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# **rain Tree consulting**

## **Arboricultural Management**

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26 May 2020

**143a STONEY CREEK ROAD**  
**BEVERLY HILLS, NSW**

## **DEVELOPMENT PROPOSAL**

## **ARBORICULTURAL IMPACT**

## **ASSESSMENT REPORT**

*Report Ref No- RTC-7320*

Prepared for  
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## INTRODUCTION

This report has been commissioned by Cambridge Unit Developments Pty Limited to assess the remaining Useful Life Expectancy (ULE) and potential impacts that may occur to significant trees in relation to a new development proposal. The new development proposal consists of constructing a new multi-level Health Service Facility located within the property formally indented as Lots 2 & 3 of DP1205598 known as 143a Stoney Creek Road, BEVERLY HILLS NSW 2209.

Recommendations for retention or removal of trees is based on tree condition, accorded ULE category, current design and potential impacts to trees under this development application.

To retain specific trees and ensure their viability development must take into consideration protection of the Tree Protection Zone (TPZ) radius as identified within Appendix- B Notes: *acceptable incursions*. As a guide to determining impacts the Structural Root Zone (SRZ) & Tree Protection Zone (TPZ) radial setbacks have been provided within Appendix- D the SRZ & TPZ distance column. Development encroachments are referred to as No impact (0%) incursion, Low impact (<10%) of minor consequence, Medium impact (<20%) incursion where the project arborist is to demonstrate the tree(s) remain viable by tree sensitive construction techniques, and High level impact (>20%) where design changes or further information is required to manage tree vitality. Where site restrictions within notional root zone radiuses exist development impacts or occupancy disturbances within tree protection zones are determined based on authors experience, observations of site conditions, soil type and topography.

Each tree assessed has been accorded a temporary identification number and is referred to by number throughout this report. For additional trees not plotted on provided documentation their location has been estimated by taking offsets from existing trees and structures.

The trees and their location may be referenced within the Tree Assessment Schedule and Tree Location Plan Appendices D and E.

Care has been taken to obtain information from reliable sources. All data has been verified as far as possible, however, I can neither guarantee nor be responsible for the accuracy of information provided by others.

### DISCLAIMER & LIMITATION ON THE USE OF THIS REPORT

This report is to be utilized in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report, may only be used where the whole of the original report (or copy) is referenced in, and directly to that submission, report or presentation. Unless stated otherwise: Information contained in this report covers only the tree/s that were examined and reflects the condition of the trees at the time of inspection: and the inspection was limited to visual examination of the subject tree without dissection, excavation, probing or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject tree/s may not arise in the future. Arborist cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specific period of time. Trees are a living entity and change continuously, they can be managed but not controlled and to be associated near one involves some degree of risk.

## METHODOLOGY

- i In preparation for this report a site and limited Level 1 Visual Tree Assessment (VTA) was conducted from ground level on Friday 24<sup>th</sup> January 2020 by the author of this report. The principles of VTA were primarily adopted from components of Mattheck & Breloer 1994 '*The Body Language of Trees*' with very basic risk values determined by criteria explained within the ISA TRAQ manual 2017. The inspection included assessment of the overall health and vigour of trees, tree form, structure and structural condition commencing from near the lower trunk to the upper first order branch division as best as site conditions would allow. On completion of the VTA the retention value of the tree was summarised utilizing the tree assessment Checklist provided within Appendix- C.
- ii The inspection was limited to a visual assessment from within the subject site. No aerial (climbing) inspections, woody tissue testing or tree root investigation was undertaken as part of this tree assessment. Tree height and canopy spread was estimated and expressed in metres with trunk diameters measured at approximately 1.4 metres above ground level, rounded off to the nearest 50mm and expressed as DBH (Diameter at Breast Height).
- iii This report acknowledges and utilizes the current Australian Standards 'Protection of Trees on Development Sites' AS 4970 – 2009 as explained within Notes of Appendix- B. Unless specified otherwise all distances and development offsets within this report are taken from the centre of the tree.
- iv Plans and/or documentation received to assist in preparation of this assessment include:

Rothelowman architects project No. 220015 *specific to*:

  - Proposed Site Plan Dwg No: TP00.01 rev P3 dated 15.5.20
  - Demolition Plan Dwg No: TP00.03 rev P1 dated 25.3.20
  - Basement 1 Dwg No: TP01.03 rev P6 dated 18.5.20
  - Ground Floor Plan Dwg No: TP01.04 rev P9 dated 22.5.20
  - Sections Dwg No: TP03.01 rev P5, 02-P4, 03-P4 & 04-P3 dated 18.5.20

LTS Surveying

  - Survey Plans Sheet 1 ref No. 50474 001DT dated 20.9.2018

## 1. SUMMARY OF ASSESSMENT

### 1.1 General tree assessment

- 1.1.1 Eighteen (18) trees have been assessed under this development proposal. Of the eighteen trees two (2) trees are Council verge trees, four (4) are neighbouring trees and two (2) trees have been accorded low retention values.

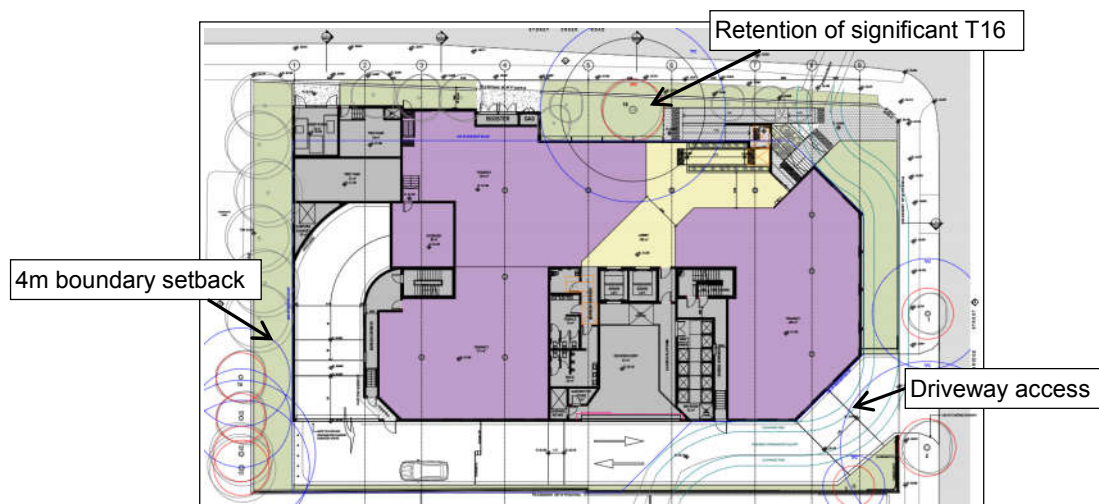
Council verge trees T1 & 2: The proposed new driveway crossover and site access is located on and within the footprint of existing hard surfaces indicating a negligible and manageable impact by design.

Neighbouring trees T11 & 14: Tree protection zones are restricted by existing hard car park surfaces indicating root zone disturbances may be less intrusive by the proposed development footprint. Within notional TPZ radiuses basement cut is located at a 4m boundary setback proposing a negligible TPZ incursion on trees 13 & 14, with minor <10% occupancy within the TPZ of T11 & 12.

Low retention value trees are identified as trees 4 & 5 with T8 an Dwarf Umbrella tree *Schiefflera*, closely related to the non-prescribed and exempt tree *Schefflera actinophylla*. Tree 4 is in slow decline with T5 containing structural faults that indicate a short safe retention value. The trees are considered trees which should not restrict this development application due to low site usefulness and short safe life expectancies.

Remaining trees on site are considered viable for retention without change in existing site conditions or modification within their Tree Protection Zone (TPZ) radiuses, refer Appendix- D the SRZ & TPZ distance column.

Figure 1, showing proposed development footprint



### 1.2 Tree removal to accommodate design

- 1.2.1 Trees requiring or recommended for removal to accommodate design are identified as T4, 5, 6, 7, 8, 9, 10, 15, 17 & 18.

Provided within the following sections discussions relating to tree protection, development impacts and/or removal by design have been provided.

### 1.3 Discussion of development impacts

- 1.3.1 Tree which require removal due to being located directly within the basement or building footprint of design are trees 7, 8, 9 & 10. Of these trees the removal of T10 was initially an arboricultural recommendation due to containing poor form. The tree displays a narrow suppressed canopy by adjacent neighbouring trees, leans to the east towards and over the adjacent property where the growth habit of the tree will become problematic in the future.
- 1.3.2 Council verge trees 1 & 2. Given the design utilizes existing hard surface footprints a negligible new Tree Protection Zone (TPZ) occupancy by design is proposed. To ensure the council verge trees remain viable the following specific tree management recommendations are provided:
1. No works or soil disturbance is to occur within the SRZ of the trees.
  2. Should works be required within the SRZ prior arborist advice is to be obtained. No root disturbance or severing is to occur within the SRZ with tree root investigations conducted to identify the location and distribution of critical roots for arborist review.
  3. Demolition within tree protection zones are to be supervised and certified by an appointed site arborist ensuring existing driveway demolition works do not disrupt critical roots.
  4. The trunk and extending first order stems of trees are to be protected with timber beam trunk protection to mitigate vehicle impact during the construction stage.
- 1.3.3 Tree 3. The driveway design proposes a moderate to high level at or near 24% occupancy within the SRZ & TPZ, where existing hard car park surfaces cover the majority of the tree protection zone. Given the proposed driveway is located on the existing driveway footprint impacts are likely to be manageable, with compensation of disturbance provided by increasing the deep soil area within the greater tree protection zone. Tree management should consist of the following recommendations:
1. The existing hard surface driveway is recommended to remain acting as a ground and root protection barrier during initial works. This permits a greater site usage within the TPZ during the development stage. Timber beam trunk protection is to be installed prior to works to minimise trunk damage during works.
  2. Should the existing driveway be removed a full fenced tree protection zone is required to be installed.
  3. There is to be no over excavation beyond the line of the proposed driveway sweep. Works within the SRZ are to be supervised by an appointed site arborist increasing the tree protection area with ground protection immediately after removal of the existing driveway.
- 1.3.4 Trees 4, 5 & 6 *driveway access to basement ramp*. Driveway and basement cut proposes a high level of SRZ severance where tree removal is required to accommodate design. Of these trees T5 is structurally defective containing a low safe site usefulness and trees 4 & 6 are small trees <5m in height which can be easily removed and replacement within landscape design.

- 1.3.5 Neighbouring trees 11 to 14. Tree protection zones are restricted by existing hard car park surfaces indicating root zone disturbances may be less intrusive by the development proposal. Within notional TPZ radiuses basement cut is located at a 4m boundary setback proposing a negligible TPZ incursion on trees 13 & 14, with minor <10% occupancy within the TPZ of T11 & 12. The following specific recommendations are provided to mitigate impacts by proposed works:
1. The existing hard surface driveway is recommended to remain acting as a ground and root protection barrier during works. This permits a greater site usage within the TPZ during the development stage.
  2. Should the existing driveway be removed a full fenced Tree Protection Area (TPA) is required to be installed at a 3.5m boundary setback. The TPA is to be maintained and managed as a Tree Protection Zone (TPZ).
  3. Canopy reduction pruning may be required, or the extending canopy protected with tree protection fencing at the extremity of canopy driplines.
  4. Basement cut: to avoid additional encroachment within the TPZ there is to be no over excavation beyond the line of the proposed basement footprint as shown within construction drawings.
  5. Ground floor / landscape design, the proposed boundary setback and deep soil area is to be retained as a tree protection zone. No works or soil disturbance is to occur within the SRZ of the trees without prior arborist advice.
- 1.3.6 Tree 15. The removal of the tree is a design requirement allowing for Gas Meter & Booster access. The tree <5m in height is located within a confined and surrounded hard surface garden bed where new design has made space for new plantings.
- 1.3.7 Tree 16. Visually the tree and site conditions have co-existed for a very long time with the trees root system adapting to confined spaces having greater SRZ distribution area compared to T17 the tree. Confined spaces indicate that the root system is highly unlikely radial in development and occupies areas outside of the notional 9m TPZ. Given that the root system has adapted to the existing site conditions, is confined and altered by solid structures acting as root barriers site modifications and disturbance within the TPZ may likely contribute to altering tree vitality in some manner. Impacts to the SRZ may be somewhat less due to the recess of the exiting foundations shown in Figure 2 p10. Notionally, TPZ occupancy is at or near 30% (High level occupancy), however, this includes occupancy within the existing building footprint where it is unlikely tree roots exist beyond the building foundations. The minimising of construction impacts has been identified by excluding works within the 3m Structural Root Zone (SRZ), and offsetting the building to allow for a 9m protection area extending to the NE & NW of the tree. Based on design aligned with the majority of the existing building footprint the following specific recommendations are provided for tree management during works:

1. No works or soil disturbance is to occur within the 3m radial SRZ. The SRZ is to be considered a development exclusion zone. Should works or access be required within the SRZ prior appointed project arborist advice and certification is required.
2. Prior to any works occurring a fenced Tree Protection Area (TPA) is to be installed and constructed under the guidance of an appointed site arborist. For the purpose of demolition and construction activities the following tree protection guidelines are provided.

*Demolition:*

- Prior to demolition the trunk of the tree is to be protected with 2.4m high timber beam trunk protection.
- An appointed site arborist shall supervise demolition, specific to the careful removal of foundations within the 9m TPZ.
- Any exposed or encountered roots are to be appropriately protected and managed.
- Immediately after demolition tree protection fencing consisting of plywood panels against 1.8m high tree protection fencing is recommended to be installed 2.5m from the tree extending 9m in length acting as a Tree Protection Area (TPA), see tree management plan Appendix- A.

*Basement cut & construction:*

- To ensure no additional encroachment within the designated TPA and SRZ occurs no over excavation beyond the line of the proposed basement footprint is to occur.
- The proposed excavation methodology is to be clearly identified, reviewed and endorsed by the appointed project arborist prior to works commencing.
- Project arborist endorsement shall include a statement from a certified engineer that the form of excavation will not destabilise or weaken the soil mass between the cut and minor boundary retaining wall that supports the tree.

*Construction:*

- Prior to construction canopy reduction pruning should occur to accommodate upper level building line clearances.
- Given the density of the canopy reduction pruning requirements are difficult to specify indicating all pruning activities should be conducted in accordance with Australian Standards AS 4373 Pruning of Amenity Trees 2007.
- The fenced 2.5m TPA setback is to be considered a tree protection zone where no access or excavation should occur without prior project arborist advice and direct arborist supervision.
- Where scaffolding is required protection measures are to revert to trunk and ground protection that extends the length of the TPA, see Figure 3 p12.
- Canopy pruning to accommodate scaffolding is to be as minimal as possible with scaffolding constructed to retain and accommodate flexible stems.



- 1.3.8 Tree 17. The removal of the tree is recommended as demolition of existing site foundations at such close proximity to the tree will likely result in loss of horizontal soil pressure and may likely contribute to whole tree collapse. As shown within Figure 2 p10, unlike T16 which has a greater root zone establishment area, the existing building foundations are located very close to the base of T17. Should the existing foundations near the base of the tree be removed a loss in horizontal soil pressure will likely occur. In this case, it will be difficult to say the tree will remain safe and that tree anchorage or will not be disrupted by the removal of the existing buildings foundations.

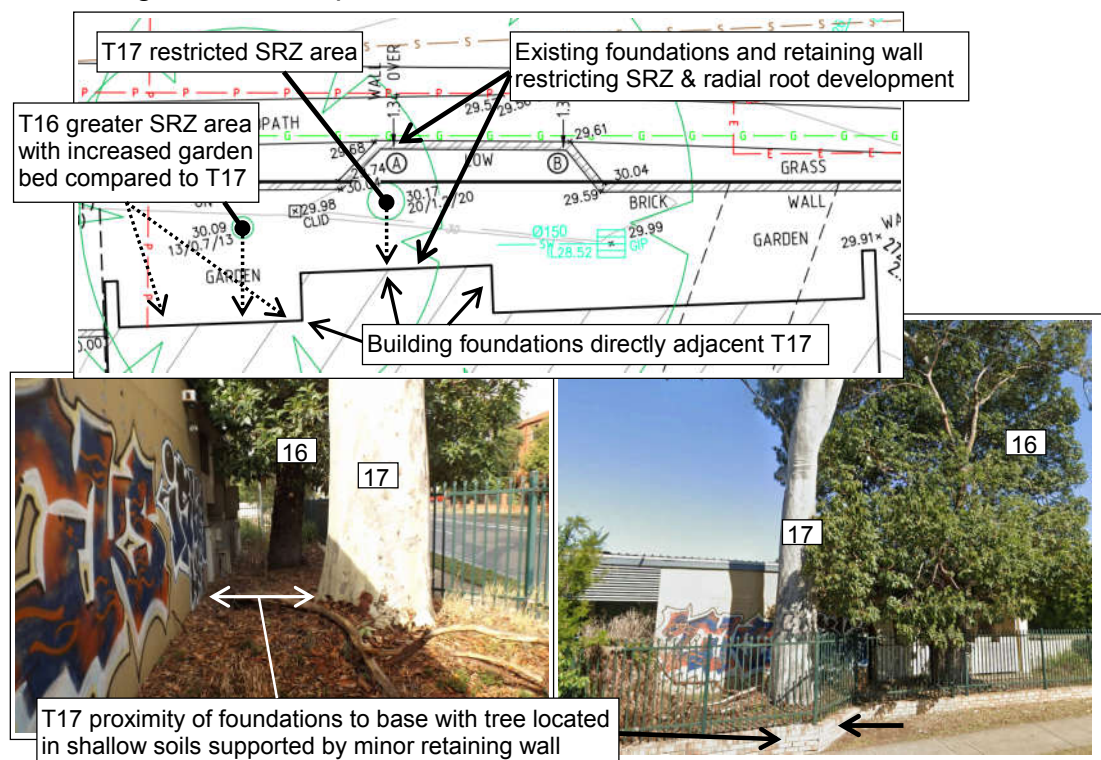
In general, as in T16 the root system is likely lineal in development and restricted in radial root distribution becoming accustomed to existing site conditions. It is also unlikely critical roots extend within the adjacent roadside verge and infrastructure where the risk and consequence of disturbing a narrow lineal anchoring root system so close to the base of the tree should be closely considered. Issues that indicate complications in tree retention consist of the following:

- Tree likely contains a shallow root system supported by a small raised retaining wall with the root system narrow, lineal in distribution between adjacent road & infrastructure and the existing building footprint (foundations).
- Tree height, mass weight and gravitational forces acts as a lever arm, where the risk of tree failure would increase when horizontal soil pressures are altered or disturbed within the SRZ *the area required for tree stability* between the building foundation and adjacent roadside infrastructure as shown.
- With anchoring root or soil disturbance failure from windthrow: *failure at ground level by wind loading pressures* would be considered more possible than not during strong wind events, to probable during normal weather conditions.
- Targets assessed as being in range of tree fall consist of high voltage powerlines, pedestrian and high traffic volume vehicle usage in both directions of Stoney Creek Road.
- Canopy reduction pruning will do little to reduce risk of ground level failure where to accommodate the multi storey proposal a one sided canopy reduction prune of >35% will result in poor form and exposure of the remaining canopy to wind loading.

For the above reasons and given the trees location to adjacent infrastructure it is likely the tree would restrict most new multi storey development proposals within the site, primarily where foundations are proposed to be removed that will likely affect tree anchorage.

- 1.3.9 Tree 18. The removal of the trees is required due to high level of disturbance within the SRZ. Given the small size of the trees removal would also make space for new plantings in landscape design.

Figure 2, showing T16 & 17 impact area



## 2. CONCLUSIONS & RECOMMENDATION

### 2.1 Tree Removal

2.1.1 With the consent of Council and based on the current development proposal ten (10) prescribed trees require or are recommended for removal to accommodate design. The ten trees are identified as tree:

- 4, 5, 6, 7, 8, 9, 10, 15, 17 & 18.

### 2.2 Tree management & protection principles

2.2.1 In addition to the recommendations provided within this report and Australian Standard AS4970 – 2009 Protection of Trees on Development Sites the following summary and/or additional recommendations are provided as a guide to tree protection:

#### *Specific recommendations*

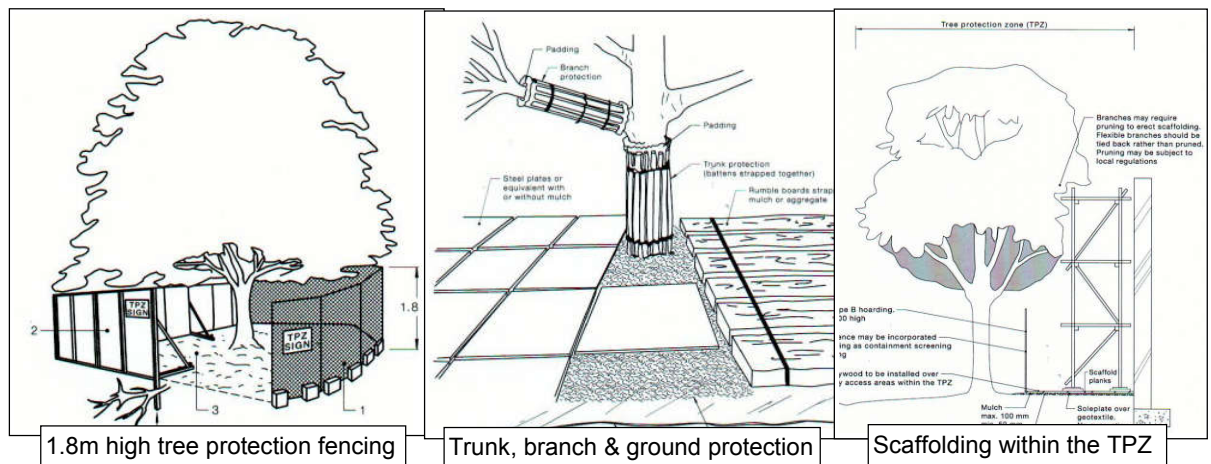
- 1) *Council verge trees T1 & 2.* Prior to works timber beam trunk protection shall be installed and certified by an appointed project arborist. There is to be no excavation within SRZ setbacks without prior arborist consultation.
- 2) *Trees 3, 11, 12, 13 & 14.* Ideally the existing hard car park surface should remain acting as a ground and root protection barrier allowing for building access within tree protection zones. Should the hard surface be removed installation of tree protection fencing as indicated within Sections 1.3.3 & 1.3.5 is to occur immediately after demolition activities with the area managed as a tree protection zone.

- 3) Tree 16. Prior to any works occurring an appointed project arborist is recommended to be engaged to manage the tree protection area (TPA) as indicated within Section 1.3.7 of this report specific to:
  - Trunk protection shall be installed prior to demolition works occurring.
  - An appointed arborist shall supervise and manage encountered tree roots during demolition of the adjacent foundation.
  - Immediately after demolition tree protection fencing at a 2.5m boundary setback spanning the 9m TPZ is to be installed. The recommended fencing should consist of plywood panels on protective fencing and be constructed to ensure a development site exclusion zone. Where scaffolding is required scaffolding shall be constructed in accordance with AS4970-2009 Section 4.5.6 *Scaffolding* within the tree protection zone.

## 2.2.2 General requirements & guidelines

- 1) Prior to demolition works Tree Protection Fencing (TPF) and/or zones as identified within Figure 1 are recommended to be located under the guidance of an appointed site arborist. Unless specified otherwise the location of tree protection fencing is to be positioned to allow for adequate work access and/or be located at the extremity of the TPZ radius, see SRZ & TPZ distance column Appendix- D.  
Where design & construction access may be restrictive timber beam trunk protection is recommended to be installed, with ground protection mats provided to protect underlying tree roots within tree protection zones or specified tree protection areas (TPA).
- 2) In accordance with AS4970 - 2009 (1.4.4) a Project or Site Arborist is to be engaged to monitor, supervise excavation within TPZ setbacks, advise and provide certification of protection works conducted.  
The appointed arborist is recommended to be suitably qualified having a minimum Australian Qualification Framework (AQF) Level 4 certification and be competent in methodology of protecting trees on development sites.
- 3) The appointed arborist is to provide final certification outlining tree protection measures with photographic evidence of ongoing works retained for certification purposes (AS4970 S/5.5.2 *Final certification*).
- 4) The appointed arborist is to be familiar with protection measures specific to Australian Standard AS4970 'Protection of Trees on Development Sites' – 2009 requirements with any modification in Tree Protection Fencing (TPF), Zones (Z) or Areas (TPA) to be compliant with AS4970 Section 4.5 *Other Tree Protection Measures*.

Figure 3: Tree protection fencing, ground and trunk protection detail



All tree protection fencing requires appropriate signage clearly stating a *TPZ restriction area* being a designated Tree Protection Zone.

- 5) **Hold points:** Hold points specific to *no works are to commence without arborist advice, inspections & certifications*: 1) No works shall occur within the SRZ without prior arborist advice and certification. 2) No excavation including demolition shall occur within the TPZ without prior project arborist notification and/or site supervision. It is the responsibility of the principle contractor to complete each task identified within Table 3 to ensure trees are appropriately managed in accordance with Australian Standard AS 4970 – 2009 Protection of Trees on Development Sites.

Table 1, certification requirements &amp; hold points

1	Pre-construction	Prior to works install tree protection as specified within this report as guided by an appointed site arborist
		T16 arborist to review and endorse excavation method proposal
2	During construction	Arborist to supervise & certify approved works within designated tree protection zones or areas to manage encountered tree roots
		Appointed arborist to inspect trees & tree protection areas at four (4) week intervals
3	Post construction	Prior to handover project arborist to provide final inspection & certification of tree health & vitality

- 6) Unless specified otherwise during approved excavation within TPZ setbacks excavation is to be conducted manually (by hand) under the supervision of an appointed project arborist. Where approved by the arborist the pruning of roots at or <30mm(Ø) is to be conducted in accordance with AS4970 – 2009 Section 4.5.4 *Root protection during works within the TPZ*, such that tree roots are not damaged or ripped beyond the point of excavation by site machinery.

Where larger roots have been encountered they are to be referred to an independent Level 5 arborist for further advice. For deep excavations exposed roots at the excavated cut face are to be protected with jute mesh, geotextile fabric or similar being secured in place to avoid drying of roots and the exposed soil profile.

- 7) The storage of materials and fill within tree protection zones or areas is to be avoided. Should storage be required further advice and certification from the appointed project arborist is recommended.
  - 8) *Canopy pruning / tree removal*: where required tree removal and canopy reductions are to be approved by the Local Government Authority. Works are to be conducted by a suitably qualified AQF Level 3 arborist in accordance with AS4373 Pruning Standards, and specifically be conducted in accordance with Safe Work Australia – Guide to managing risks of tree trimming and removal works 2016 ([www.swa.gov.au](http://www.swa.gov.au)).
  - 9) *Boundary fence and minor retaining wall construction*: to avoid disturbance to underlying tree roots boundary fences and landscape retaining walls should span across the SRZ being suspended above ground level supported by pier and beam construction within the TPZ
  - 10) *Additional inground services* which may include landscape works, sewer, stormwater, water and electrical services, final design and impact to trees shall be reviewed and endorsed by the project arborist prior to their installment.
  - 11) To ensure tree(s) are appropriately protected the development site superintendent is recommended to be familiar with all tree protection requirements as outlined within this report. The superintendent is responsible for informing all subcontractors of the responsibilities and requirements of tree protection prior to their engagement.
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Should you require further liaisons in this matter please contact me direct on 0419 250 248

Yours sincerely



Mark A Kokot

AQF Level 5 consulting arborist

Diploma of Hort/Arboriculture (AQF5), Associate Diploma Parks Management (AQF4)

Certified Arborist / Tree Surgeon (AQF3), ISA Tree Risk Assessment Qualified 2024

Member: ISA, Arboriculture Australia & IACA, Working With Children No: WWC0144637E

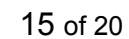


## APPENDICES

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## APPENDIX- B: Terminology, notes & references

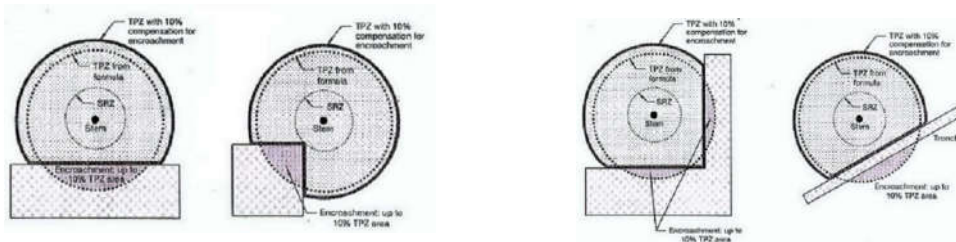
**Acceptable Risk:** Exposure to or reject risk of varying degrees. The acceptable risk is defined as 'The person who accepts some degree of risk in return for a benefit being exposed to some risk of varying degree. **Age classes:** (I) Immature refers to a well established but juvenile tree. (ESM) refers to an early semi mature tree not of juvenile appearance. (SM) Semi-mature refers to a tree at growth stages advancing into maturity and full size. (LSM) Late Semi- Mature, refers to a tree between semi-mature and close to mature. (EM) refers to a tree at the first stages of maturity. (M) Mature refers to a full size tree with some capacity for future growth. **Health:** Refers to a trees vigor 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 and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. Trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk / branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition. **Decay:** (N) – an area of wood that is undergoing decomposition. (V) – decomposition of an area of wood by fungi or bacteria. **Decline:** Is the response of a tree to a reduction of energy levels resulting from stress. Recovery from decline is difficult and slow; is usually irreversible. **Defect:** A identifiable fault in a tree. **Epicormic Shoots:** Shoots that arise from latent or adventitious buds that occur on stems and branches and on suckers produced from the base of the tree. A symptom / result of stress related factors. **Footprint:** The area occupied by site structures, including the dwelling driveways and hard surfaces. **Included Bark:** (Inclusion) a genetic weak fault, pattern of development at branch junctions where the bark is turned inwards rather than pushed out, can pose a potential hazard. **Order of branches:** First order being those that are the first to extend from the main trunk or codominant limbs, second order branches extend from the first order and third order branches extend from the second order. **Probable:** Failure may be expected under normal weather conditions within a specified time frame. **Possible:** Failure may be expected in extreme weather conditions within a specified time frame. **Probability:** The likelihood of some event happening. **Risk:** Is the probability of something adverse happening. **Suppression:** Restrained growth pattern from competition of other trees or structures. **Wound:** Damage inflicted upon a tree through injury to its living cells, may continue to develop further weakening of the structure compromising structural integrity.

**NOTE 1:** This report acknowledges the current **Australian Standards 'Protection of Trees on Development Sites'** AS 4970 – 2009 with reference to the Tree Protection Zone (TPZ): being a combination of the root and crown area requiring protection. The TPZ takes into consideration the Structural Root Zone (SRZ): The area required for tree stability. Determined by AS4970 - 2009 Figure 1, Table of determining the SRZ, section 3.3.5 of the standards. The standard states where a greater than 10% encroachment occurs the arborist is to take into consideration the schedule of determining impacts as set within AS4970 s. 3.3.4. Encroachments are referred to within this report as major or minor encroachments (AS4970 s. 3.3.2 & 3.3.3). Below is the terminology used for estimated percentage of development incursion used within this report. To retain specific trees and ensure their viability development must take into consideration protection of the TPZ radius.

**NOTE 2: The extent of inclusion within the TPZ radius has been categorized as follows:**

Development encroachments are referred to as No impact (0%) incursion, Low impact (<10%) of minor consequence, Medium impact (<20%) incursion where the project arborist is to demonstrate the tree/s remain viable by tree sensitive construction techniques, and High level impact (>20%) where design changes or further information is required to manage tree vitality.

Showing acceptable incursion within the TPZ (AS4970)



### SELECTED REFERENCES:

- Barrell J. 1993, 'Preplanning Tree Surveys: Safe useful Life expectancy (SULE) is the Natural Progression', Arboricultural Journal 17: 1, February 1993, pp. 33-46.
- International Society of Arboriculture (ISA) 2013, Tree Risk Assessment Manual, Martin Graphics, Champaign Illinois U.S.
- Mattheck, C. & Breloer, H.(1994) *The Body Language of Trees*. Research for Amenity Trees No.4 the Stationary Office, London.
- Matheny N. & Clark J. 1998, *Trees & Development 'A Technical Guide to Preservation of Trees During Land Development'* International Society of Arboriculture, Champaign USA.
- Standards Australia 2009, *Australian Standards 4970 Protection of Trees on Development Sites* - Standards Australia, Sydney, Australia.
- Standards Australia 2007, *Australian Standards 4373 Pruning of Amenity Trees* - Standards Australia, Sydney, Australia
- Georges River Council, *Tree Management Policy* 2019



**APPENDIX- C: Tree Retention Value Check list** ©rainTree consulting

**VTA i) Landscape Significance (LS):** The significance of a tree in the landscape is a combination of its amenity, environmental and heritage values.

Values may be subjective however, offer a visual understanding of the relative importance of the tree to the environment. The Landscape Significance of a tree is described in seven categories to assist in determining the retention value of trees.

1	Significant	2	Very High	3	High	4	Moderate	5	Low	6	Very Low	7	Insignificant
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**ii) Visual Tree Assessment (VTA)**

0	If appropriate to VTA - *exempt trees from Local Government Authority (LGA) Tree Management or Preservation Orders (TPO)	2E	Trees location likely to be affected by infrastructure restricting root growth potential, or tree has potential to cause infrastructure damage where risk mitigation or rectification works may compromise tree. Tree(s) may be contained within a vault have restricted anchoring root potential
0A	Noxious or invasive species located within heritage conservation area		
1	Trees that are dead, significantly declining >75% volume or obviously hazardous	3	This rating incorporates trees that may require further investigation of defects such as cavities or symptoms indicating internal decay to an extent that cannot be quantified under visual examination. Further inspections may be in the way of arborist climbing inspection within the canopy, root crown investigation, drill penetrating or Picus Sonic Tomograph ultrasound structural testing procedures to determine percentage of internal decay.
2	Trees that are structurally damaged. Have poor structure or weak & detrimental large stem inclusions capable of failure opposed to 2B. Tree also may be affected by extensive borer damage, fungal pathogens (wood rot) or viruses. Some symptoms may be reversible, remediated or controlled give appropriate management.		
2A	Tree damage specific to basal and/or root plate damage, very shallow soils or steep topography resulting in poor anchorage where condition may become problematic in near future / may include trees with included bark splits to ground level	4	Trees which appear specifically environmentally stressed by drought, poor soil or site conditions. Symptoms may be reversible given appropriate management
2B	Defect specific to stem inclusions development (weak branch attachments) where the condition may not be immediately detrimental however, require annual to biannual monitoring with control to prevent stem failure by installing slings, cable or bracing. Tree may also contain multi stems or codominant twin stems	5	Trees that would benefit from crown maintenance pruning as identified within the Australian Standards AS 4373 – 2007 Pruning of Amenity Trees
		5A	Trees that require little or no maintenance at time of inspection other than close monitoring
2C	Tree may contain minor wounds, pest or minor pathogen activity, altered from storm damaged to an extent that is not considered immediately detrimental - may also display average form. Likely to require close annual monitoring or minor corrective pruning	6	Trees may be typical for species type, of good form and visual condition for age class May have suppressed one sided canopies or are low risk trees
2D	Trees significantly altered by recent storm or over pruning events which may reduce retention values due to average form- or tree extensively pruned for power line clearance	7	VTA restricted by canopy or plant material vine or ivy covering tree parts, or site conditions which do not allow access- fences to neighbouring sites

**iii) Retention Value (RV):** Determined by [1] tree free of visual defects and viable for retention, [2] viable for retention with minor faults which may reduce ULE, [3] trees which should not restrict development applications containing faults that are likely to become problematic in the short term, [4] trees to be considered for removal due to poor condition.

1	High retention	2	Medium retention	3	Low retention	4	Consider removal
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**iv) U.L.E. categories** Useful Life Expectancy (after *Barrell* 1996, modified by the author). A tree's U.L.E. category is the life expectancy of the tree modified first by its age, health, condition, safety and location. U.L.E. assessments are not static but may be modified as dictated by changes in trees health and environment.

1. Long U.L.E. - Appear retainable at the time of assessment for over 40 years with an acceptable degree of risk assuming reasonable maintenance.
2. Medium U.L.E. - Appear to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk assuming reasonable maintenance.
3. Short U.L.E. - Trees appear to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk assuming reasonable maintenance.
4. Very short - Removal- Trees which should be scheduled for removal within the very short term or as specified within this report.
5. Small, young or regularly pruned – Trees under 5m in height that can be easily moved or replaced, includes screen plantings or hedge lines.

## APPENDIX- D: Tree Assessment Schedule

Trees requiring removal due to hazardous or dead condition - subject to Local Government Authority notification							Trees with low retention values: senescence, developing defects or being *exempt trees from the LGA Tree Preservation Order (TPO)					
Tree No	Botanical Name COMMON NAME	Height x spread (m)	DBH (mm)	SRZ TPZ	Age	Health	Condition	Significance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
1 CV	<i>Lophostemon confertus</i> Brush Box	7 x 7	450	2.5m 5.4	SM	Good	Fair / Good	3	2C/B	2	2	Multi stems at 2.2m with minor stem inclusion development
2 CV	<i>Lophostemon confertus</i> Brush Box	9 x 10	400, 300	2.8 8.4	SM	Good	Fair / Good	3	2B	2	2	Twin stems at 1m with minor stem inclusion development , canopy 2.5m in site at 4m above ground level
3	<i>Lophostemon confertus</i> Brush Box	8 x 5	250	2 3	ESM	Good	Good	4/3	6/2E	2	2	Located adjacent boundary fence where location to infrastructure is likely to become problematic in the future
4	<i>Leptospermum petersonii</i> Lemon Scented Tea Tree	3 x 4	250at base	1.8 3	SM	Fair / Poor	Fair / Poor	6	4	3	4/5	Slight decline in canopy (drought?) = low retention value
5	<i>Allocasuarina torulosa</i> Forest Oak	19 x 16	1100	3.5 13.2	M	Good	Fair / Poor	3	2/3	3	<3	Multi stems at 1m, deep cavity S side at 1m potentially descending to ground level / internal decay / minor cavity at stem junction NE may be connected to internal hollow, minor stem inclusion development above = benefit from further investigations or consider tree removal due to likely low retention value
6	<i>Melaleuca squarrosa</i> Scented Paperbark	5 x 4	multi 250at base	1.8 3	SM	Fair / Good	Good	4	4	2	2/5	Clumping trees stand along boundary, slightly environmentally stressed with decline in lower canopy
7	<i>Lophostemon confertus</i> Brush Box	7 x 5	200	1.8 2.4	ESM	Good	Good	4/3	2E	2	2	Confined root growing area, location to infrastructure may become problematic in the future, slight trunk sweep S
8x2	<i>Schiefflera arboricola</i> Dwarf Umbrella Tree	4 x 8	250at base	1.8 3	ESM	Good	Good	5	6	1	2	Clumping trees against building line with no significant visual faults
9	<i>Lophostemon confertus</i> Brush Box	6 x 5	250	2 3	ESM	Fair / Good	Good	4/3	4	2	2	Confined root growing area, slightly low foliage volume & vigour
10	<i>Lophostemon confertus</i> Brush Box	14 x 6	350	2.3 4.2	ESM	Good	Fair / Good	4/3	2C	2	2	Skewed trunk to 1.5m with upper trunk sweep and lean E – likely to become problematic in the future

Trees requiring removal due to hazardous or dead condition - subject to Local Government Authority notification							Trees with low retention values: senescence, developing defects or being *exempt trees from the LGA Tree Preservation Order (TPO)					
Tree No	Botanical Name COMMON NAME	Height x spread (m)	DBH (mm)	SRZ TPZ	Age	Health	Condition	Significance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
11 NT	<i>Citharexylum spinosum</i> Fiddlewood	15 x 11	550	2.7m 6.6	EM	Good	Good	4/3	7	1	2	Restricted VTA above ground visual parts appear in good order, canopy 3m in site >5m above ground level
12 NT	<i>Citharexylum spinosum</i> Fiddlewood	14 x 11	600	2.7 7.2	EM	Good	Good	4/3	7/2C	2	2	Restricted VTA. Above ground visual parts appear mostly in good order, past limb snap evident, canopy 7m in site at 4m above ground level
13 NT	<i>Xylosma senticosum</i> Xylosma	9 x 8	400	2.4 4.8	SM	Good	Good	4/3	7	1	2	Restricted VTA above ground visual parts appear in good order, canopy 4m in site at 1m above ground level
14 NT	<i>Xylosma senticosum</i> Xylosma	9 x 7	400	2.4 4.8	SM	Good	Good	4/3	7	1	2	Restricted VTA above ground visual parts appear in good order, canopy 4m in site at 1m above ground level
15	<i>Leptospermum petersonii</i> Lemon Scented Tea Tree	4 x 6	250at base	1.8 3	M	Good	Fair / Good	4/3	2B	2	3/5	Minor wounds & stem inclusion development on lower branch scaffolds
16	<i>Lophostemon confertus</i> Qld Brush Box	14 x 10	750	3 9	SM	Good	Good	3	6	1	2	Narrow canopy form, pruned for power line clearance N side with no significant visual faults
17	<i>Corymbia citriodora</i> Lemon Scented Gum	24 x 24	1150	3.6 13.8	M	Good	Fair / Good	3	2C	2	2	Long lower lateral S has potential for limb snap, past stub end pruning cut wound evident, foundations at base, location to infrastructure likely to become problematic in the future for public verge pathway with no significant visual faults
18 x2	<i>Leptospermum petersonii</i> Lemon Scented Tea Tree	3 x 3	150at base	1.5 2	ESM	Good	Good	4	6	1	3/5	Small tree with no significant defects noted

## APPENDIX- E: Tree Location Plan

