**COMMERCIAL IN CONFIDENCE**



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## 1. INTRODUCTION

It is proposed to redevelop the BaptistCare retirement village at 264-268 Pennant Hills Road, Carlingford, NSW. The village currently serves as a self-contained community housing and aged care facility providing a range of services and amenities. The site is being redeveloped into high quality residential flat building and multi-dwelling housing development.

AJ+C Architects and Scape Design Landscape Architects have prepared a feasibility study for the site, showing the concept site layout including structures, open spaces, access roads and path ways.

Calibre Consulting has been commissioned to participate in creating an integrated and effective stormwater management concept for the site to complement the overall objectives of the development. The following report outlines the principles to be applied to the proposed development in relation to stormwater management, including rainwater harvesting and reuse, detention, treatment drainage.

## 2. SITE STORMWATER MANAGEMENT

Stormwater management measures for the site shall be designed in accordance with Parramatta City Council and Australian Rainfall and Runoff guidelines with particular considerations to incorporate Water Sensitive Urban Design (WSUD) principles.

The site is part of the Vineyard Creek catchment, at the top end of the catchment. It has not been identified as being affected by flooding or major overland flows. The existing 375mm diameter drainage line in Martins Lane is considered to be the site's legal point of discharge based on preliminary inquiries with Council's engineers.

### a. Rainfall Return Periods

Building and sub-surface drainage systems shall be designed for the peak flow from a 1:20-year Average Recurrence Interval (Q20) storm event. Where trapped areas are unavoidable, the piped drainage system shall be designed with enough capacity for the 1:100yr ARI storm event.

Where building drainage is designed to a higher ARI standard than road drainage, the excess flow will be designed to flow down roadways without entering buildings.

Overland flow paths shall be provided throughout the development and directed along the access roads. These shall be designed to accommodate the difference between the capacity of the underground piped system and the peak flow from a 100-year Average Recurrence Interval (Q100) storm event.

### b. Onsite Stormwater Detention

Onsite Stormwater Detention (OSD) shall be provided in accordance with Council standards to ensure that post-development peak flows from the development do not exceed pre-development peak flows. This will ensure that there is no increase in stormwater discharge from the site affecting downstream flooding levels.

### c. Freeboard

The design freeboard above peak flood and overland flow water levels shall be as follows:

- Minimum 300mm for basement ramps and thresholds
- Minimum 500mm for habitable floors and storage rooms.

### d. Roadway Trafficability

Gully pits shall be located along access roads at intervals which will ensure that all roads are trafficable during the Q100 storm event. The width of overland flows down roadways during that storm event will be limited to 2.5 metres along the low side of each road carriageway. Access roads and drainage shall be designed to ensure that the depth of ponding during the Q100 storm event will not exceed the top of kerb level.

## 3. WATER SENSITIVE URBAN DESIGN

Water Sensitive Urban Design is a land planning and engineering design approach which integrates the urban water cycle, including potable water, stormwater, groundwater and wastewater management, into urban design to minimise environmental degradation without sacrificing aesthetic and recreational appeal.

Close collaboration between the various design and engineering disciplines will be required across the entire development to maximise the benefits of WSUD. WSUD principles shall be incorporated within the building design as well as in the design of the external landscape and civil infrastructure in order to reduce peak stormwater discharge and runoff volume, improve stormwater runoff quality and reduce demands on potable water. These measures provide benefits not only to the proposed development, but also the surrounding areas and downstream natural watercourses.

### a. Rainwater Harvesting

It is encouraged to harvest and re-use rainwater from the residential building roofs for landscape irrigation, toilet flushing and clothes washing to reduce demands on potable water. Rainwater tanks shall be provided in accordance with BASIX and Council requirements.

### b. Surface Permeability

Deep soil zones, soft landscaping and other permeable surfaces shall be provided where practicable to maximise rainfall infiltration and groundwater recharge opportunities.

Surface permeability may be increased through the use of permeable pavements, gravel/pebble surfacing and soft landscaping over deep soil zones. Some stormwater treatment measures such as bio-retention swales and basins, rain gardens and filter trenches also increase surface permeability.

### c. Onsite Stormwater Detention

Further to Section 2.b, OSD is to be provided to reduce peak stormwater discharge and runoff volume. This is to ensure that the proposed development does not adversely affect the performance of downstream stormwater drainage systems and does not increase flooding downstream

### d. Stormwater Quality Improvement Devices and Treatment Measures

A combination of Stormwater Quality Improvement Devices (SQID) and treatment measures such as bio-retention swales and basins, rain gardens, litter baskets, Gross Pollutant Traps (GPT), and fine particle (tertiary) filter systems shall be incorporated throughout the drainage system to treat stormwater at various points along the system and improve stormwater quality as it leaves the site. These shall be appropriately sized and located to achieve Council's treatment rates and water quality targets prior to discharging into Council's stormwater drainage system in Martins Lane.

### e. Soil and Water Management During Construction

Stormwater runoff treatment, soil erosion, sedimentation and dust controls and shall be implemented during construction in accordance with Council's guidelines and Landcom's "Managing Urban Stormwater - Soils and Construction"

## 4. Discussion

This report outlines the stormwater management principles intended to be applied for the proposed development. The feasibility study and concept plans prepared by the architect and landscape architect have been reviewed and, with the incorporation of the principles and measures set out above, is considered to have the appropriate provisions to ensure that the development will able to prevent adverse effects to the downstream stormwater drainage system and flood behaviour.

Any redevelopment of the site will require stormwater drainage and treatment measures to be designed to incorporate WSUD principles in order to reduce peak stormwater discharge and runoff volume, improve stormwater runoff quality and reduce demands on potable water. Measures to achieve these aims could include overland flow paths and in-ground drainage systems, Onsite Stormwater Detention (OSD), rainwater harvesting and re-use, gross pollutant traps and bio-retention systems.

# Appendix 6 – Arborist Assessment

# Tree Risk Assessment

Prepared by

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# INTRODUCTION

The Facilities Manager of BCS Mr. Matthew Young has commissioned a Tree Risk Assessment Report relating to trees at BCS Carlingford.

McArdle Arboricultural Consultancy Pty Ltd prepared the report. AQF level 5 Consulting Arborist James McArdle conducted the evaluation using Visual Tree Assessment (VTA) method. The systems are in accordance with industry best practice (ISA) and impact assessments are based upon the Australian Standards *AS4793-2009*, Risk Management As/NZS ISO *3100-2009* and American National Standard ANSI *A300*(Part9) Tree Risk Assessment.

AIMS

*The Tree Risk Assessment report is developed to assess the trees at the above address for health and status. It is a tree risk assessment according to ISA guidelines and the purpose is to identify trees that pose an unacceptable risk potential and extreme safety risk because of their location and condition.*

The aim of this report is to:

- To inspect trees in and around buildings and in areas where staff and public access.
- To give recommendation to the facilities manager of trees that poses a risk to human health and safety with professional opinion and management of these trees.

# METHODOLOGY

An ISA risk assessment uses a ground Visual Tree Assessment (VTA) method employed in this report. The VTA system is based on the theory of tree biology, physiology and tree architecture and structure and is a method used to identify visible signs on trees that indicate health and potential hazards. The tree risk assessment matrix is developed using AS/NZ ISO 31000:2009 Risk management and principles and translates similar information from these documents.

The collection of data is performed in the field by an AQF Level 5 arborist. The assessment summaries the species, height and diameter, the trees health and structural condition for each trees, hazards, and retention categories were assigned to each tree.

Testing on site may include:
Mallet sounding, non invasive testing for hollows, probing cavities, white ant infestation. Invasive tests will determine depth of decay around cavities.
All testing is ground based. It should be noted that this Tree Assessment Report cannot be considered final until all aerial inspections have been completed, as these may reveal further defects.

This data was recorded in a Tree Survey Table and various assessment methods were used including:

*1. Tree Useful Life Expectancy. (TULE)Adapted from Jeremy Burell (SULE)*

*Gives extra assessment life expectancy categories range to no potential for life expectancy.*

*2. Health & Structural Condition of Tree Assessment.* This describes the vigour and vitality of the tree**.**

*3. Tree Hazard & Site Assessment.* This assessment identifies structural defects that predispose a tree to failure located near a target. It is a useful OH&S requirement.

*4. Tree Risk Assessment Matrix adopted for TCAA from B.Sullivan*

*Positions a trees assessment into foreseeable risk statements.*

*5. Some trees have special restrictions including cultural, scientific, historical or threatened category and may be reviewed as part of this report or further reporting.*

# PLANNING GUIDELINES AND SPECIFIC LEGISLATION

A search of Local and State heritage registers, tree registers and determination of landscape significance were carried out for tree species identified in the survey.

In addition, trees are subject to the following legislation:

- *Threatened Species Conservation Act 1995* (NSW) (TSC Act) – The TSC Act provides a number of provisions for conserving threatened species, populations and ecological communities of animals and plants as well as managing key threatening processes. A list of species, populations and communities considered to be endangered or vulnerable are provided in the schedules to the TSC Act. Where identified, threatened tree species are considered in this report.

- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) – The EPBC Act provides provisions to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. This is defined in the EPBC Act as matters of national environmental significance. A list of species and ecological communities considered to be vulnerable, endangered or critically endangered are listed in the EPBC Act. Where identified, threatened tree species are considered in this report.

- *Noxious Weeds Act 1993* (NSW) (NWA) – The NWA provides provisions for the control and management of noxious plants and pest species. The Minister is granted powers to issue an Order declaring a plant noxious.

# THE SITE

The BCS Carlingford village is located adjacent to BCS Hayfield Village, number 268 Pennant Hills road, Carlingford. The topography of the area is gently undulating and the native vegetation is characterized by the Cumberland Plain Woodland, which is an endangered ecological community, listed under the TSC Act. As Carlingford is an urban area, scattered trees are likely to remain but with no native understorey. There are approximately 200 trees on this site, and trees are in areas, which generally have a lower occupation rate. All trees have been inspected with only trees appearing with high fail potential assessed being investigated with further inspections including Aerial Inspection.. A probability of class 5 Acid Sulfate Soils exists for the site.

The collection of survey data was limited and an inspection was conducted on the 13th March, 2014 to the site.

# SCALED SITE MAP


Site: **BCS Hayfield Village 268 Pennant hills Road, Carlingford.**

The satellite picture locates the site, within the property. (pre 2013)

The scale is approximately 16mm: 20m

# TREE SURVEY TABLE

| Tree No. | Location | Common & Scientific Name | Crown Spread m | Height (m) | Diam (cm) | *Health & Structural* Condition of Tree | TULE | TRA | MAINTENANCE |
|---|---|---|---|---|---|---|---|---|---|
| 1. | Baptist Community Services Carlingford | *Eucalyptus saligna* Blue gum | 12 | 20 | 52 | Semi-matured tree, dieback is more than 10 per cent with Epicormics. Tree is leaning, previously heavily pruned. | 3C | 2c | Prune deadwood annually and mulch. |
| 2. | " | *Cinnamomum Camphora Camphor Laurel* | 12 | 18 | 65 | Mature tree, dieback is more than 10 per cent, epicormics and inclusions at 2.5 meters. | 3C | 2c | Prune deadwood annually. |
| 3. | | *Eucalyptus saligna* Blue gum | 10 | 30 | 57 | Mature tree, dieback is more than 20 per cent with sparse foliage. Inclusions | 3D | 2c | Prune deadwood annually, aerial inspection and drill test is required. |
| 4. | | *Eucalyptus saligna* Blue gum | 12 | 30 | 55 | Mature tree, dieback is more than 10 per cent, physical damage at 70 meters. | 3C | 2c | Prune deadwood annually. |
| 5. | | *Eucalyptus saligna* Blue gum | 10 | 27 | 78 | Mature tree, dieback is more than 10 per cent with epicormics. Tree has a sparse foliage crown, unbalanced canopy, physical and insect damage. Tree has suffered from fungal attack, has a cavity, termite damage. Tree lean, has been heavily pruned, has a parasitic vine present and there are inclusions. | 5c | 2a | Remove. This tree has dropped a major limb since the initial inspection of 8 metres in length and 300cm in diameter. |
| 6. | | *Quercus Palustris* She Oak | 15 | 18 | 49 | Semi Matured tree with dieback more than 10 per cent, also physical damage to roots. | 3C | 2b | Prune deadwood annually and mulch. |
| 7. | | *Eucalyptus saligna* Blue gum | 14 | 35 | 80 | Mature tree with dieback more than 10 per cent, Epicormics and sparse foliage crown to West. Physical damage to tree from borers, fungal attack, termite damage and cavity in tree. Tree has previously been heavily pruned and has inclusions at 13 meters. Large crack at base. | 5D | 2a | Remove |
| 8. | | *Eucalyptus saligna* Blue gum | 18 | 35 | 82 | Mature tree with dieback more than 10 per cent, epicormics and physical damage to roots. | 4C | 2c | Aerial Inspection. Prune deadwood annually. |
| 9. | | *Eucalyptus saligna* Blue gum | 14 | 40 | 60 | Mature tree, dieback is more than 20 per cent, epicormics, and insect damage due to termites, habitat at 8 meters. | 3D | 2c | Prune deadwood annually. Drill root test and aerial inspection required. Termite treatment. |
| 10. | | *Eucalyptus saligna* Blue gum | 18 | 40 | 60/70 | Mature tree with dieback more than 10 per cent, epicormics unbalanced to the west and leaning west. Heavily pruned with inclusions at base. | 3D | 2c | Prune deadwood, aerial inspection, Drill test at base of tree. |
| 11. | | *Syagrus romanzoffiana* Cocos Palms 3x | 3 | 10 | 28 | Mature tree in good condition with poor development. | 2D | 2d | Annual inspection. |

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| 12. | | *Eucalyptus saligna*<br>Blue gum | 20 | 35 | 85 | Mature tree, dieback is more than 20 per cent, Epicormics with a sparse foliage crown. Tree is unbalanced canopy to the east with physical and insect damage caused by borers. Tree has a cavity and termite damage. Tree has been heavily pruned previously and has inclusions. | 4D | 2a | Remove |
| 13. | | *Eucalyptus saligna*<br>Blue gum | 19 | 35 | 80 | Mature tree dieback is more than 10 per cent. Inclusions at 2 meters. | 3D | 2c | Prune deadwood annually. Requires aerial inspection |
| 14. | | 13x C conifer sp. | 3 | 12 | 30 | Semi-mature tree in good condition but with poor development. | 3B | 2d | Annual (EM ) Monitoring of tree. |
| 15. | | | 5 | 4 | 18 | Immature tree in good condition but with poor development. | 2D | 2d | Annual Monitoring of tree. |
| 16. | | *Jacaranda mimosifolia*<br>Jacaranda | 5 | 6 | 26/9 | Immature north leaning tree and includes insect damage and damage also, to the roots of the tree. | 3D | 2d | Prune deadwood, cut big branch. Drill test is necessary. |
| 17. | | *Jacaranda mimosifolia*<br>Jacaranda | 5 | 6 | 18 | Immature tree with dieback more than 10 percent, leaning north, includes insect damage to the roots. | 3D | 2d | Prune northern most stem. Prune deadwood. Drill Test with annual monitoring (EM). |
| 18. | | *Eucalyptus saligna*<br>Blue gum | 15 | 30 | 66 | Mature tree with dieback more than10%, epicormics, a lot of physical damage, heavily pruned with inclusions. | 3D | 3c | Aerial inspection required. Prune deadwood, EM and annual monitoring. |
| 19. | | *Eucalyptus saligna*<br>Blue gum | 18 | 35 | 63 | Mature tree in good condition, but with poor development, physical damage and inclusions. | 3D | 3b | Aerial inspection. |
| 20. | | Jacaranda mimosifolia<br>Jacaranda | 8 | 10 | 28/22 | Semi-matured tree containing borers, inclusions at base. | 3D | 3d | (FI) Inspection. Annual monitoring. |
| 21. | | Liquidambar styraciflau | 10 | 8 | 35 | Semi-matured tree in good condition but poor development due to damage to the roots. | 2D | 3c | Root Test to determine anchorage with excavation within the structural root zone to a depth of 30-40cm and check on the quality of the roots.. Annual Monitoring. |
| 22. | | Syagrus romanzoffiana<br>Cocos Palms 3x | 2 | 6 | 30 | Mature tree in good condition but poor development. | 2D | 3d | Annual Monitoring. |
| 23. | | | 4 | 12 | 30 | Mature tree with a sparse foliage crown damage to the roots and leaning west. | 3C | 3b | Remove west stem. Annual Monitoring. [ E] |
| 24. | | | 3 | 10 | 30 | Mature tree in good condition, but poor development with a sparse foliage canopy. | 2D | 3d | Annual monitoring. |
| 25. | | Eucalyptus saligna<br>Blue gum | 20 | 35 | 83 | Mature tree with physical damage, fungal attack, heavily pruned with inclusions | 3D | 3b | Aerial inspection. [E]. |
| 26. | | Eucalyptus saligna<br>Blue gum | 23 | 35 | 95 | Mature tree with Epicormics, physical damage, heavily pruned with inclusions. | 3D | 3b | Aerial inspection Drill Test. [E] |
| 27. | | Cuppressus species<br>Conifer | 9 | 18 | 60 | Mature tree with Epicormics, dieback is more than 30% with sparse foliage crown. This leaning tree has an unbalanced canopy; physical damage and dehydrated | 5D | 3b | Removal [E] |

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| 28. | | *Cuppressus species* Conifer 3x | 3 | 10 | 30 | Semi-matured tree in good condition but poor development. | 2a | 3d | Annual Monitoring. |
| 29. | | *Acacia species* Wattle | 1.5 | 3 | 10 | Immature leaning tree on the embankment. | 4D | 3a | Remove |
| 30. | | *Cuppressus species* Conifer | 2.4 | 1.8 | 20 | Semi-matured tree in good condition but poor development. Inclusions. | 3D | 3c | |
| 31. | | *Cuppressus species* Conifer | 4 | 12 | 35 | Semi-matured tree in good condition but with poor development. | 2D | 3d | |
| 32. | | *Eucalyptus resinifera* Red Mahogany | 15 | 25 | 68 | Mature tree with dieback more than 10%, Epicormics at 8 meters, heavily pruned and dying at 8 meters. | 3D | 3d | Remove the eastern leader rubbing at 8m. Prune deadwood to a diameter of 40mm or decayed timber that is poorly attached. |
| 33. | Council tree requires further assessment from council. | Eucalyptus saligna Blue gum | 16 | 30 | 82 | Mature tree with dieback more than 10%, Epicormics, physical and insect damage, borers. This tree is under Fungal attack and has a cavity. Inclusion 7 meters in length. | Nd 3D+4C | 3b | Further information required with drill test in cavity to a depth of 41cm. Council may need to be informed of works as part of a significant tree in this forest community. |
| 34. | | Eucalyptus microcorys Tallowood | 12 | 20 | 46 | Semi-matured tree dieback is more than 10%, borers, physical damage, heavily pruned to the north with damage to the roots. | 3C | 3c | Root Test for quality of roots with excavation of 40-60cm within the srz (2meters). |
| 35. | | *Schleffera actinophylla* Umbrella Tree | 5 | 9 | 50 | Immature exempt from tree protection order as it is not desirable. | 3A | 3d | Thin out. |
| 36. | | *Liquidambar styraciflau* Liquid Amber | 8 | 8 | 12 | Immature cavity at 5 metres, exudations increase towards the base. Minor root damage. | 3A | 3c | Prune deadwood. Root Test required for root quality to be determined.. |
| 37. | | *Eucalyptus saligna* Blue Gum | 22 | 32 | 85 | Mature tree with cavity at 5 meters. | 3A | 3b | Further information required. Aerial inspection and Drill Test at 5 metres. Drill depth to determine extent of cavity/decay to a depth of 42cm. |
| 38. | | *Liquidambar styraciflau* Liquid Amber | 8 | 13 | 32 | Immature tree in good condition but poor development with sparse foliage crown and unbalanced canopy. | 3A | 3c | Prune out included leader to allow a single dominant stem. |
| 39. | | *Corymbia citriodora* Lemon Scented Gum | 16 | 15 | 48 | Immature tree in good condition but poor development. | 2A | 3d | Prune deadwood |
| 40. | X7 | Syagrus romanzoffiana Cocos Palms 3x | 3.7 | 8.15 | 23-30 | Immature tree in good condition but poor development. | 2A | 3d | Biannually prune. |

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| 41. | X4 Adjacent Waldock | Archontophoenix cunninghamiana Bangalow Palm | 6 | 7 | 110-20 | Immature tree in good condition but poor development. | 3A | 3e | Trim pods out. |
| 42. | | Gleditsia tricanthos Honey locust | 14 | 13 | 60 | Mature tree with insect damage at base. Cavity on both sides at base with a 80cm depth, high fail at anchorage near roots. | 4C | 3a | Remove tree in high target area with structural issue and cavity decay at base. |
| 43. | | Ulmus species Elm | 8 | 14 | 33 | Immature tree with unbalanced canopy to southwest. | 3A | 3d | Aerial Inspection required determining the quality of branch attachments. Prune out 5% of canopy on the weighted side. |
| 44. | | Gleditsia tricanthos Golden Robinia | 8 | 8 | 15 | Immature tree in good condition but poor development. Inclusions at 1 meter | 3A | 3d | Remove south leader and mulch. Prune deadwood. |
| 45. | | Plumeria sp. Australian Frangipani | 5 | 6 | 15+15 | Immature tree in good condition but poor development | ND 3A | Est 3d | Prune for thinning, and anchorage –pull test required to determine stability. |
| 46. | | Sapium sebiferum Chinese Tallowood | 12 | 16 | 34 | Mature tree in good condition but poor development. | 3A | 3d | Thin over roof 8% and prune deadwood. |
| 47. | | *Melia azederach* White Cedar | 15 | 14 | 45 | Mature tree in poor structural condition with poor development. | 5C | 3a | Remove tree. |
| 48. | | *Corymbia citriodora* Lemon Scented Gum | 3 | 7 | 8 | Immature tree with insect damage (borers) at base of tree and damage to the roots> | 4C | 3a | Remove tree. |
| 49. | | Ornamental species | 5 | 7 | 10? | Immature tree with sparse foliage crown and damage to the roots. | 3D | 3d | Physical damage. Prune on south. |
| 50. | | Cuppressus species Pine | 1 | 12 | 12 | Immature tree with dieback more than 20 %.-Top leaders are is dead. | 4C | 3b | Remove tree. |
| 51. | | Cuppressus species Pine | 2 | 12 | 15 | Immature tree with dieback 50%-dead. | 4A | 3b | Remove tree. |
| 52. | | 15x Cuppressus species Pine | 2 | 13 | 15-18 | Immature tree in good condition but poor development. | 3A | 3d | Annual (EM) Monitoring. |
| 53. | | *Sapium sebiferum* Chinese Tallow Tree 3x | 10 | 15 | 37-48 | Mature tree in good condition but with poor development | 3D | 3c | Prune deadwood and epicormics. |
| 54. | | *Eucalyptus haemastoma* Scribbly Gum | 9 | 12 | 12? | Immature tree with dieback more than 20%, Epicormics With sparse foliage crown, fungal attack throughout. | 3D | 3c | Fertilise, prune deadwood-Remedial prune 20%. |
| 55. | | Cotton Palm | 3 | 7 | 38 | Immature tree in good condition but poor development. | 2A | 3d | Prune dead fronds. |
| 56. | | *Eucalyptus robusta* Swamp Mahogany | 1.4 | 20 | 52 | Immature tree in good condition but poor development. | 2D | 3d | Prune deadwood and 10% of tree, prune lower lateral East at 6 meters. |

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| 57. | | *Eucalyptus nicholli*<br>Narrow leafed peppermint | 17 | 20 | 780 at1m | Mature tree with borers, Epicormics unbalanced canopy,, Cavity at 5meters. | 2D | 3c | Remove, dead diseased wood and Epicormics (EM monitoring). |
| 58. | | *E.elata*<br>Willow peppermint | 20 | 24 | 790 | Over matured tree with cavity west at 5 meters 30%, fungal attack | 3d | 3b | Aerial Inspection required. for damaged tree at 5 meters. Root test and drill. |
| 59. | | *Sapium sebiferum*<br>Chinese Tallowood | 8 | 18 | 30 | Immature tree, fungal attack. | 3D | 3d | Prune dead wood |
| 60. | | Syagrus romanzoffiana Cocos Palms species 3x | 5 | 6 | 14 | Immature tree in good condition but poor development. | 2D | 3d | Prune deadwoods and pods biannually |
| 61. | | Tea Tree | 6 | 7 | 27/20/24 | Over mature tree with a sparse foliage crown. Strict over reaction 20% rods were exposed south. Cavity at 1 meter | 5C | 3a | Remove tree South |
| 62. | | *Syagrus romanzoffiana* Cocos Palms species | 6 | 10 | 25 | Immature tree in good condition but with poor development, damage to roots. | 3D | 3d | Prune biannually after Root Test. Annual Monitoring EM Monitoring. |
| 63. | Damage by climbing plants 15 | *6x8 Syagrus romanzoffiana*<br>Cocos Palms species<br>6 Alder? | 4-6 | 6.8 | 10-20 | Immature tree in good condition but with poor development | 3D | 3d | Prune annually. |
| 64. | | *Acer palmatum*<br>*Japanese maple* | 7 | 6 | 20 | Immature tree adjacent house. With sparse foliage crown and unbalanced canopy, damage to the tree roots. | 5C | 3a | Remove tree. |
| 65. | 2x | 2x *Cypress species*<br>Pine | 0.5 | 7 | 20 | Immature tree in good condition but with poor development and physical damage to gutters. | 3A | 3b | Prune deadwood. |
| 66. | | *Eucalyptus Elata*<br>Willow Peppermint | 10 | 16 | 50 | Immature tree under fungal attack. | 2D | 3d | Aerial Inspection. Prune 10% of dead or dying. |
| 67. | | *Ulmus species*<br>Elm Tree | 14 | 14 | 42 | Mature tree in good condition, but poor development, minor borer damage. | 2D | 3d | Prune epicormics. |
| 68. | | *Ulmus* species<br>Elm Tree | 10 | 13 | 40 | Mature tree in good condition, but poor development. Minor attack of borers. | 3A | 3d | Prune deadwood |
| 69. | | *Ulmus species*<br>Elm Tree | 5 | 8 | 11 | Immature tree in good conditioner. | 3A | 3d | Prune dead wood |
| 70. | Neighbours tree | 9x *Camphor laurel*<br>(1 neighbours tree 1 Grevillea Robusta | 5-15 | 16-12 | 20-50 | Mature tree with dieback more than 20% and with insect damage. | 3A | 3d | Prune dead wood and remove diseased wood. |
| 71. | North Adjacent to Highway | *Melia azederach*<br>White cedar | 8 | 7 | 28 | Immature tree with sparse foliage head and physical damage to center and minor damage to roots. | 3D | 3d | Further information. Root Test and prune deadwood. |
| 72. | | *Cypresses species*<br>Pine | 5 | 6 | 12/14 | Immature tree with sparse foliage crown opening with exudations. Inclusions at one meter. | 5C | 3a | Remove tree. |
| 73. | | *Cypresses species*<br>Pine | 5 | 6 | 15 | Immature tree with a sparse foliage crown. | 3D | 3c | Event monitored |

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| 74. | | 3x *Cypresses species*<br>Pine | 5 | 6 | 28 | Immature tree with dieback is more than 20% on west. Fungal development in leaders | 4C | 3d | Remove tree. |
| 75. | | 4x *Cypresses species*<br>Pine | 1-2 | 8-10 | 10-15 | Mature tree in good condition but poor development | 3D | 3d | Monitor tree for dehydration. |
| 76. | | 3x *Cuppressus sempervirens*<br>Pine | 6 | 12 | 25-40 | Mature tree with minor fungal attack. Inclusions at base of the tree. | 3D | 3d | Fertilise and Annually Monitor tree |
| 77. | | *Pinus radiata*<br>Pine | 8 | 11 | 30 | Immature tree in good condition with poor development. | 3D | 3d | Prune deadwood |
| 78. | | *Jacaranda mimosifolia*<br>Jacaranda | 8 | 10 | 20/22 | Immature tree twin trunk minor cavity. Minor borer at base. | 3D | 3c | Prune Epicormics and Annually Monitor. |
| 79. | | *Populus italic*<br>Lombardy Poplar | 5 | 17 | 68 | Mature tree dieback is more than 20% , major deadwood and borers with damage to roots. | 4C | 3d | Remove tree |
| 80. | | *Populus italic*<br>Lombardy Poplar | 7 | 18 | 570cm | Mature tree | 3D | 3c | Drill test and prune deadwood. |
| 81. | Walking | 4x *Cuppressus species*<br>Pine | 2-4 | 6-14 | 10-20 | Immature tree in good condition but poor development. | 3D | 3c | |
| 82. | | *Cypresses species*<br>Pine | 2 | 8 | 22 | Immature tree with dieback more than 20% and dying. | 4A | 3b | Remove Tree. |
| 83. | | *Cypresses species*<br>Pine | 5 | 10 | 16 at base | Immature tree with dieback at 30% . Physical damage … | 4A | 3b | Remove tree. |
| 84. | | *Populus species* | 2 | 6 | 15 | Immature tree in excellent condition. | 2A | 3d | Prune off gutter. |
| 85. | | *Acacia species* | 5 | 6 | 15 at base | Immature tree with physical damage near roof with Insect damage. | 3D | 3d | Prune off roof. |
| 86. | X25 | *Cuppressus species*<br>Pine | 2-4 | 6-13 | 10-35 | Immature tree in good condition but poor development. | 3D | 3d | Prune deadwood. |
| 87. | | *Liquidambar styraciflau*<br>*Liquid amber* | 16 | 18 | 74 | Mature tree with physical damage lower at 12 meters and tail at 14 meters some minor borers | 3A | 3a | Aerial Inspection, Prune dead piece 8 meters south. Remove hanging branch. |
| 88. | High Target area | *Araucaria heterophylla*<br>*Norfolk Island Pine* | 5 | 18 | 40 | Immature tree in good condition but poor development. | 3A | 3c | Further investigation and root test. |
| 89. | X3 | Pinus radiata<br>Alnus species/Cuppressus sp. | 4-6 | 6-8 | 15-25 | Immature tree in good condition but poor development. | 3A | 3d | Annual Monitoring. |
| 90. | Front/North X2 | *Cuppressus species*<br>Pine | 2+3 | 6+12 | 15-25 | Immature tree in good condition but poor development. | 3A | 2d | Annual Monitoring. |
| 91. | Assembly Point | *E.nicholli*<br>Narrow leafed peppermint | 7 | 6 | 40 | Immature tree, mallet test indicates hollow cavity at base, damage to roots at South East. Hollow is indicative of less than 50% holding wood. | 5C | 4b | Remove. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 92. | | *E. microcorys* Tallowood | 15 | 22 | 64 | Mature tree, Physical damage birds -from this tree, damage to roots. | 3D | 3c | Aerial Inspection Prune diseased branches out 5% of canopy. |
| 93. | Council | *Melaluca species* Paperbark | 9 | 11 | 26/31 | Immature tree, Sparse foliage crown Termite damage. | 3D | 3d | Drill test to determine wood quality of trunk, light prune 10 % Termite treatment. |
| 94. | Adj. road | *Melaluca species* Paperbark | 3 | 5 | 4 | Immature tree in good condition but poor development. | 2A | 3e | Annual Monitoring. |
| 95. | | *Cuppressus species* Pine | 3 | 8 | 15 | Immature tree in excellent condition. | 2A | 3d | Annual Monitoring. |
| 96. | | *Corymbia citriodora* Lemon Scented Gum | 17 | 21 | 40 | Mature tree in good condition. | 3A | 3b | Prune deadwood. |
| 97. | | *Melaluca species* Paperback | 6 | 10 | 54 | Mature tree with reaction wood to 1m a cavity at the base and termite infestation and damage. An inclusion at the north side exists. Anchorage failure from embankment location imminent. Retained wall within the structural rootzone and drainage does not allow for stability. Located adjacent a sewer manhole with high target potential. | 5c | 5b | Remove. High target potential. |
| 98. | X7 | *Cuppressus species* Pine | 1-4 | 5-7 | 10-30 | Immature tree in good condition but poor development tree | 3A | 3c | Mulch and add seasoll solution before new season's growth at applicable rate. |
| 99. | Adj. road | *E. microcorys* Tallowood | 11 | 20 | 45 | Mature tree cavity at seven meters 1.5 meters along Southside. | 3D | 3c | Root test, Aerial Inspection, Drill test at 9m to determine holding wood/decay at cavity. Prune deadwood. |
| 100 | | *E. microcorys* Tallowood | 16 | 24 | 67 | Mature tree damage by climbing plant in north. Minor fungal attack damage to roots-south. | 3D | 3c | Aerial Inspection and termite treatment or bait. |
| 101 | | *Cedrus deodara* Himalayan Cedar | 6 | 14 | 23 | Immature, tree is leaning west with physical damage, suppressed crown and heavily pruned | 3D | 3b | Prune broken bough. Root test. Event Monitoring. |

*#Note: With the abbreviated terms **ND** in the TULE column meaning Not determined. **EST** is an estimation in the TRA column both assessments require more information which could be given from further investigation and testing.*

# ANALYSIS

| TREE NO. | SPECIES | Intervention according to assessment |
|---|---|---|
| **5** | *Eucalyptus saligna* Blue gum | **Urgent and immediate Removal. Priority 1** |
| **7** | *Eucalyptus saligna* Blue gum | **Urgent and immediate Remove. Priority 1.** |
| **12** | *Eucalyptus saligna* Blue gum | **Remove priority 3.** |
| **19** | *Eucalyptus saligna* Blue gum | **Aerial inspection & assessment** |
| **23** | *Cuppressus sp.* Pine | **Remove west stem** |
| **25** | *Eucalyptus saligna* Blue gum | **Aerial inspection & assessment-(***Specified pruning see aerial inspection report***).** |
| **26** | *Eucalyptus saligna* Blue gum | **Aerial inspection & assessment-(***Specified pruning see aerial inspection report***).** |
| **27** | *Cuppressus sp.* Pine | **Remove priority 2.** |
| **29** | *Acacia baileyana* Wattle | **Remove priority 3.** |
| **33** | *Eucalyptus saligna* Blue gum | **Further investigation Possible Non Urgent Removal** |
| **47** | *Gleditsia Tricanthos* Honey locust | **Removal priority 2.** |
| **48** | *Corymbia citriodora* lemon scented gum | **Non Urgent Removal priority 3.** |
| **50** | *Cuppressus sp.* Pine | **Non Urgent Removal priority 3.** |
| **51** | *Cuppressus sp.* Pine | **Non Urgent Removal priority 3.** |
| **61** | *Leptospermum sp.* Tea tree | **Removal priority 2.** |
| **64** | *Acer palmatum* Japanese maple | **Removal priority 2.** |
| **72** | *Chamaecyprus sp.* Pine | **Removal priority 2.** |
| **74** | *Cuppressus sp.* Pine | **Non Urgent Removal priority 3.** |
| **79** | Populus sp. Lombardy poplar | **Non Urgent Removal priority 3.** |
| **82** | *Cuppressus sp.* Pine | **Non Urgent Removal priority 3.** |
| **83** | *Cuppressus sp.* Pine | **Non Urgent Removal priority 3.** |
| **97** | *Melaleuca sp.* *Paperbark* | **Removal priority 2.** |

# CONCLUSION

Immediate action is required for the safety of student, teacher and parent's and general public for trees on this list. The analysis lists tree removals which are "**Non Eur**"or not categorised as emergency. Because the trees require immediate action (*removal or specified pruning*) they must be cordoned off with barriers installed to prevent and restrict access. The barrier distance from the trunk should be maintained and the forestry department state two times the trees height. The height is listed in the tree survey assessment schedule/table.

Signage must be placed on the barriers at a visible location and marked "RISK ZONE; DO NOT ENTER." This should assist in preventing access to the trees felling zone at two times the height. (*A minimum exclusion zone around the dripline of the trees, to prevent access would be suitable if the exclusion zones are not achieved on this site, provided trees are maintained within specified timeframes*).

Trees to be **immediately removed** are numbered: 5.7.27.47.61.64.72.91&97.
Priority one removals are numbered 5&7. Priority two tree removals are 27.47.61.64.72.91&97.

Tress to be **immediately pruned** are numbered: 23.25.26.32&57. Priority 1 are trees numbered 25&26. : Priority 2 are trees numbered 23. 32&57

Trees to be **removed within 6 weeks** to 6 months or as soon as practicably possible are numbered:12.29.42.48.50.51.74.79.82&83.These are Priority three trees.

Trees to be pruned as specified in the tree survey assessment **within 6 weeks to 6 months or as soon as practicable** are numbered: 1-9,13.16.17.18.38-41.43-46.49.53-56.59.60.62.63.65.66-71.77.78.80.84-87.96.99&101.

Trees to be **Further Investigated** with AERIAL Inspection are numbered: 3.8.9.1013.19.25.26.37.43.58.66.87.92.99&100. Of these six aerial inspections are urgent including trees numbered 10,18,19,25,26&37and these have been inspected on the report dated 4th of July, 2014.

Trees to be **Further Investigated** with DRILL TEST Inspection are numbered: 9.10.16.17.26.33.58.80.93&100.

Trees to be **Further Investigated** with ROOT TEST Inspection are numbered: 21.34.36.37.45.58.62.71.88.99.100&101.

Trees to be **Further treated with termite bait** are numbered: 9.93&100.

These investigations to the assessed tree should be made within 90 days by a competent Level 5 arborist.

No heritage listed trees were found on site. There were no individual tree species identified on site that are listed as endangered, critically endangered or vulnerable under the TSC Act and EPBC Act. There is a significant group of E.saligna trees on this site towards the southern boundary, which may constitute Blue gum high forest. These do not appear on the local Parramatta LEP 2011 plan as biodiversity. These are protected and would require further application to the department of land and water conservation for approved works in intervention and reduction of risk. The trees in this area are scattered remnants including trees numbered1-26, excluding introduced species within this range to be removed as soon as

practicable. Note trees numbered 5,7&12 for removal may require further notes and specific reporting including photographic analysis.

An option to preserve this remnant and reduce the loss of trees with scientific value could be to restrict access and occupancy rates in this area. These trees could be fenced with 1.8metre fencing as an option to restrict access and keep the biodiversity remnant preserved. Soils are classified as acid sulfates class 5 according to the Parramatta Local environment plan 2011(LEP).

## RECOMMENDATION

1. The trees to be removed and pruned immediately according to specification are numbered in the conclusion. An option to preserve the trees from removal with fencing to maintain the High Blue Gum Forest community is remnant and an advisable option is to retain this area in context with the act and make it inaccessible to the general public. To preserve the stand of trees at the south-west corner of the site, it is recommended that this area is fenced it off. A biodiversity area can be created with pedestrian access.

2. The facilities manager should make application to remove and prune treesto the Parramatta council as specified in the conclusion. Further information may be required to the department Urban affairs and planning for a section 96 application proposal for E.saligna trees (numbered;) intervention works or removal.

*3.* In the event that the removal are not completed immediately or within the specified timeframe, then the school principal must ensure the trees are to be immediately cordoned off with visible signage to prevent access. These trees are written in the list of trees requiring *Essential Urgent Repair*. The exclusion zones be implemented and maintained as a priority.

4. Trees to be pruned must be pruned according to AS 4373-2007 is numbered in the conclusion. The time frame is specified in the conclusion.

5. Further Investigation and aerial inspections must be carried out within 90 days or as soon as practically possible will be required as specified in the EUR list or the tree survey schedule from this investigation. Further reporting with a report will be sent to the principal of this additional inspection and investigation.

6. Replenish removed trees with one-year old stock trees at a ratio of 1:1. Replenish trees that are to be removed with 50 litre volume pots of indigenous stock selected from councils desirables species list found on their website. Replant trees within fifty metres of the original location in low target areas. (*An example may be on the border buffering a nature strip, away from access areas*)

7. A project arborist should supervise the habitat tree removal, modification and creation procedure to ensure the transition of fauna within 40 metres of its original habitat. Nesting boxes at a ratio of 1:1 should be placed at minimum of 5m height in a suitable tree located in the riparian zones. Sensitive dismantling of the habitat trees are required to be done using a crane or similar lowering device. *(see Appendices G Habitat Tree Data sheet must be lodged if trees with hollows are to be removed)*

   *To assist in the trees being managed competently the following recommendation is given:*

8. In maintaining the quality of the contractor selected to maintain the work in accordance with As 4790-2009-Protection of Trees in Development Sites, As4743-2007 Pruning of Amenity Trees and Work safe Australia Code of Practice. The principal should engage a contractor from the following associations; the works must be completed by a registered current member of TCAA Tree Contractors Association Australia or Arborists Australia. The further investigations may also be completed by IACA association member.

9. The tree contractors must liase with the consultant of this report to ensure intervention work is completed to specification. A register of this intervention work will be supplied at the end of this contract to ensure correct pruning and other investigative measures are completed.

10. All retained trees require annual monitoring and high target trees require event monitoring which constitutes a walk around and identification of failed branches or stems by a competent certificate 3 or 5 arborist. Trees also require mulching are as stated in the tree survey assessment table

# GLOSSARY

**Crown:** The width of the foliage in the upper canopy of the assessed tree to the four cardinal points. Crown lifting means the removal of the lower branches of the tree

**Crown thinning** means the portion of the tree consisting of branches and leaves and any part of the stem from which branches arise.

**Drip line**: Where the canopy releases water shed from the foliage during precipitation.

**DBH/Diameter:** Diameter of trunk at 1.4meters in height of assessed tree.

**Dead wooding** means the removal dead branches from a tree.

**Dieback:** Tree deterioration where the branches and leaves die.

Flush cut: A cut that damages or removes the branch collar or removes the branch and stem tissue and is inconsistent with the branch attachment as indicated by the bark branch ridge.

**Genus/ Species:** The Genus and species of each tree has been identified using its scientific name. Where the species name is not known the letters species is used. The common name for trees may vary considerably in each area of geographical differences and so will not be used in the field survey.

**Height:** Height has been estimated to + / - 2 metres.

**ISA:** International Society of Arboriculture.

**Maturity:** Tree maturity has been assessed as over mature (last one third of life expectancy), mature (one third to two thirds life expectancy) and semi mature (less than one third life expectancy).

**Remedial (restorative) pruning**: includes: Removing damaged, deadwood; trimming diseased or infested branches. Trimming branches back to undamaged tissue in order to induce the production of shoots from latent or adventitious buds, from which a new crown will be established.

**SRZ- Structural Root Zone:** An area within the trees root zone in which roots stabilize the tree. Roots cut in this zone can cause instability and lead to anchorage loss.

**Structural Integrity**: Describes the internal supporting timber. (Substantial to frail)

**TULE- Tree Useful Life Expectancy:** An estimation of the trees useful life expectancy using appropriate industry methods and an inspection regime. *Adapted with permission from J.Barrell, 2014.*

**TPZ- Tree Protective Zone**: This zone should be considered as optimal for tree growth and sustainability however the size of the zone is subjective and should be reassessed when individual design and construction methods are being discussed.

**Tree Age:** Trees have either been assessed as mature, immature or semi-mature.

**Tree Numbering**: All trees listed in the tree survey have been numbered and plotted

**Vigor**: This is an indication of the tree health. Trees have either been assessed as Good Vigor, Normal Vigor or Low Vigor.

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SECTION II

# APPENDIX A **T**ULE – TREE USEFUL LIFE EXPECTANCY

McArdle Arboricultural Consultancy Pty Ltd Revised 14.4.14

Categories and Sub-Categories *ADAPTED FOR TCAA CLIMBING CONSULTANT ARBORISTS FROM JEREMY BARREL (SULE)*

| | **1 Long TULE** | **2 Medium TULE** | **3 Short TULE** | **4 Remove** | **5 No Potential for Retention REMOVE IMMEDIATELY** | **6 Small, Young or regularly clipped:** |
|---|---|---|---|---|---|---|
| | **Trees that appeared to be retainable at the time of assessment for more than 40 years with low level of risk** | **Trees that appeared to be retainable at the time of assessment for 15 to 40 years with and with low to medium level risk** | **Trees that appeared to be retainable at the time of assessment for 5 to 15 years with medium to high level of risk** | **Trees that should be removed within the next 5 years High to Very high level of risk** | **Trees that must be removed immediately. Very high to Extreme level of risk** | **Trees that can be easily transplanted or replaced.** |
| **A** | Structurally sound trees located in positions that can accommodate future growth | Trees that may only live for between 15 and 40 more years | Trees that may only live for between 5 and 15 more years | Dead, dying, suppressed or declining trees through disease or inhospitable conditions. | Dead, dying or declining trees diseased or inhospitable conditions. | Small trees less than 5 meters in height |
| **B** | Trees that could be made suitable for retention in the long term by Intervention Works. | Trees that may live for more than 40 years, but would need to be removed for safety or Nuisance reasons | Trees that may live for more than 15 years, but would need to be removed for safety or nuisance reasons | Dangerous trees through instability or recent loss of adjacent trees | Dangerous trees through instability or recent loss of adjacent trees | Young trees less than 15 years old but over 5 meters in height |
| **C** | Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention | Trees that may live for more than 40 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting | Trees that may live for more than 15 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting | Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form | Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form | Trees that have been regularly pruned to artificially control growth |
| **D** | | Trees that could be made suitable for retention in the medium term by Intervention Works. | Trees that require substantial Intervention Works, and are only suitable for retention in the short term | Damaged trees that are clearly not safe to retain | Damaged trees that are clearly not safe to retain and must be removed immediately | |
| **E** | | | | Trees that may live for more than 5 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting | High Toxicity Allegan trees, asthmatic and poisonous trees and must be removed immediately. | |
| **F** | | | | Trees that may cause damage to existing structures within 5 years | OTHER with legitimate explanation to be removed immediately | |
| **G** | | | | Trees that will become dangerous after removal of other trees for reasons given in 1A-1F | | |
| **INSPECTION FREQUENCY** | Inspection frequency 1-5 Years by competent inspector unless event monitored. | Inspection frequency 1-5 Years by competent inspector unless event monitored. | Inspection frequency 1-3 years by competent inspector unless event monitored. | Inspection frequency to 1 year by competent inspector unless event monitored. | 1-7 days by competent inspector and event monitored | Inspection frequency Biannually by competent inspector |

# APPENDIX B HEALTH & STRUCTURAL CONDITION OF TREE- Visual

McArdle Arboricultural Consultancy Pty Ltd

| Health & Structural Condition of Tree | |
|---|---|
| 1. *J- Juvenile; im- Immature; SM-Semi- Mature; M-Mature* | |
| 2. Excellent Condition | |
| 3. Good Condition but Poor Development / Habit | |
| 4. Dieback is more than 20%. | 4b Epicormics |
| 5. Sparse Foliage Crown | 5b Unbalanced Canopy |
| 6. Physical Damage | |
| 7. Cavity | |
| 8. Lean | |
| 9. Heavily Pruned | |
| 10. Inclusions | |
| 11. Damage to roots | |
| 12. Insect Damage | 12b Borers |
| 13. Termite Damage | |
| 14. Fungal Attack | |
| 15. Parasitic Vine Present | |
| 16. Damage by Climbing Plant | |
| 17. Habitat Tree | |
| 18. Endangered Species | |
| 19. Endangered community | |

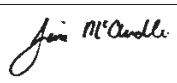
Developed by Claus Mattheck in: *The Body Language of Trees (*1994) which have adapted versions from Hornsby Shire Council.

## APPENDIX C TREE HAZARD & SITE ASSESSMENT for Preserved trees– Visual

McArdle Arboricultural Consultancy Pty Ltd

This evaluation tool is used to reinforce the risk matrix, as a general statement of the overall site hazards and tree health/conditions.

*Adapted from ISA Hazard Checklist*

| | | |
|---|---|---|
| **SIGNED:**  | **SITE:** BCS Carlingford-268 Pennant Hills road. | **DATE:-18.3.14** |
| **1. SITE** | | |
| Underground service, Overhead power lines, High / low voltage, winds direction, Building within 3m, Uneven terrain, Electrical lines to property, Telephone and cable lines, Streetlights, Vehicle & Pedestrian traffic. | | |
| **2. ROOT ZONE** | | |
| Compaction, Damaged Roots, Exposed Roots, Girdling, Close to kerb, Soil Level Raised/ Lowered, In Garden Bed /Mulched<br>Paving/ Concrete/ Bitumen, Roots Pruned, Fungal Growths At Base | | |
| **3. TRUNK** | | |
| ○ Severe decline( <20% deadwood)<br>○ Declining ( 20-60% twig & branch dieback)<br>○ | | |
| **4. BRANCH** | | |
| Lean, Cavities / cracks, Splits / cracks, Physical damage, Insects/ parasites/ borers / termites, Hangers, Condition of bark,<br>Disease, Decay, Previous failures, Inclusion. | | |
| **5. BRANCH UNIONS** | | |
| Dead branches, Branch clusters, Pockets of decay, Leaves colour | | |
| **6. VIGOUR & VITALITY - Crown** | | |
| Branch unions, Storm damage, Heavily pruned | | |

# APPENDIX D TREE PLANTING SPECIFICATIONS AND MAINTENANCE

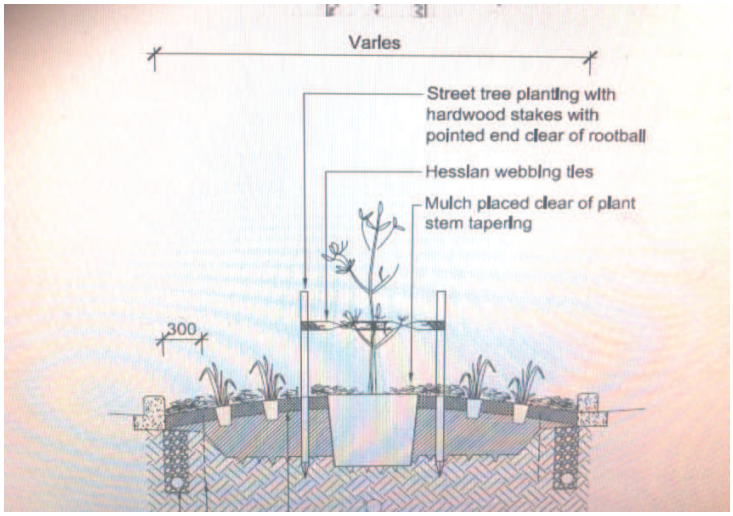
McArdle Arboricultural Consultancy Pty Ltd

Before planting, careful consideration should be given to the location of trees and shrubs to minimise future problems. A basic guide for planting follows:

1. Don't plant too close to buildings or in-ground pools or plant large trees too close together: Determine the height and canopy of trees when fully grown. Allow room for root growth (at least twice the height of the tree). Large trees should be planted at least three metres from buildings.
2. Check when planting under wires or over drainage lines: Determine the mature size of the tree and the size and nature of its root system.
3. Consider your neighbours when choosing plants: Consider the effect on neighbouring properties (i.e. shading, loss of views, impact on foundations, fences and services).
4. Use trees to provide your home with summer shade and/or winter sun: Plant deciduous trees (suitable to the climate and soils of this Shire). Consider the summer and winter shadows of evergreen trees.
5. Don't grow climbers on trees: Climbers can strangle trees, leading to the tree's eventual death.
6. Retain and protect as many trees as possible when building or extending your home. (This will be a Council requirement).
7. Use locally native and non-invasive species in your garden: Increase the success rate of your garden. Attract native fauna to your garden. Reduce the amount of watering required.
8. Don't excavate or alter the ground level around trees: Can cause root damage or starving of the roots. Can cause limb drop, instability or tree death. Substantially altering soil level within three metres of the trunk is in breach of the Tree Preservation Order.
9. When buying plants, check their characteristics: Check on mature size, shade characteristics, potential for roots to cause damage, flowers, fruits and pollen, to determine their suitability.

Mature trees do need maintenance: Remove or trim misshapen branches. Check for fungal rots or other diseases. If in doubt, contact Council for a tree inspection or contact an experienced Arborist. Indiscriminate lopping can be dangerous to your safety and the health of the tree.

Staking of trees should be carried out similar to the diagram opposite.



# APPENDIX E INDIGENOUS TREE REPLENISHMENT

McArdle Arboricultural Consultancy Pty Ltd

Indigenous trees are found on councils website.

| Replacement Tree Species<br>Low Allergy Trees | Recommended Replacement Species |
|---|---|
| Acmena smithii Lilly Pilly<br>Agonis flexuosa Willow Myrtle<br>Araucaria heterophylla Norfolk Is. Pine<br>Bauhinia blakeana Butterfly Tree<br>Eucalyptus spp. Eucalyptus Trees<br>Hakea laurina Pincushion Plant<br>H. salicifolia Willow Leaved Hakea<br>Magnolia grandiflora Bull Bay<br>Malus floribunda Crab Apple<br>Melaleuca quinquinervia Broad Leaved Paperbark<br>Nyssa sylvatica Tupelo<br>Pistacia chinensis Pistachio<br>Prunus x blireana Flowering Plum | Acmena smithii Lilly Pilly<br>Tristaniopsis laurina Water Gum<br>Corymbia exemia Yellow Bloodwood<br>Backhousia citriodora Lemon Scented Myrtle<br>Elaeocarpus reticulatus Blueberry Ash<br>Waterhousia floribunda Weeping Lilly Pilly<br>Syzygium leuhmannii Riberry<br>Hymenosporum flavum Native Frangipani<br>E. paniculata Grey ironbark<br>Eucalyptus microcorys Tallowwood<br>Eucalyptus leucoxylon Yellow Gum<br>Eucalyptus crebra Narrow Leaved Ironbark<br>Syncarpia glomulifera Turpentine<br>Lophostemon confertus Brush Box |

Trees suitable for this site are indicated, more information can be gathered by emailing info@mcardlearborists.com.au

# APPENDIX F TREE RISK ASSESSMENT MATRIX

McArdle Arboricultural Consultancy Pty Ltd REDRAFTED 14.4.14

Categories and Sub-Categories

| Failure Potential | | 1.Occasional use | 2.Intermittent use | 3.Frequent use | 4.Constant use | 5.High constant use |
|---|---|---|---|---|---|---|
| | **A.Very Likely** Almost certainly likely to occur in most circumstances | Medium | High | High | Very High | Extreme |
| | **B.Likely** May occur frequently | Medium | Medium | High | Very High | Very High |
| | **C.Somewhat likely** Possible and likely to occur at some time | Low | Medium | High | High | Very High |
| | **D.Unlikely** Not likely to occur but could happen | Low | Low | Medium | Medium | High |
| | **E.Highly unlikely** May occur in rare and exceptional circumstances | Low | Low | Low | Medium | High |

The risk rating score is determined after assessing the Failure Potential and Target Rating of an identified hazard tree. The determination of these calculations will indicate a priority and course of action when implementing the risk reduction measures.

**Failure Potential x Target Rating=Risk Assessment.**

**Legend**

**Failure Potential**

| | |
|---|---|
| A.Very Likely | Partial or whole tree failure is imminent e.g. cavity in excess of 50% of the trunk. Major bark inclusions, dead limbs, leaning tree with lifting root plate, roots/trunk decayed or damaged, Toxins, HOSTING BEES (other). |
| B.Likely | Defects that could cause structural failure of the tree within the next 6 months. |
| C.Somewhat likely | Defects present that could cause portions of the tree tom fail. |
| D.Unlikely | Defects are minor and not likely to cause significant harm. |
| E.Highly unlikely | Tree is healthy with no obvious defects. Poses no immediate threat. |

**TARGET RATING**

| | |
|---|---|
| 1.Occasional use | Out of bounds area, Restricted and inducted areas. |
| 2.Intermittent use | Parking lot, Ovals. |
| 3.Frequent use | Busy street adjacent, school yard, child care center. |
| 4.Constant use | Occupied classrooms and buildings, residences, offices, canteen and sit down lunch areas. |
| 5.High constant use | Access paths and gateways, where students congregate in numbers, assembly areas. |

*Adapted from.B.Sullivan FOR USE BY TCAA CLIMBING CONSULTANT ARBORISTS*

# APPENDIX F LIMITED RISK EVALUATION

EVALUATION SCHEDULE

SITE: BCS-Carlingford

*Adapted from the ISA Tree Hazard Evaluation Form*

<table>
<tr><td colspan="4">TREE CHARACTERISTICS</td></tr>
<tr><td colspan="2">Species: NOTED IN TREE SURVEY TABLE</td><td colspan="2"></td></tr>
<tr><td colspan="4">TREE HEALTH</td></tr>
<tr><td colspan="2">Foliage: NOTED IN TREE SURVEY TABLE</td><td colspan="2">Wound-wood: NOTED IN TREE SURVEY TABLE</td></tr>
<tr><td colspan="2">Vigour: NOTED IN TREE SURVEY TABLE</td><td colspan="2">Deadwood %: NOTED IN TREE SURVEY TABLE</td></tr>
<tr><td colspan="2">Form: NOTED IN TREE SURVEY TABLE</td><td colspan="2">In Decline: NOTED IN TREE SURVEY TABLE</td></tr>
<tr><td colspan="2">Dead Tree: NOTED IN TREE SURVEY TABLE</td><td colspan="2">Age Class: NOTED IN TREE SURVEY TABLE</td></tr>
<tr><td>ROOT ZONE</td><td>TRUNK DEFECT</td><td colspan="2">CROWN DEFECT</td></tr>
<tr><td>NOTED IN TREE SURVEY TABLE</td><td>NOTED IN TREE SURVEY TABLE</td><td colspan="2">NOTED IN TREE SURVEY TABLE</td></tr>
<tr><td colspan="4">TARGET RATING</td></tr>
<tr><td>Type: NOTED IN TREE SURVEY TABLE</td><td colspan="3">Location: NOTED IN MAP<br>Target Rating: NOTED IN TREE SURVEY TABLE-TRA Column</td></tr>
<tr><td colspan="4">TREE CONDITIONS-Summarised as TULE</td></tr>
<tr><td colspan="4">Tree Defects: NOTED IN TREE SURVEY TABLE Stem Lean: NOTED IN TREE SURVEY TABLE<br>Decay: NOTED IN TREE SURVEY TABLE</td></tr>
<tr><td>HAZARD ABATEMENT</td><td></td><td>TULE CATEGORY</td><td></td></tr>
<tr><td>Remove Tree: Stated</td><td>Prune: Stated</td><td rowspan="2">Needs further inspection: Stated</td><td rowspan="2">By: Time frame specified</td></tr>
<tr><td></td><td></td></tr>
</table>

# APPENDIX G TREE HABITAT DATA

McArdle Arboricultural Consultancy Pty Ltd

**This page must be specified by a level 5 Arborist if application is made to remove trees with hollows.**

| SITE:BCS carlingford | | | | | | DATE:TBA |
|---|---|---|---|---|---|---|
| **Tree No.** | **Scientific & Common Name** | **Height (m)/ DBH(cm) / Spread(m)** | **Vigour (%) SULE** | **Size of Hollows** | **Reason** | **Retain/ Removal** |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**SIZE OF HOLLOWS**

Large – >50 cm Medium – 10 - 30 cm nil- hollow bearing trees recorded to date.

X____ hollow bearing trees will be removed (See Schedule 2 for habitat tree data). Hollows could be replaced with artificial boxes for arboreal mammals and birds, and micro bat boxes. These boxes are to be installed on retained trees within the BGHF Riparian area. *Note: The replacement of hollows within the conservation areas of the site at a ratio of at least 1:1 is recommended to supplement the loss of natural hollows.*

**REMOVAL REASON**

A – Poor SULE rating
B – Within development footprint
C – Within the critical root zone or 5m of building edge
D – Within roads
E – To allow for landscaping

Required method of removing a habitat tree should be done with a wires representative on site.

1. Tree dismantling with crane.
2. Each piece must be surveyed for scratching markings to determine if hollows or habitat are present.
3. If habitats are present remove with a wires representative or trained personal.
4. Relocate habitat to designated areas.
5. Dismantle tree and allow an hour for habitat to locate if found, or remove and place in designated habitat hollow.

# APPENDIX H TREE MANAGEMENT NOTES

McArdle Arboricultural Consultancy Pty Ltd

It is important to **minimize compaction of the soil** around the drip line. We recommend no heavy machinery operate within the three metres area of the preserved trees. For smaller machines we recommend restricted access within the Tree Protection Zone and also limit movement in this area with smaller type machines.

**Rooting hormone** is recommended at the prescribed rate around the excavated area and inside the affected trees drip line to promote healthy recovery. Continue the use treatments associated with root growth and vigor. Apply hessian bagging over excavated areas inside the TPZ where roots are encountered.

**Weed Removal** To reduce competition with the tree the area within the *TPZ* is to be kept free of weeds. These are best removed by the application of foliar herbicide with Glyphosate as the active constituent. This is the preferred method rather than removal by cultivation of the soil within the drip-line, to minimise root disturbance to the tree. The removal of woody weeds such as Privet should use the cut and paint method of herbicide application. Weeds are to be controlled within the *TPZ* for the duration of the project.

**Mulching** inside the Tree Protection Zone at the applicable depth of 50-100 mm with organic material being 75% leaf litter and 25% wood, and this being composted material preferably from the same genus and species of tree as that to where the mulch is to be applied, i.e. species specific mulch. The depth and type of mulch is to be maintained for the duration of the project.

**Watering** In the event of prolonged dry periods, or where a tree has been transplanted, or where excavation nearby, especially up slope, leads to drying out of a soil profile, or modification to ground water flow, or flows across an existing ground surface to the tree and its growing environment; deep root watering thoroughly at least twice a week is to be undertaken to irrigate the tree. The need for such watering is determined readily by observing the dryness of the soil surface within the drip-line of the tree by scraping back some mulch. Mulch is to be reinstated afterwards. In the event of disrupted ground or surface water flows to the tree due to excavation, filling or construction, a reticulated irrigation system may be required to be installed within the *TPZ*. If an irrigation system is to be installed, consideration must be given to volume, frequency, and drainage of water delivered, and this should be in consultation with a qualified Consulting Arborist.

**Pruning** the tree; including deadwood and crown thin to council regulations and in accordance with AS4373-2007 `Pruning Amenity of Trees'. Australian Standards

**Fertilising** A tree will not be fertilised during its protection within the *TPZ.* If a tree is to be fertilised this should be in consultation with a qualified Consulting Arborist.

**Regular monitoring** of tree protection in adherence with the approved tree protection plan throughout the development process must be undertaken in consultation with the Consulting Arborist for the project to ensure that tree protection measures are maintained. Inspections are to be carried out monthly reports until completion of construction. Any problems will be rectified that may occur. A Qualified Arborist with appropriate qualifications and experience will be on site if any excavation work within the Critical Root Zone is required and will provide notes in the final report. Maintenance will continue after three months of completion.

# APPENDIX I DISCLAIMER

McArdle Arboricultural Consultancy Pty Ltd

McArdle Arboricultural Consulting Pty Ltd does not assume responsibility for liability associated with the tree on or adjacent to this project site, their future demise and/or any damage, which may result therefrom.

Any legal description provided to McArdle Arboricultural Consultancy Pty Ltd is assumed to be correct. Any titles and ownerships to any property are assumed to be good and sound. McArdle Arboricultural Consultancy Pty Ltd takes care to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others.

McArdle Arboricultural Consultancy's reports and recommendations shall not be viewed by others or for any other reason outside its intended target, either partially or whole, without the prior written consent of the consultant. Unauthorised alteration or separate use of any section of the report invalidates the whole report. McArdle Arboricultural Consultancy Pty Ltd cannot be held responsible for any consequences as a result of work carried out outside specifications, not in compliance with Australian Standards or by inappropriately qualified staff.

Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale. All recommendations contained within this report represent the current industry best practice methods of inspection. McArdle Arboricultural Consultancy Pty Ltd shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.

LIMITS OF OBSERVATION

McArdle Arboricultural Consultancy Pty Ltd makes every effort to accurately identify current tree health and safety issues. Results may or may not correlate to actual tree structural integrity. There are many factors that may contribute to limb or total tree failure. Not all these symptoms are visible. There can be hidden defects that may result in a failure even though it would seem that other, more obvious defects would be the likely cause of failure.

All standing trees have an element of unpredictable risk. McArdle Arboricultural Consultancy Pty Ltd endeavors to identify the risk that the tree represents; however a level of risk associated with every tree will remain. McArdle Arboricultural Consultancy Pty Ltd does not provide any warranty or guarantee that problems, deficiencies or failures with regard to the plant/s, property or building/s will not arise in the future.

Ongoing monitoring may foresee deterioration of a tree and allow remedial action to be taken to prevent injury or damage. The timing for re-inspection on individual trees is subjective and will vary however an annual inspection is advisable for trees in subsequent years.

FURTHER RESEARCH The report does not cover threatened, heritage or existing trees in relation to remnant forest. Further reporting may be considered as part of the relevant RISK ASSESSMENT.

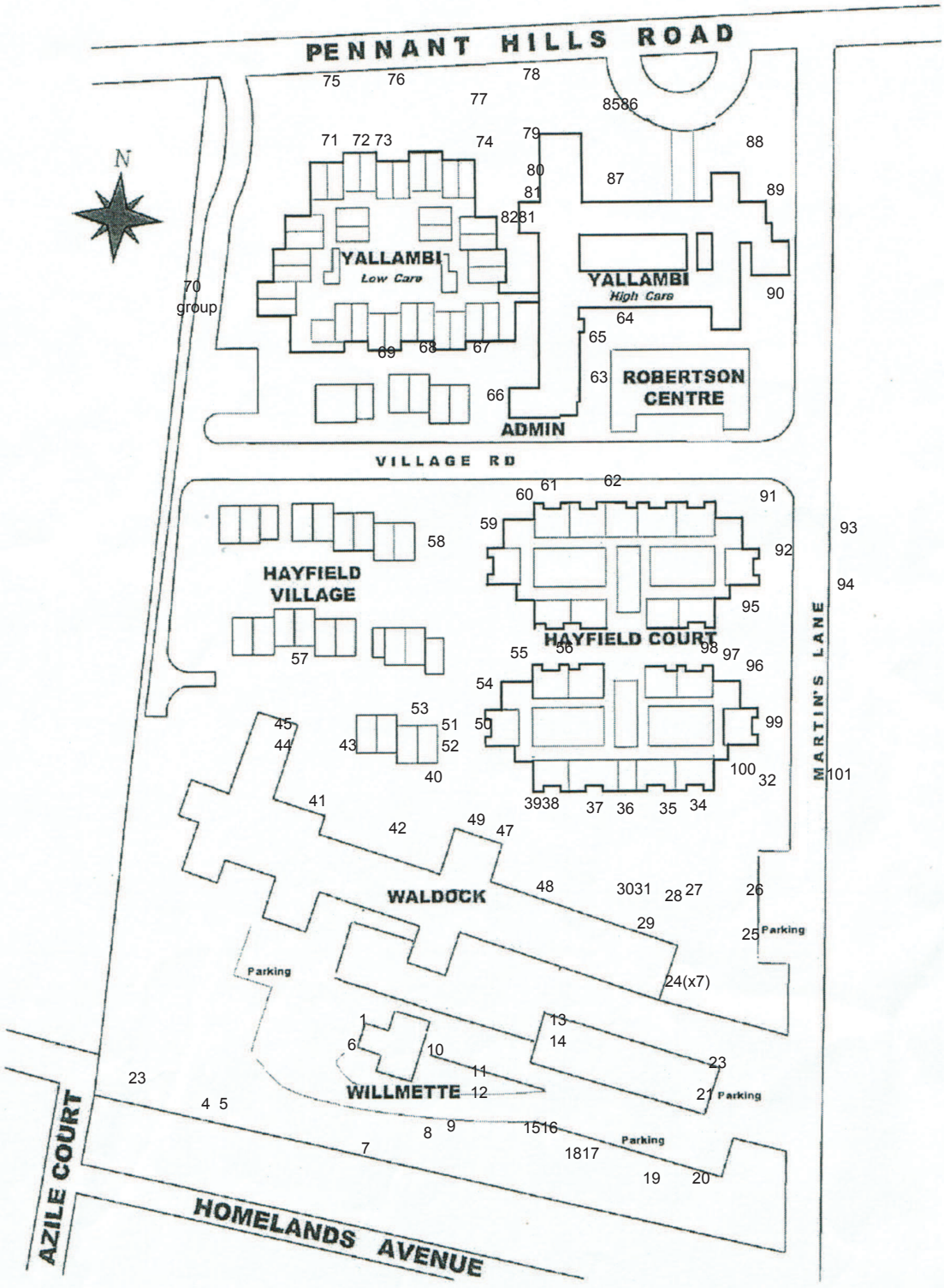
LIMIT OF OBSERVATIONS BY RODNEY M. PAGE

"There are many factors that may contribute to limb or total tree failure. Factors include, decay (in the trunk, crown or branch junctions), external damage to branches leading to decay, poor branch taper, included bark, root rot/ decay. Not all these symptoms are visible i.e. internal decay; of these some external symptoms may indicate the presence of deadwood but not the extent of decay. The most solid looking piece of timber may be riddled with breaks in continuity of growth caused by insect damage or poor pruning practices or other physical damage caused many years previous. Trees don't heal; they simply box in the damaged area ((CODIT) Compartmentalization of Decay In Trees.) and continue to expand in girth, completely disguising the fact that the branch or trunk has a hollow or decayed section. Having said this, not all areas, of decay past or present suggest a point of failure."

In addition to this information, other variables that can contribute to limb or total tree failure are tree species, wood densities, weight, age, location, exposure to the elements, soil types, disease and pests, birds using trees as habitat and food sources, termites causing structural problems and human influences such as, altered drainage, compaction or leaching of minerals.

# Carlingford

268 Pennant Hills Rd, Carlingford



# Appendix 7 – Ecological Assessment

# 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.

| Version | Date Issued | Amended by | Details |
|---|---|---|---|
| 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**.


**Figure 1.1. Location of the Subject Site**

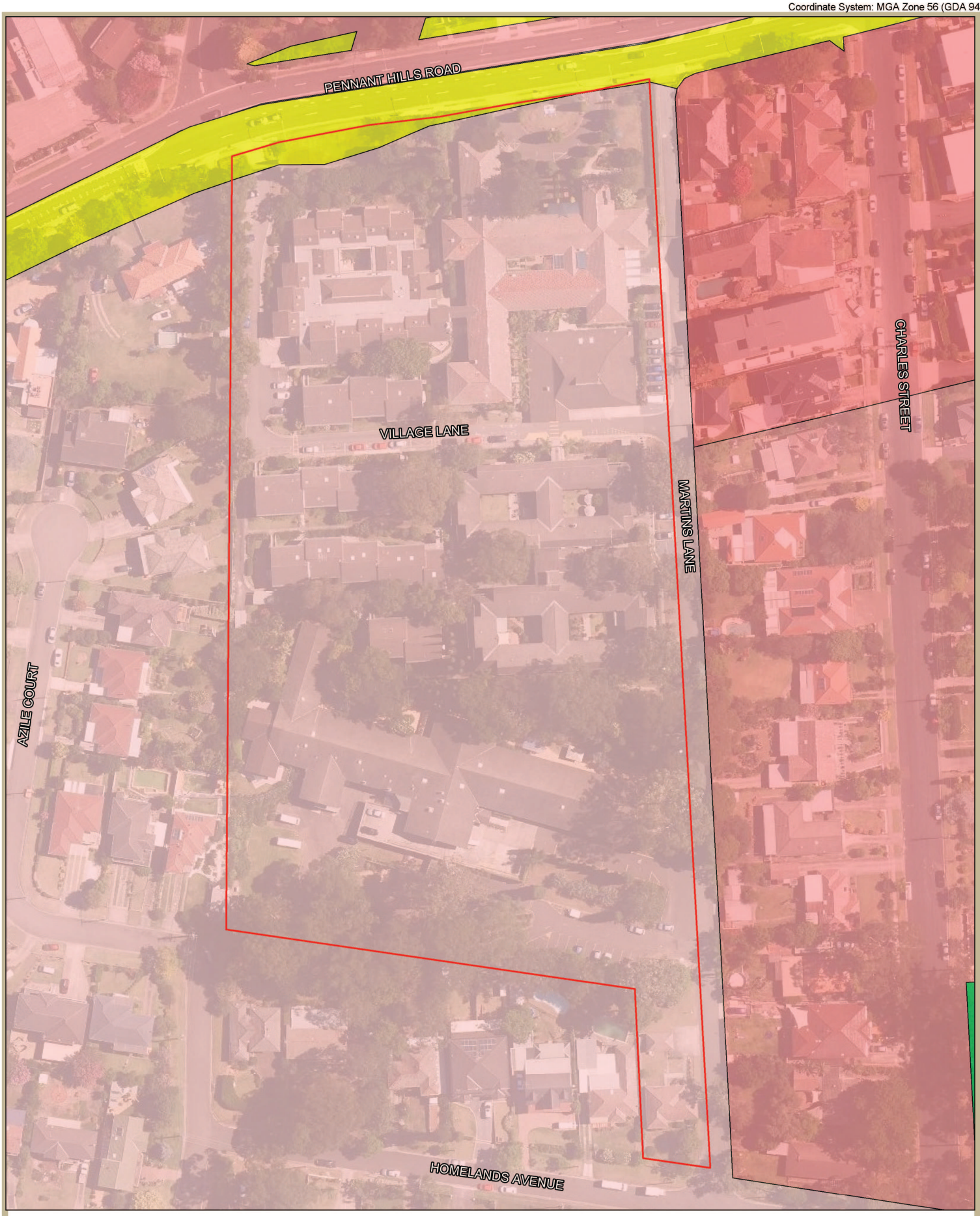


**Figure 1.2. Zoning of the Subject Site**


**Figure 1.3. Concept Master Plan of the Subject Site**

Image Source: Allen Jack + Cottier Architects, 2015

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

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)


**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*


**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.


**Figure 5.1. Constraints Map**

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
-

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.

**Prepared by City of Parramatta Council**

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