94 PARK STREET, 96 PARK STREET AND 4 KUNARI PLACE, MONA VALE, NSW

ARBORICULTURAL IMPACT ASSESSMENT

Date 16 May 2025

Client Mona Vale Central Pty Ltd

LGA Northern Beaches Council

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SELENA HANNAN LANDSCAPE DESIGN

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Disclaimer

This report is not a hazard or risk assessment report. No aerial or below-ground investigations have been undertaken. The inspection was limited to a visual examination without any dissection, probing, root investigation or other means of investigation. Trees are living structures, are inherently unpredictable and may fail from above-ground and/or below-ground parts. Structural weaknesses may exist within roots, stems and branches. Regular inspections and monitoring are necessary to make informed assessments of trees' condition and development of any problems over time. The recommendations in this report for tree protection aim to reduce risk. However, no responsibility is accepted for damage or injury caused by the trees, nor can responsibility be accepted if the recommendations in this report are not adopted.

Qualifications of consulting arborist, author of report

The author of this report has arboricultural AQF Level 5 qualification as required by Council.

1 SUMMARY

i. This report has been commissioned by Mona Vale Central Pty Ltd to accompany a **Development Application to Northern Beaches Council** for proposed new apartments.

ii. The report is a combined **Preliminary Tree Assessment** and **Arboricultural Impact Assessment** and includes a **Tree Protection Specification and Plan.**

iii. The site includes Lot 42 in DP 11108 (94 Park Street), Lot 2 in DP 222636 (96 Park Street) and Lot 13 in DP226681 (4 Kunari Place), Mona Vale, NSW, in the Northern Beaches Council LGA.

iv. The land is controlled by Pittwater Local Environmental Plan 2014 (PLEP2014). PLEP2014 and Pittwater Development Control Plan (P21DCP) have been referred to in the preparation of this report.

v. Site trees include species of Pittwater and Wagstaffe Spotted Gum Forest Endangered Ecological Community (EEC) as listed under the Threatened Species Conservation Act (1995).

vi. Development is proposed for the site, therefore prescribed trees in the vicinity of proposed works were assessed. This includes trees within neighbouring properties.

vii. The trees' retention values were determined using the STARS© methodology and discussed in this report; the potential impact of construction on trees was assessed; and recommendations have been made for appropriate management and construction methods to enable their viable retention.

viii. The process of assessment, planning and preparation of the report has been undertaken to provide information to other parties with regards tree retention or removal, to minimise impacts on retained trees.

1.1 Proposed development

i. Demolition of existing houses and driveways.

ii. Construction of new apartments with basement parking and landscaping.

1.2 Trees to be retained

i. **Twenty three (26) trees or groups of trees,** on the site, the road reserve, and neighbouring properties were assessed.

ii. **Twelve (12) trees or groups of trees are to be retained in the proposal, Trees 1, 2, 3, 5, 8, 13, 14, 16, 21, 22, 24, 25** (of these, seven (7) trees or groups of trees are on the road reserve and neighbouring properties).

iii. **Tree 5** has High Retention Value, should be able to be retained with marginal impact, and works will have to be undertaken carefully to minimise any impact to the tree. Tree 5 is 3 metres from a garage wall that was previously excavated into the TPZ. The slab floor of a studio closer to the tree than 3 metres is built on-grade. The proposed excavation for the basement is 3 metres from the centre of Tree 5 which is a 26% theoretical impact in the TPZ of 7.7 metre radius. However, if the excavation for the new basement can be managed so that no roots are affected, that is, if contiguous vertical sheet piling or other similar method can be adopted so that there is **no more excavation required than the existing cut, so that no existing roots are damaged or removed,** the tree should be able to be retained. Note that no excavation overcut may be possible (hence the vertical sheet or contiguous piling). Tree Protection Fencing shall be required to protect the remainder of the full TPZ (Tree Protection Zone) to prevent damage to roots and soil by

potential compaction and contamination during construction works. Tree-sensitive construction methods are to be adopted. **Refer to Sections 5.5, Section 6 Tree Protection Specification,** and **Tree Protection Plan TPP01 (Appendix E).**

iv. **Trees 13, 14 and 16** have High Retention Value. These street trees will be able to be retained with negligible impact. Landscape works up to and on the boundary must be carefully managed, and new walls may be required to be built with pier and beam construction method to avoid damaging roots that may be present. **Refer to Sections 5.7 and 5.8.**

v. **Tree 21** has High Retention Value. The tree is on the Council Park Street road reserve and is to be retained, with negligible impact from the proposed development (excavation at 5.0 metres away).**Refer to Section 5.11.**

vi. **Trees 22 and 24** have High Retention Value**.** These palms are protected palm species in the LGA, and are to be retained, with negligible impact from the proposed development (excavation at 4.5 metres away). **Refer to Section 5.12.**

vii. **Tree 25** is to be retained in the proposal with a marginal impact of 13% of the TPZ for excavation for the basement at 2.5 metres away. Note that the remaining existing levels and rockery under the tree are to be retained for the Tree Protection Zone of 4 metres from the tree. **Refer to Section 5.13.**

1.3 Trees to be removed

i. **Fourteen (14) trees or groups of trees are to be removed in the proposal, Trees 4, 6, 7, 9, 10, 11, 12, 15, 17, 18, 19, 20, 23, 26.**

ii. Three (3) trees are on the road reserve, **Trees 15, 20 and 26**, and are recommended for removal due to poor condition and/or Low Retention Value. No trees on neighbouring properties are to be removed).

iii. **Tree 4.** The excavation for the existing house wall is 4 metres measured from the outside of the tree stem. The wall of the proposed new basement is 3 metres from the centre of Tree 4 (excavation at 2.5 metres from the tree allowing for 500mm overcut), which is a 26% impact in the TPZ and may be detrimental to the stability and vigour of the tree. It is recommended that the tree be removed due to the potentially major impact of the excavation for the building footprint**. Refer to Section 5.5.**

iv. **Trees 6, 7, 9, 10, 11, 12, 17 and 23** are Exempt species or Exempt dimensions.

v. **Trees 18 and 19** are in poor condition, have Low Retention Value and Short Useful Life Expectancy. They are damaged trees and should be removed and replaced with new specimens grown to NATSPEC. **Refer to Section 5.10.**

1.4 Methodology for excavation works within the Tree Protection Zones (TPZ) of retained trees

i. Tree-sensitive construction methods must be adopted for works within the Tree Protection Zones of the following trees to be retained: **Trees 1, 2, 3, 5, 8, 13, 14, 16, 21, 22, 24, 25** due to the proximity of proposed excavation, drainage, and landscape works.

ii. Roots shall not be torn or removed, or otherwise damaged, or soil compacted with an excavator or other machinery, within the TPZs.

iii. Where works are approved within Tree Protection Zones, for example along the line of excavation, no excavation shall be done by machinery until AFTER non-destructive, preliminary hand excavation has been undertaken to find and

expose roots. This work is to be supervised by the project arborist. The site arborist shall determine if any roots may be cut, and if so, the number, dimension, and location.

iv. Mass excavation may be undertaken only after exposed roots have been cut cleanly.

v. No trench footings will be allowed in the TPZ unless first approved by project arborist and may require preliminary root investigation.

vi. Footings may have to be designed to be bridged over roots, by means of isolated piers supporting a beam bridging over roots.

vii. The works must be supervised by an experienced, AQF5 minimum qualified arborist.

viii. Roots over 25mm in diameter can be cut only by the project arborist.

ix. Existing soil levels in the Tree Protection Zones of all retained trees MUST be maintained as existing situation, so as not to fill over roots or cut roots.

x. Where there are existing retaining walls within the Tree Protection Zones, these must be retained in situ, or re-built in the same location without damaging roots. This may require pier and beam footings for new retaining walls.

xi. No trenching for services or other excavation, piers, or footings, and/or additional structures above ground, shall be approved in the TPZ of any trees unless it can be proven than the impact on roots is negligible. This may necessitate below-ground root investigation prior to design or installation of services/structures to determine the potential impact on the tree/trees and may not be possible – the viability and stability of a retained tree will depend on the size, number and location of roots that may be required to be severed.

1.5 Tree protection and specification

i. Tree Protection Fencing is to be erected to exclude excavation works, workers, storage of materials etc from the TPZs of all trees to be retained to a practical extent. **Refer to Section 6 Tree Protection Specification,** and **Tree Protection Plan TPP01 (Appendix E).**

ii. Where it is not possible to fully enclose the Tree Protection Zones with fencing, trees to be retained must be protected with Trunk Protection and Ground Protection to create exclusion zones in their TPZs as shown in **Diagrams in Section 6.8 of the Tree Protection Specification,** and the **Tree Protection Plan TPP01 (Appendix E).**

1.6 Pruning

Any pruning that is required shall be carried out as per the requirements of *Standards Australia 2007*, *Pruning of Amenity Trees*, *AS 4373-2007.*

1.7 Monitoring

All retained site trees should be monitored regularly (annually or bi-annually) by an experienced, qualified arborist to note any change in their vigour and development of defects.

2 INTRODUCTION

2.1 Reason for the report

i. This report has been commissioned by Mona Vale Central Pty Ltd to accompany a **Development Application to Northern Beaches Council** for proposed new apartments.

ii. The report is a combined **Preliminary Tree Assessment** and **Arboricultural Impact Assessment** and includes a **Tree Protection Specification** and **Tree Protection Plan.**

2.2 Aims of the report

- Provide relevant information to the clients, architect and Northern Beaches Council regarding trees located in areas of the site and/or on properties adjacent to the site, in proximity to proposed development.
- Assess the dimensions, health, condition, and other characteristics of subject trees, including any obvious defective structures.
- From the collected data, determine retention values, useful life expectancies, and the contribution to the site in terms of significance and amenity, of subject trees.
- Provide planning and design options to prevent unnecessary removal of trees and to minimise impacts on retained trees.
- Comply with the requirements of *Australian Standard AS 4970 -2009 Protection of Trees on Development Sites.*
- Comply with the requirements of *Australian Standard AS 4373 – 2007 Pruning of Amenity Trees.*
- Describe the subject trees that are proposed to be retained and protected, and trees proposed to be removed, based on the plans for proposed development.
- Review development plans and the impact on trees to be retained. These are detailed in **Section 5** of the report**.**
- Describe the location of tree protection measures to be installed. These are described in **Section 6 Tree Protection Specification,** and **Tree Protection Plan -TPP01 (Appendix E).**
- Make recommendations for tree sensitive construction methods to be undertaken when working within the Tree Protection Zones of trees to be retained. These are detailed in **Section 5 Proposed Development and Impacts on Trees.**

2.3 Proposed development

i. Demolition of existing houses and driveways.

ii. Construction of new apartments with basement parking and landscaping.

2.4 The site, and relevant development controls

The site includes Lot 42 in DP 11108 (94 Park Street), Lot 2 in DP 222636 (96 Park Street) and Lot 13 in DP226681 (4 Kunari Place), Mona Vale, NSW, in the Northern Beaches Council LGA.

- The land is controlled by Pittwater Local Environmental Plan 2014 (PLEP2014). PLEP2014 and Pittwater Development Control Plan (P21DCP) have been referred to in the preparation of this report.
- Trees within the area of the site that are prescribed, within the vicinity of proposed works, have been assessed.
- The site is zoned C4 Environmental Living.
- The exempt tree species list was referred to.

- Pittwater and Wagstaffe Spotted Gum Forest Endangered Ecological Community (EEC) as listed under the Threatened Species Conservation Act (1995) is the local vegetation category.

2.5 Site location and description

The sites are sloped falling from east to west. The three lots share boundaries with residential properties. Existing structures include one- and two-story residences, driveways and two swimming pools.

Mature trees (exotic and native), and shrub plantings typify the residential-style gardens.

The site is reasonably exposed to winds from the southwest.

The area is described on **Tree Location Plans TLP01 and TLP02 (Appendix D)** of this report, based on the site survey.

Figure 1: Aerial view of the site (image from Explorer).

3 METHOD

3.1 Trees on development sites

This report refers to the Australian Standard *Protection of Trees on Development Sites AS4970-2009* for guidance on the principles for protecting trees on land subject to development.

3.2 Visual Tree Assessment (VTA)

Site inspection on 1 April 2025 was undertaken to assess trees from ground level only. No aerial inspections were made.

A Stage 1 Visual Tree Assessment (VTA) of the biological and mechanical characteristics of the tree was undertaken (Mattheck, Bethge and Weber 2015). **The VTA results are included in the Tree Assessment Schedule (Appendix A).**

Observations from ground level included, but were not limited to:

- Species identification and tree characteristics.
- Dimensions - height estimated by eye, canopy spread with tape measure,
- Diameter of the stem at breast height of 1.4 metres above ground level at the base of tree (DBH), and diameter of the stem at the base, above the root flare, (DAB) were determined by measuring the circumference with tape at these points, then by calculation.
- Canopy health and condition - foliage density, size and colour; location, size, and quantity of dieback; deadwood; epicormic growth; and signs of stress.
- Branches - signs of structural defects, insect and animal activity, and disease. Previous pruning was noted.
- Stem - the base of the stem and root crown area was inspected for signs of cavities, wounds, decay, basal flare, degree of lean, soil upheaval, root damage, surface roots and structural defects.
- Photographs were taken.

3.3 Other site observations

- Proximity of trees to buildings and structures.
- Aspect and protection/exposure to prevailing winds.
- Overland flow path of water.
- Species, dimensions and location of other trees and vegetation in the trees' proximity.
- Signs of erosion, recent excavation, construction works, and level changes.
- Site usage by people and vehicles.
- Soil profile investigation and testing were not undertaken.

3.4 Summary of assessment methodologies

Type of assessment	Description	Source	Appendix/Location
VTA	Visual Tree Assessment (VTA) of the biological and mechanical characteristics of trees was undertaken (Mattheck, Bethge and Weber)	Mattheck, Bethge and Weber (2015)	Appendix A

ULE	Useful Life Expectancy (ULE) categories (updated 01/04/01)	Barrell, Jeremy (2001)	Appendix B
Landscape Significance LS	IACA Significance of a Tree, Assessment Rating System (STARS) © based on tree condition and form; heritage, ecological and amenity values; was applied according to the assessment criteria.	IACA Significance of a Tree, Assessment Rating System (STARS)© Institute of Australian Consulting Arborists (IACA 2010)©	Appendix C
Retention Value RV	IACA Significance of a Tree, Assessment Rating System (STARS)© Table 1.0 Tree Retention Value – Priority Matrix combines the Landscape Significance rating with Estimated Life Expectancy (ULE), to determine Retention Value (RV).	IACA Significance of a Tree, Assessment Rating System (STARS)© Institute of Australian Consulting Arborists (IACA 2010)©	Appendix C
TPZ	Tree Protection Zones were calculated from the DBH of trees, where relevant	AS4970-2009	Appendix A
SRZ	Structural Root Zones were calculated from the DAB of trees.	AS4970-2009	Appendix A

3.5 Plans and documents

The following plans and documents were relied upon for this arboricultural assessment.

Author	Title	Reference	Date	Drawing Number and Version
Bee & Lethbridge	Survey Plan	23487	18.3.2025	01
Walsh Architects	Architectural documentation for DA		16 May 2025	
Plot Design Group	Landscape Plan		May 2025	
RTS Civil Consulting Engineers	Stormwater Plans		May 2025	

4 Results and Observations

4.1 Visual Tree Assessment (VTA)

Detailed results are listed in the **Tree Assessment Schedule (Appendix A).**

Assessed trees are shown and numbered on **Tree Location Plans TLP01 and TLP02 (Appendix D).**

4.2 Tree Significance and Retention Schedule

The following is a summary of assessed and determined values, as per the methodology outlined in 3.5.

Tree No.	Botanical Name	Common Name	ULE	Land-scape Signific-ance (LS)	Retention Value (RV)	TPZ (m)	SRZ (m)	ACTION DUE TO PROPOSED WORKS
1	Macadamia tetraphylla	Rough Macadamia	2A	M	M	3.6	2.3	**RETAIN**
***2**	Corymbia maculata	Spotted Gum	?	H	H?	4.2	2.5?	**RETAIN**
***3**	Eucalyptus resinifera	Red Mahogany	?	H	H?	6	2.7	**RETAIN**
4	Eucalyptus pilularis	Blackbutt	2B	H	H	6.5	2.7	**REMOVE for building (26% major TPZ impact)**
5	Eucalyptus microcorys	Tallowwood	1	H	H	7.7	3.2	**RETAIN, marginal**

								impact, must manage with no additional excavation.
6 3 trees	Fraxinus griffithii	Evergreen Ash	2A	M	M, E	2.4	1.9	**REMOVE for building**
7 7 trees	Viburnum odoratissimum	Glossy Viburnum	2A, 5	M	M, E	3.6	2	**REMOVE for building**
8	Ficus lyrata	Fiddleleaf Fig	2B	M	M, E	2.4	1.9	**RETAIN**
9	Fraxinus griffithii	Evergreen Ash	2A	M	M, E	2.4	1.9	**REMOVE**
10 2 trees	Populus alba	White Poplar	2B	M	M, E	3.6	2.1	**REMOVE for building**
11 3 trees	xCupressocyparis leylandii 'Leightons Green'	Leightons Green Cypress	4F	M	L, R, E	3	1.9	**REMOVE for landscape**
12	Cupressus macrocarpa	Monterey Cypress	3C	H	L, E	12	3.4	**REMOVE for building**
***13** 3 trees	Harpullia pendula	Tulipwood	1	M	H	2	1.9	**RETAIN, no impact**
***14**	Melaleuca quinquenervia	Broad-leaf Paperbark	2B	H	H	6.1	2.6	**RETAIN, no impact**
***15**	Bauhinia variegata	Bauhinia	3D	L	L	2	1.7	**REMOVE and replant with native tree**
***16**	Melaleuca quinquenervia	Broad-leaf Paperbark	1	H	H	5.9	2.7	**RETAIN, no impact**
17 3 trees	Populus alba	White Poplar	4B	M	L, R, E	3.4	2	**REMOVE for building**
18	Angophora costata	Sydney Red Gum	4D	L	L, R	2	1.5	**REMOVE and replant with better specimen**
19	Angophora costata	Sydney Red Gum	4C	L	L, R	2	1.7	**REMOVE and replant with better specimen**
***20**	Camphora Cinnamomum	Camphor Laurel	4A	M	L, R, E	6.6	2.9	**REMOVE declining**
***21**	Araucaria columnaris	Cook Pine	1A	H	H	6.6	2.7	**RETAIN, negligible impact**
22	Livistona australis	Cabbage Tree Palm	1A	H	H	3	2	**RETAIN, no impact**
23	Glochidion ferdinandi	Cheese Tree	3C	M	L, E	3.5	2	**REMOVE to avoid future damage to T22 & T24**
24	Livistona australis	Cabbage Tree Palm	1A	H	H	3	2	**RETAIN, no impact**
25	Glochidion ferdinandi	Cheese Tree	2B	H	H	4	2.3	**RETAIN, marginal impact**
***26**	Bauhinia variegata	Bauhinia	3D	L	L	2	1.5	**REMOVE and replant with native tree**

KEY TO TREE SIGNIFICANCE SCHEDULE
H High Retention Value **M** Medium Retention Value **L** Low Retention Value **R** Removal recommended **E** Exempt
TPZ Tree Protection Zone and **SRZ** Structural Root Zone, radial distances in metre from tree centre.
***** Located in neighbouring properties or Council road reserve.
? Not able to be measured due to tree location.

4.3 Local native tree species

Several trees and palms are species typical of Pittwater and Wagstaffe Spotted Gum Forest Endangered Ecological Community (EEC) as listed under the Threatened Species Conservation Act (1995).

5 PROPOSED DEVELOPMENT AND IMPACTS ON TREES

5.1 Proposed development – refer to Tree Protection Plan TPP01 (Appendix E)

i. Demolition of existing houses.

ii. Construction of new apartments with basement parking and landscaping.

5.2 Trees to be retained

i. **Twenty three (26) trees or groups of trees,** on the site, the road reserve, and neighbouring properties were assessed.

ii. **Twelve (12) trees or groups of trees are to be retained in the proposal, Trees 1, 2, 3, 5, 8, 13, 14, 16, 21, 22, 24, 25** (of these, seven (7) trees or groups of trees are on the road reserve and neighbouring properties).

iii. **Tree 5** has High Retention Value, should be able to be retained with marginal impact, and works will have to be undertaken carefully to minimise any impact to the tree. Tree 5 is 3 metres from a garage wall that was previously excavated into the TPZ. The slab floor of a studio closer to the tree than 3 metres is built on-grade. The proposed excavation for the basement is 3 metres from the centre of Tree 5 which is a 26% theoretical impact in the TPZ of 7.7 metre radius. However, if the excavation for the new basement can be managed so that no roots are affected, that is, if contiguous vertical sheet piling or other similar method can be adopted so that there is **no more excavation required than the existing cut, so that no existing roots are damaged or removed,** the tree should be able to be retained. Note that no excavation overcut may be possible (hence the vertical sheet or contiguous piling). Tree Protection Fencing shall be required to protect the remainder of the full TPZ (Tree Protection Zone) to prevent damage to roots and soil by potential compaction and contamination during construction works. Tree-sensitive construction methods are to be adopted. **Refer to Sections 5.5, Section 6 Tree Protection Specification,** and **Tree Protection Plan TPP01 (Appendix E).**

iv. **Trees 13, 14 and 16** have High Retention Value. These street trees will be able to be retained with negligible impact. Landscape works up to and on the boundary must be carefully managed, and new walls may be required to be built with pier and beam construction methods to avoid damaging roots that may be present. **Refer to Sections 5.7 and 5.8.**

v. **Tree 21** has High Retention Value. The tree is on the Council Park Street road reserve and is to be retained, with negligible impact from the proposed development (excavation at 5.0 metres away). **Refer to Section 5.11.**

vi. **Trees 22 and 24** have High Retention Value**.** These palms are protected palm species in the LGA, and are to be retained, with negligible impact from the proposed development (excavation at 4.5 metres away). **Refer to Section 5.12.**

vii. **Tree 25** is to be retained in the proposal with a marginal impact of 13% of the TPZ for excavation for the basement at 2.5 metres away. Note that the remaining existing levels and rockery under the tree are to be retained for the Tree Protection Zone of 4 metres from the tree. **Refer to Section 5.13.**

5.3 Trees to be removed

i. **Fourteen (14) trees or groups of trees are to be removed in the proposal, Trees 4, 6, 7, 9, 10, 11, 12, 15, 17, 18, 19, 20, 23, 26.**

ii. Three (3) trees are on the road reserve, **Trees 15, 20 and 26**, and are recommended for removal due to poor condition and/or Low Retention Value. No trees on neighbouring properties are to be removed).

iii. **Tree 4.** The excavation for the existing house wall is 4 metres measured from the outside of the tree stem. The wall of the proposed new basement is 3 metres from the centre of Tree 4 (excavation at 2.5 metres from the tree allowing for 500mm overcut), which is a 26% impact in the TPZ and may be detrimental to the stability and vigour of the tree. It is recommended that the tree be removed due to the potentially major impact of the excavation for the building footprint**. Refer to Section 5.5.**

iv. **Trees 6, 7, 9, 10, 11, 12, 17 and 23** are Exempt species or Exempt dimensions.

v. **Trees 18 and 19** are in poor condition, have Low Retention Value and Short Useful Life Expectancy. They are damaged trees and should be removed and replaced with new specimens grown to NATSPEC. **Refer to Section 5.10.**

5.4 Tree 1, *Macadamia tetraphylla* Rough Macadamia

Figure 2: Tree 1, Rough Macadamia located in raised planter box. Soil levels are to remain generally as existing in the TPZ to minimise impacts on the tree. The tree will tolerate some fill on the southern side, (outside the planter box), because no roots are likely to be present here.

5.5 Tree 4, *Eucalyptus pilularis* (Blackbutt)

Figure 3: Two stems exist, one stem is a dead tree stump (behind Tree 4 stem in the foreground). Note the current building is 4 metres from the outside of the tree stem at its closest point (previously excavated at that distance). A large diameter root (90mm diameter approx.) can be seen on the surface heading to the west.

Figure 4: Note the extent of canopy of Tree 4, overhanging the existing house by 2 metres. The excavation for the existing house wall is 4 metres measured from the outside of the tree stem. The wall of the proposed new basement is 3 metres from the centre of Tree 4 (excavation at 2.5 metres from the tree allowing for 500mm overcut), which is a 26% impact in the TPZ and may be detrimental to the stability and vigour of the tree. It is recommended that the tree be removed due to the impact of the excavation for the building footprint.

5.6 Tree 5, *Eucalyptus microcorys* (Tallowwood)

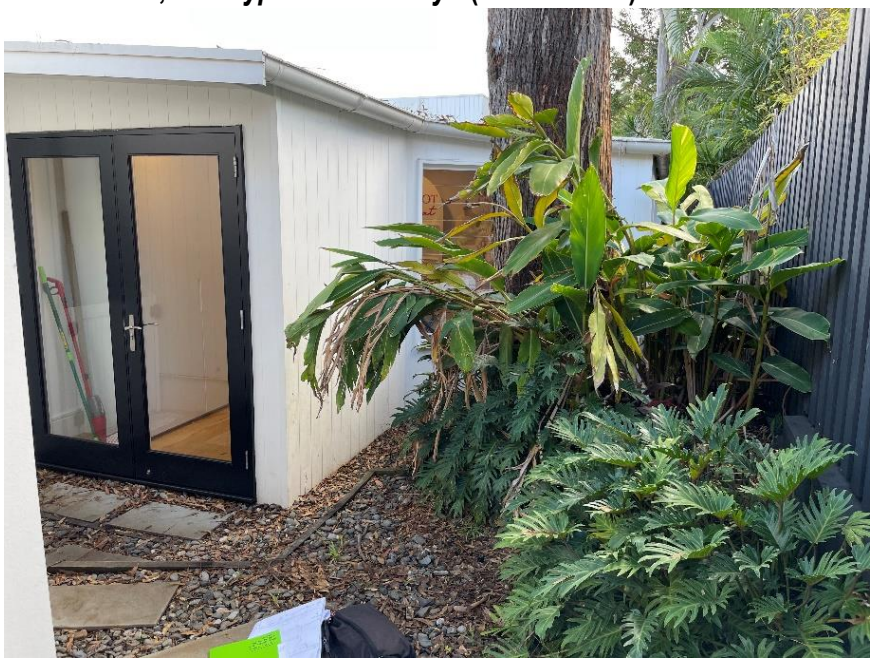


Figure 5: Tree 5 is 3 metres from a garage wall that was previously excavated into the TPZ (not in the photo). The slab floor of the studio in the photo is built on-grade. The proposed excavation for the basement is 3 metres from the centre of Tree 5 which is a 26% theoretical impact in the TPZ of 7.7 metre radius. However, if the excavation for the new basement can be managed so that no roots are affected, that is, if contiguous vertical sheet piling or other similar method can be adopted so that there is ***no more excavation required than the existing cut, so that no existing roots are damaged or removed,*** *the tree should be able to be retained. Note that no excavation overcut may be possible (hence the vertical sheet or contiguous piling).*

Figure 6: Note the extent of canopy of Tree 5, overhanging the existing house by 6 metres. The proposed amenity building is set back 5 meters from the tree, the canopy is high, and canopy pruning is not likely to be required for clearance.

5.7 Tree 12, *Cupressus macrocarpa* (Monterey Cypress)

Figure 7: Tree 12 is an exempt species and is proposed to be removed for the proposed building footprint.

5.8 Tree 13, *Harpullia pendula* (Tulip Tree) group of three

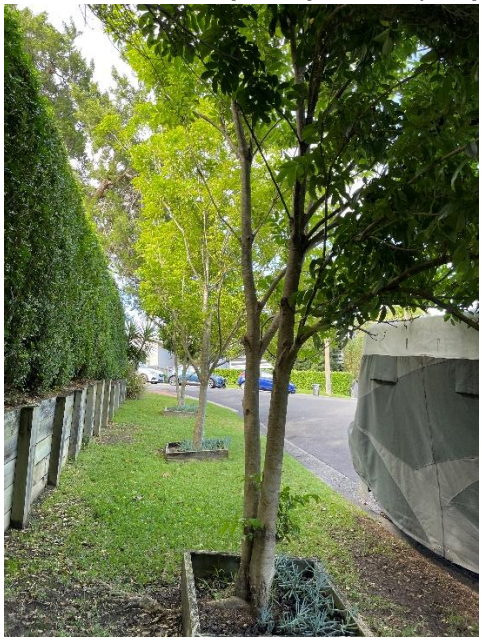


Figure 8: Tree 13 (group of three trees) are on the Council road reserve. These trees may be retained and protected with negligible impacts by the development. Note the timber retaining wall on the boundary which is to be replaced with a low height masonry wall, and footings should be bridged over the roots of the trees. Landscape works up to and on the boundary must be carefully managed, and new walls may be required to be built with pier and beam construction methods to avoid damaging roots that may be present.

5.9 Trees 14 and 16, *Melaleuca quinquenervia* (Broad-leaf Paperbark)

Figure 9: Tree 14 to be retained is on the Council road reserve. These trees may be retained and protected with negligible impacts by the development. Note the timber retaining wall on the boundary which is to be replaced with a low height masonry wall, and footings should be bridged over the roots of the trees. Landscape works up to and on the boundary must be carefully managed, and new walls may be required to be built with pier and beam construction methods to avoid damaging roots that may be present.

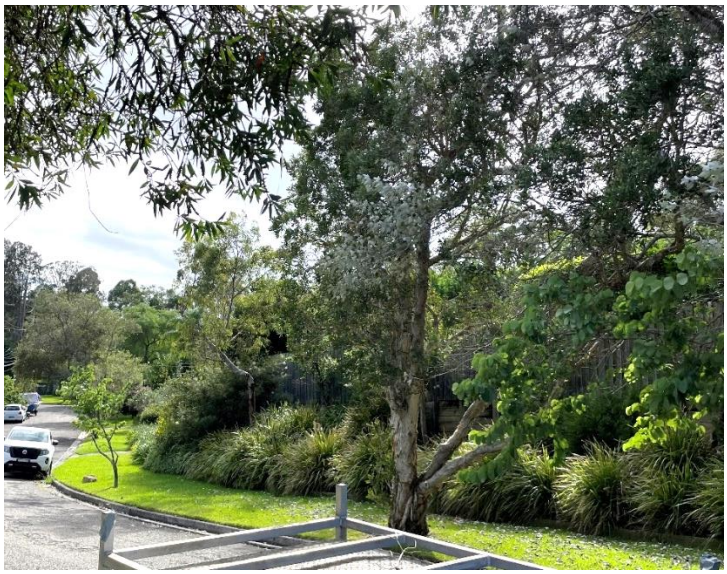


Figure 10: Tree 16 to be retained is on the Council road reserve. These trees may be retained and protected with negligible impacts by the development. Note the timber retaining wall on the boundary which is to be replaced with a low height masonry wall, and footings should be bridged over the roots of the trees. Landscape works up to and on the boundary must be carefully managed, and new walls may be required to be built with pier and beam construction methods to avoid damaging roots that may be present.

5.10 Trees 18 and 19, *Angophora costata* (Sydney Red Gum)

Figure 11: The terminal leader of Tree 18 has been topped and the tree has poor form with a short Useful Life as a result. It is recommended that this tree is removed and a new, better specimen grown to NATSPEC standards is planted instead.

Figure 12: The terminal leader of Tree 19 has been bent at 90 degrees and the tree has poor form with a short Useful Life as a result. It is recommended that this tree is removed and a new, better specimen grown to NATSPEC standards is planted instead.

5.11 Tree 20, *Cinnamomum camphora* (Camphor Laurel)

Figure 13: Canopy of Tree 20. This tree is in an advanced state of decline and should not be retained. It is a Council-owned tree on the Park Street road reserve. The species is exempt in the LGA and Council permission is required to remove the tree.

5.12 Tree 21, *Araucaria columnaris* (Cook Pine)

Figure 14: Tree 21 displays stem sway and narrow canopy that is typical of the species. The tree is on the Council Park Street road reserve and is to be retained, with negligible impact from the proposed development (excavation at 5.0 metres away).

5.13 Trees 22 and 24, *Livistona australis* (Cabbage Tree Palm) and Tree 23 *Glochidion ferdinandi* (Cheese Tree)

Figure 15: Tree 23 is the Cheese Tree growing between Trees 22 and 24, Cabbage Tree Palms. These palms are protected palm species in the LGA, and are to be retained, with negligible impact from the proposed development (excavation at 4.5 metres away). The removal of the small (Exempt size) Cheese Tree (Tree 23) is recommended now, to prevent damage to the heads of the palms from the canopy of the Cheese Tree when it matures.

5.14 Tree 25, *Glochidion ferdinandi* (Cheese Tree)

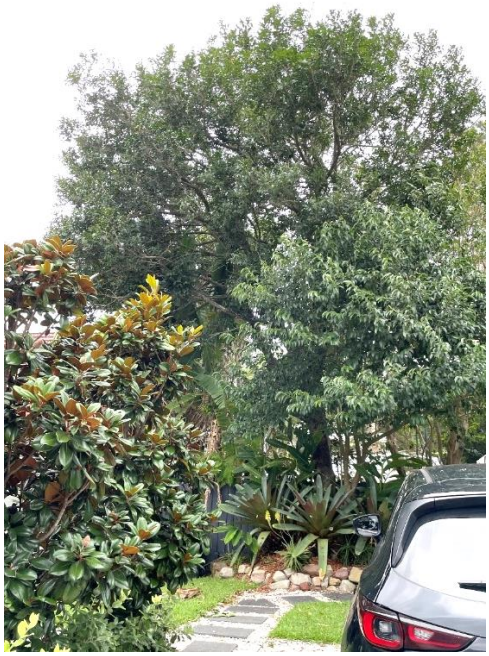


Figure 16: Tree 25 provides good screening amenity and is to be retained in the proposal with an impact of 13% of the TPZ for excavation for the basement at 2.5 metres away. Note that the remaining existing levels and rockery under the tree are to be retained for the Tree Protection Zone of 4 metres from the tree.

5.15 Methodology for excavation works within the Tree Protection Zones (TPZ) of retained trees

i. Tree-sensitive construction methods must be adopted for works within the Tree Protection Zones of the following trees to be retained: **Trees 1, 2, 3, 5, 8, 13, 14, 16, 21, 22, 24, 25** due to the proximity of proposed excavation, drainage, and landscape works.

ii. Roots shall not be torn or removed, or otherwise damaged, or soil compacted with an excavator or other machinery, within the TPZs.

iii. Where works are approved within Tree Protection Zones, for example along the line of excavation, no excavation shall be done by machinery until AFTER non-destructive, preliminary hand excavation has been undertaken to find and expose roots. This work is to be supervised by the project arborist. The site arborist shall determine if any roots may be cut, and if so, the number, dimension, and location.

iv. Mass excavation may be undertaken only after exposed roots have been cut cleanly.

v. No trench footings will be allowed in the TPZ unless first approved by project arborist and may require preliminary root investigation.

vi. Footings may have to be designed to be bridged over roots, by means of isolated piers supporting a beam bridging over roots.

vii. The works must be supervised by an experienced, AQF5 minimum qualified arborist.

viii. Roots over 25mm in diameter can be cut only by the project arborist.

ix. Existing soil levels in the Tree Protection Zones of all retained trees MUST be maintained as existing situation, so as not to fill over roots or cut roots.

x. Where there are existing retaining walls within the Tree Protection Zones, these must be retained in situ, or re-built in the same location without damaging roots. This may require pier and beam footings for new retaining walls.

xi. No trenching for services or other excavation, piers, or footings, and/or additional structures above ground, shall be approved in the TPZ of any trees unless it can be proven than the impact on roots is negligible. This may necessitate below-ground root investigation prior to design or installation of services/structures to determine the potential impact on the tree/trees and may not be possible – the viability and stability of a retained tree will depend on the size, number and location of roots that may be required to be severed.

5.16 Retention Values (RV) of trees

i. Trees assigned High Retention Value are generally recommended to be retained as a priority. This may require design, placement of buildings and infrastructure to minimise any adverse impact with respect to the Tree Protection Zones. The extent of the canopy with regards to proposed development building height must be considered in site and building design and placement, and significant pruning of canopy or roots of these trees is not generally acceptable.

ii. Trees with Medium Retention Value may be retained and protected, however are less critical for retention. Their retention should remain a priority, however, and removal considered only if all planning and design options for building and other structures have been considered.

iii. Trees with Low Retention Value are not considered to be important for retention, and do not require special planning considerations to be implemented to enable their retention.

5.17 Tree Protection Zone (TPZ) and Structural Root Zone (SRZ)

- **Table 4.2 Tree Significance and Retention Schedule** lists the calculated TPZ and SRZ for all trees.
- **Tree Location Plans TLP01 and TLP02 (Appendix D)** show the location and numbering of all assessed trees.
- **Tree Protection Plan TPP01 (Appendix E)** shows the TPZs and SRZs of trees to be retained in the proposal, if relevant.
- Tree Protection Zones (TPZ) and Structural Root Zones (SRZ) are areas described by a radial distance measured from the centre of the trees, based on calculations determined from Australian Standard *Protection of trees on development sites 4970-2009.*
- The TPZ is defined as 'a specified area above and below ground, and at a given distance from the trunk, set aside for the protection of a tree's roots and crown, to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development'.
- The TPZ is an area within which construction of buildings and other structures, trenching, soil level changes, use of machinery, storage of site materials, at minimum, should be excluded. The TPZ is the theoretical minimum area which is required for maintaining a viable tree.
- The SRZ is defined as 'the area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area'.
- The SRZ is an area within which no excavation or construction should encroach. The SRZ is the area in which roots required for stability are typically found. If an encroachment is considered into the SRZ then this must be proven to be of no impact to the structural roots, by preliminary root mapping.

5.18 Estimating impacts of development on trees - TPZ encroachment

- Some encroachment into the TPZ may be possible depending on site conditions and tree location, species, age, vigour, condition, and canopy spread, presence of existing structures (or other trees) that may be limiting or affecting root growth.
- A 10% encroachment into the TPZ may be allowable, provided there is compensatory area contiguous to the TPZ - this may be advised on a site- and tree-specific basis.
- Encroachments over 10% into the TPZ, if contemplated, may require preliminary root mapping to determine the potential impact on the tree and may not be possible – the viability and stability of a retained tree will depend on the size, number and location of roots that may be required to be severed in the proposal.
- A major encroachment is between 15 – 35% of the TPZ (root zone) impacted. Tree sensitive design must be adopted if a major encroachment into a TPZ is contemplated.
- A marginal encroachment of between 10-15% without undertaking root mapping may be acceptable, but this will depend upon a tree's vigour and tolerance to root disturbance.

5.19 Clause 3.3.4 of AS4970

Clause 3.3.4 from the *Australian Standard for Protection of trees on development sites AS4970 2009* includes considerations for assessing encroachments into the TPZ:

- Species' tolerance to root disturbance,

- Age and vigour of tree,
- The presence of existing or past structures or obstacles which may affect root growth,
- Adoption of tree-sensitive construction methods such as pier and beam, suspended slabs, discontinuous footings that would minimise impact on root systems.

6 TREE PROTECTION SPECIFICATION

6.1 Introduction

This section provides general **Tree Protection Specification** measures for tree protection works to be implemented at the proposed development site. Previous sections examined the impact on trees to be retained and removed and provided recommendations as to how the site should be managed to minimise negative impacts by construction on trees to be retained.

All works are to comply with the requirements of *Australian Standard Protection of Trees on Development Sites AS 4970-2009.*

6.2 Aims

The aims of this Tree Protection Specification are to:

- identify the responsibilities of the project arborist for site developers and managers, and to
- specify general tree protection works that are required to protect trees retained on the proposed development site.

6.3 The role of the project arborist

An AQF5-qualified consulting arborist (hereafter referred to as 'the project arborist') may be required by certifying authorities to:

- inspect and assess and supervise works within the TPZ of trees,
- specify and supervise any pruning works,
- specify and monitor compliance of tree protection measures,
- specify and certify remediation works, and to
- provide written statement of compliance at specific milestones in accordance with AS4970- 2009.

6.4 Scope of works for the project arborist

PRE-CONSTRUCTION

The project arborist is to:

- Mark trees for pruning, retention, removal, or transplanting, with reference to approved plans and documentation.
- Specify all pruning works.
- Certify all pruning, removal and transplanting on completion of these works.
- Tree Protection: The Project arborist shall certify that all tree protection measures have been installed in compliance with the Tree Protection Plan and Specification.

THROUGHOUT THE CONSTRUCTION PROCESS.

The project arborist may be required to provide reports and/or certification to Council at the following specific hold-points/milestones:

- Completion of site establishment.

- Installation of services.
- Installation of footings or slabs.
- Erection of scaffolding, if required, near trees.
- Works within Tree Protection Zones.

POST- CONSTRUCTION CERTIFICATION

At completion of the defect liability period, the project arborist may be required to certify that all tree protection measures throughout the construction and landscaping works have complied with all plans, specifications, and reports prepared by the project arborist and with the Conditions as specified in Development Application approval/Notification of Determination Conditions of Consent.

6.5 Tree Protection Plans and Details

- Erection of Tree Protection Fencing to enclose a practical TPZ exclusion area for trees prior to any works on the site.
- Work in the vicinity of the retained trees will require additional care and supervision by a project arborist so as not to damage the roots within the TPZ during demolition and excavation.
- Sediment control devices may be required to be installed within the on the line of the Tree Protection Fencing, to prevent runoff of construction pollutants or other sediment onto site vegetation.

6.6 Refer to Tree Location Plans TLP01 and TLP02 (Appendix D) for:

- location of assessed trees, tree numbers, spot levels at the base of trees, assessed canopy sizes and shape.

6.7 Refer to Tree Protection Plan TPP01 (Appendix E) for:

- location of trees to be retained and protected,
- location of proposed works,
- SRZ and TPZ of retained trees,
- Location of Tree Protection Fencing to be erected.

6.8 Pre-construction scope of works

- Prior to any construction works, the project arborist is to:
- Mark trees for pruning, retention, removal, or transplanting, with reference to approved plans and documentation.
- Specify (and supervise, if required) pruning works.
- Certify all pruning and tree removal on completion of these works.
- Supervise installation of tree protection measures and certify that all tree protection measures have been installed in compliance with the Tree Protection Plan and Specification.

PRUNING AND TREE REMOVAL

- Approved tree removal and pruning works are to be carried out before the installation of TPF and other protection measures such as may be required when scaffolding is to be installed within the TPZ.
- The project arborist shall mark trees for pruning, retention, removal, or transplanting, with reference to approved plans and documentation.
- The project arborist shall supervise any pruning required and tree removal works.
- Pruning works are to be carried out as per AS4373-2007.
- Tree removal work shall not damage trees to be retained.

- Vehicles used for tree removal works may require limited movement within TPZs. The arborist is to supervise.
- Stumps to be removed within a TPZ must be removed to not damage or disturb roots of trees to be retained. The arborist is to supervise.

INSTALLATION OF TREE PROTECTION FENCING

- Refer to Diagrams 1 to 3 for types of fencing, and additional ground protection measures if required.
- The TPZ is a restricted area and TPF is to be installed prior to site establishment.
- The TPF is to be retained intact until works are completed.
- Permission for works within the TPZ must be sought and approved by Northern Beaches Council.
- These works are to be supervised by the project arborist, and any additional work that may arise during the progress of site works must be reviewed by the project arborist and be acceptable to Council before the works are carried out. Failure to do this proactively may result in the arborist being unable to certify the works.

ACTIVITIES THAT ARE RESTRICTED FROM WITHIN THE TPZ (AS PER AS4970-2009)

- Machine excavation including trenching
- Excavation for silt fencing
- Cultivation
- Storage
- Preparation of chemicals, including preparation of cement products
- Parking of vehicles and plant
- Re-fueling
- Dumping of waste
- Wash-down and cleaning of equipment
- Lighting of fires
- Soil level changes
- Temporary or permanent installation of utilities and signs, and
- Physical damage to the tree.

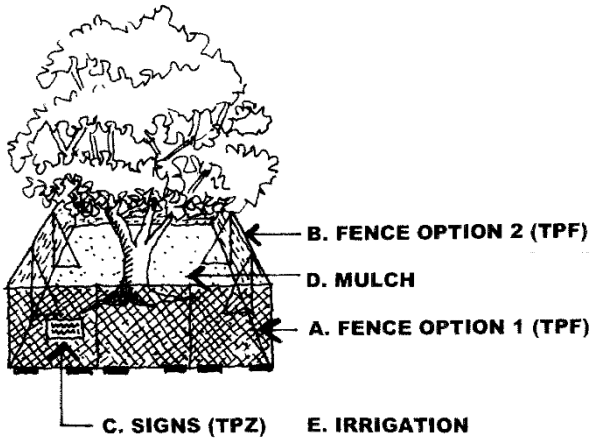


Diagram 1 TREE PROTECTIVE FENCING (TPF)

A. Fence Option 1 (TPF)
1.8 metre high chain wire mesh panels with shade cloth attached if required, to be held in place with concrete blocks.
B. Fence Option 2 (TPF)
1.8 metre high plywood or wooden panel/paling fence (prevents soil or building contaminants from coming under fence when panels are laid flush to ground).
C. Signs (TPZ)
Tree Protection Zone Signs
D. Mulch
50mm to 100mm thick layer of organic mulch, or aggregate, installed across surface area of TPZ.
E. Irrigation
Irrigation to arborist's advice.

TREE PROTECTION MEASURES TO BE INSTALLED WHEN TPF REQUIRED TEMPORARY REMOVAL, OR WHEN FENCING MUST BE LOCATED WITHIN THE TPZ – TRUNK AND BRANCH PROTECTION

The materials and positioning of protection as shown in Diagrams 2 and 3 are to be specified by the project arborist on site. A minimum of 2 metres in height is recommended. Temporary powerlines, guys and stays are not to be attached to the tree. Nails are not to be driven into the trunks or branches.

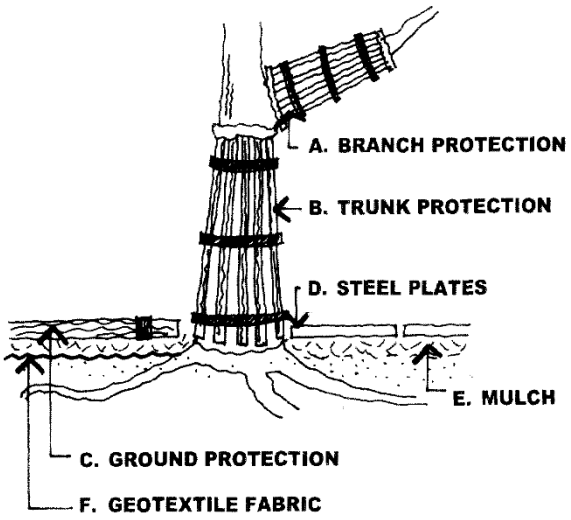


Diagram 2 TYPES OF BRANCH, TRUNK AND GROUND PROTECTION

A. Branch Protection
Prevent bark damage by use of timber boards and padding strapped to branch. (Do not use nails or screws).
B. Trunk Protection
Prevent bark damage by use of timber boards and padding for at least 2 metres above ground level. (Do not use nails or screws). Also refer to Detail Diagram 3.
C. Ground Protection
Install a suitable device eg timber rumble boards strapped together, above mulch or aggregate. The device shall be thick enough to prevent soil compaction and to prevent compression or damage to roots.
D. Steel Plates
Steel plates (or similar, as approved by arborist) may be laid with, or without, mulch or aggregate under.
E. Mulch
Minimum 50mm thick, maximum 100mm thick, organic mulch or aggregate.
F. Geotextile fabric
Geotextile fabric laid under mulch or aggregate layer.

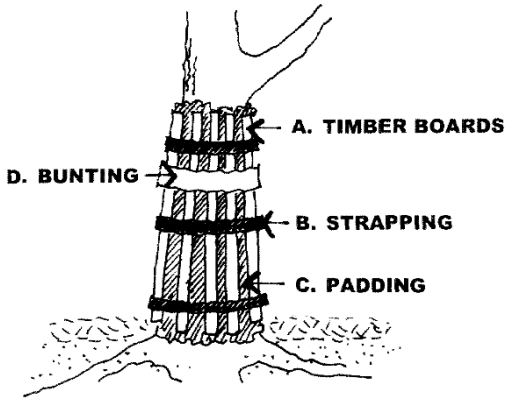


Diagram 3 DETAIL TRUNK PROTECTION

A. TIMBER BOARDS
Pine timber 3 metres x 50mm x 50mm at 150mm centres.
B. STRAPPING
Secure timber at no less than 3 locations with galvanised hoop strapping (or similar).
Do not use nails or screws.
C. PADDING
Insert expansion joint padding at minimum of three points to prevent timber from touching trunk.
D. BUNTING
Secure high visibility bunting at around 2 metres above ground level for visual reinforcement.

6.9 Scope of works for tree protection during construction

GENERAL

During construction the following situations will require the arborist's input and on-site supervision. (These may be in addition to the predetermined number of site inspections that shall be agreed upon).

- Demolition, bulk earthworks, installation of sediment control works, and drainage works near the TPZ.
- Installation of services, footings, and slabs near the TPZ.

- Temporary construction work required within TPZs – ground protection, scaffolding (erection and moving).
- Hand excavation of roots at perimeter of TPZs.
- Changes arising from building works that are different to approved plans.
- Landscaping, including installation of landscape structures such as paths, walls, soil topdressing and cultivation, planting, lighting and irrigation.

GROUND PROTECTION

If temporary access for machinery is required into the TPZ, additional ground protection measures will be required (ie. in addition to mulching). Refer to Diagram 2. This is to prevent root damage and soil compaction within the TPZ.

HAND EXCAVATION AND ROOT PROTECTION DURING EXCAVATION

Proposed works where inside Tree Protection Zones, must have minimal impact on root systems. Without prior investigation it is unknown if any large diameter roots are present.

Wounds shall not be treated with dressings or with paints.

Temporary protection of exposed roots may be required, to prevent drying out, by use of jute mesh or hessian sheeting laid in multiple layers over the exposed roots and soil profile, to the full depth of the root zone. This is to be pegged in place and kept moist for the duration of root zone exposure.

INSTALLING UNDERGROUND SERVICES WITHIN THE TPZ

Proposed works have been designed to reduce impacts on root systems. However, without prior investigation it is unknown if any large diameter roots are present at the perimeter of, or extend past the TPZ of trees nominated for retention.

Should any large roots be found in locations where proposed services are to be laid then the work methods outlined above are to be adopted. The project arborist must be consulted.

6.10 Maintaining the TPZ

MULCHING

The area within the TPZ shall be mulched. The mulch shall be maintained to a depth of 50-100mm using material that complies with AS4454. However, the arborist may determine if mulch is required in areas where there is existing turf, gardens or mulch, and additional mulching may not be required.

WATERING

Temporary irrigation will be required in the TPZ of all site trees. This is to be maintained for the duration of construction works until final certification. The project arborist shall monitor soil water and adjust if necessary.

WEED REMOVAL

All weeds within the TPZ shall be removed by hand without soil disturbance or shall be removed by use of species-appropriate herbicides by qualified operators.

6.11 Scope of works post-construction

REMOVAL OF TREE PROTECTION FENCING

TPF shall not be removed until all construction and landscaping works have been completed at Practical Completion.

DEFECTS LIABILITY PERIOD

Should any works be required during the defects liability period, such works shall not injure trees.

7 REFERENCES

7.1 BOOKS AND JOURNALS

Mattheck, C, Bethge, K & Weber, K 2015, *The Body Language of Trees*, Karlsruhe Institute of Technology, Karlsruhe, Germany.

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

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

7.2 WEBSITES

portal.spatial.nsw.gov.au/explorer/index.html

http://www.northernbeaches.nsw.gov.au

APPENDICES

Appendix A	**Tree Assessment Schedule**
Appendix B	**Useful Life Expectancy (ULE) Categories**
Appendix C	**Methodology for Determining Tree Retention Values (STARS©)**
Appendix D	**Tree Location Plans – TLP01 and TLP02**
Appendix E	**Tree Protection Plan – TPP01**

APPENDIX A TREE ASSESSMENT SCHEDULE

Site address: 94 Park Street, 96 Park Street, 4 Kunari Place, Mona Vale, NSW Date of assessment: 1 April 2025 Assessed by: Selena Hannan

'Exempt' from protection under Northern Beaches DCP due to species or dimension (under 5 metres) or proximity to approved dwelling (within 2 metres).

***** Trees located on land owned by others (neighbours, Council road reserve etc).

Tree No.	*Botanical Name* Common Name	Height (m)	Canopy spread (m)	DBH or multi (mm)	DAB mm	Age	Health/ Vigour	Cond-ition	Comments	ULE	LSR	RV	TPZ (m) radius	SRZ (m) radius
1	***Macadamia tetraphylla*** **Rough Macadamia**	8	8	220, 200	230, 190	M	F-G	F-G	Native species, not local. 2 stems from ground level. In raised planter. 15% dieback.	2A	M	M	3.6	2.3
***2**	***Corymbia maculata*** **Spotted Gum**	20	6	350	400?	EM	F-G	?	? Full inspection of condition not able to be undertaken due to tree being in neighbouring property. Local native species. The tree is 3 metres from boundary, 4 metres from existing retaining wall (cut on site side). Suppressed by dominant trees. Possible cavity in stem at 8 metres south side. 5% small twig dieback.	?	H	H?	4.2	2.5?
***3**	***Eucalyptus resinifera*** **Red Mahogany**	20	13	500	600?	M	G	?	? Full inspection of condition not able to be undertaken due to tree being in neighbouring property. Local native species. Tree is 3 metres from boundary, 5 metres from existing house (cut on site side). The canopy overhangs site from boundary by 5 metres. Low timber retaining wall along boundary (400mm high under fence). 5% small twig dieback	?	H	H?	6	2.7?
4	***Eucalyptus pilularis*** **Blackbutt**	20	10	540	620	EM	G	G	Native species, not local, probably planted in this location. In raised bed/rockery. Two separate trees, one is live (assessed) and the other is a dead stump 9 metres tall. The canopy overhangs the house roof by 2 metres. Large diameter surface root heading to west. Excavated for house wall in 2018 at 4 metres from tree.	2B	H	H	6.5	2.7

Tree No.	*Botanical Name* Common Name	Height (m)	Canopy spread (m)	DBH or multi (mm)	DAB mm	Age	Health/ Vigour	Cond-ition	Comments	ULE	LSR	RV	TPZ (m) radius	SRZ (m) radius
5	***Eucalyptus microcorys*** **Tallowwood**	25	15	640	900	M	G	G	Excavation for house wall built in 2018 at 3 metres from tree. Stem is 3 metres from an approved dwelling (excavation for garage built under Complying Development). Note that the studio at the east (back) of garage is built closer than 3 metres to tree and is built above ground level. 600mm high retaining wall on boundary. Canopy overhangs garage and studio roof by 6 metres.	1	H	H	7.7	3.2
6 **3 trees**	***Fraxinus griffithii*** **Evergreen Ash**	6	3-4 each	200 av.	270 av.	EM	G	G	Exempt. Form typical of species.	2A	M	M, E	2.4	1.9
7 **7 trees**	***Viburnum odoratissimum*** **Glossy Viburnum**	5	3	200-300	280-300	M	G	G	Exempt when kept pruned under 5 metres high. Maintained as tall hedge approx 5 metres high.	2A,5	M	M, E	3.6	2
8	***Ficus lyrata*** **Fiddle-leaf Fig**	6	4	150, 150	200	EM	G	F	Exempt. Co-dominant stems at 1 metre above ground level, with included bark, tight union, point of possible future failure. Advise removal of secondary stem if tree is to be retained.	2B	M	M, E	2.5	1.7
9	***Fraxinus griffithii*** **Evergreen Ash**	6	4	200	280	EM	G	G	Exempt. Form typical of species.	2A	M	M, E	2.4	1.9
10 **2 trees**	***Populus alba*** **White Poplar**	8	6	260, 300	300, 350	EM	F	G	Exempt. 10% dieback.	2B	M	M, E	3.6	2.1
11 **3 trees**	***xCupressocyparis leylandii 'Leightons Green'*** **Leightons Green Cypress**	7	3	160-250	280	EM	F-G	F-G	Exempt. On top of timber retaining wall, poor location for these large-growing trees, will cause wall failure.	4F	M	L, R, E	3	1.9
12	***Cupressus macrocarpa*** **Monterey Cypress**	15	16	1000	1100	LM	F	F	Exempt. Heavily pruned to stubs and flush cuts. Crown raised to 7 metres above ground level.	3C	H	L, E	12	3.4
***13** **3 trees**	***Harpullia pendula*** ***Tulipwood***	6 each	4 each	100 x 3, each	250 each	EM	G	G	Road reserve. Form typical of species.	1	M	H	2	1.9

Tree No.	*Botanical Name* Common Name	Height (m)	Canopy spread (m)	DBH or multi (mm)	DAB mm	Age	Health/ Vigour	Cond-ition	Comments	ULE	LSR	RV	TPZ (m) radius	SRZ (m) radius
*14	*Melaleuca quinquenervia* Broad-leaf Paperbark	10	8	300, 300, 280	550	M	G	F	Road reserve. Three co-dominant stems at 1 metre above ground level. 5% dieback. Planted in this location.	2B	H	H	6.1	2.6
*15	*Bauhinia variegata* Bauhinia	3	3	80, 80	200	M	F	F	Road reserve. Exempt due to small size if located on private land. Poor form.	3D	L	L	2	1.7
*16	*Melaleuca quinquenervia* Broad-leaf Paperbark	13	8	300, 280, 190, 180	600	M	G	G	Road reserve. Form typical of species. Planted in this location.	1	H	H	5.9	2.7
17 3 trees	*Populus alba* White Poplar	9	5,3,2	280, 280, 120 (dead)	300, 300, 200 (dead)	M	F	P	Exempt. All trees leaning to street, one at 60 degrees, one at 30 degrees. Stem of 120mm diameter is dead. Pruned to clear powerlines.	4B	M	L, R, E	3.4	2
18	*Angophora costata* Sydney Red Gum	3	2	90	120	I	P	P	Local native species. Planted in this location. Lopped terminal leader.	4D	L	L, R	2	1.5
19	*Angophora costata* Sydney Red Gum	5	2	150	200	I	F	P	Local native species. Bent to 90 degrees at 2 metres above ground level, poor form.	4C	L	L, R	2	1.7
*20	*Camphora cinnamomum* Camphor Laurel	12	4	550	700	OM	P	P	Exempt species when on private land. Weed species. This tree is overmature, in an advanced state of decline, and should be removed. Only 5% of usual foliage cover, extensive dieback, epicormics up stem.	4A	M	L, R, E	6.6	2.9
*21	*Araucaria columnaris* Cook Pine	20	6	550	600	M	G	G	Native, not local species. Sway in stem is typical of the species.	1A	H	H	6.6	2.7
22	*Livistona australis* Cabbage Tree Palm	15	4	300	400	M	G	G	Local native species. Good form.	1A	H	H	3	2
23	*Glochidion ferdinandi* Cheese Tree	4	4	200, 80	300	EM	G	G	Local native species. Young tree. Potentially too large for this location adjacent to the two specimen palms. Exempt while under 5 metres high (now) but protected when over 5 metres high.	3C	M	L, E	3.5	2
24	*Livistona australis* Cabbage Tree Palm	13	4	280	400	M	G	G	Local native species. Good form and will benefit from having the Camphor Laurel removed because the canopy (head) of the palm is being bent due to conflict with the tree.	1A	H	H	3	2
25	*Glochidion ferdinandi*	8	7	330	400	M	G	G	Local native species. In raised bed.	2B	H	H	4	2.3

	Cheese Tree													
***26**	***Bauhinia variegata* *Bauhinia***	2.5	2	80	60, 40	EM	F	F	Road reserve. Exempt due to small size if located on private land. Poor form.	3D	L	L	2	1.5

Key and explanation of table categories, and common abbreviations

Height is the approximate height of the tree in metres, from base of stem to top of crown (Note: Height of palms is measured to top of stem and shaft, not including leaves.

Canopy Spread is the approximate length in metres of the branches/canopy of the tree, either measured as a total, or from the stem/trunk to North, South, East, and West.

DBH (in millimetres) is the approximate Diameter of tree stem/s (trunk) measured at Breast Height ie. at 1.4 metres above ground level, unless noted otherwise.

DAB (in millimetres) is the approximate Diameter at the Base of the tree, measured just above the root buttress.

Age classes: I is immature, EM is Early Mature, M is Mature, LM is Late Mature, OM is Over Mature, D is Dead.

Health is classed as P Poor, F Fair, G Good. Tree vigour is an indication of health. Assessment includes crown density, leaf colour, pest and disease presence/resilience, dieback amount and type.

Condition is classed as P Poor, F Fair, G Good. A tree may be in good health but have poor condition due to structural defects such as weak branch/stem junctions, cavities, cracks, signs of root plate failure etc. The tree's environment (proximity to other trees, soil types and profiles, water supply, aspect and topography) may modify its form and growth habit, and its condition.

ULE Useful Life Expectancy – Barrell. Refer to Appendix B for detail of categories.

LSR Landscape Significance Rating, of High, Medium, and Low, based on IACA SIGNIFICANCE OF A TREE - ASSESSMENT RATING SYSTEM (STARS)© (IACA2010) ©. This rating system utilises structured qualitative criteria to assist in determining the retention value for a tree.

RV Retention Value, of High, Medium, Low, or Removal, is based on Useful Life Expectancy and Landscape Significance, as derived from the matrix of IACA SIGNIFICANCE OF A TREE - ASSESSMENT RATING SYSTEM (STARS)© (IACA2010) ©

E 'Exempt' species under Council's tree management order or policies.

TPZ Tree Protection Zone, expressed as a radial distance in metres, measured from the centre of the tree. It is defined in the Australian Standard *Protection of Trees on Development Sites*, AS 4970-2009 as 'a specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development'.

SRZ Structural Root Zone, expressed as a radial distance in metres, measured from the centre of the tree. It is defined in the Australian Standard *Protection of Trees on Development Sites*, AS 4970-2009 as 'the area around the base of a tree required for a tree's stability in the ground. The woody growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area".

AGL Above Ground Level (distance)

LGA Local Government Area

N (North), **S** (South), **E** (East), **W** (West)

APPENDIX B ULE

USEFUL LIFE EXPECTANCY (ULE) CATEGORIES (after Barrell, updated 01/04/01)

1 Long ULE: Trees that appeared to be retainable at the time of assessment for **more than 40 years** with an acceptable level of risk, assuming reasonable maintenance:

- **A** Structurally sound trees located in positions that can accommodate future growth.
- **B** Trees that could be made suitable for retention in the long term by remedial tree care.
- **C** Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.

2 Medium ULE: Trees that appeared to be retainable at the time of assessment for **15–40 years** with an acceptable level of risk, assuming reasonable maintenance:

- **A** Trees that may only live between 15 and 40 more years.
- **B** Trees that could live for more than 40 years but may be removed for safety or nuisance reasons.
- **C** Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
- **D** Trees that could be made suitable for retention in the medium term by remedial tree care.

3 Short ULE: Trees that appeared to be retainable at the time of assessment for **5–15 years** with an acceptable level of risk, assuming reasonable maintenance:

- **A** Trees that may only live between 5 and 15 more years.
- **B** Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
- **C** Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
- **D** Trees that require substantial remedial tree care and are only suitable for retention in the short term.

4 Remove: Trees that should be removed **within the next 5 years**.

- **A** Dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
- **B** Dangerous trees because of instability or recent loss of adjacent trees.
- **C** Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
- **D** Damaged trees that are clearly not safe to retain.
- **E** Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
- **F** Trees that are damaging or may cause damage to existing structures within 5 years.
- **G** Trees that will become dangerous after removal of other trees for the reasons given in A to F.
- **H** Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.

5 Small, young or regularly pruned: Trees that can be reliably moved or replaced.

- **A** Small trees less than 5m in height.
- **B** Young trees less than 15 years old but over 5m in height.
- **C** Formal hedges and trees intended for regular pruning to artificially control growth.

APPENDIX C METHODOLOGY FOR DETERMINING TREE RETENTION VALUES

IACA SIGNIFICANCE OF A TREE - ASSESSMENT RATING SYSTEM (STARS) © (IACA2010) ©

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.

TREE SIGNIFICANCE - ASSESSMENT CRITERIA

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.

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.

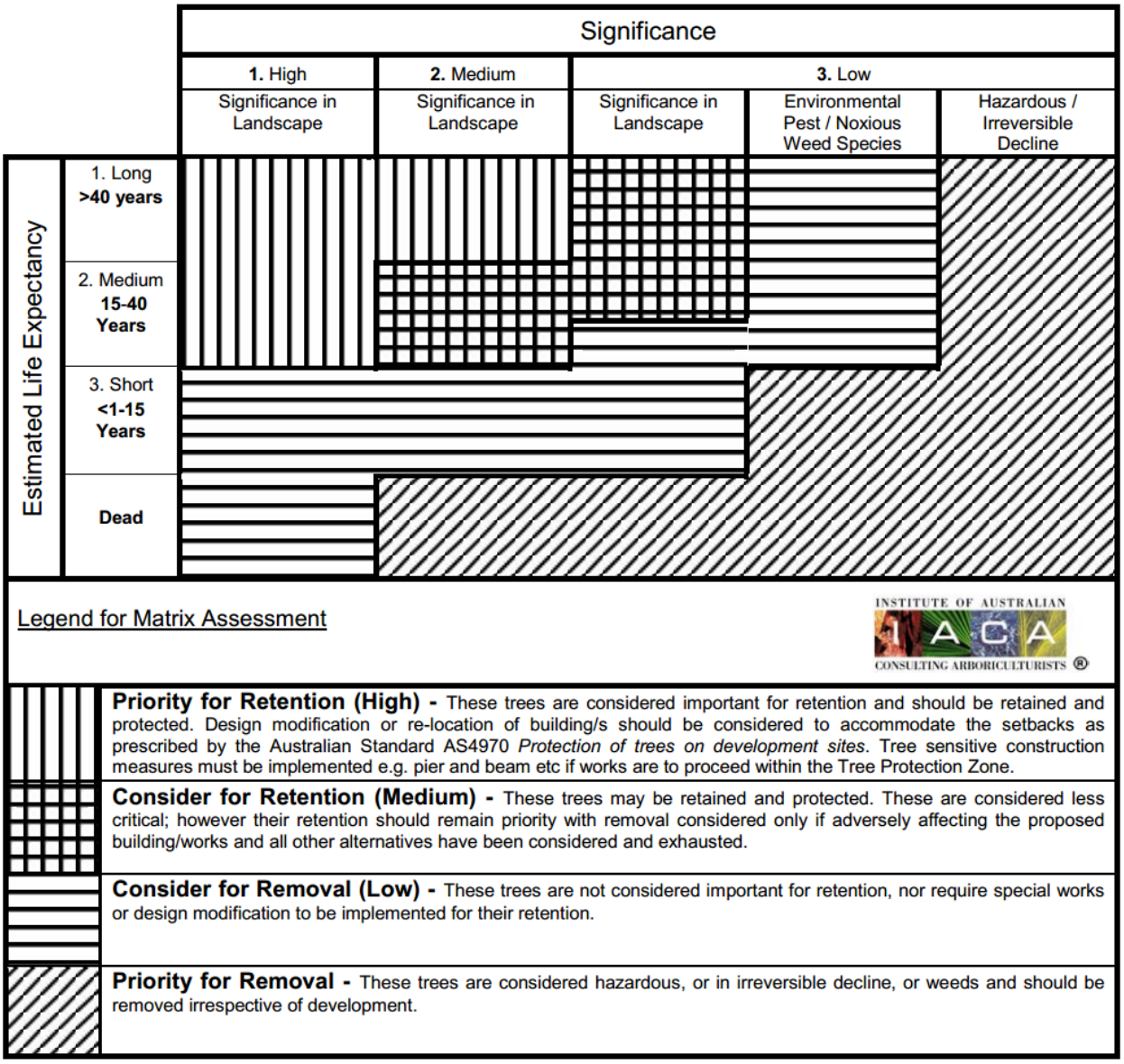
<u>Environmental Pest / Noxious Weed Species</u>

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

<u>Hazardous/Irreversible Decline</u>

- 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.

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

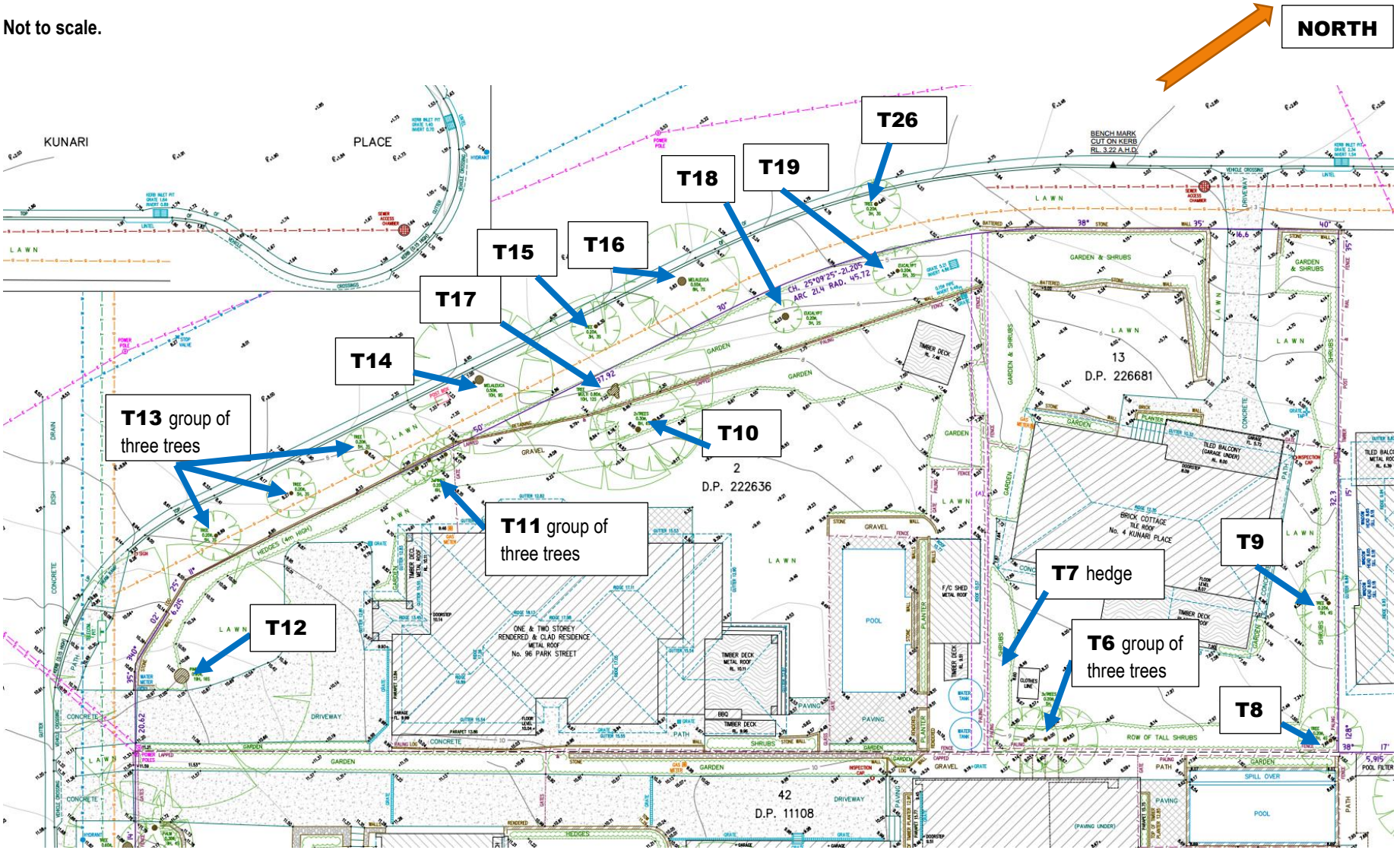
Australia ICOMOS Inc. 1999, The Burra Charter - The Australian ICOMOS Charter for Places of Cultural Significance, International Council of Monuments and Sites, www.icomos.org/australia

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

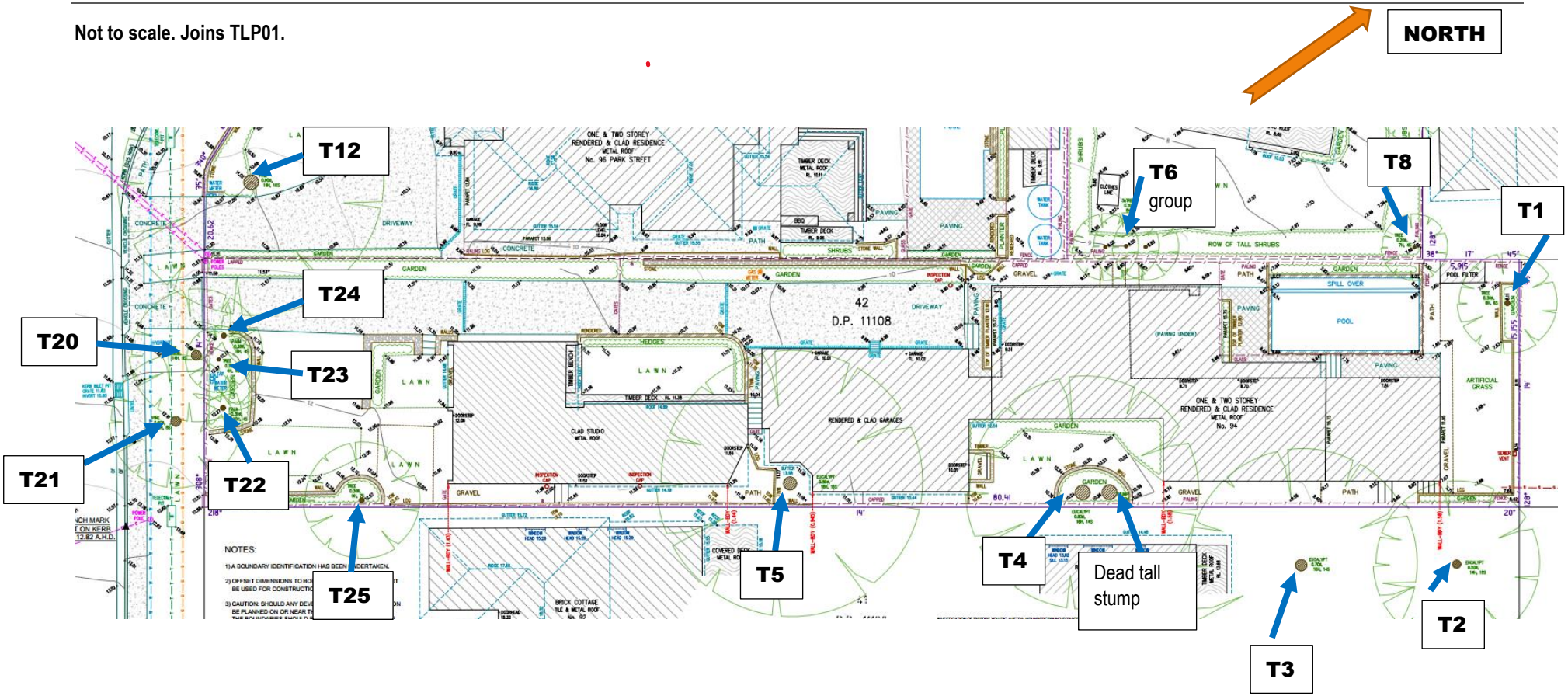
APPENDIX D TREE LOCATION PLAN -TLP01

Not to scale.



APPENDIX D TREE LOCATION PLAN -TLP02

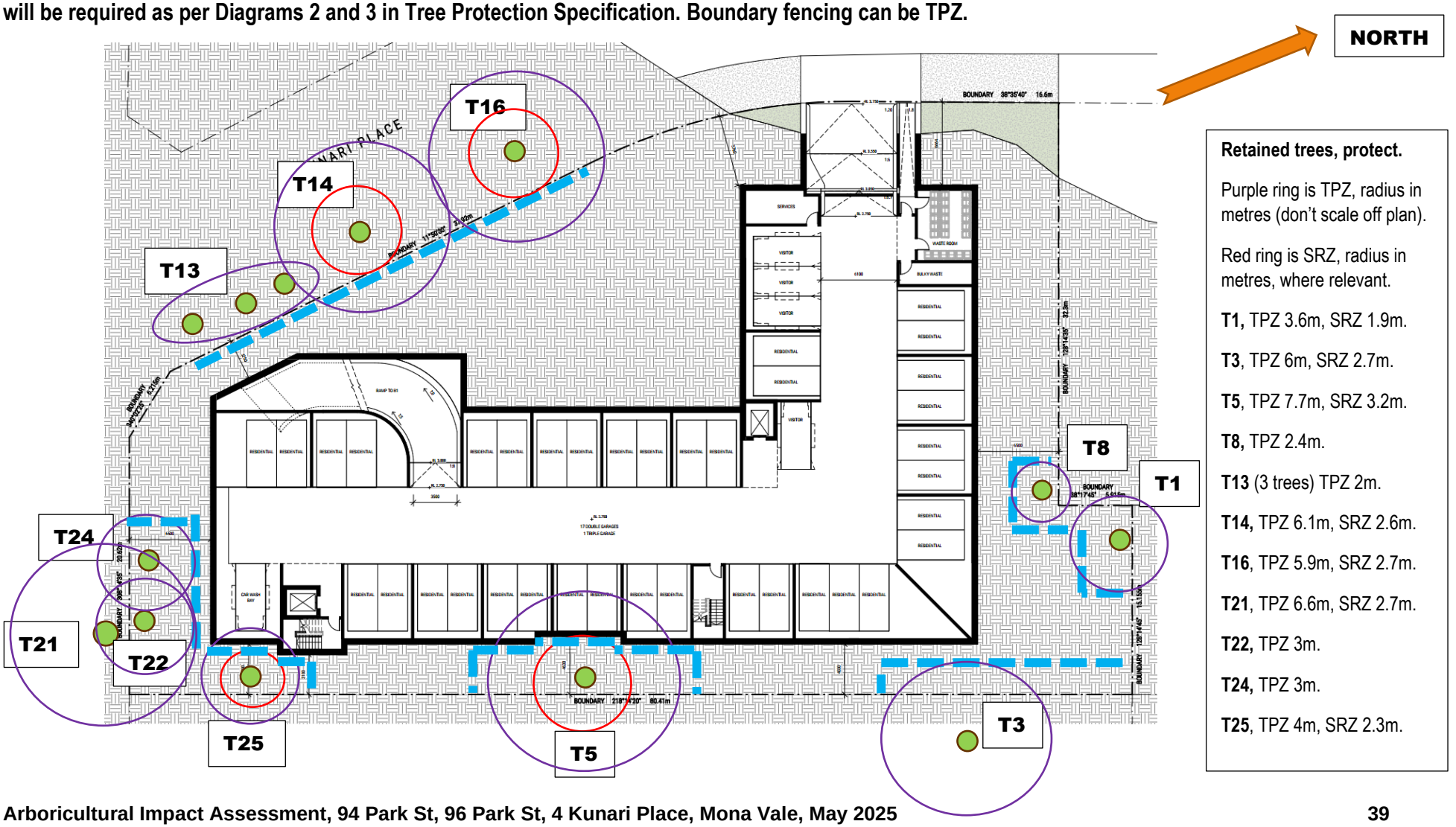
Not to scale. Joins TLP01.



APPENDIX E TREE PROTECTION PLAN -TPP01

Tree Protection Fencing (TPF) to be installed to protect TPZs of retained trees as per Diagram 1 in Tree Protection Specification. TPF may incorporate sediment control devices.

TPF *may* be able to be moved under arborist supervision. If fencing cannot be installed to enclose the whole TPZ, then ground protection in the TPZs will be required as per Diagrams 2 and 3 in Tree Protection Specification. Boundary fencing can be TPZ.



Retained trees, protect.

Purple ring is TPZ, radius in metres (don't scale off plan).

Red ring is SRZ, radius in metres, where relevant.

T1, TPZ 3.6m, SRZ 1.9m.

T3, TPZ 6m, SRZ 2.7m.

T5, TPZ 7.7m, SRZ 3.2m.

T8, TPZ 2.4m.

T13 (3 trees) TPZ 2m.

T14, TPZ 6.1m, SRZ 2.6m.

T16, TPZ 5.9m, SRZ 2.7m.

T21, TPZ 6.6m, SRZ 2.7m.

T22, TPZ 3m.

T24, TPZ 3m.

T25, TPZ 4m, SRZ 2.3m.