URBAN ARBOR
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Arboricultural Impact Assessment Report

Site Location:

290 Lower Plateau Road Bilgola Plateau NSW

Prepared for: Carty Homes

Prepared by: John Cruickshank and Jack Williams
Urban Arbor Pty Ltd
Reference: 251010_290 Lower Plateau Rd_AIA

Date Prepared: 10 October 2025

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1. INTRODUCTION

1.1 Urban Arbor have been instructed by Carty Homes to provide an Arboricultural Impact Assessment Report for trees located within the site and adjoining sites in relation to a proposed development.

1.2 Below is a list of all documents and information provided to assist in preparing this report:

A. Contour Plan, Donovan Associates, Ref: 179020, 12 December 2024.

B. Architectural Plans, Darren Campbell Architecture, Ref: J000142, Rev: C, 7 October 2025.

C. Driveway Plan, Taylor Consulting, Ref: CIVIL-1, 29 July 2025.

D. Driveway Long-Sections, Taylor Consulting, Ref: CIVIL-2, 29 July 2025.

E. Hardscape Plan, Conzept Landscape Architects, Project No.: LPDA26-41, September 2025.

F. Stormwater Management Plan, Taylor Consulting, Ref: STORM-1/A, 29 July 2025.

G. Preliminary Arboricultural Report for Development, Urban Arbor Pty Ltd, Ref: 250128_290 Lower Plateau_PDA, 28 January 2025.

1.3 The site and tree inspections were carried out by Jack Williams of Urban Arbor on 24 January 2025. Access was available to the subject site and adjoining public areas only. All tree data contained in this report was collected during this site inspection. This report has been written by John Cruickshank of Urban Arbor.

1.4 Record of report revisions:

Revision	Date	Report Reference
N/A	10 October 2025	251010_290 Lower Plateau Rd_AIA

2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives:

2.1.1 Conduct a ground level visual assessment of all significant trees located within 10 metres of development works. For the purpose of this report, a significant tree is a tree with a height equal to or greater than 5 metres.

2.1.2 Determine the trees estimated contribution years and remaining useful life expectancy and award the trees a retention value.

2.1.3 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 ‘Protection of trees on development sites’ (2025).

2.1.4 Specify tree protection measures to conform with AS4970-2025 for any tree to be retained during the development.

3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in section 1 only. The findings of this report are based on the observations and site conditions at the time of inspection.

3.2 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

3.3 The tree inspection was visual grom ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.

3.4 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.5 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of the trees at the site.

3.6 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems of deficiencies relating to the subject tree, or subject site may not arise in the future.

3.7 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an spp.

3.8 Urban Arbor neither guarantees, nor is it responsible for, the accuracy of information provided by others that is contained within this report.

3.9 All diagrams, plans, and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.10 Alteration of this report invalidates the entire report.

4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s):

- Tree common name.
- Tree botanical name.
- Tree age class.
- DSH (Trunk/stem diameter at standard height) - Measured at a height of 1.4 metres or the nearest measurable point in millimetres. Where measurement at a height of 1.4 metres is not possible, another height may be specified.
- Estimated height – metres.
- Estimated crown spread (radius of crown) – metres.
- Health.
- Structural condition.
- Amenity value.
- Estimated remaining contribution years (SULE)[1].
- Retention value (Tree AZ)[2].
- Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer 1994)[3]

4.3 Trunk diameter was measured using a diameter tape or in some cases estimated. The trunk diameter of all trees in adjoining sites has been estimated unless otherwise stated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tool used during the assessment was a digital camera.

4.4 All tree information was imported into (GIS) PT-Mapper Pro software. This software was used to measure/calculate all encroachment estimates included in this report.

4.5 All DSH measurements, notional root zones (NRZ), structural root zones (SRZ) and tree protection zones (TPZ) were calculated in accordance with the methods set out in AS4970 'Protection of trees on development sites' (2025) in a Microsoft Excel spreadsheet.

4.6 Details of how the observations in this report have been assessed are listed in the appendices.

[1] Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA*

[2] Barrell Tree Consultancy, *Tree AZ Version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C & Breloer, H., *The body language of trees – A handbook for failure analysis,* The Stationary Office, London, England (1994)

5. SITE LOCATION AND BRIEF DESCRIPTION

5.1 The site is located in the suburb of Bilgola Heights, which is located in the Northern Beaches Local Government Area (LGA). Therefore, all trees at the site are subject to protection under the Pittwater Local Environmental Plan (LEP) 2014[4] and Pittwater 21 Development Control Plan (DCP) 2023[5]. The site is not located inside a heritage conservation area and does not form part of a heritage item in the LEP Heritage maps[6]. The site has been identified as containing 'biodiversity' in the LEP Biodiversity maps[7].

5.2 Proposed works assessed in this report include the construction of a new dwelling, pool, stormwater works, driveway and crossover, retaining walls, and associated structures.

5.3 The Contour Plan (dated 12 December 2024) identified all trees within the site and assigned them a number. Under the DCP, only trees with a height greater than 5 metres are classified as 'trees', and as such only trees greater than 5 metres in height have been collected within this report. The tree numbering has been duplicated from the Contour Plan.

6. GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

6.1 **Notional Root Zone (NRZ):** The NRZ area is the primary trigger for determining when arboricultural assessment and input is required on a development site. The NRZ is calculated by multiplying the DSH by twelve, with the exception of palms, other monocots, cycads, and tree ferns, the NRZ of which have been calculated at one metre outside the crown projection. The NRZ is calculated to assist with assessing the potential impacts of root loss during development. It is commonly observed that tree roots will extent significantly further than the indicative NRZ area, however the NRZ is an area identified in AS4970-2025 to be the area where root loss or disturbance could impact the viability of the tree. The NRZ has a minimum radius of 2 metres and a maximum radius of 15 metres. The NRZ also incorporates the Structural Root Zone (SRZ), see below for more information about the SRZ.

6.2 **Structural Root Zone (SRZ):** This is an indicative area around the base of a tree required for the tree's stability in the ground. An area larger than the SRZ always needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula: (DAB x 50)0.42 x 0.64. The SRZ is a notional/indicative area only calculated in AS4970-2025 to assist with determining where severing roots could potentially impact the trees stability. There are several factors that can vary the SRZ area dimensions, including height, crown area, soil type, and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally, work within the SRZ should be avoided, unless the project arborist can demonstrate that the stability of the tree will not be impacted by severing woody roots. Soil level

[4] Pittwater Local Environmental Plan 2014, https://legislation.nsw.gov.au/view/whole/pdf/inforce/2024-02-23/epi-2014-0320, accessed on 28 January 2025.

[5] Pittwater 21 Development Control Plan 2023, https://shared-drupal-s3fs.s3.ap-southeast-2.amazonaws.com/master-test/fapub_pdf/Pittwater+21+DCP+(1).pdf, accessed on 28 January 2025.

[6] Pittwater LEP Heritage map, Sheet HER_016, https://eplanningdlprod.blob.core.windows.net/pdfmaps/6370_COM_HER_016_010_20151118.pdf, accessed on 28 January 2025

[7] Pittwater LEP Biodiversity Map, Sheet BIO_016, https://eplanningdlprod.blob.core.windows.net/pdfmaps/6370_COM_BIO_016_010_20140217.pdf, accessed on 28 January 2025

changes should also generally be avoided inside the SRZ of trees to be retained. Palms, cycads, tree ferns and other monocots, do not have an SRZ.

6.3 **Minor Encroachment into the NRZ of 0-10%:** Sometimes encroachment into the NRZ is unavoidable. Encroachment includes but is not limited to activities such as root severance, excavation/cut, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall NRZ area is generally considered acceptable, provided an area equivalent to the encroachment area can be compensated elsewhere within the TPZ, or if the project arborist otherwise demonstrates that the tree will remain viable.

6.4 **Moderate Encroachment into the NRZ of 10-20%:** This includes encroachment into the NRZ of between 10-20% of the overall NRZ area and outside the SRZ area. If moderate NRZ encroachment is proposed in the NRZ of a tree proposed to be retained, the project arborist must review the potential impact of the root loss and undertake any necessary investigation to demonstrate that the tree will remain viable. This may include tree sensitive design and construction methods to avoid root loss, or root investigations to determine any potential root loss. Examples include tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, to allow additional encroachment into the NRZ by bridging over roots and minimising root disturbance. To avoid an overall net loss of root area during a moderate NRZ encroachment, an area equivalent to the encroachment area must be compensated for elsewhere within the TPZ, unless the project arborist otherwise demonstrates that the tree will remain viable.

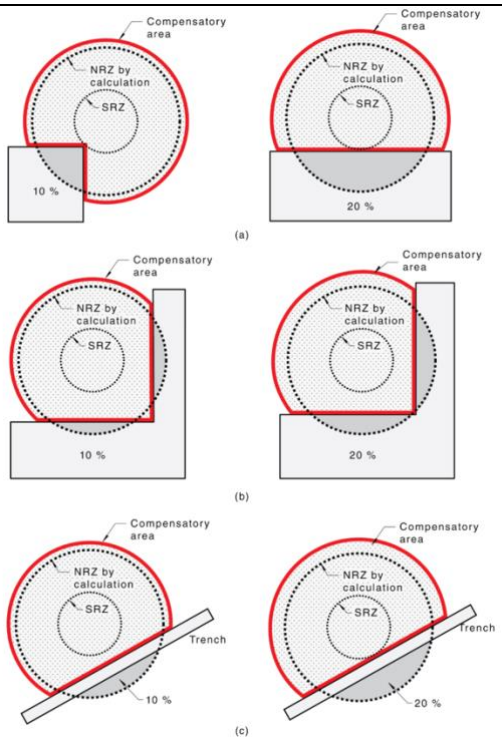
6.5 **Major Encroachment into the NRZ of more than 20%:** Where encroachment of more than 20% of the overall NRZ area or encroachment into the SRZ is proposed, the project arborist must explore alternative designs with the design team and/or investigate and demonstrate that the tree will remain in a viable condition. For assessment of major encroachment into the NRZ area, a more detailed investigation is generally required. This can include root investigations, soil analysis, analysis of historical records, research literature or examples of previous projects where similar encroachments have been achieved. To avoid an overall net loss of root area during a major NRZ encroachment, an area equivalent to the encroachment area must be compensated for elsewhere within the TPZ, unless the project arborist otherwise demonstrates that the tree will remain viable.

6.6 **Crown/Canopy Impacts:** The impacts of any required crown/canopy pruning to the condition of the tree must also be considered. This includes assessing the impacts of any crown pruning required to accommodate proposed structures, including temporary measures such as scaffolding, hoarding or construction access. All required canopy pruning for proposed development must be assessed and specified in accordance with AS4373 Pruning of amenity trees (2007).

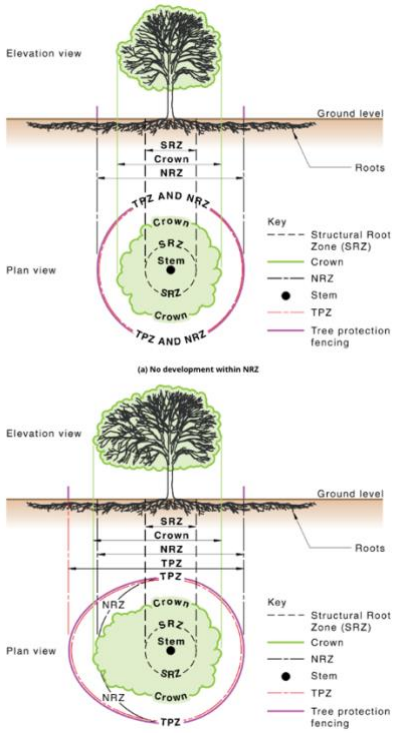
6.7 **Non-destructive Root investigations:** This can often assist in determining root impacts from proposed major NRZ encroachment. The root investigations should identify roots greater than 40mm in diameter that are located along the edge of the structure's footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Manual excavation may include the use of hand tools, a high-pressure air/air knife, or a combination of high-pressure air or water and a vacuum device. The root investigations should be carried out by a qualified arborist (minimum AQF3). Once roots are exposed, a visual assessment can be carried out by a consulting arborist. The consulting arborist

should prepare a root map/report, identifying the findings of the investigations, including photographs as supporting evidence in the report.

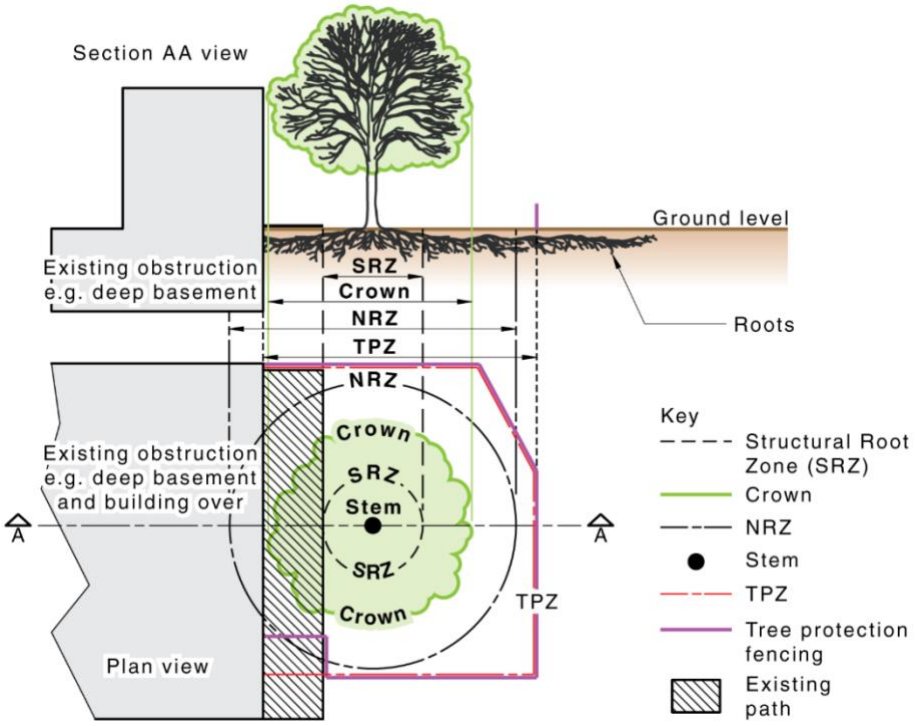
6.8 **Tree Protection Zone (TPZ):** The TPZ is the principle means of protecting trees on development sites during the development works. The TPZ is identified as a specified area to prevent damage to trees either above or below ground during a development to maintain the viability of trees during development. The TPZ area is calculated by the project arborist. The TPZ is initially based on the NRZ radius, then modified where required due to a number of factors, including the location and distribution of roots, past and present structures (existing structures or tree form/shape), canopy projection, soil characteristics, tree condition/characteristics, species characteristics and construction methods.



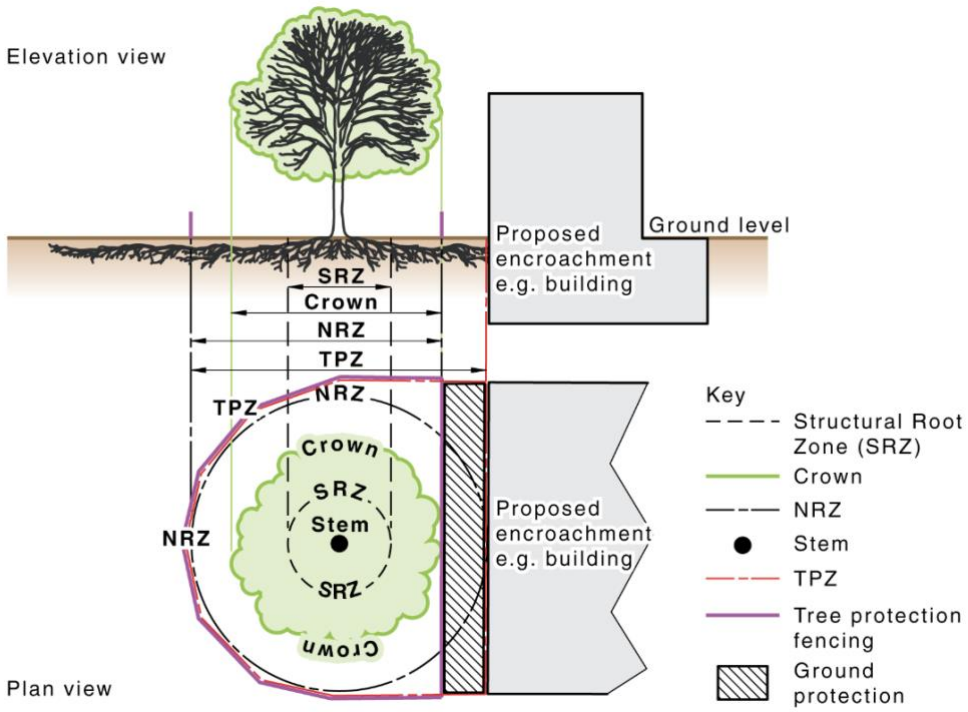
Examples of minor and moderate NRZ encroachments from AS4970-2025.



Examples of the NRZ, SRZ, TPZ and crown areas from AS4970-2025.



Example from AS4970-2025 showing how in situations where existing structures/obstacles are located in the NRZ area, an equivalent area must be incorporated into the TPZ area by the project arborist.



Example from AS4970-2025 showing how in situations where encroachment into the NRZ is proposed, an equivalent area must be incorporated into the TPZ area by the project arborist to compensate/offset the loss of root area.

7. OBSERVATIONS

7.1 **Tree Information:** Details of each individual tree assessed, including the observations taken during the site inspection, can be found in the Tree Inspection Schedule in Appendix 2, where the NRZ and SRZ has been calculated for each of the subject trees. The NRZ and SRZ should be measured in radius from the centre of the trunk. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in Appendix 3 to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

7.2 **Site Plan:** In Appendix 1 site plans have been prepared, where the tree information including canopy spread, NRZ, and SRZ have been overlaid onto the site plans. The TPZ for trees recommended to be retained has been identified on the Tree Protection Plan (TPP). The following site plans are included:

- Appendix 1A: Existing Site Plan.
- Appendix 1B: Proposed Site Plan (TPP).
- Appendix 1C: Proposed Stormwater Plan.
- Appendix 1D: Proposed Bulk Earthworks Plan.

8. ASSESSMENT OF CONSTRUCTION IMPACTS

8.1 **Table 1:** In the table below, the impact of the proposed development has been assessed for all trees included in the report. The assessed NRZ encroachments include proposed structures and hard surfacing only. All soft landscaping should be completed in accordance with section 11.14.

Tree ID	*Botanical Name*	Retention Value	NRZ Radius (m)	NRZ Area (m^2)	SRZ Radius (m)	NRZ Encroachment	Discussion/Conclusion	Recommendation
1	*Corymbia gummifera*	Z10	5.6	98.5	2.6	None	The tree is located in the adjoining property to the Southwest. No proposed NRZ encroachment.	Retain and protect
2	*Eucalyptus resinifera*	Z10	4.2	55.4	2.3	None	The tree is located in the adjoining property to the Southwest. No proposed NRZ encroachment.	Retain and protect
4	*Corymbia gummifera*	A1	4.7	69.4	2.4	None	No proposed NRZ encroachment.	Retain and protect
5	*Angophora costata*	A1	8.4	221.7	3.1	None	The tree is located in the adjoining property to the Southeast. No proposed NRZ encroachment.	Retain and protect
6	*Angophora costata*	A1	3.5	38.5	2.1	None	No proposed NRZ encroachment.	Retain and protect
10	*Corymbia gummifera*	A1	6.1	116.9	2.7	Major	The proposed pool excavations and covered area will encroach into the NRZ by 5% (6.0m^2) but not into the SRZ. This is a minor NRZ, indicating that the pool excavations and covered area will not significantly impact the tree as a single component of the development. The proposed grass swale will encroach into the NRZ by a further 31% (36.3m^2) and into the SRZ. This is a major NRZ encroachment, indicating that the stability and condition of the tree could potentially be impacted. To reduce the impact to the tree's root system, the proposed grass swale must be installed in accordance with the tree-sensitive construction methods in section 9.2 of this report.	Tree sensitive design and construction

Tree ID	*Botanical Name*	Retention Value	NRZ Radius (m)	NRZ Area (m^2)	SRZ Radius (m)	NRZ Encroachment	Discussion/Conclusion	Recommendation
11	*Eucalyptus resinifera*	A1	4.6	66.5	2.3	Major	The proposed stepping stones will encroach into the NRZ by 6% (4.1m^2) but not into the SRZ. This is a minor NRZ, indicating that the stepping stones will not significantly impact the tree as a single component of the development. The proposed grass swale will encroach into the NRZ by a further 20% (13.4m^2) and into the SRZ. This is a major NRZ encroachment, indicating that the stability and condition of the tree could potentially be impacted. To reduce the impact to the tree's root system, the proposed grass swale must be installed in accordance with the tree-sensitive construction methods in section 9.2 of this report.	Tree sensitive design and construction
13	*Angophora costata*	A1	3.2	32.2	2.0	Footprint	The trunk of the tree is located within the footprint of the proposed pool excavations.	Remove
14	*Eucalyptus resinifera*	Z4	3.4	36.3	2.1	Footprint	The trunk of the tree is located within the footprint of the proposed pool excavations.	Remove
15	*Angophora costata*	A1	3.7	43.0	2.2	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
17	*Allocasuarina littoralis*	Z10	2.0	12.6	1.6	Footprint	The trunk of the tree is located within the footprint of the proposed first floor.	Remove

Tree ID	*Botanical Name*	Retention Value	NRZ Radius (m)	NRZ Area (m^2)	SRZ Radius (m)	NRZ Encroachment	Discussion/Conclusion	Recommendation
18	*Angophora costata*	AA	10.8	366.4	3.4	Major	The tree is located in the adjoining property to the Southwest. The proposed basement excavations of more than 1 metre and retaining wall will encroach into the NRZ by 5% (18.1m^2) but not into the SRZ. This is a minor NRZ encroachment, indicating that the basement excavations and retaining wall will not significantly impact the tree as a single component of the development. The proposed first floor and stepping stones will encroach into the NRZ by a further 14% (51.4m^2) but not into the SRZ. However, the architectural plans (Drawing A301, dated 9 September 2025) show that the first floor is proposed to be a pier-elevated structure, indicating a reduced impact to the tree's root system. To further reduce the impact to the tree, the proposed first floor must be installed in accordance with the tree-sensitive construction method in section 9.2 of this report. The proposed stormwater services will encroach into the NRZ by a further 7% (26.0m^2) but not into the SRZ. To reduce the impact to the tree's root system, the stormwater services within the NRZ of the tree must be installed in accordance with the tree-sensitive construction method in section 9.2 of this report.	Tree sensitive design and construction
19	*Angophora costata*	Z10	2.4	18.1	1.8	Minor	The proposed stormwater services will encroach into the NRZ by 4% (0.7m^2) but not into the SRZ. This is a minor NRZ encroachment, indicating that the tree will not be significantly impacted.	Retain and protect
20	*Eucalyptus resinifera*	A1	3.0	28.3	1.9	None	The tree is located in the adjoining property to the Southeast. No proposed NRZ encroachment.	Retain and protect
24	*Angophora costata*	Z10	3.2	32.2	2.0	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
25	*Angophora costata*	A1	2.9	26.4	1.9	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove

Tree ID	*Botanical Name*	Retention Value	NRZ Radius (m)	NRZ Area (m^2)	SRZ Radius (m)	NRZ Encroachment	Discussion/Conclusion	Recommendation
26	*Angophora costata*	A1	3.4	36.3	2.1	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
27	*Angophora costata*	A1	2.9	26.4	2.0	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
28	*Angophora costata*	Z9	2.3	16.6	1.8	Major	The tree has been located on the common boundary on the Contour Survey (dated 12 December 2024). The proposed entry stairs will encroach into the NRZ by 9% (1.5m^2) but not into the SRZ. This is a minor NRZ encroachment, indicating that the entry stairs will not significantly impact the tree as a single component of the development. The proposed stepping stones will encroach into the NRZ by a further 30% (6.5m^2) and into the SRZ. This is a major NRZ encroachment, indicating that the stability and condition of the tree could potentially be impacted. To reduce the impact to the tree, the proposed stepping stones must be installed in accordance with the tree-sensitive landscaping specifications in section 9.3 and 11.15 of this report.	Tree sensitive design and construction
29	*Angophora costata*	A1	2.8	24.6	1.9	Major	The proposed brick edging and landscape area will encroach into the NRZ by 18% (4.4m^2) and into the SRZ. This is a major NRZ encroachment due to the SRZ encroachment, indicating that the stability and condition of the tree could potentially be impacted. To reduce the impact to the tree, the brick edging and landscape must be installed in accordance with the tree-sensitive landscaping specifications in section 9.3 and 11.15 of this report.	Tree sensitive design and construction
30	*Angophora costata*	Z1	2.0	12.6	1.5	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
31	*Corymbia gummifera*	A1	2.4	18.1	1.8	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove

Tree ID	*Botanical Name*	Retention Value	NRZ Radius (m)	NRZ Area (m^2)	SRZ Radius (m)	NRZ Encroachment	Discussion/Conclusion	Recommendation
32	*Corymbia gummifera*	Z1	2.0	12.6	1.5	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
33	*Corymbia gummifera*	Z1	2.0	12.6	1.5	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
34	*Allocasuarina littoralis*	Z4	2.4	18.1	1.8	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
35	*Corymbia gummifera*	A1	3.1	30.2	2.0	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
37	*Corymbia maculata*	Z1	2.0	12.6	1.6	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
38	*Eucalyptus haemastoma*	Z10	3.8	45.4	2.4	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
41	*Corymbia gummifera*	A2	4.4	60.8	2.4	Moderate	The tree is located in the adjoining property to the Southwest. The proposed excavations of more than 1 metre and retaining wall will encroach into the NRZ by 11% (7.0m^2) but not into the SRZ. This is just 1% above the threshold of a minor encroachment. The tree was displaying signs of fair health during the site inspection. To help offset the potential root loss, temporary irrigation and a layer of composted mulch should be applied to the remaining area of the NRZ within the site. See section 9.5 for specifications.	Retain and protect
43	*Acacia elata*	A1	6.0	113.1	2.7	None	The tree is located in the adjoining property to the Southwest. No proposed NRZ encroachment.	Retain and protect
44	*Angophora costata*	Z10	4.9	75.4	2.4	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
45	*Elaeocarpus reticulatus*	Z11	2.0	12.6	1.5	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove

Tree ID	*Botanical Name*	Retention Value	NRZ Radius (m)	NRZ Area (m^2)	SRZ Radius (m)	NRZ Encroachment	Discussion/Conclusion	Recommendation
46	*Eucalyptus haemastoma*	A2	8.4	221.7	3.1	Major	The tree is located in the adjoining property to the Southwest. The proposed driveway and area of cut of more than 1 metre will encroach into the NRZ by 10% (23.1m^2) but not into the SRZ. This is a minor NRZ encroachment indicating that the driveway and area of cut will not significantly impact the tree as a single component of the development. The proposed stormwater services and stepping stones will encroach into the NRZ by a further 10% (22.1m^2) and into the SRZ. This is a major NRZ encroachment, indicating that the stability and condition of the tree could potentially be impacted. To reduce the impact to the tree, the proposed construction within the NRZ must be completed in accordance with tree-sensitive construction method in section 9.2 of this report.	Tree sensitive design and construction
47	*Angophora costata*	A1	4.0	50.3	2.2	Minor	The tree is located on the nature strip. The proposed brick edging and landscape area will encroach into the NRZ by 2% (1.0m^2) but not into the SRZ. This is a minor NRZ encroachment, indicating the proposed construction will not significantly impact the tree.	Retain and protect
51	*Allocasuarina littoralis*	Z6	3.0	28.3	2.0	Major	The tree is located on the nature strip. The proposed driveway/crossover will encroach into the NRZ by 20% (5.6m^2) and into the SRZ. This is a major NRZ encroachment, indicating that the stability and condition of the tree could potentially be impacted. The tree was showing signs of poor structure at the time of the inspection and had partially failed at the root plate. The tree has a useful life expectancy of less than five years. The future management of the tree should be determined by Northern Beaches Council.	*Remove
52	*Angophora costata*	Z10	2.3	16.6	1.8	Footprint	The tree is located on the nature strip. The trunk of the tree is located within the footprint of the proposed driveway/crossover. The future management of the tree should be determined by Northern Beaches Council.	*Remove

Tree ID	*Botanical Name*	Retention Value	NRZ Radius (m)	NRZ Area (m^2)	SRZ Radius (m)	NRZ Encroachment	Discussion/Conclusion	Recommendation
57	*Eucalyptus haemastoma*	Z10	2.0	12.6	1.6	Major	The tree is located on the nature strip. The proposed brick edging and landscape area will encroach into the NRZ by 13% (1.6m^2) and into the SRZ. This is a major NRZ encroachment due to the SRZ encroachment, and indicates that the stability and condition of the tree could potentially be impacted. To reduce the impact to the tree, the brick edging and landscaping must be installed in accordance with the tree-sensitive landscaping specifications in section 9.3 and 11.15 of this report.	Tree sensitive design and construction
58	*Dead tree*	Z4	2.0	12.6	1.5	Footprint	The trunk of the tree is located within the footprint of the proposed landscaped area. The tree is dead and should not be a constraint to the development.	Remove
59	*Angophora costata*	A1	2.3	16.6	1.7	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
60	*Angophora costata*	Z1	2.0	12.6	1.5	Footprint	The trunk of the tree is located within the footprint of the proposed excavations of more than 1 metre.	Remove
62	*Angophora costata*	A1	2.5	19.6	1.8	Major	The proposed excavations of more than 1 metre, stormwater services, and landscaping will encroach into the NRZ by 52% (10.3m^2) and into the SRZ. This is a major NRZ encroachment, indicating that the stability and condition of the tree could potentially be impacted. The tree has been recommended for removal due to the development impacts.	Remove

Note: * = the tree is located within the nature strip and the future management of the tree should be determined by Northern Beaches Council.

9. CONCLUSIONS

9.1 **Table 2:** Summary of the impact to trees by the development.

Impact	Reason	Category A		Category Z	Total
		AA	A	Z	
Trees recommended to be removed	Building construction, new surfacing and/or proximity to structures, or trees in poor condition	None	13, 15, 25, 26, 27, 31, 35, 59, 62 (Nine trees)	14, 17, 24, 30, 32, 33, 34, 37, 38, 44, 45, 51*, 52*, 58, 60 (Fifteen trees)	**24 trees**
Trees requiring tree sensitive construction/design methods	Removal of existing surfacing/structures and/or installation of new surfacing/structures may impact the viability of the trees	18 (One tree)	10, 11, 29, 46 (Four trees)	28, 57 (Two trees)	**7 trees**
Trees recommended to be retained	Removal of existing surfacing/structures will not impact the viability of the trees	None	4, 5, 6, 20, 41, 43, 47 (Seven trees)	1, 2, 19 (Three trees)	**10 trees**

Note: * = the tree is located within the nature strip and the future management of the tree should be determined by Northern Beaches Council.

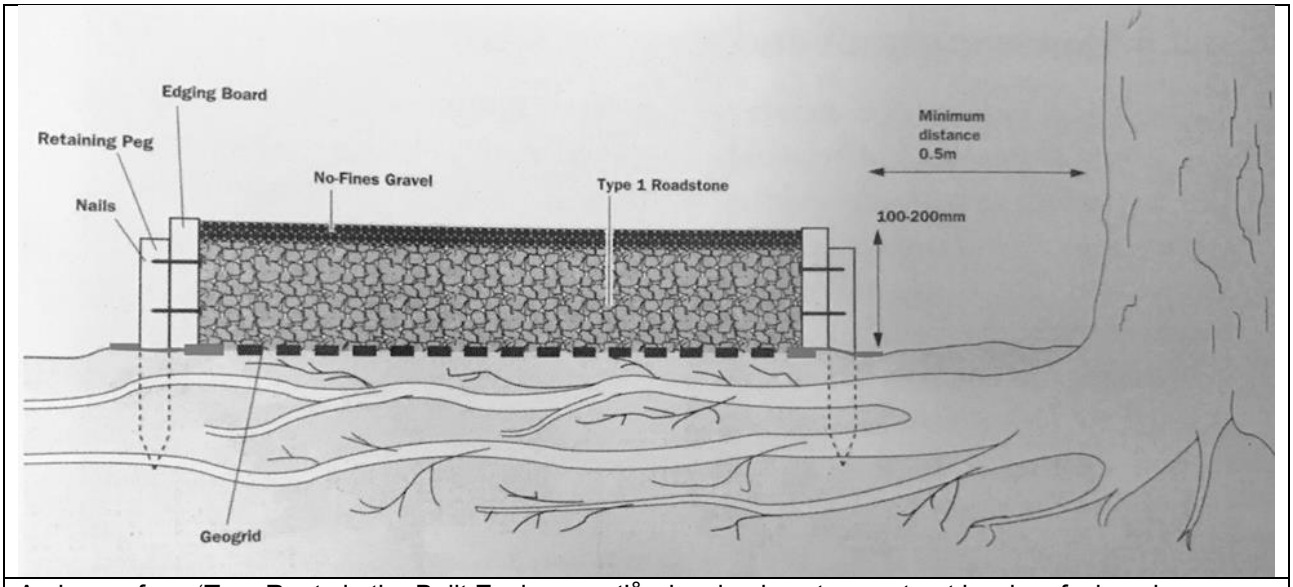
9.2 **Construction Design/Specification Requirements for Tree 10, 11, 18, 28, 29, 46, and 57:** The proposed construction will encroach into the NRZ and SRZ of trees. To ensure the trees are not adversely impacted by the construction, it must be demonstrated the following design and construction specifications can be implemented within the TPZ of the trees. If the construction cannot be implemented in accordance with these specifications, the trees may not be viable for retention.

9.2.1 **Tree Sensitive Footings – Tree 18:** To minimise root loss in the NRZ of the trees, the footings of the proposed first-floor structure should be isolated pier style footings to avoid significant tree roots and minimise root loss. To ensure that significant roots are retained, it must be demonstrated by the project engineer that the following construction methods can be implemented:

- All excavations for piers must be carried out manually under the supervision of the Project arborist (see Section 11 for details of manual excavations and Project arborist).
- The location of piers must be flexible to avoid significant roots greater than 40mm in diameter. All roots greater than 40mm in diameter must be retained unless the Project arborist has assessed and approved in writing that severing the root will not impact the condition or stability of the tree.
- Cross beams/slabs must be located on or above existing soil grades.
- The piers should be located a minimum of 200mm from any root to be retained that is greater than 40mm in diameter.

9.2.2 **Tree Sensitive Stepping Stone Construction – Tree 11, 18, 28, and 29:** To retain the trees in a viable condition, the stepping stones must be constructed in a tree sensitive method. The stepping stones should be constructed above existing grades in the NRZ of the trees. The diagrams below gives an example of a no-excavation method for constructing hard surfacing close to trees. The location of retaining pegs should be flexible, avoiding damage to structural roots.

- If excavations are essential, they must not exceed 100mm below the existing grades. The excavations should be supervised by a Project arborist with a minimum AQF Level 5 qualification. All excavations for the stepping stones should be carried out manually to avoid impacting retained tree roots. All tree roots greater than 40mm in diameter should be retained unless the Project arborist has assessed and advised that the pruning/severing of the root will not impact the condition or stability of the tree. Manual excavation may include the use of pneumatic and hydraulic tools, high pressure air, or a combination of high-pressure water and a vacuum device.
- Where tree roots greater than 40mm are encountered that must be retained, footpath should be elevated over the individual tree root to allow for its retention. Examples of methods that can be used to bridge individual tree roots have been included below. Using pier and beam bridges as per the image below is the recommended/preferred method, as it will allow for future growth of the tree roots, reducing future damage to the pavement from the roots.

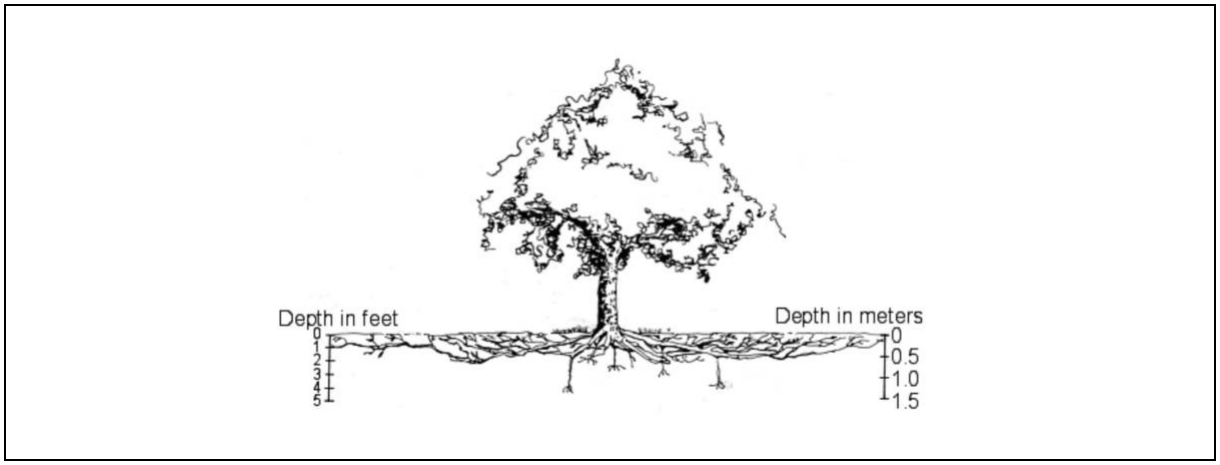


An image from 'Tree Roots in the Built Environment'[8], showing how to construct hard surfacing above a tree's root system without excavation. Type 1 Roadstones are an example of blue metal or crushed sandstone.

[8] Roberts, J., Jackson, N., & Smith, M., *Tree Roots in the Built Environment*, The Stationary Office, London, England (2006), page 305 & 306

9.2.3 **Tree Sensitive Underground Services – Tree 10, 11, 18, 19, and 46:** AS4970-2025 recommends that all underground services located inside the NRZ of any tree to be retained should be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention.

- If directional drilling is proposed, section 4.5.5 of AS4970-2025 says that 'The upper surface of the directional drilling bore should be at least 0.6 m deep and preferably outside the SRZ. Assessment of the likely impacts of boring, launch pits and exit pits on retained trees should be undertaken.10
- If manual excavations are proposed, all excavations for the services should be carried out manually under the supervision of the project arborist (minimum qualification AQF 5). Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. All roots greater than 40mm in diameter should be retained in the service trench. The service pipe should then be threaded below the retained roots where practical. Roots greater than 40mm within the alignment of the service pipe should only be severed/pruned under the approval of the project arborist. All root pruning should be in accordance with AS4373 Pruning of amenity trees (2007).
- Open trenching in the SRZ of trees can be impractical without impacting significant roots, as often dense root growth is present in the SRZ. Open trenching should therefore be avoided in the SRZ.
- Preferably, directional drilling should also avoid the SRZ area. If it is unavoidable, it is recommended that sub-surface boring/directional drilling is located at minimum 1 metre of the trunk to avoid impacting sinker roots that are critical for the trees stability, an image of the general structure of trees roots system in unimpeded conditions has been included below, the sinker roots are the vertical roots that are normally closer to the trunk.



- The feasibility of sub-surface boring/directional drilling will need to be investigated by a sub-surface boring/directional drilling specialist. The project arborist should provide advice and supervise excavations for bore pits, which must be carried out manually if located within the NRZ. The top of the pipe must be at least 600mm below the existing soil grade. The location of bore pits should be flexible in the TPZ to avoid significant roots, the project arborist should assess

and advise in writing the impact of any significant root severance to the condition of the tree.

9.3 **General Tree Sensitive Landscaping:** To minimise the impact to trees, tree sensitive landscaping advice has been provided below. In this section, general guidance has been provided. In the following sections, more detailed specifications have been provided based on the landscape details.

- All landscaping works within the NRZ of trees to be retained are to be undertaken in consultation and supervised by a consulting Arborist with a minimum AQF level 5 qualification to minimise the impact to trees.
- The demolition of all existing structures inside or directly adjacent to the NRZ of trees to be retained must be undertaken in consultation with the project arborist. Any machinery is to work from inside the footprint of the existing structures or outside the NRZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the NRZ of trees to be retained, ground protection will be required as agreed with the project arborist. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method. The lowest levels of sub-base structures should be removed manually to avoid impacting underlying roots.
- Do not use herbicides in the NRZ of trees to be retained.
- All excavations for landscaping works in the NRZ of trees to be retained should be manual and in accordance with section 11.13.
- Lowering the soil level via machine regrading is likely to result in damage to underlying tree roots and should be avoided.
- Where tree sensitive construction has been recommended, the footings of the proposed structures should be constructed via tree sensitive methods, see sections below for more information.
- Ground preparation for all proposed structures should be supervised the project arborist.
- If underground services are proposed in the NRZ of a tree to be retained, all services must be installed to conform with AS4970-2025, see sections below for more information.
- The location of new plantings inside the NRZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 40mm in diameter.
- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 50mm or increased by more 100mm without assessment by a consulting Arborist.
- Where fill/sub base is used inside the NRZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of future soil compaction. A layer of geotextile fabric is recommended between the soil and sub-base in the NRZ of any tree to be retained to minimise damage to exposed roots.
- All introduced materials must be manually distributed in the NRZ of tree to be retained. If machinery is to be used to transport materials, adequate ground protection should be agreed with the project arborist.

- Any replacement tree must be selected in accordance with AS2303-2015 Tree stock for landscape use.
- Any new fencing in the NRZ of trees should be constructed carefully to avoid impacting significant roots. The location of fence posts should be flexible to allow for the retention of root greater than 40mm in diameter. The base of fence panels should be located above existing soil grades.

10. RECOMMENDATIONS

10.1 This report assesses the impact of a proposed development at the subject site to all significant trees located within 10 metres of the development works. Forty-one trees have been identified and assessed.

10.2 In Appendix 1 site plans have been prepared, where the tree information including canopy spread, NRZ, and SRZ have been overlaid onto the site plans. The TPZ for trees recommended to be retained has been identified on the Tree Protection Plan (TPP). The following site plans are included:

- Appendix 1A: Existing Site Plan.
- Appendix 1B: Proposed Site Plan (TPP).
- Appendix 1C: Proposed Stormwater Plan.
- Appendix 1D: Proposed Bulk Earthworks Plan.

10.3 Twenty-two (22) trees have been recommended for removal to accommodate the development works, including tree 13, 14, 15, 17, 24, 25, 26, 27, 30, 31, 32, 33, 34, 35, 37, 38, 44, 45, 58, 59, 60, 62. Nine of these trees are higher value category A retention value trees, including tree 13, 15, 25, 26, 27, 31, 35, 59, 62. All other trees recommended to be removed are lower value category Z retention value trees. See section 9.1 for a table of trees by retention value.

10.4 Additionally, two trees within the nature strip are potentially impacted by the proposed design, including tree 51 and 52. The future management of these should be determined by Northern Beaches Council. Both trees are lower value category Z retention value trees.

10.5 Seven (7) trees have been recommended to be retained that require tree sensitive design and construction methods being implemented to reduce the impact to the tree, including tree 10, 11, 18, 28, 29, 46, 57. See section 8 for more detailed information. If it is not practical to implement the proposed specifications for the trees, then the trees may not be viable for retention.

10.6 The remaining ten (10) trees can be retained in a viable condition, including tree 1, 2, 4, 5, 6, 19, 20, 41, 43, 47.

10.7 All trees to be retained must be protected to conform with AS4970-2025, details of which are included in section 11.

10.8 See section 11.14 for general guidance to minimising the impact of proposed landscaping to retained trees and replacement tree planting.

10.9 All services plans should be subject to review by a consulting Arborist. Where possible, underground services should be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained, must be installed via tree sensitive techniques with AS4970-2025, see section 11.15 for more information.

10.10 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners. This report should be submitted as supporting evidence with the development application.

11. TREE PROTECTION SPECIFICATIONS (TPS) AND TREE PROTECTION PLAN (TPP)

11.1 **Use of this report:** This section includes Tree Protection Specifications (TPS) to conform with AS4970-2025. The most current version of the TPS and TPP shall be included in the construction documentation. All contractors must be made aware of the Tree Protection Specifications (TPS) prior to commencing works at the site. This section of the report and a copy of the Tree Protection Plan (TPP) drawings must also be made available to any contractor prior to works commencing and during any on site operations.

11.2 **Tree Protection Plan (TPP):** This is a scaled drawing that shows trees to be retained, the location of the TPZ areas and any tree protection specified in this section of the report. A copy of the TPP must form part of the development plans prior to the commencement of development works at the site. The location of the TPZ areas and the specified tree protection devices shown on the TPP should also be shown on other documents such as demolition, bulk earthworks, construction and landscape plans.

11.3 **Project Arborist:** Prior to any works commencing at the site, a Project arborist should be appointed. The Project arborist should be qualified to a minimum of AQF Level 5 and/or equivalent qualifications and experience and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the Project arborist.

11.4 **Tree Work:** All tree work should be carried out by a qualified and experienced Arborist with a minimum of AQF Level 3 in Arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).

11.5 **Initial Site Meeting/On-going Regular Inspections:** The Project arborist is to hold a pre-construction site meeting with the principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. To conform with AS4970-2025, the Project arborist should carry out regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a monthly frequency throughout the development.

11.6 **Installation of Tree Protection Measures:** It is the responsibility of the principal contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in an adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the Project arborist. The Project arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2025 prior to works commencing.

11.8 **Site Specific Tree Protection Recommendations:** See section 11.8 for requirements of tree protection. The location of all tree protection measures specified below should be shown on the TPP drawings (see section 11.2 for more information).

Tree ID	*Botanical Name*	NRZ Radius (m)	SRZ Radius (m)	Recommendation
1	*Corymbia gummifera*	5.6	2.6	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 1, 2, 4, 6, 10, 11, 18, 19, 20, 41, 43, and 46. The fencing is to be aligned adjacent to proposed works and encompass as much of the TPZ area within the site as practical. The fencing should be setback from proposed construction by 1m to allow for works to take place. TPZ signage required on the fence. See Appendix 1B for indicative fencing location.
2	*Eucalyptus resinifera*	4.2	2.3	Retain and protect. See tree protection specifications for tree 1.
4	*Corymbia gummifera*	4.7	2.4	Retain and protect. See tree protection specifications for tree 1.
5	*Angophora costata*	8.4	3.1	Retain and protect. Sufficiently set back from proposed works, no additional tree protection required.
6	*Angophora costata*	3.5	2.1	Retain and protect. See tree protection specifications for tree 1.
10	*Corymbia gummifera*	6.1	2.7	Tree sensitive design and construction, see section 8 and 9.2 for more information. See tree protection specifications for tree 1.
11	*Eucalyptus resinifera*	4.6	2.3	Tree sensitive design and construction, see section 8 and 9.2 for more information. See tree protection specifications for tree 1.
13	*Angophora costata*	3.2	2.0	Remove
14	*Eucalyptus resinifera*	3.4	2.1	Remove
15	*Angophora costata*	3.7	2.2	Remove
17	*Allocasuarina littoralis*	2.0	1.6	Remove
18	*Angophora costata*	10.8	3.4	Tree sensitive design and construction, see section 8 and 9.2 for more information. See tree protection specifications for tree 1.
19	*Angophora costata*	2.4	1.8	Retain and protect. See tree protection specifications for tree 1.
20	*Eucalyptus resinifera*	3.0	1.9	Retain and protect. See tree protection specifications for tree 1.
24	*Angophora costata*	3.2	2.0	Remove
25	*Angophora costata*	2.9	1.9	Remove
26	*Angophora costata*	3.4	2.1	Remove
27	*Angophora costata*	2.9	2.0	Remove

Tree ID	*Botanical Name*	NRZ Radius (m)	SRZ Radius (m)	Recommendation
28	*Angophora costata*	2.3	1.8	Tree sensitive design and construction, see section 8 and 9.2 for more information. Tree protection fencing is to create a combined exclusion zone for tree 28, 29, 47, and 57. The fencing is to be aligned adjacent to proposed works and encompass as much of the TPZ area within the site and nature strip as practical. The fencing should be aligned 1m from proposed construction to allow for the works. TPZ signage required on the fence. See Appendix 1B for indicative fencing location.
29	*Angophora costata*	2.8	1.9	Tree sensitive design and construction, see section 8 and 9.2 for more information. See tree protection specifications for tree 28.
30	*Angophora costata*	2.0	1.5	Remove
31	*Corymbia gummifera*	2.4	1.8	Remove
32	*Corymbia gummifera*	2.0	1.5	Remove
33	*Corymbia gummifera*	2.0	1.5	Remove
34	*Allocasuarina littoralis*	2.4	1.8	Remove
35	*Corymbia gummifera*	3.1	2.0	Remove
37	*Corymbia maculata*	2.0	1.6	Remove
38	*Eucalyptus haemastoma*	3.8	2.4	Remove
41	*Corymbia gummifera*	4.4	2.4	Retain and protect. See tree protection specifications for tree 1.
43	*Acacia elata*	6.0	2.7	Retain and protect. See tree protection specifications for tree 1.
44	*Angophora costata*	4.9	2.4	Remove
45	*Elaeocarpus reticulatus*	2.0	1.5	Remove
46	*Eucalyptus haemastoma*	8.4	3.1	Tree sensitive design and construction, see section 8 and 9.2 for specifications. See tree protection specifications for tree 1.
47	*Angophora costata*	4.0	2.2	Retain and protect. See tree protection specifications for tree 28.
51	*Allocasuarina littoralis*	3.0	2.0	*Remove – the future management of the tree should be determined by Northern Beaches Council.
52	*Angophora costata*	2.3	1.8	*Remove – the future management of the tree should be determined by Northern Beaches Council.
57	*Eucalyptus haemastoma*	2.0	1.6	Tree sensitive design and construction, see section 8 and 9.2 for specifications. See tree protection specifications for tree 28.
58	*Dead tree*	2.0	1.5	Remove
59	*Angophora costata*	2.3	1.7	Remove
60	*Angophora costata*	2.0	1.5	Remove
62	*Angophora costata*	2.5	1.8	Remove

11.9 Tree Protection Specifications:

11.9.1 **Trunk and Branch Protection:** The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm x 1800mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals and must be fixed against the trunk with tie wire or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.

11.9.2 **Protective fencing:** The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing should only be removed for the landscaping phase, and this should be approved by the project arborist. Where it is not feasible to install fencing at the specified location due to factors such restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project arborist. Any modifications to the fencing locations must be approved by the project arborist.

- AS4687.2 specifies applicable requirements where temporary fence panels are used. Where semi-permanent fences are used, the posts should be driven into the soil 600 mm (1000 mm in sand) and top rails should be used as required.
- Existing perimeter fences and other structures may be used as part of the protective fence if suitable.

11.9.3 **TPZ signage:** Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. The lettering on the sign should conform to AS1319.Each sign shall contain in a clearly legible form, the following information:

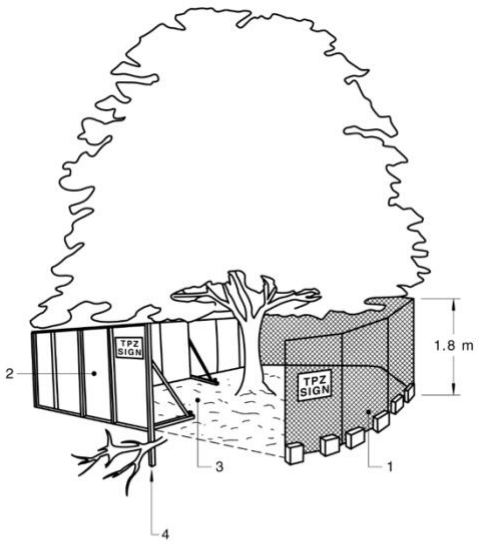
- Tree protection zone/No access.
- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project arborist.
- The name, address, and telephone number of the developer/builder and project arborist.

11.9.4 **Mulch:** Any areas of the TPZ located inside the subject site that are not covered by existing structures/hard surfacing may require mulching if specified in the site-specific tree protection specifications. These areas should be mulched with good quality mulch to a uniform depth of 75 mm. Mulch must not be built up around the trunks of the trees, as this can cause collar rot.

11.9.5 **Ground Protection:** Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric, with boards overlaid to spread the weight and avoid load points. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Existing hard surfacing, such as driveways and hard

surfacing, can provide adequate ground protection if retained. Ground protection is to be specified and approved by the project arborist as required.

11.9.6 **Temporary Irrigation:** Temporary irrigation should distribute water evenly throughout the area of the TPZ. The irrigation should be used for at minimum one hour daily throughout all stages of the development.



KEY:

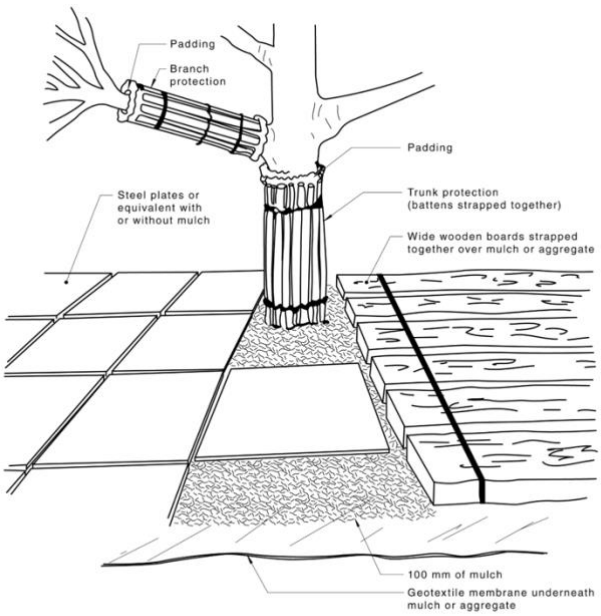
[1] Chain wire mesh panels that are held in place with concrete feet.

[2] Alternatively, plywood or wooden paling fence panels may be used. This fencing material also prevents building materials or soil from entering the TPZ.

[3] Mulch installation across the surface of the TPZ (as detailed in the TPS). No excavation, construction activity grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ other than those indicated in the TPS.

[4] Bracing may be used within the TPZ. Installation of posts or supports should avoid damaging roots.

An image from AS4970-2025, with example tree protection fencing and signage.



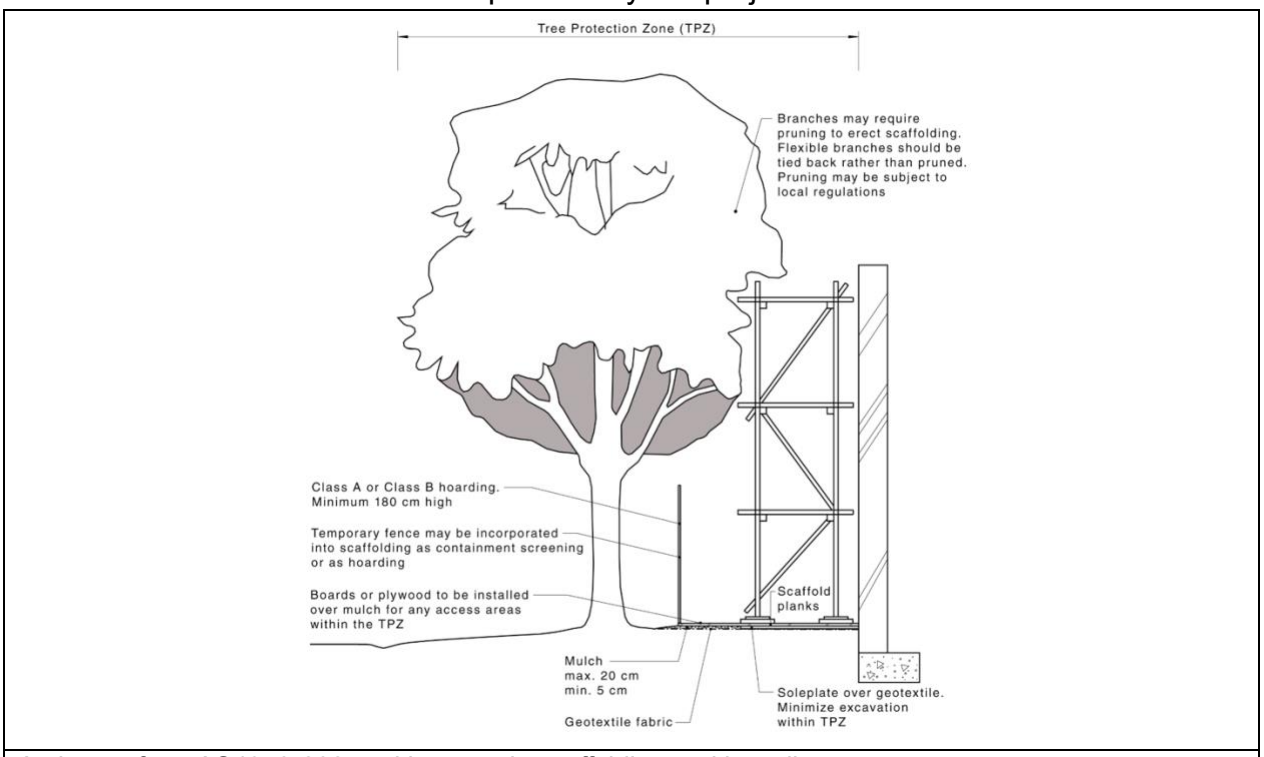
NOTE 1 For trunk and branch protection, boards and padding may be used to prevent damage to bark. Boards shall be joined to each other using hoop straps and screws or similar. They shall not be screwed or nailed to the tree.

NOTE 2 Wide wooden boards or plastic or metal plates should be of a suitable thickness to spread the load and prevent soil compaction and root damage.

An image from AS4970-2025, with example ground and trunk/branch protection.

11.10 **Installation of Scaffolding and Hoarding:** Where practical these should be located outside the TPZ area. When it is not practical, they should be aligned to minimise crown impacts and pruning. Any required crown pruning must be assessed, specified and carried out in accordance with AS4373 Pruning of amenity trees (2007) and is subject to approval by the relevant authorities.

- The ground below the scaffolding should be protected by boarding (e.g. scaffold board or plywood sheeting), to collect falling contaminants such as mortar and render. Where access is required below the scaffolding, ground protection should be installed to minimise soil compaction. The ground protection should be left in place until the scaffolding is removed; see above for details of ground protection measures. Excavation for sole plates or footings of the scaffold should be minimised or otherwise specified by the project arborist when within the NRZ.



An image from AS4970-2025, with example scaffolding and hoarding.

11.11 **Restricted Activities inside the TPZ:** The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the Project arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the Project arborist to minimise the impact to the trees/

A) Machine excavation.
B) Ripping or cultivating of soil.
C) Storage of spoil, soil, or any such materials.
D) Preparation of chemicals, including preparation of cement products.
E) Dumping of waste.
F) Wash down and cleaning of equipment.
G) Placement of fill.
H) Lighting of fires.
I) Soil level changes.

J) Any physical damage to the crown trunk, or root system.
K) Parking of vehicles.

11.12 **Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the Project arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.

11.13 **Excavations:** The Project arborist must supervise and certify that all excavations conform to AS4970-2025. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be completed to a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by the Project arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device.

11.14 **Root Pruning:** The project arborist must supervise and certify that all root pruning conform to AS4373-2007. No pruning of roots greater than 40mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 40mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF Level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).9 The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.

11.15 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimise the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.

- All excavations for landscaping works should be manual and in accordance with section 11.12.
- Replacement planting for all trees recommended for removal should be incorporated into the landscape plan. It is recommended that at minimum one tree for each tree proposed to be removed are planted to maintain/increase overall canopy cover at the site when mature. Any replacement tree must be selected in accordance with AS2303-2018 Tree stock for landscape use.
- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 40mm in diameter.

[9] Council Of Standards Australia, *AS 4373 Pruning of amenity trees* (2007) page 18

- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 50mm or increased by more 100mm without assessment by a consulting Arborist.
- New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, considerer pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.
- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the tree's root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpaths should be located outside the SRZ.
- Where fill/sub-base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- Any new fencing in the TPZ of trees should constructed carefully to avoid impacting significant roots. The location of fence posts should be flexible to allow for the retention of root greater than 40mm in diameter. The base of fence panels should be located above existing soil grades.

11.16 **Underground Services:** Where possible underground services should be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention. No roots greater than 40mm in diameter should be severed during the installation of services unless approved in writing by the project arborist.

11.17 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.

11.18 T**ree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project arborist, at the contractor's expense.

11.19 **Completion of Development Works:** After all construction works are complete the project arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project arborist should provide recommendations for remediation.

12. CONSTRUCTION HOLD POINTS FOR TREE PROTECTION

12.1 Hold Points: Below is a sequence of hold points requiring Project arborist certification throughout the development process. It provides a list of holds points that must be check and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development. The principal contractor should be responsible for implementing all tree protection measures.

Hold Point	Stage	Date Completed and Signature of Project Arborist Responsible
Project arborist to hold pre-construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise.	Prior to development work commencing	
Project arborist to assess and certify that tree protection has been installed prior to works commencing at site.	Prior to development work commencing.	
The project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. Site inspections are recommended on a monthly frequency. Project arborist to assess and certify that tree protection has been adequately maintained to conform to AS4970-2025 and specify additional measures where required.	On-going throughout the development	
The removal of existing structures inside the TPZ of any tree to be retained, such as the existing buildings and hard surfaces must be supervised by the project arborist.	Demolition	
Project arborist to supervise all manual excavations and root pruning inside the TPZ of any tree to be retained. Project arborist to approve all pruning of roots greater than 40mm inside TPZ. All root pruning of roots greater than 40mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	
Project arborist to certify that all underground services including storm water inside TPZ of any tree to be retained conform to AS4970-2025.	Construction	
Project arborist to approve relocation of tree protection for landscaping. All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project arborist to minimise the impact to trees.	Construction/ Landscape	
After all demolition, construction and landscaping works are complete the project arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project arborist should provide recommendations for remediation.	Upon completion of development	

13. BIBLIOGRAPHY/REFERENCES

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- Pittwater 21 Development Control Plan 2023, https://shared-drupal-s3fs.s3.ap-southeast-2.amazonaws.com/master-test/fapub_pdf/Pittwater+21+DCP+(1).pdf.
- Pittwater LEP Heritage map, Sheet HER_016, https://eplanningdlprod.blob.core.windows.net/pdfmaps/6370_COM_HER_016_010_20151118.pdf.
- Pittwater LEP Biodiversity Map, Sheet BIO_016, https://eplanningdlprod.blob.core.windows.net/pdfmaps/6370_COM_BIO_016_010_20140217.pdf.

14. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 1A: Existing Site Plan.
- Appendix 1B: Proposed Site Plan (TPP).
- Appendix 1C: Proposed Stormwater Plan.
- Appendix 1D: Proposed Bulk Earthworks Plan.
- Appendix 2: Tree Inspection Schedule.
- Appendix 3: Further Information of Methodology.
- Appendix 4: Glossary of Terms.

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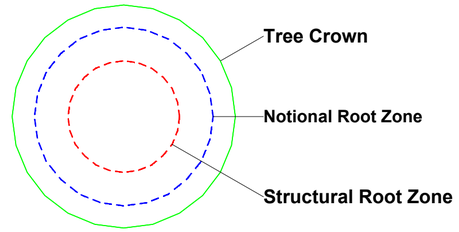
Appendix 1A: Existing Site Plan

SCALE :	DATE :	
1 : 150 @ A2	29/09/2025	URBAN ARBOR The Trusted Name in Tree Management

Prepared by: John Cruickshank

Site Location: 290 Lower Plateau Road, Bilgola Heights, NSW, 2107

Legend



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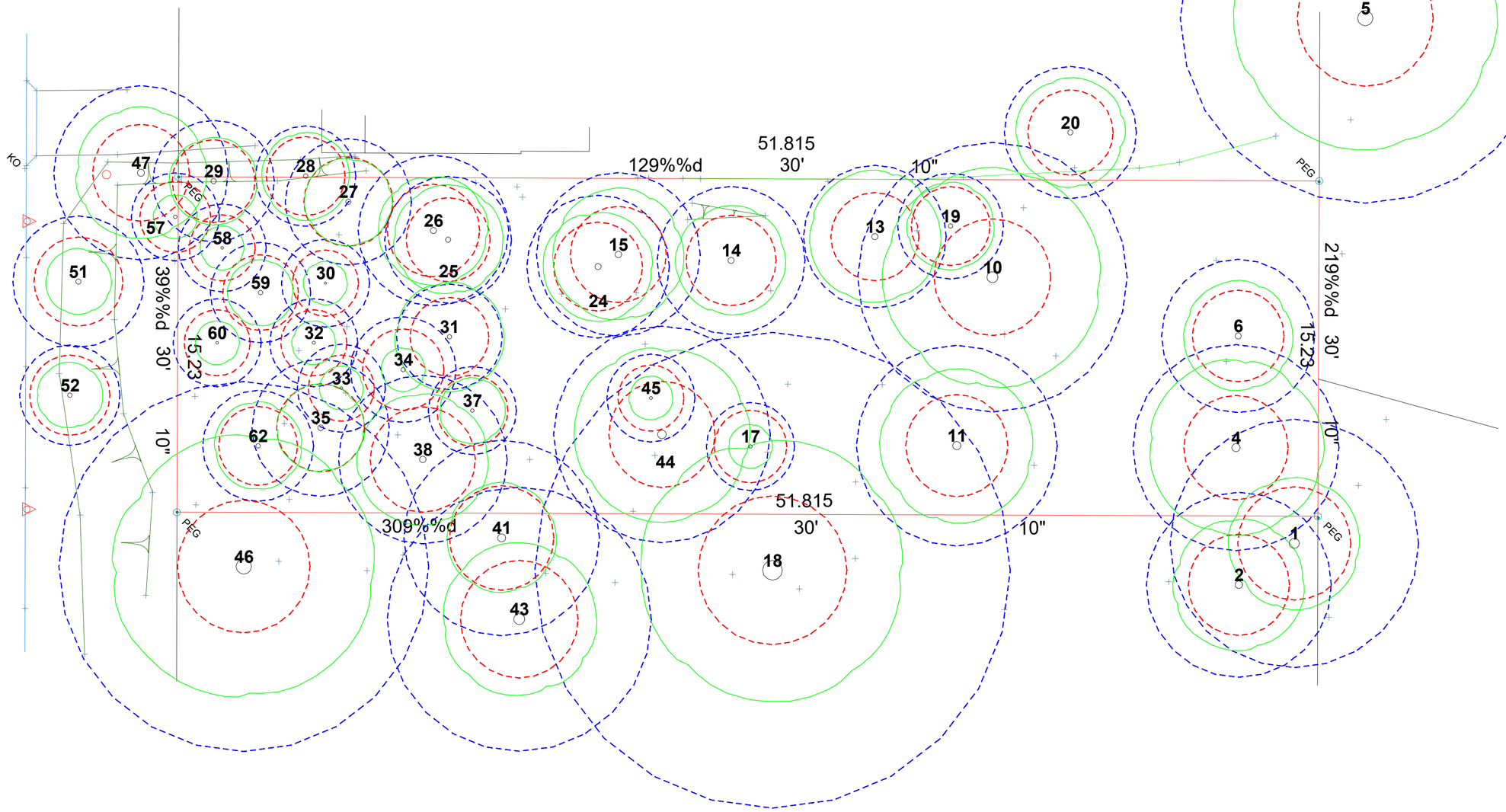
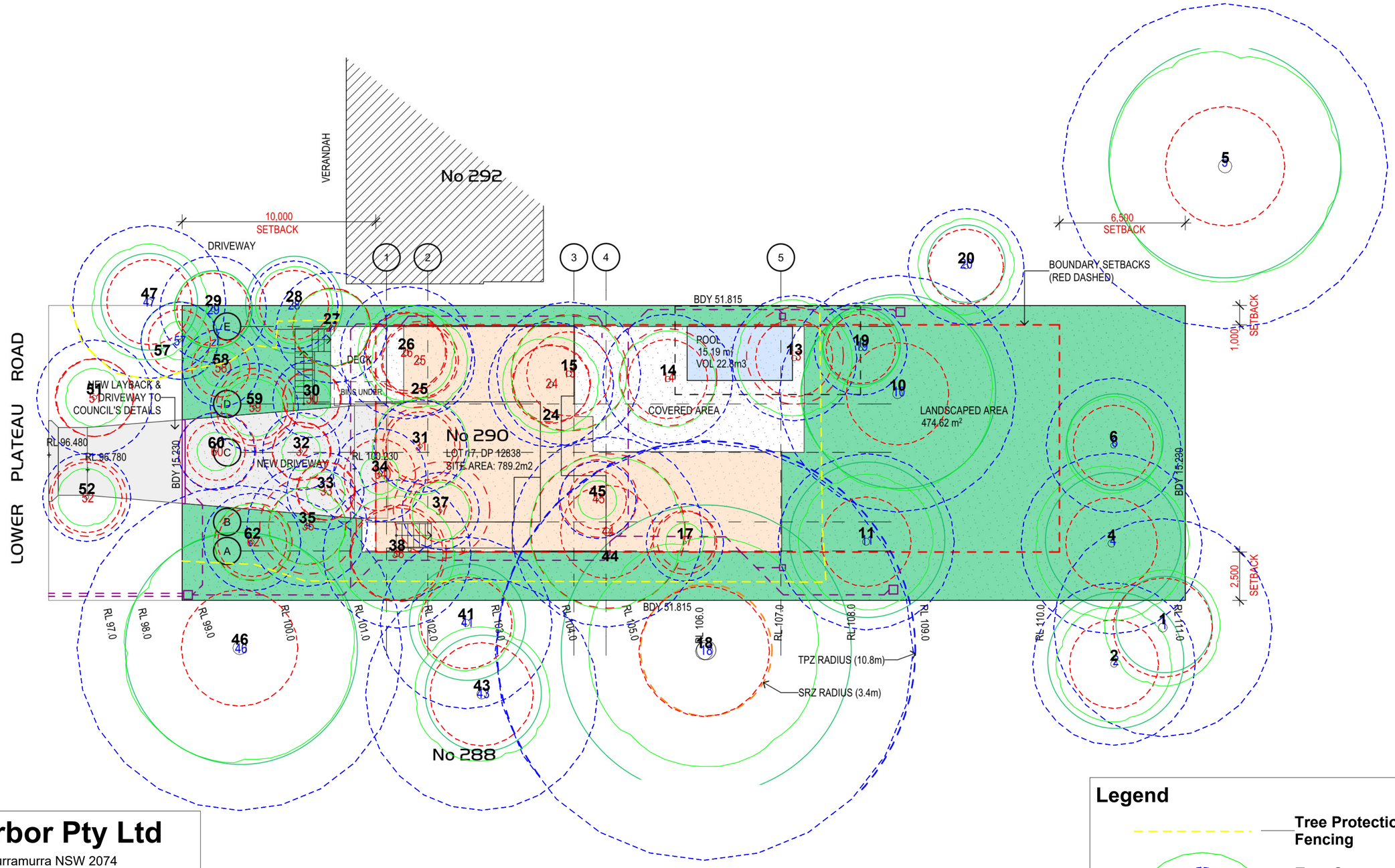
LOWER PLATEAU ROAD





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Appendix 1B: Proposed Site Plan (TPP)

SCALE :	DATE :
1 : 150 @ A2	10/10/2025

Prepared by: John Cruickshank

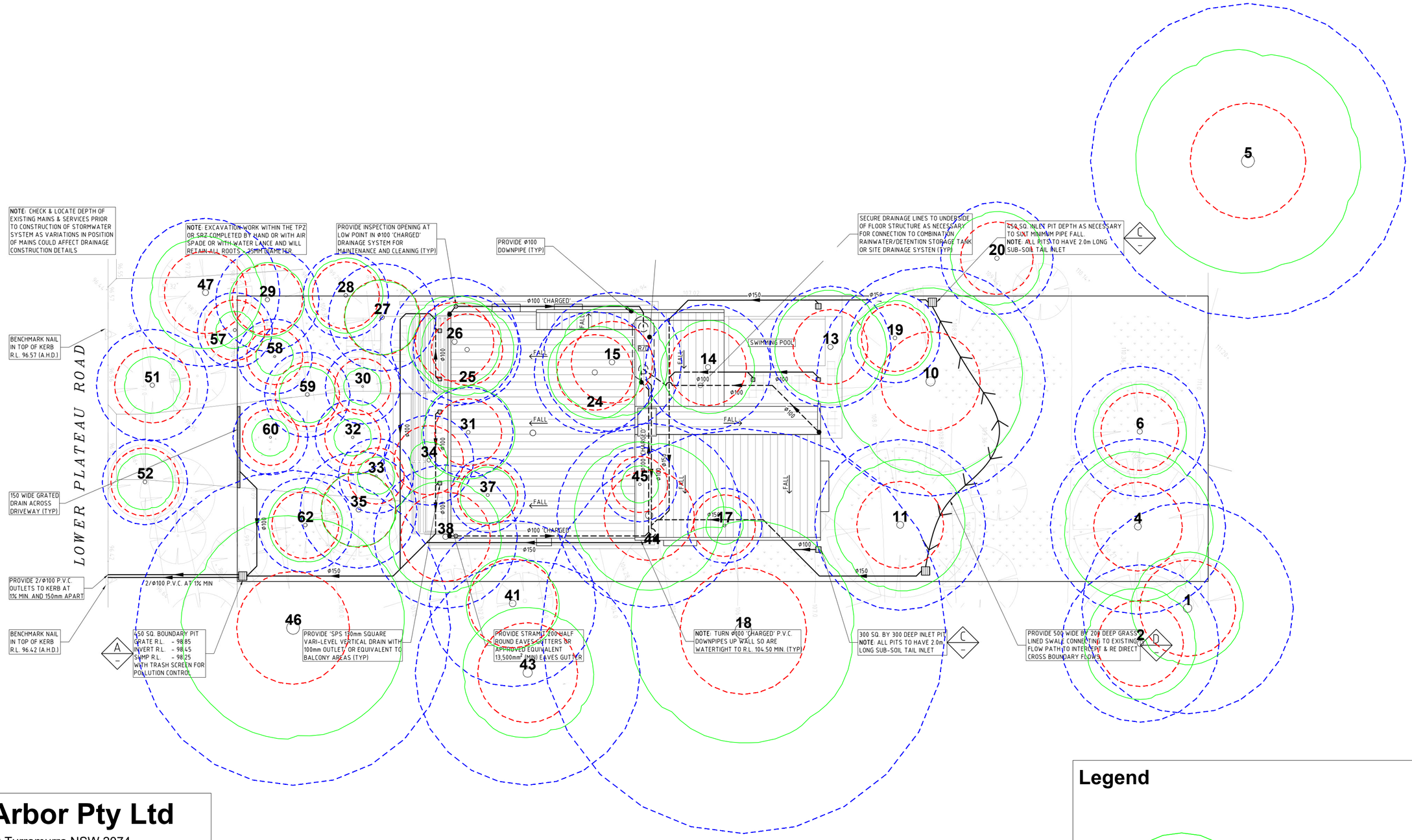
URBAN ARBOR
The Trusted Name in Tree Management

Site Location: 290 Lower Plateau Road, Bilgola Plateau, NSW, 2107

Legend

- Tree Protection Zone Fencing
- Tree Crown
- Notional Root Zone
- Structural Root Zone

0 — 15m



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Appendix 1C: Proposed Stormwater Plan

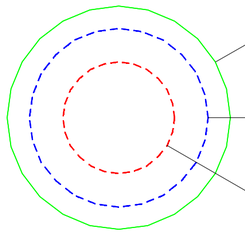
SCALE :	DATE :
1 : 150 @ A2	29/09/2025

Prepared by: John Cruickshank

URBAN ARBOR
The Trusted Name in Tree Management

Site Location: 290 Lower Plateau Road, Bilgola Heights, NSW, 2170

Legend



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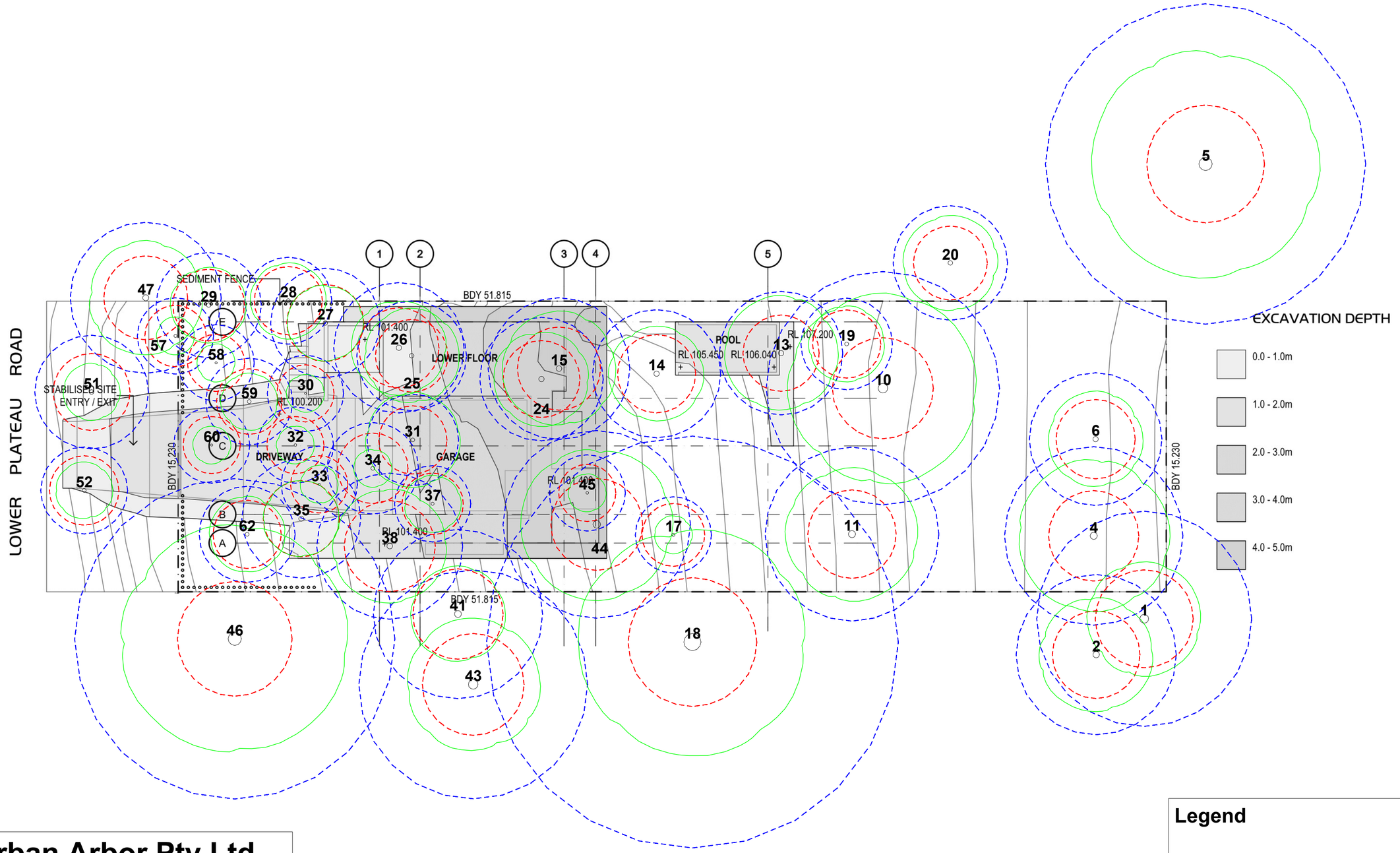

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Appendix 1D: Proposed Bulk Earthworks Plan

SCALE :	DATE :
1 : 150 @ A2	29/09/2025

Prepared by: John Cruickshank

URBAN ARBOR
The Trusted Name in Tree Management

Site Location: 290 Lower Plateau Road, Bilgola Heights, NSW, 2107

Legend

Tree Crown
Notional Root Zone
Structural Root Zone

0 15m

Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DSH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	NRZ Radius (m)	SRZ Radius (m)	Notes
1	Red Bloodwood	*Corymbia gummifera*	Mature	12	3	470					470	550	Fair	Fair	High	3. Short	Z10	5.6	2.6	Located in adjoining property to the Southwest. Upper crown has failed.
2	Red Mahogany	*Eucalyptus resinifera*	Mature	10	3	350					350	420	Fair	Fair	Medium	2. Medium	Z10	4.2	2.3	Located in adjoining property to the Southwest. Asymmetric crown shape and suppressed form.
4	Red Bloodwood	*Corymbia gummifera*	Mature	15	4	390					390	450	Good	Fair	High	1. Long	A1	4.7	2.4	None.
5	Smooth Barked Apple	*Angophora costata*	Mature	17	6	700					700	850	Good	Fair	High	1. Long	A1	8.4	3.1	Located in adjoining property to the Southeast.
6	Smooth Barked Apple	*Angophora costata*	Semi-mature	12	2.5	290					290	330	Good	Fair	Medium	1. Long	A1	3.5	2.1	Minor trunk lean.
10	Red Bloodwood	*Corymbia gummifera*	Mature	14	5	510					510	590	Good	Good	High	1. Long	A1	6.1	2.7	Deadwood in lower crown.
11	Red Mahogany	*Eucalyptus resinifera*	Mature	10	3.5	380					380	430	Good	Good	Medium	1. Long	A1	4.6	2.3	None.
13	Smooth Barked Apple	*Angophora costata*	Semi-mature	9	3	270					270	300	Good	Fair	Medium	1. Long	A1	3.2	2.0	Asymmetric crown shape.
14	Red Mahogany	*Eucalyptus resinifera*	Semi-mature	7	2.5	280					280	320	Fair	Fair	Medium	3. Short	Z4	3.4	2.1	Selective crown dieback of approximately 10-15%. Active termites. Asymmetric crown shape.
15	Smooth Barked Apple	*Angophora costata*	Semi-mature	9	3	310					310	370	Good	Fair	Medium	1. Long	A1	3.7	2.2	Asymmetric crown shape.
17	Black She Oak	*Allocasuarina littoralis*	Semi-mature	6	1	160					160	190	Fair	Fair	Low	3. Short	Z10	2.0	1.6	Upper crown failed.
18	Smooth Barked Apple	*Angophora costata*	Mature	16	6	900					900	1050	Good	Good	High	1. Long	AA	10.8	3.4	Located in adjoining property to the Southwest.
19	Smooth Barked Apple	*Angophora costata*	Semi-mature	7	2	200					200	230	Fair	Fair	Medium	2. Medium	Z10	2.4	1.8	Asymmetric crown shape and suppressed form.
20	Red Mahogany	*Eucalyptus resinifera*	Semi-mature	8	2.5	250					250	280	Good	Good	Medium	1. Long	A1	3.0	1.9	Located in adjoining property to the Southeast.
24	Smooth Barked Apple	*Angophora costata*	Semi-mature	9	2.5	270					270	310	Fair	Fair	Medium	2. Medium	Z10	3.2	2.0	Asymmetric crown shape and suppressed form.
25	Smooth Barked Apple	*Angophora costata*	Semi-mature	9	2.5	240					240	270	Good	Fair	Medium	1. Long	A1	2.9	1.9	Asymmetric crown shape.
26	Smooth Barked Apple	*Angophora costata*	Semi-mature	9	2.5	270	90				285	340	Good	Fair	Medium	1. Long	A1	3.4	2.1	Asymmetric crown shape.
27	Smooth Barked Apple	*Angophora costata*	Semi-mature	9	2	200	130				239	310	Good	Fair	Medium	1. Long	A1	2.9	2.0	Asymmetric crown shape.
28	Smooth Barked Apple	*Angophora costata*	Semi-mature	8	2	190					190	230	Good	Fair	Medium	3. Short	Z9	2.3	1.8	Decay in main union at 3.5m.
29	Smooth Barked Apple	*Angophora costata*	Semi-mature	8	2	230					230	260	Good	Good	Medium	1. Long	A1	2.8	1.9	None.
30	Smooth Barked Apple	*Angophora costata*	Young	7	1	100					100	120	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
31	Red Bloodwood	*Corymbia gummifera*	Semi-mature	8	2.5	200					200	230	Good	Fair	Medium	1. Long	A1	2.4	1.8	Asymmetric crown shape.
32	Red Bloodwood	*Corymbia gummifera*	Semi-mature	5	1	140					140	150	Fair	Fair	Low	5. Small/Young	Z1	2.0	1.5	Suppressed form.
33	Red Bloodwood	*Corymbia gummifera*	Semi-mature	6	1	120					120	130	Good	Fair	Low	5. Small/Young	Z1	2.0	1.5	None.
34	Black She Oak	*Allocasuarina littoralis*	Semi-mature	5	1	200					200	250	Poor	Poor	Low	4. Remove	Z4	2.4	1.8	None.
35	Red Bloodwood	*Corymbia gummifera*	Semi-mature	9	2	260					260	300	Good	Fair	Medium	1. Long	A1	3.1	2.0	Asymmetric crown shape.
37	Spotted Gum	*Corymbia maculata*	Semi-mature	7	1.5	160					160	180	Good	Fair	Medium	1. Long	Z1	2.0	1.6	Asymmetric crown shape.
38	Broad Leaved Scribbly Gum	*Eucalyptus haemastoma*	Semi-mature	8	3	210	240				319	460	Fair	Fair	Medium	3. Short	Z10	3.8	2.4	Co-dominant stems near base. Significant wounds at base of both stems. No central leader stem and suppressed form.
41	Red Bloodwood	*Corymbia gummifera*	Mature	13	2.5	370					370	450	Fair	Good	High	2. Medium	A2	4.4	2.4	Located in adjoining property to the Southwest. Significant deadwood.
43	Cedar Wattle	*Acacia elata*	Mature	20	3.5	500					500	600	Good	Good	High	2. Medium	A1	6.0	2.7	Located in adjoining property to the Southwest.
44	Smooth Barked Apple	*Angophora costata*	Mature	9	4	410					410	470	Fair	Fair	Medium	3. Short	Z10	4.9	2.4	Asymmetric crown shape and no central leader stem.
45	Blueberry Ash	*Elaeocarpus reticulatus*	Semi-mature	6	1	140					140	150	Fair	Fair	Low	5. Small/Young	Z11	2.0	1.5	Growing through crown of adjacent tree.
46	Broad Leaved Scribbly Gum	*Eucalyptus haemastoma*	Mature	16	6	700					700	850	Fair	Fair	High	2. Medium	A2	8.4	3.1	Located in adjoining property to the Southwest. Reduced foliage density for species. Significant previous branch failures in lower crown.
47	Smooth Barked Apple	*Angophora costata*	Semi-mature	9	3	330					330	380	Good	Fair	Medium	2. Medium	A1	4.0	2.2	Trunk skews at 3-6m.
51	Black She Oak	*Allocasuarina littoralis*	Semi-mature	3	1.5	190	160				248	310	Fair	Poor	Low	4. Remove	Z6	3.0	2.0	Significant trunk lean, root plate appears to have partially failed.
52	Smooth Barked Apple	*Angophora costata*	Semi-mature	7	1.5	190					190	240	Fair	Fair	Medium	2. Medium	Z10	2.3	1.8	Trunk skews at 3m then leans significantly.

Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DSH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	NRZ Radius (m)	SRZ Radius (m)	Notes
57	Broad Leaved Scribbly Gum	*Eucalyptus haemastoma*	Semi-mature	5	1	160					160	180	Fair	Fair	Low	3. Short	Z10	2.0	1.6	Suppressed form.
58	Dead tree	*Dead tree*	Dead	6	1	120					120	150	Poor	Poor	Low	4. Remove	Z4	2.0	1.5	None.
59	Smooth Barked Apple	*Angophora costata*	Semi-mature	7	1.5	190					190	210	Good	Good	Medium	1. Long	A1	2.3	1.7	None.
60	Smooth Barked Apple	*Angophora costata*	Semi-mature	6	1	130					130	150	Fair	Fair	Low	5. Small/Young	Z1	2.0	1.5	Significant trunk lean.
62	Smooth Barked Apple	*Angophora costata*	Semi-mature	7	2	210					210	230	Good	Fair	Medium	1. Long	A1	2.5	1.8	Asymmetric crown shape.

Explanatory Notes

Tree Species - Where species is unknown it is indicated with an '*spp*'.
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).
Diameter at Standard Height (DSH) - Measured with a DSH tape or estimated at approximately 1.4m above ground level.
Diameter Above root Buttresses (DAB): Measured with a DSH tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Notional Root Zone (TPZ) - DSH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the NRZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - (DAB x 50) $^{0.42}$ x 0.64. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead.
Structure - Good/Fair/Poor.
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young, 6. Unstable.
Amenity Value - Very High/High/Medium/Low/Very Low.
Retention Value: Tree AZ, see appendix 3 for categories.

Appendix 3: Further Information of Methodology

1. **Tree Age Class:** It can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised their likely age class which is defined below:
   - Young/newly planted – Young or recently planted tree.
   - Semi-mature – Up to 20% of the usual life expectancy for the species.
   - Mature – Between 20% - 80% of the usual life expectancy for the species.
   - Over-mature – Over 80% of the usual life expectancy for the species.
   - Dead – Tree is dead or almost dead.

2. **Health and Physiological Condition:** Below are example conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and response growth development. • Trees that have a life expectancy 40 or more years.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have up to 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average response growth development. • There may be signs of infection pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree. • Trees that may only live between 15 and 40 more years	• The tree is in below average health and vigour and may require remedial works to improve the trees health.
Poor	• The tree may be in decline, have extensive dieback or have over 25% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health. • Trees that have useful life expectancy of less than 5 years.	• The tree is displaying low levels of health and remedial action will not be sufficient to improve the health of the tree.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

3. **Structural Condition:** Below are example conditions sued when assigning a category for structural condition.

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form. • Trees that have a life expectancy 40 or more years.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have structural defects. • The identified defects could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing. • The tree may have suppressed form. • Trees that may only live between 15 and 40 more years	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects that cannot be alleviated. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure. • Trees that have useful life expectancy of less than 5 years.	• The identified defects are likely to cause either partial or whole failure of the tree and cannot be alleviated.

4. **Amenity Value:** To determine the amenity value of a tree, we assess a number of different factors, which include but are not limited to the information below:

   - The visibility of the tree to adjacent sites.
   - The relationship between the tree and the site.
   - Whether the tree is protected by any statutory conditions.
   - The habitat value of the tree.
   - Whether the tree is considered a noxious weed species.

   The amenity value is then rated using one of the following categories:

   - Very High
   - High
   - Moderate
   - Low
   - Very Low

5. **Safe Useful Life Expectancy – SULE, (Barrel, 2001):** A tree's safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow for retention in the existing situation.

Category	Description
1. Long – Over 40 years	a) Structurally sound trees located in positions that accommodate future growth. b) Trees that could be made suitable for retention in the long term by remedial tree care. c) Trees of special significance for historical, commemorative, or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.
2. Medium – 15 to 40 years	a) Trees that may only live between 15 and 40 more years. b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new plantings. d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short – 5 to 15 years	a) Trees that may only live between 5 and 15 more years. b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. d) Trees that require substantial remedial tree care and are only suitable for retention in the short-term.
4. Remove – Under 5 years	a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. b) Dangerous trees because of instability or recent loss of adjacent trees. c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. d) Damaged trees that are clearly not safe to retain. e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. f) Trees that are damaging or may cause damage to existing structures within 5 years. g) Trees that will become dangerous after removal of other trees for the reasons given in a) to f). h) Trees in categories a) to g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	a) Small trees less than 5 metres in height. b) Young trees less than 15 years old but over 5 metres in height. c) Formal hedges and trees intended for regular pruning to artificially control growth.

6. **Retention Value:** The system used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories Field Sheet (Version 10.04-ANZ)

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.

TreeAZ is designed by Barrell Tree Consultancy (www.barrelltreecare.co.uk) and is reproduced with their permission

Appendix 4: Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:
• **Primary**. A first order branch arising from a stem
• **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
• **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending load

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term 'condition' is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DSH (Diameter at Standard Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first-year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end- loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Notional Root Zone (NRZ) - The NRZ area is the primary trigger for determining when arboricultural assessment and input is required on a development site and is calculated to assist with assessing the potential impacts of root loss during development.

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the tree's stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London