Moore Trees
Arboricultural Services

ABN 90887347745

Arboricultural Development Assessment Report

St Vincent's Private Hospital
406 Victoria Street
Darlinghust NSW 2010
February 2015
Final

Member 2015

Registered Consultant

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Prepared for: St Vincent's Private Hospital
SVPHS Redevelopment
Project Office
2A Oxford Street
Paddington NSW 2021

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ISA, AA
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Registered Consultant

Summary

This report has been conducted to assess the health and condition of thirty eight (38) trees located within the site but also including the street trees along Victoria Street. This report has been prepared for St Vincent's Private Hospital, SVPHS Redevelopment Project Office, 2A Oxford Street, Paddington NSW 2021 (Diagram 1) as required for a State Significant Development Application with the Department of Planning and Environment at this site. This Report should be cited as the Arboricultural Development Assessment Report for 406 Victoria Street, Darlinghurst NSW 2010. The study area can be seen in Diagram 2.

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 any tree to be retained. Any trees that can be relocated have also been identified and a transplant method statement has been included in the Appendices.

This report contains the following information required in City of Sydney Arboricultural Report guidelines:-

1) All trees were assessed for Safe Useful Life Expectancy (SULE).
2) Genus and species of each tree.
3) Impact of the proposed development on each tree.
4) Impact of retaining tree on the proposed development.
5) The Tree Protection Zone (TPZ) for each tree to be retained.
6) Any branch or root pruning that may be required for trees.

Based on the plans provided, Trees numbered as 7, 8, 24-32 are proposed to be removed for the purpose of the development.
Palm trees numbered as 26, 29, 31 and 32 could readily be relocated. The Transplant Method Statement in Appendix 8 should be followed to ensure these palms have the best possible chance of survival. Tree 28 (the memorial tree) has a lesser chance of surviving the relocation due to its current growing location, age and species. As with the palms, the Transplant Method Statement in Appendix 8 should be followed to ensure this tree has the best possible chance of survival.

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VERSION CONTROL

Date of Issue	Details
16th January 2015	Draft 1 issued
1st February 2015	Draft 2 issued
9th February 2015	Draft 3 issued
20th February 2015	Draft 4 issued, Final issued.

1 INTRODUCTION

1.1 This report has been conducted to assess the health and condition of thirty eight (38) trees located within the site but also including the street trees. This report has been prepared for St Vincent's Private Hospital, SVPHS Redevelopment Project Office, 2A Oxford Street, Paddington NSW 2021 (Diagram 1) as required for a State Significant Development Application with the Department of Planning and Environment at this site. This Report should be cited as the Arboricultural Development Assessment Report for 406 Victoria Street, Darlinghurst NSW 2010. The study area can be seen in Diagram 2.

1.2 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 any tree to be retained. Any trees that can be relocated have also been identified and a transplant method statement has been included in the Appendices.

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

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

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

Also noted for the purpose of this report were:

- Health and Vigour; using foliage colour and size, extension growth, presence of deadwood, dieback and epicormic growth throughout the tree.
- Structural condition using visible evidence of bulges, cracks, leans and previous pruning.
- The suitability of the tree taking into consideration the proposed development.
- Age rating; Over-mature (>80% life expectancy), Mature (20-80% life expectancy), Young, Sapling (<20% life expectancy).

1.4 Documents and information provided: For this Arborist Report I was given a site plan of the location, undertaken by Rygate & Company Pty Limited marked reference No. 75514 rev C dated 19/09/2012. The plan showed the proposed building and existing trees on the site.

Plans by Hassell, 36 Warry Street Fortitude Valley QLD Australia 4006
PO Box 865 Fortitude Valley QLD 4006;

Landscape Plan DA-00-901 Revision B dated 16.1.2015
Landscape Plan DA-00-902 Revision B dated 16.1.2015
Remediation Strategy DA-00-903 Revision B dated 16.1.2015

1.5 **Location:** The proposed development site is located at 406 Victoria Street, Darlinghurst NSW 2010. The proposed development site from herein will be referred to as "the Site".

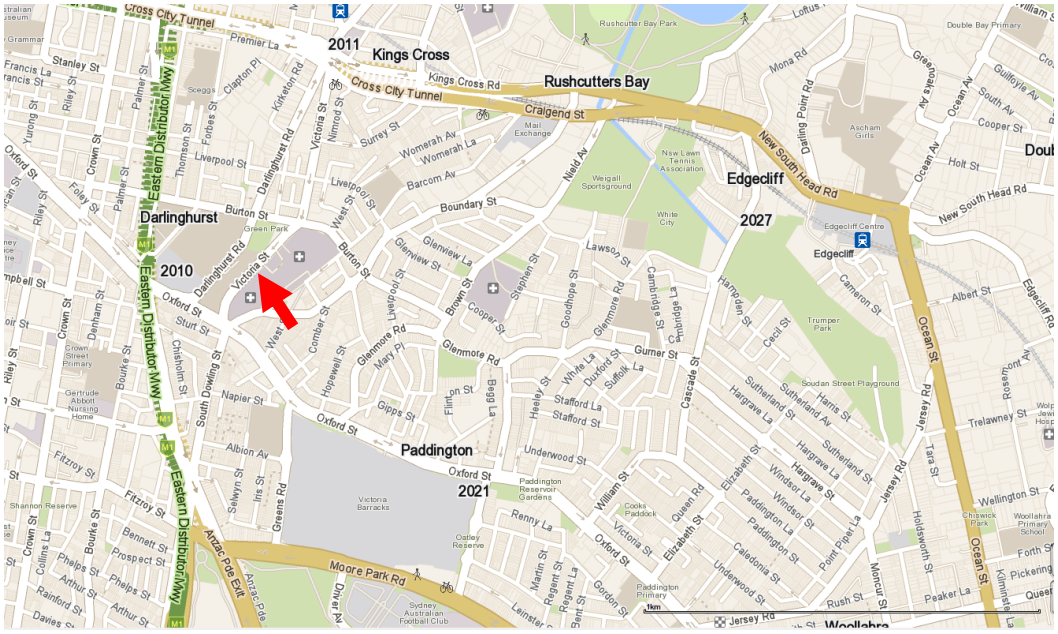


Diagram 1: Location of subject site, 406 Victoria Street, Darlinghurst NSW 2010 (Red arrow) (whereis.com.au, 2015).

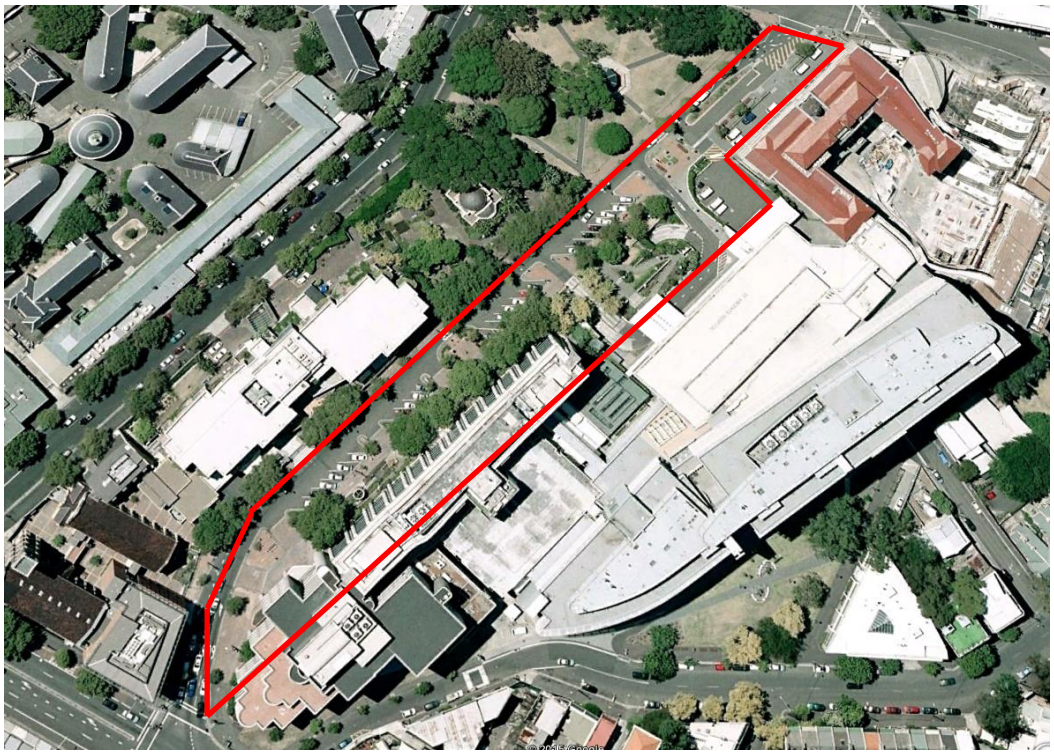


Diagram 2: Study area (Red) (Google earth, 2015)

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 12th January 2015. 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 over five (5) metres in height. It takes no account of any tree or shrub under five (5) metres in height.

2.3 **Height:** The heights and distances within this report have been measured with a Bosch DLE 50 laser measure.

2.4 **Tree Protection Zones (TPZ):** The Tree Protection Zone (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 to help determine construction impacts. The TPZ calculation is based on the Australian Standard *Protection of trees on development sites*, AS 4970, 2009. The TPZ does not relate to the root ball area for trees recommended for relocation.

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. No roots should be severed within this area. A detailed methodology on the TPZ and SRZ calculations can be found in Appendix 4.

2.6 **SULE**: The subject trees were assessed for a Safe Useful Life Expectancy (SULE). The SULE rating for each tree can be seen the Tree Assessment Schedule (Appendix 2). A detailed explanation of SULE can be found in Appendix 3.

2.7 **Impact Assessment:** An impact assessment was conducted on the site trees. This was conducted by assessing the verbal description of the Part A works. The proposed works 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.

2.8 **Plans provided**: St Vincent's Private Hospital Redevelopment Schematic Design Report, Volumes 1 and 2 dated 07 November 2014.

Plans by Hassell, 36 Warry Street Fortitude Valley QLD Australia 4006
PO Box 865 Fortitude Valley QLD 4006;

Landscape Plan DA-00-901 Revision B dated 16.1.2015
Landscape Plan DA-00-902 Revision B dated 16.1.2015
Remediation Strategy DA-00-903 Revision B dated 16.1.2015

3 RELEVANT BACKGROUND INFORMATION

3.1 The site is located along the north-western side of St Vincent's Private Hospital along Victoria Street. This section of Victoria Street has been planted on both sides with species of *Platanus* trees that vary in age from mature to sapling size (Plate 1). The proposed works entail demolition along with renovation and construction works to existing areas of the Private Hospital. The main access from Victoria Street for the site will be in the location of Trees 26-32.

3.2 **Environmental Significance**: Tree Management Controls in City of Sydney's Local Environmental Plan (LEP) and Development Control Plan (DCP) provide the legislative tool for the protection of all trees located within the City of Sydney. The Local Environmental Plan 2012, Part 5 Clause 5.9 Preservation of trees or vegetation outlines:

(1) The objective of this clause is to preserve the amenity of the area, including biodiversity values, through the preservation of trees and other vegetation.

(2) This clause applies to species or kinds of trees or other vegetation that are prescribed for the purposes of this clause by a development control plan made by the Council.

Note. A development control plan may prescribe the trees or other vegetation to which this clause applies by reference to species, size, location or other manner.

(3) A person must not ringbark, cut down, top, lop, remove, injure or wilfully destroy any tree or other vegetation to which any such development control plan applies without the authority conferred by:

(a) development consent, or

(b) a permit granted by the Council.

As outlined in Sydney Development Control Plan 2012, Section 3 – General Provisions this applies to trees that:

(a) has a height of five (5) metres or more; or

(b) has a canopy spread of over five (5) metres; or

(c) has a trunk diameter of more than three hundred (300) millimetres, measured at ground level; or

(d) is listed in the Register of Significant Trees.

3.3 **Heritage:** The City of Sydney has a Street Tree Master Plan (2011) that is an expansive document detailing long term management for the City's street and park trees. Darlinghurst (Part C, Precinct 21) covers the location that is the subject of this report. Within the species legend for this site the Victoria Street area is mapped as containing Simons Popular *(Populus simonii)* however this species is no longer present in this section of Victoria Street. The area is detailed as being located on Sandy soils produced by underlying geology of Hawkesbury sandstone. The City of Sydney has a Significant Tree Register that documents trees that have been classed as significant in the landscape. The nearest significant trees to Victoria Street are some distance away with those being located at Darlinghurst Court House and many of the trees located in Green Park are listed within this Significant Tree Register .

3.4 **The Site Trees:** The site was inspected on 12th January 2015. Each tree has been given a unique number for this site and can be viewed on the Tree Protection Plan (Appendix 1). This plan is based on the plan provided by SVPHS Redevelopment Project Office, undertaken by Rygate & Company Pty Limited marked reference no. 75514 rev C dated 19/09/2012. It should be noted that on the survey, the trees located between Trees 1 and 2 are no longer present. A large tree located between Trees 7 and 8 is an error in the survey.

3.5 The street trees are numbered as Trees 1-19. These trees are a mixture of Oriental plane *(Platanus orientalis)* and London plane *(Platanus x hybrida)*. In general, the street trees are in excellent health and condition. The main trunk, first and second order branches are free of any cracks, splits or fruiting bodies. New extension growth was noted. The basal areas and woody root zone were free of any ground heaving, or lifting with only minor disturbance to the surrounding paving occurring. Trees 7 and 8 are somewhat suppressed due to be located under much larger specimens (Plate 2). Trees 7 and 8 will be affected by the installation of the new Sub-station.

3.6 Trees 20-32 are located within the Hospital grounds. Trees 20-25 are large mature London plane *(Platanus x hybrida)* all in good health and condition (Plate 3). No major structural defects were noted on these trees. The outer edge of these canopies are generally against the exiting building. These trees form part of the memorial garden. The new substation will be located near trees 24 and 25.

3.7 Trees 27, 30, 33, 34 and 35 are mature Black locust *(Robinia pseudoacacia 'Frisia').* These trees are an exotic cultivar that are classed as a weed species in many Local Government Areas. This species is a fast growing, short lived species. Trees 27 and 30 would be considered to be nearing the end of the life span as evidenced by the die back of the canopy borer damage, and cracking and splitting of the outer bark. Trees 27 and 30 are proposed to be removed. Trees 33-35 are located on the adjacent side of the driveway.

3.8 Trees 36-38 are mature specimens of London plane *(Platanus x hybrida)*. These trees are located along a small wall (Plate 7). Only in fair condition these trees have possibly suffered root damage as evidenced by the twiggy dieback within the canopies. Extensive epicormic growth was also noted, a sign that these trees are under stress. These trees are not expected to be affected by the proposed works.

3.9 **Species possible to relocate:** Trees 26, 29 31 and 32 are all monocot species being Palm trees that have fibrous root systems. Trees 26 and 29 are semi mature Cabbage tree palms *(Livistona australis)* that are native to Australia. Trees 31 and 32 are mature Kentia palm *(Howea fosteriana)* that originate from Lord Howe Island. These palms have developed tall slender stems in a protected location (Plate 5). These two (2) specimens could readily be transplanted.

3.10 **Memorial Tree:** Tree 28 is a semi mature The Deodar cedar *(Cedrus deodara)*. This tree is in fair health and condition (Plate 4). The main trunk, first and second order branches are free of any cracks, splits or fruiting bodies. New extension growth was noted. The basal area and woody root zone were free of any ground heaving, or lifting. This tree was noted as being a memorial tree planted in 1992 as a gift to the Hospital (Plate 6). The Deodar cedar *(Cedrus deodara)* is an evergreen conifer tree that originates from the western Himalayas in eastern Afghanistan, northern Pakistan, north Republic of India, south westernmost Tibetan (China) and western Nepal. The species can grow to some 50 metres tall and 5-10 metres wide at maturity. The canopy is pyramidal in shape, with a straight trunk. It develops horizontal and pendulous branches at maturity.

3.11 I have been informed that Tree 28 is to be relocated for the duration of the construction works, stored at Centennial Park and replanted. Dicots, trees with woody root systems can be a little more difficult to transplant than monocots. If this specimen were growing in open space, the transplant would have a higher success rate as access to root ball excavation would be easier; however Tree 28 has grown in a restricted root space competing with footings and also the possibility of services running below it. As shown in the diagram in Appendix 7, tree roots would normally extend far beyond the drip line. The crowded growing area will also make it difficult to successfully excavate around the root ball in order to lift the tree. Relocating this tree is not impossible however the chances of success will only be limited. A detailed Transplant Method Statement is attached in Appendix 8. Cuttings should be taken from the tree and propagated should the transplant fail. An experienced nurseryman should be used to propagate these cuttings.

4 RECOMMENDATIONS

4.1 Based on the plans provided, Trees numbered as **7, 8, 24-32** are proposed to be removed for the purpose of the development. Due to the proximity of Trees 20-23 being close to the existing structure minor canopy reduction pruning may be required if any scaffolding is to be used along the memorial garden frontage. The trees proposed to be removed total eleven (11), four (4) of which could easily be relocated within the site (Trees 26, 29, 31 and 32) and street trees numbered as 7 and 8 could be replaced with mature specimens. Trees 27 and 30 are in a declining state from which they will not recover.

4.2 Unfortunately the construction specifications required by the two 'Type L Kiosk' Substations require Trees 7, 8, 24 and 25 to be removed. As previously mentioned the street trees numbered as 7 and 8 could be replaced with mature and better quality specimens. A site meeting was conducted with representatives of SVPH, Buildcorp and Hassell to select the best location for these substations in order to reduce tree loss. Options were limited and the site selected (Between Trees 24 and 25) was the only location available.

4.3 Any pruning required for Trees 20-23 will be pruned back to the nearest branch collar with pruning cuts not greater than one hundred (100) millimetres in diameter. Cuts shall be undercut so that branches do not tear from the tree. Pruning shall retain the natural shape of the tree as best as possible.

4.4 Palm trees numbered as **26, 29, 31 and 32** could readily be relocated. The Transplant Method Statement in Appendix 8 should be followed to ensure these palms have the best possible chance of survival.

4.5 **Tree 28** (the memorial tree) has a lesser chance of surviving the relocation due to its current growing location, age and species. As with the palms, the Transplant Method Statement in Appendix 8 should be followed to ensure this tree has the best possible chance of survival.

4.6 **Trees 9-15 and 20-23** will require trunk protection as specified in Section 5.1 of this report. This trunk protection will be required due to the proximity of heavy equipment operating near these trees (Plate 8). Some of the smaller trees may only require two sections of timber to protect them. It is important to protect the bark on trees. Bark is a very effective barrier that helps to protect trees from pest, disease and decay pathogens.

4.7 Due to excavations and trenching that may occur near **Trees 9-15** the TPZ and SRZ distances in Table 1 shall be referenced should any trenching for services or drainage be required. For distances and specifications for the TPZ and SRZ areas see Section 5.2.

4.8 The root zones of Trees 20-23 may also require protection from compaction depending on the full extent of works. Compaction of the root zone reduces oxygen and moisture exchange of the roots. This will lead to premature death of the tree. Ply sheeting is to be placed over the root zone to the extent of the drip line. Sheeting to be 19mm thick 1200mm x 2400mm. The sheeting is to remain until all construction works are completed. See Plate 9 for an example. The indicative areas for ply sheeting can be seen in the Tree Protection Plan.

5 TREE PROTECTION

5.1 Individual trunk protection: Trees 9-15 and 20-23 will require trunk protection. This is achieved by attaching lengths of timber (75mm x 50mm x 2000mm) fastened to the trunk. These timbers are to be fastened with hoop iron strapping and not attached directly into the bark of the tree. These timbers are only to be removed when all construction is complete. See Plate 7 for an example of trunk protection.

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

The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) have been measured from the centre of the trunk. The following activities shall be avoided within the TPZ and SRZ of the trees to be retained;

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

Tree	TPZ (mm)	SRZ (mm)
1	2400	1500
2	2400	1500
3	2400	1500
4	3600	2000
5	3600	2000
6	3600	2000
7	1800	1500
8	1440	1500
9	2160	1500
10	2160	1500
11	1200	1500
12	840	500
13	1200	1500
14	840	500
15	1440	1500
16	720	500
17	3000	2000
18	720	500
19	1800	1500
20	9000	500
21	6600	2500
22	5400	2300
23	6600	2700
24	6600	2700
25	7800	2700
26	4200	2000
27	2400	1500
28	3000	2000
29	4200	2200
30	3360	2000
31	1560	1500
32	1560	1500
33	2160	1500
34	2160	1500
35	2160	1500
36	3360	2000
37	2400	1500
38	3360	2000

Table 1: TPZ and SRZ distances

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

5.4 **Signage:** It is recommended that signage is attached to the tree protection fencing. A sample sign has been attached in Appendix 6. This sign may be copied and laminated then attached to any TPZ fencing.

5.5 **Root Pruning:** If excavations are required within a TPZ this excavation shall be done by hand to expose any roots. Any roots less than fifty (50) millimetres in diameter may be pruned cleanly with a sharp saw. Tree root systems are essential for the health and stability of the tree.

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

(1) Before the commencement of demolition or construction to ensure tree protection has been installed correctly;

(2) At mid point of the construction phase;

(3) At completion of the construction phase.

Arborist tree relocation inspection points are also recommended:

(1) At the time of excavation.

(2) To ensure Storage site is adequately prepared.

(3) To monitor transport to storage site.

(4) Weekly monitoring.

(5) Supervise at the time of planting.

The contractor should be responsible for the maintenance of the tree for the following 12 months after replanting.

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

20th February 2015

www.mooretrees.com.au

6 IMAGES

Plate 1: Image showing Trees 1-3. P. Vezgoff.

Plate 2: Image showing the general street view. Tree 22 left of image. P. Vezgoff.

Plate 3: Tree 20 growing in a restricted root space. P. Vezgoff.

Plate 4: Tree 28 (The memorial tree, red arrow) that has been requested to be relocated. P. Vezgoff.

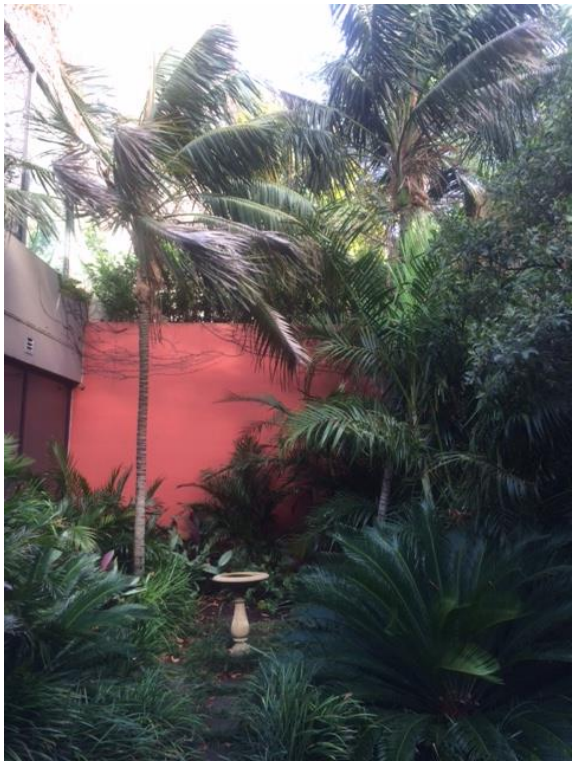


Plate 5: Palms 31 and 32 that are also possible to relocate.

Plate 6: Plaque associated to the memorial tree. P.Vezgoff.

Plate 7: Trees 36-38 (Left) behind a small wall, showing canopy dieback. P.Vezgoff.

Plate 8: Example of trunk protection with sign attached, recommended for the street trees. P. Vezgoff.

Plate 9: An example of board protection to reduce compaction over the root zone. This technique should be used over the root zone of Trees 20-23. P. Vezgoff.

Appendix 1

Plan 1

Tree Protection Plan

Plan 1

Plan 2

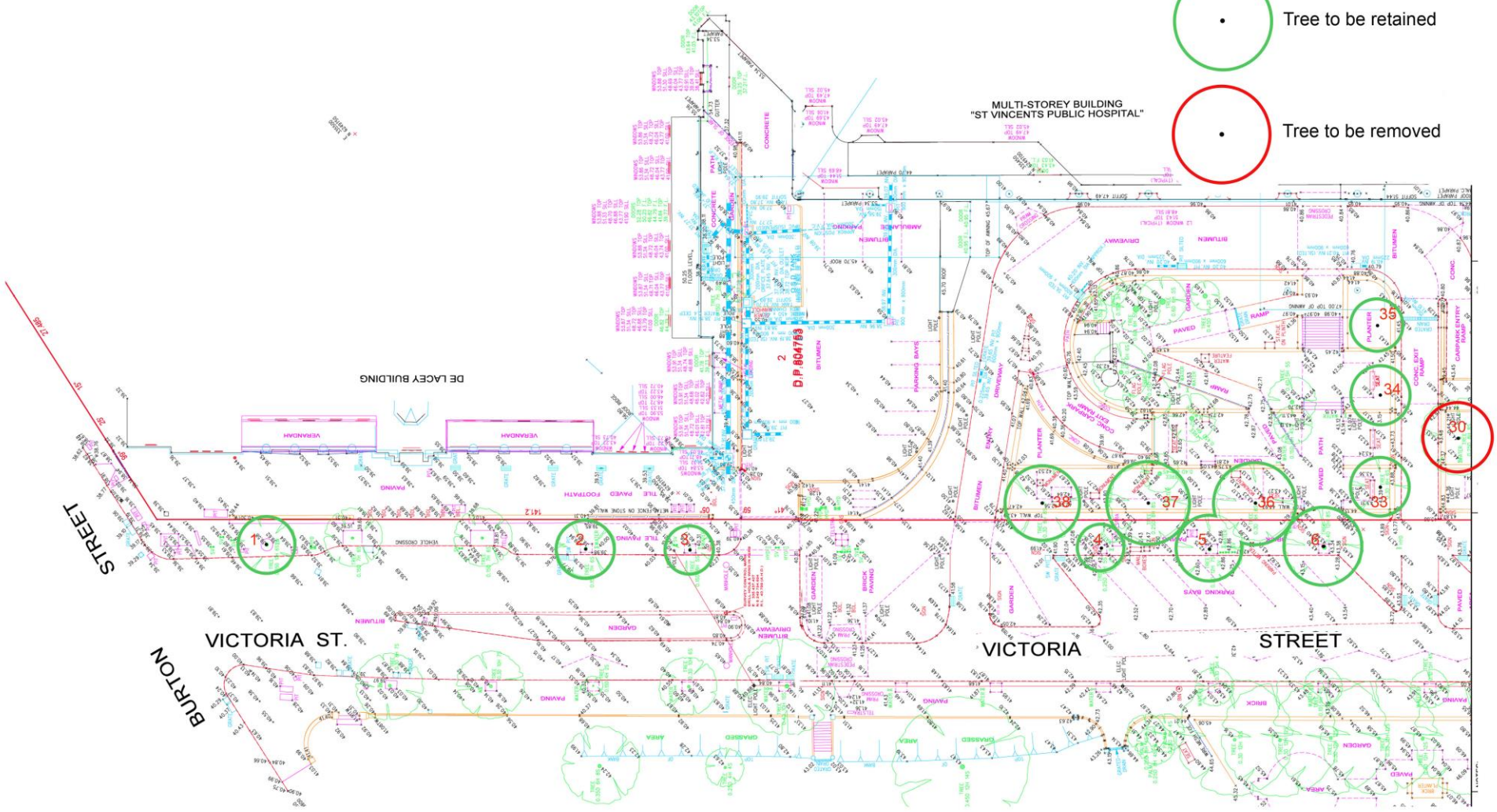
Tree protection plan

MOORE TREES

Plan 1

Tree to be retained

Tree to be removed

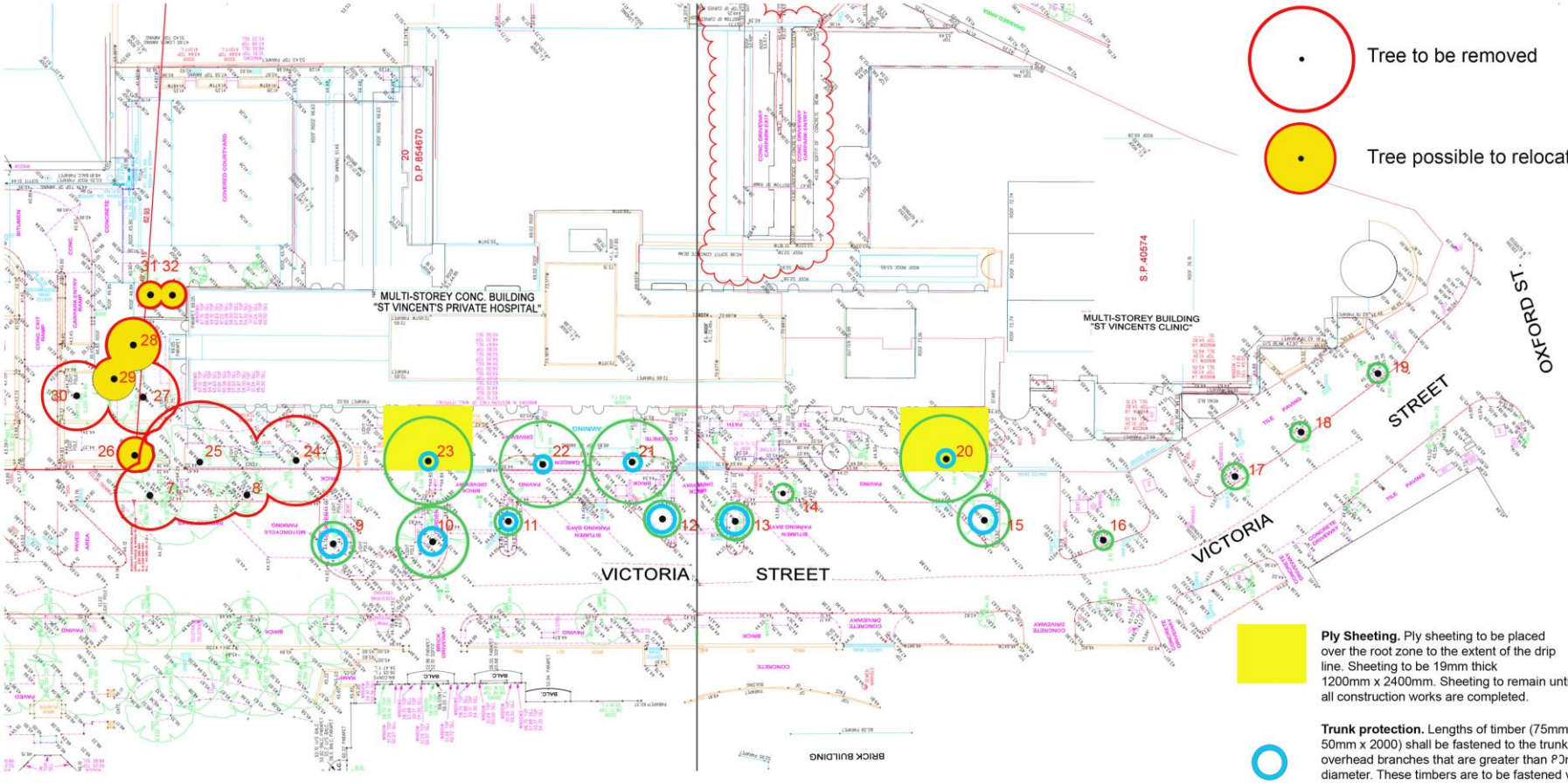


Date: 13.1.15
Drawn: P.Vezgoff
Site Address: St Vincents Private Hospital
Victoria Street Darlinghurst

Tree protection plan

MOORE TREES

Plan 2



Ply Sheeting. Ply sheeting to be placed over the root zone to the extent of the drip line. Sheeting to be 19mm thick 1200mm x 2400mm. Sheeting to remain until all construction works are completed.

Trunk protection. Lengths of timber (75mm x 50mm x 2000) shall be fastened to the trunk or overhead branches that are greater than P0mm in diameter. These timbers are to be fastened with hoop iron strapping and not fixed directly onto the trunk of the tree.

Date: 20.2.15
Drawn: P.Vezgoff
Site Address: St Vincents Private Hospital
Victoria Street Darlinghurst

Appendix 2

Tree health & condition assessment schedule

TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE – St Vincent's Private Hospital Sydney

Tree	Species	Height (m)	Spread (m)	DBH (mm)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (mm)	SRZ (mm)
1	Oriental plane (Platanus orientalis)	9	2.5	200	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Foot path planting. Minimal surface disruption.	2400	1500
2	London plane (Platanus x hybrida)	9	2.5	200	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Foot path planting. Minimal surface disruption.	2400	1500
3	Oriental plane (Platanus orientalis)	9	2.5	200	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Foot path planting. Minimal surface disruption.	2400	1500
4	Oriental plane (Platanus orientalis)	9	3	300	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Foot path planting. Minimal surface disruption.	3600	2000
5	Oriental plane (Platanus orientalis)	9	3	300	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Foot path planting. Minimal surface disruption.	3600	2000
6	Oriental plane (Platanus orientalis)	9	3	300	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Foot path planting. Minimal surface disruption.	3600	2000
7	Oriental plane (Platanus orientalis)	9	3	150	95	No visual defects	2a May only live for 15-40 years	Fair	Mature	Foot path planting. Minimal surface disruption. Suppressed by larger tree. Asymmetric lean north.	1800	1500

8	Oriental plane (Platanus orientalis)	6	3	120	95	No visual defects	2a May only live for 15-40 years	Fair	Mature	Foot path planting. Minimal surface disruption. Suppressed by larger tree. Asymmetric lean north.	1440	1500
9	London plane (Platanus x hybrida)	7	3	180	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Garden bed planting.	2160	1500
10	London plane (Platanus x hybrida)	7	3	180	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Garden bed planting.	2160	
11	Oriental plane (Platanus orientalis)	5.5	2	100	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Foot path planting. Minimal surface disruption.	1200	1500
12	Oriental plane (Platanus orientalis)	5.5	2	70	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Foot path planting. Minimal surface disruption.	840	500
13	Oriental plane (Platanus orientalis)	6	2.5	100	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Foot path planting. Minimal surface disruption.	1200	1500
14	Oriental plane (Platanus orientalis)	5.5	2	70	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Foot path planting. Minimal surface disruption.	840	500
15	London plane (Platanus x hybrida)	6	3	120	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Garden bed planting. Minimal surface disruption.	1440	1500

16	Oriental plane (Platanus orientalis)	2.5	0.5	60	95	No visual defects	2a May only live for 15-40 years	Fair	Sapling	Foot path planting. Minimal surface disruption.	720	500
17	Oriental plane (Platanus orientalis)	7	2.5	250	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Foot path planting. Minimal surface disruption.	3000	2000
18	London plane (Platanus x hybrida)	2.5	0.5	60	95	No visual defects	2a May only live for 15-40 years	Fair	Sapling	Foot path planting. Minimal surface disruption.	720	500
19	Oriental plane (Platanus orientalis)	6	2	150	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Foot path planting. Minimal surface disruption.	1800	1500
20	London plane (Platanus x hybrida)	18	8	750	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Restricted root zone.	9000	500
21	London plane (Platanus x hybrida)	17	8	550	95	No visual defects	2a May only live for 15-40 years	Good	Mature		6600	2500
22	London plane (Platanus x hybrida)	17	7	450	95	No visual defects	2a May only live for 15-40 years	Good	Mature		5400	2300
23	London plane (Platanus x hybrida)	17	8	550	95	No visual defects	2a May only live for 15-40 years	Good	Mature		6600	2700
24	London plane (Platanus x hybrida)	17	8	550	95	No visual defects	2a May only live for 15-40 years	Good	Mature		6600	2700

25	London plane (Platanus x hybrida)	16	7	650	95	No visual defects	2a May only live for 15-40 years	Good	Mature		7800	2700
26	Cabbage tree palm (Livistona australis)	3	2	350	100	No visual defects	1a >40 years	Good	Mature	Possible to relocate	4200	
27	Black locust (Robinia pseudoacacia 'Frisia')	6	4	200	80	Included codom stems	3a May only live for 5-15 years.	Fair	Mature		2400	1500
28	Deodar cedar (Cedrus deodara)	7	3.5	250	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Memorial tree planted 1992	3000	2000
29	Cabbage tree palm (Livistona australis)	4	2	350	100	No visual defects	1a >40 years	Good	Mature	Possible to relocate	4200	2200
30	Black locust (Robinia pseudoacacia 'Frisia')	7	4	280	80	Dead wood <50mm	3a May only live for 5-15 years.	Fair	Mature	Twiggy dieback	3360	2000
31	Kentia palm (Howea fosteriana)	6	2	130	92	No visual defects	1a >40 years	Good	Mature	Potential to relocate	1560	1500
32	Kentia palm (Howea fosteriana)	7	2	130	92	No visual defects	1a >40 years	Good	Mature	Potential to relocate	1560	1500
33	Black locust (Robinia pseudoacacia 'Frisia')	6	3	180	80	Dead wood <50mm	3a May only live for 5-15 years.	Fair	Mature	Twiggy dieback	2160	1500

34	Black locust (Robinia pseudoacacia 'Frisia')	6	3	180	80	Dead wood <50mm	3a May only live for 5-15 years.	Fair	Mature	Twiggy dieback	2160	1500
35	Black locust (Robinia pseudoacacia 'Frisia')	6	3	180	80	Dead wood <50mm	3a May only live for 5-15 years.	Fair	Mature	Twiggy dieback	2160	1500
36	London plane (Platanus x hybrida)	9	4	280	95	No visual defects	2a May only live for 15-40 years	Fair	Mature		3360	2000
37	London plane (Platanus x hybrida)	9	4	200	95	No visual defects	2a May only live for 15-40 years	Fair	Mature		2400	1500
38	London plane (Platanus x hybrida)	9	4	280	95	No visual defects	3a May only live for 5-15 years.	Poor	Mature	Stressed with heavy epicormic growth	3360	2000

KEY

Tree No: Relates to the number allocated to each tree for the Tree Protection 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

Significance: A tree's significance in the landscape. This may include but not be limited to visual amenity, historic value, local and site perspective. The tree may be native or it may also be native and endemic to the site. An exotic species such as a mature English Oak in excellent health and condition will be classed as having a higher significance than an over-mature native Forest Red Gum. The values are: High, Moderate, Low. Bushfire risk is not part of Significance rating.

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

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

Appendix 3

SULE categories (after Barrell, 2001)[1]

SULE Category	Description
Long	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level 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 individuals 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.
3a	Trees that may only live for another 5-15 years
3b	Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
3c	Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
3d	Trees that require substantial remedial tree care and are only suitable for retention in the short term.
Remove	Trees that should be removed within the next five years.
4a	Dead, dying, suppressed or declining trees.
4b	Dangerous trees because of instability or loss of adjacent trees
4c	Dangerous trees because of structural defects
4d	Damaged trees not safe to retain.
4e	Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
4f	Trees that are damaging or may cause damage to existing structures within 5 years.
Small	Small or young trees that can be reliably moved or replaced.
5a	Small trees less than 5m in height.
5b	Young trees less than 15 years old but over 5m in height.

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

Appendix 4

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 x 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.

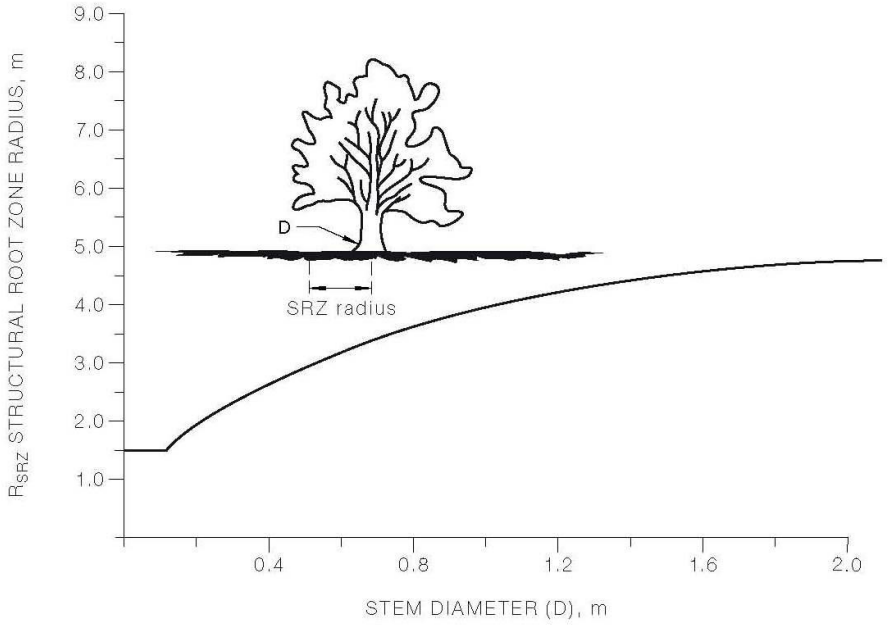
There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings. An indicative SRZ radius can be determined from the trunk diameter measured immediately above the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

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

Where

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

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



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

FIGURE 1 - STRUCTURAL ROOT ZONE

Notes:

1 R_{SRZ} is the structural root zone radius.
2 *D* is the stem diameter measured immediately above root buttress.
3 The SRZ for trees less than o.15 metres diameter is 1.5 metres.
4 The SRZ formula and graph do not apply to palms, other monocots, cycads and tree ferns.
5 This does not apply to trees with an asymmetrical root plate.

Appendix 5

Tree protection sign

sign sample

Moore Trees

Tree Consultancy
0411 712 887

Tree Trunk Protection

Protection not to be removed until all construction works completed.

Around the base of this tree there is to be

NO

Storage of materials

Trenching or excavation

Washing of tools or equipment

Appendix 6

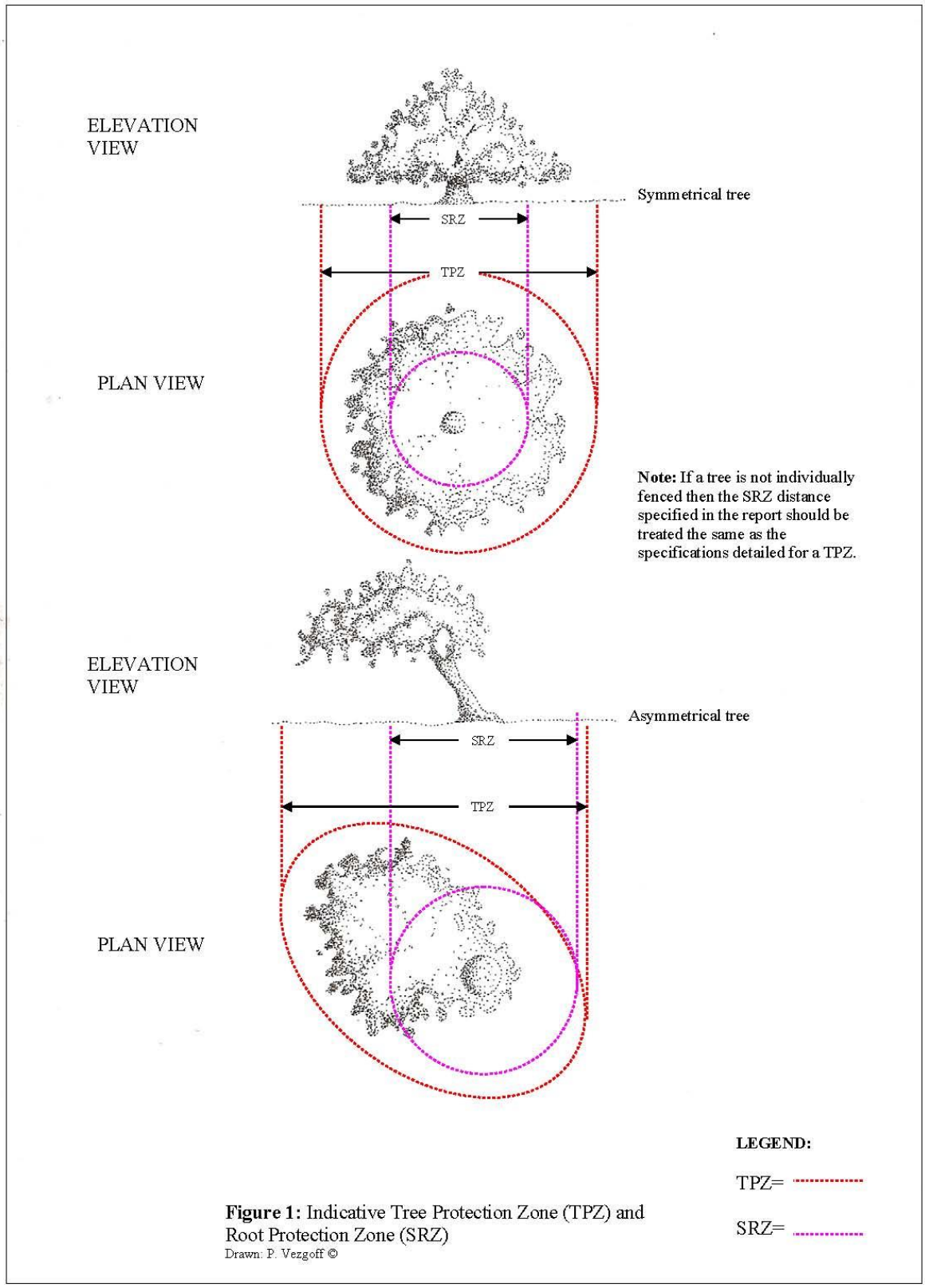


Figure 1: Indicative Tree Protection Zone (TPZ) and Root Protection Zone (SRZ)
Drawn: P. Vezgoff ©

Appendix 7

Tree structure information diagram

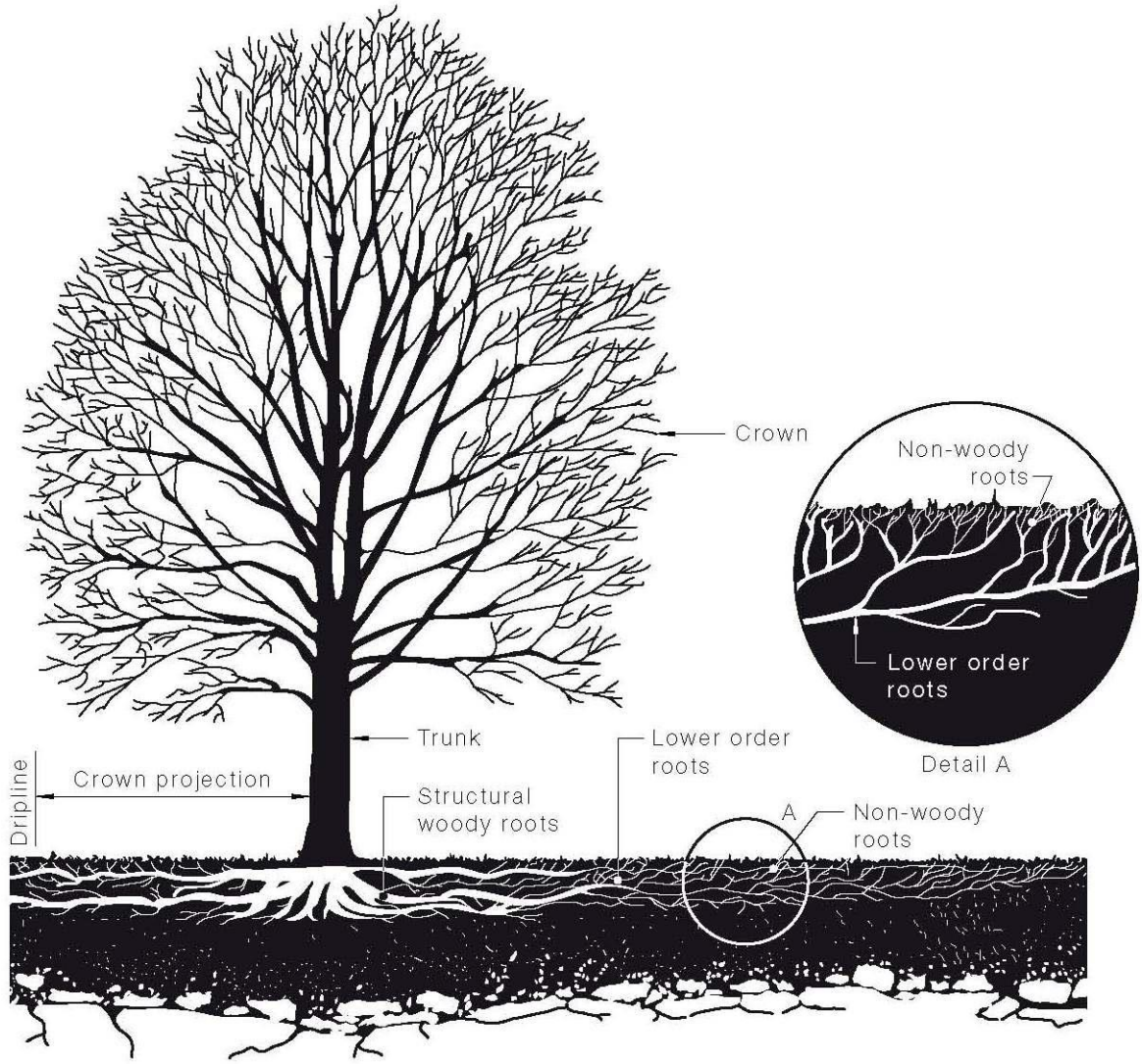


Figure 2: Structure of a tree in a normal growing environment (AS 4970, 2009.).

Appendix 8

TRANSPLANT METHOD STATEMENT

1 INTRODUCTION

1.1 This Arboricultural Transplant Method Statement has been written to assist with the relocation of Trees 26, 28, 29, 31 and 32 located at St Vincent's Private Hospital.

1.2 **Location:** The development site is located at the St Vincent's Private Hospital, Victoria Street, Darlinghurst NSW. The subject trees are located on the Victoria Street frontage.

1.3 **Transplant Method Statement:** This method statement has been written based on the current conditions on site and final positioning of the tree. Watering rates will be based on the size of the final root ball that is realized. This will only be determined once the tree or palm is lifted.

1.4 The method statement is detailed in four (4) separate sections, as listed below.

a. Excavation and lifting of the root ball.
b. Storage of the trees
c. Planting of the trees
d. Aftercare.

It should be remembered that transplanting mature trees is a difficult process however if the following instructions are followed accordingly, the tree will have a good chance of survival and continue to grow.

2 RELEVANT BACKGROUND INFORMATION

2.1 **The Site Trees:** Trees 26, 29 31 and 32 are all monocot species being Palm trees that have fibrous root systems. Trees 26 and 29 are semi mature Cabbage tree palms (Livistona australis) that are native to Australia. Trees 31 and 32 are mature Kentia palms (Howea fosteriana) that have developed tall slender stems. Tree 28 is a semi mature The Deodar cedar *(Cedrus deodara)*. These two specimens could readily be transplanted.

2.2 The palms are in excellent health and condition with the canopy showing very good vigor. The Deodar Cedar is in fair condition.

2.3 These trees will be best moved by mechanical methods and all contact with the trunk should be avoided as best as possible.

2.4 I have been informed that these trees following removal will be stored at Centennial Park for the duration of the construction works and replanted once landscaping works are underway.

3 TREE TRANSPLANT METHOD STATEMENT SPECIFICATION

Excavation of the root ball For Tree 28 a circular trench should be dug at a distance of approximately two thousand (2000) millimetres from the trunk giving the overall root ball a four (4) metre spread to a depth of 900mm. The trench should then angle towards the trunk with the aim of almost severing the entire root ball. A hose set to high pressure can sometimes help expose the last roots at the base to allow them to be severed cleanly with a sharp pruning saw. Once the trench becomes deep enough, steel poles (similar to scaffold poles) should be inserted so that the root ball does not collapse to one side. It is most likely the root ball will be a dense mat of root matter. Palms 26, 29, 31 and 32 will only require a root ball of 500mm to be excavated due to their fibros root systems.

2. The north point on the trunk shall be clearly marked so that the tree retains the correct aspect in the new location.

3. An excavator could then remove as much of the soil to allow lifting of the tree. All services shall be confirmed prior to this process occurring.

4. If the surrounding soil is very sandy it is likely that most of this soil will fall away during the lifting process. This is unavoidable during this process. What is important is to limit the damage to the root system.

5. If roots are required to be severed they should be cut cleanly with a sharp pruning saw or shears. Try not to prune any roots over fifty (50) millimetres in diameter.

6. Lifting the root ball will require an excavator taking care not to damage the trunk. The trunk should not be used to move or lift the tree under any circumstances.

7. Note: If the exposed root ball is not replanted within the same day as being excavated, the entire root ball should be covered with wet hessian to retain moisture.

(b) Storage of the trees

1. Whilst lifted out of the hole, the root ball shall be wrapped in heavy grade cling film followed by black plastic. It is important to puncture holes in the bottom to allow the escape of water from rain and irrigation. Allow space that will leave a rim around the bag similar to a large pot. Fill this area with a loam soil mix that does not contain organic matter. This loam should be washed into the side of the bag as best as possible.

2. The finished level of loam should be the same as the level the tree was at in the ground. Mulch the top of the tree to cover all areas of exposed soil.

3. If using a sling attached to an excavator there should be no contact with the trunks. All slings shall be attached and wrapped around the root ball at any time the palms are required to be moved.

4. The tree shall be stored not in direct sunlight. The less number of times the trees are moved reduces the chance of injury. The builder's advice and input may be required for this. The storage area shall be agreed prior to excavations occurring.

5. Irrigation attached to a timer shall be run in a continuous line over the trees. Drip irrigation will be the best form of regular irrigation. See Section (d)1 (below) for watering quantities.

6. An Arborist shall be consulted if there is any visual evidence of yellowing of needles of fronds, damage during the moving process or sudden change of vigour over the holding period.

(c) Planting of the subject tree(s)

1. Use a loam based soil mix for filling the new holes. Where sand or gravel has been placed in the bottom of planting holes, supposedly for the purpose of improving drainage of the soil above, this will in fact have just the opposite effect. This layer will unfortunately cause the soil above to become saturated when it otherwise would not.

2. Any roots matted at the bottom or circling around the root ball should be cut and removed or shortened and/or straightened. If these roots are not removed they will continue to grow in a circular restricted manner called 'Girdling'.

3. Don't backfill with compost. Compost is organic matter and without oxygen will begin to decompose below ground and eventually kill the subject tree.

4. Backfill with the soil you have dug from the hole if possible. If your site soil is unusable then back fill with a soil mix that is sand and loam based rather than using organic matter. Mound the soil so as to form a circular mount that will retain water over the root zone area that has been transplanted.

5. As this tree is being planted in a lawn area the base should be cultivated around the base so that the new roots will not compete with grass roots. Mulch the surface to retain moisture and encourage soil microbe activity.

6. **Agricultural drainage pipe:** To help make watering more effective when you plant the tree insert a length of Agricultural drainage pipe (100mm diameter) into the soil, alongside the root ball. This will help water and also oxygen get to the base of the planting hole.

(d) Aftercare

1. Following being planted, the single most important need of a newly-planted tree is to receive adequate moisture. As a general rule, one (1) bucket of water twice a week should suffice. Water must be concentrated on the existing root ball. An important point to remember is that moisture will not flow from wet surrounding soils back into the root ball. So, watering must concentrate on wetting the root ball itself. Below are some watering quantities specifically for Australian conditions.

Container size	***Tree height***	***Trunk Diameter***	***Litres***	***week***
15-20 Ltrs	1.5-2metres	30mm	5	1
40-50 Ltrs	2.1-3.0metres	50mm	8	2
75-100 Ltrs	3.1-4metres	75mm	12	3

I would estimate that the root ball for the subject tree will be around 100 + litres however the final volume of the root ball will need to be calculated.

2. A sturdy levy that will retain water must be built (and maintained) around the edge of the root ball of the subject tree. The pond created within the levy should be regularly filled with water.

3. If the watering basin remains wet between each watering then take a break from watering. It is good for the root ball to dry out between watering.

4. Do not stop watering in the event of rain. It might wet the ground but, unless heavy and/or prolonged, rain normally will not deliver adequate moisture to the root ball.

5. If the new growth on your tree is showing signs of wilting then water as soon as possible. If the new growth is wilting and the soil is waterlogged then the problem is below ground level.

6. Any yellowing or sudden defoliation should be reported to the Landscape Architects as soon as possible.

Appendix 9

Explanatory Notes

- **Mathematical abbreviations:** > = Greater than; < = Less than.

- **Measurements/estimates:** All dimensions are estimates unless otherwise indicated. Less reliable estimated dimensions are indicated with a '?'.

- **Species:** The species identification is based on visual observations and the common English name of what the tree appeared to be is listed first, with the botanical name after in brackets. In some instances, it may be difficult to quickly and accurately identify a particular tree without further detailed investigations. Where there is some doubt of the precise species of tree, it is indicate it with a '?' after the name in order to avoid delay in the production of the report. The botanical name is followed by the abbreviation sp if only the genus is known. The species listed for groups and hedges represent the main component and there may be other minor species not listed.

- **Height:** Height is estimated to the nearest metre.

- **Spread:** The maximum crown spread is visually estimated to the nearest metre from the centre of the trunk to the tips of the live lateral branches.

- **Diameter:** These figures relate to 1.4m above ground level and are recorded in centimetres. If appropriate, diameter is measure with a diameter tape. 'M' indicates trees or shrubs with multiple stems.

- **Estimated Age:** Age is estimated from visual indicators and it should only be taken as a provisional guide. Age estimates often need to be modified based on further information such as historical records or local knowledge.

- **Distance to Structures:** This is estimated to the nearest metre and intended as an indication rather than a precise measurement.

Appendix 10

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

INDUSTRY EXPERIENCE

Moore Trees Arboricultural Services **January 2006 to date**

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

Woollahra Municipal Council **Oct 1995 to February 2008**

ARBORICULTURE TECHNICAL OFFICER
August 2005 – February 2008
Tree asset management, programmed inspection, inventory and condition surveys of council trees, hazard and risk appraisal, Tree root damage investigation and reporting, assessment of impacts of capital works projects on council trees.
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
TEAM LEADER
September 2000 – January 2003
HORTICULTURALIST
October 1995 – September 2000

Northern Landscape Services **July to Oct 1995**

Tradesman for Landscape Construction business

Paul Vezgoff Garden Maintenance (London, UK) **Sept 1991 to April 1995**

CONFERENCES AND WORKSHOPS ATTENDED

- International Society of Arboriculture Conference (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).