Advanced Treescape Consulting

Arboriculturist & Horticulturist

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FOUNDING MEMBER OF
INSTITUTE OF AUSTRALIAN CONSULTING ARBORICULTURISTS

Arboricultural Impact Assessment

Gosford Hospital
Fleet Extension Carpark
Racecourse Road

Requested by Dean Birkett
Coffey Projects

Prepared by Russell Kingdom

11th February, 2011.

Principal: Russell Kingdom MIACA MAIH MAAL

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1.0 Proposal

Dean Birkett of Coffey Projects has commissioned Advanced Treescape Consulting to prepare an Arboricultural Impact Assessment at Gosford Hospital Fleet Extension Carpark on Racecourse Road. This site is located in the Gosford Local Government Area where there is a Tree Preservation Order in force.

It is proposed to build a carpark.

The subject site was inspected on 09/02/2011. The plans supplied are from SKM Project No. NB11302 Drawing No. CI.GD.01.004. The site plan in Appendix 1 illustrates the location of all surveyed trees.

This assessment has been carried out by:

Russell Kingdom, Grad. Dip. Hort, Dip. Hort, Dip. Hort/Arb. (Appendix 12)

2.0 Site Inspection

The site of this carpark is directly below an existing carpark. Currently it is used as a large grassed open area and there is only 1 x *Corymbia citriodora* (Lemon-scented Gum) growing in this area. It is exposed to all winds. The site is predominantly clay-based Erina Hills soils. Erina Hills Soils limitations are: mass movement (localised), high soil erosion hazard, foundation hazard (localised), localised high run-on, seasonal waterlogging of footslopes and strongly acid soils of low fertility.

3.0 Method of Assessment

Health and condition of the trees were assessed visually from ground level based upon the *Visual Tree Assessment* (VTA) technique described by Mattheck (2004). A *Tree Schedule* (provided in Appendix 2) was based upon:

- Estimation of tree heights by Silva Clinomaster/Heightmeter™ plus visual estimates of canopy spreads.
- Assessment of soil compaction by an 8mm x 400mm steel spike pushed by hand vertically into the ground.
- Sampling and testing of soils using a pH Meter, with confirmation by a Manutec pH Soil Kit.
- Distances of trees, etc. are measured using a Leica Disto™ D2 Laser Distance Meter.
- Glossary Refer to Appendix 5.

Please note that this assessment and related VTA assessments are based upon health and condition that were observed at the time of inspection.

Recommendations by this report regarding retention, works or removal are based upon Safe & Useful Life Expectancy (SULE – Appendix 6) and hazard ratings being applied to the proposed plans.

This information guided conclusions.

4.0 Tree Schedule

See Appendix 2 which summarises existing trees upon the site in terms of species, height and canopy spread, structural condition, health, hazard rating and SULE.

See Appendix 3 which provides explanations of abbreviations and assessment criteria.

The trees contained within the Tree Schedule (Appendix 2) range from having short to long SULEs. These trees also have a broad range of hazard ratings which limits the retention of such trees within development sites.

4.1 Assessment of VTA, Recommendations of Impact & Tree Protection Measures required by Proposed Plans

Please note that this assessment and related VTA assessments are based upon health and condition that were observed at the time of inspection.

Accepted tree management practices recommend removal of trees where SULE ratings are 3 or 4, and/or where hazard ratings are high (where ratings adapted from Matheny and Clark range from low=1 to dangerous=12). A detailed explanation of SULE ratings is provided in Appendix 6. Height/Diameter Ratio should not exceed 1:30 (Mattheck 2004)

1. **VTA Assessment**
2. **Impact of proposed plan**
3. **Tree Protection Measures (TPZ)**

Tree 1 is a *Corymbia citriodora* (Lemon-scented Gum). This tree is mature, in good health and structural condition. The canopy is unbalanced and the trunk lean 10° to the west. There is a crack in the trunk, small deadwood present and the undercanopy has been raised and now the tree has forest architecture. Hazard rating is 10. SULE is 3B.

1. **The tree fails the VTA.**
2. **It is within the proposed carpark. Removal is recommended.**
3. **No TPZ fence is required.**

Tree 2 is a stump. **Removal is required**.

There are **2 x shrubs** also on the site that are only 2 metres high. **Removal is required.**

4.2 Discussion

There is only 1 x *C. citriodora* (Lemon-scented Gum) growing in the immediate area. This tree fails the VTA and is within the proposed carpark. Removal is recommended.

Also within the proposed carpark is a stump and 2 x shrubs that are only 2 metres high which require removal.

4.3 Tree Significance (Appendix 5)

The *C. citriodora* (Lemon-scented Gum) is not listed as part of an Endangered Ecological Community. It would be of medium significance.

4.4 Identify Further Potential Impacts on the Tree by Proposed Plans

The tree is to be removed so there will be no other impacts.

5.0 Tree Protection Works

TPZs are not required.

5.1 Tree Works

Tree work is to be carried out by a suitably qualified, insured Arborist. (AQF 3) to AS4373:2007 Pruning of amenity trees.

5.2 Works During Demolition

There are no tree works to be carried out during demolition.

5.3 Landscaping Phase

A suitable replacement tree needs to be included in the Landscaping Plans.

6.0 Conclusions

The proposed carpark will require the removal of 1 x mature and structurally defective *C. citriodora* (Lemon-scented Gum). This tree can be replaced in the Landscaping Plan as there is more than adequate space in the immediate area. The removal of this tree will impact the streetscape amenity but with a suitable replacement tree this amenity will be replaced in the long term.

7.0 Recommendations

Implement all recommendations contained in 4.1, 4.2, 5.0, 5.1, 5.3.

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Grad. Dip. Hort.
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Disclaimer

Reference List

Australian Standards 4373 (2007) Pruning of amenity trees

Australian Standards 4970 (2009) *Protection of trees on development sites*

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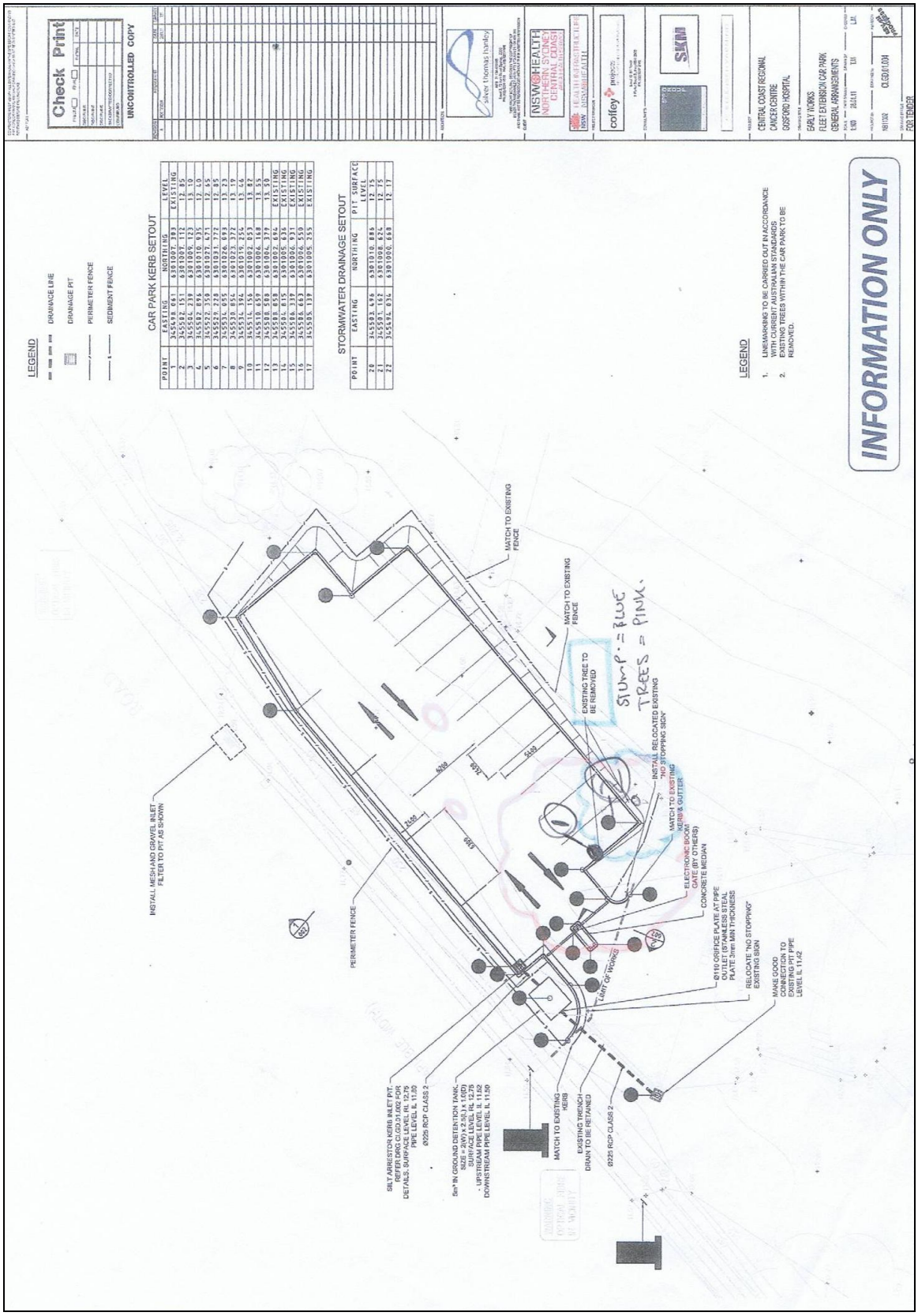
Harris, R.W., Clark, J.R., Matheny, N.P., (2004) *Arboriculture – Integrated Management of Landscape Trees, Shrubs, and Vines*, Fourth Edition, Prentice Hall

Mattheck C, Breloer, H (2004) *The Body Language of Trees. A Handbook for Failure Analysis.* Research for Amenity Trees No. 4, The Stationary Shop.

Murphy, C.L. (1993) *Soil Landscapes of the Gosford – Lake Macquarie* 1:100 000 Sheet. Department of Land & Water Conservation

Appendix 1 Site Plan with Trees and Proposed Development



Appendix 2 Tree Schedule

Abbreviations: **m**-metres, **DBH**-trunk diameter @1.4m, **DGL**-trunk diameter at ground level, **mm**-millimetres, **CD**-co-dominant trunk, **TD**-tri-dominant trunk, **QD**-4x trunk, **VP**-very poor, **P**-poor, **F**-fair, **G-**good, **VG-**very good, **J-**juvenile, **YM**-young mature, **M**-mature, **VM**-very mature, **OM**-over mature, **TL**-trunk lean, **TW**-trunk wound, **L**-longicorns, **E**-Epicormics, **FA-**Forest Architecture, **FR**-Forest Remnant, **RW**-Reaction Wood, **H/D-** Height/Diameter Ratio should not exceed 1:30 (Mattheck 2004), **dw**-deadwood small, **DW**-deadwood large, **TDB**-tip dieback, **PFS**-previous failure site, **RFS**-recent failure site, **BEW**-Branch end weight, **MTU**-Multi tree union, **MFU**-Main fork union**, IMFU**-Inclusive main fork union, **IMBU**-Inclusive main branch union, **IFU**-Inclusive fork union, **MBA**-Multiple branch attachments, **FB**-Fruiting Body, **BF**-Bracket Fungus, **U/C**-under canopy, **Decl**-declining, **bor**-borers**, PD**-Parrot Damage, **LD**-Leaf Damage, **CMP**-Chewing Mouth Piece, **TPO-**Tree Preservation Order, **D**-dangerous, **VD**-very dangerous, **X-**no room to grow / unsuitable, **H**-Habitat, **HB**-Habitat Box, **VTA**-Visual Tree Assessment (**P-**pass**, F**-fail), **Hazard Rating – 1**=low hazard, **12**=dangerous, **SULE**-See Appendix 11, **Rec**.-Recommendation, **S**-save, **R**-remove, **W**-work needed to be carried out, **mon**-monitor, **Insp**-Inspect, **N/A**-not applicable,

Tree No.	Type	Height m	DBH mm	DGL mm	Health Vigour	Structural Condition	Canopy Spread (m) N S E W	Comments	VTA	Hazard Rating 1-12	SULE	Rec
1	Corymbia citriodora Lemon-scented Gum	24	620	900	G	G	4 12 0 15	M, unbalanced canopy, TL10°W, crack in trunk, dw, undercanopy raised now FA, tropism due to tree (now rem to E), in proposed carpark	F	10	3B	R
2	Stump											R
	There are 2 x shrubs also on site that are only 2m high											R

Appendix 3 Notes on Tree Assessment

Key	Criteria	Comments
Tree No	Must relate to the number on your site diagram	
Species	Botanical name and common name of Tree	
Diameter of trunk	DBH – Diameter at Breast Height (1.4 metres) DGL – Diameter at Ground Level	
Height	In metres	
Spread	Average diameter of canopy in metres	
Crown Condition	Overall vigour and vitality 0 Dead 1 Severe decline (<20% canopy; major dead wood) 2 Declining (20-60% canopy density; twig and branch dieback) 3 Average/low vigour (60-90% canopy density; twig dieback) 4 Good (90-100% crown cover; little or no dieback or other problems) 5 Excellent (100% crown cover, no deadwood or other problems)	This requires knowledge of species.
Age class	Y Young = recently planted S Semi-mature (< 20% of life expectancy) M Mature (20-80% of life expectancy) O Over-mature (> 80% of life expectancy)	
Special Significance	A Aboriginal C Commemorative Ha Habitat Hi Historic M Memorial R Rare U Unique form O Other	This may require specialist knowledge.
Services/ adjacent structures	Bs Bus stop Bu Building within 3m HVo High voltage open-wire construction HVb High Voltage bundled (ABC) LVo Low Voltage open-wire construction LVb Low Voltage bundled (ABC) Na No services above Nb No services below ground Si Signage Sl Street light T Transmission lines (>33KV) U Underground services O Other	More than one of these may apply.
Defects	B Borers C Cavity D Decay dw Deadwood E Epicormics FA Forest Architecture H/D Height/Diameter ratio I Inclusions L Lopped LDCMP Leaf damage by chewing mouthpieced insects M Mistletoe/Parasites MBA Multiple Branch Attachments	More than one of these may apply. H/D if ratio is higher than 50:1 then tree is defective (Mattheck 2004)

	PD Parrot Damage PFS Previous Failure Sites S Splits/cracks T Termites TL Trunk Lean TW Trunk Wound O Other	
Root zone	C Compaction D Damaged/wounded roots (eg by mowers) E Exposed roots Ga Tree in garden bed Gi Girdled roots Gr Grass K kerb close to tree L+ Raised soil level L- Lowered soil level M Mulched Pa Paving/concrete/bitumen Pr Roots pruned O Other	More than one of these may apply.
Size of defective part	Rates the size of the part most likely to fail. The larger the part that fails, the greater the potential for damage. 1. most likely failure less than 150mm in diameter 2. Most likely failure 150-450mm in diameter 3. Most likely failure 450-750mm in diameter 4. Most likely failure more than 750mm in diameter	
Target Rating*	Rates the use and occupancy of the area that would be struck by the defective part 1. Occasional use (eg jogging/cycle track) 2. Intermittent use (eg picnic area, day use parking) 3. Frequent use, secondary structure (eg seasonal camping area, storage facilities) 4. Constant use, structures (eg year-round use for a number of hours each day, residences)	
Hazard rating*	Failure potential + size of part + target rating Add each of the above sections for a number out of 12	The final number identifies the degree of risk. The next step is to determine a management strategy. A rating in this column does not condemn a tree but may indicate the need for more investigation and a risk management strategy.

Appendix 4 Rating System for Tree Significance

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 tree significance 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. 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.

Once landscape significance of an individual tree has been defined, the retention value can then be determined. (Table 1.0 in this Appendix). The terms used in the Assessment Criteria and Tree Retention Value - Priority Matrix, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

Tree Significance - Assessment criteria

1. High Significance in landscape

- The tree is in good condition, or normal vigour and form typical of 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 grand age.
- The tree is listed as a Heritage Item, Threatened Species or part of a Threatened 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 by bulk and scale and makes a positive contribution to the local amenity.
- The tree has been influenced by historic figures, events or part of the heritage development of the place.
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values.
- The growing environment supports the tree to its full dimensions above and below ground without conflict or constraint.

2. Medium Significance in landscape

- The tree is in fair-good condition, or normal or low vigour and form typical or atypical of the species,
- The tree is a planted locally indigenous or a common species with its taxa readily 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 area,
- The tree is moderately constrained by above or below ground influences of the built environment to reach full dimensions.

3. Low Significance in landscape

- The tree is in fair-poor condition, or normal or low vigour and form typical or atypical of the species,
- The tree is not visible or is partly 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 area.
- The tree is severely constrained by above or below ground by influences of the built environment and therefore will not reach full dimensions; tree is inappropriate to the site conditions.
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order.
- The tree has a wound or defect that has potential to become structurally unsound.

4. 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.

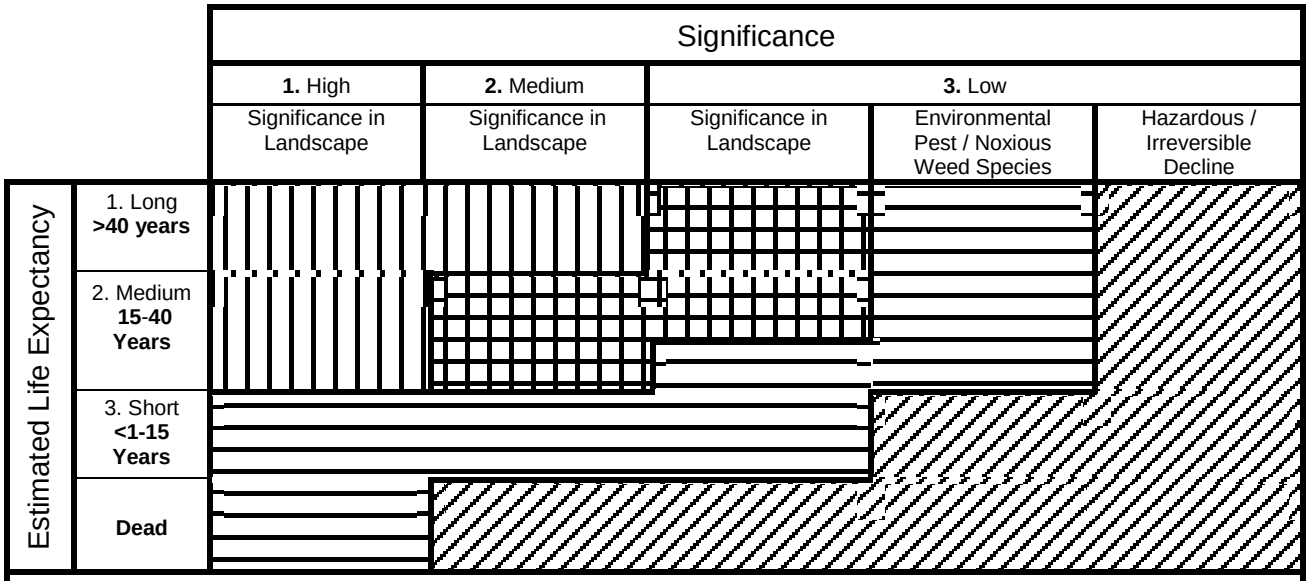
5. Hazardous/Irreversible Decline

- 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 correspond with at least three (3) of the criteria in categories 1, 2 and 3, and one (1) criteria only is required in categories 4 and 5 to be classified in that group.

Note: The assessment criteria are for individual trees only and are not to be applied to stands of trees.

Table 1.0 Tree Retention Value - Priority Matrix.



Legend for Matrix Assessment

Priority for Retention (High) - 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 detailed in Table 2. Special construction works must be implemented e.g. pier and beam, etc, if works are to proceed within the Tree Protection Zone.

Consider for Retention (Medium) - 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.

Consider for Removal (Low) – These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.

Priority for Removal – These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

Appendix 5 Glossary

Please refer to *Dictionary for Managing Trees in Urban Environments,* Institute of Australian Consulting Arboriculturists (IACA) 2009. (Draper & Richards)

Appendix 6 SULE

SULE (an acronym for **Safe & Useful Life Expectancy**). There are a number of SULE categories that indicate the safe useful life anticipated for each tree. Factors such as the location, age, condition and health of the tree are significant to determining this rating. Other influences such as the tree's effect on better specimens and the economics of managing the tree successfully in its location are also relevant to SULE (Barrell 1993, 1995).

SULE Categories and Subgroups

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1 = Long SULE OF > 40 years

A Structurally sound in suitable location	**B** Suitable to retain with some remedial care	**C** Significant status – requires special care to preserve

2 = Medium SULE of 15-40 years

A Lifespan limit	**B** Eventual removal for safety or nuisance	**C** Remove for adjacent trees or replanting	**D** Requires extensive remedial care

3 = Short SULE of 5-15 years

A Lifespan limit	**B** Eventual removal for safety or nuisance	**C** Remove for adjacent trees or replanting	**D** Requires extensive remedial care

4 = Remove tree within 5 years

A Dead, dying or disease	**B** Unstable or exposed by new clearing	**C** Structurally defective	**D** Damaged and unsafe	**E** Remove for adjacent trees or replanting	**F** Damaging existing structures	**G** Clearing will affect stability

5 = Trees suitable to transplant

A Less than 5m high	**B** Young trees over 5m high	**C** Height/width contained by pruning

The SULE rating given to any tree in this report assumes that reasonable maintenance will be provided by a qualified Arboriculturist using correct and acknowledged techniques. Retained trees are to be protected from root damage. Incorrect tree work practices can significantly accelerate tree decline and increase hazard potential.

Appendix 7 Curriculum Vitae

Graduate Diploma in Horticulture
U W S (Hawkesbury)

Diploma in Horticulture
U W S (Hawkesbury)

Diploma of Horticulture (Arboriculture) (RTF50203-6522-6/12/2005)
Hortus Australia

Tree Surgery
Ryde School of Horticulture

Arboriculture Techniques
Ryde School of Horticulture

Excel Module 1 and 2
Excel – Advanced
Central Coast Community College

OHS General Induction for Construction Work in NSW CGI00871464SEQ1
Workcover

St Johns Ambulance First Aid Certificate

Conference Attendance & Training

2010 Root Barrier Field Day
2009 Matheny & Clark: Arboriculture
2007 Quantified Tree Risk Assessment System
A Practitioners Guide to Visual Tree Assessment
2006 Barrell Tree A-Z 2 Day Workshop
IML Resistograph F500S Training Course
2005 Urban Tree Forum – Sydney City Council
Urban Tree Risk Management – Treelogic
DA Workshop Preparing Development Applications for Local Council –AIH
Urban Forest – The New Imperative – Parks and Leisure Australia
2004 Visual Tree Assessment Workshop – Professor Doctor Claus Mattheck
2003 Urban Trees - Our Urban Urgency – Parks and Leisure Australia
1999 Tree Hazard Assessment – Parramatta Park – NAAA
1990 Aero Advanced Climbers Seminar NSW

Business Achievement

Finalist in Central Coast Advocate Community Business Awards 2005 for Specialised Business category

Industry Background

20th June '01 to present	*Proprietor* ***Advanced Treescape Consulting*** *(formerly known as RJK Consulting)*
January '02 to January '05	*Part Time Horticulturist* **Acorn/Bushlands Nursery/Aquarium Centre, Erina Heights**
1997 to present	*Consultant* **Horticulturist**
1997 to present	*Public Speaker* **Horticulturist/Arboriculturist Topics**
November '97 to October '01	*Part Time Horticulturist* **Flower Power - Glenhaven**
January '94 to February '95	*Proprietor* **KAC Peninsula Firewood** Assembled team to clear backlog of firewood
June '90 to January '94	*Proprietor/Climber* **Kingdom's Arbor Care** till its sale.
January '86 to May '95	*Tree Worker* **Arbor 2000 Pro-Climb, Sydney**
1972 – present	*Bonsai enthusiast*

Memberships

Institute of Australian Consulting Arboriculturists

Australian Institute of Horticulture

Arboriculture Australia Limited

Gosford City Council Tree Protection Committee - Committee Member - August 1998 to June 2004.