17 CORNICHE ROAD, CHURCH POINT, NSW

ARBORICULTURAL IMPACT ASSESSMENT

Date 23 February 2022

Client Mr and Mrs Pockley

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.

1 SUMMARY

i. This report has been commissioned on behalf of the site owners Mr Roger Pockley and Mrs Trish Pockley to accompany a **Development Application to Northern Beaches Council** for proposed works on the site, for alterations and additions to an existing house, and new carport on a suspended, elevated driveway.

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

iii. This report is an assessment of one (1) tree growing on the subject site, in the proximity to proposed development.

iv. The site is known as 17 Corniche Road, Church Point, NSW, in the Northern Beaches Council LGA, being Lot 2 in DP532883.

v. 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.

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

vii. Development is proposed for the site, therefore prescribed trees in the vicinity of proposed works were assessed.

viii. 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.

ix. 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 Landscape Significance ratings (LS)

i. One (1) tree is rated with High Landscape Significance.

1.2 Retention Values (RV) of trees

i. Tree 1 has High Retention Value.

ii. Trees assigned High Retention Value are 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.

1.3 Proposed development

i. In the front setback, demolition of an old carport and a low retaining wall, excavation and construction of new retaining wall one metre closer to a significant tree, at 5 metres away from the tree. This is to allow for an addition to the existing building.

ii. Construction of an elevated concrete driveway with new, roofed carport over. The new driveway is to be fully suspended above existing grades of the old driveway.

iii. Above-grade and on-grade steps and paths are to be installed for access from the carport and driveway.

iv. In the backyard, removal of a failing timber retaining wall, and construction of new retaining walls and on-grade steps through new garden areas. No significant trees are in the vicinity of works in the backyard.

1.4 Trees to be retained

i. One (1) tree is in proximity to the proposed works in the front setback.

ii. **One tree, Tree 1, a late-mature *Eucalyptus paniculata* (Grey Ironbark) is to be retained in the proposal**.

iii. **Tree 1 is rated with High Landscape Significance and High Retention Value and may be potentially impacted by proposed development in the Tree Protection Zone.**

iv. **Potential impacts on Tree 1, root investigation, type of driveway design, tree-root-sensitive pier design, tree-sensitive construction to mitigate impacts, and root protection to be adopted before and during construction, are described in Discussion (Section 5), and in Tree Protection Plan and Specification (Section 7).**

v. The tree is located uphill of the existing house and all care in design and construction of the new driveway and house additions must be taken to not damage roots of the tree, to preserve its vigour and condition so as to not accelerate the trees' decline or cause the failure of the tree or its parts.

vi. 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 Root investigation

i. Preliminary root investigation in the location of three of the proposed driveway piers (as shown on engineers plans) was undertaken by the client to provide information about the possible presence of roots of Tree 1 within the Structural Root Zone. The existing concrete driveway makes it difficult to undertake further root investigation, until the concrete is removed.

ii. Refer to Appendix F or photographs and description of exploratory hand-dug trenches, and found roots, for the location of three piers within the SRZ.

iii. No significant structural roots of Tree 1 were found in the vicinity of proposed Piers 1, 2 and 3 down to a depth of 600mm. It must be noted that piers are likely to be required to go down to rock, so there may be roots below 600mm.

1.6 Tree protection and specification

i. Tree 1 shall be retained, and the stem and root system within the Tree Protection Zone (TPZ) of 12.3 metres radius from the centre of the tree must be protected with Trunk Protection and Ground Protection as shown in **Diagrams 2 and 3, in Section 7.8 of the Tree Protection Plan and Specification.**

i. Builders should be told not dump waste materials in the garden, damage any trees, store materials in the TPZ of trees, cause unnecessary soil compaction etc.

ii. Tree Protection Fencing is to be erected to exclude construction workers, storage of materials etc from the TPZ of all trees to be retained to a practical extent, if possible.

iii. Refer to **Landscape Plan LP-01 (Appendix E)** and the **Tree Protection Plan and Specification (Section 7)** for further direction.

1.7 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.*

1.8 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 on behalf of the site owners Mr Roger Pockley and Mrs Trish Pockley to accompany a **Development Application to Northern Beaches Council** for proposed works on the site, for alterations and additions to an existing house, and new carport on a suspended, elevated driveway.

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

2.2 Aims of the report

The aims of this report are to:

- 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 detailed in **Section 7, Tree Protection Plan and Specification** and **Landscape Plan LP-01 (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, Discussion - Proposed Development and Impacts on Trees.**

2.3 Qualifications of consulting arborist, author of report

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

2.4 The site, and relevant development controls

The site is known as 17 Corniche Road, Church Point, NSW, in the Northern Beaches Council LGA, being Lot 2 in DP532883.

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

2.5 Site location and description

The site slopes down towards Northeast. It shares boundaries with residential properties.

Existing structures include an existing house, carport, and pool.

Mature trees, hedges, lawn, and shrub plantings typify the residential-style garden.

The area is described on the **Tree Location Plan TLP 01 (Appendix D)** of this report, based on the site survey.

Figure 1: Aerial view of the site, yellow area (image from Six Maps). Corniche Road is to the west.

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 22 February 2022 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 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 Soils

Soil profile investigation and testing were not undertaken.

3.4 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.

3.5 Summary of assessment methodologies

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

	trees was undertaken (Mattheck, Bethge and Weber)		
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

3.6 Plans and diagrams

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

Author	Title	Reference	Date	Drawing Number and Version
H&S Land Surveyors	Details and Level Survey		26.11.2021	Revision B
JJ Drafting	Proposed Ground Floor Plan	DA06	16.12.2021	Revision B
JJ Drafting	Driveway Profile	DA015	16.12.2021	Revision B
Selena Hannan Landscape Design	Landscape Plan		31.01.2022	LP01-A
Greenwood Consulting Engineers	Driveway Plan	2021300	28.01.2022	CP01-A
Greenwood Consulting Engineers	Pier Details	2021300	28.01.2022	CP02A

4 RESULTS AND OBSERVATIONS

4.1 Visual Tree Assessment (VTA)

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

Assessed trees are shown and numbered on **Tree Location Plan TLP-01 (Appendix D)**

4.2 Tree Significance Schedule

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

Tree No.	Species Name	Common Name	ULE	Landscape Significance (LS)	Retention Value (RV)	TPZ (m)	SRZ (m)
1	Eucalyptus paniculate	Grey Ironbark	2A	H	H	12.3	3.6

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, included where relevant.

4.3 Local native tree species

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

5 DISCUSSION - PROPOSED DEVELOPMENT AND IMPACTS ON TREE

5.1 Proposed development

i. In the front setback, demolition of an old carport and a low retaining wall, excavation, and construction of new retaining wall one metre closer to a significant tree, at 5 metres away from the tree. This is to allow for an addition to the existing building.

ii. Construction of an elevated concrete driveway with new, roofed carport over. The new driveway is to be fully suspended above existing grades of the old driveway.

iii. Above-grade and on-grade steps and paths are to be installed for access from the carport and driveway.

iv. In the backyard, removal of a failing timber retaining wall, and construction of new retaining walls and on-grade steps through new garden areas. No significant trees are in the vicinity of works in the backyard.

5.2 Trees to be retained

i. One (1) tree is in proximity to the proposed works in the front setback.

ii. One tree, Tree 1, a late-mature Eucalyptus paniculata (Grey Ironbark) is to be retained in the proposal.

iii. **Tree 1 is rated with High Landscape Significance and High Retention Value and may be potentially impacted by proposed development in the Tree Protection Zone.**

iv. **Potential impacts on Tree 1, root investigation, type of driveway design, tree-root-sensitive pier design, tree-sensitive construction to mitigate impacts, and root protection to be adopted before and during construction, are described in Discussion (Section 5), and in Tree Protection Plan and Specification (Section 7).**

v. The tree is located uphill of the existing house and all care in design and construction of the new driveway and house additions must be taken to not damage roots of the tree, to preserve its vigour and condition so as to not accelerate the trees' decline or cause the failure of the tree or its parts.

5.3 Impacts of proposed work near Tree 1, *Eucalyptus paniculata* (Grey Ironbark)

Figure 2: The canopy of Tree 1. The tree is located uphill of the existing house, and all care in design and construction of the new driveway and house additions must be taken to not damage roots of the tree, to preserve its vigour and condition so as to not accelerate the tree's decline or cause the failure of the tree or its parts. Note the roof of the existing house below the tree.

Figure 3: The driveway and carport must be elevated above the old driveway. The driveway and carport are wider than the existing driveway (roughly along the red line). Existing gradients must be retained under the driveway so that roots are minimally damaged. The new driveway must have a gap between the driveway and the existing sloping wall on the boundary, so that water can pass under the new driveway to water the roots. The old driveway concrete will be removed prior to construction of the new elevated driveway, but it should be left in place until work on the house has been completed.

i. The Tree Protection Zone (TPZ) area is 475 square metres.

ii. The total TPZ area impacted by the proposed driveway, carport, house footprint, steps and paths is 110 square metres, or 23% TPZ impact, which is a potentially major encroachment.

iii. Due to the existing concrete driveway, this encroachment is considered to be acceptable ONLY if the proposed works are undertaken with extreme care to locate the driveway piers where they will not require cutting a significant number of roots of significant dimension, and the piers are to be in locations where they are judged to not cause damage to roots that are structurally supporting the tree.

iv. The works must be supervised by an experienced, qualified arborist and no excavation shall be able to be done by machinery until the arborist is satisfied of the negligible impact on roots by prior investigative hand excavation.

v. No trench footings will be allowed in the TPZ.

vi. The site arborist shall be present when any excavation is required with in the TPZ to determine if any roots may be cut, and if so, the number, dimension, and location. Footings will have to be isolated and piered over

roots, and roots over 30mm in diameter can be cut only by the site arborist. Further, roots over 30mm can be cut ONLY after all of the pier locations holes have been preliminarily hand-excavated to decide which roots, and where, can be cut.

Figure 4: The old carport is to be removed, and the old stone retaining wall at the toe of the bank is proposed to be removed and the bank cut back by one metre, roughly along the red line. This is 5 metres from the tree and downhill of the tree. Theoretically the tree will have most of its tension roots located uphill of the stem, so it is anticipated that this excavation will not have a detrimental impact on the trees' stability. However, care should still be taken to hand excavate the line of the proposed cut, as it is within the Tree Protection Zone. If a significant number of large diameter roots are encountered then an alternative design may have to be considered to retain the tree safely.

Figure 5:The carport and driveway level will be roughly at the red line. The remaining old concrete of the driveway will be removed and made as an area of new garden. New steps and garden paths are designed to be elevated above existing ground levels and require no excavation.

5.4 Root Investigation

Piers are proposed to be built within the Structural Root Zone and Tree Protection Zone.

Clauses 3.3.3 and 3.3.4 in *Australian Standard for Protection of trees on development sites AS4970 2009* require root investigation by non-destructive methods where works are proposed within the SRZ of trees to be retained.

Refer to Appendix F or photographs and description of exploratory hand-dug trenches, and found roots, for the location of three piers within the SRZ.

No significant structural roots of Tree 1 were found in the vicinity of proposed Piers 1, 2 and 3 down to a depth of 600mm. It must be noted that piers are likely to be required to go down to rock, so there may be roots below 600mm.

5.5 Retention Values (RV) of trees

- Tree 1 has High Retention Value.
- Trees assigned High Retention Value are 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.

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

- **Table 4.2 Tree Significance Schedule** lists the calculated TPZ and SRZ for all trees.
- **Tree Location Plan TLP-01 (Appendix D)** shows the location and numbering of all assessed trees.
- **Landscape Plan LP-01 (Appendix E)** show the TPZs and SRZs of trees to be retained in the proposal.
- 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.

5.7 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.

5.8 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 CONCLUSIONS AND RECOMMENDATIONS

6.1 Trees to be retained

i. One (1) tree is in proximity to the proposed works in the front setback.

ii. **One tree, Tree 1, a late-mature *Eucalyptus paniculata* (Grey Ironbark) is to be retained in the proposal**.

iii. **Tree 1 is rated with High Landscape Significance and High Retention Value and may be potentially impacted by proposed development in the Tree Protection Zone.**

iv. **Potential impacts on Tree 1, root investigation, type of driveway design, tree-root-sensitive pier design, tree-sensitive construction to mitigate impacts, and root protection to be adopted before and during construction, are described in Discussion (Section 5), and in Tree Protection Plan and Specification (Section 7).**

v. The tree is located uphill of the existing house and all care in design and construction of the new driveway and house additions must be taken to not damage roots of the tree, to preserve its vigour and condition so as to not accelerate the trees' decline or cause the failure of the tree or its parts.

vi. 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.

6.2 Root investigation

i. Preliminary root investigation in the location of three of the proposed driveway piers (as shown on engineers plans) was undertaken by the client to provide information about the possible presence of roots of Tree 1 within the Structural Root Zone. The existing concrete driveway makes it difficult to undertake further root investigation, until the concrete is removed.

ii. Refer to Appendix F or photographs and description of exploratory hand-dug trenches, and found roots, for the location of three piers within the SRZ.

iii. No significant structural roots of Tree 1 were found in the vicinity of proposed Piers 1, 2 and 3 down to a depth of 600mm. It must be noted that piers are likely to be required to go down to rock, so there may be roots below 600mm.

6.3 Tree protection and specification

ii. Tree 1 shall be retained, and the stem and root system within the Tree Protection Zone (TPZ) of 12.3 metres radius from the centre of the tree must be protected with Trunk Protection and Ground Protection as shown in **Diagrams 2 and 3, in Section 7.8 of the Tree Protection Plan and Specification.**

iii. Builders should be told not dump waste materials in the garden, damage any trees, store materials in the TPZ of trees, cause unnecessary soil compaction etc.

iv. Tree Protection Fencing is to be erected to exclude construction workers, storage of materials etc from the TPZ of all trees to be retained to a practical extent, if possible.

v. Refer to **Landscape Plan LP-01 (Appendix E)** and the **Tree Protection Plan and Specification (Section 7)** for further direction.

6.4 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.*

6.5 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.

7 TREE PROTECTION PLAN AND SPECIFICATION

7.1 Introduction

This section provides general **Tree Protection Plan and Specification** measures for tree protection works to be implemented at the proposed development, as described in the **Arboricultural Impact Assessment**.

Previous sections of the **Arboricultural Impact Assessment** examined the impact on trees to be retained and removed and provided recommendations as to how the site may 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.*

7.2 Aims

The aims of this Tree Protection Plan and 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.

7.3 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.

7.4 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.

7.5 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 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.

7.6 Refer to Tree Location Plan TLP-01 (Appendix D) for:

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

7.7 Refer to Landscape Plan LP-01 (Appendix E) for:

- location of trees to be retained and protected,
- location and levels of proposed works,
- SRZ and TPZ of retained trees.

7.8 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 so as 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 works 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.

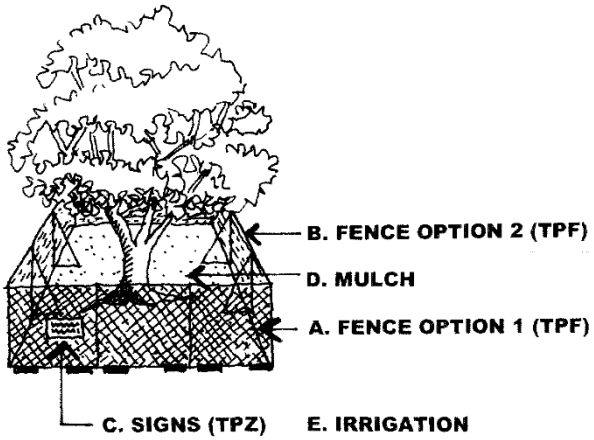


Diagram 1 TREE PROTECTIVE FENCING (TPF)

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.

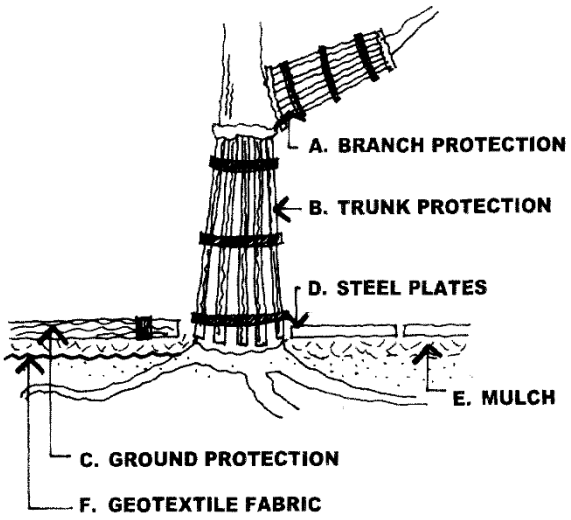


Diagram 2 TYPES OF BRANCH, TRUNK AND GROUND PROTECTION

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.

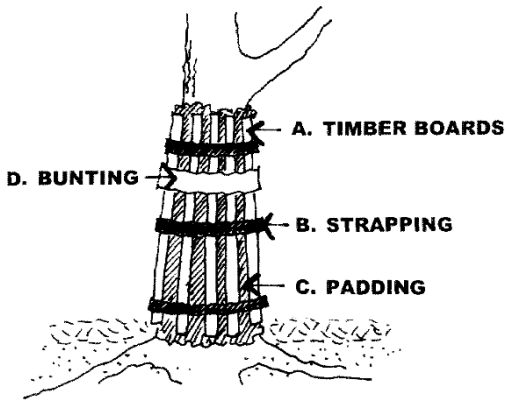


Diagram 3 DETAIL TRUNK PROTECTION

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.

7.9 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.

7.10 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 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.

7.11 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.

8 References

8.1 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.

8.2 WEBSITES

https://maps.six.nsw.gov.au/

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 Plan – TLP-01**
Appendix E	**Landscape Plan – LP-01**
Appendix F	**Root Investigation**

APPENDIX A TREE ASSESSMENT SCHEDULE

Site address: 17 Corniche Road, Church Point, NSW Date of assessment: 22 February 2022 Assessed by: Selena Hannan

Tree No.	*Botanical Name* Common Name	Height (m)	Canopy spread N, E,S,W (m)	DBH or multi (mm)	DAB mm	Age	Health/ Vigour	Cond-ition	Comments	ULE	LSR	RV	TPZ (m) radius	SRZ (m) radius
1	***Eucalyptus paniculata*** **Grey Ironbark**	25	10, 8, 4, 6	1020	1180	LM	F-G	F-G	Local native species. Deadwood 10%. Large old pruning wound at end of lowest branch to West. Suppressed to South by other trees. Tree displays typical condition and vigour for its late-mature age class. It has been pruned in the past back to stubs leaving large wounds, these should be inspected. The canopy is high and difficult to assess from ground level inspection only. Any excavation with the radius of the Tree Protection Zone will be required to be done manually. **Recommendations**: Climbing arborist to check for cavities, check condition of large wounds, check for cracks or other signs of potential failure.	2A	H	H	12.3	3.6

APPENDIX A continued.

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.

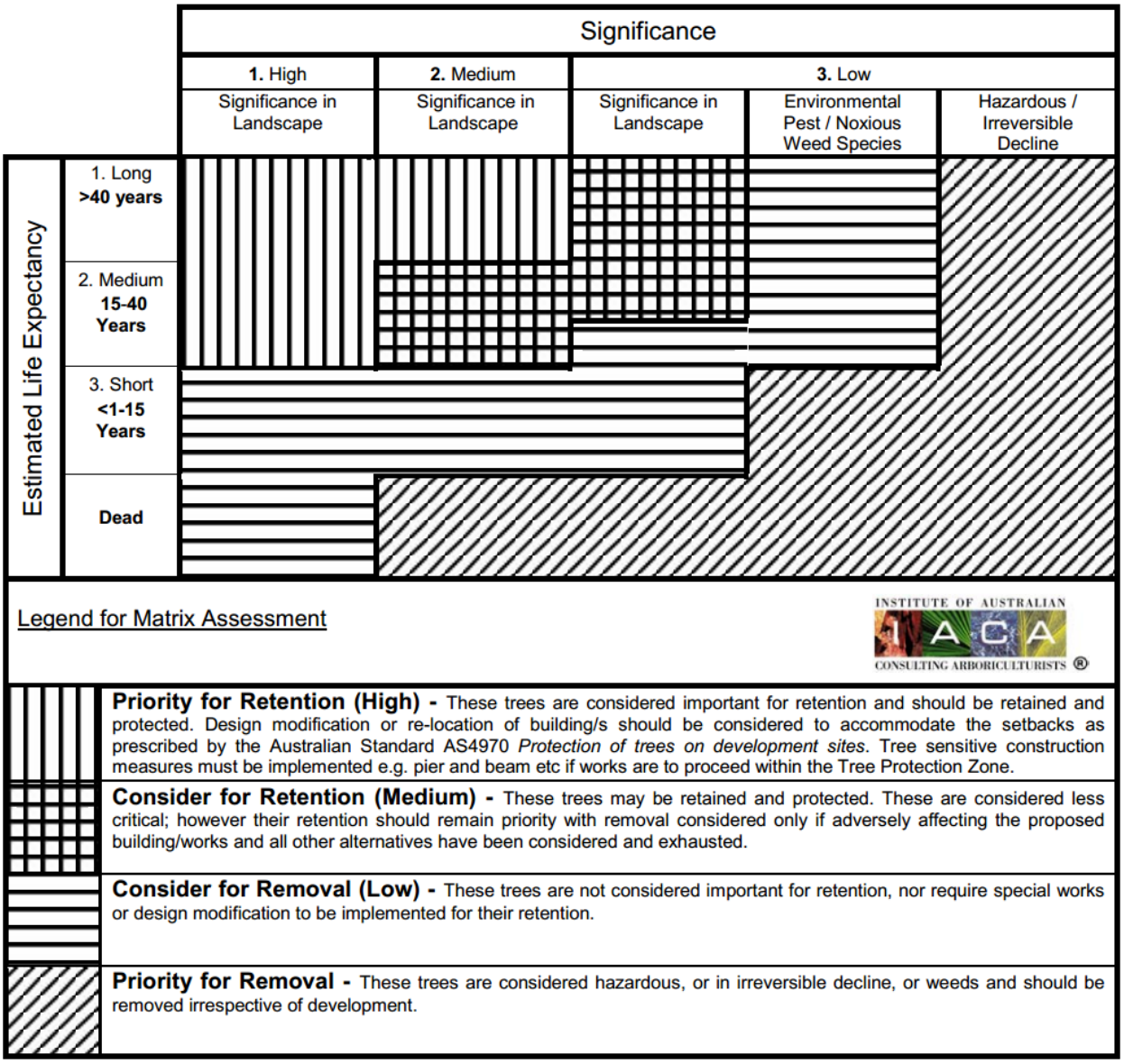
<u>Environmental Pest / Noxious Weed Species</u>

- 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

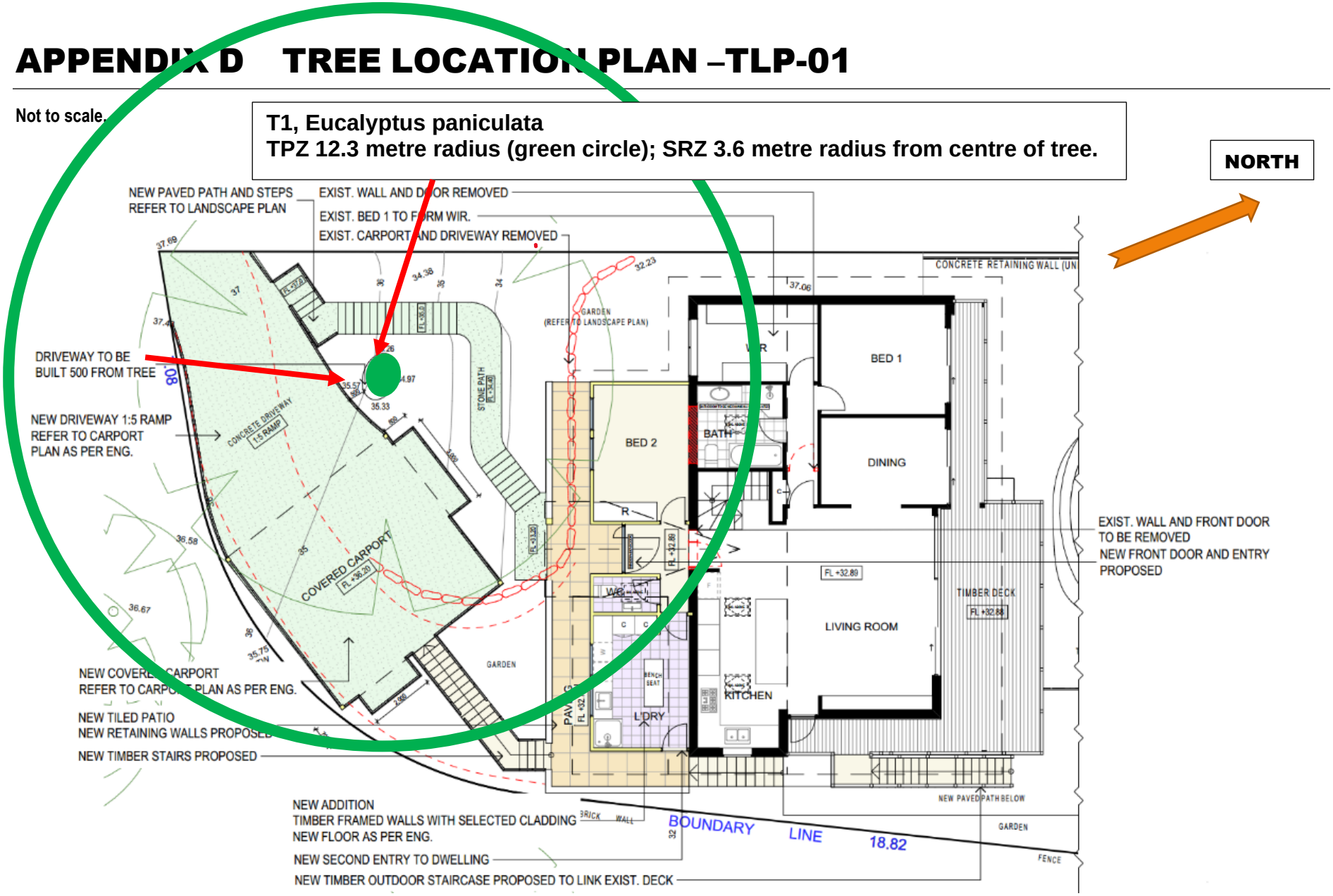
Draper BD and Richards PA 2009, Dictionary for Managing Trees in Urban Environments, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.

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

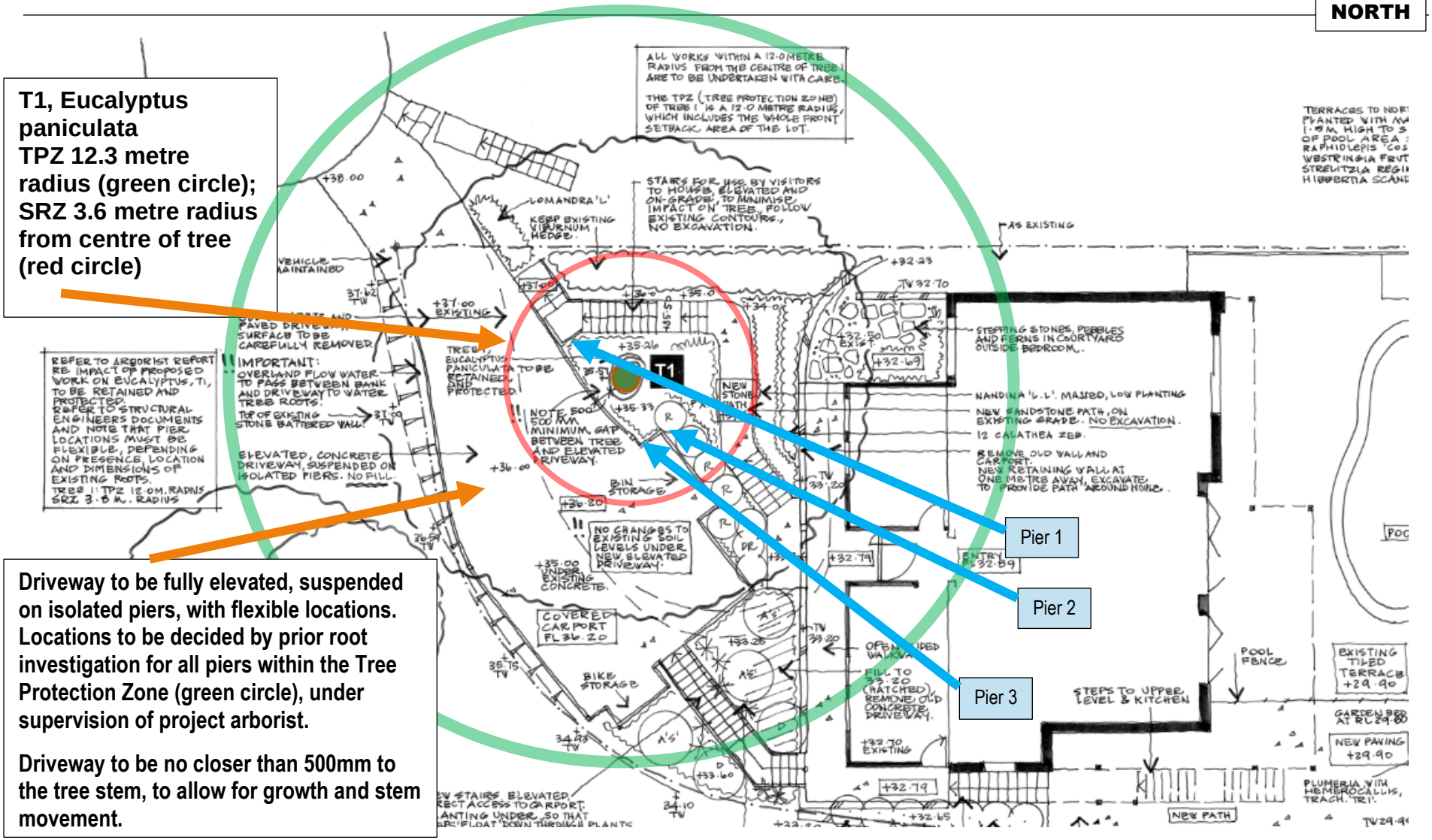
APPENDIX D TREE LOCATION PLAN –TLP-01

Not to scale.

T1, Eucalyptus paniculata
TPZ 12.3 metre radius (green circle); SRZ 3.6 metre radius from centre of tree.



APPENDIX E LANDSCAPE PLAN - LP01



Refer to Root Investigation Appendix F for results of hand excavation in vicinity of proposed "Piers 1, 2 and 3", within the SRZ of Tree 1.

APPENDIX F ROOT INVESTIGATION

Figure 6: Preliminary root investigation holes, hand excavated, in locations of proposed piers 1,2 and 3, within SRZ of Tree 3. No significant structural roots were found. Other proposed pier locations were not investigated due to presence of existing concrete driveway.