

Moore Trees  
Arboricultural Services

ABN 90887347745

# Arboricultural Development Assessment Report

*Anglicare, St Lukes*  
*4 Lindsay Evans Place, Dapto NSW 2530*  
ILU PROJECT  
April 2019  
*FINAL (Updated 16<sup>th</sup> July 2019)*



Member 2019



Prepared for: Anglicare  
c/o RJA Projects

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## Summary

This report has been compiled for RJA Projects on behalf of Anglicare. The report concerns a proposed Development Application for Anglicare, St Lukes Dapto NSW 2530. This Arborist Report refers to one hundred and thirty five (135) trees.

This report contains the following information required in Wollongong City Council Development guidelines:-

- 1) All trees were assessed for Safe Useful Life Expectancy (SULE).
- 2) Genus and species of each tree.
- 3) Impact of the proposed development on each tree.
- 4) Impact of retaining tree on the proposed development.
- 5) The Tree Protection Zone (TPZ) for each tree to be retained.
- 6) Any root barriers necessary, type and location.
- 7) Any branch or root pruning that may be required for trees.
- 8) List trees within fifteen (15) metres of the site boundary.

Trees numbered as 50, 61, 158-161, 166 (recently failed), 288, 289, 294, 304, 306, 308, 309, 310, 315, 335, 347 348, 409 and 410 are required to be removed so to comply with the bush fire management recommendations for the APZ area to the south of the site. These removals form part of an approved Development Application being DA 2008/1470 and which provides for a 40m APZ. All other trees should be possible to retain.

Trees to be retained will require tree protection fencing as specified in Section 5.2 of this report. This fencing will be located at the Tree Protection Zones (TPZ) listed in the Tree Schedule (Appendix 2). The specifications for a TPZ are in Section 5.3 of this report.

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## **VERSION CONTROL**

<b>Date of Issue</b>	<b>Details</b>
12 <sup>th</sup> April 2019	Draft 1 issued
15 <sup>th</sup> April 2019	Final version issued
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# **1 INTRODUCTION**

- 1.1** This report has been conducted to assess the health and condition of one hundred and thirty five (135) trees located at Anglicare, St Lukes, Dapto NSW 2530. This report has been prepared for RJA Projects on behalf of Anglicare as required for a Development Application with Wollongong City Council at this site.

The subject trees assessed for this report are not consecutively numbered. The numbering in this report is based on the tags that are currently affixed to the site trees. The tree locations are based on the Dennis Smith Survey Plans 2015. An additional column in Appendix 2 (Tree Health and Condition Schedule) list both numbering systems from the survey and the site tree tags.

The subject trees were assessed for their health and condition. Also included in this report are tree protection measures that will help retain and ensure that the long term health of the trees to be retained are not adversely affected by the proposed development in the future.

As specified in the Wollongong City Council Development Application guidelines the following data was collected for each tree:

- 1) A site plan locating all trees over three (3) metres in height, including all street trees.
- 2) All trees were assessed for Safe Useful Life Expectancy (SULE), health and amenity value.
- 3) Genus and species identification of each tree.
- 4) Impact of the proposed development on each tree.
- 5) The Tree Protection Zone (TPZ) for each tree to be retained.
- 6) Any branch or root pruning that may be required for trees.

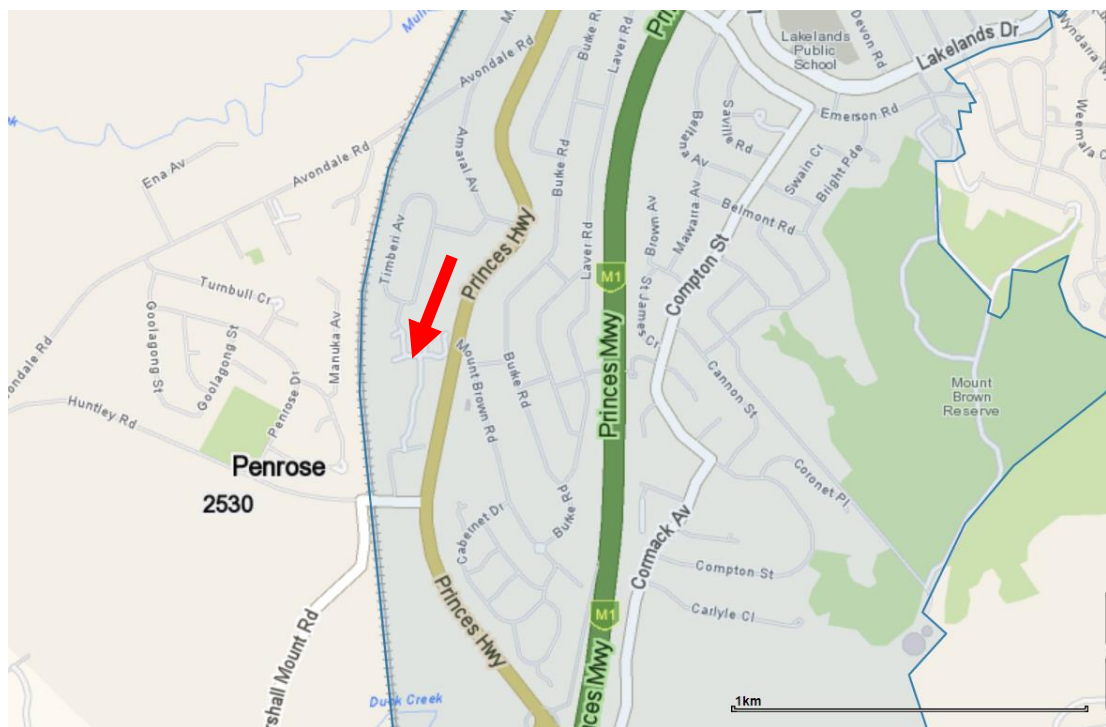
Also noted for the purpose of this report were:

- Health and Vigour; using foliage colour and size, extension growth, presence of deadwood, dieback and epicormic growth throughout the tree.

- Structural condition using visible evidence of bulges, cracks, leans and previous pruning.
- The suitability of the tree taking into consideration the proposed development.
- Age rating; Over-mature (>80% life expectancy), Mature (20-80% life expectancy), Young, Sapling (<20% life expectancy).

**1.2 Documents and information provided:** I have been informed the Independent Living Units (ILU) will be undergoing a renovation of the existing structure.

**1.3 Location:** The proposed development site is located at 4 Lindsay Evans Place, Dapto NSW 2530. The proposed development site from herein will be referred to as "the Site". The study area can be seen in Diagram 2.



**Diagram 1:** Location of subject site, Anglicare, St Lukes Dapto (Red arrow) (whereis.com.au, 2019)



**Diagram 2:** Location of the study area (Google earth 2019)



## **2 METHODOLOGY**

**2.1** To record the health and condition of the trees, a Visual Tree Assessment (VTA) was undertaken on the subject trees on 8<sup>th</sup> April 2019, 4<sup>th</sup> June 2019 and the 10<sup>th</sup> July 2019. This method of tree evaluation is adapted from Matheny and Clark, 1994 and is recognised by The International Society of Arboriculture. Individual tree assessments are listed in Appendix 2 of this report. All inspections were undertaken from the ground. No diagnostic devices were used on these trees.

**2.2** This report is only concerned with trees on the site that come under the Tree management permit policy that is part of the Wollongong City Council Development Control Plan, 2009 (Chapter E17 Preservation and management of Trees and vegetation). Under this Chapter (E17), a person must not ringbark, cut down, top, lop, remove, injure or wilfully destroy any prescribed tree or other vegetation, without development consent or a permit being granted by Council. Refer to Part 3 (Chapter E17) Definitions for the meaning of ‘prescribed tree’ and ‘prescribed other vegetation’. Two application processes have been established to deal with the assessment and approval for prescribed trees:

a) Tree Management Permit (generally for individual/small scale tree removal and pruning in urban areas) - refer to Council’s website for the Tree Management Permit Policy;

b) Development consent via either Complying Development or Development Application. This Chapter of the DCP should be read in conjunction with clauses 5.10 Heritage conservation, 5.11 Bush fire hazard reduction work and 7.2 Natural resource sensitivity – biodiversity of Wollongong Local Environmental Plan 2009.

This Report is required as per clause (b) via a Development Application for the site. This report takes no account of any tree or shrub under three (3) metres in height.

- 2.3 Height:** The heights and distances within this report have been measured with a Bosch DLE 50 laser measure.
- 2.4 Tree Protection Zones (TPZ):** The TPZ is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. TPZ's have been calculated for each tree to determine construction impacts. The TPZ calculation is based on the Australian Standard *Protection of trees on development sites*, AS 4970, 2009.
- 2.5 Structural Root Zone (SRZ):** The SRZ is a specified distance measured from the trunk that is set aside for the protection of tree roots, both structural and fibrous. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. For the purpose of this report the SRZ is within the TPZ so no additional fencing will be required. The TPZ and SRZ are measured as a radial measurement from the trunk. No roots should be severed within this area. A detailed methodology on the TPZ and SRZ calculations can be found in Appendix 4.
- 2.6 Safe Useful Life Expectancy (SULE):** The subject trees were assessed for a Safe Useful Life Expectancy (SULE). The SULE rating for each tree can be seen the Tree Assessment Schedule (Appendix 2). A detailed explanation of SULE can be found in Appendix 3.
- 2.7 Impact Assessment:** An impact assessment was conducted on the site trees. This was conducted by assessing the site survey and plans provided by RJA Projects. The plans provided were assessed for the following:
- Reduced Level (R.L.) at base of tree.
  - Incursions into the Tree Protection Zone (TPZ).
  - Assessment of the likely impact of the works.
  - Location of sediment controls in relation to TPZ areas
  - Location of stockpile areas in relation to TPZ areas



### 3 RELEVANT BACKGROUND INFORMATION

**3.1** The site is part of the St Lukes Village Anglicare site located between the Illawarra Railway and the Princes Highway just south-west of Dapto. The site contains multi-level buildings surrounded by gardens and court yard areas. A large native bushland area is located to the south of the site a portion of which form part of the APZ area. The proposed works entail renovation of the existing structure.

**3.2 Environmental Significance:** All trees in the Wollongong Local Government Area are protected and cannot be removed without the adequate requirements being met. Specifications relating to what can and cannot be removed are detailed in the Wollongong City Council Development Control Plan (DCP), 2009 in Chapter E17 '*Preservation of trees & management of trees and vegetation*'. This DCP protects all trees above three (3) metres in height with a girth of twenty (20) centimetres or more, measured at a distance of one hundred (100) centimetres above the ground.

As Council is the consent authority regarding the site trees, Council may not agree with the views expressed in this report and condition that certain trees are to be retained. This may entail redesign or minor alterations of the project. In this instance, the Architect or Draftsperson should refer to the TPZ and SRZ measurements to enable adequate distances to be maintained between the tree and any proposed works.

**3.3 OEH Native vegetation Mapping:** The online Native Vegetation Regulatory (NVR) Map was prepared by OEH under Part 5A of the amended *Local Land Services Act 2013* (LLS Act) and supporting regulation.

The Native Vegetation Regulatory Map is a tool to give landholders certainty when planning future management of their land. The Map is a regulatory requirement. Part 5A of the *Local Land Services Act 2013* (LLS Act), requires the Chief Executive of the Office of Environment and Heritage (OEH) to prepare and maintain a Native Vegetation Regulatory (NVR) Map.

The NVR Map generally covers rural land in NSW. It categorises land where management of native vegetation can occur without approval or where management of native vegetation may be carried out in accordance with Part 5A of the LLS Act. A summary of categories used in the NVR Map is shown below (Table 1). The site is mapped as *Excluded land*.

Colour	Category	Definition
Blue	<b>Category 1</b> Unregulated Land	Rural lands where clearing is not regulated by the Part 5A of the LLS Act. Other legislation may apply.
Yellow	<b>Category 2</b> Regulated Land	Rural lands where clearing is regulated and can be carried out in accordance with the Part 5A of the LLS Act or other legislation. This includes complying with the Codes and Allowable activities.
Orange	<b>Category 2</b> Vulnerable Regulated Land	Rural land where clearing of native vegetation is more restricted than on other Category 2 land. This includes steep and highly erodible lands and riparian land and special category land (as declared).
Pink	<b>Category 2</b> Sensitive Regulated Land	Rural lands where clearing of native vegetation is more restricted than other Category 2 land. This includes lands that are Sensitive Lands due to factors such as the presence of coastal wetlands, littoral rainforests, rainforest, or land that is subject to protection covenants such as conservation or incentive property vegetation plans.
Grey	<b>Excluded Land</b>	Land not regulated by the Part 5A of the LLS Act. This land includes urban zones, environmental conservation zones and R5 large lot residential as gazetted under a Local Environment Plan (LEP). It also includes public conservation lands such as National Parks and State Forests.

**Table 1:** Categories used in the NVR Map (OEH 2018)



**Diagram 3:** Native Vegetation Regulatory Map showing the site and surrounding areas (OEH 2018)

- 3.4 The Site Trees:** The site was inspected on 8<sup>th</sup> April 2019, 4<sup>th</sup> June 2019 and the 10<sup>th</sup> July 2019. Each tree has been given a unique number for this site and can be viewed on the Tree Protection Plan (Appendix 1). This plan is based on the plan provided by Nicholas Bray Landscape Architects. All site trees have been tagged to correspond with the Tree Protection Plan.
- 3.5** The site trees are mostly native specimens being Forest red gum (*Eucalyptus tereticornis*), *Melaleuca styphelioides*, White stringy bark (*Eucalyptus globoidia*), Swamp mahogany (*Eucalyptus robusta*), Lemon-scented gum tree (*Corymbia citriodora*). Only one (1) exotic specimen was noted being Tree 171 (Plate 10) a small semi mature Cook Island Pine (*Araucaria columnaris*).
- 3.6** To the south of the site is a large native bushland site that will not be impacted by the works. Most of this area is managed, most likely due to the Bush fire regulation and as such is free of any low growing shrubs (Plate 1).
- 3.7** Two (2) trees within the site located between buildings are large mature specimens in good health and condition. These trees are numbered as 111 and 168 (Plates 2 and 3). Another tree near Tree 168 has recently been removed as evidenced by the ground out stump.
- 3.8** A short access way or path is proposed within the tree group between Trees 297 and 305 (Plate 11). These trees are in mixed condition but generally in good health with the exception of Tree 300 that is a small dead tree.
- 3.9** Safe Useful Life Expectancy (SULE) is a method of evaluating individual trees. The evaluation is a subjective assessment, not an absolute judgement, because the nature of trees and opinions on trees can vary greatly. SULE assessments are made only by those who are experienced and knowledgeable in tree management. SULE is generally accepted and used world-wide as a method of evaluating trees. Each category has a number of sub-categories. These sub-categories should always be recorded to help future users of the information appreciate the reason for each allocation decision. It is normal to have instances where trees will not fit neatly into a single SULE category. The assessment of the site trees can be seen in Graph 1. In general, the trees were mostly

assessed as being in good health. SULE results show that 70% of the site's tree population has a life expectancy of greater than forty (40) years and 17% had a medium life expectancy. Trees that have a short life expectancy total 8%.

**3.10 Potential habitat:** For the purpose of this report, WCC defines a “Habitat tree” as follows;

*Habitat tree means any tree which is a nectar feeding tree, roost and nest tree or a hollow-bearing tree which is suitable for nesting birds, arboreal marsupials (possums), micro-bats or which support the growth of locally indigenous epiphytic plants such as orchids. (DCP, 2009, Chapter E17 'Preservation of trees & management of trees and vegetation').*

None of the site trees to be removed were assessed as having hollows.

**3.11 Impacts:** Trees numbered as 50, 61, 158-161, 166, 288, 289, 294, 304, 306, 308, 309, 310, 315, 335, 347, 348, 409 and 410 are required to be removed so to comply with the bush fire management recommendations for the APZ area to the south of the site. These removals form part of an approved Development Application being DA 2008/1470 and which provides for a 40m APZ. All other trees should be possible to retain.

## **4 RECOMMENDATIONS**

- 4.1** A Project Arborist should be appointed to oversee the arboricultural related works for the project. The Project Arborist should be used for arboricultural certification services and also used as a point of contact should any questions arise during the project. As specified in AS 4970, 2009, a Project Arborist is a person with a minimum Australian Qualification Framework (AQF) level 5 Diploma of Arboriculture or Horticulture qualification.
- 4.2** Trees numbered as 50, 61, 158-161, 166, 288, 289, 294, 304, 306, 308, 309, 310, 315, 335, 347 348, 409 and 410 are required to be removed so to comply with the bush fire management recommendations for the APZ area to the south of the site. These removals form part of an approved Development Application being DA 2008/1470 and which provides for a 40m APZ. These numbers related to the site tree tags affixed to the main stems. All other trees should be possible to retain.
- 4.3** A tabulated list of trees to be retained and removed is located in Appendix 2.
- 4.4** Trees to be retained will require tree protection fencing as specified in Section 5.2 of this report. This fencing will be located at the Tree Protection Zones (TPZ) listed in the Tree Schedule (Appendix 2). The specifications for a TPZ are in Section 5.3 of this report.
- 4.5** Site access is presumed to be from Timberi Avenue. All other site trees have clear access with no overhanging limbs that will impede the site access.

## 5 TREE PROTECTION

**5.1 Trees to be protected:** Trees to be retained will be required to be fenced for protection. All fencing shall be installed as specified in Section 5.2 (Tree Protection – Implementation of Tree Protection Zone). Indicative locations of the fencing are shown in the Tree Protection Plan (Appendix 1).

**5.2 Implementation of Tree Protection Zone:** All tree protection works should be carried out before the start of demolition or building work. It is recommended that chain mesh fencing with a minimum height of 1.8 metres be erected as shown in the Tree Protection Plan (Appendix 1). Specifications for this fencing are shown in Tree Protection Fencing Specifications (Appendix 5).

**5.3 Instructional videos:** Alternatively, you can view the Moore Trees short instructional films on the links below. These films are a quick onsite reference for builders, project managers and architects.

### **Film #2, Tree Protection Fencing**

<https://www.youtube.com/watch?v=ffMabxLN9nU>

**5.4 The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ):** The TPZ is implemented to ensure the protection of the trunk and branches of the subject tree. The TPZ is based on the Diameter at Breast Height (DBH) of the tree. The SRZ is also a radial measurement from the trunk used to protect and restrict damage to the roots of the tree.

The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) have been measured from the centre of the trunk. TPZ and SRZ distances are all listed in the Tree Schedule (Appendix 2). The following activities shall be avoided within the TPZ and SRZ of the trees to be retained;

- Erecting site sheds or portable toilets.

- Trenching, ripping or cultivation of soil (with the exception of approved foundations and underground services).
- Soil level changes or fill material (pier and beam or suspended slab construction are acceptable).
- Storage of building materials.
- Disposal of waste materials, solid or liquid.

**5.5 Tree Damage:** If the retained trees are damaged a qualified Arborist should be contacted as soon as possible. The Arborist will recommend remedial action so as to reduce any long term adverse effect on the tree's health.

**5.6 Signage:** Wollongong City Council requires signage is attached to the tree protection fencing. A sample sign has been attached in Appendix 6. This sign may be copied and laminated then attached to any TPZ fencing.

**5.7 Root Pruning:** If excavations are required within a TPZ this excavation shall be done by hand to expose any roots. Any roots under fifty (50) millimetres in diameter may be pruned cleanly with a sharp saw. Tree root systems are essential for the health and stability of the tree. A hand dig area can be seen in the Tree Protection Plan, Plan 2. Severed roots shall be treated with Steriprune®, available at most large Hardware Stores.

**5.8 Arborist Certification:** Wollongong City Council requires the developer to supply Council or the Principal Certifying Authority with certification from the Project Arborist three (3) times during the construction phase of the development (as outlined in Council's Development Control Plan, 2009), in order to verify that retained trees have been correctly retained and protected as per the conditions of consent and Arborist's recommendations. The certification is to be conducted by a Qualified Consulting Arborist with AQF level 5 qualifications that has current membership with either Arboriculture Australia (AA) or Institute of Australian Consulting Arboriculturists (IACA). Arborist certification is recommended:

- (1) Before the commencement of demolition or construction to confirm the fencing has been installed at the correct locations;



- (2) At mid point of the construction phase;
- (3) At completion of the construction phase.

If you have any questions in relation to this report please contact me.



**Paul Vezgoff**

Consulting Arborist

Dip Arb (Dist), Arb III, Hort cert, AA, ISA

16<sup>th</sup> July 2019



[www.mooretrees.com.au](http://www.mooretrees.com.au)

## 6 IMAGES



**Plate 1:** Trees to the south of the site. P. Vezgoff.



**Plate 2:** Tree 111. P. Vezgoff.





**Plate 3:** Tree 168. P. Vezgoff.



**Plate 4:** Trees in the south western corner of the site. P. Vezgoff.





**Plate 5:** Trees to the west of the site. P. Vezgoff.



**Plate 6:** Image showing the approximate boundary to the north of the ILU building. P. Vezgoff.





**Plate 8:** Trees 151-153. P. Vezgoff.



**Plate 9:** Trees 162, 163, 164, 166, 167 and 345. Tree 166 (red arrow) has recently failed. P. Vezgoff.





**Plate 10:** Trees 172, 173 and 171. P. Vezgoff.



**Plate 11:** Image showing adequate space between trees 297-305 for the path construction. P. Vezgoff.

## **Appendix 1**

### **Plan 1**

# **Tree Protection Plan**





Moore Trees

# Tree protection plan

## LEGEND



Trees to be retained



Trees to be removed

Black tree numbers denote tree tag number.  
Blue number is the number on the Dennis Smith Survey



**Fence.** Implementation of tree protection zone (TPZ). All tree protection works should be carried out before the start of demolition or building works. It is recommended that chain mesh fencing with a minimum height of 1.8 metres be erected

Trees numbered as 50, 61, 158-161, 166, 288, 289, 294, 304, 306, 308, 309, 310, 315, 335, 347, 348, 409 and 410 are required to be removed so to comply with the bush fire management recommendations for the APZ area to the south of the site. These removals form part of an approved Development Application being DA 2008/1470 and which provides for a 40m APZ.



Date: 16.7.19  
Drawn: P.Vezgoff  
Site Address: St Lukes Dapto  
ILU Project NSW 2350

## Appendix 2

# **Tree health & condition** **assessment schedule**

## TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE – St Lukes Village Anglicare, ILU, Dapto

Survey#	Tree #	Species	Height (m)	Spread (m)	DBH (m)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (m)	SRZ (m)	Retain/Remove
152	48	Forest red gum (Eucalyptus tereticornis)	18	8	0.9	90	No visual defects	1a >40 years	Good	Mature	Minor wound at base	10.8	3.3	Retain
NA	49	Melaleuca decora	10	5	0.35	95	No visual defects	1a >40 years	Good	Mature		4.2	2.3	Retain
156	50	Forest red gum (Eucalyptus tereticornis)	15	5	0.4	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Twisted upper stem and upper wound	5	2	Remove
150	51	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
148	52	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
147	53	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
149	54	Forest red gum (Eucalyptus tereticornis)	8	3	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
138	57	Melaleuca decora	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
137	58	Forest red gum (Eucalyptus tereticornis)	18	7	0.5	95	No visual defects	1a >40 years	Good	Mature		6	2.6	Retain
135	60	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
134	61	Forest red gum (Eucalyptus tereticornis)	17	7	0.5	95	No visual defects	1a >40 years	Good	Mature		6	2.6	Remove
NA	62	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
133	63	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
130	64	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
131	67	Forest red gum (Eucalyptus tereticornis)	19	9	0.5	95	No visual defects	1a >40 years	Good	Mature		6	2.6	Retain

Survey#	Tree #	Species	Height (m)	Spread (m)	DBH (m)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (m)	SRZ (m)	Retain/ Remove
129	68	Forest red gum (Eucalyptus tereticornis)	18	7	0.5	95	No visual defects	1a >40 years	Good	Mature		6	2.6	Retain
127	69	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
128	70	Melaleuca decora	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	71	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
112	72	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
111	73	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
110	74	Forest red gum (Eucalyptus tereticornis)	10	3	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
109	75	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
108	76	Forest red gum (Eucalyptus tereticornis)	16	6	0.5	95	No visual defects	1a >40 years	Good	Mature		6	2.6	Retain
107	77	Forest red gum (Eucalyptus tereticornis)	19	9	0.5	95	No visual defects	1a >40 years	Good	Mature		6	2.6	Retain
199	111	Lemon-scented gum tree (Corymbia citriodora)	18	9	0.4	100	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
173	112	Lemon-scented gum tree (Corymbia citriodora)	18	9	0.4	100	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
157	151	White stringy bark(Eucalyptus globoidia)	9	4	0.3	80	No visual defects	3a May only live for 5-15 years.	Fair	Mature		3.6	2.2	Retain
158	152	Forest red gum (Eucalyptus tereticornis)	13	7	0.25	95	No visual defects	1a >40 years	Good	Mature		3	2.1	Retain
159	153	Forest red gum (Eucalyptus tereticornis)	19	9	0.5	95	No visual defects	1a >40 years	Good	Mature		6	2.6	Retain
126	154	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
125	155	Forest red gum (Eucalyptus tereticornis)	10	4	0.5	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain

Survey#	Tree #	Species	Height (m)	Spread (m)	DBH (m)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (m)	SRZ (m)	Retain/Remove
123	156	Forest red gum (Eucalyptus tereticornis)	8	4	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
124	157	Forest red gum (Eucalyptus tereticornis)	11	3	0.3	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
116	158	Forest red gum (Eucalyptus tereticornis)	11	3	0.3	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Remove
115	159	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Remove
114	160	Forest red gum (Eucalyptus tereticornis)	19	13	0.8	95	Fruiting body (large)	3b 5-15 but removed for safety or nuisance reasons.	Fair	Mature	Scattered dead wood. Fruiting bodies on lower stem and basal area.	9.6	3.1	Remove
113	161	Forest red gum (Eucalyptus tereticornis)	19	13	0.8	95	No visual defects	1a >40 years	Good	Mature	Scattered dead wood	9.6	3.1	Remove
117	162	Melaleuca decora	11	4	0.5	90	No visual defects	1a >40 years	Good	Mature		9.6	3.1	Retain
NA	163	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
118	164	Swamp mahogany (Eucalyptus robusta)	14	5	0.45	40	No visual defects	4a Dead, dying or declining.	Poor	Mature		5.4	2.5	Retain
120	165	Forest red gum (Eucalyptus tereticornis)	9	4	0.2	90	No visual defects	1a >40 years	Good	Mature		2.4	1.9	Retain
121	166	White stringy bark(Eucalyptus globoidia)	14	8	0.45	80	No visual defects	3b 5-15 but removed for safety or nuisance reasons.	Fair	Mature	Tree has recently failed	5.4	2.5	Remove
122	167	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
187	168	Swamp mahogany (Eucalyptus robusta)	15	7	0.35	90	No visual defects	2a May only live for 15-40 years	Good	Mature		4.2	2.3	Retain
205	170	Forest red gum (Eucalyptus tereticornis)	19	9	0.55	90	No visual defects	1a >40 years	Good	Mature		6.6	2.7	Retain
208	171	Norfolk Island Pine (Araucaria heterophylla)	10	2.5	0.25	100	No visual defects	1a >40 years	Good	Mature		3	2.1	Retain

Survey#	Tree #	Species	Height (m)	Spread (m)	DBH (m)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (m)	SRZ (m)	Retain/ Remove
211	172	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
210	173	Forest red gum (Eucalyptus tereticornis)	9	5	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
209	174	Forest red gum (Eucalyptus tereticornis)	8	4	0.3	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
217	224	Brushbox (Lophostemon confertus)	8	3	0.35	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
216	225	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
212	226	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature	ILU	4.8	2.4	Retain
213	227	Forest red gum (Eucalyptus tereticornis)	7	3	0.25	90	No visual defects	1a >40 years	Good	Mature	ILU	4.8	2.4	Retain
215	229	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	90	No visual defects	1a >40 years	Good	Mature	ILU	4.8	2.4	Retain
NA	230	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature	ILU	4.8	2.4	Retain
NA	270	Forest red gum (Eucalyptus tereticornis)	19	7	0.6	95	No visual defects	1a >40 years	Good	Mature		7.2	2.8	Retain
NA	271	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	272	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
198	273	Forest red gum (Eucalyptus tereticornis)	14	4	0.35	95	No visual defects	1a >40 years	Good	Mature		4.2	2.3	Retain
NA	274	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	275	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	276	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
197	277	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain

Survey#	Tree #	Species	Height (m)	Spread (m)	DBH (m)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (m)	SRZ (m)	Retain/ Remove
NA	278	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	279	Forest red gum (Eucalyptus tereticornis)	4	2	0.12	100	No visual defects	1a >40 years	Good	Sapling		1.4	1.6	Retain
196	280	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	281	Forest red gum (Eucalyptus tereticornis)	4	2	0.12	100	No visual defects	1a >40 years	Good	Sapling		1.4	1.6	Retain
NA	283	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	284	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	285	Bangalay (Eucalyptus botryoides)	4	2	0.12	100	No visual defects	1a >40 years	Good	Sapling		1.4	1.6	Retain
NA	286	Blackbutt (Eucalyptus pilularis)	6	0	0.6	0	No visual defects	4a Dead, dying or declining.	Dead	Mature	Likely habitat hollows stag	7.2	2.8	Retain
NA	287	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
195	288	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	0	No visual defects	4a Dead, dying or declining.	Dead	Sapling		2.4	1.9	Remove
NA	289	Melaleuca decora	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Remove
189	290	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
190	291	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
191	292	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Mature		2.4	1.9	Retain
192	293	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	294	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Mature		2.4	1.9	Remove
186	295	Forest red gum (Eucalyptus tereticornis)	12	5	0.3	100	No visual defects	1a >40 years	Good	Sapling		3.6	2.2	Retain



Survey#	Tree #	Species	Height (m)	Spread (m)	DBH (m)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (m)	SRZ (m)	Retain/Remove
NA	296	Melaleuca styphelioides	7	4	0.2	95	No visual defects	1a >40 years	Good	Mature	Multi stemmed specimen at base of 297	2.4	1.9	Retain
185	297	Forest red gum (Eucalyptus tereticornis)	19	6	0.45	95	No visual defects	1a >40 years	Good	Mature		5.4	2.7	Retain
184	299	Melaleuca decora	14	7	0.8	95	No visual defects	1a >40 years	Good	Mature		9.6	2.6	Retain
NA	300	Melaleuca decora	8	2	0.3	0	No visual defects	4a Dead, dying or declining.	Dead	Overmature		3.6	2.2	Retain
NA	301	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	302	Forest red gum (Eucalyptus tereticornis)	4	2	0.15	100	No visual defects	1a >40 years	Good	Sapling		1.8	1.6	Retain
183	303	Forest red gum (Eucalyptus tereticornis)	4	2	0.15	100	No visual defects	1a >40 years	Good	Sapling		1.8	1.6	Retain
182	304	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Mature		2.4	1.9	Remove
174	305	Melaleuca styphelioides	8	4	0.5	95	No visual defects	1a >40 years	Good	Mature		6	2.6	Retain
101	306	Thin-leaved stringy bark (Eucalyptus eugenioides)	9	3	0.3	95	No visual defects	1a >40 years	Fair	Mature		3.6	2.4	Remove
177	308	Thin-leaved stringy bark (Eucalyptus eugenioides)	9	3	0.25	95	No visual defects	1a >40 years	Fair	Mature		3	2.4	Remove
180	309	Thin-leaved stringy bark (Eucalyptus eugenioides)	9	3	0.25	95	No visual defects	1a >40 years	Fair	Mature		3	2.4	Remove
NA	310	Thin-leaved stringy bark (Eucalyptus eugenioides)	9	3	0.25	95	No visual defects	1a >40 years	Fair	Mature		3	2.4	Remove
179	311	Thin-leaved stringy bark (Eucalyptus eugenioides)	11	3	0.25	95	No visual defects	1a >40 years	Good	Mature		3	2.1	Retain
176	312	Thin-leaved stringy bark (Eucalyptus eugenioides)	15	5	0.4	95	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
175	313	Thin-leaved stringy bark (Eucalyptus eugenioides)	15	5	0.4	95	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
169	314	Thin-leaved stringy bark (Eucalyptus eugenioides)	15	5	0.3	95	No visual defects	1a >40 years	Good	Mature		3.6	2.4	Retain

Survey#	Tree #	Species	Height (m)	Spread (m)	DBH (m)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (m)	SRZ (m)	Retain/ Remove
170	315	Thin-leaved stringy bark (Eucalyptus eugenioides)	15	5	0.4	95	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Remove
171	316	Thin-leaved stringy bark (Eucalyptus eugenioides)	11	3	0.25	95	No visual defects	4a Dead, dying or declining.	Dead	Overmature		3	2.1	Retain
172	317	Thin-leaved stringy bark (Eucalyptus eugenioides)	11	3	0.25	95	No visual defects	1a >40 years	Good	Mature		3	2.1	Retain
172	318	Thin-leaved stringy bark (Eucalyptus eugenioides)	15	5	0.4	95	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
172	319	Bangalay (Eucalyptus botryoides)	4	2	0.12	0	No visual defects	4a Dead, dying or declining.	Dead	Sapling		1.4	1.6	Retain
172	320	Thin-leaved stringy bark (Eucalyptus eugenioides)	7	2	0.15	95	No visual defects	1a >40 years	Good	Mature		1.8	1.8	Retain
NA	321	Thin-leaved stringy bark (Eucalyptus eugenioides)	15	5	0.4	95	No visual defects	1a >40 years	Good	Mature		4.8	2.4	Retain
167	322	Forest red gum (Eucalyptus tereticornis)	7	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	323	Forest red gum (Eucalyptus tereticornis)	7	1.5	0.3	28	No visual defects	4a Dead, dying or declining.	Poor	Overmature		3.6	2.2	Retain
NA	324	Forest red gum (Eucalyptus tereticornis)	10	3	0.18	90	No visual defects	1a >40 years	Fair	Mature		2.2	1.6	Retain
163	325	Forest red gum (Eucalyptus tereticornis)	18	7	0.6	100	No visual defects	1a >40 years	Good	Mature		7.2	2.8	Retain
162	326	Forest red gum (Eucalyptus tereticornis)	7	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	327	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	328	Forest red gum (Eucalyptus tereticornis)	7	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	329	Forest red gum (Eucalyptus tereticornis)	7	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	330	Forest red gum (Eucalyptus tereticornis)	7	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	331	Forest red gum (Eucalyptus tereticornis)	7	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain

Survey#	Tree #	Species	Height (m)	Spread (m)	DBH (m)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (m)	SRZ (m)	Retain/ Remove
NA	332	White stringy bark(Eucalyptus globoidia)	14	6	0.25	90	No visual defects	1a >40 years	Good	Mature	Multi stemmed specimen	3	2.1	Retain
NA	333	Forest red gum (Eucalyptus tereticornis)	7	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	334	Forest red gum (Eucalyptus tereticornis)	7	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
NA	335	Melaleuca decora	4	2	0.12	100	No visual defects	4a Dead, dying or declining.	Dead	Overmature		1.4	1.6	Remove
NA	336	Melaleuca decora	4	2	0.12	100	No visual defects	1a >40 years	Good	Sapling		1.4	1.6	Retain
139	337	Melaleuca decora	12	5	0.3	90	No visual defects	1a >40 years	Good	Mature		3.6	2.2	Retain
140	338	Forest red gum (Eucalyptus tereticornis)	4	2	0.12	100	No visual defects	1a >40 years	Good	Sapling		1.4	1.6	Retain
142	339	Forest red gum (Eucalyptus tereticornis)	13	5	0.5	95	No visual defects	1a >40 years	Good	Mature		6	2.6	Retain
141	340	Forest red gum (Eucalyptus tereticornis)	7	2	0.2	100	No visual defects	1a >40 years	Good	Mature		2.4	1.9	Retain
143	341	Forest red gum (Eucalyptus tereticornis)	7	2	0.2	100	No visual defects	1a >40 years	Good	Mature		2.4	1.9	Retain
NA	342	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
144	343	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Retain
145	344	Melaleuca styphelioides	6	4	0.3	95	No visual defects	1a >40 years	Good	Mature		3.6	2.2	Retain
119	345	Melaleuca decora	4	2	0.12	100	No visual defects	4a Dead, dying or declining.	Dead	Overmature		1.4	1.6	Retain
136	346	Forest red gum (Eucalyptus tereticornis)	28	11	.5	90	No visual defects	1a >40 years	Good	Mature		6	2.6	Retain
161	347	Forest red gum (Eucalyptus tereticornis)	18	8	0.6	90	No visual defects	1a >40 years	Good	Mature		6	2.6	Remove
155	348	Melaleuca decora	4	2	0.12	100	No visual defects	1a >40 years	Good	Sapling		1.4	1.6	Remove
154	349	Forest red gum (Eucalyptus tereticornis)	15	5	0.35	90	No visual defects	2a May only live for 15-40 years	Fair	Mature	Southern lean	4.2	2.3	Retain

Survey#	Tree #	Species	Height (m)	Spread (m)	DBH (m)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (m)	SRZ (m)	Retain/ Remove
153	352	Forest red gum (Eucalyptus tereticornis)	18	8	0.9	90	No visual defects	1a >40 years	Good	Mature	Minor wound at base	10.8	3.3	Retain
160	354	Forest red gum (Eucalyptus tereticornis)	11	5	0.3	95	No visual defects	1a >40 years	Good	Mature		3	2.1	Retain
212	405	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature	ILU	4.8	2.4	Retain
213	406	Forest red gum (Eucalyptus tereticornis)	7	3	0.25	90	No visual defects	1a >40 years	Good	Mature	ILU	4.8	2.4	Retain
215	407	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	90	No visual defects	1a >40 years	Good	Mature	ILU	4.8	2.4	Retain
NA	408	Forest red gum (Eucalyptus tereticornis)	9	4	0.4	90	No visual defects	1a >40 years	Good	Mature	ILU	4.8	2.4	Retain
143	409	Forest red gum (Eucalyptus tereticornis)	7	2	0.2	100	No visual defects	1a >40 years	Good	Mature		2.4	1.9	Remove
NA	410	Forest red gum (Eucalyptus tereticornis)	4	2	0.2	100	No visual defects	1a >40 years	Good	Sapling		2.4	1.9	Remove

**KEY**

**Tree No:** Relates to the number allocated to each tree for the Tree Plan.

**Height:** Height of the tree to the nearest metre.

**Spread:** The average spread of the canopy measured from the trunk.

**DBH:** Diameter at breast height. An industry standard for measuring trees at 1.4 metres above ground level, this measurement is used to help calculate Tree Protection Zones.

**Live Crown Ratio:** Percentage of foliage cover for a particular species.

<b>Age Class:</b> Young:	Recently planted tree	Semi-mature:< 20% of life expectancy
Mature:	20-90% of life expectancy	Over-mature:>90% of life expectancy

**SULE:** See SULE methodology in the Appendix 3

**Tree Protection Zone (TPZ):** The minimum area set aside for the protection of the trees trunk, canopy and root system throughout the construction process. Breaches of the TPZ will be specified in the recommendations section of the report.

**Structural Root Zone (SRZ):** The SRZ is a specified distance measured from the trunk that is set aside for the protection of the trees roots both structural and fibrous.

## Appendix 3

### SULE categories (after Barrell, 2001)<sup>1</sup>

SULE Category	Description
<i>Long</i>	<i>Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.</i>
1a	Structurally sound trees located in positions that can accommodate for future growth
1b	Trees that could be made suitable for retention in the long term by remedial tree care.
1c	Trees of special significance that would warrant extraordinary efforts to secure their long term retention.
<i>Medium</i>	<i>Trees that appeared to be retainable at the time of assessment for 15-40 years with an acceptable level of risk.</i>
2a	Trees that may only live for 15-40 years
2b	Trees that could live for more than 40 years but may be removed for safety or nuisance reasons
2c	Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide for new planting.
2d	Trees that could be made suitable for retention in the medium term by remedial tree care.
<i>Short</i>	<i>Trees that appeared to be retainable at the time of assessment for 5-15 years with an acceptable level of risk.</i>
3a	Trees that may only live for another 5-15 years
3b	Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
3c	Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
3d	Trees that require substantial remedial tree care and are only suitable for retention in the short term.
<i>Remove</i>	<i>Trees that should be removed within the next five years.</i>
4a	Dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
4b	Dangerous trees because of instability or loss of adjacent trees
4c	Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
4d	Damaged trees that are clearly not safe to retain.
4e	Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
4f	Trees that are damaging or may cause damage to existing structures within 5 years.
4g	Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).
4h	Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
<i>Small</i>	<i>Small or young trees that can be reliably moved or replaced.</i>
5a	Small trees less than 5m in height.
5b	Young trees less than 15 years old but over 5m in height.
5c	Formal hedges and trees intended for regular pruning to artificially control growth.

updated 01/04/01)

1 (Barrell, J. (2001) "SULE: Its use and status into the new millennium" in *Management of mature trees*, Proceedings of the 4<sup>th</sup> NAAA Tree Management Seminar, NAAA, Sydney.

## Appendix 4

# **TPZ and SRZ methodology**

### **Determining the Tree Protection Zone (TPZ)**

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12.

$$\text{TPZ} = \text{DBH} \times 12$$

Where

DBH = trunk diameter measured at 1.4 metres above ground

Radius is measured from the centre of the stem at ground level.

A TPZ should not be less than 2 metres no greater than 15 metres (except where crown protection is required.). Some instances may require variations to the TPZ.

The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 metre outside the crown projection.

### **Determining the Structural Root Zone (SRZ)**

The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree.

The SRZ only needs to be calculated when major encroachment into a TPZ is proposed.

There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings. An indicative SRZ radius can be determined from the trunk diameter measured immediately above the root buttress using the following formula or Figure 1. Root investigation may provide more information on the extent of these roots.

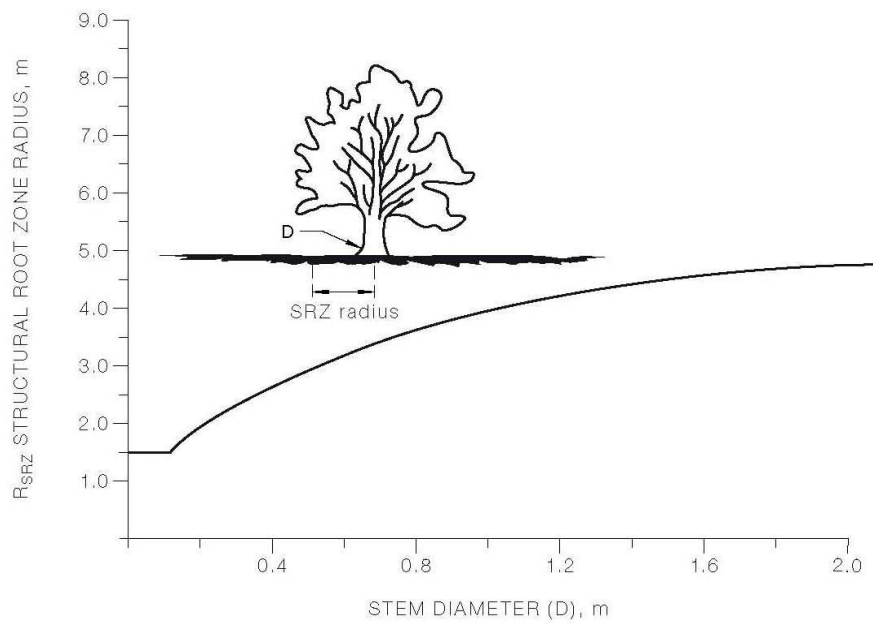
$$\text{SRZ radius} = (D \times 50)^{0.42} \times 0.64$$

Where

$D$  = trunk diameter, in m, measured above the root buttress

NOTE: The SRZ for trees with trunk diameters less than 0.15m will be 1.5m (see Figure 1).





The curve can be expressed by the following formula:  
 $R_{SRZ} = (D \times 50)^{0.42} \times 0.64$

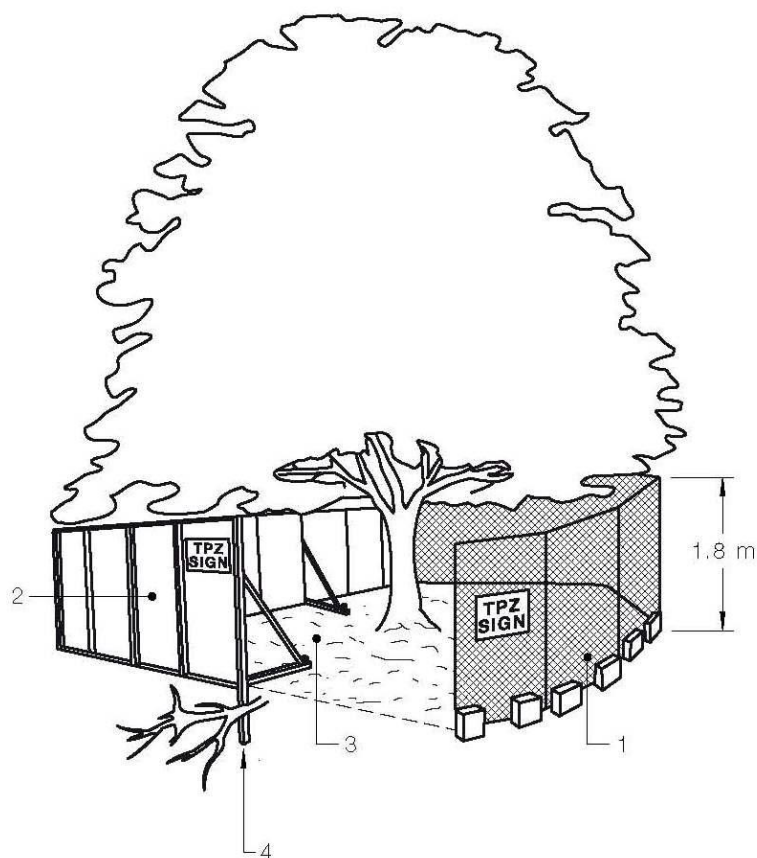
**FIGURE 1 - STRUCTURAL ROOT ZONE**

*Notes:*

- 1  $R_{SRZ}$  is the structural root zone radius.
- 2  $D$  is the stem diameter measured immediately above root buttress.
- 3 The SRZ for trees less than 0.15 metres diameter is 1.5 metres.
- 4 The SRZ formula and graph do not apply to palms, other monocots, cycads and tree ferns.
- 5 This does not apply to trees with an asymmetrical root plate.

## Appendix 5

# **Tree protection fencing** **specifications**



**LEGEND:**

- 1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
- 2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
- 3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
- 4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

**Figure 1:** Protective fencing as specified in AS 4970, 2009.

## Appendix 6

# **Tree protection sign** **sign sample**

# Tree Protection Zone

Fence not to be moved without approval from Arborist

Within this fence there is to be

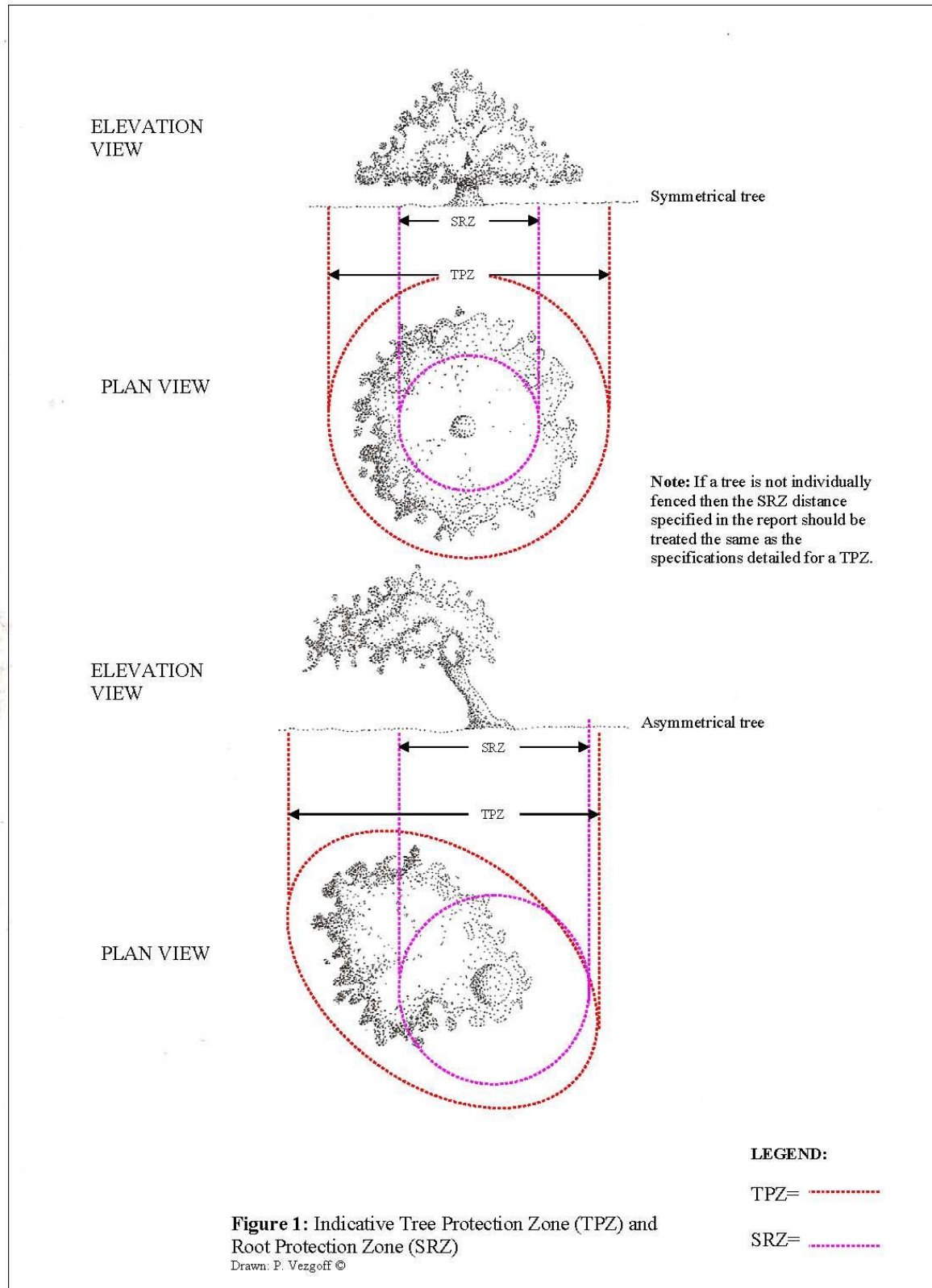
**NO**

Storage of materials

Trenching or excavation

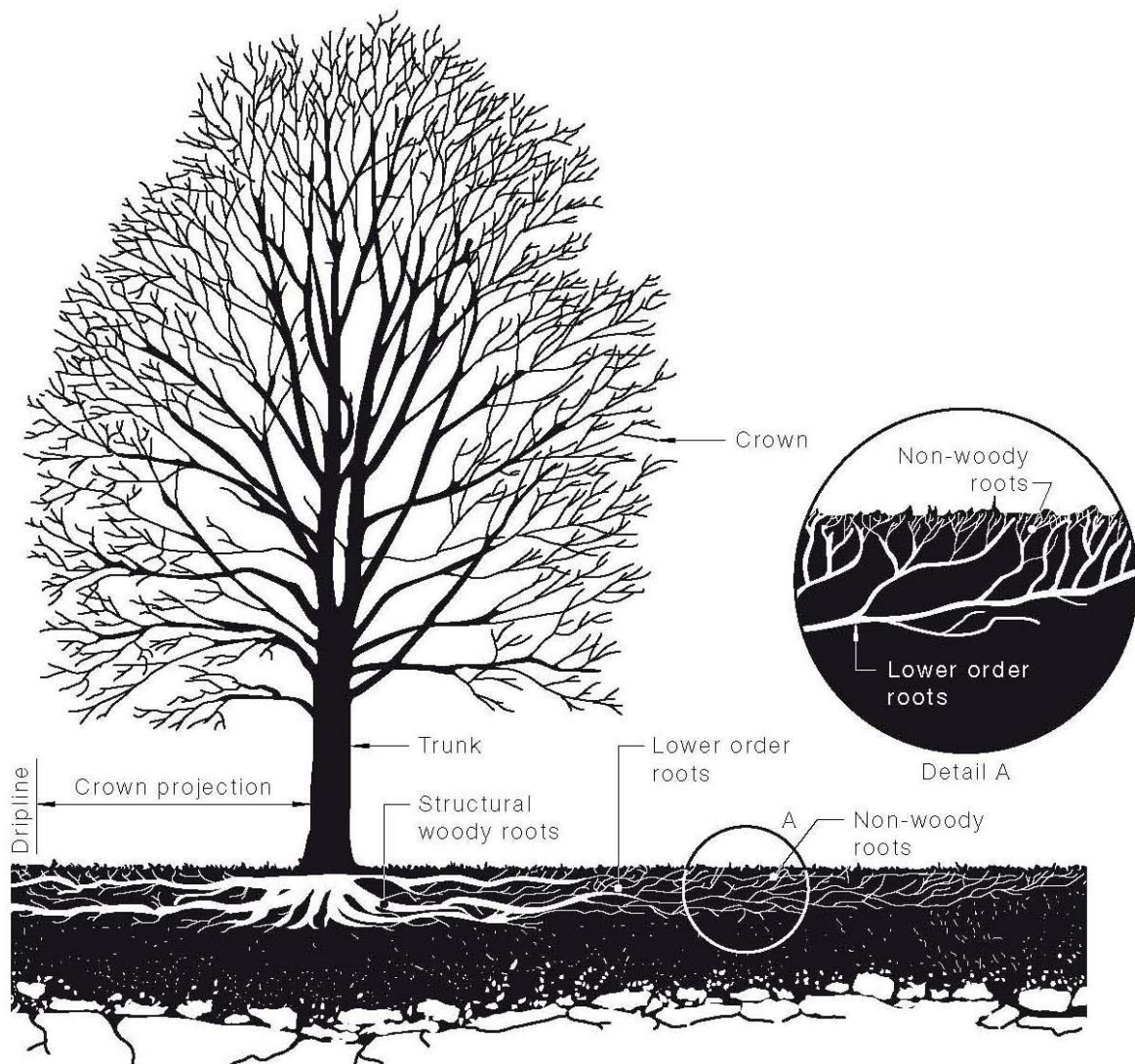
Washing of tools or equipment

## Appendix 7



## Appendix 8

### Tree structure information diagram



**Figure 2:** Structure of a tree in a normal growing environment (AS 4970, 2009.).

## Appendix 9

### Explanatory Notes

- **Mathematical abbreviations:** > = Greater than; < = Less than.
- **Measurements/estimates:** All dimensions are estimates unless otherwise indicated. Less reliable estimated dimensions are indicated with a '?'.
- **Species:** The species identification is based on visual observations and the common English name of what the tree appeared to be is listed first, with the botanical name after in brackets. In some instances, it may be difficult to quickly and accurately identify a particular tree without further detailed investigations. Where there is some doubt of the precise species of tree, it is indicated with a '?' after the name in order to avoid delay in the production of the report. The botanical name is followed by the abbreviation sp if only the genus is known. The species listed for groups and hedges represent the main component and there may be other minor species not listed.
- **Height:** Height is estimated to the nearest metre.
- **Spread:** The maximum crown spread is visually estimated to the nearest metre from the centre of the trunk to the tips of the live lateral branches.
- **Diameter:** These figures relate to 1.4m above ground level and are recorded in centimetres. If appropriate, diameter is measure with a diameter tape. 'M' indicates trees or shrubs with multiple stems.
- **Estimated Age:** Age is estimated from visual indicators and it should only be taken as a provisional guide. Age estimates often need to be modified based on further information such as historical records or local knowledge.
- **Distance to Structures:** This is estimated to the nearest metre and intended as an indication rather than a precise measurement.



## Appendix 10

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# Curriculum Vitae

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## EDUCATION and QUALIFICATIONS

- 2013 / 2018 – ISA TRAQ qualification
- 2007 – Diploma of Arboriculture (AQF Cert V) Ryde TAFE. (Distinction)
- 1997 – Completed Certificate in Crane and Plant Electrical Safety
- 1996 – Attained Tree Surgeon Certificate (AQF Cert II) at Ryde TAFE
- 1990 – Completed two month intensive course on garden design at the Inchbald School of Design, London, United Kingdom
- 1990 – Completed patio, window box and balcony garden design course at Brighton College of Technology, United Kingdom
- 1989 – Awarded the Big Brother Movement Award for Horticulture (a grant by Lady Peggy Pagan to enable horticulture training in the United Kingdom)
- 1989 – Attained Certificate of Horticulture (AQF Cert IV) at Wollongong TAFE

## INDUSTRY EXPERIENCE

### **Moore Trees Arboricultural Services**

**January 2006 to date**

Tree Consultancy and tree ultrasound. Tree hazard and risk assessment, Arborist development application reports  
Tree management plans.

### **Woollahra Municipal Council**

**Oct 1995 to February 2008**

ARBORICULTURE TECHNICAL OFFICER

August 2005 – February 2008

ACTING COORDINATOR OF TREES MAINTENANCE

June – July 2005, 2006

Responsible for all duties concerning park and street trees. Prioritising work duties, delegation of work and staff supervision.  
TEAM LEADER

January 2003 – June 2005

September 2000 – January 2003

HORTICULTURALIST

October 1995 – September 2000

### **Northern Landscape Services**

**July to Oct 1995**

Tradesman for Landscape Construction business

### **Paul Vezgoff Garden Maintenance (London, UK)**

**Sept 1991 to April 1995**

## CONFERENCES AND WORKSHOPS ATTENDED

- International Society of Arboriculture Conference (Canberra May 2017)
- QTRA Conference, Sydney Australia (November 2016)
- TRAQ Conference, Auckland NZ / Sydney (2013/2018)
- International Society of Arboriculture Conference (Brisbane 2008)
- Tree related hazards: recognition and assessment by Dr David Lonsdale (Brisbane 2008)
- Tree risk management: requirements for a defensible system by Dr David Lonsdale (Brisbane 2008)
- Tree dynamics and wind forces by Ken James (Brisbane 2008)
- Wood decay and fungal strategies by Dr F.W.M.R. Schwarze (Brisbane 2008)
- Tree Disputes in the Land & Environment Court – The Law Society (Sydney 2007)
- Barrell Tree Care Workshop- Trees on construction sites (Sydney 2005).
- Tree Logic Seminar- Urban tree risk management (Sydney 2005)
- Tree Pathology and Wood Decay Seminar presented by Dr F.W.M.R. Schwarze (Sydney 2004)
- Inaugural National Arborist Association of Australia (NAAA) tree management workshop- Assessing hazardous trees and their Safe Useful Life Expectancy (SULE) (Sydney 1997).