



future tree
HEALTH

11/844 Lygon St
Carlton North,
Victoria, 3054
ABN: 49 615 477 319

e treereports@futuretreehealth.com.au
w <https://futuretreehealth.com.au>

Arboricultural Impact Assessment & Tree Protection Plan

Tree/s Location: 139-141 Hawthorn Rd, Caulfield North VIC 3161

Completed for: Do Architects

Inspection date: 30th November 2022

Date of report: 1st December 2022

Version 3: 3rd July 2023

Prepared by: Ryan Roche, Consulting Arborist, Future Tree Health

Grad Cert Arb, University of Melbourne

©Future Tree Health 2023



Purpose of this report

The purpose of this report is to provide the findings of an independent assessment of the trees occupying the aforementioned area, as well as impact mitigation & Tree Protection Plan. This report has been prepared in accordance with *AS4970-2009 – Protection of Trees on Development Sites* and *AS4373-2007 – Pruning of Amenity Trees*.

Documents relevant to this report

- Australian Standard: Protection of Trees on Development Sites AS4970-2009
- Australian Standard: Pruning of Amenity Trees AS4373-2007
- Site proposal / Plans



To whom it may concern,

On the 30th November 2022 the services of *Future Tree Health* were provided in assessing multiple trees adjacent to the property 139-141 Hawthorn Rd, Caulfield North VIC 3161. This report, as understood by the author is to be submitted to relevant parties regarding planned development of the property and the relationship to the trees present.

As agreed, this tree report will provide the following information regarding trees assessed:

- Onsite inspection of trees using QTRA methods where relevant
- Tree Identification
- Measurements and photographs (DBH tape, height meter, iPad photographs)
- Observations of tree health and condition
- Expected impact on trees and structures (including TPZ/SRZ details)
- Professional recommendations for works (if any), and/or mitigation or changes to construction techniques to allow any significant trees to be retained in accordance with AS4970-2009 *Protection of trees on Development Sites*.
- Tree protection plan advice & schedule.
- Specifics, details, or recommendations as required by the determining authority.

Please note:

1. Prior to reading this report and subsequently following any advice, opinions, recommendations, or findings provided, you must hereby understand and agree to our *Terms of Advice and Service* as provided at the end of the report.
2. Report inclusions and exclusions, assessment methodology (QTRA) and specifics pertaining to Australian Standards referenced may also be found at the end of the document

Please find the tree report included below.

Kind Regards,

Ryan Roche.

Table of Contents

1.0. Executive Summary	5
2.0. Site Observations & Trees Present	7
2.1. Trees assessed	9
2.2. Existing conditions	10
2.3. Tree Protection Plan (Tree Protection Fencing outlined in yellow)	11
3.0. Tree Data Profiles	12
4.0. Tree Protection Management Plan Project Arborist Declaration	29
5.0 Tree Protection Measures Agreement	30
6.0 Tree Works Timeline/Sign Off	31
6.1. First Hold Point	31
6.2. Second Hold Point	31
6.3. Construction phase hold points.....	32
6.4. Pre-Landscaping hold point	32
6.5. Post-construction hold point.....	32
7.0. Overview of AS4970 & specifics on Tree Protection Measures	33
7.1. Tree Protection Zone procedures.....	33
7.2. Inspections.....	34
7.3. TPZ isolation fencing.....	34
7.4. TPZ Fencing – illustrative examples.....	35
7.5. Compaction mitigation and fine root damage prevention via Ground Protection	36
7.6. Tree Pruning, including branch and root pruning	37
7.7. Post Construction and Landscape Construction Stage	37
7.8. Final Certification.....	37
8.0. Report exclusions	38
9.0. AS 4970-2009: Protection of Trees on Development Sites	38
10.0. Retention Methodologies & Tree Assessment Descriptors	39
11.0. Glossary of terms.....	40
12.0 General References	42
13.0. Terms of advice and service	43
14.0. Disclaimer	43

1.0. Executive Summary

On the 30th November 2022, we inspected multiple trees within & adjacent to the property 139 Hawthorn Rd, Caulfield North VIC 3161. The proposal includes the demolition of the existing buildings and the subsequent construction of a two-story residential dwelling.

Trees within the site:

1. Predominately smaller species were identified within the site. Some trees within the council owned naturestrip were found present, as well as some neighbouring trees within proximity of the proposal.

Impact from proposed construction: Trees to be removed.

1. For the facilitation of this proposal, the removal of Trees 5-12 are required, these are low value specimens and are not protected under any Overlay or Local Laws. They may be removed without the requirement for permits.

Impact from proposed demolition.

1. As part of this proposal, the complete demolition of the existing buildings are required. This is not expected to impact any trees proposed for retention, however machinery access to the site has the potential to damage council owned trees within the naturestrip. These trees are to be protected as stated in Tree Protection Measures below.

Impact from installation of services:

1. This item refers to any service pits or trenches (water, waste, electricity, gas, etc.) to be installed within the TPZs of Trees. These are to be supervised by the project arborist, as access is required within the TPZs during installation. Pre-approval is required for any unscheduled SRZ works proposed within the TPZ. For works that will amount to major encroachment (greater than 10% of the total TPZ area, or within the SRZ), approval must be based on Non-destructive Root Investigation. During excavation works within the TPZ, any roots encountered can be cut by project arborist. Cuts will be made at right angle with a sharp tool or pruning saw of roots below 40mm diameter.
2. Proposed services are not expected to impact any trees to be retained and no additional protection measures are required.



Impact from proposed construction: Trees to be retained.

Council owned Trees:

1. Council owned Trees 1-5 are to be retained throughout the construction process.
2. Tree 1 is not expected to receive any impact via the proposed works and may be retained without the need for Tree Protection.
3. Trees 2, 3 & 5 are not expected to receive any impact via the proposal, however their protection from machinery and construction access to the site is required.
4. Tree 4 is expected to receive acceptable minor encroachment of 8.6% via the proposed courtyard construction along the Northern boundary of the subject site.
5. Details regarding the protection of these trees are outlined below in Tree Protection Measures.

Neighbouring trees:

1. Tree 13 has since been removed by the property owners.
2. Tree 14 is located on adjacent property 3 Halstead Street and are within proximity of the proposed driveway ramp into the basement level of the constructed building.
3. Tree 14 is not expected to receive any impact via this construction.
4. Trees 15-17 are located in adjacent property 143 Hawthorn Road and within proximity of the proposed building.
5. Trees 15 & 17 are not expected to receive any impact via the proposal.
6. Tree 16 is expected to receive acceptable minor encroachment of 7.5% from the proposed building construction.
7. Details regarding the protection of these trees are outlined below in Tree Protection Measures.

Tree Protection Measures:

1. Tree protection fencing is required for council owned Trees 2-5. This fencing must be installed to encompass the maximum allowable TPZ area. Details are provided in item 2.3. Tree Protection Plan & item 7.4. TPZ fencing. These fences can be removed to allow for crossover installation under supervision, and within the final construction stages to allow for soft landscaping works undertaken by hand or to allow for access.
2. Tree protection fencing for neighbouring Trees 14-17 is not seen to be necessary as they are protected via existing boundary fences and are expected to receive acceptable minor encroachment of <10%.
3. Root zone ground protection is not seen as necessary for any trees to be retained.
4. Construction of all proposed soft scaping within the TPZ of retained trees must be undertaken by hand and applied no lower than the current grade without excavation.
5. No pruning is seen to be required for any trees to be retained.
6. Other trees adjacent to the proposal are a suitable distance away from construction or can be adequately protected via existing 1.8m palling fences. We do not consider it necessary to protect trees via additional TPZ fencing.
7. A list of agreed Tree Protection guidelines as well as a project tree protection pre-start & sign off sheet has been provided from item 5.0.

2.0. Site Observations & Trees Present





2.1. Trees assessed

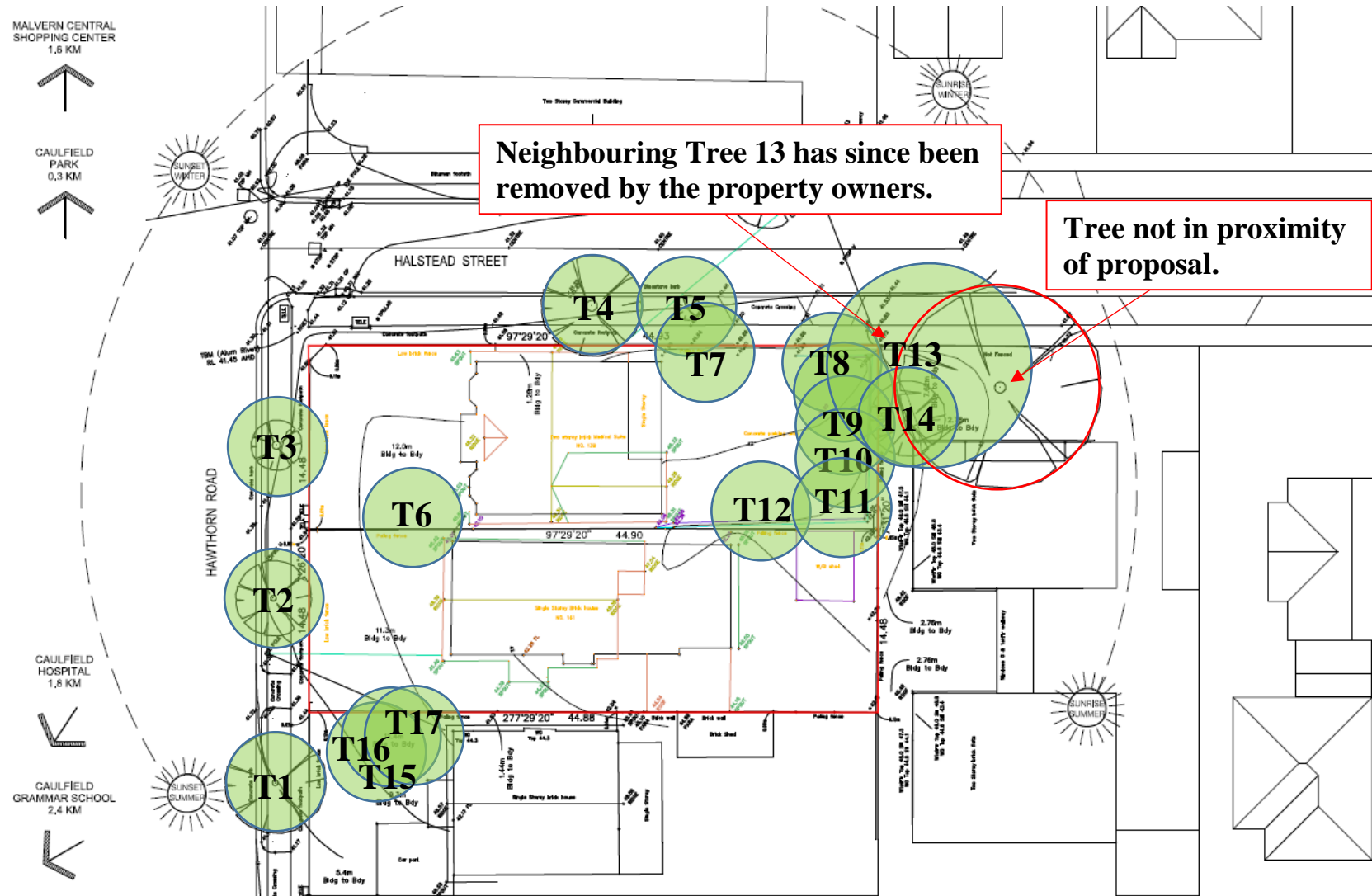
Trees assessed are included within the below table:

RETAIN TREE	REMOVE TREE
-------------	-------------

#	Botanical name	Common name	DBH	TPZ	DAB	SRZ	Impact	Tree Protection Items
1	<i>Platanus x acerifolia</i>	London Plane	0.28m	3.36m	0.34m	2.1m	None	None
2	<i>Platanus x acerifolia</i>	London Plane	0.19m	2.28m	0.25m	1.85m	Access	TPZ Fencing
3	<i>Melaleuca linariifolia</i>	Snow In Summer	0.38m	4.56m	0.52m	2.51m	Access	TPZ Fencing
4	<i>Lophostemon confertus</i>	Queensland Brush Box	0.5m	6m	0.57m	2.61m	Acceptable 8.6%	TPZ Fencing
5	<i>Lophostemon confertus</i>	Queensland Brush Box	0.13m	2m	0.17m	1.57m	Access	TPZ Fencing
6	<i>Hesperocyparis macrocarpa</i>	Monterey Cypress	0.45m	5.4m	0.51m	2.49m	Removal	N/A
7	<i>Betula pendula</i>	Silver Birch	0.1m	2m	0.17m	1.57m	Removal	N/A
8	<i>Eucalyptus caesia</i>	Silver Princess	0.05m	2m	0.05m	1.5m	Removal	N/A
9	<i>Hesperocyparis macrocarpa</i>	Monterey Cypress	0.13m	2m	0.16m	1.53m	Removal	N/A
10	<i>Eucalyptus spathulata</i>	Swamp Mallet	N/A	N/A	N/A	N/A	Removal	N/A
11	<i>Hesperocyparis macrocarpa</i>	Monterey Cypress	0.22m	2.64m	0.28m	1.94m	Removal	N/A
12	<i>Acacia implexa</i>	Lightwood Wattle	0.14m	2m	0.4m	2.25m	Removal	N/A
13	<i>Melaleuca armillaris</i>	Bracelet Honey Myrtle	-	-	-	-	N/A	None
14	<i>Melaleuca styphelioides</i>	Prickly Paperbark	0.27m	3.24m	0.27m	1.91m	None	None
15	<i>Olea europaea</i>	Olive	0.21m	2.52m	0.21m	1.72m	None	None
16	<i>Punica granatum</i>	Pomegranate	0.26m	3.12m	0.25m	1.85m	Acceptable 7.5%	None
17	<i>Salix tortuosa</i>	Corkscrew Willow	0.08m	2m	0.1m	1.5m	None	None



2.2. Existing conditions





e treereports@futuretreehealth.com.au
w <https://futuretreehealth.com.au>

DEVELOPMENT SUMMARY

AREA SUMMARY	
SEE AREA	1000.00 SQ M
PROPOSED SITE COVERAGE	796.0 SQ M / 80.4%
PROPOSED GARDEN AREA	441.0 SQ M / 44.1%
PERMEABLE SURFACES	100.0 SQ M / 10.0%
TOTAL NO. APARTMENTS	
AREA SCHEDULE	
BASEMENT CAR PARK	
TOTAL CAR SPACES	20
RESIDENTS	20
VISITORS	5
TOTAL RESIDENTIAL BEDROOM SPACES	
TOTAL VISITOR BEDROOM SPACES	7
STORAGE CAGES	
13	

PROPOSED GARDEN AREA & PERMEABLE AREA
Scale 1:100

LEGEND

- GARDEN AREA
- PERMEABLE AREA

Product
Proposed Residential Development
133-141 Hawthorn Road
Caulfield North, VIC 3161

Drawn by
Proposed Garden Area

Scale
1:100_A1

North Arrow

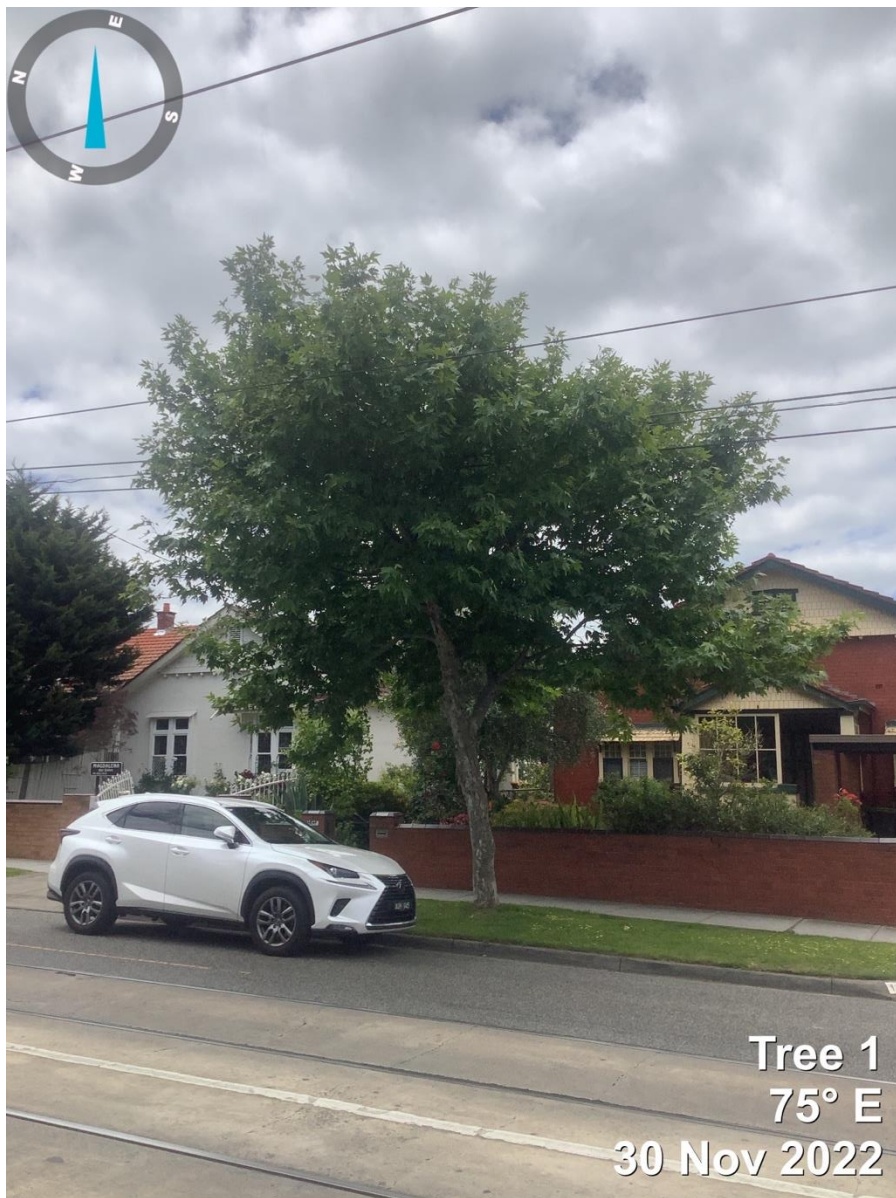


3.0. Tree Data Profiles

TREE 1 - *Platanus x acerifolia* London Plane

Exotic	Europe	Deciduous
--------	--------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Good		0.28m	3.36m	0.34m	2.1m
Height	Spread	Age	Arb Value	ULE	Impact
9m	8m	Semi-mature	High	50+	None
TPMP ITEM:	TPZ Fencing	Rumble boards	Mulch app.	Pruning	Supervision
	No	No	No	No	No





TREE 2 - *Platanus x acerifolia* London Plane

Exotic	Europe	Deciduous
--------	--------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Good		0.19m	2.28m	0.25m	1.85m
Height	Spread	Age	Arb Value	ULE	Impact
6m	5m	Semi-mature	Medium	20-30	Access
TPMP ITEM:	TPZ Fencing	Rumble boards	Mulch app.	Pruning	Supervision
	Yes	No	No	No	No





TREE 3 - *Melaleuca linariifolia* Snow In Summer

Native	Eastern Australia	Evergreen
--------	-------------------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Average		0.38m	4.56m	0.52m	2.51m
Height	Spread	Age	Arb Value	ULE	Impact
5m	4m	Semi-mature	High	20-30	Access
TPMP ITEM:	TPZ Fencing	Rumble boards	Mulch app.	Pruning	Supervision
	Yes	No	No	No	No





TREE 4 - *Lophostemon confertus* Queensland Brush Box

Native	Eastern Australia	Evergreen
--------	-------------------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Good		0.5m	6m	0.57m	2.61m
Height	Spread	Age	Arb Value	ULE	Impact
9m	8m	Maturing	High	20-30	Acceptable 8.6%
TPMP ITEM:	TPZ Fencing	Rumble boards	Mulch app.	Pruning	Supervision
	Yes	No	No	No	No





TREE 5 - *Lophostemon confertus* Queensland Brush Box

Native	Eastern Australia	Evergreen
--------	-------------------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Good		0.13m	2m	0.17m	1.57m
Height	Spread	Age	Arb Value	ULE	Impact
9m	3m	Semi-mature	Medium	50+	Access
TPMP ITEM:	TPZ Fencing	Rumble boards	Mulch app.	Pruning	Supervision
	Yes	No	No	No	No





TREE 6 - *Hesperocyparis macrocarpa* Monterey Cypress

Exotic	North America	Evergreen
--------	---------------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Good		0.45m	5.4m	0.51m	2.49m
Height	Spread	Age	Arb Value	ULE	Impact
11m	5m	Maturing	Medium	20-30	Removal





TREE 7 - *Betula pendula* Silver Birch

Exotic	Northern Hemisphere	Deciduous
--------	---------------------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Average, Average		0.1m	2m	0.17m	1.57m
Height	Spread	Age	Arb Value	ULE	Impact
6m	3m	Semi-mature	Low	10-15	Removal



TREE 8 - *Eucalyptus caesia* Silver Princess

Native	Western Australia	Evergreen
--------	-------------------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Poor		0.05m	2m	0.05m	1.5m
Height	Spread	Age	Arb Value	ULE	Impact
5m	3m	Young	Low	10-15	Removal



TREE 9 - *Hesperocyparis macrocarpa* Monterey Cypress

Exotic	North America	Evergreen
--------	---------------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Average		0.13m	2m	0.16m	1.53m
Height	Spread	Age	Arb Value	ULE	Impact
4m	4m	Semi-mature	Low	15-20	Removal





TREE 10 - *Eucalyptus spathulata* Swamp Mallet

Native	Western Australia	Evergreen
--------	-------------------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Dead, Poor					
Height	Spread	Age	Arb Value	ULE	Impact
7m	5m	Semi-mature	None	<5	Removal



TREE 11 - *Hesperocyparis macrocarpa* Monterey Cypress

Exotic	North America	Evergreen
--------	---------------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Good		0.22m	2.64m	0.28m	1.94m
Height	Spread	Age	Arb Value	ULE	Impact
6m	5m	Semi-mature	Low	20-30	Removal





TREE 12 - *Acacia implexa* Lightwood Wattle

Native	Victoria	Evergreen
--------	----------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Average, Poor		0.14m	2m	0.4m	2.25m
Height	Spread	Age	Arb Value	ULE	Impact
5m	5m	Semi-mature	Low	10-15	Removal





TREE 13 - *Melaleuca armillaris* Bracelet Honey Myrtle

Native	Victoria	Evergreen
--------	----------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Average		-	-	-	-
Height	Spread	Age	Arb Value	ULE	Impact
8m	7m	Maturing	Medium	20-30	N/A

Neighbouring Tree 13 has since been removed by the property owners.





TREE 14 - *Melaleuca styphelioides* Prickly Paperbark

Native	Eastern Australia	Evergreen
--------	-------------------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Good		0.27m	3.24m	0.27m	1.91m
Height	Spread	Age	Arb Value	ULE	Impact
9m	3m	Semi-mature	Medium	20-30	None
TPMP ITEM:	TPZ Fencing	Rumble boards	Mulch app.	Pruning	Supervision
	No	No	No	No	No



Tree 14
162° S
30 Nov 2022



TREE 15 - *Olea europaea* Olive

Exotic	Europe	Evergreen
--------	--------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Good		0.21m	2.52m	0.21m	1.72m
Height	Spread	Age	Arb Value	ULE	Impact
5m	4m	Semi-mature	Medium	50+	None
TPMP ITEM:	TPZ Fencing	Rumble boards	Mulch app.	Pruning	Supervision
	No	No	No	No	No





TREE 16 - *Punica granatum* Pomegranate

Exotic	Middle East/Asia	Deciduous
--------	------------------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Average		0.26m	3.12m	0.25m	1.85m
Height	Spread	Age	Arb Value	ULE	Impact
4m	4m	Semi-mature	Low	15-20	Acceptable 7.5%
TPMP ITEM:	TPZ Fencing	Rumble boards	Mulch app.	Pruning	Supervision
	No	No	No	No	No





TREE 17 - *Salix tortuosa* Corkscrew Willow

Exotic	Asia	Deciduous
--------	------	-----------

Health & Condition		DBH	TPZ	DAB	SRZ
Good, Average		0.08m	2m	0.1m	1.5m
Height	Spread	Age	Arb Value	ULE	Impact
6m	4m	Semi-mature	Low	15-20	None
TPMP ITEM:	TPZ Fencing	Rumble boards	Mulch app.	Pruning	Supervision
	No	No	No	No	No





4.0. Tree Protection Management Plan Project Arborist Declaration

Declared Project Arborist:

Ryan Roche, Future Tree Health. *Grad Cert Arboriculture, University of Melbourne*

Project Arborist responsibilities:

To engage with the development in a project capacity, which includes the following items:

- Arrange a pre-site meeting with relevant stakeholders and construction personnel to outline the Tree Protection Management Plan, its purpose, goals, execution, and timeframes.
- To be a point of call for the development regarding onsite inspections, advice, and supervision of works within the vicinity of trees.
- To undertake site assessment of key hold points, Protection Plan implementation as well capture data and sign off on construction progress.
- To be available as a liaison between the project and any relevant external stakeholders, such as municipal governing bodies or commercial clients.
- To finalise the successful completion of the project via a completion report
- Project Arborist may be one individual, or multiple representatives of one Company.
- The Project Arborist must be suitably qualified in Arboriculture and experienced in tree protection on development sites. The Project Arborist must hold a minimum AQF Level 5 in Arboriculture or equivalent in accordance with the Australian Standard AS4970 (2009).
- The Project Arborist is responsible for monitoring and certification detailed in this report. Only the Project Arborist may vary the requirements of this report under written consent of the Responsible Authority. Any modification to the report must be approved and certified by the Project Arborist.



5.0 Tree Protection Measures Agreement

Client: Do Architects

Site address: 139/141 Hawthorn Rd, Caulfield North VIC

Implementation measures:	Date:	Signature:
TPZ fencing for Tree 2		
TPZ fencing for Tree 3		
TPZ fencing for Tree 4		
TPZ fencing for Tree 5		



6.0 Tree Works Timeline/Sign Off

Client certification of management plan timetable:

Client:	Do Architects
Address:	139/141 Hawthorn Rd, Caulfield North VIC
Date:	
Signed:	

6.1. First Hold Point

PRE-DEMOLITION / PRE-CONSTRUCTION PHASE:	Date:
Task:	Signed off:
Management Plan site induction with all stakeholders & Contractors. Introduce and outline all TPMP measures & requirements.	

6.2. Second Hold Point

PRE-CONSTRUCTION PHASE: INSPECTION	Date:
Task:	Signed off:
Project Arborist to inspect TPZ fencing, and signage as listed within point 6.0 above.	
PRE-CONSTRUCTION PHASE: INSPECTION	Date:
Task:	Signed off:
Project Arborist to inspect any ground protection or trunk protection measures as listed within point 6.0 above.	
PRE-CONSTRUCTION PHASE: INSPECTION	Date:
Task:	Signed off:
Project Arborist to inspect any tree pruning/tying back as listed within point 6.0 above.	

6.3. Construction phase hold points

CONSTRUCTION PHASE	Date:
Task:	Signed off:
For any unscheduled works (pruning, clearance, excavation, access) within the Tree Protection Zones, this must be pre-approved by the project Arborist and governing authority. Supervision by the Arborist during these works is essential.	
Project arborist to be notified if any tree in this report sustains damage	
Project arborist to be notified if any Tree Protection measures need moving or altering	
Any roots uncovered during approved excavation within the TPZ of trees must be pruned back by the Project Arborist.	

6.4. Pre-Landscaping hold point

PRE-LANDSCAPE PHASE	Date:
Task:	Signed off:
Landscapers site induction with TPMP	
Project arborist to check compliance with landscaping plan	
Landscaping within TPZ to be completed without heavy <u>machinery</u>	
All soft landscaping completed at natural soil grade unless otherwise specified	

6.5. Post-construction hold point

FINAL CERTIFICATION	Date:
Task:	Signed off:
After the completion of construction and the removal of all tree protection measures, Project Arborist to inspect the health and condition of trees and provide a site sign off report/amendment to this report.	



7.0. Overview of AS4970 & specifics on Tree Protection Measures

This TPMP has been prepared in accordance with Australian Standard 4970-2009: Protection of Trees on Development Sites. Where proposed works are within the vicinity of trees, this standard is used to determine acceptable distances of works from trees via the calculation of Tree Protection Zones (TPZ) and the Structural Root Zone (SRZ). This ensures trees are protected for the duration of the works.

The proposed works must not encroach within the tree protection zone unless this encroachment is less than 10% of the TPZ, is previously agreed upon and compensation of additional TPZ area (% of encroachment) is added to the TPZ.

7.1. Tree Protection Zone procedures

This section outlines the **non-negotiable prohibitions** beyond allowable encroachment into the TPZ:

- Machine excavations including trenching
- Excavation for silt fencing
- Cultivation
- Storage
- Preparation of chemicals including cement products
- Parking of vehicles and plant
- Refuelling
- Dumping of waste
- Wash down and cleaning of equipment
- Placement of fill
- Lighting of fires
- Soil level changes
- Temporary placement of utilities and/or signs
- Physical damage to the tree



7.2. Inspections

During construction, any damage is to be documented and subsequently reported to the determining authority/Project Arborist within 24 hours. Items for the checklist are, in general:

- Tree condition including any damage
- Adherence to TPMP procedures
- Unauthorized deviations from the TPMP
- New requests due to unforeseen events and requirements for amendments to the TPMP

7.3. TPZ isolation fencing

The tree protection zone indicates the minimum area required by the tree to remain healthy and vital.

For specifics on TPZ, including TPZ area, see glossary

The TPZ isolation fence should be installed around all trees in question on all sides. Ideally this fencing follows TPZ distances, however, where footpaths and roads are within these, adjacent to these is suitable.

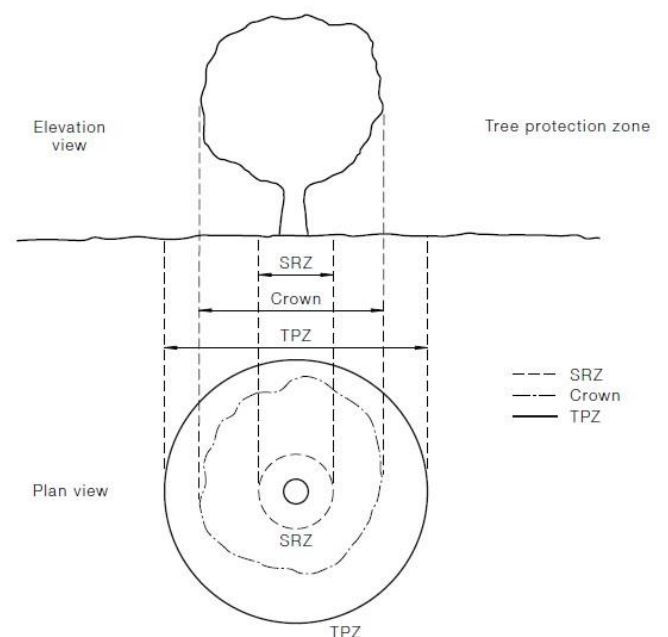
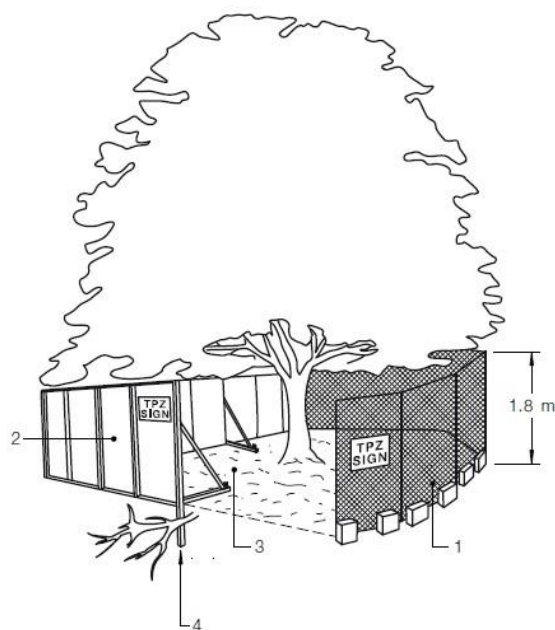
Fencing must be 1.8m high with post size a minimum of 20mm, installed clear of roots. Shade cloth or similar is to be installed over the fencing to prevent dust, particles, or other materials from entering the exclusion zone. The TPZ fencing is to be secured to restrict access.

Signs are to be erected on all sides of each TPZ fence. Signs are to read: *Tree Protection Zone. Strictly no entry without prior consultation with project arborist - add project arborists/site manager contact number.* See the above section 8.1. of the report for prohibitions within the TPZ.

7.4. TPZ Fencing – illustrative examples



**Although only one side of tree is shown, all sides of trees must be protected*
** As much allocation should be made as possible for the fencing within the nature strip area (wider the better so long as footpaths or similar are kept clear).*



7.5. Compaction mitigation and fine root damage prevention via Ground Protection

For definitions on Compaction, TPZ, Rumble Boards, Trunk Protection see Glossary.

Below are the steps to adequately protect both the trunk and TPZ of a tree in accordance with AS4970-2009. Please refer to page 3. For which, if any of these stages are required for this project.

Ground Protection is a required protection measure when pedestrian, vehicular or machine access through the TPZ is required.

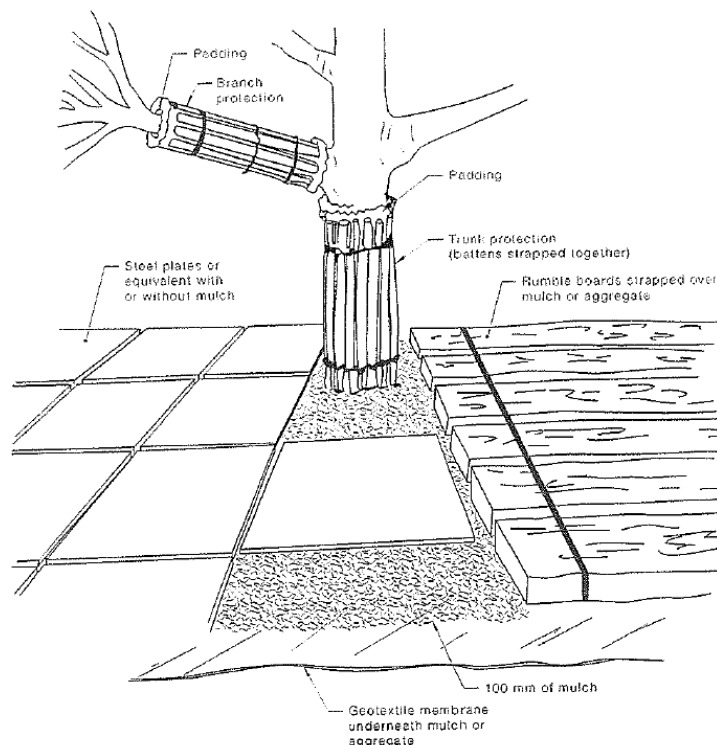
Stage 1: Project arborist to install trunk protection / branch protection around the trunk/lower branches of the tree if this is needed.

Stage 2: In consultation with the Project Arborist, temporarily remove/alter TPZ fencing and apply mulch atop a geotextile membrane within the TPZ. This encompasses the laying of mulch (100mm deep).

Stage 3: Placement of Rumble Boards or steel plates (project arborist will advise) over the mulch within the TPZ over areas where access is required. This prevents machinery from compacting the soil and/or damaging roots while the TPZ is entered into and/or crossed for access purposes.

Stage 4: Reinstate TPZ fencing.

Stage 5: Project Arborist to remove trunk/ branch protection.



7.6. Tree Pruning, including branch and root pruning

Below are the steps to adequately protect trees from inadvertent branch breakage or the cutting of branches contrary to AS4373-02007 Pruning of Amenity Trees.

Please refer to page 3. For specifics on any trees to be pruned / have their branches tied back.

For all trees that require pruning of branches, roots, or the tying back of branches, the following procedure applies.

Any pruning requests (branches or roots) must be submitted to the determining authority, subsequently authorized, and must only be undertaken by a qualified arborist (AQF5 min) in accordance with AS4373-2007, Pruning of Amenity Trees.

Prior to any works, and utilising the Impact Assessment where relevant, project arborist and construction manager are to determine extent of branch pruning and/or root pruning required to gain clearances for proposed work zones (once approval is gained). Pruning is to comply with AS 4373-2007 (Pruning of Amenity Trees).

Damage to roots and/or pruning of roots must not occur/be undertaken without the authority of project arborist.

7.7. Post Construction and Landscape Construction Stage

Landscaping within any TPZs is to be completed in the final stage of construction once machinery has left the site. Tree protection fencing and additional protective measures may be removed at this stage unless specified by the project arborist.

All soft landscaping to be completed at existing ground level, without cultivation or changes to soil levels.

7.8. Final Certification

Project Arborist is to visit the site to provide final certification of tree protection for the project.

Final certification document to be provided to the responsible authority, project manager and builder / developer.

8.0. Report exclusions

This assessment/report did not include the following:

1. Below ground inspection (includes: location, condition and/or integrity of roots; condition of inaccessible parts of trunk; property or asset conflicts and/or damage due to roots).
2. Soil profile test (includes levels of compaction if any)
3. Detailed aerial tree inspection observations/findings (Visual Tree Inspection was conducted from the ground)
4. Abiotic disorder certainty (resulting from groundwater analysis, gas leak investigations, etc.).
5. Certainty of presence/identity of biotic agents (pests, pathogens). Where present, biotic agents must be sampled and sent for lab analysis, a process not included in this commission.
6. Certainty of decay present (if any) within the tree (tree was inspected from the outside only, meaning the condition and integrity of the xylem - wood - within the tree cannot be ascertained).

9.0. AS 4970-2009: Protection of Trees on Development Sites

This report has been prepared in accordance with Australian Standard 4970-2009: Protection of Trees on Development Sites. Where proposed works are within the vicinity of trees, this standard is used to determine acceptable distances of works from trees via the calculation of Tree Protection Zones (TPZ) and the Structural Root Zone (SRZ).

A tree protection zone is calculated ($DBH \times 12$) to establish the acceptable proximity of works, equipment, and construction practices/procedures from an existing tree. Following this, the erection of isolation fencing, the tying of branches, tree protection measures or instalment of tree protection zone signage may be required. This ensures the tree is protected for the duration of the works. The proposed works must not encroach within the tree protection zone unless this encroachment is less than 10% of the TPZ, is previously agreed upon and compensation of additional TPZ area (% of encroachment) is added to the TPZ.

Structural Root Zone (SRZ) refers to the structural roots within closer vicinity to the trunk which are required by the tree to remain upright. Encroachment into the SRZ of an existing tree is not permitted. Works conducted within the SRZ may destabilise the tree, requiring removal to avoid subsequent tree failure.

10.0. Retention Methodologies & Tree Assessment Descriptors

Arboricultural Value:

Low	Trees that offer little in terms of contributing to the future landscape.
Medium	Trees with some beneficial attributes that may benefit the site. Could be considered for retention if possible.
High	Trees with the potential to positively contribute to the site. Should be considered for retention if possible.

ULE (Useful Life Expectancy):

Long	Trees that appear retainable with an acceptable level of risk for more than 40 years.
Medium	Trees that appear retainable with an acceptable level of risk for 15- 40 years.
Short	Trees that appear retainable with an acceptable level of risk for 5-15 years.
Remove	Trees with a high level of risk that would require removal within the next 5 years.

Tree age:

Juvenile	A recently planted tree.
Young	Tree is actively establishing.
Semi-mature	Tree is actively growing.
Maturing	Tree has reached expected size in existing conditions.

Tree health:

Good	Foliage is entire and with good colour, very little sign of pathogens and good density. Growth indicators are good i.e., extension growth of twigs and wound wood development. Minimal or no canopy dieback (deadwood).
Average	Tree is showing one or more of the current symptoms; <25% deadwood, minor canopy dieback, foliage with good colour though with some imperfections may be present. Minor pathogen damage present with growth indicators typical for the species and location of tree.
Poor	Tree is showing one or more of the following symptoms: >25% deadwood, canopy dieback is observable, discoloured, or distorted leaves. Pathogens present, stress symptoms are observable as reduced leaf size, extension growth and canopy density.

Tree structure:

Good	Trunk and scaffold branches show good taper and attachment with minor or no structural defects. Tree is a good example of species with a well-developed form showing no obvious root problems, pests, or disease.
Average	Tree shows minor structural defects or minor damage to trunk e.g., bark missing, cavities present. Minimal damage to structural roots. Tree could be seen as an average/typical example of its species.
Poor	There are major structural defects, damage to trunk or bark missing. Co-dominant stems present, or poor structure with points of failure. Girdling or damaged roots can be observed. Tree is structurally problematic.

11.0. Glossary of terms

Term	Definition
Arb Value	The Arboricultural value of a tree
Compaction	The process of removing aeration from between soil aggregate via pressure applied to the soil. Pressure can be applied via pedestrian, vehicular or machinery methods. Compaction is damaging to tree roots and overall tree health and vitality
DAB	Diameter at base, as measured from just above the root flare of tree
DBH	Diameter at Breast Height, as measured at 1.4m from the ground
Encroachment (%)	The percentage of total TPZ area to be impacted via demolition, access, or construction. Lesser than 10% is acceptable minor encroachment. Above 10% is major, unacceptable encroachment.
Ground Protection	The entire process of protecting the TPZ of a tree from damaging soil compaction or root cuts/disturbance via pedestrian, vehicular or machinery access. Executed via a geotextile membrane under 100mm of mulch. Rumble boards or steel plates are then placed atop.
Health	The health of a tree, gauged from a visual inspection, including but not limited to canopy %, photosynthetic material quantity and quality, apical bud health & bark condition.
Height	An estimate of the height of a tree
Impact	Potential / actual damage of proposed works to a tree.
Incursion	See encroachment
Measurements	All measurements within the report, including DBH, DAB, height, Spread, etc are measured in metres.
Overlay	Any vegetation or tree related regulations as imposed by the determining authority (i.e., local council).
POF	Probability of Failure
Project Arborist	An AQF Level 5 or higher qualified consulting Arborist
Pruning	The process of removing branch or root material from a tree
QTRA	Quantified Tree Risk Assessment
Rumble Boards	Wooden planks to be placed atop mulch for ground protection
Spread	The combination of east-west & north-south canopy width estimates
SRZ	Structural Root Zone (SRZ) refers to the structural roots within closer vicinity to the trunk which are required by the tree to remain upright. Encroachment into the SRZ of an existing tree is not permitted without authorization. Root cuts conducted within the SRZ may destabilise the tree, requiring removal to avoid subsequent tree failure.
SRZ breach	Disturbance of any kind within the Structural Root Zone via any unapproved or unscheduled works.
Structure	The structural integrity of a tree, i.e., architecture, root structure,
Supervision	The presence of a Project Arborist to observe works within the TPZ of a tree/s



TPMP Site Induction	Construction manager, project arborist and all contractors to meet on-site or remotely prior to site preparation to introduce the Tree Management and Protection Plans, including the works requiring supervision by the project arborist inside the TPZ. The Tree Management Plan and Tree Protection Plan induction must be attended by all contractors. Project arborist to attend and sign off.
TPZ	A tree protection zone is calculated ($\text{DBH} \times 12$) to establish the acceptable proximity of works, equipment, and construction practices/procedures from an existing tree. This measurement represents a radius from the centre of the tree trunk and encompasses both below and above ground aspects.
TPZ Fencing	Fencing erected in accordance with AS4970 to isolated and protect a tree to be retained
TPZ Mulching	The procedure of applying mulch within the TPZ of a tree. Mulch must be of a heavy, wood chip variety and applied at a minimum of 100mm depth. To avoid burns and health complications, mulch must not be allowed to come in contact with the immediate tree trunk
Tree architecture	The shape of a trees' canopy.
Tree Protection Plan	A document involving all protection measures for trees on a site to be retained in the same or an acceptable condition throughout a construction project. This document is provided to all workers on site and must be adhered to
Trunk Protection	The process of protecting tree trunks or branches from any form of damage as a result of demolition, access, or construction.
ULE	Useful Life Expectancy

12.0 General References

1. Bardgett, R, 2005, *The Biology of Soil: A Community and Ecosystem Approach*, Oxford University Press, New York
2. Costello, L, Perry, E, Matheny, N, Henry, J, Geisel, P, 2003, *Abiotic disorders of landscape plants: a diagnostic guide*, Oakland, Calif.: University of California, Agriculture and Natural Resources
3. Draper, D, Richards, P, 2009, *Dictionary for Managing Trees in Urban Environments*, CSIRO Publishing, Collingwood
4. James et al, 2014, *Tree Biomechanics Literature Review: Dynamics*, Arboriculture & Urban Forestry 2014. 40(1): 1–15, International Society of Arboriculture
5. Harris, R, 1992, *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines*, 2nd edn, Prentice Hall Career & Technology, New Jersey
6. Mathney & Clark, 1994, A photographic guide to the evaluation of hazard trees in urban areas, International Society of Arboriculture, Champaign, Il.
7. Moore, G.M., 2003, Crown Thinning and Weight Reduction, Proceedings, ISAA Conference, Annual
8. Standards Australia, 4970-2009 – *Protection of Trees on Development Sites*.
9. Standards Australia 4373-2007 – *Pruning of Amenity Trees*



13.0. Terms of advice and service

Prior to reading this report and subsequently following any advice, opinions, recommendations, or findings provided, you must hereby understand and agree to the following:

- This assessment and subsequent report findings are the culmination of research combined with the professional opinion of a qualified consulting arborist. Our consultants pride themselves on independent reports. This report has not been produced to support a particular motive, produce a desired value, or predict a desired occurrence. All findings are reported without bias towards certain parties or results.
- To the authors knowledge, all facts, assessment techniques and material presented is current and accurately researched. Opinions expressed within this report are supported by current research.
- This report contains sketches, photographs, plans, and/or diagrams. These are for illustrative use only and should not be considered to scale unless stipulated otherwise.
- *Future Tree Health* and its representatives will assume that all information divulged to them regarding legal matters, ownership of property or titles is correct. Any properties or projects will be considered to be compliant to relevant codes, legislation, and/or appropriate regulations.
- *Future Tree Health* has gone to every professional length to ensure data and information provided is correct, reliable, and accurate. Data or information provided by third parties is considered outside the control of our consultants and neither they, nor *Future Tree Health* will be held responsible for discrepancies or inaccuracies.
- Representatives of *Future Tree Health* are not required to give testimony or appear in court as a result of this tree report. An expert opinion may be presented by *Future Tree Health* where further arrangements are made; however, this is not a requirement or contractual obligation of this report.
- *Future Tree Health* and its representatives will not be held responsible for occurrences outside the consultants' control.
- This report is the product of a tree assessment, undertaken at the specific time and date listed on the Cover Page, within specific weather and environmental conditions. Thus, all information expressed within is relevant to this time, and date only. As a result, *Future Tree Health* will be in no way held responsible for damages, matters, occurrences, or other issues occurring after this inspection was completed. Following the inspection, all aspects pertaining to the tree/s and site/s in question are considered out of the control of *Future Tree Health*.
- Alterations or loss of this report will result in the entire report being deemed invalid.
- Publication and ownership rights of this report remain with *Future Tree Health*, and no file sharing, hard copy sharing, unauthorised publication or other unintended use will be undertaken without gaining prior consent from *Future Tree Health*.
- This report will not include or pertain to matters other than those aforementioned within the introductory letter and will not include any items listed within the 'Report exclusions' section.
- *Future Tree Health* cannot guarantee that any opinions expressed will come to fruition and will not be held responsible should matters discussed either eventuate or fail to do so.

14.0. Disclaimer

- *Future Tree Health* and its representatives are qualified professionals, and we take great care to provide information that is accurate, knowledgeable, and reliable. You hereby agree to the extent of the law that we will not be held responsible (regardless of liability theory) for occurrences or advice, due to direct, indirect or negligent actions (using professional opinions, experience, or information – including information from third parties) which lead to or are perceived to lead to: any loss or damage (monetary, or otherwise), perceived loss, perceived damage; injury; revenue changes; aesthetic changes; and/or lifestyle impacts. We do not provide warranties or guarantees.

This disclaimer is governed by the law in force in the State of Victoria, Australia.