



Arboricultural Impact Assessment

Proposed Alterations & Additions at
5 Surfview Road, Mona Vale

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2 Introduction

2.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for Lex & Belinda Pederson in relation to the existing trees and a proposed alterations and additions at 5 Surfview Road, Mona Vale.

The purpose of this AIA is to assess the likely impacts of the proposed works on the existing site trees and to make recommendations regarding construction methods and tree protection measures to limit adverse impacts on trees recommended for retention.

This AIA has been guided by the principles set out in the Australian Standard 4970-2009, *Protection of trees on development sites*.

2.2 Subject Site/Proposed Works

The subject site is a residential lot, currently occupied by a two storey residential dwelling with a basement garage and pool. The proposed works include alterations and additions to the existing dwelling landscape.

2.3 Subject Trees

Four (4) trees have been assessed due to their proximity to the proposed works. Refer to Figure A (following page) for tree locations. These are made up of the following species:

- Norfolk Island Pine, *Araucaria heterophylla* (Tree 1) -Located at No.7
- Rhododendron, *Rhododendron sp.* (Tree 2)
- Broad-leaved Paperbark, *Melaleuca quinquenervia* (Tree 3)
- Yellowwood, *Afrocarpus falcatus* (Tree 4)

Trees 1, 3 and 4 are protected under SEPP (biodiversity & Conservation) 2021. Tree 2 is exempt from protection as it is less than the prescribed height for a tree in the Northern Beaches LGA.

None of the assessed trees are protected under the Threatened Species Conservation Act (1995) or Biodiversity Conservation Act (1999).

A detailed description of the subject trees is included in the Tree Assessment Table (Section 4 –page 6).

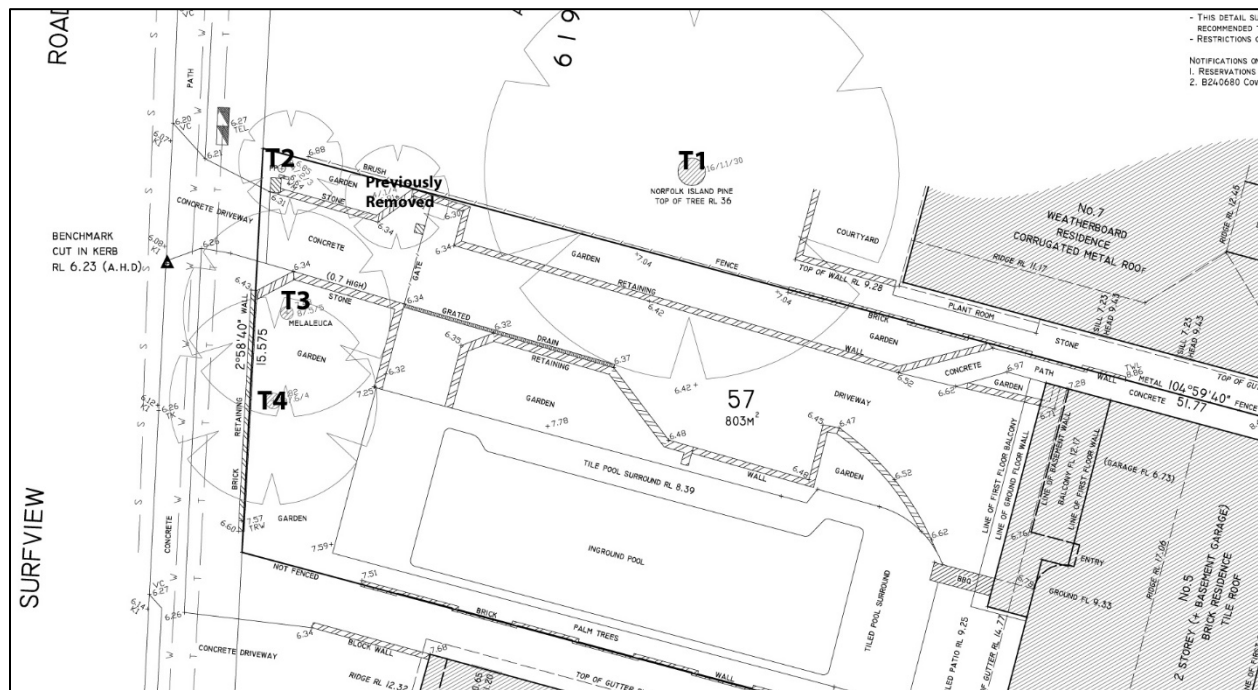


Figure A: Excerpt from the Site Survey showing tree locations and numbering.

3 Methodology

3.1 Site Inspection/Tree Assessment

Site inspection and tree assessment was undertaken by Alexis Anderson on the 9th of August, 2016 and the 2nd November 2022. The trees were assessed from ground level using a Tree Assessment Table, as outlined in Section 4. The definitions and explanations of terms used are outlined in the Tree Table Definitions page which is included at Attachment A.

3.2 Exploratory Excavation

Exploratory excavation was undertaken within the Structural Root Zone of Tree 1 (Norfolk Island Pine) to determine if structural roots were present within the garden bed on the northern side of the existing driveway retaining wall. Exploratory excavation was undertaken by Alexis Anderson at the time of the August 2016 tree assessment. Exploratory excavation was undertaken with care, using hand tools to the depth of existing driveway levels. The purpose of the exploratory excavation was to inform the Architect of structural root locations and depths to allow a design that would avoid severing large roots growing across the boundary.

3.3 Plans and Diagrams

This report is based upon a review of the set of Architectural Plans and Landscape Concept Plan provided by MHDP Architects (October 2022).

No underground services plans, hydraulics plans or engineering detail were available for review at the time of this assessment.

3.4 Tree Protection Zones

Tree assessments in accordance with the Australian Standard 4970-2009, *Protection of trees on development sites*, require calculation of a Tree Protection Zone (TPZ) and Structural Root Zone (SRZ). The following is a brief explanation of these terms:

Tree Protection Zone -TPZ: This is the area that should be isolated from construction disturbance so that the tree remains viable. Some disturbance within the TPZ may be possible following arboricultural assessment.

Structural Root Zone -SRZ: This is the area of undisturbed soil and roots required to maintain tree stability. Excavation within the SRZ can lead to whole tree failure.

3.5 Retention Values

Retention values are derived from a combination of Estimated Life Expectancy rating and Landscape and Environmental Significance ratings.

- **HIGH Retention Value:** These trees are worthy of retention and design consideration should be made where possible to allow their retention. Removal of these trees will have an impact on the landscape amenity or local environment.
- **MEDIUM Retention Value:** These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g. placement of ancillary structures, garden retaining walls, driveway levels). Removal of these trees will not have a significant impact on the landscape amenity or local environment.
- **LOW Retention Value:** These trees should not be considered to be a constraint to design layout. Some of these trees should be removed irrespective of any proposed development.

The method of determining and defining retention values used in this report has been derived from the ©Retention Index developed by Tree Wise Men® Australia Pty Ltd.

4 Tree Assessment Details

4.1 Tree Assessment Table

| | Species | Trunk Diameter @ 1.4m | Height | Canopy Spread Radius | Age Class | Health/ Vitality | Structural Condition | Estimated Life Expectancy | Landscape and Environmental Significance | Retention Value |
|---|---|------------------------|--------|----------------------|-----------|------------------|----------------------|---------------------------|--|-----------------|
| 1 | Norfolk Island Pine, <i>Araucaria heterophylla</i> | 120cm | 27m | 7m | Mature | Good | Good | Long (30+ yrs) | 2 | High |
| | Comments: Located on the neighbouring property. | | | | | | | | | |
| 2 | Rhododendron, <i>Rhododendron sp.</i> | 27cm | 4m | 3m | Mature | Good | Good | Medium (10-15 yrs) | 3 | Medium |
| | Comments: The upper crown has been pruned for powerline clearance. | | | | | | | | | |
| 3 | Broad-leaved Paperbark, <i>Melaleuca quinquenervia</i> | 33cm, 32cm | 7m | 3m | Mature | Good | Fair | Medium (10-15 yrs) | 3 | Medium |
| | Comments: The front boundary wall is leaning. This is likely to be influenced by the expansion of the root plate (Photo B). | | | | | | | | | |
| 4 | Yellowwood, <i>Afrocarpus falcatus</i> | 30cm, 25cm, 14cm, 10cm | 6m | 4m | Mature | Fair | Good | Medium (10-15 yrs) | 3 | Medium |
| | Comments: The canopy is shaped by the salt laden wind with the exposed side stunted. The existing brick wall is starting crack under pressure from the expanding root plate. | | | | | | | | | |



Photo A: Trees 1-4 as viewed from the street.



Photo B: Wall displacement and cracking is influenced by the root plate expansion of Trees 3 and 4.

4.2 Exploratory Excavation Findings

Exploratory excavation was undertaken in the location outlined in Figure B below. The location was chosen based on an earlier revision of plans that had a proposed widened driveway retaining wall and building footings in that position.

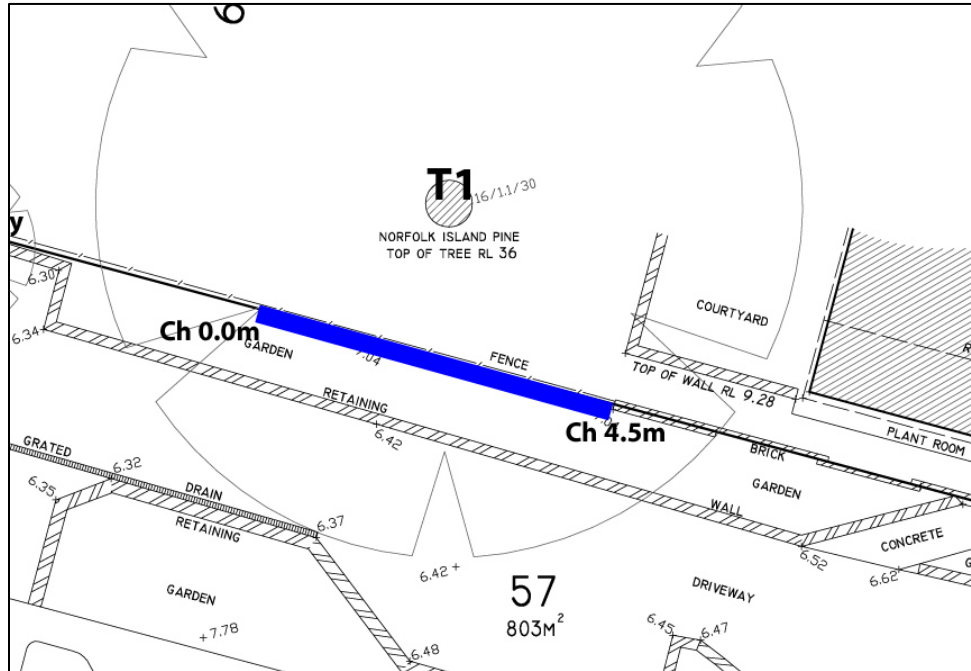


Figure B: Excerpt from the Survey Plan showing the location of exploratory excavation (blue line).



Photo C: Location of the exploratory trench.

The trench was excavated to a depth of 700mm and was 4.5m long. This depth was sufficient to expose large structural roots extending from Tree 1 across the boundary. The following table outlines the locations (chainage) size and depth of the exposed roots.

| Chainage | Root Diameter | Root Depth |
|----------|---------------|------------|
| 0.40m | 50mm | 600mm |
| 0.70m | 100mm | 600mm |
| 0.95m | 100mm | 600mm |
| 1.90m | 40mm | 500mm |
| 2.10m | 250mm | 400mm |
| 2.20m | 50mm | 50mm |
| 2.60m | 30mm | 100mm |
| 2.80m | 50mm | 100mm |
| 3.00m | 40mm | 50mm |
| 3.10m | 30mm | 500mm |



250mm diameter root

Photo D: Exploratory trench taken facing west.



Photo E: Exploratory trench taken facing east.

The findings of the exploratory excavation was used by the Architect to ensure the design layout is clear of the structural roots.

4.3 Tree Protection Zones

| Tree Protection Offsets based on <i>AS4970-2009-Protection of Trees on Development Sites</i> | | |
|---|-----------------------------|-----------------------------|
| Tree Number | Tree Protection Zone radius | Structural Root Zone radius |
| 1 | 14.4m | 3.6m |
| 2 | 3.2m | 1.9m |
| 3 | 5.0m | 2.3m |
| 4 | 4.2m | 2.1m |

5 Potential Impacts of Proposed Works

5.1 Trees Proposed for Removal

| Tree Number/Species | Retention Value | Reason for Removal |
|--------------------------------|-----------------|---|
| 4 Broad-leaved Paperbark | Medium | Within the proposed new pedestrian access way. This tree is also contributing to the damage to the existing boundary wall (Photo B) and would need to be removed to allow wall replacement irrespective of any other proposed works. |
| 5 Yellowwood | Medium | This tree is also contributing to the damage to the existing boundary wall (Photo B) and is recommended for removal to allow wall replacement. |

Replacement canopy tree planting is proposed for both of these trees. Refer to the Landscape Concept plans for details.

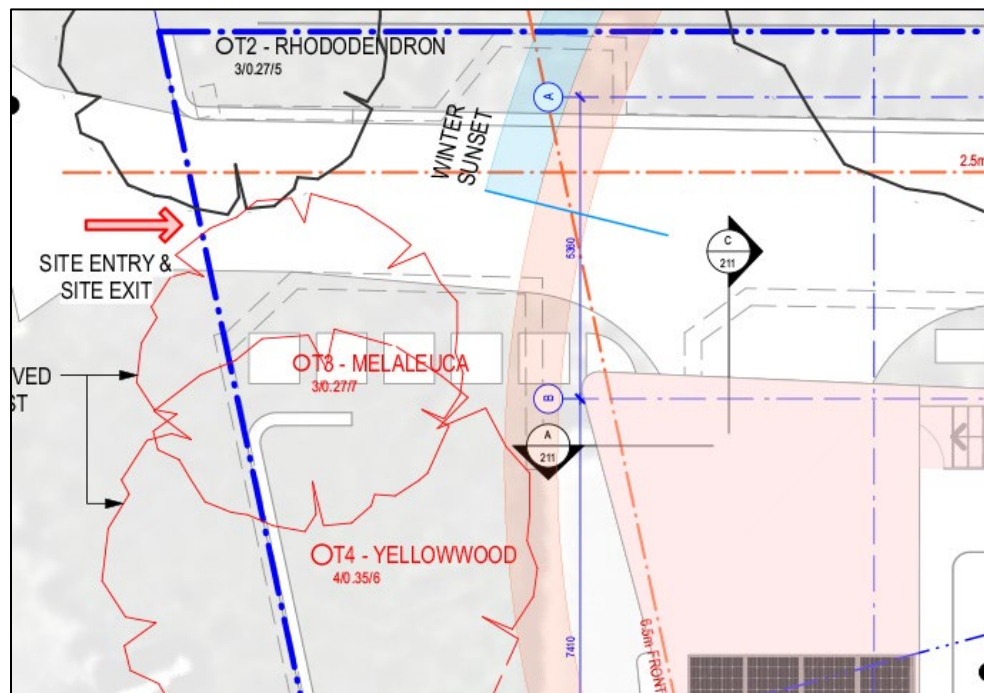


Figure C: Excerpt from the Site Plan showing proposed path and new wall near Trees 3 and 4.

5.2 Potential Impacts of Proposed Works on Retained Trees

| Tree Number/Species | Retention Value | Works Proposed Within the Tree Protection Zone (TPZ) |
|--------------------------|-----------------|--|
| 1 Norfolk Island Pine | High | <p>Removal of part of the existing garden bed retaining and construction of a new section of garden bed retaining wall is proposed within the TPZ. These works are clear the area where large structural roots were found (Figure D). Some pruning of woody transport roots and fine absorbing roots may be required. The tree is likely to tolerate this with no significant impact.</p> <p>The driveway alignment and levels will be as existing in this area with no excavation or driveway widening proposed (Figure D).</p> |

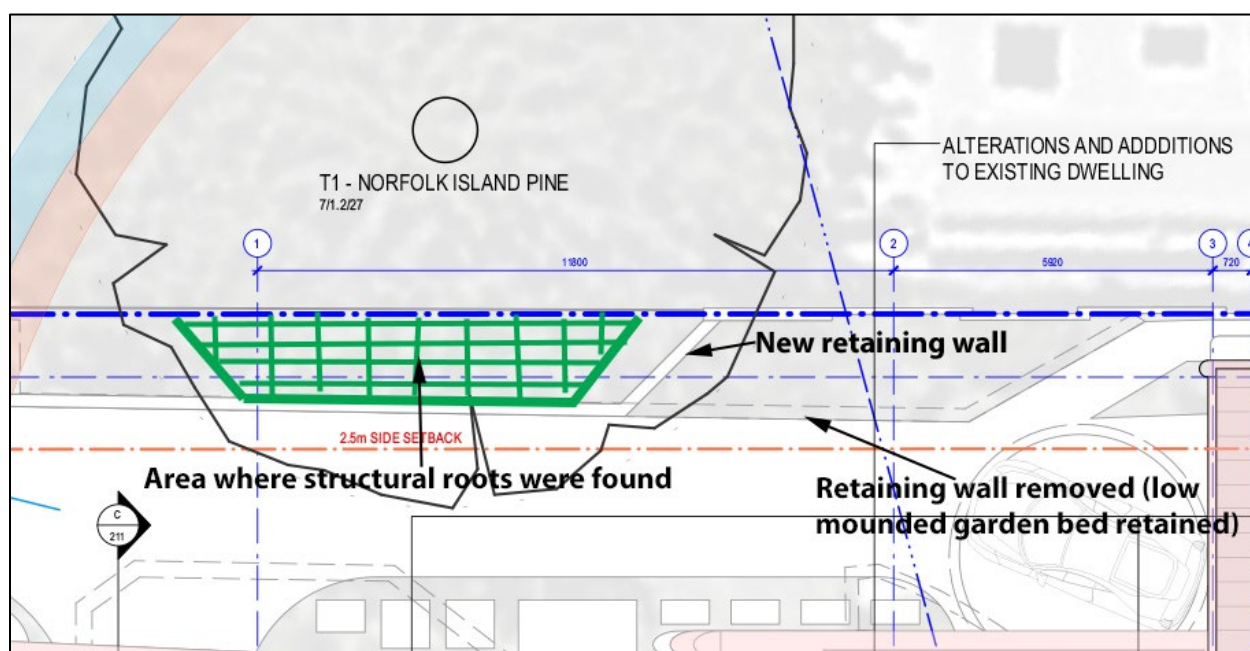


Figure D: Garden bed retaining wall works are outside of the area where large structural roots were found.

Incidental Impacts: Trees are commonly impacted on construction sites in the following ways. These impacts can be easily avoided through awareness and basic tree protection measures.

- Stripping of existing ground cover, topsoil and removal of organic material from the soil surface.
- Compaction of the topsoil and damage to surface roots through use of heavy machinery and frequent foot traffic.
- Soil contamination through washing out barrows and disposal or spillage of chemical materials.
- Root loss due to unforeseen excavation for plumbing upgrades and landscape construction.
- Bark/trunk and branch injuries from accidental contact with machinery.

6 Recommendations

6.1 Site Establishment –Prior to Construction

Appointment of a Project Arborist: An Arborist with an AQF Level 5 qualification should be engaged prior to the commencement of work on the site. The Project Arborist may be required at the following times:

- Following installation of tree protection fencing.
- During retaining wall construction within the TPZ of Tree 1.
- At project completion to verify tree protection and retention.

Tree Removal: Trees 3 and 4 are proposed to be removed. Tree removal works should be undertaken in accordance with the WorkSafe Australia *Guide to Managing Risks of Tree Trimming & Removal Work*.

Tree Protection Fencing: Tree protection fencing is recommended for Trees 1 and 2. Tree protection fencing may consist of starpickets and web-mesh or similar and be a minimum height of 1.5m. Standard 1.8m steel web-mesh temporary fencing may also be used if it is not restrictive to site access. This should be installed prior to commencement of works. Refer to Figure E for the recommended positioning of the Tree Protection Fencing.

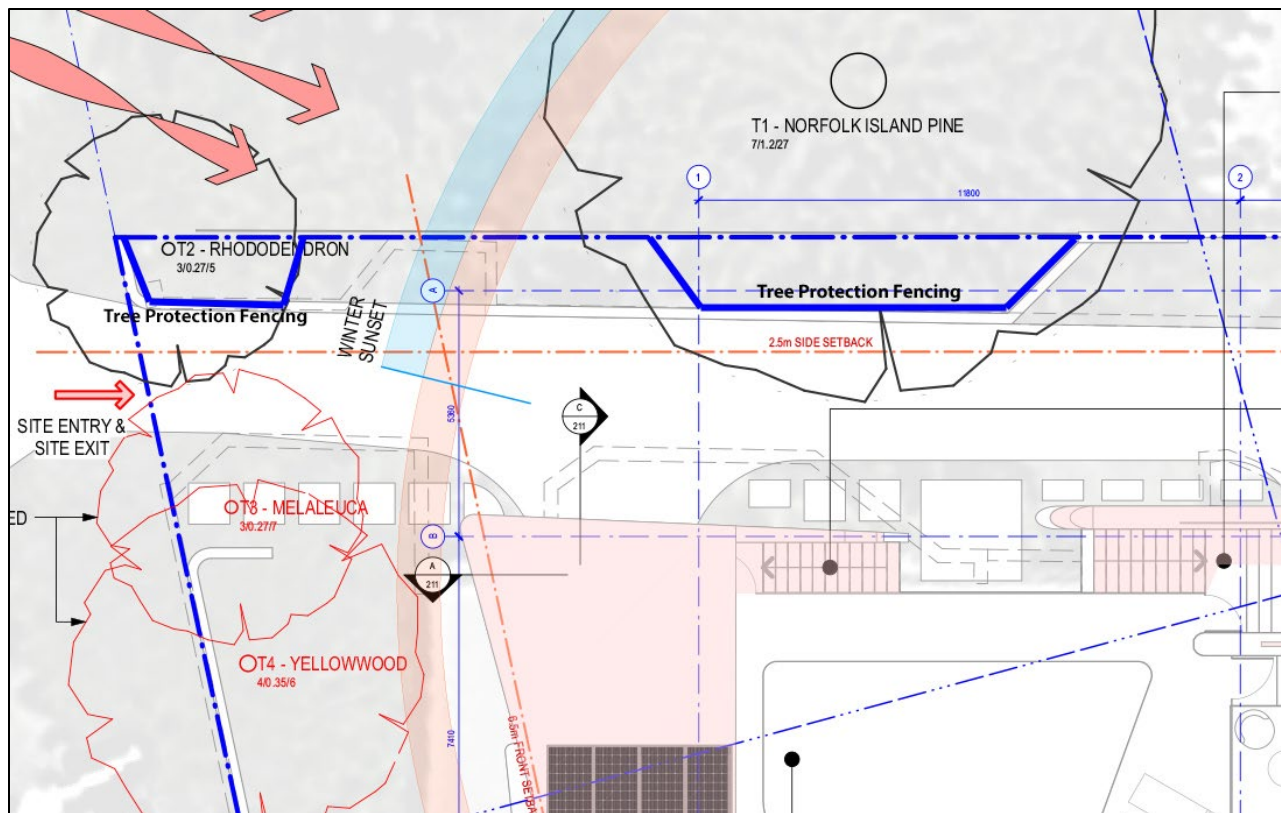


Figure E: Recommended position of the tree protection fencing.

6.2 During Construction

Garden bed retaining wall works: The Project Arborist should be present during garden bed grading and retaining wall construction within a 10.0m radius of Tree 1. All excavation must be undertaken using hand tools. Any exposed tree roots within the alignment of footings should be cleanly cut (using a hand saw or secateurs) before excavation continues. This process should be photographed and documented for tree protection certification purposes.

Sewer, Stormwater, Services Connection: The existing underground services alignments and connection points should be continued with the new plumbing. The purpose of this is to avoid additional trenching and associated root loss. There must be no new trenching within the garden bed located between the existing driveway and northern boundary.

Tree Protection Zone: The following should be prohibited within a 14.4m radius of Tree 1:

- Removal or stripping of topsoil / organic surface material.
- Disposal of solid, liquid or chemical waste.
- Any excavation, fill or other construction activity other than that discussed in this report.

6.3 Post Construction

At the completion of the project, Trees 1 and 2 and the new replacement trees should be inspected by the Project Arborist. Depending on the health and vitality of retained trees, the Project Arborist may prescribe some remedial tree care. This may include installation of temporary or permanent irrigation, application of soil conditioners, compost application and installation of mulch.

7 Statement of Impartiality

- This report prepared by Bluegum Tree Care & Consultancy (BTCC) reflects the impartial and expert opinion of Alexis Anderson.
- BTCC is acting independently of and not as the advocate for the owners of the subject trees.
- BTCC does not undertake tree pruning and removal works and will not have any involvement with pruning or removing trees which are the subject of this report.

8 Limitations

- The tree assessment was undertaken for the purpose of pre-development planning. Detailed tree risk assessment was not requested or included in the scope of works.
- The findings of this report are based upon and limited to visual examination of trees from ground level without any climbing, internal testing and limited exploratory excavation.
- This report reflects the health and structure of trees at the time of inspection. Bluegum cannot guarantee that a tree will be healthy and safe under all circumstances or for a specified period

of time. There is no guarantee that problems or defects with assessed trees, will not arise in the future. Liability will not be accepted for damage to person or property as a result of failure of assessed trees.

Attachment A: TREE ASSESSMENT DEFINITIONS

Height. Tree height is estimated from ground level. This assessment is made independently of data plotted on survey plan. These measurements have not been confirmed with clinometer or other surveying instrument.

Diameter at Breast Height (DBH). Trunk diameter is measured at 1.4 metres above ground level. A diameter tape is used which calculates the diameter from a measurement of the circumference. DBH is primarily used for the calculation of the TPZ. The trunk diameter above the root buttress is measured to calculate the Structural Root Zone. If a tree has more than 4 trunks, the diameter of the four largest trunks is recorded. For irregular trunk formations the DBH is calculated as outlined in Appendix A of AS4970-2009 -*Protection of Trees on Development Sites*.

Canopy Spread Radius. Average canopy spread radius is estimated from the centre of trunk to the outer edge of canopy. Refer to Comments column for detail of heavily skewed canopy spread.

Age Class - This is an estimation of the tree's current age class based on size, growth habit, local environmental conditions and comparison with surrounding trees.

- **Immature (IM):** This is a juvenile specimen that is likely to have germinated within the previous 5 years.
- **Early Mature (EM):** This is a tree that is established within its growing environment, though has not reached an age of reproductive maturity or the natural growth habit of a mature individual.
- **Mature (M):** This is a tree has reached both reproductive maturity and a physical form and shape typical for the species. Trees can have a Mature Age Class for the majority of their life span.
- **Late-Mature (LM):** These trees show early signs of senescence with symptoms such as reduced canopy density and an accumulation of dead branches.
- **Over-mature (OM):** These trees show symptoms of irreversible decline such as canopy dieback with dead branches concentrated in the upper canopy.

Health - Good (G), Fair (F) or Poor (P). This is primarily based on the extent of vigorous new foliage growth at branch tips and the colour, size and density of foliage generally. The percentage of live branches to dead branches is considered. The location of any dead branches is also considered. The presence of any pest or disease is considered as part of this assessment. Health can vary with climatic conditions.

Structural Condition - Good (G), Fair (F) or Poor (P). This is an assessment of tree structure and stability. Root anchorage, trunk lean, structural defects, canopy skew and any hazardous features are considered. Dead branches can be considered as part of Structural Condition if they are of a size and location that could cause injury or property damage.

Tree Protection Zone (TPZ). This is a radial distance of (12X) the DBH measured from centre of trunk. TPZ is rounded to the nearest 0.1 metre. A TPZ should not be less than 2m or greater than 15m. The TPZ for palms and other monocots should not be less than 1m outside of the crown projection. Existing constraints to root spread can vary the TPZ. For a tree to remain viable, construction activity should be excluded or undertaken with care within the TPZ. Disturbance within up to 10% of the TPZ area is considered to be a minor encroachment. Disturbance to more than 10% of the TPZ area is considered a major encroachment. Major encroachment into the TPZ is possible depending on the type of disturbance, and species tolerance to disturbance. Exploratory excavation may be required to quantify the presence of roots at the alignment of proposed ground disturbance.

This is based upon the Australian Standard AS 4970, 2009, *Protection of trees on development sites* and the Matheney & Clarke "Guidelines for adequate tree preservation zones for healthy, structurally stable trees".

Structural Root Zone (SRZ). This is a radial distance based on the following formula- $SRZ = (D \times 50)^{0.42} \times 0.64$ (for trees less than 150mm Diameter, a minimum SRZ of 1.5 metres). The **D** in the formula is the trunk diameter measured above the root buttress. This was recorded in the field notes. SRZ measurements are rounded to the nearest 0.1m. The Structural Root Zone is the area of soil and roots required to maintain tree stability. Excavation within the SRZ can result in whole tree failure. Fully elevated construction is possible within SRZ with specific rootzone assessment. Existing constraints to root spread can vary the SRZ. This method of determining SRZ is outlined at Section 3.3.5 of Australian Standard AS 4970, 2009, *Protection of trees on development sites*.

Estimated Remaining Life Expectancy: This gives a length of time that the Arborist believes a particular tree can be retained from the time of assessment with an acceptable level of risk based on the information available at the time of the inspection. This system of rating does not take into consideration the likely impacts of any proposed development. Ratings are **Long** (retainable for 30 years or more with an acceptable level of risk), **Medium** (retainable for 10-30 years), **Short** (retainable for 0-10 years) and **Removal** (tree requiring removal due to risk/hazard or absolute unsuitability).

Landscape & Environmental Significance*. This is an assessment of the impact of the tree on the surrounding landscape amenity and natural environment. Rarity, habitat value, physical prominence, historical and cultural significance of the tree are considered in this rating system. The Landscape & Environmental Value ratings used in this report are:

1. Very High Value: This is an outstanding specimen that holds irreplaceable environmental, landscape or cultural value.

2. High Value: An excellent specimen that holds environmental, landscape or cultural value that is present in other site trees or that could be replaced.

3. Moderate Value: Can be a good to fair specimen with environmental, landscape or cultural value that is common within other trees in the locality.

4. Low Value: Removal would not result in any loss of site amenity or environmental value. Can include undesirable or weed species or trees growing in unsuitable locations.

5. Very Low Value: Dead or hazardous with no other environmental or cultural value. Could also include weed species. These trees should be removed or pruned in a way to make safe irrespective of any development.

***Note:** The concept of using a five (5) point scale to assess tree significance was derived from the Tree Wise Men® Australia Pty Ltd ©Significance Rating Scale.

Retention Value*. Retention values are derived from a combination of Estimated Life Expectancy rating and Landscape and Environmental Significance ratings.

| Landscape & Environmental Significance | | Estimated Life Expectancy | | | |
|--|---------------|---------------------------|--------|--------|---------|
| | | Long | Medium | Short | Removal |
| | Very High (1) | HIGH | | MEDIUM | LOW |
| | High (2) | | | | |
| | Medium (3) | MEDIUM | | | |
| | Low (4) | | | | |
| | Very Low (5) | | | | |

HIGH Retention Value: These trees are worthy of retention and major design consideration should be made where feasible to allow this.

MEDIUM Retention Value: These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g. placement of ancillary structures, garden retaining walls, driveway levels).

LOW Retention Value: These trees should not be considered to be a constraint to design layout. Some of these trees should be removed irrespective of any proposed development.

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