Tree Assessment

Boat Shed & Jetty

121 Florence Terrace
Scotland Island

Report Prepared by Julia Stanton
Syncarpia Vegetation Management
24 Windsor Street Tarbuck Bay 2428
juliastanton@ozemail.com.au
Mob:0417398050
January 2020

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1.0 Introduction

This Tree Assessment & Management Plan has been prepared for Stephen Crosby on behalf of clients S & C Towers.

This report is to accompany a development application to Northern Beaches Council for a boatshed & Jetty at Lot 158 DP 12749 121 Florence Terrace Scotland Island.

The report includes:

- an overview of existing indigenous trees;
- a photographic record of existing trees, and site conditions
- an assessment of the health and condition of existing trees within 5m of the proposed development;
- an assessment of the likely impact of the proposed development on existing trees and vegetation;
- recommendations for the protection of existing trees to be retained to in accordance with AS 4970 *Protection of Trees on Development Sites.* Standards (2009).
- details of exclusion fencing required prior to commencement of construction works;

The following documentation has been reviewed in preparation of this Tree Assessment Report:

- Boatshed & Jetty for 121 Florence Terrace Scotland Island prepared by Stephen Crosby and Associates dated January 2020;
- Boatshed Plan & Elevations prepared by Stephen Crosby & Associates
- AS 4970 *Protection of Trees on Development Sites* Standards Australia (2009) and
- Northern Beach Council Exempt Tree Species List.

2.0 Proposed Development

The proposed development is for a new Boat Shed & Jetty including areas of decking, replacement of an existing stone retaining wall with a concrete block retaining wall and replacement of old slip way.

It is understood no significant excavation is proposed and the current building footprint is to be utilized.

Twelve (12) existing trees are located within 5m of the proposed development.

Four (4) existing small trees are proposed for removal (Trees 5, 6, 7 & 8).

3.0 Site Description

The property includes an existing aging Boatshed with tile roof, old timber deck and slip rails and existing stone retaining wall and stairs.

The property has a south easterly aspect, and slopes down to the Pittwater Waterway.

Existing vegetation supports remnant indigenous trees characteristic of fragmented Pittwater Spotted Gun Forest Endangered Ecological community;

Indigenous trees include immature, semi-mature & mature specimens of *Corymbia maculata* (Spotted Gum), *Casuarina glauca* (Swamp Oak), *Allocasuarina torulosa* (Forest Oak), *Elaeocarpus reticulatus* (Blueberry Ash) and *Eucalyptus umbra* (White Mahogany).

Indigenous understory vegetation has been disturbed and removed by previous development activity, a variety of weed species including *Lantana camara* (Lantana) & *Asparagus aethiopicus* (Asparagus Fern) dominate the understory vegetation.

4.0 Tree Assessment

To be read in conjunction with Figure 1 Tree Survey, Figure 2 Site Photos and Table 1 in Appendix.

Twelve (12) existing trees (Trees 1 - 12) are located within 5m of the proposed development. Four (4) existing small trees are proposed for removal.

Tree assessment is based on Visual Tree Assessment (VTA) and similar tree assessment guidelines (Dunster, Smiley, Matheny & Lilly 2013, Mattheck, 1999 and Matheny and Clark, 2004 & 1999).

Site inspection was conducted by Julia Stanton on 4th January 2020.
The assessment includes details of the health, condition and impact of the proposed development on all trees within 5m of the proposed development,

The inspection and assessment was from ground level, no aerial or subterranean inspections were carried out. The report includes the following information (Refer Table 1 Appendix):

- botanical name, common name, diameter at breast height (DBH), height, canopy spread, tree health, form, tree defects, site conditions, hazard rating, Health & Condition rating* SULE rating**;
- an assessment of the potential impact of the proposed development
- recommendations of tree protection and management prior to, during and post construction; and
- a site plan and photographic record of existing trees and site conditions.

5.0 Discussion Development Impacts

Refer to Figure 1 Tree Survey, Figure 2 Site Photos

The most common impacts of development on existing trees include:

- significant changes to natural soil levels;
- excavation and mechanical damage to existing root system;
- mechanical damage to trunk and branches;
- soil compaction or inversion of soil profile, resulting in reduced soil water and air movement;
- changes in natural hydrology, increased nutrient levels, changes to soil pH and soil contamination.

Estimating the extent of the root system of an existing tree is often used as the basis for assessing the potential adverse impact of a development on a tree. The area of significant root system (structural & feeder) that a tree relies on for survival is often calculated by the use of formulae related to the diameter of the trunk. Various terms and formulae exist to describe the area of root system that requires protection and in which development should be limited or excluded. These terms include Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) or Primary Root Zone (PRZ) and Critical Root Zone (CRZ).

Calculating the area of a root system that requires protection is often used to predict the potential adverse impact of a proposed development on the root system of existing trees. It is noted that the definition and formulae for calculating the area of root system that requires protection is considered a guide in estimating the extent of the root system of a tree.

When assessing the potential adverse impact of a proposed development on an existing tree the following must be considered:

- the type and extent of development, including building envelope, services and landscaping.
- extent of excavation
- use of machinery or vehicles on site
- the area of a root system identified as requiring protection or management during development, and establishment of a (TPZ)
- an assessment of the subject tree including species, age, vigor, vitality, health and condition; and
- site and soil characteristics.

Development activity does not necessarily need to be excluded from within the calculated SRZ & TPZ, provided tree sensitive construction techniques are utilized and specific tree protection & management are implemented,

Some level of development activity within an identified SRZ & TPZ such as minor excavation, minor fill and changes to hydrological patterns are often within acceptable limits when specific tree management and protection recommendations and sensitive construction techniques are adopted.

5.1 Potential adverse impacts of the proposed development on existing trees. Refer to detailed assessment in Table 1.

Twelve (12) existing trees are located within 5m of the proposed development. The proposed development incorporates replacement of the existing boatshed, area of decking, slip rails & boat storage area.
No significant excavation is proposed and the current building footprint is to be utilized.

Four (4) existing trees are proposed for removal Trees 5, 6, 7 & 8.

Trees proposed for removal
Four (4) existing trees (Trees 5, 6, 7 & 8) are either within direct conflict, or close proximity of the proposed new boat shed, retaining wall, slip rails and boat storage area.

The four (4) trees proposed for removal are young small trees 5m or less in height that are not considered significant specimens. They can be reliably replaced in a suitable location on the property.

Tree 5 is an immature specimen of *Elaeocarpus reticulatus* (Blueberry Ash)) in fair – good health & condition.

Tree 6 is a semi-mature specimen of *Allocasuarina torulosa* (Forest Oak) in poor health & condition.

Tree 7 is a semi-mature specimen of *Rapania variables* (Muttonwood) in fair to good health & condition.

Tree 8 is an immature specimen of *Allocasuarina torulosa* (Forest Oak) in fair health & condition.

Tree 3 a semi-mature specimen of *Eucalyptus punctate* (Grey Gum) is a dead tree & does not require removal to accommodate the proposed development, however should be considered for removal on the basis of hazard management.

Trees to be retained

Seven (7) existing trees to be retained are within 5m of the proposed development. The proposed development utilizes existing building foot prints, no significant excavation is proposed.

Tree Protection recommendations in accordance with AS 4970 *Protection of Trees on Development Sites.* Australian Standards (2009), Refer to Figure 1 recommended Tree Protection Zones (TPZ).

Recommendations to minimise the potential adverse impact of the proposed development on existing trees to be retained include:

- Establishing adequate Tree Protection Zones prior to the commencement of construction of the proposed development. Tree protective fencing must be maintained for the duration of construction works;
- Adopting & implementation of sensitive construction techniques specifically undertaking removal of existing retaining wall within 5m of existing trees to be retained by hand;
- Storage of construction materials in designated storage area.

Vegetation proposed for removal

There is no significant indigenous understory vegetation proposed for removal.

6.0 Tree and Vegetation Protection and Management Recommendations.
Recommendations have been included for the protection and management of existing indigenous trees and vegetation.

Recommendations:

- Tree & soil protective zones are to be established and fencing is to be in place prior to commencement of site works (Specifically for Trees 1, 2, 9, 10, 11 & 12). Fencing is to be maintained for the duration of construction works. Refer to Figure 1 for recommended tree protective / exclusion fencing.
- Demolition of existing retaining wall within 5m of Trees to be retained is to be undertaken by hand.
- Structural roots greater than 50mm must not be cut. If roots greater than 50mm are encountered during excavation and cannot be avoided the project arborist is to be notified. The project arborist is to assess and report on the likely impact of damage to the roots on the health and structural stability of the tree.
- Exclusion fencing / Tree Protective fencing is to be maintained for the duration of building work.
- Materials to be stored in designated storage areas, suitable storage areas include existing deck more than 5m from all existing trees to be retained.
- There is to be no storage of materials, storage of old sandstone retaining wall, or building waste, within 5m of existing trees to be retained or designated Tree Protection Zones (TPZ).
- Excavated soil is not to be disposed of or stored within 5m of existing trees, and is to be removed from site if required.
- Ensure minimum four (4) replacement indigenous canopy tree plantings in foreshore vegetation area to compensate for tree removal & to enhance the ecological values of the site.
- Crown maintenance pruning (removal of dead, diseased & defective branches) is recommended for all trees to be retained (specifically Tree 4).
- All pruning works is to be undertaken by an experienced and qualified arborist in accordance with AS4373- 2007 Pruning of Amenity Trees.
- It is recommended a qualified arborist undertake an assessment of the health, condition and hazard potential of existing trees every 12 months.

7.0 Conclusions

The property includes an existing aging Boatshed with tile roof, old timber deck and slip rails and existing stone retaining wall and stairs.

Twelve (12) existing trees are located within 5m of the proposed development. The proposed development incorporates replacement of the existing boatshed, area of decking, slip rails & boat storage area.

No significant excavation is proposed and the current building footprint is to be utilized.

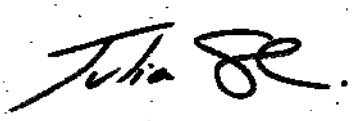
Four (4) existing trees are proposed for removal Trees 5, 6, 7 & 8.

Trees 5, 6, 7 & 8 are either within direct conflict, or close proximity of the proposed new boat shed, retaining wall, slip rails and boat storage area.

The four (4) trees proposed for removal are young small trees 5m or less in height that are not considered significant specimens. They can be reliably replaced in a suitable location on the property.

Tree 3 a semi-mature specimen of *Eucalyptus punctate* (Grey Gum) is a dead tree & does not require removal to accommodate the proposed development, however should be considered for removal on the basis of hazard management.

Existing trees to be retained are unlikely to be adversely effected by the proposed development provided tree protection and management recommendations detailed in Sections 6 of this report are adopted & implemented.



Julia Stanton B.Sc. (Environmental and Urban Horticulture)
31st January 2020
Arborist/Bushland Management Consultant

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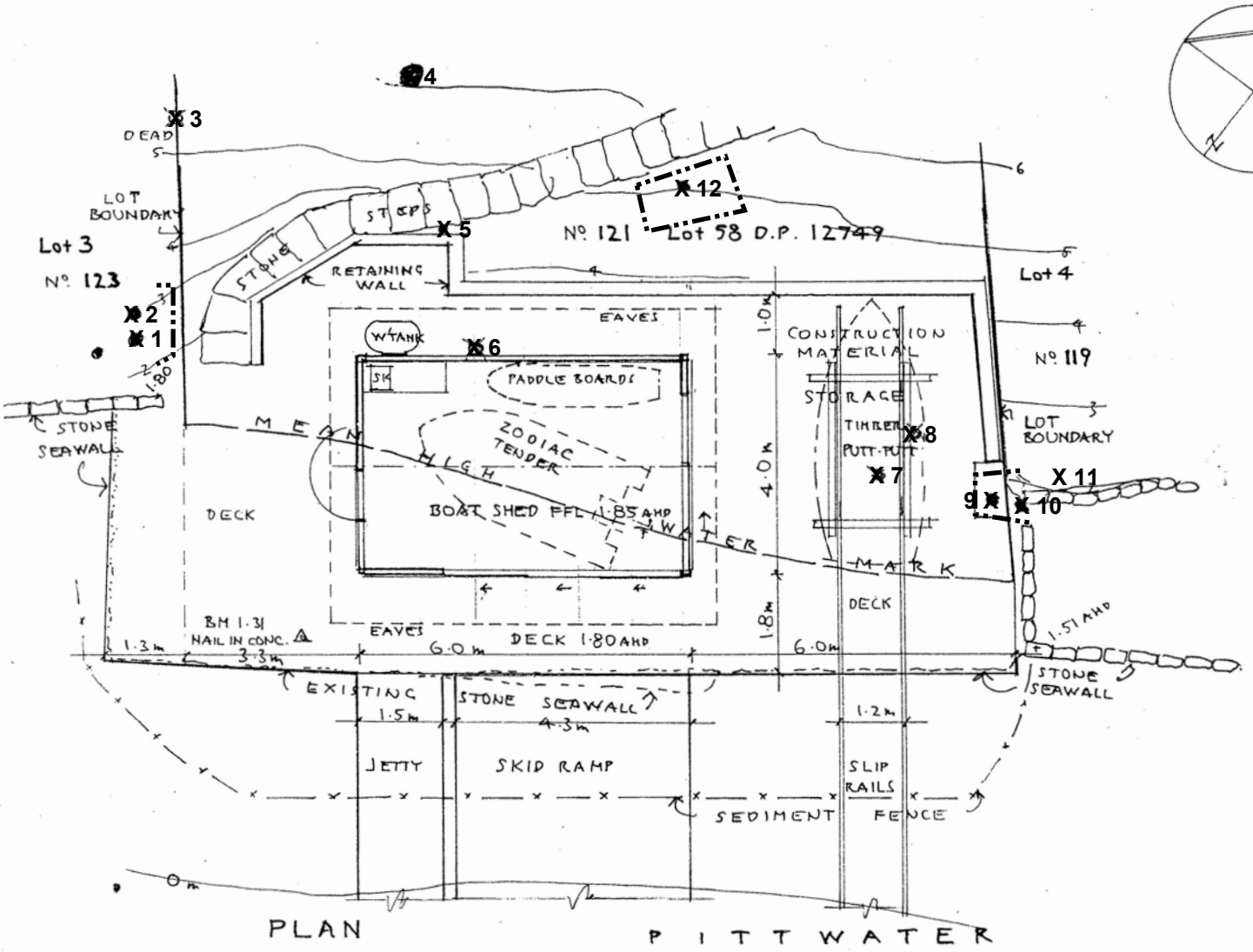

Tree Protection Fencing

Site Plan / Tree Survey
January 2020

Revision Date

Stephen Crosby & Assoc. Pty. Ltd.

SCOTLAND ISLAND
PO Box 204 Church Pt. NSW 2105
M: 0409 047 513 E. scrosby@internode.on.net

Job

BOAT SHED & JETTY
121 FLORENCE TCE
SCOTLAND ISLAND
Lot 158 DP 12749

For S & C TOWERS

Drawing

PLAN

Scale 1 : 100 AT A4
Date JANUARY 2020
Drawn S.C.

Drawing Number

2128 - **DA 00**

Figure 1

Photo 1 Existing boat shed, slip way, jetty & decking

Photo 2 Trees 1 , 2, 3 & 4, stairs & Stone retaining wall

Photo 3 Trees 7, 8, 9, 10 & 11

Site Photos
121 Florence Terrace
Scotland Island
January 2020

Figure 2

Table 1 Existing Trees within 5m of proposed development 121 Florence Terrace Scotland Island

Tree No.	Botanical Name	Common Name	Age	Hgt m	Av. Can	DBH mm	Health	Condition	Site Condition	Comments	Sule	H&C rate	Hazard rating
1	*Casuarina glauca*	Swamp Oak	Imm	6m	2m	160	Good	Good. Typical of species	Remnant indigenous tree located on neighbouring property 1.5m from existing stairs & 2m from existing stone retaining wall	**Retain & protect** Located 2m from existing and replacement retaining wall Existing retaining wall to be removed sensitively. It is understood there is no additional excavation proposed for replacement block retaining.	2a	4	Low
2	*Casuarina glauca*	Swamp Oak	Sm	10	3m	200	Good	Good Typical of species	Remnant indigenous tree located on neighbouring property 1.5m from existing stairs & 2m from existing stone retaining wall	**Retain & protect** Located 2m from existing and replacement retaining wall Existing retaining wall to be removed sensitively. It is understood there is no additional excavation proposed for replacement block retaining.	2a	4	Low
3	*Eucalyptus punctata*	Grey Gum	Sm				Dead	Dead	Remnant indigenous tree located on existing boundary.	**Does not require removal to accommodate** proposed development	4a	0	Medium

Tree No.	Botanical Name	Common Name	Age	Hgt m	Av. Can	DBH mm	Health	Condition	Site Condition	Comments	Sule	H&C rate	Hazard rating
4	*Corymbia maculata*	Spotted Gum	M	22	14m	550	Fair –good Vigorous foliage in crown. Some epicormics growth	Fair – Good Dieback of lower scaffold branches	Remnant indigenous tree	**Retain & protect** Located 5m from and 2m above the existing and proposed retaining wall. Proposed development located outside calculated SRZ & TPZ Remove deadwood.	2	3	Medium
5	*Elaeocarpus reticulatus*	Blue Berry Ash	Imm	4m	2m	150 mm	Fair - good	Fair- good	Remnant indigenous tree	**Remove to accommodate new retaining wall.**	5a	4	Low
6	*Allocasuarina torulosa*	Forest Oak	Sm	5m	1.5m	180	Poor - Fair health Sparse foliage in crown. Some epicormic growth.	Poor Extensive dieback through trunk. Poor form.	Remnant indigenous tree located between existing boat shed & retaining wall.	**Remove** In conflict with boatshed. Not a significant specimen. Replace with a healthy structurally sound specimen in suitable location on property.	5a	2	Medium
7	*Rapania variables*	Mutton wood	Sm	5m	2m	100	Good	Good	Remnant indigenous small tree	**Remove to accommodate boat storage.**	5a	4	Low
8	*Allocasuarina torulosa*	Forest Oak	Imm	4m	2m	150	Fair - Good	Fair - Good	Remnant indigenous small tree	**Remove to accommodate boat storage.**	5a	3	Low

Tree No.	Botanical Name	Common Name	Age	Hgt m	Av. Can	DBH mm	Health	Condition	Site Condition	Comments	Sule	H&C rate	Hazard rating
9	*Allocasuarina torulosa*	Forest Oak	Sm	4.5	3m	170	Good	Fair Leader removed	Remnant indigenous tree located close to property boundary.	**Retain & protect** Located 1m from new retaining wall.	3a	3	Low
10	*Allocasuarina torulosa*	Forest Oak	Sm	4m	2m	160	Good	Fair Leader removed	Remnant indigenous tree located on neighboring property,	**Retain & protect** Located 1.5m from new retaining wall.	3a	3	Low
11	*Elaeocarpus reticulatus*	Blueberry Ash	Im	4m	3m	90 50	Fair – good Typical of species	Fair-good Typical of species	Remnant indigenous small tree located on neighboring property.	**Retain & protect** Located 2m from new retaining wall	3a	3	Low
12	*Eucalyptus umbra*	White Mahogany	Imm	5m	2m	100	Fair Some tip dieback	Good	Remnant indigenous tree loacted1m from existing stairs	**Retain & protect** Located 2m from new retaining wall	3a	3	Low

Notes

Hgt = Height in metres, Age = Age Class, Av Can = Average Canopy Spread in metres, DBH = Diameter @ breast height (1.5m) in millimetres

I = Immature, Sm = Semi-mature, M = Mature, Om = over-mature

NOTES

Hgt = Height in metres, Age = Age Class, Av Can = Average Canopy Spread in metres
DBH = Diameter @ breast height (1.5m) in millimetres

Age classess (I) *immature* refers to a well established but juvenile tree. (S) Semi-mature refers to a tree at growth stages between immaturity and full size. (M) *Mature* refers to a full sized tree with some capacity for further growth. (O) *Overmature* refers to a tree about to enter decline or already declining.
Health refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion and the degree of dieback.
Condition refers to the tree's form & growth habit, as modified by its environment. And includes the state of the scaffold (ie trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions (inclusions) and condition of the root system . These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

Adapted from Matheny and Clark (1999) Conducting a Resource Evaluation, from *Care and Management of Trees on Development Sites Proceedings of the 2nd NAAA Tree Management Seminar and Workshop.*

*** H & C (Heath & Condition) rating -** summary of the health and structure of the tree on a scale of 0 - 5

5 A healthy vigorous tree, little if any signs / symptoms of disease or stress with good structure and form typical of the species

4 Trees with some evidence of decline in vigour, minor twig die back, small amount of dead wood, good form and structure.

3 A tree with only moderate vigour, presence of moderate amounts of twig die back and dead wood, crown may be thinning, moderate form, or a tree with some branch or trunk damage but canopy/ foliage cover good, or a tree with good overall condition, but poor form.

2 A tree in a state of decline, large amount of twig die back or epicormic growth, dieback of medium to large branches, cause of decline cannot be rectified or alleviated. Or a tree with significant structural defects (inclusions, root girdling, and cavities) which cannot be rectified or satisfactorily remediated.

1 A tree in serve decline, die back of dominant branches or trunk, large amounts of twig die back or the majority of foliage epicormic. Cause of decline cannot be rectified or alleviated. Or a tree with significant structural defects (inclusions, root girdling, and cavities) which cannot be rectified or remediated.
0 Dead tree

****SULE categories (Barrell.**
Safe Useful Life Expectancy Categories (Updated 01/04/01) Barrell (2001)

1: Long SULE: Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.
{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 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 SULE: Trees that appeared to be retainable at the time of assessment for 15-40 years with an acceptable level of risk.**
(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 SULE: Trees that appeared to be retainable at the time of assessment for 5-15 years with an acceptable level of risk.
(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 (t).**
(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.

DEFINITIONS (From Tree Risk Assessment Manual ISA (2013), Australian Standard *Protection of Trees on Development Sites* 2009 Australian Standards AS 4373 – 2007 Pruning of Amenity Trees, Matheny and Clark, 1994 and 2004)

Co-dominant stems – stems or trunks of about the same size originating from the same position from the main stem. When the stem bark ridge is turned upwards the union is strong, when the ridge turns inwards the union is weak.

Critical Root Zone (CRZ) – an offset 5 x the trunk diameter of a tree. Within this area significant structural roots are usually encountered. Elevated construction may be possible within this area, subject to an assessment of the subject tree including age, vigor, health and condition and root zone assessment. Specific tree management and protection recommendations and construction techniques required.

C & PRZ – **Critical and Primary root zone -** The definition and formulae for calculating the C & PRZ of a tree is to be considered only a guide to determine the extent of a trees root system. The C & PRZ calculation should be used in conjunction with an assessment of the subject tree including age, vigor, health and condition, site and soil characteristics and root zone assessment, when assessing the potential adverse impact of a proposed development on a tree.

Crown lifting – the removal of the lowest branches.

Crown Thinning – General pruning with the additional removal of secondary branches whist retaining the main structural branches of the tree.

Crown Maintenance General – pruning which consists of removal of dead, diseased, dying, defective and conflicting branches.

Deadwooding – removal of deadwood

DGL- Trunk diameter at ground level

Endemic – having a natural distribution confined to a particular geographic region.

Hazard- situation or condition that is likely to lead to a loss, personal injury property damage, a likely source of harm.

Hazard abatement- Reduction in the likelihood that failure of a tree or a part will result in injury to people or damage to property.

Indigenous – native to the area not introduced

Locally native flora and fauna – plants and animals that are native in Pittwater at any stage of life cycle

Lopping- random cutting of branches or stems between branch union or internodes. This is an unacceptable practice.

Primary Root Zone (PRZ) – an offset 10 x the trunk diameter of a tree. Within this area significant feeder roots area usually encountered. Excavation and fill may possible within this area, subject to an assessment of the subject tree including age, vigor, health and condition and root zone assessment. Specific tree management and protection recommendations and construction techniques required.

Risk – The combination of the likelihood of tree failure and severity of the potential consequences. The likelihood of tree failure occurring and affecting a target and severity of the consequences.

Selective pruning – The removal of identified branches that are causing a specific problem. These branches shall be specified.

Senescence – The process of aging and death.

Significant Trees - trees that contribute substantially, either individually or as a component of a tree group to the landscape character, amenity, cultural values or biodiversity of their locality.

Structural Root Zone (SRZ) The portion of the root plate comprised primarily of structural woody roots (integral with the soil profile) providing the main mechanical support and anchorage of a tree, calculated in accordance with AS 4970:2009, expressed as a radial dimension in metres from the centre of the trunk.

Target – People or property potentially affected by tree failure

Tree Protection Zone (TPZ) - A specified area at a given distance from the trunk set aside for the protection of a trees root system and canopy during land development works to ensure the long term viability and stability of a tree, calculated in accordance with AS 4970:2009.

Table 2 Indigenous plant species suitable for screen planting & tree replacement

Botanical Name	Common Name
Small Trees / Large Shrubs	
Acmena smithii	Lilly Pilly
Backhousia myrtifolia	Grey Mrytle
Ceratapetalum gummiferum	NSW Christmas Bush
Elaeocarpus reticulatus	Blueberry Ash
Ficus coronata	Sandpaper Fig
Livistona australis	Cabbage Tree
Canopy Trees	
Angophora costata	Sydney Red Gum
Allocasuarina torulosa	Forest Oak
Corymbia maculata	Spotted Gum
Eucalyptus paniculata	Grey Iron Bark
Syncarpia glomulifera	Turpentine