

ABN 90887347745

# Arboricultural Development Assessment Report

Shellharbour Anglican College 1 Piper Drive Dunmore NSW 2529 Lot 2 DP 1144885 AUGUST 2022 *FINAL* 







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Prepared by: Paul Vezgoff Consulting Arborist ISA, AA Arboriculture Australia Registered Consultant

### Summary

This report has been compiled for Shellharbour Anglican College. The report concerns a proposed Development Application for the proposed learning centre at Shellharbour Anglican College, 1 Piper Drive, Dunmore NSW 2529. This Arborist Report refers to seventy eight (78) trees and addresses Shellharbour City Council's request for further information (dated 21/7/2022 DA0291/2022).

This report contains the following information required in Shellharbour 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) calculated for each tree.
- 6) Any branch or root pruning that may be required for trees.

I have assessed most of the trees as being rated as 5b;*Young trees less than 15 years old but over 5m in height* (See Plate 4). These trees could be replaced and appropriately spaced to allow trees that will grow for more than fifty (50) years as long term specimens.

Although in theory it appears possible to retain some trees, I am not adverse to see all of the trees removed with replanting occurring where trees and shrubs can reach their full potential. Along with proper soil conditioning these new plantings would potentially be a better option for the project area.

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Date of Issue	Details	
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#### **1** INTRODUCTION

1.1 This report has been conducted to assess the health and condition of trees and vegetation for the proposed learning centre development, located at Shellharbour Anglican College, 1 Piper Drive, Dunmore NSW 2529. This report has been prepared for Jonathon Turnbull of Shellharbour Anglican College as required for a Development Application with Shellharbour City Council at this site. This report addresses Shellharbour City Council's request for further information in their letter dated 21/7/2022 for DA 0291/2022.

The purpose of this report is to collect the appropriate tree related data on the subject trees and to provide advice and recommendations to the design and possible construction alternatives to aid against any adverse impacts on the health of the subject trees' to be retained.

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

- A site plan locating all trees over three (3) metres in height, including all street trees.
- 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) calculated for each tree.
- 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 Location:** The proposed development site is located at Shellharbour Anglican College, known as Lot 2 DP 1144885. The proposed development site from herein will be referred to as "the Site".



**Diagram 1:** Location of subject site, Shellharbour Anglican College (Red arrow) (whereis.com.au, 2022)



**Diagram 2:** Location of the study area (Google earth, 2022)

#### 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 5<sup>th</sup> August 2022. 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 Shellharbour Local Environmental Plan (SLEP) 2013. Council's LEP provides for certain trees or other vegetation to be prescribed in the Development Control Plan (DCP). Trees or other vegetation prescribed in the DCP require a tree management permit if it is sought to ringbark, cut down, top, lop, remove, injure or wilfully destroy them. In the DCP a tree is prescribed if it meets any one or more of the following criteria:
  - (a.) is 3 metres or more in height
  - (b.) has a trunk circumference of 30 cm or more at natural ground level
  - (c.) has a branch spread of three (3) metres or more
  - (d.) Is a hollow bearing tree (has cavities in trunk or branches, which can be used by native animals for foraging, shelter, roosting and nesting).
- **2.3 Height:** The heights and distances within this report have been measured with a Bosch DLE 50 laser measure.
- 2.4 Tree Protection Zone (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. The TPZ and SRZ are measured as a radial measurement from the trunk. <u>No roots should be severed within the SRZ area.</u> 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 in the Tree Assessment Schedule (Appendix 2). A detailed explanation of SULE can be found in Appendix 3.
- **2.7 Plans and information provided:** For this Arboricultural Report I was supplied the following documents:
  - Site plan by Edmiston Jones marked DA01/A dated 09.05.2022; and
  - Site survey by SET marked 103864/6 dated 15/08/22.

I have not been provided any plans for engineering specifications or service diagrams for the site.

- **2.8 Impact Assessment:** An impact assessment was conducted on the site trees. This was conducted by assessing the site survey and plans provided by Shellharbour Anglican College. 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 project area is located between two (2) existing buildings with a steep gradient between both structures. The embankment is heavily planted with native tree and shrub specimens. The proposed works entail the construction of a walkway that will traverse the slope.
- **3.2 Environmental Significance:** The Shellharbour City Council Development Control Plan (DCP), amended 6 July 2016, details tree management for the Shellharbour LGA. Section 20.8 (Existing trees/vegetation and development) of the DCP states;

...The arborist report must identify trees by genus and species, be clearly numbered on a survey plan, provide a health and SULE rating, provide a report on the impacts of the proposed development on the tree/s, recommend trees suitable for retention, nominate a tree protection zone plan, recommend the method of tree management, including any branch or root pruning.

These specifications in this DCP have been covered by this Arborist Report.

**3.3 Illegal tree removal:** Damaging or removing trees can result in heavy fines. Local Government does have the authority to issue on the spot fines known as penalty infringement notices (PINS) starting from \$3,000 or can elect to have a potential tree damaging incident addressed in the Local Court. Recent cases, for example, include two (2) mature trees removed for development (Sutherland Shire Council (SSC) v Palamara, 2008) costing \$4,500 in fines and \$5,000 in court costs. SSC v El-Hage, 2010 concerning illegal tree removal of a single tree costing \$31,500 in fines and \$5,000 in costs. Poisoning trees can also incur substantial fines (SSC v Hill) resulted in a single tree fine that totalled \$14,000 plus a \$10,000 bond for a replacement tree. All of the above cases resulted in a criminal conviction for the guilty parties.

- **3.4** The Site Trees: The site was inspected on 5<sup>th</sup> August 2022. Each tree has been given a unique number for this site and can be viewed on the Tree Location Plan (Appendix 1).
- **3.5** In total seventy eight (78) individual trees have been assessed for this report. Most have been planted too close together and as such are unlikely to reach their full potential in terms of their natural shape and size (Plate 1). All trees have been identified as native Illawarra species.
- **3.6** The tree species in this group consist of Blackbutt (*Eucalyptus pilularis*) and Forest red gum (*Eucalyptus tereticornis*), Coastal banksia (*Banksia integrifolia*), Acacia melanoxylon, Acacia maidenii, Melaleuca bracteata, Melaleuca decora, Melaleuca styphelioides.



Plate 1: Image showing the project area from the north, Tree 78 lower right of image. P. Vezgoff.



Plate 2: Image showing the project area from the south. P. Vezgoff.



Plate 3: Images showing the density of the site trees. P. Vezgoff.Page | 11Moore Trees Arboricultural Report for Shellharbour Anglican College

**3.7** 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. In general, the trees were mostly assessed as being in fair health. I have assessed most of the trees as being rated as 5b;*Young trees less than 15 years old but over 5m in height* (See Plate 4). These trees could be replaced and appropriately spaced to allow trees that will grow for more than fifty (50) years as long term specimens.



Plate 4: Aerial image from 2009 showing the study area clear of any vegetation. P. Vezgoff.

- **3.8 Impacts:** Based on the construction requirements Trees 1-78 will be removed. Compensatory planting will be addressed within the landscape plan and School Master Plan.
- **3.9** Ultimately due to poor soil conditioning and overplanting in a small area, with species that are forest trees, the specimens within the study area will never reach their full potential and as such new plantings are recommended.

#### **4 RECOMMENDATIONS**

- **4.1** Although in theory it appears possible to retain some trees, I am not adverse to see all of the trees removed with replanting occurring where trees and shrubs can reach their full potential. Along with proper soil conditioning these new plantings would potentially be a better long term option for this part of the project area.
- **4.2** Trees 1-78 are recommended for removal along with smaller unnumbered *Acacia* saplings. Compensatory planting should occur as recommended within the Master Plan

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

18 August 2022



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## Plan 1

## **Tree Location Plan**



## <u>Tree health & condition</u> <u>assessment schedule</u>

#### TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE – Shellharbour Anglican College

						Live							
Troo	Spacias	Height	Spread	DBH (m)	SRZ	canopy ∞	Defects	SILLE	Condition	٨٥٥	Commonts	TPZ (m)	SRZ (m)
nee	Forest red gum (Eucalyntus	(11)	(11)	(11)	Dasai	70	No visual	JOLL	Condition	Age	comments		(11)
1	tereticornis)	10	45	0.27	0 37	100	defects	1a >40 years	Good	Mature		32	21
	Forest red gum (Eucalyntus	10	4.5	0.27	0.57	100	No visual		0000	Watare			2.1
2	tereticornis)	10	5	0.23	0.33	100	defects	1a >40 years	Good	Mature		2.8	2
		_	_					2c removed for			borer damage		
	Forest red gum (Eucalyptus						No visual	more suitable			Scattered		
3	tereticornis)	9	3	0.18	0.28	100	defects	planting	Poor	Mature	Deadwood	2.2	1.9
							No visual	· · ·					
4	Acacia melanoxylon	9.5	5.5	0.24	0.34	100	defects	1a >40 years	Good	Mature		2.9	2
							No visual						
5	Acacia melanoxylon	9.5	5.5	0.19	0.29	100	defects	1a >40 years	Good	Mature		2.3	1.9
								2c removed for					
							No visual	more suitable					
6	Acacia maidenii	7	3.5	0.14	0.24	100	defects	planting	Fair	Mature		1.7	1.8
	Forest red gum (Eucalyptus						No visual						
7	tereticornis)	10.5	6	0.26	0.36	100	defects	1a >40 years	Good	Mature		3.1	2.1
							No visual				Multi-Stemmed		
8	Melaleuca bracteata	6	3	0.12	0.22	100	defects	1a >40 years	Good	Mature	Specimen	1.4	1.7
							No visual				Multi-Stemmed		
9	Melaleuca bracteata	6	3	0.12	0.22	100	defects	1a >40 years	Good	Mature	Specimen	1.4	1.7
							No visual				Multi-Stemmed		
10	Melaleuca bracteata	6	3	0.12	0.22	100	defects	1a >40 years	Good	Mature	Specimen	1.4	1.7
							No visual						
11	Acacia maidenii	5.5	2.5	0.07	0.17	100	defects	1a >40 years	Good	Mature		0.8	1.5
							No visual				Multi-Stemmed		
12	Melaleuca decora	6	3.5	0.12	0.22	100	defects	1a >40 years	Good	Mature	Specimen	1.4	1.7
							No visual				Multi-Stemmed		
13	Melaleuca bracteata	6	3	0.12	0.22	100	defects	1a >40 years	Good	Mature	Specimen	1.4	1.7
				0.12	0.00	100	No visual	1	Carad	Mature			4 7
14	ivielaleuca decora	7.5	4	0.12	0.22	100	aetects	1a >40 years	Good	iviature		1.4	1./
4 5		_	_	0.00	0.40	100	NO VISUAL	1	Card	Mature			1.0
15	ivielaleuca bracteata	3	2	0.09	0.19	100	aefects	1a >40 years	Good	iviature		1.1	1.6

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						Live							
		Height	Spread	DBH	SRZ	canopy						TPZ	SRZ
Tree	Species	(m)	(m)	(m)	basal	%	Defects	SULE	Condition	Age	Comments	(m)	(m)
	Forest red gum (Eucalyptus						No visual						
16	tereticornis)	11	2	0.14	0.24	100	defects	1a >40 years	Good	Mature		1.7	1.8
	Forest red gum (Eucalyptus						No visual				Multi-Stemmed		
17	tereticornis)	11	2.5	0.18	0.28	100	defects	1a >40 years	Good	Mature	Specimen	2.2	1.9
	Forest red gum (Eucalyptus						No visual						
18	tereticornis)	11	2	0.14	0.24	100	defects	1a >40 years	Good	Mature		1.7	1.8
	Forest red gum (Eucalyptus						No visual				Multi-Stemmed		
19	tereticornis)	11.5	6	0.25	0.35	100	defects	1a >40 years	Good	Mature	Specimen	3	2.1
	Forest red gum (Eucalyptus						No visual						
20	tereticornis)	11	3	0.17	0.27	100	defects	1a >40 years	Good	Mature		2	1.8
	Forest red gum (Eucalyptus						No visual						
21	tereticornis)	11	4	0.19	0.29	100	defects	1a >40 years	Good	Mature		2.3	1.9
	Forest red gum (Eucalyptus						No visual						
22	tereticornis)	8	1	0.09	0.19	100	defects	1a >40 years	Good	Mature		1.1	1.6
	Forest red gum (Eucalyptus						No visual						
23	tereticornis)	9.5	2.5	0.13	0.23	100	defects	1a >40 years	Good	Mature		1.6	1.7
	Forest red gum (Eucalyptus						No visual						
24	tereticornis)	9	2.5	0.1	0.2	100	defects	1a >40 years	Good	Mature		1.2	1.6
	Forest red gum (Eucalyptus						No visual						
25	tereticornis)	9	2.5	0.1	0.2	100	defects	1a >40 years	Good	Mature		1.2	1.6
	Forest red gum (Eucalyptus						No visual						
26	tereticornis)	9	3	0.18	0.28	100	defects	1a >40 years	Good	Mature		2.2	1.9
								2c removed for					
							No visual	more suitable					
27	Acacia maidenii	8	2.5	0.16	0.26	100	defects	planting	Fair	Mature		1.9	1.8
							No visual				Multi-Stemmed		
28	Melaleuca bracteata	6	3	0.12	0.22	100	defects	1a >40 years	Good	Mature	Specimen	1.4	1.7
							No visual				Multi-Stemmed		
29	Melaleuca bracteata	6.5	3	0.12	0.22	100	defects	1a >40 years	Good	Mature	Specimen	1.4	1.7
							No visual				Multi-Stemmed		1
30	Melaleuca bracteata	6	3	0.12	0.22	100	defects	1a >40 years	Good	Mature	Specimen	1.4	1.7
							No visual				Multi-Stemmed		1
31	Melaleuca styphelioides	6	4	0.12	0.22	100	defects	1a >40 years	Good	Mature	Specimen	1.4	1.7

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						Live							
		Height	Spread	DBH	SRZ	canopy						TPZ	SRZ
Tree	Species	(m)	(m)	(m)	basal	%	Defects	SULE	Condition	Age	Comments	(m)	(m)
								2c removed for					1
	Forest red gum (Eucalyptus						No visual	more suitable					
32	tereticornis)	6.5	1.5	0.1	0.2	100	defects	planting	Fair	Mature		1.2	1.6
	Forest red gum (Eucalyptus						No visual						
33	tereticornis)	11.5	3.5	0.16	0.26	100	defects	1a >40 years	Good	Mature		1.9	1.8
								2c removed for					
							No visual	more suitable					
34	Acacia maidenii	7	3.5	0.17	0.27	100	defects	planting	Fair	Mature		2	1.8
	Forest red gum (Eucalyptus						No visual						
35	tereticornis)	10	3.5	0.13	0.23	100	defects	1a >40 years	Good	Mature		1.6	1.7
	Forest red gum (Eucalyptus						No visual						
36	tereticornis)	8.5	3.2	0.09	0.19	100	defects	1a >40 years	Good	Mature		1.1	1.6
	Forest red gum (Eucalyptus						No visual				Multi-Stemmed		
37	tereticornis)	12	5	0.28	0.38	100	defects	1a >40 years	Good	Mature	Specimen	3.4	2.1
	Forest red gum (Eucalyptus						No visual						
38	tereticornis)	12	7	0.28	0.38	100	defects	1a >40 years	Good	Mature		3.4	2.1
	Forest red gum (Eucalyptus						No visual						
39	tereticornis)	12	5	0.24	0.34	100	defects	1a >40 years	Good	Mature		2.9	2
	Forest red gum (Eucalyptus						No visual						
40	tereticornis)	10.5	5	0.24	0.34	100	defects	1a >40 years	Good	Mature		2.9	2
								2c removed for					
							No visual	more suitable			Multi-Stemmed		
41	Melaleuca decora	5	1	0.12	0.22	100	defects	planting	Fair	Mature	Specimen	1.4	1.7
	Forest red gum (Eucalyptus						No visual						
42	tereticornis)	10.5	5	0.24	0.34	100	defects	1a >40 years	Good	Mature		2.9	2
								2c removed for					1
	Forest red gum (Eucalyptus						No visual	more suitable					
43	tereticornis)	6	1	0.08	0.18	80	defects	planting	Fair	Mature		1	1.6
								2c removed for					
							No visual	more suitable					
44	Acacia longifolia	8	3.5	0.1	0.2	80	defects	planting	Fair	Mature		1.2	1.6
	Forest red gum (Eucalyptus						No visual	5b;Young trees less					
45	tereticornis)	10.5	5	0.24	0.34	100	defects	than 15 years old	Good	Mature		2.9	2

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						Live							
		Height	Spread	DBH	SRZ	canopy						TPZ	SRZ
Tree	Species	(m)	(m)	(m)	basal	%	Defects	SULE	Condition	Age	Comments	(m)	(m)
								but over 5m in					
								height.					
								5b;Young trees less					
								than 15 years old					
	Forest red gum (Eucalyptus						No visual	but over 5m in					
46	tereticornis)	7	1.5	0.13	0.23	100	defects	height.	Good	Mature		1.6	1.7
								5b;Young trees less					
								than 15 years old					
							No visual	but over 5m in			Multi stemmed		
47	Melaleuca styphelioides	6	2.5	0.09	0.12	95	defects	height.	Good	Mature	specimen	1.1	1.3
								5b;Young trees less					
								than 15 years old					
							No visual	but over 5m in			Multi stemmed		
48	Melaleuca styphelioides	6	2.5	0.09	0.12	95	defects	height.	Good	Mature	specimen	1.1	1.3
								5b;Young trees less					
								than 15 years old					
							No visual	but over 5m in			Multi stemmed		
49	Melaleuca styphelioides	6	2.5	0.09	0.12	95	defects	height.	Good	Mature	specimen	1.1	1.3
								5b;Young trees less					
								than 15 years old					
							No visual	but over 5m in			Multi stemmed		
50	Melaleuca bracteata	6	2.5	0.09	0.12	95	defects	height.	Good	Mature	specimen	1.1	1.3
								5b;Young trees less					
								than 15 years old					
	Forest red gum (Eucalyptus						No visual	but over 5m in					
51	tereticornis)	9	2.5	0.16	0.25	80	defects	height.	Good	Mature		1.9	1.8
								5b;Young trees less					
								than 15 years old					
	Forest red gum (Eucalyptus						No visual	but over 5m in					
52	tereticornis)	9	2.5	0.16	0.25	80	defects	height.	Good	Mature		1.9	1.8
								5b;Young trees less					
								than 15 years old					
							No visual	but over 5m in					
53	Acacia melanoxylon	5	2	0.12	0.15	90	defects	height.	Poor	Mature		1.4	1.4

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						Live							
		Height	Spread	DBH	SRZ	canopy						TPZ	SRZ
Tree	Species	(m)	(m)	(m)	basal	%	Defects	SULE	Condition	Age	Comments	(m)	(m)
								5b;Young trees less					
								than 15 years old					
	Blackbutt (Eucalyptus						No visual	but over 5m in					
54	pilularis)	11	3.5	0.25	0.35	80	defects	height.	Good	Mature		3	2.1
								5b;Young trees less					
								than 15 years old					
							No visual	but over 5m in					
55	Acacia maidenii	7	2	0.12	0.18	90	defects	height.	Fair	Mature		1.4	1.6
								5b;Young trees less					
								than 15 years old					
	Blackbutt (Eucalyptus						No visual	but over 5m in					
56	pilularis)	5.5	2	0.11	0.15	95	defects	height.	Good	Sapling		1.3	1.4
								5b;Young trees less					
								than 15 years old					
	Forest red gum (Eucalyptus						No visual	but over 5m in					
57	tereticornis)	11	3	0.19	0.25	95	defects	height.	Good	Mature		2.3	1.8
								5b;Young trees less					
								than 15 years old					
	Forest red gum (Eucalyptus						No visual	but over 5m in					
58	tereticornis)	11	3	0.19	0.25	95	defects	height.	Good	Mature		2.3	1.8
											Extensive Bora		
	Forest red gum (Eucalyptus							3a May only live for			damage on the		
59	tereticornis)	10	3	0.16	0.25	95	Stem wounds	5-15 years.	Fair	Mature	main stem	1.9	1.8
								5b;Young trees less					
								than 15 years old					
	Forest red gum (Eucalyptus						No visual	but over 5m in					
60	tereticornis)	9	2.5	0.21	0.25	80	defects	height.	Fair	Mature		2.5	1.8
								2c removed for					
								more suitable					
61	Acacia maidenii	4.2	1.5	0.1	0.15	88	Storm damage	planting	Poor	Mature		1.2	1.4
								5b;Young trees less					
								than 15 years old					
							No visual	but over 5m in					
62	Melaleuca styphelioides	3	1	0.08	0.15	90	defects	height.	Fair	Mature		1	1.4

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						Live							
		Height	Spread	DBH	SRZ	canopy						TPZ	SRZ
Tree	Species	(m)	(m)	(m)	basal	%	Defects	SULE	Condition	Age	Comments	(m)	(m)
								5b;Young trees less					
								than 15 years old					
							No visual	but over 5m in					
63	Melaleuca styphelioides	3	1	0.08	0.15	90	defects	height.	Fair	Mature		1	1.4
								5b;Young trees less					
								than 15 years old					
							No visual	but over 5m in					
64	Melaleuca styphelioides	3	1	0.08	0.15	90	defects	height.	Good	Mature		1	1.4
								5b;Young trees less					
								than 15 years old					
65		2		0.00	0.45		No visual	but over 5m in					
65	Melaleuca styphelioides	3	1	0.08	0.15	90	defects	height.	Good	Mature		1	1.4
				0.00	0.42		No visual	2a May only live for	_ ·		Lopped on lean	2.0	
66	Acacia maidenii	8	4	0.32	0.42	80	defects	15-40 years	Fair	Mature	over tence	3.8	2.2
								5b;Young trees less					
							Newiguel	than 15 years old					
67	Assais maidanii	c	0.0	0.00	0.15	00	NO VISUAI	but over 5m in	Cood	Conling		1	1.4
67		0	0.8	0.08	0.15	90	Newiguel	As Dead, duing or	Good	Sapiing			1.4
69	Acacia melanovulon	0	2	0 10	0.25	20	dofocts	4a Dead, dying or	Poor	Maturo		22	10
00		0	2	0.19	0.25	20	uerects	Eh:Voung troos loss	P001	Wature		2.5	1.0
								than 15 years old					
							No visual	but over 5m in					
69	Acacia melanoxylon	8	25	0.21	0 31	95	defects	height	Good	Mature		25	2
		Ŭ	2.5	0.21	0.51	55		5h:Young trees less	0000	Watare			
								than 15 years old					
							No visual	but over 5m in					
70	Acacia maidenii	8	2.3	0.2	0.25	95	defects	height.	Good	Mature		2.4	1.8
								5b;Young trees less					
								than 15 years old					
							No visual	but over 5m in					
71	Acacia maidenii	8	2.3	0.13	0.25	95	defects	height.	Good	Mature		1.6	1.8
							No visual	5b;Young trees less					
72	Melaleuca bracteata	3	0.5	0.05	0.1	90	defects	than 15 years old	Good	Mature		0.6	1.2

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		Hoight	Spread		SP7	Live						TD7	CP7
Tree	Species	(m)	(m)	(m)	basal	%	Defects	SULE	Condition	Age	Comments	(m)	(m)
	•							but over 5m in		<u> </u>			
								height.					
								5b;Young trees less					
								than 15 years old					
	Forest red gum (Eucalyptus						No visual	but over 5m in					
73	tereticornis)	11	3	0.18	0.25	80	defects	height.	Fair	Mature		2.2	1.8
								5b;Young trees less					
								than 15 years old					
	Forest red gum (Eucalyptus						No visual	but over 5m in					
74	tereticornis)	8	2.5	0.18	0.25	80	defects	height.	Poor	Mature		2.2	1.8
								5b;Young trees less					
								than 15 years old					
	Willow Bottle brush						No visual	but over 5m in					
75	(Callistemon salignus)	3.2	0.5	0.08	0.1	100	defects	height.	Good	Sapling		1	1.2
								5b;Young trees less					
								than 15 years old					
							No visual	but over 5m in					
76	Melaleuca styphelioides	4.2	1	0.1	0.2	100	defects	height.	Good	Mature		1.2	1.6
								5b;Young trees less					
								than 15 years old					
							No visual	but over 5m in					
77	Melaleuca styphelioides	3.2	0.5	0.1	0.2	100	defects	height.	Good	Mature		1.2	1.6
								5b;Young trees less					
								than 15 years old					
	Coastal banksia ( Banksia						No visual	but over 5m in					
78	integrifolia)	5	2	0.21	0.31	100	defects	height.	Good	Mature		2.5	2

#### 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.

Age Class: 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.

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

LongTrees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of1aStructurally sound trees located in positions that can accommodate for future growth	of risk.
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.	
Medium Trees that appeared to be retainable at the time of assessment for 15-40 years with an acceptable level of risk.	
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 ind	ividuals
or to provide for new planting.	
2d Trees that could be made suitable for retention in the medium term by remedial tree care.	
Short Trees that appeared to be retainable at the time of assessment for 5-15 years with an acceptable level of risk.	
3aTrees that may only live for another 5-15 years	
3bTrees 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 ind	ividuals
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.	
Remove Trees that should be removed within the next five years.	
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 indivi-	duals 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.	
Small       Small or young trees that can be reliably moved or replaced.	
5a   Small trees less than 5m in height.	
5bYoung 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.

# **TPZ and SRZ methodology**

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

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

$$TPZ = DBH \times 12$$

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.

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

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.



## Tree structure information diagram



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

## **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 <u>main</u> 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 <u>estimated</u> from visual indicators and it should only be taken as a <u>provisional</u> <u>guide</u>. 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.

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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

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Moore Trees Arboricultural Services

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

#### Woollahra Municipal Council

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 Tradesman for Landscape Construction business

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#### **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 Londsdale (Brisbane 2008)
- Tree risk management: requirements for a defensible system by Dr David Londsdale (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).

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