17 January 2023

AURA TREE SERVICES

smart arbor professional CONSULTING

9 Horning Parade, Manly Vale

Arbor Impact Assessment
Version 1.0
Client: Tom & Jeni Daven

Prepared By

Luke Smart
AQF V Consulting Arborist (AHC50510)

Arboriculture Australia™

QTRA Registered User

Smart Arbor Professional Consulting
ABN: 81214180513
Ph: 0439 727 266
www.smartarbor.com.au

Contents

1. DISCLAIMER

The information provided within this report from Smart Arbor Professional Consulting is independently gathered by the author as an unbiased party and represents only the opinions and summations of the consulting arborist; compiled using the data gathered from the site inspection/s and any relevant information provided to the author.

All recommendations and information provided in this report relates to the time and date of the initial, and any following, site assessment/s. In the absence of historical records or information provided to the author, assumptions and findings of the consulting arborist are made based off observations at the time of inspection.

Measurements and locations noted in this report are an approximation and may be based on information found in surveys and further documentation not necessarily completed by the author. Exact locations and measurements of landscape require the assessment of a qualified surveyor.

 The author and/or consulting arborist will not to be held liable for any damage or loss for actions taken regarding findings, conclusions, specifications or recommendations provided in this report.

No guarantees are implied for any findings or recommendations made within this report. Deficiencies, defects, climatic impacts, environmental changes, vandalism, mechanical impacts, or any other variable that may change the current state of the tree/s assessed are not covered in this report and may change the relevance to the opinions and findings provided.

2. EXECUTIVE SUMMARY

The report has been commissioned by Tom & Jeni Daven to provide a qualified assessment for tree specimens adjacent to a proposed development site located at 9 Horning Parade, Manly Vale; a residential property located in the Northern Beaches Council LGA and subject to Local Government Tree Management policies.

The general vegetation on and adjacent to the site is noted to be a combination made up of endemic and native tree specimens, as well as select native and exotic shrub specimens. The vegetation assessed were two trees in the rear yard of a neighbouring property to the north (#7 Horning Parade).

The proposed development that bears any impact to trees on site includes the construction of a larger new pool with associated fencing, strip drains, paved coping and seating area and additional landscaping with new retaining walls. This will involve construction activities including demolition of the existing pool, deck and retaining wall structures and regrading site levels by excavation for retaining wall footings, and installation of fill to extend the level rear yard.

A summary of the recommendations in reference to the vegetation assessed and information on the proposed development provided within this report is as follows:

- Tree No.'s 1 & 2 are suitable for retention. The proposed encroachments to their respective measured Tree Protection Zones having a lower likelihood of impact to the tree's root system due to the presence of a rocky outcrop where the works are occurring and the differentiation in levels of the excavation and the location of each tree's root buttress.

- A Project Arborist with a minimum AQF V qualification must be engaged for the duration of the project to manage the implemented TPZs, supervise excavation works within a measured Tree Protection Zone of retained trees, and certify Tree Protection Measures.

- A fenced exclusion zone must be implemented in order to protect as much of the measured TPZs as feasible, while providing a reasonable offset from the northern property boundary to allow clear access for construction activities (as indicated in the **TREE LOCATION PLAN**, page 15). This fenceline should also exclude partial access to the rear of the neighbouring property to ensure construction staff access is less viable, while not completely excluding rear property access for the neighbouring tenants. Fencing must be installed as per **10.2- TREE PROTECTION FENCING**, page 16 of this report.

Schedule of Tree Management Processes

Stage	Task	Responsible Parties	Process Timing
1	Engagement of Project Arborist to oversee tree health and management	Principal Contractor	Prior to site establishment
2	Install Tree Protection fencing around Trees 1 & 2	Principal Contractor	Prior to site establishment.
3	Certification of Tree Protection Measures	Project Arborist	Prior to site establishment.
4	Supervise all excavation works proposed within the TPZ	Principal Contractor Project Arborist	As required prior to the works proceeding adjacent to tree
5	Final Inspection and certification of trees	Project Arborist	Following the removal of tree protection measures from Stage 3

3. PURPOSE

3.1 - PROPOSAL

The report has been commissioned by Tom & Jeni Daven to provide a qualified assessment for tree specimens adjacent to a proposed development site located at 9 Horning Parade, Manly Vale; a residential property located in the Northern Beaches Council LGA and subject to Local Government Tree Management policies.

The objective of this report is to complete a Visual Tree Assessment (Mattheck and Breloer 1994 standard)[d] and take data to assess and provide advice on the impacts posed on vegetation protected by Local Government policies and provide recommendations to assist and guide management of tree species with the view of retaining and protecting suitable specimens.

Determinations and conclusions are drawn in this report by identifying key factors such as:

- Significant tree specimens
- Trees protected under the Warringah Development Control Plan 2011[c] and the Warringah Local Environmental Plan 2011[i].
- Trees protected under the NSW Biodiversity Conservation Act 2016
- Trees suitable/unsuitable for retention
- The impacts by proposed structures to currently existing tree specimens

The data collected can be read in summarized table form in **TREE DATA COLLECTION FORM** (page 11).

3.2 - LOCAL GOVERNMENT TREE PROTECTION

The site is located within the Northern Beaches Council LGA and is thus governed by their relevant adopted Development Control Plans and Local Environment Plans from former Councils and their current Tree Management Policies. The Warringah Development Control Plan(c) requires a Vegetation Clearing Permit for:

a. Removal or cutting down of any tree over five (5) metres in height;
b. Pruning of more than ten percent (10%) of a tree canopy.
c. The removal or cutting down of vegetation in "Bushland".

The policy applies to all trees included in this report.

4. METHOD

4.1 – METHODOLOGY

A visual assessment of the trees (VTA[8] - Mattheck and Breloer 1994 standard)[d] was performed on 9th January, 2023. VTA[8] is an industry recognised and standard assessment of an individual tree from ground level to identify tree health and structural symptoms. VTA[8] is limited to view at ground level, and does not observe symptoms below ground level, or up in the canopy not viewable from ground.

In order to view tree conditions below ground level, excavation around the root base would be required. For viewing areas of the canopy not viewable from ground, an aerial inspection would be required. Neither of these methods were completed at the time of assessment.

4.2 - INSPECTION DATA

- Genus and species
- Height (Estimation),
- Canopy Spread (Estimation)
- DBH (Diameter at Breast Height) and DRB (Diameter at Root Base) with Diameter Tape
- Age
  (**J**uvenile, **S**emi-**M**ature, **M**ature, **O**ver-**M**ature, **S**enescent)
- Vigor
  (**G**ood, **AV**erage, **P**oor, **D**ead, **DO**rmant)
- Growth Habit
  (**U**pright, **S**preading, **L**eaning, **O**ver-**E**xtended, **D**ominant, **C**o-**D**ominant, **M**ulti-**S**temmed)
- Crown[1] Form
  (**S**ymmetrical, **AS**ymmetrical, **DE**nse, **SP**arse)
- IACA STARS© Significance value
  (**H**igh, **M**edium, **L**ow)
- Defects
- General Comments

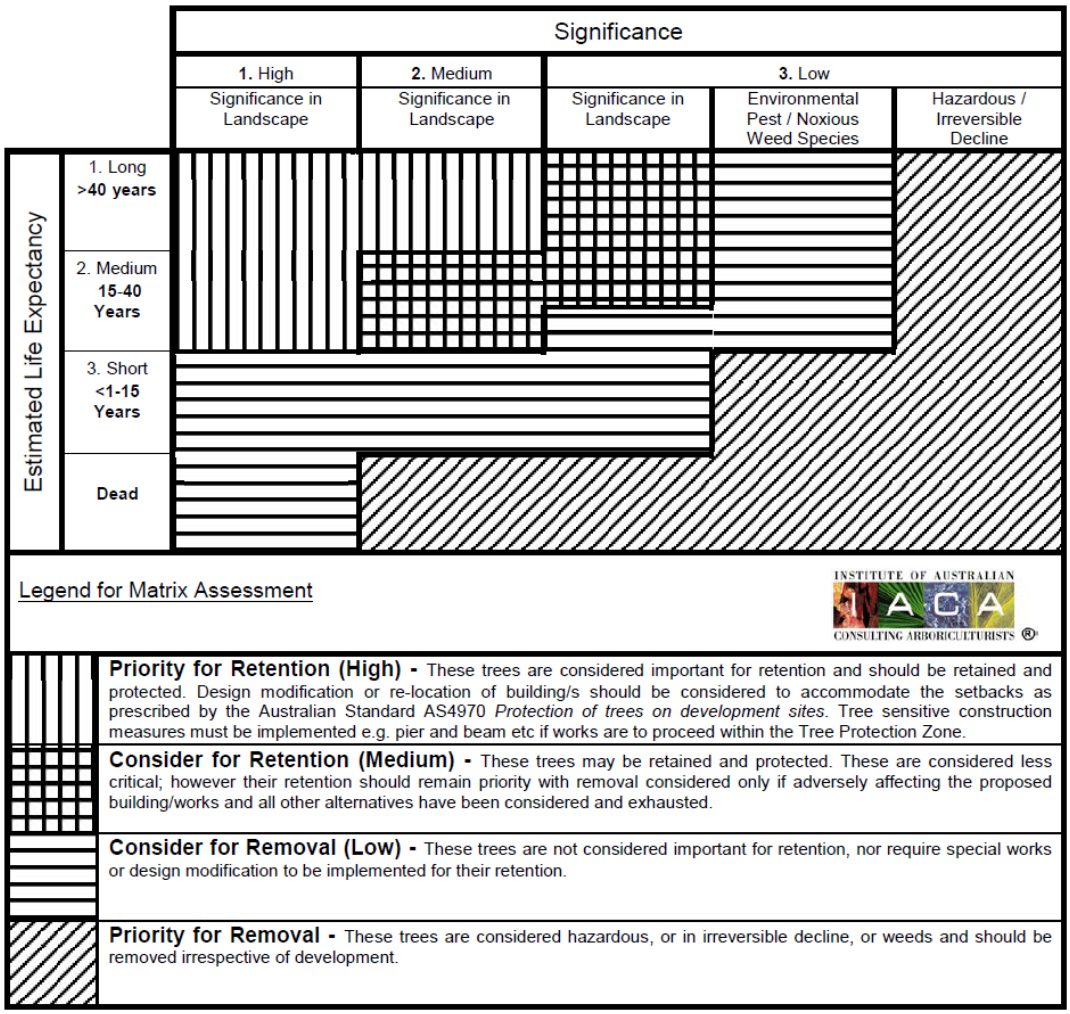
Data collected is then subject to the SULE (© Jeremey Barrell 2001)[e] methodology of assessment, which influences any conclusions drawn and recommendations made.

4.3 - TREE DATA DEFINITIONS

- **Age:** The definitions for tree age refer to the stage of life and maturity the tree is currently in that is relevant to tree species. Juvenile (**J**) is where the tree is in a small or sapling form and has not yet reached a stage where it is producing fruit. This category can often refer to a tree specimen that is under Local Government minimum requirements for classification of a tree, but is not necessarily defined by this parameter. A juvenile specimen can grow at an accelerated rate in comparison to the other categories depending on competing species. Semi-Mature (**SM**) is an age of the tree where it may have reached fruiting ability, however the size and habit does not reflect what would be classified as a fully mature example of its species. This category is governed by tree species and their growth habits. Mature (**M**) is the category where the tree has reached fruiting ability and the size and habit reflect what is expected from a fully mature specimen. A mature tree will continue to have steady annual growth. Over-Mature (**OM**) is a mature tree that has considerably slowed its growth rate and has neared its useful life expectancy. Senescent (**S**) is a stage where the tree is still alive, but no longer capable of putting on new growth. This is the final live stage of a tree.
- **Vigor:** The definitions for vigor correlate with how well the tree is performing in its environment and inclusive of canopy growth, branch growth and habit, and expression of general shape from the species in question. Good (**G**) is signs of new growth both in leaf/canopy and branches. 'Flushing'[4] is a general good indicator. Average (**AV**) is little to no signs of 'Flushing'[4], however growth is stabilizing and there is no significant loss of canopy growth, nor is there excessive presence of deadwood. Poor (**P**) is when the tree shows signs of decline, usually with excessive amounts of deadwood or epicormic[3] growth, along with less canopy leaf presence and little to no progress in branch and trunk growth. Dead (**D**) means no signs of growth, and the tree is irreversible of its condition. Dormant (**DO**) describes the canopy as being non-existent, i.e. no leaves, however this is not necessarily a sign of death or poor vigor as the tree may be deciduous and just during its dormancy stage.
- **Growth Habit:** The definitions for growth habit apply to condition and habit of the tree and the form features that impact its shape and other factors. Upright (**U**) means the tree is generally growing straight up and reaching skyward with little deviation of direction from the point of the root base. Leaning (**L**) means the tree has deviated from the point of the root base and is favoring a direction that is leaning away. Over-extended (**OE**) means the tree has an excessive lean that could over-balance the tree, and extreme weather conditions may pose a threat of uprooting the tree. Co-Dominant (**CD**) means the main leader of the tree has split into two or more main leaders that have started growing their own primary and secondary laterals. Multi-Stemmed (**MS**) means the tree has begun growth of multiple leaders from the root base that have started their own scaffold of primary and secondary branches.
- **Crown Form:** The definitions for crown form describe the shape and habit of the canopy, or crown, and touch upon the vigor or leaf growth habit of the crown also. Symmetrical (**S**)

describes the canopy as being generally even and balanced in all directions, without favoring a direction. Asymmetrical (**AS**) could refer to a lean or unbalanced canopy, generally seen in species inhibited by other species or unevenly pruned. Dense (**DE**) describes the canopy as generally full for its species, with decent or 'Flushing'[4] growth. Sparse (**SP**) describes the canopy as having less decent growth, or open gaps in the canopy.

- **Significance Value:** The definitions for significance value are determined using the IACA Significance of a Tree, Assessment Rating System (STARS)©[1]. This rating system assists with tree management in the planning processes for a proposed development that impacts trees protected under Local Government Tree Management Policies. The system defines three categories of significance as **H**igh, **M**edium and **L**ow within the landscape. Once assessment criteria defines the significance of the tree in the landscape, a retention value can then be determined utilising the below Priority Matrix :



Other variations on values defined and attributed to the significance value of a tree is at the discretion of the author utilizing experience and professional opinion. All such results are discussed in a report's recommendations.

5. SITE OBSERVATIONS

5.1 - SITE DESCRIPTION

The trees are located on a residential block with a north-easterly aspect that composes of a three-storey split level residence with associated driveway, paved paths and footways, existing pool structure with glass and metal fencing, timber decking and landscaped gardens supporting the slope to rocky outcrops at the rear of the block. The approximate location of each tree specimen can be identified on the **TREE LOCATION & IMPACT PLAN** (page 15).

The proposed development that bears any impact to trees on site includes the construction of a larger new pool with associated fencing, strip drains, paved coping and seating area and additional landscaping with new retaining walls. This will involve construction activities including demolition of the existing pool, deck and retaining wall structures and regrading site levels by excavation for retaining wall footings, and installation of fill to extend the level rear yard.

5.2 - VEGETATION COMMUNITY

The nearest mapped vegetation community for this site is approximately 400m to the south-east where bushland with a diverse array of species associated with the Sydney Coastal Dry Sclerophyll Forest is located. This community is an open eucalypt forest and woodland with prominent and diverse sclerophyll shrub understorey and open groundcover of sclerophyll sedges.

The dominant tree species across the topography of this ecological community includes *Angophora costata* (Sydney red gum) and *Corymbia gummifera* (Red Bloodwood). In gullies *Eucalyptus piperita* (Sydney Peppermint) is frequent, while ridges house canopy species consisting of *Eucalyptus capitellata* (Brown Stringybark), *Eucalyptus haemastoma* (Broad-leaved Scribbly Gum), *Eucalyptus oblonga*, *Eucalyptus racemosa* (Narrow-leaved Scribbly Gum) and *Eucalyptus sieberi* (Silvertop Ash). *Banksia serrata* (Old Man Banksia) and *Ceratopetalum gummiferum* (NSW Christmas Bush) make up a tree mid-canopy in gullies.

However, a segement of bushland located east, behind the property has not been mapped and would appear to match properties of a naturalised corridor which includes a presence of *Eucalyptus botryoides* (Bangalay) and *Glochidion ferdinandi* (Cheese Tree).

5.3 - REFERENCE MATERIAL

- Site Plan & Site Analysis and Demolition Plan by **Space Landscape Designs**; 30/11/2022
- NSW Government; **The SEED Initiative**; 2022
- Conservation Advice for the Coastal Swamp Sclerophyll Forest of NSW and South-east QLD; **Department of Agriculture, Water and the Environment**; 24/01/2022

ADDRESS: 9 Horning Parade, Manly Vale INSPECTION: 09/01/2023

NO#	Genus	Species	Common Name	Age	Vigor	Growth Habit	Crown Form	Height (m)	Canopy Spread (m)	DBH	DRB	SRZ	TPZ	STARS© Rating	Defects & Attributes	General Comments	Encroachment
1	*Eucalyptus*	*botryoides*	Bangalay	M	G	CD, U	S	18	12	790	900	3166	9480	M-H	Codominant leaders from 3.5m. Regular maintenance completed on branches overhanging property, crownlifted on S side to 15m.	Located on neighbouring property to N. Tree appears to be surrounded by rock shelf.	Located 3.6m from proposed new retaining wall posing a 26% encroachment within the TPZ
2	*Eucalyptus*	*botryoides*	Bangalay	M	G	Skew	As	16	9	530	610	2689	6360	M	Tree with phototropic lean and skew to E, suppressed to W from T1. Rope hanging off lowest FOB to E @ 5m.	Located on neighbouring property to N. Tree appears to be surrounded by rock shelf.	Located 3.5m from proposed new retaining wall posing a 17% encroachment within the TPZ

7. DISCUSSION

The two tree species assessed in this report can be categorized as associated with the local vegetation community and canopy line. The proposed development appears to be taking an approach to reasonably retain most existing levels and only raise levels further to the rear (east) of the property, and outside the measured Tree Protection Zone (TPZ) of the trees.

The extent of impacts to trees on development sites can be broadly rated using the following scale of impact to the tree's health and structure (as utilised by Guy Paroissien – Landscape Matrix Pty Ltd):

0% of encroachment into the Tree Protection Zone –	No Impact
0 to 10% of encroachment into the Tree Protection Zone –	Low Impact
10 to 15% of encroachment into the Tree Protection Zone –	Low to Moderate Impact
15 to 20% of encroachment into the Tree Protection Zone –	Moderate Impact
20 to 25% of encroachment into the Tree Protection Zone –	Moderate to High impact
25 to 35% of encroachment into the Tree Protection Zone –	High Impact
>35% of encroachment into the Tree Protection Zone –	Significant Impact

7.1 - Moderately Impacted Trees (>10%; <20%)

- Tree 2 is a Bangalay (*Eucalyptus botryoides*), located in the rear yard of No. 7 Horning Parade and is 3.5m from a proposed replacement retaining wall along the northern edge of the development, providing a 17% encroachment within the Tree Protection Zone. This tree is considered as having a Medium STARS© Significance rating and is suitable for retention.

  The proposed new 'reconfigured' retaining wall aligns with an already existing timber retaining wall but will require to be installed to a raised height to increase the level of the proposed new turf area to the south of it. The wall appears to be proposed as a brick construction and is likely to require the installation of a footing to support the base of the wall.

  While the installation of this footing would require some excavation, the proposed line of this excavation is on an uphill slope to the location of this tree, and outside the structural root zone. The tree appears to be growing between sections of rock that form an outcrop at the rear of the properties and the root system spread may be less predictable due to availability of soil in the localised area.

  Excavation that occurs within the TPZ should be completed using appropriate hand-controlled tools under the supervision of a Project Arborist with a minimum AQF5 level qualification. If roots greater than 30mm diameter are identified, the Project Arborist at their discretion should advise whether the root must be retained, or they should be clean cut with a pruning saw or chainsaw under their direction.

A fenced exclusion zone must be implemented in order to protect as much of the measured TPZ as feasible, while providing a reasonable offset from the property boundary to allow clear access for construction activities (as indicated in the **TREE LOCATION & IMPACT PLAN**, page 15).

No pruning should be required due to the tree's crown being already heavily crownlifted over the property. However, in the event that any crane access is utilised to the rear of the property, the Project Arborist should be on site to supervise access nearby protected tree canopies.

7.2 - Highly Impacted Trees (>20%; <35%)

- Tree 1 is a Bangalay (*Eucalyptus botryoides*), located in the rear yard of No. 7 Horning Parade and is 3.6m from a proposed replacement retaining wall along the northern edge of the development, providing a 26% encroachment within the Tree Protection Zone. This tree is considered as having a Medium-High STARS© Significance rating and is suitable for retention.

  The proposed new 'reconfigured' retaining wall is the same line of wall that poses an encroachment to Tree 2, and the installation of the wall's footing would require a line of excavation on an uphill slope to the location of this tree, and outside the structural root zone. This tree also appears to be growing between sections of rock that form an outcrop at the rear of the properties and the root system spread may be less predictable due to availability of soil in the localised area. The measured encroachment's impact may not necessarily apply due to the differentiation in levels between the installed footing and the location of the tree's root buttress.

  The same recommended courses of action apply to this tree over the development process including supervision of excavation within the TPZ by a Project Arborist with a minimum AQF5 level qualification; as well as the implementation of a fenced exclusion zone providing a reasonable offset from the property boundary to allow clear access for construction activities (as indicated in the **TREE LOCATION & IMPACT PLAN**, page 15).

  No pruning should be required due to the tree's crown being already heavily crownlifted over the property. However, in the event that any crane access is utilised to the rear of the property, the Project Arborist should be on site to supervise access nearby protected tree canopies.

7.3 - Other Trees Assessed and General Notes

- A tree surveyed on the Site Plan & Site Analysis by Space Landscape Designs located to the rear of the property was noted as dead at the time of inspection and was not assessed as part of this report.

- A Bangalay located directly behind Tree No.'s 1 & 2 was not included on the survey, however all recommendations provided in this report will assist in the retention and protection of this tree. No data was taken from this tree at the time of inspection.

- Shrubs located in the front yard of the property did not match minimum prescribed tree criteria as per the Warringah Development Control Plan and are not included in this report. However, care should be taken when transporting equipment from the front of the property to the construction zone to avoid unnecessary damage to retained shrub crowns or compaction to soil adjacent to these shrubs.

8. RECOMMENDATIONS

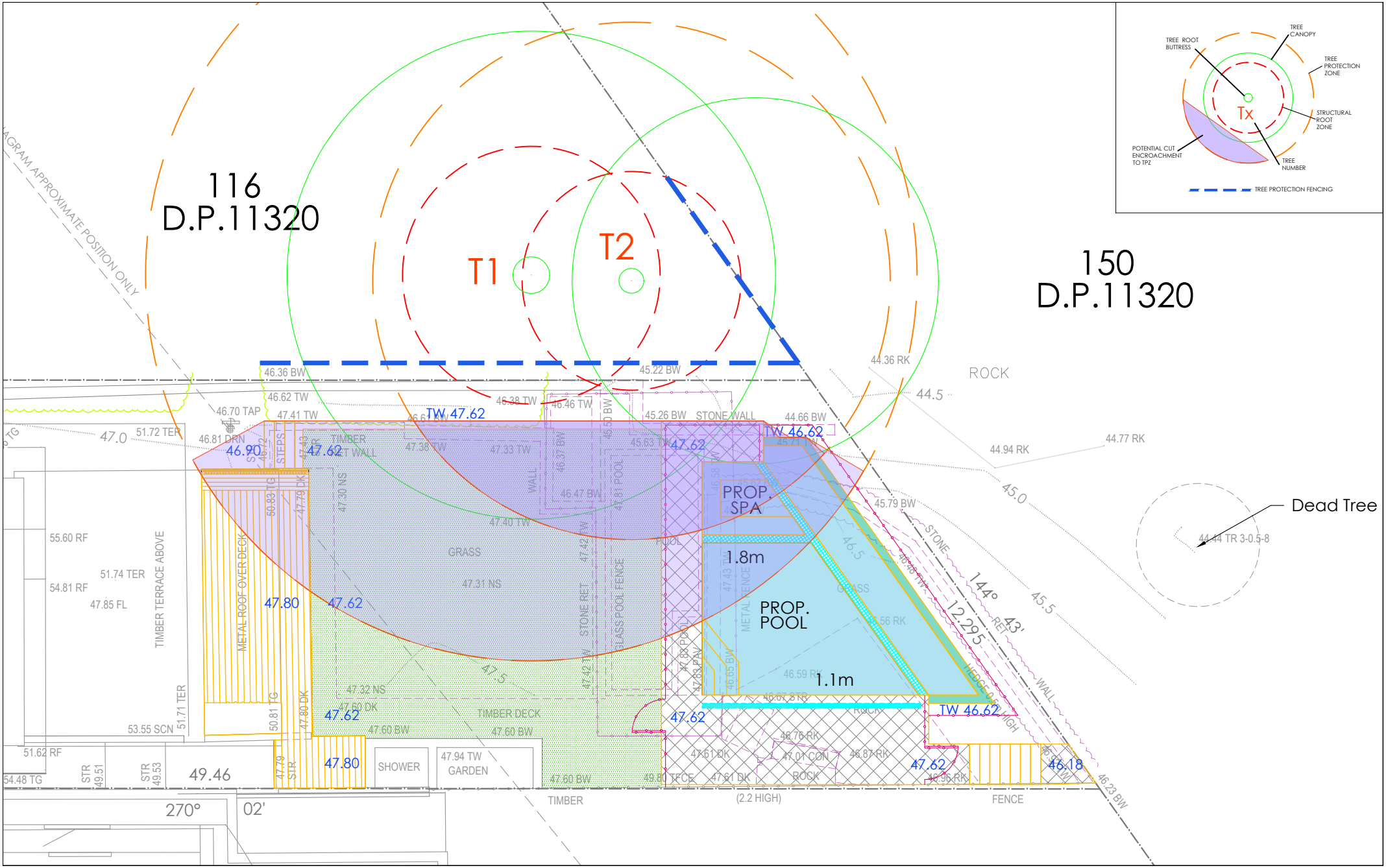
8.1 - TREES SUITABLE FOR RETENTION

➢ Tree No.'s 1 & 2 are suitable for retention. The proposed encroachments to their respective measured Tree Protection Zones having a lower likelihood of impact to the tree's root system due to the presence of a rocky outcrop where the works are occurring and the differentiation in levels of the excavation and the location of each tree's root buttress.

8.2 – SITE SPECIFIC TREE PROTECTION MEASURES

➢ A Project Arborist with a minimum AQF V qualification must be engaged for the duration of the project to manage the implemented TPZs, supervise excavation works within a measured Tree Protection Zone of retained trees, and certify Tree Protection Measures.

➢ A fenced exclusion zone must be implemented in order to protect as much of the measured TPZs as feasible, while providing a reasonable offset from the northern property boundary to allow clear access for construction activities (as indicated in the **TREE LOCATION & IMPACT PLAN**, page 15). This fenceline should also exclude partial access to the rear of the neighbouring property to ensure construction staff access is less viable, while not completely excluding rear property access for the neighbouring tenants. Fencing must be installed as per **10.2- TREE PROTECTION FENCING**, page 16 of this report.



REV.	TITLE	BY	DATE
A	PRELIMINARY TREE LOCATION PLAN	LS	28.07.22

smart arbor professional CONSULTING

Ph: 0439 727 266
Email: luke@smartarbor.com.au
Web: www.smartarbor.com.au
Member of Arboriculture Australia
Registered User of QTRA

ADDRESS: **9 HORNING PARADE, MANLY VALE**

CLIENT: **TOM & JENI DAVEN**

PROJECT	LANDSCAPE & SWIMMING POOL		
DRAWING	TREE LOCATION & IMPACT PLAN		
SCALE: NTS @ A4	ISSUE: V1.0	DRAWN BY: LS	
SHEET NUMBER: TLP-S1	DATE: 28.07.22	REVISION: A	

NORTH

10. TREE PROTECTION PLANNING

10.1 – Engagement of A Project Arborist

The engagement of a Project Arborist is required to oversee and certify tree protection measures implemented prior to any site establishment works and maintained for the duration of the construction process. The Project Arborist is to perform additional site inspections as required at each stage of the development that may impact tree health including supervision of construction works with a tree's measure TPZ, pruning of trees away from construction activities, etc. The Project Arborist should also be notified in the event the protected trees are damaged or are showing signs of decline which may require further management recommendations.

10.2 - Tree Protection Fencing

When required as part of an approved Development Application, tree protection fencing shall be installed prior to site establishment to establish the TPZ for trees to be retained. Tree protection fencing shall be maintained for the duration of the development schedule. The Tree Protection Fencing should enclose as much of the TPZ as can reasonably be fenced off, allowing for pedestrian access and a minimum 1m offset around construction footprint and scaffolding. The fencing should be made up of steel with a chain mesh or fence palings with plywood panels that is lockable and a minimum 1.8m in height. All Tree Protection Fencing should be sign posted with a 'no access' instruction and contact details for the Project Manager and Project Arborist. This should all be certified by the Project Arborist.

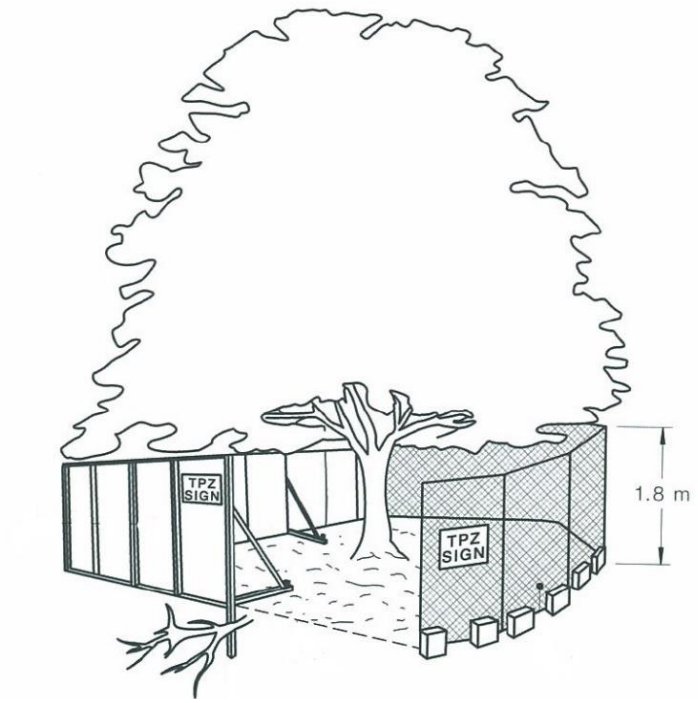


Image from AS 4970 'Protection of Trees on Development Sites'; Standards Australia, 2009

10.3 - Other Tree Protection Measures

Other measures that can assist with the protection of the canopy, trunk, branches, or roots from the risk of damage can include:

- A 100mm layer of approved mulch to be installed to the TPZ.
- A temporary drip irrigation system to be installed to the TPZ.
- Ground protection matting for staff, equipment and machinery access over tree roots.
- Trunk and branch battens and/or wrapping.

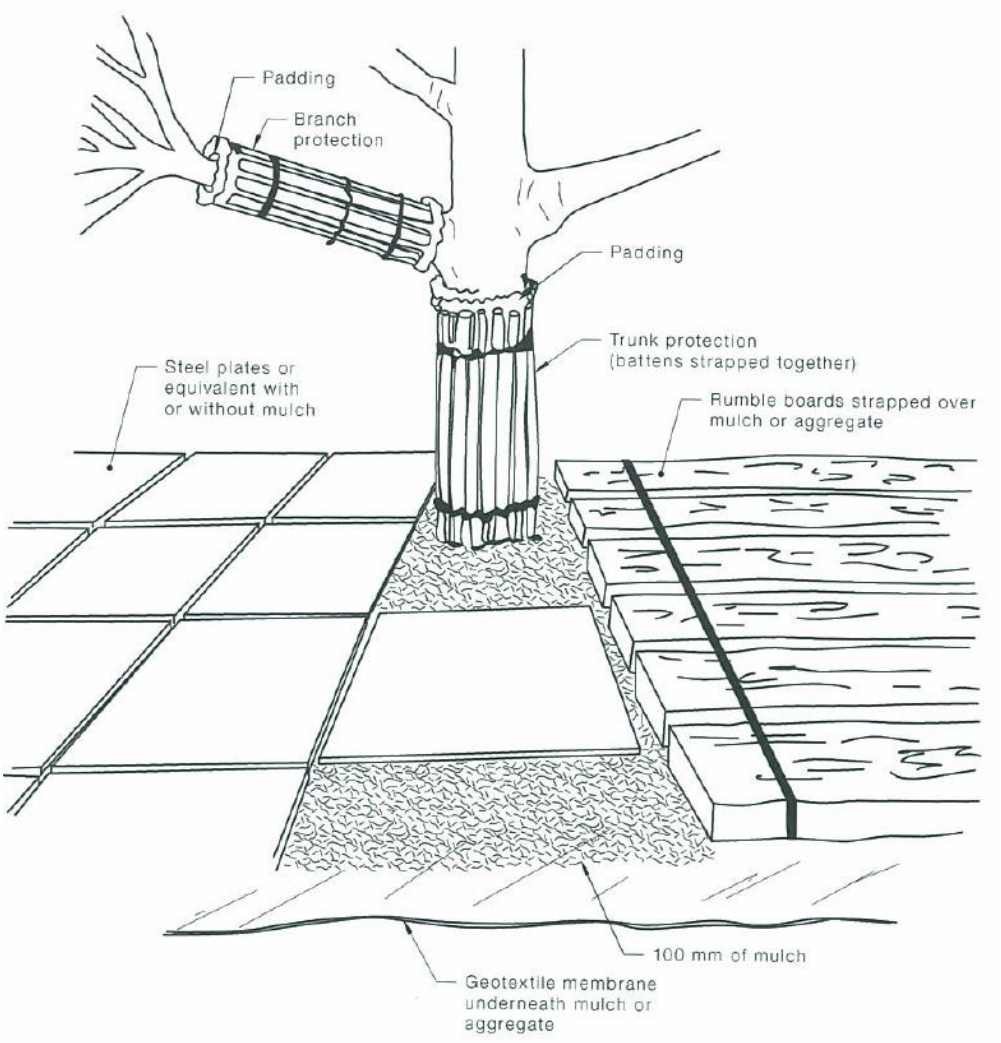


Image from AS 4970 'Protection of Trees on Development Sites'; Standards Australia, 2009

10.4 - Excavation within the TPZ

Excavation within the TPZ should be avoided, however this is not always realistically the case during a development. All efforts to preserve tree root systems should be taken including:

- Supervision from the Project Arborist during excavation.
- Excavation to be completed by hand when reasonable to avoid damage to roots.
- Root mapping may be required prior to excavation and should be completed with the use of either ground penetrating radar, air spade, water laser or by hand excavation; and should be certified by the Project Arborist.
- Where roots >50mm diameter are encountered, alternative construction methods should be considered to ensure roots are not damaged. Allowance should also be made for future root growth.
- Under-boring for services proposed below the root ball of the tree should be considered and certified by the Project Arborist.

10.5 - Fill

All fill material to be placed within the TPZ should be approved prior by the Project Arborist and be interfaced with a large diameter gravel or pebble to provide aeration and percolation to the root zone.

10.6 - Paving

Proposed paved areas within the TPZ That are to be installed on or above grade should ensure to minimise excavation and avoid surface root severance and/or damage. If proposed pavement materials are not permeable or porous, consideration should be given to forms of irrigation to the soil area below where tree roots have been retained.

10.7 - Pruning

All recommended pruning works (including root pruning) should be in accordance with Australian Standard for Pruning of amenity trees (AS4373 - 2007)[a]. If required, roots should be severed with clean sharp implement flush with the face of the excavation and maintained in a moist condition. Root pruning shall be performed under the supervision of the Project Arborist.

10.8 - Tree Removal

Tree removal work shall be carried out by an experienced Arborist in accordance with the NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and holds Public Liability and

Workers Compensation insurance. Care shall be taken to avoid damage to trees during the felling operation. Stumps shall be grinded using a mechanical stump grinder to a minimum depth of 300mm without damage to other retained root systems.

10.9 - Tree Damage

In the event of damage to a tree or the TPZ of a tree to be retained, the Project Arborist should be advised in order to provide advice on remedial action. This should be implemented as soon as practicable and certified by the Project Arborist.

10.10 - Post Construction Tree Management

Tree protection fencing with additional trunk and root protection shall be removed following completion of the development schedule. Any mulch layer installed for root protection should be reduced to a 75mm layer and retained on site. In the event of any tree deteriorating in health after the development schedule is complete, the Project Arborist should be engaged to provide advice on any remedial action.

11. GLOSSARY OF INDUSTRY TERMS

1. Crown: The canopy of the tree from the starting point of the tree's first primary lateral.

2. Deadwood: Leaves and branches that have died back and are of an irreversible condition.

3. Epicormic: The growth that occurs at the point of the epicormic bud that become active shoots when reacting to damage or stress in the tree.

4. Flushing: Fast green leaf growth occurring in reaction to ideal or high nutrient conditions for the tree.

5. Tree Protection Zone (TPZ): The area calculated (DBH x 12) as a protective buffer to isolate a tree from construction and excavation disturbance so the tree may remain viable.

6. Structural Root Zone (SRZ): The area calculated ($(DRB \times 50)^{0.42} \times 0.64$) that estimates root growth requiring to be retained for stability of the tree.

7. Encroachment: An activity or disturbance that takes place within proximity to the tree and inside the Tree Protection Zone that has potential for impact to tree health and structure.

8. Visual Tree Assessment (VTA): a non-invasive biomechanically based system of Tree Assessment developed by Claus Mattheck and Helge Breloer, examining the health and structural condition of individual trees.

9. Canker: A symptom of an infectious fungal pathogen that has entered between the bark cambium and heartwood that can display as a discolouration, a depression in the bark, or a wound that continues to attempt to heal but is continuously expanding.

10. Stem taper: The rate of decrease in stem diameter with increasing height from ground level to the highest point of a singular stem canopy point. Symptoms of good stem taper is an obvious, but not disproportionate decrease in stem diameter from root buttress to a height of 1.4m that continues evenly up the stem. Symptoms outside these proportions can be considered as poor taper.

12. REFERENCES

a) Standards Australia; **AS 4373 Pruning of amenity trees;** 2007

b) Standards Australia; **AS 4970 Protection of trees on development sites;** 2009

c) Warringah Council (adopted by Northern Beaches Council); **Warringah Development Control Plan;** 2011

d) Claus Mattheck; Helge Breloer; **The body language of trees : a handbook for failure analysis;** 1994

e) Jeremy Barrell; **SULE: Its use and status into the New Millennium;** modified paper, 2001

f) Institute of Australian Consulting Arboriculturalists; **IACA Significance of a Tree, Assessment Rating System (STARS)©;** 2010

g) NSW Government; **The SEED Initiative;** 2022

h) Richard W. Harris; James R. Clark; Nelda P. Matheny; **Arboriculture: Integrated Management of Landscape Trees, Shrubs , and Vines**; 4th Edition 2004

i) Warringah Council (adopted by Northern Beaches Council); **Warringah Local Environmental Plan;** 2011

13. PHOTO REFERENCE

Area of Development (dead tree at rear)

Trees 1 & 2

Tree not assessed

Dead tree in rear bushland

Proximity of Trees 1 & 2 to development area

Root buttresses lower than property level