). and just meets the minimum area criteria. The site meets the minimum criteria as the listed community.

The Significant Impact guidelines prepared by the Commonwealth DEWHA (2009) set out the criteria to be used in determining if there is likely to be a significant impact upon listed matters of National Environmental Significance (NES). The criteria for endangered ecological communities are provided below.

Significant impact criteria for endangered ecological communities

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- reduce the extent of an ecological community
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- adversely affect habitat critical to the survival of an ecological community
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
 - assisting invasive species, that are harmful to the listed ecological community, to become established, or
 - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
- interfere with the recovery of an ecological community.

6.2 Threatened Animal Species

The potential threatened animal species were listed above, in **Table 1**. These species are now individually assessed as to their potential to occur in the study area. Our records of the threatened species in the study area are provided in **Appendix 6**.

6.2.1 Species not Recorded

Pink-tailed Worm Lizard

This small lizard is known to be quite common along the Murrumbidgee River corridor and nearby, where it inhabits rocky outcrops in native grassland. There are no suitable rocky outcrops in the project area and virtually no native grassland; the lizard is very unlikely to occur there. The rocky areas in the lower southern valley are sedimentary so are less likely to support this lizard, but this cannot be ruled out completely.

Brown Treecreeper

This woodland bird is unlikely to occur in the tiny areas of poor quality woodland in the project area, but could occur in the woodland between Vineyards 2 and 3 (Site B).

Hooded Robin

The woodland bird is unlikely to find valuable habitat in the tiny areas of poor quality woodland in the study area, although it may occasionally occur in the area incidentally.

Painted Honeyeater

The honeyeater is usually associated with mistletoe; it is rare in the region and unlikely in the few trees within the project area.

Varied Sittella

The sittella could conceivably occasionally visit the trees in the area, but the small areas involved and the poor quality of the woodland is such that the species is not likely to be resident. Despite many surveys in the study area, the species was not found in the area.

White-winged Triller

The migratory White-winged Triller probably occurs in the area in the warmer months as it moves through the region, but not necessarily every year. As with other woodland birds, this species would find only a small amount of suitable habitat in the project area.

Golden Sun Moth

The lack of native grassland in the study area almost certainly excludes the likelihood of the presence of this species.

Perunga Grasshopper

The lack of native grassland in the study area almost certainly excludes the likelihood of the presence of this species.

6.2.2 Species Recorded

EPBC listed Species

One animal species listed under the EPBC was recorded in the study area, namely the Superb Parrot.

Superb Parrot

Recently the parrot was recorded immediately to the south of the study area, where many pairs were breeding in the 2011-2012 season (Davey 2012). The species was regularly recorded in the study area in spring 2012. Most observations were of birds heading south, towards the 2011-12 breeding area. Breeding is very possible in the woodland between Vineyards 2 and 3, where many large old trees with

hollows occur (Site B). There was no evidence of breeding activity by Superb parrots in the 21 hollow-bearing trees in the project area. It was quite evident from the observations made in the surveys that birds were using flyways associated with the native trees around the vineyards, as shown in **Figure 3**.

The Significant Impact guidelines prepared by the Commonwealth DEWHA (2009) to assess listed vulnerable species are provided below.

Significant impact criteria for vulnerable species

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species
- reduce the area of occupancy of an important population
- fragment an existing important population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of an important population
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- introduce disease that may cause the species to decline, or
- interfere substantially with the recovery of the species.

Note: An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

The Superb Parrot requires assessment as a listed vulnerable species.

6.3 Listed Migratory Species

The Significant Impact guidelines prepared by the Commonwealth DEWHA (2009) to assess listed migratory species are provided below.

Significant impact criteria for listed migratory species

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

What is important habitat for a migratory species?

An area of 'important habitat' for a migratory species is:

- a. habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or
- b. habitat that is of critical importance to the species at particular life-cycle stages, and/or
- c. habitat utilised by a migratory species which is at the limit of the species range, and/or
- d. habitat within an area where the species is declining.

What is an ecologically significant proportion?

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered

include the species' population status, genetic distinctiveness and species specific behavioural patterns (for example, site fidelity and dispersal rates).

What is the population of a migratory species?

'Population', in relation to migratory species, means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.

There are several listed migratory species in the area, including native ducks and diurnal birds of prey. No species would have an ecologically significant proportion of its population in the area.

6.4 Other Species of Concern

Three woodland bird species of conservation concern were recorded, although they are not listed under the NC Act 1980. These species were recorded to the south of the study area by Davey (2012). Our records of these species are documented in **Appendix 6**.

Little Eagle

The Little Eagle occurs regularly over the project area, it was recorded several times over the eastern part of the area in spring 2012. Davey (2012) located a nesting pair near the project area, but did not provide the exact location. The presumed nest tree is to the east of the project area, where a tall tree contains two very large stick nests.

Diamond Firetail and Dusky Woodswallow

These species are not listed in the Act but are of general concern as vulnerable woodland birds. Both species were observed in the study area a few times. The only areas of potential importance are the woodland sites described earlier in this report.

Diurnal Birds of Prey

All birds of prey observed in the study area were recorded during the study; observations of six species are listed in **Appendices 5**. These species are significant because they are at the top of the food chain, and are therefore thinly distributed across the landscape. Six species were recorded in the area, none of which are resident specifically on the project area; all species have territories much larger than the size of the project area. None of these species was found breeding within the project area, although as noted above, the Little Eagle breeds nearby.

7 IMPACT ASSESSMENT

Direct Impacts

The area to be used for urban development is generally the land currently covered in vineyards and the surrounding slashed areas. The three treed areas described in this report are on drainage lines and will be incorporated into the design of the subdivision as parts of green corridors. The small area of native grassland is not part of the EPBC listed Box-Gum Woodland derived grassland and given its tiny area, complete isolation from any other native grassland and poor quality it is considered not to be of any importance and not a constraint to development.

The assessment under the EPBC Act employing the guidelines provided by the Commonwealth found that neither the one listed vulnerable species, Superb Parrot, the listed endangered ecological community, Box-Gum Woodland, or listed migratory species would be significantly impacted by the proposed residential development of the vineyard land.

Discussion of Indirect Impacts

Urbanisation clearly has the potential to cause indirect impacts on the biological environment, both in the retained internal 'green' areas and in the surrounding areas. For convenience of discussion, these indirect impacts are discussed under several categories.

1. Downstream and downslope impacts primarily related to stormwater runoff.

Stormwater control are engineered into all new residential subdivisions. Sediment control, erosion avoidance and minimisation and nutrient stripping in purpose-built wetlands are all standard practices. An issue that is often not so well managed is the movement of weed propagules downslope/downstream, resulting in the proliferation of these weeds into new areas. Minimising the input of sediment and nutrients goes a long way towards managing the spread of weeds along watercourses. Targeted removal/control of certain weeds below new subdivisions may be required until the area stabilises.

2. Pest species, including weeds and species from several animals groups.

Pest species are those organisms that are alien to the environment in question and are invasive and detrimental to native biota and/or people and their activities. Common pest species include weeds, foxes, rabbits and birds such as Common starlings and Common Mynas. Invertebrate pests include feral European bees and European wasps.

The change from a rural environment to an urban environment results in a change in the suite of pest species in the area. Many pest species are present in rural environment and some will persist in the urban area, while others will invade urban areas.

3. The impact of permanently bringing many people in close proximity to the non-urbanised environment.

The impact of people and their activities on land surrounding a residential subdivision depends upon several key factors. Managed farmland receives little impact as there is no legal access and farm management practices limit any potential impact. The impact on reserved land depends in part on its management, the facilities provided and the character of the land, including sensitive areas (e.g. rare plants). The main problems, e.g. dumping rubbish and cutting tree down, can be addressed through good management of the land and adequate education of the surrounding public. It is envisaged that a plan of management would be prepared for the reserved land containing the significant features described in this report.

4. Bringing residential development close to sensitive sites, e.g. nesting areas.

The impact of residential development can potentially impact on habitats near the developed area. These impacts include an increase in noise and general, disturbance, lighting and disturbance and predation by pet dogs and cats.

8 CONCLUSION

Summary of Findings

(a) The vast majority of the land in the project area has no importance as habitat for native plants and animals, including threatened or rare species. Of the 130 hectare site, approximately 80 hectares or 61 percent is under grape vines. The majority of the remainder is exotic grassland that is regularly slashed.

(b) Four small sites are identified that have some habitat value, primarily because of the presence of indigenous trees. These sites are remnants of the listed Box-Gum Woodland community, although their quality is low. The only site that just meets the minimum criteria for Commonwealth listing of the community is site G.

(c) Large hollow-bearing trees are an important habitat component, particularly for several listed threatened species of birds. Twenty-one hollow-bearing trees were recorded on the project area; many more occur in the adjoining woodland.

(d) No threatened plant species were located and none are expected to occur on the site, given the character of the habitats present, and the searches that were carried out.

(e) Two threatened bird species were recorded, namely Superb Parrot and Little Eagle. It is expected that some listed woodland birds would occasionally visit the area, most particularly the woodland between Vineyards 2 and 3 (Site B). The threatened lizard *Aprasia parapulchella* is known to be common in the region, but no suitable rocky habitat occurs on the project area so the species is not likely to be present. Tiny areas of native grassland occur, but these are entirely isolated from other native grassland areas and are not likely to support the Golden Sun Moth or the Perunga Grasshopper.

(f) The most valuable vegetation in the study area is the relatively large area of woodland between the vineyards (Site B). Although it has an exotic understorey, large eucalypts are common and eucalypt regeneration is abundant. The Superb Parrot was seen in this woodland on several occasions, but breeding activity was not observed.

(g) Native grassland is extensive in the lower section of the valley to the south of the project area.

Impact Assessment

Future consideration requires detailed information on project.

Recommendations

(i) The woodland remnants at Sites A, D and G be incorporated into green corridors within the developed land. These are all on drainage lines.

(ii) Investigate an alternative to routing the sewer line down the southern valley, as woodland and native grassland would be impacted if that route was utilised.

(iii) Prior to the commencement of any construction activity, a Vegetation and Habitat Management Plan (VHMP) be prepared that would, among other things, identify the actions to be taken during the construction period to ensure that the woodland remnants to be retained are not impacted.

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Appendix 1
List of Plant Species for the Project Area

Introduced species are indicated by an asterisk (*).

Pteridophyta (Ferns)

Sinopteridaceae

Cheilanthes sieberi Mulga Fern

Gymnospermae (Conifers)

Pinaceae

**Pinus radiata* Radiata Pine

Angiospermae (Flowering Plants)

Amaranthaceae

Alternanthera sp. A Joyweed

Anthericaceae

Tricoryne elatior Yellow Rush-lily

Apiaceae

Hydrocotyle laxiflora Stinking Pennywort

Asteraceae

Chrysocephalum apiculatum Common Everlasting
Euchiton sphaericus Star Cudweed
Pseudognaphalium luteoalbum Jersey Cudweed
Senecio quadridentatus Cotton Fireweed
Triptilodiscus pygmaeus Austral Sunray
Vittadinia cuneata New Holland Daisy
Vittadinia gracilis Woolly New Holland Daisy
Vittadinia muelleri Narrow-leaf New Holland Daisy
 **Arctotheca calendula* Capeweed
 **Carthamus lanatus* Saffron Thistle
 **Cirsium vulgare* Spear Thistle
 **Gamochaeta purpurea* Purple Cudweed
 **Hypochaeris radicata* Flatweed
 **Lactuca serriola* Prickly Lettuce
 **Onopordium acanthium* Scotch Thistle
 **Sonchus asper* subsp. *glaucescens* Prickly Sowthistle
 **Sonchus oleraceus* Common Sowthistle
 **Tolpis umbellata* Yellow Hawkweed

Boraginaceae

Cynoglossum australe Austral Hound's Tongue
 **Echium plantagineum* Paterson's Curse

Brassicaceae

**Capsella bursa-pastoris* Shepherd's Purse
 **Hirschfeldia incana* Hairy Brassica

Campanulaceae

Wahlenbergia communis Tufted Bluebell
 Kevin Mills & Associates

<i>Wahlenbergia gracilis</i>	Australian Bluebell
Caryophyllaceae	
* <i>Cerastium fontanum</i>	Mouse-ear Chickweed
* <i>Paronychia brasiliensis</i>	Chilean Whitlow Wort
* <i>Petrorhagia nanteuilii</i>	Proliferous Pink
* <i>Spergularia rubra</i>	Sandspurry
Casuarinaceae	
* <i>Casuarina cunninghamiana</i>	River Oak (planted)
Chenopodiaceae	
<i>Einadia nutans</i>	Nodding Saltbush
* <i>Chenopodium album</i>	Fat Hen
Crassulaceae	
<i>Crassula sieberiana</i>	Stonecrop
Cyperaceae	
<i>Carex appressa</i>	Tall Sedge
<i>Carex ? inversa</i>	Sedge
<i>Eleocharis</i> sp.	Spike-rush
<i>Schoenus apogoin</i>	Common Bog-rush
<i>Schoenoplectus validus</i>	River Club-rush
Droseraceae	
<i>Drosera peltata</i>	Pale Sundew
Fabaceae	
Faboideae (subfamily)	
* <i>Trifolium arvense</i>	Haresfoot Clover
* <i>Trifolium augustifolium</i>	Narrow-leaf Clover
* <i>Trifolium campestre</i>	Hop Clover
* <i>Trifolium dubium</i>	Yellow Suckling Clover
* <i>Trifolium repens</i>	White Clover
* <i>Trifolium subterraneum</i>	Subterranean Clover
Mimosoideae (subfamily)	
<i>Acacia dealbata</i>	Silver Wattle
<i>Acacia mearnsii</i>	Black Wattle
* <i>Acacia baileyana</i>	Cootamundra Wattle
* <i>Acacia melanoxylon</i>	Blackwood (planted)
Gentianaceae	
* <i>Centaurium erythraea</i>	Common Centaury
Geraniaceae	
<i>Geranium solanderi</i>	Native Geranium
* <i>Erodium botrys</i>	Large Stork's-bill
Goodeniaceae	
<i>Goodenia pinnatifida</i>	Scrambled Eggs
Haloragaceae	
<i>Haloragis heterophylla</i>	Swamp Raspwort

Juncaceae	
<i>Juncus</i> sp.	Rush
* <i>Juncus articulatus</i>	Rush
Lamiaceae	
* <i>Mentha</i> sp.	Mint
* <i>Marrubium vulgare</i>	Horehound
* <i>Salvia verbenaca</i>	Wild Sage
Lomandraceae	
<i>Lomandra filiformis</i>	Wattle Mat-rush
Lythraceae	
<i>Lythrum hyssopifolia</i>	Hyssop Loosestrife
Malaceae	
* <i>Malus x domestica</i>	Apple Tree
Malvaceae	
* <i>Malva neglecta</i>	Dwarf Mallow
* <i>Modiola caroliniana</i>	Red-flowered Mallow
Myrtaceae	
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum
<i>Eucalyptus bridgesiana</i>	Apple Box
<i>Eucalyptus dives</i>	Broad-leaved Peppermint
<i>Eucalyptus goniacalyx</i>	Bundy
<i>Eucalyptus macrorhyncha</i>	Red Stringybark
<i>Eucalyptus melliodora</i>	Yellow Box
<i>Eucalyptus rossii</i>	Inland Scribbly Gum
<i>Eucalyptus rubida</i>	Candlebark
<i>Leptospermum brevipes</i>	Slender Teatree
* <i>Eucalyptus pauciflora</i>	Snow Gum (planted)
* <i>Eucalyptus stellulata</i>	Black Sallee (planted)
* <i>Eucalyptus viminalis</i>	Snow Gum (planted)
Onagraceae	
<i>Epilobium billardierianum</i>	Willowherb
Oxalidaceae	
<i>Oxalis perennans</i>	Grassland Wood Sorrel
Plantaginaceae	
* <i>Plantago lanceolata</i>	Ribbed Plantain
Poaceae	
<i>Austrodanthonia</i> sp.	Wallaby Grass
<i>Austrodanthonia carphoides</i>	Short Wallaby Grass
<i>Austrostipa bigeniculata</i>	Tall Speargrass
<i>Austrostipa scabra</i>	Corkscrew
<i>Bothriochloa macra</i>	Red-leg Grass
<i>Cynodon dactylon</i>	Couch Grass
<i>Elymus scaber</i>	Wheatgrass
<i>Enneapogon nigricans</i>	Nineawn Grass
<i>Microlaena stipoides</i>	Weeping Grass

<i>Poa sieberiana</i>	Poa Tussock
<i>Sorghum leiocladum</i>	Wild Sorghum
<i>Themeda australis</i>	Kangaroo Grass
* <i>Avena</i> sp.	Oats
* <i>Briza maxima</i>	Large Quaking Grass
* <i>Briza minor</i>	Lesser Quaking Grass
* <i>Bromus cartharticus</i>	Prairie Grass
* <i>Bromus diandrus</i>	Great Brome
* <i>Bromus hordeaceus</i>	Soft Brome
* <i>Dactylis glomerata</i>	Cocksfoot
* <i>Eragrostis curvula</i>	African Lovegrass
* <i>Holcus lanatus</i>	Yorkshire Fog
* <i>Hordeum</i> sp.	Barley Grasses
* <i>Lolium</i> sp.	Ryegrass
* <i>Nassella trichotoma</i>	Serrated Tussock
* <i>Paspalum dilatatum</i>	Paspalum
* <i>Phalaris aquatica</i>	Phalaris
* <i>Vulpia</i> sp.	Fescue
* <i>Pentaschistis airoides</i>	False hair Grass
Polygonaceae	
<i>Rumex brownii</i>	Swamp Dock
* <i>Acetosella vulgaris</i>	Sheep Sorrel
* <i>Polygonum aviculare</i>	Wireweed
* <i>Rumex crispis</i>	Curled Dock
Proteaceae	
* <i>Hakea salicifolia</i>	Willow Hakea (planted)
Ranunculaceae	
<i>Ranunculus pumilio</i>	Ferny Buttercup
Rosaceae	
<i>Acaena agnipila</i>	Sheep's Burr
* <i>Crataegus monogyna</i>	Hawthorn
* <i>Rosa rubiginosa</i>	Sweet Briar
* <i>Rubus fruticosus</i> sp. agg.	Black berry
Rubiaceae	
<i>Asperula conferta</i>	Common Woodruff
Scrophulariaceae	
* <i>Linaria arvensis</i>	Toadflax
* <i>Linaria pelisserana</i>	Pelisser's Toadflax
Typhaceae	
<i>Typha orientalis</i>	Cumbungi
Vitaceae	
* <i>Vitis vinifera</i>	Common Grape Vine

Appendix 2**List of Animal Species for the Study Area**

1. Recorded in the locality by KMA and/or others.

2. Recorded in the current study area in November 2010 and/or spring 2012.

Introduced species are indicated by an asterisk (*).

FAMILY Species		Locality ¹	This Study ²
MAMMAL SPECIES			
ORNITHORHYNCHIDAE			
Platypus	<i>Ornithorhynchus anatinus</i>	1	
TACHYGLOSSIDAE			
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	1	2
DASYURIDAE			
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	1	
PHASCOLARCTIDAE			
Koala	<i>Phascolarctos cinereus</i>	1	
VOMBATIDAE			
Common Wombat	<i>Vombatus ursinus</i>	1	2
PHALANGERIDAE			
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	1	2
MACROPODIDAE			
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	1	2
Common Wallaroo	<i>Macropus robustus</i>	1	
Red-necked Wallaby	<i>Macropus rufogriseus</i>	1	
Swamp Wallaby	<i>Wallabia bicolor</i>	1	
MOLOSSIDAE			
Eastern Freetail Bat	<i>Mormopterus species</i>	1	
White-striped Freetail Bat	<i>Nyctinomus australis</i>	1	
VESPERTILIONIDAE			
Eastern Bentwing Bat	<i>Miniopterus schreibersii</i>	1	
Long-eared Bat species	<i>Nyctophilus sp.</i>	1	
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	1	
Chocolate Wattled Bat	<i>Chalinolobus morio</i>	1	
Large Forest Bat	<i>Vespadelus darlingtoni</i>	1	
Southern Forest Bat	<i>Vespadelus regulus</i>	1	
Little Forest Bat	<i>Vespadelus vulturinus</i>	1	
MURIDAE			
House Mouse*	<i>Mus musculus</i>		2
CANIDAE			
Fox*	<i>Vulpes vulpes</i>	1	2
LEPORIDAE			
Rabbit*	<i>Oryctolagus cuniculus</i>	1	2
Brown Hare*	<i>Lepus capensis</i>	1	2

CERVIDAE			
Sambar Deer*	<i>Cervus unicolor</i>	1	2
<hr/> BIRD SPECIES <hr/>			
PHASIANIDAE			
Stubble Quail	<i>Coturnix pectoralis</i>	1	
Brown Quail	<i>Coturnix ypsilophora</i>	1	
ANATIDAE			
Musk Duck	<i>Biziura lobata</i>	1	
Australian Wood Duck	<i>Chenonetta jubata</i>	1	2
Pacific Black Duck	<i>Anas superciliosa</i>	1	2
Grey Teal	<i>Anas gracilis</i>	1	2
Hardhead	<i>Aythya australis</i>	1	2
PODICIPEDIDAE			
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	1	2
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>	1	2
PHALACROCORACIDAE			
Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>	1	
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>		2
Great Cormorant	<i>Phalacrocorax carbo</i>	1	2
PELECANIDAE			
Australian Pelican	<i>Pelecanus conspicillatus</i>	1	
ARDEIDAE			
White-faced Heron	<i>Egretta novaehollandiae</i>	1	2
White-necked Heron	<i>Ardea pacifica</i>	1	2
Eastern Great Egret	<i>Ardea modesta</i>	1	
Cattle Egret	<i>Ardea ibis</i>	1	
Nankeen Night Heron	<i>Nycticorax caledonicus</i>	1	
THRESKIORNITHIDAE			
Australian White Ibis	<i>Threskiomis molucca</i>	1	2
Straw-necked Ibis	<i>Threskiomis spinicollis</i>	1	2
ACCIPITRIDAE			
Black Kite	<i>Milvus migrans</i>	1	
Black-shouldered Kite	<i>Elanus axillaris</i>	1	2
Whistling Kite	<i>Haliastur sphenurus</i>	1	
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	1	
Variable Goshawk	<i>Accipiter hiogaster</i>	1	
Grey Goshawk	<i>Accipiter novaehollandiae</i>	1	
Brown Goshawk	<i>Accipiter fasciatus</i>		2
Collared Sparrowhawk	<i>Accipiter cirrhocephalus</i>	1	
Wedge-tailed Eagle	<i>Aquila audax</i>	1	2
Little Eagle	<i>Hieraaetus morphnoides</i>	1	2
FALCONIDAE			
Brown Falcon	<i>Falco berigora</i>	1	2
Australian Hobby	<i>Falco longipennis</i>	1	
Peregrine Falcon	<i>Falco peregrinus</i>	1	

Nankeen Kestrel	<i>Falco cenchroides</i>	1	2
RALLIDAE			
Buff-banded Rail	<i>Gallirallus philippensis</i>		2
Australian Spotted Crake	<i>Porzana fluminea</i>		2
Purple Swamphen	<i>Porphyrio porphyrio</i>	1	
Dusky Moorhen	<i>Gallinula tenebrosa</i>	1	2
Eurasian Coot	<i>Fulica atra</i>	1	2
SCOLOPACIDAE			
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>	1	
CHARADRIIDAE			
Black-fronted Dotterel	<i>Elseymoris melanops</i>	1	2
Red-kneed Dotterel	<i>Erythronyctes albigularis</i>	1	
Banded Lapwing	<i>Vanellus tricolor</i>	1	
Masked Lapwing	<i>Vanellus miles</i>	1	2
COLUMBIDAE			
Rock Dove*	<i>Columba livia</i>	1	
Common Bronzewing	<i>Phaps chalcoptera</i>	1	
Crested Pigeon	<i>Ocyphaps lophotes</i>	1	2
Diamond Dove	<i>Geopelia cuneata</i>	1	
Peaceful Dove	<i>Geopelia striata</i>	1	
CACATUIDAE			
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>	1	
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	1	
Galah	<i>Eolophus roseicapillus</i>	1	2
Little Corella	<i>Cacatua sanguinea</i>	1	2
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	1	2
PSITTACIDAE			
Australian King-Parrot	<i>Alisterus scapularis</i>	1	
Superb Parrot	<i>Polytelis swainsonii</i>	1	2
Crimson Rosella	<i>Platycercus elegans</i>	1	2
Eastern Rosella	<i>Platycercus eximius</i>	1	2
Red-rumped Parrot	<i>Psephotus haematonotus</i>	1	2
CUCULIDAE			
Pallid Cuckoo	<i>Cacomantis pallidus</i>	1	2
Brush Cuckoo	<i>Cacomantis variolosus</i>	1	
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	1	
Horsfield's Bronze-Cuckoo	<i>Chalcites basalis</i>	1	
Shining Bronze-Cuckoo	<i>Chalcites lucidus</i>	1	
STRIGIDAE			
Southern Boobook	<i>Ninox novaeseelandiae</i>	1	
PODARGIDAE			
Tawny Frogmouth	<i>Podargus strigoides</i>	1	
APODIDAE			
White-throated Needletail	<i>Hirundapus caudacutus</i>	1	
Fork-tailed Swift	<i>Apus pacificus</i>	1	

HALCYONIDAE			
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	1	2
Sacred Kingfisher	<i>Todiramphus sanctus</i>	1	2
MEROPIDAE			
Rainbow Bee-eater	<i>Merops ornatus</i>	1	2
CORACIIDAE			
Dollarbird	<i>Eurystomus orientalis</i>	1	2
MENURIDAE			
Superb Lyrebird	<i>Menura novaehollandiae</i>	1	
CLIMACTERIDAE			
White-throated Treecreeper	<i>Cormobates leucophaea</i>	1	
Brown Treecreeper	<i>Climacteris picumnus</i>	1	
MALURIDAE			
Superb Fairy-wren	<i>Malurus cyaneus</i>	1	2
PARDALOTIDAE			
Spotted Pardalote	<i>Pardalotus punctatus</i>	1	
Striated Pardalote	<i>Pardalotus striatus</i>	1	2
White-browed Scrubwren	<i>Sericornis frontalis</i>	1	2
Speckled Warbler	<i>Chthonicola sagittata</i>	1	
Weebill	<i>Smicromis brevirostris</i>	1	
Western Gerygone	<i>Gerygone fusca</i>	1	
White-throated Gerygone	<i>Gerygone albugularis</i>	1	
Brown Thornbill	<i>Acanthiza pusilla</i>	1	2
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>	1	2
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	1	2
Yellow Thornbill	<i>Acanthiza nana</i>	1	
Striated Thornbill	<i>Acanthiza lineata</i>	1	
Southern Whiteface	<i>Aphelocephala leucopsis</i>	1	2
MELIPHAGIDAE			
Red Wattlebird	<i>Anthochaera carunculata</i>	1	2
Noisy Friarbird	<i>Ptilinopus corniculatus</i>	1	2
Noisy Miner	<i>Manorina melanocephala</i>	1	2
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	1	2
White-eared Honeyeater	<i>Lichenostomus leucotis</i>	1	
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	1	2
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>	1	
White-naped Honeyeater	<i>Melithreptus lunatus</i>	1	
Crescent Honeyeater	<i>Phylidonyris pyrrhoptera</i>	1	
New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>	1	
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	1	
White-fronted Chat	<i>Epthianura albifrons</i>	1	
PETROICIDAE			
Scarlet Robin	<i>Petroica boodang</i>	1	
Flame Robin	<i>Petroica phoenicea</i>	1	
CINCLOSOMATIDAE			
Eastern Whipbird	<i>Psophodes olivaceus</i>	1	