



Arboricultural Impact Assessment

Proposed Residential Development at 1b The Serpentine, Bilgola Beach

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2 Summary

This Arboricultural Impact Assessment (AIA) is based on twenty six (26) trees located at 1b The Serpentine, Bilgola Beach (subject site).

The tree population of the site consists of a combination of naturally occurring locally native species and planted trees. The locally native tree population consists mostly of Cabbage Tree Palms, *Livistona australis*. The proposed works include alterations and additions to the existing dwelling including a new carport and vehicle turning bay and landscape improvements.

The Retention Values of the subject trees were rated as outlined in the following Table. Refer to the Tree Protection Plan (Attachment C) for tree locations.

Table A: Retention Values of the Subject Trees.

	High Retention Value (Tree Number)	Medium Retention Value (Tree Number)	Low Retention Value (Tree Number)
To be Retained	7, 8, 9, 11, 12, 14, 16, 18, 21, 26	10, 13, 15, 17, 20, 23	1, 5
To be Transplanted	24	25	-
To be Removed	-	2, 3, 19, 22	4, 6

The majority of assessed trees are able to be retained on site including all of the High Retention Value and the majority of the Medium Retention Value trees. Six (6) trees are proposed to be removed to facilitate the proposed works.

There are works proposed within the Tree Protection Zones (TPZ) of Trees 10, 12, 17, 18, 21 and 23. Recommendations have been made regarding tree protection measures and tree sensitive construction methods to limit the impact on retained trees.

3 Introduction

3.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for Bruce McConochie in relation to the existing trees and proposed building works at 1b The Serpentine, Bilgola Beach (subject site)

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

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

3.2 Subject Site/Subject Trees

The subject site (1b The Serpentine) is currently occupied by a two storey residential dwelling, driveway and open landscape space.

All trees located within 5.0m of the proposed works have been assessed. The tree population of the site is made up of a mixture of naturally occurring locally native species and planted exotics and natives.

There are other trees on the site that were not assessed due to their distance from the proposed works.

A significant portion of the tree population consists of naturally occurring Cabbage Tree Palms, *Livistona australis*.

Refer to the Tree Protection Plan (Attachment C) for tree locations and numbers. A detailed description of the subject trees is included in the Tree Assessment Table (Attachment A).

3.3 Proposed Works

It is proposed to undertake alterations and additions to the existing dwelling including a new carport and vehicle turning bay and landscape improvements.

4 Methodology

4.1 Site Inspection

Site inspection and tree assessment was undertaken on the 12th of March, 2015. The trees were assessed from ground level using a Tree Assessment Table, which is included as Attachment A. The definitions and explanations of terms used are outlined in the Tree Table Definitions page which is included at Attachment B.

The tree assessment was undertaken for the purpose of pre-development planning. Detailed tree risk assessment was not included in the scope of works.

4.2 Plans and Diagrams

The set of plans for DA prepared by Mathew Woodward Architecture, dated 09/04/2015 were provided for review as part of this assessment.

No Stormwater Plans or Engineering Detail were available for review as part of this assessment.

All tree protection diagrams were hand drawn by Bluegum Tree Care and Consultancy.

4.3 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 or undisturbed soil and roots required to maintain tree stability. Excavation within the SRZ can lead to whole tree failure.

Refer to the Tree Assessment Table (Attachment A) for the Tree Protection Zones of the assessed trees.

4.4 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.

4.5 Consideration for Tree Retention and Removal

Where demolition of existing structures, excavation or fill is proposed within the Tree Protection Zone (TPZ), arboricultural assessment and sensitive construction methods will be required. Where works are proposed outside of the TPZ, no sensitive construction methods are required.

Tree removal recommendations have been based on tree Retention Values and construction offsets.

Trees may generally be recommended for removal in the following circumstances:

- Trees located within construction footprints.

- Trees with construction proposed within SRZ where root loss cannot be avoided through sensitive design.
- Trees with a TPZ loss of more than 25%, may be recommended for removal providing tree sensitive design cannot be implemented to avoid significant root and canopy loss.
- Trees with low Retention Values may be recommended for removal irrespective of proposed development.

5 Potential Impacts of Proposed Works

5.1 Trees to be removed

Tree Number	Retention Value	Reason for Removal
2, 3	Medium	Within the proposed turning bay footprint. This species (<i>Erythrina crista-galli</i>) is exempt from protection under the Pittwater Council DCP.
4	Low	Almost dead at the time of inspection. Proposed for removal due to poor health and short estimated life expectancy.
6	Low	Proposed for removal due to its inappropriate location and cracking of the nearby driveway slab. This species (<i>Phoenix canariensis</i>) is exempt from protection under the Pittwater Council DCP.
19	Medium	Within the proposed building footprint. This species (<i>Archontophoenix alexandrae</i>) is exempt from protection under the Pittwater Council DCP.
22	Medium	Within the proposed building footprint.

5.2 Trees to be Transplanted

Tree 24 (*Livistona australis*) and Tree 25 (*Pandanus sp.*) are proposed to be transplanted for use elsewhere on the site. Both of these trees are likely to tolerate transplantation.

5.3 Potential Impacts of Proposal on Retained Trees

Tree Number	Works proposed within the Tree Protection Zone (TPZ)
10	Proposed stair replacement within the TPZ. Less than 10% of the TPZ area will be affected by the works. No notable impact is expected.
12, 17, 18, 21, 23	Proposed steel post footing(s) for new building additions within the Tree Protection Zone and Structural Root Zone. Minor excavation will be required to install footings. No other excavation is proposed. Each of these trees are palms (monocots) and have a dense mat of slender fibrous roots rather than large woody roots. Consequently, minor root disturbance close to the trunk is unlikely to affect stability. The building is to be fully elevated on post footings with no impact on soil oxygen levels or groundwater flow. No notable impact is expected.

Incidental Impacts: There is the potential for incidental/accidental damage to the trunk, canopy and shallow roots of all retained trees throughout the construction process. Trees are commonly impacted on construction sites in the following ways.

- Stripping of 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.

These impacts can be easily avoided through communication with building contractors and basic tree protection measures.

6 Recommendations

6.1 Site Establishment –Prior to Construction

Tree Transplantation: Trees 24 (*Livistona australis*) and 25 (*Pandanus sp.*) are to be transplanted elsewhere on site (Refer to the Landscape Plan for new positions). A tree transplantation specialist or horticulturalist with demonstrated experience in mature tree transplants should be engaged at the start of the project. Preparation of the roots of the transplanted trees and planting sites should be made in advance of the transplantation operation.

Tree Removal: Six (6) trees are proposed to be removed as part of the project. It is also recommended that the small Cocos Palm growing at the base of Tree 18 be removed. Tree removal works should be undertaken in accordance with the WorkCover Code of Practice for Amenity Tree Industry, 1998.

Canopy Pruning: Tree 1 (Oleander) may require some pruning on the northern side of the canopy to facilitate site access for heavy vehicles. This species is tolerant of heavy pruning and no impact is expected.

Tree 23 (Canary Island Date Palm) may require removal of some of the lower fronds to allow construction and clearance of the proposed building addition roof line.

Trunk Protection: Trunk protection is recommended for Trees 18 and 21. Trunk battening is aimed at preventing accidental bark wounds as often occurs on construction sites where heavy machinery is used. Refer to Figure A below for detail of adequate trunk protection.

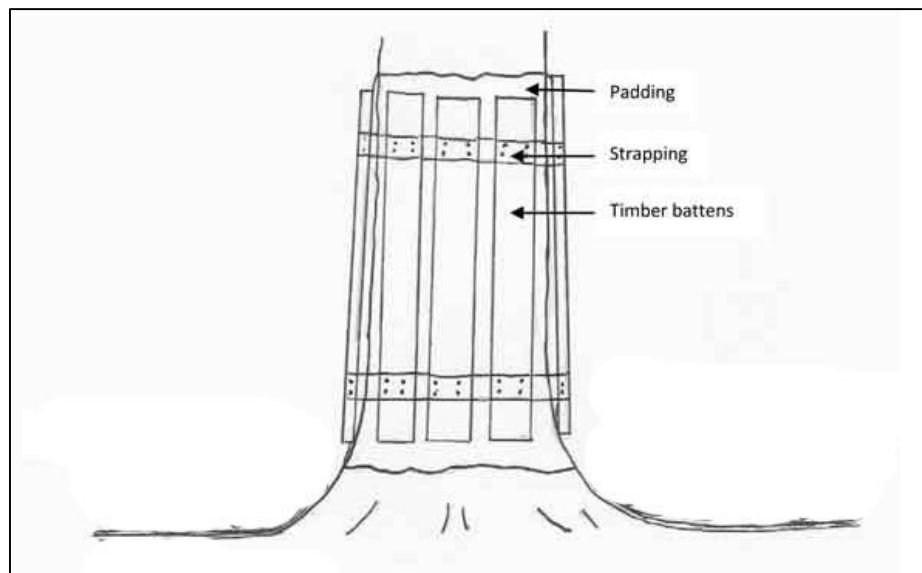


Figure A: Specification of appropriate trunk protection.

6.2 During Construction

Tree Protection Zones: Refer to the Tree Assessment Table (Attachment A) for the spread of TPZ's of trees nominated for retention. The following should be prohibited within the Tree Protection Zones:

- Stripping of topsoil or organic surface material.
- 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 80mm.

Steel Post Footings: The setout of the building footings should be undertaken with consideration of the positions of Trees 18 and 21. The footing positions should be spaced with the maximum possible clearance from these trees. All roots encountered during excavation should be cleanly cut using secateurs.

Landscape Works: Existing ground levels should be retained within all TPZ's of retained trees. There must be no stripping of topsoil within the TPZ's of retained trees. For the benefit of retained trees and new plantings, mulched garden beds are a preferable option to lawn or paving.

Underground Services: No hydraulics or services plans have been reviewed as part of this assessment. Existing service easements and trenches should be used wherever possible. Any new services must be routed outside of the Structural Root Zones of retained trees. Where services need to be installed within TPZ', excavation must be carried out by hand under supervision of an AQF Level 5 Arborist.

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 findings of this report are based upon and limited to visual examination of trees from ground level without any climbing, internal testing or exploratory excavation.

- 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.
- 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.