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ARBORICULTURAL IMPACT ASSESSMENT

Mr and Mrs Rooney
205 Riverview Rd,
AVALON BEACH

Report Reference: AIA – ROO 09/19

12th September 2019

Prepared by:

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1.0 Introduction

- I. This Arboricultural Impact Assessment was commissioned by Landforms Pty Ltd, on behalf of property owners of 205 Riverview Rd, Avalon, to provide an assessment of trees as part of a Development Application (DA) for construction at the site.
- II. The proposal involves the construction of additions and alterations to the dwelling, construction of pool and renewal of landscape.
- III. The Arborist was requested by the clients to assess the nominated nine (9) trees, potentially impacted by the proposal, and tabled as T1 – T9 in this report, with T9 being a well-established hedge. Only four rear trees were assessed, being T1-T4, by request of the client.
- IV. Trees are assessed with direct reference to guidelines as stipulated in *Australian Standard- Protection of trees on development sites* (AS 4970/2009).
- V. The Arborist assesses the trees as significant species of the Pittwater Spotted Gum Forest and endorses their retention and protection as part of this project.
- VI. Given that pool construction is at differing RLs to that of tree base, low impacts to T1-T4 is anticipated. The methods of construction for the low set retaining walls and renewal of decking and staircase *must* follow stringent guidelines as dictated by the Arborist in this report.
- VII. Street trees (T7 and T8) and the hedge (T9) can be retained with some incorporation of tree sensitive construction methods and protection, with specific requirements for retaining T5 and T6, as well as providing some points for discussion and consideration on these trees..
- VIII. The Arborist also endorses that a Tree Protection Plan be sought once the final design is established.

2.0 Methodology

- I. A Visual Tree Assessment (VTA) was conducted, at ground level only, on 19th October 2018, under normal weather conditions, and subsequently on 6th July 2019.
- II. Trees are identified by observations only
- III. The Arborist used a Thorax hammer to tap the base of trees .
- IV. Except for a small hand dig around tree base, no subterranean investigation or canopy inspection was undertaken and not warranted.
- V. All dimensions are estimated by diameter tape or by eye sight.

- VI. The Arborist tables the following in 3.2 Tree Observations -Table 1 - Tree Assessment & Impacts Evaluation;
- Genus & species, Common name, age, vigour and crown characteristics, general health and condition, defects and the presence of pest and disease.
 - An appraisal of trees with reference to Tree AZ; determination of the worthiness of trees in the planning process, and a Tree Retention Value (STARS Matrix) that assesses the trees significance and value for retention on the site where development occurs. (Refer to Appendix for further clarification of all scales and values)
 - Calculation of Tree Protection Zones (TPZ) and Structural Root Zones (SRZ), proposed setbacks to works and degree of incursion characterised by minor, moderate, major or no impact to trees.
- VII. Findings in Table 1.0 are to be read in conjunction with Notes in Appendix.
- VIII. Calculations of impacts are undertaken by using an interactive calculator. (Treetec, 2014).
- IX. A Site Plan is included in Appendix, using survey provided by the client, and overlaid by the Arborist, to annotate tree locations only.
- X. A Glossary of terms is provided in the Appendix of this report, for clarification of Arboricultural terms and meanings.
- XI. The following documentation was used as part of this assessment;

Plan Type/Document	Provided by	Reference	Date
Survey	True North Surveys	Job 7204 Dwg 7204DU	23.07.2013
Demolition Site/Roof Plan	Mark Harcum Design Practice	Project 1824 A010 Rev A	Jan 2019
Demolition Plan – Lower Ground Floor	Mark Harcum Design Practice	Project 1824 A012 Rev A	Jun 2019
Demolition Plan – Ground Floor	Mark Harcum Design Practice	Project 1824 A013 Rev A	Jun 2019
Ground Floor Plan	Mark Harcum Design Practice	Project 1824 A103 Rev A	Mar 2019
First Floor Plan	Mark Harcum Design Practice	Project 1824 A104 Rev A	Mar 2019
North Elevation	Mark Harcum Design Practice	Project 1824 A201 Rev A	Nov 2018
South Elevation	Mark Harcum Design Practice	Project 1824 A202 Rev A	Nov 2018
Landscape Plan	Landforms	2106-19 DA/1	22.08.2019

3.0 Observations

3.1 Site Observations

- I. The site is referred to as Lot 4 DP 18667 of Northern Beaches Council.
- II. The site is characterised as being zones E4 - Environmental Living, dissected by a Foreshore Building Line and as having Terrestrial Biodiversity.
- III. Site orientation is predominantly east and steeply sloped with falling west to Pittwater. Natural outcrops resemble a terraced landscape along the steep slope.
- IV. The resident carport is detached and built at street level. Access to the existing dwelling is built to conform to the site topography and accessed with side setback stairs. Timber stairs to the rear jetty and meander around the rock outcrops and site trees.
- V. The trees in question are of modest stature with tall merging canopies and located in the rear setback.
- VI. Aerial image of the site as depicted below with red outline.



SOURCE: SIX Maps

3.2 Tree Observations

Table 1: Tree Assessment & Impacts Evaluation

Table 1: Tree Assessment & Impacts Evaluation																			
#	Genus Species	Common Name	DBH (mm)	Height (m)	Spread (m)	Age	Vigour	Condition	Crown Form	Canopy Cover %	Defects	Pest &Disease	TREEAZ	Significance	Retention Value	TPZ (m)	SRZ (m)	Impacts/ Incursion %	Tree comments and Impacts summary
																		Nil	
																		Low	
																		Moderate	
																		Major	
																		Total Loss (TL)	
1	<i>Eucalyptus paniculata</i>	Grey ironbark	340	14	12	M	F	F	C	60 +	NO	NO	A2	H	H	4.08	2.25	Codominant tree anchored in rock, has a relatively thin canopy and minimal deadwood Proposed pool is to be built on outcrop of an RL that is 2.5m higher than tree base with a spatial a setback of 1.7m The southern extremity of the pool will meander around the tree and extend west, partially canter-levered and found on isolated piers with no encroachment of the TPZ Low sandstone walls and renewal of timber stairs can be managed LOW IMPACT	
2	<i>Corymbia maculata</i>	Spotted gum	250	13	7	M	G	F	C	60	NO	NO	A2	H	H	3.0	2.0	Codominant tree anchored in rock, has a relatively thin canopy and minimal deadwood Proposed pool is to be built on outcrop on an RL that is 2m higher than tree base with a spatial a setback of 2.1 from the eastern pool edge. Pool will meander to the west at 3.8m spatial setback and partially canter-levered, supported by isolated piers with no encroachment of the TPZ Low sandstone walls and renewal of timber stairs can be managed LOW IMPACT	
3	<i>Eucalyptus paniculata</i>	Grey ironbark	700	20+	10	M	G	G	C	80	DW	NO	A2	H	H	8.4	3.09	Tall canopy tree with sweeping trunk and small amount of deadwood New timber stairs will be renewed and maintain the existing footprint except for a minor deck extension for the proposed bench seat. Bio - Filtration rock cut will have no bearing on T3 Low set sandstone walls are manageable No encroachment from pool LOW IMPACT	

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																		Nil	
																		Low	
																		Moderate	
																		Major	
																		Total Loss (TL)	
4	Corymbia maculata	Spotted gum	400	15	12	M	G	F	C	80	DW	FD	A2	H	H	4.8	2.47	Partially sheltered tree within terraced soil pocket The upper low sandstone wall below tree is proposed in a soil pocket and may affect roots. Refer to viable methods of construction in Recommendations. The lower wall is pre-existing and will be replaced, this is manageable No encroachment from pool LOW IMPACT	
5	Eucalyptus paniculata	Grey ironbark	380	14	10	M	G	F	S	60	DW KT	NO	Z10	M	L	4.56	Absent	Tree stands in sandstone retainer (narrow) on the north boundary and established on lower RL (1m) the proposed works hence the absent basal. Relatively sparse canopy, asymmetric bias west. Minor kink of the mid trunk, except for deadwood removal, no pruning required Tree exposed to direct and indirect impacts from the demo and the renewal of existing retaining wall The steps will be removed to allow for a retainer to the south The landscape works will require supervision to ensure any impact imposed is manage and reduced to a tolerable degree LOW IMPACT	
6	Corymbia maculata	Spotted gum	440	16+	10	M	G	F	C	60	L	NO	A2	H	L	5.28	Absent	Tree sits in a narrow sandstone planter at the top of the first flight of steps (north) and approx. 2m below street level. Basal is absent. Relatively sparse canopy and the upper canopy previously lopped, presumably to overhead cable. Tree exposed to direct and indirect impacts from the demo of the steps, grade down existing levels to provide a lower paved platform which may see the loss of roots MAJOR IMPACT	
7	Eucalyptus paniculata	Grey ironbark	520	19+	10+	M	G	F	C	70	DW	NO	A2	M	M	6.24	2.76	Tree resides on the street verge thus established approx. 2m above the proposed works. The tree presents with faire health and vigour.	

Table 1: Tree Assessment & Impacts Evaluation

#	Genus Species	Common Name	DBH (mm)	Height (m)	Spread (m)	Age	Vigour	Condition	Crown Form	Canopy Cover %	Defects	Pest & Disease	TREEAZ	Significance	Retention Value	TPZ (m)	SRZ (m)	Impacts/ Incursion %	Tree comments and Impacts summary
																		Nil	
																		Low	
																		Moderate	
																		Major	
																		Total Loss (TL)	
																			The existing robust retaining wall within the site separates the site to the tree. This means root spans are most likely restricted to the wall and as such the perceived impact imposed by the works is considered negligible Tree will need to be protected throughout the works NIL IMPACT
8	<i>Eucalyptus paniculata</i>	Grey ironbark	350	13+	8+	M	G	F P	C S	60	KT TO	B	Z10	M	L	4.2	2.47		Tree resides on the street verge thus established approx. 2m above the proposed works. Canopy is partly suppressed and is relatively thin. The trunk is kinked possibly because of routine crown lopping for overhead cables. The existing boundary wall also separates the site to the tree. This means root spans are most likely restricted to the wall and as such the perceived impact imposed by the works is considered negligible NIL IMPACT
9	<i>Syzigium australe</i>	Bush Cherry	100	3.5	1.5	M	G	G	C	90	NO	NO	A2	L	L	2.0	1.5		Hedge locates on the northern boundary growing in sandstone retainer (narrow) and enveloping T5. Hedge is contained where no work is proposed NIL IMPACT

4.0 Indirect Impacts

The following are indirect impacts that trees may succumb to during construction related activities. It is imperative that these be taken into consideration and all attempts made to minimise indirect impacts, as they can occur over the duration of construction and indeed accumulate to have significant effect on trees longevity.

- I. Mechanical damage from plant/machinery; Direct wounding and damage of stems and branches by large plant & machinery, including excavator, bob cat, crane, etc., during construction activities will have some impact in the form of cambium damage/abrasion to tree trunks and branch tearing well into collar attachments in turn exposing live woody tissue and predisposing the tree to pest and disease. Similarly, plant/machinery is also responsible for soil compaction within the trees TPZ.
- II. Indirect root injury from soil compaction; When soil is compacted either via building materials/debris stockpiled on the TPZ or TPZ is utilised as a thoroughfare for heavy plant and machinery, the soil inevitable becomes compacted and impacts on the air and moisture uptake and ultimately affecting the gaseous exchange within the drip line that is vital for the trees health and longevity.
- III. Soil contamination; where chemicals, cement, and paint products etc., get washed or spilled into the soil and the tree absorbs the soluble content through its roots in addition lime from cement wash off can alter the soil PH
- IV. Soil grade changes; when the top soil cover down to a depth of approximately 150mm is striped it can illuminate vital feeder roots and can temporarily shock the tree. This process is common particularly during the landscape process. In addition, these fine roots if exposed can prematurely dehydrate and die
- V. Landscaping Impact; Side paths and driveways comprised of concrete and non-porous materials can deprive roots of air and water and affect gaseous exchange. This is particularly true when there has been lack of consideration for trees located on adjacent properties and within close proximity to building envelope. In addition, masonry fence lines require sub grade footings and usually at the expense of root loss of nearby trees. Furthermore, there can be an increase in reflected heat to the remaining trees as a result from surrounding hard surfaces.

5.0 Conclusion & Recommendations

- I. The Arborist concludes that the trees assessed are significant in that they are locally occurring and consistent with Pittwater Spotted Gum Forest, remnant vegetation of this area, and growing on the abrupt sloping grounds towards Pittwater.
- II. The works in the rear essentially involves the construction of a new pool, renewal of existing decking, and construction of low set retaining wall. Works seemingly take advantage of the rock outcrop closest to the existing house as well as utilising some of the existing balcony and therefore minimising intrusion into grounds where some of the trees are located
- III. The proposal potentially imposes low impact to T1 – T4, in accordance with AS4970/2009, Incursions were challenging to establish as the works are proposed on varying RL's to that of the trees and the calculated setbacks from trees cannot truly depict potential root damage, where ground intrusion does *not* necessarily mean direct impact to root zones. However, the Arborist is satisfied that, overall, there is no canopy encroachment and the amount of root disturbance for these trees is low and trees can remain viable.
- IV. The works to the dwelling, including partial demolition and reconstruction, renewed landscape, and grade changes, all impact the front trees. The front site trees (T5, T6, and T9) are more so impacted by site topography that has meant that trees have established on lower RLS of the exiting RLs of the front. The inevitable changing of grades, and demolition of existing site elements, namely stairs, pavement, retainers etc. for the proposed courtyard, could mean that the trees are susceptible to *cumulative* impacts, even before major works begin. The fact that the Arborist is unaware of the basal of T5 and T6, as well as the *extent* works needed for the grade modifications that would be required, makes it difficult to ascertain the true degree of impacts when grade changes occur. Whilst the Arborist applauds the proposal in that it has attempted retain these trees and hedge to complement the new landscape, but the Arborist questions whether it can be retained successfully. The condition of T5 and T6 is slightly below average with thinning canopies and odd form, but this could be argued that this is *normal* forest behaviour and for such trees. The Arborist does not negate the ecological contribution these trees play, but queries whether proper tree management would be to remove these trees and re-establish this area with new trees.
- V. T7 and T8, although in below average condition and basically disturbed by overhead street infrastructure, seem to be not exposed to impacts, given that the boundary is bolstered by a masonry wall, and roots are likely to be kerbed.
- VI. The Arborist recommends the following T1-T4 and T7, T8 and T9 be retained as part of the proposal and that the following be incorporated into the project;
 - a. A Project Arborist must be engaged to oversee tree protection as part of this project.

- b. All trees will require trunk protection, and Tree Protection signage, in accordance with AS4970/2009.
- c. For T1 and T2, a tightly woven cover, up until 5m in height, must be installed for added protection.
- d. Rear setback trees (T1-T4) require ground protection, by way of Geotech fabric, underneath the proposed pool (cantilevered section).
- e. T7 and T8 will either use trunk protection or protective fencing and will require ground protection in the form of mulch.
- f. The hedge (T9) may be protected by a lightweight net, as fencing may be difficult.
- g. All soil and rock cuts and pier holes supporting the cantilevered pool must be carried out manually. The piers shall not be closer than 3.5m from T1.
- h. The Arborist must be present during excavation to minimise root damage (should roots be present).
- i. Where roots, >30mm in diameter, are encountered, piers must be offset.
- j. For T3, the decking should be fixed on screw piles, or narrow piers, and stay clear of the SRZ. Otherwise, pre-existing stump holes can be used. If any excavation is to happen, it must be manually and under supervision of the Arborist.
- k. While the Arborist supports all low set, walls proposed in the rear, they will require a pre-dig, manually, so that the Arborist is satisfied that there is minimal root activity and that a concrete pad (footing) can be used.
- l. The staircase and decking in the rear should make all efforts to use existing footing holes, otherwise, new pier holes must be hand dug.
- m. For the hedge to be retained, the current planter/retainer must remain in place.
- n. The demolition of the stairs and pavement in the front setback must be removed manually and under the supervision of a Project Arborist to be able to evaluate the true extent of impacts to the root system of the hedge and minimise damage.

VII. Whilst the Arborist would *like* to see T5 and T6 be retained, consideration must be given to the following;

- a. The existing soil levels as currently instated around both trees must remain *as is*.
- b. In the absence of being able to investigate the tree base for T5 and T6, the demolition of the stairs has to be done with a meticulous approach, should tree roots be encountered. This may then dictate the design of subsequent retainers.
- c. New retaining walls can be established forward of the trees, and any further retaining walls can be terraced to meet the proposed floor level of the courtyard. These can be established as garden beds in the new landscape.
- d. Trees would need to be protected throughout the works with fencing and/or trunk protection.
- e. Consideration *may* also want to be given to removing these two trees, with the Arborist noting that the site is heavily vegetated and there is enough canopy cover to mitigate their loss. Both trees were assigned a low retention value, and without negating their contribution, this is based on their current condition, which is not of optimum vitality. The Arborist believes that these trees have

already endured impacts from the *current* landscape, hence being buried, and this will only be compounded with the proposed works. New trees could be planted to complement the new landscape and adapt to new site conditions.

- VIII. Given the intricacy of the project, a Tree Protection Plan (TPP) should be sought at Construction Certificate (CC) stage, and only once final determination is made on the design and extent of grade modifications required.

Yours Faithfully,

A handwritten signature in black ink, appearing to read 'SA', written diagonally.

Sam Allouche

Diploma of Arboriculture (AQF Level 5)

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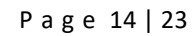
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Appendix A

Tree location Plan – T1 – T4



Arborist Impact Assessment - AIA ROO 09/19



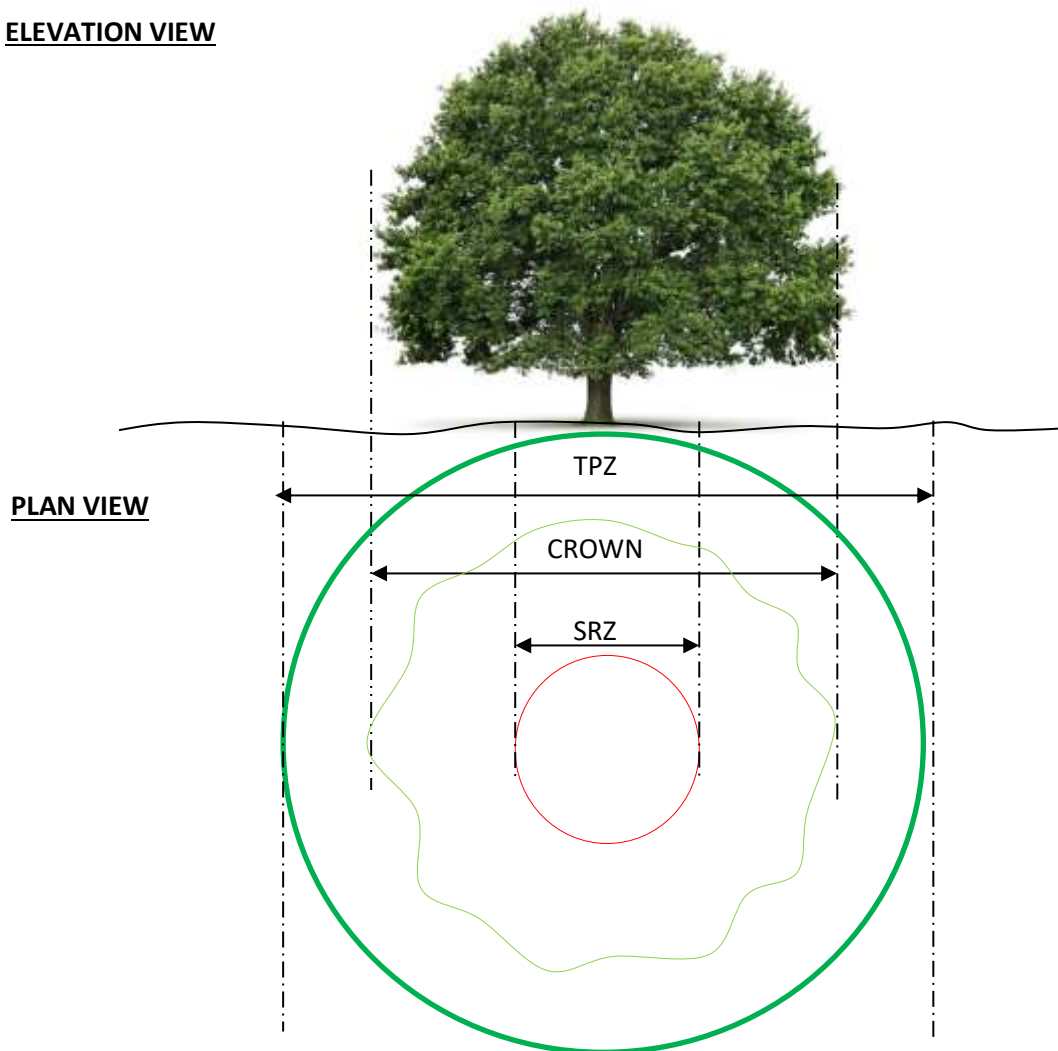
Appendix B

Tree Assessment & Impacts Evaluation Table Notes					
DBH	Diameter at Breast Height (estimated circumference of tree at approximately 1400mm)				
H	Height of tree (estimated)				
S	Spread of tree (estimated)				
Age	Y = Young J= Juvenile M= Mature O=Over mature S=Senescent EM = Early Mature				
Vigour	G= Good F=Fair L= Low D=Dormant				
Condition	G= Good F=Fair P= Poor D= Dead				
Crown Form	D=Dominant C=Co-dominant I=Intermediate S=Suppressed F=Forest E=Emergent				
Crown Cover	Percentage of crown foliage present on tree. D = Dormant at time of inspection, no foliage noted P = Palm				
Defects	BI = Bark Inclusion (defect fork) BC = Basal cavity BD = Basal decay C =Cavity or hollow CC = Cable conflict DB = Dieback DC = Declining canopy DF = Dead Fronds DW = Deadwood H = Hangers KT = Kinked trunk L = Lopped MW = Mechanical wound PBA = Poor Branch Attachment R =Root exposure/decay RD = Root Decline SBD = Summer Branch Drop SC = Stem cavity SF = Stem Failure SFW = Stem failure Wound SW =Stem Wound TO = Tear out				
Pest and Disease	B=Borers F=Fungal FD = Fungal Decay T= Termites NO = Nothing Obvious O= other				
TREES AZ	Categorisation of trees with regards to development Refer to Appendix – Tree AZ				
Significant Scale	H=High M=Medium L=Low (Refer to Appendix - Significance of a Tree, Assessment Rating System (STARS))©				
Retention Value	H=High M=Medium L=Low R=Removal (Refer to Appendix - Significance of a Tree, Assessment Rating System (STARS))©				
TPZ	Calculated area above and below ground at a radial distance form centre of trunk. Exclusion zone for the protection of tree roots and crown to ensure tree viability				
SRZ	Calculated area below ground at a radial distance from centre trunk of tree, required exclusively for tree stability				
Setback	Calculated setback for proposed works from tree, measured at centre of trunk.				
Impacts/Incursion	Calculated degree of incursion				
	Nil No impact	Low 0% - 15%	Moderate 15%- 25%	Significant 25%+	Total Loss Lost to proposal
Comments	Arborist commentary on tree location, health , structure and relationship to development.				

Appendix C

Indicative TPZ and SRZ (AS 4970/2009)

ELEVATION VIEW



CALCULATIONS

$$\text{TPZ (Radius)} = \text{DBH} \times 12$$

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

- The Australian Standards provides a formula for calculating both the TPZ and SRZ. The TPZ is a combination of both root and crown area requiring protection for viable tree retention. Basically, it is the area isolated from construction disturbances. The TPZ incorporates the SRZ, the area required for tree stability.
- It should be noted that the TPZs have been calculated with the following in mind; tree characteristics, topography of the site and the TPZ reconfiguration allowance as stated in AS 4970-2009. (Refer to Appendix E for calculation methods of TPZ.) The Standards allow 10% of the radii from one edge of the TPZ to be offset and added to another edge whilst still maintaining total surface area required for TPZ
- TPZ of palms is calculated as no greater than 1m of its radial canopy span and no SRZ is calculated.
- TPZ and SRZ estimated only and cannot be relied on as accurate with trees on neighbouring properties

Appendix D

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

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001. The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

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

Tree Significance - Assessment Criteria

1. High Significance in landscape

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

2. Medium Significance in landscape

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

3. Low Significance in landscape

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


- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.
Environmental Pest / Noxious Weed Species
- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.
- Hazardous/Irreversible Decline - The tree is structurally unsound and/or unstable and is considered potentially dangerous, - The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

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

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

Table 1.0 Tree Retention Value - Priority Matrix

IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

		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 the Australian Standard AS4970 <i>Protection of trees on development sites</i> . Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.				
		Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.				
		Consider for Removal (Low) - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.				
		Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.				

Appendix E

Tree AZ Categories (Version 10.10 ANZ)

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species

Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

A1	No significant defects and could be retained with minimal remedial care
A2	Minor defects that could be addressed by remedial care and/or work to adjacent trees
A3	Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
A4	Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)

NOTE: Category A1 trees that are already large and exceptional, or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.

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Appendix F

Glossary of Terms

Taken from: Draper, D. B and Richards, P.A. (2009) Dictionary for Managing Trees in Urban Environments, CSIRO Publishing, Victoria, Australia

Arborist An individual with competence to cultivate, care and maintain trees from amenity or utility purposes.

Basal Proximal end of the trunk or branch, e.g. trunk wound extending to the ground is a basal wound, or as epicormic shoots arising from lignotuber

Branch failure The structural collapse of a branch that is physically weakened by wounding or from the actions of pests and diseases or overcome by loading forces in excess of its load – bearing capacity.

Buttress A flange of adaptive wood occurring at a junction of a trunk and root or trunk and branch in response to addition loading.

Callus wood Undifferentiated and un lignified wood that forms initially after wounding around the margins of a wound separating damaged existing wood from the later forming lignified wood or wound wood.

Canker A wound created by repeated localized killing of the vascular cambium and bark by wood decay fungi and bacteria usually marked by concentric disfiguration. The wound may appear as a depression as each successive growth increment develops around the lesion forming a wound margin (Shigo 1991, p. 140)

Canopy cover The amount of area of land covered by the lateral spread of the tree canopy, when viewed from above that land.

Codominant stem Two or more first order structural branches or lower order branches of similar dimensions arising from about the same position from a trunk or stem.

Crown Of an individual tree all the parts arising above the trunk where it terminates by its division forming branches, e.g. the branches, leaves, flowers and fruits; or the total amount of foliage supported by the branches.

Decline The response of the tree to a reduction of energy levels resulting from stress. Recovery from a decline is difficult and slow, and decline is usually irreversible.

Diameter at Breast Height (DBH) Measurement of a trunk width calculated at a given distance from above ground from the base of the tree often measured at 1.4m.

Dominance A tendency in a leading shoot to maintain a faster rate of apical elongation and expansion other than other nearby lateral shoots, and the tendency also for a tree to maintain a taller crown than its neighbours (Lonsdale 1999, p.313)

Dripline A line formed around the edge of a tree by the lateral extent of the crown.

Dynamic Load Loading force that is moving and changes over time, e.g. from wind movement (James 2003, p. 166)

Endemic A native plant usually with a restricted occurrence limited to a particular country, geographic region or area and often further confined to a specific habitat.

Epicormic Branch derived from an epicormic shoot

Frass The granular wood particles produced from borer insects and can be categorized as fine frass, medium frass, and coarse frass with the different types being of different sizes and caused by different insects.

Habitat tree A tree providing a niche supporting the life processes of a plant or animal

Hazard The threat of danger to people or property from a tree or tree part resulting from changes in the physical condition, growing environment, or existing physical attributes of the tree, e.g. included bark, soil erosion, or thorns or poisonous parts, respectively.

Included bark The bark on the inner side of the branch union , or in within a concave crotch that is unable to be lost from the tree and accumulates or is trapped by acutely divergent branches forming a compression fork

Indigenous A native plant usually with a broad distribution in a particular country, geographic region or area. See also Endemic, Locally indigenous and non-locally indigenous.

In situ Occurring in its original place, e.g. soil level, remnant vegetation, the place from where a tree was transplanted, or where a tree is growing.

Irreversible decline The decline of a tree where it has progressively deteriorated to a point where no remedial works will be sufficient to prevent its demise, usually of poor form and low vigour.

Isolated tree A tree growing as a solitary specimen in an exposed location away from other trees as a result of natural or artificial causes and may be naturally occurring.

Kino The extractive polyphenols (tannins) formed in veins in a cambial zone as a defense in response to wounding in eucalypts. Often visible as an exudate when the kino veins rupture or are injured (Boland, *et al.* 2006, p. 691)

Lignotuber A woody tuber developed in the axils of the cotyledons.

Loading Weight that is carried, e.g. as bending stress on a branch.

Locally Indigenous A native plant as remnant vegetation, self-sown or planted in an area or region where it occurred originally.

Longevity Long lived, referring to a plant living for a long period of time.

Mechanical wound -Wound inflicted by abrasion, by mechanical device

Naturalised A plant introduced from another country or region to a place where it was not previously indigenous where it has escaped from agriculture or horticulture or as a garden escape and has sustained itself unassisted and given rise to successive generations of viable progeny.

Necrotic Dead area of tissue that may be localized e.g. on leaves, branches, bark or roots

Negligence With regard to trees, failure to take reasonable care to prevent hazardous situations from occurring which may result in injury to people or damage to property (Lonsdale 1999, p. 317)

Noxious weed A plant species of any taxa declared a weed by legislation. Treatment for the control or eradication of such weeds is usually prescribed by legislation...

Remnant A plant /s of any taxa and their progeny as part of the floristics of the recognised endemic ecological community remaining in a given location after alteration of the site or its modification or fragmentation by activities on that land or on adjacent land

Useful Life Expectancy (ULE) A system used to determine the time a tree can be expected to be usefully retained

Shedding - Shedding of plant organs when it is mature or aged, by the formation of a corky layer across its base. This may be influenced by stress, drought, senescence, declining condition, reduced vigour and also occurs

Stability Resistance to change especially from loading forces or physical modifications to a trees growing environment

Stress A factor in a plants environment that can have adverse impacts on its life processes e.g. altered soil conditions, root damage, toxicity, drought or water logging. The impact of stress may be reversible given good arboricultural practices that may lead to plant decline.

Structural defect A weak point in or on a tree causing its structural deterioration diminishing its stability in full or part

Structural integrity The ability of a load bearing part of a tree, and its resistance to loading forces

Structural roots- Roots supporting the infrastructure of the root plate providing strength and stability of the tree.

Symbiotic An association between different species usually but not always mutually beneficial.

Termite leads Tunnels of mud on the stem and between the bark created by termites that may be active or inactive.

Tree Protection Zone (TPZ) A combination of RPZ and CPZ as an area around the tree set aside for the protection of a tree and a sufficient proportion of its growing environment above and below ground established prior to demolition or construction and maintained until the completion of works to allow for its viable retention including stability.

Visual Tree Assessment (VTA) A visual inspection of a tree from the ground. Such assessment should only be undertaken by suitably competent practitioners.

Disclaimer

This report has been compiled using knowledge & expertise relating to trees, and makes recommendations based on this. It should be noted that trees are affected by many elements, environmental and situational, some of which cannot be predicted or foreseen even by Qualified Arborists.

The client when reading this report should take the following factors into consideration;

- ❖ It is not feasible to assume that Arborists identify all hazards or risks associated with trees at the time of consultation or indeed in this report.
- ❖ This Assessment is valid for 3 months from the date stipulated on the report, and may need to be updated after this.
- ❖ Regular maintenance and monitoring by a Qualified Arborist will minimize the risks associated with tree and contribute to its longevity in its growing environment, however there is no guarantee that all risks are to be eliminated and that the tree is not privy to external factors that will impact on the tree after it has been assessed by our service.
- ❖ The report is compiled in good faith, where any information given to our service is correct and true, and where interested parties and /or stakeholders are notified. This includes title and ownership of property, orders as directed by relevant authorities, development application determinations and other matters that affect the tree/s in question.
- ❖ The Arborist shall not be required to give testimony or to attend court by reason of this report unless other arrangements are made prior.
- ❖ This Arborist Report does not issue permission for any recommendations made in this report, particularly where trees are to be removed. Permission must be sought and obtained from Council and owner/s of trees.
- ❖ Any treatments recommended by the Arborist cannot be guaranteed, due to the volatile environment in which trees are growing.
- ❖ Clients may choose to accept or disregard the recommendations of the Arborist, or to seek additional advice.
- ❖ This report is intended for the Recipient, no part of this report is to be copied or altered without the authors permission

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