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12 December 2018

56 CRESCENT ROAD

NEWPORT, NSW

ARBORICULTURAL ASSESSMENT & DEVELOPMENT IMPACT REPORT

Report Ref No- RTC-19618

Prepared for

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INTRODUCTION

This report has been commissioned by Josh & Rebecca Lisle 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 additions and alterations to the existing dwelling with provision for a new swimming pool and associated infrastructure within the property identified as Lot 37L in DP 402192 known as 56 Crescent Road NEWPORT, NSW.

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

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 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.

METHODOLOGY

i In preparation for this report a limited site and ground level Visual Tree Assessment (VTA) was conducted on Monday 3rd December 2018 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 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, Appendix- B.

ii The inspection was limited to a visual assessment from within the subject site 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).

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- A. Unless specified otherwise all distances and development offsets within this report are taken from the centre of the tree.

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.

iv 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.

v Plans and/or documentation received to assist in preparation of this assessment include:

Network Design, Dwg No. 06-18-CRE

- Lower Ground Floor Plan Sheet 1, issue DA dated June 2018
- Upper Ground Floor Plan Sheet 2, issue DA dated June 2018
- South & East Elevations Sheet 4, issue DA dated June 2018
- North & West Elevations Sheet 5, issue DA dated June 2018
- Section Sheet 6, issue DA dated June 2018
- Site Plan Sheet 7, issue DA dated June 2018

DP Surveying

- Survey Plan ref No: 3060 dated 13.11.2017

1. SUMMARY OF ASSESSMENT

1.1 General assessment

1.1.1 Under this development proposal three (3) trees have been assessed which are located adjacent new development activities. Of the three trees T1 is a Council verge tree with all trees determined as being viable for retention displaying no significant defects.

1.1.2 No trees are proposed to be removed to accommodate design with onsite project arborist supervision recommended during excavation activities. Tree protection zones are recommended to be installed prior to works commencing with the Structural Root Zone (SRZ) setback to be considered a development exclusion area. Prior to works occurring within Tree Protection Zones (TPZ) the appointed project arborist is to be consulted, and where required supervise excavations to appropriately treat encountered tree roots.

Table 1 below provides SRZ exclusion areas & TPZ protection radius

Table 1: SRZ & TPZ setbacks

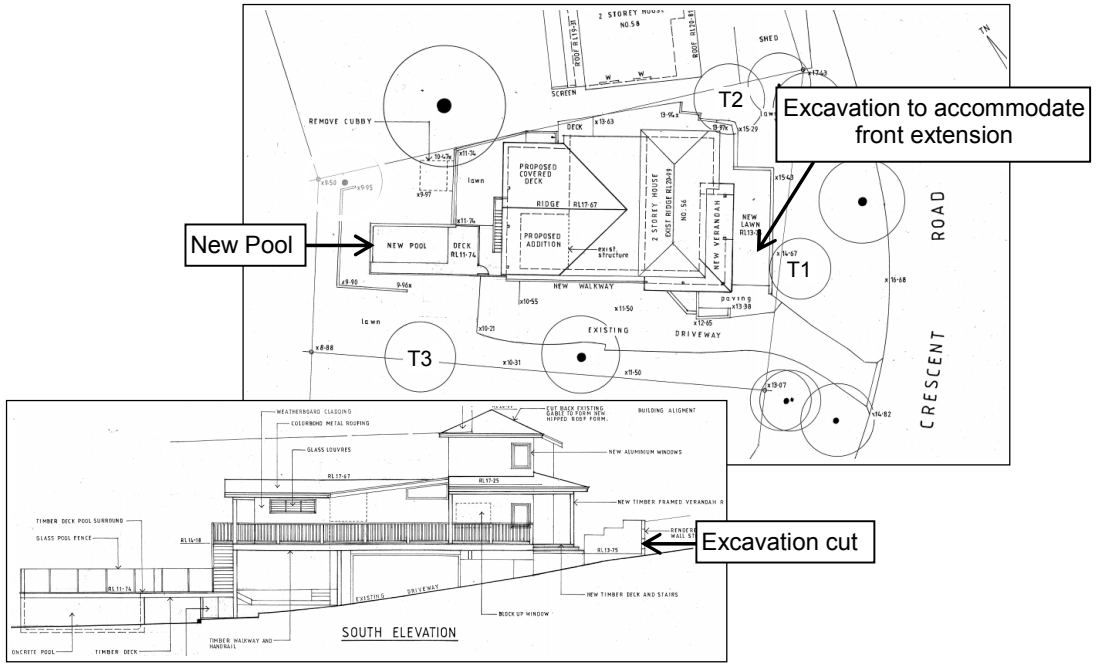
Tree	SRZ(m)	TPZ(m)
1	2.4	4.8
2	2.5	5.4
3	2.7	7.2

NOTE: all setbacks are radiuses are taken from the centre of the tree

1.2 The development proposal

1.2.1 The development proposal consist of additions and alterations to the existing dwelling with excavation to accommodate a new retaining wall cut and rear yard swimming pool.

Figure 1, showing proposed development footprint

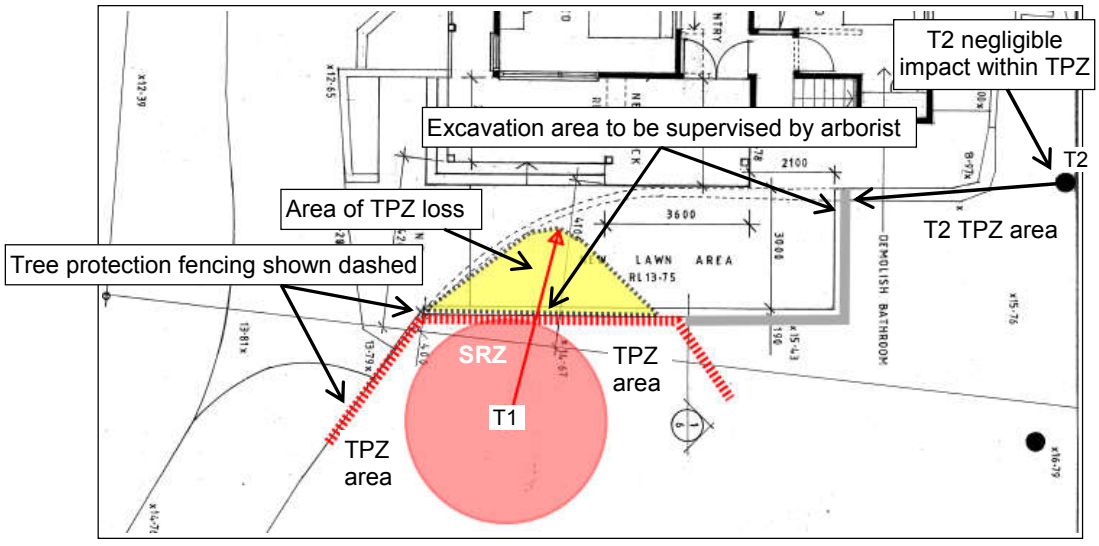


1.3 Discussion of development impacts

1.3.1 Tree 1. Proposed works adjacent the tree consist of excavating a cut face to accommodate a new entry access area, verandah and timber decking. Works are located just outside of the 2.4m SRZ with the overall encroachment within the TPZ considered a Medium level (<20%) of encroachment within the tree protection zone (TPZ). The level of impact is considered manageable as the TPZ is not radial due to the existing cut within the notional TPZ and recent loss of an adjacent tree which has reduced soil moisture competition. To ensure the tree is adequately managed the following recommendations are provided as a guide for the minimising of impacts during work activities:

1. Given the height of the tree there is to be no excavation within 2.6m from the tree to accommodate the proposed block retaining wall.
2. Prior to works occurring Tree Protection Fencing (TPF) is to be installed and certified by an appointed project arborist as indicated within Figure 2 below. The fenced area is to be considered a tree protection zone where development access is to be restricted.
3. The extent of excavation within the TPZ is to be supervised by the site project arborist with manual (hand) excavation occurring to a depth of 0.7m (700mm) to ensure all encountered tree roots are appropriately clean cut. Mechanical excavation should then occur to achieve the required RL.
4. The extent of the cut face within the 4.8m TPZ is to be covered with jut-mesh, geotextile fabric or similar product to avoid exposure and drying of the soil profile and root system.
5. Given the cut location adjacent the SRZ and soil loss, the TPZ radius is recommended to be mulched with native leaf mulch and routinely watered to retain soil moisture content and reduce stress during development activities.
6. The site project arborist is to provide certification of tree protection methodology including evidence of appropriate root pruning and photographs of works conducted.

Figure 2, showing proposed works adjacent T1 & 2, *not to scale*



1.3.2 Tree 2. Proposed works adjacent the tree consist of excavating a cut face to accommodate a block retaining wall at near 5.2m from the tree. The encroachment within the 5.4m TPZ is considered negligible to low impact (<10%) with the following recommendations provided to ensure the tree is adequately protected during work activities.

1. There should be no excavation within 5m of the tree to accommodate the block retaining wall as shown within construction drawings.
2. As in tree 1 protection methodology the excavation cut is to be supervised and certified by the site project arborist appropriately treating all encountered tree roots. Given the setback of the excavation line mechanical excavation under the supervision of the arborist is permitted to achieve the required RL.
3. Prior to works occurring timber beam trunk protection is to be installed with the remaining upper natural ground level at RL15.29+ to be considered a Tree Protection Zone (TPZ). No long term storage of building materials should occur within the 5.4m TPZ without prior arborist advice.

1.3.3 Tree 3. Proposed works adjacent the tree consist of excavation to accommodate the new swimming pool with the line of cut located outside of the 7.2m tree protection zone. That which may affect underlying tree roots is constant traffic and disturbance during construction activities. In order to adequately protect the tree the following general recommendations are provided:

1. Prior to works occurring tree protection fencing is recommended to be installed at a 3.5m radius from the tree, primarily protecting the 2.7m SRZ. Should the tree protection fencing restrict development activities alternate tree protection methodology may be applied under the guidance and certification of the appointed project arborist. Alternate protection may include timber beam trunk and ground protection, with designated vehicle tracks during earthworks.
2. The SRZ is to be considered a development access and work exclusion zone.

1.3.4 Remaining trees located along the driveway access handle are protected by default having a hard surface driveway over tree protection areas. Timber beam trunk protection is recommended to be installed to avoid potentail vehicle impacts that may occurring during earthworks and general construction activities.

2. CONCLUSIONS & RECOMMENDATION

2.1 Tree Removal

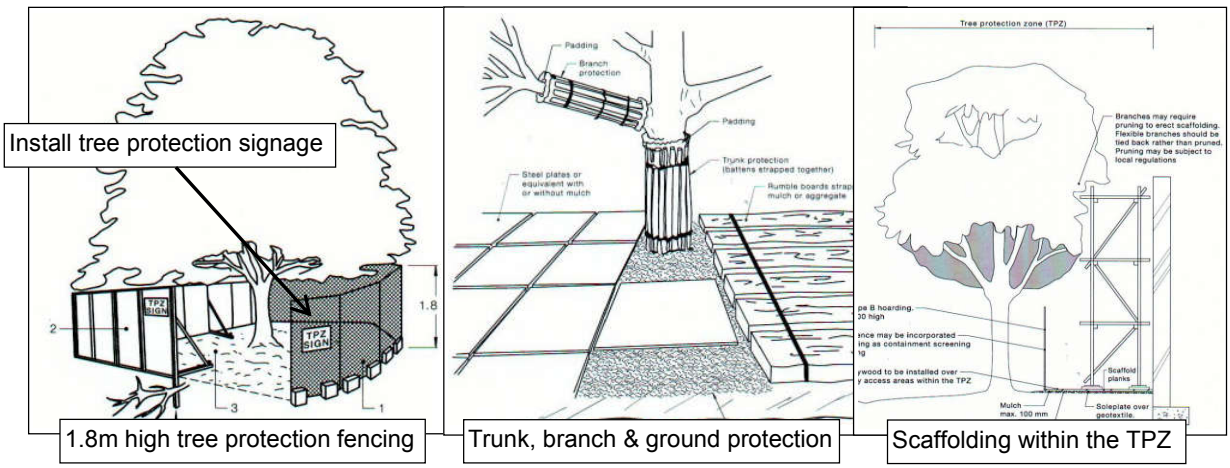
2.1.1 No trees are proposed for removal under the current development proposal.

2.2 Recommended tree management & protection principles

2.2.1 In addition to the recommendations provided within this report the following summary and/or additional recommendations are provided as a guide to tree protection during works:

1. *Specific* – Council verge tree T1. The tree is to be adequately protected with tree protection fencing prior to works occurring. All excavations are to be supervised by an appointed project arborist with manual (hand) excavation to a depth of 700mm along the line of cut to avoid mechanical ripping of roots beyond the cut face. The cut face is to be protected with geotextile fabric or similar to avoid drying of the soil profile with the remaining tree protection zone covered with native leaf mulch and routinely watered - refer protection methodology as stated within Section 1.3.1 p6.
2. *Trees to be retained* – general. Tree protection fencing and/or zones are to be installed prior to development works occurring. 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. Where design constraints exists other tree protection measure such as ground and timber beam trunk protection may be incorporated into the tree protection design.
3. Unless specified otherwise within this report in accordance with AS4970 - 2009 (1.4.4) a Project Arborist is to be engaged to monitor, supervise excavation within TPZ setbacks, advise and provide certification of protection works conducted. The project 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. The project 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*).

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



4. ***Hold points***: Hold points specific to *no works are to commence without arborist advice, inspections & certifications*. It is the responsibility of the principle contractor to complete each task identified and hold point items for Principal Certifying Authority (PCA) compliance purposes.

Table 2, certification requirements & hold points

1	Pre-construction works	Prior to works engage a project arborist for ongoing advice and site supervision
		Install tree protection fencing or zones around trees to be retained
2	During construction	Schedule project arborist for supervision during excavation within TPZ setbacks
		At completion of major construction activities arborist to approve protection fence removal
3	Post construction	Prior to handover project arborist to provide final inspection & certification of tree condition

4a ***Hold point 1 specific***. No construction works are to commence without tree protection fencing and/or zones being in place and certified by the project arborist.

4b ***Hold point 2***. There is to be no access, excavation or soil disturbance within SRZ setbacks (the area required for tree stability AS4970) without prior project arborist advice and direct on site supervision, refer SRZ & TPZ setback distance column Appendix- C.

4c ***Hold point 3***. No open trench excavation for in ground services are to occur within Tree Protection Zones (TPZ) without prior arborist advice and/or site supervision. Works within TPZ setbacks are to be supervised and certified by the project arborist.

5. During approved excavation activities within TPZ setbacks the pruning of roots is to be conducted by an appointed arborist 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.

6. *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).

7. *Additional inground services within TPZ's* which may include 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.

8. To ensure trees 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.
9. Should there be any uncertainty in tree protection requirements the appointed arborist is to be consulted prior to work activities commencing.

Should you require further liaisons in this matter please contact me direct on 0419 250 248

Yours sincerely

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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 6/2014
Member: Arboriculture Australia No.1292, Working With Children No: WWC01446

APPENDICES

APPENDIX- A: Terminology & references

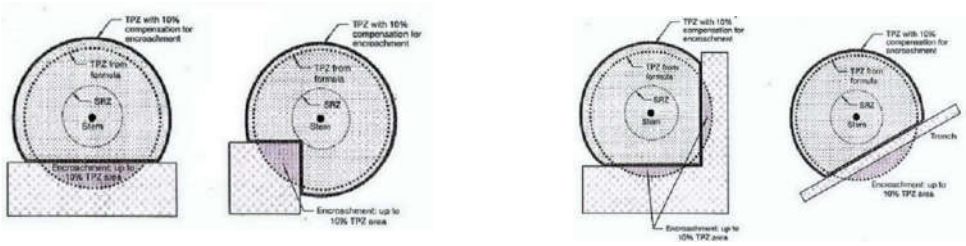
Acceptable Risk: Exposure to or reject risk of varying degrees. The acceptable risk is defined as '*The person who accepts some degree of risk in return for a benefit being exposed to some risk of varying degree*.
Age classes: (I) Immature refers to a well established but juvenile tree. (ESM) refers 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 week 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.

NOTES:

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.

The extent of inclusion within the TPZ radius has been categorised as follows:
<10% = negligible incursion / >10 - <15% = low to moderate level of incursion / >15 - <20% = moderate level of incursion / >20 - <25% = moderate to high level of incursion / >25 - <35% = high level of incursion, >35% = significant inclusion within the TPZ

Showing acceptable incursion within the TPZ (AS4970)



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Barrell J. 1993, 'Preplanning Tree Surveys: Safe useful Life expectancy (SULE) is the Natural Progression", Arboricultural Journal 17: 1, February 1993, pp. 33-46.
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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.

APPENDIX- B: 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

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
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 Picus 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 or 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 at the base or main 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 fee 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 condition.

1	High retention	2	Medium retention	3	Low retention	4	Consider removal

iv) U.L.E. categories Useful Life Expectancy (after *Barrell* 1996, modified by the author). A trees 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 to15 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**	**Signifi-cance**	**VTA**	**RV**	**U. L.E.**	**Comments** CV = Council verge tree NT= Neighbouring tree
1 CV	*Syncarpia glomulifera* Turpentine	17 x 9	400	2.4m / 4.8	ESM	Good	Fair / Good	2	2C	2	2	Tree of tall forest form, canopy apical with lower trunk reaction wood development likely from loading pressure during bending stress, base with minor wound EST side – appears not immediately detrimental.
2	*Syncarpia glomulifera* Turpentine	13 x 10	450	2.5 / 5.4	ESM	Good	Good	2	2C	2	2	Multi stemmed at 2.2m, tree with Slightly low foliage volume and with no significant defects evident
3	*Syncarpia glomulifera* Turpentine	18 x 13	600	2.7 / 7.2	ESM	Good	Fair	2	2D	2	3	EST side main twin stem failure modifying tree form – appears not immediately detrimental, remaining upper branch parts with no

APPENDIX- D: Tree Location Plan