FLORA & FAUNA AND BIODIVERSITY

IMPACT ASSESSMENT FOR

PROPOSED CONSTRUCTION OF

JUNIOR AND SENIOR SCHOOLS,

RELOCATION AND EXPANSION

INCLUDING PARKING AND LANDSCAPING

AS WELL AS

NEW SHARED FACILITIES INCLUDING

LIBRARY, MULTI-PURPOSE HALL

AND

LANDSCAPING AT 7 & 37 WORCESTER ROAD,

ROUSE HILL

Prepared for:

ANGLICAN SCHOOLS CORPORATION

FURTHER AMENDED SEPTEMBER 2017

ACS Environmental P/L

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Consultants experience

The directors of 'Actinotus Consultancy Services (ACS) – Environmental P/L' (formerly Actinotus Environmental Consultants) have collectively worked in the area of biodiversity impact and bushfire hazard assessment services for a period of greater than 20 years. They also have over 30 years of experience in scientific research (ecological, genetic) and teaching in biological science.

The principals of the former 'Actinotus Environmental Consultants' have completed the NSW Consulting Planners Bushfire Training Course organised by the Planning Institute of Australia NSW Division for planning consultants and allied professionals relating to the implementation of 'Planning for Bushfire Protection', in June 2003.

CONTENTS page No.

CONTENTS **page No.**

FIGURES **page No.**

FIGURES **page No.**

TABLES

APPENDICES

EXECUTIVE SUMMARY

ACS (Actinotus Consultancy Services) – Environmental' were commissioned to undertake a comprehensive survey of an area of land at No. 37 Worcester Road, Rouse Hill, as well as existing areas of woodland occurring within the Rouse Hill Anglican College (RHAC) site at 7 Worcester Road, Rouse Hill, as part of a DA submission for a proposed Masterplan for the RHAC.

The proposal is for the construction of a junior school, relocation and expansion including parking and landscaping and new shared facilities including library, multi-purpose hall and landscaping at 7 & 37 Worcester Road, Rouse Hill.

The landscape consists of a gently sloping hillslope with easterly aspect, the subject site occurring within the Area 20 Precinct growth centre that was rezoned for urban development in October 2011 by the Minister for Planning and Infrastructure.

Indigenous species of canopy trees mostly include Forest Red Gum with Narrow-leaved Ironbark and Grey Box occurring less frequently. Few indigenous shrub, grass and forb species occur at the site, the shrub layer cleared and ground layer comprised largely of exotic grassland.

The vegetative cover of the subject land at 37 Worcester Road, Rouse Hill consists of exotic pasture grassland with few scattered remnant indigenous trees occurring along sections of the fence-lines.

The vegetative cover of the subject land at the existing RHAC site at 7 Worcester Road, Rouse Hill, consists of a managed open woodland of trees (Urban Forestry Australia 2016).

The ecological plant community occurring at the existing RHAC at 7 Worcester Road, Rouse Hill, location is mapped as Cumberland Shale Plains Woodland (Code: S_GW03; DEC 2002). The subject area at 37 Worcester Road that is not shaded in the mapping occurs predominantly as exotic grassland.

Cumberland Shale Plains Woodland is a component of Cumberland Plain Woodland in the Sydney Basin Bioregion, listed as a Critically Endangered Ecological Community (CEEC) under the TSC Act (1995). It is also listed as a component of Cumberland Shale Woodlands and Shale-Gravel Transition Forest, listed as a Critically Endangered Ecological Community (CEEC) under the registers of the EPBC Act (1999).

Conservation Assessment Significance mapping by DEC (2002) of the subject area denotes the vegetation significance of the RHAC site as being 'Core Habitat'.

In relation to locally occurring habitat, many of the listed species occur in natural, un-degraded sandstone-derived habitats that are distinctly different to that occurring at the subject site, which is characterized by a cleared area of exotic grassland at 37 Worcester Road and a managed woodland of Cumberland Shale Plains Woodland that is retained in a cleared exotic grassland landscape at the existing RHAC site.

Where the edaphic habitat may be compatible, the history of clearing and former agricultural practices as well as the current educational facility of the RHAC occurring at Worcester Road, would largely preclude any threatened species from occurring at the subject sites.

A total of 189 indigenous locally-occurring trees (excluding exotic and non-locally occurring tree species) occur at 37 Worcester Road, Rouse Hill and the existing RHAC site at 7 Worcester Road, Rouse Hill. Of these, 116 individuals of canopy trees will be removed, however, up to 60 individuals of the indigenous canopy species Grey Box and Turpentine (*Syncarpia glomulifera*) will be planted in a landscape plan for the site.

A total of 40 indigenous species of terrestrial fauna, mainly avifauna, were recorded or were expected to occur within the exotic grassland habitat of 37 Worcester Road, Rouse Hill and the existing RHAC site. Evidence of Ringtail Possum *Pseudocheirus peregrinus*) was noted with Common Brushtail Possum (*Trichosurus vulpecula*) also expected to occur.

The OEH Atlas of NSW Wildlife database 2015 listed thirty (30) species of terrestrial and avifauna considered threatened under the TSC Act within a 5 km radius of the site.

Some species that have been recorded within 1km of the subject sites, such as the Little Eagle, Powerful Owl, Black-chinned Honeyeater, Varied Sittella, Scarlet Robin, Eastern Freetail Bat, Eastern Bentwing Bat, Southern Myotis and the Large Cumberland Plain Land Snail are more likely to occur to the west of the school within undisturbed woodland.

A history of former disturbance, clearing and landscaping at the school reduces the likelihood of threatened species utilising resources within the grounds. The most likely to occur on occasion are the Varied Sitella and small microbats which forage over wide ranges.

No threatened fauna species were recorded during this survey.

The subject land at Rouse Hill is included in the Biodiversity Certification of land occurring within the Area 20 Precinct of the North-west Growth Centres SEPP.

Biodiversity Certification removes the need for further threatened species assessments before developing land in 'Certified' lands for the Area 20 Precinct.

As the local area containing the subject land is Biodiversity Certified under the Sydney Region Growth Centres SEPP (2006), addressing threatened species legislation is not considered a requirement of this stage of the development approval process.

ACRONYMS & GLOSSARY

APZ – Asset Protection Zone

BLEP - Blacktown City Local Environment Plan

BDCP - Blacktown City Development Control Plan

CCPD – Crown Canopy Projective Density

CEEC – Critically Endangered Ecological Community

CEMP - Construction Environmental Management Plan

CKPoM - Comprehensive Koala Plans of Management

CRSSP - Cudgegong Road Station Structure Plan

DEC – State Department of Environment and Conservation

DECCW – State Department of Environment, Climate Change and Water

DoE – Commonwealth Department of Environment

EEC – Endangered Ecological Community

EPA Act – Environment Protection Act

EPBC Act – Environment Protection and Biodiversity Conservation Act

GCPDCP - Blacktown Growth Centres Development Control Plan 2010

LEP - Local Environment Plan

NPWS – State National Parks and Wildlife Service

OEH – Office of the Environment and Heritage

RoTAP – Rare and Threatened Australian Plants

SEPP 44 – State Environmental Planning Policy No. 44 – Koala Habitat Protection

SMCMA – Sydney Metropolitan Catchment Management Authority

TSC Act – Threatened Species Conservation Act

INTRODUCTION

1.1 Proposed development

ACS (Actinotus Consultancy Services) – Environmental' were commissioned by Sydney Anglican Schools Corporation to undertake a comprehensive survey of an area of land at No. 37 Worcester Road, Rouse Hill, as well as existing areas of woodland occurring within the Rouse Hill Anglican College (RHAC) site at 7 Worcester Road, Rouse Hill, as part of a DA submission for a proposed Masterplan for the RHAC.

The proposal at 7 & 37 Worcester Road, Rouse Hill, is for the construction of the following:

i) the junior school at the northern section of the site to be expanded via relocation to accommodate further student growth with 3 new classroom modules, new roadway and car-parking and associated landscaping areas;

ii) the extension of the senior school at the south of the site including the demolition and replacement of the 2 previous classroom modules with new teaching spaces including for specialised teaching streams, new roadway and associated landscaped areas, and;

iii) the construction of new shared facilities between the junior and senior schools including new library, multi-purpose building and associated landscaping.

The landscape consists of a gently sloping hillslope with easterly aspect, the subject site occurring within the Area 20 Precinct growth centre that was rezoned for urban development in October 2011 by the Minister for Planning and Infrastructure.

Figure 1 - Aerial view of surveyed sections within the subject area at 37 Worcester Road and including the northern wooded areas at the existing RHAC site, Worcester Road, Rouse Hill (yellow outline) (from the Masterplan for the site 2016)

Figure 2 - Proposed Masterplan of new buildings at the subject Junior and Senior School areas at 37 Worcester Road and existing RHAC site at Rouse Hill

1.2 Statutory and legislative requirements

Planning controls that need to be addressed in any comprehensive biodiversity studies on the subject land are listed below.

Planning controls provided by State and Commonwealth Legislation include the following:

- *Environmental Planning and Assessment Act (EP & A Act)(1979)*,

  The objectives of this Act are:
  - to provide for the protection of the environment, especially matters of national environmental significance
  - conserve Australian biodiversity
  - provide a streamlined national environmental assessment and approval process
  - enhance the protection and management of important natural and cultural places
  - promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources

- *Commonwealth Environment Protection and Biodiversity Conservation Act (EPBC Act)(1999),*

  The objectives of this Act are:
  - to encourage the proper management, development and conservation of natural and artificial resources, specifically the protection of the environment, native animals and plants and threatened species, populations and ecological communities, and their habitats.

- *Threatened Species Conservation Act (TSC Act)(1995).* The *Threatened Species Conservation Act (TSC Act)(1995)* includes Preliminary Determinations of the NSW Scientific Committee (to July 2014) as well as Provisional Listings of Endangered Species on an emergency basis (to July 2014),

  The objectives of this Act are:
  - to provide for the conservation of threatened species, populations and ecological communities of animals and plants. The Act sets out a number of specific objects relating to the conservation of biological diversity and the promotion of ecologically sustainable development.

- *Planning for Bushfire Protection (2006).*

- *Noxious Weeds Act 1993 (NW Act) (NSW)*
  The objectives of this Act are:
  - to reduce the negative impact of weeds on the economy, community and

environment of this State by establishing control mechanisms to:
- prevent the establishment in this State of significant new weeds, and
- restrict the spread in this State of existing significant weeds, and
- reduce the area in this State of existing significant weeds,
- to provide for the monitoring of and reporting on the effectiveness of the management of weeds in this State

Other relevant legislation that were implemented to restrict the uncontrolled development of bushland in urban areas include:

- SEPP 19 (Bushland in Urban Areas),
- SEPP 44 (Koala Habitat Protection),
- *National Parks and Wildlife Act (1974),* and
- *Local Government Act (1993)*

Biodiversity conservation planning principles promoted by DECCW (2011) that apply to tracts of natural bushland are outlined in *Mid North Coast Regional Conservation Plan (Draft DECCW 2011).*

Local Council planning controls and other relevant local and State planning documents that relate to the proposed development include the following:

- *State Environmental Planning Policy (SEPP) - North-western Sydney Regional Growth Centres 2006*
- *Blacktown Growth Centres Development Control Plan DCP 2010 (GCPDCP 2010),*
- *Blacktown LEP (2015), and*
- *State Environmental Planning Policy (SEPP)(Infrastructure) 2007*

1.3 Objectives and scope of the study

The objectives and scope of the study are:

- To identify, locate and describe the biodiversity values of the Study Area and its environmental context in the region by undertaking detailed flora and fauna field surveys. Current and detailed information will be obtained on the following:

  - Identification of the flora and fauna that occur within the Study Area including documentation of species lists and mapping of identifiable plant communities;
  - Identification of Threatened (Endangered and Vulnerable) species, populations, communities and habitats as listed in Schedules 1 & 2 of the Threatened Species

Conservation Act 1995 (TSC Act), including Preliminary Determinations of the NSW Scientific Committee, and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), RoTAP species (Briggs & Leigh 1996) and regionally and locally significant species;

- Identification of fauna species including amphibians, reptiles, birds and mammals, not directly recorded during surveys but that could potentially occur in the Study Area as indicated by the presence of associated habitat;
- Description of the identifiable vegetation communities occurring within the Study Area indicating their current condition, conservation value and level of degradation; and
- Recording of the area and extent of Noxious (and other significant) weed species in the Study Area;

- To prepare a comprehensive flora and fauna biodiversity impact assessment report including recommendations for minimising potential impacts and maintaining biodiversity values in relation to the proposed development.

Specific details of methodology relating to floristic and fauna habitat survey and assessment are documented in following sections of this report.

2 EXISTING ENVIRONMENT

2.1 Topography, geology and soils

The site has a south-easterly aspect. The topography of the subject site is a gently sloping hillslope from about 2 to 5^{O} (Figure 1).

The local substrate geology of the subject area is the Ashfield Series of the Wianamatta Shale group of sediments (Clark & Jones 1991).

The lithology of the Wianamatta Shale sediments are largely comprised of dark grey to black claystone-siltstone and fine grained sandstone-siltstone laminite (Clark & Jones 1991).

The soil landscape particular to the surveyed area is the residual 'Blacktown' Soil Landscape Series (Bannerman & Hazelton 1989). This soil landscape is characterised by gently undulating rises on Wianamatta Shale (Bannerman & Hazelton 1989).

Original soil material formed from differential erosion and weathering of Wianamatta Shale substrates include shallow to moderately deep red and brown podzolics on crests grading to yellow podzolics on lower sideslopes and drainage lines (Bannerman & Hazelton 1989).

2.2 Existing vegetation – local plant assemblages

The vegetative cover of the subject land at 37 Worcester Road, Rouse Hill consists of exotic pasture grassland with few scattered remnant indigenous trees along sections of the fence-lines (Figures 1 & 3).

The vegetative cover of the subject land within the existing RHAC site at 7 Worcester Road, Rouse Hill, consists of a managed open woodland of trees ranging from about 10 - 30m in height (Urban Forestry Australia 2014).

Indigenous species of canopy trees mostly include Forest Red Gum with Narrow-leaved Ironbark and Grey Box occurring less frequently (Urban Forestry Australia 2014) (Figures 1 & 4).

Few indigenous shrub, grass and forb species occur at the site, the shrub layer cleared and ground layer comprised largely of exotic grassland (Figures 1, 3 & 4).

Figure 3 - View to the north-east of the subject site at 37 Worcester Road, Rouse Hill indicating managed exotic grassland with scattered indigenous trees along fence-lines

Figure 4 - View to the north-west within the wooded section of the subject land at the existing RHAC site indicating managed grassland with canopy cover of indigenous trees

2.3 Current and surrounding land use

Surrounding properties in the immediate locality have also been largely cleared of canopy trees and under storey shrubs with respect to former grazing and cropping land use with scattered shade trees retained, often along fence-lines (Figure 1). Areas to the north-east include significant distributions of natural vegetation within Rouse Hill Regional Park as well woodland/open forest occurring to the south-west (Figure 1).

3 FLORA AND FAUNA SURVEY AND ASSESSMENT

3.1 Methods

3.1.1 Literature review

Existing information on 'Threatened Flora and Fauna of the Locality', defined as an area of 5km radius around the site, was accessed from the OEH Bionet Atlas of NSW Wildlife (1:100,000 map sheets 9030 Penrith - September 2015), Commonwealth DoE Protected Matters Environmental Reporting Tool (September 2015) and RoTAP (Briggs & Leigh, 1996) databases. Searches of JAMBA (Japan and Australia Migratory Bird Agreement), CAMBA (China and Australia Migratory Bird Agreement) and ROKAMBA (Republic of Korea Migratory Bird Agreement) databases were also consulted in regard to the distribution of migratory bird species

Other literature detailing locally threatened flora and fauna, as well as endangered populations and plant communities of the Study Area included NSW Scientific Committee Final Determinations (1996-2015), Native Vegetation of the Cumberland Plain – Final Edition (DEC 2002), The Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area – (OEH 2013) and Blacktown City Council Biodiversity Strategy (2011).

3.1.2 Site survey

The subject site was inspected by 'ACS Environmental P/L' on 29th September 2015.

3.1.2.1 Flora Survey

Comprehensive surveys of the Study Area undertaken on foot by the diversity search method of Cropper (1993) and DEC 'Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities' (2004) to identify the existence of extant and exotic flora.

Survey methods include a complete floristic inventory of indigenous and exotic species and an assessment of the presence, or likelihood of occurrence, of any threatened, rare (RoTAP), regionally or locally significant species or ecological plant community occurring in the Study Area.

Survey design

The relative occurrence of indigenous and exotic flora (modified Braun-Blanquet frequency-of-occurrence ranking) occurring over the site and distinct ecological communities were mapped.

3.1.2.2 Fauna Survey

The fauna survey was undertaken as a habitat based assessment. The survey involved different search strategies and protocols and all extant fauna or evidence of fauna were recorded. Threatened fauna species not recorded in the surveys but with the potential to be present as indicated by habitat were also listed.

Strategies employed for the field investigation of the Study Area:

Assessment of the value of habitat suitable for native fauna species and specific habitat structures/resources considered important in life cycles. These structures or resources include:

- Mature trees with hollows for breeding, roosting and/or nesting;
- Particular foraging resources such as certain tree or shrub species;
- Dispersal, migratory or foraging corridors for fauna;
- Leaf litter and ground search for reptiles, frogs and threatened invertebrates;
- Identification of scats and other indirect evidence to suggest fauna utilisation such as tracks, scratch marks or diggings;

ii) Summary of minimum survey effort employed for each fauna group

Fauna group	*Survey technique*	Survey period (season)	Survey effort per vegetation community
Mammals			
Small terrestrial	*Scat collection*	*spring*	Whole site
	Predator scats	*spring*	Whole site
Medium terrestrial	*Scat collection*	*spring*	Whole site
	Scat collection	*spring*	Whole site
Birds			
Diurnal birds	*Formal census*	*spring*	Ha per 20mins per habitat-morning and afternoon
Diurnal birds	*Opportunistic*	*spring*	Morning and Afternoon
Reptiles			
Diurnal search	*Habitat search*	*spring*	Morning
Amphibians			
Diurnall search	*Habitat search*	*spring*	Morning
Gastropoda			
Diurnal search	*Litter search at base of eucalypts*	*spring*	All eucalypt trees

iii) Recording Methods

Analysis of scat collected and contents examined of composite matter e.g. vegetative material, bone fragments, feathers etc, with particular reference to hair type. Hair identity was determined mainly from scale and banding pattern with the aid of software (Brunner, Triggs and Ecobyte Pty. Ltd., 2002). Scat identity was determined from gross morphology in association with all internal elements.

3.1.2.3 Limitations of the study

Limitations of the study may arise where certain cryptic species of plants may occur as soil-stored seed or as subterranean vegetative structures. Some species are identifiable above-ground only after particular environmental circumstances occur that may be related to factors such as periodic fire frequency, intensity or seasonality, soil moisture regime, grazing pressure, biological life-cycle patterns as in the case of small geophytic taxa such as species of orchids etc.

Diurnal surveys at one time of the year cannot be expected to detect the presence of all species occurring, or likely to occur, in the Study Area. This is because some species may (a) occur seasonally, (b) utilise different areas periodically (as a component of a more extensive home range), or (c) become dormant during specific periods of the year. Rather, the survey provides the opportunity to sample the area, search specifically for species likely to be encountered within the available time frame, and assess the suitability of habitat for particular species.

These potential limitations to the location of certain cryptic or diurnally active species are not expected to cause any significant constraints to the purposes of this assessment.

3.2 Results - Flora

3.2.1 Indigenous and exotic species

Appendix 1 is a floristic species list of terrestrial indigenous and exotic species recorded and compiled as a census of species throughout the subject site.

Very few indigenous ground cover species occur throughout the exotic formerly grazed and cropped areas of the surveyed site, most indigenous species occurring in low frequency or uncommonly in the area. Species nomenclature follows that of Harden (1990 – 2002; 2015 online).

3.2.2 Ecological communities

3.2.2.1 Previous mapping

The local ecological plant communities that occur at and in the environs of the Study Area have been mapped by DEC (2002) compiling data from API and environmental attributes of geology, average annual rainfall, topography, elevation, Soil Landscape Series type and extent of disturbance (condition), and including some ground-truthing (DEC 2002).

Figure 5 indicates that the ecological plant community occurring at the existing RHAC location is mapped as Cumberland Shale Plains Woodland (Code: S_GW03; DEC 2002). The subject area at 37 Worcester Road that is not shaded in the mapping occurs predominantly as exotic grassland.

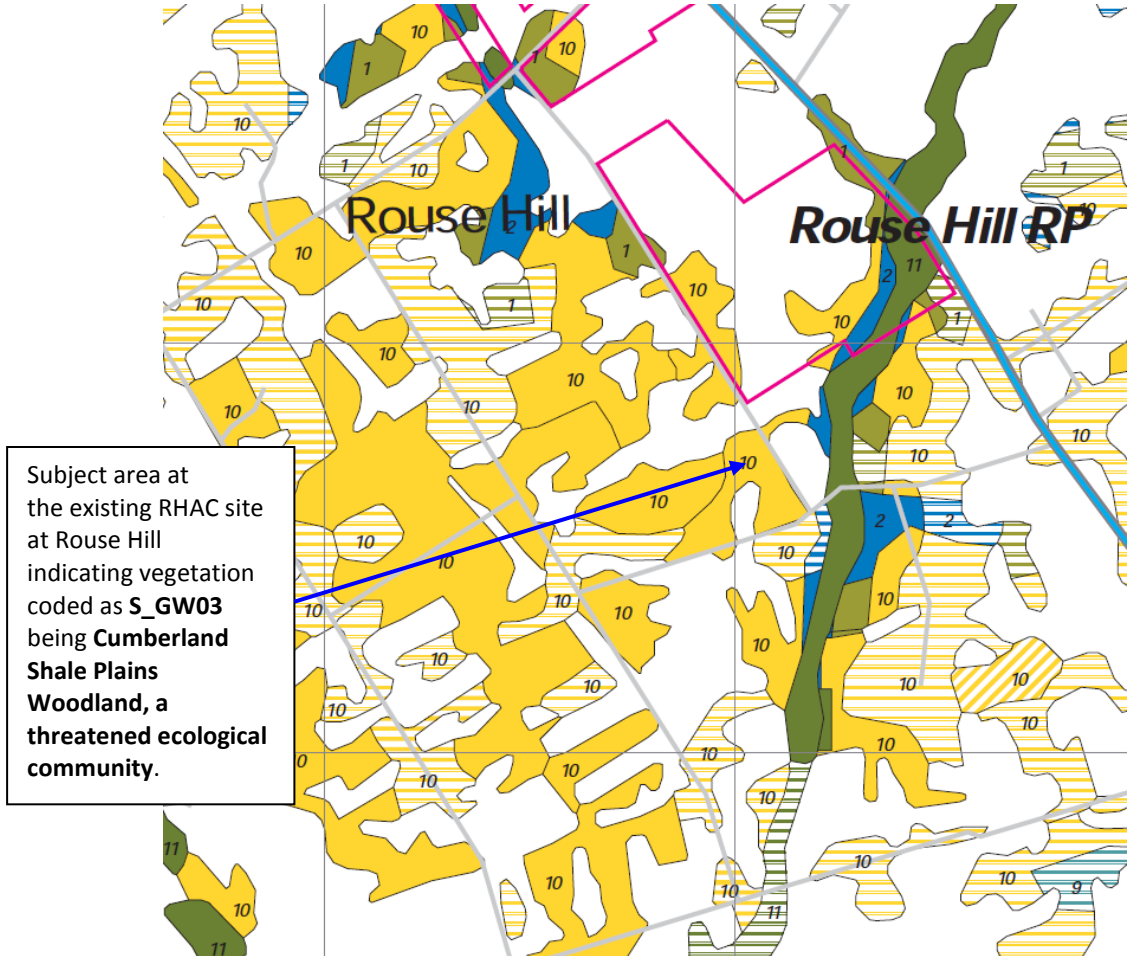

Figure 5 – Vegetation mapping by DEC (2002) of woodland at the existing RHAC site indicates a distribution of Cumberland Shale Plains Woodland (Code: S_GW03), mapped in yellow shading.

Vegetation mapping documented in North West Rail Link - Cudgegong Road Station Structure Plan (CRSSP) (2013) also indicates a similar distribution of Cumberland Shale Plains Woodland at the existing RHAC site (Figure 6).

Figure 6 - Excerpt of vegetation mapping in North West Rail Link - Cudgegong Road Station Structure Plan (2013) indicates Cumberland Shale Plains Woodland vegetation occurring at the existing RHAC site.

3.2.2.2 Ground-truthing and assessment

Subject site at 37 Worcester Road, Rouse Hill (Figures 1 & 3)

This section of the surveyed area has been historically modified by extensive clearing and grazing activity in the past, with the greater area of the subject land occurring as exotic grassland (Figures 1 & 3). Isolated and small clumps of indigenous trees have been retained along the western, northern and southern fence-lines in the surveyed area (Figures 1 & 3). Scattered trees appear no older than about 30 years and all understorey and natural ground cover strata have been cleared (Figures 1 & 3).

Subject site at the existing RHAC development, 7 Worcester Road, Rouse Hill (Figures 1 & 4)

This section of the surveyed area has been wooded to varying extent since prior to 1947 (LPI Mapping provided Martens 2015) with some natural canopy regeneration resulting in

various aged cohorts of individuals occurring as an open woodland to 30m tall. The area of the RHAC grassed playzone is maintained by regular mowing, having no understorey canopy and an exotic grassland ground stratum (Figures 1 & 4).

3.2.3 Conservation status of Cumberland Shale Plains Woodland ecological community

Cumberland Shale Plains Woodland is a component of Cumberland Plain Woodland in the Sydney Basin Bioregion, listed as a Critically Endangered Ecological Community (CEEC) under the TSC Act (1995). It is also listed as a component of Cumberland Shale Woodlands and Shale-Gravel Transition Forest listed as a Critically Endangered Ecological Community (CEEC) under the registers of the EPBC Act (1999).

Conservation Assessment Significance mapping by DEC (2002) of the area of woodland occurring at the existing RHAC development site of the subject area (Figures 5 & 6) denotes the vegetation significance as 'Core Habitat' (Figure 7).

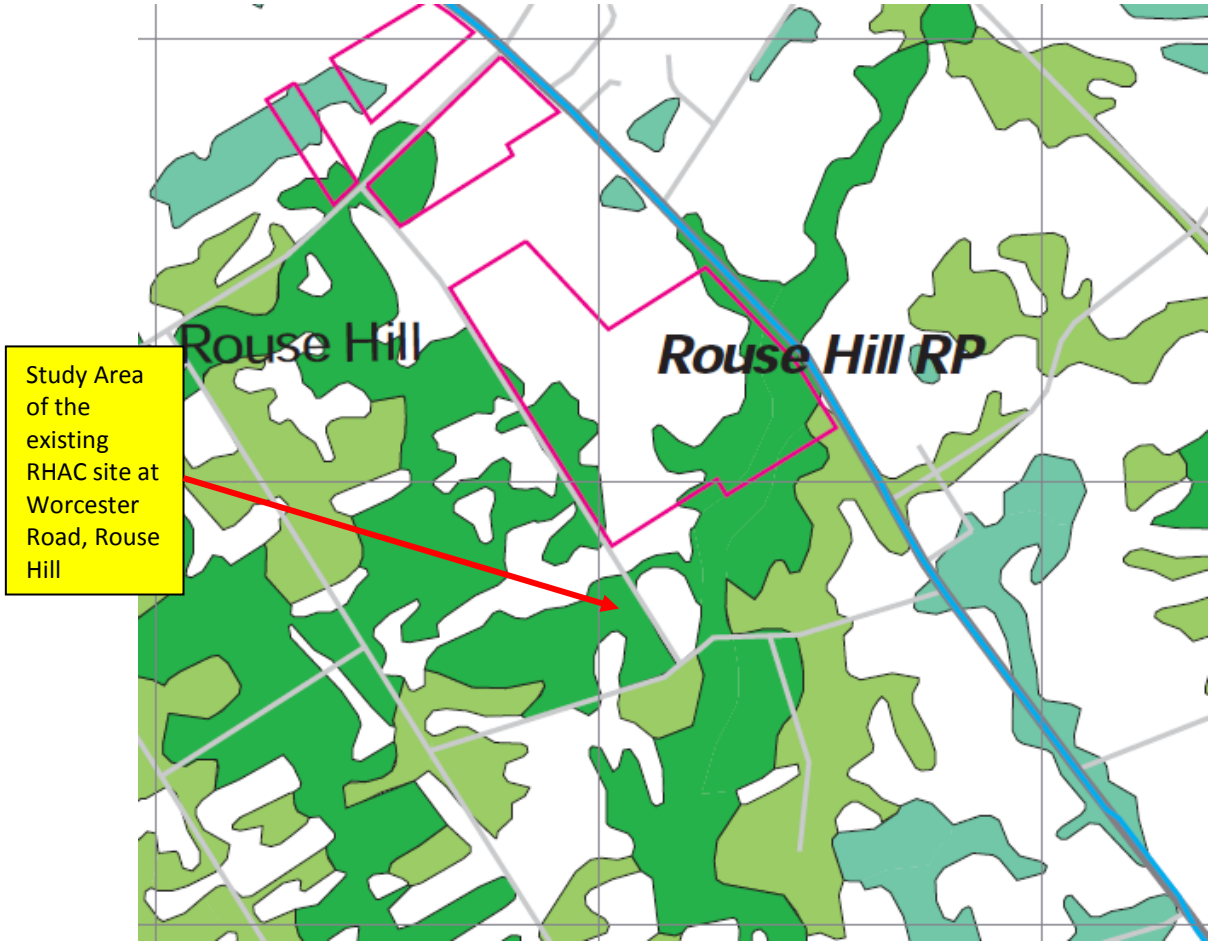

Figure 7 – DEC mapping of Conservation Significance Assessment of local vegetation (2002) of the subject area at the existing RHAC site at Rouse Hill (bold green shading) indicates the subject woodland as being denoted as 'Core Habitat', this inferred to be of high conservation significance.

Areas designated as being 'Core Habitat' include areas that potentially provide a viable conservation network across the landscape (DEC 2002).

3.3 Results - Fauna

3.3.1 Summary of habitats present

Habitat features occurring at the subject sites at the existing RHAC facility and at 37 Worcester Road, Rouse Hill include the following;

- Large old trees with spouts and hollows

  Most trees occurring at the subject sites appear to be aged less than 30 years (Binney *pers comm).* However a mature hollow-bearing individual of Forest Red Gum is located to the front of the school near the car-park. It contains two large hollows with Rainbow Lorikeets nesting in one.
- Wooden fence posts and stumps

  These structures that occur along fence-lines and from historical tree-felling provide foraging, nesting and basking habitat for birds and reptiles.

- Leaves and fruit of Eucalypts- including up to about 200 individuals of eucalypts occurring at the subject sites are a food source for nectar foraging birds, mammals and invertebrates. Different fauna species have different foliage nutrient requirements. Concentrations and composition of nutrients differ between mature foliage and new growth flushes.

- Crevices in stone walls that act as retaining walls behind school buildings - these structures are important basking, sheltering and feeding sites for reptiles such as skinks and water dragons etc.

- Large expanse of grass with friable soil - the areas of managed grassland provides good foraging habitat for small to medium marsupials, reptiles and ground foraging birds.

3.3.2 Coordinates and fauna survey weather conditions

Co-ordinates: -33.684750 S, 150.907422 E
Date surveyed: 29th September 2015
Weather: 23°C Fine, no wind, no rain

3.3.3 Site potential to form part of a wildlife habitat corridor

The school is situated at the edge of urban development and adjacent to a small drainage channel, Second Ponds Creek (red flag). A radius of 5km around the study site includes areas of land used for agricultural purposes. Creeks, which are tributaries of the Hawkesbury River fan out across the Rouse Hill area and provide wooded habitat for avifauna movement.

Figure 8 – The school is situated at the edge of urban development and adjacent to a small creekline, Second Ponds Creek (red flag). A radius of 5km around the study site includes areas of land used for agricultural purposes. Creeks draining northwards to the Hawkesbury River fan out across the Rouse Hill locality, providing habitat for avifauna movement

3.3.4 Fauna recorded

Fauna recorded or that may be expected to occur at the subject sites at 37 Worcester Road and at the existing RHAC site are listed in Table 1 below:

Family	Common Name	*Scientific name*	TSC Act	No. recorded
Hylidae	Eastern Dwarf Tree Frog	*Litoria fallax*	P	h
Scincidae	Eastern Water-skink	*Eulamprus quoyii*	P	e
	Dark-flecked Garden Sunskink	*Lampropholis delicata*	P	5+
Agamidae	Eastern Water Dragon	*Intellagama lesueurii*	P	1
Elapidae	Red-bellied Black Snake	*Pseudechis porphyriacus*	P	e
Columbidae	Spotted Turtle-Dove	*Streptopelia chinensis**		2
Threskiornithidae	Australian White Ibis	*Threskiornis molucca*	P	e
Charadriidae	Masked Lapwing	*Vanellus miles*	P	1
Psittacidae	Crimson Rosella	*Platycercus elegans*	P	2
	Eastern Rosella	*Platycercus eximius*	P	4
	Rainbow Lorikeet	*Trichoglossus haematodus*	P	2
Strigidae	Powerful Owl	*Ninox strenua*	V	pot
Alcedinidae	Laughing Kookaburra	*Dacelo novaeguineae*	P	1
Maluridae	Superb Fairy-wren	*Malurus cyaneus*	P	5+
Acanthizidae	Yellow Thornbill	*Acanthiza nana*	P	5+
Pardalotidae	Spotted Pardalote	*Pardalotus punctatus*	P	h
Neosittidae	Varied Sittella	*Daphoenositta chrysoptera*	V	pot
Meliphagidae	Yellow-faced Honeyeater	*Caligavis chrysops*	P	e
	Noisy Miner	*Manorina melanocephala*	P	10+
	Bell Miner	*Manorina melanophrys*	P	H adj
	Noisy Friarbird	*Philemon corniculatus*	P	1
Campephagidae	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	P	e
Pachycephalidae	Golden Whistler	*Pachycephala pectoralis*	P	h
	Rufous Whistler	*Pachycephala rufiventris*	P	2+
Artamidae	Australian Magpie	*Cracticus tibicen*	P	5+
	Grey Butcherbird	*Cracticus torquatus*	P	1
	Pied Currawong	*Strepera graculina*	P	h
Rhipiduridae	Grey Fantail	*Rhipidura albiscapa*	P	1
	Willie Wagtail	*Rhipidura leucophrys*	P	2
Corvidae	Australian Raven	*Corvus coronoides*	P	4+ OH
Monarchidae	Magpie-lark	*Grallina cyanoleuca*	P	2
Timaliidae	Silvereye	*Zosterops lateralis*	P	5+
Hirundinidae	Welcome Swallow	*Hirundo neoxena*	P	2
Sturnidae	Common Myna	*Sturnus tristis**		2
Pseudocheiridae	Common Ringtail Possum	*Pseudocheirus peregrinus*	P	Scat + dead
Phalangeridae	Common Brushtail Possum	*Trichosurus vulpecula*	P	e
Molossidae	Eastern Free-tailed Bat	*Mormopterus norfolkensis*	V	pot
Vespertilionidae	Gould's Wattled Bat	*Chalinolobus gouldii*	P	e
	Gould's Long-eared Bat	*Nyctophilus gouldi*	P	e

Family	Common Name	*Scientific name*	TSC Act	No. recorded
	Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	V	pot
	Little Forest Bat	*Vespadelus vulturnus*	P	e
Muridae	House Mouse	*Mus musculus**		e
	Black Rat	*Rattus rattus*		e
Canidae	Fox	*Vulpes vulpes**		e
Leporidae	Rabbit	*Oryctolagus cuniculus**		1 + scat

Code
P- protected V- vulnerable
h - characteristic call heard in nearby bushland
scat – faeces belonging to fauna collected on site
OH – overhead
* introduced species
pot- potential to occur
+ - more than
e – expected to occur

Table 1 - Fauna species observed and/or with potential to occur within study area at 37 Worcester Road and the existing RHAC site, Rouse Hill

Terrestrial fauna within the exotic grassland habitat of 37 Worcester Road, Rouse Hill include the Rabbit (*Oryctolagus cuniculus*) with the European Fox *(Vulpes vulpes*) also expected to occur. Evidence of Ringtail Possum *Pseudocheirus peregrinus*) was noted with Common Brushtail Possum (*Trichosurus vulpecula*) also expected to occur (Table 1).

Common avifauna occurring in the subject grassland and landscaped woodland habitats included the Masked Lapwing (*Vanellus miles*), Magpie-lark (*Grallina cyanoleuca*), Willie Wagtail (*Rhipidura leucophyrs*), numerous Noisy Miner (*Manorina melanocephala*), Australian Raven (*Corvus coronoides*), Eastern Rosella (*Platycercus eximius*), Superb Fairy Wren (*Malurus cyaneus*), Yellow Thornbill (*Acanthiza nana*), Australian Magpie (*Cracticus tibicen*), Silvereye (*Zosterops lateralis*) and the introduced Common Myna (*Sturnis tristis*) (Table 1).

Microchiropteran species expected to occur include Gould's Long-Eared Bat (*Nictophilus* gouldi), Gould's Wattled Bat (*Chalinolobus gouldii*), and Little Forest Bat (*Vespidelus vulturnus*) (Table 1).

The larger megabat, Grey-headed Flying Fox (*Pteropus poliocephalus)* was not sighted during the survey but may be attracted to flowering Eucalyptus trees on occasion.

The most common reptilian fauna recorded was the Dark-flecked Garden Sunskink (*Lampropholis delicata*) and a mature individual Eastern Water Dragon (*Intelligama lesuerii*) was observed (Table 1).

3.3.5 Fauna species of conservation significance

Threatened species

The criteria used to assess the likelihood of threatened species occurring in the Study Area included the specificity of habitat features such as tree canopy cover, relative soil moisture regime, relative soil nutrient regimes, historical disturbance and degradation of vegetation and known occurrences of threatened species in the immediate locality.

If all or most of these collective criteria deemed optimal for the occurrence of a particular threatened species occur in relation to the habitat of the Study Area, then the likelihood of its potential occurrence in the habitat of the Study Area could be assessed as being relatively high. If only some of these collective criteria deemed suitable for the occurrence of a particular threatened species occur in the habitat of the Study Area, then its potential occurrence in the area of study may be deemed moderate at best. If few of these collective criteria deemed suitable for the occurrence of a particular threatened species occur in the habitat of the Study Area, then the likelihood of its occurrence would be assessed as being low to very unlikely.

The OEH Atlas of NSW Wildlife database 2015 listed thirty (30) species of terrestrial and avifauna considered threatened under the TSC Act within a 5 km radius of the site (Appendix 3). Four of these species are designated as endangered by the NSW Scientific Committee with the remainder designated as vulnerable. Under the EPBC Act 1999, two of these species are listed as endangered and five listed as vulnerable. Additionally the Dural Land Snail which is not listed on TSC registers is listed on EPBC registers, the species designated as endangered. Appendix 4 documents an assessment of habitats in which these threatened species are likely to occur and the likelihood of occurrence within the Study Area at Worcester Street, Rouse Hill.

Some species that have been recorded within 1km of the subject sites, such as the Little Eagle, Powerful Owl, Black-chinned Honeyeater, Varied Sittella, Scarlet Robin, Eastern Freetail Bat, Eastern Bentwing Bat, Southern Myotis and the Large Cumberland Plain Land Snail are more likely to occur to the west of the school within undisturbed woodland (Figure 1).

The current management practices of mowing and landscape maintenance in the school grounds reduces the likelihood of threatened species utilising resources within the grounds. The most likely to occur on occasion are the Varied Sitella and small microbats which forage over wide ranges.

Threatened Species recorded within 1Km (OEH Atlas of NSW Wildlife 2015) that have potential to occur on subject land

Varied Sittella (recorded within 1km in 2003, 2006 and 2012)
This species inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. The Varied Sittella feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and from small branches and twigs in the tree canopy. There is potential for this species to forage towards the rear of the subject land.

Eastern Freetail-bat (recorded within 1km in 2002)
The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. They occur in dry sclerophyll forest and woodland east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures.

Eastern Bentwing Bat (recorded within 1km in 2002)
They occur along the coast and ranges, from north Queensland to the far south-eastern corner of South Australia. Recorded in a wide range of habitats from grasslands through to subtropical rainforests, but it is typically found in well-timbered valleys Dwyer (1995). Known roost sites include caves, disused mines, storm-water drains, culverts and buildings.

A targeted search for the Cumberland Plain Land Snail (recorded 3 times within 1km in 2003, 2008 and 2012) was carried out.

This large land snail inhabits remnant areas of bushland and has been largely destroyed by urbanisation and is now reported as surviving only as isolated populations.

Individuals of the Cumberland Plain Land Snail (*Meridolum corneovirens*) burrow into the soft soil around the base of trees and during dry periods can appear to be lost from an area. However following prolonged wet periods they will re-emerge into the litter to feed on decaying wood and fungi. There is a negative correlation between weed incursions and presence of the snail (ACS Environmental personal obs).

Meridolum was not found during this survey and is considered more likely to be found west of the school grounds in undisturbed woodland.

3.3.6 Species listed by the OEH Atlas of NSW Wildlife database 2015 as potential migratory inhabitants of the site.

The OEH Atlas of NSW Wildlife database 2015 listed six (6) migratory species of avifauna covered by bi-lateral bird agreements, and recorded within a 5 km radius of the site (Appendix 5). Habitat for these birds was assessed in Appendix 6. One migratory species, the White-bellied Sea Eagle (*Haliaeetus leucogaster*) was considered likely to occur on occasion foraging overhead as part of a wide range over the creek lines. There is no habitat for any of the other listed migratory species.

3.3.9 Conclusion – fauna

No threatened fauna species were recorded during the current survey. Threatened fauna species identified as having the most potential to occur on or foraging above the subject site include the Varied Sitella, the Little Eagle, The Eastern Bentwing Bat, Eastern Freetail Bat and the Large Cumberland Land Snail. Whilst no individuals of these species were recorded, an assessment of habitats concluded that potential exists for these species to occur on or to forage over the subject land.

An Assessment of Significance to determine an impact by the proposed development was not considered necessary as, even though a total of 105 individuals of canopy trees will be removed, up to 60 individuals of the indigenous canopy species Grey Box and Turpentine (*Syncarpia glomulifera*) will be planted in a landscape plan for the site, so local foraging habitat at the Study Area will still be available for the Varied Sitella. The microbat species are likely overhead foragers that have large foraging ranges and their lifestyle would not likely be impacted upon by the proposed development. The likely potential habitat for the Cumberland Land Snail occurs mostly in grassy areas beneath individuals of Narrow-leaved Ironbark and Forest Red Gum at 37 Worcester Road, Rouse Hill, some of which will be retained, and so potential habitat for the Cumberland Land Snail would be available if it were to occur.

One introduced invasive pest species was recorded within the survey area. This was the Rabbit (*Oryctolagus cuniculus*) as indicated by the direct observation and scat. The absence of small ground dwelling mammalian fauna was possibly due to historical clearing and farming practises and predation by the European Fox.

Overall the biodiversity within the study area is low, due in most part to previous management practices of the land which has contributed to the fragmented landscape in terms of fauna movement in the general Rouse Hill locality.

4 IMPACTS OF DEVELOPMENT AND COMPLIANCE WITH DEVELOPMENT IN THE BLACKTOWN CITY COUNCIL LGA

4.1 Introduction

For this development, the following planning documents apply to the proposal:

- Blacktown City Council Local Environmental Plan (2015);
- Blacktown City Council Development Control Plan (2015);
- State Environmental Planning Policy (SEPP) - Sydney Growth Centres (2006);
- State Environmental Planning Policy (SEPP) (Infrastructure) (2007); and
- The Blacktown Growth Centres Development Control Plan 2010 (GCDCP 2010)

These planning instruments apply to all land within the Blacktown City Council LGA.

4.2 State Environmental Planning Policy (SEPP) - Sydney Growth Centres (2006) and Bio-certification in the North-west Growth Centres

Biodiversity Certification

The aim of this SEPP is to grant Biodiversity Certification for Sydney's North West and South West Growth Centres. This will provide for:

- The protection of at least 2,000 hectares of existing native vegetation within the Growth Centres;
- The ability to ensure a more streamlined release of land for 181,000 new homes in the Growth Centres, and
- The ability to address biodiversity issues upfront so that landowners, councils and developers no longer need to consider biodiversity issues in regard to individual development applications with Development Applications in areas classified as 'certified' under the Biodiversity Certification Order.

Certification applies to all proposed developments and activities carried out under the Growth Centres SEPP or under other local environmental planning instruments such as The Blacktown Growth Centres Development Control Plan 2010 (GCDCP 2010) or other State Environmental Planning Policies.

Biodiversity Certification follows the 2007 exhibition of a Draft Conservation Plan which identified areas of native vegetation in the Growth Centres to be retained and areas

where losses could be 'offset' by protecting land inside or outside the Growth Centres with similar ecological characteristics

This will permanently protect the largest and most intact bushland areas inside and outside the Growth Centres, offsetting around 1,800 hectares of vegetation occurring on land that is required for future housing, infrastructure and services.

Biodiversity Certification of the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* (the Growth Centres SEPP) commenced in December 2007 under section 126G of the Threatened Species Conservation Act 1995 (TSC Act). In July 2008. The Bio-certification was validated by the *Threatened Species Conservation Amendment (Special Provisions) Act 2008*. This amendment is now incorporated into Part 7 of Schedule 7 of the TSC Act.

Biodiversity Certification is subject to conditions known as relevant biodiversity measures (RBMs), which establish a process for the Department of Planning to ensure consistency with the Certification.

'Certified' lands are those where development proposals require no further threatened species assessment. Biodiversity Certification is not an automatic approval to clear native vegetation; it refers to the legislation that on certified lands, threatened species assessments are no longer required during Development Applications (DAs) or when undertaking local and regional infrastructure works.

Specific Precinct Planning seeks to retain and enhance natural biodiversity and habitat as well as to provide important amenity and open space benefits to future residents. Although threatened species assessments are no longer required, relevant approvals to clear native vegetation, such as that commonly required by Councils or land occurring under Commonwealth legislation, may still be necessary. Biodiversity Certification removes the need for further threatened species assessments before developing land in 'Certified' lands such as shown on the map in Figure 9 for the Area 20 Precinct.

A key certification requirement is to ensure that native vegetation is to be protected through existing reserves, zonings and development controls in the Growth Centres SEPP. No new reserves, zonings or controls have been introduced as part of the Biodiversity Certification.

Additional areas of existing native vegetation may be protected during Precinct Planning through the provision of local open space and the protection and rehabilitation of waterways.

Figure 9 - Showing the subject land at Rouse Hill to be included in the Biodiversity Certification of land within the Area 20 Precinct of the North-west Growth Centres SEPP.

The Area 20 Precinct

The Cudgegong Road Area is within the North West Growth Centre and has been identified within two growth centre release area precincts, Riverstone East and Area 20 (Figure 9). Planning for the Riverstone East Precinct is yet to be undertaken by the Department of Planning and Infrastructure. The Area 20 Precinct was rezoned for urban development in October 2011 by the Minister for Planning and Infrastructure.

Area 20 was rezoned having regard to the future delivery and location of the North West Rail Link corridor, Cudgegong Road station, commuter car parks and stabling yard. Figure 6 indicates that some areas of remnant native bushland and the Second Ponds Creek corridor remain (CRSSP 2013).

The Area 20 Precinct is zoned to allow for a local centre and a mix of residential densities. Medium density residential development is allowed on lands closest to the Rouse Hill

centre and proposed location of the Cudgegong Road station. Permitted residential densities gradually decrease with distance from the centre.

The Area 20 Precinct has large portions of unconstrained land. Given the current market demand for residential and employment land it is likely that the area currently zoned for rural residential could be reconsidered in terms of its use. An assessment of these current controls on the opportunity sites reveals that the capacity for future growth within Area 20 Precinct occurs predominantly within the residential market. The current and proposed draft controls for the Area 20 Precinct could result in an additional 1600 jobs and 2500 dwellings (CRSSP 2013).

Figure 10 indicates the Area 20 Precinct Plan including the subject sites.

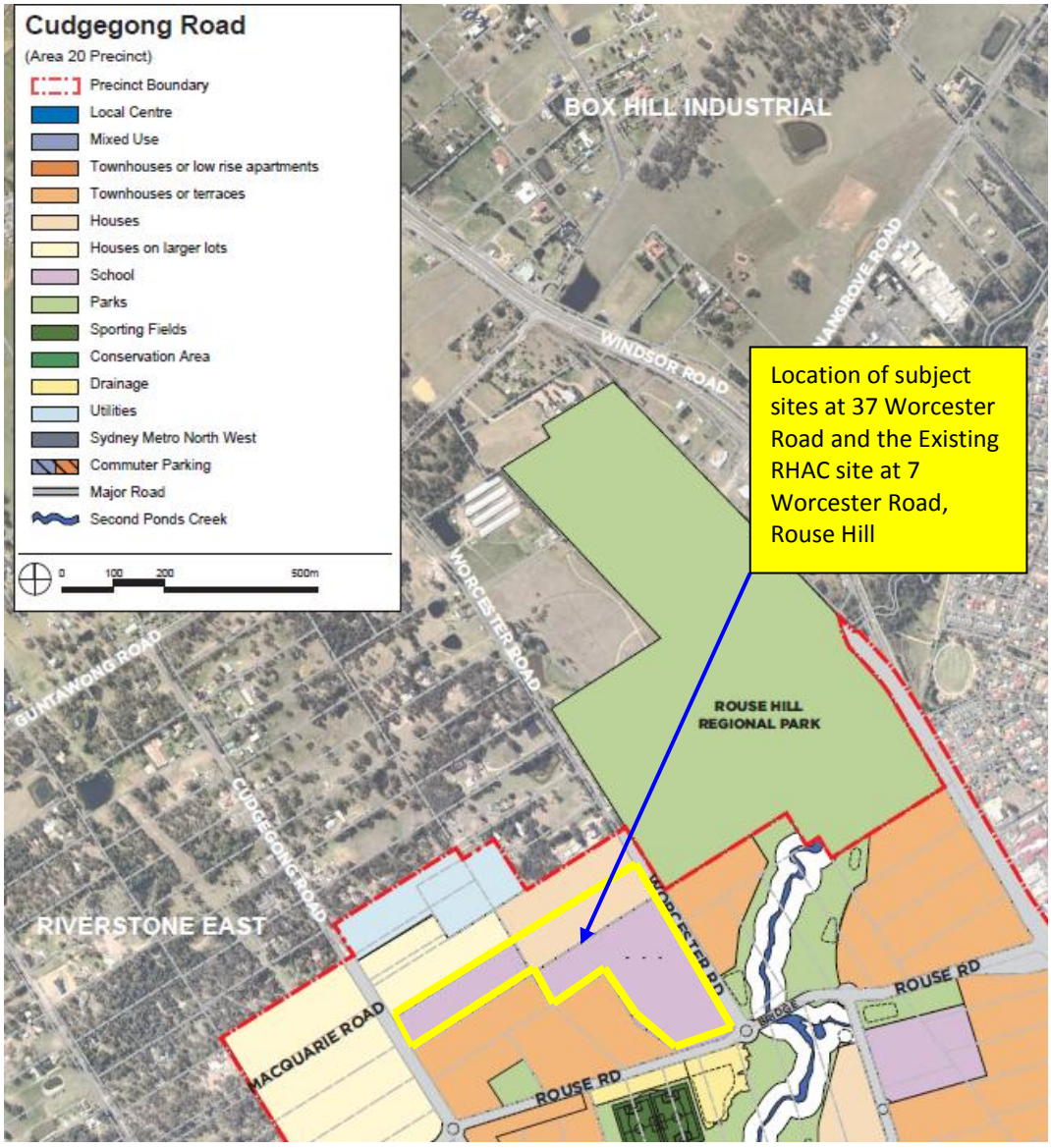

Figure 10 - Proposed zonings for sections of land contained within the Area 20 Precinct including that for the subject school sites (bounded by yellow line) (from Dept Infrastructure and Planning)

4.3 Compliance with Threatened Species Legislation

As the local area containing the subject land is Biodiversity Certified under the Sydney Region Growth Centres SEPP (2006) addressing threatened species legislation is not considered a requirement of this stage of the development approval process.

Impacts and assessment at 37 and 7 Worcester Road, Rouse Hill

Considering Biodiversity Certification of this area, the retention of a significant number of trees is a positive outcome for this component of the development and affords potential habitat for the Large Cumberland Land Snail were it to occur at the site.

Figure 11 indicates the location of 189 indigenous locally-occurring trees (excluding exotic and non-locally occurring tree species) occurring at 37 Worcester Road, Rouse Hill and the existing RHAC site at 7 Worcester Road, Rouse Hill. Figure 11 includes the locations of trees proposed to be removed and those retained.

In total, 116 individuals of canopy trees will be removed, however, up to 60 individuals of the indigenous canopy species Grey Box and Turpentine (*Syncarpia glomulifera*) will be planted in a landscape plan for the site, so local foraging habitat at the Study Area will still be available for the Varied Sitella. The microbat species are likely overhead foragers that have large foraging ranges and their lifestyle would not likely be impacted upon by the proposed development. The likely potential habitat for the Cumberland Land Snail occurs mostly in grassy areas beneath individuals of Narrow-leaved Ironbark and Forest Red Gum at 37 Worcester Road, Rouse Hill, many of which will be retained, and so potential habitat for the Cumberland Land Snail would be available if it were to occur.

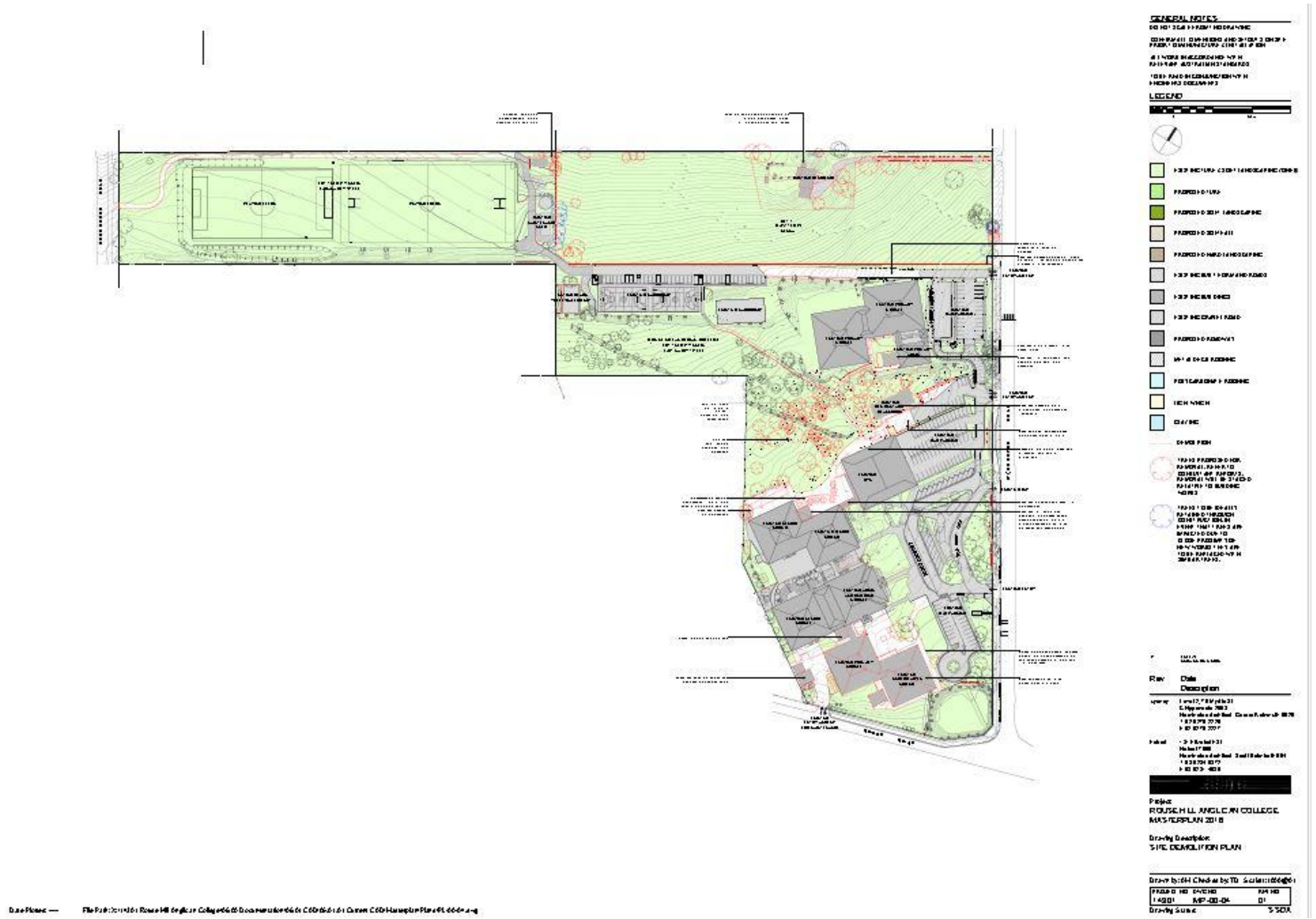

Figure 11 - Section of the land occurring within the 7 Worcester Road and the existing RHAC site at 7 Worcester Road, Rouse Hill, indicating the principal areas where trees are proposed to be retained (black and blue circles) and those proposed to be removed (red circles) (from plans submitted by Terroir Architects 2016).

4.4 Conclusions and recommendations

With the appropriate undertaking of mitigation measures, including the replacement planting in any proposed landscape plan, of saplings of tree species such as Grey Box and Turpentine that are deemed safe for management in a school play-zone environment, the proposed development complies with the desired environmental criteria in relation to Blacktown City Council Local Environmental Plan (2015), State Environmental Planning Policy (SEPP) - Sydney Growth Centres (2006), State Environmental Planning Policy (SEPP) (Infrastructure) (2007) and The Blacktown Growth Centres Development Control Plan 2010 (GCDCP 2010).

5 GENERAL CONCLUSIONS

1. The vegetative cover of the subject land at 37 Worcester Road, Rouse Hill consists of a managed exotic pasture grassland with few scattered remnant indigenous trees occurring along sections of the fence-lines (Figures 1 & 3).

   A total of 12 indigenous plant species were recorded in the subject area at 37 Worcester Road, whereas a total of 5 indigenous tree species occur in the wooded area of the existing RHAC site at 7 Worcester Road, Rouse Hill, two of which are not locally occurring (Appendix 1).

   A total of 38 exotic plant species, mostly herbaceous environmental weeds and grasses but including a low frequency of occurrence of the woody weeds Lantana and Large and Small-leaved Privet, were recorded in the subject area at 37 Worcester Road

2. The vegetative cover of the subject land at the existing RHAC site at 7 Worcester Road, Rouse Hill, consists of a managed open woodland comprised of a total of 116 trees ranging from about 10 - 30m in height (Urban Forestry Australia 2016). Indigenous species of canopy trees mostly include Forest Red Gum with Narrow-leaved Ironbark and Grey Box occurring less frequently (Urban Forestry Australia 2016).

3. The ecological plant community occurring at the existing RHAC location at 7 Worcester Road, Rouse Hill, is mapped as Cumberland Shale Plains Woodland (Code: S_GW03; DEC 2002) (also in CRSSP 2013). The subject area at 37 Worcester Road that is not shaded in the mapping and occurs predominantly as exotic grassland.

4. Cumberland Shale Plains Woodland is a component of Cumberland Plain Woodland in the Sydney Basin Bioregion, listed as a Critically Endangered Ecological Community (CEEC) under the TSC Act (1995). It is also listed as a component of Cumberland Shale Woodlands and Shale-Gravel Transition Forest listed as a Critically Endangered Ecological Community (CEEC) under the registers of the EPBC Act (1999).

5. Conservation Assessment Significance mapping by DEC (2002) of the area of woodland occurring at the existing RHAC development site of the subject area at 7 Worcester Road, Rouse Hill (Figures 5 & 6) denotes the vegetation significance as ‘Core Habitat’ (Figure 7).

6. Evidence of Ringtail Possum *Pseudocheirus peregrinus*) was noted with Common Brushtail Possum (*Trichosurus vulpecula*) also expected to occur (Table 3).

   Common avifauna occurring in the subject grassland and landscaped woodland habitats included the Masked Lapwing (*Vanellus miles*), Magpie-lark (*Grallina cyanoleuca*), Willie Wagtail (*Rhipidura leucophyrs*), Noisy Miner (*Manorina melanocephala*), Australian Raven (*Corvus coronoides*), Eastern Rosella (*Platycercus eximius*), Superb Fairy Wren (*Malurus cyaneus*), Yellow Thornbill (*Acanthiza nana*), Australian Magpie (*Cracticus tibicen*), Silvereye (*Zosterops lateralis*) and the introduced Common Myna (*Sturnis tristis*) (Table 3).

   Microchiropteran species expected to occur include Gould's Long-Eared Bat (*Nictophilus* gouldi), Gould's Wattled Bat (*Chalinolobus gouldii*), and Little Forest Bat (*Vespidelus vulturnus*) (Table 3).

   The larger megabat, Grey-headed Flying Fox (*Pteropus poliocephalus)* was not sighted during the survey but may be attracted to flowering Eucalyptus trees on occasion.

   The most common reptilian fauna recorded was the Dark-flecked Garden Sunskink (*Lampropholis delicata*) and a mature individual Eastern Water Dragon (*Intelligama lesuerii*) was observed (Table 3).

8. The OEH Atlas of NSW Wildlife database 2015 listed thirty (30) species of terrestrial and avifauna considered threatened under the TSC Act within a 5 km radius of the site (Appendix 3).

   Some species that have been recorded within 1km of the subject sites, such as the Little Eagle, Powerful Owl, Black-chinned Honeyeater, Varied Sittella, Scarlet Robin, Eastern Freetail Bat, Eastern Bentwing Bat, Southern Myotis and the Large Cumberland Plain Land Snail are more likely to occur in woodland to the west of the school within undisturbed woodland (Figure 1).

   The current management and maintenance practices at the subject sites reduces the likelihood of threatened species utilising resources within the grounds. The most likely to occur on occasion are the Varied Sitella and small microbats which forage over wide ranges. Even though a total of 105 individuals of canopy trees will be removed, up to 60 individuals of the indigenous canopy species Grey Box and Turpentine (*Syncarpia glomulifera*) will be planted in a landscape plan for the site, so local foraging habitat at the Study Area will still be available for the Varied Sitella.

No threatened fauna species were recorded during this survey.

9. The subject land at Rouse Hill is included in the Biodiversity Certification of land occurring within the Area 20 Precinct of the North-west Growth Centres SEPP. Biodiversity Certification removes the need for further threatened species assessments before developing land in 'Certified' lands such as shown on the map in Figure 9 for the Area 20 Precinct.

   The Area 20 Precinct was rezoned for urban development in October 2011 by the Minister for Planning and Infrastructure. Area 20 was rezoned having regard to the future delivery and location of the North West Rail Link corridor, Cudgegong Road station, commuter car parks and stabling yard. Figure 6 indicates that some areas of remnant native bushland and the Second Ponds Creek corridor remain (CRSSP 2013).

10. As the local area containing the subject land is Biodiversity Certified under the Sydney Region Growth Centres SEPP (2006), addressing threatened species legislation is not considered a requirement of this stage of the development approval process.

11. Considering Biodiversity Certification of this area, the retention of a significant number of trees is a positive outcome for this component of the development and affords potential habitat for the Large Cumberland Land Snail were it to occur at the site.

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Appendix 1: Floristic species assemblages recorded at subject site at 37 Worcester Road, Rouse Hill and the existing RHAC site at 7 Worcester Road, Rouse Hill

KEY

Status:
*- Exotic species
C4 - Noxious Weeds in the Blacktown LGA
- planted ornamental species

Vegetation
The general vegetation of the woodland occurring in the existing RHAC site is a floristically and structurally modified form of Cumberland Shale Plains Woodland (OEH 2013) with a landscaped indigenous tree canopy, no understory stratum and managed ground cover with predominantly exotic forb and grass species composition.

Relative ranked frequency of occurrence (modified Braun-Blanquet rank scale)

1 – uncommon or rare
2 – relatively uncommon but occasional individuals <5% cover
3 – abundant individuals but cover <5%
4 - Cover abundance from 5 – 10%
5 - Cover abundance from 10 – 25%
6 - Cover abundance from 25 - 50%
7 - Cover abundance from 50 - 75%
8 - Cover abundance from 75 - 100%

STATUS	SCIENTIFIC NAME	COMMON NAME	WOODLAND TREES IN EXISTING RHAC SCHOOL GROUNDS	EXOTIC GRASSLAND AT NO. 37 WORCESTER ROAD, ROUSE HILL
	GYMNOSPERMAE: CONIFERALES			
	Araucariaceae			
#pl	*Araucaria columnaris*	Cook Pine		1 tree to 16m tall
	Pinaceae			
#pl	*Cedrus deodara*	Himalayan Cedar		1 tree to 10m tall

STATUS	SCIENTIFIC NAME	COMMON NAME	WOODLAND TREES IN EXISTING RHAC SCHOOL GROUNDS	EXOTIC GRASSLAND AT NO. 37 WORCESTER ROAD, ROUSE HILL
	MAGNOLIOPSIDA: MAGNOLIDAE			
	Asclepiadaceae			
*	*Araujia sericifera*	Moth Plant		2
	Asteraceae			
*	*Arctotheca calendula*	Cape Marigold		3
*	*Cirsium vulgare*	Common Thistle		2
*	*Conyza bonariensis*	Flaxleaf Fleabane		2
*	*Gamochaeta americana*	Cudweed		3
*	*Hypochaeris radicata*	Cats Ears		3
*	*Senecio madagascariensis*	Fireweed		3
*	*Soliva sessilus*	Bindi		3
*	*Sonchus oleraceous*	Common Sowthistle		2
	Bignoniaceae			
#pl	*Jacaranda mimosaefolia*	Jacaranda		1 tree to 7m tall to be removed
	Campanulaceae			
	Wahlenbergia gracilis	Spreading Bluebell		2
	Caryophyllaceae			
*	*Cerastium glomeratum*	Mouse-eared Chickweed		3
*	*Stellaria media*	Common Chickweed		3
	Chenopodiaceae			
	Einadia hastata	Berry Saltbush		2
	Clusiaceae			
	Hypericum gramineum	Small St Johns Wort		3
	Convolvulaceae			
	Dichondra repens	Kidney Weed		3
	Euphorbiaceae			
*	*Euphorbia peplis*	Petty Spurge		2

STATUS	SCIENTIFIC NAME	COMMON NAME	WOODLAND TREES IN EXISTING RHAC SCHOOL GROUNDS	EXOTIC GRASSLAND AT NO. 37 WORCESTER ROAD, ROUSE HILL
	Fabaceae: Faboideae			
	Glycine clandestina	Twining Glycine		2
*	*Lotus corniculatus* var *corniculatus*	Birds-foot Trefoil		2
*	*Medicago polymorpha*			2
*	*Trifolium repens*	White Clover		3
	Geraniaceae			
	Geranium solanderi	Native Geranium		2
	Lamiaceae			
*	*Stachys arvensis*	Stagger Weed		2
	Malaceae			
#pl	*Cotoneaster glaucophyllous*	Cotoneaster		1 shrub
	Malvaceae			
*	*Modiola caroliniana*	Red-flowering Mallow		3
*	*Sida rhombifolia*	Paddys Lucerne		2
	Myrtaceae			
pl	*Angophora bakeri*	Narrow-leaved Apple	1 tree to be retained	
	Eucalyptus crebra	Narrow-leaved Ironbark	Not specified by arborist as to how many retained or removed	Not specified by arborist as to how many retained or removed
	Eucalyptus moluccana	Grey Box	25 trees to be removed	
pl	*Eucalyptus robusta*	Swamp Mahogany Gum		1 tree to 12m tall to be removed
pl	*Eucalyptus sideroxylon*	Mugga Ironbark	1 tree to be retained	

STATUS	SCIENTIFIC NAME	COMMON NAME	WOODLAND TREES IN EXISTING RHAC SCHOOL GROUNDS	EXOTIC GRASSLAND AT NO. 37 WORCESTER ROAD, ROUSE HILL
	Eucalyptus tereticornis	Forest Red-gum	Not specified by arborist as to how many retained or removed	Not specified by arborist as to how many retained or removed
	Oleaceae			
C4	*Ligustrum lucidum*	Large-leaved Privet		1
C4	*Ligustrum sinense*	Small-leaved Privet		2
*	*Olea europea* var *cuspidata*	African Olive		2
	Oxalidaceae			
*	*Oxalis corniculata*	Oxalis		3
	Pittosporaceae			
	Bursaria spinosa	Blackthorn		1 (1 shrub)
	Plantaginaceae			
*	*Plantago lanceolata*	Plantain		3
	Polygonaceae			
	Rumex brownii			3
	Primulaceae			
*	*Anagallis arvensis*	Pimpernel		3
	Rubiaceae			
*	*Sherardia arvensis*	Field Madder		3
	Sapindaceae			
#pl	*Liquidamber styraciflua*	Liquidamber		1 tree to 12m tall to be removed
	Solanaceae			
*	*Solanum linnaenum*	Apple of Sodom		1
*	*Solanum nigrum*	Black Nightshade		2
	Verbenaceae			
C4	*Lantana camara*	Lantana		2

STATUS	SCIENTIFIC NAME	COMMON NAME	WOODLAND TREES IN EXISTING RHAC SCHOOL GROUNDS	EXOTIC GRASSLAND AT NO. 37 WORCESTER ROAD, ROUSE HILL
	MAGNOLOPSIDA: LILIDAE			
	Asparagaceae			
C4	*Asparagus aethiopicus*	Asparagus Fern		1
C4	*Asparagus asparagoides*	Bridal-veil Creeper		2
	Iridaceae			
*	*Romulea rosa* var *australis*	Onion Grass		3
	Juncaceae			
	Juncus usitatus	Common Rush		2
	Poaceae			
*	*Axonopus fissifolius*	Narrow-leaved Carpet Grass		4
*	*Briza minor*	Shivery Grass		2
*	*Bromus catharticus*	Prairie Grass		3
*	*Ehrhata erecta*	African Veldt Grass		4
*	*Lolium perenne*	Perennial Ryegrass		4
	Microlaena stipoides var *stipoides*	Weeping Grass		3
*	*Paspalum dilatatum*	Paspalum		8
*	*Sporobolus africanus*	Parramatta Grass		3

LEGEND TO APPENDIX 1 - NOXIOUS WEEDS IN BLACKTOWN LGA

C4 - A noxious weed the growth and spread of which must be controlled according to the measures specified in a management plan published by the local control authority

Appendix 2: Threatened fauna species recorded previously within a 5km radius of the subject sites at Worcester Road, Rouse Hill (Source: OEH NSW Atlas of Wildlife 2015)

Family	Common Name	*Scientific name*	TSC Act	EPBC Act	No. recorded within 5km radius	No. recorded within 1km radius
Myobatrachidae	Giant Burrowing Frog	*Heleioporus australiacus*	V	V	1	0
	Red-crowned Toadlet	*Pseudophryne australis*	V		2	0
Hylidae	Green and Golden Bell Frog	*Litoria aurea*	E1	V	3	0
Ardeidae	Australasian Bittern	*Botaurus poiciloptilus*	E1	E	1	0
Accipitridae	Little Eagle	*Hieraaetus morphnoides*	V		4	1
	Square-tailed Kite	*Lophoictinia isura*	V		1	0
Cacatuidae	Gang-gang Cockatoo	*Callocephalon fimbriatum*	V		1	1
	Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V		7	0
Psittacidae	Little Lorikeet	*Glossopsitta pusilla*	V		8	0
	Swift Parrot	*Lathamus discolor*	E1	E	4	0
	Turquoise Parrot	*Neophema pulchella*	V		1	0
Strigidae	Powerful Owl	*Ninox strenua*	V		10	1
Tytonidae	Masked Owl	*Tyto novaehollandiae*	V		1	0
Climacteridae	Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	V		1	0
Acanthizidae	Speckled Warbler	*Chthonicola sagittata*	V		1	0
Meliphagidae	Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*	V		1	1
Neosittidae	Varied Sittella	*Daphoenositta chrysoptera*	V		17	3
Petroicidae	Scarlet Robin	*Petroica boodang*	V		2	1
Phascolarctidae	Koala	*Phascolarctos cinereus*	V	V	3	0
Petauridae	Yellow-bellied Glider	*Petaurus australis*	V		2	0
Pteropodidae	Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V	14	0
Emballonuridae	Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V		6	0
Molossidae	Eastern Freetail-bat	*Mormopterus norfolkensis*	V		26	1
Vespertilionidae	Large-eared Pied Bat	*Chalinolobus dwyeri*	V	V	3	0
	Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V		14	0
	Little Bentwing-bat	*Miniopterus australis*	V		5	0
	Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	V		29	1
	Southern Myotis	*Myotis macropus*	V		15	1
	Greater Broad-nosed Bat	*Scoteanax rueppellii*	V		9	0
Camaenidae	Cumberland Plain Land Snail	*Meridolum corneovirens*	E1		66	3
	Dural Woodland Snail	*Pommerhelix duralensis*		E	11	0

P = protected
V = Vulnerable
E = Endangered

Appendix 3 - Likelihood of occurrence in surveyed area of fauna species of conservation significance recorded within a 5km radius of the Study Area at Worcester Road, Rouse Hill, since 1990 (OEH Atlas of NSW Wildlife 2015) or where potential habitat is deemed to potentially occur.

Common Name	Scientific Name	TSC Act	EPBC Act	Number recorded	Preferred Habitat	Habitat within survey area	Indicative Likelihood of Occurrence
Giant Burrowing Frog	*Helioporus australiacus*	V	V	1	The Giant Burrowing Frog occurs from the NSW Central Coast to eastern Victoria, but is most common on the Sydney sandstone. It has been found from the coast to the Great Dividing Range. Found in ridgetop heath, woodland and open forest with sandy soils. Generally lives in the heath or forest and will travel several hundred metres to creeks to breed. Burrows into deep litter or loose soil, emerging to feed or breed after rain.	No suitable habitat on the subject land in the form of seasonal creek-lines or sandstone soaks.	Highly unlikely
Green and Golden Bell Frog	*Litoria aurea*	E1	V	3	Formerly distributed from the NSW north coast near Brunswick Heads, southwards along the NSW coast to Victoria where it extends into east Gippsland. It inhabits marshes, dams and stream-sides, particularly ones with bullrushes (*Typha orientalis).* spp.) or spikerushes (*Eleocharis* spp.).	No suitable habitat on the subject land in the form of seasonal creek-lines or sandstone soaks.	Unlikely
Red-crowned Toadlet	*Pseudophryne australis*	V		2	Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses. Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter.	No suitable habitat on the subject land in the form of seasonal creek-lines or sandstone soaks.	Highly unlikely

Common Name	Scientific Name	TSC Act	EPBC Act	Number recorded	Preferred Habitat	Habitat within survey area	Indicative Likelihood of Occurrence
Australasian Bittern	*Botaurus poiciloptilus*	E1	E	1	It is found in south-western and south-eastern Australia, Tasmania, New Zealand, New Caledonia and Ouvea. Populations in Australia and New Zealand have declined in the 20th century. It is a cryptic and partly nocturnal species that inhabits densely vegetated wetlands	No suitable wetland habitat for the occurrence of this species.	Unlikely
Square-tailed Kite	*Lophoictinia isura*	V		1	In NSW the Square-tailed Kite is often associated with ridge and Gully forests dominated by Woollybutt *Eucalyptus longifolia,* Spotted Gum *Eucalyptus maculata,* or Peppermint Gum *Eucalyptus elata.* It has also been sighted in forests containing *Angophora spp*.and *Callitris spp* with a shrubby understorey and Box-Ironbark woodland. It feeds on honeyeating birds and insects in the tree canopy. They have a large foraging range and hunt prey early morning and evening. Nesting sites are along or close to watercourses in a fork or large horizontal limb of a *Eucalyptus* or *Angophora* species (Pizzey and Knight 2003).	No suitable habitat for foraging or roosting at the highly modified and urbanised site	Unlikely
Little Eagle	*Hieraaetus morphnoides*	V		4	The Little Eagle is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest. The Little Eagle searches for prey on the wing or from a high exposed perch, taking prey from the ground, the shrub layer or the canopy. Prey includes rabbits, other live mammals and insects.	it is considered possible that it could forage overhead. Its preference for foraging over open grassland should not be compromised by the development as this type of habitat is well conserved in the local area.	Possible as an overhead forager, but will not be affected by the proposed development.

Common Name	Scientific Name	TSC Act	EPBC Act	Number recorded	Preferred Habitat	Habitat within survey area	Indicative Likelihood of Occurrence
Gang-gang Cockatoo	*Callocephalon fimbriatum*	V		1	The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee (Pizzey and Knight 2003). In summer, generally found in tall mountain forests and woodlands. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas. Move to lower altitudes in winter, preferring more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas.	No suitable habitat present within survey area.	Highly Unlikely
Glossy Black Cockatoo	*Calyptorhynchus lathami*	V		7	The species is uncommon although widespread throughout suitable forest and woodland habitats. In NSW, the Glossy Black-Cockatoo occurs in coastal and mountain districts, extending west along spurs of the Great Dividing Range. Feeds almost exclusively on the seeds of She-oaks, mostly Forest She-oak *Allocasuarina torulosa* and Black She-oak *A. Littoralis* although they are also known to eat the seeds of Shrub She-oak A. distyla at times	No suitable foraging habitat containing Sheoaks present within survey area.	Highly unlikely

Common Name	Scientific Name	TSC Act	EPBC Act	Number recorded	Preferred Habitat	Habitat within survey area	Indicative Likelihood of Occurrence
Swift Parrot	*Lathamus discolor*	E1	E	4	Autumn – winter migrant to coastal NSW. In NSW mostly occurs on the coast and south west slopes where eucalypts are flowering profusely or where there are abundant lerp infestations. Will feed in the following trees; Swamp Mahogany (*E. robusta)*, Forest Redgum (*E. tereticornus*), Spotted Gum (*Corymbia maculata*), Red Bloodwood (*Corymbia gummifera).*	Forest Red Gum may provide suitable habitat on the subject land in the form of foraging resources.	Unlikely with urbanised location though possible during quieter periods
Little Lorikeet	*Glossopsitta pusilla*	V		8	The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. Nomadic movements are common, influenced by season and food availability. Forages primarily in the canopy of open Eucalyptus forest. Riparian habitats are particularly used. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards.	Forest Red Gum woodland at the RHAC site may provide suitable habitat on the subject land in the form of foraging resources.	Possible foraging habitat
Turquoise Parrot	*Neophema pulchella*	V		1	The Turquoise Parrot occurs on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Forages quietly and may be quite tolerant of disturbance. Nests in tree hollows, logs or posts, from August to December. It lays four or five white, rounded eggs on a nest of decayed wood dust	Foraging habitat may occur at the site. In any case.	Possible foraging habitat

Common Name	Scientific Name	TSC Act	EPBC Act	Number recorded	Preferred Habitat	Habitat within survey area	Indicative Likelihood of Occurrence
Powerful Owl	*Ninox strenua*	V		10	Endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands. Now uncommon throughout its range where it occurs at low density. Inhabits woodland and open sclerophyll forest to tall open wet forest and rainforest.	Possible suitable habitat on the subject land in the form of prey species	Possible forager from time to time. Wide foraging range.
Masked Owl	*Tyto novaehollandiae*	V		1	The Masked Owl occurs in coastal and sub-coastal Australia, with the exception of a portion of the north-western coastline of Western Australia. In NSW, it extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution (Pizzey & Knight 2003). It is usually found in the denser heavier forested eucalypt forests and woodlands never more than 300 km from the coast.	No suitable habitat present within survey area.	Unlikely
Brown Treecreeper (Eastern species)	*Climacteris picumnus victoriae*	V		1	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The eastern subspecies lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands.	No suitable habitat on the managed and structurally modified woodlands of the subject areas.	Unlikely

Common Name	Scientific Name	TSC Act	EPBC Act	Number recorded	Preferred Habitat	Habitat within survey area	Indicative Likelihood of Occurrence
Speckled Warbler	*Chthonicola sagittata*	V		1	The Speckled Warbler lives in dry sclerophyll forests and woodlands dominated by eucalypts. It is mostly seen on the grassy ground layer, when it is foraging. The Speckled Warbler feeds on the ground, probing the leaf litter for insects. It will also eat seeds. It feeds in pairs or small parties up to 6 in number.	It is considered unlikely that it would forage on the regularly managed grassland ground cover of the subject land. Its preference for foraging within woodland limits its potential to occur.	Unlikely, but will not be affected by the proposed development.
Black-chinned Honeyeater (eastern species)	*Melithreptus gularis gularis*	V		1	The Black-chinned Honeyeater has two subspecies. The eastern subspecies extends south from central Queensland, through NSW, Victoria into south eastern South Australia. In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. A gregarious species usually seen in pairs and small groups of up to 12 birds. Feeding territories are large making the species	Suboptimal habitat may occur at the site. It is considered unlikely that it would forage on the regularly managed grassland ground cover of the subject land. Its preference for foraging within woodland limits its potential to occur.	Unlikely, large foraging range.

					locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares. Moves quickly from tree to tree, foraging rapidly along outer twigs, underside of branches and trunks, probing for insects. Nectar is taken from flowers, and honeydew is gleaned from foliage. Breeds solitarily or co-operatively, with up to five or six adults, from June to December		
Varied Sittella	*Daphoenositta chrysoptera*	V		17	The Varied Sittella is sedentary and inhabits NSW from the coast to the far west. It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. It feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy.	Prefers structured unmanaged woodland vegetation. It is considered unlikely that it would forage on the subject land. It would not be compromised by the development as this type of habitat is well conserved in the area and about 70% of the total area of habitat (number of trees) proposed for development will be retained.	Unlikely, but inany case, will not be affected by the proposed development.
Scarlet Robin	*Petroica boodang*	V		2	The Scarlet Robin lives in dry eucalypt forests and woodlands where understorey is open and grassy with few scattered shrubs, abundant logs and fallen timber. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or paddocks with scattered trees.	It is considered unlikely that it would forage on the highly managed and maintained subject land. It would not be compromised by the development as this type of habitat is well conserved in the area and about 70% of the total area of habitat (number of trees) proposed for development will be retained.	Possible, but will not be affected by the proposed development.

Common Name	Scientific Name	TSC Act	EPBC Act	Number recorded	Preferred Habitat	Habitat within survey area	Indicative Likelihood of Occurrence
Koala	*Phascolarctos cinereus*	V	V	3	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coast with some populations in the western region. They inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Primary food trees in the region of the subject land are *Eucalyptus tereticornis.*	The primary eucalypt species occurring at the subject site is Forest Redgum (*E tereticornis*) however the most recent recording of the koala was over 7km to the south-west near Colebee. Given the subject land is fenced and contains an active school facility, it is unlikely that the koala would forage on the site.	Unlikely, and will not be affected by the proposed development.
Yellow-bellied Glider	*Petaurus australis*	V		6	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south.	Prefers undisturbed woodland. It is considered unlikely that it would forage on the subject land. It should not be compromised by the development as this type of habitat is well conserved in the area.	Unlikely, and will not be affected by the proposed development.
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V	14	Occurs along the east coast of Australia from Gladstone in Qld. to south Gippsland and Melbourne in Vic (Strahan 1995; Churchill 1998). The species congregates in large camps and is found in a variety of habitats including rainforest, mangroves, Melaleuca swamps, wet and dry sclerophyll forests and also cultivated areas.	It is considered unlikely that it would forage on the subject land but may pass over in search of suitable foraging habitat. It should not be compromised by the development as this type of habitat is well conserved in the area.	Likely- the survey area does contain eucalypt trees that when in flower provide food for the Grey-headed Flying Fox. About 70% of the trees will be retained. The species is

							more likely to forage within nature reserves with a mature tree canopy in the area. The proposed development should have minimal impact on foraging habitat.
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V		6	Occurs along the east coast of Australia from Gladstone in Qld. to south Gippsland and Melbourne in Vic (Strahan 1995; Churchill 1998). The species congregates in large camps and is found in a variety of habitats including rainforest, mangroves, Melaleuca swamps, wet and dry sclerophyll forests and also cultivated areas. Roosts in tree hollows; may also use caves; has also been recorded in a tree hollow in a paddock (Lumsden and Menkhorst (1995) and in abandoned sugar glider nests (Churchill 1998).	Recorded over 7km to the south-west of the subject land. No hollows are present that could provide roosting opportunity.	Unlikely, and will not be affected by the proposed development.
Eastern Freetail-bat	*Mormopterus norfolkensis*	V		26	Inhabits eucalypt forest and woodland on the coastal side of the Great Dividing Range. Roosts in tree hollows, under bark and in various man-made structures.	No hollows are present that could provide roosting opportunity but it may forage overhead on occasion. About 70% of trees occurring on the subject land will be retained.	Likely as an overhead forager but will not be affected by the proposed development.
Large-eared pied Bat	*Chalinolobus dwyeri*	V	V	3	Roosts in caves, crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Hirundo ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features.	Recorded over 7km to the south-west of the subject land. No caves or Fairy Martin nests are present that could provide roosting opportunity but it may forage overhead on occasion.	Unlikely. Will not be affected by the proposed development.

Common Name	Scientific Name	TSC Act	EPBC Act	Number recorded	Preferred Habitat	Habitat within survey area	Indicative Likelihood of Occurrence
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V		14	It occupies sclerophyll forests, particularly where the habitats are wet and where the mature tree heights are greater than 20 metres (Churchill 1998). Roosts in tree hollows, and have also been recorded occupying caves in the Jenolan area (NSW). Known home ranges of 12 km have been recorded.	No suitable habitat on the subject land in the form of foraging or roosting resources.	Unlikely
Little Bentwing-bat	*Miniopterus australis*	V		5	Occurs throughout coastal NSW and eastern Queensland. Inhabits moist eucalypt forest, rainforest or dense coastal banksia scrub. Little Bentwing-bats roost in caves, tunnels and sometimes tree hollows during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. In NSW the largest maternity colony is in close association with large maternity colonies of Eastern Bentwing-bats (*M. schreibersii oceanensis)* and appears to depend on the large colony to provide the high temperatures needed to rear its young.	No suitable habitat on the subject land in the form of foraging or roosting resources.	Unlikely
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	V		29	Occurs along the coast and ranges, from north Queensland to the far south-east corner of South Australia (Churchill 1998). Recorded in a wide range of habitats from grasslands through to subtropical rainforests, typically found in well-timbered valleys Dwyer (1995). Known roost sites include caves, disused mines, storm-water drains, culverts and buildings.	No caves are present that could provide roosting opportunity but it may forage overhead on occasion.	Possible but will not be affected by the proposed development.

Common Name	Scientific Name	TSC Act	EPBC Act	Number recorded	Preferred Habitat	Habitat within survey area	Indicative Likelihood of Occurrence
Southerm Myotis	*Myotis macropus*	V		15	The Southern Myotis is generally recorded in the coastal regions from south-eastern South Australia, through Victoria, New South Wales, Queensland, Northern Territory and the top of WA (Churchill 1998). Prefers permanent and/or flowing water. The species is commonly a cave dwelling, but will utilise tree hollows, mines, stormwater drains, bridges and dense vegetation (Churchill 1998). Roosting sites are usually located in close proximity to permanent, slow flowing water. Breeding occurs between November and December.	No suitable habitat on the subject land in the form of foraging resources or roosting opportunities.	Unlikely
Greater Broad-nose bat	*Scoteanax rueppellii*	V		9	The preferred foraging habitat of this species is tree-lined creeks and the interface between forested land and cleared areas. This species usually roosts in tree hollows. The roof spaces of old buildings are utilised. The Greater Broad-nosed Bat has been observed to travel from a forested foraging area, several kilometres to a roost tree hollow adjacent to the edge of a town. Large, individual paddock trees have also been found to be used by this species. Open woodland habitat and dry open forest suits the direct flight of this species.	No caves are present that could provide roosting opportunity but it may forage overhead on occasion.	Possible although habitat is suboptimal. Will not be affected by the proposed development.
Cumberland Plain Land Snail	*Meridolum corneovirens*	E1		66	This large land snail inhabits remnant areas of bushland and been largely destroyed by urbanisation and it now is reported as surviving only as isolated populations. *Meridolum corneovirens* burrow into the soft soil around the base of trees and during dry periods can appear to be lost from an area. However following prolonged wet periods	The Cumberland Plain Land Snail is found in undisturbed vegetation and often under discarded building materials within the vegetation. ACS Environmental has never recorded the snail where there are significant weed incursions. However, a dedicated ground search was	Possible although managed woodland habitat is suboptimal. Will not be affected by the proposed development.

					they will re-emerge into the litter to feed on decaying wood and fungi. There is a negative correlation between weed incursions and the presence of the snail (ACS personal obs).	undertaken around the base of all mature eucalypt trees occurring in the subject areas. No evidence of the species was observed.	
Dural Woodland Snail	*Pommerhelix duralensis*		E	11	*Pommerhelix duralensis* (the Dural land snail), also commonly known as the Dural woodland snail (Stanisic, 2010), is a medium sized snail with a dark brown to black semi translucent subglobose (almost spherical shaped) shell. The species is a shale-influenced habitat specialist, which occurs in low densities along the northwest fringes of the Cumberland Plain on shale-sandstone transitional landscapes. The Dural land snail occurs in low abundance and individuals are solitary (Clark, 2005; Ridgeway et al., 2014). The species' maximum recorded density is three live snails per hectare, however it is possible that densities may be higher in some populations (Ridgeway, 2010), particularly as the species can be very difficult to find during surveys given its small size, dark colour and propensity to shelter under rocks or inside curled up fallen bark (Clark, pers. comm., 2014). The majority of confirmed records are from intact remnant bushland and the species is considered unlikely to be tolerant of highly disturbed or weedy habitats.	No suitable habitat for the Dural Woodland Snail No evidence of the species was observed in the highly disturbed and managed woodland occurring within the subject area..	Unlikely

Appendix 4 - List of migratory avifauna covered by bi-lateral bird agreements and recorded previously within 10km of the study site (Source: OEH NSW Atlas of Wildlife 2015)

Family	Common Name	*Scientific name*	TSC Act	EPBC Act	No. recorded within 5km radius	No. recorded within 5km radius
Apodidae	White-throated Needletail	*Hirundapus caudacutus*	P	C,J,K	2	0
Ardeidae	Cattle Egret	*Ardea ibis*	P	C,J	20	3
Accipitridae	White-bellied Sea-Eagle	*Haliaeetus leucogaster*	P	C	2	2
Scolopacidae	Red-necked Stint	*Calidris ruficollis*	P	C,J,K	1	0
	Latham's Snipe	*Gallinago hardwickii*	P	C,J,K	4	1
Meropidae	Rainbow Bee-eater	*Merops ornatus*	P	J	1	1

C = CAMBA (China-Australia Migratory Bird Agreement)
J = JAMBA (Japan-Australia Migratory Bird Agreement)
K = ROKAMBA (Republic of Korea-Australia Migratory Bird Agreement)

P = protected by NSW government legislation

Appendix 5 – Habitat assessment for migratory avifauna covered by bi-lateral bird agreements and recorded in the OEH Atlas of Wildlife 2015

Name	Distribution	Preferred Habitat	Number of Sightings within 5km of the subject area	Number of Sightings within 1km of the subject area	Likelihood of occurrence in surveyed areas and requirement for further assessment
White-throated Needletail *Hirundapus caudacutus* ○ Δ □	Summer migrant to coastal and sub-coastal eastern Australia. White-throated Needletails arrive in Australia from their breeding grounds in the northern hemisphere in about October each year and leave somewhere between May and August.	Range of habitats where it forages in the airspace over forests, woodlands, urban areas, grasslands and water. Whilst mostly aerial, birds will roost in trees, and radio-tracking has since confirmed that this is a regular activity. The White-throated Needletail feeds on flying insects, such as termites, ants, beetles and flies. They catch the insects in flight in their wide gaping beaks. Birds usually feed in rising thermal currents associated with storm fronts and bushfires and they are commonly seen moving with wind fronts.	2	-	May overfly the survey area on occasion but unlikely to utilise resources on site. **No further assessment required.**
Cattle Egret *Ardea ibis* ○ Δ	Originally found in Africa, Europe and Asia, the Cattle Egret is now found on nearly every continent, with birds in Australia originating from Asia. it is most widespread and common in south-eastern Australia from Bundaberg, Queensland to Port Augusta, South Australia, including Tasmania. The Cattle Egret is partially migratory, moving during winter.	The Cattle Egret is found in grasslands, woodlands and wetlands, and is not common in arid areas. It also uses pastures and croplands, especially where drainage is poor. Will also forage at garbage dumps, and is often seen with cattle and other stock.	20	3	Suitable habitat present within survey area but the proposed development should not impact on this migratory species as habitat is well conserved in the local area. **No further assessment required.**

Name	Distribution	Preferred Habitat	Number of Sightings in the area	Likelihood of occurrence in surveyed areas and requirement for further assessment
White-bellied Sea Eagle *Haliaeetus leucogaster* ○	White-bellied Sea-Eagles are a common sight in coastal and near coastal areas of Australia. In addition to Australia, the species is found in New Guinea, Indonesia, China, south-east Asia and India.	White-bellied Sea-Eagles are normally seen perched high in a tree, or soaring over waterways and adjacent land. Birds form permanent pairs that inhabit territories throughout the year.	2 (within 5km); 2 (within 1 km)	May overfly the survey area on occasion but unlikely to utilise resources on site. **No further assessment required.**
Red-necked Stint *Calidris ruficollis* ○ Δ □	The Red-necked Stint breeds in north-eastern Siberia and northern and western Alaska. It follows the the East Asian-Australasian Flyway to spend the southern summer months in Australia. Found widely in Australia. The Red-necked Stint is a migratory wader arriving in Australia from late August to September and leaving early March to mid-April. Some first-year birds may remain in Australia.	Red-necked Stints are found on the coast, in sheltered inlets, bays, lagoons, estuaries, intertidal mudflats and protected sandy or coralline shores. They may also be seen in saltworks, sewage farms, saltmarsh, shallow wetlands including lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in saltflats, flooded paddocks or damp grasslands.	1 (within 5km)	No suitable habitat present within survey area. More likely to occur in ponds associated with the Chain of Ponds Creek. **No further assessment required.**
Latham's Snipe *Gallinago hardwickii* ○ Δ □	Latham's Snipe is a non-breeding migrant to the south east of Australia including Tasmania, passing through the north and New Guinea on passage. Latham's Snipe breed in Japan and on the east Asian mainland. Latham's Snipe is a migratory wader, moving to Australia in our warmer months. Birds may fly directly between Japan and Austraia. They leave their breeding areas from August to November, arriving in Australia mainly in September.	Latham's Snipe are seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They are omnivorous, eating seeds and plant material, worms, spiders and insects, some molluscs, isopods and centipedes.	4 (within 5km); 1 (within 1 km)	No suitable habitat present within survey area. More likely to occur in ponds associated with the Chain of Ponds Creek. **No further assessment required.**

Name	Distribution	Preferred Habitat	Number of Sightings in the area	Likelihood of occurrence in surveyed areas and requirement for further assessment
Rainbow Bee-eater *Merops ornatus*	The Rainbow Bee-eater is found throughout mainland Australia, as well as eastern Indonesia, New Guinea and, rarely, the Solomon Islands. In Australia it is widespread, except in desert areas, and breeds throughout most of its range, although southern birds move north to breed.	The Rainbow Bee-eater is most often found in open forests, woodlands and shrublands, and cleared areas, usually near water. It will be found on farmland with remnant vegetation and in orchards and vineyards. It will use disturbed sites such as quarries, cuttings and mines to build its nesting tunnels.	1 (within 5km); 1 (within 1 km)	Possible habitat present within survey area. More likely to occur in ponds associated with the Chain of Ponds Creek. Retention of 70% of trees will ensure significant extent of habitat is retained. **No further assessment required.**

Δ ○ □ represents birds listed under CAMBA Δ, and JAMBA ○, ROCKAMBA □

Reference material: Pizzey & Knight 2003 'A Field Guide to the birds of Australia'