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DYLAN TEMPEST – ARBORICULTURAL CONSULTANT

MSc Master of Arboriculture and Urban Forestry, 'Class Dux' and recipient of the Top Student Award for the Masters Degree in Arboriculture and Urban Forestry, The University of Central Lancashire (MSc Arb)
AQF Level 8 Graduate Certificate of Arboriculture 1st class honours The University of Melbourne (Grad Cert Arb)
AQF Level 5 Diploma of Arboriculture (Dip Arb)
AQF Level 3 Certificate 3 of Arboriculture (Cert III Arb)
QTRA Advanced Quantified Tree Risk Assessor User 5637
QTRA Quantified Tree Risk Assessor User 5637
ISA TRAQ International Society of Arboriculture Tree Risk Assessment Qualification
VALID Tree Risk-Benefits Assessor
Gold Australian Arborist Industry License No: AL2360

5 Million Professional Indemnity Insurance
20 Million Public Liability Insurance

Date:
25 June 2025

Arboricultural Report

Client:
Gary Williams
E: garyw@theassuredgroup.com.au

Site Address:
488/500 Yatala Vale Road
Yatala Vale
SA 5126

TABLE OF CONTENTS:

INTRODUCTION:

The client brief is to provide an assessment and report on the condition of five trees located within the site 488/500 Yatala Vale Road Yatala Vale SA 5126. This assessment and report will consider the health, structure, and risk the trees may pose as well as their retention values. This assessment and report includes management recommendations for the trees.

Each tree was tagged with a numbered tree tag. Each tree is indicated on figure 1 by its corresponding tag number. Each tree's distance to the site boundaries is annotated on the figure.

Figure 1: The trees are indicated by their numbers. Their distance to the site boundaries is annotated on the figure.

METHODS:

This ground-based level 2 VTA was conducted with a sounding mallet, diameter tape, trowel, probe, and smart phone on 27 May2025. The height and spread of the trees were estimated.

The health of the trees was assessed and rated within the following parameters,

1. **Good:** The tree / vegetation demonstrates a full canopy of foliage or living tissue for the species. The tree/ vegetation should be free of or exhibit only minor signs of decline or pest or disease signs and symptoms.
2. **Average:** The tree / vegetation demonstrates a moderate canopy of foliage or living tissue for the species. The canopy may contain dead branches and may exhibit minor to moderate signs of decline or pest or disease signs or symptoms.
3. **Below Average:** The tree/ vegetation demonstrates a declining canopy of foliage or failing tissue for the species. The canopy may contain multiple dead or dying sections and may display moderate to significant signs of decline or pest or disease signs or symptoms.
4. **Poor:** The tree/ vegetation shows signs of extreme stress and/or decline. A high percentage of the canopy foliage may be made up of declining epicormic growth. A high percentage of the canopy foliage may be chlorotic or necrotic. A high percentage of the canopy foliage and tissue may be dead. Or the tree has declined and is not producing sufficient defenses to stop secondary insect and or pathogen attack.
5. **Dead:** The tree / vegetation shows no signs of life

The structure of the trees was assessed and rated within the following parameters,

1. **Good:** The approximate structural root zone appears unaffected; the trunk exhibits proportional buttressing and taper. Stem and branch unions are free of recognisable flaws, few if any insect or fungal signs or symptoms are visible.
   The tree is considered a good example of the species.
2. **Average:** Minor impacts may have occurred in the approximate structural root zone, the trunk exhibits proportional buttressing and taper, some second or third order branch unions may contain minor recognisable flaws, insect or fungal signs or symptoms may be visible. The tree could be retained with some corrective pruning.
3. **Below Average:** Moderate impacts may have occurred in the approximate structural root zone, the trunk may exhibit moderate disproportional buttressing and taper, some second or third order branch unions may contain recognisable flaws, minor branch over extension may be occurring, minor to moderate inappropriate pruning may have occurred, the tree may have a moderate lean, insect or fungal signs or symptoms may be visible. The tree may not be able to be reasonably retained with some corrective pruning.
4. **Poor:** Damage to the structural root zone may be likely, damage to the trunk may be likely, the tree may exhibit multiple branch failures, trunk buttressing and taper may be disproportionate, the main union has recognisable flaws, first, second and/or third order branch unions may contain recognisable flaws, moderate to major branch over extension may be occurring, major inappropriate pruning may

have occurred, the tree may have a lean near or above 25^0, insect or fungal signs or symptoms are visible and have progressed to beyond moderate levels, the tree is unlikely to be reasonably retained with corrective pruning.

- The risk the trees pose was assessed using QTRA Advanced.

- The Barrell Safe Useful Life Expectancy (SULE) method was used to determine the trees SULE.

- The retention rating of the trees was assessed using the IACA Significance of a Tree Assessment Rating System.

- The results of this tree assessment are addressed and scientifically referenced using peer reviewed literature and the Harvard Referencing System throughout this Arboricultural Report.

RESULTS:

Tree 774	
Family	Myrtaceae
Scientific Name	*Eucalyptus camaldulensis*
Common Name	River Red Gum
Approximate Tree Height	12 m
Approximate Canopy Spread Diameter	10 m
Tree Age	Mature
Circumference at 1m above ground level (*South Australian Planning Development and Infrastructure Act 2016* and the *South Australian Planning Development and Infrastructure (General) Regulations 2017*)	>2000mm
Legal Status (*South Australian Planning Development and Infrastructure Act 2016* and the *South Australian Planning Development and Infrastructure (General) Regulations 2017*)	Significant Tree
DSH at 1.4 m above ground level or as altered by AS4970-2025 due to stem positions, union positions and or deformities	Not required
Root Collar Diameter	Not required
NRZ radius (AS4970-2025)	Not required
SRZ radius (AS4970-2025)	Not required

Further Information:

1. The health of the tree is rated as below average.
   - There is some dieback and deadwood in the canopy and the tree is being attacked by borers (*Phoracantha* spp.) This pest can only attack declining trees and so the tree is declining due to environmental stressors.
2. The structure of the tree is rated as poor.
   - Years ago, the tree was topped approximately 2 metres above ground level. The tree has grown as epicormic scaffolds from this topping point. This epicormic growth is now supporting many tons of canopy weight and the area at the top of the trunk where it is attached shows signs of decay. There are cankers on some of the epicormic scaffolds showing there is also decay in the epicormic scaffolds. The tree has grown phototropically and is bowing. The tree is being attacked by borers (*Phoracantha* spp.). The tree has a history of large scaffold branch failure. The tree is a subdominant tree growing within a group of five trees. Therefore, all five trees are intrinsically connected due to thigmomorphogenesis.
3. The tree is approximately 12 metres tall and so has a high ground to crown clearance increasing the impact force from failures.
4. Refer to appendix 1 for photos of the tree.

Tree 775	
Family	Myrtaceae
Scientific Name	*Eucalyptus camaldulensis*
Common Name	River Red Gum
Approximate Tree Height	22 m
Approximate Canopy Spread Diameter	22 m
Tree Age	Mature
Circumference at 1m above ground level (*South Australian Planning Development and Infrastructure Act 2016* and the *South Australian Planning Development and Infrastructure (General) Regulations 2017*)	>2000mm
Legal Status (*South Australian Planning Development and Infrastructure Act 2016* and the *South Australian Planning Development and Infrastructure (General) Regulations 2017*)	Significant Tree
DSH at 1.4 m above ground level or as altered by AS4970-2025 due to stem positions, union positions and or deformities	Not required
Root Collar Diameter	Not required
NRZ radius (AS4970-2025)	Not required
SRZ radius (AS4970-2025)	Not required

Further Information:

1. The health of the tree is rated as below average.
   - There is some dieback and deadwood in the canopy and the tree is being attacked by borers (*Phoracantha* spp.) This pest can only attack declining trees and so the tree is declining due to environmental stressors.
2. The structure of the tree is rated as poor.
   - Years ago, the tree was topped at approximately 2-3 metres above ground level. The tree has grown as epicormic scaffolds from this topping point. This epicormic growth is now supporting many tons of canopy weight and the area at the top of the trunk where it is attached shows signs of decay. There are cankers on some of the epicormic scaffolds showing there is also decay in the epicormic scaffolds. The tree has grown phototropically and is bowing. The tree is being attacked by borers (*Phoracantha* spp.). The tree has a history of second order branch failures. The tree is a codominant tree growing within a group of five trees. Therefore, all five trees are intrinsically connected due to thigmomorphogenesis.
3. The tree is approximately 22 metres tall and so has a high ground to crown clearance increasing the impact force from failures.
4. Refer to appendix 1 for photos of the tree.

Tree 798	
Family	Myrtaceae
Scientific Name	*Eucalyptus camaldulensis*
Common Name	River Red Gum
Approximate Tree Height	20 m
Approximate Canopy Spread Diameter	18 m
Tree Age	Mature
Circumference at 1m above ground level (*South Australian Planning Development and Infrastructure Act 2016* and the *South Australian Planning Development and Infrastructure (General) Regulations 2017*)	>2000mm
Legal Status (*South Australian Planning Development and Infrastructure Act 2016* and the *South Australian Planning Development and Infrastructure (General) Regulations 2017*)	Significant Tree
DSH at 1.4 m above ground level or as altered by AS4970-2025 due to stem positions, union positions and or deformities	Not required
Root Collar Diameter	Not required
NRZ radius (AS4970-2025)	Not required
SRZ radius (AS4970-2025)	Not required

Further Information:

1. The health of the tree is rated as below average.
   - The tree is a codominant tree.
2. The structure of the tree is rated as below average.
   - The tree is a codominant tree growing within a group of five trees. Therefore, all five trees are intrinsically connected due to thigmomorphogenesis.
3. The tree is approximately 20 metres tall and so has a high ground to crown clearance increasing the impact force from failures.
4. Refer to appendix 1 for photos of the tree.

Tree 799	
Family	Myrtaceae
Scientific Name	*Eucalyptus camaldulensis*
Common Name	River Red Gum
Approximate Tree Height	16 m
Approximate Canopy Spread Diameter	14 m
Tree Age	Mature
Circumference at 1m above ground level (*South Australian Planning Development and Infrastructure Act 2016* and the *South Australian Planning Development and Infrastructure (General) Regulations 2017*)	>2000mm
Legal Status (*South Australian Planning Development and Infrastructure Act 2016* and the *South Australian Planning Development and Infrastructure (General) Regulations 2017*)	Significant Tree
DSH at 1.4 m above ground level or as altered by AS4970-2025 due to stem positions, union positions and or deformities	Not required
Root Collar Diameter	Not required
NRZ radius (AS4970-2025)	Not required
SRZ radius (AS4970-2025)	Not required

Further Information:

1. The health of the tree is rated as below average.
2. The structure of the tree is rated as below average and is tending to poor.
   - The tree has grown phototropically and is bowing. The tree is a codominant tree growing within a group of five trees. Therefore, all five trees are intrinsically connected due to thigmomorphogenesis.
3. The tree is approximately 16 metres tall and so has a high ground to crown clearance increasing the impact force from failures.
4. Refer to appendix 1 for photos of the tree.

Tree 899	
Family	Myrtaceae
Scientific Name	*Eucalyptus camaldulensis*
Common Name	River Red Gum
Approximate Tree Height	14 m
Approximate Canopy Spread Diameter	8 m
Tree Age	Mature
Circumference at 1m above ground level (*South Australian Planning Development and Infrastructure Act 2016* and the *South Australian Planning Development and Infrastructure (General) Regulations 2017*)	>2000mm
Legal Status (*South Australian Planning Development and Infrastructure Act 2016* and the *South Australian Planning Development and Infrastructure (General) Regulations 2017*)	Significant Tree
DSH at 1.4 m above ground level or as altered by AS4970-2025 due to stem positions, union positions and or deformities	Not required
Root Collar Diameter	Not required
NRZ radius (AS4970-2025)	Not required
SRZ radius (AS4970-2025)	Not required

Further Information:

1. The health of the tree is rated as poor.
   - There is some dieback and deadwood in the canopy and the tree is being attacked by borers (*Phoracantha* spp.) This pest can only attack declining trees and so the tree is declining due to environmental stressors.
2. The structure of the tree is rated as poor.
   - There are two large open necrotic wounds on the trunk of the tree. The tree is being attacked by borers (*Phoracantha* spp.). The tree is a subdominant tree growing within a group of five trees. Therefore, all five trees are intrinsically connected due to thigmomorphogenesis.
3. The tree is approximately 14 metres tall and so has a high ground to crown clearance increasing the impact force from failures.
4. Refer to appendix 1 for photos of the tree.

DISCUSSION:

All Five Trees; Trees Declining from Environmental Stressors:

All five trees have varied degrees of environmental stress as they are codominant and subdominant trees. This means they are suppressed as they are under resourced due to excessive competition for water and mineral nutrients, light, and wind. Trees enduring environmental stressors build thinner structured growth rings year on year (DeSoto *et al.*, 2020) because cell expansion is unable to occur as is required (Hirons and Thomas 2018).

Trees declining from environmental stressors have a reduced ability to use carbon plus simple and complex carbohydrates gained from photosynthesis for all growth including thigmomorphogenesis to maintain and grow sufficient structure (Hirons and Thomas 2018; Lonsdale 2013; Lilly 2010).

Weakened trees have lower defence capability and attract biotic stressors by releasing volatile organic compounds including ethanol. Certain pathogens and insects that damage trees thrive in such situations obtaining omnipotent status inclusive of increased fecundity increasing tree stress and mortality risk (Hirons and Thomas 2018; McDowell *et al.*, 2008).

Longicorn Borers (*Phoracantha* spp.) ring bark trees as they eat the symplasm and apoplasm and weaken the tree structure in the process reducing the trees elastic modulus causing tree failure (Dunster *et al.*, 2017; Crawford 2015). As little as a 14% reduction in elastic modulus can reduce the impact bending strength by more than 60% (Schwarze *et al.*, 2000).

Tree 774, Tree 775, and Tree 889; Borers (*Phoracantha* spp.):

Tree 774, Tree 775, and Tree 889 have been damaged by Borers. Borers tend to attack damaged or stressed trees as healthy trees produce defensive chemicals capable of killing borers (Prado *et al.*, 2009). Borer (Phoracantha spp.) create bark wounds as they ring bark trees eating the symplasm (xylem, phloem, and cambium) and apoplasm (heartwood) weakening the tree structure in the process reducing the trees elastic modulus causing tree failure (Dunster *et al.*, 2017; Crawford 2015). As little as a 14% reduction in elastic modulus can reduce the impact bending strength by more than 60% (Schwarze *et al.*, 2000).

> *"The two major plant stress factors associated with weather are drought and too much soil moisture. The result in either case is the same—the plant's vascular system shuts down. When the vascular system is troubled, leaf-feeding pests usually don't have to deal with as many plant defensive chemicals, and borers can gain entrance through the trunk because there is a lack of pitch or sap".*
> *"Recent research has indicated that most insect borers (bark beetles, metallic wood borers, and clearwing moths) seem to be attracted to stressed trees and shrubs. Apparently, plants under vascular stress can be detected by these pests, and the stressed plants are often subject to mass attacks or at least to successful entrance. Scientists believe that these borers detect the stressed plants by odors and ultrasonic noise. The ultrasonic noise is caused by the breaking of water columns in the vascular bundles of plants" (Shetlar n.d.)."*

Tree 774, Tree 775, and Tree 889; Bark Wounds Caused by Borers:

Tree 774, Tree 775, and Tree 889 have been damaged by Borers. This pest damages the bark layers by eating them. Tree bark is a complex and important series of layers providing an essential role in the health and longevity of trees. If this protective barrier is compromised, stems and branches will typically become increasingly dysfunctional (Hirons and Thomas 2018; Lilly 2010).

The outer bark is a waterproof protective layer that stops desiccation by keeping the moisture inside the tree. It also prevents latent decays from having an environment where they can become successful pathogens. Bark acts as a barrier to stop pests and outside pathogens from entering the tree. These vital functions become compromised when the bark is wounded. (Hirons and Thomas 2018; Lilly 2010). Wounds within this area of the bark shorten the safe useful life expectancy (SULE) of trees (Roberts *et al*., 2018).

The inner bark is the phloem and is a vital transport for photosynthates and plant hormones. These vital functions become compromised when the bark is wounded. (Hirons and Thomas 2018; Lilly 2010). Wounds within this area of the bark shorten the safe useful life expectancy (SULE) of trees (Roberts *et al*., 2018). The symplasm is the vascular connective pathway between the roots and shoots inclusive of the xylem, phloem and cambium (Lilly 2010). Damage and disruption to this connectivity reduce the photosynthetic ability of trees leading to carbon starvation. This is because tree respiration exceeds simple and complex carbohydrate production which depletes carbon energy reserves (McDowell *et al*., 2008). Wounds within this area shorten the safe useful life expectancy (SULE) of trees (Roberts *et al*., 2018).

All Five Trees; Phototropism:

Due to the codominant and subdominant relationship within this stand of five trees. All of the trees have varied degrees of phototropism which has altered the structure of the trees.

Plant tropisms have been observed and written about by poets; philosophers, and artists from as early as 287 BCE and include works from Anaxagoras, Empedocles, Plato and Aristotle (Whippo and Hangarter 2006). Phototropism was also studied by Charles and Francis Darwin in monocot coleoptiles in the late eighteenth century (Darwin 1880). Then in 1937 the Cholodny-Went theory was proposed in which the phytohormone auxin, and its movement through plants, plays an integral role in the production of tropic curvatures in vivo (Went and Thimann 1937). There have since been many studies of phototropism enabling scientists to continue unlocking the secrets in vivo triggering the occurrence of this phenomenon while proving the theory of auxin distribution triggering phototropism to be true (Christie *et al*., 2011; Whippo and Hangarter 2006; Blakeslee, Peer and Murphy 2005).

Photosynthesis is the process in which green plants use the energy within light to build carbon molecules that make carbohydrates. These carbohydrates can also be referred to as photosynthates. The process of photosynthesis takes place in the chloroplasts within leaves. The light reaction occurs in photosystem 2 and photosystem 1, which are located in the thylakoid membrane. The Calvin Cycle takes place within the stroma with each turn of the Calvin Cycle fixing 1 molecule of CO_2 (Hirons and Thomas 2018; Lilly 2010).

Photosynthesis predominantly takes place within the leaves of trees and plants (Hirons and Thomas 2018; Lilly 2010). Photosynthesis does also occur within the smooth bark of trees and plants (Johnstone *et al*., 2013; Johnstone *et al*., 2012).

These photosynthates are distributed throughout plants and utalised for growth and function. If the process of photosynthesis stops for long enough, the plant will use up its stored energy reserves through the process of respiration and eventually die. This brief examination of photosynthesis in plants makes it abundantly clear as to why plants prioritize growth towards light (Hirons and Thomas 2018; Lilly 2010) However, due to this requirement for photosynthesis, plants (including trees) will forego reasonable structure to be able to photosynthesise, often growing a poor structure with an increased rate of failure (Gilman 2012).

Tree 774 and Tree 899; Subdominant Trees:

Tree *774* and Tree 899 are subdominant trees. Subdominant trees are trees within a group of trees that are underperforming when directly compared to the other trees within the group. The problem exponentially compounds as subdominant trees are starved of essential resources as they our outcompeted by the group. Due to a lack of resources received, subdominant trees will have less well developed and therefore weaker above and below ground parts (canopy and roots) (Dunster *et al., 2017)*.

Tree 775, Tree 798 and Tree 799; Codominant Trees:

Tree *775*, Tree *798*, and Tree *799* are codominant trees. Codominant trees are trees within a group of trees that have poor structural form caused by a lack of resources inclusive of water and mineral nutrients, sunlight, and wind loading.

Due to a lack of thigmomorphogenesis and resources received, codominant trees will have less well developed and therefore weaker above and below ground parts (canopy and roots). This issue is such that removal of trees which are required can destabilise remaining trees from the group. (Dunster *et al*., 2017).

Tree 774, Tree 775, and Tree 779; Bows/Leans:

Trees *774*, *775*, and *779* are bowing due to phototropism. Bows are a lean in a tree that present as the top of the tree extending further out than the lower trunk. Bows typically represent an initiated failure of the wood fibres within the trunk. It is rare that a tree can recover from being bowed and tree failure is expected when this defect is present. Therefore, bowed trees are less stable than vertical trees (Dunster *et al*., 2017).

Leaning trees are difficult to defend objectively. Trees with leans >25° are an immediate priority for full removal. The larger the lean the more difficult it is to project dynamic loading and the greater the complexity in defending leaving the tree standing (Coder 2000).

Tree 774 and Tree 775; Epicormic Growth:

Tree *774* and Tree *775* were topped many years ago and have regrown their canopies with epicormic growth that stems from the topping points on their trunks. This growth is supporting tons of canopy weight. Decay is present due to this historical pruning. Epicormic growth is weekly attached until enough wood is formed at their attachment point to the parent branch. When epicormic growth has occurred because of poor pruning practices, decay developing at the failure site (which is a byproduct of the disfunction caused by the pruning) often further weakens the epicormic attachment (Dunster *et al.*, 2017).

Tree 774 and Tree 775; Decay:

Trees 774 and 775 show signs of decay. Decay reduces structural integrity. This is because decay weakens the woody xylem tissue reducing the elastic modulus of wood. As little as a 14% reduction in elastic modulus can reduce the impact bending strength of wood by more than 60% causing the compromise of structural integrity (Schwarze *et al.*, 2000).

Tree 774 and Tree 775; Cankers:

Tree 774 and Tree 775 have cankers. Cankers come in 4 separate types, saprophytic, annual, perennial and defuse. Cankers cause death of the vascular cambium and are commonly associated with environmental stressors such as drought, mechanical damage, bark splits and insect damage (Keane *et al.*, 2000). Cankers are also caused by fungal pathogens. Cankers can increase the likelihood of failure in trees which typically occurs once the canker covers 30% of more of the affected area (Dunster *et al.*, 2017).

Tree 774 and Tree 775; History of failure:

Tree 774 and Tree 775 have a history of branch failures. Trees with a history of branch failure often have continued branch failure (Dunster *et al.*, 2017). The trees have similar branches present to these that have previously failed. The size of these similar branches and their ground to crown distance means the similar branches are considered a higher consequence of impact should they hit a target (Dunster *et al.*, 2017; Hayes 2014).

Tree 899 Tree 774 and Tree 775; Open Necrotic Wounds:

Tree 899 has large open necrotic wounds. Trees 774 and 775 have cankers which are an open necrotic wound. Open necrotic wounds are large bark wounds. The outer bark is a protective skin providing an insulative layer between the inside of the tree and the outside world. Damage compromising the bark can lead to the rapid disfunction of the transport systems within as the entry of air into sealed transport systems such as xylem and phloem disrupts conduction. Microorganisms and damaging insects can also rapidly invade these newly exposed areas, and so bark integrity is essential for correct function of trees and their defence to pathogens, disease and insects (Hirons and Thomas 2018).

All Five Trees; Increased Risk with Height:

The risk to targets is elevated by the height a failure would come down from (Dunster *et al.*, 2017). This is because the smallest tree is approximately 12 metres tall while the tallest tree is approximately 22 metres tall. Height will increase the force with which the tree strikes the ground and targets. This is because the force of fall is proportional to tree height to the fifth power ($height^5$) (Coder 2000).

All Five Trees; *Eucalyptus camaldulensis* species failure profile:

Sudden limb drop in this tree species (Eucalyptus camaldulensis) often occurs in sound timber under normal conditions as this species grows with overextension and excessive end weighted branches and scaffolds. The species also has an increased likelihood of failure with age (Nicolle 2016; Nicolle 2013).

Summer limb failure also termed sudden limb drop and summer limb drop are a type of failure occurring in many genera inclusive of *Eucalyptus* sp. Failures typically occur during hot weather. High temperatures can allow wood fibers to slide past each other with more ease resulting in the branch elastic modulus being exceeded. Heat stress induced stomatal closure is thought to be a cause, however, it appears there are a multitude of environmental stressors involved making this topic difficult to research. Sudden limb failure does often occur in branches with the majority of their foliage within their distal area (Gilman 2012).

Tree 774; QTRA Advanced Tree Risk Assessment:

The level of risk this nominated tree poses has been calculated using the Quantified Tree Risk Assessment Advanced Method (QTRA user number 5637). Risk becomes unacceptable at 1:10,000 (Ellison 2018). The methods and outcome of this risk assessment are outlined below.

Part: Epicormic scaffolds stemming from the main union and the first order branches.

Risk to people

- Target Range (2) 2.4 hours – 15 minutes per day (due to use in neighbouring sites)
- Size of Part (1) >450 mm diameter
- Probability of Failure (3) 1/100 -> 1/1K
- **Level of Risk (Risk of Harm) RoH = 1:4,000**
- As risk becomes unacceptable at 1:10,000 (Ellison 2018), the risk the tree poses is at a level deemed unacceptable to enforce on a third party without their consent.

Tree 775; QTRA Advanced Tree Risk Assessment:

The level of risk this nominated tree poses has been calculated using the Quantified Tree Risk Assessment Advanced Method (QTRA user number 5637). Risk becomes unacceptable at 1:10,000 (Ellison 2018). The methods and outcome of this risk assessment are outlined below.

Part: Epicormic scaffolds stemming from the main union and the first order branches coupled with wind loading dynamics issues due to the required removal of Tree 774.

Risk to people

- Target Range (2) 2.4 hours – 15 minutes per day (due to use in neighbouring sites)
- Size of Part (1) >450 mm diameter
- Probability of Failure (3) 1/100 -> 1/1K
- **Level of Risk (Risk of Harm) RoH = 1:4,000**
- As risk becomes unacceptable at 1:10,000 (Ellison 2018), the risk the tree poses is at a level deemed unacceptable to enforce on a third party without their consent.

Tree 798; QTRA Advanced Tree Risk Assessment:

The level of risk this nominated tree poses has been calculated using the Quantified Tree Risk Assessment Advanced Method (QTRA user number 5637). Risk becomes unacceptable at 1:10,000 (Ellison 2018). The methods and outcome of this risk assessment are outlined below.

Part: Bowing scaffold stemming from the main union and the first order branches due to wind loading dynamics issues because of the required removal of Trees 774 and 775.

Risk to people

- Target Range (2) 2.4 hours – 15 minutes per day (due to use in neighbouring sites)
- Size of Part (1) >450 mm diameter
- Probability of Failure (3) 1/100 -> 1/1K
- **Level of Risk (Risk of Harm) RoH = 1:4,000**
- As risk becomes unacceptable at 1:10,000 (Ellison 2018), the risk the tree poses is at a level deemed unacceptable to enforce on a third party without their consent.

Tree 799; QTRA Advanced Tree Risk Assessment:

The level of risk this nominated tree poses has been calculated using the Quantified Tree Risk Assessment Advanced Method (QTRA user number 5637). Risk becomes unacceptable at 1:10,000 (Ellison 2018). The methods and outcome of this risk assessment are outlined below.

Part: Scaffolds stemming from the main union and the first order branches coupled with wind loading dynamics issues due to the required removal of Trees 774, 775, and 798.

Risk to people

- Target Range (2) 2.4 hours – 15 minutes per day (due to use in neighbouring sites)
- Size of Part (1) >450 mm diameter
- Probability of Failure (3) 1/100 -> 1/1K
- **Level of Risk (Risk of Harm) RoH = 1:4,000**
- As risk becomes unacceptable at 1:10,000 (Ellison 2018), the risk the tree poses is at a level deemed unacceptable to enforce on a third party without their consent.

Tree 899; QTRA Advanced Tree Risk Assessment:

The level of risk this nominated tree poses has been calculated using the Quantified Tree Risk Assessment Advanced Method (QTRA user number 5637). Risk becomes unacceptable at 1:10,000 (Ellison 2018). The methods and outcome of this risk assessment are outlined below.

Part: Defective primary structure coupled with wind loading dynamics issues due to the required removal of Trees 774, 775, 798, and 799.

Risk to people

- Target Range (2) 2.4 hours – 15 minutes per day (due to use in neighbouring sites)

- Size of Part (1) >450 mm diameter
- Probability of Failure (3) 1/100 -> 1/1K
- **Level of Risk (Risk of Harm) RoH = 1:4,000**
- As risk becomes unacceptable at 1:10,000 (Ellison 2018), the risk the tree poses is at a level deemed unacceptable to enforce on a third party without their consent.

All Five Trees; Barrell Safe Useful Life Expectancy (SULE):

When the nominated tree is assessed within this system the nominated tree is within the following category.

4: Remove: Trees that should be removed within the next 5 years.

(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions.

- All five trees have varied degrees of environmental stress as they are codominant and subdominant trees. This means they are suppressed as they are under resourced due to excessive competition for water and mineral nutrients, light, and wind.

(b) Dangerous trees because of instability or recent loss of adjacent trees.

- All five trees because they are intrinsically connected due to thigmomorphogenesis. The requirement to remove the worst trees is setting off a domino effect.

(c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.

- All five trees have varied structural and poor form issues ranging from subdominant and codominant structures, open necrotic wounds, poorly attached epicormic growth, borer damage, decay damage, and phototropic bowing.

(d) Damaged trees that are clearly not safe to retain.

(e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.

(f) Trees that are damaging or may cause damage to existing structures within 5 years.

(g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).

- All five trees due to their intrinsic connection due to thigmomorphogenesis which is caused by their subdominant/codominant relationship.

(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.

Refer appendix 2 of this report for further details.

All 5 Trees; IACA Significance of a Tree, Assessment Rating System:

When the nominated trees are assessed within this system the nominated trees are within the following category.

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.**

When the nominated trees Safe Useful Life Expectancy and Landscape Significance ratings are considered within the Legend for S.T.A.R.S Matrix Assessment, the retention value of the trees is determined as,

> ***"Priority for Removal*** *- These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development."*

Refer appendix 3 of this report for further details.

All Five Trees; Risk Reduction Considerations:

The installation of a permanent exclusion zone within the target area of the trees can reduce and or eliminate material risk (Ellison 2018; Dunster *et al.*, 2017; Lonsdale 2013). This option is not viable as the trees are within a site used for functions. Reducing the usable area would deleteriously affect the viability of the site.

Material risk could be reduced by constructing a sufficiently engineered protective structure under the trees. Any structure would need to span over the aforementioned area. To not damage the trees, this structure would be required to adhere to tree sensitive design requirements remaining water permeable, allowing nutrient cycling and be installed without exceeding root disturbance and edaphic restriction thresholds following the *South Australian Planning, Development and Infrastructure Act 2016*, the *South Australian Planning Development and Infrastructure (General) Regulations 2017* and AS4970-2025 requirements. The load bearing requirement of the considered structure is expected to be cost prohibitive and therefore unreasonable considering the size of the trees and the required size and loadbearing capabilities of the structure. The engineering and cost of the structure is outside the scope of this report as it will require expert advice in that field. It is estimated this structure would be in the order of 66m x 66m totaling 4,356m^2 which is the approximate area a failure could land into. This structure would reduce the visual appeal of the site deleteriously affecting the viability of the site. The structure would not increase the short life expectancy of the trees.

Further risk mitigating strategies such as pruning in accordance with AS4373-2007 Pruning of Amenity Trees would not assist in reducing associated risk to tree failure or prevent further structural damage. This is because

- Intervention is best administered early. This intervention was required many years ago and did not occur. The trees are now at the point where the reduction of leaves caused by pruning will reduce the trees abilities to produce $C_6H_{12}O_6$ from photosynthesis which is essential for continued growth and survival (Lilly 2010). The trees are already subdominant and codominant trees meaning they are already under resourced due to excessive competition. Therefore, all matters discussed in this report will exacerbate if pruning occurs. Essentially, the trees currently lack the required energy to correctly grow and function and pruning will reduce their ability to photosynthesize while creating an energy demand due to the physiological process that occur in trees for managing pruning wounds, thus creating a further energy deficit. Therefore, pruning is not a viable option.

All Five Trees; Legislation:

Desired Outcome

DO 1

Conservation of regulated and significant trees to provide aesthetic and environmental benefits and mitigate tree loss.

PO 1.2

Significant trees are retained where they:

PO 1.2

Significant trees are retained where they:

(a) make an important contribution to the character or amenity of the local area: No, the oxford dictionary definition of the word important is *"having a great effect on people or things; of great value"*. As the trees are structurally defective specimens posing an unacceptable level of risk, their contribution in this area is reduced as shown within the tree retention value matrix. Therefore, the trees make a contribution but do not make an "important" contribution to the character or amenity of the local area.

(b) are indigenous to the local area and are listed under the National Parks and Wildlife Act 1972 as a rare or endangered native species: No, the trees are indigenous to the local area. However, they are not listed under the National Parks and Wildlife Act 1972 as a rare or endangered native species. As this criterion has the connective word "and" rather than the separative word "or", both parts must be met to fulfil this section of legislation. Both parts are not met.

(c) represent an important habitat for native fauna: No, the oxford dictionary definition of the word important is *"having a great effect on people or things; of great value"*. The trees do offer habitat potential. However, the trees have a <5-year safe useful life expectancy and so offer a short amount of habitat potential due to this short timeframe. Therefore, the trees represent habitat potential for native fauna, but do not represent an "important" habitat for native fauna.

(d) are part of a wildlife corridor of a remnant area of native vegetation: No, the tree is not part of a wildlife corridor of a remnant area of native vegetation. The locality of the tree is that of habitat fragmentation due to human development.

(e) are important to the maintenance of biodiversity in the local environment: No, the oxford dictionary definition of the word important is *"having a great effect on people or things; of great value"*. It is rare and endangered trees; and, large healthy trees with a long safe useful life expectancy that have the highest biodiversity values. The trees have a <5-year safe useful life expectancy and are not a rare or endangered species. Therefore, the trees are not important to the maintenance of biodiversity in the local environment.

and / or

(f) form a notable visual element to the landscape of the local area: No, the oxford dictionary definition of the word notable is *"deserving to be noticed or to receive attention; important"*. As the trees are structurally defective specimens with a short safe useful life expectancy posing an unacceptable level of risk, their contribution in this area is devalued as shown in the tree retention value matrix. Therefore, the trees form a visual element, but the trees do not form a "notable" visual element to the landscape of the local area.

PO 1.3

A tree damaging activity not in connection with other development satisfies (a) and (b):

(a) tree damaging activity is only undertaken to:

(i) remove a diseased tree where its life expectancy is short: Yes, the Oxford Languages Dictionary defines disease as "A disorder of structure or function in a human, animal or plant, especially one that produces specific symptoms or that affects a specific location and is not simply a direct result of physical injury." The trees have deleterious structure and function issues as they are under resourced due to their subdominant/codominant relationship. Therefore, tree damaging activity is recommended as the tree is diseased, and its life expectancy is short.

(ii) mitigate an unacceptable risk to public or private safety due to limb drop or the like: Yes, the QTRA Advanced Tree Risk assessment, the Barrell Safe Useful Life Expectancy assessment, and the IACA Significance of a Tree assessment show the risk the trees pose is unacceptable; therefore, tree damaging activity is recommended to mitigate an unacceptable risk to public or private safety due to limb drop and the like.

(iii) rectify or prevent extensive damage to a building of value as comprising any of the following:

A. a Local Heritage Place: Not applicable.
B. a State Heritage Place: Not applicable.
C. a substantial building of value: Not applicable.
and there is no reasonable alternative to rectify or prevent such damage other than to undertake a tree damaging activity: Not applicable.

(iv) reduce an unacceptable hazard associated with a tree within 20m of an existing residential, tourist accommodation or other habitable building from bushfire: Not applicable.

(v) treat disease or otherwise in the general interests of the health of the tree: Not applicable.

and / or

(vi) maintain the aesthetic appearance and structural integrity of the tree: Not applicable.

(b) in relation to a significant tree, tree-damaging activity is avoided unless all reasonable remedial treatments and measures have been determined to be ineffective. Yes, all reasonable remedial treatments and measures have been determined to be ineffective (refer to the risk reductions considerations section in this report).

CONCLUSION:

All Five Trees:

The assessment of the trees underscores the necessity for tree removal due to a confluence of interrelated biological, structural, and environmental factors. This is backed by quantified and peer-reviewed data. The findings reveal that all five trees are significantly compromised due to subdominant or codominant relationships, exhibiting phototropic bowing, historical topping with epicormic regrowth, extensive borer (*Phoracantha* spp.) damage, decay, and wind load dynamics issues due to thigmomorphogenesis—each element contributing to structural instability and elevated risk of failure.

The interconnection of the trees through thigmomorphogenesis amplifies their dependency and vulnerability. The degradation caused by biotic factors, such as bark wounds and open necrotic wounds, shortens each tree's safe useful life expectancy and significantly increases their risk profile. Tree *774* and Tree *775*, in particular, display epicormic scaffolds supporting substantial canopy mass with signs of decay and previous branch failure, representing an immediate threat. Risk assessments using the QTRA Advanced methodology confirm that each tree poses a level of harm rated at 1:4,000, which exceeds the threshold for acceptable risk (Ellison, 2018).

Additionally, no viable alternative risk mitigation measures are feasible without undermining the economic and functional viability of the site, as both pruning and engineered exclusion zones have been deemed ineffective or cost-prohibitive.

Given the evidence across all assessment sections—particularly the legal, biological, and structural analyses—it is clear that retaining these trees presents an unacceptable risk and fails to deliver significant environmental, aesthetic, or biodiversity benefits in their current condition. The trees fall short of meeting the legislative criteria under PO 1.2 and do meet PO 1.3(a)(i), (ii), and (b) under the South Australian Planning, Development and Infrastructure Act 2016, supporting their removal on both safety and regulatory grounds. Therefore, the cumulative evidence—scientifically, legally, and practically—justifies the immediate removal of all five trees.

To summarise,

- The risk the trees pose is unacceptable (refer to the QTRA Advanced risk assessment).
- The trees have a "remove < 5-year" Safe Useful Life Expectancy" (refer to the Safe Useful Life Expectancy Section).
- The trees are hazardous low significance trees within the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) ©. This equation gives the result in the tree retention matrix of,

> ***"Priority for Removal*** *- These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development."*

- The trees do not meet the Significant Trees PO 1.2 (a) (b) (c) (d) (e) and (f) to demonstrate they possess attributes worthy of a Significant Tree and so the removal of the trees is warranted on this basis alone. Further, the trees meet PO 1.3 (a) (i) (ii) and (b) in support of tree damaging activity.
- Complete removal of the trees is recommended. This requires development approval because the trees are protected by the *Planning Development and Infrastructure Act 2016 and the Planning Development and Infrastructure (General) Regulations 2017*.

Kind regards

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DISCLAIMER:

This report only covers identifiable defects present at the time of inspection. The author accepts no responsibility or can be held liable for any structural defect or unforeseen event/situation that may occur after the time of inspection.

The author cannot guarantee trees contained within this report will be structurally sound under all circumstances and cannot guarantee that the recommendations made will categorically result in the tree being made safe.

Unless specifically mentioned this report will only be concerned with above ground inspections, that will be undertaken visually from ground level. Trees are living organisms and as such cannot be classified as safe under any circumstances. The recommendations are made on the basis of what can be reasonably identified at the time of inspection; therefore, the author accepts no liability for any recommendations made.

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

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APPENDICES:

Appendix 1; Tree Photos:

Figure 2: Trees 774, 775, 798, 799, 899.

Figure 3: Tree 774 phototropically bowing.

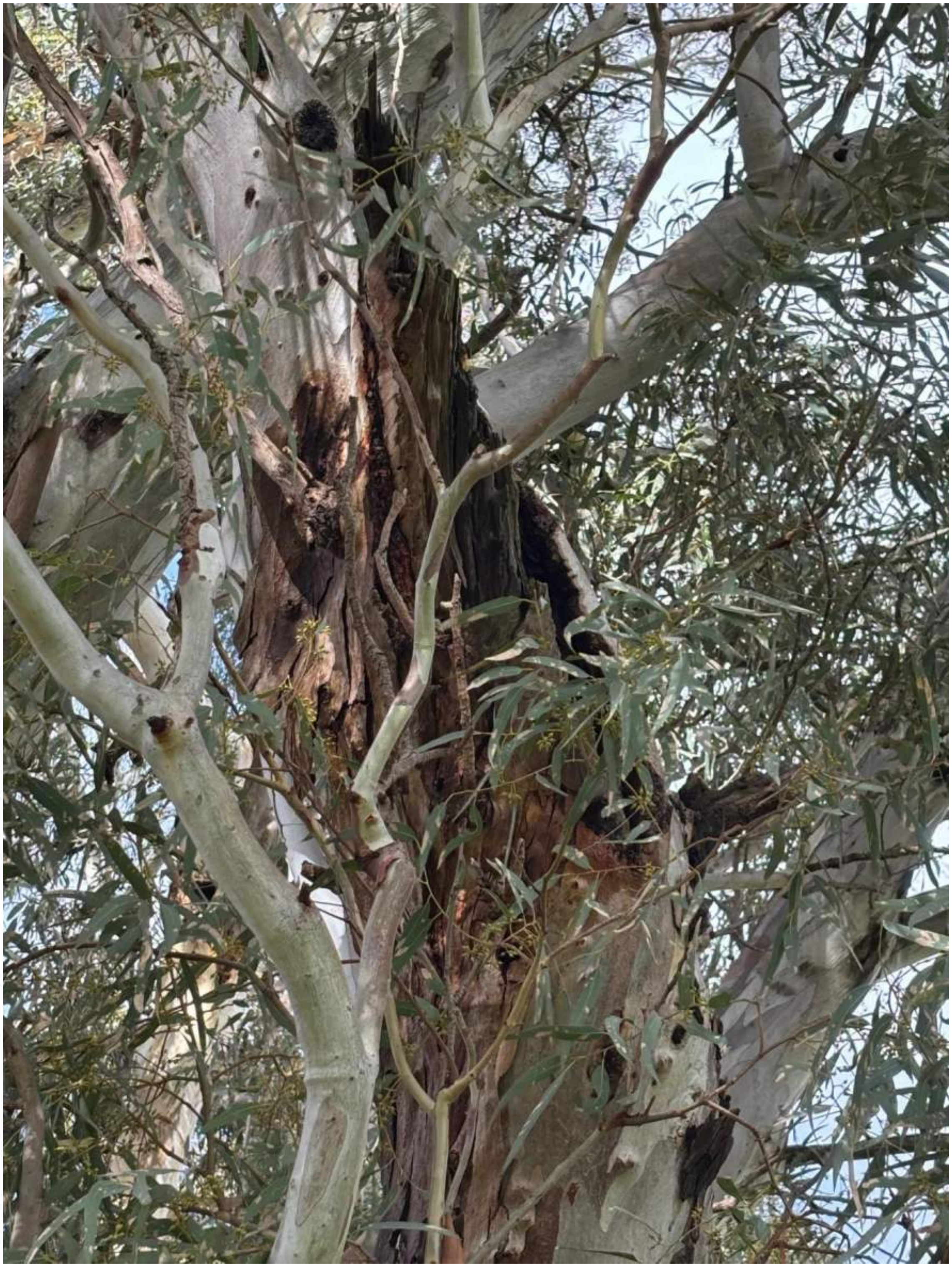

Figure 4: Large failure wound in Tree 774.

Figure 5: Decay in the primary structure of Tree 774.

Figure 6: Tree 775 phototropically bowing.

Figure 7: Decaying main union supporting epicormic growth in Tree 775.

Figure 8: Tree 799 phototropically bowing.

Figure 9: Tree 899 large open necrotic wound.

Figure 10: Tree 899 large open necrotic wound.

Appendix 2; Safe Useful Life Expectancy Categories

Barrell Safe Useful Life Expectancy (SULE)

1: Long SULE: Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.

(a) Structurally sound trees located in positions that can accommodate future growth.
(b) Trees that could be made suitable for retention in the long term by remedial tree care.
(c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.

2: Medium SULE: Trees that appeared to be retainable at the time of assessment for 15–40 years with an acceptable level of risk.

(a) Trees that may only live between 15 and 40 more years.
(b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons.
(c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
(d) Trees that could be made suitable for retention in the medium term by remedial tree care.

3: Short SULE: Trees that appeared to be retainable at the time of assessment for 5–15 years with an acceptable level of risk.

(a) Trees that may only live between 5 and 15 more years.
(b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
(c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
(d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.

4: Remove: Trees that should be removed within the next 5 years.

(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
(b) Dangerous trees because of 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 that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
(f) Trees that are damaging or may cause damage to existing structures within 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.

Appendix 3; Legend for S.T.A.R.S Matrix Assessment:

IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) ©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

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.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. 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.

IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) ©

		Significance				
Estimated life expectancy		1. High Significance in Landscape	2. Medium Significance in Landscape	3. Low Significance in Landscape	4. Environmental Pest / Noxious Weed Species	5. Hazardous / Irreversible Decline
	Long >40 years					
	Medium 15-40 Years					
	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 the Australian Standard AS4970 Protection of trees on development sites. 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.
	Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

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 in situ - 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 form typical or atypical of the species; - The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local 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 or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.

3. Low Significance in landscape

The tree is in fair-poor condition and good or low vigour; - The tree has form atypical of 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 in situ - 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.

4. 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.

5. 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.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.