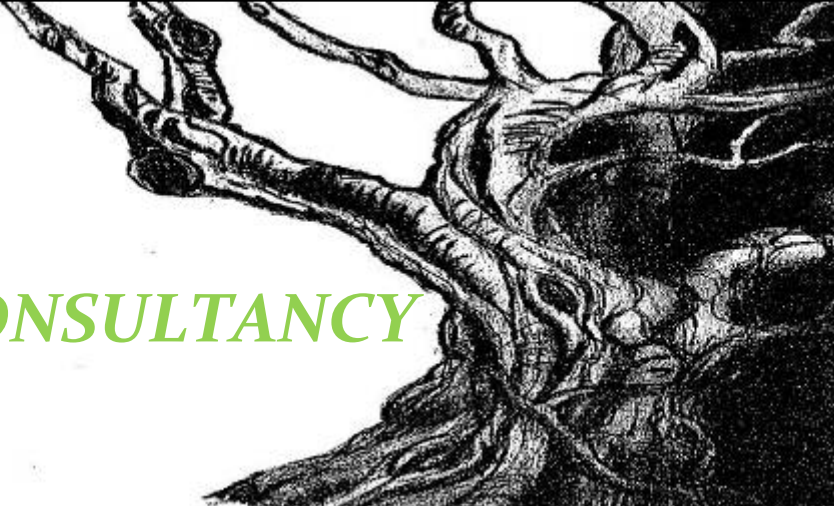


Client	UNSW c/o Bovis Lend Lease
Location	Wallace Wurth Building Upgrade UNSW.
Document Type	Arboriculture Assessment for Project Application
Date/Time	15 th June 2010



THE ENTS TREE CONSULTANCY

Client	UNSW c/o Bovis Lend Lease
Location	Wallace Wurth Building Upgrade UNSW.
Document Type	Arboriculture Assessment for Development Application
Date/Time	15 th June 2010

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2 Introduction

2.1 On the 2nd February 2010 Ms Teoh representing Bovis Lend Lease contacted The Ents Tree Consultancy in regards to obtaining a tree report for the trees located on the proposed Wallace Wurth Development site at the UNSW Kensington Campus. The client stated that the trees have been nominated to be inspected in relation to a Major Project (Part 3A) Application. Consultation with the client about the number and position of trees to be inspected in relation to the works occurred prior to a survey being completed.

2.2 The site inspection of the nominated trees occurred on the 23rd February. The client was not present for the site inspection but the client had previously issued a verbal brief providing background information in regards to the trees on site. The client also issued a site plan showing the position of the trees on the site and another plan showing the extent of the works. On the 11th June 2010, a representative of Bovis Lend Lease issued amended drawing based on the new site plans which involves an increased building foot print to the East.

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. 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.

2.4 To achieve the objectives of the report, the trees will be assessed noting the species, size, general condition with any defects discussed. 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 a numerical system will be used to identify them for this report and future reference on this job site. A site plan will show the trees and their allocated numbers in Appendix 4.

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. VTA is an internationally recognised practice in the visual assessment of trees as formulated by Mattheck & Breloer (1994).

3.2 A Lufkin 6.5m diameter tape was used to obtain the Diameter at breast height (DBH) as recommended at 1.3 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 350D Digital camera with a 20-40mm lens was used to take all photographs in this report. No image modification has been used in any of the images.

3.5 The SULE rating system has been used as a guide to assist in determining the Safe Useful Life Expectancy of the tree surveyed. Refer to Appendix 1.

4 Discussion

4.1 The trees nominated to be inspected are located on the proposed Wallace Wurth Redevelopment site at the UNSW Kensington Campus. 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 redesign of the area to the East of the site will result in the loss of some trees, however it is envisaged that they can be replaced in the new landscape plan.

4.2 The trees are located on an exposed site with some protection from surrounding structures and topography. The soil on site is sandy and it has been disturbed previously. The majority of the trees nominated to be retained on this site are located in garden beds that separate the UNSW campus from either High or Botany Street. Most of the works are limited to the within existing building footprints, with the exception of the eastern facade with some additions made to the existing building footprints or facades.

4.3 Based on the information provided by the client, the existing buildings are to be renovated and the new sections of the building added. The existing Wallace Wurth Building will have its facade renovated with little impact the trees on the Botany or Northern side of the building. The new building extension will require the removal of a number of trees. Most of the trees are semi mature and most will be able to be replaced within the new landscape plan.

4.4 The trees nominated to be retained on site will have little or no disturbance due to the proposed works. To review the requirements of the trees to be retained and the trees to be removed they will be discussed in groups below. It is envisaged that all of the trees proposed to be retained can be kept in good condition for the duration of the works using the Australian Standard AS4970 2009 Protection of trees on development sites. Additional instructions will be discussed below as required.

4.5 Trees to be Removed.

4.5.1 The trees that are proposed to be removed are within the footprint of the proposed building or are close to the proposed boundary of the new building. Many of the trees close to the boundary cannot be retained due to the impacts anticipated by the works. These impacts may cause the tree to decline or may impact too heavily on the trees crown or root structure. Due to the size and position of the proposed works and structures the best long term management plan for these trees close to the works is to remove and replace them in a new landscape plan.

4.5.2 The trees nominated for removal are Trees 4-9, 11- 23 & trees 26-38. It is recommended that trees 12 – 17 are transplanted to another position in the same area.

4.6 Trees to be Retained.

4.6.1 High Street West Trees 1-3. The trees nominated to be retained in this area are anticipated to have little or no disturbance due to the works. These trees will require pruning works to allow the facade to be renovated, however no significant excavations are anticipated. Tree 2 requires a 10m tree protection zone but has been allocated 7m. This is acceptable as there will be no excavations or significant disturbance to the trees root zone.

4.6.2 Botany Street Trees 10, trees 24 and tree 25. It is anticipated that some trees will have little disturbance to their root zones or crown with no significant impacts anticipated. After consideration of the impacts it has been decided that the impacts were not large enough to cause the trees to decline or would they interfere with their longevity. These trees may have up to 20% of their root zones disturbed or may require up to 10% of their crowns pruned. It is anticipated that these trees can be kept in good condition for the duration of the works using the Australian Standard AS4970 2009 Protection of trees on development sites.

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Recommendations

After reviewing the site plan and the information provided by the client it is my recommendation the proposed plan for the Wallace Wurth Redevelopment at the UNSW Kensington Campus is allowed to proceed with the following actions carried out.

It is recommended that trees 4-9, trees 11- 23 and trees 26 -38 are removed due to their position in relation to the works. It would be difficult to recommend replacing these trees as the UNSW has an excellent tree planting policy in place and there is little or no room on this site for more trees. Trees 12 – 17 are small trees that can be relocated on site.

It is recommended that trees 1 – 3, tree 10, tree 24 and tree 25 are retained in good condition for the duration of the works using the Australian Standard AS4970 2009 Protection of trees on development sites. Regular site inspections by a level 5 Arborist should be completed to ensure the appropriate tree protection measures and recognised horticultural practices are being utilised to keep these trees in good condition for the duration of the works.

Note: All tree works are to be conducted by suitably qualified persons and should comply with the Australian standard for the pruning of Amenity trees AS4373.

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

Regards

Hayden Coulter
Diploma in Arboriculture
Advanced Certificate in Urban Horticulture

The Ents Tree Consultancy. ABN: 95 598 933136 theents@bigpond.net.au



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. 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

S.U.L.E Categories (After Barrell) 1996 Updated 01/04/01.

1. **Long S.U.L.E-** the tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - a. Structurally sound trees located in positions that can accommodate future growth.
 - b. Trees, which could be made suitable for long term retention by remedial care.
 - c. Trees of special significance which would warrant extraordinary efforts to secure their long term retention.
2. **Medium S.U.L.E-** the tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - a. Trees, which may only live from 15-40 years.
 - b. Trees that may live for more than 40 years but may be removed for safety or nuisance reasons.
 - c. Trees which may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new plantings.
 - d. Trees which could be made suitable for retention in the medium term with remedial care.
3. **Short S.U.L.E-** trees that appeared to be retainable at the time of assessment for 5-15 years with an acceptable degree of risk, assuming reasonable maintenance:
 - a. Trees which may only live from 5 to 15 years.
 - b. Trees that may live for more than 15 years but may be removed for safety or nuisance reasons.
 - c. Trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new plantings.
 - d. Trees which require substantial remediation and are only suitable for retention in the short term.
4. **Removal-** Tree which should be removed within the next 5 years.
 - a. Dead, dying suppressed or declining trees
 - b. Dangerous trees through instability or recent loss of adjacent trees.
 - c. Dangerous trees because of structural defects including cavities, decay included bark, wounds or poor form.
 - d. Damaged trees that are clearly not safe to retain.
 - e. Trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new plantings.
 - f. Trees which are damaging or may cause damage to existing structures within the next 5 years.
 - g. Trees that will become dangerous after the removal of other trees for the reasons given in (A) to (F).
 - h. Trees in categories (A) to (G) that have a high wild life habitat value and with appropriate treatment could be retained subject to regular review.
5. **Small, young or regularly pruned-** Trees that can be reliably moved or replaced.
 - a. Small trees less than 5m in height.
 - b. Young trees less than 15 years old but over 5m in height.
 - c. Formal hedges and trees intended for regular pruning to artificially control growth.

Appendix 2 Assessment of Trees

Tree No	Species	Height (m)	Trunk Diameter (DBH*)	Canopy Spread (m)	Estimated Age Class	TPZ **	SULE ***	Observations and comments
1	<i>Agonis flexuosa</i>	7	.59	8	Mature	7m SRZ 3.2	Medium	This semi mature tree is located close to the existing building, has average health and average form for the species. The tree has no significant defects evident.
2	<i>Eucalyptus scoparia</i>	18	.90	10	Mature	10m SRZ 4.5m	Medium	This mature tree is located close to the existing building, has average health and average form for the species. The tree has strong reaction wood and a lean to light but no significant defects evident.
3	<i>Agonis flexuosa</i>	8	.71	9	Mature	8.4m SRZ 3.5	Medium	This semi mature tree is located close to the existing building, has average health and average form for the species. The tree has no significant defects evident.
4	<i>Podocarpus falcatus</i>	14	.70	12	Mature	8.4m SRZ 3.5	Medium	This mature tree is located near an existing building, has average health and average form for the species. The tree has no significant defects evident.
5	<i>Banksia integrifolia</i>	5	.10	2	Semi mature	1.5m SRZ 1.5m	Medium	This semi mature tree is located near an existing building, has average health and average form for the species. The tree has no significant defects evident.
6	<i>Callistemon viminalis</i>	7	.10	4	Semi mature	1.5m SRZ 1.5	Medium	This semi mature tree is located near an existing building, has average health and average form for the species. The tree has no significant defects evident.
7	<i>Calodendron capense</i>	13	.55	12	Mature	6.5m SRZ 3.25m	Medium	This semi mature tree is located near an existing building, has average health and average form for the species. The tree has no significant defects evident.
8	<i>Melaleuca quinquenervia</i>	15	.70	8	Mature	8.5m SRZ 3.5m	Medium	This semi mature tree is located near an existing building, has average health and average form for the species. The tree has no significant defects evident.
9	<i>Melaleuca quinquenervia</i>	14	.45	5	Mature	5.5m SRZ 2.75m	Medium	This semi mature tree is located near an existing building, has average health and average form for the species. The tree has no significant defects evident.
10	<i>Podocarpus elatus</i>	3	.08	1	Semi mature	1.5m SRZ 1.5	Medium	This semi mature tree is located near an existing building, has average health and average form for the species. The tree is partially suppressed, has no significant defects evident.
11	<i>Calodendron capense</i>	12	.39	8	Mature	4.5m SRZ 2.5m	Medium	This semi mature tree is located near an existing building, has average health and average form for the species. The tree has no significant defects evident.

Appendix 3 Assessment of Trees, (continued)

Tree No	Species	Height (m)	Trunk Diameter (DBH*)	Canopy Spread (m)	Estimated Age Class	TPZ **	SULE ***	Observations and comments
12	<i>Podocarpus elatus</i>	4	.10	2	Semi mature	1.5m SRZ 1.5	Medium	This semi mature tree is located near an existing building, has average health and average form for the species. The tree is partially suppressed, has no significant defects evident.
13	<i>Podocarpus elatus</i>	3	.08	1	Semi mature	1.5m SRZ 1.5	Medium	This semi mature tree is located near an existing building, has average health and poor form for the species. The tree is partially suppressed, has no significant defects evident.
14	<i>Podocarpus elatus</i>	4	.10	2	Semi mature	1.5m SRZ 1.5	Medium	This semi mature tree is located near an existing building, has average health and average form for the species. The tree is partially suppressed, has no significant defects evident.
15	<i>Phoenix dactylifera</i>	7	.40	4	Semi mature	1m SRZ 1	Medium	This semi tree is located close to the existing building, has average health and average form for the species. The tree has no significant defects evident.
16	<i>Phoenix dactylifera</i>	4	.40	3	Semi mature	1m SRZ 1	Medium	This semi tree is located close to the existing building, has average health and average form for the species. The tree has no significant defects evident.
17	<i>Phoenix dactylifera</i>	5	.40	3	Semi mature	1m SRZ 1	Medium	This semi tree is located close to the existing building, has average health and average form for the species. The tree has no significant defects evident.
18	<i>Corymbia maculata</i>	14	.35	8	Semi mature	4.2m SRZ 2.7	Medium	This semi mature tree is located close the existing building, has average health and average form for the species. The tree has no significant defects evident.
19	<i>Corymbia maculata</i>	13	.37	8	Semi mature	4.2m SRZ 2.7	Medium	This semi mature tree is located close the existing building, has average health and average form for the species. The tree has no significant defects evident.
20	<i>Corymbia maculata</i>	15	.26	6	Semi mature	3.2m SRZ 2.2	Medium	This semi mature tree is located close the existing building, has average health and average form for the species. The tree has no significant defects evident.
21	<i>Corymbia maculata</i>	15	.21	4	Semi mature	2.5m SRZ 2m	Medium	This semi mature tree is located close the existing building, has average health and average form for the species. The tree has no significant defects evident.
22	<i>Melaleuca quinquenervia</i>	13	.45	6	Semi mature	5.5m SRZ 2.7m	Medium	This semi mature tree is located near an existing building, has average health and average form for the species. The tree has no significant defects evident.
23	<i>Melaleuca quinquenervia</i>	12	.42	6	Semi mature	5.5m SRZ 2.7m	Medium	This semi mature tree is located near an existing building, has average health and average form for the species. The tree has no significant defects evident.

Appendix 3 Assessment of Trees, (continued)

Tree No	Species	Height (m)	Trunk Diameter (DBH*)	Canopy Spread (m)	Estimated Age Class	TPZ **	SULE ***	Observations and comments
24	<i>Corymbia maculata</i>	15	.24	4	Semi mature	2.8m SRZ 2.5	Medium	This semi mature tree is located close the existing building, has average health and average form for the species. The tree has no significant defects evident.
25	<i>Corymbia maculata</i>	16	.33	5	Semi mature	3.9m SRZ 2.5	Medium	This semi mature tree is located close the existing building, has average health and average form for the species. The tree has no significant defects evident.
26	<i>Corymbia maculata</i>	15	.23	6	Semi mature	2.8m SRZ 2.5	Medium	This semi mature tree is located close the existing building, has average health and average form for the species. The tree has no significant defects evident.
27	<i>Corymbia maculata</i>	5	.10	4	Semi mature	1.5m SRZ 1.5m	Medium	This semi mature tree is located close the existing building, has average health and average form for the species. The tree is suppressed, has no significant defects evident.
28	<i>Eucalyptus microcorys</i>	15	.47	8	Mature	5.6m SRZ 2.7	Medium	This mature tree is located in a lawn close to the existing buildings, has average health and average form for the species. The tree has no significant defects evident.
29	<i>Eucalyptus microcorys</i>	14	.25	5	Mature	2.8m SRZ 2.5	Medium	This mature tree is located in a lawn close to the existing buildings, has average health and average form for the species. The tree has no significant defects evident.
30	<i>Eucalyptus microcorys</i>	14	.30	6	Mature	3.6m SRZ 2.5	Medium	This mature tree is located in a lawn close to the existing buildings, has average health and average form for the species. The tree has no significant defects evident.
31	<i>Eucalyptus microcorys</i>	10	.31	4	Mature	3.6m SRZ 2.5	Medium	This mature tree is located in a lawn close to the existing buildings, has average health and average form for the species. The tree has no significant defects evident.
32	<i>Eucalyptus microcorys</i>	12	.28	6	Mature	3.3m SRZ 2.4	Medium	This mature tree is located in a lawn close to the existing buildings, has average health and average form for the species. The tree has no significant defects evident.
33	<i>Eucalyptus microcorys</i>	14	.42	8	Mature	5m SRZ 2.7	Medium	This mature tree is located in a lawn close to the existing buildings, has average health and average form for the species. The tree has no significant defects evident.
34	<i>Casuarina glauca</i>	12	.28	5	Semi mature	3.3m SRZ 2.4m	Medium	This semi mature tree is located close to an existing building has average health and average form for the species. The tree has no significant defects evident.
35	<i>Casuarina glauca</i>	14	.30	6	Semi mature	3.6m SRZ 2.5m	Medium	This semi mature tree is located close to an existing building has average health and average form for the species. The tree has no significant defects evident.

Appendix 3 Assessment of Trees, (continued)

Tree No	Species	Height (m)	Trunk Diameter (DBH*)	Canopy Spread (m)	Estimated Age Class	TPZ **	SULE ***	Observations and comments
36	<i>Casuarina glauca</i>	11	.12	3	Semi mature	1.5m SRZ 1.5m	Medium	This semi mature tree is located close to an existing building has average health and average form for the species. The tree has no significant defects evident.
37	<i>Toona australis</i>	15	.20	4	Semi mature	2.4m SRZ 2m	Medium	This semi mature tree is located close to an existing building has average health and average form for the species. The tree has no significant defects evident.
38	<i>Liriodendron tulipifera</i>	17	.20	5	Semi mature	2.4m SRZ 2m	Medium	A semi mature tree with average health and form for the species.

Explanatory Notes for Table

- *Dbh = Diameter of trunk at breast height.
- **TPZ refers to the Tree Protection Zones as recommended by The Ents Tree Consultancy and are to be used in conjunction with the Tree Protection Guidelines in Appendices 3. TPZ based on 10x the trees Dbh for retention of biological function, 5x Dbh for critical root zone and tree stability.
- ***SULE Explanation can be found in Appendix 2.

Appendix 3 Tree Images



Pictured above left tree 1 on site. Pictured above right tree 2 on site. Pictured below left are trees 3 & 4. Pictured below centre are trees 5 & 6. Pictured below right is tree 7.





Pictured above right are trees 8 & 9 with smaller trees 10,12,13,14. Above centre are trees 11 & 15. Pictured above right are trees 19 & 18. Pictured below left are trees 20-22. Pictured below centre are trees 24-27. Pictured below centre right are trees 28-33. Below right is trees 34-38.



Arboricultural Assessment 22 June 2010. Site: Wallace Wurth Upgrade UNSW.

Appendix 5

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Appendix 6

Glossary Of Terms

Abiotic	Nonliving
Anthrachnose	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 7 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.
-

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.** Writing of tree reports for development applications, 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.
- **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