



TREE MANAGEMENT CONSULTING ARBORICULTURISTS

ARBORICULTURAL IMPACT ASSESSMENT

for

Gartner Trovato Architects
Suite 13 / 10 Park Street
MONA VALE NSW 2103

SITE ADDRESS

26 DARLEY STREET EAST
MONA VALE NSW 2106

JUNE 2019

Prepared by
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1 INTRODUCTION

- 1.1 This Arboricultural Impact Assessment (AIA) prepared by Chantalle Hughes of Urban Forestry Australia (UFA), was commissioned by Sean Gartner of Gartner Trovato Architects, on behalf of the owners of the subject site. 'The site' is identified as DP 881594 and known as 26 Darley Street East, Mona Vale, New South Wales.
- 1.2 This AIA is to accompany a development application to Northern Beaches Council for a new multistory aged-care facility, including basement carparking and associated landscaping.
- 1.3 The purpose of this report is to assess the *vigour* and *condition* of the surveyed trees, and identify the potential impacts the proposed development may have on those trees to be retained in proximity to the works.
- 1.4 This report gives recommendations for tree retention or removal and provides guidelines for tree protection and maintenance.
- 1.5 Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible; however, I can neither guarantee nor be responsible for the accuracy of information provided by others.
- 1.6 This AIA is not intended as an assessment of any impacts on trees by any proposed future development of the site, other than the current development application.
- 1.7 This report is not intended to be a comprehensive tree *risk* assessment; however, the report may make recommendations, where appropriate, for further assessment, treatment or testing of trees where potential structural problems have been identified, or where below ground investigation may be required.

2 METHODOLOGY

- 2.1 In preparation for this report, ground level, *visual tree assessments*¹ of twelve (12) trees was undertaken by Chantalle Hughes on 17th June 2019. Inspection details of these trees are provided in Appendix E—*Schedule of Assessed Trees*.
- 2.2 This AIA takes account of prescribed trees pursuant to Pittwater 21 Development Control Plan DCP 2014 – Section B4.22 Preservation of Trees or Bushland Vegetation.
- 2.3 Tree heights and canopy spreads were visually estimated or measured using a Nikon ForestryPro Laser measurer. Unless otherwise noted in Appendix D, all trunk diameters were measured at approximately 1.4 metres above ground level (“the DBH”), using a Yamiyo diameter tape.
- 2.4 Field observations were written down, and photographs of the site and trees were taken using an iPhone 8.
- 2.5 No *aerial inspections*, *root mapping* or woody tissue testing were undertaken as part of this tree assessment. Information contained in this tree report covers only the trees that were examined and reflects the condition of those trees at the time of inspection.
- 2.6 Plans and documents referenced for the preparation of this report include:
- Detail and Levels Survey Plan, Job Ref. 7766, dated 8/10/2017, prepared by SDG Land and Development Solutions;
 - Architectural Plans, Project no. 1812, Plans DA.01- DA.05, dated 12/6/2019, prepared by Gartner Trovato Architects.
 - AS4970-2009 *Protection of trees on development sites*, Standards Australia.
 - Section B4.22 Preservation of Trees or Bushland Vegetation of Pittwater 21 Development Control Plan 2014.
- 2.7 No hydraulic service or landscape plans have been reviewed in preparation of this report.
- 2.8 The subject trees are shown on a marked-up excerpt of the survey plan. This marked-up plan is attached as Appendix F—Tree Location Plan.

¹ Visual Tree Assessment (VTA) is a procedure of defect analysis developed by Mattheck and Breloer (1994) that uses the growth response and form of trees to detect defects.

3 OBSERVATIONS AND DISCUSSION

3.1 Assessed Trees

3.1.1 Twelve (12) trees (prescribed and non-prescribed) were assessed or identified and are included in this report. Details of these are included in the Schedule of Assessed Trees—Appendix E.

3.1.2 Tree numbers—of the 12 assessed trees, the following is noted:

- Five (5) trees are non-prescribed and exempt from protection controls under B4.22 of the P21 DCP—Tree 1-3, 10 & 12;
- Four (4) trees are prescribed and are located on property adjoining the subject site — Trees 4-6 & 11;
- Three (3) prescribed trees are located within the subject site—Trees 7-9.

3.1.3 The prescribed trees and their respective *Retention Value* (RV) are identified in Table 1, below.
Note: Refer to Appendix B for the methodology used to assess the Retention Value of a tree.

Table 1—Tree Identification and Retention Value, where **L** = Low, **M** = Medium, **H** = High. **R** = proposed removal.

Tree No.	Genus & species Common Name	RV	Tree No.	Genus & species Common Name	RV
4	<i>Melaleuca viminalis</i> Weeping Bottlebrush	M	8	<i>Melaleuca viminalis</i> Weeping Bottlebrush	M
5	<i>Banksia integrifolia</i> Coast Banksia	M	9	<i>Melaleuca viminalis</i> Weeping Bottlebrush	M
6	<i>Magnolia grandiflora</i> cv Magnolia	M	11	<i>Jacaranda mimosifolia</i> Jacaranda	M
7	<i>Glochidion ferdinandi</i> Cheese Tree	M			

3.1.4 Species assemblage—of the 7 prescribed trees, the following is noted:

- Two (2) are locally indigenous species—Tree 5 & 7;
- Three (3) are an introduced Australian native species—Tree 4, 8 & 9;
- Two (2) are introduced exotic species—Tree 6 & 11.

3.1.5 No assessed tree is considered threatened or endangered under Australian and State Government legislation (i.e. NSW *Biodiversity Conservation Act* 2016, and the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999).

3.2 Proposed Removal of Prescribed Trees for Site Development

3.2.1 Three (3) prescribed trees are proposed to be removed:

- Tree 7—Cheese Tree of Medium RV. This subject site tree is located within the footprint of the proposed basement parking driveway access and would require removal.
- Tree 8—Weeping Bottlebrush –of Medium RV. This introduced native tree is located within the footprint of the proposed basement parking driveway access and would require removal.
- Tree 9—Weeping Bottlebrush – of Medium RV. This subject site tree is located within the footprint of the proposed basement parking driveway access and would require removal.

3.3 Proposed Tree Retention

3.3.1 Four (4) neighbouring trees directly adjoining the subject site are proposed to be retained. Potential impacts on these trees are discussed in the following paragraphs.

3.4 Potential Impacts on Trees Proposed for Retention

3.4.1 Under the Australian Standard 4970-2009 *Protection of trees on development sites* (AS4970), encroachments less than 10% of the *Tree Protection Zone* (TPZ) are considered to be minor. No specifications are provided in AS4970 for potential impacts of 10% or greater. This 10% is interpreted as the threshold figure, and the trigger where arboricultural investigations into TPZ encroachments beyond this figure need to be considered.

3.4.2 Disturbance within the *Structural Root Zone* (SRZ), and extent of encroachments into the TPZ's of prescribed trees to be retained are summarised in Table 2, below.

Table 2: *Estimated encroachments into the SRZ and TPZ of trees proposed for retention.* Note 1: These figures are based on the SRZ and TPZ's offsets of the trees as calculated under AS4970 and do not necessarily reflect the actual root zones of the trees. Existing at or below ground structures, site topography and soil hydrology will influence the presence, spread and direction of tree root growth.

Tree No.	Tree	Tree located on site	SRZ affected	TPZ area (m ²)	TPZ encroachment (approx. m ²)	TPZ encroachment (approx. %)
4	Weeping Bottlebrush	×	×	64	*9.9	*15.5
5	Coast Banksia	×	×	72	0	0
6	Magnolia	×	×	41	0	0
11	Jacaranda	×	×	72	*5.7	*7.9

*Indicates further explanation below will greatly differ (in this case, reduce) the calculated encroachment shown within Table 2.

3.4.3 **Tree 4**—Weeping Bottlebrush – Neighbouring tree, 1 Seabeach Avenue.

Structural Root Zone impacts:

- All proposed works are located outside the tree's SRZ.

Tree Protection Zone impacts:

- The proposed driveway will encroach an estimated 9.9m², equating to a 15.5% encroachment of the TPZ (see Figure 1 below). However currently within the area of encroachment is a concrete footpath and the existing dwelling, root ingress would be significantly limited within this area.
- The proposal actually provides a strip of turf/garden between the boundary and the proposed driveway so the tree may benefit from this additional access to resources it has not previous had within the calculated TPZ.

Pruning impacts:

- The canopy is fairly low and sprawling, it is possible some pruning will be required to accommodate the proposed works, however it is not foreseen that this would equate to more than 10% of the total live canopy.

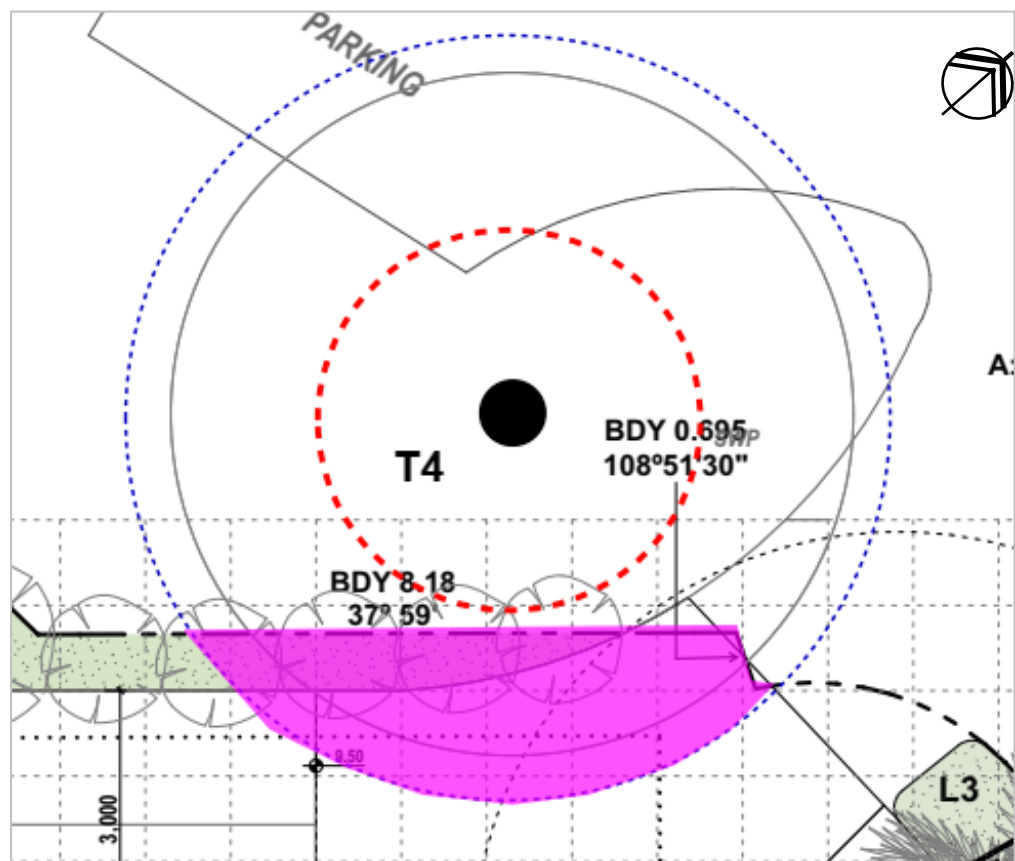


Figure 1 – Tree 4 - Red dashed circle represents SRZ. Blue dotted circle represents TPZ; bright pink shading denotes approximate encroachment. Not to scale. Excerpt of Ground Floor Level, dwg no. DA-03, dated 12/6/2019. Marked up by C Hughes.

3.4.4 **Tree 5**—Coast Banksia – Neighbouring tree, 1 Seabeach Avenue.

Structural Root Zone impacts:

- All proposed works are outside this tree's SRZ.

Tree Protection Zone impacts:

- The proposed works are located outside the calculated TPZ of this tree.

Pruning impacts:

- No pruning of this tree will be required to accommodate the proposed works.

3.4.5 **Tree 6**— Magnolia – Neighbouring tree, 1 Seabeach Avenue.

Structural Root Zone impacts:

- All proposed works are outside this tree's SRZ.

Tree Protection Zone impacts:

- The proposed works are located outside the calculated TPZ of this tree.

Pruning impacts:

- No pruning of this tree will be required to accommodate the proposed works.

3.4.6 **Tree 11**— Jacaranda – Neighbouring tree, 22A Darley Street East.

Structural Root Zone impacts:

- All proposed works are outside this tree's SRZ.

Tree Protection Zone impacts:

- An encroachment of 7.9% has been calculated for landscaped retaining walls (see Figure 2 below/next page), whilst this is considered *minor* encroachment under AS4970, the existing, large masonry wall along the property boundary (see detail survey) would inhibit root ingress into the site. The tree would rely on the immediate area on the east side of the existing wall for root occupation and soil resources.
- No short or long term effect on the tree health or condition are foreseen due to the proposed works.

Pruning impacts:

- No pruning of this tree will be required to accommodate the proposed works.

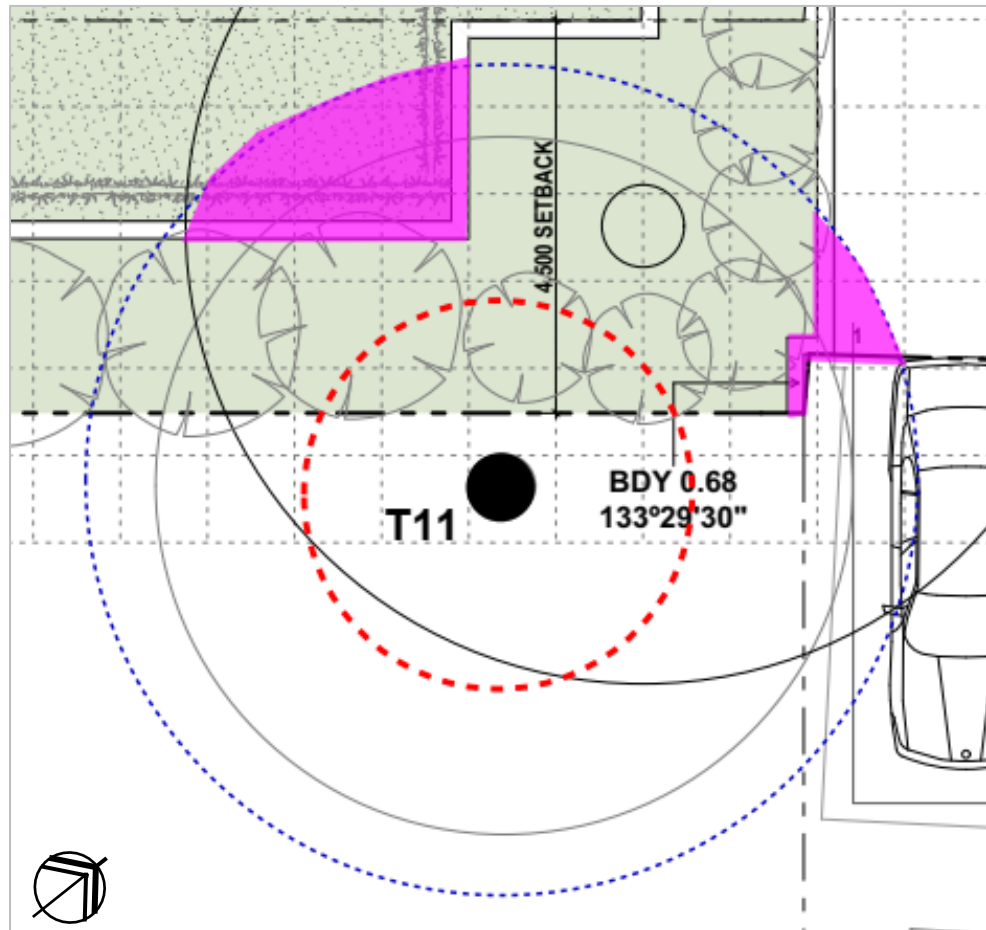


Figure 2 – Tree 11 - Red dashed circle represents SRZ. Blue dotted circle represents TPZ; bright pink shading denotes approximate encroachment. Not to scale. Excerpt of Ground Floor Level, dwg no. DA-03, dated 12/6/2019, Marked up by C Hughes.

4 CONCLUSIONS

- A total of twelve (12) trees are included in this Arboricultural Impact Assessment. Of these:
 - Five (5) trees within the subject site have been identified as exempt from protection under the P21 DCP 2014 and would be removed— Trees 1–3, 10 and 12.
 - Three (3) prescribed trees ascribed a Medium Retention Value are proposed for removal—Tree 7 – 9.
 - Four (4) neighbouring trees within 5m of the proposal will be retained—Trees 4–6 and 11. Nil to very low TPZ encroachments have been calculated and are considered to be within acceptable thresholds.
- No trees on or within 5m of the subject site have been identified as endangered or threatened under Federal and State Government legislation.
- Provided the recommendations of this report are adopted, adverse impacts on the vigour and structural condition of trees to be retained are unlikely.

5 RECOMMENDATIONS

5.1 Tree Removal

- 5.1.1 Removal of three (3) trees - Tree 7, 8 and 9 are subject to authority review of this report, and approval is to be obtained (e.g. by Consent) before any tree is removed.
- 5.1.2 Tree removals are to be undertaken in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998).

5.2 Project Arboriculturist

- 5.2.1 A Project Arboriculturist (PA) shall be engaged prior to works commencing on the site, including demolition of structures, site clearing and the like.
- 5.2.2 The PA must have a minimum Australian Qualification Framework Level 5 (AQF5) or above in Arboriculture.
- 5.2.3 Duties of the PA shall include, but not be limited to:
 - Liaising with the Project Manager/Head Contractor/Site Manager to confirm the tree protection fencing locations, construction access, and other specific tree protection requirements prior to site works commencing.
 - Inspection of Tree Protection Devices and supervision of works as recommended in this report or as specified in any Conditions of Consent associated with an approved development application.
 - Provision of Compliance Certification as and when required.

5.3 Minimising Impacts on Trees to be Retained

5.3.1 ADJOINING TREE - TREE 4 WEEPING BOTTLEBRUSH

- Given the lack of boundary fencing onsite currently, protect Tree 4 by placing fencing (i.e. in the form of typical temporary fencing to secure the site for site construction works) along the site boundary linking to the existing boundary fence of no. 28 Darley St East and along the existing kerb.
- In the unlikely event roots are found during works, works are to be stopped and contact and direction taken from the Project Arboriculturist.
- Any pruning works shall meet the Australian Standards 4373-2007 (AS4373) and be carried out by a minimally qualified AQF Level 3 Tree Worker. Pruning works require Council or Project Arborist approval and are to be carried out prior to works commencing, with owner permission.

5.3.2 ADJOINING TREES – TREE 5 COAST BANKSIA and TREE 6 WEEPING BOTTLEBRUSH

- These trees in No 1 Seabeach are separated from the site by the internal access road (which is not subject to the site development application). The site will be fenced at its boundary, which is more than 6m from the trees and acceptable for their protection.
- No pruning is approved. Any required pruning will require a separate application to Council.

5.3.3 ADJOINING TREE – TREE 11 JACARANDA

- Existing boundary wall will be adequate tree protection.
- In the unlikely event roots are found during works, works are to be stopped and contact and direction taken from the Project Arboriculturist.
- No pruning is approved. Any required pruning will require a separate application to Council.
- Care when planting within the TPZ is required. Hand tools only are to be used and planting positions are to be flexible should the unlikely event Jacaranda roots are uncovered.

5.4 Tree Protection

5.4.1 The Tree Protection is to be in accordance with the following:

- Tree Protection Devices (TPD) may include mulching, tree guards and other devices other than fencing.
- The TPD must be in place prior to any site works commencing, including clearing, demolition or grading.
- The most appropriate fencing for tree protection is 1.8m chainlink with 50mm metal pole supports. During installation, care must be taken to avoid damage to significant roots. The practicality of providing this fencing on this site must be addressed by the arboriculturist.
- Locate large primary roots by careful removal of soil within the fencing area. ***Do not drive any posts or pickets into tree roots.*** Replace soil back over tree roots.
- It is recommended that the arboriculturist provide written certification that the TPD is/are installed and will satisfy tree protection requirements.
- Nothing should occur inside the tree protection fenced areas, so therefore all access to personnel and machinery, storage of fuel, chemicals, cement or site sheds is prohibited.
- Signage should explain exclusion from the area defined by TPD and carry a contact name for access or advice (see Appendix D – Tree Protection Devices).
- The TPD cannot be removed, altered, or relocated without the project arborists' prior assessment and approval.

5.5 Arboricultural advice

5.5.1 Tree and Root Pruning

- Any pruning required is to be assessed and approved by the PA, prior to undertaking any of this type of work.
- Pruning shall not be undertaken by unqualified site personnel at any time.

- Pruning of branches must be undertaken by a minimum AQF Level 3 arborist in accordance with the Australian Standard AS4373-2007 *Pruning of amenity trees*,
- Unless otherwise approved by the Conditions of Development Consent, or by separate application and approval by the consent authority, pruning is to be limited to cutting of limbs less than 80mm diameters, and no more than 10% total live material removed.

5.5.2 Stockpiling and location of site sheds

- The project arboriculturist must be consulted prior to placing any items within a tree's TPZ.
- Where stockpiling must be located within the TPZ offset of trees to be retained, the existing/undisturbed natural ground must be covered with thick, coarse mulch to a minimum 75-100mm thickness.
- Large, or bulky materials (non-contaminating) can be stacked on wooden pallets or boards placed over the mulch.
- Tarpaulins (or similar) placed on boards or pallets on top of mulch shall be used to prevent loose or potentially contaminating materials from moving into the soil profile within the TPZ of trees or within 10m upslope of trees.
- Where site sheds must be located within the TPZ offset of a tree/s, the shed must be fully elevated on all sides with a minimum 300mm between existing ground and the floor/floor bearers. Isolated pad footings must be carefully dug by hand and not damage or sever any roots greater than 20mm diameters.
- Any conflict between footing locations and larger roots (i.e. 20mm Ø plus) must be brought to the attention of the project arboriculturist who is to provide practical alternatives that do not include unnecessary tree root removal.
- Preference is to be given to the stockpiling location shown on the Tree Protection Plan—Appendix D.

5.5.3 Fill Material

- Placement of fill material within the TPZ of trees to be retained should be avoided where possible. Where placement of fill cannot be avoided, the material should be a coarse, gap graded material such as 20 — 50mm crushed basalt or equivalent to provide some aeration to the root zone. Note that roadbase or crushed sandstone or other material containing a high percentage of fines is unacceptable for this purpose.
- The fill material should be consolidated with a non-vibrating roller to minimise compaction of the underlying soil.
- Permeable geotextile may be used beneath the sub-base to prevent migration of the stone into the sub-grade. No fill material shall be placed in direct contact with the trunk.

5.5.4 Pavements

- Pavements should be avoided within the TPZ of trees to be retained where possible.
- Proposed paved areas within the TPZ of trees to be retained is to be placed above grade to minimise excavations within the root zone, avoiding root severance and damage.

5.5.5 Fencing and walls within the SRZ and TPZ of retained trees.

- Where fencing and/or masonry walls are to be constructed along site boundaries, they must provide for the presence of any living woody tree roots greater than 50mm diameter.
- Hand digging must occur within the SRZ of trees to be retained.

- For masonry walls/fences it may be acceptable to delete continuous concrete strip footings and replace with suspended in-fill panels (e.g. steel or timber pickets, lattice etc) fixed to pillars.

5.5.6 Landscaping within tree root zones.

- The level of introduced planting media into any proposed landscaped areas within the TPZ is not to be greater than 75mm depth, and be of a coarse, sandy material to avoid development of soil layers that may impede water infiltration.
- Appropriate container size of proposed plants within the SRZ of trees should be determined prior to purchase of plants. Otherwise, any proposed landscaping within the SRZ must consist of tubestock only. This is required to ensure that damage to tree roots is avoided.
- Mattocks and similar digging instruments must not be used within the TPZ of the trees. Planting holes should be dug carefully by hand with a garden trowel, or similar small tool.
- Where possible, do not plant canopy trees beneath, or within 6 - 8m of overhead lines.

5.5.7 Other

- No washing or rinsing of tools or other equipment, preparation of any mortars, cement mixing, or brick cutting is to occur within 8m upslope of any palms or trees to be retained.
- Regular monitoring of the trees during development works for unforeseen changes or decline will help maintain the trees in a healthy state.

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June, 2019

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APPENDIX A

TERMS AND DEFINITIONS



TERMS AND DEFINITIONS

The following relates to terms or abbreviations that may have been used in this report and provides the reader with a detailed explanation of those terms.

Age classes

Y	<i>Young</i> refers to a well-established but juvenile tree
SM	<i>Semi-mature</i> refers to a tree at growth stages between immaturity and full size
EM	<i>Early-mature</i> refers to a tree that is more or less full sized and vigorously growing.
M	<i>Mature</i> refers to a full sized tree with some capacity for further growth
LM	<i>Late Mature</i> refers to a full sized tree with little capacity for growth, not yet about to enter decline
OM	<i>Over-mature</i> refers to a tree about to enter decline or already declining.

Condition refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

Crown All the parts of a tree arising above the trunk where it terminates by its division forming branches, e.g. the branches, leaves, flowers and fruit: or the total amount of foliage supported by branches.

Crown raise pruning Pruning technique where lower limbs are removed, thereby lifting the overall crown above the ground.

Deadwood refers to any whole limb that no longer contains living tissues (e.g. live leaves and/or bark). Some dead wood is common in a number of tree species.

Diameter at Breast Height (DBH) refers to the tree trunk diameter at breast height, i.e. measured at 1.4 m above ground level.

Form refers to the crown shape of the tree as influenced by the availability or restriction of space and light, or other contributing factors within its environment. Crown form may be determined by tree shape, species and habit and described as Dominant, Codominant, Intermediate, Emergent, Forest and Suppressed, as well as Forest Form or Open Grown. May also be described qualitatively as Good Form or Poor Form.

Growth crack / split Longitudinal crack/split that may develop as a rupture in the bark from normal growth. Longitudinal crack/split that may develop in the trunk of some fast growing palms.

Habit The shape of a tree when its growth is unencumbered by constraints for space and light, e.g. idealized by an isolated field grown specimen with consideration of the species and the type of environment in which it evolved e.g. rainforest, open forest, etc.

Habitat A habitat is an ecological or environmental area that is inhabited by a particular species of animal, plant or other type of organism. It is the natural environment in which an organism lives, or the physical environment that surrounds (influences and is utilised by) a species population. In restoration ecology of native plant communities or habitats, some invasive species create monotypic stands that replace and/or prevent other species, especially indigenous ones, from growing there.

Health (syn. vigour) refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Inclusion - the pattern of development at branch or stem junctions where bark is turned inward rather than pushed out. This fault is located at the point where the stems/branches meet. This is normally a genetic fault and potentially a weak point of attachment as the bark obstructs healthy tissue from joining together to strengthen the joint.

Indigenous Native to an area, and not introduced.

Lopping Cutting between branch unions (not to branch collars), or at internodes on a tree, with the final cut leaving a stub. Lopping may result in dieback of the stub and can create infection courts for disease or pest attack.

Root Mapping The exploratory process of recording the location of roots usually in reference to a datum point where depth, root diameter, root orientation and distance from trunk to existing or proposed structures are measured. It may be slightly invasive (disturbs or displaces soil to locate but not damage roots, e.g. hand excavation, or use of air or water knife), or non-invasive (does not disturb soil, e.g. ground penetrating radar).

Scaffold branch/root A primary structural branch of the crown or primary structural root of the tree.

Structural Root Zone (SRZ) Refers to the radial distance in metres, measured from the centre of the tree stem, which defines the critical area required to maintain stability of the tree. Only thorough investigation into the location of structural roots within this area can identify whether any minor incursions into this protection zone are feasible. Note: The SRZ is calculated on the diameter measured immediately above the root/stem buttress (DAB). Where this measurement is not taken in the field, it is calculated by adding 12.5% to the stem diameter at breast height (DBH). Note: The SRZ may not be symmetrical in shape/area where there is existing obstruction or confinement to lateral root growth, e.g. structures such as walls, rocky outcrops, etc).

Suppressed In crown class, trees which have been overtopped, whose crown development is restricted from above.

Tree Protection Zone (TPZ). Refers to the radial distance in metres, measured from the centre of the tree stem which defines the *tree protection zone* for a tree to be retained. This is generally the minimum distance from the center of the tree trunk where protective fencing or barriers are to be installed to create an exclusion zone. The **TPZ** surrounding a tree aids the tree's ability to cope with disturbances associated with construction works. Tree protection involves minimising root damage that is caused by activities such as construction. Tree protection also reduces the chance of a tree's decline in health or death and the possibly damage to structural stability of the tree from root damage.

To limit damage to the tree, protection within a specified distance of the tree's trunk must be maintained throughout the proposed development works. No excavation, stockpiling of building materials or the use of machinery is permitted within the TPZ. Note: In many circumstances the tree root zone does not occupy a symmetrically radial area from the trunk, but may be an irregular area due to the presence of obstructions to root spread or inhospitable growing conditions.

Tree Risk Assessment is the systematic process to identify, analyze, and evaluate tree risk. A tree risk rating of Low, Moderate, High or Extreme is derived by categorising or quantifying both the *likelihood* (probability) of tree or tree part(s) failure and impact on a target(s) and the severity of consequences of the impact on the target(s).

USEFUL LIFE EXPECTANCY (ULE) In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. ULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner. ULE categories are easily verifiable by experienced personnel without great disparity. A tree's ULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give the life expectancy); then by economics (i.e. cost of maintenance - retaining trees at an excessive management cost is not normally acceptable); and finally, effects on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population). ULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short ULE may at present be making a contribution to the landscape, but their value to the local amenity will decrease rapidly towards the end of this period, prior to them being removed for safety or aesthetic reasons. For details of ULE categories see Appendix B, modified from Barrell 2001.

Vigour (syn. health) refers to the tree's health as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

APPENDIX B

TREE RETENTION VALUE ASSESSMENT



APPENDIX B—TREE RETENTION VALUE ASSESSMENT

Part 1 of 3—Useful Life Expectancy (ULE)

In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. ULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner. ULE categories are easily verifiable by experienced personnel without great disparity. A tree's ULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give the life expectancy); then by economics (i.e. cost of maintenance - retaining trees at an excessive management cost is not normally acceptable); and finally, effects on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population). ULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short ULE may at present be making a contribution to the landscape, but their value to the local amenity will decrease rapidly towards the end of this period, prior to them being removed for safety or aesthetic reasons.

ULE categories (modified from Barrell 2001) The five categories and their sub-groups are as follows:

- 1. Long ULE** - 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 ULE** - 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 to 40 years
 - B. trees which may live for more than 40 years but would 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 planting
 - D. trees which could be made suitable for retention in the medium term by remedial care
- 3. Short ULE** - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:
 - A. trees which may only live from 5 to 15 years
 - B. trees which may live for more than 15 years but would 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 planting
 - D. trees which require substantial remediation and are only suitable for retention in the short term
- 4. Removal** - trees which should be removed within the next 5 years.
 - A. dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
 - 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 planting.
 - F. trees which are damaging or may cause damage to existing structures within the next 5 years.
 - G. trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).
 - H. trees in categories (a) to (g) that have a high wildlife 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

Part 2 of 3—IACA Significance of a Tree, Assessment Rating System (STARS)©

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

The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.



Tree Significance - Assessment Criteria

1. HIGH SIGNIFICANCE IN LANDSCAPE
The tree is in good condition and good vigour
The tree has a form typical for the species
The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
The tree is listed as a Heritage Item, Threatened Species or part of an Endangered Ecological Community, or listed on Councils Significant Tree Register
The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa <i>in situ</i> - tree is appropriate to the site conditions
2. MEDIUM SIGNIFICANCE IN LANDSCAPE
The tree is in fair-good condition and good or low vigour
The tree has a form typical or atypical for the species
The tree is a planted locally indigenous or a common species with its taxa commonly planted in the area
The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street.
The tree provides a fair contribution to the visual character and amenity of the local area.
The tree's growth is moderately restricted by above and/or below ground influences, reducing its ability to reach dimensions typical for the taxa <i>in situ</i> .
3. LOW SIGNIFICANCE IN LANDSCAPE
The tree is in fair-poor condition and good or low vigour
The tree has a form atypical for the species
The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings
The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area.
The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen
The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa <i>in situ</i> - tree is inappropriate to the site conditions
The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
The tree has a wound or defect that has potential to become structurally unsound.
Environmental Pest / Noxious Weed Species
–The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties
–The tree is a declared noxious weed by legislation
Hazardous/Irreversible Decline
–The tree is structurally unsound and/or unstable and is considered potentially dangerous
–The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term

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

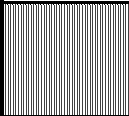
The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

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

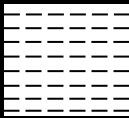
Part 3 of 3—Tree Retention Value Priority Matrix

		SIGNIFICANCE															
		1. High				2. Medium				3. Low							
		Significance in landscape				Significance in landscape				Significance in landscape				Environmental pest / Noxious weed species		Hazardous / Irreversible decline	
ESTIMATED LIFE EXPECTANCY	1. Long >40 years																
	2. Medium 15–40 years																
	3. Short <1–15 years																
	Dead																

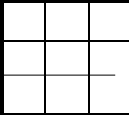
LEGEND FOR MATRIX ASSESSMENT




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 prescribed by AS4970 *Protection of trees on development sites*. Tree sensitive construction measures 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.



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.

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CONSULTING ARBORICULTURISTS

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REFERENCES

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

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

Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au

APPENDIX C

TREE PROTECTION DEVICES



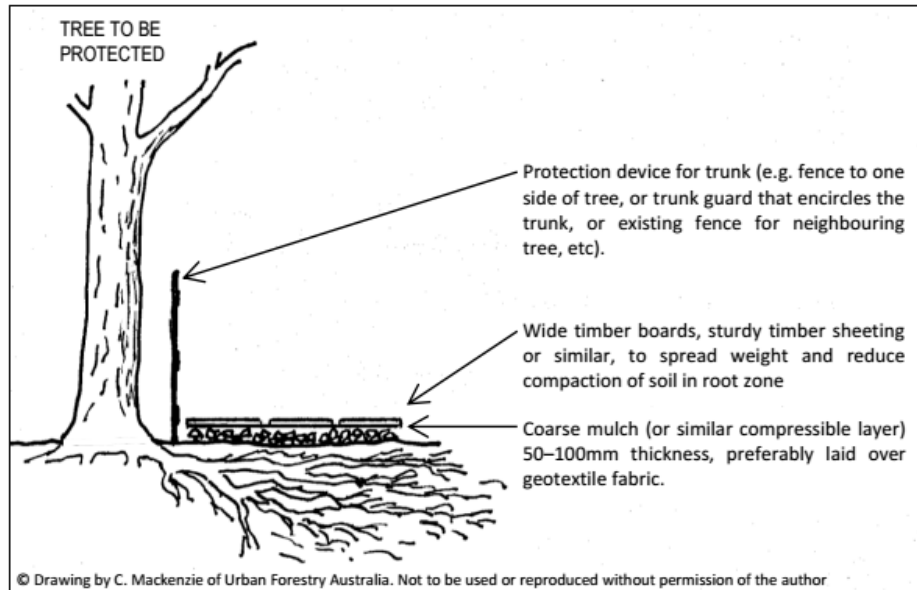


Figure 1

A method of reducing risk of root damage and soil compaction within the tree's Structural Root Zone.

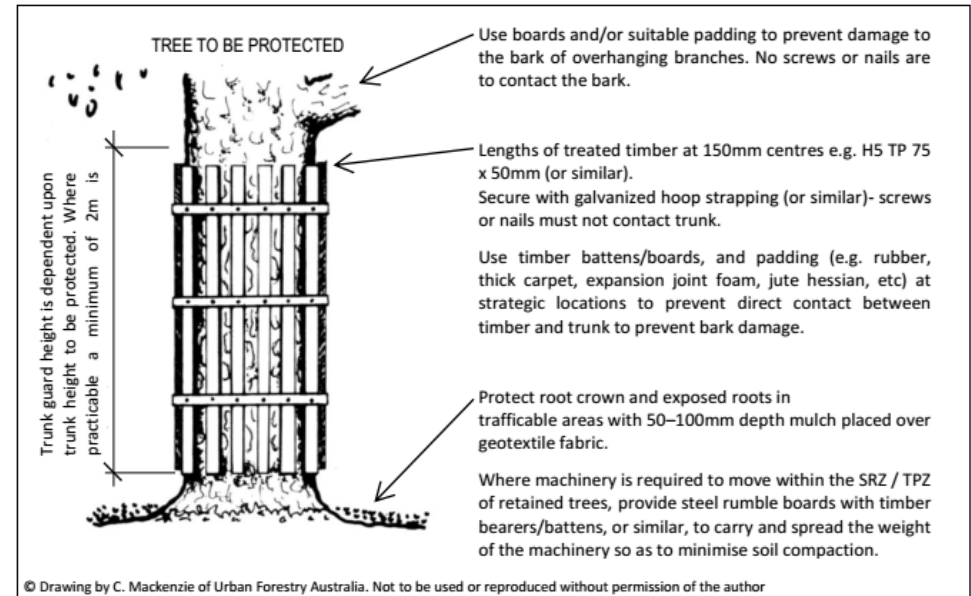


Figure 2

Example of tree trunk and tree branch protection.

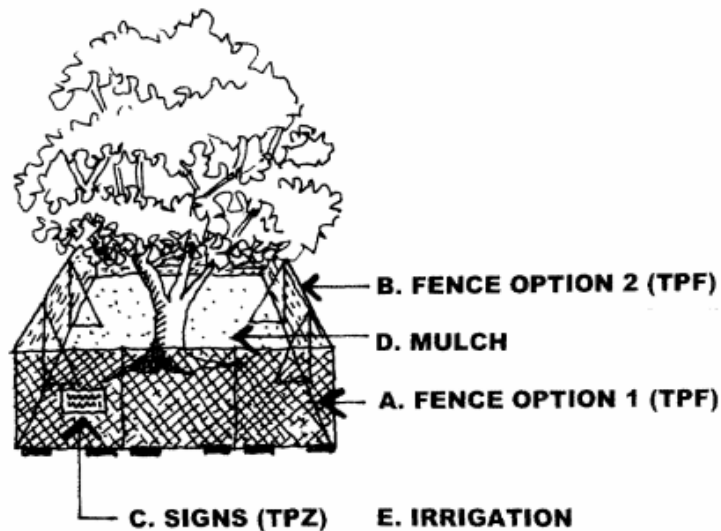


Figure 3

TREE PROTECTIVE FENCING (TPF)

A. Fence Option 1 (TPF)

1.8 metre high chain wire mesh panels with shade cloth attached if required, to be held in place with concrete blocks.

B. Fence Option 2 (TPF)

1.8 metre high plywood or wooden panel/paling fence (prevents soil or building contaminants from coming under fence when panels are laid flush to ground).

C. Signs (TPZ)

Tree Protection Zone Signs

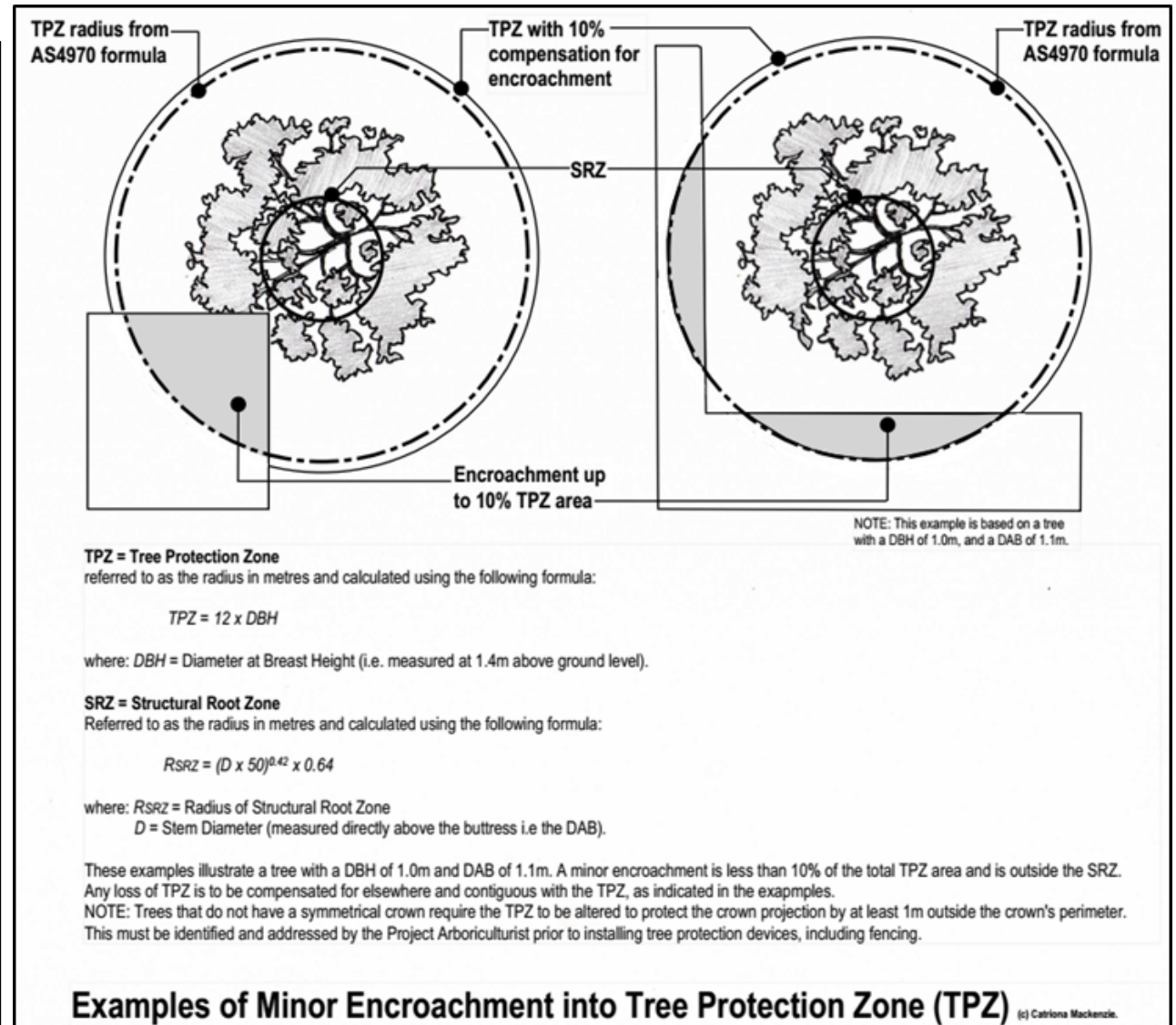
D. Mulch

50mm to 100mm thick layer of organic mulch, or aggregate, installed across surface area of TPZ.

E. Irrigation

Irrigation to arborist's advice.

© Drawing by Selena Hannan. Used with permission.



Include the Project Arboriculturist's details in the 'Contact' panel.

APPENDIX D

PHOTOGRAPHS





Plate 1 Tree 1 – Requires removal for proposal, tree exempt from DCP21 due to being 2m from existing dwelling.



Plate 2 Tree 4 – Footpath existing hard against property boundaries. New design allows a small, garden strip between the properties.



Plate 3

Tree 7, 8 (T9 obscured, behind T8) – Trees require removal for proposed works.



Plate 4

Tree 5 – Located on neighbouring property, will remain unaffected from the proposed works.



Plate 5
Tree 11 – Located on neighbouring property, will remain unaffected from the proposed works.

APPENDIX E

SCHEDULE OF ASSESSED TREES

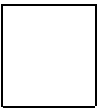


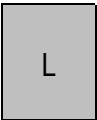

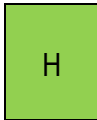


Schedule of Assessed Trees—26 Darley Street East, Mona Vale. 17 June 2019

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Observations/Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
1	<i>Magnolia grandiflora</i> cv Magnolia	6	4	175	EM	G	G	Introduced exotic species. Exempt under DCP P21 2014 due to being located less than 2m from an approved dwelling.	3B	L	L	-	-	-
2	<i>Plumeria acutifolia</i> Frangipani	4	2	150	EM	G	G	Introduced exotic species. Exempt under DCP P21 2014 due to height.	5A	L	L	-	-	-
3	<i>Murraya paniculata</i> Orange Jessamin	4	2	*75	M	G	G	Introduced exotic species. Exempt under DCP P21 2014 due to height.	5A	L	L	-	-	-
4	<i>Melaleuca</i> (<i>Callistemon</i>) <i>viminalis</i> Weeping Bottlebrush	8	10	AB 375	M	G	G	Introduced native species. Located on neighbouring property. Trifurcate stems @ 0.2m AGL.	2A	M	M	2.2	4.5	64
5	<i>Banksia integrifolia</i> Coast Banksia	10	8	400	M	G	F	Locally native species. Located on neighbouring property. Canopy orientated to south, over existing driveway.	2A	M	M	2.5	4.8	72
6	<i>Magnolia grandiflora</i> cv Magnolia	8	6	@ 1m AGL 300	M	G	G	Introduced exotic species. Located on neighbouring property. Heavily crown raised to clear existing neighbouring dwelling.	2A	M	M	2.2	3.6	41
7	<i>Glochidion ferdinandi</i> Cheese Tree	12	10	450	M	G	G-F	Locally native species. Co-dominant stems @ 2.2m AGL, minor inclusion suspected into union, small 'ears' formed at union.	2A	M	M	2.5	5.1	84
8	<i>Melaleuca</i> (<i>Callistemon</i>) <i>viminalis</i> Weeping Bottlebrush	7	8	150/ 100/ 175/ 175 (300)	M	G	G-F	Introduced native species. Multiple stems @ 0.1m AGL. Twiggy deadwood noted.	2A	M	M	2.2	3.6	41
9	<i>Melaleuca</i> (<i>Callistemon</i>) <i>viminalis</i> Weeping Bottlebrush	6	7	AB 350	M	G	G	Introduced native species. Multiple stems @ 0.2m AGL. No special problems noted at time of assessment.	2A	M	M	2.2	4.2	55
10	<i>Murraya paniculata</i> Orange Jessamin	4	6	AB 200	M	G	G	Introduced exotic species. Exempt under DCP P21 2014 due to height.	5A	L	L	-	-	-
11	<i>Jacaranda mimosifolia</i> Jacaranda	8	8	*400	M	G	F	Introduced exotic species. Located on neighbouring property. Hard to assess due to location. Appears to have prolific epicormic growth and some die-back in upper canopy.	2A	M	M	2.3	4.8	72

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Observations/Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
12	<i>Magnolia grandiflora</i> cv Magnolia x 5	3-4	3	150	EM	G	G	Introduced exotic species. Exempt under DCP P21 2014 due to height and being located less than 2m from an approved dwelling.	5A	L	L	-	-	-

KEY

	Prescribed trees to be retained		Prescribed trees proposed to be removed.		Non-prescribed trees exempt from tree preservation controls under MDCP.
	LOW Retention Value-These trees are not considered important for retention.		MEDIUM Retention Value-These trees may be retained and protected.		HIGH Retention Value -These trees are considered important for retention and should be retained and protected.

DETAILS FOR HEADINGS AND SYMBOLS USED IN TREE SCHEDULE

* Denotes those situations where the tree's Diameter at Breast Height (DBH) has been *visually* estimated (usually adjoining trees or those that are hard to access and/or physically measure).
 ? used to highlight a tentative condition assessment and subsequent ULE and RV rating where the tree cannot be visually assessed 'in-the-round' (usually adjoining trees or those that are hard to access).

() The numerical figure in parentheses is the calculated DBH for a multiple stemmed tree, using the AS4970 formula, *or*, is the calculated DBH where the measurement cannot be made at the standard 1.4m above ground level, e.g. where the diameter of the stem is measured at ground level (DGL) or above the buttress (DAB). All calculated figures are rounded up to the nearest 25mm to determine the tree's TPZ offsets.

NOTE: According to AS4970, the TPZ of palms, other monocots, cycads and tree ferns should not be less than 1m outside the crown projection. The AS4970 formula for calculating the SRZ of a tree does not apply to palms, other monocots, cycads and tree ferns.

DAB—The trunk/stem diameter measured *above the buttress* (i.e. root and trunk confluence), using a diameter tape

DGL—The trunk/stem diameter measured *at ground level*, using a diameter tape.

AGL—*above ground level*.

GL—*at ground level*.

H refers to the approximate height of a tree in metres, from base of stem to top of tree crown.

Sp refers to the approximate and/or average diameter spread in metres of branches/canopy (the 'crown') of a tree.

DBH	refers to the approximate diameter of tree stem at breast height i.e. 1.4 metres above ground (unless otherwise noted) and expressed in millimetres.
Age	refer to Appendix A -Terms and Definitions for more detail.
V	refers to the tree's vigour (health) Refer to Appendix A -Terms and Definitions for more detail.
C	refers to the tree's structural condition. Refer to Appendix A -Terms and Definitions for more detail.
ULE	refers to the estimated <i>Useful Life Expectancy</i> of a tree. Refer to Appendices A and B for details.
TSR	The <i>Tree Significance Rating</i> considers the importance of the tree as a result of its prominence in the landscape and its amenity value, from the point of public benefit. Refer to Appendix B – Significance of a Tree Assessment Rating for more detail.
RV	Refers to the retention value of a tree, based on the tree's ULE <i>and</i> Tree Significance. Refer to Appendix B – Significance of a Tree Assessment Rating for more detail.
SRZ	Structural Root Zone (SRZ) refers to the critical area required to maintain stability of the tree. Refer to Appendix A -Terms and Definitions for more detail.
TPZ	Tree Protection Zone (TPZ) refers to the <i>tree protection zones</i> for trees to be retained. Refer to Appendix A -Terms and Definitions for more detail.
ILR	Impact Level rating. Refer to Appendix A -Terms and Definitions for more detail.

APPENDIX F

TREE LOCATION PLAN



Arboricultural Impact Assessment for 26 Darley Street East, Mona Vale. June 2019 © Urban Forestry Australia