Arboricultural Assessment

50 Walder Rd, Hammondville

Prepared for Liverpool City Council, C/- TreeServe Pty Ltd.
785-811 Wallgrove Road, Horsley Park
NSW 2175

Prepared By Isaac Dale on March 03rd, 2024

REF: 20240303/01

Document Information

Report Title:	50 Walder Rd, Hammondville – AA20240303/01
Report Type:	Arboricultural Assessment (AA)
Author:	Isaac Dale Diploma of Arboriculture (AQF Level 05) Arboriculture Australia Registered Consulting Arborist No.13601
Contact Details:	0459 555 498 info@conceptarborconsulting.com.au

Document Status	**Date**	**Description**
Final V1.0	03/03/2024	Final version

Disclaimer

1.0 Scope

1.0.1 Concept Arbor Consulting was engaged by Liverpool City Council, C/- TreeServe Pty Ltd, to provide an arboricultural assessment of one (1) tree on the council road reserve at the intersection of Walder Rd & Norman Ave, Hammondville, NSW 2170.

1.0.2 The works were to include an assessment of the tree's health & condition, aerial inspection, and with the information available provide a reasoned determination of risk.

2.0 Method

2.0.1 All tree data contained within this report is based on observations by the author, obtained during the site inspection conducted on February 24th, 2024. The subject tree was inspected visually (VTA[1]) from ground level and an aerial inspection of the cavities, failure location and main branch junctions was conducted utilising an elevated work platform (EWP).

2.0.2 Information in this report is limited to the subject tree and reflects its condition at the time of inspection only. No invasive or diagnostic testing was undertaken.

2.0.3 Tree height was measured using a Nikon Forestry Pro 2; canopy spread is visually estimated. Trunk diameter was measured at breast height (DBH), which is defined as 1.4m above ground level or 1.4m from the uphill side of a slope. Setbacks were measured using a Bosch GLM 50-27 CG Professional laser. Tree location was surveyed using a mobile data collection application & its position is plotted on an aerial image (Metromap), listed below as figure 01.

2.0.4 The identification of genus and species is based on broad features, visible at the time of inspection only and has not been compared to an herbarium specimen.

2.0.5 The Quantified Tree Risk Assessment (QTRA – Version 5.3.7) has been used to assess and provide a numerical estimate of risk.

2.1 Legislation & regulations

2.1.1 In preparation of this arboricultural assessment, the following regulatory documentation has been considered:

- *Liverpool Local Environmental Plan 2008* (LLEP 2008).
- *Liverpool Development Control Plan 2008* (LDCP 2008).
- Liverpool Tree Management Policy, October 2016.
- *State Environmental Planning Policy (Biodiversity and Conservation)* 2021.
- *Biodiversity Conservation Act* 2016.
- *Environment Protection Biodiversity Conservation* Act 1999.

[1] **VTA** is a commonly used method of assessing trees, it is accepted by the ISA (International Society of Arboriculture) and is described by Claus Mattheck in *The body language of trees - A handbook for failure analysis* (1994). Pages 144-145. The Stationary Office. London.

2.2 Tree preservation order

2.2.1 Liverpool Local Environmental Plan 2008 facilitates preparation of DCP provisions outlining provisions and requirements relating to Preservation of Trees or Vegetation.

2.2.2 The provisions of LLEP 2008 rely on definitions contained within the LDCP 2008. The Liverpool Development Control Plan 2008, amendment 36, February 2021, part 01 General Controls for all developments, section 02 Tree Preservation applies the following definitions:

"Tree" means:

a) Any perennial plant that has a:
- Height greater than 3.5m and/or
- Canopy spread of greater than 4m and/or
- Primary trunk diameter greater than 400mm when measured 1m above the existing ground level of the tree.

b) Any tree that forms part of a heritage item or is situated within a heritage conservation area.

3.0 Observations

3.0.1 The subject site is the council road reserve/nature strip fronting 50 Walder Rd, Hammondville; legally defined as lot 2 DP841598. Lot 2 is zoned CA – Complex Area and E1 – Local Centre, pursuant to Liverpool Local Environmental Plan 2008, map amendment No.6. The site is not listed as heritage or environmentally sensitive, refer to figures 02 & 03.

3.0.2 The site vegetation is comprised of a single Eucalypt located on the corner of Walder Rd & Norman Ave. For the purpose of this document it shall be referred to as the subject tree, its details are outlined in the tree schedule, listed below as table 01.

3.0.3 The tree assessment, including aerial inspection, was undertaken on the morning of Saturday, February 24th, 2024. The weather was light rain; a consistent traffic & pedestrian volume was noted on Walder Rd and utilising the shops adjacent. Powerlines beneath the canopy, two (2) pedestrian paths (one either side of Walder Rd) and a public school on the northern side of Walder Rd were also noted.

3.0.4 The subject tree is a mature specimen of *Eucalyptus bosistoana*, health is seemingly good. There is recent failure of a first order lateral on the southern side, cockatoo damage and minor decay were noted in this location. The author is unaware when the failure occurred. Most branch junctions contain cavities, and some cavities have developed on the upper side of branches. Of greatest concern was the cavity in the main junction of the northern leader, it measured approximately 420mm x 200mm; there is a crack on the tension side of the northern first order lateral and limited response growth is forming below this junction.

3.0.5 Minor dead wood (>50mm in diameter) is retained throughout the canopy. Sulphur-crested cockatoos (*Cacatua galerita*) and Rainbow lorikeets (*Trichoglossus moluccanus*) were roosting in the subject tree at the time of inspection, although no nests were observed in any of the hollows.

Figure 01: Tree location. Source: *Metromap, November 2023. CAC Data Overlay 03/03/24*.

Table 01: Tree schedule.

H D	Hazard tree / unacceptable risk (H) or dead tree (D).											
Tree No.	***Botanical Name*** COMMON NAME	**Height x spread (m)**	**DBH (mm)**	**ØRF (mm)**	**TPZ (m)** / **SRZ (m)**	**Age**	**Health**	**Form**	**Distance from boundary**	**U.L.E.**	**Priority to retain or remove** Consider removal	Viable for retention
01	*Eucalyptus bosistoana* **Coast grey box**	17 x 25	1330	N/A	15.0 / N/A	M	Good	Poor	N/A	4(e)	Consider removal	
Notes: Co-dominant leaders formed at approx. 3m. Recent first-order lateral failure on the southern side; damaged/lopped second order lateral on western side, assuming this resulted from activities to re-connect the service wire damaged by the failure on the southern side. Cavities in almost all branch junctions and many on the top side of lateral branches, consistent with bird browse. No fauna observed in any hollow, but at the time of inspection interest was shown by Lorikeets and Sulphur-crested Cockatoos. Cavity in main junction on northern leader measured 420mm in diameter and 200mm deep; within the cavity there is a crack on the tension side of the northern first order lateral, over path, powerlines and Walder Rd, limited response growth is developing.												

Legend: Trees with low retention values: senescence, developing defects or being non-prescribed exempt trees from LGA LEP, Tree Preservation Order (TPO) or SEPP.

See table 02 for SULE categories.

Notes:

Health - Is an indication of the tree's overall vitality at the time of inspection. Consideration is given to the canopy density, foliage colour and size, twig die-back, seasonal variation, etc.; and is expressed as good, fair, poor, or dead.

- Good – appears healthy, typical foliage colour and size for the species (if known), good canopy density, requiring little or no maintenance.
- Fair – appears relatively healthy, may have minor health problems that are generally able to be managed; not likely to cause short-term problems.
- Poor – significant health problems, sparse canopy density, poor foliage color, extensive die-back or epicormic growth; generally requires extensive maintenance or removal.
- Dead – no obvious signs of life; generally require removal, consideration is given to habitat value.

Form - Is an indication of the trees structural condition at the time of inspection. Consideration is given to significant defects or faults, structural integrity, soil, and root disturbance, and is expressed as good, fair, or poor.

- Good – free from any major structural defects; form typical of the species (if known).
- Fair – minor or moderate structural defects can usually be managed or tolerated.
- Poor – significant structural defects, extensive decay. Consideration is given to the target value, retention value and cost of remediation or removal

Figure 02: Environment & heritage map, subject site outlined in white. Source: *Landchecker.*

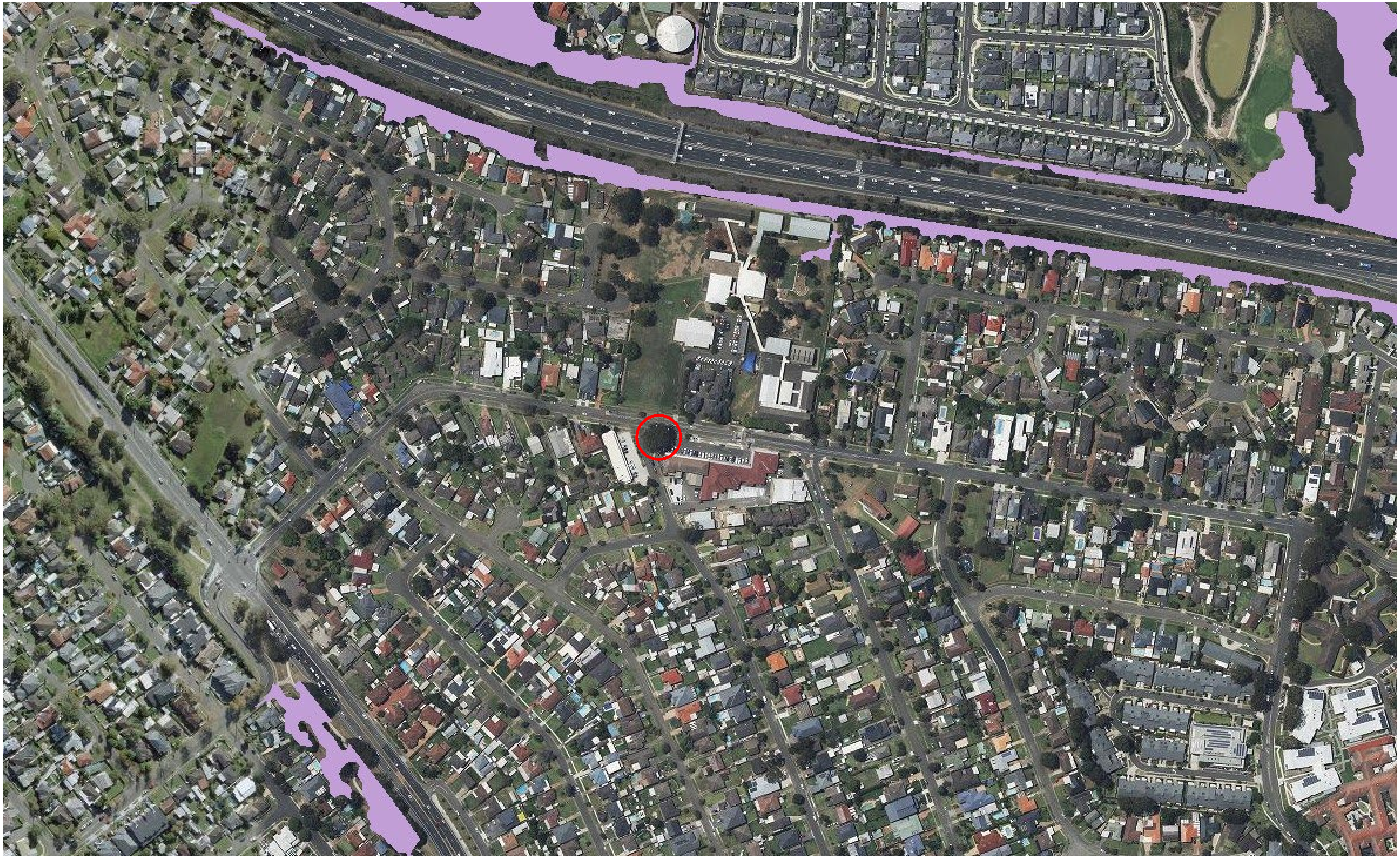


Figure 03: Biodiversity Values Map. Source: *NSW Department of Planning and Environment.*

4.0 Useful life expectancy

4.0.1 A commonly used method of determining an estimated life expectancy of a tree is the 'SULE' method. This system was developed by in 1993, by British arborist Jeremy Barrell, who loosely adopted the principles of the existing British standard (BS 5837 - *Trees in Relation to Construction*) but is more systematic and rigorous in his approach.

4.0.2 SULE or Safe Useful Life Expectancy makes an attempt to assimilate the vigour, condition, and value of a tree, balancing remaining life expectancy with risk, to determine its sustainability within the landscape. The basic concept of SULE is that the longer the tree can contribute to the amenity, in a sustainable way, and at an "acceptable" level of risk, the higher the retention value.

4.0.3 This system provides a reasonable retention value of 'sustainable amenity'; however, the categories are subjective and there is little information in its methodology to assist in determining the value, amenity or otherwise. The term 'safe' is also potentially misleading, in terms of risk.

4.0.4 The following table (table 02) outlines the adopted SULE categories.

Table 02: SULE Categories.

Rating	Category	Definition
01.	***Long SULE:*** Trees that appear to be retainable with an acceptable level of risk for more than 40 years.	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Storm damaged or defective trees that could be made suitable for retention in the long term by remedial tree surgery. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.
02.	***Medium SULE:*** Trees that appear to be retainable with an acceptable level of risk for 15 to 40 years.	(a) Trees that may only live between 15 and 40 more years. (b) Trees that may live for more than 40 years but would be removed to allow the safe development of more suitable individuals. (c) Trees that may live for more than 40 years but would be removed during the course of normal management for safety or nuisance reasons. (d) Storm damaged or defective trees that can be made suitable for retention in the medium term by remedial work.
03.	***Short SULE:*** Trees that appear to be retainable with an acceptable level of risk for 5–15 years.	(a) Trees that may only live between 5 and 15 more years. (b) Trees that may live for more than 15 years but would be removed to allow the safe development of more suitable individuals. (c) Trees that may live for more than 15 years but would be removed during the course of normal management for safety or nuisance reasons. (d) Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.

ABN: 30 105 907 481
633A COMLEROY RD, KURRAJONG, NSW 2758
E: info@conceptarborconsulting.com.au

Table 02: Continued.

04.	***Remove:*** Trees with a high level of risk that would need removing within the next 5 years.	(a) Dead trees. (b) Dying or suppressed and declining trees through disease or inhospitable conditions. (c) Dangerous trees through instability or recent loss of adjacent trees. (d) Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form. (e) Damaged trees that are considered unsafe to retain. Trees that will become dangerous after removal of other trees for the reasons given in (a) to (e).
05.	***Young or Small Trees*:**	(a) Trees which are less than 5 metres (m) in height. (b) Trees which are over 5m in height but less than15 years old.

Source: TreeAZ/01/1993, Barrell, J 2007.

4.1 Risk

4.1.1 Risk assessment is not necessarily about precision, nor is it about trying to predict what will or will not fail; there can be no certainty. Risk assessment is about, as far as is reasonably practicable, and with the available information, providing a reasoned determination of the risks.

4.1.2 When making decisions about how to manage the risks associated with trees, we must consider several factors, and although it may seem counterintuitive, the condition of the tree should not be the first consideration.

4.1.3 The first consideration should be given to the usage of the land. There are three (3) principal components that constitute risk. **1)** There needs to be a target (i.e., anything of value, which could be harmed in the event of a tree failure). **2)** There must be a hazard (i.e., something that has the **potential** to cause harm or loss. This is not to say that it will cause harm or is likely to cause harm, but potentially, it is possible). All trees are hazardous, in that they have the potential to cause harm or loss. **3)** Statistical probability is the measure of the likelihood of an event occurring (i.e., the likelihood of a tree or tree part failing when a target is present). Risk can be summarised quite simply as Risk = Consequence x Likelihood.

4.1.4 Another consideration when determining risk is the influence of weather conditions. Inclement weather will increase the likelihood of failures occurring, whilst simultaneously reducing the target value in terms of pedestrians and occupancy rates. Conversely, the opposite may be true, during hot weather occupancy rates may increase beneath trees while the risk of summer branch drop (sudden limb failure) is also increased.

4.2 QTRA

4.2.1 The Quantified Tree Risk Assessment (QTRA) system was developed in the UK by Mike Ellison. It takes established and accepted risk assessment principals and applies them to tree safety management. In order to determine the risk associated with trees, the QTRA system provides the foundation for the evaluation of three (3) primary components of tree-failure risk. *1) 'Target' value, 2) 'Probability of failure' and 3) 'Impact potential'.*

4.2.2 Tree safety management is a matter of limiting the risk of significant harm from tree failure, whilst simultaneously, sustaining the benefits convened by trees. This system moves tree management away from the misleading labelling of trees as either 'safe' or 'unsafe'. Instead, QTRA applies a numerical estimate of the risk of harm from tree failure, in a way that enables tree managers to balance tree value with safety and operate to a predetermined limit of reasonable or accepted risk.

4.2.3 It is suggested that the predetermined level of 'accepted risk' is in the order of 1/1,000,000 or less, while the level of 'unacceptable risk' is in the order of 1/10,000 or greater. Figures in between these ranges shall be considered 'tolerable risk' (i.e., <1/10,000 – >1/500,000). The British Health & Safety Executive (1996) state *"For members of the public who have a risk imposed on them 'in the wider interest' HSE would set this limit at 1/10,000 per annum"* (QTRA User Manual version 3.04).

QUANTIFIED TREE RISK ASSESSMENT - RISK DECISION INFORMING FRAMEWORK

Risk Thresholds	Description	Action
	Unacceptable Risks will not ordinarily be tolerated	• Control the risk • Periodically review the risk
1/1 000		
	Unacceptable (where imposed on others) Risks will not ordinarily be tolerated	• Control the risk • Periodically review the risk
	Tolerable (by agreement) Risks may be tolerated if • those exposed to the risk accept it, or • the tree has exceptional value	• Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value • Periodically review the risk
1/10 000		
	Tolerable (where imposed on others) Risks are generally tolerable	• Assess costs and benefits of risk control • Control the risk only where a significant benefit might be achieved at a reasonable cost • Periodically review the risk
1/1 000 000		
	Broadly Acceptable	• No action currently required • Periodically review the risk

Figure 04: QTRA Risk Advisory Thresholds. Source: *QTRA User manual V5.*

4.2.4 The QTRA output is termed 'Risk of Harm' (although in this context the word harm is somewhat redundant) and is a measure of consequence x likelihood of tree failure, either whole tree or part thereof. The baseline consequence is a loss of life (1/1); however, this is not the only consequence considered. For example, a risk of harm (RoH) of 1/100,000 is representative of a 1/100,000 likelihood of death, or a 1/1 likelihood of a consequence that is equivalent to a hundred-thousandth of a life, or any combination in between (QTRA User Manuel V5.3.7).

4.3 Discussion

4.3.1 *Eucalyptus bosistoana* is a species of forest tree, endemic to parts of south-eastern NSW & VIC. It is considered the largest of the "box" group of Eucalypts (subgenus *Symphyomyrtus*, section *Adnataria* – characterised by buds with two opercula, although fused in this species), heights up to 60m have been recorded. The species is not listed as threatened under the *Biodiversity Conservation Act* 2016 or the *Environment Protection Biodiversity Conservation* Act 1999.

4.3.2 Bark damage & minor decay were noted at the point of failure of the first order lateral on the southern side. Similar damage is quite extensive throughout the tree. The bark damage appears consistent with that caused by Cockatoos, Galahs or Corellas, commonly referred to as 'cockatoo damage' or 'cockatoo crotching'; a Sulphur-crested cockatoo (*Cacatua galerita*) was observed at the time of inspection. These species of birds often damage non-food items by chewing; this behaviour helps maintain their beaks at the appropriate length and condition. Almost all problems caused by cockatoos relates to their chewing behaviour. However, the severity relates to their social tendencies.

4.3.3 Due to the social tendencies of these birds, they tend to do most things in a flock, and their habitual nature means they often do the same things repeatedly. Most damage caused by cockatoos tends to be more of a nuisance than significantly detrimental to the tree; however, if the same tree is repeatedly used as a day roost, it may sustain serious damage through chewing for either feeding or beak maintenance. The removal or damage of tree bark exposes the tree to secondary pathogens. It is primarily the introduction of secondary, decay causing organisms that ultimately results in the formation of cavities; such is the case for the subject tree.

4.3.5 The largest cavity is in the junction of the first order laterals on the north-eastern leader[2], it measured approximately 420mm in diameter and 200mm in depth. Within this cavity, at the base of the first order lateral on the northern side, extending over Walder Rd, a vertical crack has formed, which suggests there is torsional loading at this point. There didn't appear to be substantial response growth forming on the compression side of this branch, which may simply mean the crack is recent and the tree has not yet produced more wood in this area, or the crack may be old and minimal adaptive growth was required to stabilise the junction; either way, the open crack is a direct entry point for secondary pathogens and further degradation of this junction is likely.

4.3.6 The majority of the other cavities were relatively shallow; however, decay is still likely at these locations and a reduction in structural integrity can be reasonably assumed. Sound response growth is developing around some wounds, but repeated damage is hindering occlusion. At the time of inspection, no nests were observed in any hollow, although birds were showing interest.

---

[2] Co-dominant leaders are stems that arise at the same position on the trunk and grow fairly equally in diameter. Problems can arise as the stems grow larger in diameter and begin to push against each other, occasionally resulting in cracks forming below the junction. Co-dominant stems themselves are not usually a cause for immediate concern; however, when the stem or branch angle is acute, more often than not there is included bark between the two stems.

4.3.7 In determining an annual risk of harm (RoH), a failure of a first order lateral (discussed in 4.3.5) onto a dynamic target (vehicle) was considered the highest risk. QTRA target range 2 provides a vehicle frequency rate between 4,700 – 480 per day (24Hrs) @ 50km/h (posted speed limit is 50km/h, plus reduction to 40km/h during school peak times). Size part is range 2, 450mm - 260mm in diameter. Probability of failure (PoF) is estimated at range 3, 1/100 - >1/1,000. The QTRA output provides an annualised risk of harm of 1/10,000 which may be tolerable by agreement, although in this circumstance, an agreement with those exposed to the risk it is impracticable, if not impossible; therefore the risk is generally considered unacceptable. QTRA calculation is included below as figure 05.

5.0 Conclusion

5.0.1 The subject tree, whilst appearing healthy, has developed notable defects, that in a busy, urban environment present an annual risk elevated above that of the “average” tree. It is the role of the risk manager, not the risk assessor, to determine their risk threshold; if council deems an annualised risk of 1/10,000 tolerable given the habitat value & visual amenity the subject tree provides, then the tree can be retained in the short term, subject to routine review.

5.0.2 Remedial pruning to reduce load above the defects is not recommended in this instance, the volume of photosynthetic material requiring removal will be detrimental to the tree’s health and can have unintended consequences in terms of dissipation of load applied by external forces, such as wind.

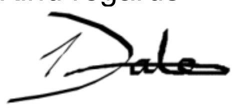
6.0 Recommendations

6.0.1 Option 01 is to remove the subject tree, thereby eliminating risk. All hollows shall be inspected immediately prior to removal; in the event fauna is found, appropriate measures are to be taken to ensure no harm occurs.

6.0.2 Option 02, if desirable to retain, the installation of a dynamic cable system may assist in short-term retention. Any such system shall be designed & installed by suitably experienced professionals, such as Total Height Safety (THS). Similar examples are present in Parramatta Park.

If you require any further assistance, please do not hesitate to contact me.

Kind regards



Isaac Dale

AQF V Diploma of Arboriculture (with distinction)
AQF III Horticulture (Arboriculture)
AQF IV Training & Assessing
Arboriculture Australia Registered Consulting Arborist No.13601
VALID Tree Risk / Benefit Assessor (Validator)
QTRA Registered User No.8110

VALID Tree Risk-Benefit Validator
Arboriculture Australia 2024 MEMBER
QTRA Licensed User

References:

Mattheck, C & Breloer, H 2004. *The body language of trees: A handbook for failure analysis*. The Stationary Office, London.

Quantified Tree Risk Assessment User Manual V5.3.7. Quantified Tree Risk Assessment Ltd. 2023, Ponyton, United Kingdom.

Figures by the author unless otherwise noted.

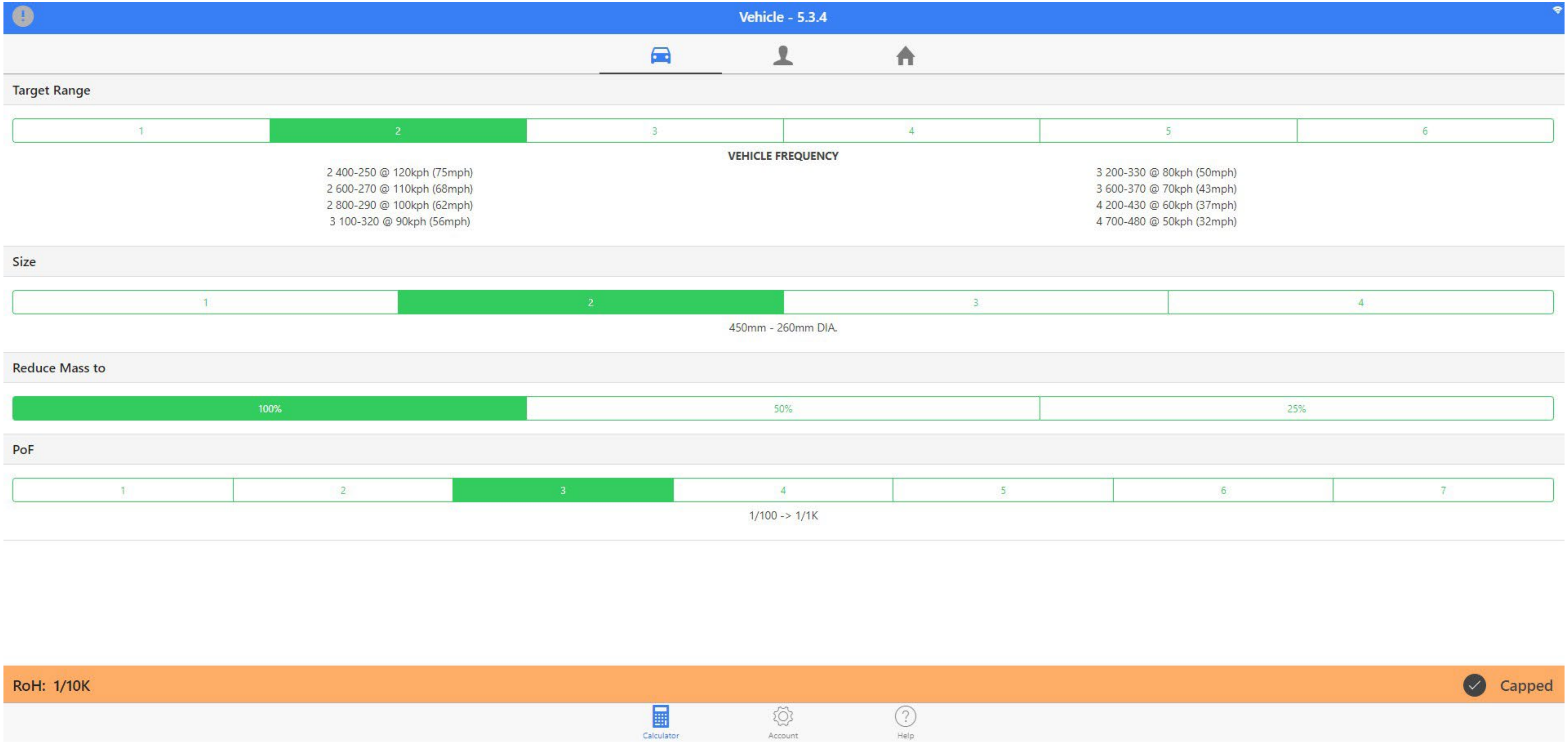


Figure 05: QTRA calculation for the subject tree (QTRA App. Version 2.0.6)

Appendix 01: Site Photographs

Figure 01a: The subject tree.

Figure 01b: Failure on southern side.

Figure 01c: Recent limb failure.

Figure 01d: Sulphur-crested cockatoo chewing at time of inspection.

Figure 01e: Location of chewing at time of inspection.

Figure 01f: Cavity on eastern side.

Figure 01g: Lopped second order lateral on western side.

Figure 01h: Second order lateral.

Figure 01i: Cavity on western side.

Figure 01j: Cavity in junction on north side.

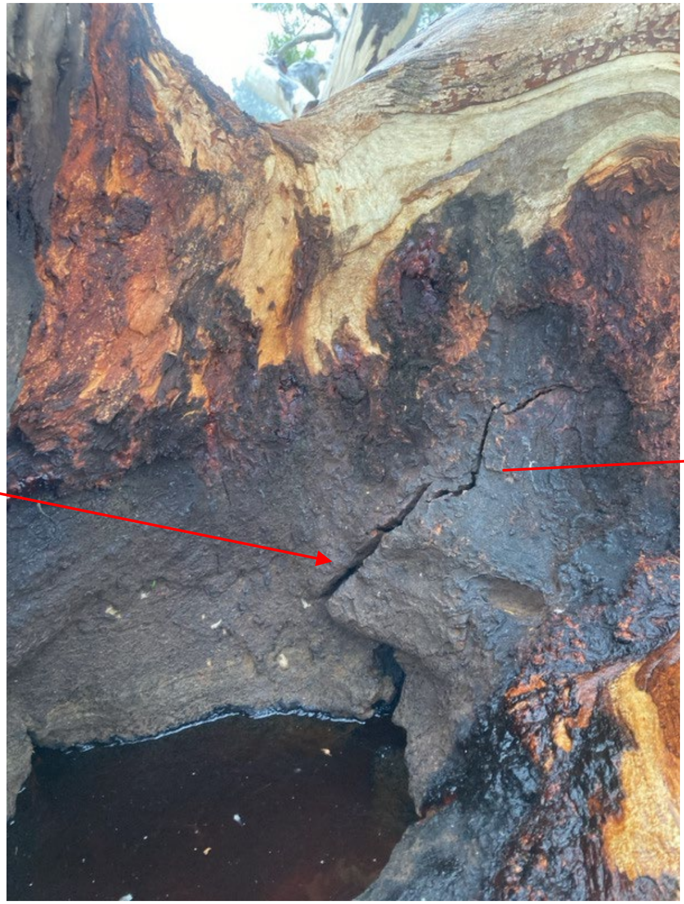


Figure 01k: Crack.

Figure 01l: First order lateral over road.

CAC

CONCEPT ARBOR CONSULTING