

Client	The Client c/o h3 Architects
Location	83-99 North Terrace Bankstown
Document Type	Arboricultural Impact Assessment
Date/Time	12 <sup>th</sup> October 2016.



## *THE ENTS TREE CONSULTANCY*

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CONSULTING ARBORICULTURISTS ®

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## 2 Introduction

2.1 On the 23<sup>rd</sup> September 2016 h3 Architects engaged The Ents Tree Consultancy on behalf of their client to complete an Arboricultural Impact Assessment for the proposed development site at 83-99 North Terrace Bankstown. This report will assess the nominated trees that are on and adjoining the site which may be impacted upon by the works or the associated activities. The client stated that the trees have been nominated to be inspected in relation to a proposed development, which involves the demolition of some of the existing buildings, the construction of a new building and some landscape works. Consultation was sought with the client about the number and position of trees to be inspected prior to a survey being completed.

2.2 The site inspection of the nominated trees occurred on the 12<sup>th</sup> October 2016. The client was not present for the site inspection but had previously issued a brief providing background information in regards to the trees on and adjoining the site. This tree report will detail the condition of the nominated trees, observe the proposed works and recommend removal or retention of the trees on or adjoining the site. Recommendations for removal or retention will be based on the proposed works and compatibility of the trees with the works as well as the trees hazard potential or ULE Rating. The report will also assess any potential impacts for trees nominated to be retained and attempt to remove or minimise them where possible. Recommended tree protection measures as set out in the Australian Standard AS4970 Protection of Trees on development sites will be nominated as required.

2.3 The purpose of this report is to assess the proposed works as well as the health and suitability of the trees nominated at the time of the inspection. The report will also provide tree management options for trees on the site in regards to the proposed works. The Tree Protection Guidelines will be discussed for all trees nominated to be retained. The information in this report will be based on the information presented by the client at the time of the inspection as well as the site inspection. The Australian Standard AS4970 Protection of Trees on development sites will be used as a guide to managing the site. Additional Tree Protection measures are included in appendix 8.

2.4 To achieve the objectives of the report, the trees will be assessed noting the species, size, general condition. The trees will be assessed using the internationally recognised VTA assessment method for above ground parts only. The trees characteristics and eventual size will be taken into consideration as will the trees position in relation to structures and hard scapes. Recommendations will be outlined in section 5 of the report. A detailed list of the trees surveyed will be provided in Appendix 2 of the report and an existing numerical system has been used to identify them for this report and future reference on this job site.

## 3 Methodology

3.1 The trees were assessed using the standard Visual Tree Assessment technique (VTA). The trees were assessed from the ground for the purpose of this report.

3.2 A Lufkin 6.5m diameter tape was used to obtain the Diameter at breast height (DBH) as recommended at 1.4 metres unless otherwise stated due to variations in the trees form.

3.3 The height of the trees was estimated and the spread of the trees canopy was paced out.

3.4 A Canon 5D Digital camera with a 24-105mm lens was used to take all photographs in this report.

3.5 The ULE rating system has been used as a guide to assist in determining the Useful Life Expectancy of the trees surveyed. Refer to Appendices 1.

## 4 Discussion

4.1 The trees nominated to be inspected are located on and adjoining the property at 83-99 North Terrace Bankstown. Some of the trees are significant in the immediate landscape and some are likely to be considered important in the local areas landscape in terms of amenity and function. The trees are located on partially sheltered site with some protection from surrounding structures, trees and topography. The soil on site appears to be a clay loam that has been disturbed previously when the existing building and hardscapes were built and the site was cleared.

4.2 Based on the information provided by the client, the works involve the removal of some of the existing buildings on site, the construction of a new building and some landscape works. To achieve the works, all of the trees on site will need to be removed. The trees adjoining the site are proposed to be retained and protected for the duration of the works. The trees nominated to be retained, will be retained using sympathetic building activities to allow the works to proceed. Options for the managing the trees nominated to be retained adjoining the proposed works site will be provided. Any tree that is nominated to be retained adjoining site will be kept in good condition for the duration of the works using the Australian Standard AS4970 2009 Protection of trees on development sites for the basis of all tree management practices.

4.3 **Trees 1 to 10** are a stand of mature trees that form an informal hedge / screen. These trees are in the position of the proposed works and are proposed to be removed. **Trees 11 & 12** are mature shrubs or small trees that are located in the position of the proposed works. These two shrubs / small trees are also proposed to be removed.

4.4 **Trees 13 to 15** are native trees that are in less than perfect condition. Trees 13 & 14 have wounds at their base and tree 15 is partially suppressed. Trees 14 is a poor specimen with a moderate level of dieback in its crown. These three trees are proposed to be removed to allow the works to proceed. **Trees 16 to 21** are a stand of semi mature paper barks with average health and form. These trees are in the position of the proposed works and are proposed to be removed to allow the works to proceed.

4.5 **Trees 22 & 23** are native trees with average health vigour and form for the species. Both of these trees have a lean to light and are required to be removed to allow the works to proceed. **Tree 24** is a native tree with a sparse crown and some dieback. This tree appears to have been disturbed previously and has suffered from construction impacts. This tree is in the position of the proposed works and is proposed to be removed and replaced. **Tree 25** is a semi mature tree with average health and form. This tree is proposed to be removed and replaced.

4.6 **Trees 26 to 29** are trees located in the council nature strip. The works will have no disturbance to the trees projected Structural Root Zone and a limited disturbance to the trees Tree Protection Zone. The disturbance is anticipated to be 10% and will not have any measurable impact upon the trees. The trees may also require some minor pruning for building clearance. All pruning works is to be completed by an AQF level 3 Arborist in accordance with the Australian Standard AS4373.

4.7 These trees are proposed to be retained and protected for the duration of the works. To protect these trees during the works period, trunk wraps and ground protection should be installed prior to the works commencing. The trunks wraps should consist of a layer of padded material to protect the trees vascular tissue from damage. Vertical timber slats will be fastened to the padding using an adjustable strap or tightening mechanism. The timber slats must be approximately 1.8m in height, approximately 50mm x 70mm and cover the trunk with a maximum spacing of 25mm.

4.8 If the trees have the paving remain in place no ground protection will be required. If the paving is removed, ground protection will need to be installed prior to the works. The ground protection will need to be installed to protect the area of the nominated tree protection zone that will not be built upon. This can be achieved by placing a layer of geo-textile fabric down, adding a 100mm layer of mulch and placing rumble boards 100mm x 200mm planks down. These tree protection measures must be installed prior to demolition and construction of works.

## 5 Recommendations

5.1 After reviewing the site and the information provided by the client it is my recommendation that the works proceed with the following recommendations,

5.2 To allow the works to proceed trees 1 to 25 are removed, with some of the trees replaced within a new landscape plan. Trees 26-29 are proposed to be retained and protected for the duration of the works. To achieve this there should be no significant level changes or excavations within the trees projected tree protection zones that disturb more than 10% of their root mass and no disturbance to their structural root zones. The installation of the tree protection measures in section 4 of the report will assist in reducing the disturbance to the trees nominated to be retained.

5.3 It is recommended that all tree protection measures are in place as described in section 4 of the report prior to the commencement of any works. The AQF level 5 site Arborist will need to sign off on the tree protection measures prior to works commencing. All works within 2.5m of any tree will need to be supervised and recorded by the AQF level 5 site Arborist. It is the client's responsibility to arrange site inspections and co-ordinate the works with the AQF level 5 site Arborist.

5.4 Monthly reports may be required to ensure the trees are adequately protected. At the end of the works period the tree will be inspected by an AQF 5 Arborist to determine if the tree has been maintained adequately. If this is done the compliance certificate will be issued. If trees have been damaged or breaches of the Australian Standards have occurred council will be contacted for further advice.

5.5 It is recommended that construction proceeds using the Australian Standard AS4970 2009 Protection of trees on development sites as a basis for tree protection on the site as well as the site specific instructions listed in section 5 of this report. Additional Tree Protection measures are listed in Appendix 7 of the report to assist in the care of the trees on site.

Please do not hesitate to call **0422 265 128** if you have any questions regarding the contents of this report.

Regards

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### Disclaimer

All trees have been assessed based on the information and facts of the site and as presented by the client or relevant parties at the time of inspection. No responsibility can be taken for incorrect or misleading information provided by the client or other parties. The nominated tree/s are assessed for biological requirements and hazard potential with reasonable care. The trees are assessed from the ground and by visual means only unless otherwise stated. All tree protection and tree preservation measures are designed to minimise the damage to the tree/s or to reduce the hazard potential of the tree/s. No responsibility can be taken by the author of this report for future damage to structures by the existing trees or planted trees. Trees are inherently dangerous, therefore will always have a hazard potential. Trees fail in ways that are not predictable or fully understood. There is no guarantee expressed or implied that failure or deficiencies may not arise of the subject trees in the future. No responsibility is accepted for damage to property or injury/death caused by the nominated tree/s.

Appendix 1 ULE Rating

**Useful Life Expectancy (ULE):** Useful life expectancy refers to an expected period of time the tree can be retained within the landscape before its amenity value declines to a point where it may detract from the appearance of the landscape and/or becomes potentially hazardous to people and/or property. ULE values consider tree species, current age, health, structure and location. ULE values are based on the tree at the time of assessment and do not consider future changes to the tree’s location and environment which may influence the ULE value.

Category rating:	Category definition in years:
0	Immediate removal
1	0-5 Years
2	5-10 Years
3	10-20 Years
4	20-30 Years
5	30-50 Years
6	>50 Years

## Appendix 2 Assessment of Trees

Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health	Structure	ULE Rating ***	Stars Rating ****	Observations and comments
1	<i>Cupressus torulosa</i> Bhutan Cypress	12	.35 DAC .50	5	4.2 SRZ 2.5	A	A	6	L	# A mature tree with average health, vigour and average form for the species.
2	<i>Cupressus torulosa</i> Bhutan Cypress	13	.38 DAC .40	5	4.6 SRZ 2.2	A	A	6	L	# A mature tree with average health, vigour and average form for the species.
3	<i>Cupressus torulosa</i> Bhutan Cypress	13	.35 DAC .40	5	4.2 SRZ 2.2	A	A	6	L	# A mature tree with average health, vigour and average form for the species.
4	<i>Cupressus torulosa</i> Bhutan Cypress	12	.36 DAC .40	5	4.3 SRZ 2.2	A	A	6	L	# A mature tree with average health and form for the species.
5	<i>Cupressus torulosa</i> Bhutan Cypress	12	.30 DAC .35	4	3.6 SRZ 2.15	A	A	6	L	# A mature tree with average health and form for the species.
6	<i>Cupressus torulosa</i> Bhutan Cypress	7	.30 DAC .35	4	3.6 SRZ 2.15	A	A	6	L	# A mature tree with average health and form for the species.
7	<i>Cupressus torulosa</i> Bhutan Cypress	7	.30 DAC .35	4	3.6 SRZ 2.15	A	A	6	L	# A mature tree with average health and form for the species.
8	<i>Cupressus torulosa</i> Bhutan Cypress	8	.35 DAC .40	5	4.2 SRZ 2.25	A	A	6	L	# A mature tree with average health and form for the species.
9	<i>Cupressus torulosa</i> Bhutan Cypress	12	.45 DAC .50	5	5.5 SRZ 2.5	A	A	6	L	# A mature tree with average health and form for the species.
10	<i>Cupressus torulosa</i> Bhutan Cypress	12	.45 DAC .50	5	5.5 SRZ 2.5	A	A	6	L	# A mature tree with average health and form for the species.
11	<i>Callistemon viminalis</i> Bottle Brush	7	.25 DAC .30	4	3 SRZ 2	A	A	5	L	# A semi mature shrub or small tree with average health, vigour and form.
12	<i>Callistemon viminalis</i> Bottle Brush	7	.25 DAC .30	4	3 SRZ 2	A	A	5	L	# A semi mature shrub or small tree with average health, vigour and form.

Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health	Structure	ULE Rating ***	Stars Rating ****	Observations and comments
13	<i>Angophora costata</i> Smooth Barked Apple	9	.40 DAC .45	6	4.8 SRZ 2.4	Ba	Ba	4	L	# A semi mature tree with below average health, vigour and below average form. This tree has a sparse crown with some die back and a wound at its base.
14	<i>Angophora costata</i> Smooth Barked Apple	14	.60 DAC .65	9	7.25 SRZ 2.75	A	A	6	M	# A semi mature tree with average health, vigour and average form. This tree has a sparse crown with some die back and a wound at its base.
15	<i>Angophora costata</i> Smooth Barked Apple	9	.50 DAC .55	7	6 SRZ 2.6	A	Ba	5	L	# A semi mature tree with average health, vigour and below average form. This tree has a slightly sparse crown with some die back and a wound at its base. This tree is partially suppressed.
16	<i>Melaleuca quinquenervia</i> Paper Bark	10	.60 DAC .80	7	7.2 SRZ 3	A	A	5	M	# This is a semi mature tree with average health, average vigour and average form for the species.
17	<i>Melaleuca quinquenervia</i> Paper Bark	10	.67 DAC .75	7	8 SRZ 2.9	A	A	5	M	# This is a semi mature tree with average health, average vigour and average form for the species.
18	<i>Melaleuca quinquenervia</i> Paper Bark	10	.55 DAC .70	7	6.6 SRZ 2.85	A	A	5	M	# This is a semi mature tree with average health, average vigour and average form for the species.
19	<i>Melaleuca quinquenervia</i> Paper Bark	10	.71 DAC .85	7	8.5 SRZ 3.1	A	A	5	M	# This is a semi mature tree with average health, average vigour and average form for the species.
20	<i>Melaleuca quinquenervia</i> Paper Bark	10	.50 DAC .60	7	6 SRZ 2.7	A	A	5	M	# This is a semi mature tree with average health, average vigour and average form for the species.
21	<i>Melaleuca quinquenervia</i> Paperbark	11	.55 DAC .70	7	6.6 SRZ 2.85	A	A	5	M	# This is a semi mature tree with average health, average vigour and average form for the species.
22	<i>Angophora costata</i> Smooth Barked Apple	13	.55 DAC .70	9	6.6 SRZ 2.85	A	A	6	M	# A semi mature tree with average health, vigour and average form.
23	<i>Angophora costata</i> Smooth Barked Apple	10	.55 DAC .60	7	6.6 SRZ 2.7	A	A	5	M	# A semi mature tree with average health, vigour and average form. This tree has some dieback and suppression.



Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health	Structure	ULE Rating ***	Stars Rating ****	Observations and comments
24	<i>Angophora costata</i> Smooth Barked Apple	10	.40 DAC .45	6	4.8 SRZ 2.4	A	A	5	M	# A semi mature tree with average health, vigour and below average form. This tree has some die back and a lean to light.
25	<i>Platanus orientalis</i> Oriental Plane Tree	13	.35 DAC .50	9	4.2 SRZ 2.5	A	a	6	M	# A semi mature tree with average health and form.
26	<i>Lophostemon confertus</i> Brush Box	9	.35 DAC .40	6	4.2 SRZ 2.25	Ba	A	4	L	# A mature council street tree with below average health, vigour and average form. This tree has suffered a previous stress and has dieback in its crown.
27	<i>Lophostemon confertus</i> Brush Box	9	.35 DAC .40	6	4.2 SRZ 2.25	Ba	A	5	L	# A mature council street tree with below average health, vigour and average form. This tree has suffered a previous stress and has dieback in its crown.
28	<i>Lophostemon confertus</i> Brush Box	8	.35 DAC .40	5	4.2 SRZ 2.25	Ba	A	4	L	# A mature council street tree with below average health, vigour and average form. This tree has suffered a previous stress and has dieback in its crown.
29	<i>Lophostemon confertus</i> Brush Box	8	.35 DAC .40	5	4.2 SRZ 2.25	Ba	A	4	L	# A mature council street tree with below average health, vigour and average form. This tree has suffered a previous stress and has dieback in its crown.

#### Explanatory Notes for Table

- \*Dbh = Diameter of trunk at breast height.
- \*\* DAC = Diameter above the root collar used to measure the Structural Root Zone (SRZ).
- \*\*\*TPZ is the recommended TPZ 12x the DBH at 1.4m, SRZ is the trees structural root zone. Refer to AS4970 for details.
- \*\*\*\* ULE Explanation can be found in Appendix 1.  
IACA S.T.A.R.S Rating system. Refer to Appendix

## Appendix 3 Images of Tree



Image 1 above left shows trees 1 -10 on site. Image 2 above left centre shows trees 11 & 12 on site. Image 3 above right centre shows tree 13 on site. Image above right shows trees 14 & 15 on site. Image 5 below left shows trees 16 to 21 on site. Image 6 below left centre shows trees 19 to 21. Image 7 below right centre shows trees 23 & 27 on site. Image 8 below right shows tree 24 on site.





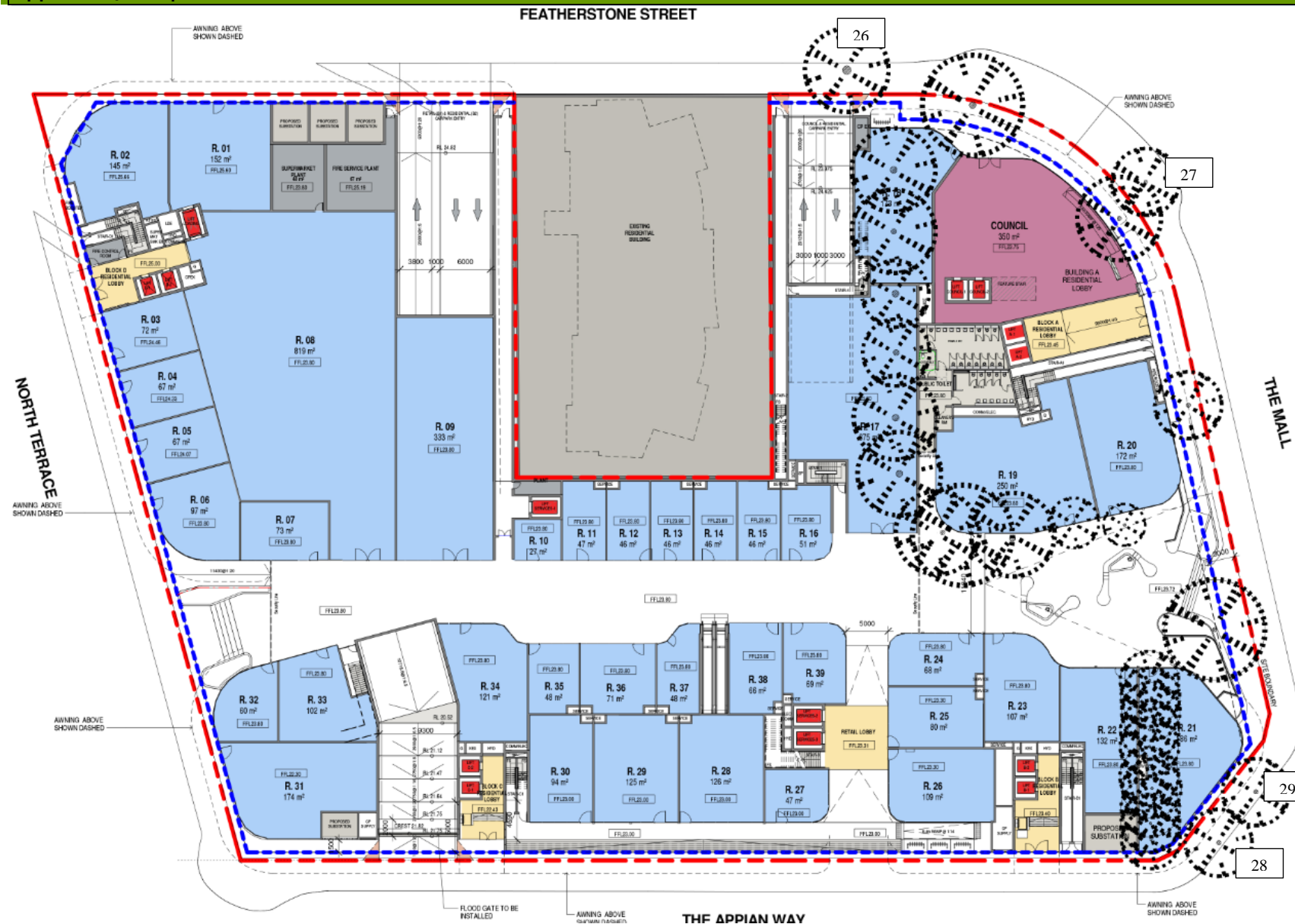
Image 9 above left shows tree 25 on site. Image 10 above centre shows trees 28 & 29 on the council nature strip. Image 11 below right shows tree 26 on the council nature strip.



## Appendix 4 Site Plan



## Appendix 4a Proposed Plan



## Appendix 5 Legend for S.T.A.R.S matrix assessment

### IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010)©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

#### Tree Significance - Assessment Criteria



##### **1. High Significance in landscape**

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa *in situ* - tree is appropriate to the site conditions.

##### **2. Medium Significance in landscape**

- The tree is in fair-good condition and good or low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

##### **3. Low Significance in landscape**

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

##### **Environmental Pest / Noxious Weed Species**

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.


##### **Hazardous/Irreversible Decline**

- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

**The tree is to have a minimum of three (3) criteria in a category to be classified in that group.**

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

Table 1.0 Tree Retention Value - Priority Matrix.

		Significance				
		1. High	2. Medium	3. Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1. Long >40 years					
	2. Medium 15-40 Years					
	3. Short <1-15 Years					
	Dead					
<p><u>Legend for Matrix Assessment</u></p> <div style="text-align: right;">  </div>						
		<b>Priority for Retention (High)</b> - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 <i>Protection of trees on development sites</i> . Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.				
		<b>Consider for Retention (Medium)</b> - These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.				
		<b>Consider for Removal (Low)</b> - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.				
		<b>Priority for Removal</b> - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.				

## REFERENCES

Australia ICOMOS Inc. 1999, *The Burra Charter – The Australian ICOMOS Charter for Places of Cultural Significance*, International Council of Monuments and Sites, [www.icomos.org/australia](http://www.icomos.org/australia)

Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.

Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, [www.footprintgreen.com.au](http://www.footprintgreen.com.au)

## Appendix 6 References

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## Appendix 7 Glossary of Terms

Abiotic	Nonliving
Anthracnose	a fungal disease causing dead areas on the leaves, buds, stems.
Arboriculture	The science and art of caring for trees, shrubs and other woody plants in landscape settings.
Barrier Zone	Protective boundary formed in new wood in response to wounding or other injury.
Biotic	Alive, pertaining to living organisms.
Branch attachment	The structural union of a lateral branch.
Callus	Undifferentiated tissue produced in response to wounding.
Canker	A dead spot or necrotic lesion that is caused by a bark inhabiting organism/pathogen.
Cavity	an open wound characterized by the presence of decay resulting in a hollow.
Collar	the ring of tissue that surrounds the lateral branch at its point of attachment.
Compartmentalization	A physiological process that creates the chemical and physical boundaries that act to limit the spread of disease and decay organisms.
Compression wood	A type of reaction wood that forms on the underside of branches which tends to maintain a branch angle of growth.
Crown	The above ground parts of the tree, including the trunk.
DBH	The diameter of a trees trunk measured at 1.4m.
Decay	Process of degradation of woody tissues by fungi and bacteria through the decomposition of cellulose and lignin.
Decline	Progressive decrease in health of organs or the entire plant usually caused by a series of interacting factors.
Drip line	The width of the crown, as measured by the lateral extent of the foliage.
Epicormic shoot	a shoot that arises from latent or adventitious buds that occur on stems, branches or the bases of trees.
Included bark	Pattern of development at branch junctions where bark is turned inward, rather than pushed out; contrast with the branch bark ridge.
Mortality Spiral	The sequence of events describing a change in the trees health from vigorous to declining to death.
Photosynthesis	The transformation in the presence of chlorophyll and light, of carbon dioxide from (the air) and water (primarily from soil) into a simple carbohydrate and oxygen.
Pruning	systematic removal of branches of a plant usually a woody perennial.
Reaction wood	Specialized secondary xylem that develops in response to a lean or similar mechanical stress to restore the stem to vertical.
Taper	The change in diameter over the length of trunks and branches. Important to mechanical support.
Tension wood	A type of reaction wood that trees form on the upper side of branches and stems and roots.
VTA	Visual Tree Assessment is a method of evaluating structural defects and stability in trees.
Wound	Any injury that induces a compartmentalization response.

## **Appendix 8, The Ents Tree Consultancy Tree Protection Guidelines**

### **Definitions**

- A. Tree Protection Zone (TPZ),** The TPZ is divided into 2 areas. 1 The Structural Root Zone delineated by an area nominated in table section 4 of the report and is assumed to contain most structural roots. The Tree Protection Zone that is twelve times the diameter of the tree trunk which is used to gauge the amount of feeder roots. No machinery works are permitted in these areas unless specified in this report or without written approval from the Council or the Arborist employed for this job site.
- B. Qualified Arborist,** for supervision of works and reports level 5. For carrying out tree works level 3 Levels are as recognised by the Australian training framework.

**Standards,** AS4970 2009, Protection of Trees on development sites. AS 4373: 1996, The pruning of amenity trees.

### **Tree Protection Generally**

1. Prior to works commencing erect a 1800mm chain mesh fence to protect the trees trunk at 12x Dbh or as specified in this report. The Tree Protection Zones as nominated should be marked with line marking paint and observed as an area free from machinery for the duration of the works unless stated otherwise in the accompanying report. Do not remove, alter or relocate without the approval of the Council or the Arborist employed for this site.
2. Trees to be protected in the works contract are items entrusted to the Contractor /owner by the Council for the purpose of carrying out the work under the Contract. The Contractor/owner has obligations to protect these trees as part of the care of the work in the contract conditions.
3. Prior to commencing work on Site confirm with the Council all trees to be protected for the duration of the Works. Confirm also all access and haulage routes, storage areas, tree protection measures and work procedures. Ensure that the protection measures are in place prior to commencing work.
4. Use suitably qualified Arborist (level 5) to supervise earthworks or activities within the Structural Root Zone of tree, Do not severe roots 50mm or greater, which may cause damage to or affect the health of trees. Pruning of trees by the contractor is not permitted. If pruning works are required a suitably qualified (Minimum level 3) arborist will complete all works in the crown. All root pruning must be completed and documented by the level 5 site arborist.
5. Ensure construction trailers, vehicles and equipment do not come in contact with any tree at any time. Do not locate storage areas within the nominated Tree Protection Zone. Do not deposit or store materials, spoil, contaminants, and waste or washout water within Tree Protection Zone.
6. Take all reasonable precautions to protect trees to be retained on site from damage and decline, maintaining their health during the Contract. Implement recognised best practice industry standards to satisfy horticultural requirements for tree care.
7. Assess and monitor water stress in relation to trees on site. This is of particular importance if earthworks have occurred. Apply sufficient water to the trees on site as required to keep the trees healthy. Immediately report to the Council and site arborist, any trees on site that are injured, damaged or are in decline.

NOTE: Failure to comply with any part of these tree protection guidelines or the Australian standard AS4970 or AS4373 will result in the party breaching the Tree Protection Guidelines taking responsibility for all associated consequences.

## Appendix 9 Curriculum Vitae

### Education and Qualifications

- 2005 Diploma of Arboriculture (AQF Cert 5), Ryde TAFE. Distinction.
- 2000 Tree Climbing Course (AQF Cert 2), Ryde TAFE.
- 1999 Advanced Certificate in Urban Horticulture, (AQF Cert 4), Ryde TAFE. Distinction.
- 1995 Greenkeepers Trade Certificate (AQF 3) Ryde TAFE. Credit.
- 1991 Higher School Certificate.
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### Conference Attendance/presentation of Scientific Papers

- **Barrell Tree Care Workshop- Trees on Construction Sites (Brisbane 2005)**
- **Tree Logic seminar- Urban Tree Risk Management (Sydney 2005)**
- **Tree Pathology and Wood Decay Seminar Sydney (2004)**
- **Excelsior Training Claus Mattheck (Sydney 2001)**
- **Managing Mature Trees NAAA(Sydney 2000), Presented a Paper "Habitat Value of Mature Trees"**

### Industry Experience

- **2004 to Date, Sole Trader The Ents Tree Consultancy.** Consultant for the Royal Botanic Gardens, Consultant Parramatta Park Trust, Consultant/ Expert Witness Woollahra Council. Master plan works for Sydney University, Taronga Zoo and University of NSW. Writing of tree reports for development applications for Energy Australia, Numerous Architectural Firms and builders. Provision of master plans, hazard evaluations, tree management plans and expert witness reports. Hazard assessments, tree surveys and consultations.
  - **2003 to 2008, Arborist University of New South Wales.** Survey all trees on site, developed a Tree Management Database. Minimise hazard potential of all trees on site through evaluation and works. Generate and prioritise works and tree assessment based areas usage, tree conditions and staff required. Development of UNSW Tree Protection Guidelines for master planning works. Acting Supervisor December 2006 to May 2007.
  - **2003 Tree management Officer Randwick Council.** Liaise with public to explain and enforce the councils Tree Preservation order. Management of internal staff and contractors. Project management and co-ordination of street tree planting and maintenance.
  - **1999 to 2003 Animal Food Production Manager and Arborist.** Management of Koala food Plantation, Management of animal food supply registry for herbivores/omnivores. Coordination of staff contractors and volunteers. Maintain and manage tree management database, complete tree works within zoo grounds and at zoo owned plantations. Acting supervisor 6 month period 2002 for grounds dept and asset management trade team (60 Staff).
  - **1998 to 1999 Sole Trader Techniques Lawn & Garden Consultancy.** Lawn, garden and Tree care. Garden design and maintenance. Tree works and tree removal. Installation of irrigation equipment.
  - **1997 to 1998 Greenkeeper / Horticulturist Muirfield Golf Course.** General grounds duties, machinery maintenance, horticultural works, tree works
- 1992 to 1997 Greenkeeper / Horticulturist Ashlar Golf Course.** General grounds duties, machinery maintenance, horticultural works, tree works.