HUGH
THE ARBORIST

Arboricultural Impact Assessment Report

Client Name: Barrie and Iyuko Fieldman
Site Address: 95 Bower Street, Manly NSW
Authors Details: Hugh Millington
Email: hugh@hughtheArborist.com.au
Phone: 0426 836 701
Date Prepared: 8th April 2021

Table of Contents

COPYRIGHT

HUGH
THE ARBORIST

1. INTRODUCTION

1.1 This report has been commissioned by Your Beautiful Home on behalf of the clients Barrie and Iyuko Fieldman to provide an Arboricultural Impact Assessment Report for trees located on and adjoining the site in relation to a proposed development.

1.2 All tree data was collected during one site inspection that was carried out on 30th March 2021. The weather at the time of the assessment was clear with average visibility.

Table 1: documents provided for the assessment.

Title	Author	Date	Reference on document
Site Survey	Waterview Surveys	18/9/2020	1196/detail
Architectural Plans	Your Beautiful Home	23/3/2021	See below
Landscape Concept Plan	Harrison's Landscaping	7/4/2021	Revision A

Drawing List

Drawing No	Title	Revision
01	SITE ANALYSIS	
02	SETBACK STUDIES	
03	SITE CALCULATIONS	
04	DEMOLITION + WASTE MANAGEMENT	
05	SITE PLAN	
06	ROOF PLAN	
07	BASEMENT	
08	GROUND FLOOR	
09	FIRST FLOOR	
10	NORTH EAST	ELEVATION	
11	SOUTH WEST	ELEVATION	
12	NORTH WEST	ELEVATION	
13	SOUTH EAST	ELEVATION	
14	SECTION A-A	
15	SECTION B-B	
16	MATERIALS	
17	MATERIALS	
18	SHADOW DIAGRAMS	9AM 21 JUNE	
19	SHADOW DIAGRAMS	12PM 21 JUNE	
20	SHADOW DIAGRAMS	3PM 21 JUNE	
21	3D VIEWS	
23	3D VIEWS	
24	3D VIEWS	
26	3D VIEWS	
27	8.5m HEIGHT LIMIT	
001	EXISTING ELEVATIONS	

2. SCOPE OF THE REPORT

2.1 **This report has been undertaken to meet the following objectives.**

2.1.1 Conduct a visual assessment from ground level of trees located on and adjoining the site as identified on the survey plans provided.

2.1.2 For the purpose of this report, a tree taken to have height greater than 5 metres.

2.1.3 Determine the trees estimated contribution years and remaining, useful life expectancy and award the trees a retention value.

2.1.4 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).

2.1.5 Provide pragmatic recommendations for the management of trees and mitigation of construction impacts on retained trees.

2.1.6 Specify tree protection measures for trees to be retained in accordance with AS 4970-2009.

3. LIMITATIONS

3.1 The findings of this report are based on the observations and site conditions at the time of inspection.

3.2 Where access was limited, measurements have been estimated.

3.3 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

3.4 The tree inspections were visual from ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.

3.5 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.6 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.

3.7 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with a spp.

3.8 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.9 Hugh The Arborist neither guarantees, nor is responsible for, the accuracy of information provided by others that is contained within this report.

3.10 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.

3.11 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.

3.12 Alteration of this report invalidates the entire report.

4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s).

4.1.1 Tree common name

4.1.2 Tree botanical name

4.1.3 Tree age class

4.1.4 DBH (Trunk/Stem diameter at breast height/1.4m above ground level) - millimetres.

4.1.5 Estimated height - metres

4.1.6 Estimated crown spread (Radius of crown) - metres

4.1.7 Health

4.1.8 Structural condition

4.1.9 Amenity value

4.1.10 Estimated remaining contribution years (SULE)[1]

[1] Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, http://www.treeaz.com/.

4.1.11 Retention value (Tree AZ)[2]

4.1.12 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

4.3 Tree diameter was measured using a DBH tape or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools I used during the assessment were a digital camera, Japanese made 170mm blade digging knife and a Leica DistoD410 digital laser tape.

4.4 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009). See appendices for more information.

4.5 Details of how the observations in this report have been assessed are listed in the appendices.

5. SITE LOCATION AND BRIEF DESCRIPTION OF THE PROPOSAL

5.1 The site is located in the in the Northern Beaches Council suburb of Manly. All trees at the site are managed under the following policy and legislation:

5.1.1 Manly Local Environmental Plan (LEP) 2013[4]

5.1.2 Manly Development Control Plan (DCP) 2013

5.1.3 Northern Beaches Tree Management Controls

5.1.4 State Environmental Planning Policy (Vegetation in Non-Rural Areas 2017)

[2] Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

[4] https://eservices.northernbeaches.nsw.gov.au/ePlanning/live/Public/XC.Track/SearchProperty.aspx?id=128235

5.2 The subject site is a corner block orientated east (front) to west (rear). The site was vacant at the time of the assessment with the building and the landscape largely dilapidated and overgrown. The site rises from east to west and holds retaining wall structures along the northern and western boundaries.

5.3 The trees and vegetation on site are largely low value weed species or species in below average condition.

5.4 The sites have not been identified as within a heritage conservation area or to contain high levels of biodiversity. [5]

Tile 1: Site Location[6]

[5] https://eservices.northernbeaches.nsw.gov.au/ePlanning/live/Public/XC.Track/SearchProperty.aspx

[6] https://www.google.com/maps/place/95+Bower+St,+Manly+NSW+2095

6. OBSERVATIONS AND GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

6.1 **Tree information**: Details of each individual tree assessed, including the observations taken during the site inspection, can be found in the tree inspection schedule in appendix 2, where the indicative tree protection zone (TPZ) and Structural Root Zone (SRZ) has been calculated for each of the subject trees. The TPZ and SRZ should be measured in radius from the centre of the trunk. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in appendix 3 to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

6.2 **Site plan:** Appendix 1 contains an existing site plan. Appendix 1A contains a site plan showing the proposal, subject trees locations and a tree protection plan. Information including canopy spread, TPZ and SRZ have been overlaid on both plans.

6.3 **Tree protection zone (TPZ):** The TPZ is the principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified in AS4970-2009 to be the area where root loss or disturbance will generally impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The TPZ also incorporates the SRZ (see below for more information about the SRZ). The TPZ is calculated by multiplying the DBH by twelve, with the exception of palms, other monocots, cycads and tree ferns, the TPZ of which have been calculated at one metre outside the crown projection. Additional information about the TPZ is included in appendix 3.

6.4 **Structural Root Zone (SRZ):** This is the area around the base of a tree required for the tree's stability in the ground. An area larger than the SRZ always needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula: (DAB x 50) $^{0.42}$ x 0.64. There are several factors that can vary the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally, work within the SRZ should be avoided. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ.

6.5 **Minor encroachment into TPZ:** Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.

6.6 **Major encroachment into TPZ:** Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted. Root investigations may be required to identify roots that will be impacted during major TPZ encroachment.

7. ASSESSEMENT OF CONSTRUCTION IMPACTS

7.1 **Table 2:** In the table below the impact of proposed development impact to all trees included in the report has been assessed.

Tree ID	Species	Retention value	TPZ radius (m)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
1	Cheese Tree	Z10	3.8	2.2	Major	Tree has been proposed to be replaced as part of the landscaping works. The tree has been assessed as in fair to poor condition with minimal potential for improvement.	Remove
2	African Olive	Z10	5.4	2.4	Major	Tree has been proposed to be replaced as part of the landscaping works. The species is listed as exempt from protection in NBLGA.	Remove
3	Coinspot Tree Fern	A1	2.0	0.0	Minor	Tree located within a stone retaining wall and is isolated from the main development works. The tree may be subject to a minor encroachment from the installation of the timber paling fence which will be of negligible impact.	Retain and protect
4	Hong Kong Orchid	Z2	2.0	1.7	Footprint	Tree located within the footprint of the proposed works. The tree is below the height threshold for protection in NBLGA and considered an unimportant tree.	Remove
5	Coinspot Tree Fern	Z2	2.0	0.0	Footprint	Tree is self-sown onto the inner edge of the stone retaining wall and is not retainable under the proposal.	Remove
6	Cheese Tree	Z2	2.0	1.6	Footprint	Tree located within the footprint of the proposed works and is within two metres of the existing dwelling and listed as exempt from protection in NBLGA.	Remove
7	Brush Cherry	Z2	2.2	1.9	Footprint	Tree located within the footprint of the proposed works and is within two metres of the existing dwelling and listed as exempt from protection in NBLGA.	Remove

8. CONCLUSIONS

8.1 **Table 3:** Summary of the impact to trees during the development.

Impact	Reason	Category		
		AA1	A	Z
Trees to be removed	Building/landscape construction, new surfacing and/or proximity, or trees in poor condition.	None	None	1,2,4,5,6,7 Six Trees
Retained trees subject to TPZ encroachment	Removal of existing surfacing/structures and/or installation of new surfacing/structures will not significantly impact the tree	None	3 One Tree	None
Retained trees subject to no TPZ encroachment	Located outside of the construction area	None	None	None

9. PHOTOGRPAPHS

Photo A: Trees 1 and 2 are low value and suppressed.

Photo B: Trees 6 and 7 within 2 metres of the existing dwelling.

HUGH
THE ARBORIST

10. RECOMMENDATIONS

10.1 This report assesses the impact of a proposed development at the site on seven trees located on and adjoining the site.

10.2 One tree (T3) is the only tree proposed to be retained and protected as part of the proposal. The remaining six trees are either in poor condition, are listed as exempt from protection or are within two metres of the existing dwelling.

10.3 The proposed removals are recommended to be replaced at a ratio not less than 1:1 and contain species capable of contributing to the canopy cover of the site.

11. ARBORICULTURAL WORK METHOD STATEMENT (AMS) AND TREE PROTECTION REQUIREMENTS

11.1 The following advice is generic site advice for the management of trees.

11.2 **Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site and be provided a copy of this report.

11.3 **Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.

11.4 **Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 3 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).

11.5 **Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. I recommend regular site inspections on a frequency based on the longevity of the project; this is to be agreed in the initial meeting.

11.6 **Site Specific Tree Protection Recommendations:**

Table 5: Protection Requirements: See appendix 1A for indicative protection location.

Tree Number	Protection Specification
3	- Tree 3 is located in a retaining wall above the site. Fencing is likely to become hazardous is installed at height therefore it is recommended that star pickets are installed around the tree with fluorescent tape to act as a visual barrier. - Tree protection zone signage is to be installed to clearly identify the tree for retention and protection. - All timber posts for the paling fence are to be installed manually.

11.7 **Tree protection Specifications:** See sections below for site/tree specific requirements. It is the responsibility of the principal contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.

11.8 **Protective fencing:** Where it is not feasible to install fencing at the specified location due to factors such restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing in unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

11.9 **TPZ signage:** Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

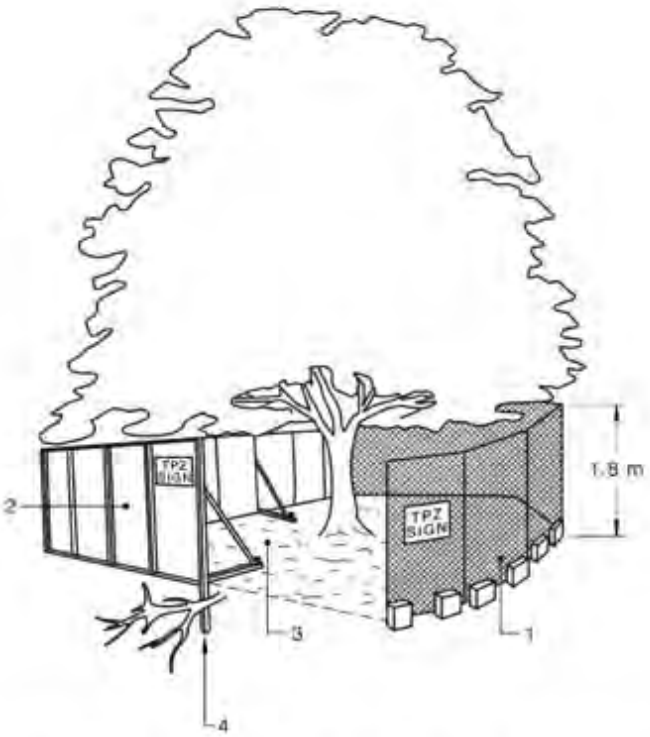
- Tree protection zone/No access.
- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.

- The name, address, and telephone number of the developer/builder and project Arborist

11.10 **Trunk and Branch Protection:** The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals and must be fixed against the trunk with tie wire or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.

11.11 **Mulch:** Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.

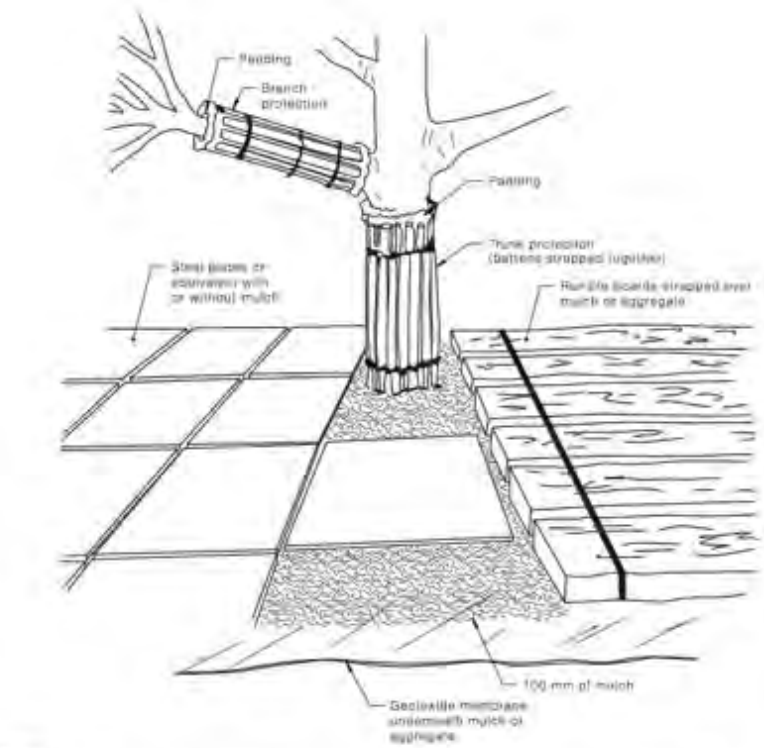
11.12 **Ground Protection:** Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric, overlaid with durable timber boards/plywood. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.



LEGEND:
1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

An image from AS4970-2009,[7] with example tree protection.

[7] Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.



NOTES:

1. For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
2. Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

An image from AS4970-2009,[8] with example tree protection.

11.13 **Restricted activities inside TPZ:** The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

A) Machine excavation.
B) Ripping or cultivation of soil.
C) Storage of spoil, soil or any such materials
D) Preparation of chemicals, including preparation of cement products.
E) Refueling.
F) Dumping of waste.

[8] Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

G) Wash down and cleaning of equipment.
H) Placement of fill.
I) Lighting of fires.
J) Soil level changes.
K) Any physical damage to the crown, trunk, or root system.
L) Parking of vehicles.

11.14 **Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.

11.15 **Excavations:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 10mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).[9] The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.

11.16 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.

[9] Council of Standards Australia, *AS 4373 Pruning of amenity trees* (2007) page 18

11.17 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.

- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 50mm or increased by more 100mm without assessment by a consulting Arborist.
- New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, considerer pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.
- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the tree root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpath should be located outside the SRZ.
- Where fill/sub base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.

11.18 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.

11.19 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.

11.20 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

12. HOLD POINTS

12.1 **Hold Points:** Below is a sequence of hold points requiring project Arborist certification throughout the development process**.** It provides a list of hold points that must be checked and certified. All certifications must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development.

Hold Point	Stage	Responsibility	Certification	Complete Y/N and date
Project Arborist to hold pre construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise.	Prior to work commencing.	Principle contractor	Project Arborist	
Project Arborist to assess and certify that tree protection has been installed in accordance with development conditions and AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	Principle contractor	Project Arborist	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations.	Ongoing throughout the development	Principle contractor	Project Arborist	
Project Arborist to oversee all manual excavations and demolition inside the TPZ of any tree to be retained.	Construction	Principle contractor	Project Arborist	

Project Arborist to certify that all pruning of roots has been carried out in accordance with AS4373-2007. All root pruning must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	Principle contractor	Project Arborist	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	Principle contractor	Project Arborist	
Project arborist to approve relocation of tree protection for landscaping. All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimize the impact to trees.	Landscape	Principle contractor	Project Arborist	
After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigor and authorize the removal of protective fencing. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of construction	Principle contractor	Project Arborist	
Any wounding or injury that occurs to a tree during the demolition/construction process will require the project arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. All remediation work is to be carried out by the project arborist, at the contractor's expense.	Ongoing throughout the development	Principle contractor	Project Arborist	

13. BIBLIOGRAPHY/REFERENCES

- Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009).
- Council of Standards Australia, *AS4373 Pruning of amenity trees* (2007).
- Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).
- Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop, Sydney*, 2001. Barrell
- Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.
- *Manly Local Environmental Plan 2013*
- *Manly Development Control Plan 2013*
- https://eservices.northernbeaches.nsw.gov.au/ePlanning/live/pages/plan/book.aspx?exhibit=PDCP.
- *Northern Beaches Council - Removing and Pruning Trees on Private Land*, https://www.northernbeaches.nsw.gov.au/planning-development/tree-management/private-land
- State Environmental Planning Policy *(Vegetation in Non-Rural Areas 2017).*
- *https://weeds.dpi.nsw.gov.au/Weeds/AfricanOlive*

14. LIST OF APPENDICES

The following are included in the appendices:

Appendix 1 – Existing Site Plan
Appendix 1A – Tree Protection Plan and Proposed Site Plan
Appendix 2 - Tree inspection schedule
Appendix 3 – Health
Appendix 4 – Amenity Value
Appendix 5 – Age Class
Appendix 6 – Structural Condition
Appendix 7 – SULE Categories
Appendix 8 – Retention Values
Appendix 9 – Trees AZ
Appendix 10 – TPZ Encroachment

Hugh Millington

Diploma of Arboriculture (AQF5)
NC Forestry and Arboriculture III (UK)
RFS Tech. Cert. II (UK)
QTRA Registered User
ISA Tree Risk Assessment Qualification

0426836701
hugh@hughtheArborist.com.au

Hugh The Arborist Pty Ltd

hugh@hughthearborist.com.au
www.hughthearborist.com.au

95 Bower street Manly NSW

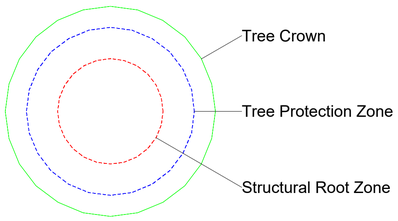
SCALE : 1 : 100 @ A1

DATE : 8/04/2021

MAP FILENAME : Appenxix 1 - Existing Site Plan

HUGH THE ARBORIST

Prepared by Hugh Millington for Barrie and Iyuko Fieldman



0 15m

T7
T6
T4
T3
T5
T1
T2

Rebuild sandstone wall using existing stone to allow for more open and curved entry stairs. Wall to rake with new stairs. New black steel balustrade to sit on top of wall

Proposed picket gate with 120mm gap under to allow for bandicoot movement

New house number and letter box to sit within this section of the new picket fence

Rebuild wall in new location re-using existing sandstone

Proposed small maple tree with low mounded under planting

Proposed small maple tree with low mounded under planting and feature boulder to extend into path slightly

Proposed gravel path

Proposed coniferous hedge

Proposed feature boulder surrounded with low under planting

Remove existing path, stairs and gate. Fill in section of sandstone wall

Proposed large maple tree

Remove existing concrete stairs and build new step

Proposed side gate and fence, 1.8m tall with 120mm gap at the bottom to allow for bandicoot passage

Re-build existing sandstone walls where required to ensure stability

Remove existing Acmena smithii (exempt within 2m of exisitng dwelling)

New concrete slab and paving

Remove existing tree - Bauhinia sp. (exempt - within 2m of exisitng dwelling)

Retain existing stone walls and repair where necessary. Plant out with a mixture of ferns and spillover plants

Retain existing 2 x Cyathea cooperi

Proposed lapped and capped timber boundary fence - 1.8m tall with gap at the bottom to allow for bandicoots - 120mm high x 300mm wide, spaced 2m apart.

Remove existing concrete stairs and exposed exisitng natural rock

Proposed low garden bed

This section of fence is in good condition and is to be retained

1.5m round smoked glass mirror with black steel frame and circular LED light behind to light up at night. Row of bamboo with root barrier to keep the clump narrow, with fern- like under planting

Pebble path

Shou Sugi Ban vertical cedar timber picket fence, 2.4m high on 3 sides with 2 access gates.

New concrete slab and paving

Proposed low garden bed

Proposed lapped and capped timber boundary fence - 1.8m tall with gap at the bottom to allow for bandicoots - 120mm high x 300mm wide, spaced 2m apart. Painted black. Steel rope trellis to be attached to the fence with jasmine to grow along and cover the fence.

Remove existing concrete retaining wall and rebuild new masonry block wall, stepped with existing slope of the land behind, rendered and painted in a dark charcoal colour

Remove existing carport including roof structure and brick posts. Cut back existing sandstone walls to allow for wider driveway - 6.2m wide in total. New stacking sliding automatic gate to retract to the west of the driveway. Fence to return down the eastern side of the driveway with a gate for side access

Retain existing wall

Proposed grove of Michelia alba with softly layered planting under

Curved crazy-paved sandstone path slightly raked to meet short set of stairs up to lawn terrace

Proposed bamboo hedge to surround lawn. Where fence reduces in height from 1.8 to 1.5 forward of the building line, hedge is to change to a more coniferous form to allow for more dense privacy

Sandstone retaining wall / lawn edging

Proposed mostly level lawn area with slight slope to allow for drainage

Proposed tree - Lagerstroemia indicia 'Natchez'

Proposed softly structured and layered underplanting

Proposed wide stairs to fan out to lower lawn area

Low sandstone step to create a level platform with gravel floor and area for chairs under the proposed tree

Proposed lapped and capped timber boundary fe... 1.8m tall with gap at the bottom to allow for ban... 120mm high x 300mm wide, spaced 2m apart.

Proposed wide sandstone bench seat to retaining wall for the soil behind

Proposed large tree (Ficus ... - native)

Transplant existing frangipani

Proposed tri-stem Howea forsteriana palm

Proposed free standing folding clothesline with black frame 2.2 x 1.2m

Proposed organic stepping stones to clothesline and rear access

Low wall to connect with bottom step

Remove existing tree - species tbc

Remove existing tree - species tbc

BENCHMARK NAIL IN CONC R.L 10.23

COLLEGE

311° 01' 45"

CHD: 349°46'25" – CH: 14.26

234° 22' 00" 15.95 SURVEY 15.99 BY TITLE

81

D.P.8076

799.7 m²

BASEMENT FL - 10.44

GROUND FLOOR RL - 13.18

FIRST FLOOR RL - 16.48

T7 T6 T4 T3 T5 T1 T2

Hugh The Arborist

hugh@hughthearborist.com.au
www.hughthearborist.com.au
0426836701

95 Bower Street Manly NSW

SCALE : 1 : 100 @ A2

DATE : 8/04/2021

MAP FILENAME : Appendix 1A - Proposed Plan And Tree Protection Plan

Drawn By Hugh Millington
for Barrie and Iyuko Fieldman

Protective Fencing

Tree Crown

Tree Protection Zone

Structural Root Zone

0 12m

Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1 (mm)	Stem 2 (mm)	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
1	Cheese Tree	*Glochidion ferdinandi*	Mature	5	4	320		320	360	Fair	Poor	Low	3. Short	Z10	3.8	2.2	Boundary tree. Heavily suppressed. Various sections of decay.
2	African Olive	*Olea europaea subsp. cuspidata*	Mature	6	5	450		450	480	Good	Poor	Low	3. Short	Z10	5.4	2.4	Boundary tree. Heavily suppressed.
3	Coinspot Tree Fern	*Cyathea cooperi*	Mature	3	2	170		170	0	Good	Fair	Medium	1. Long	A1	2.0	0.0	In retaining wall.
4	Hong Kong Orchid	*Bauhinia Spp.*	Mature	3	2	200		200	210	Fair	Poor	Low	3. Short	Z2	2.0	1.7	Growing on side of rock retaining wall, proximity exemption.
5	Coinspot Tree Fern	*Cyathea cooperi*	Mature	4	2	140		140	0	Good	Poor	Medium	2. Medium	Z2	2.0	0.0	Proximity exemption.
6	Cheese Tree	*Glochidion ferdinandi*	Semi-mature	5	3	140		140	180	Good	Good	Medium	1. Long	Z2	2.0	1.6	Proximity exemption.
7	Brush Cherry	*Syzegium australe*	Mature	5	3	100	110	185	270	Good	Fair	Medium	2. Medium	Z2	2.2	1.9	Proximity exemption.

Explanatory Notes

Tree Species - Botanical name followed by common name in brackets. Where species is unknown it is indicated with an '*spp'.*
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y), Dead (D).
Diameter at Breast Height (DBH) - Measured with a DBH tape or estimated at approximately 1.4m above ground level. Where DBH has been estimated it is indicated with an 'est'.
The (1) indicates the stem number and the (t) indicates the total DBH when calculated in accordance with AS4970-2009 definition.
Diameter Above root Buttresses (DAB): Measured with a DBH tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Tree Protection Zone (TPZ) - DBH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the TPZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - $(DAB \times 50)^{0.42} \times 0.64$. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead
Structure - Good/Fair/Poor
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.
Amenity Value - Very High/High/Medium/Low/Very Low.
(x) Indicates the measurement taken for the diameter at tree base above the buttress roots.
(E) Indicates estimated measurements.

Appendix 3 - Health/Physiological condition

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree.	• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	• The may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health.	• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

Appendix 4 - Amenity value

To determine the amenity value of a tree we assess a number of different factors which include but are not limited to the information below.

- The visibility of the tree to adjacent sites.
- The relationship between the tree and the site.
- Whether the tree is protected by any statuary conditions.
- The habitat value of the tree.
- Whether the tree is considered a noxious weed species.

Appendix 5 - Age class

If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below.

Category	Description
Young/Newly planted	• Young or recently planted tree.
Semi Mature	• Up to 20% of the usual life expectancy for the species.
Early mature/Mature	• Between 20% - 80% of the usual life expectancy for the species.
Over mature	• Over 80% of the usual life expectancy for the species.
Dead	• Tree is dead or almost dead.

Appendix 6 - Structural condition

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing.	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure.	• The identified defects are likely to cause either partial or whole failure of the tree.

Appendix 7 - Safe Useful Life Expectancy (SULE), (Barrel, 2001)

A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long	Useful life expectancy over 40 years
2. Medium	Useful life expectancy 15 to 40 years
3. Short	Useful life expectancy 5 to 15 years
4. Remove	Useful life expectancy under 5 years
5. Small/Young	Trees that could be transplanted or replaced with similar specimen.
6. Unstable	Tree has become hazardous or structurally unstable.

Appendix 8 - Retention value

The retention value that has been allocated to each tree in this report is not definitive and should only be used as a guideline by the client. We have assigned the retention value after assessing the combined SULE, structural condition, health, and amenity value of the tree. Any heritage listing that may apply to the tree has not been considered in this value, although if it has been identified it is included in the notes for the tree. Each tree has been assessed individually and consideration has not been given to value of the tree within a group.

Category	Example recommendation
Very high	Every effort should be made to preserve and retain trees in this category.
High	The trees in this category should be retained if it is reasonably possible.
Medium	The trees in this category should be retained if they do not constrain the development on the site.
Low	The trees in this category should not cause a constraint on the development proposals. They should be retained only if they do not or will not cause a risk to people or property.
Very low	The tree should generally be removed unless they do not or will not cause a risk to people or property.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

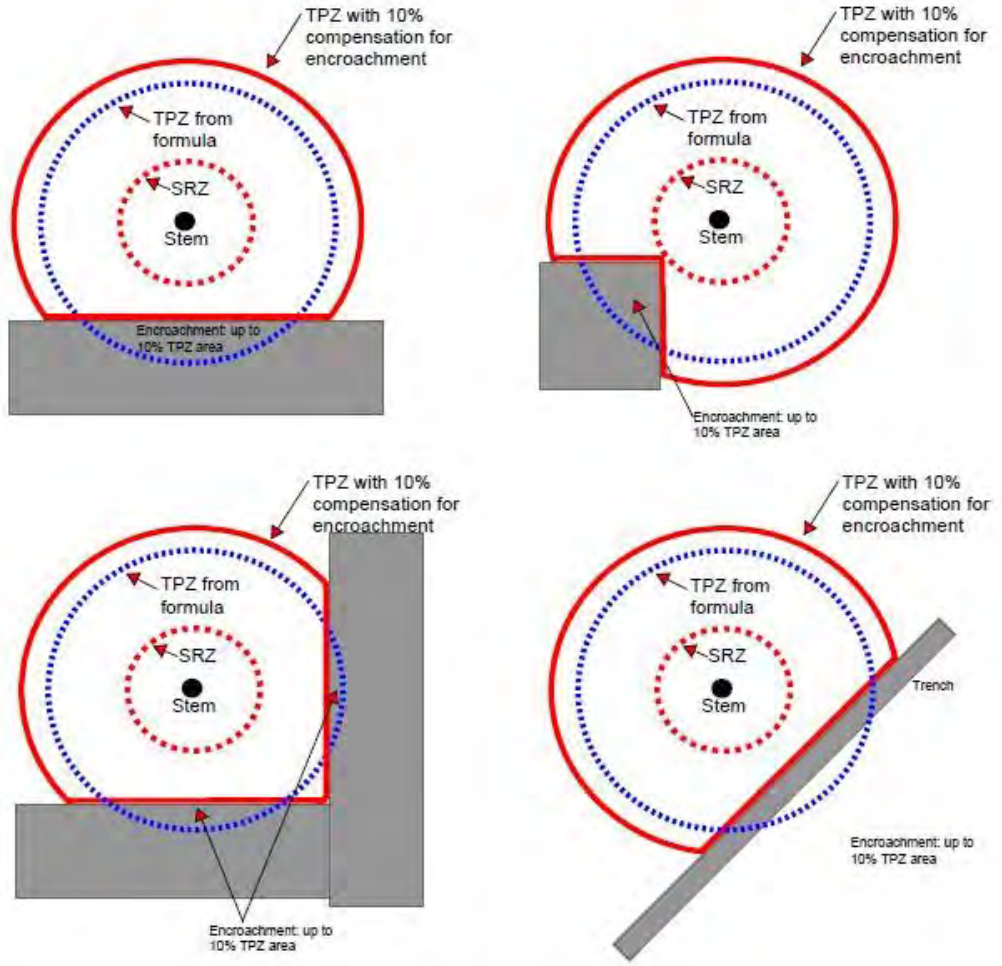
Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

A1	No significant defects and could be retained with minimal remedial care
A2	Minor defects that could be addressed by remedial care and/or work to adjacent trees
A3	Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
A4	Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)

NOTE: Category A1 trees that are already large and exceptional, or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.

Appendix 10 – Examples of TPZ Encroachment

Encroachment into the Tree Protection Zone is sometimes unavoidable. The following diagram shows examples of acceptable levels of encroachment and how they may be compensated for by providing additional space contiguous to the TPZ area.



Note: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.