8 August 2019

Justin Micallef
Project Director
Oakstand
Level 10, 503–505 Kent Street
Sydney NSW 2000
M: 0409 459 035
E: justin@oakstand.com.au

Ecological Values and Constraints Assessment for Block 7, Section 4, Yarralumla, ACT

Capital Ecology project no. 2847

Dear Mr Micallef,

This letter provides an Ecological Values and Constraints Assessment (EVCA) for Block 7, Section 4, Yarralumla, ACT (the 'study area', refer Figure 1). The study area encompasses approximately 10.93 ha and is located on Banks Street, Yarralumla. It is understood that the study area is being investigated as a potential site for future development at the expiry of the land lease held by the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

This EVCA provides preliminary identification and assessment of the potential values of recognised biodiversity conservation significance occurring within the study area, specifically those currently listed pursuant to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or the ACT *Nature Conservation Act 2014* (NC Act).

This EVCA has been prepared based on:

- the results of database searches for the study area, including the EPBC Act Protected Matters Search Tool (PMST), ACTMAPi, and Canberra Nature Map;
- a review of relevant studies and other background information, including the surveys and sources referenced herein;
- a field survey on 28 February 2019, completed to record and assess the ecological values of the study area; and
- the knowledge of the authors regarding the biota of the locality, specifically the threatened ecological communities, flora, and fauna (and associated habitat) with the potential to occur in the lowland ecosystems of the ACT and region.

This EVCA is divided into the following sections.

1. Methods.
2. Results.
3. Assessment of Potential for Impacts.
4. Conclusion and Recommendations.

1. Methods

1.1 Database and Literature Review

To inform the surveys, Capital Ecology completed a desktop review, involving the following.

- A list of threatened species (flora and fauna), threatened populations and threatened ecological communities (TECs) listed pursuant to the EPBC Act with the potential to occur in the study area was obtained using the Department of the Environment and Energy's online EPBC Act Protected Matters Search Tool (PMST) on 25 February 2019.
- A review of the ACT Government ACTMAPi mapping tool and Canberra Nature Map to obtain the most current layers and point data for the significant ecological values of the locality. These values include species listed as threatened pursuant to the EPBC Act and/or the NC Act, together with flora species considered 'rare or uncommon in the ACT' and fauna species which are otherwise of a conservation focus.
- A review of previous and current studies undertaken by Capital Ecology and others in the locality.

1.2 Remnant Tree Survey

A survey was completed across the study area to identify and record any remnant trees present (i.e. naturally occurring trees which would have been present pre-development).

1.3 Vegetation Survey and Mapping

The vegetation across the entire study area was surveyed and mapped in accordance with the detailed methodology provided in Chapter 3 of the ACT *Environmental Offsets Calculator Assessment Methodology* (ACT Government 2015[1]) (the 'Survey Methodology'). The vegetation survey and mapping involved the two-staged process outlined in the sections below.

The results of the vegetation survey were accurately mapped using GIS allowing the total area of each vegetation zone to be calculated.

1.3.1 Plant Community Type (PCT) mapping

The on-ground boundaries of each of the Plant Community Types (PCTs) (as provided in the Survey Methodology and the ACT Vegetation Types Database) present in the study area were accurately mapped. Mapping of the PCTs (i.e. the climax communities) was undertaken by walking the boundaries

[1] ACT Government (2015a). *ACT Environmental Offsets Calculator Assessment Methodology*.

and marking them using a combination of hand-held GPS and marking directly on to high resolution orthorectified aerial photograph field maps.

Given that ecotones are usually gradual transitions between vegetation communities (i.e. often in excess of 50 m in width) and that the vegetation across much of the study area has been subject to intensive modification over an extended period, it is difficult to now define the precise pre-1750 boundaries of the PCTs. Notwithstanding this, the PCT boundaries were defined based on:

- the presence, species, growth form and density of remnant canopy trees and/or stags or stumps;
- the presence and species of midstorey shrubs and trees;
- the floristic composition of the groundstorey; and
- the landscape position and other geographical features (elevation, aspect, soils, apparent hydrology etc.).

The above was informed by the both the current vegetation (2018 aerial image and site surveys) and that shown in the 1955 aerial image provided on ACTMAPi.

1.3.2 Vegetation Zone definition and mapping

Each of the mapped PCTs was divided into Vegetation Zones based on the structure, floristic composition and overall condition ('intactness') of the vegetation. Mapping of the Vegetation Zones was undertaken by walking the boundaries and marking them using a combination of hand-held GPS and marking directly on to high resolution orthorectified aerial photograph field maps.

1.4 Likelihood of Occurrence Assessment

The Likelihood of Occurrence Assessment for threatened flora and fauna species is a categorisation used to determine the likelihood that the subject species occurs within a study area. The results are based on the findings of completed desktop studies and field surveys, expert opinion, and consideration of the species' currently recognised distribution and preferred habitat.

Threatened species and populations identified in the Likelihood of Occurrence Assessment include all of those identified during the database and literature review as potentially occurring within five kilometres of the study area. Included are threatened species listed pursuant to the EPBC Act and/or the NC Act and considered by Capital Ecology to have some potential to occur within the study area.

The likelihood of a species occurring within the study area is categorised as either negligible, low, moderate, or high. A species that has been identified within the study area during the surveys for this EVCA or by other confirmed records is expressed as confirmed.

The completed Likelihood of Occurrence Assessment is provided as Appendix C. Species assigned a moderate or higher likelihood of occurrence within the study area, other than if this is limited to transient visitation, are considered in more detail in Section 2.5 (threatened flora) and Section 2.6 (threatened fauna) of this EVCA.

2. Results

2.1 Study Area Description

The study area comprises 10.93 ha of land zoned 'Designated – DES, Suburban Zone – RZ1' under the Territory Plan (ACTMAPi 2019) and bordered by:

- Royal Canberra Golf Club to the northwest;
- Banks Street and the Forestry Oval to the east; and
- Bentham Street to the south.

The study area contains numerous buildings associated with the CSIRO facility, together with a wide variety of planted native and exotic trees. The planted trees appear to have been planted for research purposes, given the arboretum-style grouping and labelling of trees of similar species. No remnant trees are present in the study area, as none of the eucalypts are either locally indigenous species or of sufficient age to be identified as remnant. The midstorey and shrubstorey are comprised of exotic species and non-local native cultivars.

The groundstorey across the study area is predominantly exotic, the dominant species being Chilean Needle Grass *Nassella neesiana*, African Love Grass *Eragrostis curvula*, and Couch Grass *Cynodon dactylon*. Several small patches of the study area are characterised by a mixture these exotic grasses with local native grasses such as Red-leg Grass *Bothriochloa macra*, Tall Speargrass *Austrostipa bigeniculata*, and several Wallaby Grasses *Rytidosperma* spp.

Aerial photography from 1955 shows the current CSIRO facility already present in the study area. To the west of the study area is a newly developed golf course, and agricultural land to the south. ACTMAPi identifies patches of Yellow Box – Blakely's Red Gum grassy woodland (classified as Plant Community Type ACT16, commonly known as Box-Gum Woodland) to the east and south east of the study area. ACTMAPi also identifies Natural Temperate Grassland to the east of the study area.

2.2 Vegetation

2.2.1 Climax vegetation communities (PCTs)

Given the geographical/geophysical characteristics (i.e. landscape position, elevation, soil type, hydrology, etc.) the study area is estimated to occur on the historical ecotone between Natural Temperate Grassland and Box-Gum Woodland.

Due to the heavily modified nature of the study area (and lack of remnant vegetation) it is difficult to accurately determine the climax vegetation community. Historically, natural grasslands were chosen first to develop for both agricultural and urban use (due to the preferential landscape position, relatively fertile soils, and lack of required tree clearance). However, the woodland to the east suggests that at least part of the study area may have required clearance of woodland vegetation for the current development. Based on these factors it is reasonable to suggest that the ecotone between Natural Temperate Grassland and Box-Gum Woodland may occur within or nearby the study area.

2.2.2 Current vegetation communities

Capital Ecology assessed and mapped the vegetation within the study area categorising it according to its potential climax communities and current condition. Appendix A and Appendix B provide the lists of flora and fauna species recorded within study area during the field survey.

Illustrated in Figure 2, the study area has been divided into two vegetation zones, 'Planted Overstorey Vegetation with Exotic Groundstorey', and 'Planted Overstorey Vegetation with a Mixed Native and Exotic Groundstorey'. As none of the study area contains remnant trees, the canopy cover was not used to classify vegetation zones during mapping.

- Planted Overstorey Vegetation with Exotic Groundstorey – This vegetation zone consists of 10.38 ha of planted overstorey vegetation, consisting of a variety of experimentally planted Pines *Pinus* spp., eucalypts, and other species. The groundstorey is dominated by exotic species such as Chilean Needle Grass *Nassella neesiana*, African Love Grass *Eragrostis curvula*, and Couch Grass *Cynodon dactylon*.
- Planted Overstorey Vegetation with a Mixed Native and Exotic Groundstorey – This vegetation zone consists of 0.55 ha of land with or without planted overstorey vegetation. The groundstorey is comprises a mix of native and exotic grasses and forbs, the native proportion being over 50% in some areas.

2.3 Threatened Ecological Communities

2.3.1 *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)

Two EPBC Act listed threatened ecological communities (TECs) have the potential to occur in the area, both listed as critically endangered under the EPBC Act: 'Natural Temperate Grassland of the South Eastern Highlands' (NTG-SEH), and 'White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland' (Box-Gum Woodland).

Natural Temperate Grassland of the South Eastern Highlands – listed as critically endangered pursuant to the EPBC Act

Description – As detailed in Commonwealth of Australia (2016[2]), the NTG-SEH TEC is characterised by grassy vegetation dominated by moderately tall (25–50cm) to tall (50–100cm), dense to open tussock grasses in the genera *Rytidosperma*, *Austrostipa*, *Bothriochloa*, *Poa* and *Themeda*. Up to 70% of all plant species may be forbs. The community may be treeless or contain up to 10% cover of trees, shrubs or sedges. Natural Temperate Grassland occurs within the biogeographical region of the South Eastern Highlands in valleys influenced by cold air drainage and in broad plains.

Presence in the study area – Absent – As discussed above, the study area would likely have supported areas of NTG-SEH TEC (Natural Temperate Grassland) pre-1750, however no remnants remain in the study area in a condition that meets the listing criteria.

White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland – listed as critically endangered pursuant to the EPBC Act

Description – The White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC (PCT-ACT16) is characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs (where shrub cover comprises less than 30% cover), and a dominance or prior dominance of White Box and/or Yellow Box and/or Blakely's Red Gum trees. This TEC occurs along the western slopes and tablelands of the Great Dividing Range from southern Queensland through New South Wales and the Australian Capital Territory to Victoria.

[2] Commonwealth of Australia (2016). *Approved conservation advice for the Natural Temperate Grassland of the South Eastern Highlands (NTG–SEH) ecological community*.

Presence in the study area – Absent – As discussed above, the study area is likely have supported areas of Box-Gum Woodland pre-1750, however no traces of remnant woodland or moderately intact derived grassland remain. As a result, the study area does not meet the listing criteria for Box-Gum Woodland as outlined in Commonwealth of Australia (2006[3]).

2.3.2 *Nature Conservation Act 2014* (ACT)

The following two ecological communities are listed as endangered pursuant to the ACT NC Act.

Natural Temperate Grassland

The definition of the NC Act listed TEC is generally consistent with the EPBC Act definition. Importantly, a patch must be predominantly native with at least moderate forb diversity to be considered the TEC under the NC Act.

Presence in the study area – Absent – As discussed above, the study area would likely have supported areas of NTG-SEH TEC (Natural Temperate Grassland) pre-1750, however its current condition the study area does not meet the listing criteria.

Yellow Box – Blakely's Red Gum Grassy Woodland

Woodland meeting the NC Act listed community was defined in Action Plan 10 (ACT Government 1999[4]) and Action Plan 27 (ACT Government 2004[5]) as any polygon in which:

- *the proportion of crown cover contributed by either E. melliodora or E. blakelyi or both jointly is ≥ 40%; and*
- *understorey is not exotic pasture; and*
- *remnants are not isolated trees or clumps.*

Presence in the study area – Absent – As discussed above, the study area would have likely supported the Yellow Box – Blakely's Red Gum Grassy Woodland pre-1750, however the study area does not support any vegetation which meets the criteria for NC Act listed Box-Gum Woodland.

2.4 Native Vegetation

Pursuant to the NC Act, 'native vegetation' is defined as present if:

- *trees or shrubs indigenous to the area have a canopy cover of 10% or greater in any stratum; or*
- *native plants indigenous to the area comprise 50% or more of the cover of the groundstorey (grasses, small shrubs, forbs, sedges etc.).*

According to this definition, the area designated 'Planted Overstorey Vegetation with a Mixed Native and Exotic Groundstorey' may have enough native grass and forb cover to constitute native vegetation

[3] Commonwealth of Australia (2006). *Policy Statement 3.5: White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands. Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth Department of Environment and Heritage.
[4] ACT Government (1999). *Yellow Box – Red Gum Grassy Woodland: An endangered ecological community. Action Plan No. 10.* Environment ACT, Canberra.
[5] ACT Government (2004). *Woodlands for Wildlife: ACT Lowland Woodland Conservation Strategy. Action Plan No. 27*. Environment ACT, Canberra.

(i.e. >50% cover), however a detailed spring vegetation composition survey would be required to accurately determine this.

2.5 Threatened Flora Occurrence

No EPBC Act and/or NC Act listed threatened flora species were recorded in the study area during the survey, nor are any identified as occurring in the study area on ACTMAPi or Canberra Nature Map. As detailed in the Likelihood of Occurrence Assessment (refer Appendix C), the land use history and associated disturbance of the study area is likely to preclude the persistence of threatened or rare species.

2.6 Fauna Habitat and Threatened Fauna Occurrence

2.6.1 Native fauna recorded

As detailed in Appendix B, one native mammal (Eastern Grey Kangaroo *Macropus giganteus*), one native reptile (Delicate Skink *Lampropholis delicata*), and 14 native bird species were recorded during the field surveys. All of these are common urban-adapted species in the ACT and region. Note that no targeted surveys were completed, these species were recorded incidentally.

2.6.2 Threatened fauna habitat

As recorded during the survey, the study area supports the following fauna habitat features.

- Potential Golden Sun Moth Habitat – As shown in Figure 3, the study area contains several patches of vegetation which are potential habitat for the Golden Sun Moth *Synemon plana*, a species listed as critically endangered under the EPBC Act. These patches are characterised by an open grassy groundstorey with low or no canopy cover. The groundstorey cover comprises Wallaby Grasses *Rytidosperma* spp., and/or the exotic pest species Chilean Needle Grass *Nassella neesiana*, both known food species for the Golden Sun Moth.

- In addition to many common native birds, several EPBC Act and/or NC Act listed birds, and numerous other species considered conservation dependant in the region, may forage in the study area, including Dusky Woodswallow *Artamus cyanopterus cyanopterus*, Speckled Warbler *Chthonicola sagittata*, Spotted Harrier *Circus assimilis*, Brown Treecreeper *Climacteris picumnus victoriae*, White-fronted Chat *Epthianura albifrons*, Hooded Robin *Melanodryas cucullate cucullate,* Scarlet Robin *Petroica boodang*, Flame Robin *Petroica phoenica* and Diamond Firetail *Stagonopleura guttata*. However, given the urban location and that the overstorey consists primarily of exotic tree species, the study area is unlikely to be of significance to these species.

2.7 Pest Plants

Thirty-three (33) exotic plant species were recorded in the study area. Whilst the majority of these are common weeds across urban land throughout the region, the species in Table 1 are listed as Weeds of National Significance (Commonwealth) and/or are listed as declared pest plant species in the ACT.

Table 1. Noxious weed occurrence

Key for below table

- WoNS - (Commonwealth) Weed of National Significance
- Declared pest plant species in the ACT listed under the *Pest Plants and Animals (Pest Plants) Declaration 2015*
  - Must be supressed
  - Must be contained
  - Prohibited
  - Notifiable

Name	Growth Form	Status	Description of Occurrence	Threat Level
Cotoneaster franchetii Grey Cotoneaster	Shrub <5 m	Prohibited	Scattered plants throughout study area.	Low
Echium plantagineum Paterson's Curse	Forb <1.2 m	Must be contained	Scattered plants across the study area.	Low
Eragrostis curvula African Love Grass	Tussock <1.2 m	Must be contained	Scattered plants across the study area.	High – In the absence of concerted control the infestation will continue to spread throughout the study area.
Hedera helix English Ivy	Vine	Prohibited	Scattered plants throughout study area.	Moderate – Control of this species is recommended to prevent its proliferation in the study area.
Hypericum perforatum St John's Wort	Forb <1 m	Must be contained	Scattered plants across the study area.	High
Nassella neesiana Chilean Needle Grass	Tussock <1 m	Must be contained/ Prohibited	Moderate density throughout study area.	High – control measures are required to prevent the infestation from proliferating in the study area.
Nassella trichotoma Serrated Tussock	Tussock <0.6 m	WoNS, Must be contained / prohibited	Scattered plants throughout study area.	High – control measures are required to prevent the infestation from proliferating in the study area.
Pinus radiata Radiata Pine	Large tree	Must be contained	Planted trees in patches around the periphery of the study area. No evidence of self-seeding was observed in the study area.	Low
Pyracantha angustifolia Orange Firethorn	Shrub <4 m	Prohibited	Scattered plants throughout study area.	Moderate – Control of this species is recommended to prevent its proliferation in the study area.
Rosa rubiginosa Briar Rose	Shrub <3 m	Must be suppressed / Prohibited	Scattered plants throughout study area.	Moderate – Control of this species is recommended to prevent its proliferation in the study area.

Name	Growth Form	Status	Description of Occurrence	Threat Level
Rubus fruticosis Blackberry	Shrub/Bramble	Must be contained/ Prohibited	Scattered plants throughout study area.	Moderate – Control of this species is recommended to prevent its proliferation in the study area.

2.8 Pest Animals

The exotic pest species Indian Myna *Acridotheres tristis* was recorded in the study area during the field survey. Additionally, it can be assumed that the exotic pest species European Rabbit *Oryctolagus cuniculus*, European Brown Hare *Lepus europaeus*, House Sparrow *Passer domesticus*, and Common Starling *Sturnus vulgaris* will be present or visit the area to forage. Each of these species is commonly encountered on such peri-urban sites.

2.9 Summary of Ecological Values and Potential Constraints

This assessment has identified a single significant ecological value, the Golden Sun Moth, as potentially occurring in the study area.

Figure 3 shows the areas of identified potential habitat for the Golden Sun Moth, characterised by open grassy areas devoid of tree cover. The native Wallaby Grasses and/or exotic Chilean Needle Grass in these locations are potential food resources for Golden Sun Moth. Given the known presence of the Golden Sun Moth nearby (i.e. Canberra Brickworks site, grasslands off Dudley Street, etc.), patches supporting potential food resources must be considered potential habitat for the species.

3. Assessment of Potential for Impacts

3.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The EPBC Act is the key Commonwealth Government legislation for the protection and conservation of Australia's environment and biodiversity. The EPBC Act provides the legislative framework for the assessment and approval mechanism requiring that proposed 'actions' to be assessed in terms of their potential to impact upon 'Matters of National Environmental Significance' (MNES). MNES currently listed under the EPBC Act of relevance to the study area are:

- threatened species and ecological communities; and
- migratory species (protected under international agreements).

Where a potential impact on a MNES may occur as a result of a proposed action, the significance of that impact must be assessed. Should it be determined that a proposed action may have a significant impact on one or more listed matters, referral of the action to the Commonwealth Minister for Environment and Energy is required for consideration, and potentially assessment, under the EPBC Act. If impacts to MNES cannot be avoided or substantially minimised/mitigated, the Minister is likely to declare the action a 'controlled action'. In such a case a formal offset would likely be required to offset the residual significant impact/s, the specifics of which would be determined in accordance with the EPBC Act Environmental Offsets Policy (Commonwealth of Australia 2012[6]).

[6] Commonwealth of Australia (2012). *EPBC Act Environmental Offsets Policy.* Australian Government Department of Sustainability, Environment, Water, Population and Communities.

Matters of National Environmental Significance

As detailed in the EPBC Act Significant Impact Guidelines (Commonwealth of Australia 2013[7]), whilst there are several criteria against which to assess the likelihood that a proposed action will significantly impact an EPBC Act listed ecological threatened species or community, it is important to note that the first states that –

> *"An action will require approval if the action has, will have, or is likely to have a significant impact on a species listed in any of the following categories:*
>
> - *extinct in the wild*
> - *critically endangered*
> - *endangered, or*
> - *vulnerable."*

With regard to the above, an action/development which would clear areas of potential Golden Sun Moth habitat (Figure 3) would require targeted surveys in the appropriate season (generally November-December) to determine presence/absence of the species. If the Golden Sun Moth is present, any clearance of habitat would require referral under the EPBC Act.

With regard to other MNES, the study area does not support either of the TECs with the potential to occur, nor does the study area support habitat of potential significance to any EPBC Act listed threatened flora species or threatened or migratory fauna species. Accordingly, development within the study area would not impact any other MNES.

Whole of Environment

For any proposed action that will be carried out by a Commonwealth entity and/or that will occur on Commonwealth/National land, the significance of the proposed action on the 'whole of environment' must be assessed in addition to MNES. Guidelines for determining whether an impact is significant are provided by the Department of the Environment (Commonwealth of Australia 2013[8]) and are outlined below. If it is determined that a proposed action will, or is likely to, have a significant impact on the 'whole of environment', the action must be referred to the Commonwealth Minister for the Environment and Energy. The Department of the Environment and Energy will then consider the referred action and the Minister (or his/her Delegate) will make a determination regarding whether the action requires approval under the EPBC Act and associated conditions and controls.

In deciding whether or not a proposed action is likely to have a significant impact on the 'whole of environment', the following must be considered.

- The environmental context.

  The study area is a historically disturbed site which currently houses a CSIRO research facility. There is evidence of experimental tree planting for scientific uses and other associated urban

[7] Commonwealth of Australia (2013). *Matters of National Environmental Significance - Significant Impact Guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth Department of the Environment.

[8] Commonwealth of Australia (2013). *Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies - Significant Impact Guidelines 1.2. Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth Department of the Environment

infrastructure. As a result, the majority of the study area has been intensively landscaped and regularly mown over a long period of time. This has heavily modified the groundlayer and midstorey and encouraged the proliferation of exotic species.

The study area is adjacent to a golf course, urban development, and public use ovals. Given the historic disturbance to the study area and surrounds, it is unlikely that it constitutes a significant component of a wildlife movement corridor or is otherwise important for fauna habitat connectivity. This is evident as the study area is not identified as a 'Local Link' or as possessing 'Regional Linkage Value' on ACTMAPi. However, it is noted that the EPBC critically endangered species Golden Sun Moth *Synemon plana* occurs nearby. Additionally, the TEC's Natural Temperate Grassland and Box-Gum Woodland both have recorded patches in the nearby locality.

- The potential impacts likely to be generated by the action, including indirect consequences of the action.

  Outside of the identified potential Golden Sun Moth habitat, any proposed development is unlikely to have a significant impact either directly or indirectly on any significant biodiversity values. The presence of Golden Sun Moth could be confirmed through targeted surveys. If this species is recorded, EPBC Act referral will be necessary should the proponent wish to impact any habitat present.

- Whether mitigation measures will avoid or reduce these impacts.

  The heavily modified condition of the study area means that it is unlikely that any significant ecological values would be impacted by development. As mentioned above, if the Golden Sun Moth is present in identified potential habitat areas, mitigation measures such as avoidance of the habitat areas would reduce the impacts of any proposed development.

With respect to the above, the proposed development is unlikely to significantly impact on the 'whole of environment'. As such, EPBC Act referral is unwarranted and is not recommended for any proposed development, on the proviso that Golden Sun Moth is not present in the study area.

If Golden Sun Moth is present in the study area, an EPBC Act referral would be required should impacts to habitat be proposed.

3.2 ACT Nature Conservation Act 2014

The entire study area is a 'Designated Area' under the National Capital Plan (NCP). The provisions of the ACT *Nature Conservation Act 2014* do not apply for development on Designated Areas. Notwithstanding this, there is minimal area in the study area that has the potential to constitute native vegetation and the study area is unlikely to be of value to any NC Act listed flora or fauna species.

3.3 ACT Planning and Development Act 2007

The entire study area is a 'Designated Area' under the NCP. The provisions of the ACT *Planning and Development Act 2007* do not apply for development on Designated Areas.

3.4 ACT Tree Protection Act 2005 requirements

The entire study area is a 'Designated Area' under the NCP). The provisions of the ACT *Tree Protection Act 2005* do not apply to Designated Areas.

3.5 ACT Pest Plants and Animals Act 2005

The entire study area is a 'Designated Area' under the NCP. The provisions of the ACT *Pest Plants and Animals Act 2005* do not apply to Designated Areas.

Notwithstanding the above, we note that 11 species listed on the *ACT Pest Plants and Animals (Pest Plants) Declaration 2015 (no 1)* under the ACT *Pest Plants and Animals Act 2005* were recorded in the study area (refer Section 2.7, Appendix A). Serrated Tussock and Chilean Needle Grass, both Weeds of National Significance (WoNS) are present in the study area. Additionally, seven species which must be contained (African Love Grass, Blackberry, Radiata Pine, St John's Wort, Orange Firethorn and Serrated Tussock), one species that must be suppressed (Briar Rose), and three species that are prohibited (Grey Cotoneaster, English Ivy, and Orange Firethorn).

4. Conclusions and Recommendations

The following are the key conclusions or our assessment.

1. The study area's climax vegetation communities have been highly degraded by the land use history and urban development in the Yarralumla area. The study area now contains primarily planted exotic vegetation. None of the vegetation in the study area meets the listing criteria for a TEC under the EPBC Act or NC Act. As displayed in Figure 2, 0.55 ha of the study may have enough native groundcover to be classified as 'native vegetation' under the NC Act, however the land is zoned as Designated Land (DES) (i.e. Commonwealth land). As such, the NC Act does not apply to the study area, and the land is assessed under the EPBC under a whole of environment context (as discussed above).

2. The study area contains 1.16 ha of open grassy areas that support the appropriate food species to constitute potential Golden Sun Moth habitat. This species is listed as Critically Endangered under the EPBC Act. If Golden Sun Moth presence is confirmed in these areas, any development that would impact the habitat would need to be referred under the provisions of the EPBC Act.

Considering the above, we recommend the following actions before planning any development within the study area:

1. Conduct targeted surveys for the Golden Sun Moth in the areas identified in Figure 3, noting that the surveys must occur during the appropriate season (generally November-December). If the species' presence is confirmed, any proposed development which would impact the habitat would require referral under the provisions of the EPBC Act. If the species is not recorded in these areas, the identified potential constraint would no longer apply.

Overall, with consideration of the study area's land use history and current ecological values, it is our view that the redevelopment of the study area is a reasonable proposition. Provided that the above recommendations are appropriately incorporated, development within the study area is unlikely to impact upon any significant ecological value.

We trust that this EVCA provides the information and advice required. If, however, you should have any questions relating to this report, please do not hesitate to contact us.

Yours sincerely,

Robert Speirs

Director / Principal Ecologist

Alan Vincent

Graduate Ecologist

Attachments:

Figure 1. Locality Plan

Figure 2. Vegetation Mapping

Figure 3. Potential Threatened Species Habitat

Appendix A. Flora Species Recorded

Appendix B. Fauna Species Recorded

Appendix C. Likelihood of Occurrence Assessment

References

ACT Government (1999). *Yellow Box – Red Gum Grassy Woodland: An endangered ecological community. Action Plan No. 10.* Environment ACT, Canberra.

ACT Government (2004). *Woodlands for Wildlife: ACT Lowland Woodland Conservation Strategy.* Action Plan 27. Environment ACT, Canberra.

ACT Government (2012). *Survey guidelines for determining lowland vegetation classification and condition in the ACT*, Conservation, Planning and Research, ACT Government.

ACT Government (2015a). *ACT Environmental Offsets Calculator Assessment Methodology*.

Commonwealth of Australia (2006). *Policy Statement 3.5: White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands*. Environment Protection and Biodiversity Conservation Act 1999. Australian Government Department of Environment and Heritage.

Commonwealth of Australia (2012). *EPBC Act Environmental Offsets Policy.* Australian Government Department of Sustainability, Environment, Water, Population and Communities.

Commonwealth of Australia (2013). *Matters of National Environmental Significance - Significant Impact Guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth Department of the Environment.

Commonwealth of Australia (2016). *Approved conservation advice for the Natural Temperate Grassland of the South Eastern Highlands (NTG–SEH) ecological community*. Commonwealth Department of the Environment.

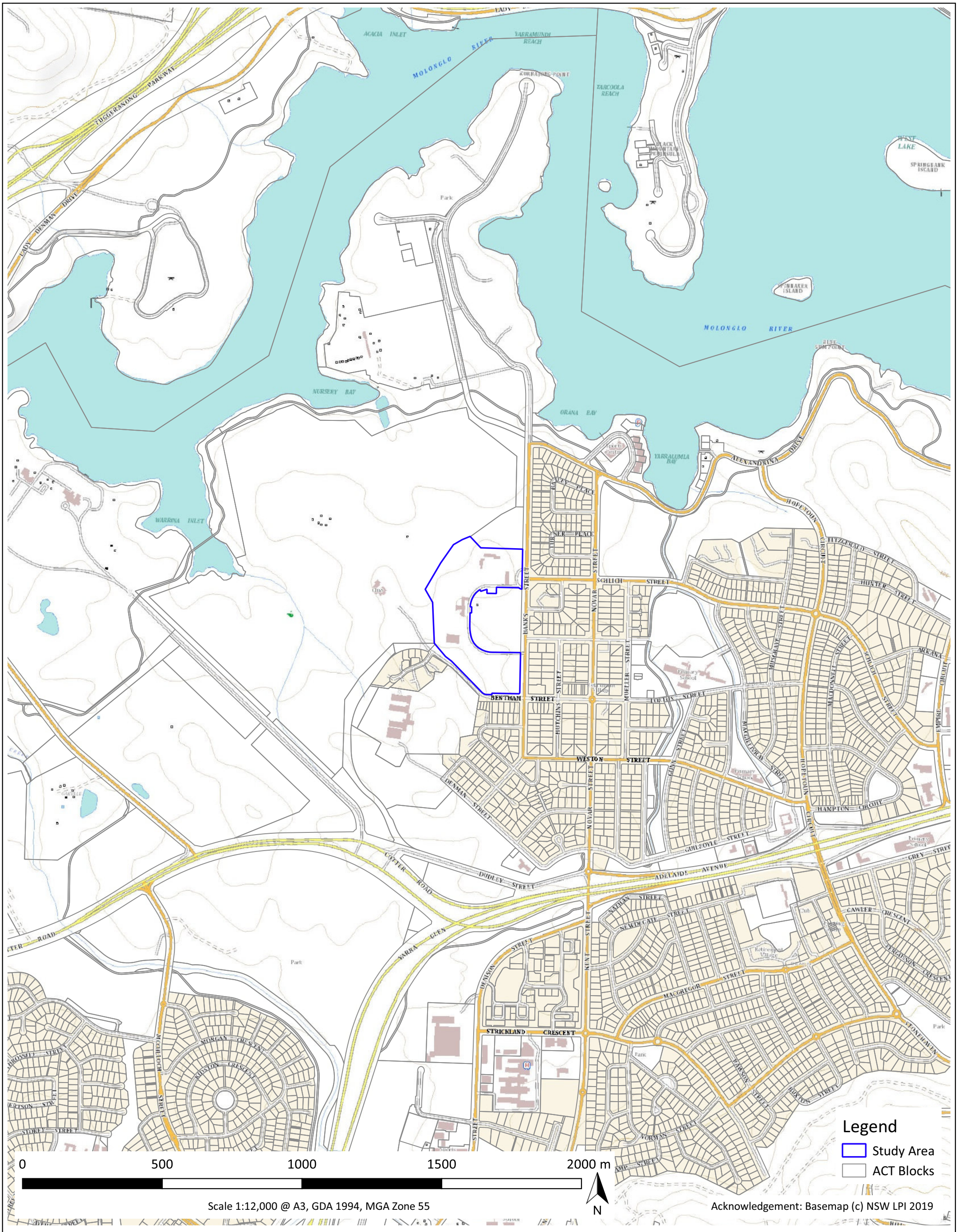

Figure 1. Locality Plan

Capital Ecology Project No: 2847
Drawn by: A. Vincent
Date: 14 March 2019

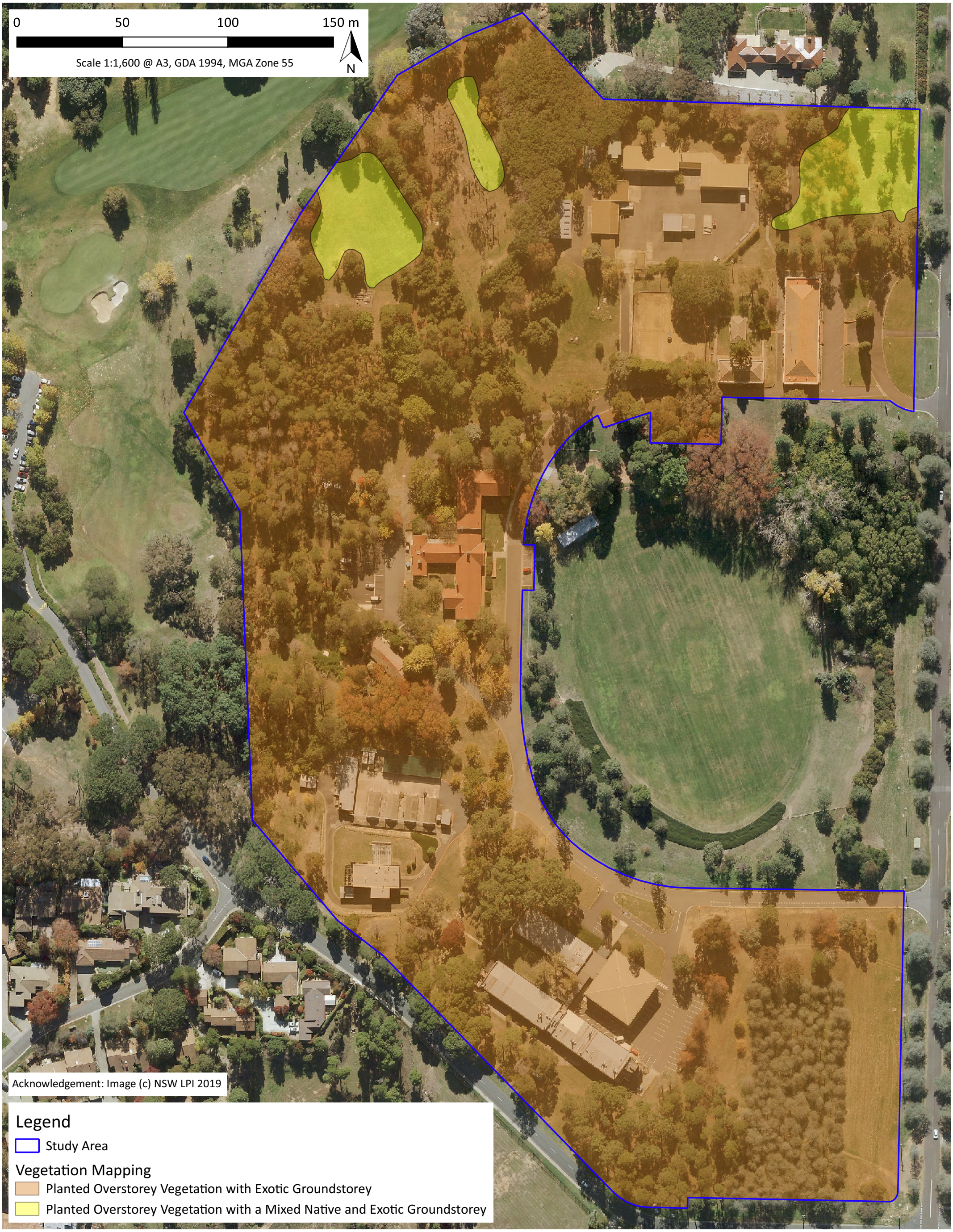

Figure 2. Vegetation Mapping

Capital Ecology Project No: 2847
Drawn by: A. Vincent
Date: 14 March 2019

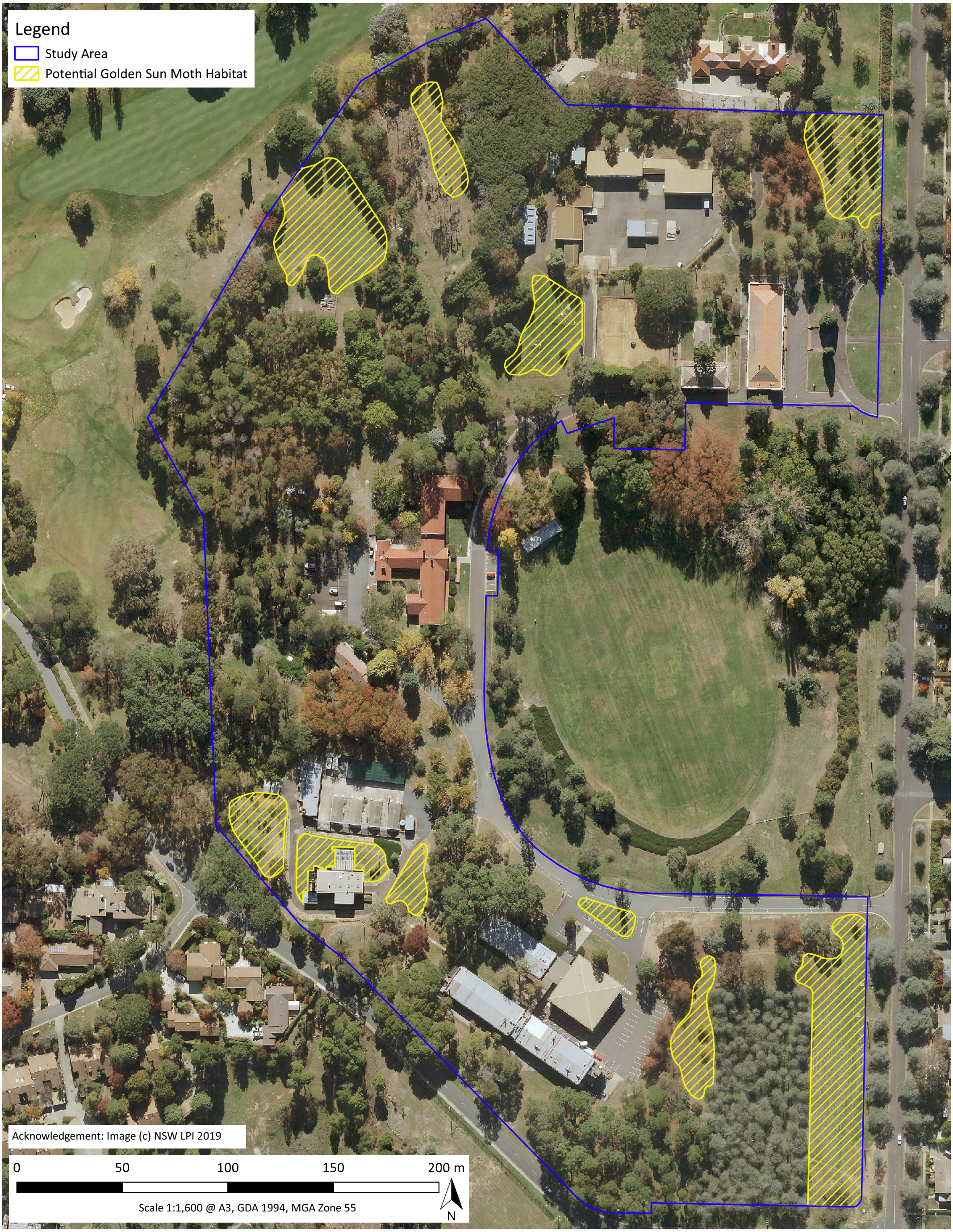

Figure 3. Potential Threatened Species Habitat

Capital Ecology Project No: 2847
Drawn by: A. Vincent
Date: 14 March 2019

Appendix A. Flora Species Recorded

Common name	Scientific name	NC Act status
Exotic		
Wild Oat	*Avena* sp.	-
Spear Thistle	*Cirsium vulgare*	-
Grey Cotoneaster	*Cotoneaster franchetii*	-
Couch grass	*Cynodon dactylon*	-
Cock's Foot	*Dactylis glomerata*	-
Paterson's Curse	*Echium plantagineum*	-
Panic Veldgrass	*Ehrharta erecta*	-
Goose Grass	*Eleusine tristachya*	-
African Lovegrass	*Eragrostis curvula*	-
English Ivy	*Hedera helix*	-
St John's Wort	*Hypericum perforatum*	-
Flatweed	*Hypochaeris radicata*	-
Prickly Lettuce	*Lactuca serriola*	-
Broad-leaf Privet	*Ligustrum lucidum*	-
Red-flowered Mallow	*Modiola caroliniana*	-
Chilean Needle Grass	*Nassella neesiana*	-
Serrated Tussock	*Nassella trichotoma*	-
Common Prickly Pear	*Opuntia stricta*	-
Shamrock	*Oxalis articulata*	-
Brazilian Whitlow	*Paronychia brasiliana*	-
Paspalum Grass	*Paspalum dilatatum*	-
Radiata Pine	*Pinus radiata*	-
Pine	*Pinus* sp.	-
Plantain / Lamb's Tongue	*Plantago lanceolata*	-
White Poplar	*Populus alba*	-
Plum	*Prunus* sp.	-
Orange Firethorn	*Pyracantha angustifolia*	-
Holly Oak	*Quercus ilex*	-
English Oak	*Quercus robur*	-
Briar Rose	*Rosa rubiginosa*	-
Blackberry	*Rubus fruticosus*	-
Wild Sage	*Salvia verbenaca*	-
Clover	*Trifolium sp.*	-
Elm	*Ulmus* sp.	-
Native		
Cootamundra Wattle	*Acacia bailyana*	Protected
Black Wattle	*Acacia mearnsii*	Protected
River She-oak	*Allocasuarina cunninghamiana*	Protected

Common name	Scientific name	NC Act status
Tall Speargrass	*Austrostipa bigeniculata*	Protected
Red-leg Grass	*Bothriochloa macra*	Protected
Kurrajong	*Brachychiton populneus*	Protected
Native Blackthorn	*Bursaria lasiophylla*	Protected
Wild Rosemary	*Cassinia quinquefaria*	Protected
Rock Fern	*Cheilanthes sieberi*	Protected
Common Everlasting	*Chrysocephalum apiculatum*	Protected
Australian Bindweed	*Convolvulus erubescens*	Protected
Slender Tick-trefoil	*Desmodium varians*	Protected
Flax Lily	*Dianella sp.*	Protected
Climbing Saltbush	*Einadia nutans*	Protected
White Box	*Eucalyptus albens*	Protected
Blakely's Red Gum	*Eucalyptus blakelyi*	Protected
Spotted Gum	*Eucalyptus maculata*	Protected
Red Box	*Eucalyptus polyanthemos*	Protected
Mugga Ironbark	*Eucalyptus sideroxylon*	Protected
Ribbon Gum	*Eucalyptus viminalis*	Protected
Native Sarsaparilla	*Hardenbergia violacea*	Protected
Hairy Panic	*Panicum effusum*	Protected
Black Pine	*Pinus nigra*	Protected
Snowgrass	*Poa sieberiana*	Protected
Swamp Dock	*Rumex brownii*	Protected
Wallaby Grass	*Rytidosperma sp.*	Protected
Cotton Fireweed	*Senecio quadridentatus*	Protected
Kangaroo Grass	*Themeda triandra*	Protected
Narrow-leaved New Holland Daisy	*Vittadinia muelleri*	Protected
Native Bluebell	*Wahlenbergia communis*	Protected

Appendix B. Fauna Species Recorded

Class	Common name	Scientific name	NC Act status
Aves	Indian Myna	*Acridotheres tristis*	-
Aves	Australian King-Parrot	*Alisterus scapularis*	Protected
Aves	Sulphur-crested Cockatoo	*Cacatua galerita*	Protected
Aves	Little Corella	*Cacatua sanguinea*	Protected
Aves	Gang-gang Cockatoo	*Callocephalon fimbriatum*	Protected
Aves	Galah	*Eolophus roseicapilla*	Protected
Aves	Magpie-lark	*Grallina cyanoleuca*	Protected
Aves	Australian Magpie	*Gymnorhina tibicen*	Protected
Aves	Noisy Miner	*Manorina melanocephala*	Protected
Aves	Crested Pigeon	*Ocyphaps lophotes*	Protected
Aves	Great Cormorant	*Phalacrocorax carbo*	Protected
Aves	Crimson Rosella	*Platycercus elegans*	Protected
Aves	Eastern Rosella	*Platycercus eximius*	Protected
Aves	Satin Bowerbird	*Ptilonorhynchus violaceus*	Protected
Aves	Pied Currawong	*Strepera graculina*	Protected
Mammalia	Eastern Grey Kangaroo	*Macropus giganteus*	Protected
Reptilia	Delicate Skink	*Lampropholis delicata*	Protected

Appendix C. Likelihood of Occurrence Assessment

Key for the below table:

1) Listed pursuant to the EPBC Act as Critically Endangered (CE), Endangered (E), or Vulnerable (V)

2) Listed pursuant to the NC Act as Critically Endangered (CE), Endangered (E) or Vulnerable (V)

Note: The brief descriptions of species distribution and habitat are paraphrased from or based on information sourced from the threatened species profiles, recovery plans and listing determinations prepared for each species by the Commonwealth and ACT governments. These resources and their references can be found on the relevant government websites.

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence
Plants				
Ammobium craspedioides Yass Daisy	V	-	The Yass Daisy is a perennial herb that bears large yellow flowerheads, with each flowerhead supported by a 30-60 cm stem. It is found from Crookwell (north of Goulburn) to near Wagga Wagga, with most populations occurring in the Yass District. The Yass Daisy occurs in dry forest, Box-Gum Woodland and secondary derived grassland of these communities. It tolerates light grazing and areas that are irregularly mown or slashed. Flowering occurs from October to November.	Negligible The species is not known to occur in the locality and was not recorded during field surveys.
Amphibromus fluitans River Swamp Wallaby-grass	V	-	River Swamp Wallaby-grass has been recorded along the Lachlan River at sites at Laggan near Crookwell and the headwaters of the Wollondilly River. The species grows mostly in permanent swamps, as well as lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground, such conditions being caused by seasonally-fluctuating water levels.	Negligible There is no potential habitat in the study area for the species.
Caladenia actensis Canberra Spider Orchid	CE	CE	This orchid is endemic to the ACT and is only known from two populations on the western lower slopes of Mount Ainslie and Mount Majura. It was previously recorded at Aranda and Campbell, but no longer exists at those locations. The Canberra Spider Orchid grows on shallow, gravelly, brown clay loam soils. The species occurs amongst a groundcover of grasses, forbs and low shrubs, often among rocks. It grows on the transition zone (ecotone) between grassy woodland and dry sclerophyll forest.	Negligible There is no potential habitat in the study area for the species.

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence
Dodonaea procumbens Trailing Hop-bush	V	-	Trailing Hop-bush is found in the dry areas of the Monaro, between Michelago and Dalgety where it occurs mostly in Natural Temperate Grassland or Snow Gum *Eucalyptus pauciflora* Woodland. A single known population occurs at Lake Bathurst (the northern-most occurrence of the species) where it occurs adjacent to the lake bed in grassland dominated by Corkscrew Grass *Austrostipa scabra* and Curly Sedge *Carex bichenoviana*. The species grows on sandy-clay soils in open bare patches where there is little competition from other species. The species often occurs on roadside batters and does not persist in heavily grazed pastures.	Negligible There is no potential habitat in the study area for the species.
Eucalyptus aggregata Black Gum	V	V	Black Gum occurs on the central and southern tablelands of NSW, and in a small disjunct population in Victoria. In NSW, it occurs predominantly in the South Eastern Highlands Bioregion. The species is a small to medium-sized woodland tree which grows in grassy woodlands on alluvial soils in moist sites along creeks on broad, cold and poorly-drained flats and hollows. It commonly occurs with Candlebark *Eucalyptus rubida*, Ribbon Gum *E. viminalis*, and Snow Gum *E. pauciflora*, with a grassy understorey of River Tussock *Poa labillardieri*. Most populations are located on private land or road verges and travelling stock routes.	Negligible The species is not present in the study area.
Lepidium ginninderrense Ginninderra Peppercress	V	E	The species is known from two natural sites in northern ACT, both within Natural Temperate Grassland.	Negligible There is no potential habitat in the study area for the species.
Lepidium hyssopifolium Basalt Peppercress	E	-	This species is known from a few populations in NSW, Victoria and Tasmania. The Basalt Pepper-cress is known to establish on open, bare ground with limited competition from other plants. It was previously recorded from Eucalypt woodland with a grassy ground cover, low open Casuarina woodland with a grassy ground cover and tussock grassland. Recently recorded localities have predominantly been in weed-infested areas of heavy modification, high degradation and high soil disturbance such as road and rail verges, on the fringes of developed agricultural land or within small reserves in agricultural land. Many populations are now generally found amongst exotic pasture grasses and beneath exotic trees.	Negligible There is no potential habitat in the study area for the species.

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence
Leucochrysum albicans var. *tricolor* Hoary Sunray	E	-	The Hoary Sunray occurs from Queensland to Victoria and in Tasmania. In the ACT the species can be seen in spring in abundance on the roadside along Fairbairn Avenue and into Mt Ainslie Nature Reserve, on the western slopes of Mt Majura and adjacent to the Federal Highway road easement. The species is usually found in ungrazed and lightly grazed areas, along roadsides in particular. It appears to be very sensitive to grazing but responds to disturbance as a coloniser and appears to tolerate mowing. Flowers spring to summer.	Low While present in the locality, this conspicuous species was not recorded during the field surveys.
Pelargonium subsp. striatellum Omeo Stork's-bill	E	-	An undescribed species of Pelargonium, Omeo Stork's Bill is a tufted perennial herb threatened by grazing, recreational activities, and exotic species. It is known to occur just above the high-water level of ephemeral lakes in NSW and Victoria.	Negligible There is no potential habitat in the study area for the species.
Pomaderris pallida Pale Pomaderris	V	-	A compact perennial shrub, growing to 1.5 m high. It is found in the ACT, southern NSW and eastern Victoria. In the ACT it is scattered along the Cotter, Paddy's and Murrumbidgee Rivers and through the Molonglo Gorge. It is found along the plateau edge and very steep upper slopes and cliffs of river valleys, in shallow, pale brown sandy loam soil over granite rock. It grows in shrubland, surrounded by *Eucalyptus* or *Callitris* woodland. In the ACT, it is only found on the eastern banks of the rivers.	Negligible There is no potential habitat in the study area for the species.
Prasophyllum petilum Tarengo Leek Orchid	E	E	When first described in 1991, the Tarengo Leek Orchid was known only from the Hall Cemetery in the ACT. It has since been found at four sites in New South Wales: Captains Flat Cemetery, Ilford Cemetery, Steves Travelling Stock Route (TSR) at Delegate and the Tarengo TSR near Boorowa. The Tarengo Leek Orchid occurs on relatively fertile soils in grassy woodland or natural grassland. The three cemetery sites originally contained grassy woodland, dominated by Snow Gum *Eucalyptus pauciflora* and Black Gum *E. aggregata* at Captains Flat, and Blakely's Red Gum *E. blakelyi* and Yellow Box *E. melliodora* at Hall and Ilford. Both Tarengo TSR and Steves TSR are natural grasslands. The species is intolerant of grazing and this is considered to be the key reason it has been found only within cemeteries and TSRs, land from which grazing has been restricted.	Negligible There is no potential habitat in the study area for the species.

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence
Rutidosis leptorrhynchoides Button Wrinklewort	E	E	In the ACT and NSW, Button Wrinklewort occurs in box-gum woodland, secondary grassland derived from box-gum woodland or in natural temperate grassland. It prefers open spaces where it does not have to compete for light. It is known from several sites in the ACT, NSW and Victoria, where it is threatened by habitat loss, grazing and weed encroachment.	Negligible While present in the locality, this conspicuous species was not recorded during the field surveys.
Swainsona recta Small Purple-pea	E	E	The Small Purple-pea occurs in the grassy understorey of woodlands and open forests dominated by Blakely's Red Gum, Yellow Box, Candlebark and Bundy. The species grows in association with understorey dominants that include Kangaroo Grass, Poa tussocks and Spear-grasses. Plants die back in summer, surviving as rootstocks until they shoot again in autumn. The species is intolerant of grazing but generally tolerant of fire, which also enhances germination by breaking the seed coat and reducing competition from other species.	Negligible The species is not known to occur near the study area and was not recorded during field survey.
Thesium australe Austral Toadflax	V	V	Found in very small to large populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. Austral Toadflax is a root parasite that takes water and some nutrients from other plants, especially Kangaroo Grass. It is often found in damp sites in association with Kangaroo Grass, but it is also found on other grass species at inland sites. Occurs on clay soils in grassy woodlands or coastal headlands.	Negligible The species is not known to occur near the study area and the study area is unlikely to constitute potential habitat for this species.
Mammals				
Chalinolobus dwyeri Large-eared Pied Bat	V	-	The Large-eared Pied Bat is found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. The species roosts in caves, crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin *Petrochelidon ariel*. The species frequents low to mid-elevation dry open forest and woodland close to roosts and is often found in well-timbered areas containing gullies.	Low No potential roosting habitat is present in the study area or nearby. As the species is known to forage close to roost sites, it is unlikely to forage in the study area.

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence
Dasyurus maculatus maculatus Spot-tailed Quoll (SE mainland population)	E	V	The Spot-tailed Quoll occurs along the east coast of Australia and the Great Dividing Range. The species uses a range of habitats including sclerophyll forests and woodlands, coastal heathlands and rainforests. Occasional sightings have been made in open country, grazing lands, rocky outcrops and other treeless areas. Habitat requirements include suitable den sites, including hollow logs, rock crevices and caves, an abundance of food and an area of intact vegetation in which to forage. Seventy per cent of the diet is medium-sized mammals, and also feeds on invertebrates, reptiles and birds. Individuals require large areas of relatively intact vegetation through which to forage. The home range of a female is between 180 and 1000ha, while males have larger home ranges of between 2000 and 5000ha. Breeding occurs from May to August.	Low The ACT Wildlife Atlas records the study area as historical habitat to the species. However, given the degradation and urbanisation of the surrounds, the species is unlikely to visit the study area.
Petauroides Volans Greater Glider	V	V	The greater glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria, with an elevational range from sea level to 1200 m above sea level. The greater glider is an arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. It is primarily folivorous, and is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species	Negligible The study area does not contain potential habitat for the species.
Petrogale penicillate Brush-tailed Rock-wallaby	V	E	The Brush-tailed Rock-wallaby was once widespread in south-eastern Australia, but its range and numbers have contracted, particularly in Victoria and southern NSW. The last sighting of this species in the ACT was in Tidbinbilla Nature Reserve in 1959. Populations are comprised of small, isolated groups or 'colonies'. Each colony may occupy a territory of up to 35 ha. The species prefers rocky habitats/outcrops and steep slopes/cliffs, combined with dense arboreal cover. They are associated with rainforest, wet and dry sclerophyll forest, vine thicket, and open forest.	Negligible The species is not known to occur in the lowland/urban areas of the ACT.
Phascolarctos cinereus Koala (combined populations of Qld, NSW and the ACT)	V	V	In NSW, the Koala mainly occurs on the central and north coasts with some populations in the western region. Koalas feed almost exclusively on eucalypt foliage, and their preferences vary regionally. They are solitary with varying home ranges. In high quality habitat home ranges may be 1 -2 ha and overlap, while in semi-arid country they are usually discrete and around 100 ha.	Negligible The species is not known to occur in the lowland/urban areas of the ACT.

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence
Pteropus poliocephalus Grey-headed Flying Fox	V	V	The Grey-headed Flying Fox occurs in the coastal belt from Rockhampton in central Queensland to Melbourne in Victoria. Whilst Brisbane, Newcastle, Sydney and Melbourne are occupied continuously, the species is widespread throughout their range during summer. In autumn the species occupies coastal lowlands and is uncommon inland. In winter the species congregates in coastal lowlands north of the Hunter Valley and is occasionally found on the south coast of NSW and on the northwest slopes (associated with flowering eucalypts of these areas). The Grey-headed Flying-fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. The Grey-headed Flying-fox roosts in aggregations of various sizes on exposed branches. Roost sites are typically located near water, such as lakes, rivers or the coast. The roost at Commonwealth Park in Canberra is the only known roost in the ACT region.	**Moderate** The species may periodically forage within the study area. The Commonwealth Park roost site is located nearby.
Birds				
Anthochaera phrygia Regent Honeyeater	E	E	A semi-nomadic species occurring in temperate eucalypt woodlands and open forests. Most records are from box-ironbark eucalypt forest associations and wet lowland coastal forests. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. It also utilises a number of other eucalypt species. Nectar and fruit from the mistletoes *Amyema miquelii*, *A. pendula*, and *A. cambagei* are also eaten during the breeding season. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and sheoaks as well as within mistletoe haustoria (section of the root which connects with the host tree). An open cup-shaped nest is constructed by the female of bark, grass, twigs and wool.	Low The species may periodically visit the study area to forage, however it is not known to nest in the locality and the potential foraging habitat is not of potential importance to the species.

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence
Botaurus poiciloptilus Australasian Bittern	E	E	Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails.	Negligible The study area does not support potential habitat for this species.
Calidris ferruginea Curlew Sandpiper	CE	-	The Curlew Sandpiper occurs around the coast of Australia, and are also widespread inland, albeit in smaller numbers. In the south-east they are occasionally recorded in the Tablelands and often in the Riverina. When inland, they are found around ephemeral and permanent lakes, dams, waterholes and bore drains. Curlew Sandpipers prey mainly on invertebrates, foraging on mudflats and at the edge of shallow pools, wading up to depths of 60 mm deep. They generally roost on dry shingle or sandy beaches, sandspits, and islets. Curlew Sandpipers are migratory, and adults are found in Australia from August to April, juveniles are found year-round. This species does not breed in Australia.	Negligible The study area does not support potential habitat for this species.
Calyptorhynchus lathami Glossy Black-cockatoo	-	V	The Glossy Black-cockatoo has a patchy distribution, having once been widespread across most of the south-east of Australia. The species is now distributed throughout an area which extends from the coast near Eungella in eastern Queensland to Mallacoota in Victoria. Glossy black-cockatoos feed on casuarina seeds, however they occasionally consume seeds from eucalypts, angophoras, acacias and hakeas, as well as insect larvae. In the ACT region the species feeds almost exclusively on Drooping Sheoak (*Allocasuarina verticillata*). Pairs mate for life and nest in the hollows of large, old living or dead eucalypt trees. Breeding takes place between March and August.	Low The study area does not contain potential breeding habitat or substantial foraging habitat for this species (note the species feeds almost exclusively on Drooping Sheoak).

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence
Climacteris picumnus victoriae Brown Treecreeper (eastern subspecies)	-	V	In the ACT region, Brown Treecreepers occur in dry woodlands and open forest below 1,000 metres. The species is relatively common along the Clear Range and along the Lower Naas River. Other populations occur at Mulligans Flat Reserve, Campbell Park, Burbong and former quarries south of the airport in the northern part of the ACT, and at Castle Hill, north of Tharwa. Brown Treecreepers also frequent paddocks and grasslands where there are sufficient logs, stumps and dead trees nearby. The species prefers relatively undisturbed woodland and dry open forest where the native understorey, especially grasses, has been preserved. The species usually prefers predominantly rough-barked trees such as Stringybarks and rough barked Boxes.	Low The species may periodically visit the study area to forage, however it has not been recorded in the locality. The study area does not contain significant foraging or potential breeding habitat for the species.
Daphoenositta chrysoptera Varied Sittella	-	V	In the ACT region, the Varied Sittella occurs in a wide variety of woodland and forest habitats, particularly in lowland areas. The species prefers areas with a dominance of rough barked trees, notably Red Stringybark at relatively high density. The species is rarely recorded in sparsely treed areas.	Low The species may periodically visit the study area to forage, however it has not been recorded in the locality. The study area does not contain significant foraging or breeding habitat for the species.
Grantiella picta Painted Honeyeater	V	V	The Painted Honeyeater is found in Queensland and New South Wales west of the Great Dividing Range, through to northern Victoria. The species displays some migratory movement and is occasionally found in the Northern Territory and is a vagrant to South Australia and the ACT. The species frequents eucalypt forests and woodlands, particularly those that are infested heavily with mistletoes. In the ACT, the species' primary habitat is River Oak (*Casuarina cunninghamiana*) along river systems, especially the Murrumbidgee River.	Low The species may periodically visit the study area to forage, however it is not known to nest in the locality.
Hieraaetus morphnoides Little Eagle	-	V	The Little Eagle is distributed throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment and occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. The species is sensitive to human disturbance.	Low The study area may be part of the hunting range of an individual or pair of Little Eagles. Given the exotic composition of the canopy, there is unlikely to be breeding habitat within the study area.

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence
Lathamus discolor Swift Parrot	CE	CE	The Swift Parrot occurs in woodlands and forests of NSW (and occasionally the ACT) from May to August, where it feeds on eucalypt nectar, pollen and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.	Low The species is an uncommon, non-breeding visitor to the region, however it has historically been recorded in the locality. The study area is unlikely to contain foraging resources of significance to the species.
Melanodryas cucullata cucullata Hooded Robin (southeastern form)	-	V	The Hooded Robin occupies drier eucalypt forest, woodland and scrub, grasses and low shrubs, as well as cleared paddocks with regrowth or stumps. The species uses stumps, posts or fallen timber from which to locate prey on the ground. In the ACT region, the species is found in woodland, often with scattered Yellow Box and/or Blakely's Red Gum, with long grass and low shrubs, or fallen logs.	Low The species may periodically visit the study area to forage, however it has not been recorded in the locality. The study area does not contain significant foraging or breeding habitat for the species.
Numenius madagascariensis Eastern Curlew	CE	-	The eastern curlew is Australia's largest shorebird and a long-haul flyer. The eastern curlew takes an annual migratory flight to Russia and north-eastern China to breed, arriving back home to Australia in August to feed on crabs and molluscs in intertidal mudflats. It is extremely shy and will take flight at the first sign of danger.	Negligible The study area does not support potential foraging habitat for the species.
Petroica boodang Scarlet Robin	-	V	The Scarlet Robin is found in south-eastern Australia (extreme south-east Queensland to Tasmania, western Victoria and south-east South Australia) and south-west Western Australia. In NSW it occupies open forests and woodlands from the coast to the inland slopes, breeding in drier eucalypt forests and temperate woodlands.	**Confirmed** This species has previously been recorded in the study area. The species may periodically visit the study area to forage, however the study area does not contain significant foraging or breeding habitat for the species.

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence
Polytelis swainsonii Superb Parrot	V	V	Found mainly in open, tall riparian River Red Gum forest or woodland. Often found in farmland including grazing land with patches of remnant vegetation. Breeds in hollow branches of tall eucalypt trees within 9 km of feeding areas.	**Moderate** The species may occasionally forage in the study area although is not known to breed in the vicinity of the study area.
Rostratula australis Australian Painted Snipe	E	E	Usually found in shallow inland wetlands including farm dams, lakes, rice crops, swamps and waterlogged grassland. The species prefers freshwater wetlands, ephemeral or permanent, although it has been recorded in brackish waters.	Negligible The study area does not provide potential habitat for the species and it is only rarely recorded at a few locations in the ACT region (i.e. Jerrabomberra Wetlands, upper Yerrabi Ponds etc.).
Amphibians				
Litoria aurea Green and Golden Bell Frog	V	V Locally Extinct	The species is found in marshes, dams and stream sides, particularly those containing bullrushes or spikerushes. Preferred habitat contains water bodies that are unshaded, are free of predatory fish, have a grassy area nearby and have diurnal sheltering sites nearby such as vegetation or rocks, although the species has also been recorded from highly disturbed areas including disused industrial sites, brick pits, landfill areas and cleared land.	Negligible The study area does not support potential habitat for this species.
Litoria castanea Yellow-spotted Tree Frog	CE	CE Locally Extinct	The Yellow-spotted Tree Frog previously had a disjunct distribution, being recorded on the New England Tablelands and on the Southern Tablelands from Lake George to Bombala. The species has only recently (2010) been rediscovered on the Southern Tablelands. Prior to this the species had not been recorded on the Southern Tablelands since the 1970s. Found in large permanent ponds, lakes and dams with an abundance of bulrushes and other emergent vegetation, it shelters during autumn and winter under fallen timber, rocks, other debris or thick vegetation.	Negligible The study area does not support potential habitat for this species.
Reptiles				

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence
Aprasia parapulchella Pink-tailed Worm-lizard	V	V	The Pink-tailed Worm-lizard is a fossorial species which lives beneath surface rocks and occupies ant burrows. It feed on ants, particularly their eggs and larvae. Thought to lay eggs within the ant nests under rocks that it uses as a source of food and shelter and for thermoregulation. Key habitat features are a cover of native grasses, particularly Kangaroo Grass, sparse or no tree cover, little or no leaf litter, and scattered small rock with shallow embedment in the soil surface.	Negligible There is no potential habitat (surface rock scatter with suitable native grasses and minimal leaf litter) in the study area for this species.
Delma impar Striped Legless Lizard	V	V	The Striped Legless Lizard is patchily distributed in grasslands of south-eastern NSW, the ACT, north-eastern, central and south-western Victoria, and south-eastern South Australia. In the ACT, the species is known to occur at four separate locations - in grassland areas of Gungahlin, Majura and Jerrabomberra Valleys, and Yarramundi. Unsuitable habitat, roads and urban development separate these sites. Most areas where the species persists are thought to have had low to moderate levels of agricultural disturbance in the past and it has been suggested that ploughing in particular may be incompatible with the survival of the species. Until recently, the species was thought to inhabit only native grasslands dominated by species such as Tall Speargrass and Kangaroo Grass. In recent years, surveys have revealed the Striped Legless Lizard in many sites dominated by exotic species such as Phalaris, Serrated Tussock and Flatweed (Biosis Research 2012). They have also been found in several secondary grassland sites, generally within two kilometres of primary grassland.	Negligible The site does not support potential habitat for this species.
Tympanocryptis pinguicolla Grassland Earless Dragon	E	E	In the Canberra-Monaro region the Grassland Earless Dragon is restricted to Natural Temperate Grassland that is dominated by perennial tussock-forming species. It is known to make use of grass tussocks as well as small holes in the ground that are also used by invertebrates such as wolf spiders and crickets. The species is known to occur in suitable native grassland habitat in the Majura and Jerrabomberra valleys in the ACT and at 'Letchworth' near Queanbeyan in NSW.	Negligible The site does not support potential habitat for this species.
Fish and Crustacea				

Species Name	EPBC Act Status	NC Act Status	Description (Distribution and Habitat)	Likelihood of Occurrence
Maccullochella peelii Murray Cod	V	-	The Murray Cod's natural distribution extends throughout the Murray-Darling basin ranging west of the divide from south east Queensland, through NSW into Victoria and South Australia. The species is found in the waterways of the Murray– Darling Basin in a wide range of warm water habitats that range from clear, rocky streams to slow flowing turbid rivers, billabongs and large deep holes. Murray Cod is entirely a freshwater species and will not tolerate high salinity levels.	Negligible There is no potential habitat within the study area for this species.
Macquaria australasica Macquarie Perch	E	E	Macquarie Perch are found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury and Shoalhaven catchments. Macquarie perch are found in both river and lake habitats, especially the upper reaches of rivers and their substantial tributaries.	Negligible There is no potential habitat within the study area for this species.
Insects				
Perunga ochracea Perunga Grasshopper	-	V	The Perunga Grasshopper is usually recorded opportunistically by ecologists undertaking vegetation surveys or targeted surveys for other species. The species is generally a natural grassland specialist, and although some records occur in Box-Gum Woodland, such sites are usually nearby the historical ecotone between the two ecological communities.	Low It is unlikely that the species would occur in the study area given the degree of modification.
Synemon plana Golden Sun Moth	CE	E	The Golden Sun Moth's NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut and the species has been recorded at many sites in the lowland areas of the ACT. The species occurs in Natural Temperate Grasslands and Box-Gum Grassy Woodland in which the groundcover is dominated by Wallaby Grasses (*Rytidosperma* spp.). It is believed that the females lay up to 200 eggs at the base of the Wallaby Grass tussocks. After hatching, the larvae tunnel underground where they remain feeding on the roots of Wallaby Grass tussocks. The species is also known to feed on the introduced species (and Weed of National Significance), Chilean Needle Grass *Nassella neesiana*.	**Moderate** Small patches in the study area constitute potential habitat for this species. Additionally, this species is known to occur in the locality.