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1B BOLINGBROKE PARADE

FAIRLIGHT, NSW

MANLY BOATSHED REDEVELOPMENT PROPOSAL

ARBORICULTURAL IMPACT ASSESSMENT REPORT

Report Ref No- RTC-2120

Prepared for

Manly Boatshed

C/- Robbie Treharne

1B Bolingbroke Parade

FAIRLIGHT, NSW

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Prepared by

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INTRODUCTION

This report has been commissioned by Mr. Robbie Treharne 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 the redevelopment of Many Boatshed situated within Lot 2699 of DP 752038 known as 1B Bolingbroke Parade, FAIRLIGHT NSW.

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

Within a notional tree radius development encroachments and occupancy within tree protection zones 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 exists 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 tree 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 C and D.

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 consultation and limited ground level Visual Tree Assessment (VTA) was conducted on Friday 30th November 2018 with an additional walk by inspection conducted 13th December 2019 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 basic risk values determined by criteria explained within the ISA Tree Risk Assessment Qualification (TRAQ) manual 2013. The inspection included assessment of the overall health and vigour of the 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- B.
- ii The inspection was limited to a visual assessment from within the subject sites where the retention value, condition and diameters of neighbouring trees was estimated. 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). The height of palms was taken from ground level to the top of the crown shaft only, and excludes the central apical spear projection, with the Tree Protection Zone (TPZ) determined as 1m outside the canopy projection.
- iii This report acknowledges the current Australian Standards 'Protection of Trees on Development Sites' AS 4970 – 2009 as explained within Notes of Appendix- A. 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- A Notes: *acceptable incursions*. As a guide to determining impacts the Structural Root Zone (SRZ) & Tree Protection Zone (TPZ) setbacks have been provided within Appendix- C the SRZ & TPZ distance column.

Unless specified otherwise all distances and development offsets within this report are taken from the centre of the tree.
- iv Plans and documentation received to assist in preparation of this report include:
Ken Down Architects project No. 170046 *specific to*:
 - Plotted Trees Dwg No. DA-01-11_B dated 3.12.2019
 - Site Plan Dwg No. DA01-02_L dated 29.11.2019
 - Proposed Elevations Dwg No. DA04-02_L dated 29.11.2019LTS Lockley
 - Survey Plan ref No. 50504 001DT dated 12.10.2018

1. SUMMARY OF ASSESSMENT

1.1 General tree assessment

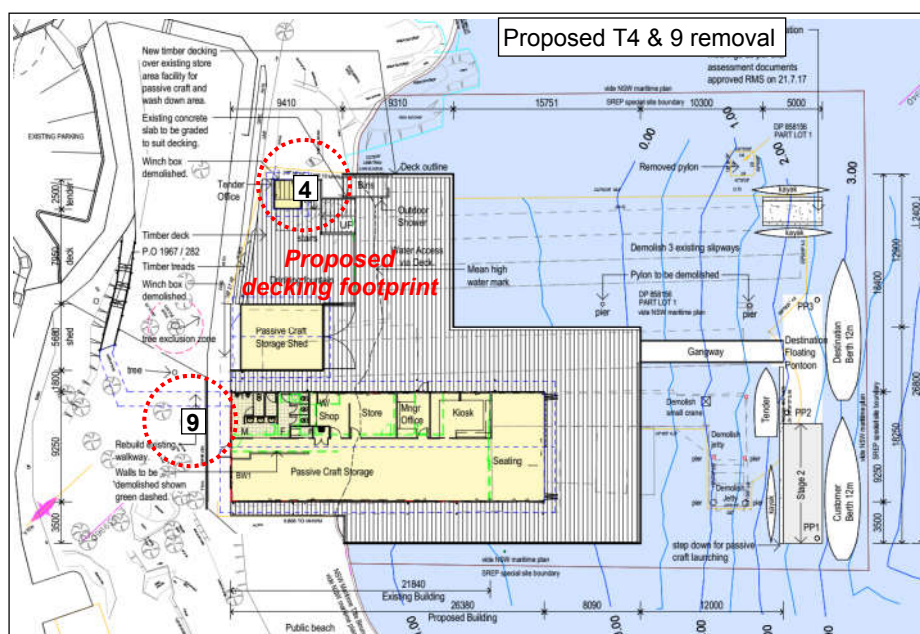
- 1.1.1 Ten (10) trees and/or palms have been assessed under this development proposal with nine (9) of the ten trees located outside of the property boundary.

Tree 4 located within the boundary requires removal to accommodate design consisting of new bin loading bay, outdoor shower and associated decking.

Undesirable Coco's palm T9 located within the adjoining reserve has been requested for removal to eliminate nuisance and invasive exotic palm colonization within the reserve area.

Remaining trees & palms are viable for retention with development mostly located on the footprint of existing structures or site facility operational use open space areas.

Figure 1, proposed development footprint & tree removal plan

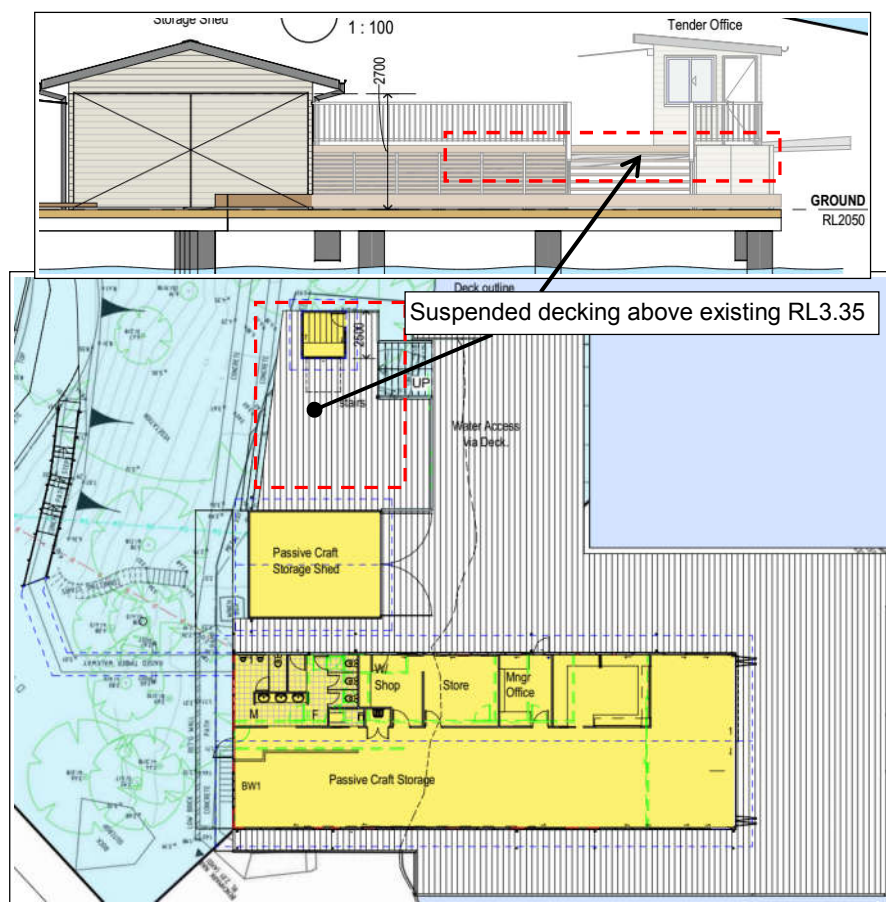


1.2 Discussions of development impacts

- 1.2.1 Within the boundary limits new works primarily consist of suspended decking supported by pier and beam construction spanning from an existing driveway. Being suspended above ground the tree protection zone coverage adjacent surrounding trees is likely to be minor having low to negligible root zone impact on trees 3 & 5. As a guide for minimising development impacts during works the following recommendations are provided:
- i. *Trunk & tree protection.* Prior to works commencing the trunk of tree 5 is to be protected with 2m high timber beam trunk protection with tree protection fencing to be installed adjacent tree 3, to mitigate the potential for trunk damages during works and vehicle access.

- ii. *Canopy pruning.* The pruning of low extending limbs above the driveway access may be required, where material delivery vehicle heights are to be provided to determine extent of pruning to achieve appropriate clearances.
- iii. *Excavation activities.* Trees 3 & 5; there is to be no excavation within SRZ setbacks as indicated within Appendix- C, the SRZ & TPZ distance column. Should excavations be required within the SRZ further advice from an appointed project arborist is required prior to works commencing. Where minor cut may be required to accommodate timber tread access to decking works within the TPZ are to be supervised by an appointed site arborist.
- iv. Where additional demolition or excavation is required for modification of works, all works are to be supervised by an appointed project arborist within designated TPZ areas

Figure 2, showing proposed suspended structure areas



2. CONCLUSIONS & RECOMMENDATION

2.1 Tree Removal

- 2.1.1 With the consent of Council under the current proposal the removal of two (2) trees T4 & 9 are required or recommended to accommodate design.

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 during works:

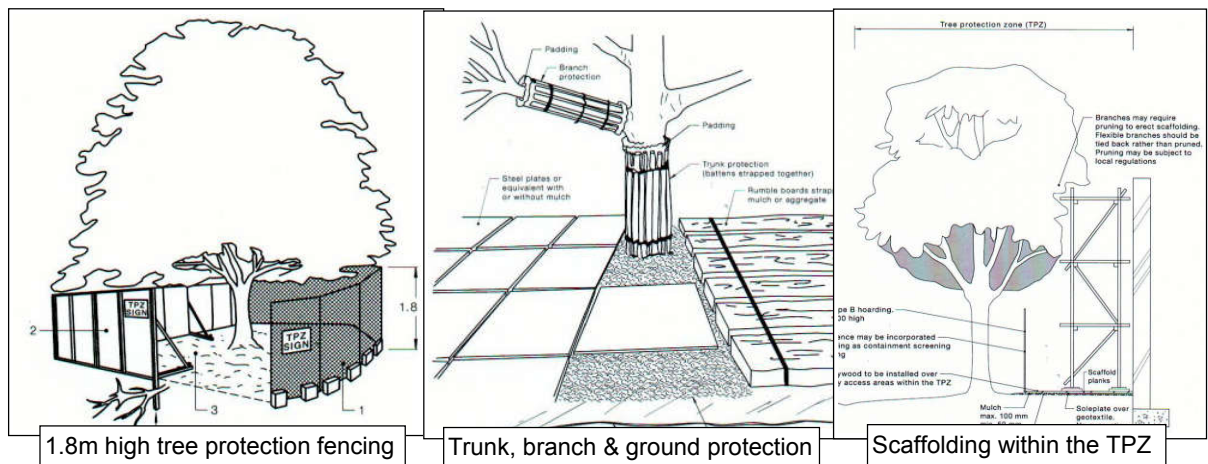
Specific recommendations

1. Trees 3 & 5. The trees require trunk or tree protection fencing to be installed prior to works commencing. No excavation is to occur within SRZ setbacks, with minor excavation within tree protection zones ensuring no tree root at or >30mm(Ø) is cut without prior site arborist advice. No continuous trench excavation should occur with the TPZ unless approved, supervised and certified by an appointed site arborist.

General requirements

2. In accordance with AS4970 - 2009 (1.4.4) a site arborist is to be engaged to monitor, supervise excavation within TPZ setbacks, advise on tree protection methodology and provide certification of protection works conducted. The site 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 project or site 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. Where required tree protection fencing and/or zones are to be installed prior to development works occurring. Unless specified otherwise within this report the extent of tree protection fencing is to be located at the extremity of Tree Protection Zone (TPZ) radiuses, or constructed under the guidance and certification of an appointed project arborist. Excluding specific recommendations where design constraints exists other tree protection measure such as scaffolding within the TPZ, ground and timber beam trunk protection may be incorporated forming part of a tree protection area.

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



5. The project 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) or Zones (Z) to be compliant with AS4970 Section 4.5 *Other Tree Protection Measures*.
6. **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 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 1 to ensure trees are appropriately managed in accordance with this report and Australian Standard AS4970 – 2009 Protection of Trees on Development Sites.

Table 1, certification requirements & hold points

1	Pre-construction	Prior to works install tree protection fencing & zones as specified within this report or as directed and certified by the appointed project arborist
2	During construction	Project arborist to supervise & certify approved major excavation works within TPZ's
3	Post construction	Prior to handover project arborist to provide final inspection & certification of tree health & vitality

7. 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.

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).
 9. *Additional inground services within TPZ's* 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.
 10. 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 6/2024
Member: ISA, Arboriculture Australia & IACA, Working With Children No: WWC0144637E



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APPENDIX- A: 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.'

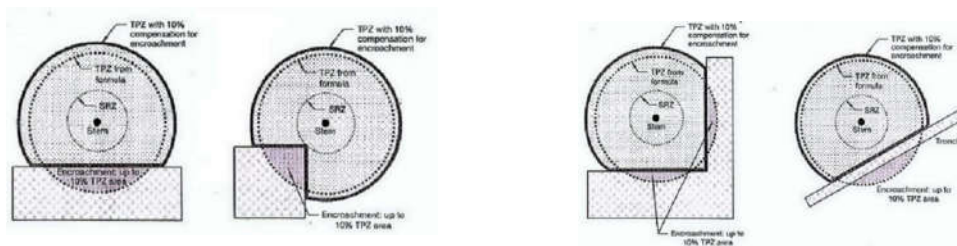
Age classes: (I) Immature refers to a well established but juvenile tree. (ESM) refers to an early semi mature tree not of juvenile appearance. (SM) Semi-mature refers to a tree at growth stages advancing into maturity and full size. (LSM) Late Semi-Mature, refers to a tree between semi-mature and close 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. (LM) Late mature refers to a tree entering into over maturity (OM) and likely first stages of senescence. **Health:** Refers to a tree's 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. **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.
- Georges River Council. <https://www.georgesriver.nsw.gov.au/Environment/Trees-and-Biodiversity/Tree-Management>

APPENDIX- B: Tree Retention Value Checklist ©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 likely compromise tree, trees may be contained within a vault having restricted root development / anchorage
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 and/or drill penetrating or Picos Sonic Tomograph ultrasound 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 average or 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- C: 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	<i>Casuarina glauca</i> She Oak	15 x 11	350	2.3m 4.2	ESM	Good	Fair / Good	3	2C/B	2	2	Trunk wound at 1.6m NE with good wound wood development, minor stem inclusion development in upper branch scaffolds evident
2	<i>Ficus rubiginosa</i> Port Jackson Fig	9 x 13	750at base	2.8 9	ESM	Fair / Poor	Fair / Good	2	4/2B	2	2	Slightly environmentally stressed with decline in canopy, multi stemmed at base with part stem inclusion development
3	<i>Hibiscus tiliaceus</i> Tree Hibiscus	8 x 10	300	2.1 3.6	EM	Fair / Good	Fair / Good	3	2C/A	2	2	Moderate lean SE with potential poor surface anchoring root development, damaged limb in upper branch scaffold
4	<i>Glochidion ferdinandi</i> Cheese Tree	10 x 8	450	2.4 5.4	EM	Fair / Good	Fair / Good	2	2C	2	2	Suppressed canopy form S, minor wound NE side
5	<i>Platanus x acerfolia</i> London Plane Tree	24 x 24	850	3.1 10.2	EM	Good	Fair / Good	2	2C	2	2	Minor wound & potential cavity 7m SW with no significant defects noted
6	<i>Livistona australis</i> Cabbage Palm	6 x 4	200	- 3	ESM	Good	Fair / Good	2	7	1	2	Restricted VTA above ground visual parts appear in good order
7	<i>Livistona australis</i> Cabbage Palm	4 x 5	350	- 3.5	ESM	Good	Fair / Good	2	2C	2	2	Bowing lean W – with no significant visual faults
8	<i>Livistona australis</i> Cabbage Palm	5 x 4	350	- 3	ESM	Good	Good	2	6	1	2	Palm with no significant defects noted
9	<i>Syagrus romanzoffiana</i> Cocos Palm	10 x 7	350	- 4.5	ESM	Good	Good	5	6	1	2	Undesirable palm species with no significant defects noted
10	<i>Livistona australis</i> Cabbage Palm	15 x 3	350	- 2.5	M	Fair / Good	Good	2	6	1	2	Palm with no significant defects noted

