264-268 PENNANT HILLS ROAD CARLINGFORD

Ecological Constraints Assessment

For:

BaptistCare

July 2015

Final Report

PO Box 2474
Carlingford Court 2118

Report No. 15045RP1

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

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1	13/05/2015	Mikael Peck	1st Draft
2	15/07/2015		Final Draft

Approved by: Dr David Robertson

Position: Director

Signed: David Robertson

Date: *15 July, 2015*

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Glossary of Terms

BaptistCare	BaptistCare NSW & ACT
CEEC	Critically Endangered Ecological Community
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
KTP	Key Threatening Process
LGA	Local Government Area
Locality	The area within a 5km radius of the subject site
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
Parramatta LEP 2011	*Parramatta Local Environmental Plan 2011*
SIS	Species Impact Statement
Subject site	Lot 1 DP 1033201 and Lot 2 DP 364225 at 264-268 Pennant Hills Road, Carlingford (see **Figure 1.1**)
TSC Act	NSW *Threatened Species Conservation Act 1995*

Chapter 1

Introduction

1.1 Purpose

Cumberland Ecology was commissioned by DFP Planning on behalf of BaptistCare NSW & ACT (BaptistCare) to prepare and Ecological Constraints Assessment for the proposed rezoning of 264-268 Pennant Hills Road, Carlingford ('the subject site'). This report will form part of the Planning Proposal being prepared by DFP Planning to support an application for rezoning of the subject site.

The purpose of this report is to describe the current biodiversity values of the subject site and assess any impacts that may constrain future development as a result of the Planning Proposal. In particular, impacts on threatened species, populations and communities that are listed under the New South Wales (NSW) *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) will be assessed.

The specific objectives of this report are to:

- Describe the vegetation communities on the subject site;
- Describe fauna habitats and fauna usage of the subject site;
- Identify any threatened species, populations or ecological communities (as listed under the TSC Act and/or EPBC Act) existing within the subject site;
- Assess the likelihood of occurrence of threatened species, populations or communities (as listed under the TSC Act and/or EPBC Act) within the subject site;
- Assess the potential impacts (both direct and indirect) of the Planning Proposal on threatened communities, flora and fauna, including the completion of Assessments of Significance under Section 5A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act); and
- Where relevant, recommend mitigation measures to reduce the impacts of the proposed development on biodiversity values.

1.2 Background

1.2.1 Site Description

The subject site comprises Lot 1 DP 1033201 and Lot 2 DP 364225, and is located at 264-268 Pennant Hills Road, Carlingford, in the Parramatta Local Government Area (LGA) (**Figure 1.1**). The subject site is currently zoned as R2 (Low Density Residential) under the *Parramatta Local Environmental Plan 2011* (the 'Parramatta LEP 2011') (**Figure 1.2**). The subject site is bounded by Pennant Hills Road to the north and residential dwellings to the east, west and south. The subject site is approximately 2.8 ha in size and contains an existing residential development and vehicular roads, including planted garden areas, and patches of remnant vegetation.

1.2.2 Description of the Planning Proposal

DFP Planning has been commissioned by BaptistCare to prepare a Planning Proposal for the subject site. The planning proposal seeks to rezone the land from R2 Low Density Residential to R4 High Density Residential to allow for the redevelopment of residential flat buildings and multi dwelling housing. The Planning Proposal also seeks to amend controls relating to Height of Buildings and Floor Space Ratio.

A concept master plan developed by Allen Jack and Cottier Architects (AJ+C) has proposed future redevelopment of the site, post rezoning, to include 350 apartments within nine residential flat buildings and three multi dwelling housing buildings (Allen Jack + Cottier Architects, 2015). The preliminary concept scheme is shown in **Figure 1.3**.

Coordinate System: MGA Zone 56 (GDA 94)

Grid North

Legend

Subject Site

CUMBERLAND ECOLOGY

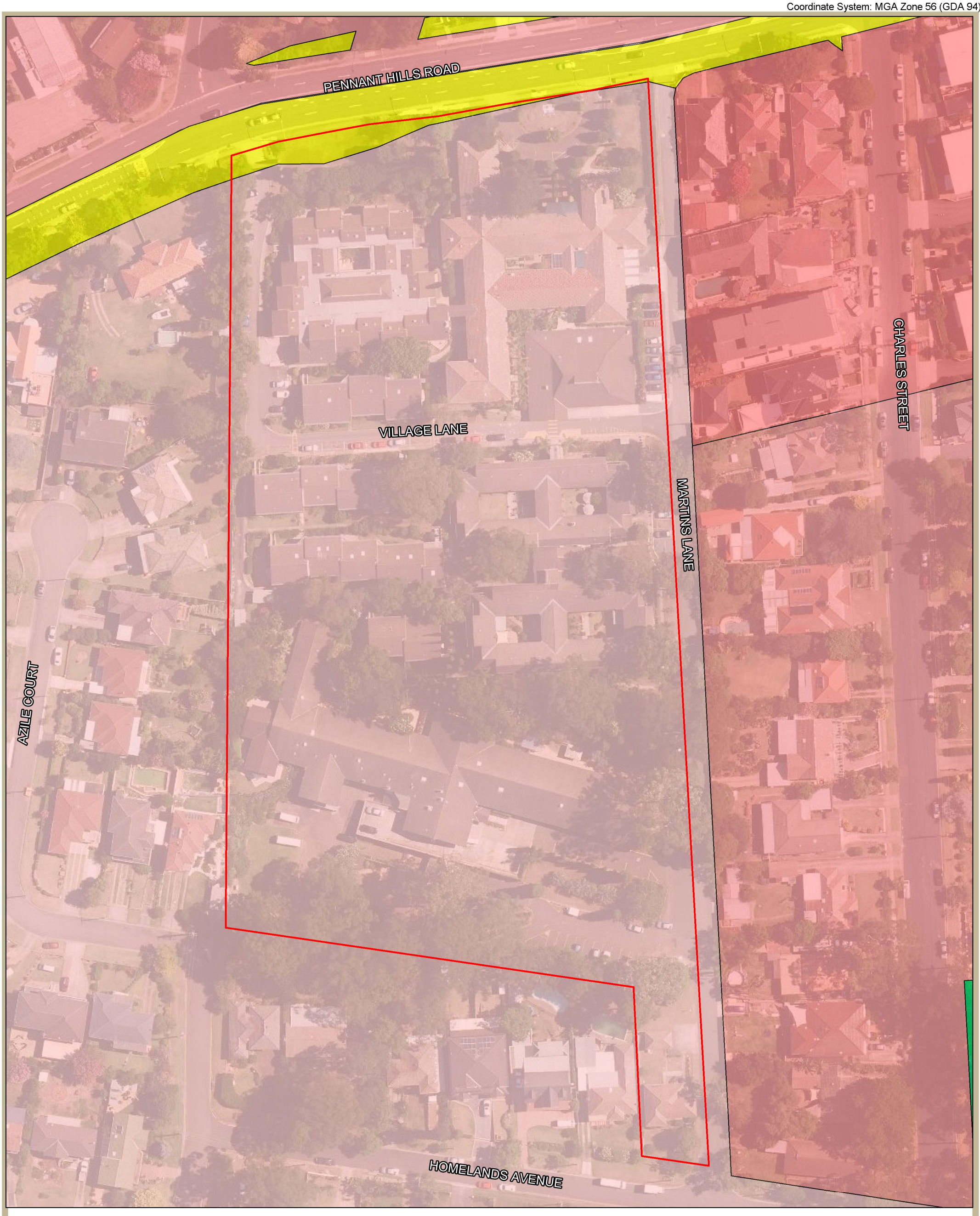
Image Source:
SIXmaps 4-09-2014

Figure 1.1. Location of the Subject Site

20 0 20 40 60 80m

I:\...\15045\Figures\RP1_FFA\20150508\Figure 1.1. Location_Subject Site

Coordinate System: MGA Zone 56 (GDA 94)



Legend

- Subject Site

Land Use Zoning

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Infrastructure

Image Source:
SIXmaps 4-09-2014

Data Source:
Parramatta City Council LEP 2011
The Hills Shire Council LEP 2012

CUMBERLAND ECOLOGY

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I:\...\15045\Figures\RP1_FFA\20150508\Figure 1.2. Zoning_Subject Site

Figure 1.2. Zoning of the Subject Site

I:\...\15045\Figures\RP1_FFA\20150508\Figure 1.3. Concept Plan

Figure 1.3. Concept Master Plan of the Subject Site

Image Source: Allen Jack + Cottier Architects, 2015

Chapter 2

Methodology

2.1 Database Analysis

Database analysis was conducted for the locality using both the NSW Office of Environment and Heritage (OEH) Atlas of NSW Wildlife (OEH, 2015a) and the Commonwealth Department of the Environment Protected Matters Search Tool (DoE, 2015). The locality is defined as the area within a 5 km radius of the subject site. The Atlas of NSW Wildlife Database search was used to generate records of threatened flora and fauna species listed under the TSC Act within the locality. The Protected Matters Search Tool generated a list of Matters of National Environmental Significance listed under the EPBC Act potentially occurring within the locality. The lists generated from these databases were reviewed against available knowledge of the subject site, in conjunction with the abundance, distribution and age of records, to ascertain the likelihood of occurrence of threatened species within the subject site.

2.2 Flora Survey

Flora surveys were undertaken within the subject site by Cumberland Ecology on 29 April 2015 over a 3.5 hour period. Surveys included vegetation mapping and targeted threatened flora searches. Further details of each of the survey methods are provided below. Flora survey locations are shown on **Figure 2.1**.

All vascular plants recorded or collected were identified using keys and nomenclature provided in Harden (1990-1993). Where known, taxonomic and nomenclatural changes have been incorporated into the results, as derived from *PlantNET* (Botanic Gardens Trust, 2015). All flora species were identified as remnant, planted (ornamental), or exotic.

2.2.1 Vegetation Mapping

Previous broad-scale mapping conducted by OEH for the Sydney metropolitan area (OEH, 2013) was utilised to determine potential vegetation communities likely to occur within the subject site. Cumberland Ecology conducted additional vegetation surveys to revise and update the vegetation mapping prepared by OEH.

The vegetation within the subject site was ground-truthed to examine and verify the mapping of the condition and extent of the different vegetation communities. Based on previous mapping and the developed nature of the subject site, a stratified sampling approach was

utilised to ground-truth extant vegetation. The subject site's vegetation was stratified based on a walkthrough of all vegetated areas while identifying and recording all vascular flora species. Due to a previous tree assessment (Mcardle Arboricultural Consultancy, 2014) identifying the presence of Blue Gums (*Eucalyptus saligna*) and the species local historical extent, the flora survey focussed on areas that appeared to have a remnant canopy and some native understorey.

The resultant information was synthesised using a Geographic Information System to create a spatial database that was used to interpret and interpolate the data to produce a vegetation map of the subject site.

2.2.2 Targeted Threatened Flora Surveys

Targeted threatened flora searches via random meanders were undertaken within suitable habitat of threatened flora species known from the locality. The locations of threatened flora specimens observed during surveys were recorded using a hand-held Global Positioning System.

2.3 Fauna Survey

Fauna surveys were undertaken within the subject site by Cumberland Ecology on 29 April 2015 over a 3.5 hour period. The survey consisted of a fauna habitat assessment and incidental observations. Further details of each of the survey methods are provided below.

2.3.1 Habitat Assessments

The fauna habitat assessment included consideration of important indicators of habitat condition and complexity including the occurrence of microhabitats such as tree hollows, fallen logs, bush rock and wetland areas such as creeks and soaks. Structural features considered included the nature and extent of the understorey and ground stratum and extent of canopy. The survey also included an assessment of the presence of habitat features suitable for use by threatened fauna species known from the locality.

2.3.2 Incidental Observations

Any incidental fauna species that were observed, heard calling, or otherwise detected on the basis of tracks or signs, were recorded and listed in the total species list for the subject site.

2.4 Limitations

Vertebrate fauna and vascular flora of the locality are well known based upon a sizeable database of past records and various published reports. The surveys by Cumberland Ecology added to the existing database and helped to provide a clear indication of the likelihood that various species occur, or are likely to occur within the subject site. The data obtained from database assessment and surveys of the subject site furnished an appropriate level of information to support this assessment.

The weather conditions at the time of the flora surveys were generally favourable for plant growth and production of features required for identification of most species. Shrubs, grasses, herbs and creepers were readily identifiable in most instances. It is expected that not all flora species present would have been recorded during surveys. Despite this, it is considered that sufficient information has been collected to assess issues including conservation significance of the flora, condition and viability of vegetation and likely impact on native vegetation. An assessment of the likelihood of occurrence of threatened flora species recorded within the locality of the subject site in the database searches was undertaken to supplement the flora survey.

No targeted fauna surveys were undertaken for this assessment, which relied solely on a database analysis and fauna habitat assessment. In general, opportunistic observations of fauna provide a "snapshot" of some of the fauna present on a site that were active during the time of the survey. The data produced by the survey is intended to be indicative of the types of species that could occur and not an absolute census of all vertebrate fauna species occurring within the subject site. Therefore not all fauna utilising the subject site are likely to have been recorded during surveys. An assessment of the likelihood of occurrence of threatened and migratory fauna species listed for the locality in the database searches was undertaken to supplement the fauna surveys. The combination of these techniques is considered appropriate for assessing the habitat values of the site for threatened fauna within the subject site.

Coordinate System: MGA Zone 56 (GDA 94)

N
Grid North

Legend

Subject Site

Survey Tracks

Image Source:
SIXmaps 4-09-2014

CUMBERLAND ECOLOGY

20 0 20 40 60 80m

I:\...\15045\Figures\RP1_FFA\20150508\Figure 2.1. Survey Tracks

Figure 2.1. Survey Tracks

Chapter 3

Results

3.1 Vegetation Communities

The vegetation of the subject site exists primarily within landscaped areas of an existing aged care facility. Landscaped areas of the subject site have been planted with a mixture of exotic and native plant species. Native non-planted vegetation is present within the subject site in the form of mature remnant eucalypt trees. These large remnant trees are located in the southern portion of the subject site, which is relatively developed, and have a significantly modified understorey.

Previous broad-scale mapping conducted by OEH for the Sydney metropolitan area (OEH, 2013) indicates that presence of Blue Gum High Forest and Urban Native and Exotic Cover within the subject site. Surveys by Cumberland Ecology for this assessment confirmed the presence of these two communities within the subject site, albeit with slightly different extents. The distribution of these communities is shown in **Figure 3.1**. A description of each of these communities is discussed below, including details on whether they conform to a threatened community listed under the TSC Act and/or EPBC Act.

3.1.1 Blue Gum High Forest

TSC Act Status: Critically Endangered Ecological Community (CEEC)

EPBC Act Status: Not listed

Blue Gum High Forest is a tall eucalypt forest characterised by an open mesic tree/shrub layer and an open moist groundcover. This tall forest has a restricted distribution on wet shale ridges of the Hornsby plateau in northeast Sydney where annual rainfall exceeds 1000mm and at elevations above 100m ASL. Most of Blue Gum High Forest's original range has been cleared for urban development (Tozer *et al.*, 2010).

The community is characterised by a tall canopy of eucalypts dominated by *Eucalyptus pilularis* (Blackbutt) or *Eucalyptus saligna* (Sydney Blue Gum). The understorey is often multi-layered, containing a midstorey of mesophyllous shrubs and small trees along with a diverse ground layer of herbs, grasses and ferns. Common shrubs and small trees include *Pittosporum undulatum* (Sweet Pittosporum), *Breynia oblongifolia* (Coffee Bush), *Elaeocarpus reticulatus* (Blueberry Ash) and *Allocasuarina torulosa* (Forest Oak). Characteristic ground layer species include *Adiantum aethiopicum, Entolasia marginata*

(Bordered Panic), *Lomandra longifolia* (Spiny-headed Matrush), *Tylophora barbata* (Bearded Tylophora) and *Eustrephus latifolia* (Wombat Berry) (NSW Scientific Commitee, 2011).

This community is present in two discernible areas (Area 1 and Area 2) within the subject site and largely exists as scattered remnant *Eucalyptus saligna* (Sydney Blue Gum) trees. A description of each discernible area of this community is provided below and their occurrence within the subject site is shown in **Figure 3.1**. Area 1 has the highest abundance of *Eucalyptus saligna* (Sydney Blue Gum) trees (11), followed by Area 2 (3). The understorey of the remnant trees in Area 1 exists in landscaped areas and contains a mixture of planted exotic and native species. Two Blue Gum High Forest characteristic species (*Pittosporum revolutum* and *Lomandra longifolia)* are present in the south west section of Area 1*,* but all individuals of these species appear to be planted. The understorey of Area 2 contains no Blue Gum High Forest characteristic species, but native grasses are present. Area 3 contains two Blue Gum High Forest species (*Pittosporum revolutum* and *Lomandra longifolia),* but like Area 1, all individuals of these species appear to be planted.

Under the TSC Act, Blue Gum High Forest CEEC is dominated by a canopy of *Eucalyptus pilularis* (Blackbutt) or *Eucalyptus saligna* (Sydney Blue Gum). The community is typically comprised of a midstorey and understorey of characteristic species, however due to past disturbances, highly modified relics of the community exist as small clumps of trees without a native understorey (NSW Scientific Commitee, 2011). Areas of the subject site contain characteristic canopy species in the form of *Eucalyptus saligna* (Sydney Blue Gum), but lack a native understorey. These areas represent highly modified Blue Gum High Forest relics and conform to TSC Act CEEC.

Blue Gum High Forest listed CEEC under the EPBC Act is characterised by similar species as outlined in the TSC Act's final determination for the community, including the presence of *Eucalyptus saligna* (Sydney Blue Gum). Under the EPBC Act, Blue Gum High Forest also needs to be greater than one hectare in size and have a canopy cover greater than 10%; or have a canopy cover less than 10% and occur in area of native vegetation in excess of five hectares (DoE, 2014).Due to the small extent of this community within the subject site, being less than one hectare, the remnant *Eucalyptus saligna* (Sydney Blue Gum) trees on the subject site do not conform to the description of Blue Gum High Forest listed under the EPBC Act.

i. Area 1

The majority of Area 1 is located in the southern edge of the subject site, with a small patch located in the south central section of the subject site. These areas are surrounded by a car park, walkways and residential properties (see **Figure 3.1**). The patch of Area 1 located at the southern end of the subject site is comprised primarily of mulched areas, planted gardens, and mature planted and remnant trees (see **Photograph 3.1**). Planted trees in this area include, *Conifer* sp., *Jacaranda mimosifolia* (Jacaranda), *Quercus palustris*, *Cinnamomum camphora* (Camphor Laurel), and *Syagrus romanzoffiana*. The remaining canopy trees include 10 remnant *Eucalyptus saligna* (Sydney Blue Gum) which are scattered throughout this area.

No small trees exist in the area but a number of planted shrubs are present, primarily along the southern fence line of the subject site. A number of the shrub species may be garden escapees from adjacent properties. The only native shrub occurring is *Pittosporum revolutum* (Rough Fruit Pittosporum), but the individuals appear to be planted due to their uniform height and locations. Common exotic planted shrubs include: *Ligustrum lucidum* (Large-leaved Privet), *Olea europaea* subsp. *cuspidata* (African Olive), *Plumbago auriculata* (Blue Plumbago), and *Cotoneaster* sp..

The ground layer of the area is made up of landscaped gardens, and mulched and paved areas. Weeds and planted species make up the entire ground layer with no naturally occurring native species present. Commonly occurring ground cover species include: *Sida rhombifolia*, *Pennisetum clandestinum* (Kikuyu), *Cyclospermum leptophyllum* (Slender Celery) and *Lomandra longifolia* (Spiny-headed Mat-rush). *Lomandra longifolia* (Spiny-headed Mat-rush) is a native plant species characteristic of Blue Gum High Forest; however all individuals within this area are planted as part of landscaped gardens and do not occur naturally.

The small patch of Area 1 located in the south central section of the subject site contains one *Eucalyptus saligna* (Sydney Blue Gum) with a mown lawn understorey (see **Figure 3.1** and **photograph 3.2**).

Three Class 4 noxious weeds identified within the Parramatta City Council control area occur in the area and include: *Ligustrum lucidum* (Large-leaved Privet), *Ligustrum sinense* (Small-leaved Privet), and *Asparagus aethiopicus* (Sprengeri Fern).

Photograph 3.1 Mature remnant trees amongst planted vegetation in Area 1 (photo point 1 in Figure 3.1)

Photograph 3.2 *Eucalyptus saligna* (circled in blue) isolated from other Area 1 vegetation with mown lawn understorey (photo point 2 in Figure 3.1),

ii. Area 2

Area 2 occurs along a section of Martins Lane, located in the eastern side of the site (see **Figure 3.1**). This area contains squared off garden beds surrounded by parking lots and Martins Lane (see **Photograph 3.3**). A mixture of remnant and mature planted trees exist within the garden beds. Remnant trees included *Eucalyptus resinifera* (Red Mahogany), *Eucalyptus microcorys* (Tallowwood) and three *Eucalyptus saligna* (Sydney Blue Gum), and mature planted trees included: *Cupressus* sp., *Bauhinia* sp., *Eucalyptus nicholii* (Narrow-leaved Black Peppermint) and *Cedrus deodora* (Himalayan Cedar).

A mixture of native and exotic shrubs has been planted in the garden beds and along the eastern fence line. Native planted shrubs are *Banksia serrata* (Old-man Banksia), *Banksia integrifolia* (Coast Banksia) and *Melaleuca quinquenervia* (Broad-leaved Paperbark). *Agapanthus* sp. (African Lily), *Strelitzia reginae* (Bird of Paradise) and *Trachelospermum jasminoides* (Star Jasmine) are the only planted exotic shrubs found in this area.

The understorey beneath the remnant trees in this area appears to be from original topsoil as it contains native species such as *Rytidosperma* sp. and *Aristida ramosa* (Three-awned grass). Other native species found throughout the original topsoil were *Dichondra repens* (Kidney Weed), *Carex inversa*, *Cyperus gracilis* (Slender Flat-sedge) and *Glycine tabacina*. Exotic grass species such as *Cynodon dactylon* (Couch Grass), *Paspalum dilatatum* (Paspalum) and *Pennisetum clandestinum* (Kikuyu) also occurred within the area.

Photograph 3.3 Planted and remnant vegetation along Martins Lane within Area 2 (photo point 3 in Figure 3.1)

3.1.2 Planted Native and Exotic Vegetation

TSC Act Status: Not listed

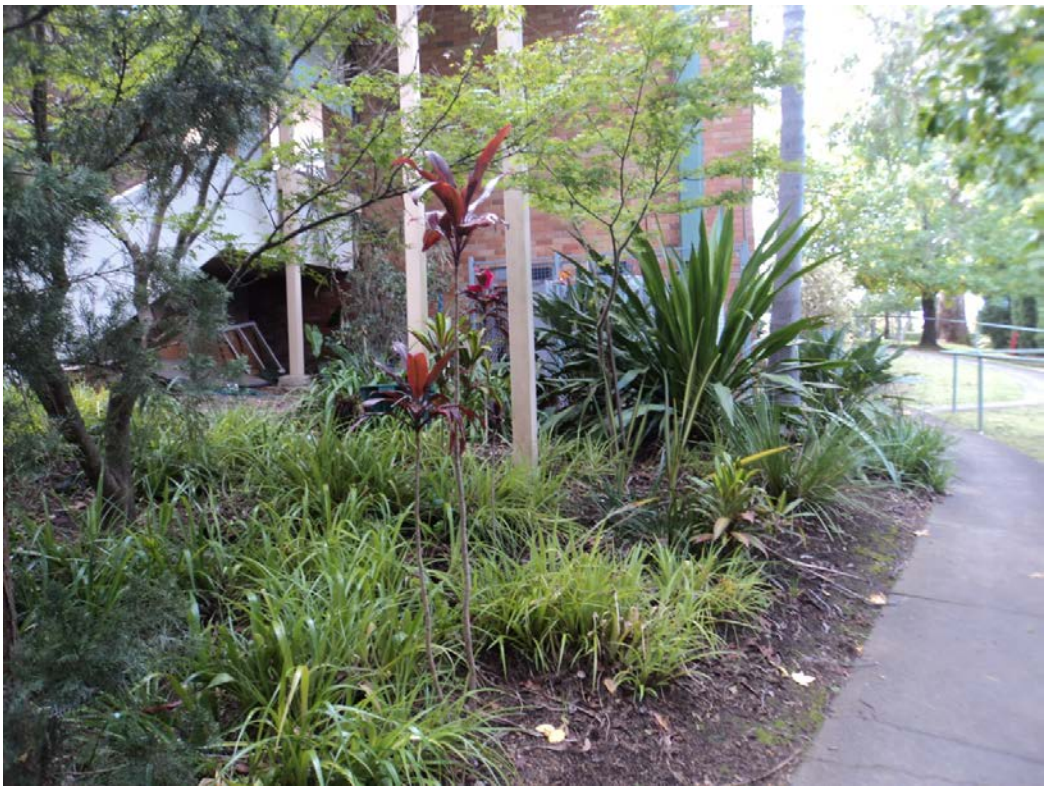
EPBC Act Status: Not listed

Planted native and exotic vegetation is present throughout the subject site, especially in areas surrounding existing buildings, car parks, roads and walking paths. This community does not conform to any naturally occurring vegetation community. Examples of this community within the subject site are shown in **Photograph 3.4 - Photograph 3.6**.

Canopy species within this vegetation community are predominantly planted exotic and non-endemic native species. Non-endemic native species include *Corymbia citriodora* (Lemon-scented Gum), *Araucaria heterophylla* (Norfolk Island Pine), *Grevillea robusta* (Silky Oak) and *Eucalyptus nicholii* (Narrow-leaved Black Peppermint). Planted exotic tree species include *Liquidambar styraciflua* (American Sweetgum), *Jacaranda mimosifolia* (Jacaranda), *Cupressus sp*. (Cypress), *Cinnamomum camphora* (Camphor Laurel) and *Ulmus parvifolia* (Chinese Elm). *Eucalyptus elata* (River Peppermint), *Eucalyptus haemastoma* (Scribbly Gum) and *Eucalyptus resinifera* (Red Mahogany) are native species that occur within areas 3 and 4 of the subject site. Although these species occur naturally in some areas of the locality, they are likely planted on site and not part of a naturally occurring vegetation community.

The understorey vegetation of this community exists in a mixture of landscaped areas including lawns, mulched areas and garden beds. Areas of lawn are present along walkways and carparks (see **Photograph 3.6**). Common exotic grasses comprising these lawn areas include *Aristida ramosa* (Three-awned Grass), *Axonopus fissifolius* (Narrow-leaved Carpet Grass), *Cynodon dactylon* (Couch Grass), *Paspalum dilatatum* (Paspalum), *Pennisetum clandestinum* (Kikuyu), and *Stenotaphrum secundatum* (Buffalo Grass). Garden beds containing planted ornamental exotic species occur in all areas of the subject site with commonly planted exotic shrubs being *Olea europaea* subsp. *cuspidata* (African Olive), *Ligustrum lucidum* (Large-leaved Privet), *Ligustrum sinense* (Small-leaved Privet), *Hibiscus* sp. (Pink Hibiscus), *Cotoneaster glaucophyllus* (Cotoneaster) and *Trachelospermum jasminoides* (Star Jasmine). Planted native ornamentals include *Lomandra longifolia* (Spiny-headed Mat-rush), *Banksia serrata* (Old-man Banksia), *Banksia integrifolia* (Coast Banksia), *Pittosporum revolutum (*Wild Yellow Jasmine) and *Melaleuca quinquenervia* (Broad-leaved Paperbark). Most garden beds contain little to no remnant ground cover species and are dominated by variety of exotic herbs, grasses and vines including: *Pennisetum clandestinum* (Kikuyu), *Modiola caroliniana* (Red-flowered Mallow), *Sida rhombifolia* (Paddy's Lucerne), *Oxalis corniculata*, and *Araujia sericifera* (Moth Vine).

Asparagus aethiopicus is classified as a Class 4 noxious weed and *Oxalis corniculata* is classified as a Class 5 noxious weed within the Parramatta City Council control area.



Photograph 3.4 Planted vegetation within garden beds of Area 3 (photo point 4 in Figure 3.1)

Photograph 3.5 Planted vegetation along walkway of Area 3 (photo point 5 in Figure 3.1)

Photograph 3.6 Planted vegetation in northern portion of Area 3 (photo point 6 in Figure 3.1)

3.2 Flora Species

3.2.1 General Species

A total of 93 flora species were recorded within the subject site during surveys. The dominant plant families encountered within the subject site have been represented by the Poaceae, Asteraceae and Myrtaceae families. Species present within the subject site consists of a mix of exotics (71%), planted native locally indigenous species (12%), planted native non-locally indigenous species (6%) and remnant native species (9%). Flora survey data for the subject site is provided in **Appendix A**.

3.2.2 Threatened Species

Two individuals of *Eucalyptus nicholii* (Narrow-leaved Black Peppermint) were recorded within the subject site (see **Figure 3.2**). This species is listed as Vulnerable under the TSC and EPBC Act. This species is sparsely distributed but widespread on the New England Tablelands from Nundle to north of Tenterfield, being most common in central portions of its range (OEH, 2014e). This species is not considered to be locally indigenous to the locality and therefore its conservation significance is reduced.

No other threatened flora species have been recorded within the subject site. An analysis of the likelihood of occurrence on the subject site for each threatened flora species recorded within the locality is provided in **Appendix B**. This assessment concluded that none of threatened flora species known from the locality are likely to occur within the subject site.

3.2.3 Noxious Weeds

Four of the exotic flora species recorded within the subject site are listed as Declared Noxious Weeds under the NSW *Noxious Weeds Act 1993* in the Parramatta Council control area. These species are; *Ligustrum lucidum* (Large-leaved Privet), *Ligustrum sinense* (Small-leaved Privet), *Asparagus aethiopicus* (Sprengeri Fern) and *Oxalis corniculata*. These species are all classified as Control Class 4 – locally controlled weeds, with the exception of *Oxalis corniculata* which is classified as Control Class 5 – Notifiable Restricted Plants. *A. aethiopicus* (Sprengeri Fern) is also listed as a Weed of National Significance.

3.3 Fauna

3.3.1 Fauna Habitat

The vegetation of the subject site provides some potential habitat for native fauna known to occur in the locality, including threatened species. Microhabitats are present within the subject site include a total of eight trees containing 11 hollows, one tree containing two nest boxes (see **Photograph 3.7**), a culvert and a drain. The details and location of each microhabitat are detailed in **Table 3.1** and shown on **Figure 3.3**. In addition to the microhabitats, many exotic flora species are present on the subject site that can provide potential foraging resources for nectivorous mammals and birds that may use the subject site on occasion as part of a larger foraging range.

Table 3.1 Details of each microhabitat identified within the subject site

Habitat ID	Type	Easting	Northing	Species	Description of Habitat
1	Habitat tree	318681	6259697	*Eucalyptus saligna*	1 large hollow
2	Habitat tree	318644	6259701	*Eucalyptus saligna*	1 small hollow
3	Habitat tree	318629	6259702	*Eucalyptus saligna*	2 nest boxes (lorikeet size)
4	Habitat tree	318600	6259708	*Eucalyptus saligna*	2 small hollows
5	Drain	318583	6259716		Potential reptile habitat when dry and amphibian habitat when water is present
6	Habitat tree	318695	6259764	*Eucalyptus saligna*	1 medium hollow
7	Habitat tree	318670	6259767	*Eucalyptus saligna*	1 large hollow
8	Culvert	318617	6259773		Potential microbat habitat
9	Habitat tree	318577	6259883	*Cinnamomum camphora*	1 medium hollow
10	Habitat tree	318681	6259810	*Corymbia citriodora*	3 small hollows
11	Habitat tree	318689	6259742	*Eucalyptus saligna*	1 medium hollow

Photograph 3.7 *Eucalyptus saligna* (Sydney Blue Gum) (Habitat ID 3 in Table 3.1) with two nest boxes (photo point 1 in Figure 3.1)

3.3.2 General Species

Eight vertebrate fauna species were recorded within the subject site through incidental observations during the habitat assessment. All eight species were common urban adapted bird species (see **Table 3.2**). Such species as the Rainbow Lorikeet (*Trichoglossus haematodus*) and Sulphur-crested Cockatoo (*Cacatua galerita*) were present in high abundances throughout the subject site, especially in *Cinnamomum camphora* (Camphor Laurel) trees located in the north-west corner of the subject site.

Table 3.2 Incidental observations of fauna species within subject site

Common Name	Scientific Name
Common Myna	*Acridotheres tristis*
Sulphur-crested Cockatoo	*Cacatua galerita*
Australian Raven	*Corvus coronoides*
Australian Magpie	*Cracticus tibicen*
Laughing Kookaburra	*Dacelo novaeguineae*
Magpie-lark	*Grallina cyanoleuca*
Noisy Miner	*Manorina melanocephala*
Rainbow Lorikeet	*Trichoglossus haematodus*

3.3.3 Threatened Species

No threatened fauna species were recorded within the subject site during surveys. An analysis of the likelihood of occurrence on the subject site for each threatened fauna species recorded within the locality is provided in **Appendix C**. This assessment concluded that ten threatened vertebrate fauna species and two migratory species have the potential to occur within the subject site. **Table 3.3** lists the threatened fauna species considered to have the potential to occur within the subject site.

Table 3.3 Threatened species with potential to utilise the subject site

Common Name	Scientific Name	TSC Act Status	EPBC Act Status
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	V	
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V	
Eastern Freetail-bat	*Mormopterus norfolkensis*	V	
Gang-gang Cockatoo	*Callocephalon fimbriatum*	V	
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V	
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V

Table 3.3 Threatened species with potential to utilise the subject site

Common Name	Scientific Name	TSC Act Status	EPBC Act Status
Little Lorikeet	*Glossopsitta pusilla*	V	
Powerful Owl	*Ninox strenua*	V	
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V	
Migratory			
Fork-tailed Swift	*Apus pacificus*		M
White-throated Needletail	*Hirundapus caudacutus*		M

TSC Act / EPBC Act Status: V = Vulnerable, M = Migratory

Coordinate System: MGA Zone 56 (GDA 94)

N
Grid North

PENNANT HILLS ROAD

CHARLES STREET

AZILE COURT

HOMELANDS AVENUE

Legend

- Subject Site
- **Vegetation Communities**
  - Blue Gum High Forest - Area 1
  - Blue Gum High Forest - Area 2
  - Planted Native and Exotic Vegetation
- Habitat Items
- Photo Point Locatic
- **Threatened Species**
  - *Eucalyptus nicholii*

Image Source:
SIXmaps 4-09-2014

CUMBERLAND ECOLOGY

20 0 20 40 60 80m

I:\...\15045\Figures\RP1_FFA\20150710\Figure 3.1. Vegetation Areas

Figure 3.1. Vegetation Communities and Locations of Habitat Items and Threatened Species

Chapter 4

Impact Assessment

The subject site is proposed to be rezoned to R4 High Density Residential and as such will support residential flat buildings and multi dwelling housing. The potential impacts of the rezoning will likely arise after rezoning, during the subsequent development of the subject site. A discussion of the potential impacts from future development of the subject site is provided below.

4.1 Vegetation Communities

Assuming that development is maximised in the proposed R4 zones of the subject site, the Planning Proposal will potentially facilitate the clearance of approximately 0.28 ha TSC Act listed Blue Gum High Forest CEEC. An additional 1.98 ha of Planted Native and Exotic Vegetation will be cleared.

Blue Gum High Forest is a CEEC that is considered to be of high conservation significance and is identified as being at extremely high risk of extinction in the immediate future. Pre-European settlement, the community covered an estimated 3,700 ha. Today, the community is highly fragmented and has an extant distribution covering an estimated area of less than 200 ha, resulting in less than 5% of its original extent remaining. Additionally, its entire distribution is series of fragmented remnant patches surrounded by urban development, many of which contain only trees and no native understorey. As a consequence of the decline of Blue Gum High Forest trees, many fauna dependent of trees have been impacted. The degradation of the community's understorey, in particular shrub species, has also impacted bird and mammal species that utilise such shrubs for refuge (NSW Scientific Commitee, 2011).

Key Threatening Processes (KTPs) relevant to the community include: 'Clearing of native vegetation', 'Invasion of native plant communities by exotic perennial grasses', 'Invasion, establishment and spread of Lantana' and 'Invasion and establishment of exotic vines and scramblers'. These threats are exacerbated by continued urban development and stormwater runoff and its associated pollutants and dispersal of invasive weeds. The highly degraded nature of the remaining fragmented patches combined with these KTPs have significantly reduced the community's ecological function (DoE, 2014).

The Blue Gum High Forest on the subject site exists as 14 scattered canopy trees with a highly modified understorey and has moderate conservation significance. Nonetheless, the community is critically endangered, and is at great risk from development in general. Presently though, the remnant trees within the subject site do not greatly contribute to the

long-term survival of the community in the locality. Assuming the Planning Proposal would facilitate the removal of all 14 *E. saligna* remnant trees (0.28 ha of Blue Gum High Forest), the result would have a significant impact on the community within the subject site, but not in the locality as the community is conserved in nearby parks and reserves. As evidenced in the Master Concept Plan (see **Figure 1.3**), it is unlikely that a proposed future development would clear all 14 remnant trees within the subject site, reducing the impacts on the community within subject site and the locality.

A precautionary Assessment of Significance prepared in accordance with Section 5A of the EP&A Act is provided in **Appendix D**. In consideration of all of the above, the potential removal of 0.28 ha of TSC listed Blue Gum High Forest could be considered as significant given that the community is listed as critically endangered. The removal of vegetation within the subject site will contribute to the cumulative loss of what is considered to be an over-cleared vegetation community.

4.2 Flora Species

4.2.1 General Species

Future development of the subject site has the potential to result in a number of minor impacts to flora species within the subject site. In addition to the direct removal and modification of vegetation within the subject site potential indirect impacts to flora species include:

- Weed invasion;
- Runoff, erosion and sedimentation; and
- Modification of microhabitat features resulting from long and short-term edge effects (e.g. changes in light filtration).

The project is not considered to exacerbate these impacts further than current conditions, given the location of the subject site within a highly modified urban area. A number of mitigation measures could be implemented to minimise these impacts.

4.2.2 Threatened Species

Two individuals of *Eucalyptus nicholii* (Narrow-leaved Peppermint) were identified within the subject site. This species is listed as vulnerable under the TSC Act and EPBC Act. This species is not locally indigenous to the subject site given the known distribution of the species in the New England Tablelands (OEH, 2014e). As this species has been planted within the subject site the conservation significance has been reduced. Both individuals would likely be removed during future development of the subject site. It is not considered likely that the future development would have a significant impact upon this species. No other threatened flora species are considered to have the potential to occur within the subject site.

Considering all the above, the Planning Proposal is considered unlikely to have the potential to cause a significant impact on threatened flora species through facilitation of future development of the subject site.

4.3 Fauna Species

4.3.1 Fauna Habitat

Future development of the subject site has the potential to result in a number of minor direct and indirect impacts to fauna species and their habitat within the subject site. Potential direct impacts to fauna species include:

- Loss of hollow-bearing trees; and
- Loss of blossom-producing trees and shrubs.

Potential indirect impacts to fauna species include;

- Runoff, erosion and sedimentation;
- Increased pollution; and
- Modification of microhabitat features resulting from long and short-term edge effects (e.g. changes in light filtration).

The Planning Proposal is not considered to exacerbate these impacts further that current conditions, given the location of the subject site within a highly modified urban area. It is expected that the majority of fauna species occurring within the subject land would be hardy native species that would readily adapt to any such changes in habitat.

4.3.2 Fauna Species

A discussion of the Planning Proposal's potential impacts on threatened fauna with the potential to occur on the subject site is discussed below. Assessments of Significance have been prepared for threatened fauna species identified as potentially occurring within the subject site and are provided in **Appendix D**. None of the threatened fauna species discussed are considered to be significantly impacted by the potential removal of habitat within the subject site as result of future development facilitated by the Planning Proposal.

i. Gang-gang Cockatoo (Callocephalon fimbriatum)

The Gang-gang Cockatoo (*Callocephalon fimbriatum*) is listed as Vulnerable under the TSC Act. It is a charismatic cockatoo that has a length up to 37 cm and a wingspan up to 76 cm. The species is distributed in NSW from the south-east coast to the Hunter region, and inland to the south-west slopes and the Central Tablelands. During summer, it is found in tall mountain forests, while in winter it moves to lower altitude eucalypt forests and woodland. For nesting and roosting, the species prefers old growth attributes (OEH, 2015b).

The species has the potential to utilise the subject site for foraging, but likely only as part of a much larger foraging range. Two large hollows located on-site provide potential roosting habitat, although these are not optimal hollows due to their low height from the ground (~2 m). Approximately 0.28 ha of suitable habitat for this species, including foraging habitat may be removed through future development of the subject site. The area of habitat that may be removed occurs within a highly modified urban area and would represent only a small amount of available habitat for the species within the locality.

ii. Little Lorikeet (Glossopsitta pusilla)

The Little Lorikeet (*Glossopsitta pusilla*) is listed as Vulnerable under the TSC Act. The species is a small bright green parrot that flies fast and direct through or above the canopy. NSW comprises a large portion of the species' core habitat with its distribution occurring along the entire coastline and as far inland as Dubbo and Albury. The Little Lorikeet forages for nectar, pollen, fruits and mistletoe in the canopy of *Eucalyptus* forest and woodland, *Angophora*, *Melaleuca* and other tree species on. Nesting often occurs in hollows of smooth-barked eucalypts.

The species has the potential to utilise the subject site for foraging, but likely only as part of a much larger foraging range. Potential nesting habitat for this species occurs primarily within tree hollows of the subject site. Approximately 2.28 ha of suitable habitat for this species, including foraging and nesting habitat may be removed through future development of the subject site. The area of habitat that may be removed occurs within a highly modified urban area and would represent only a small amount of available habitat for the species within the locality.

iii. Powerful Owl (Ninox strenua)

The Powerful Owl (*Ninox strenua*) is listed as Vulnerable under the TSC Act. The species is endemic to eastern and south eastern Australia and in NSW is widely distributed throughout the eastern forests from the coast inland to the tablelands. It inhabits a range of vegetation types from woodland and open sclerophyll forest to tall open wet forest and rainforest and generally requires large tracts of forest or woodland habitat but can occur in fragmented landscapes. The Powerful Owl requires large tree hollows for nesting that are at least 50cm deep in large old eucalypts that have a diameter at breast height of 80-240 cm, and roosts in dense vegetation (OEH, 2014f).

The Powerful Owl is considered to have the potential to occur within the subject site given the species is known to utilise fragmented habitat within urban areas. The species has the potential to utilise the subject site for foraging, but likely only as part of a much larger foraging range. The most optimal foraging habitat on-site occurs within Blue Gum High Forest vegetation, where the most mature *Eucalyptus* trees are present. Two large hollows located on-site also provide potential roosting habitat, although these are not optimal hollows due to their low height from the ground (~2 m). Approximately 2.28 ha of suitable foraging habitat may be removed through future development, of which less than 0.28 ha is suitable for roosting. The area of habitat that may be removed occurs within a highly modified urban area and would represent only a small amount of available habitat for the species within the locality.

iv. Grey-headed Flying-fox (Pteropus poliocephalus)

The Grey-headed Flying-fox (*Pteropus poliocephalus*) is listed as Vulnerable under the TSC Act and EPBC Act. The Grey-headed Flying-fox is distributed primarily along the eastern coastal plain from Bundaberg in Queensland, through NSW and south to eastern Victoria (NSW Scientific Committee, 2004). Within its extent, the species occurs in rainforests, open forest, woodlands, Melaleuca swamps and Banksia woodlands (NSW Scientific Committee, 2004).

Potential foraging habitat for this species occurs within the subject site in the form of Palm trees located in the southern portion of the subject site. The species has potential to forage on the subject site, but likely only as part of a much larger foraging range. Grey-headed Flying-foxes live in specific roost camps, the locations of which are well-known with the closest known camp located in Parramatta Park, approximately 5km to the southwest (Ku-ring-gai Bat Conservation Society, 2011) . No camps were observed within the subject site. Approximately 2.28 ha of suitable foraging habitat may be removed through future development; however this habitat occurs within a highly modified urban area and would represent only a small amount of available habitat for the species within the locality.

v. Eastern Bentwing-bat (Miniopterus schreibersii oceanensis)

The Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) is listed as Vulnerable under the TSC Act. The species weighs up to 20 grams, a body length of 6 cm and a wingspan up to 35 cm. It is distributed along the east and north-west coasts of Australia. The Eastern Bentwing-bat roosts primarily in caves, but is known to also utilise mines, storm-water tunnels and man-made structures. Foraging occurs in forested areas preying on flying insects above the canopy (OEH, 2014a).

The species has the potential to utilise the subject site for foraging, but likely only as part of a much larger foraging range. Potential roosting habitat for this species occurs primarily within the culvert and drain of the subject site. Approximately 2.28 ha of suitable foraging habitat may be removed through future development; however this habitat occurs within a highly modified urban area and would represent only a small amount of available habitat for the species within the locality.

vi. Eastern False Pipistrelle (Falsistrellus tasmaniensis)

The Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) is listed as Vulnerable under the TSC Act. It is relatively large weighing up to 28 grams and is distributed along the south-east coast and ranges of Australia. Within its extent, the Eastern False Pipistrelle tends to occur in moist habitats with trees over 20m in height, and roosts in eucalypt hollows as well as loose bark or in buildings (OEH, 2014b).

The species has the potential to utilise the subject site for foraging, but likely only as part of a much larger foraging range. Potential roosting habitat for this species occurs primarily within tree hollows of the subject site. Approximately 2.28 ha of suitable foraging habitat and 0.28 ha of roosting habitat may be removed through future development. This area of habitat

occurs within a highly modified urban area and would represent only a small amount of available habitat for the species within the locality.

vii. Eastern Freetail-bat (Mormopterus norfolkensis)

The Eastern Freetail-bat (Mormopterus norfolkensis) is listed as Vulnerable under the TSC Act. It is a freetail-bat with a 3-4 cm long bare tail and weighs up to 10g. The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. It occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range and roosts mainly in tree hollows but will also roost under bark or in man-made structures (OEH, 2014c).

The species has the potential to utilise the subject site for foraging, but likely only as part of a much larger foraging range. Potential roosting habitat for this species occurs primarily within tree hollows of the subject site. Approximately 2.28 ha of suitable foraging habitat and 0.28 ha of roosting habitat may be removed through future development. These areas of habitat occur within a highly modified urban area and would represent only a small amount of available habitat for the species within the locality.

viii. Greater Broad-nosed Bat (Scoteanax rueppellii)

The Greater Broad-nosed Bat (*Scoteanax rueppellii*) is listed as Vulnerable under the TSC Act. It is a large bat which grows up to 95mm. It is distributed from north-eastern Victoria to the Atherton Tableland, mainly in gullies and river systems draining the Great Dividing Range. The Greater Broad-nosed Bat occurs more commonly in tall wet forest and roosts in tree hollows as well as buildings (OEH, 2014d).

The species has the potential to utilise the subject site for foraging, but likely only as part of a much larger foraging range. Potential roosting habitat for this species occurs primarily within tree hollows of the subject site. Approximately 2.28 ha of suitable foraging habitat and 0.28 ha of roosting habitat may be removed through future development. These areas of habitat occur within a highly modified urban area and would represent only a small amount of available habitat for the species within the locality.

ix. Yellow-bellied Sheathtail-bat (Saccolaimus flaviventris)

The Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) is listed as Vulnerable under the TSC Act. It is a large bat which grows up to 87mm in length and its tail is covered with an elastic sheath. It is distributed across northern and eastern Australia in most habitats with and without trees. The species roosts in tree hollows and buildings, and in areas without trees it utilises mammal burrows (OEH, 2014g).

The species has the potential to utilise the subject site for foraging, but likely only as part of a much larger foraging range. Potential roosting habitat for this species occurs primarily within tree hollows of the subject site. Approximately 2.28 ha of suitable foraging habitat and 0.28 ha of roosting habitat may be removed through future development. These areas of habitat occur within a highly modified urban area and would represent only a small amount of available habitat for the species within the locality.

x. Migratory Species

Two species listed as migratory terrestrial under the EPBC Act may potentially pass through the locality. These are the Fork-tailed Swift (*Apus pacificus*) and White-throated Needletail (*Hirundapus caudacutus*) which are aerial species that may forage aerially above the subject site on occasion as part of a much larger foraging range. Approximately 2.8 ha of suitable foraging habitat may be removed through future development. These areas of habitat occur within a highly modified urban area and would represent only a small amount of available habitat for the species within the locality.

Chapter 5

Constraints and Recommendations

This study has endeavoured to describe and assess the various ecological attributes of the subject site, including presence of threatened species, populations and communities, and the presence of valuable habitat resources for such threatened species. These attributes were used to develop a map of the areas of highest ecological constraint to future development, and conversely the areas of least constraint to future development. Constraints identified primarily focused on impacts associated with TSC Act listed species and their habitats, communities and populations. The relative ecological constraint values of the subject site are shown in **Figure 5.1**.

Future development of all the R4 zoned has the potential to impact biodiversity values within the subject site, particularly within the areas mapped as having high ecological constraints. **Figure 5.1** indicates that the areas of high constraint correspond to areas containing remnant *Eucalyptus saligna* (Sydney Blue Gum) trees which conform to Blue Gum High Forest CEEC listed under the TSC Act. Low constrained areas are comprised of paved roads and car parks, planted vegetation and lawns which do not contain any *Eucalyptus saligna* (Sydney Blue Gum) trees.

The Planning Proposal has the potential to cause a significant impact on Blue Gum High Forest through facilitation of future urban development of the subject site. Although the Planning Proposal is unlikely to result in the local extinction of Blue Gum High Forest, it has the potential to cause a significant impact on the community within the subject site if avoidance measures aren't taken.

The Planning Proposal would also remove potential habitat for threatened fauna species, however it is unlikely that this would result in a significant impact to these species given the location of the habitat within a highly modified urban landscape and the available habitat in the locality.

It is recommended that any development facilitated by the Planning Proposal avoids the removal of *Eucalyptus saligna* (Sydney Blue Gum) trees where possible. In circumstances where this is not possible, this species could be planted as part of the landscape plan to offset the loss the trees removed. Additionally, characteristic shrub and understorey Blue Gum High Forest plant species may be incorporated into the landscape plan to further increase the ecological functioning of the community within the subject site. Other mitigation measures that would reduce impacts to flora and fauna values within the subject site include:

- Use of suitable runoff, sedimentation, erosion and pollution controls during construction;

- Clear demarcation of trees to be removed to avoid any unnecessary vegetation removal;
- Use of locally occurring native species within landscape design, which may provide potential habitat for native fauna species such as birds and reptiles;
- Targeted fauna surveys prior to demolition of buildings using ultrasonic bat detection units to determine whether any microchiropteran bats area using the buildings as roosting habitat; and
- Supervision of tree removal by appropriately qualified personnel to rescue any resident fauna present.

Any future development applications that may be prepared for the subject site would need to include an assessment of potential impacts on the CEEC and threatened species in accordance with Section 5A of the EP&A Act (the 'Assessment of Significance'). Further to this, if the Assessment of Significance for the proposed development concluded that the proposed development would have a significant impact on Blue Gum High Forest or threatened species, a Species Impact Statement (SIS) would need to be undertaken and submitted as part of the development application.

Coordinate System: MGA Zone 56 (GDA 94)

N
Grid North

Legend

Subject Site

Constraint

High

Low

Image Source:
SIXmaps 4-09-2014

CUMBERLAND ECOLOGY

I:\...\15045\Figures\RP1_FFA\20150710\Figure 5.1. Constraints Map

Figure 5.1. Constraints Map

20 0 20 40 60 80m

Chapter 6

Conclusion

The subject site is comprised of intact and modified native vegetation, and planted vegetation. The native vegetation community identified within the subject site comprises Blue Gum High Forest, which conforms to the CEEC listed under the TSC Act. Within the subject site, all of this community (0.28 ha) conforms to the TSC Act listing of the CEEC, but none conforms to the EPBC Act listing of the CEEC. The remaining vegetation portions of the subject site comprises Planted Native and Exotic Vegetation (1.98 ha). The vegetation within the subject site provides potential habitat for a number of threatened fauna species known from the locality.

The Planning Proposal for the subject site includes 2.8 ha of land currently zoned as R2. The areas of high constraint correspond to the areas that conform to the Blue Gum High Forest CEEC, which also contain habitat features suitable for threatened species. Low constraint areas are comprised of paved roads and carparks, planted vegetation, and lawns.

Future development of the subject site has potential to impact Blue Gum High Forest and potential habitat for threatened fauna species. Although the Planning Proposal is unlikely to result in the local extinction of Blue Gum High Forest, it has the potential to cause a significant impact on the community within the subject site if avoidance measures aren't taken. The Planning Proposal may facilitate the removal of potential habitat for threatened fauna species, however it is unlikely that this would result in a significant impact to these species given the location of the habitat within a highly modified urban landscape and the available habitat in the locality.

Any future development applications that may be prepared for the subject site would need to include an assessment of potential impacts on the CEEC and threatened species in accordance with Section 5A of the EP&A Act (the 'Assessment of Significance'). Further to this, if the Assessment of Significance for the proposed development concluded that the proposed development would have a significant impact to any CEEC or threatened species, an SIS would need to be undertaken and submitted as part of the development application.

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Appendix A

Flora Species List

Table 6.1 Flora species recorded during surveys

Form	Family	Status	Scientific Name	Common Name	Origin	Area 1	Area 2	Area 3
Tree	Altingiaceae	exotic	*Liquidambar styraciflua*	American Sweetgum, Sweetgum	planted			x
Tree	Apocynaceae	exotic	*Plumeria sp.*	Frangipani	planted		x	x
Tree	Araliaceae	exotic	*Schefflera actinophylla*	Umbrella Tree	planted	x		x
Tree	Araucariaceae	native, not local to area	*Araucaria heterophylla*	Norfolk Island Pine	planted			x
Tree	Arecaceae	exotic	*Archontophoenix cunninghamiana*	Bangalow Palm	planted			x
Tree	Arecaceae	exotic	*Syagrus romanzoffiana*	Cocos Palm, Queen Palm	planted	x		x
Tree	Bigoniaceae	exotic	*Jacaranda mimosifolia*	Jacaranda	planted	x		x
Tree	Cuppressaceae	exotic	*Cuppressus sp.*	Cypress	planted	x	x	x
Tree	Euphorbiaceae	exotic	*Triadica sebifera*	Chinese Tallow Tree	planted			x
Tree	Fabaceae-Caesalpinioideae	exotic	*Bauhinia sp.*	-	planted		x	
Tree	Fabaceae-Caesalpinioideae	exotic	*Gleditsia triacanthos*	Honey Locust	planted			x
Tree	Fagaceae	exotic	*Quercus robur*	English Oak, German Oak	planted	x		
Tree	Lauraceae	exotic	*Cinnamomum camphora*	Camphor Laurel	planted	x		x
Tree	Myrtaceae	native, not local to area	*Eucalyptus citriodora*	Lemon-scented Gum	planted			x

Table 6.1 Flora species recorded during surveys

Form	Family	Status	Scientific Name	Common Name	Origin	Area 1	Area 2	Area 3
Tree	Myrtaceae	native	*Eucalyptus elata*	River Peppermint	planted			x
Tree	Myrtaceae	native	*Eucalyptus haemastoma*	Scribbly Gum	planted			x
Tree	Myrtaceae	native	*Eucalyptus microcorys*	Tallowwood	remnant		x	
Tree	Myrtaceae	native, not local to area	*Eucalyptus nicholii**	Narrow-leaved Black Peppermint	planted		x	
Tree	Myrtaceae	native	*Eucalyptus resinifera*	Red Mahogany	remnant		x	
Tree	Myrtaceae	native	*Eucalyptus saligna***	Sydney Blue Gum	remnant	x	x	
Tree	Pinaceae	exotic	*Cedrus deodora*	Himalayan Cedar	planted		x	
Tree	Pinaceae	exotic	*Pinus radiata*	Monterey Pine, Radiata Pine	planted			x
Tree	Proteaceae	native, not local to area	*Grevillea robusta*	Silky Oak	planted	x		x
Tree	Salicaceae	exotic	*Populus sp.*	Poplar	planted			x
Tree	Ulmaceae	exotic	*Ulmus ?parvifolia*	Chinese Elm	planted	x		x
Shrub	Apocynaceae	exotic	*Nerium oleander*	Oleander	planted	x		x
Shrub	Apocynaceae	exotic	*Trachelospermum jasminoides*	Star Jasmine	planted	x	x	x
Shrub	Asteliaceae	exotic	*Cordyline sp. (red cultivar)*	Cabbage Tree, Cabbage-palm	planted			x
Shrub	Asteraceae	exotic	*Euryops chrysanthemoides*	Bush Daisy	planted	x		x
Shrub	Hydrangeaceae	exotic	*Hydrangea sp. (cultivar)*	Hydrangea	planted			x
Shrub	Malaceae	exotic	*Cotoneaster ?glaucophyllus*	Cotoneaster	planted	x		x
Shrub	Malaceae	exotic	*Rhaphiolepis indica*	Indian Hawthorn	planted	x		

Table 6.1 Flora species recorded during surveys

Form	Family	Status	Scientific Name	Common Name	Origin	Area 1	Area 2	Area 3
Shrub	Malvaceae	exotic	*Hibiscus sp.*	Pink Hibiscus	planted	x		x
Shrub	Melastomataceae	exotic	*Tibouchina sp. (cultivar)*	Glory Bush	planted			x
Shrub	Myrtaceae	native	*Callistemon citrinus*	Crimson Bottlebrush	planted			x
Shrub	Myrtaceae	native	*Kunzea ambigua*	Tick Bush	planted			x
Shrub	Myrtaceae	native	*Leptospermum polygalifolium*	Tantoon	planted			x
Shrub	Myrtaceae	native	*Melaleuca quinquenervia*	Broad-leaved Paperbark	planted		x	
Shrub	Nandinaceae	exotic	*Nandina domestica*	Heavenly Bamboo, Nandina	planted			x
Shrub	Oleaceae	exotic	*Ligustrum lucidum***	Large-leaved Privet	planted	x		x
Shrub	Oleaceae	exotic	*Ligustrum sinense****	Small-leaved Privet	planted	x		x
Shrub	Oleaceae	exotic	*Olea europea ssp. cuspidata*	African Olive	planted	x		x
Shrub	Pittosporum	native	*Pittosporum revolutum***	Wild Yellow Jasmine	planted	x		x
Shrub	Plumbaginaceae	exotic	*Plumbago auriculata*	Blue Plumbago	planted			x
Shrub	Portulaceae	exotic	*Portulacaria afra*	Money Bush, Elephant Bush	planted			x
Shrub	Proteaceae	native	*Banksia ?serrata*	Old-man Banksia	planted		x	
Shrub	Proteaceae	native	*Banksia integrifolia*	Coast Banksia	planted		x	
Shrub	Theaceae	exotic	*Camellia japonica*	Japanese Camellia	planted			x
Other	Alliaceae	exotic	*Agapanthus sp.*	African Lily	planted	x	x	x
Other	Apiaceae	native	*Centella asiatica*	Indian Pennywort	planted			x
Other	Apiaceae	exotic	*Cyclospermum leptophyllum*	Slender Celery	weed	x		

Table 6.1 Flora species recorded during surveys

Form	Family	Status	Scientific Name	Common Name	Origin	Area 1	Area 2	Area 3
Other	Apocynaceae	exotic	*Araujia sericifera*	Moth Vine	weed	x		
Other	Araceae	exotic	*Colocasia ?esculenta*	Gabi, Elephant Ears	planted			x
Other	Araceae	exotic	*Monstera deliciosa*	Fruit Salad Plant	planted	x		x
Other	Araliaceae	exotic	*Hedera helix*	English Ivy	planted	x		
Other	Asparagaceae	exotic	*Asparagus aethiopicus***	Sprengeri Fern	weed	x		x
Other	Asteraceae	exotic	*Bidens pilosa*	Cobbler's Pegs	weed			x
Other	Asteraceae	exotic	*Gazania sp.*	Gazania	planted			x
Other	Asteraceae	exotic	*Gnaphalium sp.*	Cudweed	weed		x	x
Other	Asteraceae	exotic	*Hypochaeris radicata*	Catsear, Flatweed	weed			x
Other	Asteraceae	exotic	*Soliva sessilis*	Bindyi	weed	x		
Other	Asteraceae	exotic	*Sonchus asper*	Prickly Sowthistle	weed	x		
Other	Asteraceae	exotic	*Taraxacum officionale*	Dandelion	weed		x	
Other	Bromeliaceae	exotic	*Bromelia sp.*	Bromelia	planted			x
Other	Caryophyllaceae	exotic	*Paronychia sp.*	Whitlow Wort	weed		x	
Other	Commelinaceae	exotic	*Tradescantia fluminensis*	Wandering Jew	weed	x		x
Other	Convolvulaceae	native	*Dichondra repens*	Kidney Weed	remnant		x	x
Other	Cyatheaceae	native, not local to area	*Cyathea? sp.*	Tree Fern	planted			x
Other	Cyperaceae	native	*Carex inversa*	-	remnant		x	

Table 6.1 Flora species recorded during surveys

Form	Family	Status	Scientific Name	Common Name	Origin	Area 1	Area 2	Area 3
Other	Cyperaceae	native	*Cyperus gracilis*	Slender Flat-sedge	remnant		x	x
Other	Doryathaceae	native, not local to area	*Doryanthese excelsa*	Gymea Lily	planted			x
Other	Euphorbiaceae	exotic	*Euphorbia peplus*	Petty Spurge	weed	x		
Other	Fabaceae-Faboideae	native	*Glycine tabacina*	-	remnant		x	
Other	Geraniaceae	exotic	*Pelargonium sp.*	Geranium	planted			x
Other	Iridaceae	exotic	*Dietes sp.*	Iris	planted	x		x
Other	Lomandraceae	native	*Lomandra longifolia***	Spiny-headed Mat-rush	planted	x		x
Other	Lomandraceae	native	*Lomandra sp.*	Mat-rush	planted	x		
Other	Lomariopsidaceae	exotic	*Nephrolepis cordifolia*	Fishbone Fern, Herringbone Fern	planted	x		x
Other	Malvaceae	exotic	*Modiola caroliniana*	Red-flowered Mallow	weed		x	x
Other	Malvaceae	exotic	*Sida rhombifolia*	Paddy's Lucerne	weed	x		
Other	Oleaceae	exotic	*Jasminum polyanthum*	White Jasmine	weed	x		
Other	Oxalidaceae	exotic	*Oxalis corniculata****	-	weed			x
Other	Oxalidaceae	exotic	*Oxalis pes-caprae*	-	weed	x		
Other	Plantaginaceae	exotic	*Plantago laneolata*	Lamb's Tongue	weed		x	
Other	Plantaginaceae	native	*Veronica plebeia*	Trailing Speedwell	remnant			x
Other	Poaceae	native	*Aristida ramosa*	Three-awned grass	remnant		x	
Other	Poaceae	exotic	*Axonopus fissifolius*	Narrow-leaved Carpet Grass	established			x

Table 6.1 Flora species recorded during surveys

Form	Family	Status	Scientific Name	Common Name	Origin	Area 1	Area 2	Area 3
Other	Poaceae	exotic	*Cynodon dactylon*	Couch Grass	established		x	
Other	Poaceae	exotic	*Paspalum dilatatum*	Paspalum	established		x	x
Other	Poaceae	exotic	*Pennisetum clandestinum*	Kikuyu	weed	x	x	x
Other	Poaceae	native	*Rytidosperma sp.*	Wallaby Grass	remnant		x	
Other	Poaceae	exotic	*Stenotaphrum secundatum*	Buffalo Grass	established			x
Other	Rubiaceae	exotic	*Richardia stellaris*	-	weed		x	
Other	Strelitziaceae	exotic	*Strelitzia reginae*	Bird of Paradise	planted	x	x	x

**Notes*

* Vulnerable under the TSC Act/EPBC Act,

** Characteristic Sydney Blue Gum High Forest Species,

*** Parramatta Council listed Noxious Weed

Appendix B

Threatened Flora Likelihood of Occurrence

Table 6.2 Likelihood of occurrence for threatened flora known to occur in the locality

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Count	Habitat Requirements	Likelihood of Occurrence
Acacia pubescens	Downy Wattle	V	V	5	Occurs on alluviums, shales and at the intergrade between shales and sandstones. Occur in open woodland and forest, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland.	Unlikely to occur. Limited suitable habitat present.
Epacris purpurascens var. purpurascens		V		56	Found in a range of habitat types, in sclerophyll forest, scrubs and swamps on sandstone, on strong shale soil influence.	Unlikely to occur. No suitable habitat present.
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	1	Grows in dry grassy woodland on shallow and infertile soils, mainly on granite.	Present
Hibbertia superans		E		43	Occurs in both open woodland and heathland on sandstone ridgetops, and appears to prefer open disturbed areas, such as tracksides.	Unlikely to occur. No suitable habitat present.
Leptospermum deanei		V	V	3	Woodland on lower hill slopes or near creeks. Sandy alluvial soil or sand over sandstone	Unlikely to occur. No suitable habitat present.
Pimelea curviflora var. curviflora		V	V	6	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands	Unlikely to occur. No suitable habitat present.
Pomaderris prunifolia	P. prunifolia in the Parramatta, Auburn,	E		3	Only known locations are at Rydalmere, within Rookwood Cemetery and at The Crest of Bankstown.	Unlikely to occur. Not within a known location.

Table 6.2 Likelihood of occurrence for threatened flora known to occur in the locality

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Count	Habitat Requirements	Likelihood of Occurrence
	Strathfield and Bankstown Local Government Areas					
Syzygium paniculatum	Magenta Lilly Pilly	E	V	1	On south coast of NSW occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	Unlikely to occur. No suitable habitat present.
Tetratheca glandulosa		V		1	Found in various communities from heaths and scrub to woodlands/open woodlands, and open forest. Common woodland tree species include: Corymbia gummifera, C. eximia, Eucalyptus haemastoma, E. punctata, E. racemosa, and/or E. sparsifolia. Soils are generally shallow, consisting of a yellow, clayey/sandy loam.	Unlikely to occur. No suitable habitat present and associated canopy species absent.
Wilsonia backhousei	Narrow-leafed Wilsonia	V		43	Found in the margins of salt marshes and lakes.	Unlikely to occur. No suitable habitat present.

Appendix C

Threatened Fauna Likelihood of Occurrence

Table 6.3 Likelihood of occurrence for threatened fauna known to occur in the locality

Class	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Count	Habitat Requirements	Likelihood of Occurrence
Amphibia	*Litoria aurea*	Green and Golden Bell Frog	E	V	62	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (Typha spp.) or spikerushes (Eleocharis spp.).	Unlikely to occur. No suitable habitat present.
Amphibia	*Pseudophryne australis*	Red-crowned Toadlet	V		1	Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings. Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter. Breeding congregations occur in dense vegetation and debris beside ephemeral creeks and gutters.	Unlikely to occur. No suitable habitat present.
Aves	*Botaurus poiciloptilus*	Australasian Bittern	E	E	1	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.).	Unlikely to occur. No suitable habitat present.
Aves	*Calidris ferruginea*	Curlew Sandpiper	E	C	14	Occurs in littoral and estuarine habitats, primarliy in mudflats of sheltered coasts.	Unlikely to occur. No suitable habitat present.
Aves	*Callocephalon fimbriatum*	Gang-gang Cockatoo	V		7	Occurs in tall mountain forests and woodlands in summer and drier more open eucalypt forests and woodlands in winter, and often found in urban areas. Require old growth attributes for nesting and roosting.	Potential to occur. Old growth attributes for nesting and roosting are present, but limited suitable foraging habitat is present.

Table 6.3 Likelihood of occurrence for threatened fauna known to occur in the locality

Class	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Count	Habitat Requirements	Likelihood of Occurrence
Aves	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V		1	Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (Allocasuarina littoralis), Forest She-oak (A. torulosa) or Drooping She-oak (A. verticillata) occur. Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species). Dependent on large hollow-bearing eucalypts for nest sites.	Unlikely to occur. Limited suitable foraging habitat present. No breeding habitat.
Aves	*Daphoenositta chrysoptera*	Varied Sittella	V		1	Eucalypt forest and woodlands, especially with rough barked species, smooth-barks with dead branches, mallee and acacia. Nests in living trees and feeds off insects in dead trees.	Unlikely to occur. No suitable habitat present.
Aves	*Epthianura albifrons*	White-fronted Chat	V		172	Found on grassy ground in wetland areas and in low isolated mangroves.	Unlikely to occur. No suitable habitat present.
Aves	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V		3	Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Potential to occur. Eucalypt hollows are present and the species is highly mobile and may pass over the subject site as part of a larger foraging range.
Aves	*Glossopsitta pusilla*	Little Lorikeet	V		5	Forages primarily in the canopy of open Eucalyptus	Potential to occur. Suitable

Table 6.3 Likelihood of occurrence for threatened fauna known to occur in the locality

Class	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Count	Habitat Requirements	Likelihood of Occurrence
						forest and woodland, yet also finds food in Angophoras, Melaleucas and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Also utilises isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees. Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts.	foraging trees present and teh species is highly mobile and may pass over the subject site as part of a larger foraging range.
Aves	*Lathamus discolor*	Swift Parrot	E	E	8	Occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.	Unlikely to occur. Limited suitable foraging habitat present.
Aves	*Limosa limosa*	Black-tailed Godwit	V	C	1	A coastal species primarily found in estuaries and lagoons of sheltered bays. Inland in can be found around muddy lakes and swamps.	Unlikely to occur. No suitable habitat present.
Aves	*Miniopterus schreibersii oceanensis*	Eastern Bentwing-bat	V		17	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Hunt in forested areas, catching moths and other flying insects above the tree tops.	Potential to occur. Culvert is present and the species is highly mobile and may pass over the subject site as part of a larger foraging range.

Table 6.3 Likelihood of occurrence for threatened fauna known to occur in the locality

Class	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Count	Habitat Requirements	Likelihood of Occurrence
Aves	*Mormopterus norfolkensis*	Eastern Freetail-bat	V		3	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.	Potential to occur. Tree hollows are present and the species is highly mobile and may pass over the subject site as part of a larger foraging range.
Aves	*Ninox connivens*	Barking Owl	V		3	Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting. During the day they roost along creek lines, usually in tall understorey trees with dense foliage such as Acacia and Casuarina species, or the dense clumps of canopy leaves in large Eucalypts. Nests in hollows of large, old eucalypts.	Unlikely to occur. No suitable habitat present.
Aves	*Ninox strenua*	Powerful Owl	V		93	Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Also occurs in fragmented habitats.	Potential to occur. Known to utilise fragmented landscapes, may utilise the subject site as part of a larger foraging area.
Aves	*Petroica phoenicea*	Flame Robin	V		1	Occurs in upland tall moist eucalypt forests and woodlands, often on ridges and slopes for breeding. Prefers clearings or areas with open understoreys.	Unlikely to occur. No suitable habitat present.

Table 6.3 Likelihood of occurrence for threatened fauna known to occur in the locality

Class	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Count	Habitat Requirements	Likelihood of Occurrence
Aves	*Ptilinopus superbus*	Superb Fruit-Dove	V		2	Found in rainforest and closed forests, and feeds on the fruit of figs and palms.	Unlikely to occur. No suitable habitat present.
Mammalia	*Dasyurus maculatus*	Spotted-tailed Quoll	V	E	1	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares; usually traverse their ranges along densely vegetated creeklines.	Unlikely to occur. Marginal suitable habitat present but not a common occurrence within the locality.
Mammalia	*Myotis macropus*	Southern Myotis	V		3	Roosts close to water in caves, mines, tree hollows, storm water channels, bridges, buildings or in dense foliage. Forages over streams and pools catching insects and fish.	Unlikely to occur. Marginal suitable habitat present but subject site is located too far from water bodies...
Mammalia	*Pteropus poliocephalus*	Grey-headed Flying-fox	V	V	55	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Potential to occur. Suitable foraging habitat present. No known roost camp present on subject site.
Mammalia	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V		3	Found in a large variety of habitats including treed and treeless areas. Inhabits tree hollows or mammal	Potential to occur. Hollows are present and the species is highly

Table 6.3 Likelihood of occurrence for threatened fauna known to occur in the locality

Class	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Count	Habitat Requirements	Likelihood of Occurrence
						burrows in treeless areas.	mobile and may pass over the subject site as part of a larger foraging range.
Mammalia	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V		3	More commonly found in tall wet forest but also occurs in dry eucalypt forest. Roosts in tree hollows and buildings. Forages along creek and river corridors.	Potential to occur. Tree hollows are preesent and the species is highly mobile and may pass over the subject site as part of a larger foraging range.
Migratory Terrestrial							
Aves	*Monarcha melanopsis*	Black-faced Monarch		M		Wetter, denser forest, often at high elevations.	Unlikely to occur. No suitable habitat present.
Aves	*Apus pacificus*	Fork-tailed Swift		M		Forages aerially over a variety of habitats usually over coastal and mountain areas with a preference for wooded areas.	Potential to occur. Highly mobile, aerial species that may pass over the subject site but unlikely to utilise it directly.
Aves	*Merops ornatus*	Rainbow Bee-eater		M		Inhabit healthland, open forests and woodlands, shrublands, and various cleared semi-cleared habitats, including farmland and areas of human habitation. Often occur in open, cleared or lightly-timbered areas located in close proximity to	Unlikely to occur. No suitable habitat present.

Table 6.3 Likelihood of occurrence for threatened fauna known to occur in the locality

Class	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Count	Habitat Requirements	Likelihood of Occurrence
						permanent water.	
Aves	*Rhipidura rufifrons*	Rufous Fantail		M		Occurs in open country, chiefly at suitable breeding places in areas of sandy or loamy soil: sand-ridges, riverbanks, sand-pits, occasionally coastal cliffs.	Unlikely to occur. No suitable habitat present.
Aves	*Myiagra cyanoleuca*	Satin Flycatcher		M		Found in rainforest, dense wet eucalypt and monsoon forests, paperbark and mangrove swamps and riverside vegetation.	Unlikely to occur. No suitable habitat present.
Aves	*Monarcha trivirgatus*	Spectacled Monarch		M		Prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	Unlikely to occur. No suitable habitat present.
Aves	*Haliaeetus leucogaster*	White-bellied Sea-Eagle		M		Found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands.	Unlikely to occur. No suitable habitat present.
Aves	*Hirundapus caudacutus*	White-throated Needletail		M		Almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Occur over most types of habitat, particularly above wooded areas including open forest and rainforest, between trees or in clearings and below the canopy.	Potential to occur. Highly mobile, aerial species that may pass over the subject site but unlikely to utilise it directly.

Appendix D

Assessment of Significance (7 part test)

D.1 Blue Gum High Forest

Blue Gum High Forest is a tall eucalypt forest community that typically occurs on areas with shale ridge soils of the Hornsby plateau. Dominant canopy trees are *Eucalyptus saligna* (Sydney Blue Gum), *E. pilularis* (Blackbutt), *E. paniculata* (Grey Ironbark), *Syncarpia glomulifera* (Turpentine) and *Angophora costata* (Smooth-barked Apple). Common understorey shrubs include *Pittosporum undulatum* (Sweet Pittosporum), *Polyscias sambucifolia* (Elderberry Panax), *Breynia oblongifolia* (Coffee Bush), and *Leucopogon juniperinus* (Prickly Beard-heath). Groundcover species include *Microlaena stipoides* var. *stipoides* (Weeping Grass), *Dianella caerulea* (Blue Flax-lily), *Pratia purpurascens* (White Root), *Entolasia marginata* (Bordered Panic) and Entolasia stricta (Wiry Panic).

Blue Gum High Forest exists on the subject site as 14 scattered remnant *E. saligna* trees which conform to the TSC Act listing for Blue Gum High Forest. However, these 14 remnant trees consisting of 0.28 ha does not conform to the EPBC Act listing for the critically endangered ecological community.

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

Not applicable.

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

Not applicable.

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

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

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

The community is found as a mosaic amongst lawns and planted garden beds. Canopy trees characteristic of Blue Gum High Forest are concentrated in the southern portion of the subject site. Characteristic understorey species are largely absent. Assuming that a proposed future development would remove all 14 *E. saligna* trees present on-site, a total of 0.28 ha of Blue Gum High Forest would be removed. Such a proposed future development would have an adverse effect on the ecological community's extent within the subject site. Larger, more intact patches of this community are conserved within Herbert Rumsey Reserve, Calangara Park and Allan Cunningham Reserve to the east of the subject site.

Based on the within the subject site and the time the community has been dominated by exotic species, it is probable that the soil seed bank for locally indigenous species now largely depleted according to the variable soil disturbance and time since native seed was deposited in the soil seed bank in different parts of the subject site. However, if it is assumed that a proposed future development would remove all 14 *E. saligna* trees within the subject site, a substantial modification to the community on-site would occur as all of the community would be removed.

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

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

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

Assuming that a future proposed development would remove all 14 *E. saligna* trees present on-site, a total of 0.28 ha of Blue Gum High Forest would be removed.

The Blue Gum High Forest present on-site is a fragmented patch of vegetation in its current state with little to no connectivity to off-site Blue Gum High Forest habitat. A proposed future development removing all Blue Gum High Forest on-site is unlikely to cause significant fragmentation or isolation from other occurrences in the locality.

The Blue Gum High Forest occurring within the subject site is highly modified and largely comprises remnant trees over garden beds and lawn. Despite the condition of the understorey, the Blue Gum High Forest within the subject site could be considered important due to the highly restricted nature of the community and highly modified forms being included within the TSC Act definition of the community. However, other areas of Blue Gum High Forest are under conservation in nearby parks and reserves.

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

There is no critical habitat for Blue Gum High Forest currently listed by the Director-General of the OEH.

(f) *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plans,*

The recovery of this ecological community is being addressed as part of the Cumberland Plain Endangered Ecological Communities Recovery Plan. Conservation mechanisms proposed in the Recovery Plan that are relevant to the subject site include:

- Development control processes;
- Plans of management; and
- Voluntary conservation agreements.

The development on the subject site will be undertaken in accordance with the Development Control Plan prepared for the Parramatta LGA. A Vegetation Management Plan could be developed as a mitigation measure for any future development. The Blue Gum High Forest within the subject site is not currently proposed to be conserved within an appropriate zoning.

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

Assuming that a proposed future development would remove all 14 *E. saligna* trees present on-site, this hypothetical action would constitute the key threatening processes of 'Clearing of native vegetation'.

Conclusion

The Blue Gum High Forest on the subject site exists as 14 scattered canopy trees over mulched ground, paved areas and planted garden beds and has moderate conservation significance. Despite the condition of the understorey, the Blue Gum High Forest within the subject site could be considered important due to the highly restricted nature of the community and highly modified forms being included within the TSC Act definition of the community. This community is at great risk from development in general. Assuming a proposed future development would remove all 16 *E. saligna* remnant trees (0.28 ha of Blue Gum High Forest), the result would have a significant impact on the community within the subject site.

D.2 Potentially Occurring Threatened Fauna Species

This Assessment of Significance covers the following threatened fauna species, which are considered to have potential to occur within the subject land:

- Gang-gang Cockatoo (*Callocephalon fimbriatum*);
- Little Lorikeet (*Glossopsitta pusilla*);
- Powerful Owl (*Ninox strenua*);
- Grey-headed Flying-fox (*Pteropus poliocephalus*);
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis);*
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*);

- Eastern Freetail-bat (*Mormopterus norfolkensis*);
- Greater Broad-nosed Bat (*Scoteanax rueppellii*);
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*);
- Fork-tailed Swift (*Apus pacificus*); and
- White-throated Needletail (*Hirundapus caudacutus)*

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

The subject site represents a small area of habitat available to these potentially occurring fauna species in the locality. These species are highly mobile and potentially utilise the subject site as a much wider range. Assuming the proposed zoning will facilitate the development of the entire area to be rezoned as R4, there would not be an adverse effect on the life cycle of the species such that a viable local population of the species would be placed at risk of extinction. Areas of suitable habitat are conserved in the wider locality within nearby parks and reserves.

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

Not applicable.

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

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

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

Not applicable.

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

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

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

Assuming the proposed zoning will facilitate the development of the entire area to be rezoned as R4, approximately 2.8 ha of land will be cleared, including 0.28 ha of Blue Gum High Forest and 1.98 ha of native and exotic planted vegetation.

The proposed project is not likely to fragment or isolate any areas of habitat for these species. The subject site exists within a developed urban environment and is already isolated from other areas of habitat. The potentially occurring species are highly mobile and are expected to utilise other areas of habitat within the locality. Additionally, areas of suitable habitat are conserved in the wider locality within the nearby reserves and parks.

The habitat that will potentially be removed as a result of future development within the R4 zoned land is not considered to be important for these species. Larger areas of suitable habitat will remain in the locality within reserves and parks. The removal of vegetation within the subject site is not likely to have an adverse effect on the long-term survival of these species in the locality.

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

No critical habitat for these species has currently been identified by the Director-General of OEH.

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

A national recovery plan has been prepared for large forest owls. Its relevant objectives are:

- Ensure the impacts on large forest owls and their habitats are adequately assessed during planning and environmental assessment processes; and
- Minimise further loss and fragmentation of habitat by protection and more informed management of significant owl habitat (including protection of individual nest sites).

Future development of the subject site would not involve the removal of significant owl habitat. The actions area considered to be consistent with the recovery plan objectives for this species in that it will not decrease or fragment the extent of any significant habitat..

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

The following KTPs are relevant to the proposed project:

- Clearing of native vegetation; and
- Loss of hollow-bearing trees; and
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The KTPs of 'Clearing of native vegetation' and 'Loss of hollow-bearing trees' may potentially impact habitat for these species further than current conditions. However, the vegetation on the subject site is not considered to constitute significant habitat for these species. Potential habitat will remain in the locality and the clearing of native vegetation is not likely to significantly impact habitat for potentially occurring threatened species.

Conclusion

Assuming the proposed zoning will facilitate the development of the entire area to be rezoned as R4, there will be a loss of 0.28 ha of Blue Gum High Forest and 1.98 ha of planted native and exotic vegetation comprising potential habitat for these species. There is currently no DA lodged for the subject site and the assumed quantum of impact represents a maximum value. Future development applications are not likely to involve the clearance of the entire subject site. Areas of suitable habitat are conserved in the wider locality within the nearby reserves and parks.

Future development of the rezoned R4 land is not likely to have a significant detrimental impact upon any of the potentially occurring threatened fauna species discussed above.