Arboricultural Impact Assessment

Proposed Alterations & Additions at
15 Trappers Way, Avalon Beach

Date: May 2019
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1 Contents

2 Introduction

2.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for Margaret Richardson in relation to the proposed alterations and additions at 15 Trappers Way, Avalon.

The purpose of this AIA is to assess the likely impacts of a proposed external wall footing on a single Spotted Gum, *Corymbia maculata* located on the adjoining property and to make recommendations regarding tree protection measures to limit adverse impacts on the tree.

This AIA has been prepared in accordance with the Australian Standard 4970-2009, *Protection of trees on development sites.*

2.2 Subject Site/Subject Tree

The subject site is currently occupied by a two storey weatherboard house on a sloping lot with a north-eastern aspect. A sandstone rock shelf is visible in the location of the proposed external wall footing.

The subject tree is a mature Spotted Gum, *Corymbia maculata* located on the adjoining property to the south east. This species is the dominant native canopy overstorey in this location. A detailed description of the subject tree is included at Page 6.

Photo A:

2.3 Proposal

The proposed works include major renovations within the existing footprint. Excavation for the lower floor level construction will be required on the southern side. This is within the Tree Protection Zone of the subject tree.

3 Methodology

3.1 Site Inspection

Site inspection and tree assessment was undertaken by Alexis Anderson on the 7th of May, 2019. The tree was assessed from ground level using a Tree Assessment Table. The definitions and explanations of terms used in the assessment are outlined in the Tree Table Definitions page which is included at Attachment A.

3.2 Exploratory Excavation

Exploratory excavation was undertaken along the southern edge of the proposed lower floor level external wall. The purpose of this was to determine the presence of any tree roots that were growing into the area of proposed excavation. Exploratory excavation was undertaken carefully using hand tools to the depth of the underlying rock. Refer to Figure A and the photo on the previous page for the trench location.

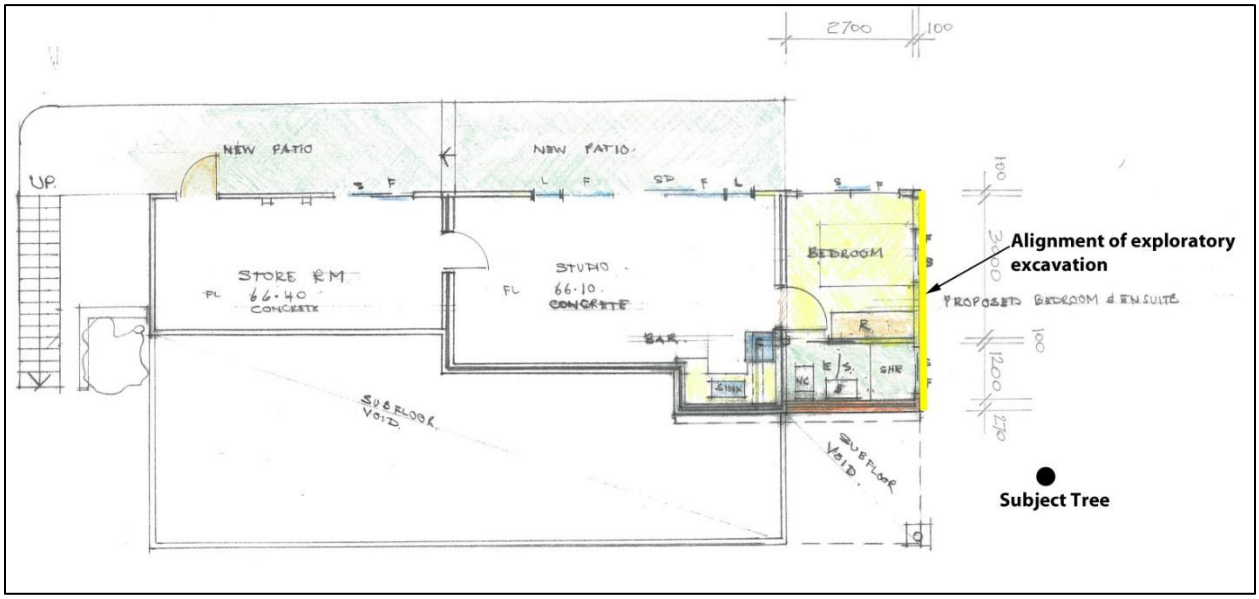

Figure A: Excerpt from the Lower Floor Plan showing exploratory excavation location.

3.3 Plan Review

This report is based upon a review of the Plans prepared by Peter Paine dated 20.03.19.

3.4 Tree Protection Zones

A Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) has been calculated In accordance with the Australian Standard 4970-2009, *Protection of trees on development sites*. The terms TPZ and SRZ are used throughout this report. 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 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.
- **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.

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 Findings

4.1 Tree Assessment Table

Subject Tree –Spotted Gum, *Corymbia maculata*	
Diameter at Breast Height (1.4m height)	440mm
Diameter at Base (above root flare)	480mm
Height (estimated)	13 metres
Canopy Spread Radius	7 metres. The canopy spread is heavily skewed to the NW.
Age-Class	Mature
Health/Vitality	Fair. Small dead branches throughout the canopy. Small leaf sizes and low canopy density.
Structural Condition	Fair.
Estimated Life Expectancy (remaining)	Long (30+ years)
Landscape and Environmental Significance	2. The subject tree is a locally native species that is likely to have self-sown. Forms part of a native forest ecological community. The tree is part of a group of street trees with sufficient canopy dimensions to moderate local climatic conditions and slow storm water run-off.
Retention Value	High. This tree is worthy of retention and protection during construction.
Comments	Large sandstone rock shelf visible on the surface beneath the existing house to the north.

4.2 Exploratory Excavation Findings

Exploratory excavation was undertaken to the depth of underlying rock in the areas shown in Section 3.2. The soil profile consisted of disturbed sandy soil and old building debris above the underlying rock. The underlying sandstone was encountered between 400-600mm depth.

A single 40mm diameter root was found within the exploratory trench at a depth of 350mm (Photos B and C).

Other tree roots may exist below the depth of the sandstone rock shelf. Any such roots were unable to be detected within this investigation and are likely to be below the depth of proposed excavation.

Photos B and C: 40mm diameter root and the sandstone rock shelf.

Photo D: Sandstone rock shelf taken facing south.

5 Tree Protection Zones

Tree Protection Offsets based on AS4970-2009-*Protection of Trees on Development Sites*	
Tree Protection Zone (radius –measured from centre of trunk)	**Structural Root Zone (radius –measured from centre of trunk)**
5.3 metres	2.4 metres

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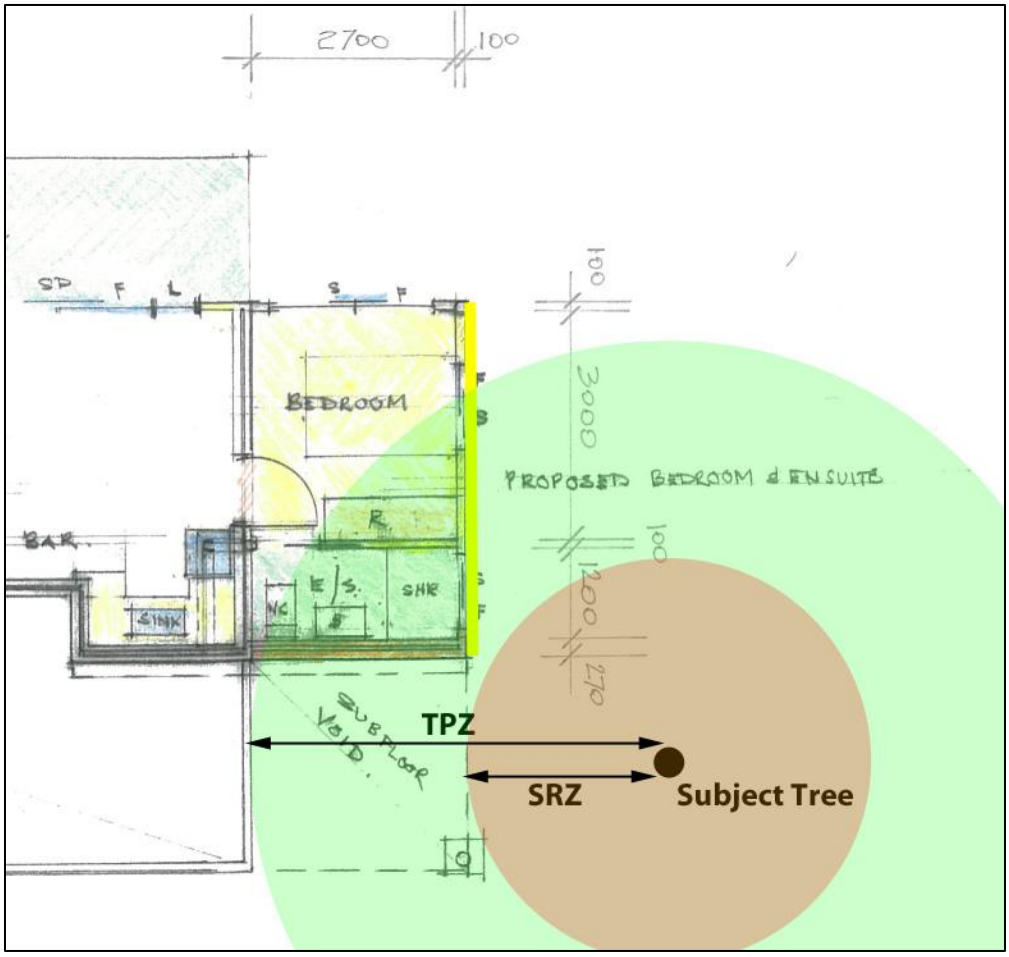

Figure B: Excerpt from the Lower Floor Plan showing the Tree Protection Zone and Structural Root Zone.

6 Potential Impacts of Proposed Works

6.1 Root Zone Impacts

Excavation for the lower floor is proposed within the TPZ. Approximately 10% of the TPZ area will be affected. The 40mm diameter root will be cut. The tree is likely to tolerate the impact of the proposed excavation/root loss and remain viable in the long term.

No excavation is proposed within the Structural Root Zone. The stability of the tree will not be compromised.

6.2 Canopy Impacts

The new roof line shall be clear of the canopy spread. No canopy pruning will be required to accommodate the new roof-line or scaffolding.

7 Recommendations

7.1 Prior to Demolition

Trunk protection is recommended for subject tree. This should be installed prior to the commencement of demolition. The purpose of this is to prevent accidental trunk injuries. Detail of adequate trunk battening is detailed in Figure C below:

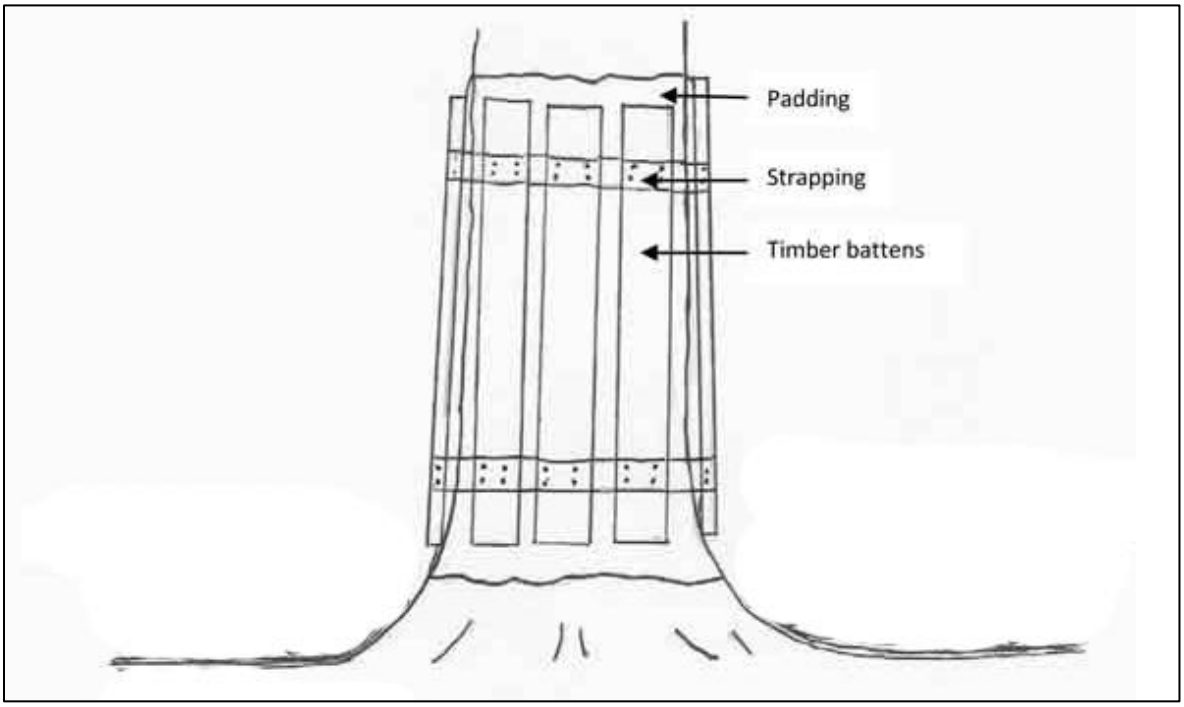

Figure C: Detail of adequate trunk protection.

7.2 During Construction

During Excavation: Excavation for building footings is proposed within the Tree Protection Zone (5.3m radius). All excavation within this radius must be undertaken using hand tools to the depth of bedrock. All tree roots encountered must be cleanly cut using a hand saw or secateurs. The purpose of this is to avoid additional unnecessary root damage such (tearing/splintering) that typically occurs when roots are pruned using an excavator and to minimise the surface area of pruning wounds.

Tree Protection Zones: The following should be prohibited within the Tree Protection Zone:

- Stripping of topsoil or organic surface material outside of the building footprint.
- Storage of material, vehicles and machinery.
- Disposal of solid, liquid or chemical waste.
- Any excavation, fill or other construction activity other than that discussed in this report.

If the existing groundcover is stripped within a Tree Protection Zone, it should be replaced with leaf and woodchip mulch to a depth of 80-100mm.

7.3 Post Construction

At the completion of the project, the subject tree should be inspected by an AQF Level 5 Arborist. Depending on the health and vitality of retained trees, the 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.

8 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.

9 Limitations

- The findings of this report are based upon and limited to visual examination of a single tree from ground level without any climbing, internal testing and limited exploratory excavation.
- This report reflects the health and structure of tree 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.

- This report must be read in its entirety. No part of this report may be referred to, verbally or in writing, unless taken in full context of the whole report.

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 circumfrence. 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)**: There 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/Vitality - 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 x 50) $^{0.42}$ x 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 wass 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.

<table>
<tr><td rowspan="6">Landscape & Environmental Significance</td><td></td><td colspan="4">Estimated Life Expectancy</td></tr>
<tr><td></td><td>Long</td><td>Medium</td><td>Short</td><td>Removal</td></tr>
<tr><td>Very High (1)</td><td colspan="2" rowspan="2">HIGH</td><td rowspan="2">MEDIUM</td><td rowspan="2"></td></tr>
<tr><td>High (2)</td></tr>
<tr><td>Medium (3)</td><td colspan="2">MEDIUM</td><td rowspan="3" colspan="2">LOW</td></tr>
<tr><td>Low (4)</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>Very Low (5)</td></tr>
</table>

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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