

4 May 2018

The General Manager
Northern Beaches Council
1 Park Street
MONA VALE NSW 2103



Attention: Planning and Tree Management Officers

**PROPOSED DISABLED ACCESS INCLINATOR THRESHOLD STRUCTURE
159 Riverview Road Avalon**

**TREE MANAGEMENT
CONSULTING ARBORICULTURISTS
HORTICULTURISTS
LANDSCAPE DESIGNERS**

Dear Officers,

At the request of Annie and Rowan Ross, owners and occupiers of 159 Riverview Road, Avalon (the site), I undertook an inspection of the site on 15 March 2018 to assess the potential impact of a proposed disabled access inclinator threshold structure on the health and viability of a large, mature tree located between an existing double garage to the south and pedestrian access inclinator on the north boundary.

I have also reviewed the following documentation in preparation for my site visit and this Arboricultural Impact Assessment:

- Plans SK-01 and SK-02, dated 13/04/2018, by Terrior Architects;
- Details and levels plan (the survey) 15893E, dated 29/10/2003, by Paul Keen & Company;
- Tree Management Controls, Northern Beaches Council (the Council) accessed 4 April 2018 at <https://www.northernbeaches.nsw.gov.au/planning-development/tree-management/private-land>

At the time of writing this report, I noted the site does not fall within a designated 10/50 vegetation clearing entitlement area.

THE TREE

The subject tree is a large and mature *Corymbia maculata* (Spotted Gum); the majority of the tree is located just outside the site's east boundary. The tree is a keystone species of the Pittwater Spotted Gum Forest endangered ecological community, and is subsequently afforded conservation status and protection under the NSW Biodiversity Conservation Act 2016.

The tree is approximately 28m or so high and has a generally balanced crown and spread of 16m or more. The tree is in good health and appears to have a stable crown architecture. Based on the tree's current status, I accord it a Useful Life Expectancy of 1A (see attached Tree Significant Rating methodology), with a subsequent high retention value

The tree's stem diameter at 1.4m above ground level is 875mm. The trunk diameter was measured in 2006 and was approximately 600mm at that time. The tree's growth indicates the trunk is expanding by approximately 23mm each year (i.e. typically 5.75mm in each compass direction).

Based on formulae from the Australian Standard AS 4970-2009 Protection of trees on development sites (AS4970), the tree has a notional Structural Root Zone (SRZ) offset of 3.4m radius and a notional Tree Protection Zone (TPZ) of 10.6m radius, measured from the centre of the tree's trunk.

Note: The AS4970 bases its formulae on a 'tree' growing on level land with no restrictions to root growth in all directions.

SITE OBSERVATIONS

- Relatively unencumbered ground, with landscaping, for approximately 7.5m or more to the north of the tree.
- Existing garage wall to the south is approximately 2.3m from the centre of the tree's trunk.
- A robust sandstone retaining wall is very close to the east side of the tree (i.e. less than 300mm). This wall supports the edge of the bitumen road reserve nearly 2m higher than the base of the tree. I expect much of the woody roots and non-woody root system will be in the garden areas where higher concentrations of available oxygen, water and nutrients would be found. However, it is possible the tree has some woody roots relying on this sandstone wall for stability.
- Existing stone steps and level changes approximately 2 – 3m to the west of the tree.

IMPACT ASSESSMENT

Despite the notional SRZ and TPZ offsets, there is little in the existing growing conditions to justify application of those offsets. For the purpose of assessing tree impacts, I believe the entire garden area where the tree is located must be treated as a SRZ, with no limit on the extent or arrangement of woody roots in all directions.

The proposal includes partial or complete removal of the east sandstone retaining wall within the identified demolition footprint (i.e. dashed red lines on plan SK-02) to ground level, which may disturb or destabilise woody roots belonging to the tree. At approximately 1m from the tree, the potential for encountering roots is high. The demolition of this wall must have a qualified arboriculturist on site to supervise this work. At this time, the most appropriate location and construction method for a supporting structure at this east alignment can be determined by liaison between the arboriculturist, architect and engineer.

There is no reason the other column or columns supporting the platform cannot be located where they will not interfere with woody tree roots that must remain undamaged and undisturbed. Typically, the further the columns are from the tree, the less likely it is that woody roots are encountered. In any event, the are of the proposed structure will require that an arboriculturist is in attendance during investigation for the most appropriate location for the supporting columns.

There will not be any material TPZ encroachment at ground level, however the proposed structure will be roofed, and this may reduce the amount of rainwater that reaches the ground and is available to the tree. This could be readily addressed by allowing for drainage (e.g. grated drains, gutter chains, etc) at construction.

Based on the tree trunk diameter (Figure 1), the tree trunk will be less than 500mm from the closest edge of the proposed disabled access inclinuator threshold structure. Given the trunk tends to have a slight northerly sweep, parts of the tree's trunk are likely be in the vicinity of 300mm from the proposed structure. Even so, the proposed structure will be much greater than 150mm clear of the tree trunk and unlikely to result in any contact damage under extremely strong wind conditions.

Allowing for a generous estimation of annual trunk expansion of 10mm in each direction over twenty-five years, the tree's trunk would be approximately 250mm from the closest edge of the proposed structure.

The lowest branch to the north of the tree and where the proposed structure would be constructed, is approximately 3m above the existing concrete fence plinth. The proposed height of the proposed structure from floor to roof would be approximately 2.7m and likely to fit under the limb without any contact occurring. It would require wrapping to protect it during construction. However, if the need arose to remove this limb for clearance, it could be pruned without any adverse impact on the tree's viability.

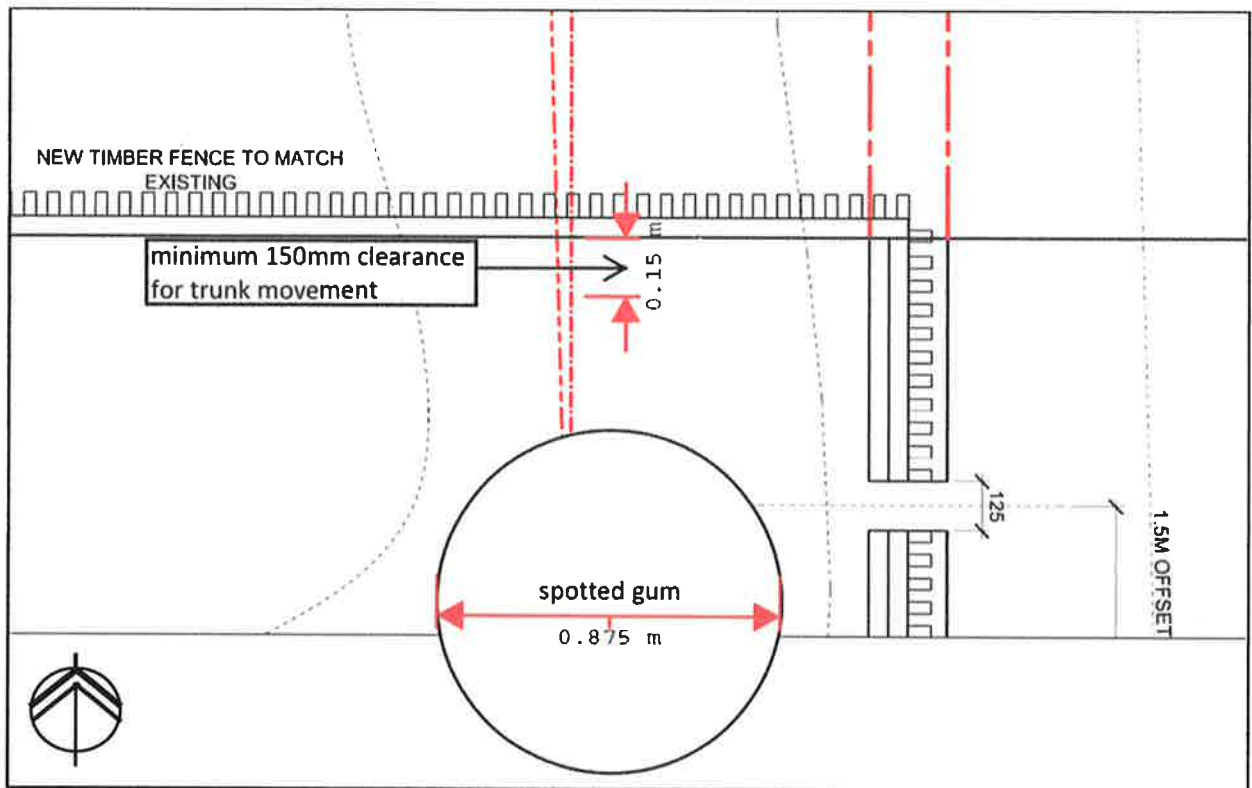


Figure 1—Illustrates the trunk diameter of the tree and its location in relation to the proposed disabled access inclinator threshold structure. Excerpt of SK-01, marked up by C. Mackenzie. Not to scale.

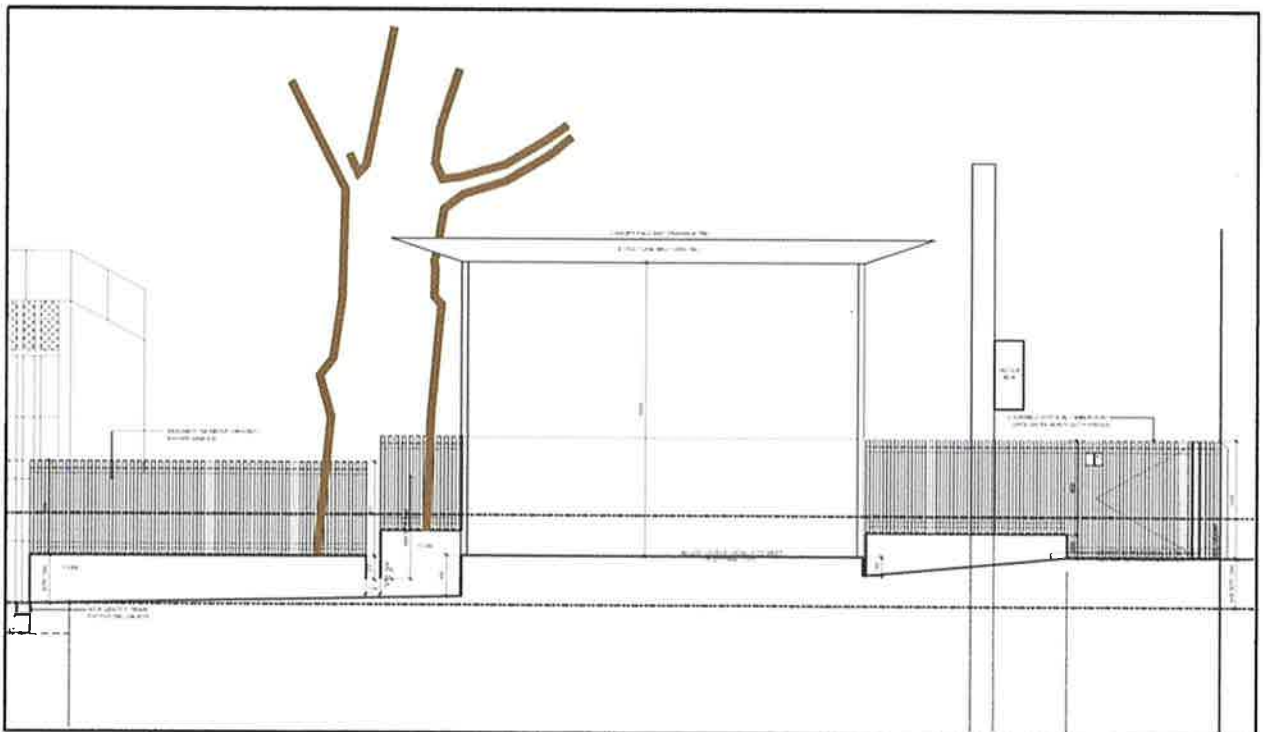


Figure 2—Illustrates the location of the tree and its lower northern limb (right hand side of tree) over the roof of the proposed disabled access inclinator threshold structure. Excerpt of platform street elevation SK-02, marked up by C. Mackenzie. Not to scale.

CONCLUSIONS

The proposed elevated disabled access inclinator threshold structure can be constructed with minimal disturbance to the tree if a high level of arboricultural care and supervision is maintained during the entire excavation (boring/piling) and construction phases of the project.

The proximity of the proposed structure combined with the existing site constraints means it is crucial to tree survival that this high level of tree care is accommodated.

RECOMMENDATIONS

Project Arboriculturist

- It is recommended an Australian Qualification Framework Level 5 Arboriculturist (the Project Arboriculturist [PA]) who is a registered consulting member of a nationally recognised arboricultural organisation or association, and who does not undertake any tree pruning or removal works in the Northern Beaches Local Government Area, is engaged to supervise the works within 6m of the tree to assist in managing and minimising any potential root disturbances if they arise.

Tree Protection

- The trunk of the tree and any exposed root buttress or roots shall be protected for the entire works period. A trunk guard is to be provided that protects the entire trunk from ground level to a distance at least 3m above the existing public road level (Figure 3).
- The northern limb of the tree shall be wrapped with carpet or layers of hessian thick enough to protect the limb from contact damage during construction.
- The entire garden area is to be covered with a 100mm depth layer of coarse mulch to protect the soil from compaction and contaminants. Heavily trafficked areas (e.g. foot traffic, wheelbarrows routes and the like) are to be provided with additional protection in the form of wide timber sheeting, Trakmat®, or similar device to spread load over the mulched areas.
- Surface roots shall be covered with carpet or similar, and identified with a device (e.g. post, flag, paint) to highlight their location so they are less likely to be damaged.

Prior to commencement of works

- The PA shall inspect the tree protection devices and confirm in writing that they are fit for purpose and in accordance with these recommendations and/or the Conditions of Consent.

Demolition

- The demolition of the existing sandstone retaining wall shall be directly supervised by the PA as there is potential for woody anchor roots to be located in this area. The PA must advise whether entire or partial removal of the existing wall is the most appropriate method to avoid unnecessary root disturbance or instability.
- Demolition of other existing structures, such as stairs and the like, shall be supervised by the PA.

Construction

- The PA shall confirm appropriate locations for supporting columns by the hand removal of soil to bedrock depth or 800mm depth, whichever comes first. The remaining excavation could be undertaken with machinery (e.g. screw piling) under the supervision of the arboriculturist.

Should you require any further assistance with this matter, including liaison with Council's Tree Management Officers if required, please do not hesitate to call me.

Yours faithfully,




Catriona Mackenzie

Consulting arboriculturist, horticulturist and landscape designer.

Tree Risk Assessment Qualified 2014 (TRAQ)

Certificate of Horticulture Honours

Diploma of Horticulture (Arboriculture) *Distinction*

Associate Diploma of Applied Science (Landscape) *Distinction*

Member of the International Society of Arboriculture (ISA)

Founding Member of the Institute of Australian Consulting Arboriculturists (IACA) ACM0052003

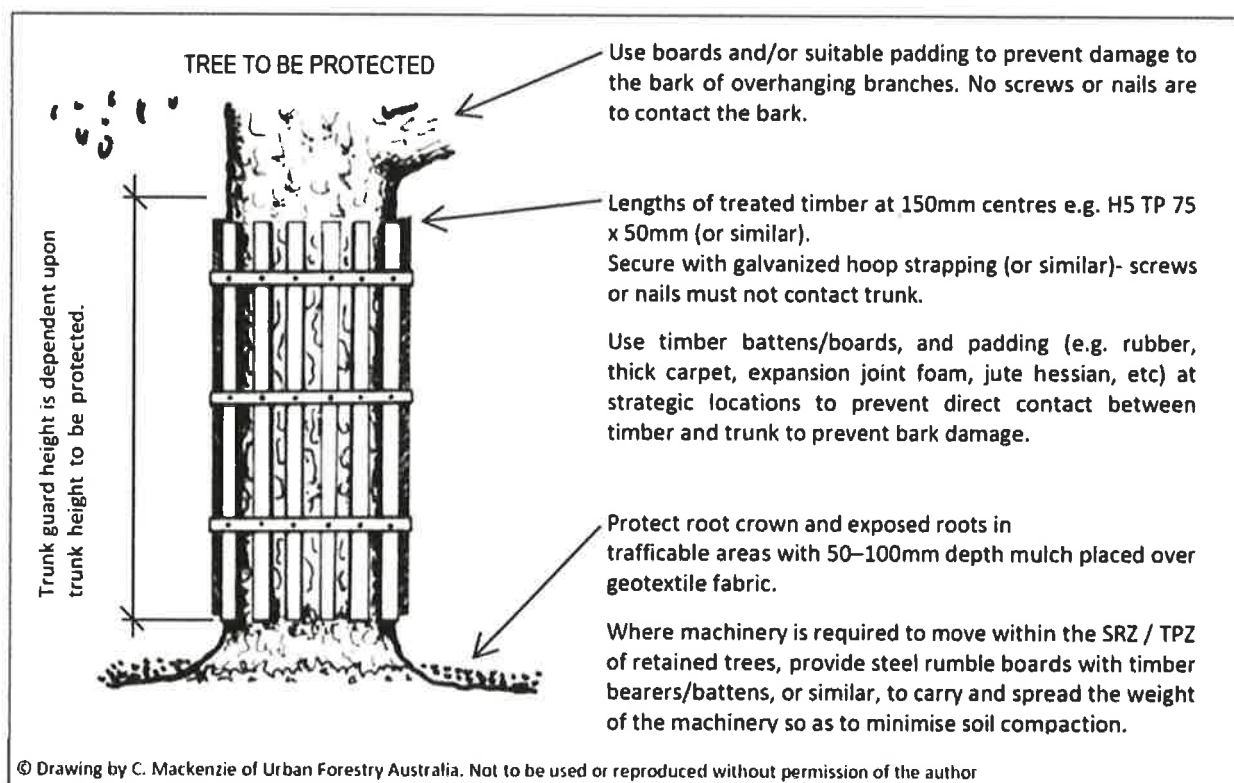


Figure 3

Example of tree trunk and tree branch protection.

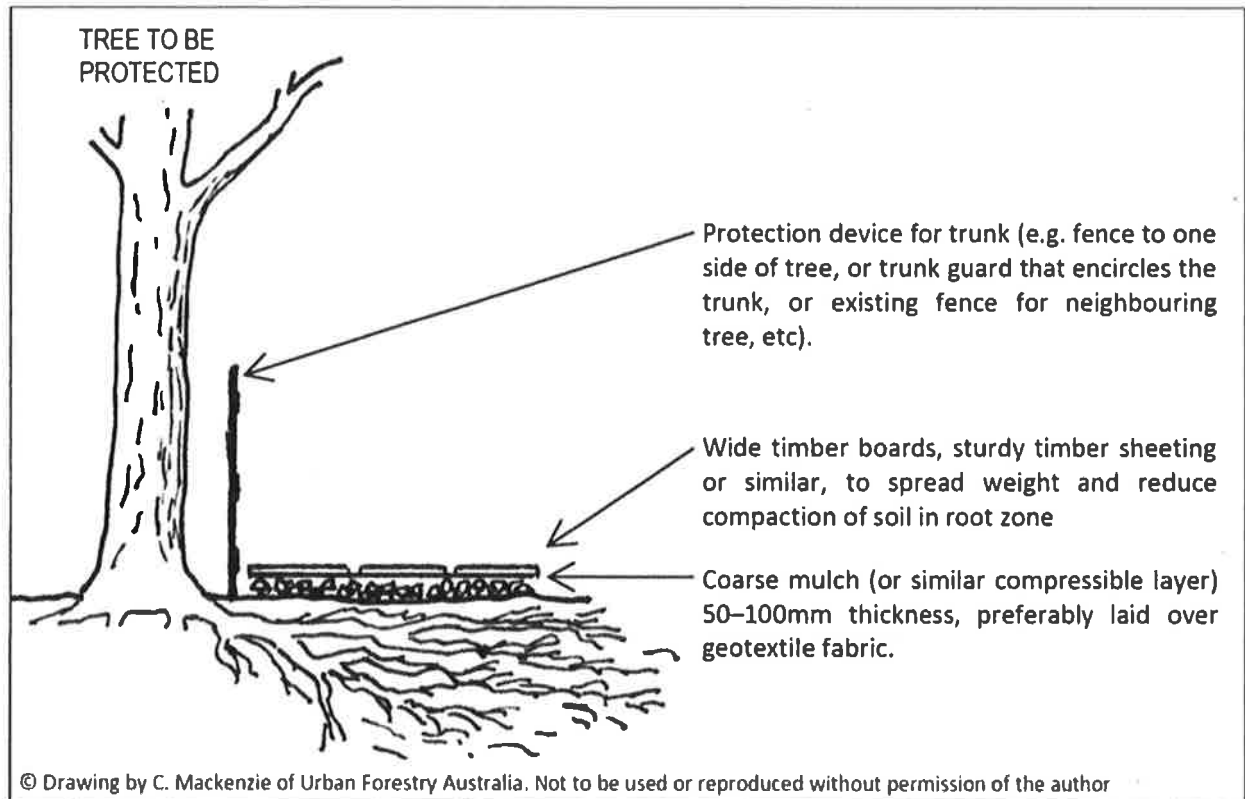


Figure 4

A method of reducing risk of root damage and soil compaction within the tree's Structural Root Zone.



Plate 1

Looking SSW at the tree from Riverview Road.

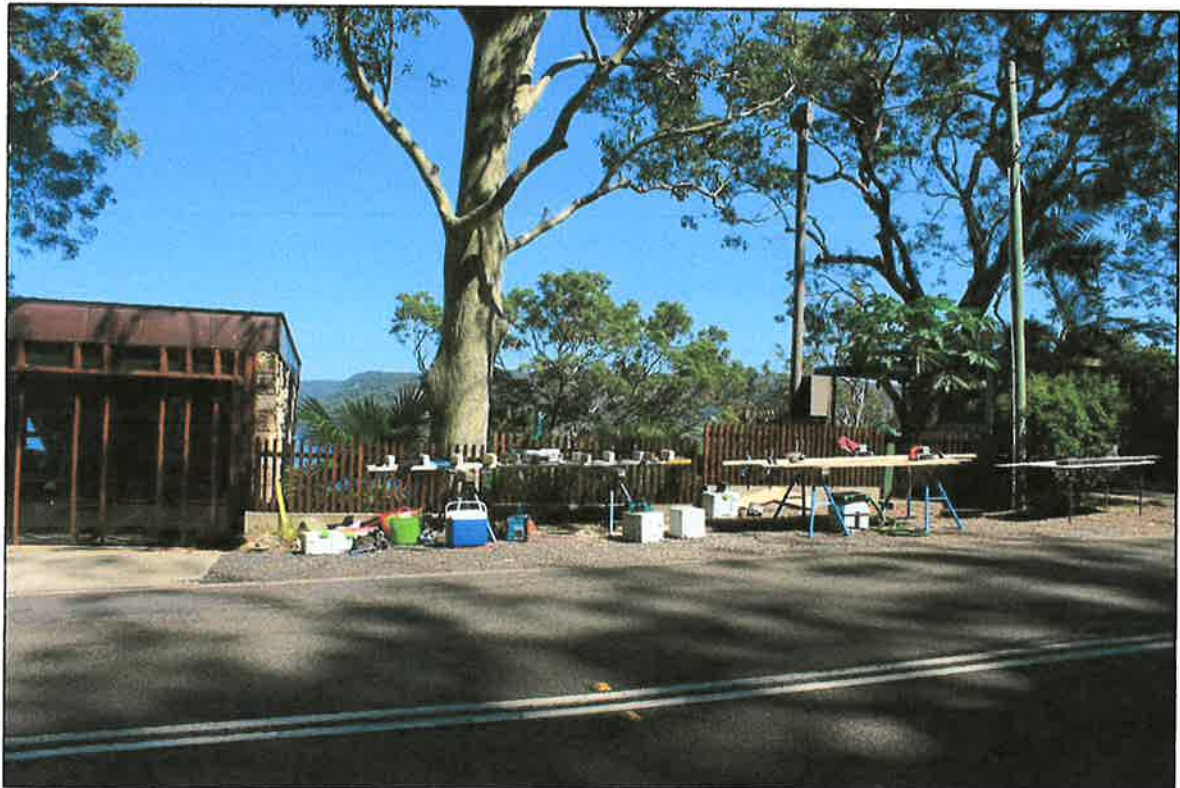


Plate 2

Looking WNW at the tree from Riverview Road.

TREE RETENTION VALUE ASSESSMENT

Part 1 of 3—Useful Life Expectancy (ULE)

In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. ULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner. ULE categories are easily verifiable by experienced personnel without great disparity. A tree's ULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give the life expectancy); then by economics (i.e. cost of maintenance - retaining trees at an excessive management cost is not normally acceptable); and finally, effects on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population). ULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short ULE may at present be making a contribution to the landscape, but their value to the local amenity will decrease rapidly towards the end of this period, prior to them being removed for safety or aesthetic reasons.

ULE categories (modified from Barrell 2001) The five categories and their sub-groups are as follows:

1. **Long ULE** - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - A. structurally sound trees located in positions that can accommodate future growth
 - B. trees which could be made suitable for long term retention by remedial care
 - C. trees of special significance which would warrant extraordinary efforts to secure their long term retention
2. **Medium ULE** - tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - A. trees which may only live from 15 to 40 years
 - B. trees which may live for more than 40 years but would be removed for safety or nuisance reasons
 - C. trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - D. trees which could be made suitable for retention in the medium term by remedial care
3. **Short ULE** - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:
 - A. trees which may only live from 5 to 15 years
 - B. trees which may live for more than 15 years but would be removed for safety or nuisance reasons
 - C. trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - D. trees which require substantial remediation and are only suitable for retention in the short term
4. **Removal** - trees which should be removed within the next 5 years.
 - A. dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
 - B. dangerous trees through instability or recent loss of adjacent trees
 - C. dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
 - D. damaged trees that are clearly not safe to retain.
 - E. trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.
 - F. trees which are damaging or may cause damage to existing structures within the next 5 years.
 - G. trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).
 - H. trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. **Small, young or regularly pruned** - Trees that can be reliably moved or replaced.
 - A. small trees less than 5m in height.
 - B. young trees less than 15 years old but over 5m in height.
 - C. formal hedges and trees intended for regular pruning to artificially control growth

Part 2 of 3—IACA Significance of a Tree, Assessment Rating System (STARS)©

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009. The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

Tree Significance - Assessment Criteria



1. HIGH SIGNIFICANCE IN LANDSCAPE
The tree is in good condition and good vigour
The tree has a form typical for the species
The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
The tree is listed as a Heritage Item, Threatened Species or part of an Endangered Ecological Community, or listed on Councils Significant Tree Register
The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa <i>in situ</i> - tree is appropriate to the site conditions
2. MEDIUM SIGNIFICANCE IN LANDSCAPE
The tree is in fair-good condition and good or low vigour
The tree has a form typical or atypical for the species
The tree is a planted locally indigenous or a common species with its taxa commonly planted in the area
The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street.
The tree provides a fair contribution to the visual character and amenity of the local area.
The tree's growth is moderately restricted by above and/or below ground influences, reducing its ability to reach dimensions typical for the taxa <i>in situ</i> .
3. LOW SIGNIFICANCE IN LANDSCAPE
The tree is in fair-poor condition and good or low vigour
The tree has a form atypical for the species
The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings
The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area.
The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen
The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa <i>in situ</i> - tree is inappropriate to the site conditions
The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
The tree has a wound or defect that has potential to become structurally unsound.
Environmental Pest / Noxious Weed Species
–The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties
–The tree is a declared noxious weed by legislation
Hazardous/Irreversible Decline
–The tree is structurally unsound and/or unstable and is considered potentially dangerous
–The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge. In the development of this document IACA acknowledges the contribution and original concept of the Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd and Andrew Morton in June 2001.

Part 3 of 3—Tree Retention Value Priority Matrix

		SIGNIFICANCE									
		1. High			2. Medium			3. Low			
		Significance in landscape			Significance in landscape			Significance in landscape		Environmental pest / Noxious weed species	Hazardous / Irreversible decline
ESTIMATED LIFE EXPECTANCY	1. Long >40 years										
	2. Medium 15–40 years										
	3. Short <1–15 years										
	Dead										
LEGEND FOR MATRIX ASSESSMENT 											
		Priority for Retention (High) -These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by AS4970 <i>Protection of trees on development sites</i> . Tree sensitive construction measures must be implemented e.g. pier and beam etc. if works are to proceed within the Tree Protection Zone.									
		Consider for Retention (Medium) -These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.									
		Consider for Removal (Low) -These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.									
		Consider for Removal (Low) -These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.									

IACA, 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

REFERENCES

Australia ICOMOS Inc. 1999, *The Burra Charter – The Australian ICOMOS Charter for Places of Cultural Significance*, International Council of Monuments and Sites, www.icomos.org/australia

Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.

Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au

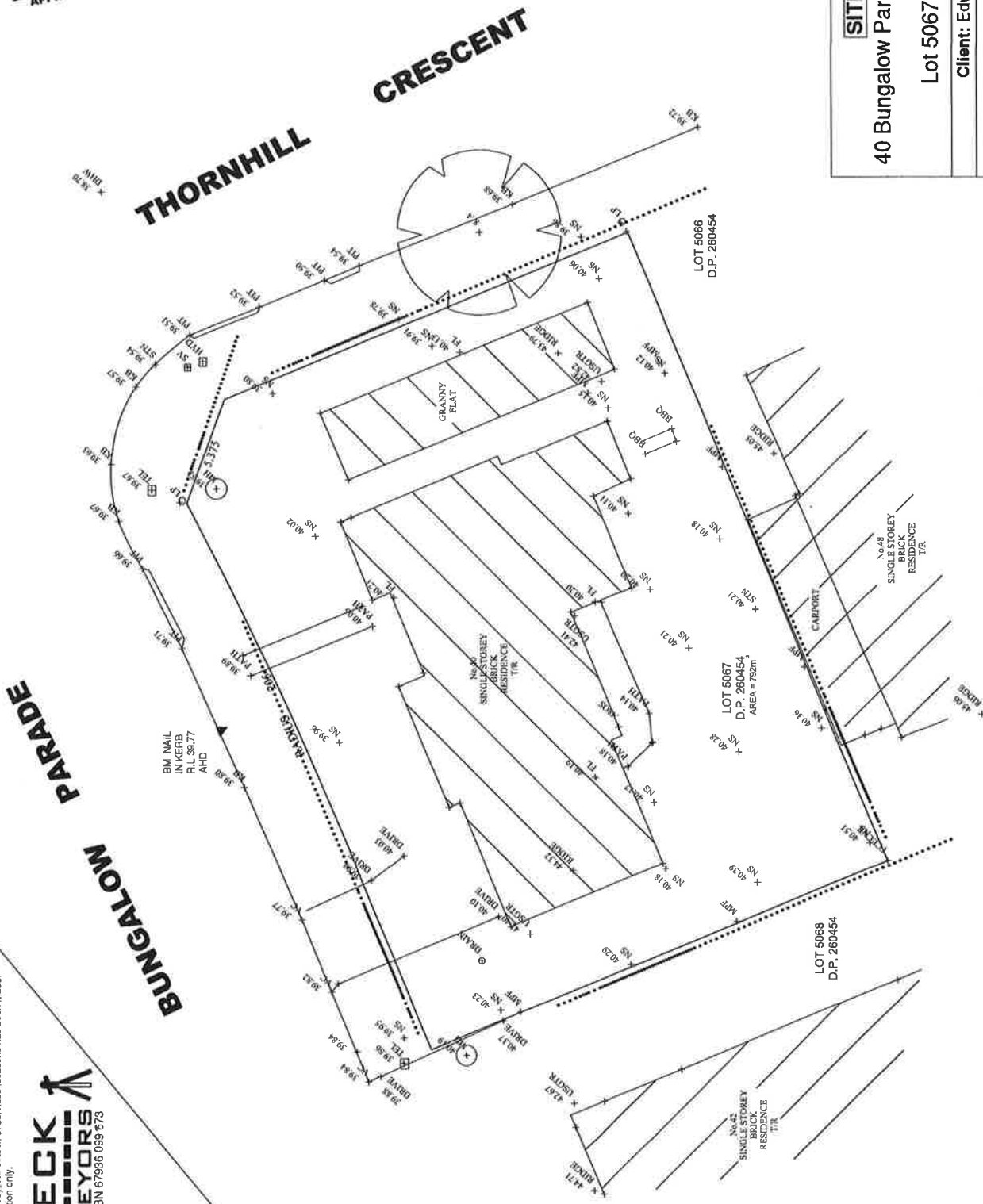
SURVEY PLAN NOTES:

- THE BOUNDARIES HAVE NOT BEEN SURVEYED. The Title boundaries as shown hereon were not marked at the time of survey and have been determined by plan dimensions only and not by field survey.
- DO NOT SCALE OFF THIS PLAN.
- Services shown are as noted by field survey. No search of services locations has been made.
- Heights at spot levels shown are an approximation only.

SURVHECK
SURVEYORS
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MN



SITE LOCATION

40 Bungalow Parade, Werrington Downs

at

Lot 5067 in D.P. 260454

Client: Edward Thomas

PLAN SHOWING SITE FEATURES AND LEVELS
FOR BUILDING DESIGN PURPOSES

Origin: SSM 44956(R.L. 40.24)	Datum: A.H.D.	Surveyed: LW/LW
Date: 22nd July 2015	Ref: 4328D	Scale: 1:100 @ A1



CAUTION: • The location of walls and detail points in relation to boundaries is approximate only!