



Arboricultural Impact Assessment

Proposed Cabin Construction at
11 Catalina Crescent, Avalon Beach

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2 Introduction

2.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for Charles Mort in relation to the proposed cabin construction at 11 Catalina Crescent, Avalon Beach.

The purpose of this AIA is to assess the likely impacts of the proposed works on a single Broad-leaved Paperbark, *Melaleuca quinquenervia* 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 (rear yard of 11 Catalina Crescent) is currently occupied by two single storey cabins.

The subject tree is a mature Broad-leaved Paperbark, *Melaleuca quinquenervia* located close to the existing cabins. This tree is a locally native species and prominent landscape feature. A detailed description of the subject tree is included at Page 5.



Photo A: Subject tree

2.3 Proposal

The proposed works include elevating the existing cabin structures with the existing footings retained and addition of a new bathroom and deck on new pier footings.

3 Methodology

3.1 Site Inspection

Site inspection and tree assessment was undertaken by Alexis Anderson on the 6th of February, 2023. 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 Plan Review

This report is based upon a review of the Plans prepared by Phillip Low (Revision A).

3.3 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.

3.4 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 –Broad-leaved Paperbark, <i>Melaleuca quinquenervia</i>	
Trunk Diameter	96cm.
Height (estimated)	23 metres
Canopy Spread Radius	6 metres.
Age-Class	Mature
Health/Vitality	Good
Structural Condition	Good
Estimated Life Expectancy (remaining)	Long (30+ years)
Landscape and Environmental Significance	2. The tree is a locally native species and a prominent landscape feature. The tree has 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	The existing cabin footings do not appear to have affected the health, vitality or structural condition.



Photo B: Trunk of the subject tree relative to the existing cabins.
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5 Tree Protection Zones

Tree Protection Offsets based on <i>AS4970-2009-Protection of Trees on Development Sites</i>	
Tree Protection Zone (radius –measured from centre of trunk)	Structural Root Zone (radius –measured from centre of trunk)
11.5 metres	3.3 metres

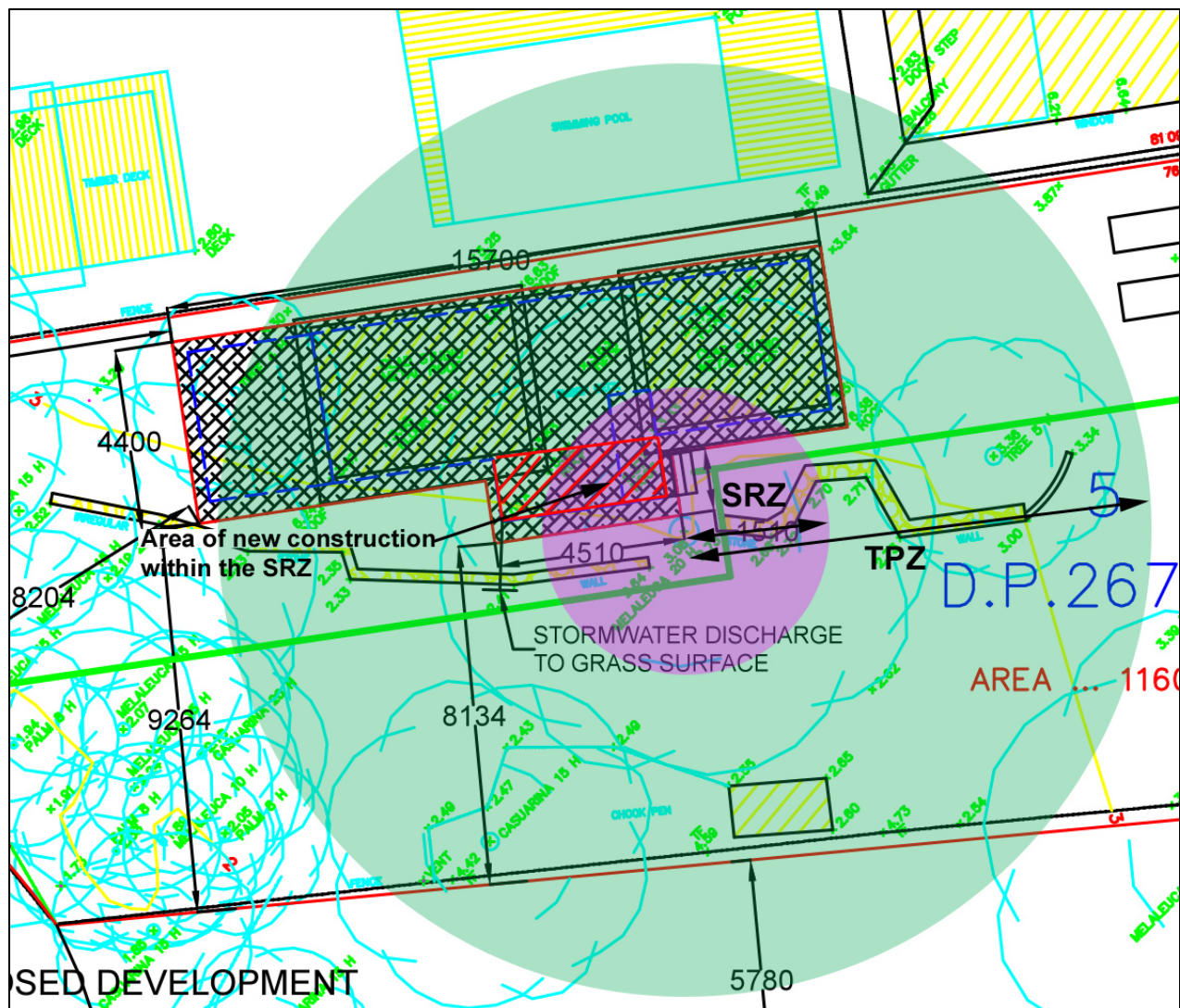


Figure A: Excerpt from the Site Plan showing the Tree Protection Zone and Structural Root Zone

6 Potential Impacts of Proposed Works

6.1 Root Zone Impacts

The existing cabin footings shall be retained in ground with no disturbance. Any tree roots that are located beneath the existing sections of cabin shall remain undisturbed.

New pier footings are proposed for the new bathroom section of the cabins within the Structural Root Zone. There is the potential for tree destabilisation if large tree roots are damaged within the 3.3m Structural Root Zone radius. It will be possible to have flexibility in the footing positions by cantilevering the joists above a variably set-back bearer position. The final pier footings positions must be determined following test digging under Project Arborist guidance. The pier footings shall be positioned in space between structural roots.

The bathroom plumbing can be suspended from the underside of the floor within the Structural Root Zone to avoid the need for trenching. Any trenching required within the Tree Protection Zone shall be undertaken with care as detailed in the Recommendations (Section 7.4).

6.2 Canopy Impacts

All proposed new structures are located beneath the lowest branch height. No canopy pruning or over-shadowing is required or expected.

7 Recommendations

7.1 Project Arborist Involvement

An Arborist with an AQF Level 5 qualification in Arboriculture and experience in tree protection within construction sites should be engaged prior to the commencement of work on the site. The Project Arborist should be present at the following times:

- Project start up to meet the Site Foreman and discuss tree protection requirements.
- During exploratory excavation to determine suitable positions for the bathroom piers.
- At project completion to verify tree protection and retention.

7.2 Engineering Detail -Bathroom Pier Footings

Engineering detail must specify the smallest diameter piers possible for the required load. The flexibility of pier positions, bearer spans and joint layout should also be detailed and labelled on the Engineering Plans.

7.3 Tree Protection Measures

Tree protection barriers are not recommended for this site as no heavy machinery, vehicles or large sub-contractor involvement is required. Access will be limited to foot traffic from a small construction team.

7.4 During Construction

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

- Stripping of topsoil or existing ground surfaces.
- Disposal of solid, liquid or chemical waste.
- Mixing materials or cleaning out barrows and buckets.
- Any excavation, fill or other construction activity other than that discussed in this report.

Test Digging to Locate Pier Positions: Prior to setting out the bathroom floor framework, test digging must be undertaken to locate a suitable space for piers between structural roots greater than 50mm diameter. This must be undertaken using hand tools with care taken not to injure tree roots. This process should be undertaken under guidance from the Project Arborist. A photographic record must be kept of this for certification purposes.



Photo C: Area where test digging is required to determine pier footing locations.

Trenching for Bathroom Plumbing: Trenching for bathroom plumbing shall be required within the TPZ. Any tree roots greater than 50mm diameter must be carefully exposed and protected. The conduits must be carefully threaded above and below the exposed roots as detailed in Figure B below.

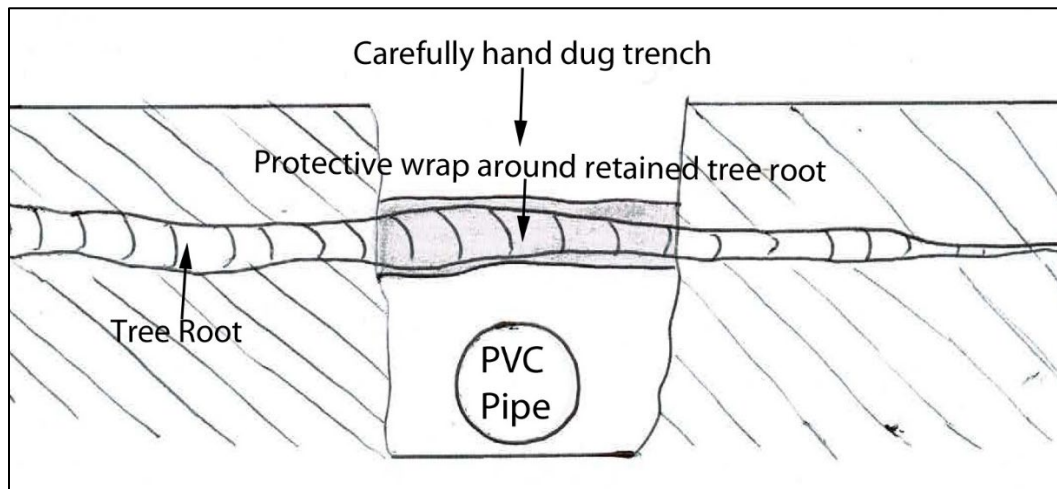


Figure B: Detail of recommended plumbing trenching within the TPZ radius.

7.5 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 the retained tree, 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 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/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- $SRZ = (D \times 50)^{0.42} \times 0.64$ (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 is 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.

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