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CREATIVEPLANNINGSOLUTIONS

ARBORICULTURAL IMPACT ASSESSMENT

Proposed Demolition of Existing Structures and Construction of an Industrial Building with Associated Parking Areas

323-327 Warringah Road, Frenchs Forest NSW 2086

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DISCLAIMER

The Client acknowledges this Report, and any opinions, advice or recommendations expressed or given in it, are based on the information supplied by the Client and on the data, inspections, measurements and analysis carried out or obtained by CPS and referred to in the Report. No guarantee is implied with respect to future tree safety. The Client should rely on the Report and its contents, only to that extent.

1 EXECUTIVE SUMMARY

This revised Arboricultural Impact Assessment (AIA) was commissioned by LEDA on the 1st of August following revised plans to address issues raised by Northern Beaches Council and the Design and Sustainability Panel. The report relates to one-hundred and six (106) trees located on and adjoining the subject site at 323-327 Warringah Road, Frenchs Forest within the Northern Beaches Council local government area (LGA).

The report provides an evaluation of the likely impact to existing trees (within the subject site, adjoining the site within 5m of the boundaries and within Council street verge areas) as a result of the proposed development including demolition of existing structures and the construction of an industrial building containing thirty-six (36) warehouses, thirty-six (36) offices, one hundred and two (102) car parking spaces and forty-eight (48) bike parking spaces.

A summary of those trees identified has been provided in ***Table 1*** below along with a description of their location, retention values and nominated retention/removal status under the proposal.

Table 1 *– Tree assessment summary*

Tree No.	*Genus & species* Common Name	Location	Retention Value	Retain / Remove
1	***Casuarina glauca*** Swamp Oak	Adjoining allotment – 14 Rodborough Road	Medium	Retain & Protect
2	***Eucalyptus microcorys*** Tallowwood	Adjoining allotment – 14 Rodborough Road	High	Retain & Protect
3	***Casuarina glauca*** Swamp Oak	Adjoining allotment – 14 Rodborough Road	Medium	Retain & Protect
4	***Casuarina glauca*** Swamp Oak	Adjoining allotment – 14 Rodborough Road	Medium	Retain & Protect
5	***Melaleuca styphelioides*** Prickly-leaved Paperbark	Adjoining allotment – 14 Rodborough Road	High	Retain & Protect
6	***Ficus microcarpa var. hillii*** Hills Weeping Fig	Adjoining allotment – 16 Rodborough Road	High	Retain & Protect
7	***Melaleuca styphelioides*** Prickly-leaved Paperbark	Adjoining allotment – 14 Rodborough Road	High	Retain & Protect
8	***Eucalyptus microcorys*** Tallowwood	Adjoining allotment – 16 Rodborough Road	High	Retain & Protect
9	***Ficus microcarpa var. hillii*** Hills Weeping Fig	Adjoining allotment – 16 Rodborough Road	High	Retain & Protect
10	***Ficus microcarpa var. hillii*** Hills Weeping Fig	Adjoining allotment – 16 Rodborough Road	High	Retain & Protect
11	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	High	Retain & Protect
12	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	High	Retain & Protect
13	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	High	Retain & Protect
14	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	Medium	Retain & Protect
15	***Casuarina glauca*** Swamp Oak	Adjoining allotment – 16 Rodborough Road	High	Retain & Protect

Tree No.	*Genus & species* Common Name	Location	Retention Value	Retain / Remove
16	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	Medium	Retain & Protect
17	***Casuarina glauca*** Swamp Oak	Adjoining allotment – 16 Rodborough Road	Medium	Retain & Protect
18	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	Low	Retain & Protect
19	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	Medium	Retain & Protect
20	***Casuarina glauca*** Swamp Oak	Adjoining allotment – 16 Rodborough Road	Low	Retain & Protect
21	***Ficus microcarpa var. hillii*** Hills Weeping Fig	Adjoining allotment – 16 Rodborough Road	High	Retain & Protect
22	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	Medium	Retain & Protect
23	***Ficus microcarpa var. hillii*** Hills Weeping Fig	Adjoining allotment – 16 Rodborough Road	High	Retain & Protect
24	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	Medium	Retain & Protect
25	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	Medium	Retain & Protect
26	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	Medium	Retain & Protect
27	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	Medium	Retain & Protect
28	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	Medium	Retain & Protect
29	***Casuarina glauca*** Swamp Oak	Site Tree – Eastern Boundary	Medium	Retain & Protect
30	***Ulmus parvifolia*** Chinese Elm	Site Tree – Eastern Boundary	Medium	Remove
31	***Eucalyptus bicostata*** Southern Blue Gum	Site Tree – Eastern Boundary	Medium	Remove
32	***Cupaniopsis anacardioides*** Tuckeroo	Site Tree – Eastern Boundary	Medium	Remove
33	***Corymbia gummifera*** Red Bloodwood	Site Tree – Eastern Boundary	High	Remove
34	***Acmena smithii*** Lilly Pilly	Site Tree – Eastern Boundary	Low	Remove
35	***Murraya paniculata*** Orange Jessamine	Site Tree – Eastern Boundary	Low	Remove
36	***Homalanthus populifolius*** Bleeding Heart Tree	Site Tree – Eastern Boundary	Low	Remove
37	***Acmena smithii*** Lilly Pilly	Site Tree – Eastern Boundary	Low	Remove
38	***Banksia integrifolia*** Coast Banksia	Site Tree – Eastern Boundary	Medium	Remove
39	***Banksia integrifolia*** Coast Banksia	Site Tree – Eastern Boundary	Low	Remove
40	***Corymbia gummifera*** Red Bloodwood	Site Tree – Eastern Boundary	High	Remove

Tree No.	*Genus & species* Common Name	Location	Retention Value	Retain / Remove
41	***Callistemon viminalis*** Weeping Bottlebrush	Site Tree – Eastern Boundary	Low	Remove
42	***Corymbia gummifera*** Red Bloodwood	Site Tree – Eastern Boundary	Medium	Remove
43	***Eucalyptus microcorys*** Tallowwood	Site Tree – Eastern Boundary	High	Remove
44	***Callistemon viminalis*** Weeping Bottlebrush	Site Tree – Eastern Boundary	Medium	Remove
45	***Banksia integrifolia*** Coast Banksia	Site Tree – Eastern Boundary	Medium	Remove
46	***Corymbia gummifera*** Red Bloodwood	Site Tree – Eastern Boundary	High	Remove
47	***Corymbia gummifera*** Red Bloodwood	Site Tree – Eastern Boundary	High	Retain & Protect
48	***Eucalyptus sp.*** Eucalyptus	Site Tree – Northern Boundary	Priority for Removal	Remove
49	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
50	***Corymbia gummifera*** Red Bloodwood	Council Street Verge – Warringah Road	High	Retain & Protect
51	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
52	***Lophostemon confertus*** Brush Box	Council Street Verge – Warringah Road	Medium	Retain & Protect
53	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
54	***Lophostemon confertus*** Brush Box	Council Street Verge – Warringah Road	Medium	Retain & Protect
55	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
56	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
57	***Eucalyptus scoparia*** Wallangarra White Gum	Site Tree – Northern Boundary	Medium	Retain & Protect
58	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
59	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
60	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
61	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
62	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
63	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
64	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
65	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect

Tree No.	*Genus & species* Common Name	Location	Retention Value	Retain / Remove
66	***Lophostemon confertus*** Brush Box	Council Street Verge – Warringah Road	Low	Retain & Protect
67	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
68	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
69	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
70	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
71	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
72	***Lophostemon confertus*** Brush Box	Council Street Verge – Warringah Road	Low	Retain & Protect
73	***Lophostemon confertus*** Brush Box	Council Street Verge – Warringah Road	Low	Retain & Protect
74	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
75	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
76	***Lophostemon confertus*** Brush Box	Council Street Verge – Warringah Road	Low	Retain & Protect
77	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
78	***Lophostemon confertus*** Brush Box	Council Street Verge – Warringah Road	Medium	Retain & Protect
79	***Eucalyptus microcorys*** Tallowwood	Council Street Verge – Warringah Road	High	Retain & Protect
80	***Eucalyptus robusta*** Swamp Mahogany	Site Tree – Northern Boundary	High	Retain & Protect
81	***Eucalyptus scoparia*** Wallangarra White Gum	Site Tree – Northern Boundary	Medium	Remove
82	***Eucalyptus camaldulensis*** River Red Gum	Site Tree – Northern Boundary	High	Remove
83	***Corymbia gummifera*** Red Bloodwood	Site Tree – Northern Boundary	High	Remove
84	***Pittosporum undulatum*** Sweet Pittosporum	Site Tree – Western Boundary	Low	Remove
85	***Acacia floribunda*** White Sally Wattle	Site Tree – Western Boundary	Low	Remove
86	***Acmena smithii*** Lilly Pilly	Site Tree – Western Boundary	Low	Retain & Protect
87	***Eucalyptus sp.*** Eucalyptus	Adjoining allotment – 10 Rodborough Road	Low	Retain & Protect
88	***Melaleuca quinquenervia*** Broad-leaved Paperbark	Adjoining allotment – 10 Rodborough Road	High	Retain & Protect
89	***Melaleuca quinquenervia*** Broad-leaved Paperbark	Adjoining allotment – 10 Rodborough Road	High	Retain & Protect
90	***Bauhinia variegata*** Orchid Tree	Adjoining allotment – 10 Rodborough Road	Low	Retain & Protect

Tree No.	*Genus & species* Common Name	Location	Retention Value	Retain / Remove
91	***Bauhinia variegata*** Orchid Tree	Adjoining allotment – 10 Rodborough Road	Low	Retain & Protect
92	***Eucalyptus microcorys*** Tallowwood	Site Tree – Western Boundary	High	Retain & Protect
93	***Eucalyptus microcorys*** Tallowwood	Site Tree – Western Boundary	High	Retain & Protect
94	***Eucalyptus microcorys*** Tallowwood	Site Tree – Western Boundary	High	Remove
95	***Eucalyptus microcorys*** Tallowwood	Site Tree – Western Boundary	High	Retain & Protect
96	***Melaleuca styphelioides*** Prickly-leaved Paperbark	Site Tree – Western Boundary	High	Retain & Protect
97	***Melaleuca styphelioides*** Prickly-leaved Paperbark	Site Tree – Western Boundary	High	Retain & Protect
98	***Melaleuca styphelioides*** Prickly-leaved Paperbark	Site Tree – Western Boundary	High	Retain & Protect
99	***Melaleuca styphelioides*** Prickly-leaved Paperbark	Site Tree – Western Boundary	High	Retain & Protect
100	***Eucalyptus microcorys*** Tallowwood	Site Tree – Western Boundary	High	Retain & Protect
101	***Eucalyptus microcorys*** Tallowwood	Site Tree – Western Boundary	High	Retain & Protect
102	***Eucalyptus microcorys*** Tallowwood	Site Tree – Western Boundary	High	Retain & Protect
103	***Callistemon viminalis*** Weeping Bottlebrush	Site Tree – Eastern Boundary	Medium	Remove
104	***Banksia integrifolia*** Coast Banksia	Site Tree – Eastern Boundary	Medium	Remove
105	***Callistemon viminalis*** Weeping Bottlebrush	Site Tree – Eastern Boundary	Medium	Remove
106	***Callistemon viminalis*** Weeping Bottlebrush	Site Tree – Eastern Boundary	Medium	Remove

Based on the plans supplied and should the proposed works proceed in their current form, it is recommended that twenty-eight (28) trees be removed (**Trees 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 81, 82, 83, 84, 85, 94, 103, 104, 105 & 106**) and seventy-eight (78) trees be retained and protected (**Trees 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 86, 87, 88, 89, 90, 91, 92, 93, 95, 96, 97, 98, 99, 100, 101 & 102**).

It is noted that six (6) of those trees (**Trees 30, 32, 37, 48, 81 & 84**) nominated for removal are exempt from protection under provisions of Part E1 – *Preservation of Trees and Bushland Vegetation* of the Warringah DCP 2011 due to species classification, being located within 2 metres of an existing, approved building, or being dead with no active habitat for native fauna observed.

Specific recommendations as per ***Section 7*** will need to be adopted to ensure root sensitive construction techniques and methodology are employed which mitigate any potential negative impacts to retained trees.

2 INTRODUCTION

2.1 Background

This revised Arboricultural Impact Assessment (AIA) was commissioned by LEDA on the 1st of August following revised plans to address issues raised by Northern Beaches Council and the Design and Sustainability Panel. This revised report will evaluate the potential impacts that proposed development works will have on existing trees located on and adjacent to the subject site at 323-327 Warringah Road, Frenchs Forest (refer to ***Figure 1***).

Accordingly, the purpose of this report is to assess the potential impact of the proposed development on the subject trees, as well as provide recommendations for further amendments to the design or construction methodology where necessary to minimise any adverse impact. The report also provides recommended tree protection measures to ensure the long-term preservation of the trees to be retained where appropriate.

2.2 Objectives

This report has been prepared to assess the level of impact development works are likely to cause to existing trees and make a determination as to whether trees will be adversely affected. The report will aim to provide guidance as to those trees requiring removal, retention or protection in accordance with the provisions of *AS4970-2009 Protection of trees on development sites*. Where necessary, it will also provide recommendations for design modifications and any replacement planting. As such, the objectives of this report are as follows:

- Assess the current site and growing conditions of trees;
- Assess the current health, condition, lifespan & significance of the trees within the site;
- Identify relative retention values of trees within the site;
- Calculate anticipated encroachment levels resulting from proposed works;
- Determine the likely impact as a result of the calculated encroachments;
- Assess potential for retention and protection of trees where possible;
- Advise any design modifications necessary to retain important trees;
- Recommend tree and root sensitive design and construction methodologies to mitigate impacts to trees to be retained;
- Inform of any tree removal necessary due to unsustainable impacts;
- Provide guidance and recommendations for any replacement planting necessary.

No aerial inspection, root mapping or internal diagnostic testing has been carried out as part of this report. Additionally, no cation exchange capacity testing or plant tissue analysis has been undertaken.

2.3 Legislation & Regulating Documents

This Arboricultural Impact Assessment has considered the following regulatory documents:

- *State Environmental Planning Policy (Biodiversity and Conservation) 2021*
- *Warringah Local Environmental Plan 2011 (Warringah LEP 2011)*
- *Warringah Development Control Plan 2011 (Warringah DCP 2011)*

2.4 Documentation Received

The following documents were received and have been relied upon for this Assessment:

Table 2 *– Documentation received and reviewed as part of the Arboricultural Impact Assessment*

Document Description	Author	Revision No. / Date
Architectural Plans	WMK Architecture	21 / 04.09.2023
Drainage Layout	Van Der Meer Consulting	F / 23.08.2023
Feature & Level Survey	Realserve	B / 05.09.2022

Note: care has been taken to obtain all information from reliable sources; however, the author makes no representations, guarantees or warranties as to the accuracy of information provided by others. No other information has been reviewed, should this become available impacts may be subject to change.

2.5 The Site

The site is known as 323-327 Warringah Road, Frenchs Forest and is legally described as Lot 21 in DP881819 (the site). The site is located on the southern side of Warringah Road and currently contains a multi-storey warehouse and office building with associated driveways and parking spaces (refer to ***Figure 1*** below).

2.6 Proposed Development

The proposed development is for the demolition of existing structures and construction of an industrial building containing thirty-six (36) warehouses, thirty-six (36) offices, one hundred and two (102) car parking spaces and forty-eight (48) bike parking spaces (refer to ***Figure 2*** below).

Specifically, those works considered likely to impact the existing trees on and adjoining the subject site include the new building footprint and associated earthworks.

2.7 Limitations

Trees are living organisms whose health and condition can change rapidly. The conclusions and recommendations in this report are valid for one (1) year only from the date of the report, unless otherwise stated. Any changes to the site as it stands at present, for example building extensions, excavation works, importing of soils, extreme weather events etc. will invalidate this report. Any reproduction of this report must be in full colour using the report in its entirety.

Figure 1 *– Aerial image indicating subject site (outlined blue) – Source: Nearmap*

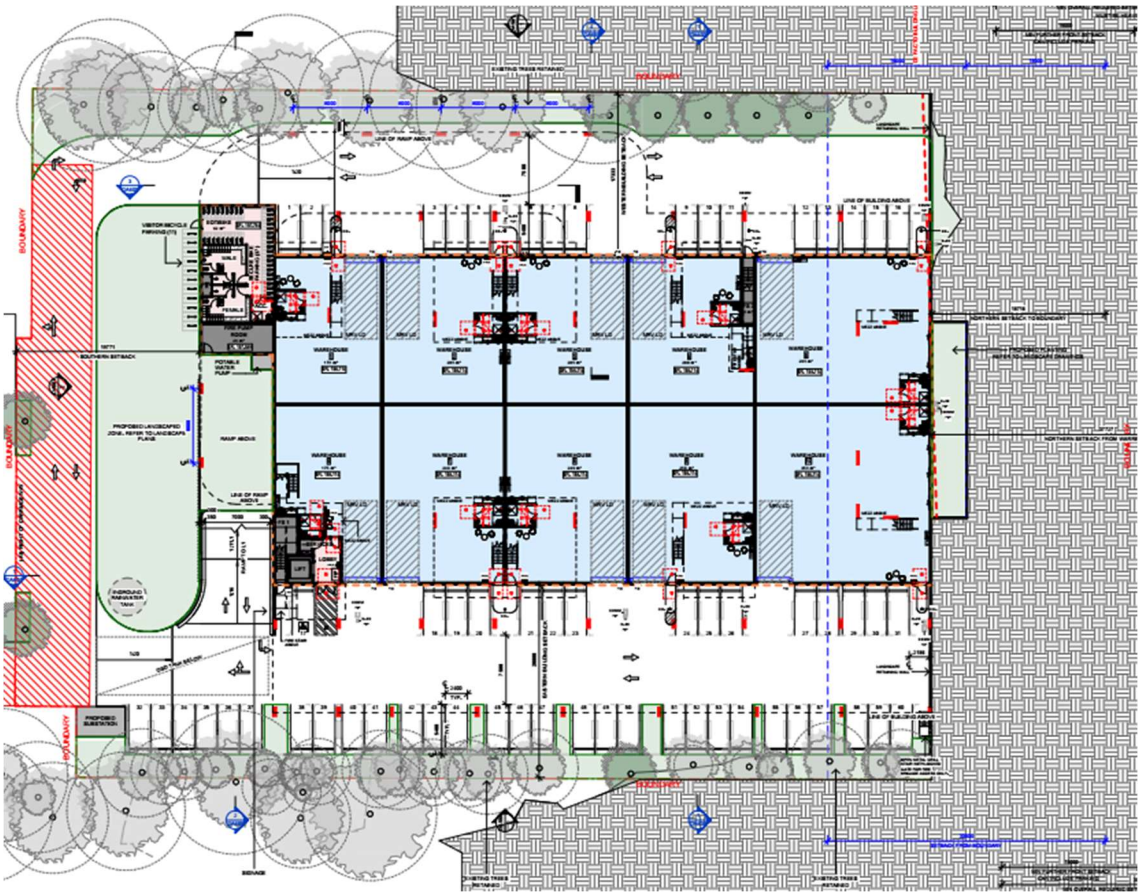

Figure 2 *– Ground Floor Plan extract showing the proposed layout of the development*
Source: WMK Architecture 04.09.2023

3 METHOD

3.1 Method

3.1.1 Site Inspection

A site inspection was carried out by the author with the subject trees and the general growing environment evaluated on the 31st of August 2021. The weather at the time of inspection was fine and with good visibility.

The subject trees were inspected visually from ground level with the following information recorded and provided in tabulated form at ***Appendix 1***:

- Tree Species (Botanical & Common Name);
- Approximate height;
- Approximate canopy spread;
- Trunk Diameter (measured at 1.4 metres from ground level);
- Trunk Diameter at base (above root crown);
- Age class;
- Health & vigour; using foliage size, colour, extension growth, presence of disease or pest infestation, canopy density, presence of deadwood, dieback and epicormic growth as indicators;
- Condition; using visible evidence of structural defects, instability, evidence of previous pruning and physical damage as indicators;
- Suitability of the tree to the site and its existing location;
- Safe Useful Life Expectancy (SULE).

3.1.2 Safe Useful Life Expectancy (SULE)

The remaining Safe Useful Life Expectancy of a tree is an estimate of the sustainability of the tree in the landscape, calculated based on an estimate of the average age of the species in an urban area, less its estimated current age. The life expectancy of each tree has been further modified where necessary in consideration of its current health, vigour, condition and suitability to the site. The estimated SULE of each tree is shown in ***Appendix 1***.

The following ranges have been allocated to each tree:

- Long SULE: Trees that appear to be retainable with an acceptable level of risk for > 40 years.
- Medium SULE: Trees that appear to be retainable with an acceptable level of risk for 15 to 40 years.
- Short SULE: Trees that appear to be retainable with an acceptable level of risk for 5–15 years.
- Remove: Trees with a high level of risk that would need removing within the next 5 years.
- Small, Young or Regularly Pruned.

3.1.3 Landscape Significance

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. Several factors contribute towards the assessment of a tree's significance including but not limited to condition and vigour, form, visual prominence, heritage status, indigeneity, legislative protection, cultural sentiment and future growth potential.

For the purposes of this report the Australian Institute of Consulting Arborists (IACA) Significance of a Tree, Assessment Rating System (STARS)© has been utilised. The system uses a scale of High, Medium and Low significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

Appendix 3 provides a full outline of assessment criteria for each significance rating as per IACA STARS (2010).

3.1.4 Retention Value

Retention values have been determined for each tree on site to establish a hierarchy for tree retention. Retention values are based on estimated life spans and their associated landscape significance rating in accordance with the Tree Retention Value Priority Matrix. This matrix established the following retention values and can be found at ***Appendix 3*** with attributed retention values found within ***Appendix 1***:

- Priority for Retention (High)
- Consider for Retention (Medium)
- Consider for Removal (Low)
- Priority for Removal

3.1.5 AS4970-2009 Protection of Trees on Development Sites

The Australian Standard, *AS4970-2009-'Protection of trees on development sites'*, has been used as a guide to provide recommendations for the assessed trees. The Standard provides guidance on the principles for protecting trees on land subject to development as well as principles for determining viability of tree retention. Terminology and recommended methods are consistent with *AS4970-2009*.

3.1.6 Tree Protection Zones

The assessed trees have been allocated Tree Protection Zones (TPZ). The Australian Standard, *AS4970-2009-'Protection of trees on development sites'*, has been used as a guide in the allocation of TPZs for the assessed trees. The TPZ is calculated based on trunk (stem) diameter at breast height (DBH), measured at 1.4 metres above ground level. The radius of the TPZ is calculated by multiplying the trees DBH by 12. The method provides a TPZ that addresses health and growing requirements of a tree as well as the trees stability. TPZ distances are measured as a radius from the centre of the trunk at (or near) ground level. The maximum TPZ should be no more than 15m radius and the minimum TPZ should be no less than 2m radius.

An extract of the *AS4970-2009* for calculating TPZ has been provided at ***Appendix 4*** for reference.

3.1.7 Structural Root Zone

The assessed trees have been allocated Structural Root Zones (SRZ). The Australian Standard, *AS4970-2009 - 'Protection of trees on development sites'*, has been used as a guide in the allocation of SRZ's for the assessed trees. The SRZ is a radial area extending outwards from the centre of the trunk and is calculated as follows:

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

4 OBSERVATIONS

4.1 General

The site area subject to this assessment was observed as highly disturbed with minor understorey present. The majority of trees observed included native and locally indigenous species. All trees appeared to be planted specimens with no remnant trees likely to represent any of those identified. Health, vigour and condition was varied across the trees forming part of the assessment. Root zones of assessed trees were generally observed as modified groundcover within deep soil areas. Two (2) trees (*Eucalyptus scoparia*) observed within the site bounds are listed as 'Endangered' under the NSW Biodiversity Conservation Act 2016. No endangered or critically endangered ecological communities were observed.

4.2 State Environment Planning Policy (Biodiversity and Conservation) 2021

In accordance with Part 2.3(1)(a) of State Environment Planning Policy (Biodiversity & Conservation) 2021 (Biodiversity & Conservation SEPP), this Policy is applicable to the subject land given the site is located within the Northern Beaches local government area. As outlined by Part 2.1 of the Biodiversity & Conservation SEPP, the aims of this policy are:

(a) to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and;

(b) to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation.

The aims of this policy are considered to have been achieved as part of the proposed development through the preservation and protection of amenity and biodiversity values provided by trees and other vegetation on site wherever possible. Adverse impacts have been mitigated and overall vegetation loss reduced through careful consideration of building footprints and associated infrastructure throughout the design development process. The report also provides detailed tree protection measures and technical specifications to ensure the ongoing health, viability and preservation of the trees to be retained throughout construction.

4.3 Tree Preservation Order

Part E1 –– *Preservation of Trees and Bushland Vegetation* of the Warringah DCP 2011 applies to all land, waterways and bushland covered by the Warringah DCP 2011. The provisions included within the DCP generally protect any tree or vegetation that corresponds with the following criteria:

1) Any tree that is over 5 metres in height.

2) Vegetation in "Bushland"

"Bushland" means land on which there is vegetation which is either a remainder of the natural vegetation of the land or, if altered, is still representative of the structure and floristics of the natural vegetation.

4.4 The Trees

A total of one hundred and six (106) trees were observed within the subject site, adjoining the site within 5m of the boundaries and within the Council street verge have been surveyed as part of this assessment. All tree data recorded on site has been tabulated and is contained at ***Appendix 1***. Each tree has been provided with an identification number for reference purposes and is denoted on the attached Tree Location Plan at ***Appendix 2***.

Trees 1, 2, 3, 4, 5, & 7 (*Casuarina glauca, Eucalyptus microcorys & Melaleuca styphelioides*) are located in the adjoining allotment (14 Rodborough Road) and are situated in garden beds that are bounded by driveways and car parking spaces. Trees were observed to be in Good/Average health and condition and were assigned Medium/High Retention Values.

Trees 6, 8, 9, 10, 15, 17, 20, 21, & 23 *(Ficus microcarpa var. hillii, Eucalyptus microcorys & Casuarina glauca)* are located in the neighbouring allotment (16 Rodborough Road) and along with **Trees 11, 12, 13, 14, 16, 18, 19, 22, 24, 25, 26, 27, 28 & 29** (*Casuarina glauca*) form a dense avenue along the eastern boundary. Trees were observed to be in Good/Average health and condition and were assigned Medium/High Retention Values with the exception of **Trees 18 & 20** which are semi-mature trees that were assigned Low Retention Values due to their suppressed form and poor structure.

Trees 30, 31, 32 & 33 *(Ulmus parvifolia, Eucalyptus bicostata, Cupaniopsis anacardioides & Corymbia gummifera)* are located within an open landscaped area surrounded by the existing car park on site. These trees were observed to be in Good/Fair health and condition and were assigned Medium/High Retention Values. **Trees 30 & 32** are noted to be exempt from protection under provisions of Part E2 -– *Preservation of Trees and Bushland Vegetation* of the WDCP 2011due to species classification.

Trees 34, 35, 36 & 37 *(Acmena smithii, Murraya paniculata & Homolanthus populifolius)* surround the existing substation located on site. These trees were observed to be in generally Good/Average health and condition and were assigned Low Retention Values as they were not considered significant in the landscape setting. **Tree 37** is noted to be exempt from protection under provision of Part E2 -– *Preservation of Trees and Bushland Vegetation* of the WDCP 2011due to proximity to a building.

Trees 38, 39, 40, 41, 42, 43, 44, 45, 103, 104, 105 & 106 (*Banksia integrifolia, Corymbia gummifera, Callistemon viminalis & Eucalyptus microcorys)* surround the existing metal shed on the north-east corner of the site. Tree varied in age class from juvenile to mature and were observed to be in generally Good/Fair health and condition. All trees were assessed to provide a Medium/High Retention Value with the exception of **Trees 39 & 41** which are semi-mature trees that were assigned Low Retention Values due to their suppressed health and condition.

Trees 46, 47, 48, 57, 80, 81, 82 & 83 *(Corymbia gummifera, Eucalyptus scoparia, Eucalyptus robusta & Eucalyptus camaldulensis)* are located in the northern setback adjoining the Warringah Road verge and along with **Trees 49-56 & 58-79** *(Eucalyptus microcorys, Corymbia gummifera & Lophostemon confertus) which* are located within the Warringah Road verge make up a small open forested area. All trees were observed to be in Good/Fair health and condition and were assigned Medium/High Retention Values with the exception of **Tree 48** which was observed to be a hazardous dying tree,

and **Trees 66, 72, 73 & 76** *(Lophostemon confertus)* which are semi-mature trees that were assigned Low Retention Values due to their suppressed form and poor health and condition.

Trees 84, 85 & 86 *(Pittosporum undulatum, Acacia floribunda & Acmena smithii)* are located adjacent to the carpark retaining wall on the north-western corner of the site. These trees were observed to be in generally Poor/Average health and condition and were assigned Low Retention Values as they were not considered significant in the landscape setting.

Trees 87, 88, 89, 90 & 91 *(Eucalyptus sp., Melaleuca quinquenervia & Bauhinia variegata)* are located in the adjoining allotment (10 Rodborough Road) and are situated in a raised garden bed adjacent to the driveway and car parking spaces. All trees were observed to be in generally Good/Average health and condition. **Trees 87, 90 & 91** were assigned Low Retention Values due to their insignificance in the landscape while **Trees 88 & 89** were assigned High Retention Values due to being long lived and providing a moderate significance to the landscape setting.

Trees 92, 93, 94, 95, 96, 97, 98, 99, 100, 101 & 102 (*Eucalyptus microcorys & Melaleuca styphelioides*) form an avenue of mature trees along the western boundary on site. All trees were observed to be in Good/Average health and condition and were assigned High Retention Values.

5 DISCUSSION

5.1 Impact Assessment

The impact assessment is to calculate the incursions to the root zones and canopies as a result of the proposed demolition and construction works and evaluate the likely impact of the proposed works on the subject trees. A summary of the impacts anticipated are contained within the Tree Schedule at ***Appendix 1***. Additionally, plans demonstrating the level of incursion and conflict to TPZ's and SRZ's can be found at ***Appendix 2***. As part of the assessment the following criteria have been considered:

- Existing Relative Levels (R.L.);
- Proposed Relative Levels;
- Tree Protection Zones (TPZ);
- Structural Root Zones (SRZ);
- Footprint of the proposed development (incl. stormwater and services) and temporary structures (scaffolding, hoardings etc.);
- Incursions to the TPZ & SRZ, including estimated cut & fill beyond the building footprint;
- Incursions to the tree canopy from the building envelope and temporary structures;
- Pruning necessary for building clearance;
- Remediation works for soil contaminants;
- Species tolerance to disturbance; and
- Assessment of the likely impact of the works on existing trees.

5.2 Trees Recommended for Removal

Should the proposed works proceed in their current form, it is recommended that twenty-eight (28) site trees be removed. This includes **Trees 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 81, 82, 83, 84, 85, 94, 103, 104, 105 & 106**. Removals have been recommended based upon;

- Location within the proposed building footprint, driveway and grading works;
- Unsustainable major encroachment into the Tree Protection Zones (TPZs) and Structural Root Zones (SRZs);
- Hazardous tree risk.

It is noted that six (6) of those trees (**Trees 30, 32, 37, 48, 81 & 84**) nominated for removal are exempt from protection under provisions of Part E1 – *Preservation of Trees and Bushland Vegetation* of the Warringah DCP 2011 due to species classification, being located within 2 metres of an existing, approved building, or being dead with no active habitat for native fauna observed.

Refer to ***Appendix 2*** for a plan indicating the location of trees that will require removal (dashed red).

Table 3 *– Trees recommended for removal*

Tree No.	Genus & Species	Retention Value	Reason for Removal
30	***Ulmus parvifolia*** Chinese Elm	Medium	Full encroachment. Within the proposed building footprint.

Tree No.	Genus & Species	Retention Value	Reason for Removal
31	***Eucalyptus bicostata*** Southern Blue Gum	Medium	Full encroachment. Within footprint of proposed ramp.
32	***Cupaniopsis anacardioides*** Tuckeroo	Medium	Full encroachment. Within footprint of proposed ramp.
33	***Corymbia gummifera*** Red Bloodwood	High	Full encroachment. Within footprint of proposed ramp.
34	***Acmena smithii*** Lilly Pilly	Low	Major 31% TPZ and 33% SRZ incursion due to proposed retaining wall and level change.
35	***Murraya paniculata*** Orange Jessamine	Low	Major 25% TPZ and 25% SRZ incursion due to proposed retaining wall and level change.
36	***Homalanthus populifolius*** Bleeding Heart Tree	Low	Major 14% TPZ and 9% SRZ incursion due to proposed retaining wall and level change.
37	***Acmena smithii*** Lilly Pilly	Low	Full encroachment. Within footprint of proposed driveway.
38	***Banksia integrifolia*** Coast Banksia	Medium	Major 14% TPZ and 43% SRZ incursion due to proposed retaining wall and level change.
39	***Banksia integrifolia*** Coast Banksia	Low	Full encroachment. Within proposed carparking area.
40	***Corymbia gummifera*** Red Bloodwood	High	Full encroachment. Within footprint of proposed driveway.
41	***Callistemon viminalis*** Weeping Bottlebrush	Low	Full encroachment. Within proposed carparking area.
42	***Corymbia gummifera*** Red Bloodwood	Medium	Full encroachment. Within proposed grading extents.
43	***Eucalyptus microcorys*** Tallowwood	High	Full encroachment. Within proposed grading extents.
44	***Callistemon viminalis*** Weeping Bottlebrush	Medium	Full encroachment. Within proposed grading extents.
45	***Banksia integrifolia*** Coast Banksia	Medium	Full encroachment. Within proposed grading extents.
46	***Corymbia gummifera*** Red Bloodwood	High	Full encroachment. Within proposed grading extents.
48	***Eucalyptus sp.*** Eucalyptus	Priority for Removal	Dead tree.

Tree No.	Genus & Species	Retention Value	Reason for Removal
81	***Eucalyptus scoparia*** Wallangarra White Gum	Medium	Major 26% TPZ and <1% SRZ incursion due to proposed grading extents.
82	***Eucalyptus camaldulensis*** River Red Gum	High	Full encroachment. Within proposed grading extents.
83	***Corymbia gummifera*** Red Bloodwood	High	Full encroachment. Within proposed grading extents.
84	***Pittosporum undulatum*** Sweet Pittosporum	Low	Full encroachment. Within proposed carparking area.
85	***Acacia floribunda*** White Sally Wattle	Low	Major 30% TPZ & 26% SRZ incursion from proposed retaining wall and level change.
94	***Eucalyptus microcorys*** Tallowwood	High	Full encroachment. Within footprint of proposed driveway.
103	***Callistemon viminalis*** Weeping Bottlebrush	Medium	Major 40% TPZ + 39% SRZ incursion from proposed retaining wall and level change.
104	***Banksia integrifolia*** Coast Banksia	Medium	Major 44% TPZ + 40% SRZ incursion from proposed retaining wall and level change.
105	***Callistemon viminalis*** Weeping Bottlebrush	Medium	Major 40% TPZ + 37% SRZ incursion from proposed retaining wall and level change.
106	***Callistemon viminalis*** Weeping Bottlebrush	Medium	Major 40% TPZ + 37% SRZ incursion from proposed grading extents.

5.3 Trees Recommended for Retention & Protection

Should the proposed works proceed in their current form, it is recommended that seventy-eight (78) trees be retained and protected given the proposed works are unlikely to result in any significant negative impacts to their long-term health and viability[1]. This includes **Trees 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 86, 87, 88, 89, 90, 91, 92, 93, 95, 96, 97, 98, 99, 100, 101 & 102.**

Trees 92 & 93 have been nominated for retention despite 'major' encroachment into their TPZ/SRZ as per AS4970:2009 Protection of Trees on Development Sites from the proposed driveway footprint and retaining wall. Incursions have been deemed sustainable due the good health and condition of these trees as well as these trees being located on an embankment approximately 1.17 metres higher than the proposed works resulting in potential reduction of structural root loss due to compression roots not extending a great distance and being less important for supporting the tree. Root-sensitive excavation methods and Project Arborist supervision are recommended in ***Section 7*** below to ensure these trees' ongoing health, viability and longevity.

Trees 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27, 28, 29, 95, 96, 97, 98, 99, 100, 101 & 102 have been nominated for retention despite apparent encroachment into their TPZs from the proposed driveway footprint. Incursions have been deemed sustainable due the location of the existing hard paved car parking area in a similar alignment that is likely to have inhibited root development into the site as well as these species known tolerance for moderate root disturbance. Impacts to these trees' health, viability and longevity have been deemed sustainable following the implementation of root-sensitive excavation methods recommended in ***Section 7*** below.

Refer to ***Appendix 2*** for a plan indicating the location of trees that are to be retained and protected (shaded green).

Table 4 *– Trees recommended for retention & protection*

Tree No.	Genus & Species	Retention Value			Works within the Tree Protection Zone (TPZ)
1-10	***Casuarina glauca, Eucalyptus microcorys, Melaleuca styphelioides, Ficus microcarpa var. hillii***	Medium		High	No works proposed within the TPZ
11-19	***Casuarina glauca***	L	M	H	No additional incursion due to existing site structures
20-21	***Casuarina glauca, Ficus microcarpa var. hillii***	Low		High	No works proposed within the TPZ
22-29	***Casuarina glauca, Ficus microcarpa var. hillii***	Medium		High	No additional incursion due to existing site structures

[1] Though nominated for retention, it is noted that **Tree 57** is exempt from protection under provisions of Part E1 — *Preservation of Trees and Bushland Vegetation* of the Warringah DCP 2011 due to species classification.

Tree No.	Genus & Species	Retention Value			Works within the Tree Protection Zone (TPZ)
47, 49-80	***Corymbia gummifera, Eucalyptus microcorys, Lophostemon confertus, Eucalyptus scoparia, Eucalyptus robusta***	L	M	H	No works proposed within the TPZ
86-91	***Casuarina glauca***	Low		High	No works proposed within the TPZ
92	***Eucalyptus microcorys***	High			'Major' 5% TPZ + 3% SRZ incursion from proposed driveway footprint and retaining wall
93	***Eucalyptus microcorys***	High			'Major' 9% TPZ + 3% SRZ incursion from proposed driveway footprint and retaining wall
95-102	***Eucalyptus microcorys, Melaleuca styphelioides***	High			No additional incursion due to existing site structures

5.4 Ancillary Construction Related Impacts

Vehicles, machinery and equipment requiring access to the site have potential to result in inadvertent impacts to those trees being retained including compaction of the root zone, soil disturbance, physical damage to roots, trunk damage etc. and as such will require management.

Furthermore, storage and stockpiling of material may result in similar impacts and will require management. In this regard, protection for those trees to be retained is to be carried out in accordance with ***Appendix 5***.

6 CONCLUSION

6.1 Proposed Development Impact

Based on the plans and information supplied, the proposal would result in the following impacts to existing trees on site:

Removal of twenty-eight (28) trees, including:

- **Trees 30, 31, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 82, 83, 84 & 94** (19 trees) due to being located within the proposed building footprint and associated driveways and car parking spaces;

- **Trees 34, 35, 81, 85, 103, 104, 105 & 106** (8 trees) due to major unsustainable encroachments into the TPZ and SRZ from the proposed driveways;

- **Tree 48** due to being a hazardous dying tree.

Retention and protection of seventy-eight (78) trees, including:

- Twenty-eight (28) site trees **(Trees 11, 12, 13, 14, 16, 18, 19, 22, 24, 25, 26, 27, 28, 29, 47, 57, 80, 86, 92, 93, 95, 96, 97, 98, 99, 100, 101 & 102)** and fifty (50) neighbouring trees **(Trees 1-10, 15, 17, 20, 21, 23, 49-56, 58-79 & 87-91)** which are generally located away from the proposed construction works and are to have either nil or sustainable incursions to their respective Tree Protection Zones. Impacts are considered tolerable and unlikely to impact long term health and viability pending implementation of tree protection measures and Project Arborist supervision.

Specific recommendations as per ***Section 7*** will need to be adopted to ensure root sensitive construction techniques and methodology are employed which mitigate the potential negative impacts to trees nominated for retention.

7 RECOMMENDATIONS

7.1 Tree Removal

Remove **Trees 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 81, 82, 83, 84, 85, 94, 103, 104, 105 & 106** (28 trees) to facilitate the proposed development works.

Development consent and relevant approvals must be obtained from Northern Beaches Council prior to the removal or pruning of any tree on site.

All tree removal work is to be carried out by an experienced Arborist with minimum AQF Level 3 qualifications in accordance with *AS4373-2007 - Pruning of Amenity Trees*, Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016) and other applicable legislation.

7.2 Tree Retention & Protection

Retain and protect **Trees 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 86, 87, 88, 89, 90, 91, 92, 93, 95, 96, 97, 98, 99, 100, 101 & 102** (78 trees) in accordance with the Tree Location Plan & Tree Protection Specifications held at ***Appendix 2 & 5***, *AS497-2009 Protection of trees on development sites* and the specific recommendations below:

7.2.1 Project Arborist Engagement

A Project Arborist experienced in tree protection on construction sites should be engaged prior to the commencement of any works on site. The Project Arborist shall monitor and report regularly to the Principal Certifying Authority (PCA) and the Applicant on the condition and protection of the retained trees during the works. The Project Arborist is to supervise and monitor any excavation, machine trenching or compacted fill placement within the TPZ of retained trees throughout construction.

7.2.2 Specific Tree Protection Measures

Tree Protection must be installed as shown on the Tree Location & Protection Plan Specification held at ***Appendix 2*** and in accordance with Section 4.3 of AS4970-2009 and ***Appendix 5***. Tree protection must not be removed or altered without prior approval of the Project Arborist.

7.2.3 Root-sensitive Excavation

Excavation within the TPZ of **Trees 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27, 28, 29, 92, 93, 95, 96, 97, 98, 99, 100, 101 & 102** must be undertaken in a root sensitive manner to minimise root disturbance and severance. Initial excavation should be undertaken using non-motorised hand tools under the supervision of a Project Arborist. Should significant roots be identified (>40mmØ) during construction, works are to cease, and direction sought from the Project Arborist with regards to root pruning, modification of construction methodology or design alteration.

7.3 Replacement Planting

Replacement planting should be considered to compensate and replenish any loss of amenity or impact to landscape character resulting from the proposed tree removal. Replacement planting should be at the direction of Council and is capable of forming part of any conditional approval.

Should you have any queries in relation to the information presented, please feel free to contact me.

Sincerely,

Greg Tesoriero
PRINCIPAL CONSULTING ARBORIST
Dip. Hort. (Arboriculture) AQF Level 5
Registered Consulting Arborist No. 3008
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8 REFERENCES

Council of Standards Australia. 2009 AS 4970 – 2009 – *Protection of Trees on Development Sites* Standards Australia, Sydney.

Council of Standards Australia. 2007 AS 4373 – 2007 – *Pruning of Amenity Trees* Standards Australia, Sydney.

Google Australia. 2023. *Google Maps*. [ONLINE] Available at: https://www.google.com.au/maps. [Accessed September 2023].

Northern Beaches Council. Warringah Development Control Plan 2011: Part E1 –– *Preservation of Trees and Bushland Vegetation*

Mattheck, C 2007, *Updated Field Guide for Visual Tree Assessment,* 1st Ed., Forschungszentrum Karlsruhe, Germany

Nearmap Australia. 2023, Photo Maps. [ONLINE] Available at: https://maps.au.nearmap.com [Accessed September 2023].

APPENDIX 1: TREE ASSESSMENT SCHEDULE

Tree No.	*Genus & species* Common Name	Height (m)	Crown Spread (m)	DBH #1 (mm)	DBH #2 (mm)	DBH #3 (mm)	DBH #4 (mm)	DGL (mm)	TPZ Radius (m)	SRZ Radius (m)	Age Class	Health / Vitality	Structure/ Condition	SULE Rating	Landscape Significance	Retention Value	Development Impact	Retain / Remove	Comments
1	***Casuarina glauca*** Swamp Oak	9	4	200				250	2.40	1.85	M	Good	Average	Medium 15-40yrs	Medium	Medium	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Growing under canopy of T2. Past pruning
2	***Eucalyptus microcorys*** Tallowwood	17	7	450				550	5.40	2.57	M	Good	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Minor branch decay 6m. Moderate amount medium sized deadwood
3	***Casuarina glauca*** Swamp Oak	14	4	250				350	3.00	2.13	M	Good	Average	Medium 15-40yrs	Medium	Medium	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Basal epicormic growth. Past pruning
4	***Casuarina glauca*** Swamp Oak	15	7	450				550	5.40	2.57	M	Good	Average	Medium 15-40yrs	Medium	Medium	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Included co-dominant stem 2m
5	***Melaleuca styphelioides*** Prickly-leaved Paperbark	11	6	400				450	4.80	2.37	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Past pruning
6	***Ficus microcarpa var. hillii*** Hills Weeping Fig	14	10	300	350	450		700	7.73	2.85	M	Average	Fair	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Trunk lean north corrected. Past pruning. Surface roots extending 5m south and east
7	***Melaleuca styphelioides*** Prickly-leaved Paperbark	13	7	600				600	7.20	2.67	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Multi-stem at base
8	***Eucalyptus microcorys*** Tallowwood	12	5	500				550	6.00	2.57	M	Fair	Fair	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Suppressed canopy from neighbouring trees. Canopy bias West. Vine through lower canopy
9	***Ficus microcarpa var. hillii*** Hills Weeping Fig	11	10	500				500	6.00	2.47	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Surface roots extending 2m from base. Past pruning
10	***Ficus microcarpa var. hillii*** Hills Weeping Fig	13	12	350	350	200		550	6.41	2.57	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Vine through lower canopy. Past pruning
11	***Casuarina glauca*** Swamp Oak	18	5	400				450	4.80	2.37	M	Average	Average	Long 40yrs +	Medium	High	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Minor canopy bias to west.
12	***Casuarina glauca*** Swamp Oak	18	4	300				350	3.60	2.13	M	Average	Average	Long 40yrs +	Medium	High	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Minor branch failures. Past pruning
13	***Casuarina glauca*** Swamp Oak	18	4	250				300	3.00	2.00	M	Average	Average	Long 40yrs +	Medium	High	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Minor branch failures
14	***Casuarina glauca*** Swamp Oak	7	2	100				150	2.00	1.50	SM	Average	Average	Medium 15-40yrs	Medium	Medium	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Growing under canopy of T13 & T15
15	***Casuarina glauca*** Swamp Oak	19	9	650				750	7.80	2.93	M	Good	Average	Long 40yrs +	Medium	High	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Neighbouring tree. Past pruning
16	***Casuarina glauca*** Swamp Oak	7	2	100				150	2.00	1.50	SM	Average	Average	Medium 15-40yrs	Medium	Medium	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Growing under canopy of T15
17	***Casuarina glauca*** Swamp Oak	17	4	250				300	3.00	2.00	M	Average	Average	Medium 15-40yrs	Medium	Medium	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Neighbouring tree. Past pruning. Minor trunk lean north. Slender form
18	***Casuarina glauca*** Swamp Oak	9	3	100				150	2.00	1.50	SM	Average	Fair	Medium 15-40yrs	Low	Low	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Suppressed canopy from neighbouring trees. Canopy bias west
19	***Casuarina glauca*** Swamp Oak	16	4	250				300	3.00	2.00	M	Average	Good	Medium 15-40yrs	Medium	Medium	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Past pruning
20	***Casuarina glauca*** Swamp Oak	6	2	100				150	2.00	1.50	SM	Average	Fair	Medium 15-40yrs	Low	Low	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Suppressed canopy from neighbouring trees. Canopy bias SW
21	***Ficus microcarpa var. hillii*** Hills Weeping Fig	15	12	450				550	5.40	2.57	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Surface roots extending 4m west

Tree No.	Genus & species Common Name	Height (m)	Crown Spread (m)	DBH #1 (mm)	DBH #2 (mm)	DBH #3 (mm)	DBH #4 (mm)	DGL (mm)	TPZ Radius (m)	SRZ Radius (m)	Age Class	Health / Vitality	Structure/ Condition	SULE Rating	Landscape Significance	Retention Value	Development Impact	Retain / Remove	Comments
22	***Casuarina glauca*** Swamp Oak	18	5	300				350	3.60	2.13	M	Average	Average	Medium 15-40yrs	Medium	Medium	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Nil
23	***Ficus microcarpa var. hillii*** Hills Weeping Fig	16	14	400	450			750	7.22	2.93	M	Average	Average	Long 40yrs +	Medium	High	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Neighbouring tree. Multi-stem at 1m
24	***Casuarina glauca*** Swamp Oak	19	5	350				400	4.20	2.25	M	Average	Average	Medium 15-40yrs	Medium	Medium	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Included branch union at 3m. Minor amount small diameter deadwood
25	***Casuarina glauca*** Swamp Oak	19	5	200	300			400	4.33	2.25	M	Average	Average	Medium 15-40yrs	Medium	Medium	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Multi-stem at base
26	***Casuarina glauca*** Swamp Oak	19	5	300				400	3.60	2.25	M	Average	Average	Medium 15-40yrs	Medium	Medium	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Past pruning
27	***Casuarina glauca*** Swamp Oak	19	4	300				350	3.60	2.13	M	Average	Average	Medium 15-40yrs	Medium	Medium	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Past pruning. Minor branch failures
28	***Casuarina glauca*** Swamp Oak	19	4	200	300			450	4.33	2.37	M	Average	Average	Medium 15-40yrs	Medium	Medium	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Past pruning
29	***Casuarina glauca*** Swamp Oak	19	5	350				450	4.20	2.37	M	Average	Average	Medium 15-40yrs	Medium	Medium	No additional incursion due to existing kerb, gutter and blockwork wall infrastructure impeding root development	Retain & Protect	Past pruning
30	***Ulmus parvifolia*** Chinese Elm	10	12	400				450	4.80	2.37	M	Average	Average	Medium 15-40yrs	Medium	Medium	Within footprint of proposed building	Remove	Multi-stem at 1m. Past pruning. Minor amount small diameter deadwood. Exempt - species
31	***Eucalyptus bicostata*** Southern Blue Gum	14	13	500				550	6.00	2.57	M	Fair	Average	Medium 15-40yrs	Medium	Medium	Within footprint of proposed ramp	Remove	Reduced foliage density. Moderate amount medium sized deadwood. Past pruning
32	***Cupaniopsis anacardioides*** Tuckeroo	8	8	300	250			400	4.69	2.25	M	Good	Average	Medium 15-40yrs	Medium	Medium	Within footprint of proposed ramp	Remove	Past pruning. Exempt - species
33	***Corymbia gummifera*** Red Bloodwood	19	11	600				700	7.20	2.85	M	Average	Average	Long 40yrs +	Medium	High	Within footprint of proposed ramp	Remove	Minor lean to west
34	***Acmena smithii*** Lilly Pilly	7	6	100	100	100		350	2.08	2.13	M	Good	Average	Medium 15-40yrs	Low	Low	Major 31% TPZ and 33% SRZ incursion due to proposed retaining wall and level change	Remove	Past pruning. Multi-stem at base
35	***Murraya paniculata*** Orange Jessamine	6	5	100	100	50	50	300	2.00	2.00	M	Good	Good	Medium 15-40yrs	Low	Low	Major 25% TPZ and 25% SRZ incursion due to proposed retaining wall and level change	Remove	Multi-stem at base
36	***Homalanthus populifolius*** Bleeding Heart Tree	5	4	150				200	2.00	1.68	M	Good	Average	Short 5-15yrs	Low	Low	Major 14% TPZ and 9% SRZ incursion due to proposed retaining wall and level change	Remove	Past pruning
37	***Acmena smithii*** Lilly Pilly	6	2	100				150	2.00	1.50	M	Average	Average	Medium 15-40yrs	Low	Low	Within footprint of proposed driveway	Remove	Growing in raised garden bed. Exempt - located within 2m of existing approved building
38	***Banksia integrifolia*** Coast Banksia	10	5	350				400	4.20	2.25	M	Good	Average	Medium 15-40yrs	Medium	Medium	Major 14% TPZ and 43% SRZ incursion due to proposed retaining wall and level change	Remove	Minor lean North. Minor amount small diameter deadwood
39	***Banksia integrifolia*** Coast Banksia	6	2	150	50			200	2.00	1.68	SM	Average	Average	Medium 15-40yrs	Low	Low	Within proposed carparking area	Remove	Multi-stem at base
40	***Corymbia gummifera*** Red Bloodwood	14	11	450				550	5.40	2.57	M	Good	Average	Long 40yrs +	Medium	High	Within footprint of proposed driveway	Remove	Minor lean North. Minor amount small diameter deadwood
41	***Callistemon viminalis*** Weeping Bottlebrush	7	5	100	100			150	2.00	1.50	SM	Fair	Fair	Medium 15-40yrs	Low	Low	Within proposed carparking area	Remove	Reduced foliage density
42	***Corymbia gummifera*** Red Bloodwood	7	2	150				150	2.00	1.50	J	Average	Average	Long 40yrs +	Low	Medium	Within proposed grading extents	Remove	Minor lean East
43	***Eucalyptus microcorys*** Tallowwood	10	6	200				250	2.40	1.85	M	Good	Good	Long 40yrs +	Medium	High	Within proposed grading extents	Remove	Nil

Tree No.	*Genus & species* Common Name	Height (m)	Crown Spread (m)	DBH #1 (mm)	DBH #2 (mm)	DBH #3 (mm)	DBH #4 (mm)	DGL (mm)	TPZ Radius (m)	SRZ Radius (m)	Age Class	Health / Vitality	Structure/ Condition	SULE Rating	Landscape Significance	Retention Value	Development Impact	Retain / Remove	Comments
44	***Callistemon viminalis*** Weeping Bottlebrush	6	5	50	50	50	50	100	2.00	1.50	M	Fair	Fair	Medium 15-40yrs	Medium	Medium	Within proposed grading extents	Remove	Reduced foliage density. Multi-stem at base
45	***Banksia integrifolia*** Coast Banksia	8	5	200				250	2.40	1.85	M	Average	Average	Medium 15-40yrs	Medium	Medium	Within proposed grading extents	Remove	Minor amount small diameter deadwood
46	***Corymbia gummifera*** Red Bloodwood	18	13	400				500	4.80	2.47	M	Good	Good	Long 40yrs +	Medium	High	Within proposed grading extents	Remove	Past pruning. Minor amount small diameter deadwood
47	***Corymbia gummifera*** Red Bloodwood	8	4	200				300	2.40	2.00	SM	Good	Good	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Canopy bias SE
48	***Eucalyptus sp.*** Eucalyptus	7	4	250				350						Dead		Priority for Removal	No additional TPZ incursion	Remove	Dead tree. Exempt - dead tree no active habitat observed.
49	***Eucalyptus microcorys*** Tallowwood	16	16	550				700	6.60	2.85	M	Good	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Moderate amount medium diameter deadwood
50	***Corymbia gummifera*** Red Bloodwood	17	11	350				400	4.20	2.25	M	Good	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Minor canopy bias West
51	***Eucalyptus microcorys*** Tallowwood	12	7	200				250	2.40	1.85	M	Average	Fair	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Suppressed canopy and lean NE
52	***Lophostemon confertus*** Brush Box	6	5	150				200	2.00	1.68	SM	Average	Good	Long 40yrs +	Low	Medium	No additional TPZ incursion	Retain & Protect	Street tree. Minor amount small diameter deadwood
53	***Eucalyptus microcorys*** Tallowwood	18	19	600				700	7.20	2.85	M	Good	Good	Long 40yrs +	High	High	No additional TPZ incursion	Retain & Protect	Street tree. Minor amount small diameter deadwood
54	***Lophostemon confertus*** Brush Box	8	5	250				300	3.00	2.00	M	Average	Average	Long 40yrs +	Low	Medium	No additional TPZ incursion	Retain & Protect	Street tree. Cankers on stem. Minor amount small diameter deadwood. Basal epicormic growth
55	***Eucalyptus microcorys*** Tallowwood	18	12	500				600	6.00	2.67	M	Good	Good	Long 40yrs +	High	High	No additional TPZ incursion	Retain & Protect	Street tree. Moderate amount medium sized deadwood
56	***Eucalyptus microcorys*** Tallowwood	17	15	500				600	6.00	2.67	M	Good	Good	Long 40yrs +	High	High	No additional TPZ incursion	Retain & Protect	Street tree. Past pruning
57	***Eucalyptus scoparia*** Wallangarra White Gum	11	6	250				350	3.00	2.13	M	Average	Average	Medium 15-40yrs	Medium	Medium	No additional TPZ incursion	Retain & Protect	Moderate lean SW. Exempt - species
58	***Eucalyptus microcorys*** Tallowwood	17	13	450				500	5.40	2.47	M	Average	Good	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Past pruning
59	***Eucalyptus microcorys*** Tallowwood	15	7	350				450	4.20	2.37	M	Average	Fair	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Past pruning for road clearance. Epicormic growth
60	***Eucalyptus microcorys*** Tallowwood	17	7	350				450	4.20	2.37	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Minor lean N corrected. Minor amount small diameter deadwood
61	***Eucalyptus microcorys*** Tallowwood	16	5	300				400	3.60	2.25	M	Fair	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Moderate amount medium sized deadwood
62	***Eucalyptus microcorys*** Tallowwood	17	11	400				500	4.80	2.47	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Past pruning
63	***Eucalyptus microcorys*** Tallowwood	17	9	400				500	4.80	2.47	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Past pruning. Canopy bias N
64	***Eucalyptus microcorys*** Tallowwood	17	6	300	300			600	5.09	2.67	M	Average	Fair	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Past pruning for road clearance. Moderate amount medium sized deadwood. Co-dominant stem at 0.5m
65	***Eucalyptus microcorys*** Tallowwood	16	12	400				500	4.80	2.47	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Moderate amount medium sized deadwood

Tree No.	*Genus & species* Common Name	Height (m)	Crown Spread (m)	DBH #1 (mm)	DBH #2 (mm)	DBH #3 (mm)	DBH #4 (mm)	DGL (mm)	TPZ Radius (m)	SRZ Radius (m)	Age Class	Health / Vitality	Structure/ Condition	SULE Rating	Landscape Significance	Retention Value	Development Impact	Retain / Remove	Comments
66	***Lophostemon confertus*** Brush Box	9	3	150				200	2.00	1.68	SM	Poor	Fair	Very Short <5yrs	Low	Low	No additional TPZ incursion	Retain & Protect	Street tree. Reduced foliage density. Epicormic growth. High amount small diameter deadwood
67	***Eucalyptus microcorys*** Tallowwood	15	6	350				450	4.20	2.37	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Past pruning for road clearance
68	***Eucalyptus microcorys*** Tallowwood	16	5	350				450	4.20	2.37	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Included co-dominant stem at 3m. Minor amount small diameter deadwood
69	***Eucalyptus microcorys*** Tallowwood	15	6	350				450	4.20	2.37	M	Fair	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Epicormic growth. Minor amount small diameter deadwood. Past pruning
70	***Eucalyptus microcorys*** Tallowwood	17	8	400				500	4.80	2.47	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Canopy bias S
71	***Eucalyptus microcorys*** Tallowwood	18	8	400				450	4.80	2.37	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Moderate amount medium sized deadwood
72	***Lophostemon confertus*** Brush Box	9	5	200				250	2.40	1.85	SM	Fair	Average	Medium 15-40yrs	Low	Low	No additional TPZ incursion	Retain & Protect	Street tree. Moderate amount medium sized deadwood
73	***Lophostemon confertus*** Brush Box	7	3	150				200	2.00	1.68	SM	Poor	Average	Medium 15-40yrs	Low	Low	No additional TPZ incursion	Retain & Protect	Street tree. Reduced foliage density. Epicormic growth. High amount small diameter deadwood
74	***Eucalyptus microcorys*** Tallowwood	18	10	400				500	4.80	2.47	M	Good	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Past pruning for road clearance. Minor amount small diameter deadwood
75	***Eucalyptus microcorys*** Tallowwood	18	10	400				500	4.80	2.47	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Included branch union at 2m. Moderate amount medium diameter deadwood
76	***Lophostemon confertus*** Brush Box	7	3	150				200	2.00	1.68	SM	Average	Average	Medium 15-40yrs	Low	Low	No additional TPZ incursion	Retain & Protect	Street tree. Minor amount small diameter deadwood
77	***Eucalyptus microcorys*** Tallowwood	17	10	400				500	4.80	2.47	M	Good	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Street tree. Canopy bias East
78	***Lophostemon confertus*** Brush Box	9	5	250				350	3.00	2.13	SM	Average	Average	Medium 15-40yrs	Medium	Medium	No additional TPZ incursion	Retain & Protect	Street tree. Minor branch failure. Minor amount small diameter deadwood
79	***Eucalyptus microcorys*** Tallowwood	13	15	400	250			650	5.66	2.76	M	Good	Average	Long 40yrs +	High	High	No additional TPZ incursion	Retain & Protect	Street tree. Multi-stem at 0.5m. Minor amount small diameter deadwood
80	***Eucalyptus robusta*** Swamp Mahogany	16	10	450				550	5.40	2.57	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Epicormic growth. Canopy bias East
81	***Eucalyptus scoparia*** Wallangarra White Gum	17	10	600				650	7.20	2.76	M	Average	Average	Medium 15-40yrs	Medium	Medium	Major 26% TPZ and <1% SRZ incursion due to proposed grading extents	Remove	Branch dieback. Past pruning. Epicormic growth. Exempt - species
82	***Eucalyptus camaldulensis*** River Red Gum	16	18	800				900	9.60	3.17	M	Average	Average	Long 40yrs +	High	High	Within proposed grading extents	Remove	Minor amount small diameter deadwood
83	***Corymbia gummifera*** Red Bloodwood	11	9	350				450	4.20	2.37	M	Average	Average	Long 40yrs +	Medium	High	Within proposed grading extents	Remove	Past pruning. Epicormic growth
84	***Pittosporum undulatum*** Sweet Pittosporum	8	3	200				250	2.40	1.85	M	Fair	Poor	Medium 15-40yrs	Low	Low	Within proposed carparking area	Remove	Past crown failure. Exempt - located within 2m of existing approved building
85	***Acacia floribunda*** White Sally Wattle	7	5	100	100			200	2.00	1.68	M	Average	Average	Medium 15-40yrs	Low	Low	Major 30% TPZ & 26% SRZ incursion from proposed retaining wall and level change	Remove	Minor amount small diameter deadwood. Minor branch failure
86	***Acmena smithii*** Lilly Pilly	6	4	150				250	2.00	1.85	M	Average	Good	Medium 15-40yrs	Low	Low	No additional TPZ incursion	Retain & Protect	Minor branch failure
87	***Eucalyptus sp.*** Eucalyptus	10	3	100				150	2.00	1.50	J	Good	Good	Medium 15-40yrs	Low	Low	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Appears self seeded

Tree No.	*Genus & species* Common Name	Height (m)	Crown Spread (m)	DBH #1 (mm)	DBH #2 (mm)	DBH #3 (mm)	DBH #4 (mm)	DGL (mm)	TPZ Radius (m)	SRZ Radius (m)	Age Class	Health / Vitality	Structure/ Condition	SULE Rating	Landscape Significance	Retention Value	Development Impact	Retain / Remove	Comments
88	***Melaleuca quinquenervia*** Broad-leaved Paperbark	8	6	150	150	150	100	350	3.34	2.13	M	Good	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Multi-stem at base
89	***Melaleuca quinquenervia*** Broad-leaved Paperbark	7	4	300				350	3.60	2.13	M	Good	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Past pruning
90	***Bauhinia variegata*** Orchid Tree	6	6	100	100	50	50	300	2.00	2.00	M	Average	Average	Medium 15-40yrs	Low	Low	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Past pruning. Epicormic growth
91	***Bauhinia variegata*** Orchid Tree	8	10	300	100			400	3.79	2.25	M	Average	Average	Medium 15-40yrs	Low	Low	No additional TPZ incursion	Retain & Protect	Neighbouring tree. Past pruning. Epicormic growth
92	***Eucalyptus microcorys*** Tallowwood	20	19	800				900	9.60	3.17	M	Good	Good	Long 40yrs +	High	High	Major 5% TPZ + 3% SRZ incursion from proposed retaining wall	Retain & Protect	Past pruning. Minor amount medium diameter deadwood
93	***Eucalyptus microcorys*** Tallowwood	19	18	650				750	7.80	2.93	M	Good	Good	Long 40yrs +	High	High	Major 9% TPZ + 3% SRZ incursion from proposed retaining wall	Retain & Protect	Past pruning. Minor amount medium diameter deadwood
94	***Eucalyptus microcorys*** Tallowwood	9	5	200				300	2.40	2.00	SM	Good	Good	Long 40yrs +	Medium	High	Within footprint of proposed driveway	Remove	Stem wound at 1.5m
95	***Eucalyptus microcorys*** Tallowwood	20	16	650				700	7.80	2.85	M	Good	Good	Long 40yrs +	High	High	No additional TPZ incursion due to existing hard surface parking extents	Retain & Protect	Past pruning. Minor amount small diameter deadwood
96	***Melaleuca styphelioides*** Prickly-leaved Paperbark	16	8	450	450	250		750	8.20	2.93	M	Good	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Multi-stem at 1m. Past pruning - car-park clearance
97	***Melaleuca styphelioides*** Prickly-leaved Paperbark	15	5	350				450	4.20	2.37	M	Good	Good	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Past pruning - car-park clearance
98	***Melaleuca styphelioides*** Prickly-leaved Paperbark	14	6	250	350	200	100	600	5.82	2.67	M	Good	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Multi-stem at base
99	***Melaleuca styphelioides*** Prickly-leaved Paperbark	15	7	300	200			600	4.33	2.67	M	Good	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Past pruning. Co-dominant stem at 0.5m
100	***Eucalyptus microcorys*** Tallowwood	17	9	500				600	6.00	2.67	M	Average	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Past pruning. Canopy bias West
101	***Eucalyptus microcorys*** Tallowwood	18	9	650				750	7.80	2.93	M	Good	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Past pruning of major stem. Canopy bias West. Minor epicormic growth
102	***Eucalyptus microcorys*** Tallowwood	18	10	600				750	7.20	2.93	M	Good	Average	Long 40yrs +	Medium	High	No additional TPZ incursion	Retain & Protect	Included codominant stem at 4m. Past pruning. Canopy bias South
103	***Callistemon viminalis*** Weeping Bottlebrush	6	4	100	100	100		200	2.08	1.68	M	Average	Average	Medium 15-40yrs	Medium	Medium	Major 40% TPZ + 39% SRZ incursion from proposed retaining wall and level change	Remove	Multi-stem at base. Minor amount small diameter deadwood
104	***Banksia integrifolia*** Coast Banksia	8	4	300				350	3.60	2.13	M	Good	Average	Medium 15-40yrs	Medium	Medium	Major 44% TPZ + 40% SRZ incursion from proposed retaining wall and level change	Remove	Minor amount small diameter deadwood
105	***Callistemon viminalis*** Weeping Bottlebrush	5	4	100	100	100		200	2.08	1.68	M	Average	Average	Medium 15-40yrs	Medium	Medium	Major 40% TPZ + 37% SRZ incursion from proposed retaining wall and level change	Remove	Multi-stem at base. Minor amount small diameter deadwood
106	***Callistemon viminalis*** Weeping Bottlebrush	7	5	100	100	100		200	2.08	1.68	M	Average	Average	Medium 15-40yrs	Medium	Medium	Major 40% TPZ + 37% SRZ incursion from proposed grading extents	Remove	Branch failures. Multi-stem at 1m

Tree Inspection Data Notes & Terminology

Tree No. (Tree Number)

The tree number associated to each tree located on or adjacent to the subject site. Relates to the Tree Location Plan held at Appendix 2.

Botanical Name and Common Name

The botanical and common name of each tree is identified and recorded. Occasionally the exact species name is unknown; sp. is recorded to indicate this.

Height, Crown Width and DBH

- The trees height and crown spread is recorded in metres (m);
- The tree DBH is recorded in millimetres (mm). DBH is an abbreviation of Diameter (of the trunk) measured at Breast Height (or 1.4m from the base of the trunk). If more than one trunk is present the DBH is calculated in accordance with AS4970-2009 Protection of Trees on Development Sites

Age Class

The age class of each tree is estimated as either:
IM – Immature refers to well established but juvenile tree
SM – Semi Mature, a tree that has not grown to mature size
M – Mature, a tree that has reached mature size and will slowly increase in size over time
OM – Over Mature, a tree that has been mature for a long period and is beginning to display signs of decline, e.g. large dead branches
S – Senescent, an over mature tree that is now in decline

Health & Condition

The trees health and vigour is recorded as a measurement of:
Good - the tree does not appear to appear stressed with no excessive dieback, insect infestation, decay, deadwood or epicormic shoots
Average - the tree appears stressed and has some crown dieback, and /or a few epicormic shoots, and/or some deadwood in the crown and some new growth at branch tips. These trees may benefit from remediation of the growing environment to reduce stress and return it to good health
Fair - the tree may have areas of crown dieback, and/or epicormic shoots, and/or areas of decay, and/or reduced new growth at branch tips. These trees have been stressed for a short period of time, remediation of the growing environment may improve trees health
Poor - the tree may have large areas of crown dieback, and/or many epicormic shoots, and/or reduced new growth at branch tips. These trees have been stressed for a long period of time, remediation of the growing environment would not return the tree to good health.

SRZ (Structural Root Zone)

The SRZ is a radial area extending outwards from the centre of the trunk. This area contains the majority of the structural woody roots. This area is responsible primarily for stability. Root damage or root loss within this zone greatly increases the opportunity for decay fungi to ingress into the heartwood, causing internal decay in addition to destabilising the trees structural integrity. The SRZ is calculated as follows (This calculation is taken from the Australian Standard 4970 – 2009 Protection of Trees on Development Sites): (D x 50)0.42 x 0.64

TPZ (Tree Protection Zone)

The TPZ is a radial area measured by multiplying the DBH by twelve (12) or a circular area the size of the trees drip line, whichever is greater. This area contains the majority of the structural and feeder roots responsible for stability, gaseous exchange and water and nutrient uptake. Excavation, back filling, compaction or other disturbance should not occur in this area. The TPZ is used to identify the minimum area required for the safe retention of a given tree. This calculation is derived from the Australian Standard 4970-2009 Protection of Trees in Development Sites. An incursion up to 10% within the TPZ is potentially acceptable if no other option is available. A major encroachment (in excess of 10%) is required to be clearly justified by the Project Arborist and compensated for elsewhere. Justification methodology may vary depending on site or individual tree's health, vigour and ability to withstand disturbance and may require root investigation.

Landscape Significance

The landscape significance of a tree or group of trees is determined using a combination of health/vigour/condition, amenity, heritage and ecological values in accordance with IACA Significance of a Tree, Assessment Rating System (STARS)© (IACA 2010)©.
1. High Significance in Landscape
2. Medium Significance in Landscape
3. Low Significance in Landscape

Retention Value (RV)

Determined by [1] tree free of visual defects and viable for retention, [2] viable for retention with minor faults which may reduce SULE, [3] trees which should not restrict development applications containing faults that are likely to become problematic in the short term, [4] trees to be considered for removal due to average condition.
High Retention - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 Protection of trees on development sites. Tree sensitive construction measures must be implemented e.g. pier and beam etc. if works are to proceed within the Tree Protection Zone.
Medium Retention - These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
Low Retention - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

S.U.L.E. Categories

Safe Useful Life Expectancy (after *Barrell* 1996, modified by the author). A trees S.U.L.E. category is the life expectancy of the tree modified first by its age, health, condition, safety and location. S.U.L.E. assessments may be modified as dictated by changes in trees health and environment.
Long - Appear retainable at the time of assessment for over 40 years with an acceptable degree of risk assuming reasonable maintenance.
Medium - Appear to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk assuming reasonable maintenance.
Short - Trees appear to be retainable at the time of assessment for 5 to15 years with an acceptable degree of risk assuming reasonable maintenance.
Very Short - Removal - Trees which should be scheduled for removal within the very short term or as specified within this report.
Small, Young or Regularly Pruned – Trees under 5m in height that can be easily moved or replaced, includes screen plantings or hedge lines.

Development Impact

Brief outline of the impact of the proposed development works or ancillary construction related activities likely to impact the tree.

Retain/Remove

The proposed removal or retention recommendation in light of the proposed development related impacts.

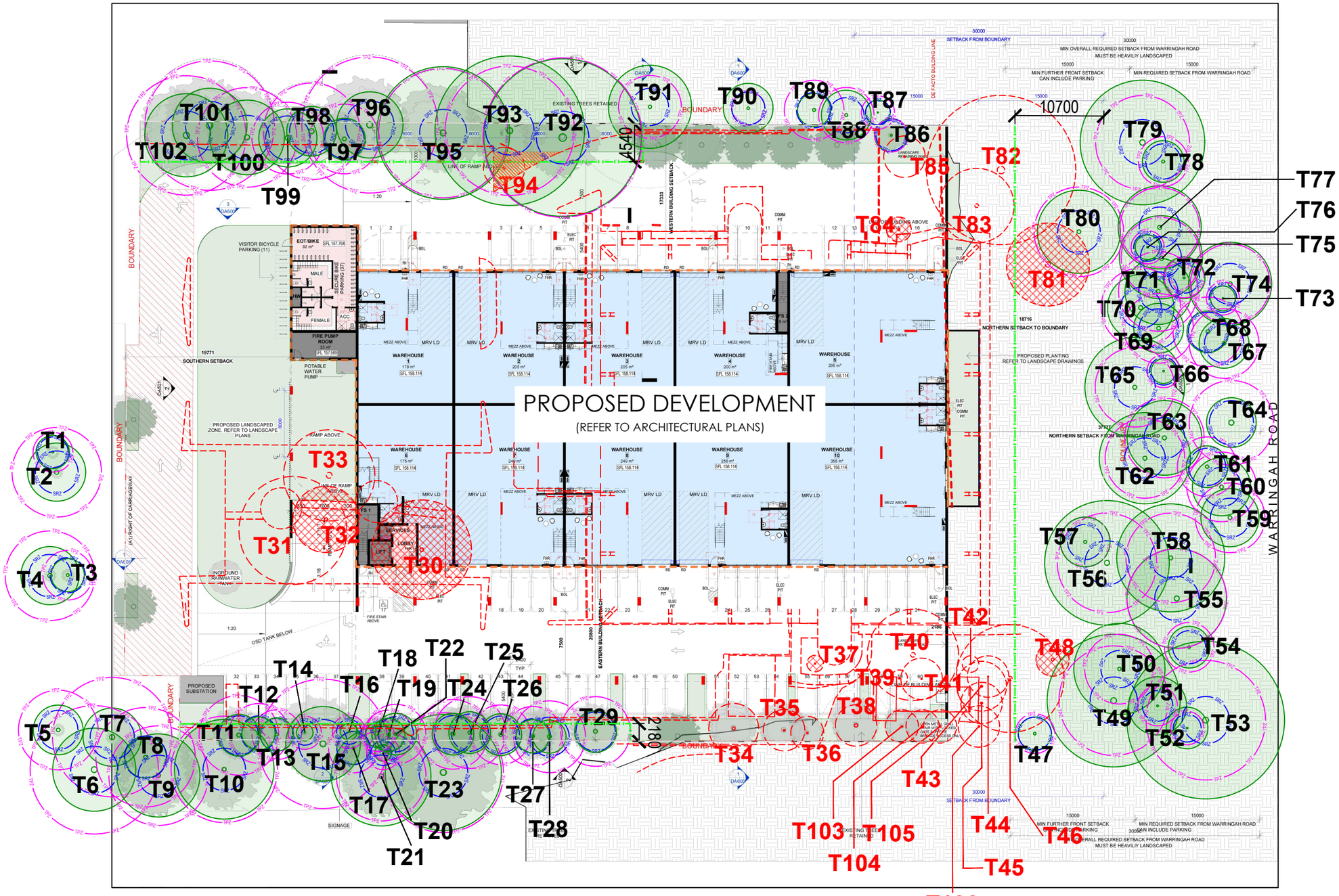
NOTES: This report acknowledges the current Australian Standards 'Protection of Trees on Development Sites' AS 4970 – 2009 with reference to the Tree Protection Zone (TPZ): being a combination of the root and crown area requiring protection. The TPZ takes into consideration the Structural Root Zone (SRZ): The area required for tree stability. Determined by AS4970 - 2009 Figure 1,Table of determining the SRZ, section 3.3.5 of the standards. The standard states where a greater than 10% encroachment occurs the arborist is to take into consideration the schedule of determining impacts as set within AS4970 s. 3.3.4. Encroachments are referred to within this report as major or minor encroachments (AS4970 s. 3.3.2 & 3.3.3). Below is the terminology used for estimated percentage of development incursion used within this report. To retain specific trees and ensure their viability, development must take into consideration protection of the TPZ radius. The extent of inclusion within the TPZ radius has been categorised within this report as follows:

<10% - negligible incursion
>10 - <15% - low to moderate level of incursion
>15 - <20% - moderate level of incursion
>20 - <25% - moderate to high level of incursion
>25 - <35% - high level of incursion
>35% - significant incursion within the TPZ

APPENDIX 2: TREE LOCATION PLAN

LEGEND

- EXISTING TREE TO BE RETAINED
- EXISTING TREE TO BE REMOVED
- EXISTING TREE TO BE REMOVED (EXEMPT DUE TO SPECIES / PROXIMITY TO EXISTING BUILDING)
- TREE PROTECTION ZONE (TPZ)
- STRUCTURAL ROOT ZONE (SRZ)
- TPZ INCURSION ZONE
- OUTLINE OF EXISTING & ANCILLARY STRUCTURES TO BE DEMOLISHED
- TREE PROTECTION FENCING *(AS PER APPENDIX 5)*
- SITE BOUNDARY



CPS
CREATIVEPLANNINGSOLUTIONS
LEVEL 3
397 RILEY STREET
SURRY HILLS NSW 2010
PO BOX 1074 BROADWAY NSW 2007
TEL: + (61) 2 8039 7461
INFO@CPSPLANNING.COM.AU
CPSPLANNING.COM.AU

DIMENSIONS :
All dimensions are in millimetres unless otherwise noted. Do not scale from this drawing.

Verify all dimensions on site prior to construction.

CIVIL, STRUCTURAL, HYDRAULIC, ELECTRICAL AND SPECIALIST WATER FEATURE WORKS :
Refer to specialist and consultant's drawings for all information contained within these documents relating to and nominated as specialist and consultant work. Specialist and consultant drawing information contained in the landscape documents are indicative only and not for construction or certification purposes.

Issue	Code	Issue Description	By	Chk	Date
D	CA	UPDATED APROVAL	JHG	GT	15.09.23
C	CA	UPDATED APPROVAL	JHG	GT	29.08.23
B	CA	UPDATED APRVAL	NZ	GT	14.10.22
A	CA	FOR APPROVAL	NZ	GT	26.09.22

PRE- Preliminary CA - Council Approval T - Tender CON - Construction

PROJECT
PROPOSED DEVELOPMENT
323-327 WARRINGAH ROAD,
FRENCHS FOREST

DRAWING TITLE
TREE LOCATION PLAN

CLIENT
LEDA

Drawn : NZ
Designed : NZ
Project No. : F160
Bar Scale

1:500 @ A3

SHEET NUMBER F160_TIP_01
REVISION D

APPENDIX 3

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

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

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

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

Tree Significance - Assessment Criteria

1. High Significance in landscape

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

2. Medium Significance in landscape

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

3. Low Significance in landscape

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

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

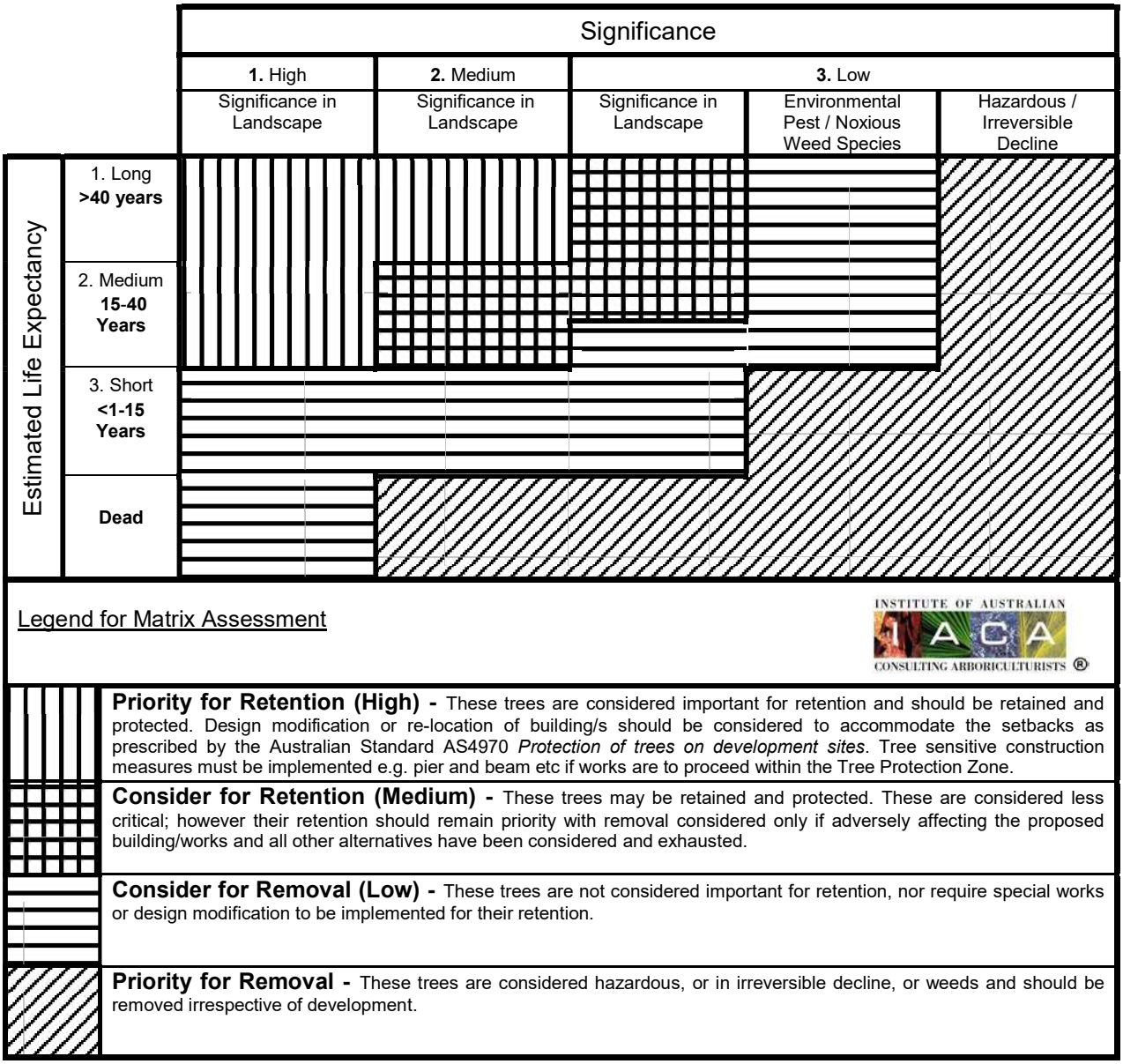
Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

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

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

Table 1.0 Tree Retention Value - Priority Matrix.



USE OF THIS DOCUMENT AND REFERENCING

The IACA Significance of a Tree, Assessment Rating System (STARS) is free to use, but only in its entirety and must be cited as follows:

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

REFERENCES

Australia ICOMOS Inc. 1999, *The Burra Charter – The Australian ICOMOS Charter for Places of Cultural Significance*, International Council of Monuments and Sites, www.icomos.org/australia

Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.

Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au

The following example shows the IACA **Significance** of a **Tree, Assessment Rating System** (STARS) used in an Arboricultural report.

Tree Significance

Determined by using the Tree Significance - Assessment Criteria of the *IACA Significance of a Tree, Assessment Rating System* (STARS)© (IACA, 2010), Appendix B.

Trees 14, 16, 17/3, 19 and 20/4 are of high significance with the remaining majority of medium significance and a few of low significance. Tree 14 is significant as a prominent specimen and a food source for indigenous avian fauna. Tree 16 as a non-locally indigenous planting is of good from and prominent *in situ*; Tree 17/3 as a stand of 6 street trees along the Davey Street frontage screening views to and from the site and contiguous with trees in Victoria Park extending the aesthetic influence of the urban canopy to the site. Similarly for Trees 20/4 as street trees in Long Road and Tree 19 as an extant exotic planting as a senescent component of the original landscaping. The trees of low significance are recent plantings as fruit trees – Avocados, and 1 Cootamundra Wattle as a non-locally indigenous tree in irreversible decline and potentially structurally unsound.

Significance Scale

1 – High
2 – Medium
3 – Low

Significance Scale	1	2	3
Tree No. / Stand No.	14, 16, 17/3, 19, 20/4	1/1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12/2, 15, 18, 21/5	3, 13, 22

Tree Retention Value

Determined by using the Retention Value - Priority Matrix of the *IACA Significance of a Tree, Assessment Rating System* (STARS)© (IACA, 2010), Appendix B.

Retention Value

High – Priority for Retention
Medium – Consider for Retention
Low – Consider for Removal
Remove - Priority for Removal

Retention Value	High Priority for Retention	Medium Consider for Retention	Low Consider for Removal	Remove Priority for Removal
Tree No. / Stand No.	1/1, 5, 17/3*, 19	2, 4, 6, 7, 8, 9, 10, 11, 14, 15, 16, 18, 20/4*, 21/5	3, 12/2, 13,	22

* Trees located within the neighbouring property and should be retained and protected.

APPENDIX 4 - EXTRACT FROM AS4970 2009 PROTECTION OF TREES ON DEVELOPMENT SITES

Section 3, Determining the tree protection zones of the selected trees

3.1 Tree protection zone (TPZ)

"The tree protection zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

The TPZ incorporates the structural root zone (SRZ) (refer to Clause 3.3.5)."

3.2 Determining the TPZ

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12.

TPZ = DBH x 12

where

DBH = trunk diameter measured at 1.4 m above ground

Radius is measured from the centre of the stem at ground level.

3.3.5 Structural root zone (SRZ)

"The SRZ is the area required for street stability. A larger area is required to maintain a viable tree. The SRZ only needs to be calculated when a major encroachment into a TPZ is proposed. Root investigation may provide more information on the extent of these roots."

Determining the SRZ

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12.

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

where

D = trunk diameter, in metres, measured above the root buttress.

Note: The SRZ for trees less than 0.15 m will be 1.5 m (see Figure 1).

The curve can be expressed by the following formula:

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

NOTES:

1 R_{SRZ} is the structural root zone radius.

2 D is the stem diameter measured immediately above root buttress.

3 The SRZ for trees less than 0.15 m diameter is 1.5 m.

4 The SRZ formula and graph do not apply to palms, other monocots, cycads and tree ferns.

5 This does not apply to trees with an asymmetrical root plate.

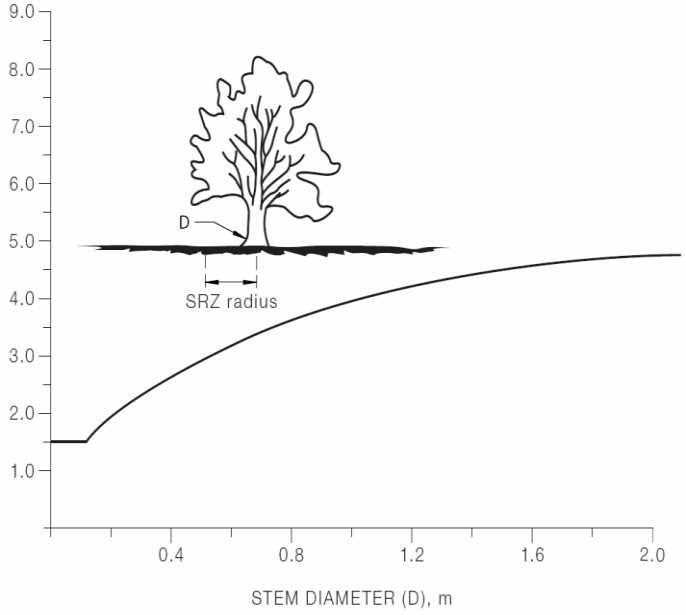


FIGURE 1 STRUCTURAL ROOT ZONE

APPENDIX 5 – GENERAL TREE PROTECTION SPECIFICATION

1.0 Appointment of Project Arborist

A Project Arborist shall be engaged prior the commencement of work on-site and monitor compliance with the protection measures. The Project Arborist shall inspect the tree protection measures and Compliance Certification shall be prepared by the Project Arborist for review by the Principal Certifying Authority prior to the release of the Compliance Certificate.

The Project Arborist shall have a minimum qualification equivalent (using the Australian Qualifications Framework) of Level 5 or above in Arboriculture.

2.0 Compliance

Contractors and site workers shall receive a copy of these specifications a minimum of 3 working days prior to commencing work on-site. Contractors and site workers undertaking works within the Tree Protection Zone shall sign the site log confirming they have read and understand these specifications, prior to undertaking works on-site.

The Project Arborist shall undertake regular site inspections and certify that the works are being undertaken in accordance with this specification.

Compliance Documentation shall be prepared by the Project Arborist following each site inspection. The Compliance Documentation shall include documentary evidence of compliance with the tree protection measures and methods as outlined within this Specification. Upon the completion of the works, a final assessment of the trees shall be undertaken by the Project Arborist and future recommended management strategies implemented as required.

3.0 Tree Removal

The trees to be removed shall be removed prior to the establishment of the tree protection measures. Tree removal works shall be undertaken in accordance with the *Workcover Code of Practice for the Amenity Tree Industry (1998)*. Tree and vegetation removal shall not damage the trees to be retained.

4.0 Tree Protection Zone

The trees to be retained shall be protected prior and during construction from activities that may result in an adverse effect on their health or structural condition. The area within the Tree Protection Zone (TPZ} shall exclude the following activities, unless otherwise stated:-

- Modification of existing soil levels, excavations and trenching
- Mechanical removal of vegetation
- Movement of natural rock
- Storage of materials, plant or equipment or erection of site sheds
- Affixing of signage or hoarding to the trees
- Preparation of building materials, refuelling or disposal of waste materials and chemicals
- Lighting fires
- Movement of pedestrian or vehicular traffic
- Temporary or permanent location of services, or the works required for their installation
- Any other activities that may cause damage to the tree

5.0 Tree Protection Fencing

TPZ fencing shall be located at the perimeter of the TPZ. Where TPZ areas overlap, TPZ fencing may be combined to form a single larger TPZ area. The exact location of the fencing shall be confirmed through consultation between the Head Contractor/Project Manager and the Project Arborist prior to the commencement of works. Fencing may be setback to allow for demolition/construction access and for the installation of pavements only where appropriate ground protection is installed and approved by the Project Arborist.

As a minimum, the Tree Protection Fence shall consist of 1.8m high wire mesh panels supported by concrete feet. Panels shall be fastened together and supported to prevent sideways movement. The tree shall not be damaged during the installation of the Tree Protection Fencing. Refer to Typical Tree Protection Details (***Appendix 6***).

6.0 Site Management

Materials, waste storage, and temporary services shall not be located within the TPZ.

7.0 Scaffolding

Where possible, scaffolding shall not be located within the TPZ. Scaffolding shall not be in contact with the tree. As necessary, this shall be achieved by erecting scaffolding around branches. Branches shall be tied back and protected as deemed necessary by the Project Arborist. Refer to Typical Tree Protection Details (***Appendix 6***).

8.0 Works within the Tree Protection Zones

In some cases works within the TPZ may be authorized by the determining authority. These works shall be supervised by the Project Arborist. When undertaking works within the TPZ, care should be taken to avoid damage to the tree's root system, trunks and lower branches.

If roots (>25mm⌀) are encountered during the demolition, excavation and construction works, these roots must be retained in an undamaged condition and advice sought from the Project Arborist. Adjustment of final levels and design shall remain flexible to enable the retention of roots (>25mm⌀) where deemed necessary by the Project Arborist.

Drilling/piling machinery shall be of a suitable size to not damage the tree's roots, trunk, branches and crown. No clearance pruning is permitted to allow for machinery access. Machinery shall work in conjunction with an observer to ensure that adequate clearance from trees is maintained at all times.

9.0 Ground Protection

Where deemed necessary by the Project Arborist, machinery movements shall be restricted to areas of existing pavement or from areas of temporary ground protection such as ground mats or steel road plates. Refer to Typical Tree Protection Details (***Appendix 6***)

10.0 Trunk Protection

Where required by the Project Arborist, trunk protection shall be installed. Trunk protection shall be installed by wrapping padding (either carpet underlay or 10mm thick jute geotextile mat) around the trunk and first order branches to a minimum height of 2m. Timber battens (90 x 45mm) spaced at 150mm centres shall be strapped together and placed over the padding. Timber battens must not be fixed to the trees. Refer to Typical Tree Protection Details (***Appendix 6***).

11.0 Structure & Pavement Demolition

Demolition of existing structures/pavement within the TPZ shall be supervised by the Project Arborist. Machinery is to be excluded from the TPZ unless operating from the existing slabs, pavements or areas of ground protection (refer to Section 9.0). Machinery should not contact the tree's roots, trunk, branches and crown.

The existing pavement shall be carefully lifted to minimise damage to the underlying soil profile (or sub-base materials) and to prevent damage to tree roots. Wherever possible, existing sub-base materials shall remain in-situ.

When removing slab sections within TPZ, machinery shall work backwards out of the TPZ to ensure machinery remains on un- demolished sections of slab at all times. Wherever possible, footings or elements below grade shall be retained to minimise disturbance to the tree's roots.

Where deemed necessary by the Project Arborist, the structures shall be shattered prior to removal with a hand-operated pneumatic/electric breaker.

If roots (>25mmØ) are encountered during the demolition works, these roots must be retained in an undamaged condition and advice sought from the Project Arborist. Where the Project Arborist determines that the tree is using underground elements (i.e footings, pipes, rocks etc.) for support, these elements shall be left in-situ.

12.0 Underground Services

Underground service installation within the TPZ shall be supervised by the Project Arborist.

The installation of underground services shall be located outside of the TPZ. Where this is not possible, they shall be installed using either hydrovac or hand excavation methods with the services installed around/below roots (>25mm¢, or as determined by the Project Arborist).

Alternatively, boring methods may be used for underground service installation where the installation depth is greater than 800mm below existing grade. Excavations for starting and receiving pits for boring equipment shall be located outside of the TPZ or located to avoid roots (>25mm¢, or as determined by the Project Arborist).

13.0 Excavations, Root Protection & Root Pruning

Excavations and root pruning within the TPZ shall be supervised by the Project Arborist. Excavations within the TPZ shall be avoided wherever possible.

Excavations within the TPZ shall be undertaken by hand or using hydro vacuum excavation methods (or similar approved device) to protect tree roots. If there is any delay between excavation works and backfilling, exposed roots shall be protected from direct sunlight, drying out and extremes of temperature by covering with a 10mm thick jute mat. The mat shall be kept in a damp condition at all times.

Hand excavation and root pruning shall be undertaken along the excavation line prior to the commencement of mechanical excavation to prevent tearing and shattering damage to the roots from excavation equipment. Roots (>25mm¢) shall be pruned by the Project Arborist only. Roots (<25mm¢) may be pruned by the Principal Contractor. Root pruning shall be undertaken with clean, sharp secateurs or a pruning saw to ensure a smooth wound face, free from tears.

No over-excavation, battering or benching shall be undertaken beyond the footprint of any structure unless approved by the Project Arborist.

Damaged roots shall be pruned behind the damaged tissues with the final cut made to an undamaged part of the root.

APPENDIX 6 - TYPICAL TREE PROTECTION DETAILS

Note:
No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.

Option 1 - Fencing
1.8m high chain wire mesh panels with shade cloth attached (if required), held in place with concrete feet.

Tree Protection Zone (TPZ) sign

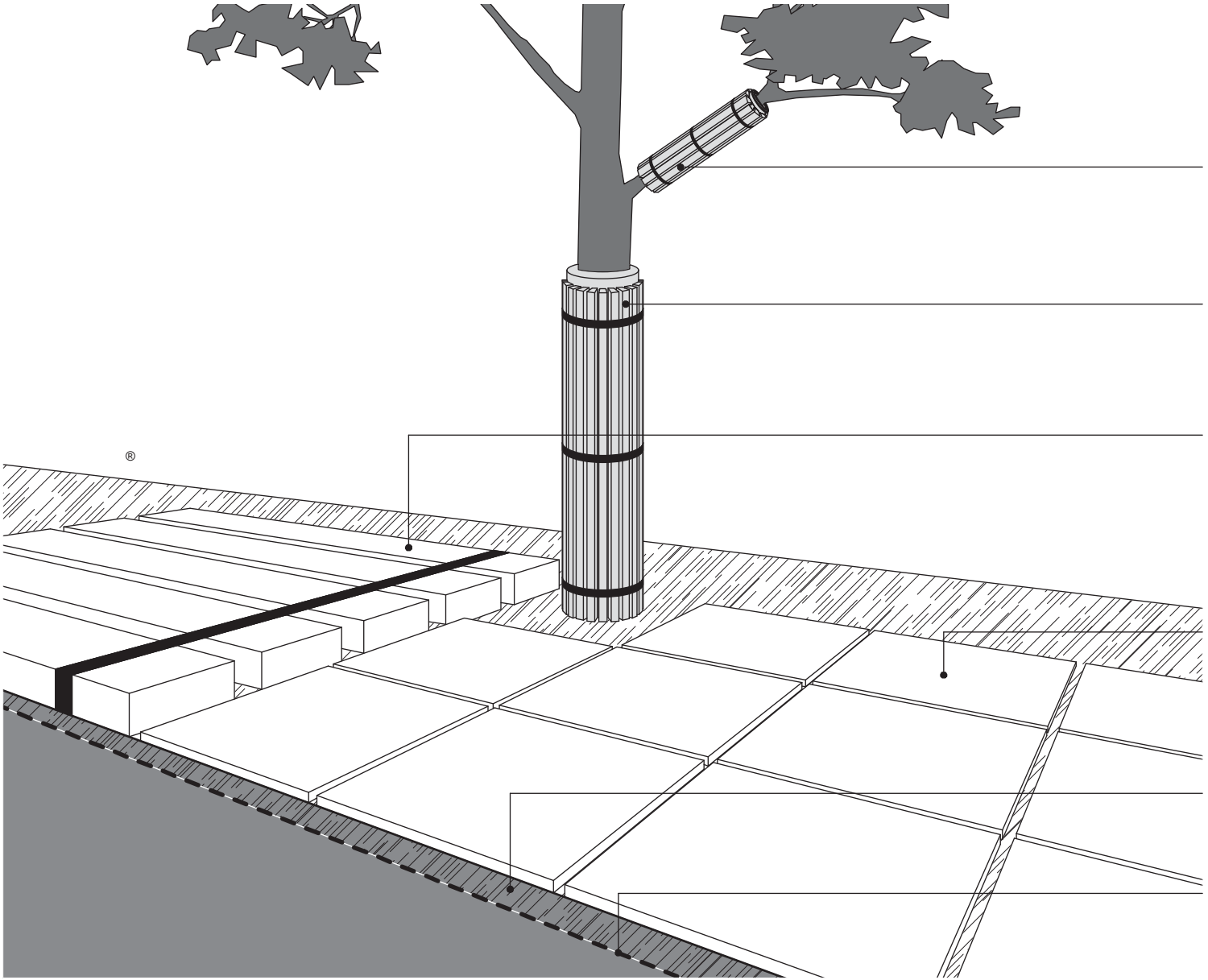
Option 2 - Fencing
Plywood or wooden panel paling fence. This type of fencing material also prevents building materials or soil entering the TPZ.

Installation of supports should avoid damaging roots.

Bracing is permissible within the TPZ.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer installed across surface of TPZ.

01 Tree Protection Fencing



Branch Protection - use boards and padding to prevent damage to bark on branch. Boards are to be strapped, not screwed or nailed to the branch.

Trunk Protection - use boards and padding to prevent damage to bark (minimum 2m). Boards are to be strapped, not screwed or nailed to the trunk.

Ground Protection - use device strapped over mulch or aggregate layer. Ground protection device should be of a suitable thickness to prevent soil compaction and root damage.

Steel plates (or approved equivalent) with or without mulch or aggregate layer below.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer.

Geotextile fabric underneath mulch or aggregate layer.

02 Examples of Branch, Trunk and Ground Protection

Branches may require pruning to erect scaffolding. Pruning may be subject to local regulations. Flexible branches should be tied back in preference to pruning.

Minimum 1.8m high hoarding. Temporary fencing may be incorporated into scaffolding as either containment screening or as hoarding.

Note:
If excavation is required for installation of support post for fencing, the Project Arborist should assess any pruning of roots greater than 20mm diameter.

Scaffold planks

Boards or plywood to be installed over mulch or aggregate layer for any areas requiring access within the TPZ.

Soleplate over geotextile. No excavation for soleplate within TPZ.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer within TPZ.

Geotextile fabric

03 Indicative Scaffolding within a Tree Protection Zone (TPZ)