



**HEARTWOOD TREE
CONSULTING**

Arboricultural Impact Assessment Report

25 Aranda Drive Davidson

Version 1

Prepared For:

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Date:

2nd April 2025



Heartwood Tree Consulting

Document Control

Document Title:	25 Aranda Drive AIA
Report type:	Arboricultural Impact Assessment Report
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Version:	1

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1. Background

1.1. Introduction

Daniel Leonard (Author) was commissioned by Gemma Williams (Client) through Aura Trees to provide Arboricultural advice on the potential impact the proposed development will have on existing trees at 25 Aranda Drive Davidson (the site).

The Client requested the Author compile an Arboricultural Impact Assessment Report (AIA) on their behalf on the 25th February 2025. This assessment will include:

- The identification of all trees that have the potential to be impacted by the building proposal,
- A ground based Visual Tree Assessment (VTA) of all trees potentially affected by the building proposal,
- A retention rating for all trees potentially affected by the building proposal,
- Any encroachments to the existing trees and their ability to be retained,
- Any recommendations for pruning or removal, and a
- Tree Protection Plan (TPP) for trees to be retained.

1.2. Purpose of this report

This report provides an analysis of the impact the proposed development may have on existing trees on the site and will provide specifications for the effective management of the existing trees including tree protection measures and supervision of works.

The primary purpose of the report is to:

- identify which trees can be retained under the building proposal,
- provide evidence to Council that those trees will remain viable and be protected prior to, during and after construction.

1.3. The Proposal

The site consists of a single-story residence with a double garage. It is surrounded by similar properties and is not listed as a heritage item (see attached survey plans).

The proposal is to undertake additions and alterations to the existing structure including a swimming pool a timber deck and a first-floor addition.

1.4. Subject Trees

There are a total of 17 prescribed trees on or near the site.

There are numerous shrubs and small trees located on the site that do not meet Northern Beaches Council's definition of a prescribed tree. These trees are not protected and have not been included in this report.

Specific details such as observations, species, and measurements on each tree can be found in Section 3.4 Assessment Results.

Numbered tree locations can be found in *Figure 3*.

1.5. Documents Referenced

- (IACA) Significance of a Tree Assessment Rating System (STARS),
- AS4970 - 2009 Protection of trees on development Sites,
- Heritage.nsw.gov.au,
- Site analysis and Survey plan provided by the Client.
- Northern Beaches Council DCP.

2. Method

2.1. Assessment Method

The subject trees were assessed in accordance with a stage one limited visual tree assessment as formulated by *Mattheck & Breloer (1994)*, and practices consistent with modern arboriculture.

This method is subject to the following limitations:

- Tree heights and canopy widths were estimated unless stated otherwise,
- Tree identification was based on the broad taxonomical features present, available, and visible from the ground at the time of the assessment unless stated otherwise,
- A complete visual assessment was not undertaken on trees that were not easily accessible or located in restricted areas,
- The subject trees were assessed from ground level without the use of any invasive diagnostic tools. The following non-invasive tools may have been used; binoculars, probe, sounding hammer, diameter tape, electronic data collection device.

2.2. Retention Value

The retention value of a tree or group of trees is determined using a combination of environmental, cultural physiological and social values.

- **Low:** These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
- **Medium:** These trees are moderately important for retention. Their removal should only be considered if they are adversely affecting the proposed building/ works and all other alternatives have been considered and exhausted.
- **High:** These trees are considered important for retention and should be retained and protected. Design modification or relocation of buildings should be considered to accommodate the setbacks as prescribed by the Australian standard *AS4970 Protection of trees on development sites*.

This tree retention assessment has been undertaken in accordance with the Institute of Australian Consulting Arboriculturists (IACA) Significance of a Tree Assessment Rating System (STARS). The System uses a scale of High, Medium, and Low significance in the landscape. Once the landscape significance of a tree has been defined, the retention value can be determined. Each tree must meet a minimum of three assessment criteria in order to be classified within a category. Further details and the assessment criteria can be found in Appendix 3.

2.3. Tree Protection Zones

The most important consideration for the successful retention of trees is to ensure appropriate crown and root area of the trees remain unaffected during construction/works thus allowing them to continue to grow. This requires the allocation of Tree Protection Zones (TPZ) for all trees to be retained within the construction footprint.

As detailed in the Australian Standard for Protection of Trees on Development Sites (AS4970 – 2009), a TPZ. defines an area in which construction activity is either avoided, or as a minimum controlled, in order to successfully retain the tree/s.

The Structural Root Zone (SRZ) represents the minimum area required to maintain tree stability without consideration to the ongoing health of the tree. Severing roots within the SRZ that are >50mm is not recommended as it may lead to the decline or structural failure of the tree/s

All TPZ measurements are provided in the tree assessment data in *table 2*.



Figure 1: TPZ and SRZ cross section

2.4. Encroachment Assessment

Encroachment into the TPZ is generally broken into the three categories listed below:

- **No Encroachment:** No likely foreseeable encroachment within the TPZ,
- **Minor Encroachment (<10%):** If the proposed encroachment within the TPZ is less than 10% and there is no encroachment into the SRZ then detailed root investigations should not be required. The area that has been encroached upon should be compensated for elsewhere and be contiguous with the TPZ,
- **Major Encroachment (>10%):** The project arborist must be able to demonstrate that the subject tree/s remain viable if the encroachment is greater than 10%. The area that has been encroached upon should be compensated for elsewhere and be contiguous with the TPZ,



Figure 2: Encroachment zones

2.5. Mitigation Measures

Any encroachment within a TPZ must be compensated for to ensure the impacts of the encroachment are mitigated. The amount of compensation required increases as the level of encroachment increases.

The following table outlines the levels of encroachment and the corresponding mitigation measures that are required.

Encroachment	Mitigation Measures
No Encroachment (0%)	No mitigation measures required
Minor Encroachment (<10%)	A detailed noninvasive root investigation should not be required under most circumstances, The area that has been lost must be compensated for elsewhere, contiguous with the TPZ, and Any roots that are cut must be done so with a sharp saw to ensure a clean cut.
Major Encroachment (>10%)	A detailed noninvasive root investigation should be carried out using approved methods such as air spade, Vacuum Excavator, or hand digging. The Project Arborist must be onsite to determine which roots may be severed, The area that has been lost must be compensated for elsewhere, contiguous with the TPZ, The project arborist must be able to demonstrate the tree/s would remain viable, and consideration should be given to, size, age, species, root diameter, location and species.

Table 1: encroachment

2.6. Tree Protection Plan

A detailed site-specific Tree Protection Plan (TPP) is to be prepared by an AQF Level 5 Arboricultural Consultant and submitted for approval to the nominated certifier prior to issue of the Construction Certificate. The TPP is to be prepared in accordance with the principles and specifications identified in AS4970 - 2009 Protection of trees on development sites and is to include, but not be limited to the following:

- A site plan showing locations of proposed tree protection fencing, trunk and ground protection within the identified Tree Protection Zones (TPZ) of trees identified for retention,
- Tree Protection fences and other protection methods such as trunk protection,
- Specifications for any proposed pruning to above ground parts of the tree,
- Tree root protection specifications for excavations or soil fill within the TPZ,
- Hold points and site compliance reporting schedules if applicable, and
- Ground protection for vehicular access to limit compaction if required.

The Tree Protection Plan can be found in the appendix of this report.

3. Results

The results were calculated by overlaying the TPZ radius onto the survey plans provided. The results can be found in *Table 2*.

Any discrepancies to the Survey Plans may result in inaccuracies in the TPZ encroachment calculation.

Trees 9, 10, and 11 (**3 trees**) will have no encroachment into their TPZs.

3.1. Minor Encroachment (<10%)

The following trees have minor encroachment of less than 10%:

- No trees have a minor encroachment

3.2. Major Encroachment (>10%)

The following trees have a major encroachment of more than 10%:

- Trees 1 and 3 (**2 trees**) will have a major encroachment between 18.% and 28%. Due to the proposed driveway cut for the front yard. This encroachment can be significantly reduced if the proposed driveway is placed at or above grade. Tree sensitive excavation methods must be undertaken under the supervision of the Project Arborist when excavating around these trees.
- Trees 2, 6, 12 and 13 (**4 trees**) will have a major encroachment of between 19.3% and 34.8%. Encroachment around these trees will also greatly affect the Structural root zones and they will not be able to be retained if the proposed development is to proceed.
- Trees 4, 5, 7, 8, 14, 15, 16 and 17 (**8 trees**) are within the proposed construction footprint.

3.3. Trees unable or unworthy of retention

The following trees are unworthy or unable to be retained:

- Trees 2, 6, 12 and 13 (**4 trees**) has an unacceptable encroachment to the TPZ and or SRZ and will not be able to be retained if the proposal is to proceed.
- Trees 4, 5, 7, 8, 14, 15, 16 and 17 (**8 trees**) are within the proposed construction footprint and will not be able to be retained if the proposal is to proceed.
- Tree 13 (**1 tree**) has a retention priority of 'priority for removal'. This tree should be removed as part of good arboricultural practice.

Of the **17** trees on or near the site, **12** will need to be removed if the proposed development is to proceed with a further **1** tree recommended for removal due to it being in irreversible decline.

3.4. Assessment Results

Project Name: Arboricultural Impact Assessment - 25 Aranda Drive Davidson																	
Results																	
Survey Number	Number of trees	Genus	Species	Common Name	Height (m)	Canopy Spread (m)	Age Class	DBH (CM)	Health	Structural condition	Significance	Useful Life Expectancy	Retention Priority	TPZ Radius (m)	SI2Z Radius (m)	Encroachment (%)	Comments
T1	1	Lophostemon	confertus	Brush Box	16	12	Mature	63	Good	Fair	High	Medium 15-40Y	Priority for retention	7.56	2.7	28.1%	Impacted by the cut and fill for the terrace front lawn and the new driveway.
T2	1	Liquidambar	styraciflua	Sweet Gum	16	15	Mature	67	Good	Fair	Medium	Medium 15-40Y	Consider for retention	8.04	2.8	34.8%	Impacted by the new driveway.
T3	1	Podocarpus	elata	Illawarra Plum	6	6	Mature	71	Good	Fair	Medium	Medium 15-40Y	Consider for retention	8.52	2.9	27.5%	Impacted by the new driveway.
T4	1	Pittosporum	undulatum	Sweet pittosporum	6	4	Mature	25	Good	Poor	Low	Medium 15-40Y	Consider for retention	3	1.8	100%	Impacted by the new driveway.
T5	1	Camellia	saenqua	Camelia	6	3	Mature	22	Good	Poor	Low	Short 5-15Y	Consider for removal	2.64	1.8	100%	Multiple trunks. Impacted by the new driveway.
T6	1	Camellia	saenqua	Camelia	6	3	Mature	20	Good	Poor	Low	Short 5-15Y	Consider for removal	2.4	1.7	57.6%	Impacted by the new driveway.
T7	1	Ceratopetalum	gummiferum	Christmas Bush	5	3	Mature	18	Fair	Poor	Low	Short 5-15Y	Consider for removal	2.16	1.6	100%	Impacted by the proposed deck and swimming pool
T8	1	Camellia	saenqua	Camelia	4	3	Mature	16	Good	Poor	Low	Short 1-15Y	Consider for removal	2	1.5	100%	Impacted by the proposed deck and swimming pool
T9	1	Muraya	paniculata	Muraya	4	3	Mature	16	Good	Fair	Low	Short 5-15Y	Consider for removal	2	1.5	0%	
T10	1	Syzygium	paniculatum	Lilly pilly	4	2	Mature	14	Good	Fair	Low	Short 5-15Y	Consider for removal	2	1.5	0%	
T11	1	Muraya	paniculata	Muraya	4	2	Mature	15	Good	Fair	Low	Short 5-15Y	Consider for removal	2	1.5	0%	
T12	1	Syzygium	paniculatum	Lilly pilly	4	2	Mature	14	Good	Fair	Low	Short 5-15Y	Consider for removal	2	1.5	27.9%	Impacted by the proposed deck and stairs
T13	1	Eriobotrya	japonica	Loquat Tree	5	5	Mature	20	Decline	Poor	Low	Remove 0-5Y	Priority for removal	2.4	1.7	19.3%	Impacted by the proposed terrace.
T14	1	Camellia	saenqua	Camelia	6	3	Mature	17	Good	Fair	Low	Medium 15-40Y	Consider for removal	2	1.5	100%	Impacted by the first floor addition and the scaffolding.
T15	1	Acer	palatum	Japanese Maple	4	4	Mature	17	Good	Fair	Low	Medium 15-40Y	Consider for removal	2	1.5	100%	Impacted by the cut and fill for the terraced front lawn.
T16	1	Syzygium	paniculatum	Lilly pilly	5	3	Mature	15	Good	Fair	Low	Medium 15-40Y	Consider for removal	2	1.5	100%	Impacted by the proposed terrace.
T17	1	Camellia	saenqua	Camelia	4	3	Mature	17	Good	Fair	Low	Medium 15-40Y	Consider for removal	2	1.5	100%	Impacted by the proposed terrace.

Table 2 Results from site survey

4. Specifications

The following specifications are required if the proposed development is to proceed:

A detailed site-specific Tree Protection Plan (TPP) is to be prepared by an AQF Level 5 Arboricultural Consultant along with an AIA and submitted to the nominated certifier for approval (*See Appendix 2 for TPP*).

- Trees 1 and 3 (**2 trees**) will have a major encroachment. Tree sensitive excavation methods must be undertaken under the supervision of the Project Arborist when excavating around these trees. The proposed driveway should be placed at or above the current grade to reduce the impact on these trees.
- The Project Arborist must be informed prior to any further unplanned encroachment within the TPZs.
- The area within the tree protection fencing should be mulched with good quality leaf mulch to a depth of 100mm prior to construction to promote better tree health during the construction period.
- Ensuring that the soil moisture content stays above 50% within the TPZs will greatly benefit the trees to be retained on the site and will help offset the impacts of construction.

4.1. Tree removals

The following trees are unworthy or unable to be retained:

- Trees 2, 6, 12 and 13 (**4 trees**) has an unacceptable encroachment to the TPZ and or SRZ and will not be able to be retained if the proposal is to proceed.
- Trees 4, 5, 7, 8, 14, 15, 16 and 17 (**8 trees**) are within the proposed construction footprint and will not be able to be retained if the proposal is to proceed.
- Tree 13 (**1 tree**) has a retention priority of 'priority for removal'. This tree should be removed as part of good arboricultural practice.

Of the **17** trees on or near the site, **12** will need to be removed if the proposed development is to proceed with a further **1** tree recommended for removal due to it being in irreversible decline.

Appendix 1 – Tree locations

Below is an image of the tree locations showing the TPZ and encroachments.



Figure 3: Showing the TPZ and area of encroachment

Appendix 2 – Tree Protection Plan

Specifications

The following specifications are required if the proposed development is to proceed:

- Trees 1 and 3 (**2 trees**) will have a major encroachment. Tree sensitive excavation methods must be undertaken under the supervision of the Project Arborist when excavating around these trees. The proposed driveway should be placed at or above the current grade to reduce the impact on these trees.
- The Project Arborist must be informed prior to any further unplanned encroachment within the TPZs.
- The area within the tree protection fencing should be mulched with good quality leaf mulch to a depth of 100mm prior to construction to promote better tree health during the construction period.
- Ensuring that the soil moisture content stays above 50% within the TPZs will greatly benefit the trees to be retained on the site and will help offset the impacts of construction.

Tree Protection Fencing

Tree protection fencing must be established in the locations shown in *Figure 6*. Existing fencing, site hoarding or structures (such as a wall or building) may be used as tree protection fencing, providing the TPZ remains isolated from construction footprint.

Tree protection fencing must be installed prior to site establishment and remain intact until completion of works. Once erected, protective fencing must not be removed or altered without the approval of the project arborist.

Tree protection fencing shall be:

- Enclosed to the full extent of the TPZ (or as specified in the Specifications and Tree Protection Plan).
- Temporary mesh panel fencing (minimum height 1.8m).
- Certified and inspected by the project arborist.
- Installed prior to the commencement of works.
- Prominently signposted with 300mm x 450mm boards stating, "NO ACCESS - TREE PROTECTION ZONE".

If tree protection fencing cannot be installed due to sloping or uneven ground, tree protection barriers must be installed as an alternative.

Specifications for tree protection barriers are as follows:

- Star pickets spaced at 2m intervals,
- Connected by a continuous high-visibility barrier/hazard mesh.
- Maintained at a minimum height of 1m.

Where approved works are required within the TPZ, fencing may be setback to provide construction access. Trunk, branch and ground protection shall be installed and must comply with AS 4970-2009, Protection of Trees on Development Sites. Any additional construction activities within the TPZ of the subject trees must be assessed and approved by the Project Arborist.



Arboricultural Impact Assessment Report

Below is an image of the Fencing plan.

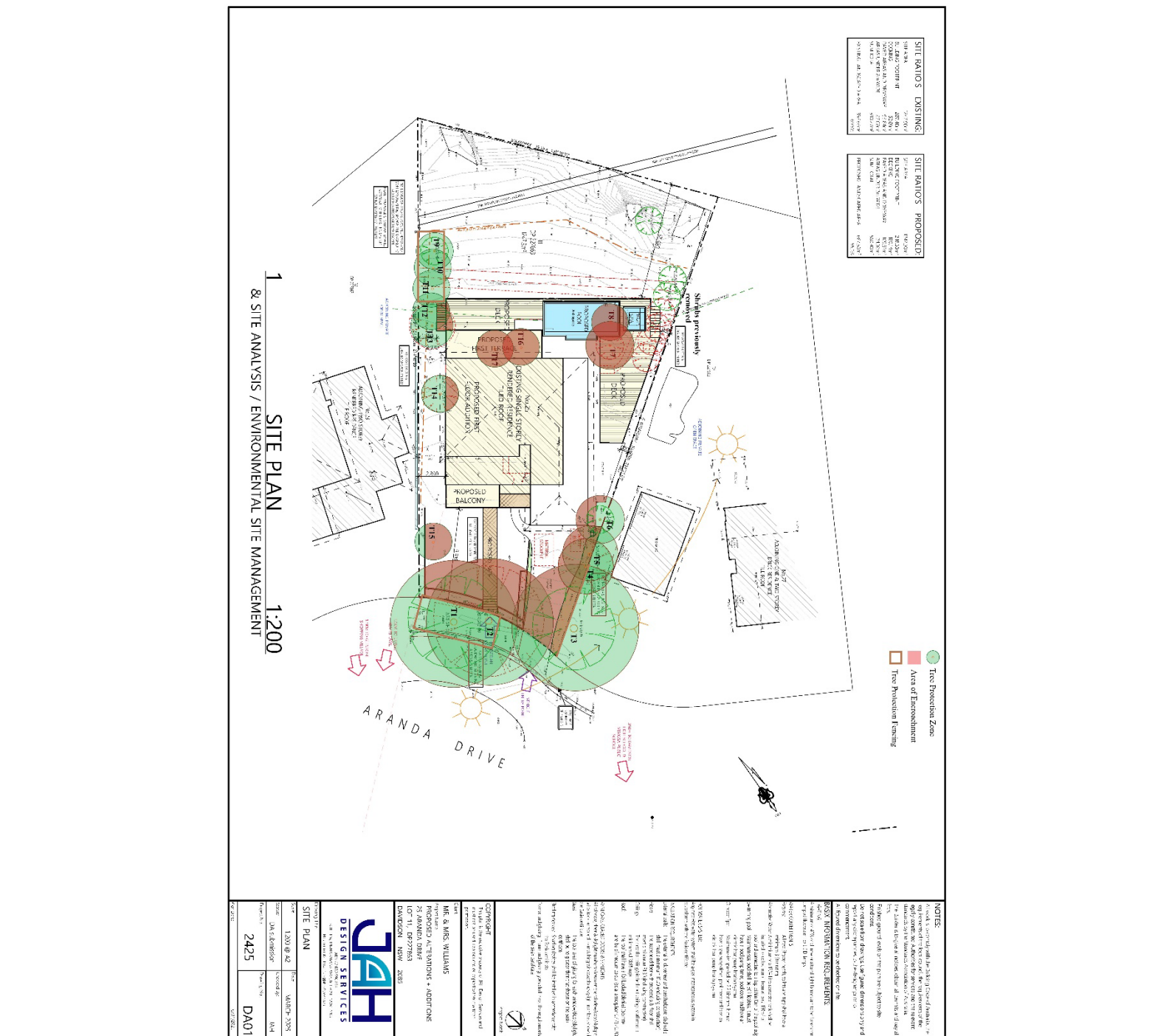


Figure 4: Fencing Plan - Fence in brown

Trunk protection

Where the provision of tree protection fencing is impractical or must be temporarily removed, trunk protection must be installed to avoid accidental mechanical damage.

Specifications for trunk protection are as follows:

- A thick layer of carpet underfelt, geotextile fabric or similar wrapped around the trunk to a minimum height of 2m.
- 1.8m lengths of softwood timbers aligned vertically and spaced evenly around the trunk (with a small gap of approximately 50mm between the timbers).
- The timbers must be secured using galvanized hoop strap.

The timbers shall be wrapped around the trunk but not fixed to the tree, as this will cause injury/damage to the tree.

Ground protection

If temporary access for vehicles, plant or machinery is required within the TPZ, ground protection shall be installed. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Where possible, areas of existing pavement shall be used as ground protection.

Specifications for light traffic access (<3.5 tonne) are as follows:

- Permeable membrane such as geotextile fabric.
- Layer of mulch or crushed rock (at minimum depth of 100mm)

Specifications for heavy traffic access (>3.5 tonne) are as follows:

- Permeable membrane such as geotextile fabric.
- Layer of lightly compacted road base (at minimum depth of 200mm)
- Geotextile fabric shall extend a minimum of 300mm beyond the edge of the road base.

Pedestrian, vehicular and machinery access within the TPZ shall be restricted solely to areas where ground protection has been installed.

Excavations

All approved excavations (including root investigations) within the TPZ must be carried out using tree sensitive methods under supervision of the Project Arborist. These methods may include:

- Manual excavation (hand tools).
- Air spade.
- Hydro-vacuum excavations (sucker-truck).

Where approved by the Project Arborist, excavations using compact machinery fitted with a flat bladed bucket is permissible. Excavations using compact machinery shall be undertaking in small increments and guided by the Project Arborist who is to look for and prevent root damage to roots >50mm in diameter.

No over-excavation, battering or benching shall be undertaken beyond the footprint of any structure unless approved by the Project Arborist. Hand excavation and root mapping shall be undertaken along excavation lines within the TPZ prior to the commencement of mechanical excavation (to prevent tearing and shattering of roots from excavation equipment). Any conflicting roots (>50mm in diameter) shall be pruned using clean, sharp secateurs or a pruning saw to ensure a clean cut free from tears. All root pruning must be documented and carried out by the project arborist.

Underground services

All underground services should be routed outside of the TPZ. If underground services need to be installed within the TPZ, they must be installed using tree sensitive excavation methods under supervision of the Project Arborist.

Alternatively, boring methods such as horizontal directional drilling (HDD) may be used for underground service installation, providing the installation is at minimum depth of 800mm below grade. Excavations for entry/exit pits must be located outside the TPZ.

Site Inspections

In accordance with the Australian Standard, AS 4970-2009, *Protection of Trees on Development Sites*, inspections must be conducted by the Project Arborist at the following key project stages:

- Prior to any work commencing on-site (including demolition, earthworks or site clearing) and following installation of tree protection.
- During any excavations, building works and any other activities carried out within the TPZ of any tree to be retained & protected.
- Following completion of the building works.

It shall be the responsibility of the Project Manager to notify the Project Arborist prior to any works within the TPZ, of any protected tree at a minimum of 48 hours' notice. To ensure the Tree Protection Plan is implemented, hold points have been specified in the schedule of work (*Table 4*).

Schedule of Work

Hold Point	Instruction
Pre - Construction Works	A project arborist is to be nominated and a site meeting/walkthrough is to be undertaken with the principal builder.
Pre - Construction Works	Tree protection (for trees that will be retained) shall be installed prior to demolition and site establishment, this may include mulching of areas within the TPZ. Project Arborist shall inspect and certify tree protection.
During Construction works	Project Arborist to undertake monthly compliance inspections and document any noncompliance with the approved Tree protection plan along with specifying rectification works.
During Construction works	Project Arborist to supervise and document all works carried out within the TPZ of trees to be retained.
Post Construction Works	Inspection of trees by Project Arborist after all major construction has ceased, following the removal of tree protection measures.

Table 3: Hold points

Appendix 3 – STARS Retention Rating Method

		Tree Significance			
		High	Medium	Low	
Useful Life Expectancy	Long >40 years				
	Medium 15-40 years				
	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 Protection of trees on development sites. Tree sensitive construction measures must be implemented 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 the removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for removal (Low): These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Consider for removal (Low): These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.

Reference

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