REPORT: **Arboricultural Impact Assessment**

REPORT COMMISSIONED FOR:

Dawson Vu Pty Ltd
c/o Ms. Trang Vu

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28-30 Forrest Road
East Hills NSW 2213

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Document Tracking

Name	Contribution	Date
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Jim McArdle AQF Level 5 Arborist	Site Assessor Editor	30/09/2023 (V4)

1. EXECUTIVE SUMMARY

1.1 The client commissioned an Arboricultural Impact Assessment to evaluate the potential impacts on trees by a proposed development and, if viable, to make recommendations that reduce the impacts on trees at 28-30 Forrest Road, East Hills NSW 2213.

1.2 The proposed development involves the demolition of existing structures and the construction of a childcare centre.

1.3 The assessment was conducted on the 25th of May, 2023 by Jim McArdle B.Ed. Sci (ACU), Dip. Arb AQF L5 (Ryde), Tree Risk Assessment Qualified (TRA), Quantified Tree Risk Assessment (QTRA) & Tree Contractors Association of Australia (TCAA) Vice President.

1.4 Three (3) trees on site and in the adjacent surrounding area were assessed and are summarised as follows:

Table 1: *Retention Values.*

Retention Values				
High (0 trees)	Moderate (2 trees)	Low-Moderate (0 trees)	Low (1 tree)	Very Low (0 trees)
-	1, 2.	-	3.	-

Table 2: *Tree Works.*

Tree Works	
Retain (1 tree)	Remove (2 trees)
1.	2, 3.

1.5 **Retain** one (1) tree numbered 1.

1.6 **Remove** two (2) trees numbered 2 and 3.

1.7 **Tree-sensitive construction measures** are required to minimise major anticipated impacts to one (1) tree numbered 1.

1.8 **Root mapping investigations** are to be conducted by an AQF Level 5 arborist prior to the proposed works to locate roots of one (1) tree numbered 1 that may be situated within the footprint of the proposed development.

2. INTRODUCTION

2.1 AIMS

The aim of the report is to:

2.1.1 To assess the trees' health and retention value and to evaluate the potential impacts on trees by the proposed development.

2.1.2 To provide options, if viable, to reduce potential impacts on trees and make recommendations for tree management and protection during development.

2.2 SCOPE

2.2.1 Trang Vu of Dawson Vu Pty Ltd commissioned an Arboricultural Impact Assessment for the site at 28-30 Forrest Road, East Hills NSW 2213.

2.2.2 The assessment was conducted on the 25th of May, 2023 by Jim McArdle B.Ed. Sci (ACU), Dip. Arb AQF L5 (Ryde), Tree Risk Assessment Qualified (TRA), Quantified Tree Risk Assessment (QTRA) & Tree Contractors Association of Australia (TCAA) Vice President.

2.2.3 Tree management measures are regulated by Bankstown Development Control Plan (DCP) 2015 and Bankstown Local Environmental Plan (LEP) 2015.

2.2.4 Three (3) trees on site and in the adjacent surrounding area were assessed.

2.2.5 The inspection does not include below ground root excavation, and no expert laboratory analyses – including internal diagnostics, inaccessible trunk and aerial inspections – were conducted. No pathology tests or soil analyses were conducted. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale.

2.2.6 The owner or manager of this site has not provided other documentation relating to the trees. Apart from post-site research and comparisons of similar sites, our observations are the only details analysed.

2.3 METHODOLOGY

2.3.1 The inspection was primarily conducted using ground-based collection of data to identify visible signs of tree health, structure and potential hazards. Collection data methods may include the use of a mallet for sound testing, the use of a trowel to test for soil compaction, and the use of a screwdriver to probe cavities for pathogens, pests and disease. The assessments do not involve laboratory analysis. Methods may include the following:

Visual Tree Assessment (VTA) (Mattheck and Breloer 1994), a method for assessing biological and lower-level mechanical functions and signs of decay, damage or defects (Appendix A).

Tree AZ Categories (Barrell 2010) classifies the importance of trees on development sites (Appendix B).

- **Category A** – suitable for retention.
- **Category Z** – not worthy of constraint.

Tree Useful Life Expectancy (TULE) (Barrell 2014) determines the time a tree can be expected to be usefully retained in normal circumstances (Appendix C).

- **Long** > 40 years.
- **Medium** 15 – 40 years.
- **Short** 5 – 15 years.
- **No retention potential** 0 – 5 years.

Landscape Significance Rating (Morton 1996), (Appendix D).

- **Significant** – based on heritage or ecological value.
- **Very High** – based on adjacent area surrounding the site.
- **High** – neighbourhood status but may have some conditions or health issues.
- **Moderate** – good and worthy of preservation, may have minor health issues.
- **Low** – worthy of preservation, may have major conditions or health issues.
- **Very Low** – retain if possible.
- I**nsignificant** – exempt from retention.

Retention Value Rating (Morton 2011), determined by considering both TULE and the Landscape Significance (Appendix E).

- **High** retention value trees are a priority for retention.
- **Medium** retention value trees are retained where possible.
- **Low** retention value trees are generally not a constraint to development.
- **Very Low** retention value trees may have potential hazards.

Planting Specifications from NATSPEC (Clark 2003) and Australian Standard® AS 2303-2018 – Tree Stock for Landscape Use (Appendix F).

2.3.2 **Tree Contractors** must have a minimum AQF Level 3 Certificate in Arboriculture and work in accordance with Australian Standard® AS 4373-2007 – Pruning of Amenity Trees, the Work Health & Safety (WHS) Act 2011 and the WHS Regulations 2017, the SafeWork NSW – Guide to Managing Risks of Tree Trimming and Removal Work 2016, and the Code of Practice for The Amenity Tree Industry 1998. Work near powerlines should be carried out in accordance with the Code of Practice for Work Near Overhead Power Lines.

3. RESULTS

3.1 THE SITE

3.1.1 The site is 28-30 Forrest Road, East Hills NSW 2213.

3.1.2 This landscape is relatively flat, and the soils[1] are classified generally as sandy loam.

Figure 1: *Aerial site map of 28-30 Forrest Road, East Hills NSW 2213 (Nearmap 2023). The site perimeter is outlined in yellow.*

[1] *Espade.environment.nsw.gov.au*

3.2 LEGISLATION AND SIGNIFICANCE IN THE ENVIRONMENT

Trees are subject to the following commonwealth and State Legislation:

3.2.1 NSW and Commonwealth Legislation regulates the **Biosecurity Act 2015** (diseases and pests) and the **Environmental Protection & Biodiversity Conservation Act 1999 (EPBC Act)**, which manages nationally endangered ecological communities (EEC) and national heritage items. The EPBC Act delegates to the **NSW Biodiversity Conservation Act 2016 (BC Act)**[2] and allows state and local authorities to manage ecological and heritage matters of significance. The BC Act repealed (but still has some transitional arrangements) the NSW Threatened Species Conservation Act 1995. The BC Act may require a Species Impact Statement and Biodiversity Banking and Offset Scheme agreements determined by the Biodiversity Assessment Method (BAM).

3.2.2 NSW State Legislation[3] is regulated under the **NSW Environmental Planning and Assessment Act 1979 (EP&A Act),** which manages significant development and infrastructure in NSW. The EP&A Act utilises **Environmental Planning Instruments (EPI)**[3]. These instruments include **State Environment Planning Policies (SEPP)** that deal with matters of state or regional environmental planning significance and **Local Environmental Plans (LEP)** that provide local councils a framework for land usage. **SEPP (Vegetation in Non-Rural Areas) 2017** applies to this local government area (LGA) and prohibits clearing vegetation without council consent.

3.2.3 NSW **Rural Fire Act 1997**[4] regulates a **10/50 Vegetation Clearing Code**, which may allow a designated area to clear trees within 10 metres of a home and clear underlying vegetation such as shrubs (but not trees), within 50 metres of a home to reduce risk from bushfires. The 10/50 Vegetation Clearing Code does not apply to this site.

3.2.4 An analysis of state and local legislation, development controls and planning instruments concludes the following:

- **Tree management measures**[5] are regulated by Bankstown DCP 2015 and Bankstown LEP 2015.
- **Acid Sulfate Soils:** Class 5.
- **Land Zoning:** R2: Low Density Residential.
- **Local Aboriginal Land Council:** Gandangara.

[2] *https:// https://www.environment.nsw.gov.au*
[3] *https://www.planningportal.nsw.gov.au/*
[4] *https://www.rfs.nsw.gov.au/*
[5] *https://www.cbcity.nsw.gov.au/*

3.3 LOCAL PLANNING AND ZONING CONTROLS

Site Address: 28-30 Forrest Road, East Hills NSW 2213.

Figure 2: *Acid Sulfate Soils.*
Class 5 (yellow).

Figure 3: *Land Zoning.*
R2: Low Density Residential (red).

3.4 TREE SCHEDULE

Table 3: *Tree Schedule – Health and Structural Condition of Trees.*
(*DBH – Diameter Breast Height, *DRC – Diameter Root Collar, *TPZ – Tree Protection Zone, *SRZ – Structural Root Zone, *TULE – Tree Useful Life Expectancy).

Tree No.	Location	Botanical Name Common Name	Crown (m)	Height (m)	DBH* DRC* (cm)	TPZ* SRZ* (m)	Visual Tree Assessment (VTA) – Tree Health & Condition	TULE* A-Z	Retention Value	Intended Works
1	Street tree in front of 28 Forrest Road.	*Glochidion ferdinandi* Cheese Tree	8	8	46 55	5.5 2.6	Semi-mature, good condition, with a lean to the south.	3a A1	Moderate	**Retain** and **protect.**
2	28 Forrest Road, eastern corner.	*Angophora bakeri* Narrow-Leaved Apple	10	12	40/40 50	6.8 2.5	Semi-mature, good condition, with multiple stems inclusion cavity at base.	3a Z10	Moderate	**Remove** and **replenish.**
3	30 Forrest Road, front yard.	*Lagerstroemia indica* Crepe Myrtle	4	4	10 (x 10) 30	3.8 2.0	Semi-mature, moderate condition, heavily pruned, with a cavity at the base of the tree.	3a Z5	Low	**Remove** (Exempt, under 5m height).

3.5 OBSERVATIONS

Plate 1: *Tree 1, Glochidion ferdinandi (Cheese Tree).*

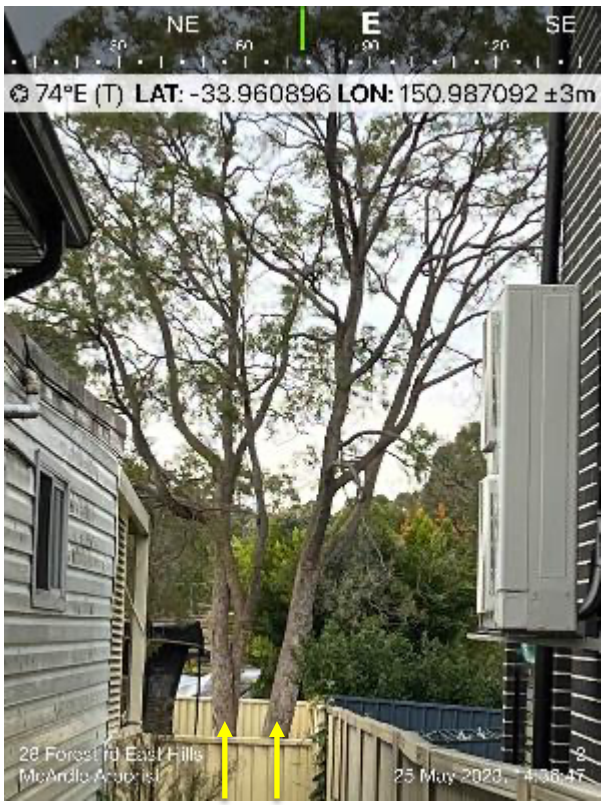


Plate 2: *Tree 2, Angophora bakeri* (Narrow-Leaved Apple).

Plate 3: *Tree 3, Lagerstroemia indica (Crepe Myrtle).*

4. DISCUSSION

4.0.1 Three (3) trees on site and in the adjacent surrounding were assessed by the AQF level 5 certified and licensed arborist.

4.0.2 One (1) tree numbered 1 is proposed for **retention** and two (2) trees numbered 2 and 3 are proposed for **removal** to support the proposed works.

4.1 SIGNIFICANCE IN THE LANDSCAPE AND USEFUL LIFE EXPECTANCY

4.1.1 Trees 1 and 2 have **short** useful life expectancy ratings (3a) and estimated life durations of 5 to 15 years. As the trees are native plant species of the Sydney region and have **medium** live crown sizes exceeding 40m^2, the trees are considered to have **moderate** value in the landscape.

4.1.2 Tree 3 has a **short** useful life expectancy rating (3a) and an estimated life duration of 5 to 15 years. As the tree is an exotic plant species and has a small live crown size less than 40m^2, the tree is considered to have **low** value in the landscape.

4.2 RETENTION VALUES

4.2.1 Retention values are determined by considering both TULE and Significance in The Landscape (Appendix E). The retention values of the assessed trees are as follows:

Table 4: *Retention Values.*

Retention Values				
High (0 trees)	Moderate (2 trees)	Low-Moderate (0 trees)	Low (1 tree)	Very Low (0 trees)
-	1, 2.	-	3.	-

4.2.2 The trees of **moderate** retention value are numbered 1 and 2. These trees are desirable for retention and should be retained if possible.

4.2.3 Tree 3 has **low** retention value, as it does not have special ecological or amenity value and it is not considered to be worthy of preservation.

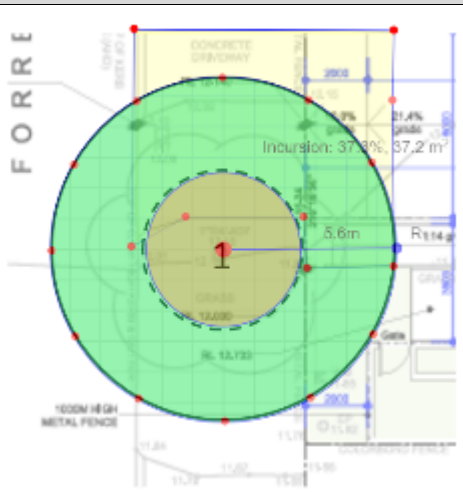
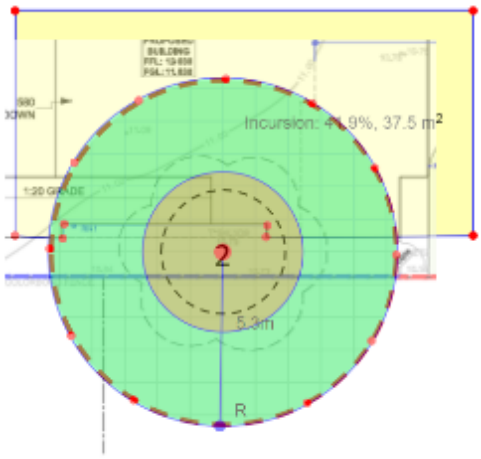
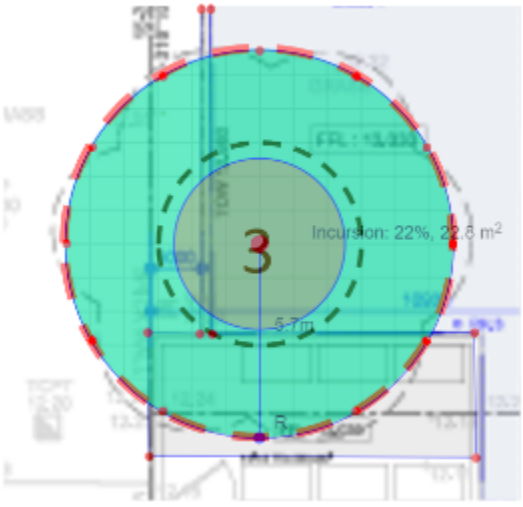
4.3 IMPACT ASSESSMENT

4.3.1 The assessment evaluates how the proposed development will impact the Tree Protection Zones (TPZ) and canopies of the assessed trees. The impacts are classified as minor or major TPZ encroachments.

Table 5: *TPZ Encroachments.*

Tree No.	*Botanical Name* (Common Name)	TPZ Encroachment	Category
1	*Glochidion ferdinandi* (Cheese Tree)	37.3%	**Major** (more than 10%)
2	*Angophora bakeri* (Narrow-Leaved Apple)	41.9%	**Major** (more than 10%)
3	*Lagerstroemia indica* (Crepe Myrtle)	22.0%	**Major** (more than 10%))

Table 6: *Major TPZ Encroachments. Encroachments are highlighted in red.*

Major TPZ Encroachments	
Tree 1, *Glochidion ferdinandi* (Cheese Tree) **Retention Value:** Moderate **TPZ Encroachment:** 37.3% **Likely Impacts:** • Access path within TPZ. • Driveway and crossover within SRZ and TPZ. **Recommendations:** Retain and protect with mulch and tree trunk protection. Root mapping is to be conducted **by an AQF Level 5 arborist prior to development**. Excavations for the driveway basement ramp are to be completed under AQF Level 5 arborist supervision using non-destructive digging (NDD) methods. Pier and beam footings are required for the access path within Tree 1's TPZ. Pier holes are to be excavated under AQF Level 5 arborist supervision using NDD methods.	
Tree 2, *Angophora bakeri* (Narrow-Leaved Apple) **Retention Value:** Moderate **TPZ Encroachment:** 41.9% **Likely Impacts:** • Basement within SRZ and TPZ. • Childcare centre within SRZ and TPZ. **Recommendations:** Remove due to major anticipated impacts from encroachments of greater than 10% within the tree's TPZ. The removal of this tree is necessary to accommodate the proposed works.	
Tree 3, *Lagerstroemia indica* (Crepe Myrtle) **Retention Value:** Low **TPZ Encroachment:** 22.0% **Likely Impacts:** • Retaining wall within SRZ and TPZ. • Bin area of proposed building within TPZ. **Recommendations:** Remove due to major anticipated impacts from encroachments of greater than 10% within the tree's TPZ. The removal of this tree is necessary to accommodate the proposed works. Tree 3 is exempt from preservation.	

5. RECOMMENDATIONS

5.1 TREE WORKS

Table 7: *Tree Works.*

Tree Works	
Retain (1 tree)	Remove (2 trees)
1.	2, 3.

5.1.1 **Retain** one (1) tree numbered 1, which will have major anticipated impacts from encroachments of greater than 10% within its TPZ. This is a Council street tree that should be considered for retention. Tree-sensitive construction measures and a root mapping investigation are required to minimise these impacts.

5.1.2 **Remove** two (2) trees numbered 2 and 3, which will have major anticipated impacts from encroachments within their SRZs and/or from encroachments of greater than 10% within their TPZs. The removal of these trees is necessary to accommodate the proposed works. One (1) tree numbered 3 is exempt from preservation under Bankstown DCP 2015, as it is under the defined 5 metre height of a tree.

5.1.3 **Suitably Qualified Arborist:** Most councils require written consent prior to tree pruning or removal. Tree contractors must have a minimum AQF Level 3 Certificate in Arboriculture and work in accordance with Australian Standard® AS 4373-2007 – Pruning of Amenity Trees, the Work Health & Safety (WHS) Act 2011 and the WHS Regulations 2017, the SafeWork NSW – Guide to Managing Risks of Tree Trimming and Removal Work 2016, and the Code of Practice for The Amenity Tree Industry 1998. Work near powerlines should be carried out in accordance with the Code of Practice for Work Near Overhead Power Lines. Tree contractors shall be members of Tree Contractors Association Australia (TCAA) or Arborists Australia (AA) and hold Workers Compensation and Public Liability Insurance. Tree contractors must liaise with the consulting arborist to ensure that tree pruning and removal works are completed according to specification.

5.1.4 **Canopy Cover Loss:** Replenish tree removals with new tree plants within the site to compensate for loss of amenity in accordance with council requirements. To compensate for the reduced canopy cover, planting of indigenous trees which are appropriate to the local environment and provide koala habitat should be considered using the canopy cover formula $((½ \times \text{canopy diameter})^2 \times \pi)$ as follows:

Table 8: *Canopy Loss.*

Tree No.	Canopy Diameter (m)	Canopy Loss (m^2)	Total Canopy Loss	New Planting
2	10	78.54	91.11m^2	Plant one (1) tree with a canopy diameter at maturity of 10-11 metres.
3	4	12.57		

5.1.5 **Replenishment Planting:** One (1) 45L potted volume replenishment tree is required. In accordance with Council requirements, new tree plantings should be a native species or from a vegetation community present on site to compensate for loss of amenity. Replenishment is to be completed in accordance with planting specifications from NATSPEC (Clark 2003) and Australian Standard® AS 2303-2018 – Tree Stock for Landscape Use (Appendix F).

5.1.6 **Mulch:** Maintain aged *Eucalyptus spp.* mulch around all the retained and replenished trees in accordance with Australian Standard® AS 4454-2003 – Compost, Soil Conditioners and Mulches.

5.1.7 **Watering Schedule:** Maintain a watering schedule for the replenished tree. A 45L potted volume requires approximately 35L of water daily (Trees Impact: 2021).

5.2 TREE PROTECTION MEASURES

5.2.1 Minor TPZ encroachments must be compensated for elsewhere and be contiguous with the TPZs of the assessed trees. All measures must be certified by an AQF Level 5 arborist in accordance with Council requirements and Australian Standard® AS 4970-2009 – Protection of Trees on Development Sites.

Table 9: *Tree Management Plan.*

Tree Management Measures	Tree No.
Mulch Ground Cover Protection	1.
Tree Trunk Protection	1.
Tree-Sensitive Construction Measures	1.
Root Mapping Investigations	1.

5.2.2 **Mulch ground cover protection** is required over the TPZs (where viable) of one (1) tree numbered 1 to minimise soil compaction and root damage. This is to consist of 75mm depth layers of clean and certified *Eucalyptus spp.* mulch.

5.2.3 **Tree trunk protection** is required around the stems of one (1) tree numbered 1, as tree protection fencing would be unpractical and block access to the work site. This is to consist of hessian, padding or geotextile fabric wrapped around the trees' trunk, with 1.8 metre lengths of timber spaced at small intervals and strapped over the top of the padding, not nailed or screwed into the trees.

5.3 TREE-SENSITIVE CONSTRUCTION MEASURES

5.3.1 **Tree-sensitive construction measures** are required to minimise major anticipated impacts to one (1) tree numbered 1.

5.3.2 Excavations for the driveway basement ramp within Tree 1's SRZ and TPZ are to be completed under AQF Level 5 arborist supervision using **non-destructive digging (NDD) methods** (e.g. shovel and pickaxe, hydro vacuum, air spade).

5.3.3 **Pier and beam** footings are required for the access path within Tree 1's TPZ. Pier holes are to be excavated under AQF Level 5 arborist supervision using **NDD methods**.

5.4 FURTHER INVESTIGATION

5.4.1 **Root mapping investigations** are to be conducted by an AQF Level 5 arborist prior to construction to locate roots of one (1) tree numbered 1 that may be situated within the footprint of the proposed development.

5.5 SITE MONITORING

5.5.1 An AQF Level 5 arborist must monitor trees throughout the construction process. The site manager should notify the project arborist prior to works within the TPZs of the retained trees.

Table 10: *Project Arborist Inspections.*

SITE INSPECTIONS DURING CONSTRUCTION			
Stage	General Schedule of Work	Person Responsible	Certification by Project Arborist
Pre-Construction	Root mapping investigations to locate roots within footprint of development.	Project Arborist	Root Mapping Report
	Prior to demolition, earthworks or site clearing, clearly mark trees for removal (spray paint on trunks).	Competent Person	n/a
	Tree Protection Systems (for retained trees) must be installed prior to demolition, include mulching in TPZ.	Competent Person	Pre-Construction Tree Protection Certificate
Construction	Scheduled inspection of trees during construction-usually monthly.	Project Arborist	Inspection and Certification
	Supervise and protect any excavations within the TPZ of retained trees.	Project Arborist	Supervision and Certification
Post-Construction	Final inspection after construction and prior to the removal of protection measures.	Project Arborist	Final Tree Protection Certificate

6. HOLDING POINTS

6.1 Tree protection measures are to be installed around the retained trees and certified by the project arborist prior to any demolition, development, or soil stripping. The protected area is an exclusion zone. Protection measures should not be removed or altered unless agreed by the supervising arborist. Ground protection should support all anticipated loading and prevent compaction in the TPZ.

6.2 All works carried out within the TPZs of the retained trees must be supervised by an AQF Level 5 arborist. Activities prohibited in TPZs are listed in 8. Tree Management Specifications.

6.3 Root mapping investigations are to be conducted by an AQF Level 5 arborist prior to construction to locate roots of one (1) tree numbered 1 that may be situated within the footprint of the proposed development.

6.4 Tree pruning and removal works are to be completed by qualified AQF Level 3 arborists in accordance with Australian Standard® AS 4373-2007 – Pruning of Amenity Trees and SafeWork NSW – Guide to Managing Risks of Tree Trimming and Removal Works. Tree contractors shall be members of Tree Contractors Association Australia (TCAA) or Arborists Australia (AA) and hold Workers Compensation and Public Liability Insurance. Tree contractors must liaise with the consulting arborist to ensure that pruning and removal works are completed in accordance with specification.

6.5 One (1) 45L potted volume replenishment tree is to be planted in a suitable location at least 3-5 metres away from buildings and away from power lines, hard-surface infrastructure and underground services. The replenishment tree is to be certified by an AQF Level 5 arborist and planted in accordance with Australian Standard® AS 2303-2018 – Tree Stock for Landscape Use.

6.6 Inspections monthly or every second month are to be carried out by an AQF Level 5 arborist to ensure the retained trees are preserved in viable condition, and to certify that tree protection measures are compliant and being maintained around the trees.

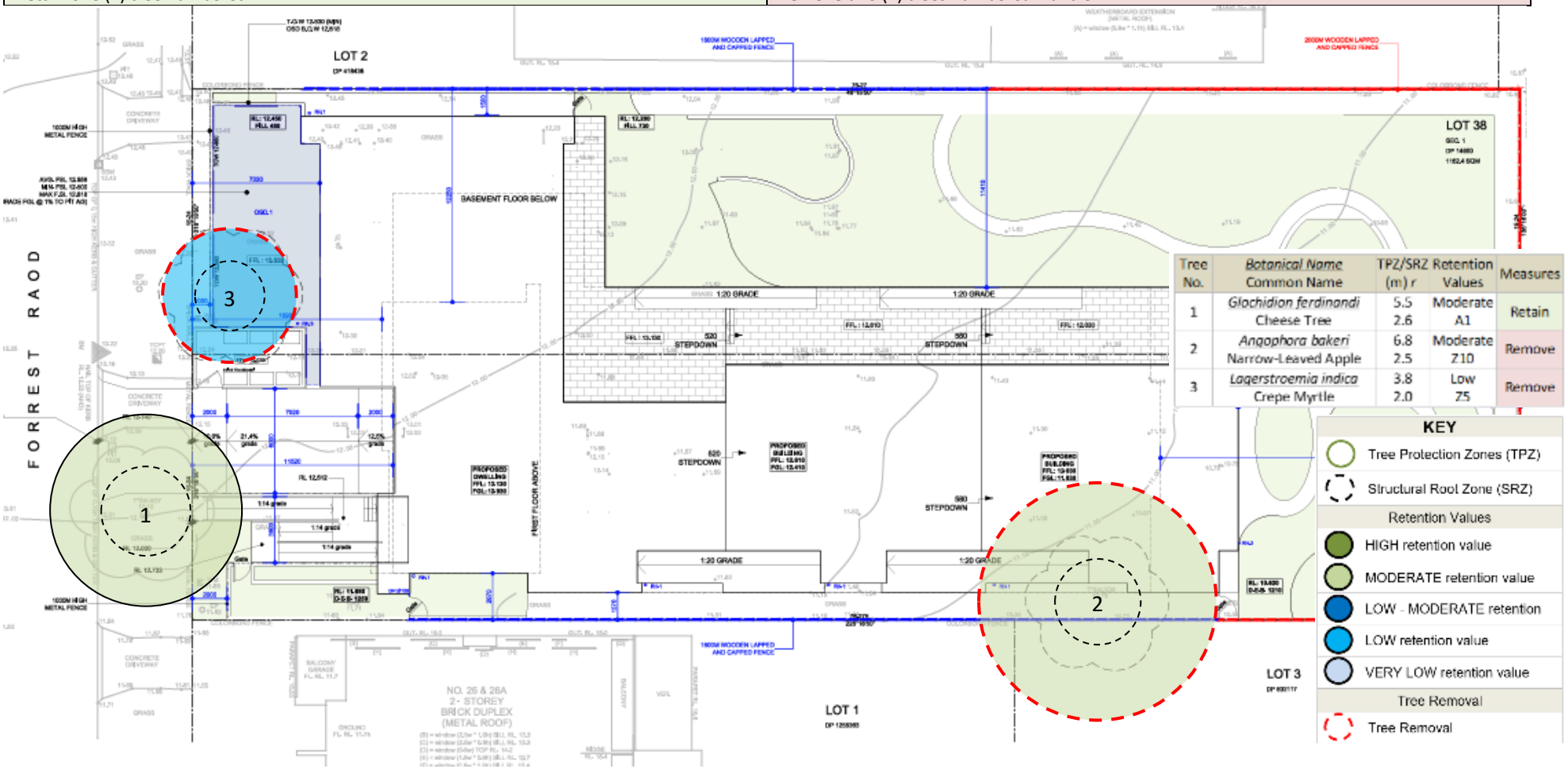
6.7 Hoarding, waste and amenities (HWA) should be stored outside the TPZs of the retained trees.

6.8 If any of the retained trees are damaged during the proposed development, then a remedial plan must be prepared by an AQF Level 5 arborist for each damaged tree.

7. MAPS

MAP A TREE RETENTION AND REMOVAL PLAN

Retain one (1) tree numbered 1.	**Remove** two (2) trees numbered 2 and 3.

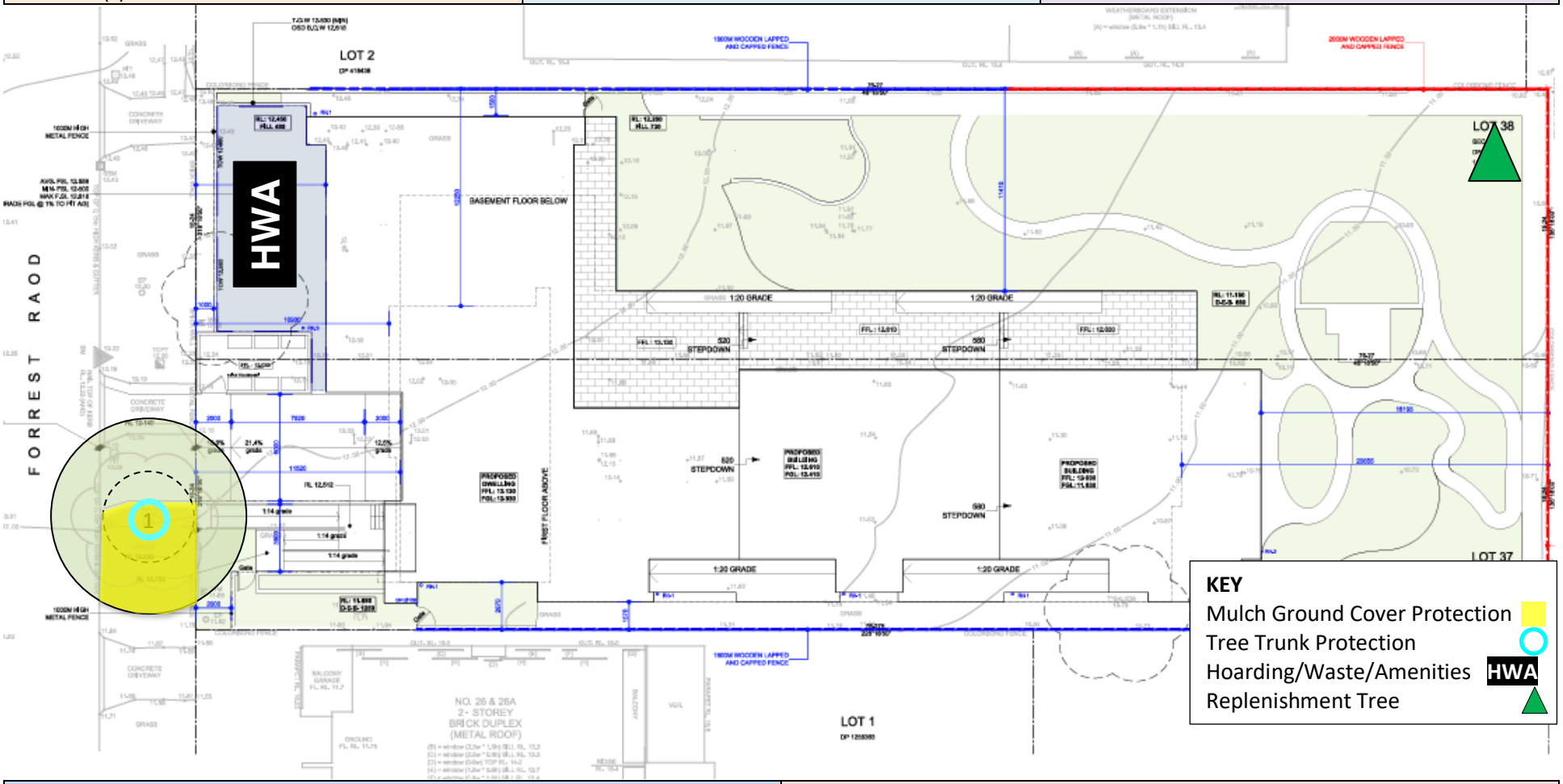


Tree No.	Botanical Name / Common Name	TPZ/SRZ (m) r	Retention Values	Measures
1	*Glochidion ferdinandi* Cheese Tree	5.5 2.6	Moderate A1	Retain
2	*Angophora bakeri* Narrow-Leaved Apple	6.8 2.5	Moderate Z10	Remove
3	*Lagerstroemia indica* Crepe Myrtle	3.8 2.0	Low Z5	Remove

Site Plan (Revision D)	Dawson Vu Pty Ltd	28-30 Forrest Road, East Hills NSW 2213	**Scale on Plan:** 1:200	**Date on Plan:** 28/08/2024

MAP B TREE PROTECTION PLAN

Place **mulch ground cover protection** (where viable) over the TPZ of one (1) tree numbered 1.	Install **tree trunk protection** around the stem of one (1) tree numbered 1.	**AQF Level 5 arborist supervision** is required for all works carried out within the tree's TPZ.

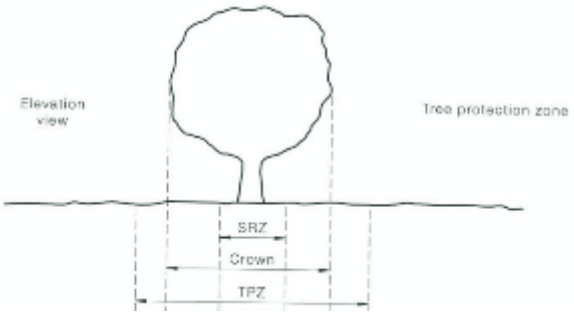


Tree-sensitive construction measures are required to minimise impacts to one (1) tree numbered 1. • Excavations for the driveway basement ramp are to be completed under AQF Level 5 arborist supervision using **non-destructive digging (NDD) methods**. • **Pier and beam footings** are required for the access path within Tree 1's TPZ. Pier holes are to be excavated under AQF Level 5 arborist supervision using **NDD methods**.	**Root mapping investigations** are to be conducted by an AQF Level 5 arborist prior to construction to locate roots of one (1) tree numbered 1 that may be situated within the footprint of the proposed development.

Site Plan (Revision D)	Dawson Vu Pty Ltd	28-30 Forrest Road, East Hills NSW 2213	**Scale on Plan:** 1:200	**Date on Plan:** 28/08/2024

8. TREE MANAGEMENT SPECIFICATIONS

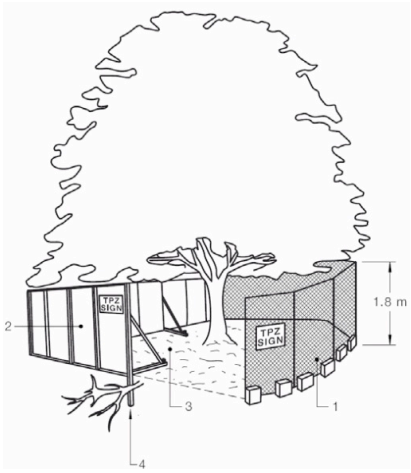
Tree Protection Zone (TPZ) Specifications



Tree protection fencing ensures construction does not encroach into a tree's TPZ. The Structural Root Zone (SRZ) of a tree is the area essential for tree stability. Works conducted within the SRZ may destabilise the tree and lead to potential failure.

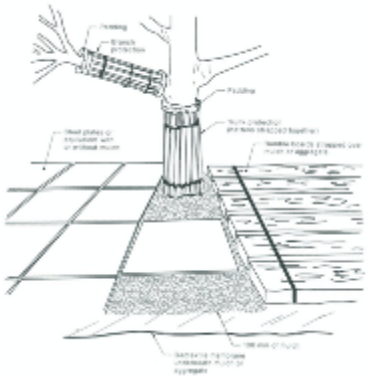
Tree Protection Fencing: Fencing must not be removed or altered. Specifications for tree protection fencing must be as follows:

- Installed prior to development and certified by a project arborist.
- Fully enclosed around a tree's TPZ.
- 1.8-metre-high temporary chain wire mesh cyclone fencing.
- Signposted with 300mm x 450mm signage that reads "No Entry. Tree Protection Zone".
- Add mulch across the surface of the TPZ and water regularly.



Specifications for tree protection fencing on slopes or uneven ground must be as follows:

- Star pickets spaced at 2 metre intervals with a minimum height of 1 metre.
- Connected by a continuous high-visibility barrier or hazard mesh.
- Alternative plywood or wooden paling fence panels.



Tree Trunk and Branch Protection: Specifications for tree trunk protection when fencing is impractical must be as follows:

- A layer of padding, geotextile fabric or similar wrapped around the trunk to a minimum height of 2 metres.
- 1.8 metre lengths of timbers aligned vertically and spaced at small gaps evenly around the trunk.
- Boards are to be strapped to trees, not nailed or screwed to the tree.

Prohibitions for Tree Protection Zones: The following activities shall **not** be carried out within any TPZ:

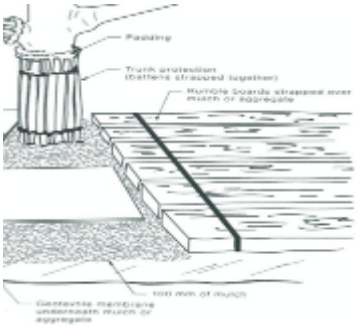
- Disposal of chemicals and liquids (including concrete and mortar slurry, solvents, paint, fuel or oil).
- Stockpiling, storage or mixing of materials.
- Refuelling, parking, storing, washing and repairing tools, equipment, machinery and vehicles.
- Disposal of building materials and waste.

The following activities shall **not** be carried out within any TPZ **unless** under the supervision of a project arborist:

- Increasing or decreasing soil levels (including cut and fill).
- Soil cultivation, excavation or trenching.
- Placing offices or sheds.
- Assembly of scaffolding or hoardings; and/or another act that may adversely affect the tree.

Root Protection Specifications: If temporary access for machinery is required within the TPZ, ground protection measures will be required to prevent root damage and soil compaction. Specifications for ground protection are as follows:

- Permeable membrane such as geotextile fabric.
- Layer of mulch or crushed rock (at minimum depth of 100mm).
- Or rumble boards strapped over mulch or aggregate.



CORRECT MULCH METHOD

Mulch Within TPZ: Maintain aged *Eucalyptus spp.* mulch around the retained trees for the duration of the development in accordance with Australian Standard® AS 4454-2003 – Compost, Soil Conditioners and Mulches.
Mulch should have at least 70% by mass of its particles, with a maximum size of greater than 16mm and spread 50-75mm deep to the extent of the dripline, (never exceed 100mm depth). Mulch should not have contact with a tree's trunk. Apply 200mm from the trunk, shaping a soil berm dish close to the root ball to facilitate establishment of watering.

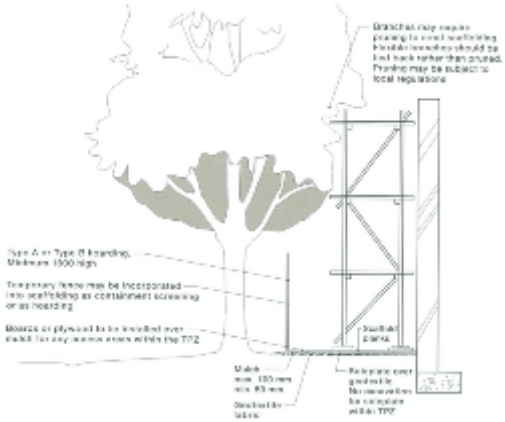
Watering Schedule: Maintain a watering schedule for retained trees at a rate of approximately 45 litres daily (Trees Impact: 2021).

Excavation Within TPZ's: Excavations shall be undertaken under the supervision of a project arborist, using tree-sensitive, non-destructive methods (e.g. manual excavation with hand tools, air-spade or hydro-vacuum machinery).

- No roots greater than 40mm in diameter are to be damaged, pruned or removed. All care shall be taken to preserve and avoid damaging roots. Excavations should not occur within a tree's SRZ.
- Exposed roots shall be protected from direct sunlight by covering with hessian or similar fabric and kept moist at all times.
- Hand excavation and root mapping shall be undertaken along excavation lines within the TPZ. Any conflicting roots greater than 40mm in diameter shall be pruned using clean, sharp secateurs or a pruning saw to ensure a clean cut that is free from tears.

Installing Underground Services Within TPZ: All services should be routed outside the TPZ.

- If underground services must be routed within the TPZ, they should be installed by directional drilling or in manually excavated trenches.
- The directional drilling boring methods, such as horizontal drilling (HDD) may be at least 600mm deep. The project arborist should assess the likely impacts of boring and bore pits on retained trees.
- Excavations for entry/exit pits must be located outside the TPZ.



9. GLOSSARY

Aerial inspection: Where a tree is climbed by an arborist to inspect the upper stem and crown for signs or symptoms of defects and disease.
Assets Protection Zone (APZ): A fuel-reduced area surrounding a built asset or structure.
Bracket fungus: The rigid fruiting body of some fungus species.
Branch collar: The ring of wood tissue, which forms around the base of a branch (near the branch attachment).
Cavity: A void, initiated by a wound within the trunk, branches or roots. These voids are referred to as hollows.
Canker: Fungal infections of the bark and cambium that can occur on all parts of the tree.
Co-dominant: Stems or branches equal in size and relative importance.
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 lifting: The removal of the lower branches of the tree.
Dead wood: Refers to any whole limb that no longer contains living tissues
Decay: Process of degradation of woody tissues by fungi or bacteria through decomposition of cellulose and lignin.
Deciduous: Describes trees and bushes that shed their leaves in the autumn (opposite to evergreen).
Dieback: Tree deterioration where the branches and leaves die.
Drip line: Where the canopy releases water shed from the foliage during precipitation.
DBH: Diameter at breast height, about 1.4 metres of trunk height.
Epicormic Shoots: These shoots often have a weak point of attachment. Epicormic growth/shoots are generally a survival mechanism, often indicating the presence of a current, or past stress event such as fire, pruning, drought, etc.
Flush cut: A cut that damages or removes the branch collar or removes the branch and stem tissue and is inconsistent with the branch attachment as indicated by the bark branch ridge.
Genus/species: Identified using its botanical name. Where the species name is not known, species (spp.) is used. The common name for trees may vary considerably in each area by geographical differences.
Height: Height has been estimated to +/- 2 metres.
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.
Maturity: Tree age, assessed as over-mature (last 1/3 of life expectancy), mature (1/3 to 2/3 life expectancy) and semi-mature (less than 1/3 life expectancy).
Remedial (restorative) pruning: The removal of damaged or dead wood; or the trimming of diseased or infested branches. Trimming branches back to undamaged tissue in order to induce shoots, from which a new crown will be established.
Resistograph® testing: A resistograph® is a specialised machine that measures timber density by a drilling a 3mm diameter probe through the wood, simultaneously plotting the results on a graph at full scale.
Structural integrity: Describes the internal supporting timber (substantial to frail).
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.
Targets: Are people, property, or activities that could be injured, damaged, or disrupted by a tree.
Tree Protection Zone (TPZ): Refers to the radius 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 centre of the tree trunk where protective fencing is to be installed to create an exclusion zone associated with construction works.
Vigour: 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.
Windthrow: Tree failure when a force exerted by wind against the foliage crown and trunk overcomes resistance to that force in the root plate.

10. BIBLIOGRAPHY

Standards Australia, 2009, AS 4970 – Protection of trees on development sites, Standards Australia, Sydney.
Standards Australia, 2007, AS 4373 - Pruning of Amenity Trees, Standards Australia, Sydney.
Barrell, J, 2012, Balancing Tree Benefits Against Tree Security: The duty holder's dilemma, Arboricultural journal. The International Journal of Urban Forestry, 34:1,29-44.
Barrell, J. 1993-95, 'Pre-planning Tree Surveys: Safe Useful Life Expectancy (SULE) is the Natural Progression' Arboricultural Journal V.
Crossing H & McArdle J (2022) Issues With Trees in Dam Walls Arbor Age 2022
Crossing H & McArdle J (2022) Lightning Strike, Arbor Age Oct-Nov 2021 Australia.
CSIRO Boland et al Forest Trees of Australia; Nelson University Press. Australia: 1984.
McArdle J King M & Crossing H (2023) Eco Arborist, Arbor Age, February March 2023 Australia
McArdle, D & J (2014 ed. 2022) TCAA Tree Management Guidelines, Best Industry Practice, Australia.
McArdle J (2022) Root Systems, Arbor Age Oct-Nov 2022 pg28-34 Australia.
McArdle J (2022) TCAA Training Day, Arbor Age Aug -Sep 2022 Australia.
Hadlington PW. and Johnston IA. 1983. Australian Trees. Australia: NSW University press.
Hadlington PW and Johnston IA. 1983 Australian Insects. Australia: NSW University press.
Harris, R, Clark, J, & Matheny, N 2004, Arboriculture - Integrated Management of Landscape Trees, Shrubs, and Vines, 4th Edition, Prentice Hall, New Jersey.
Hayes, E (2001) Evaluating Tree Defects, 2nd edition, safe trees, Rochester, MN.
King, M & McArdle, J (2022) Pre-DA Assessment Reporting, Arbor Age, June 2022 Australia.
Leake, S & Elke, H (2014) Soil for Landscape Development; Selection, Specification and Validation. CSIRO Victoria.
Lonsdale, D, 1999, Principles of Tree Hazard Assessment and Management, Forestry Commission, London.
Matheny, N.P and Clark, J.R, 1998, Trees and Development: A Technical Guide to Preservation of Trees during Land Development', International Society of Arboriculture, Savoy, Illinois.
Mattheck, C, 2007, Updated Field Guide for Visual Tree Assessment, Karlsruhe Research Centre:
Mattheck, C & Breloer, H 1994, The Body Language of Trees – a handbook for failure analysis.
Research for Amenity Trees No 4 Sixth impression – 2008, TSO (The Stationary Office), Norwich, UK.
Morton, A, 2011, Determining the retention value of trees on development site, Illinois, USA
E. Thomas Smiley, Nelda Matheny, and Sharon Lilly (2011) Tree Risk Assessment & Principles. ISA Printed USA.
Watson et al, (1996) Replacing Soil in The Root Zone of Mature Trees for Better Health, Journal Arboriculture.

WEBSITES

Bureau of Meteorology, Climate change trends and extremes, http://www.bom.gov.au/climate/change
E-Spade, Environment NSW Government, https://www.environment.nsw.gov.au/eSpade2WebApp
Near Maps, http://maps.au.nearmap.com
NSW legislation, https://www.legislation.nsw.gov.au/
Planning Portal, https://www.planningportal.nsw.gov.au/
Rural Bushfire Services, https://www.rfs.nsw.gov.au/plan-and-prepare
SafeWork Australia, http://www.safeworkaustralia.gov.au Tree Impact Group, 2019,
Watering Newly-planted Trees, viewed 2021. https://www.treesimpact.com.au/
Urban J (2014) Tree Planting Specification. https://www.jamesurban.net

APPENDICES

Appendix A Visual Tree Assessment (VTA)

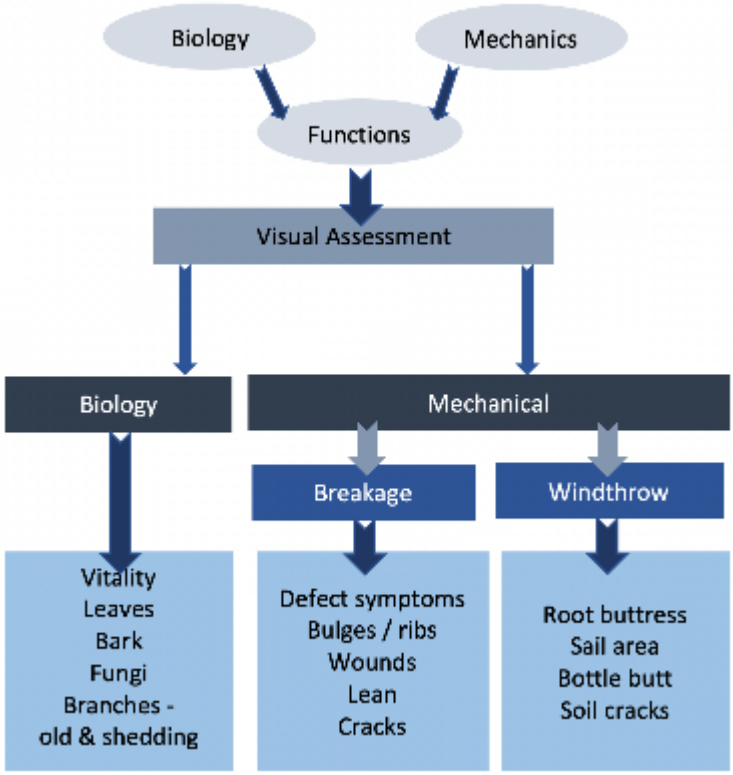


Diagram 1: *VTA Chart by Claus Mattheck (1994) The Body Language of Trees adapted*

Schedule 1: *Categories for VTA.*

Visual Tree Diagnostics			
1	Maturity: J - Juvenile; IM - Immature; SM - Semi-Mature; M - Mature		
Health & Vigour		**Condition of Tree**	
KEY		KEY	
		2	Good condition
		3	Good condition but poor development
		3b	Moderate condition
		3c	Poor condition
4	Dieback is more than 20%.		
4b	Epicormics		
5	Sparse foliage	5b	Unbalanced Canopy
		6	Physical Damage
7	Insect damage – foliage		
7b	Borers		
8	Fungal attack – pathogen		
		9	Cavity
10	Termite activity	10b	Inclusions
		11	Lean
12b	Dying	12	Heavily pruned
		13	Damaged roots
		13b	Encroachment
14	Parasitic vine present		
15	Damage from a climbing plant		
		16	Inclusions
17	Habitat tree		
18	Endangered species		

Appendix B Tree A-Z Categories

Schedule 2: *Tree A-Z Categories Field Sheet (version 10.04-U8C)*

Barrell (2019) Criteria for Assessing the Importance of Trees on Development Sites.

TreeAZ Categories Field Sheet (Version 10.04-USC)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

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 structural failure
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.

Appendix C Tree Useful Life Expectancy – (TULE)

Schedule 3: *Adapted with permission Jeremy Barrell (SULE) 2014 for TCAA consulting arborists.*

	1 LONG TULE	2 MEDIUM TULE	3 SHORT TULE	4 REMOVE	5 NO POTENTIAL FOR RETENTION	6 SMALL, YOUNG OR REGULARLY CLIPPED
	Trees that appear to be retainable for more than 40 years with a low level of risk.*	Trees that appear to be retainable for 15-40 years with a low to medium level of risk.*	Trees that appear to be retainable for 5-15 years with a medium to high level of risk.*	Trees that should be removed within the next 5 years with a high to very high level of risk.*	Trees that should be removed immediately with a very high to extreme level of risk.*	Trees than can be easily transplanted or replaced.
A	Structurally sound trees located in positions that can accommodate future growth.	Trees that may only live for between 15 and 40 more years.	Trees that may only live for between 5 and 15 more years.	Dead, dying or declining trees through disease or inhospitable conditions.	Dead, dying or declining trees diseased or inhospitable conditions.	Small trees less than 5 metres in height.
B	Trees that could be made suitable for retention in the long term by intervention works.	Trees that may live for more than 40 years, but would need to be removed for safety or nuisance reasons.	Trees that may live for more than 15 years, but would need to be removed for safety or nuisance reasons.	Dangerous trees through instability or recent loss of adjacent trees.	Dangerous trees through instability or recent loss of adjacent trees.	Young trees less than 15 years old but over 5 metres in height.
C	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.	Trees that may live for more than 40 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees that may live for more than 15 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form.	Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form.	Trees that have been regularly pruned to artificially control growth.
D		Trees that could be made suitable for retention in the medium term by intervention works.	Trees that require substantial intervention works and are only suitable for retention in the short term.	Damaged trees that are clearly not safe to retain.	Damaged trees that are clearly not safe to retain and must be removed immediately.	
E				Trees that may live for more than 5 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	High toxicity/allergen trees, asthmatic and poisonous trees that must be removed immediately.	
F				Trees that may cause damage to existing structures within 5 years.	OTHER, with legitimate explanation to be removed immediately.	
G				Trees that will become dangerous after removal of other trees for reasons given in 4A to 4F.		

INSPECTION FREQUENCY					
Every 1-5 years by a competent inspector, or event monitored.	Every 1-5 years by a competent inspector, or event monitored.	Every 1-3 years by a competent inspector, or event monitored.	Annually by a competent inspector, or event monitored.	Every 1-7 days by a competent inspector and event monitored.	Bi-annually by a competent inspector.

** For sites with higher occupation.*

Appendix D Landscape Significance Rating

Schedule 4: *Heritage, Ecological and Amenity Significance. Source: Morton, A (2006) Criteria for Assessment of Landscape Significance.*

RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state, or national level of significance or is listed on Council's Significant Tree Register.	The subject tree is scheduled as a Threatened Species as defined under the Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999.	The subject tree has a very large live crown size exceeding 300m^2 with normal to dense foliage cover, is in a visually prominent position in the landscape, exhibits very good form and habit typical of the species.
	The subject tree forms part of the curtilage of a Heritage Item (building/structure/artefact as defined under the LEP) and has a known or documented association with that item.	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter, or nesting tree for endangered or threatened fauna species.	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity.
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event.	The subject tree is a remnant tree, being a tree in existence prior to development of the area.	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc..) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m^2, a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area.
HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence.	The tree is a locally indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link/Wildlife Corridor or has known wildlife habitat value.	The subject tree has a large live crown size exceeding 100m^2; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% (normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area.
MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of this DCP.	The subject tree has a medium live crown size exceeding 40m^2; The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc.) with a crown density of more than 50% (thinning to normal); and The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.
LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item.	The subject tree is scheduled as exempt (not protected) under the provisions of this DCP due to its species, nuisance, or position relative to building or other structures.	The subject tree has a small live crown size of less than 40m^2 and can be replaced within the short term (5-10 years) with new tree planting.
VERY LOW	The subject tree is causing significant damage to a heritage Item.	The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).
INSIGNIFICANT	The tree is completely dead and has no visible habitat value.	The tree is a declared noxious weed under the Biosecurity Act 2015 (NSW) within the relevant Local Government Area.	The tree is completely dead and presents a potential hazard.

Appendix E Retention Value Rating

Schedule 5: *Determining the Tree Retention Value Morton, A (2011).*

Evaluating Sustainability and Landscape Significance to Determine Retention Value	
Retention Value	Criteria and Categories
HIGH	These trees are worthy of preservation. As such, careful consideration should be given to their retention as a priority. Proposed site design and placement of buildings and infrastructure should consider the Tree Protection Zones (TPZ), as discussed in the following section, to minimise any adverse impact. In addition to TPZs, the extent of the canopy (canopy dripline) should also be considered, particularly in relation to a high-rise development. Significant pruning of the trees to accommodate the building envelope or temporary scaffolding is generally not acceptable.
MODERATE	The retention of these trees is desirable. These trees should be retained as part of any proposed development, if possible; however, these trees are less critical for retention. If these trees must be removed, replacement planting should be considered in accordance with Council's Tree Replacement Policy to compensate for loss of amenity.
LOW	These trees are not considered to be worthy of any special measures to ensure their preservation, due to current health, condition, or suitability. They do not have any special ecological, heritage or amenity value, or these values are substantially diminished due to their SULE. These trees should not be considered as a constraint to the future development of the site.
VERY LOW	These trees are potentially hazardous or very poor specimens, or may be environmental or noxious weeds. The removal of these trees is therefore recommended regardless of the implications of any proposed development.

Appendix F Tree Planting Specifications

Tree planting specifications are in accordance with NATSPEC Specification for Trees, Ross Clark (2003) and Australian Standard® AS 2303-2018 – Tree Stock for Landscape Use.

BEFORE PLANTING

- Don't plant trees too close to buildings, in-ground pools, avoid planting under power lines and over drainage pipes or near other large trees.
- A consider the effect on neighbouring properties (i.e. shade, loss of views, impact on foundations, fences and services).
- Plant deciduous trees if you want in summer shade and winter sun. Consider shadows cast from evergreen trees.
- Use locally native to attract native fauna and to reduce watering required.

BASIC TREE PLANTING

1. Dig the hole at least twice as wide as the pot size.
2. Loosen the soil at the sides of the hole. Fill hole with water and allow to drain away.
3. Place the loosened root ball in the hole. Fill back soil. The top of the root ball should be level with the surrounding soil.
4. Water the plant deeply after planting, once a week for the first two months.

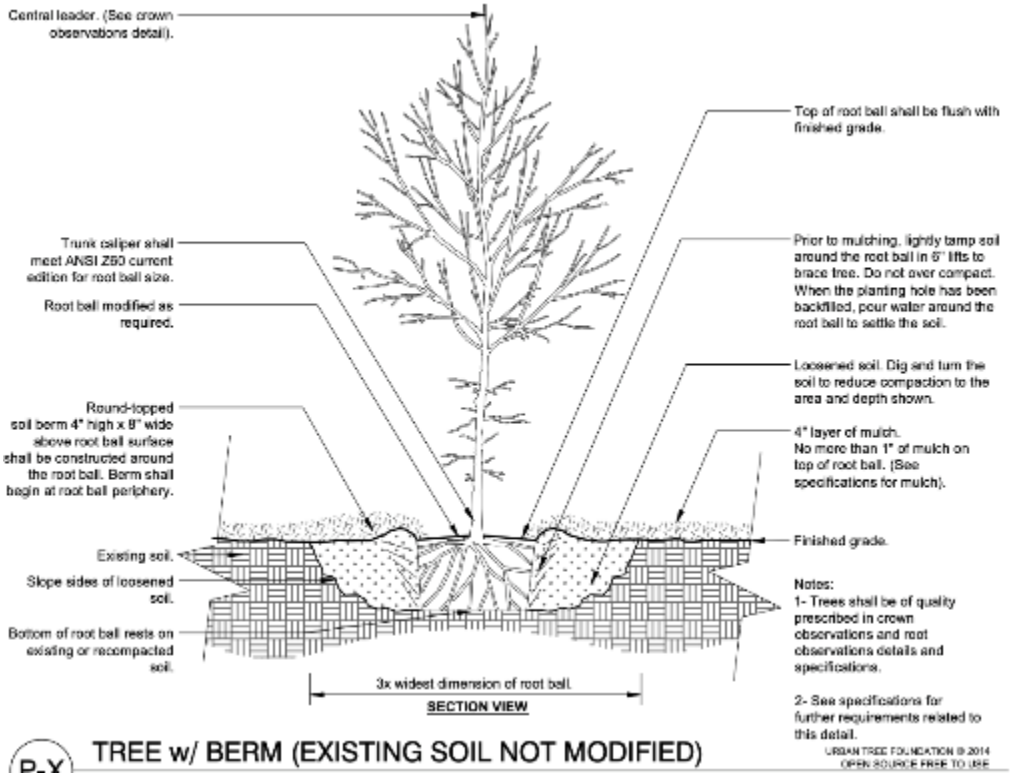


Diagram 2: *Urban J (2014) Tree Planting Specification diagram*

Schedule 6: *Watering Frequency Table.*

	Watering frequency for 45L pot		
Time of year	*1st month*	*2nd and 3rd month*	*4th to 6th month*
Sept-Feb.	4x week	3 x week	2 x week
Mar-May	3 x week	2 x week	1 x week
Jun-August	2 x week	1 x week	1x fortnight

Appendix G Replenishment of Native Trees Species

Schedule 7: *Tree Species and Sizes.*

Botanical Name	Common Name	Height (m) at maturity	Crown Spread (m)
Leptospermum petersonii	Lemon-Scented Tea Tree	5	6
Agonis flexuosa	Willow Myrtle	7	6
Elaeocarpus eumundi	Quandong	8	4
Corymbia ficifolia	Red Flowering Gum	8	5
Syzygium luehmannii	Riberry	8	5
Waterhousea floribunda	Weeping Lilly Pilly	8	5
Acacia implexa	Hickory Wattle	8	6
Hymenosporum flavum	Native Frangipani	8	6
Tristaniopsis laurina	Water Gum	9	5
Corymbia eximia	Yellow Bloodwood	10	7
Callistemon viminalis	Weeping Bottlebrush	10	8
Melaleuca linariifolia	Narrow-Leaved Paperbark	10	8
Cupaniopsis anacardioides	Tuckeroo	10	10
Callistemon salignus	Willow Bottlebrush	12	6
Eucalyptus cinerea	Argyle Apple	12	7
Elaeocarpus reticulatus	Blueberry Ash	15	8
Flindersia australis	Australian Teak	15	10
Brachychiton populneus	Kurrajong Tree	15	12
Backhousia citriodora	Lemon Myrtle	18	6
Angophora costata	Sydney Red Gum	20	10
Lophostemon confertus	Brush Box	20	16

MULCH: Adding a layer of mulch to reach 75mm, encourages water retention and microbes, that will break down and incorporate organic matter into the soil. Organic mulch will reduce weeds and root development.

- Add at least 70% by mass of its particles with a maximum size of greater than 16 mm in accordance with Australian Standard® AS 4454-2003 – Compost, Soil Conditioners and Mulches. Apply 200mm from trunk and shaping a soil berm dish close to the root ball to facilitate establishment of watering.
- The TPZ of retained trees should be maintained with a 75mm depth of organic, certified, coarse Eucalyptus mulch.
- Mulch should be retained at 5075mm depth and never exceed 100mm in depth.
- Do not allowed mulch to contact the tree trunk. Retain a mulch free gap of not less than 75mm and preferably 200mm clear from the base of the tree trunk.

Disclaimer

McArdle Arboricultural Consultancy Pty Ltd does not assume responsibility for liability associated with the tree on/or adjacent to this project site, the future demise and/or any damage which may result therefrom. They take care to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others.

McArdle Arboricultural Consultancy Pty Ltd cannot be held responsible for any consequences as result of work carried out outside specifications, not in compliance with Australian Standard® or by inappropriately qualified staff. If further investigations such as, aerial, drill and root test are recommended, the report shall not be considered final until all investigations have been completed, as further defects may be found.

STATEMENT OF LIMITATIONS

McArdle Arboricultural Consultancy Pty Ltd makes every effort to accurately identify current tree health and hazards. Results may or may not correlate to actual tree structural integrity. There are many factors that may contribute to limb or total tree failure. Not all these symptoms are visible. There can be hidden defects that may result in a failure even though it would seem that other, more obvious defects would be the likely cause of failure. All standing trees have an element of unpredictable risk.

The inspection was limited to a visual ground examination of the tree, without aerial inspections and below ground excavations. The assessments are limited and do not include specialised analysis. No internal diagnostics, aerial inspection and pathology test were conducted. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale.

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