# ABOUT TREES

URBAN TREE & BUSHLAND MANAGEMENT

**FLORA & FAUNA ASSESSMENT**

**AND**

**7 PART TESTS OF SIGNIFICANCE**

**LEONAY GOLF COURSE**

**LEONAY PARADE**

**LEONAY**

**FOR**

**LEONAY LINKS PTY LIMITED**

# TABLE OF CONTENTS



© ABOUT TREES (2017)

**10.0 APPENDICES**



© ABOUT TREES (2017)

**ABOUT TREES**
URBAN TREE AND BUSHLAND MANAGEMENT

LAWRIE SMITH
ECOLOGICAL AND
BUSHFIRE CONSULTANT

PO Box 300
Wentworth Falls 2782
PH 0439 758 658

30/01/17
Ref. # 1878

# 1.0 INTRODUCTION

A Development Application has been lodged with Penrith City Council for a subdivision within Lot 110 in DP1135581, Leonay and will be known as Leonay Links.

## 1.1 Brief:

This report has been commissioned by the Leonay Links P/L, and its purpose it to prepare a Flora & Fauna Report and Seven Part Test in accordance with the Working Draft Guidelines (2004) provided by New South Wales Department of Environment and Conservation.

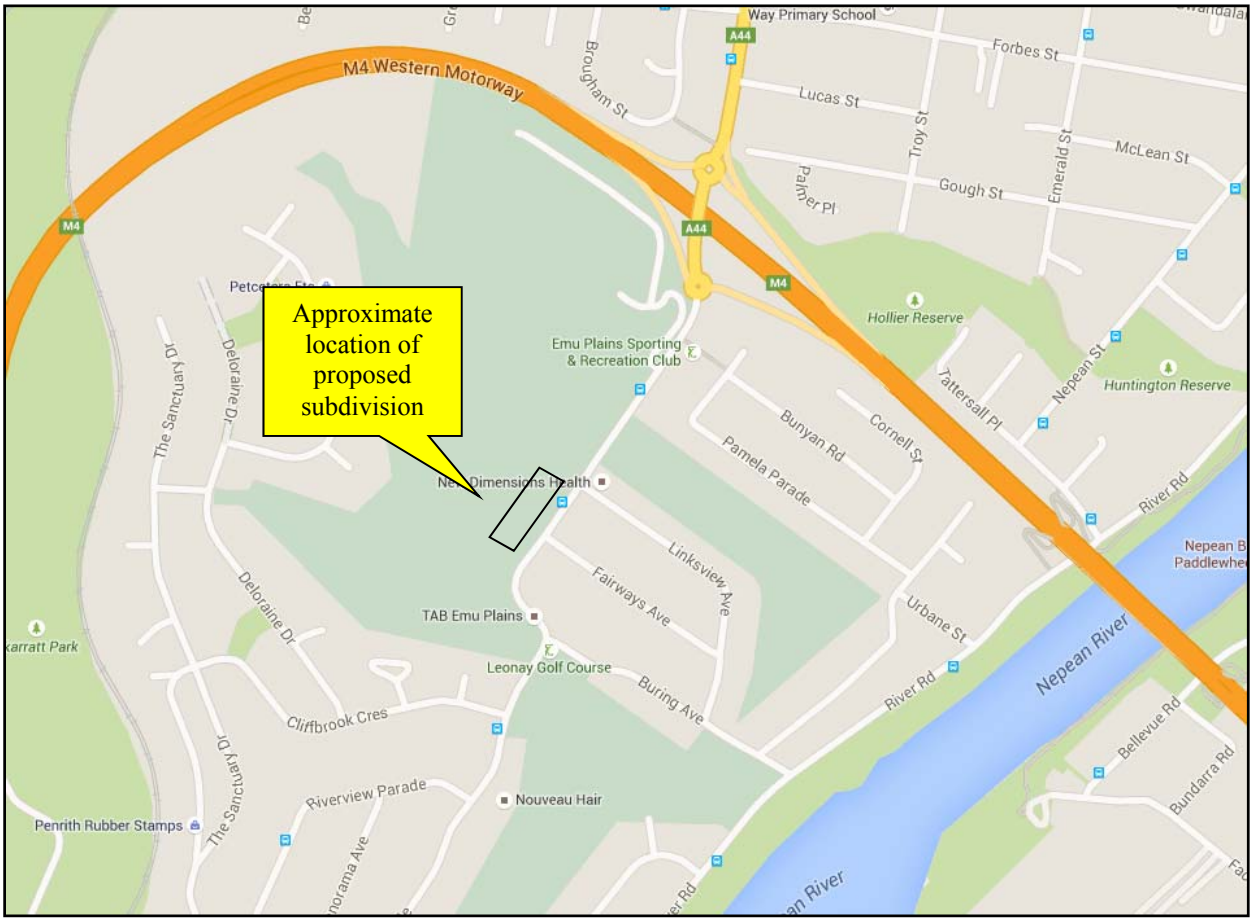



Diagram 1: Showing location of Subject Site (Dept Lands 2017)

## 1.2 Summary of Report

### Threatened Ecological Communities

The condition of the remnant Alluvial Woodland is a component of the *Sydney Coastal River Flat Forest Ecological Community*, which is listed as an endangered ecological community under the Threatened Species Conservation Act 1995 (NPWS 2002). However, is unlikely to comply with the NSW Scientific Communities definition of this community

The Seven Part Test in Appendices 6.1 concluded that the proposed development is unlikely to have a significant effect on the *Sydney Coastal River Flat Forest Ecological Community*. As such, no Species Impact Statement or referral to the Commonwealth Environment Minister is required.

© ABOUT TREES (2017)

**Threatened Flora Species**

The site and surrounding study area has been historically cleared for agricultural and urban activities, and is currently managed as a golf-course.

A number of threatened flora species have been recorded in a 5km radius of the site, but these species are unlikely to occur as their preferred habitat is not provided in the study area

No Species Impact Statement or referral to the Commonwealth Environment Minister is required.

**Threatened Fauna Species**

No threatened fauna species were detected within the site during the survey, and no significant habitat features are provided in the study area.

The trees could provide marginal foraging habitat for 16 threatened fauna species, but as these are highly mobile species and large areas of similar habitat are provided in the local area, the proposed development is unlikely to have a significant impact upon threatened fauna species, populations or their habitats. As such, no further assessment is considered necessary

If you require any further information, please feel free to contact me on 0439 758 658.

© ABOUT TREES (2017)

# 2.0 METHODOLOGY AND OTHER INFORMATION

## 2.1 Methodology

This survey and report follows the 'Threatened Species Survey and Assessment: Guidelines for develop- ments and activities (working draft)' DEC 2004, New South Wales Department of Environment and Conservation, Hurstville, NSW.

## 2.2 Limitation of Report

The flora survey may be an underestimate of the actual species present in the study area as it was undertaken in . Inherent limitations to a survey undertaken at this time of the year may include seasonal variability, and this could inhibit the capacity to detect some cryptic species. For example, spring flowering annuals and plants with underground storage mechanisms that only produce above ground material at certain times of the year (i.e. orchids) are not likely to be evident. A general absence of floral and fruiting characteristics presents difficulties in making a correct identification to species level, particularly with grass and sedge species. Other plants may only as represented by seed in the soil seed bank. For these reasons, a more comprehensive survey over an extended period of time, taking seasonal variability into account, may result in addition species being detected.

## 2.3 Background

The author was provided copy of the Proposed Site Plan, and a request from the owners to prepare a Seven Part Test to assess impacts of the subdivision on the remnant Alluvial Forest Ecological Community that occurs in the Study Area.

## 2.4 Literature and Database Review

Prior to the field survey, a literature and database review was conducted. This involved the following;

- Commonwealth EPBC Act, Protected Matters Report, (2017)
- Land and Property Management Authority (2017) Spatial Information Exchange http://imagery.maps.nsw.gov.au/
- NSW NPWS Wildlife Atlas Report (2017)
- Tozer, M. (2003) 'The Native Vegetation of the Cumberland Plain, Western Sydney: Systemic classification and field identification of communities' *Cunninghamia*, Vol. 8 [1] 2003 1 -155. Royal Botanic Gardens, Sydney. NSW

## 2.5 Review of Relevant Legislation

The survey and report has considered the likely impacts of the proposed action on threatened species, populations or endangered ecological communities, or their habitats, that are known to occur in the local area. The criteria used to assess these impacts vary between the Commonwealth, State and Local government agencies. This report considers these issues in accordance with the following legislative requirements. It also provides a conclusion on whether a referral is required to the Federal Minister for the Environment, and whether a Species Impact Statement is necessary.

### 2.5.1 Commonwealth Environmental Protection and Biodiversity Conservation Act (1999)

The EPBC Act is a nationally applicable Act administered by the Commonwealth Department of Environment and Heritage. This Act requires the approval for actions that are likely to have a significant impact on matters of National Environmental Significance.

There are seven matters that may require a Commonwealth assessment and approval. These include;

- World Heritage Properties;
- National Heritage Places;
- Wetlands of International Significance (Ramsar Sites);
- Nationally Threatened Species and Communities
- Migratory species
- Nuclear actions
- Commonwealth Marine Environments.

*'Under the EPBC Act, a person must not take an action that has, will have or is likely to have a significant impact on any of these matters of NES without approval from the Commonwealth Environment Minister. There are penalties for taking such an action without approval.*

*In general, an action that may need under the Act will involve some physical interaction with the environment, such as the clearing of native vegetation, building a new road, discharging pollutants into the*

© ABOUT TREES (2017)

*environment, or off shore seismic survey.*
*If it is determined that an action is not likely to have a significant impact, then the action is not a controlled action. Approval under the EPBA Act is not required and the action may proceed, subject to obtaining any other necessary permits or approvals'*

### 2.5.2 NSW Environmental Planning & Assessment Act (EPA Act 1979)

Section 5A (EPA Act) sets out 7 matters that require consideration in order to assess the likelihood of significant impacts of a proposed action on threatened species, populations or ecological communities, or their habitats, as listed under the Threatened Species Conservation Act (TPC Act 1995). This section 5A assessment is referred to as the Seven Part Test of Significance.

If it is considered that a proposed activity is likely to have a significant impact upon on threatened species, populations or ecological communities, or their habitats, a Species Impact Statement will need to be prepared.

## 2.6 Uniform Civil Procedures Rules (2005)

In order to ensure the reliability of evidence provided by experts, the Courts have provided the Uniform Civil Procedures Rules 2005 (UCPR) and Land & Environment Court Rules 2007 (LECR).

The author of this report has read and understands the Expert Witness Code of Conduct in Schedule 7 to UCPR, and agrees to be bound by it in accordance with UCPR 31.23.

An expert is permitted to provide evidence before a Court in order to assist the Court draw inferences. The primary overriding duty of an expert is to assist the Court impartially on matters relevant to the expert witness's expertise. Any opinions expressed must be based on the persons training, study or expertise.

## 2.7 Curriculum Vitae of Author

The authors Curriculum Vitae is attached as Appendices 10.1 of this report which provides the qualifications, experience and additional training on which any stated opinions and conclusions are based.

## 2.8 Copyright

This work is copyright. About Trees retains intellectual property rights of its reports under the Copyright Act (1968). Apart from any use permitted under the Act, no part may be reproduced by any process, nor may any other exclusive right be exercised, without the permission of the author.

Payment for a report permits a client to use it on the provision that all contractual arrangements are complied with. Its unauthorised use in any form is prohibited. The report is only to be used for its stated purpose and by the person for whom it was commissioned. It cannot be transferred to any third party without written consent from the author. About Trees accepts no liability or responsibility in respect of the use or reliance upon this report by a third party.

## 3.0 SITE DETAILS

**3.1** The site is part of Lot 110 in DP1135581, Leonay and will be known as Leonay Links. It is bounded on the northeast, northwest and southwest by Leonay Golf Course and on the southeast by Leonay Parade. The surrounding areas are mainly comprised of urban residential development


Map 2 – showing subject trees (Google Maps 2017)

### 3.2 Soil Landscape

The soil of the general has been described by Bannerman & Hazelton as 'Richmond' soil landscape, and occurs on the higher Quaternary terraces of the Hawkesbury, Nepean and Georges Rivers. It is a Quaternary alluvium consisting of sand, silt and gravels derived from sandstone and shales, forming poorly structured orange to red clay loams, clays and sands. The texture may increase with depth. Ironstone nodules and hardened iron rich layers may be present. (Bannerman 1990)

Topsoil: Up to 40cm of reddish brown loamy sand with apedal single-grained structure and porous sandy fabric (bt1) overlies 40 – 100cm of brown sandy clay loam with apedal massive structure and earthy fabric (bt2). The bt2 may occasionally be absent. Roots are common near the surface of bt1 but are rare at depth.

Subsoil; Brown mottled light clay with apedal massive structure (bt3) overlies brown mottled stiff medium – heavy clay (bt4). Small iron-indurated gravels may occur in concentrated bands or dispersed throughout bt3. The subsoil is stratified with alternating layers of bt3 & bt4.

© ABOUT TREES (2017)

### 3.3 Landform & Aspect

The site has an open aspect and is located on a higher terrace on the western side the Nepean River. It drains to the northeast with an average gradient of 1: 30, or a downslope of <1°, to Jamison Creek (see Diagram 3).

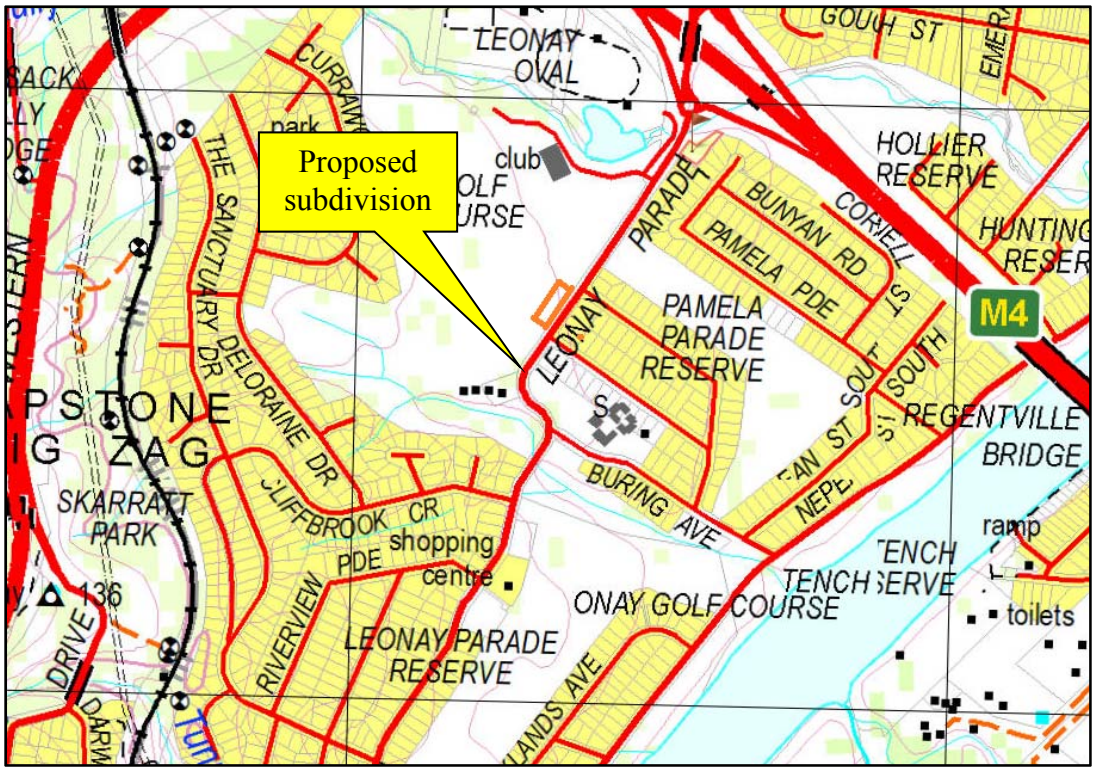


Diagram 3 – Topographic Details of Local Area (Dept Lands 2017)

### 3.4 Bush Fire Prone Land

The site is not within 100m of a bushfire risk and has not been mapped as beingbushfire prone land

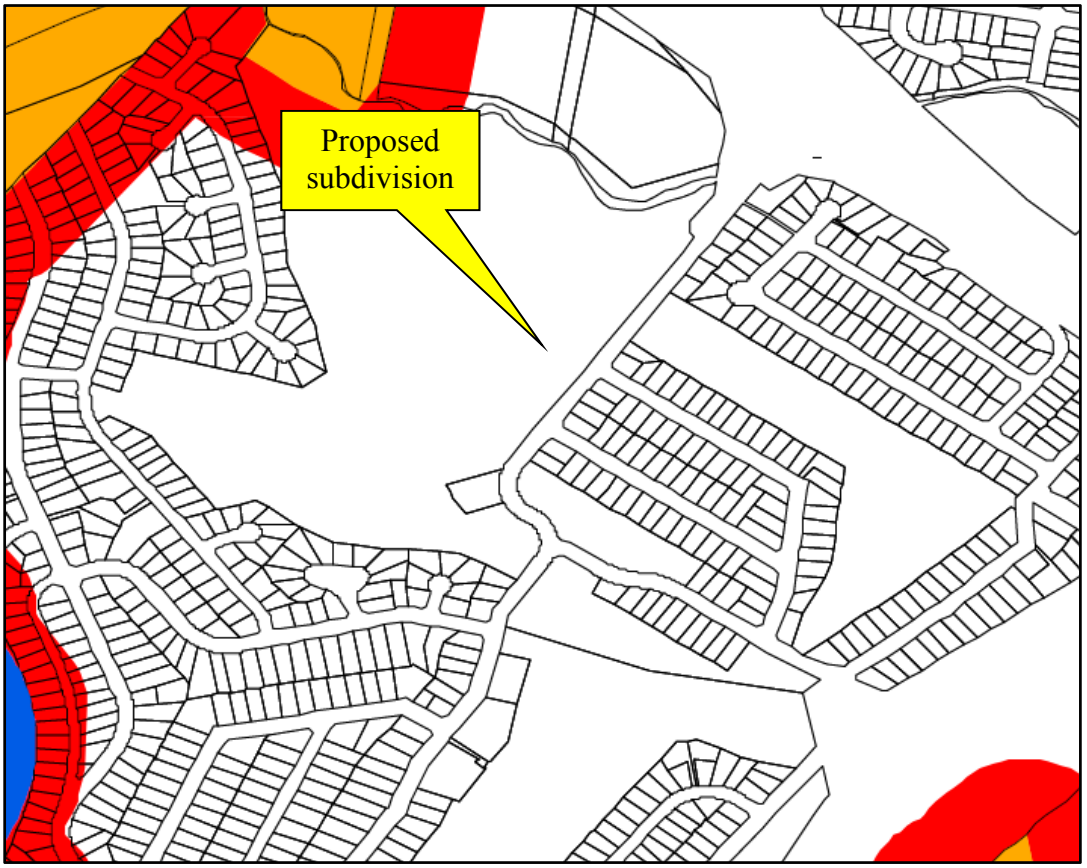


Diagram 4 – Bushfire Mapping of Local Area (Penrith City Council 2015)

© ABOUT TREES (2017)

# 4.0 ECOLOGICAL COMMUNITYASSESSMENT

## 4.1 Vegetation Mapping of the Local Area

The site has been mapped containing a form of *Sydney Coastal River Flat Forest Ecological Community*, which is listed as an endangered ecological community under the Threatened Species Conservation Act 1995 (NPWS 2002)

In the NPWS vegetation mapping of the Cumberland Plain, two main forms of Sydney Coastal River Flat Forest have been identified — Riparian Forest and Alluvial Woodland.

Alluvial Woodland occurs along minor watercourses and on terraces adjacent to riparian forest and commonly includes trees such as cabbage gum (*E. amplifolia*) forest red gum (*E. tereticornis*) and dense stands of Swamp Oak (*Casuarina glauca*).

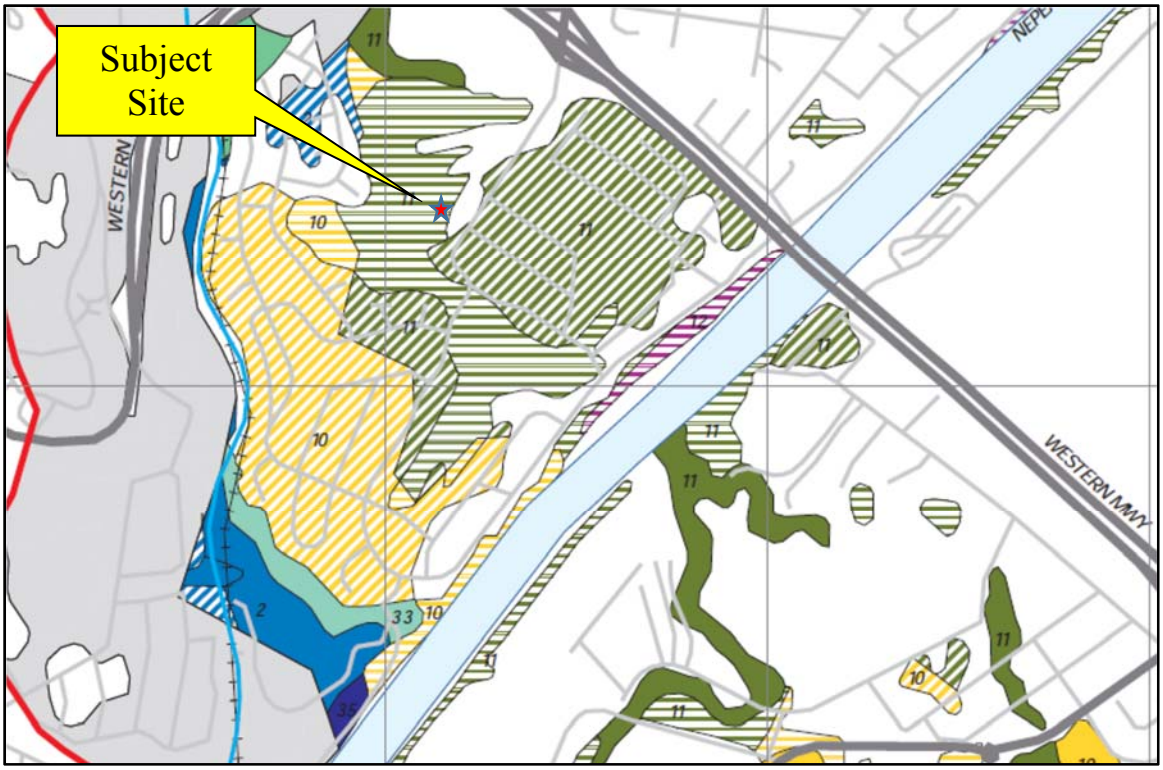
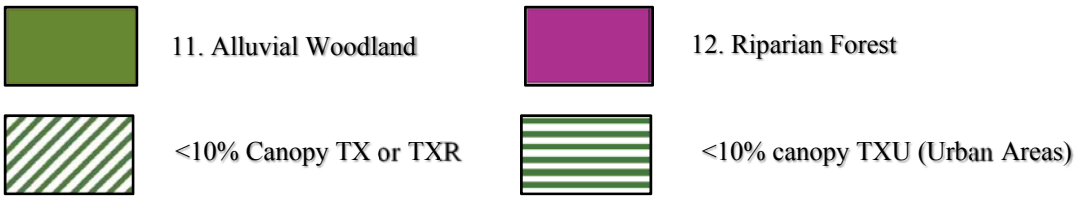



Diagram 5 – Vegetation Mapping of Local Area (NPWS 2002)




## 4.2 Description of the Ecological Community

Alluvial Woodland (Map 11) typically occurs in close proximity to minor watercourses draining soils derived from Wianamatta Shale. It is the most common community found on soils of recent alluvial deposition. It is also found on the floodplains of the major watercourse, the Hawkesbury–Nepean River, but grades into Map Unit 12 on the terraces immediately adjacent to the river.

The tree stratum is most often dominated by *Eucalyptus amplifolia* and *E. tereticornis* with *Angophora floribunda* occurring less frequently. It often includes a stratum of small trees, frequently including *Acacia parramattensis*, and less frequently *Casuarina glauca*, *Angophora floribunda* and *Melaleuca linariifolia*.

A shrub stratum is usually evident, but is often sparse and invariably dominated by *Bursaria spinosa.*

The dense ground stratum is usually dominated by grasses such as *Oplismenus aemulus*, *Microlaena stipoides*, *Entolasia marginata* and *Echinopogon ovatus*. Herb species are also common, including *Solanum prinophyllum*, *Pratia purpurascens* and *Commelina cyanea*.

© ABOUT TREES (2017)

## 4.3 Conservation Significance Assessment

The conservation significance of the Riparian Woodland on the site has been assessed in accordance with the Matrix contained in Appendices 2.0

The study area has been historically cleared for agricultural use, and in recent years it has been managed and maintained as a golf course (see Diagram 6)

The tree stratum is comprised of landscape plantings dominated by introduced species which include *Eucalyptus microcorys*, *Eucalyptus saligna*, and *Pinus* . In addition, some indigenous species of the Riparian Woodland have been planted. These include *Eucalyptus tereticornis* and *Casuarina*


Diagram 6 – 1943 Aerial Photograph of Local Area (Dept Lands 2017)

## 4.4 Potential Impacts on the Threatened Ecological Communities

The proposed activity may require the removal of up to 10 indigenous trees of the *Sydney Coastal River Flat Forest Ecological Community,* but no indigenous shrub or ground stratums occur on the site or in the study area.

## 4.5 Ecological Communities Conclusions

Alluvial Woodland is a form of '*Sydney Coastal River Flat Forest Ecological Community'* which is listed as a threatened ecological community under the *NSW TSC Act* (1995). However, this community is not listed under the schedules of the *EPBC Act* (1999)

The condition of the remnant Alluvial Woodland is a component of the *Sydney Coastal River Flat Forest Ecological Community*, which is listed as an endangered ecological community under the Threatened Species Conservation Act 1995 (NPWS 2002). However, is unlikely to comply with the NSW Scientific Communities definition of this community

The Seven Part Test in Appendices 6.1 concluded that the proposed development is unlikely to have a significant effect on the *Sydney Coastal River Flat Forest Ecological Community*.

As such, no Species Impact Statement or referral to the Commonwealth Environment Minister is required

© ABOUT TREES (2017)

# 5.0 FLORA SURVEY

## 5.1 Limitations

The flora survey may be an underestimate of the actual species present in the study area as it was undertaken in the summer and autumn of 2017. Inherent limitations to a survey undertaken at this time of the year may include seasonal variability, and this could inhibit the capacity to detect some cryptic species. For example, spring flowering annuals and plants with underground storage mechanisms that only produce above ground material at certain times of the year (i.e. orchids) are not likely to be evident. A general absence of floral and fruiting characteristics presents difficulties in making a correct identification to species level, particularly with grass and sedge species. Other plants may only as represented by seed in the soil seed bank. For these reasons, a more comprehensive survey over an extended period of time, taking seasonal variability into account, may result in addition species being detected.

Where these limitations cannot be overcome, this survey has adopted the precautionary principle. This involves assuming that threatened flora which is likely to occur in the study area (based on the presence of suitable habitat and recent records) is also likely to inhabit the study area. The Assessment of Significance on threatened flora species has been conducted on this basis

## 5.2 Methodology

- The flora survey is based upon a check list of native plants known to occur in the local area.
- The subject site was traversed in a north south axis at 3m intervals and flora species were recorded along with their abundance as they were detected
- A list of these is included as Appendices 10.3.1.

## 5.3 Flora Habitat Analysis

The flora species with the site and surrounding study area is not typical of the diagnostic flora species found within the Alluvial Woodland.

The Alluvial Woodland has previously been cleared, with landscape plantings of trees and turf grass on the fairways.

A total of 7 tree species have been utilized within the landscape plantings, three being indigenous species and four being introduced.

The tree stratum is comprised of a codominant, equal aged stand of landscape plantings along the edges of the fairways. It includes *Eucalyptus microcorys* (Tallow Wood), *Eucalyptus tereticornis* (Forest Red Gum), *Allocasurina cunninghamii* (River Oak), *Eucalyptus sideroxylon* (Mugga Ironbark), *Eucalyptus deanii (*Deane's Blue Gum) and *Pinus rigida* (Pitch Pine)

The ground stratum is represented by introduced turf species, with minor vestiges of indigenous herbs and grasses.

No threatened flora species were detected and they are considered highly unlikely to occur

## 5.4 Threatened Flora Species within Local Area

A search was undertaken on the 07/03/17 of the NSW NSWS Atlas of NSW Wildlife for the threatened flora species that are known to occur within a 5 kilometre radius of the site. A list of these species is contained in Appendices 10.4.1. Additional species which have the potential to occur have also been added. An assessment was undertaken of the potential for these species to occur in the study area. This assessment is included in Appendices 10.5.1.

## 5.5 Flora Species Conclusions

No threatened flora species were observed during the survey and it is unlikely that the proposed development will have a negative impact upon threatened flora species, populations or their habitats.

No Species Impact Statement or referral to the Commonwealth Environment Minister is required.

© ABOUT TREES (2017)

# 6.0 FAUNA SURVEY

River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions provides habitat for a broad range of animals, including many that are dependent on trees for food, nesting or roosting (Law *et al*. 2000a, b).

These include Cormorants (*Phalacrocorax* spp.) and Egrets (*Ardea* spp. and *Egrettia* spp.), the Osprey (*Pandion haliaetus*), Whistling Kite (*Haliastur sphenurus*), White-bellied Sea-eagle (*Haliaeetus leucogaster*), as well as the Brush-tailed Phascogale (*Phascogale tapoatafa*), Yellow-bellied Glider (*Petaurus australis*), Squirrel Glider (*Petaurus norfolcensis*) (Law *et al*. 2000a), Sugar Glider (*Petaurus breviceps*) and Grey-headed Flying Fox (*Pteropus poliocephalus*).

The fauna of River-Flat Eucalypt Forest also includes a number of species of frogs in the families Myobatrachidae and Hylidae, particularly *Litoria* spp., and many species of forest birds including Honeyeaters, Kingfishers, Cuckoos, Owls, Doves, Whistlers and Fantails.

This survey was conducted for mammals, diurnal and nocturnal birds, reptiles and insects on the dates and times of the following table.

| DATE | TIME | TEMP | CLOUD | WIND | HUMID | COND |
|---|---|---|---|---|---|---|
| 20/01/17 | 1.00pm – 3.00pm | | | | | |
| 09/03/17 | 7.30pm – 9.30p | | | | | |

## 6.1 Limitations to the Fauna Survey

The fauna survey may be an underestimate of the actual species present in the study area as it was undertaken in January to March of 2017. Inherent limitations to a survey undertaken at this time of the year may include seasonal variability and this could inhibit the capacity to detect some cryptic species. It is acknowledged by the author that a more comprehensive survey over an extended period of time, taking seasonal variability into account, may result in addition species being detected.

For example, many species of migratory birds are only present at certain seasons, others are always present but can only be detected in certain seasons (eg. breeding season for certain frogs) while others are inactive in cooler weather (e.g. micro-bats, reptiles and frogs), or inclement weather (e.g. birds in wet and windy conditions). Some species are nomads or have very large home ranges and may utilise seasonal variability food resources in the area (e.g. flowers and fruits)

Where these limitations cannot be overcome, this survey has adopted the precautionary principle. This involves assuming that threatened fauna which is likely to occur in the study area (based on the presence of suitable habitat and recent records) is also likely to inhabit the study area (see Fauna Habitat Assessment in Section 4.2). The Assessment of Significance on threatened fauna species has been conducted on this basis.

## 6.2 Methodology

This fauna survey has been undertaken in accordance with DEC Draft Guidelines (2004) to determine if threatened species are likely to inhabit or utilise habitat provided in the study area.

**Mammals**

- An initial habitat assessment took into account the different types of habitat and vegetation in the study area, as well as its condition. If present, the key habitat features of threatened and endangered mammal species were noted.
- The mammal survey included visual sightings, observations of scratch marks on tree trunks, evidence of feeding sites and the presence of scats.
- No mammal species were detected in the study area during the survey.
- In addition, no threatened/endangered mammal species were detected, but potential habitat foraging habitat occur microbats and Flying Foxes.
- However, these are highly mobile species that can forage over large areas, and the proposed development is unlikely to have a significant impact on the species or any important habitat

© ABOUT TREES (2017)

**Birds**

- An initial habitat assessment took into account the different types of habitat and vegetation in the study area, as well as its condition. If present, the key habitat features of threatened and endangered bird species were noted.
- A survey for diurnal birds in the study area was undertaken in the following manner
    - Two thirty minute area searches as the observer walked around the study area at variable speeds, stopping when necessary. The Atlas of Australian Birds recommends that a 20 minute area search be allocated to every 2ha (400m x 500m) being surveyed.
    - Three point counts based on ten minute observation periods at predetermined locations throughout the study area.
    - Opportunistic observations while focused on other survey activities included additional sightings of birds, nests, remains of eggshells, feathers, feeding activity, pellets and scats, and calls heard while undertaking all other surveys on the site.
- Six (6) bird species were detected during the survey, all indigenous species and these are recorded in Appendices 10.4.2
- No direct observations were made of threatened nocturnal bird species and their key habitat features were not observed in the study area. Due to the small size of the site and the lack of any key habitat features required by the Powerful, Masked and Sooty Owls, no call playbacks and/or spotlighting for thee species was considered necessary.
- No threatened/endangered bird species or key habitat requirements were detected during the survey, and they are considered unlikely to occur in the study area

**Reptiles**

- The initial habitat assessment took into account the different types of habitat and vegetation in the study area, as well as their condition. General habitat requirements for reptiles are sandstone outcrops, boulders, logs, leaf litter, termite mounds and sunny basking sites near dense low vegetation.
- The reptile survey consisted of an area count and four time counts. The area count included a systematic search in areas of suitable habitat within the study area. Searches for cryptic species were made beneath bushrocks and fallen logs, decorticating and fallen bark, leaf litter, rock outcrops and other suitable habitat (e.g. roofing iron and other rubbish).
- Two x 30 minute diurnal area searches targeting threatened species were undertaken on two separate days, before reptiles reached their optimum body temperature.
- Opportunistic observations were also made while undertaking all other surveys in the study area.
- No reptile species or important habitat features were detected during the survey.
- No threatened/endangered reptile species or key habitat requirements were detected during the survey, and they are considered unlikely to occur in the study area

**Amphibians**

- The initial habitat assessment took into account the different types of habitat and vegetation in the study area, as well as its condition. If present, the key habitat features of threatened and endangered amphibian species were noted.
- A survey for the known the amphibian species in the local area was undertaken in areas of suitable on two evenings. Opportunistic observations while undertaking all other surveys were also recorded.
- No amphibian species or important habitat features were detected during the survey
- No threatened amphibian species were detected in the study area and they are considered unlikely to occur in the study area

**Insects**

- No Blue Mountains Swamps occur in the study area and therefore, The Giant Dragonfly is unlikely to occur.

© ABOUT TREES (2017)

## 6.3 FAUNA HABITAT ASSESSMENT

### Food Resources

Tree Stratum – Large mature trees provide more food & nesting resources than young trees (Recher 1991). Healthy mature trees direct a large amount of their energy into the production of nectar, foliage and fruits, whereas younger trees use most of their energy on growth and height (Robinson 1992).

- The site contains a stands of codominant and suppressed trees which could provide roosting, nesting and foraging habitat for various fauna species.
- The proposed activity is unlikely to have a significant impact on the habitat requirements of any fauna species.
- As there are large areas of similar habitat in the local area and the proposed activity is unlikely to represent a significant impact on the habitat of any threatened species at a local, regional or national level.

Shrub Stratum – Many bird species are strongly associated with the shrub and tall grass understorey (Fisher and Gouldney 1997), and remnants with a shrub/tussock understorey will usually contain more bird species than those that don't (Barrett & Davidson 1999). A diverse understorey can provide nesting sites, food resources and shelter for birds, mammals, frogs, reptiles and many different species of invertebrate. For example, spider distribution is often related to vegetation structure and the plant species present. In addition, flowering shrubs are another important resource for spider populations as their flowers can attract prey species (Martin & Green 2004).

- The indigenous shrub stratum has been historically cleared, and no shrub stratum is present (see Plate 4 & 5)
- It does not provide important habitat features for any threatened species at a local, regional or national level.

Ground Stratum and Litter – A variety of herbs, forbs and grasses in the ground stratum can provide similar faunal habitat to that of the shrub stratum, providing food resources and shelter for ground foraging mammals and birds. However, the ground litter is also an important habitat component for fauna and a functioning ecosystem (Lyon 1987). Decomposition by micro-organisms provides a continual input of nutrients into the eco-system and is the beginning of a large food chain (Martin & Green 2004). Many ground dwelling invertebrates rely on a diverse litter layer for shelter and survival. It also provides food resources and shelter for many species of birds, mammals, frogs, reptiles, and invertebrates (Recher & Lim 1990)

- The indigenous ground stratum on the site has been historically cleared and the ground stratum is currently being managed as a lawn, although the dense shade from the codominant trees and competition for nutrients and moisture has resulted in large unvegetated areas (see Plates 4 & 5)
- It does not represent important habitat for any threatened species at a local, regional or national level

### Hollow Trees and Logs

The 'Loss of Hollow-bearing trees' is listed as a key threatening process in Schedule 3 of the NSW TSC Act. In NSW, terrestrial vertebrate species that are reliant on tree hollows for shelter and nests include at least 46 mammals, 81 birds, 31 reptiles and 16 frogs (Gibbons and Lindenmayer 2002). Of these, 40 species are listed as threatened under the NSW TSC Act. On average, it takes about 100 years for a useful hollow to form in Eucalypts and 200 years or more for the formation of a hollow large enough for use by a cockatoo or possum (Martin & Green 2002)

- The majority of the trees located on the site are not of an appropriate size or age class to have developed suitable hollows for large faunal species.
- No cavities considered suitable for hollow dependent fauna were detected.

### Standing and Fallen Dead Timber

Dead timber is an important resource for numerous faunal species and often contains more hollows and refuge than live timber (Bennet 1994). Fallen timber provides refuge for every major group of vertebrate fauna, as well as invertebrates, in woodland (Abensperg-Traun and Smith 1993). It provides foraging habitat for predators, perches for birds and reptiles (Robinson 1992) and feeding, breeding and sheltering habitat for small lizards and invertebrates (Abensperg-Traun and Smith 1993).

- Minor deadwood was detected throughout the upper canopy of a tree on the northern end of the stand (see Plate 6)
- No significant standing or fallen deadwood habitat was detected in the study area.

© ABOUT TREES (2017)

**Bushrocks, Exposed Rock Outcrops & Overhangs**

The presence of rocky outcrops in areas of remnant vegetation can provide important habitat for many species of reptiles, especially if they are associated with tree hollows, fallen deadwood and exfoliating sandstone surface rocks. The density of tree plantings and regrowth vegetation around rock outcrops need to be considered so that thermal environments are not modified in ways that are detrimental to reptile species. (Lindenmayer, D & others 2010) The way rocky outcrops are managed can make a substantial difference to their habitat value and negative impacts on their integrity should be avoided. Bushrocks should be left undisturbed; regrowth vegetation protected and invasive weeds controlled (Michael & Lindenmayer 2010) Bushrock removal has been listed as a key threatening process under Schedule 3 NSW TSC Act. Numerous threatened fauna species are associated with bushrock habitat, and have been identified as being adversely affected by it disturbance and/or removal. As bushrock is habitat for these species, the impact of any development activity that is likely to disturb it must be individually assessed where these species are known or likely to occur

- No rock outcrops or exposed bushrocks where detected in the study area

**Drainage Lines and Water Bodies**

- No drainage lines or water bodied where detected in the study area

## 6.4 Threatened Fauna Survey

A search was undertaken on the 07/03/17 of the NSW NSWS Atlas of NSW Wildlife for the threatened fauna species that are known to occur within a 5 kilometre radius of the site. A list of these species is contained in Appendices 10.4.2. Additional species which have the potential to occur have also been added. An assessment was undertaken of the potential for these species to occur in the study area. This is included in Appendices 10.5.2.

## 6.5 Potential Threats to Threatened Fauna Species

Thirty-three (33) threatened fauna species have been recorded within a 5km radius of the site, and potential habitat is available for nine (16) of these in the Study Area.

Potential foraging habitat is provided for Gang-gang Cockatoo, Varied Sittella, Powerful Owl and Grey-headed Flying Fox, and marginal foraging habitat for two (2) species of microbats (Eastern False Pipistrelle and Eastern Bent Wing Bat). These are highly mobile species, which are known to forage over large areas, and no important habitat features were detected in the study area.

As large areas of similar habitat are available in the local area, the proposed development is unlikely to represent a no significant impact on these species, and no further assessment is considered necessary

The tree canopies could provide marginal foraging habitat for six (6) species of micro-bats. These are highly mobile species with large home ranges, and abundant areas of similar habitat are provided in the local area. No tree cavities or other roosting habitat considered suitable for hollow dependent faunal species were detected in the study area. As such, the proposed tree removal would not be seen as a significant impact on these species. No further assessment is considered necessary.

Blossom on the Eucalypts could provide intermittent foraging habitat for *Pteropus poliocephalus* (Grey-headed Flying-fox). This is also a highly mobile species with a very large home range extending throughout the Sydney basin and beyond. As such, the proposed tree removal would not be seen as a significant impact on this species. No further assessment is considered necessary. In addition, no large tree hollows were detected within the site

Seed capsules in the Eucalypt canopies could provide foraging habitat for Gang-Gang Cockatoo's, but the removal of approximately 20 Eucalypt species within the site would not be seen as a significant impact on this species as very large areas of similar habitat are provided in the immediate areas. In addition, no large tree hollows were detected within the site

© ABOUT TREES (2017)

Capsules on the *Allocasurina littoralis* (Black She-oak) could provide foraging habitat for Glossy-black Cockatoo's, but as no chewed capsules were detected beneath their canopies, they are not currently being used as feed trees. The proposed removal of approximately 4 mature and <15 semi-mature and juvenile She-oak within the site would not be seen as a significant impact on this species as very large areas of similar habitat are provided in the immediate areas.

No significant habitat is provided in the ground or shrub stratums in the study area, but marginal foraging habitat for various small woodland bird species could be provided by the tree canopy. However, the active colony of Noisy Miners in the study area and the lack of indigenous small trees and shrubs would discourage their presence.

> 'The Noisy Miner (*Manoria melanocphala*) is an aggressive honeyeater which is commonly found in degraded Eucalypt woodlands. It tends to exclude almost all other medium sized and small birds. In many studies, the presence of Noisy Miners in a site was found to have a far greater impact on how many birds and how many species occur, than any other factor. This was especially the case where the vegetation had been simplified by thinning of trees and grazing. Removing Noisy Miners allows other bird species to return to a site (Grey 1998). Several studies have shown that the Noisy Miner is less likely to dominate sites where there are trees and shrubs, such as Wattles and She-Oaks, in addition to Eucalypts. (Ford 2010 How Can We Reverse the Loss of Our Woodland Birds? In Temperate Woodlands Conservation and Management)

As such, it is unlikely that any threatened woodland bird species would utilize the study area and no further assessment is considered necessary on these species.

*Heiraaetus morphnoides* (Little Eagle), *Lophoictinia isura* (Square-tailed Kite) and *Falco hypoleucos* (GreyFalcon), have been recorded in the local area. These species are known to forage over large home ranges and the study area could provide marginal foraging habitat. No large stick nests or other important habitat were detected in the study area. The proposed activity is unlikely have a significant impact on these species and no further assessment is considered necessary.

### 6.6 Fauna Species Conclusions

No threatened fauna species were detected within the study area during the survey, and no significant habitat features are provided.

The trees could provide marginal foraging habitat for 16 threatened fauna species, but as these are highly mobile species and large areas of similar habitat are provided in the local area, the proposed development is unlikely to have a significant impact upon them. As such, no further assessment is considered necessary

© ABOUT TREES (2017)

# 7.0 CONCLUSION & RECOMMENDATIONS

The original site vegetation has been historically cleared for agricultural and urban activities. In recent years, the property has been and managed in recent years as a golf course.

The codominant stands of canopy trees within the site and surrounding study area trees have been planted as landscape specimens, and are mostly comprised of introduced species with a few local indigenous trees to the Alluvial Woodland being included. The shrub is absent and the ground stratum is dominated by introduced species of turf grass and lawns.

## 7.1 Threatened Ecological Communities

The condition of the remnant Alluvial Woodland is a component of the *Sydney Coastal River Flat Forest Ecological Community*, which is listed as an endangered ecological community under the Threatened Species Conservation Act 1995 (NPWS 2002). However, is unlikely to comply with the NSW Scientific Communities definition of this community

The Seven Part Test in Appendices 6.1 concluded that the proposed development is unlikely to have a significant effect on the *Sydney Coastal River Flat Forest Ecological Community*. As such, no Species Impact Statement or referral to the Commonwealth Environment Minister is required.

## 7.2 Threatened Flora Species

The site and surrounding study area has been historically cleared for agricultural and urban activities, and is currently managed as a golf-course.

A number of threatened flora species have been recorded in a 5km radius of the site, but these species are unlikely to occur as their preferred habitat is not provided in the study area

No Species Impact Statement or referral to the Commonwealth Environment Minister is required.

## 7.3 Threatened Fauna Species

No threatened fauna species were detected within the site during the survey, and no significant habitat features are provided in the study area.

The trees could provide marginal foraging habitat for 16 threatened fauna species, but as these are highly mobile species and large areas of similar habitat are provided in the local area, the proposed development is unlikely to have a significant impact upon threatened fauna species, populations or their habitats. As such, no further assessment is considered necessary

If you require any further information, please feel free to contact me on 0439 758 658.

Lawrie Smith,
Ecological Consult

© ABOUT TREES (2017)

# 8.0 SITE PHOTOS

Plate 1 – showing northern end of codominant stand of trees, viewed from the southwest

Plate 2 – showing the codominant stand of trees, viewed from the west

Plate 3 – showing southern end of codominant stand of trees, viewed from the northwest

© ABOUT TREES (2017)

Plate 4 – showing cleared shrub and very sparse ground stratums

Plate 5 – showing cleared shrub and very sparse ground stratums

Plate 6 – showing minor dieback in canopy of tree on northwest end of stand

© ABOUT TREES (2017)

# 9.0 REFERENCES


- Abensberg-Traun & Smith (1993) *'Predictable effects of agricultural development on the long-term availability of hollows for animals: observations from the Western Australian wheat belt' Pacific Conservation Biology* 1, 78 – 79.
- Bennett, A.F. Lumsden, L.F. & Nicholls, A.O. (1994) 'Tree Hollows as a resource for wildlife in remnant woodlands: spatial and temporal patterns across the Northern Plains Victoria', *Australia Pacific Conservation Biology* 1, 222 - 235
- BMCC (2002) Draft LEP 2002 CD ROM
- Commonwealth EPBC Act, Protected Matters Report, (2016)
- DEWH & A (2010) '*Cumberland Plain Shale Woodlands and Shale-Gravel Transitional Forest – A guide to identifying the nationally threatened ecological community'*, Department of the Environment, Water, Heritage and the Arts
- DECW (2010) '*Cumberland Plain Recovery Plan'*, Department of Environment and Climate Change and Water (NSW) Sydney
- Fairley, A. (2004) '*Seldom Seen; Rare plants of Greater Sydney'* Reed New Holland Publishers, Australia P/L
- Fisher, A. M, and Gouldney, D. C, (1997) 'Use by birds of riparian vegetation in an extensively fragmented landscape', *Pacific Conservation Biology* 3, 275 – 288
- Ford (2010) 'How can we reverse the loss of our woodland birds?' in Temperate Woodland Conservation and Management ed. Lindenmayer and others CSIRO Publishing Collingwood Victoria
- Gibbons & Lindenmayer (2002) '*Hollow selection by vertebrate fauna in forests of south-eastern Australia and implications for forest management*' *Biological Conservation* 103, 1 – 12.
- Keith & Benson (1988), '*The Natural Vegetation of Katoomba 1:100,000 Map Sheet'*, *Cunninghamia,* Vol. 2 [1] 1988, National Herbarium of NSW
- King, 1994 'Soil Landscapes of Katoomba 1: 100,000 Map Sheet', Soil Conservation Services NSW.
- Land and Property Management Authority (2016) Spatial Information Exchange http://imagery.maps.nsw.gov.au/
- Lindenmayer, D & others (2010) 'The conservation of woodland vertebrate biota in the temperate woodlands of southern New
- South Wales' In: *Temperate Woodland Conservation and Management* (Ed. D. Lindenmayer, A. Bennett & R. Hobbs) CSIRO Publishing; Collingwood Victoria
- McIntire (2002) 'Trees' in Managing and Conserving Grassy Woodlands' ed. McIntyre and others, CSIRO Publishing Collingwood Victoria
- Michael, D. & Lindenmayer, D. (2010) 'The conservation of reptiles in the temperate woodlands of southern New South Wales' In: *Temperate Woodland Conservation and Management* (Ed. D. Lindenmayer, A. Bennett & R. Hobbs) CSIRO Publishing; Collingwood Victoria
- Martin, T. G, & Green, J. L, (2002) 'Wildlife and core conservation areas' In: *Managing & Conserving Grassy Woodlands* (Ed McIntire, S, McIvor, J. G, & Heard, K. M) CSIRO Publishing: Collingwood Victoria
- NSW NPWS Wildlife Atlas Report (2016)
- Recher, H. F, & Lim, L. (1990) '*A review of current ideas of the extinction, conservation and management of Australia's terrestrial vertebrate fauna*' Proceedings of the Ecological Society of Australia 16, 287 - 301
- Recher, H. F, (1991). 'The conservation and management of Eucalypt forest birds: resource requirements for nesting and foraging'. In: *Conservation of Australia's forest fauna*. (Ed. D. Lunney) pp. 25 – 34, Royal Zoological Society of NSW: Mosman.
- Robinson D. (1992) '*Old trees for life' Land for wildlife notes*: September Series No. LW0018 Department of Natural Resources and Environment: Victoria.
- UBD (2004) '*Australian Cities CD ROM'* Universal Publishers P/L


© ABOUT TREES (2017)

# 10.0 APPENDICES

# APPENDICES 1:0 QUALIFICATIONS & EXPERIENCE OF AUTHOR

**QUALIFICATIONS**

- Diploma in Conservation & Land Management, 2005.
- Advanced Diploma in Arboriculture 2002
- Certificate in Horticulture, 1987.

**WORK EXPERIENCE**

- Flora & fauna surveys of the Blue Mountains
- Flora & fauna surveys of the Cumberland Plain in Western Sydney
- Flora & fauna surveys of the Blue Gum High Forest in Northern Sydney
- Flora & fauna surveys in Ku-ring-gai National Park
- Flora surveys of the Illawarra Escarpment
- Flora surveys of Alpine Herbfields in the Australian Alps

**ADDITIONAL TRAINING**

- Ecological Consultants Association (ECA) Conference, Wollongong 2012
- ECA Micro Bat Survey Workshop, Jenolan Caves 2012
- ECA Conference, Gosford 2011
- ECE Reptile Survey Workshop, Bundeena 2011
- ECA Frog & Tadpole Survey Workshop, Smiths Lake 2010
- ECA Conference, Mt Annan 2010
- ECA Eucalyptus Identification Workshop (2010)
- ECA Tree Hollow Workshop, Kioloa 2010.
- ECA Conference, Newcastle 2009
- ECA Fauna Survey Workshop, Smiths Lake 2008
- ECA Conference, Manly 2008
- BMCC Swampcare Workshop – Monitoring Techniques for B/M Water Skink &Giant Dragon-fly in Upland Swamps 2007
- BMCC Swampcare Workshop – Soft Engineering Techniques to Rehabilitate Upland Swamps 2007
- BMCC Swampcare Workshop – Swamp Vegetation of the Blue Mountains Swamps 2007
- BMCC Swampcare Workshop – Identification of Sedges in Upland Swamps 2007
- Sedges of the Sydney Region Identification Workshop, Katoomba 2004
- Grasses of the Blue Mountains Identification Workshop, Katoomba 2003
- Bushland Regeneration, Wentworth Falls TAFE 1998
- Grass & Sedge Identification Workshop, Wentworth Falls 1998
- Frogs of the Sydney Region Identification Workshop, Blackheath 1997

**PROFESSIONAL ASSOCIATIONS**

© ABOUT TREES (2017)

# APPENDICES 2:0 ECOLOGICAL COMMUNTY ASSESSMENT

## 2.1 ECOLOGICAL COMMUNITY CONDITION

**Interpretations of Vegetation Condition Classes (NPWS 2002)**

- **Solid blocks of colour represent areas of relatively intact native tree canopy, or large areas of remnant vegetation with a low or discontinuous canopy, or areas of native vegetation that does not have a Eucalypt canopy cover.**

**Canopy Cover > 10% (Unless Remnant > 5ha, where canopy cover > 5%. Areas mapped as A B or C**

**A.** Relatively intact native tree canopy. Dominant canopy species and understorey characteristics identified.

**B.** Larger areas of remnant vegetation with a low or discontinuous canopy. Often found on the disturbed edges of larger remnants. It has been assessed to identify the dominant canopy species only, and understorey characteristics are not assessed. However, native shrub and grass layer is often present, indicating understorey integrity.

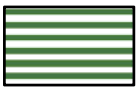
**C.** Areas of native vegetation that do not have a Eucalypt canopy cover. Understorey appears dominated by native vegetation, and codes were applied to identify patches of Melaleuca, Casuarina etc.

- **Diagonal hashing represents areas of remnant trees over urban development.**

**Canopy Cover < 10% (Urban Areas); Areas mapped as Txu**

**Txu'** Areas of scattered trees where Arial Photography Interpretation determined they were in an urban landscape (buildings and roads present), which may preclude the presence of native vegetation understorey (NB. Ground truthing required to check this).

- **Horizontal hashing represents areas of native vegetation with a canopy cover of less than 10%**



**Canopy Cover <10% Areas mapped as Cmin, Tx or Txr**

***Cmin*;** Areas of native vegetation that do not have a Eucalypt canopy cover, as for 'C', but where understorey appears not to be dominated by native vegetation, but with extensive weed presence.

***Tx*;** Areas of native trees with very discontinuous canopy cover agriculture. Boundaries are difficult to define from aerial photographs due to low densities.

***Txr*;** Areas of Tx (as above) located in areas where there is a combination of urban and rural activities such as rural residential development. Most have dominant canopy species assessed.

© ABOUT TREES (2017)

## 2.2 CONSERVATION SIGNIFICANCE ASSESSMENT

**Alluvial Woodland:** NPWS (2002) uses condition classes for native vegetation on the Cumberland Plain to distinguish good and poor quality vegetation (see Appendices 2.1).

The main condition classes include 'A', 'B', 'C', 'TX' and 'TXR' (See Appendices 11.2.1). 'Condition classes A, B and C contains areas with a relatively intact native tree canopy. These condition classes are most likely to contain high levels of floristic diversity (Tozer 2003).

Condition classes TX and TXR contain areas of scattered native canopy (NPWS 2002) and may have either high or low levels of floristic diversity (Tozer 2003). Only a small proportion of TX and TXR areas are likely meet the definition of a TSC Act listed community as defined in the NSW Scientific Committee determination (2009)' (DECW 2010)

Remnants of endangered ecological communities listed under the Threatened Species Conservation Act vary greatly in canopy condition, understorey condition, recovery potential, size and connectivity to other remnants.

To address this variability Perkins (2002) and Eco Logical Australia (2002) developed methods to empirically determine these factors and consequently the degree of ecological constraint represented by remnant vegetation. These methods have been used in the following five-step analysis with the assigned category for the site highlighted in red.

Step 1: Determine the canopy and condition code by reference to Table 1. The result of this is that the site vegetation includes a minor occurrence of remnant trees over urban development

| Code | Canopy Density | Description |
|---|---|---|
| A | >10% | Canopy and understorey in good condition |
| B | <10% | Canopy thinner, some understorey |
| C | | Not used |
| TX | <10% | Scattered tree overstorey over agriculture |
| TXr | <10% | Scattered tree overstorey over rural residential |
| Txu | <10% | Scattered trees over urban development. |

**TABLE 1: CANOPY AND CONDITION CODE** (Source Eco Logical 2002)

© ABOUT TREES (2017)

Step 2: Determine the recovery potential of the vegetation by reference to Table 2. The result of this is that the remnant Alluvial Woodland on the site has a very low recovery potential.

| Current condition and land use | Past land use and disturbance | Soil Condition | Vegetation | Recovery Potential |
|---|---|---|---|---|
| Cleared (no woodland canopy). Includes *Bursaria* thickets in grassland | Recently cleared (<2 years) | Unmodified, largely natural or uncultivated. | Native dominated | High |
| | | | Exotic dominated | Moderate |
| | | Modified. Heavily cultivated and/or pasture improved. Imported material. | Either | Low |
| | Historically cleared (>2 years) and consistently managed as cleared. | Unmodified, largely natural or uncultivated. | Native dominated | Moderate |
| | | | Exotic dominated | Low |
| | | Modified. Heavily cultivated and/or pasture improved. Imported material. | Either | Very Low |
| Wooded/Native Canopy present or regenerating | No recent clearing of understorey | Unmodified, largely natural or uncultivated. | Native understorey relatively intact or in advanced state of regeneration. Native dominated. | High |
| | | | Native understorey significantly structurally modified, absent or largely absent. Includes areas dominated by African Olive. | Moderate |
| | | | Exotic dominated | Low |
| | | Moderately modified by long term grazing or mowing. | Native dominated | Low |
| | | Modified. Heavily cultivated and/or pasture improved. Imported material. | Native understorey significantly structurally modified, absent or largely absent. Includes areas dominated by African Olive. | Very Low |
| | | | Native understorey present. Heavily weed invaded. | Low |
| | Understorey patchily intact | Disturbed | Native dominated | Moderate |
| | | | Exotic dominated | Low |
| | Recent clearing of understorey, and/or native understorey significantly structurally modified due to existing land use (eg. mowing & grazing) | Unmodified, largely natural or uncultivated. | Native dominated. If no vegetation present, assume native dominated. | High |
| | | | Exotic dominated | Moderate |
| | | Modified. Heavily cultivated and/or pasture improved. Imported material. | Native dominated | Low |
| | | | Exotic dominated | Very Low |

**TABLE 2: RECOVERY POTENTIAL** (Source; Eco Logical Australia 2002)

© ABOUT TREES (2017)

Step 3: The recovery potential is combined with the degree of connectivity to other remnants to determine the conservation significance by reference to table 3. The result of this is that the remnant Alluvial Woodland has a conservation significance rating of Other Remnant Vegetation

| Community | Condition | Patch Size* | Connectivity* | Code | Significance rating |
|---|---|---|---|---|---|
| Critically endangered | ABC, Tx or Txr | Any | Any | C3 | Core |
| | Txu | Any | Any | URT | Urban Remnant Trees (Critically Endangered Communities) |
| Not Critically Endangered | ABC | > 10 ha | Any | C1 | Core |
| | | < 10 ha | Adjacent to C3 | C2 | Core |
| | | | Adjacent to S1 | S2 | Support for Core |
| | | | None | O | Other remnant vegetation |
| | Tx or Txr | Any | Adjacent to any Core | S1 | Support for Core |
| | | | None | O | Other remnant vegetation |
| | Txu | Any | Any | O | Other remnant vegetation |
| | Native grasslands in good condition | Any | Adjacent to Core or Support for Core | S3 | Support for Core |

**TABLE 3: CONSERVATION SIGNIFICANCE MATRIX** (Source; Eco Logical Australia 2002).

Step 4: Recovery potential is combined with the conservation significance assessment in table 4 to determine the ecological constraint of the vegetation. The ecological constraint of the remnant Alluvial Woodland is low

| Conservation Significance Assessment | Recovery Potential: High | Moderate | Low | Very Low |
|---|---|---|---|---|
| **Core** | High | High | High | High |
| **Support for core** | High | Moderate | Moderate | Low |
| **Other** | Moderate | Moderate | Low | Low |

**TABLE 4: ECOLOGICAL CONSTRAINT MATRIX PART 1** (Source; Eco Logical Australia 2002).

Step 5: This combines the ecological constraint of the vegetation with the Threatened Species Assessment from section of this report in table 5. This found that threatened species have a low potential of occurring on the site.

| | | Combined Recovery Potential & Local Conservation Significance | | |
|---|---|---|---|---|
| | | **High** | **Moderate** | **Low** |
| **Threatened Species Assessment** | **Known** | High | High | High |
| | **Likely (1)** | High | Moderate | Moderate |
| | **Nil** | High | Moderate | Low |

**TABLE 5: ECOLOGICAL CONSTRAINTS MATRIX PART 2** (Source; Eco Logical Australia, 2002)

© ABOUT TREES (2017)

# APPENDICES 3.0: FAUNA & FAUNA SURVEY

## 3.1 FLORA SURVEY

| | |
|---|---|
| *Allocasurina cunninghamii* | River Oak |
| *Eucalyptus deanei* | Deane's Blue Gum |
| *Eucalyptus microcorys* | Tallow Wood |
| *Eucalyptus sideroxylon* | Mugga Ironbark |
| *Eucalyptus tereticornis* | Forest Red Gum |
| *Pinus rigida* | Pitch Pine |

## 3.2 FAUNA SURVEY

KEY; **Bold –** denotes an threatened or endangered species
* **–** denotes an introduced species

**Observations** S – Seen or heard within site,
A – Seen or heard within adjacent areas
D – Seen or heard from a distance

**BIRDS**

| Scientific Name | Common Name | Seen | Heard | Other |
|---|---|---|---|---|
| *Aviceda subcristata* | Pacific Baza | | | |
| *Cracticus torquatus* | Grey Butcherbird | S | A/D | |
| *Geophaps lophotes* | Crested Pigeon | | | |
| *Gymnorhina tibicen* | Australian Magpie | A | A | |
| *Manorina melonocephala* | Noisy Miner | | | |
| *Platycercus elegans* | Crimson Rosella | S/A | S/A | |

© ABOUT TREES (2017)

# APPENDICES 4.0 – THREATENED BIODIVERSITY IN LOCAL AREA

## 4.1 – THREATENED FLORA SPECIES

| Scientific Name | TSA Act | EPBC Act | Local Records | Key Habitat Requirements | Potential Habitat in Study Area | Species Observed in Study Area |
|---|---|---|---|---|---|---|
| *Eucalyptus benthamii* Camden White Gum | V | N/A | | Only occurs on sandy alluvial soils of the river vallys to the south-west of Sydney. (AF 2004) | **No** | **No** |
| *Dillwynia tenuiflora* | E2 | | 3 | The core distribution is the Cumberland Plain from Windsor and Penrith east to Dean Park near Colebee. Other populations in western Sydney are recorded from Voyager Point and Kemps Creek in the Liverpool LGA, Luddenham in the Penrith LGA and South Maroota in the Baulkham Hills Shire. Disjunct localities outside the Cumberland Plain include the Bulga Mountains at Yengo in the north, and Kurrajong Heights and Woodford in the Lower Blue Mountains | **No** | **No** |
| *Hibbertia puberula* | E1 | | 2 | Extends from Wollemi National Park south to Morton National Park and the south coast near Nowra. It favours low heath on sandy soils or rarely in clay, with or without rocks underneath (Toelken & Miller 2012) | **No** | **No** |
| *Marsdenia viridiflora* | E2 | | 1 | Grows in vine thickets and open shale woodland but is very rare around Sydney. (AF 2004) | **No** | **No** |
| *Melaleuca deanei* Deane's Paperbark | V | V | 5 | This shrub has a very scattered distribution, occurring only in isolated clumps. It seems to prefer dry ridges with sandy soils or with laterite in shrubby woodland. A disjunct population occurs at Faulconbridge and Springwood | **No** | **No** |
| *Persoonia hirsuta* Hairy Geebung | E1 | E | 7 | Restricted to the Greater Sydney district, where it is widely distributed, but uncommon, in Open Forest. Population numbers at each site are very small, usually 1 - 3; only 2 sites have 10 - 20 plants.(AF 2004) | **No** | **No** |
| *Pterostylis chaetophora* | V | N/A | | Recorded in Queensland and NSW. In NSW it is currently known from 18 scattered locations in a relatively small area between Taree and Kurri Kurri, extending to the south-east towards Tea Gardens and west into the Upper Hunter, with additional records near Denman and Wingen. There are also isolated records from the Sydney region. The preferred habitat is seasonally moist, dry sclerophyll forest with a grass and shrub understorey. | **No** | **No** |
| *Pterostylis saxicola* Sydney Plains Greenhood | E1 | | | Commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelved above cliff lines, usually associated with sclerophyll Forest & Woodland on shale/sandstone transitional soils or shale soils (DEC 2005) | **No** | **No** |
| *Pultanaea villifera* (B/M population) | E2 | | 11 | The population of P. villifera in the Blue Mountains Local Government Area is disjunct from other known populations and occurs only at a few small sites in the Springwood-Woodford Area. | **No** | **No** |
| *Syzygium paniculatum* Magenta Lilly-pilly | E1 | V | 1 | A small tree preferring moist deep sand of old sand dunes in rainforest and sandy floodplains of creeks with rainforest remnants. It is widely cultivated and planted as a street tree (Fairly 2004) | **No** | **No** |

© ABOUT TREES (2017)

## 4.2 THREATENED FAUNA SPECIES

### Threatened Bird Species

| Scientific Name | TSA Act | EPBC Act | Local Records | Key Habitat Requirements | Potential Habitat in Study Area | Species Observed in Study Area |
|---|---|---|---|---|---|---|
| *Anthochaeara phrygia* Regent Honeyeater | E4, A | E, M | 5 | Inhabits dry eucalypt forests and woodland in south-eastern mainland Australia. Feeds on nectar and arthropods. The main dietary nectar is taken from 16 species of Eucalypts and 2 species of mistletoe. It is highly mobile, following the flowering seasons of Red Ironbark, White Box and Yellow Box. The occasional sighting of this species in the BM appear to be individuals passing through the area, soon moving on to more suitable areas. There are no known regular sites for the species in the local area, and no breeding records. | No | **No** |
| *Artamus cyanopterus cyanopterus* Dusky Woodswallow | V | N/A | 4 | Widespread from coast to inland of NSW, including the western slopes of the Great Dividing Range and farther west. Despite records showing a wide distribution and occurrence in a variety of habitats, it is considered to be a woodland dependent bird. Due to its foraging mode, it has been classified as an aerial insectivore, primarily feeding on invertebrates, mainly insects, which are captured whilst hovering and sallying above the canopy or over water. The nest is an open shallow untidy cup frequently in an open hollow, crevice or stump. Although they have large home ranges, individuals may spend most of their time in about a 2 ha range and defend an area about 50 m around the nest | **No** | **No** |
| *Botaurus poiciloptilus* Australian Bittern | V | E | 1 | Freshwater wetland habitats, with a widespread but uncommon range 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 bulrushes (Typha spp.) and spike rushes (Eleocharis spp.) DEC 2005 | No | **No** |
| *Callocephalon fimbriatum* Gang-gang Cockatoo | V | N/A | 8 | The Gang-gang Cockatoo has a restricted distribution in South-eastern Australia and occurs in higher altitude old growth eucalypt forests. In winter it may move down into lower altitude woodlands and suburbs. The seeds of the forest eucalyptus and acacias make up most of the diet, supplemented by other plant material and insects. It requires tree hollows for nesting. | Marginal foraging habitat, no tree hollows | **No** |
| *Calyptorhynchus lathami* Glossy Black-Cockatoo | V, E2 | N/A | 9 | Inhabits forests & woodlands on sites with low-soil nutrient status, reflecting the distribution of *Allocasuarina* spp. It feeds exclusively on their cones and requires tree hollows for nesting. | Marginal foraging habitat, no tree hollows | **No** |
| *Daphoenositta chysoptera* Varied Sittella | V | N/A | 8 | Inhabits Eucalypt forests and woodlands, especially rough barked species and mature smooth barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy. Cup shaped nests made of plant fibres in an upright tree fork high in the living tree canopy (DEC 2009) | Marginal foraging habitat | **No** |
| *Lathamus discolor* Swift Parrot | E1 | E | 4 | Winter migrant from Tasmania, feeding mainly on winter flowering Eucalypts in the Sydney region | No | No |

© ABOUT TREES (2017)

## Threatened Bird Species (Continued)

| Scientific Name | TSA Act | EPBC Act | Local Records | Key Habitat Requirements | Potential Habitat in Study Area | Species Observed in Study Area |
|---|---|---|---|---|---|---|
| *Lophoictinia isura* Square-tailed Kite | V | N/A | 4 | In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. It is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to occupy large hunting ranges of more than 100km2. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs. | Marginal foraging habitat, no stick nests | No |
| *Neophema pulchella* Turquoise Parrot | V | N/A | 1 | Endemic to Eastern Australia from N/E Vic through NSW to S/E Qld. In NSW, it typically occurs west of escarpments in the tablelands and on the western slopes. Scattered populations occur near Sydney on steep, rocky sites and gullies, rolling hills, valleys and river flats and nearby plains of the Great Dividing Range. It occurs in Eucalypt Woodlands and Open Forests with a ground cover of grasses and shrubs. Feeding on the seeds of grasses, herbaceous plants and shrubs and requires a regular supply of drinking water. Breeding from August to January, usually nesting less than 2m above the ground in hollows of small trees, fence posts or even logs lying on the ground. | No | No |
| *Ninox connivens* Barking Owl | V | N/A | 1 | Occurs in forests and woodlands, usually on fertile soil, where it feeds on mammals, including large rabbits, and birds up to the size of a magpie. It is dependent on old Eucalypt trees with large hollows for roosting and nesting. | No | No |
| *Ninox strenua* Powerful Owl | V | N/A | 18 | Occurs in forests and woodlands where it feeds primarily on arboreal mammals (gliders and possums). Nests in trees with hollows at least 50cm deep | Yes | No |
| *Petroica boodang* Scarlet Robin | V | N/A | 1 | In NSW, this species occurs from the coast to inland slopes, primarily residing in forests and woodlands. After breeding, some birds disperse to the lower valleys and plains of the tablelands and slopes, joining mixed flocks of other small insectivorous birds which forage through dry forests and woodlands. Breeding, foraging and shelter/roosting and refuge habitat is provided in grasslands, woodlands and dry open forest (DEC 2005) | Marginal foraging habitat | No |
| *Petroica phoenicea* Flame Robin | V | N/A | 4 | In NSW, this species breeds in upland areas and in winter, many birds move to the inland slopes and plains. Breeding habitat - open cuplike nests in sheltered habitat in tall open forest and grassy woodland. Forages on flying insects in forest, woodland and grassland (DEC 2005) | Marginal foraging habitat | No |
| *Tyto novaehollandiae* Masked Owl | V | – | | Occurs in forest and woodland and treeless areas where suitable caves are available for shelter. It ranges over an area of between 500 - 1000 ha where it feeds on small mammals, small birds, insects and young rabbits. It prefers sites with high a density of tree hollows for nesting with a grassy understory. | Marginal foraging habitat, no tree hollows | No |
| *Tylo tenbricosa* Sooty Owl | V | | | Occurs in forest and woodland and treeless areas where suitable caves are available for shelter. It ranges over an area of between 500 - 1000 ha where it feeds on small mammals, small birds, insects and young rabbits. It prefers sites with high a density of tree hollows for nesting with a grassy understory. The only record of the species in the BM is one seen in Blue Gum Swamp, Winmalee in 1981 | No | No |

© ABOUT TREES (2017)

## Threatened Mammal Species

| Scientific Name | TSA Act | EPBC Act | Local Records | Key Habitat Requirements | Potential Habitat in Study Area | Species Observed in Study Area |
|---|---|---|---|---|---|---|
| *Cercartetus nanus* Eastern Pygmy Possum | V | | | Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable. | Marginal foraging habitat, no tree hollows | No |
| *Chalinolobus dwyeri* Large-eared Pied Bat | V | V | | Well-timbered areas with rocky outcrops and gullies. Roosts in caves (near entrances), crevices in cliffs, old mine workings and the disused mud nests of Fairy Martins. Probably forages for small, flying insects below the forest canopy. | Marginal foraging habitat, no tree hollows | No |
| *Dasyurus maculatus* Spotted Tiger Quoll | V | E | | Forests, woodlands, health and rainforests. Requires den sites in hollow logs, tree cavities, rock outcrops or caves. Large areas of relativity intact vegetation to forage for birds, small mammals and reptiles | No | No |
| *Falsistrellus tasmaniensis* Eastern False Pipistrelle | V | | | Occurs in forests and woodlands, preferring gullies and highland areas to 1500m where it forages on insects above or just below the tree canopy. Roosts in tree hollows, caves and abandoned buildings. | Marginal foraging habitat, no tree hollows | No |
| *Miniopterus schreibersii oceanensis* Eastern Bent Wing Bat | V | | | Primary roosting habitat is caves, but also known to uses derelict mines, stormwater tunnels and building etc. Forages in forested areas, catching moths and other flying insects above tree tops | Marginal foraging habitat, no tree hollows | No |
| *Mormophterus norfolkensis* Eastern Free-tail Bat | V | | | Dry sclerophyll forests and woodlands on the east side of the Great Dividing Range. Roosts mainly in tree hollows, also known to roost under bark or manmade structures. Probably insectivorous. | Marginal foraging habitat, no tree hollows | No |
| *Myotis macropus Southern* Myotis | V | | | Habitat includes forests, mangroves, paperbark swamps, woodlands and rainforest near slow flowing creeks, lakes and esturies. Feeds on insects, aquatic insects and small fish. Roost close to fresh water in caves, tunnels, buildings, tree hollows and dense vegetation. | Marginal foraging habitat, no tree hollows | No |
| *Petaurus australis* Yellow-bellied Glider | V | | | Restricted to tall mature forests in areas of high rainfall. It requires winter flowering Eucalypts & other plants that provide edible sap and nectar throughout the year. Roosts and nests in suitable cavities in tall mature Eucalypts | No | No |
| *Petaurus volans* Greater Glider | | | | The population of the Greater Glider *Petauroides volans*, occupying the Eurobodalla local government area, is eligible to be listed as an endangered population as in the opinion of the Scientific Committee it is facing a very high risk of extinction in New South Wales in the near future as determined in accordance with the following criteria as prescribed by the Threatened Species Conservation Regulation 2002: | No | No |
| *Phascolarctos cinereus* Koala | V | | | Eucalypt forests and woodlands where they browse on the foliage of specific Eucalyptus feed trees. | Marginal foraging habitat, | No |
| *Pteropus poliocephalus* Grey-headed Flying-fox | V | V | | A highly mobile species that can range over an extensive area where it feeds on a various Eucalypt nectar & blossom and on native and introduced fruits. | Marginal foraging habitat | No |
| *Scoteanax rueppellii* Greater Broad Nosed Bat | V | | | Rainforests, forests, woodlands & moist gullies below 800m. Feeds on insects. Roosts in tree hollows | Marginal foraging habitat, no tree hollows | No |

© ABOUT TREES (2017)

## Threatened Amphibian Species

| Scientific Name | TSA Act | EPBC Act | Local Records | Key Habitat Requirements | Potential Habitat in Study Area | Species Observed in Study Area |
|---|---|---|---|---|---|---|
| *Heleioporus australiacus* Giant Burrowing Frog | V | V | | In the Sydney region this species prefers sandstone ridgetop habitat and upland valleys. It is associated with small headwater creek lines and along slow flowing creek lines in woodland, open-woodland and heath and may be associated with hanging swamps. Its diet consists mainly of invertebrates; including ants, beetles, cockroaches, spiders, centipedes and scorpions. | No | No |
| *Litoria aurea* Green & Gold Bell Frog | E1 | V | 2 | The Green and Golden Bell Frog inhabit marshes, dams and stream sides, particularly those containing bulrushes or spike rushes. Optimum habitat includes water bodies which are unshaded, free of predatory fish, have a grassy area nearby and diurnal sheltering sites such as vegetation and/or rocks | No | No |
| *Pseudophryne australis* Red-crowned Toadlet | V | | | Found in low nutrient, sandstone seepage lines in dry forests, woodlands & heath typical of Hawkesbury & Narabeen geology. Favoured microhabitats for shelter sites are under flat sandstone rocks, either resting on bare rock or damp ground. They can be found under logs on soil, beneath thick ground litter, particularly near large trees and in horizontal rock crevices near the ground. Opportunistic breeding occurs in and around rocks and debris around non-perennial creek beds. Preferred breeding sites are seepage lines or beneath accumulated leaf litter in association with temporary pools | No | No |

## Threatened Reptile Species

| Scientific Name | TSA Act | EPBC Act | Local Records | Key Habitat Requirements | Available Habitat on site | Species Observed on Site |
|---|---|---|---|---|---|---|
| *Hoplocephalus bungaroides* (Broad-headed Snake) | E1 | V | | Restricted to the Sydney Basin within a radius of 200km of Sydney. They typically occur on sites with exposed sandstone outcrops and benching with a westerly to northerly aspect. Sites usually contain canopy trees of *Corymbia eximia* & *C. gummifera*. They utilise rock crevices and exfoliating sheets of weathered sandstone during the cooler months and tree hollows during summer. Preys predominantly on Velvet Geckos during the cooler months and small mammals and arboreal skinks in summer. | No | No |

## Threatened Mollusk Species

| Scientific Name | TSA Act | EPBC Act | Local Records | Key Habitat Requirements | Potential Habitat in Study Area | Species Observed in Study Area |
|---|---|---|---|---|---|---|
| *Meridolum corneovirens* Cumberland Land Snail | E1 | | | The Cumberland Land Snail occurs within the Cumberland Plain region of Western Sydney. It is restricted to the Cumberland Plain, Castlereagh Woodlands and along the fringes of the River Flat Forest. Typically occurs under logs and other debris, amongst leaf and bark litter beneath trees and sometimes under grass clumps. | No | No |

## Threatened Insect Species

| Scientific Name | TSA Act | EPBC Act | Local Records | Key Habitat Requirements | Potential Habitat in Study Area | Species Observed in Study Area |
|---|---|---|---|---|---|---|
| *Petaluridae gigantea* Giant Dragonfly | E1 | | | No | No | No |

© ABOUT TREES (2017)

# APPENDICES 5.0 – THREATENED BIODIVERSITY ASSESSMENT

## 5.1 THREATENED FLORA SPECIES

The site and surrounding study area has been historically cleared for agricultural and urban activities, and is currently managed as a golf-course.

A number of threatened flora species have been recorded in a 5km radius of the site, but these species are unlikely to occur as their preferred habitat is not provided in the study area.

## 5.2 THREATENED FAUNA SPECIES

Thirty-three (33) threatened fauna species have been recorded within a 5km radius of the site, and potential habitat is available for nine (16) of these in the Study Area.

Potential foraging habitat is provided for Gang-gang Cockatoo, Varied Sittella, Powerful Owl and Grey-headed Flying Fox, and marginal foraging habitat for two (2) species of microbats (Eastern False Pipistrelle and Eastern Bent Wing Bat). These are highly mobile species, which are known to forage over large areas, and no important habitat features were detected in the study area.

As large areas of similar habitat are available in the local area, the proposed development is unlikely to represent a no significant impact on these species, and no further assessment is considered necessary

The tree canopies could provide marginal foraging habitat for six (6) species of micro-bats. These are highly mobile species with large home ranges, and abundant areas of similar habitat are provided in the local area. No tree cavities or other roosting habitat considered suitable for hollow dependent faunal species were detected in the study area. As such, the proposed tree removal would not be seen as a significant impact on these species. No further assessment is considered necessary.

Blossom on the Eucalypts could provide intermittent foraging habitat for *Pteropus poliocephalus* (Grey-headed Flying-fox). This is also a highly mobile species with a very large home range extending throughout the Sydney basin and beyond. As such, the proposed tree removal would not be seen as a significant impact on this species. No further assessment is considered necessary. In addition, no large tree hollows were detected within the site

Seed capsules in the Eucalypt canopies could provide foraging habitat for Gang-Gang Cockatoo's, but the removal of approximately 20 Eucalypt species within the site would not be seen as a significant impact on this species as very large areas of similar habitat are provided in the immediate areas. In addition, no large tree hollows were detected within the site

Capsules on the *Allocasurina littoralis* (Black She-oak) could provide foraging habitat for Glossy-black Cockatoo's, but as no chewed capsules were detected beneath their canopies, they are not currently being used as feed trees. The proposed removal of approximately 4 mature and <15 semi-mature and juvenile She-oak within the site would not be seen as a significant impact on this species as very large areas of similar habitat are provided in the immediate areas.

No significant habitat is provided in the ground or shrub stratums in the study area, but marginal foraging habitat for various small woodland bird species could be provided by the tree canopy. However, the active colony of Noisy Miners in the study area and the lack of indigenous small trees and shrubs would discourage their presence.

> 'The Noisy Miner (*Manoria melanocphala*) is an aggressive honeyeater which is commonly found in degraded Eucalypt woodlands. It tends to exclude almost all other medium sized and small birds. In many studies, the presence of Noisy Miners in a site was found to have a far greater impact on how many birds and how many species occur, than any other factor. This was especially the case where the vegetation had been simplified by thinning of trees and grazing. Removing Noisy Miners allows other bird species to return to a site (Grey 1998). Several studies have shown that the Noisy Miner is less likely to dominate

© ABOUT TREES (2017)

sites where there are trees and shrubs, such as Wattles and She-Oaks, in addition to Eucalypts. (Ford 2010 How Can We Reverse the Loss of Our Woodland Birds? In Temperate Woodlands Conservation and Management)

As such, it is unlikely that any threatened woodland bird species would utilize the study area and no further assessment is considered necessary on these species.

*Heiraaetus morphnoides* (Little Eagle), *Lophoictinia isura* (Square-tailed Kite) and *Falco hypoleucos* (GreyFalcon), have been recorded in the local area. These species are known to forage over large home ranges and the study area could provide marginal foraging habitat. No large stick nests or other important habitat were detected in the study area. The proposed activity is unlikely have a significant impact on these species and no further assessment is considered necessary.

© ABOUT TREES (2017)

# APPENDICES 6.0 – SEVEN PART TESTS

## 6.1 SYDNEY COASTAL RIVER FLAT FOREST

**In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population is likely to be placed at risk of extinction.**

Response – This question is not relevant to a threatened Ecological Community

**b. In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population is likely to be placed at risk of extinction.**

Response – This question is not relevant to a threatened Ecological Community

**c. In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

**(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk**

Response – The remnant *Sydney Coastal River Flat Forest Ecological Community* is comprised of a few trees that have been included as part of landscape planting that are dominated by introduced species. No indigenous shrub or ground stratums occur in the study area.

The proposed activity is unlikely to place any local occurences of the *Sydney Coastal River Flat Forest Ecological Community* at risk

**(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.**

Response – Substantial and adverse modification of the ecological community is unlikely and the proposed development is unlikely to be place a local occurrence of the community at risk of extinction.

**d. In relation to the habitat of a threatened species, population or ecological community:**

**(i) The extent to which habitat is likely to be modified as a result of the action proposed**

Response – The activity may require the removal of up to 10 indigenous trees

**(ii) Whether an area of is to become fragmented or isolated from other areas of habitat as a result of the proposed action**

Response – No, the proposed tree removal is on the south-eastern side of the golf course and this area has already been fragmented by Leonay Road and urban development.

**(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long term survival of the species, population or ecological community in the locality.**

Response – The condition of the *Sydney Coastal River Flat Forest Ecological Community* is a minor occurrence of remnant trees over urban development. No shrub or ground stratum are present. The remnant trees are highly unlikely to meet the definition of the ecological community.

**e. Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)**

Response – No areas of critical habitat have been declared for the *Sydney Coastal River Flat Forest Ecological Community*.

**f. Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.**

© ABOUT TREES (2017)

Response – A number of objective and strategies for this community have been detailed in DEC (2006) 'Introducing the threatened species priority action statement'. Of relevance to this proposal are the following objectives.

1. Surveying and mapping

The 1st objective is served by undertaking the survey for this assessment and the provision of data to the relevant authorities.

**g. Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

Response – The proposed action relates to Clearing of Native Vegetation within an area previously cleared for agriculture. As the action proposed is listed as a key threatening process on Schedule 3 of NSW TSC Act (1995), but it is unlikely to increase the impacts of any threatening process at a local, regional or national level.

**CONCLUSION**

This Seven Part Test indicates that the proposed development is unlikely to have a significant impact upon the remnant Sydney Coastal River Flat Forest ecological community in the study area, and it is unlikely to place its local

© ABOUT TREES (2017)

# APPENDICES 7.0 – GLOSSARY

**Activity Means:**

- the erection of a building;
- the carrying out of a work in, on, over or under land;
- the use of land or of a building or work;
- the subdivision of land;
- any act, matter or thing prescribed in an environmental planning instrument under s26 of the EP&A Act as an activity; but does not include any act, matter or thing for which development consent under Part 4 is required or has been obtained or is prohibited under an environmental planning instrument (EP&A Act).

**AEC** (also known as ACEC) **–** Animal Ethics Committees control animal research. Their role is to advise, monitor, discipline and control animal research and approve animal supply for research. They must also ensure that all research conducted in their institution, or by the independent researchers they supervise, complies with the NSW *Animal Research Act 1985* and the *Australian Code of Practice for the Care and Use of Animals for Scientific Purposes*.

**AMG** – Australian Map Grid coordinates.

**Animal** – Means any animal, whether vertebrate or invertebrate, and at whatever stage of development, but does not include fish within the meaning of the FM Act other than amphibians or aquatic or amphibious mammals or aquatic or amphibious reptiles (TSC Act).

**ARA**: (Australian Research Authority) – This is a requirement for every person undertaking animal research under the NSW *Animal Research Act 1985*. The authorities are issued by either an accredited research establishment or by the Director-General of NSW Agriculture.

**Biodiversity** – The biological diversity of life is commonly regarded as being made up of the following three components:

- Genetic diversity – the variety of genes (or units of heredity) in any population;
- Species diversity – the variety of species; and
- Ecosystem diversity – the variety of communities or ecosystems

**Clearing** – Under the *Native Vegetation Act 2003 clearing* native vegetation means any one or more of the following:

- cutting down, felling, thinning, logging or removing native vegetation,
- killing, destroying, poisoning, ring barking, uprooting or burning native vegetation.

**Consent Authority** – In relation to a development application means:
a) the council having the function to determine the application; or
b) the Minister, public authority (other than a council) or Director General of DIPNR where specified in an environmental planning instrument (EP&A Act).

**Conservation** – The protection, maintenance, management, sustainable use, restoration and enhancement of the natural environment (NPWS 1997a-d)

**Conservation Reserves** – Consists of those areas gazetted as National Parks, Nature Reserves and State Conservation Areas under the NPW Act, and those areas designated as Plant Reserves under the *Forestry Act 1916* (NPWS 1996a).

**Critical Habitat** – Habitat declared to be critical habitat under Part 3 of the TSC Act. For the purposes of the TSC Act and other Acts amended by the TSC Act, critical habitat is the whole or any part or parts of an area or areas of land comprising the habitat of an endangered species, an endangered population or an endangered ecological community that is critical to the survival of the species, population or ecological community (TSC Act).

**DBH** – Diameter of a tree at breast height

© ABOUT TREES (2017)

**Determining Authority** – A Minister or public authority:

- by or on whose behalf an activity is to be carried out; or
- whose approval is required in order to enable the activity to be carried out (EP&A Act)

**Development** – In relation to land:

- the erection of a building on that land;
- the carrying out of a work in, on, over or under land;
- the use of land or of a building or work on that land; and,
- the subdivision of that land; but does not include any development of a class or description prescribed by the EP&A Act for the purpose of this definition (EP&A Act).

**Development Application** – An application for consent under Division 1 of Part 4 of the EP&A Act, to carry out development (EP&A Act)

**Ecological Community** – An assemblage of species occupying a particular area

**Endangered Ecological Community** – An ecological community specified in Part 3 of Schedule 1 of the TSC Act (TSC Act)

**Endangered Population** – A population specified in Part 2 of Schedule 1 of the TSC Act (TSC Act).

**Endangered Species** – A species specified in Part 1 of Schedule 1 of the TSC Act (TSC Act).

**Environmental Weed** – Any plant that is not native to the local area that has invaded the native vegetation (DLWC 1999a-c)

**Habitat** – An area or areas occupied, or periodically or occasionally occupied by a species, population or ecological community and includes any biotic or abiotic components.

**Harm** – To harm an animal (including an animal of a threatened species, population or ecological community) includes hunt, shoot, poison, net, snare, spear, pursue, capture, trap, injure or kill, but does not include harm by changing the habitat of an animal (which is damage of habitat) (NPW Act 1974).

**Hollow-bearing Tree** – A tree where the base, trunk or limbs contain hollows, holes and cavities that have formed as a result of decay, injury or other damage. Such hollows may not be visible from the ground, however may be apparent from the presence of deformities such as burls, protuberances or broken limbs, or where it is apparent the head of the tree has been lost or broken off (NPWS 1999).

**Isolated Trees** – Isolated trees are individual or scattered small clumps of trees (1-5) that occur in a highly modified landscape (eg. in a wheat paddock), where there are no understorey plants and the groundcover typically comprises non-native species. As an indication, these trees or clumps are generally spaced in excess of 100 metres apart or greater (DLWC 1999a,b).

**Key Threatening Process** – A threatening process specified in Schedule 3 of the TSC Act. Threatening process is defined as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities (TSC Act).

**Likely** – Taken to be a real chance or possibility (NPWS 1996a)

**Life cycle** – The sequence of events from the origin as a zygote, to the death of an individual (NPWS 1996a)

**Limit of its Geographic Range** – The final or furthest boundary or point that a plant or animal species continues to extends to, in relation to the known geographical extent of distribution of that species (NPWS 1996a).

**Local Population** – The population that occurs within the study area, unless the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the boundary can be demonstrated (NPWS 1996a)

**Native Vegetation** – Any of the following types of indigenous vegetation: trees, understorey plants, groundcover and plants occurring in a wetland (DLWC 1999a & b).

© ABOUT TREES (2017)

**Nest** – Includes but is not limited to, a structure built by birds, or a tree hollow, or a site on the ground or in a cave used by birds for the purposes of the incubation and/or rearing of young. A nest also includes a site where the actual nest can not be seen or found, however there is clear evidence of breeding nearby and it is considered likely that a nest occurs nearby (ie. within 50 metres) (NPWS 1999).

**Pick** – To pick a native plant (including a threatened species, population or ecological community) means to gather, pluck, cut, pull up, destroy, poison, take, dig up, remove or injure the plant or any part of the plant (NPW Act 1974).

**Plant** – Means any plant-life that is indigenous to NSW, whether vascular or non-vascular and in any stage of biological development, and includes fungi and lichens, but does not include marine vegetation within the meaning of the FM Act.

**Population** – A group of organisms, all of the same species, occupying a particular area

**Proponent** – In relation to an activity:

- any person proposing to carry out the activity;
- State Forests of NSW in respect to forestry activities authorised by State Forests on land under the management of State Forests; or
- Any determining authority which the Minister certifies in writing to be the proponent of a particular activity or for which the regulation declares to be the proponent of an activity of the kind specified in the regulation (EP&A Act).

**Protected Areas** – Any reserve that fits the IUCN criteria with its function being conservation; in NSW, this includes areas gazetted as National Parks, Nature Reserves and State Conservation Areas under the NPW Act, and those areas designated as Plant Reserves under the *Forestry Act 1916* (NPWS 1996b).

**Protected Species** – Those species defined as protected under the NPW Act. It includes all native animals, and all native plants listed on Schedule 13 of the NPW Act.

**Public Authority** – Under the *Threatened Species Conservation Act 1995* ***public authority*** means any public or local authority constituted by or under an Act, a government department, a statutory body representing the Crown, or a State owned corporation, and includes a person exercising any function on behalf of the authority, department, body or corporation and any person prescribed by the regulations to be a public authority

**Record** – Where the record pertains to animal, includes an observation of a live or dead individual of a species, or any parts of an individual, or a sign that indicates the species' presence. Where the record pertains to plant, includes any part of a plant including, but not limited to, roots, stems, branches, leaves, fruits, seeds and flowers (NPWS 1999).

**Recovery Plan** – A plan prepared and approved under Part 4 of the TSC Act.

**Region** – For the purposes of the provision in which it is used, a bioregion defined in a national system of bio-regionalisation that is determined (by the Director-General by order published in the Gazette) to be appropriate for those purposes. If the bioregion occurs partly within and partly outside NSW, the region consists only of such much of the bioregion as occurs within NSW (TSC Act).

**Risk of Extinction** – A species is at risk of extinction if its numbers are reduced to such a critical level, or its habitats have been so drastically reduced, that it is in danger of becoming extinct (NPWS 1996a).

**Rocky Outcrop** – An area where rocks or exposed boulders cover more than 70% of any 0.1 hectare area (30 metres by 30 metres); and/or areas with skeletal soils (areas with shallow soils where rocks are exposed), supporting heath or scrub (sometimes with occasional emergent trees) (NPWS 1999)

**Roost** – Where the roost relates to a microchiropteran bat tree roost, it includes a tree, stag or rocky crevice where there is clear evidence that a microchiropteran bat has roosted, such as an accumulation of bat excreta or where a microchiropteran bat has been seen flying into or out. Where the roost relates to threatened owls, roost includes a site where an owl has been observed roosting (ie. sheltering or resting during the day); and/or a site where there is clear evidence that an owl has roosted such as where there are owl pellets, remains of prey or owl excreta (NPWS 1999).

© ABOUT TREES (2017)

**Sap Feed Tree** – A tree, with recent 'V-notch incisions' or other incisions, made by Yellow-bellied Gliders or Squirrel Gliders to obtain sap. Recent incisions are less than two years old and not closed (NPWS 1999)

**Scientific Committee** – The Scientific Committee constituted under Part 8 of the TSC Act.

**Scientific Licence** – A scientific licence is required under the NPW Act to undertake an action for scientific, educational or conservation purposes that is likely to result in one of more of the following:

- Harm to any protected fauna, or to an animal that is of, or is part of, a threatened species, an endangered population or an endangered ecological community;
- the picking of any protected native plant or of any plant that is of, or is part of, a threatened species, an endangered population or an endangered ecological community;
- damage to critical habitat; or,
- damage to a habitat of a threatened species, an endangered population or an endangered ecological community. These licences are issued by the DEC.

**Significant** – Important, weighty or more than ordinary (NPWS 1996a)

**Species** – Of an animal or plant; includes any defined sub-species and taxon below a sub-species and any recognisable variant of a sub-species or taxon.

**Species Impact Statement** – A statement referred to in Division 2 of Part 5 of the TSC Act and includes an environmental impact statement, prepared under the EP&A Act that contains a Species Impact Statement (TSC Act).

**Species Presumed Extinct** – A species specified in Part 1 or 4 of Schedule 1 or in Schedule 2 of the TSC Act (TSC Act).

**Stag** – A standing dead and dry tree greater than 30 centimetres DBH, and greater than three metres in height (NPWS 1999)

**Study Area** – The subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly (NPWS 1996a)

**Subject Site** – The area to be directly affected by the proposal

**Threat Abatement Plan** – Plan prepared and approved under Part 5 of the TSC Act (TSC Act).

**Threatened Biodiversity** – For the purpose of this document threatened biodiversity refers to threatened species, populations or ecological communities, or their habitats.

**Threatened Species** – A species specified in Schedule 1 Part 1 (endangered species), Part 4 (presumed extinct) and Schedule 2 (vulnerable species) of the TSC Act (TSC Act).

**Threatened Species, Populations or Ecological Communities** – Means a species, population and ecological community identified in either Schedule 1 or Schedule 2 of the TSC Act (TSC Act)

**Threatening Process** – A process that threatens, or may have the capability to threaten, the survival or evolutionary development of the species, population or ecological community (TSC Act)

**Viable Local Population** – A population that has the capacity to live, develop and reproduce under normal conditions, unless the contrary can be conclusively demonstrated through analysis of records and references (NPWS 1996a).

**Vulnerable Species** – A species specified in Schedule 2 of the TSC Act (TSC Act).

© ABOUT TREES (2017)

# 11.0 PROPOSED SITE PLAN


© ABOUT TREES (2017)