CLAYMORE URBAN RENEWAL PROJECT

Ecological Study

For:

LANDCOM

June 2011

Final Report

Cumberland Ecology
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Report No. 11022RP1

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

Approved by:	David Robertson
Position:	Project Director
Signed:	
Date:	*14 June, 2011*

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INTRODUCTION

Purpose

The purpose of this report is to summarise the findings of an investigation of the ecological impacts of the proposed urban renewal project at Claymore ("the Project") in western Sydney. The scope of work entailed mapping and assessment of existing native flora and fauna across the Project Area, evaluating drafts of the Concept Plan for urban renewal and then assessing the impacts of the preferred Concept Plan on native flora and fauna.

This impact assessment covers all native flora and fauna including terrestrial and freshwater species but focuses upon threatened communities, species and populations listed by both the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Background

Cumberland Ecology was engaged by Landcom to conduct an ecological investigation of land at Claymore in western Sydney. The Claymore Urban Renewal Project is a 125 hectare public housing estate located along Badgally Road adjacent to the Hume Highway M5 in the Campbelltown Local Government Area (LGA). This land was originally cleared and used for farming early in the history of Sydney. The predominant agricultural use was for grazing and by the late 1970s the Project Area consisted of open grassland areas with scattered young regrowth of native trees.

Claymore is one of the largest public estates in South West Sydney, containing 1096 public housing dwellings, including detached cottages and townhouses. The estate was planned in the 1980s using the Radburn design principle with cul-de-sac, pedestrian pathways and excessive large open space areas; this design having proved to be unsuccessful in this context.

The concept plan will be delivered in stages over a 12-15 year period. Upon completion, it is anticipated that the Project will deliver approximately 1,280 dwellings/lots of which a maximum of 30% of the final yield will be retained for public housing. The development will include:

- The demolition of existing townhouses, poor configured cottages and structures including roads and services;
- Upgrades to existing Housing NSW (HNSW) cottages to be retained on site;

- The construction of a new subdivision with works including new streets, stormwater management works, utility services and bulk earthworks;
- Public domain improvements, including landscaped reserves and new parks, as part of a networks of public open spaces and street trees; and
- A use of land for housing and related purposes.

METHODS

A literature review was conducted of relevant ecological literature that covered flora and fauna of the Project Area and surrounding locality. Databases containing flora and fauna records, including the State Wildlife Atlas and the Commonwealth Protected Matters Search Tool, were also interrogated to acquire information about flora and fauna known to occur in the locality.

Vegetation mapping of the subject land and that in the surrounding locality by the NSW Department of Environment and Heritage (NSW DEH) was studied to gain an appreciation of broad vegetation types that occurred.

Field surveys were conducted in April/May 2011 to ground truth the NSW DEH vegetation mapping; examine the nature and extent of fauna habitats; and to search for threatened species.

Vegetation was studied by completing 400 metre square quadrats within mapped native vegetation on the subject land. Within each quadrat each species of vascular plant was recorded and assigned a cover value. Plant community type was recorded and notes were made about the quality of fauna habitat.

Within patches of native trees and semi-natural grassland, targeted surveys were done for threatened plants, Cumberland Land Snail (*Meridolum corneovirens*) and for threatened bats. The methods used for surveying these species is summarised within this report.

All habitats for native flora and fauna on site were considered and covered in the survey including remnant forest and woodland trees and riparian (stream) areas.

RESULTS OF FIELD INVESTIGATIONS

The Project Area has had a long history of human land use and development. Originally used for farming, the land had been cleared and heavily modified by the time of the original housing development in the 1980s. All original trees appear to have been cleared and the native trees that occurred scattered across the gently undulating site are made up of regrowth and planted trees of various ages. The canopy is largely dominated by planted Australian native trees most of which are representative of the original vegetation

community within the area; however irregular occurrences of exotic native trees indicate the fact that most of the trees in the area are in fact planted. It is predicted that this planting occurred either in an agricultural setting, or following the original housing development.

Notwithstanding the high degree of modification of the landscape, areas of semi-natural vegetation remain and these have been derived from, or are low quality examples of, two threatened vegetation types:

- River-flat Eucalypt Forest (TSC Act listed); and
- Cumberland Plain Woodland (TSC Act & EPBC Act listed).

The natural or semi-natural vegetation that occurs form patches within reserves including Badgally Reserve, Dimeny Park, Fullwood Reserve and Davis Park. All of these areas are mown regularly and the vegetation consists of trees above a mown lawn, consisting of both native and exotic herbaceous plants. Young mature native trees occur within yards of houses and along roadsides within the Project Area.

The River-flat Eucalypt Forest includes scattered, highly modified stands of paperbarks (*Melaleuca* spp) and various trees such as Swamp Oak (*Casuarina glauca*) and Cabbage Gum (*Eucalyptus amplifolia*). The occurrences of the Cumberland Plain Woodland include specimens of Coastal Grey Box (*E. moluccana*), Forest Red Gum (*E. tereticornis*), Narrow-leaf Ironbark (*E. crebra*) and Spotted Gum (*Corymbia maculata*).

Native shrubs and creepers are essentially missing from treed areas due to mowing. The ground stratum includes grasses such as *Austrostipa racemosa*, Windmill Grass (*Chloris ventricosa*), and Weeping Meadow Grass (*Microlaena stipoides*). Native herbaceous plants include *Einadia polygonoides*, Kidney Weed (*Dichondra repens*), Twinning Glycine (*Glycine clandestina*) and *Oxalis perenans*. Exotic grasses are abundant and include such species as Couch (*Cynodon dactylon*), Paspalum (*Paspalum distichum*), African Love Grass (*Eragrostis curvula*) and Kikuyu (*Pennisetum clandestinum*). Exotic herbs include such species as Cats Ear (*Hypochaeris radicata*), Common Plantain (*Plantago lanceolata*), Fireweed (*Solanum madagascariensis*) and Spear Thistle (*Cirsium vulgare*). A list of species encountered in the field surveys and/or predicted to occur based upon literature review and interpretation of database records is presented in this report.

Fauna habitats are quite limited in the Project Area. Most trees lack hollows. There are no major water bodies and the gully that occurs along the northern boundary of the Project Area is a dry ephemeral creek that has been drained and is now regularly mown.

As a consequence of the modification of the Project, the fauna of the Project Area is typical of suburban areas. It is dominated by hardy native birds such as Australian Magpie (*Cracticus tibicen*), Australian Raven (*Corvus coronoides*), Eastern Rosella (*Platycercus eximius*), Rainbow Lorikeet (*Trichoglossus haematodus*) and Noisy Miner (*Manorina melanocephala*). Likely fauna includes Ringtail Possum (*Pseudocheirus peregrinus*) and Common Brush-tail Possum (*Trichosurus vulpecula*). Herpetofauna is poorly represented

due to mowing but is likely to include grass and garden skinks (*Pseudomoia* spp, and *Lampropholis* spp.) as well as the Common Eastern Froglet (*Crinia signifera*) and Spotted Marsh Frog *(Limnodynastes tasmaniensis*). A list of species encountered in the field surveys and/or predicted to occur based upon literature review and interpretation of database records is presented in this report. Likely feral animals include foxes and feral cats and Black Rats are well established in the Project Area.

Targeted surveys for threatened species did not locate any threatened species of plants or animals. However, several threatened species have limited potential to occur, these comprising mainly wide ranging threatened species such as bats, including the Grey-headed Flying Fox (*Pteropus poliocephalus*) and various microbats.

IMPACTS OF THE PROPOSED REDEVELOPMENT

The proposed redevelopment of the Project Area will remove patches of species-poor Cumberland Plain Woodland within Badgally Reserve and along the eastern side of the Project Area as well as a small area of River Flat Eucalypt Forest. It will also remove native trees from across the existing suburban areas. At this stage it is not possible to be precise about the numbers of trees to be removed in the redevelopment process.

The Project will provide for revegetation of the riparian corridor on the northern boundary of the Project Area with native trees, shrubs and understorey plants. Native trees will also be retained within passive recreation areas of Dimeny Park; Fullwood Reserve; Badgally Park and Davis Park.

Some Cumberland Plain Woodland of low management viability will be removed as the Project Area is redeveloped. This will be compensated for by replanting of species endemic to Cumberland plain Woodland, particularly along the along the Linear Park to the north of the Project Area.

No significant impacts are predicted for threatened species of plants or animals as a result of the redevelopment of the Project Area.

It is recommended that:

- A Vegetation Management Plan be prepared and implemented to guide the revegetation and ongoing maintenance of the Project Area;
- A variety of local native plants including riparian and dry land woodland should be replanted along the linear park (Brady Park through to Fullwood reserve) traversing the northern portion of the Project Area; and
- Consideration be given to retention of as many native trees within the existing urban areas as possible as the site is redeveloped.

CONCLUSION AND RECOMMENDATIONS

The Project Area has been cleared and highly modified for many years, originally as a result of clearing for agriculture, then as a result of urban development in the 1980s. The remaining patches of woodland and open forest are highly modified and exist within mown parklands and to a lesser extent, within other open space (roadsides) and housing lots. Under a "do nothing" scenario, such vegetation has limited viability in the long term.

Under the proposed redevelopment of the Project Area, native vegetation will be managed along the linear park and in the parks of the Project Area. No significant impacts are predicted for threatened species.

Chapter 1

Introduction

This chapter outlines the general purpose of the surveys and then goes on to briefly describe the objectives that this report plans to achieve. It also provides a table of the terms and abbreviations throughout the report.

1.1 Purpose

The purpose of this report is to assess the flora and fauna impacts of the proposed redevelopment of the Claymore Urban Renewal, with particular attention paid to species listed under the *Threatened Species Conservation Act 1975* (TSC Act) and the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Project Area is located in the suburb of Claymore within Campbelltown City Council along the Hume Highway in Sydney's South West.

The objectives of this report are to:

- Describe and map the vegetation communities on the subject site;
- Describe fauna habitats and fauna usage of the subject site;
- Assess the likelihood of threatened species as listed under the TSC Act and the EPBC Act occurring on the subject site;
- Assess the ecological constraints and opportunities for development on the subject site; and
- Where relevant, suggest mitigation measures to reduce the impacts of the proposed development on flora and fauna.

The report will be included as part of the Environmental Assessment (EA) of the Project to be submitted to the Department of Planning (DoP) under the former Part 3A of the Environment Planning and Assessment Act 1975 (which is subsequently being replaced: refer to Section 3.2)

1.2 Terms and Abbreviations

This report uses the following terms and abbreviations:

Table 1.1 TERMS AND ABBREVIATIONS USED IN THIS REPORT

Term / Abbreviation	Meaning
CEEC	Critically Endangered Ecological Community listed under the TSC Act and/or EPBC Act
DSEWPC	Commonwealth Department of Sustainability, Environment Water, Populations and Community
DoP	NSW Department of Planning
EA	Environmental Assessment
EEC	Endangered Ecological Community listed under the TSC Act and/or EPBC Act
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
HNSW	Housing NSW
Important Habitat – Migratory Species (EPBC Act)	An area of 'important habitat' for a migratory species is: a) habitat utilised by a migratory species occasionally or periodically within a region that; ➢ supports an ecologically significant proportion of the population of the species; and/or ➢ habitat that is of critical importance to the species at particular life-cycle stages; and/or ➢ habitat utilised by a migratory species which is at the limit of the species range; and/or ➢ habitat within an area where the species is declining.
LGA	Local Government Area
Locality	The area within 10km of the Project Area
Local Population	The population of a given species that occurs associated with the Project Area.
Population of a migratory species (EPBC Act)	'Population' in relation to a migratory species means the entire population or any geographically separate part of the population of any species, a significant proportion of whose members cyclically

Table 1.1 TERMS AND ABBREVIATIONS USED IN THIS REPORT

Term / Abbreviation	Meaning
	and predictably cross one or more national jurisdictional boundaries including Australia.
OEH	NSW Office of Environment and Heritage
Project Area	Refers to the parcel of land that could potentially be affected by the proposal
Threatened flora and fauna	Refers to communities, populations and species listed as Vulnerable or Endangered under the EPBC and TSC Acts
TSC Act	*NSW Threatened Species Conservation Act 1995*
VMP	Vegetation Management Plan

Chapter 2

Site Assessment

This chapter outlines the general and specific information of the Project. It provides a general description of the Project Area based on the information provided by the Department of Planning as well as a short assessment of the general physical and ecological features that occur across the Project Area.

2.1 The Site

The Claymore Urban Renewal Project is a 125ha public housing estate located along Badgally Road adjacent to the Hume Highway M5 in the Campbelltown Local Government Area (LGA) (**Figure 2.1**). It is approximately 2km north of Campbelltown Town Centre and is surrounded by the established residential area of Eagle Vale and Blairmount.

Claymore is approximately 56 km from the Sydney CBD and approximately 2km north of Campbelltown Town Centre. The topography of the Claymore site is undulating, with ridgelines generally extending parallel along Badgally Road. There are a number of high points along this southern side of the site with additional rises in the central portion of the site. The low points of the site are generally within the linear park traversing the northern portion of the Project Area.

Some steep areas of land with slopes greater than 18% meander through the site, partially contributing to the form of the existing road pattern. Such slopes will have a significant impact on the size of lots in some areas, even after significant bulk earthworks have been completed and consideration has been given as to whether 100% of existing roads should be demolished.

2.2 The Project

Claymore is one of the largest public housing estates in South West Sydney, containing 1,123 public housing dwellings including detached cottages and townhouses. The estate was planned in the 1980's using Radburn design principles with cul-de-sac, pedestrian pathways and excessive large open space areas, this design having proven to be unsuccessful in this context.

Landcom has been engaged by Housing NSW (HNSW) to deliver the Claymore Urban Renewal Project, following the Federal Government's recent allocation of $12.96M under

the Housing Affordability Fund (HAF) to develop a master plan and undertake site works at Claymore. The preferred plan for the Project Area can be seen in **Figure 2.2** below.

2.3 The Planning Process

The Project Area will be developed in stages over 12-15 years. This requires listing the area as a State Significant Site and having it dealt with as a Major Project under the *Environmental Planning and Assessment Act 1979*. The Part 3A legislation has recently been abolished and no new major projects will be assessed under Part 3A. Interim legislation has been implemented by the State Government to assist with the transitional period prior to establishing a new review process for major projects.

Landcom is preparing an environmental assessment (EA) for a Project Application to facilitate Infrastructure and Early Works, including site preparation, infrastructure and roads for Stages 1 and 2.

Coordinate System: MGA Zone 56 (GDA 94)

Legend

Subject Site

Grid North

Image Source: © 2011 Sinclair Knight Merz & Fugro

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Figure 2.1. Project Area

125 0 125 250 375 500 m

Coordinate System: MGA Zone 56 (GDA 94)

Grid North

Eagle Vale High School

Brady Park

11
2018

Claymore Public School

CROZIER STREET

DOBELL ROAD

BOYD STREET

LEIGH CR

FAIRWEATHER PL

GOULD ROAD

PRESTON WAY

ABRAHAMS WAY

10
2018

9
2018

Fullwood Reserve

Fullwood Reserve

FULLWOOD PL

8
2017

Davis Park

3B
2012-2013

3A
2012-2013

GIDLEY CRESCENT

GLENROY ROAD

5
2014

6
2015-2016

4
2013

NORMAN CRESCENT

7
2016-2017

Dimeny Park

Blairmount Public School

Badgally Reserve

BADGALLY ROAD

1
2011

2
2011

Glenroy

Homestead

HUME HIGHWAY M5

Bundeena Reserve

Kanbyugal Reserve

- Collector Road
- Enhance Collector Road
- Retained Road
- Retail Centre and Potential Community Facilities
- Future Residential
- Higher Density Residential
- Seniors Living
- Claymore Public School
- Private
- ADHC Site (NSW Ageing, Disability and Home Care)
- Open Space
- Road Reserve
- Signalised Intersection
- Roundabout
- Draft Staging Boundary showing approximate relocation dates

0 20 50 100 200 500m

Claymore Urban Renewal Indicative Staging Plan

09 June 2011

AECOM
LEVEL 8, 17 YORK STREET, SYDNEY NSW 2000 T 02 8023 9363 F 02 8023 9399

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Figure 2.2. Preferred Plan for the Claymore Development

Chapter 3

Regulatory Context

This chapter outlines the regulatory context that influences the ecological aspects of the Claymore redevelopment. This legislation includes: relevant State and Commonwealth legislation as well as local council zoning.

3.1 Zoning

The site is zoned under the provisions of the Campbelltown (Urban Area) Local Environmental Plan. A number of land use zonings apply to the site with residential areas being zoned 2(b) Residential and open spaces within an open space zone. The zoning reflects the existing pattern of development and will need to be modified to reflect the new subdivision pattern and range of uses.

3.2 NSW Environmental Planning and Assessment Act 1979

The EP&A Act is the overarching planning document for NSW. This Act provides for the creation of planning instruments that guide land use. The Act also provides for the consideration of biodiversity values, which is addressed in Section 5A (Significant effect on species, populations or ecological communities or their habitats). The TSC Act requires that an "Assessment of Significance" under Section 94A of the TSC Act, also known as the "Seven-Part Test", is undertaken in relation to species, communities, habitat and processes listed under either the TSC Act or the *Fisheries Management Act 1994* (FM Act).

Until recently, the Part 3A amendment to the EP&A Act consolidated the assessment and approval regime for all Major Projects previously addressed under Part 4 (Development Assessment) or Part 5 (Environmental Assessment) of the Act. There was no statutory requirement to undertake an "Assessment of Significance" for a development being assessed under Part 3A. An Environmental Assessment (EA) was required for Part 3A development proposals and was to be prepared in accordance with the Director-General's environmental assessment guidelines.

Under recent amendments to legislation the State Government is proceeding with the abolition of Part 3A as the process to assessing major projects. The Government is currently developing transitional provisions for dealing with projects such as this project that was commenced under Part 3A prior to the legislation changes. No further project applications will be accepted under Part 3A.

The Government is currently working on the preparation of policy and legislation for an assessment framework for projects of genuine state significance that will operate until the Department introduces a new planning system..

This report has been prepared under the requirements of the recently abolished Part 3A legislation as the project was commenced under this legislation. The draft Director-General's Environmental Assessment Requirements (DGR) for the Project, pursuant to Section 75 F(2) of the EP&A Act and as pertains to biodiversity issues, requests that the following are provided:

- *A field survey of the site should be conducted and documented;*
- *Assessment, evaluation and report on the likely impacts on threatened species, populations, EECs and their habitats including but not limited to, Cumberland Plain Woodland, Cumberland Plain Land Snail, Sydney Plains Greenhood Orchid and Spiked Rice Flower;*
- *Identify any remnant EEC on the site , including a description of their condition, disturbance history and recovery capacity and the extent of any proposed EEC to be disturbed or removed;*
- *Identify the area of any hollow bearing, foraging, roosting, feed and nesting trees proposed to be removed or modified; and*
- *A description of the measures that will be taken to avoid or minimise impacts or compensate for any unavoidable impacts on the Project on threatened species populations or ecological communities.*

3.3 NSW Threatened Species Conservation Act 1995

The TSC Act aims to protect and encourage the recovery of threatened species, populations and communities that are listed under the Act, through threat abatement and species recovery programs.

The TSC Act requires consideration of whether a development (Part 4) or an activity (Part 5) is likely to significantly impact threatened species, populations, communities or their habitat. The potential impacts of any developments, land use changes or activities would need to undergo an "Assessment of Significance" under Section 5A of the EP&A Act.

3.4 Fisheries Management Act 1994

The threatened species Schedules of the FM Act comprise lists of threatened marine, estuarine and freshwater fish or other aquatic animal life at any stage of their life history and ecological communities of fish. The Act provides for the conservation of key fish habitats and threatened species, populations and ecological communities of fish and marine vegetation. It does not include whales, mammals, reptiles, birds or amphibians.

The FM Act does not apply to the proposed Project as there is no habitat available that would support a significant community of fish or aquatic mammals.

3.5 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides for the protection of nationally listed matters of environmental significance and includes Cumberland Plain Woodland, which has been identified on the subject site. The EPBC Act is administered by Department of Sustainability, Environment, Water, Population and Communities (DSEWPC).

A Project that may impact on nationally listed matters is referred to DSEWPC to determine whether the impact to nationally listed matters is likely to be significant. If the Project is determined to be likely to have a significant impact on nationally listed matters, the Project is declared a "controlled action" and additional assessments will be required to gain approval from the Commonwealth Minister for the Environment.

The Project has been referred to DSEWPC stating that it is not considered likely that the proposed development will cause a significant environmental impact as stated in the referral, despite no official decision being made as yet. It is considered that this will be the likely decision because there are no matters of Matter of National Environmental Significance (MNES) within, or adjacent to, the project area.

Chapter 4

Methodology

This chapter outlines the various flora and fauna techniques that were used during the recent surveys. It provides information on the procedures used within each technique.

4.1 Literature Review

All relevant documentation provided by the client formed part of this literature review. The review also included database searches of the Atlas of NSW Wildlife (DECC (NSW), 2009) and the EPBC Act Protected Matters Search Tool (DEWHA, 2009) to obtain records of threatened flora and fauna species and endangered ecological communities listed under the TSC Act and EPBC Act respectively. The Atlas of NSW Wildlife search included all records within 10 km and the EPBC Act Protected Matters search included all protected matters that may occur in a 10 km radius.

4.2 Site Inspection

4.2.1 Initial Site Inspection

An initial site inspection was conducted by Cumberland Ecology on the 29 April 2011. The intention of the inspection was to assess the nature and quality of the flora and fauna habitat within the Project Area. The inspection was largely conducted from a vehicle with detailed inspections on foot conducted in areas containing open spaces.

4.2.2 Flora surveys

Flora surveys were undertaken on 10 May 2011. These surveys were conducted in accordance with the DEC Threatened Biodiversity Survey and Assessment Guidelines for Development and Activities (Working Draft) (DEC (NSW), 2004). These surveys involved the following:

- Random meander surveys to detect flora species across the subject land;
- Vegetation sampling within quadrats (20m x 20m) to obtain information on floristic composition and community structure;
- Targeted searches for threatened flora known or considered likely to occur within the subject land; and

- Targeted searches for endangered ecological communities (EECs) known or considered likely to occur within the subject land.

Vegetation within a total of 2 quadrats was sampled according to DEC survey guidelines. The relative abundance and cover of each species within these quadrats was approximated using a modified Braun-Blanquet scoring system (Braun-Blanquet, 1927). The locations of the quadrats are shown in **Figure 4.1**.

Within each quadrat, all vascular flora species present were identified to species level where possible, and recorded. All vascular plants recorded or collected were identified using keys and nomenclature provided in Harden (Harden, 1990-1993). Where known, taxonomic and nomenclatural changes have been incorporated into the results, as derived from PlantNET (Botanic Gardens Trust, 2010).

A number of random meander transects were also conducted across the Project Area to collate a full list of species occurring across the site.

A list of species present on the subject land is provided in Appendix A.

4.2.3 Fauna Surveys

Fauna surveys were conducted by Cumberland Ecology on 10 May 2011 and consisted of the diurnal survey methods outlined below. Nocturnal survey methods were not used but likely nocturnal species were predicted based upon habitat assessment.

i. Fauna Habitat Assessment

The site was assessed for groundcover, shrub/understory cover, canopy cover as well as other habitat features such as bush rock, fallen trees and signs of fauna use such as scats, scratches and scrapings.

ii. Cumberland Plain Land Snail Searches

Targeted searches were conducted for Cumberland Plain Land Snails across the Project Area. Searches were conducted at the base of each of the trees considered as possible habitat as well as under debris on the ground in an effort to locate any living snails and empty shells.

Coordinate System: MGA Zone 56 (GDA 94)

Legend

Subject Site

Flora Quadrat

Grid North

Image Source: © 2011 Sinclair Knight Merz & Fugro

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Figure 4.1. Flora Survey Locations

125 0 125 250 375 500 m

Chapter 5

Results

This chapter provides the results of the flora and fauna surveys across the Project Area. The general features of the Project Area are summarised directly below and detailed results of the surveys can be found in the sections below.

5.1 Site Description

The landscape of the subject site is highly disturbed with a large proportion currently existing as sealed roads and residential housing. As a result of this former land use and the lack of vegetation management on the site, the vegetation is largely dominated by exotic weeds within all plant strata excluding the canopy. The canopy is largely dominated by planted Australian native trees most of which are representative of the original vegetation community within the area, however regular occurrences of exotic native trees indicate that most of the trees in the area are planted. A number of native ground covers and shrubs are present but exotic species dominate in most locations. Canopy species are mostly native, while small trees and shrubs are largely absent.

Fauna habitat is generally poor across the subject site due to its highly degraded nature and exotic understorey. Few tree hollows are present for bats and roosting birds but dense leaf litter and residential housing provide ideal habitat for small terrestrial animals such as skinks and common urban birds. A complete list of flora and fauna can be found in **Appendix A** and **B** respectively.

5.2 Literature Review

The results of the database searches conducted as described in Section 4.1 are provided in **Tables C.1** and **C.2** in **Appendix C**.

5.3 Vegetation Communities

The highly disturbed nature of the vegetation within the Project Area has resulted in the quality of the vegetation being considered of little conservation value, particularly within and around the residential buildings. Despite this level of disturbance, there are some areas of vegetation within the Project Area that conform to State and Commonwealth listed EECs as mapped under the Sydney Metropolitan Catchment Management Authority

(SMCMA) Mapping Project (DECCW, 2009). These areas are considered to be of conservation value.

The vegetation communities that are present within the Project Area are listed here and discussed in detail below:

- River Flat Eucalypt Forest;
- Cumberland Plain Woodland; and
- Australian Native Plantations and Exotic Vegetation.

A map of the vegetation present within the Project Area is shown in **Figure 5.1** and a table showing the areas of vegetation is provided in **Table 5.1**.

Table 5.1 VEGETATION COMMUNITIES OCCURRING WITHIN THE PROJECT AREA

Vegetation Communities	Total area on site (ha)
River Flat Eucalypt Forest	2.75
Cumberland Plain Woodland	0.33
Australian Native Plantings and Exotic Vegetation	7.08
Total EEC	**3.08**
Total Vegetation	**10.16**

5.3.1 River Flat Eucalypt Forest

This community is considered a modified form of River Flat Eucalypt Forest, as some elements of this community still exist. This community is listed as an EEC under the TSC Act. The modification of the subject site's drainage patterns has led to a reduction in the distribution of this community on the subject site.

The River-flat Eucalypt Forest includes scattered, highly modified stands of paperbarks (*Melaleuca* spp) and various other tree species such as Swamp Oak (*Casuarina glauca*) and Cabbage Gum (*Eucalyptus amplifolia*). The area of River-flat Eucalypt Forest that is present in the subject site is relatively small. Native shrubs and creepers are essentially missing from treed areas due to mowing and the ground layer is highly exotic. Ground covers are similar to those that have been recorded within the Cumberland Plain Woodland as described below.

Native shrubs are absent missing from his area, however, the ground stratum includes grasses such as *Austrostipa racemosa*, Red-legged Grass (*Bothriochloa macra*), Windmill Grass (*Chloris ventricosa*), Couch (*Cynodon dactylon*), and Weeping Meadow Grass (*Microlaena stipoides*). Native herbaceous plants include *Einadia polygonoides*, Kidney Weed (*Dichondra repens*), Twinning Glycine (*Glycine clandestina*) and *Oxalis perenans*.

Exotic grasses are abundant and include such species as Paspalum (*Paspalum distichum*), African Love Grass (*Eragrostis curvula*) and Kikuyu (*Pennisetum clandestinum*). Exotic herbs include such species as Cats Ear (*Hypochaeris radicata*), Common Plantain (*Plantago lanceolata*), Fireweed (*Solanum madagascariensis*) and Spear Thistle (*Cirsium vulgare*).

This vegetation community is typically groundwater dependent due its proximity to riparian corridors. With respect to this project it is unlikely to be affected by the proposed development. Impact upon this community will be discussed in further detail in the **Chapter 6** below.

5.3.2 Cumberland Plain Woodland

The Cumberland plain Woodland within the Project Area both of which are listed as EECs under the TSC Act. The occurrences of Cumberland Plain Woodland include various stands of Coastal Grey Box (*E. moluccana*), Forest Red Gum (*E. tereticornis*), Narrow-leaf Ironbark (*E. crebra*) and Spotted Gum (*Corymbia maculata*).

Native shrubs and creepers are essentially missing from treed areas due to mowing. The ground stratum includes grasses such as *Austrostipa racemosa*, Red-legged Grass (*Bothriochloa macra*), Windmill Grass (*Chloris ventricosa*), Couch (*Cynodon dactylon*), and Weeping Meadow Grass (*Microlaena stipoides*). Native herbaceous plants include *Einadia polygonoides*, Kidney Weed (*Dichondra repens*), Twinning Glycine (*Glycine clandestina*) and *Oxalis perenans*. Exotic grasses are abundant and include such species as Paspalum (*Paspalum distichum*), African Love Grass (*Eragrostis curvula*) and Kikuyu (*Pennisetum clandestinum*). Exotic herbs include such species as Cats Ear (*Hypochaeris radicata*), Common Plantain (*Plantago lanceolata*), Fireweed (*Solanum madagascariensis*) and Spear Thistle (*Cirsium vulgare*). A list of species encountered in the field surveys and/or predicted to occur based upon literature review and interpretation of database records is presented in this report in **Appendix A**.

Photograph 5.1 Ironbark dominated Cumberland Plain Woodland

5.3.3 Planted Natives and Exotic Weeds

The majority of vegetation in proximity to the buildings consists of planted native or exotic trees with species such as Mugga Ironbark (*Eucalyptus sideroxylon*), Spotted Gum (*Corymbia maculata*), Broad-leaved Paperbark (*Melaleuca quinquinervia*) and Tallowwood (*Eucalyptus microcorys*).

5.3.4 Flora

The vegetation of project area is highly degraded existing as remnant and planted trees over grassland. The trees are largely planted natives with the regular occurrence of exotics. Shrubs are generally absent with groundcovers mostly exotic. Some areas are dominated by native groundcovers and generally exist under native dominant canopy trees. The flora and habitat values of the project area are highly degraded due to the persistent anthropogenic disturbance. Limited potential habitat for the threatened species *Pimelea spicata* occurs within the project area. This species is discussed below.

5.3.5 Threatened Flora

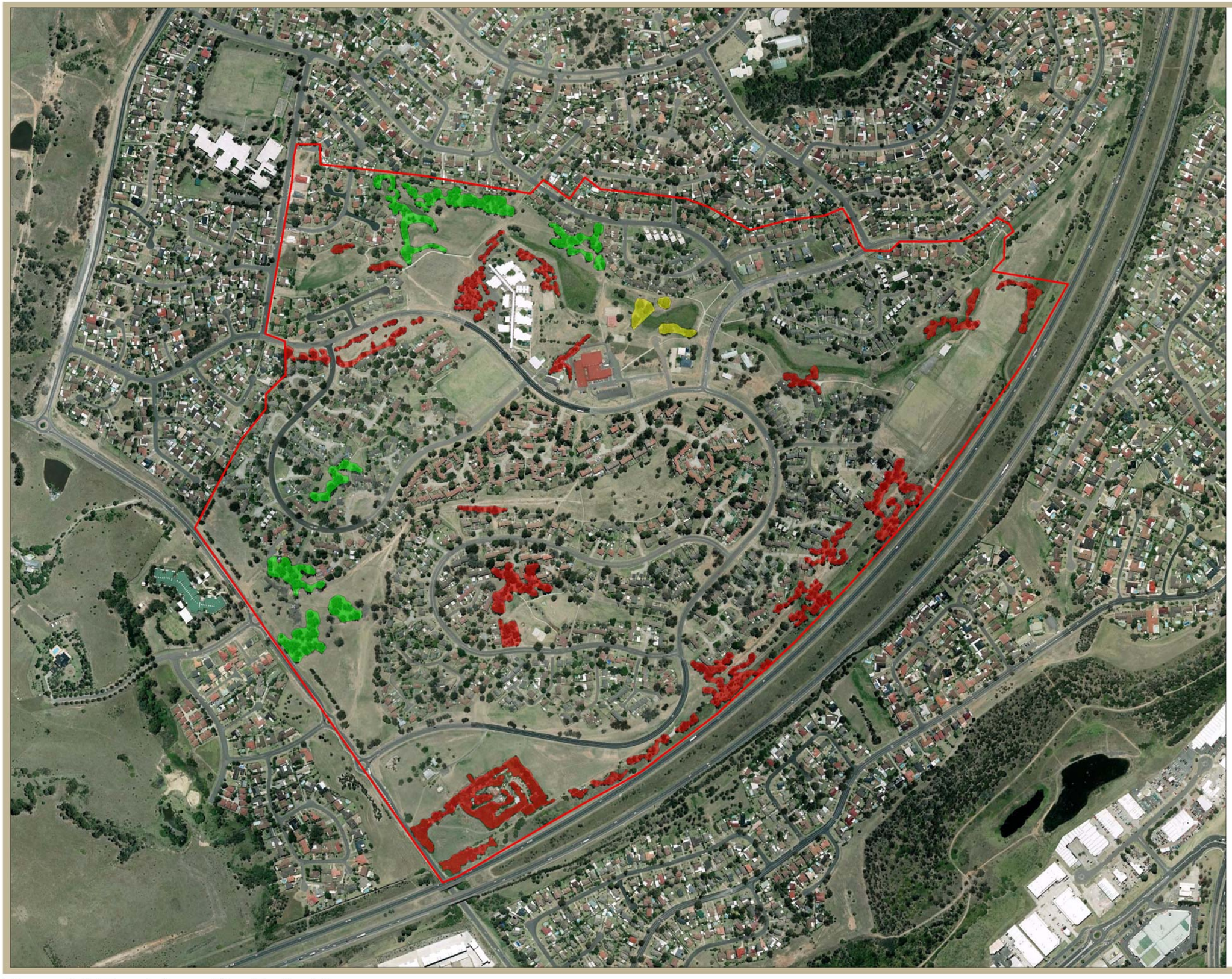
i. Pimelea spicata

Pimelea spicata is listed as Endangered under Commonwealth and State Legislation. It is typically associated with Grey Box and Ironbark woodland and found on the well structured

soils of the Wianamatta shale group. The species is highly resilient to ongoing disturbance and such a disturbance regime is considered important to the lifecycle of the species. As such the species is often found along disturbed edges of tracks and trails.

While no individuals of this species have been recorded within the Project Area, potential habitat occurs on the site. However, it occurs in fragmented patches and is not considered to be important habitat for the conservation of the species. Given the high frequency and nature of the disturbance within the open space of the Project Area as well as the scarcity of individuals within the locality it is considered to have a low chance of occurrence on the site and the development is unlikely to have a significant impact on this species.

Coordinate System: MGA Zone 56 (GDA 94)



Legend

Site Boundary

Vegetation Community

River Flat Eucalyptus Forest (EEC)

Cumberland Plain Woodland (CEEC)

Planted Native & Exotic Weeds

Grid North

Image Source:
© 2011 Sinclair Knight Merz & Fugro

Vegetation Data Source:
The Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area (Draft) (DECCW, 2009)

Updated by Cumberland Ecology, May 2011

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Figure 5.1. Vegetation of the Project Area

125 0 125 250 375 500 m

5.4 Fauna

5.4.1 Habitat Assessment

The highly disturbed nature of the vegetation within the Project Area has resulted in the fauna habitat being considered of little value to many species. There are however, numerous State and Commonwealth listed threatened species that have some potential to utilise the Project Area. The Project Area, also does contain habitat of value for some of the more common species that are typically found within the Western Sydney suburban area, particularly common birds and reptiles.

No obvious large tree hollows were detected during the tree hollow survey although a number of large mature trees were observed that showed good hollow recruitment potential (that is, they are considered likely to produce hollows in the short to medium term). It is likely that small hollows that were not sighted during the survey are present in a number of trees across the subject site. These hollows are likely to provide habitat for a number of small birds and microbats.

As a consequence of the modification of the Project Area, the fauna within the Project Area is typical of suburban areas. It is dominated by hardy native birds such as Australian Magpie (*Cracticus tibicen*), Magpie Lark (*Grallina cyanoleuca*), Australian Raven (*Corvus coronoides*), Eastern Rosella (*Platycercus eximius*), Rainbow Lorikeet (*Trichoglossus haematodus*) and Noisy Miner (*Manorina melanocephala*).

Typical native mammal fauna species likely to occur include the Ringtail Possum (*Pseudocheirus peregrinus*) and Common Brush-tail Possum (*Trichosurus vulpecula*). It is expected that exotic mammal species dominate the Project Area. Species expected to occur including the European Red Fox (*Vulpes vulpes*), Feral Cat (*Felis catus*), Black Rat (*Rattus rattus*) and House Mouse (*Mus musculus*).

Reptiles are poorly represented due to regular mowing activities but species likely to occur include grass and garden skinks (*Pseudomoia* spp, and *Lampropholis* spp.) as well as other common larger reptiles. Amphibians likely to occur include the Common Eastern Froglet (*Crinia signifera*) and Spotted Marsh Frog *(Limnodynastes tasmaniensis*). A list of species encountered in the field surveys and/or predicted to occur based upon literature review and interpretation of database records is presented in **Appendix B**.

5.4.2 Threatened Fauna

One threatened fauna species was recorded within the Project Area. A small number of Little Lorikeets (*Glossopsitta pusilla*) were recorded overflying the site during the survey. This species is listed as vulnerable under the TSC Act. The Project Area contains some habitat for a small range of threatened birds and bats. It is unlikely that the vegetation provides suitable habitat for any threatened amphibians, reptiles or terrestrial mammals and no threatened amphibians, mammals or reptiles are considered likely to occur in the Project Area.

i. Birds

As mentioned above, Little Lorikeets were recorded flying above one location within the study area. Nectar producing trees provide suitable feeding habitat for a small number of additional threatened nectivorous birds such the Swift Parrot (*Lathamas discolor*), Black-chinned Honeyeater (*Melithreptus gularis*) and Regent Honeyeater (*Archeoptera phrygia*). While the latter species are relatively unlikely to occur within the Project Area it is considered that is possible that they would utilise the habitat during the flowering periods of dominant canopy trees. The Black-chinned Honeyeater is listed as Vulnerable under the TSC Act. The Swift Parrot is listed as Endangered under the TSC and EPBC Acts while the Regent Honeyeater is listed as Critically Endangered under the TSC Act and Endangered under the EPBC Act.

ii. Bats

While no tree hollows were recorded during the current surveys it is considered likely that numerous threatened bats forage throughout the Project Area. There is potential for threatened microchiropteran bats to roost within small undetected tree-hollows and building cavities. Bat species predicted to have the potential to occur within the Project Area include the Southern Myotis (*Myotis macropus*), Yellow-bellied Sheath-tail Bat (*Saccolaimus flaviventris*) and Greater Broad-nosed Bat (*Scoteanax rueppellii*) as well as the Grey-headed Flying-fox (*Pteropus poliocephalus*). The above microchiropteran bat species are listed as Vulnerable under the TSC Act while the Grey-headed Flying-fox is listed as Vulnerable under State and Commonwealth legislation.

Chapter 6

Impact Assessment

This chapter outlines the potential impacts of the proposed Project on State and Commonwealth listed flora and fauna. It describes in detail both direct and indirect impacts that could occur and short-term and long-term effects. The general natures of these different types of impacts are explained below while the impacts as they relate specifically to the Project are described in further detail in the following sections.

6.1 Direct and Indirect Impacts

Direct impacts are impacts that occur from a Project as a result of the direct physical effect of the Project, such as the clearing of vegetation. These impacts are obvious in their visual effects and can potentially have a significant ecological impact on the Project Area.

Indirect effects occur as a result of secondary processes that occur as a result of the Project. Typically, such effects occur over a longer time scale with less ecological impacts, or occur in areas adjacent to or downstream/downslope from the physical disturbance footprint. Examples of secondary impacts that occur as part of a development are weed invasion and associated edge effect, as well as sediment and erosion problems in riparian areas.

6.2 Vegetation Clearance

6.2.1 Endangered Ecological Communities

The site is zoned under the provisions of the Campbelltown (Urban Area) Local Environmental Plan. A number of land use zonings apply to the site with residential areas being zoned 2(b) Residential and open spaces within an open space zone allow a large-scale development of the Project Area.

As a result of the Project, approximately 5.82 ha of native vegetation will be removed from the Project Area. The proposed areas of impact from vegetation clearance for the Project Area are provided in **Figure 6.1** whilst the size of each area of impact for each vegetation community occurring within the Project Area can be viewed in **Table 6.1**. The total area to be cleared includes the removal of 1.62ha of EECs. Although this vegetation occurs as isolated fragments of degraded woodland and forest, some of these fragments are recognised as modified forms of highly cleared ecological community types that are protected under the TSC Act and/or the EPBC Act.

In the context of the Project Area itself the removal of this 1.62ha of native vegetation is not expected to have a significant impact upon the Cumberland Plain Woodland within the locality. The highly isolated, disturbed and fragmented nature of the vegetation indicates that the vegetation of the project area is not viable in the longer term. This project will allow for the ongoing management of the retained vegetation as well as the re-establishment of a significant area of this and other C/EECs within the linear park, and can be seen as being beneficial to the longer term longevity of the C/EECs.

The 'Clearing of Native Vegetation' is listed as a Key Threatening Process and has been identified as a direct cause in the decrease in biodiversity (NSW Scientific Committee, 2004).

Table 6.1 SUMMARY OF VEGETATION CLEARANCE

Vegetation Communities	Total area on site (ha)	Area to be cleared (ha)
River Flat Eucalypt Forest	2.75	1.47
Cumberland Plain Woodland	0.33	0.15
Australian Native Plantings and Exotics	7.08	4.2
Total EEC	**3.08**	**1.62**
Total Vegetation	**10.16**	**5.82**

6.2.2 Groundwater Dependent Ecosystems

River Flat Eucalypt Forest is a typically a groundwater dependent ecosystem due to its close proximity to riparian areas. A small amount of this vegetation community will be removed as part of the proposed development. It is unlikely that the remaining vegetation will be impacted as part of the proposed development due to the low level of excavation that will be used in close proximity to the vegetation. In addition to this the drainage network of the Project Area has not changed significantly. As a result, the water reaching the drainage line in the linear corridor will be of similar quality, and will recharge the groundwater system thoroughly. This should ensure that the remaining vegetation of this community will remain unaffected as a result of the proposed development.

6.3 Threatened Flora

No threatened species of plants were detected within the Project Area. Given the highly disturbed nature of the vegetation within the Project Area, and the level of survey effort completed to date, it is considered unlikely that any threatened plants occur within the Project Area.

Potential habitat for Pimelea spicata occurs within the project area. However, the species is considered to have a low chance of occurrence considering the high levels of disturbance of the site, the fragmented nature of the habitat and the lack of any records of the species nearby. The loss of 5.82ha of marginal potential habitat for this species is not expected to cause a significant impact to this species therefore.

As such, the development in its current form is not expected to have a significant impact on any listed threatened plant species.

6.4 Threatened Fauna

One threatened fauna species, the Little Lorikeet, has been recorded within the Project Area, although only flying through the area. The Project Area also provides some potential habitat for a number of State and Commonwealth listed threatened birds and bats as described in Chapter 5. The proposed Project will result in the removal of 5.82ha of potential habitat for a number of these threatened species; but the impact of this removal is expected to be minimal, based on the following factors:

- The Project landscape and habitats are highly disturbed and fragmented and potential habitat value for most species would be expected to be low;
- The total extent of clearing of habitat is low;
- The occurrence of habitat features such as hollows is minimal;
- Species with some potential to occur are either relatively uncommon within the LGA and/or have large areas of foraging habitat available in the Sydney area and any dependence on the Project habitats is unlikely; and
- Habitat will be retained and enhanced within conservation areas within the Project Area.

Further discussion on specific groups of threatened species is provided below.

6.4.1 Threatened Birds

The Project is not considered likely to have a significant impact on the threatened birds that are known or have potential to occur on the subject site. The two EPBC listed threatened species Swift Parrot and Regent Honeyeater, are migratory and present only in the area at certain times of the year. The Little Lorikeet is relatively common throughout Western Sydney and has a considerable amount of foraging habitat within this area. The Black-chinned Honeyeater is less common but still has the potential to forage within the Project Area. On a regional scale habitat for this species exists throughout NSW. This loss of 5.82ha of flowering tree habitat is considered unlikely to cause a significant impact on any of these species across their range.

6.4.2 Threatened Bats

The Project also provides a considerable area of foraging habitat and potentially some breeding and roosting habitat, in the form of tree hollows, for TSC Act listed threatened microchiropteran bats. There is also potential foraging habitat for the Grey-headed Flying-fox. A considerable area of suitable habitat and a number of roost sites will remain present within the Project Area however. These occur within the conservation areas (see details in Section 7.2), as well as within areas adjacent to the proposed Claymore development. Due to this retention of habitat and the small area of habitat proposed to be cleared, it is considered unlikely that the vegetation proposed to be removed as part of the Project will cause a significant impact on any of the State listed Vulnerable microchiropteran bats or the Grey-headed Flying-Fox.

Consequently, the proposed extent of removal of trees from this urban landscape is not expected to have a significant effect on any threatened fauna species or populations within the LGA.

Coordinate System: MGA Zone 56 (GDA 94)

Legend

- Subject Site

Vegetation Community

- River Flat Eucalyptus Forest (EEC)
- Cumberland Plain Woodland (CEEC)
- Planted Native & Exotic Weeds
- Vegetation to be Removed
- Riparian Corridor

Grid North

Image Source:
Claymore Urban Renewal Scheme and Staging, by AECOM, Draft, dated 22/02/2011

Vegetation Data Source:
The Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area (Draft) (DECCW, 2009)

Updated by Cumberland Ecology, May 2011

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Figure 6.1. Proposed Project Impacts

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Chapter 7

Mitigation Measures

This chapter provides an assessment of the avoidance measures and recommended mitigation measures for the proposed Project. Future development will utilise avoidance and mitigation measures to minimise any potential impacts to the ecological values of the subject land as well as adjoining vegetation that may be indirectly impacted by the Project.

The process of avoidance and mitigation is as follows:

- Avoid: to the extent possible, developments should be designed to avoid or minimise ecological impacts;
- Mitigate: where certain impacts are unavoidable through design changes, mitigation measures should be introduced to ameliorate the ecological impacts of the future development;
- Offset: where mitigation and avoidance do not appropriately offset the impacts of the proposed development, offsetting measures will be introduced. In the case of this Project an area, vegetation reminiscent of the native vegetation communities will be re-established in the Linear Park to the north of the Project Area. This will be discussed in further detail below.

The subject site is zoned for residential redevelopment. In developing the Concept Plan for the subject site, the proponent has considered a range of options for mitigating the clearance of EECs and subsequent loss of potential habitat for flora and fauna.

The proposed mitigation strategy is to conserve and revegetate a portion of the existing native vegetation that exists on site and to manage this 13.89ha of vegetation according to an approved Vegetation Management Plan (VMP). This mitigation strategy is discussed in detail below.

7.1 Avoidance Measures

A portion of the site (12ha) is proposed to be zoned for Environmental Conservation. Any future development will avoid this portion of the site. This conservation area will be managed under a site specific VMP as discussed in more detail below. This proposed conservation area currently contains 1.47ha of the C/EECs Cumberland Plain Woodland and River flat Eucalypt Forest. Other areas throughout the Project Area within open space

and parkland will be conserved and managed under the VMP; this includes a total of 0.17ha of remnant Cumberland Plain Woodland.

Within the northern portion of the Project Area the proponent plans to revegetate the drainage channel and linear park using species indicative of the original communities prior to development. The aim of the revegetation process would be to develop vegetation communities similar to those that originally occurred within the Project Area. Further details on the revegetation of this corridor are provided in **Section 7.3** below and within the VMP to be prepared for the Project. Additional smaller pockets of vegetation will be retained throughout the Project Area and will be managed under the VMP to be prepared for the site. These areas will undergo consistent management in perpetuity to ensure that the quality of the EEC vegetation will be maintained. It is also recommended that any hollow bearing trees within the Project Area are retained to ensure that habitat for birds and bats is retained.

The areas of vegetation to be cleared, retained and re-established are presented in Table 7.1 below.

Table 7.1 VEGETATIOMN TO BE CLEARED RETAINED WITHIN THE PROJECT AREA

Vegetation Community	Current area on site (ha)	Area to be cleared (ha)	Area to be retained
River Flat Eucalypt Forest	2.75	1.47	0.18
Cumberland Plain Woodland	0.33	0.15	3.08
Australian Native Plantings and Exotics	7.08	4.2	-
Total EEC	**3.08**	**1.62**	**3.26**
Total Vegetation	**10.16**	**5.82**	**3.26**

7.2 Recommended Mitigation Measures

A number of mitigation measures are recommended to be utilised for the proposed Project. These mitigation measures include those to be undertaken during the construction, operational and post-operational phases of the proposed Project. The major component of the post-operational phase is the implementation of the VMP, details of which are provided below. It is proposed that these mitigation measures be incorporated into the conditions of consent upon approval of the Project.

7.2.1 Construction and Operational Phases

During the construction and operational phases there is the potential for a number of direct and indirect impacts to important ecological items. Potential impacts to flora and fauna

occurring in these phases that can be managed include: unnecessary vegetation removal, runoff, sedimentation, erosion and pollution. As some of the Project Area is located on sloped land, it is recommended that precautions be taken to minimise the impacts further down the slope. Recommended mitigation measures to be undertaken within the construction and operational phase are detailed below.

i. Access, signage and demarcation

Site inductions are to be given by the civil contractor to ensure all site workers and visitors are aware of any sensitive vegetation. Access to adjoining vegetation should only be granted if conducting or overseeing mitigation measures.

The development footprint should be clearly demarcated and signed, where appropriate, to ensure no vegetation beyond these boundaries is removed. Temporary fencing can be erected to ensure construction and operational activities are contained within the development footprint.

ii. Erosion, Sediment and Pollution Control

During the construction and operational phases, precautions should be taken to ensure that no sediment or pollution enters adjoining vegetation. To reduce sedimentation on the construction site, erosion control measures need to be implemented. This may involve minimising the amount of exposed soils on the site at any given time. Silt traps should be established to prevent the impacts of sedimentation on the adjoining vegetation. During development, precautions should be taken to ensure that no pollution escapes the construction site. Pollution traps and efficient removal of pollution to an off site location will help to minimise pollution impacts. Such mitigation measures will assist in the control of weed invasion during construction.

iii. Water Management

To prevent excess runoff flowing off the building site, barriers should be established to divert the flow of water away from the adjoining vegetation and into appropriate drainage systems. Filters within the barriers will minimise the amount of sedimentation entering the waterways. These measures will also reduce the likelihood of weed invasion in adjacent areas.

iv. Habitat Retention

Where possible, the following habitat features should be retained:

- Mature native trees to provide feeding and potential nesting habitat;
- Hollow-bearing trees to provide nesting and roosting habitat for fauna species; and
- Riparian areas, to allow for the persistence of riparian habitats within the subject land.

7.3 Proposed Offsets

Rehabilitation and management of vegetation to be retained across the Project Area should be handled according to a VMP. This VMP is yet to be prepared.

The conservation area is generally made up of the linear park traversing the northern portion of the Project Area. A small number of other pockets of vegetation exist across the Project Area that will be managed under the VMP. These are located within the passive recreation areas of the following parks, Dimeny Park; Fullwood Reserve; Badgally Park; and Davis Park. The vegetation under the VMP should be managed and rehabilitated to reform a community composition and structure reminiscent of the original forms of the community from which they are derived. Weed removal should be the initial focus and the propagation and replanting of local native seed is recommended to hasten community recovery. The plan of the ongoing management under the VMP is to improve and maintain the quality of the vegetation across the subject site post-development. The document will be prepared to contain specific management actions and performance criteria to ensure the quality of the vegetation is maintained.

7.4 Other Recommendations

7.4.1 Landscaping

To maintain the natural scenic values of the subject site, locally occurring species are recommended for use in landscape design. All landscaping and visual screening works on the subject site should use species endemic to the Cumberland Plain to suit the existing landscape character. A planting list comprising Cumberland Plain Woodland and Floodplain Forest species should be referred to for all planting operations. Utilisation of endemic species common in Cumberland Plain Woodland and River Flat Eucalypt Forest species within the landscaping will also provide potential habitat for native fauna species.

Chapter 8

Conclusion

The Project Area has had a long history of land use and development. Notwithstanding the high degree of modification of the landscape, areas of semi-natural vegetation remain and these have been derived from, or are low quality representations of, two threatened vegetation types:

- River-flat Eucalypt Forest (TSC Act);
- Cumberland Plain Woodland (TSC Act & EPBC Act):

The proposed redevelopment of the Project Area will remove patches of species-poor Cumberland Plain Woodland within Badgally Reserve and along the eastern side of the Project Area. It will remove native trees from across the existing suburban areas. At this stage it is not possible to be precise about the numbers of trees to be removed in the redevelopment.

The Project will provide for the revegetation of the linear park traversing the northern boundary of the Project Area with native trees, shrubs and understorey plants. A total of 13.89ha of vegetation will be managed under the VMP. This area includes the native trees to be retained within Dimeny Park; Fullwood Reserve; part of the existing Badgally Park and Davis Park. Passive recreation areas will be filled out with additional trees, where appropriate.

Some Cumberland Plain Woodland of low management viability will be removed as the Project Area is redeveloped. This will be compensated for by replanting along the linear park.

No significant impacts are predicted for threatened species of plants or animals as a result of the redevelopment of the Project Area.

It is recommended that:

- A Vegetation Management Plan be prepared and implemented to guide the revegetation and ongoing maintenance of the Project Area;
- A variety of local native plants including riparian and dry land woodland should be replanted along the linear park (Brady Park and Fullwood Reserve) traversing the northern portion of the Project Area; and

- Consideration be given to retention of as many native trees within the existing urban areas as possible as the site is redeveloped.

Chapter 9

References

Botanic Gardens Trust (2009) **PlantNET** http://www.rbgsyd.nsw.gov.au/search_plant_net

Braun-Blanquet, J. (1927) **Pflanzensoziologie Wien Springer**

Commonwealth Government (2004) ***Environment Protection and Biodiversity Conservation Act***

DECCW (2009). **The Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area**. Department of Environment and Climate Change NSW, Hurstville.

OEH (2011) **Atlas of NSW Wildlife** http://wildlifeatlas.nationalparks.nsw.gov.au /wildlifeatlas/watlas.jsp.

DSEWPC (2011) **EPBC Protected Matters Search Tool** http://www.environment.gov.au/erin/ert/epbc/index.html

Harden, G.J. (1990) **Flora of New South Wales Volume 1** New South Wales University Press, Kensington.

Harden, G.J. (1991) **Flora of New South Wales Volume 2** New South Wales University Press, Kensington.

Harden, G.J. (1992) **Flora of New South Wales Volume 3** New South Wales University Press, Kensington.

Harden, G.J. (1993) **Flora of New South Wales Volume 4** New South Wales University Press, Kensington.

NSW Government (1979) ***Environmental Planning and Assessment Act***

NSW Government (1995) ***Threatened Species Conservation Act***

NSW Scientific Committee (2004) **Clearing of Native Vegetation – Key Threatening Process**, Sydney NSW.

Appendix A

Flora Species

Table A.1 PLANT SPECIES RECODED WITHIN THE PROJECT AREA

Form	Scientific Name	Common Name	Q1	Q2	T1	T2
Trees					x	
Casuarinaceae	*#Casuarina glauca*	Swamp Oak				
Myrtaceae	*Eucalyptus amplifolia*	Cabbage Gum			x	
	E. crebra	Narrow-leaved Ironbark	5	5	x	x
	E. eugenioides	Thin-leaved Stringybark			x	
	**E. grandis*	Flooded Gum				x
	**E. microcorys*	Tallowwood			x	
	E. moloccana	Grey Box	5	1	x	x
	**E. nicholii*	Small-leaved Black Peppermint			x	
	E. tereticornis	Forest Red Gum		1	x	x
	#Melaleuca styphelioides	Prickly Paperbark			x	
Ulmaceae	**Ulmus parvifolia*	Small-leaved Elm			x	
Shrubs						
Oleaceae	**Olea europaea*					
	ssp cuspidata	African Olive			x	
Sapindaceae	*Dodonaea viscosa*					
	ssp cuneata	a Hopbush			x	
Rutaceae	**Murraya paniculata*	Murraya				x

Table A.1 PLANT SPECIES RECODED WITHIN THE PROJECT AREA

Form	Scientific Name	Common Name	Q1	Q2	T1	T2
Solanaceae	**Lycium ferosissimum*	African Boxthorn	1	1	x	x
Herbs - Dicots						
Acanthaceae	*Brunoniella australis*	Purple Trumpet	1	1	x	x
Amaranthaceae	**Alternanthera pungens*	Khaki Weed	2		x	x
Asteraceae	**Arctotheca calendula*	Cape Weed	2		x	
	**Bidens pilosa*	Farmers Friends				
	Calotis cuneifolia	Blue Burr-daisy				
	**Cirsium vulgare*	Spear Thistle		1	x	
	**Conyza bonariensis*	Fleabane		2	x	x
	Cotula australis		2		x	
	Cymbonotus lawsonianus			2	x	
	Euchiton spaericum			1		x
	**Gnaphalium sp.*	a Cudweed			x	x
	**Hypochaeris microcephala*		2			
	**H. radicata*	Flatweed	2	2	x	
	**Senecio madagascariensis*	Fireweed			x	
	**Solvia sp.*	Bindii	4		x	x
	**Sonchus oleraceus*	Sow Thistle	2	1	x	x
	**Taraxacum officinalis*	Dandelion	2	3	x	x
Brassicaceae	**Lepidium africanum*			1	x	x

Table A.1 PLANT SPECIES RECODED WITHIN THE PROJECT AREA

Form	Scientific Name	Common Name	Q1	Q2	T1	T2
Campanulaceae	*Wahlenbergia gracilis*	Small Bluebell				x
Caryophyllaceae	**Paronychia brasiliensis*		4	3	x	x
	**Petrorhagia nanteulii*	Pinks		1		
	**Spurgularia diandra*			1		
	**Stellaria media*	Chickweed			x	
Chenopodiaceae	*Einadia polygonoides*		2	2		x
	Einadia trigonos	Fishweed			x	
Convolvulaceae	*Dichondra repens*	Kidney Plant	4	4	x	x
Fabaceae	*Desmodium varians*	Tick Trefoil				x
	**Medicago polymorpha*				x	x
	**Trifolium repens*	White Clover			x	x
Lamiaceae	*Ajuga australis*		1			
	**Stachys arvensis*	Stagger Weed			x	
Malvaceae	**Malva parviflora*	Small-flowered Mallow	2		x	
	**Modiola caroliniana*		3	2	x	x
	Sida corrugata			2		x
	**S. rhombifolia*	Paddys Lucerne		1	x	x
Oxalidaceae	*Oxalis perennans*		2	3	x	
Pittosporaceae	*Bursaria spinosa*	seedlings	1			
Plantaginaceae	**Plantago lanceolata*	Lambs Tongue	4	4	x	x
Polygonaceae	*Rumex brownii*			1	x	

Table A.1 PLANT SPECIES RECODED WITHIN THE PROJECT AREA

Form	Scientific Name	Common Name	Q1	Q2	T1	T2
Rubiaceae	**Richardia stellaria*			2	x	x
Scrophulariaceae	*Veronica plebeia*	Trailing Speedwell				x
Solanaceae	**Solanum nigrum*	Blackberry Nightshade		1		x
Verbenaceae	**Verbena bonariensis*	Small-flowered Purpletop				x
Herbs - Monocots						
Anthericaceae	*Arthropodium sp.*		2	2		
Commelinaceae	*Commelina cyanea*	Blue Wandering Jew				x
Cyperaceae	*Cyperus gracilis*		2	3	x	x
Iridaceae	**Romulea rosea*	Nutgrass			x	
Lomandraceae	*Lomandra filiformis ssp filiformis*	Wattle Mat-rush		1	x	x
Poaceae	*Austrostipa racemosa*			5	x	
	**Axonopus affinis*	Carpet Grass			x	
	Bothriochloa macra	Red Leg Grass		2	x	x
	**Chloris gayana*	Rhodes Grass	3	2	x	x
	C. truncata	Large Windmill Grass		1	x	x
	C. ventricosa	Windmill Grass	5	3	x	x
	**Cynodon dactylon*	Couch Grass	5		x	
	Danthonia sp.	a Wallaby Grass			x	x
	**Ehrharta erecta*	Veldt Grass			x	

Table A.1 PLANT SPECIES RECODED WITHIN THE PROJECT AREA

Form	Scientific Name	Common Name	Q1	Q2	T1	T2
	**Eleusine indica*	Crowsfoot Grass	2		x	
	**Eragrostis curvula*	African Love-grass		2	x	x
	E. leptostachya	Paddock Love-grass	2	2	x	
	Eriochloa pseudoaccrotricha		2		x	x
	**Lolium sp.*	Rye Grass	2		x	
	Microlaena stipoides	Weeping Meadow-grass	2	4	x	x
	Paspalidium distans					x
	**Paspalum dilatatum*	Paspalum	2	2	x	x
	**Pennisetum clandestinum*	Kikuyu			x	
	**Setaria gracilis*	Slender Pigeon Grass		1		x
	Sporobolus creber	Slender Rats Tail Grass			x	x
	**S. indica var capensis*	Parramatta Grass				x
Vines						
Fabaceae	*Glycine tabacina*		2	4	x	x

Cover abundance in quadrats (modified Braun-Blanquet system)

- 1 = rare;
- 2 = occasional;
- c = common;

- v = very common but less than 5%;
- 5 = 5-25%;
- 6 = 26-50%;
- .X = Present.

Appendix B

Fauna Species

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
Amphibia					
Bufonidae					
	*Rhinella marina**	Cane Toad		2	
Hylidae					
	Litoria caerulea	Green Tree Frog		1	
	Litoria dentata	Bleating Tree Frog		1	
	Litoria fallax	Eastern Dwarf Tree Frog		15	
	Litoria freycineti	Freycinet's Frog		1	
	Litoria latopalmata	Broad-palmed Frog		1	
	Litoria peronii	Peron's Tree Frog		10	
	Litoria tyleri	Tyler's Tree Frog		6	
	Litoria verreauxii	Verreaux's Frog		8	
	Litoria wilcoxii			1	
Myobatrachidae					
	Crinia signifera	Common Eastern Froglet		42	
	Heleioporus australiacus	Giant Burrowing Frog	V	3	
	Limnodynastes peronii	Brown-striped Frog		11	
	Limnodynastes tasmaniensis	Spotted Grass Frog		14	
	Paracrinia haswelli	Haswell's Froglet		1	
	Pseudophryne australis	Red-crowned Toadlet	V	8	

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Pseudophryne bibronii	Bibron's Toadlet		2	
	Uperoleia laevigata	Smooth Toadlet		3	
Aves					
Acanthizidae					
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill		97	
	Acanthiza lineata	Striated Thornbill		17	
	Acanthiza nana	Yellow Thornbill		435	
	Acanthiza pusilla	Brown Thornbill		321	
	Acanthiza reguloides	Buff-rumped Thornbill		9	
	Gerygone albogularis	White-throated Gerygone		17	
	Gerygone mouki	Brown Gerygone		24	
	Hylacola pyrrhopygia	Chestnut-rumped Heathwren		1	
	Origma solitaria	Rockwarbler		9	
	Pyrrholaemus saggitatus	Speckled Warbler	V	5	
	Sericornis frontalis	White-browed Scrubwren		632	
	Smicrornis brevirostris	Weebill		109	
Accipitridae					
	Accipiter cirrocephalus	Collared Sparrowhawk		5	
	Accipiter fasciatus	Brown Goshawk		9	

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Accipiter novaehollandiae	Grey Goshawk		6	
	Aquila audax	Wedge-tailed Eagle		5	
	Aviceda subcristata	Pacific Baza		3	
	Elanus axillaris	Black-shouldered Kite		31	
	Haliastur sphenurus	Whistling Kite		1	
	Hieraaetus morphnoides	Little Eagle	V	7	
	Milvus migrans	Black Kite		2	
Acrocephalidae					
	Acrocephalus australis	Australian Reed-Warbler		30	
Aegothelidae					
	Aegotheles cristatus	Australian Owlet-nightjar		4	
Alaudidae					
	*Alauda arvensis**	Eurasian Skylark		1	
Alcedinidae					
	Ceyx azureus	Azure Kingfisher		7	
	Dacelo novaeguineae	Laughing Kookaburra		40	
	Todiramphus sanctus	Sacred Kingfisher		37	
Anatidae					
	Anas castanea	Chestnut Teal		4	
	Anas gracilis	Grey Teal		2	

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	*Anas platyrhynchos**	Mallard		1	
	Anas superciliosa	Pacific Black Duck		20	
	Aythya australis	Hardhead		4	
	Chenonetta jubata	Australian Wood Duck		19	
	Cygnus atratus	Black Swan		3	
	Oxyura australis	Blue-billed Duck	V	1	
	Stictonetta naevosa	Freckled Duck	V	1	
Anhingidae					
	Anhinga novaehollandiae	Australasian Darter		3	
Ardeidae					
	Ardea ibis	Cattle Egret		7	
	Ardea modesta	Eastern Great Egret		2	
	Egretta garzetta	Little Egret		1	
	Egretta novaehollandiae	White-faced Heron		12	
	Ixobrychus dubius	Australian Little Bittern		1	
	Nycticorax caledonicus	Nankeen Night Heron		1	
Artamidae					
	Artamus cyanopterus	Dusky Woodswallow		68	
	Artamus personatus	Masked Woodswallow		2	
	Artamus superciliosus	White-browed Woodswallow		1	

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Cracticus nigrogularis	Pied Butcherbird		5	
	Cracticus tibicen	Australian Magpie		62	x
	Cracticus torquatus	Grey Butcherbird		113	x
	Strepera graculina	Pied Currawong		24	x
Cacatuidae					
	Cacatua galerita	Sulphur-crested Cockatoo		47	
	Cacatua sanguinea	Little Corella		9	
	Cacatua tenuirostris	Long-billed Corella		8	
	Callocephalon fimbriatum	Gang-gang Cockatoo	V	2	
	Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo		5	
	Eolophus roseicapillus	Galah		25	
Campephagidae					
	Coracina novaehollandiae	Black-faced Cuckoo-shrike		48	
	Coracina papuensis	White-bellied Cuckoo-shrike		1	
	Coracina tenuirostris	Cicadabird		3	
	Lalage sueurii	White-winged Triller		3	
Charadriidae					
	Elseyornis melanops	Black-fronted Dotterel		2	
	Vanellus miles	Masked Lapwing		18	x
Cisticolidae					

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Cisticola exilis	Golden-headed Cisticola		7	
Climacteridae					
	Cormobates leucophaea	White-throated Treecreeper		31	
Columbidae					
	*Columba livia**	Rock Dove		1	
	Geopelia humeralis	Bar-shouldered Dove		2	
	Geopelia striata	Peaceful Dove		8	
	Leucosarcia picata	Wonga Pigeon		7	
	Lopholaimus antarcticus	Topknot Pigeon		1	
	Macropygia amboinensis	Brown Cuckoo-Dove		3	
	Ocyphaps lophotes	Crested Pigeon		47	**x**
	Phaps chalcoptera	Common Bronzewing		12	
	*Streptopelia chinensis**	Spotted Turtle-Dove		41	**x**
Coraciidae					
	Eurystomus orientalis	Dollarbird		2	
Corcoracidae					
	Corcorax melanorhamphos	White-winged Chough		11	
Corvidae					
	Corvus coronoides	Australian Raven		68	**x**
Cuculidae					

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Cacomantis flabelliformis	Fan-tailed Cuckoo		45	
	Cacomantis pallidus	Pallid Cuckoo		3	
	Cacomantis variolosus	Brush Cuckoo		4	
	Chalcites lucidus	Shining Bronze-Cuckoo		9	
	Eudynamys orientalis	Eastern Koel		8	
	Scythrops novaehollandiae	Channel-billed Cuckoo		4	
Estrildidae					
	Lonchura castaneothorax	Chestnut-breasted Mannikin		4	
	Neochmia temporalis	Red-browed Finch		2112	
	Taeniopygia bichenovii	Double-barred Finch		450	
	Taeniopygia guttata	Zebra Finch		3	
Falconidae					
	Falco berigora	Brown Falcon		5	
	Falco cenchroides	Nankeen Kestrel		28	
	Falco longipennis	Australian Hobby		1	
	Falco peregrinus	Peregrine Falcon		5	
Fringillidae					
	*Carduelis carduelis**	European Goldfinch		65	
Hirundinidae					
	Hirundo neoxena	Welcome Swallow		28	**x**

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Petrochelidon ariel	Fairy Martin		411	
	Petrochelidon nigricans	Tree Martin		3	
Maluridae					
	Malurus cyaneus	Superb Fairy-wren		1026	
	Malurus lamberti	Variegated Fairy-wren		84	
Meliphagidae					
	Acanthorhynchus tenuirostris	Eastern Spinebill		95	
	Anthochaera carunculata	Red Wattlebird		16	
	Anthochaera chrysoptera	Little Wattlebird		36	
	Gliciphila melanops	Tawny-crowned Honeyeater		2	
	Lichenostomus chrysops	Yellow-faced Honeyeater		527	
	Lichenostomus fuscus	Fuscous Honeyeater		15	
	Lichenostomus leucotis	White-eared Honeyeater		29	
	Lichenostomus melanops	Yellow-tufted Honeyeater		31	
	Lichenostomus penicillatus	White-plumed Honeyeater		214	
	Manorina melanocephala	Noisy Miner		125	**x**
	Manorina melanophrys	Bell Miner		26	
	Meliphaga lewinii	Lewin's Honeyeater		70	
	Melithreptus brevirostris	Brown-headed Honeyeater		10	
	Melithreptus gularis gularis	Black-chinned Honeyeater (eastern	V	3	

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
		subspecies)			
	Melithreptus lunatus	White-naped Honeyeater		53	
	Myzomela sanguinolenta	Scarlet Honeyeater		19	
	Philemon corniculatus	Noisy Friarbird		34	
	Phylidonyris niger	White-cheeked Honeyeater		1	
	Phylidonyris novaehollandiae	New Holland Honeyeater		8	
	Xanthomyza phrygia	Regent Honeyeater	CE	1	
Menuridae					
	Menura novaehollandiae	Superb Lyrebird		1	
Meropidae					
	Merops ornatus	Rainbow Bee-eater		2	
Monarchidae					
	Grallina cyanoleuca	Magpie-lark		53	
	Monarcha melanopsis	Black-faced Monarch		4	
	Myiagra cyanoleuca	Satin Flycatcher		2	
	Myiagra inquieta	Restless Flycatcher		14	
	Myiagra rubecula	Leaden Flycatcher		12	
Motacillidae					
	Anthus novaeseelandiae	Australian Pipit		5	
Nectariniidae					

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Dicaeum hirundinaceum	Mistletoebird		31	
Neosittidae					
	Daphoenositta chrysoptera	Varied Sittella	V	25	
Oriolidae					
	Oriolus sagittatus	Olive-backed Oriole		25	
Pachycephalidae					
	Colluricincla harmonica	Grey Shrike-thrush		60	
	Falcunculus frontatus frontatus	Eastern Shrike-tit		16	
	Pachycephala pectoralis	Golden Whistler		390	
	Pachycephala rufiventris	Rufous Whistler		138	
Pardalotidae					
	Pardalotus punctatus	Spotted Pardalote		254	
	Pardalotus striatus	Striated Pardalote		131	
Passeridae					
	*Passer domesticus**	House Sparrow		80	
Pelecanidae					
	Pelecanus conspicillatus	Australian Pelican		5	
Petroicidae					
	Eopsaltria australis	Eastern Yellow Robin		767	
	Melanodryas cucullata	Hooded Robin	V	2	

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Microeca fascinans	Jacky Winter		5	
	Petroica boodang	Scarlet Robin	V	6	
	Petroica goodenovii	Red-capped Robin		1	
	Petroica phoenicea	Flame Robin	V	1	
	Petroica rosea	Rose Robin		70	
Phalacrocoracidae					
	Microcarbo melanoleucos	Little Pied Cormorant		9	
	Phalacrocorax carbo	Great Cormorant		1	
	Phalacrocorax sulcirostris	Little Black Cormorant		6	
	Phalacrocorax varius	Pied Cormorant		4	
Phasianidae					
	Coturnix ypsilophora	Brown Quail		2	
Podargidae					
	Podargus strigoides	Tawny Frogmouth		9	
Podicipedidae					
	Tachybaptus novaehollandiae	Australasian Grebe		6	
Psittacidae					
	Alisterus scapularis	Australian King-Parrot		15	
	Glossopsitta concinna	Musk Lorikeet		6	
	Glossopsitta pusilla	Little Lorikeet	V	7	**x**

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Lathamus discolor	Swift Parrot	E	2	
	Platycercus elegans	Crimson Rosella		14	
	Platycercus eximius	Eastern Rosella		69	x
	Psephotus haematonotus	Red-rumped Parrot		59	x
	Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet		2	
	Trichoglossus haematodus	Rainbow Lorikeet		47	x
Psophodidae					
	Cinclosoma punctatum	Spotted Quail-thrush		3	
	Psophodes olivaceus	Eastern Whipbird		33	
Ptilonorhynchidae					
	Ptilonorhynchus violaceus	Satin Bowerbird		15	
Pycnonotidae					
	*Pycnonotus jocosus**	Red-whiskered Bulbul		275	
Rallidae					
	Fulica atra	Eurasian Coot		4	
	Gallinula tenebrosa	Dusky Moorhen		11	
	Porphyrio porphyrio	Purple Swamphen		12	
Recurvirostridae					
	Himantopus himantopus	Black-winged Stilt		1	
Rhipiduridae					

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Rhipidura albiscapa	Grey Fantail		340	
	Rhipidura leucophrys	Willie Wagtail		95	
	Rhipidura rufifrons	Rufous Fantail		62	
Scolopacidae					
	Gallinago hardwickii	Latham's Snipe		6	
Strigidae					
	Ninox novaeseelandiae	Southern Boobook		8	
	Ninox strenua	Powerful Owl	V	3	
Sturnidae					
	*Sturnus tristis**	Common Myna		68	
	*Sturnus vulgaris**	Common Starling		156	**x**
Threskiornithidae					
	Platalea flavipes	Yellow-billed Spoonbill		4	
	Platalea regia	Royal Spoonbill		5	
	Threskiornis molucca	Australian White Ibis		5	
	Threskiornis spinicollis	Straw-necked Ibis		3	
Timaliidae					
	Zosterops lateralis	Silvereye		6152	
Turdidae					
	*Turdus merula**	Eurasian Blackbird		317	

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Zoothera lunulata	Bassian Thrush		1	
	Zoothera sp.	unidentified ground thrush		1	
Turnicidae					
	Turnix varius	Painted Button-quail		2	
Tytonidae					
	Tyto javanica	Eastern Barn Owl		2	
Gastropoda					
Bradybaenidae					
	*Bradybaena similaris**	Asian trampsnail		1	
Camaenidae					
	Meridolum corneovirens	Cumberland Plain Land Snail	E	25	
Helicidae					
	*Helix aspersa**	Brown gardensnail		4	
Mammalia					
Acrobatidae					
	Acrobates pygmaeus	Feathertail Glider		1	

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
Bovidae					
	*Bos taurus**	European cattle		3	
	*Capra hircus**	Goat		3	
Canidae					
	*Canis lupus familiaris**	Dog		7	
	*Canis lupus**	Dingo, domestic dog		5	
	*Vulpes vulpes**	Fox		106	
Cervidae					
	*Cervus sp.**	Unidentified Deer		13	
Dasyuridae					
	Antechinus stuartii	Brown Antechinus		2	
	Dasyurus maculatus	Spotted-tailed Quoll	V	1	
Emballonuridae					
	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	1	
Equidae					
	*Equus caballus**	Horse		5	
Felidae					
	*Felis catus**	Cat		4	
Leporidae					
	*Lepus capensis**	Brown Hare		2	

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	*Oryctolagus cuniculus**	Rabbit		28	
Macropodidae					
	Macropod sp.	unidentified macropod		1	
	Macropus giganteus	Eastern Grey Kangaroo		4	
	Macropus robustus	Common Wallaroo		5	
	Wallabia bicolor	Swamp Wallaby		32	
Molossidae					
	Mormopterus "Species 2"	Undescribed Freetail Bat		2	
	Mormopterus norfolkensis	Eastern Freetail-bat	V	8	
	Tadarida australis	White-striped Freetail-bat		8	
Muridae					
	*Mus musculus**	House Mouse		6	
	Rattus fuscipes	Bush Rat		2	
	*Rattus rattus**	Black Rat		2	
Ornithorhynchidae					
	Ornithorhynchus anatinus	Platypus		5	
Petauridae					
	Petaurus breviceps	Sugar Glider		9	
	Petaurus sp.	glider		1	
Phalangeridae					

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Trichosurus sp.	brushtail possum		23	
	Trichosurus vulpecula	Common Brushtail Possum		9	
Phascolarctidae					
	Phascolarctos cinereus	Koala	V	463	
Pseudocheiridae					
	Pseudocheirus peregrinus	Common Ringtail Possum		11	
Pteropodidae					
	Pteropus poliocephalus	Grey-headed Flying-fox	V	16	
Suidae					
	*Sus scrofa**	Pig		1	
Tachyglossidae					
	Tachyglossus aculeatus	Short-beaked Echidna		35	
Vespertilionidae					
	Chalinolobus dwyeri	Large-eared Pied Bat	V	1	
	Chalinolobus gouldii	Gould's Wattled Bat		17	
	Chalinolobus morio	Chocolate Wattled Bat		7	
	Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	2	
	Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V	3	
	Myotis macropus	Southern Myotis	V	4	

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Nyctophilus geoffroyi	Lesser Long-eared Bat		6	
	Nyctophilus gouldi	Gould's Long-eared Bat		3	
	Nyctophilus sp.	long-eared bat		4	
	Scoteanax rueppellii	Greater Broad-nosed Bat	V	5	
	Scotorepens orion	Eastern Broad-nosed Bat		5	
	Vespadelus darlingtoni	Large Forest Bat		1	
	Vespadelus pumilus	Eastern Forest Bat		2	
	Vespadelus regulus	Southern Forest Bat		1	
	Vespadelus sp.	Unidentified Eptesicus		2	
	Vespadelus vulturnus	Little Forest Bat		11	
Vombatidae					
	Vombatus ursinus	Common Wombat		19	
Reptilia					
Agamidae					
	Amphibolurus muricatus	Jacky Lizard		4	
	Physignathus lesueurii	Eastern Water Dragon		6	
	Pogona barbata	Bearded Dragon		4	
Boidae					

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Morelia spilota	Carpet & Diamond Pythons		1	
Chelidae					
	Chelodina longicollis	Eastern Snake-necked Turtle		5	
Elapidae					
	Cryptophis nigrescens	Eastern Small-eyed Snake		1	
	Demansia psammophis	Yellow-faced Whip Snake		1	
	Hoplocephalus bungaroides	Broad-headed Snake	E	1	
	Pseudechis porphyriacus	Red-bellied Black Snake		8	
	Pseudonaja textilis	Eastern Brown Snake		5	
	Vermicella annulata	Bandy-bandy		2	
Gekkonidae					
	Diplodactylus vittatus	Wood Gecko		2	
	Oedura lesueurii	Lesueur's Velvet Gecko		5	
	Phyllurus platurus	Broad-tailed Gecko		5	
	Underwoodisaurus milii	Thick-tailed Gecko		1	
Pygopodidae					
	Pygopus lepidopodus	Common Scaly-foot		2	
Scincidae					
	Acritoscincus platynota	Red-throated Skink		3	
	Cryptoblepharus virgatus	Cream-striped Shinning-skink		7	

Table B.1 FAUNA SPECIES PRESENT IN THE PROJECT AREA AND 10 KM RADIUS

Common Name	Scientific Name	Common Name	Legal Status	Presence within 10Km^2	Presence on Project Area Site
	Ctenotus robustus	Robust Ctenotus		7	
	Ctenotus taeniolatus	Copper-tailed Skink		8	
	Egernia whitii	White's Skink		1	
	Eulamprus heatwolei	Yellow-bellied Water-skink		3	
	Eulamprus quoyii	Eastern Water-skink		18	
	Eulamprus tenuis	Barred-sided Skink		9	
	Lampropholis delicata	Dark-flecked Garden Sunskink		19	
	Lampropholis guichenoti	Pale-flecked Garden Sunskink		20	
	Lygisaurus foliorum	Tree-base Litter-skink		2	
	Saiphos equalis	Three-toed Skink		1	
	Saproscincus mustelinus	Weasel Skink		2	
	Tiliqua scincoides	Eastern Blue-tongue		6	**x**
Typhlopidae					
	Ramphotyphlops nigrescens	Blackish Blind Snake		3	
Varanidae					
	Varanus varius	Lace Monitor		6	

Appendix C

Likelihood of Occurrence

Table C.1 LIKELIHOOD OF OCCURRENCE AND HABITAT REQUIREMENTS OF THREATENED FLORA

Scientific Name	Common Name	Status TSC Act	EPBC Act	Habitat	Likelihood of occurrence*
Acacia bynoeana	Bynoe's Wattle	E	V	Found in heath and woodland on sandy soils. Scattered from coast to mountains, uncommon. Associated overstorey species include Corymbia gummifera (Red Bloodwood), Scribbly Gum (Eucalyptus haemastoma), Parramatta Red Gum (Eucalyptus parramattensis), Banksia serrata and Angophora bakeri. Records occur north and east of the NWGC. No previous records occur within the Desktop Assessment Area	Unlikely. No suitable habitat.
Cynanchum elegans	White-flowered Wax Plant	E	E	Climber or twiner with a variable form. It occurs in dry rainforest gullies, scrub and scree slopes. It prefers the ecotone between dry subtropical rainforest and sclerophyll woodland/forest. However has been found in littoral rainforest; Eucalyptus tereticornis aligned open forest/ woodland; E. maculata aligned open forest/woodland; and Melaleuca armillaris scrub to open scrub. Flowers between August and May, peaking in November. Seeds are unlikely to persist in the seedbank. No previous records in the desktop assessment area.	Unlikely. No suitable habitat.
Eucalyptus benthamii	Camden White Gum	V		Occurs in open forest. Requires a combination of deep alluvial sands and a flooding regime that	Unlikely. No suitable habitat.

Table C.1 LIKELIHOOD OF OCCURRENCE AND HABITAT REQUIREMENTS OF THREATENED FLORA

Scientific Name	Common Name	Status TSC Act	EPBC Act	Habitat	Likelihood of occurrence*
				permits seedling establishment	
Grevillea parviflora subsp. parviflora	Small Flower Grevillea	V	V	Occurs on sandy clay loam soils, often with lateritic ironstone gravels. Soils are mostly derived from Tertiary sands or alluvium and from the Mittagong Formation with alternating bands of shale and fine-grained sandstones. Soil landscapes include Lucas Heights and Berkshire Park. Often occurs in open, slightly disturbed sites such as along tracks. Flowering has been recorded between July to December as well as April-May. No existing records for the desktop assessment area. Although suitable habitat occurs for this species in the NWGC, it is outside of the species known range and therefore is considered unlikely to occur there.	Unlikely. No suitable habitat.
Leucopogon exolasius	Woronora Beard-heath	V	V	This plant occurs in woodland in areas of sandstone.	Unlikely. One record within a 10km of the Project Area.
Leucopogon fletcheri subsp. fletcheri		E		Occurs in dry eucalypt woodland or in shrubland on clayey lateritic soils, generally on flat to gently sloping terrain along ridges and spurs.	Unlikely. No suitable habitat.
Marsdenia viridiflora subsp. viridiflora		Endangered Population		Grows in vine thickets and open shale woodland	Potential. Small areas of degraded habitat exist within the Project Area.

Table C.1 LIKELIHOOD OF OCCURRENCE AND HABITAT REQUIREMENTS OF THREATENED FLORA

Scientific Name	Common Name	Status TSC Act	EPBC Act	Habitat	Likelihood of occurrence*
Melaleuca deanei	Deane's Melaleuca	V	V	Marshy heath on coastal sandstone plateaus.	Unlikely. No suitable habitat.
Persoonia hirsuta	Hairy Geebung	E	E	Found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	Unlikely. No suitable habitat.
Persoonia nutans	Nodding Geebung	E	E	Associated with dry woodland, Castlereagh Scribbly Gum Woodland, Agnes Banks Woodland and sandy soils associated with tertiary alluvium, occasionally poorly drained. Also occurs in Shale Gravel Transition Forest and Castlereagh Ironbark Forest. Endemic to the Western Sydney.	Unlikely. Small areas of degraded habitat exist within the Project Area.
Pimelea spicata	Spiked Rice-flower	E	E	In western Sydney, it occurs on an undulating topography of well structured clay soils, derived from Wianamatta shale. It is associated with Cumberland Plain Woodland (CPW), in open woodland and grassland often in moist depressions or near creek lines. Has been located in disturbed areas that would have previously supported CPW	Potential. Small areas of degraded habitat exist within the Project Area.
Pomaderris brunnea	Brown Pomaderris	V	V	Associated with open forests in association with Eucalyptus amplifolia, Angophora floribunda, Acacia parramattensis, Bursaria spinosa and Kunzea ambigua. It is found on the Colo River, the Nepean R. floodplain at Menangle, in	Unlikely. Small areas of degraded habitat exist within the Project Area.

Table C.1 LIKELIHOOD OF OCCURRENCE AND HABITAT REQUIREMENTS OF THREATENED FLORA

Scientific Name	Common Name	Status TSC Act	EPBC Act	Habitat	Likelihood of occurrence*
				creeklines at Wirrumbirra Sanctuary (Bargo) and on the Hawkesbury River. The distribution may extend into the southern section of Yengo NP along major creeklines and floodplains	
Pterostylis saxicola	Syndey Plains Greenhood	E	E	Occurs in western Sydney from Freemans Reach in the north to Picton in the south. It grows in shallow soil in depression on sandstone rock escarpments. It lives in sclerophyll forest and woodland.	Unlikely. Small areas of degraded habitat exist within the Project Area.

Table C.2 LIKELIHOOD OF OCCURRENCE AND HABITAT REQUIREMENTS OF THREATENED FAUNA

Scientific Name	Common Name	Status TSC Act	EPBC Act	Habitat	Likelihood of occurrence
Amphibians					
Heleioporus australiacus	Giant Burrowing Frog	V	V	The vegetation is typically woodland, open woodland and heath and may be associated with 'hanging swamp' seepage lines and where small pools form from the collected water. Within the Sydney region this species is confined to Sandstone environments, with breeding occurring in small streams.	Unlikely. No suitable habitat.
Litoria aurea	Green and Golden Bell Frog	E	V	Large permanent to semi-permanent freshwater wetlands, with dense stands of reeds.	Unlikely. No suitable habitat.
Litoria littlejohni	Littlejohn's Tree Frog, Heath Frog	V	V	Habitats include dams, creeks and lagoons in heathland or woodland. Favours higher woodland areas, particularly in areas of sandstone.	Unlikely. No suitable habitat.
Litoria rainformis	Southern Bell Frog	E	V	Inhabits swamps, dams and slow flowing streams with abundant emergent vegetation in open woodland and cleared areas.	Unlikely. No suitable habitat.
Pseudophryne australis	Red-crowned Toadlet	V		Hawkesbury sandstone and may be found beside temporary creeks, gutters and soaks, and under rocks and logs. Breeds in damp leaf litter that become inundated with heavy rain.	Unlikely. No suitable habitat.
Invertebrates					
Meridolum corneovirens	Cumberland Plain	E		Primarily inhabits Cumberland Plain Woodland.	Potential to occur. Suitable

Table C.2 LIKELIHOOD OF OCCURRENCE AND HABITAT REQUIREMENTS OF THREATENED FAUNA

Scientific Name	Common Name	Status TSC Act	EPBC Act	Habitat	Likelihood of occurrence
	Land Snail			This community is a grassy, open woodland with occasional dense patches of shrubs.	habitat within the study area within native woodland areas.
Reptiles					
Hoplocephalus bungaroides	Broad-headed Snake	E	V	Occur under large exfoliating slabs of sandstone and rock crevices in areas of undisturbed bushland, usually on tops of cliffs. Commonly found in rock on rock situations in this context also includes crevices in cliff faces	Unlikely. No suitable habitat.
Varanus rosenbergi	Rosenberg's Goanna	V		Found in coastal heaths, humid woodlands and wet and dry sclerophyll forests. Shelters in burrows, rock hollows or crevices. Known to lay eggs in burrow in termite mound.	Unlikely. No suitable habitat.
Aves					
Burhinus grallarius	Bush Stone-curlew	E		Well wooded floodplain forests, amongst fallen timber	Unlikely. No suitable habitat.
Callocephalon fimbriatum	Gang-gang Cockatoo	V		Wetter forests, and woodlands, from sea level to 2000m on divide. From timbered foothills and valleys to suburban gardens.	Unlikely. No suitable habitat.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		Eucalypt forests and woodlands and forage in Allocasuarina. Nest in tree hollows	Unlikely. No suitable habitat.

Table C.2 LIKELIHOOD OF OCCURRENCE AND HABITAT REQUIREMENTS OF THREATENED FAUNA

Scientific Name	Common Name	Status TSC Act	EPBC Act	Habitat	Likelihood of occurrence
Circus assimilis	Spotted Harrier	V		The Spotted Harrier occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe (e.g. chenopods). It is found mostly commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	Unlikely. No suitable habitat.
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V		Drier forests, woodlands, scrub with fallen branches	Unlikely. No suitable habitat.
Daphoenositta chrysoptera	Varied Sitella	V		The Varied Sittella is sedentary and inhabits most of mainland Australia. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Unlikely. No suitable habitat.
Ephippiorhynchus asiaticus	Black-necked Stork	E		Associated with tropical and warm temperate terrestrial wetlands, estuarine and littoral habitats, and occasionally woodlands and grasslands, floodplains. Forages in fresh or saline waters up to 0.5m deep, mainly in open fresh waters, extensive sheets of shallow water over grasslands or sedgeland, mangroves, mudflats, shallow swamps with short emergent vegetation and permanent billabongs and pools	Unlikely. No suitable habitat.

Table C.2 LIKELIHOOD OF OCCURRENCE AND HABITAT REQUIREMENTS OF THREATENED FAUNA

Scientific Name	Common Name	Status TSC Act	EPBC Act	Habitat	Likelihood of occurrence
				on floodplains.	
Gallinago hardwickii	Latham's Snipe, Japanese Snipe		M	Soft wet ground or shallow water with tussocks and other green and dead growth. Wet drainage areas	Unlikely. No suitable habitat.
Glossopsitta pusilla	Little Lorikeet	V		Mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes.	Small number recorded during surveys. Suitable foraging habitat within dominant canopy trees during flowering season.
Hieraaetus morphnoides	Little Eagle	V		The Little Eagle occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring. Young fledge in early summer. It eats birds, reptiles and mammals, occasionally adding large insects and carrion	Unlikely. No suitable habitat.
Lathamus discolor	Swift Parrot	E	E	Forests, woodlands, plantations, banksias, street trees and gardens on the mainland	Potential. Suitable foraging habitat within dominant canopy trees during flowering season.

Table C.2 LIKELIHOOD OF OCCURRENCE AND HABITAT REQUIREMENTS OF THREATENED FAUNA

Scientific Name	Common Name	Status TSC Act	EPBC Act	Habitat	Likelihood of occurrence
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V		Drier eucalypt forests, woodlands, timber on water courses, often no understorey, scrubs. Favours ironbark woodlands on western slopes.	Potential. Suitable foraging habitat within dominant canopy trees during flowering season
Ninox strenua	Powerful Owl	V		Pairs occupy large, probably permanent home ranges in forests to woodlands. Nest in large hollow	Unlikely. No suitable habitat.
Petroica boodang	Scarlet Robin	V		The Scarlet Robin breeds in drier eucalypt forests and temperate woodlands, often on ridges and slopes, within an open understorey of shrubs and grasses and sometimes in open areas. Abundant logs and coarse woody debris are important structural components of its habitat. In autumn and winter it migrates to more open habitats such as grassy open woodland or paddocks with scattered trees. It forages from low perches, feeding on invertebrates taken from the ground, tree trunks, logs and other coarse woody debris.	Unlikely. No suitable habitat in such heavily urbanised areas.
Rostratula australis	Australian Painted Snipe	E	E, M	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds (ibid.). Breeding is often in response to local	Unlikely. No suitable habitat.

Table C.2 LIKELIHOOD OF OCCURRENCE AND HABITAT REQUIREMENTS OF THREATENED FAUNA

Scientific Name	Common Name	Status TSC Act	EPBC Act	Habitat	Likelihood of occurrence
				conditions; generally occurs from September to December. Roosts during the day in dense vegetation. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter	
Xanthomyza phrygia	Regent Honeyeater	CE	E, M	Dry open forests, woodlands, especially red ironbark, yellow box, yellow gum	Potential. Suitable foraging habitat within dominant canopy trees during flowering season.
Mammals					
Cercartetus nanus	Eastern Pygmy-possum	V		Inhabits eastern forests and woodlands and feeds mostly on the pollen and nectar from banksias, eucalypts and understorey plants and will also eat insects, seeds and fruit	Unlikely. No suitable habitat.
Chalinolobus dwyeri	Large-eared Pied Bat,	V	V	Roosts in caves, mines. Uncommon but observed in wet and dry eucalypt forests	Unlikely. No suitable habitat.
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Occurs in wide variety of habitats in large remnants. Dens in tree hollows, hollow logs or rock crevices	Unlikely. No suitable habitat.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		Usually roosts in tree hollows in the higher rainfall forests within its range.	Possible. Suitable forage habitat throughout the study area.
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V		Forages above the canopy and eats mostly moths. Roosts in caves, old mines, road	Possible. Suitable forage habitat throughout the study area.

Table C.2 LIKELIHOOD OF OCCURRENCE AND HABITAT REQUIREMENTS OF THREATENED FAUNA

Scientific Name	Common Name	Status TSC Act	EPBC Act	Habitat	Likelihood of occurrence
				culverts	
Mormopterus norfolkensis	Eastern Freetail-bat	V		Inhabits dry and wet sclerophyll forests, coastal woodland. Roosts in tree hollows and buildings. Have been found roosting under the bark of trees.	Possible. Suitable forage habitat throughout the study area.
Myotis macropus	Southern Myotis	V		Known from a range of habitats close to water from lakes, small creeks to large lakes and mangrove lined estuaries	Possible. Suitable forage habitat throughout the study area.
Petaurus australis	Yellow-bellied Glider	V		Patchily distributed in wet sclerophyll forest.	Unlikely. No suitable habitat.
Petaurus norfolcensis	Squirrel Glider	V		Associated with dry hardwood forest and woodlands. Habitats typically include gum barked and high nectar producing species, including winter flower species. The presence of hollow bearing eucalypts is a critical habitat value	Unlikely. No suitable habitat.
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	Rocky areas of sclerophyll forest of inland and subcoastal southeastern Australia. Rocky areas in a variety of habitats, typically north facing sites with numerous ledges, caves and crevices	Unlikely. No suitable habitat.
Phascolarctos cinereus	Koala	V		Widespread in sclerophyll forest and woodlands. Requires relatively large home ranges.	Unlikely. No suitable habitat.
Potorous tridactylus tridactylus	Long-nosed Potoroo		V	Known from coastal heathy woodland but also	Unlikely. No suitable habitat.

Table C.2 LIKELIHOOD OF OCCURRENCE AND HABITAT REQUIREMENTS OF THREATENED FAUNA

Scientific Name	Common Name	Status TSC Act	EPBC Act	Habitat	Likelihood of occurrence
				occurs in rainforest, wet sclerophyll and coastal wallum. Dense cover for shelter adjacent to open areas for foraging	
Pseudomys novaehollandiae	New Holland Mouse		V	This species inhabits open heathlands, open woodland with a heathy understorey and vegetated sand dunes. It is commonly found in areas that are frequently burnt.	Unlikely. No suitable habitat.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Roosts in large camps and disperses nightly up to 20km to feed in flowering eucalypts	Likely. Suitable foraging habitat within canopy trees across the Project Area.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V		Occur in all habitats, from wet and dry sclerophyll forest, open woodland. Insectivorous and forage above the tree canopy. The species roosts in tree hollows and tend to be solitary for most of the year.	Possible. Suitable forage habitat throughout the study area.
Scoteanax rueppellii	Greater Broad-nosed Bat	V		Usually in tall wet forest, extending into drier forest along gullies. Forages along forest edges. Roosts in tree hollows	Possible. Suitable forage habitat throughout the study area.