Our lady Help of Christian, East Warrnambool

Targeted Tree Risk Assessment

Risk Assessment & Management Proposals

March 2022

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1. Introduction

Carters Tree Services has been engaged to undertake an assessment of trees at Our Lady Help of Christian School (OLHCS) and provide a arboricultural report. After the failure of a large section of tree in October of 2021, a targeted inspection of trees identified within the subject site by a representative of OLHSC has been requested.

This assessment will encompass tree conditions and risks currently presented in their landscape and will offer short and long-term management options.

1.1. Purpose of the Report

1. Provide an arboricultural report that identifies the subject trees to species level and provides information on each tree, including origin, dimensions and suitability for retention.

2. To offer recommendations on management of the trees, including tree protection measures for retained trees.

3. Undertake a risk assessment on assessed trees to aid in prioritising works.

This report provides comments on these issues, information is summarized and linked to conclusions and recommendations. Any works proposed are made with consideration and subject of adequate resources.

2. Methodology

A site assessment was undertaken on the 3rd day of December 2021, the site was expected from the ground with the environment and surrounding area observed, no samples of trees or soil were taken off site. Trees assessed onsite were nominated by a representative of Our Lady Help of Christian School prior to commencing the appraisal.

Details recorded for trees include:

- Species profile (Genus & Species),
- Age classification
- Origin
- Trunk diameters (Diameter at Breast Height / DBH & Basal Measurement)
- Tree condition including health and structural rating
- Canopy dimension (Tree height x Canopy spread)
- General comments
- Health description
- Retention Values

All assessments were taken from ground level utilising Visual Tree Assessments (VTA). TPZ dimensions have been assessed in conjunction with AS 4970 – 2009 *Protection of Trees on Development Sites*.

A Visual Tree Assessment (VTA) was conducted for each assessed trees , a VTA consist of an inspection of the trees and the immediate site / environment, including a visual inspection of buttress roots, trunk, branches, and canopy to determine the overall health of a tree.

A Quantified Tree Risk Assessment (QTRA) was carried out for the trees. The QTRA quantifies the risk and significance of harm or property damage from full tree or tree part and provides a risk rating for individual trees based by assigning the assessed trees a numeric value.

3. Vegetive Controls

The subject site is located within the Local Government Authority (LGA) of the Warrnambool City Council (WCC). The WCC enforces the protection of native vegetation on site with an area greater then 0.25 of a hectares. Under the clause 52:17 a permit is required to remove Victorian native vegetation.

It is likely an exemption applies to all trees (Victorian natives) within the grounds as they are planted after landscaping and considered exempt under "planted vegetation" within clause 52:17.

"*Native vegetation that is to be removed, destroyed or lopped that was either planted or grown as a result of direct seeding. Planted vegetation This exemption does not apply to native vegetation planted or managed with public funding for the purpose of land protection or enhancing biodiversity unless the removal, destruction or lopping of the native vegetation is in accordance with written permission of the agency (or its successor) that provided the funding'.*

3. Observations

3.1. Site Details

The subject site is a school zone located at 28 Selby Rd, Warrnambool VIC 3280. The site is a wholly flat modified landform with an area of 34,924.24 m² . Located throughout the site are school buildings and grassed oval areas. Trees are sporadically located throughout with the largest standings located on the perimeters of both oval areas.

3.1.1. Site Map

Figure 1. Aerial view of subject site with site boundary highlighted.

3.2. Broad Overview of Tree Assessments

A total of thirty-four (34) trees were assessed onsite, the majority of the tree assessed consist of mature medium to large *Eucalyptus* species. Many of the assessed trees have diminished health and structures, this is predominately attributed to past poor pruning practices. All trees assessed were native to Australia, fifteen (15) trees are native to Victoria.

Table 1. Species composition

Botanical Name	Common Name	No of Individuals
Acacia melanoxylon	Blackwood	1
Agonis flexuosa	Agonis	2
Allocasurina verticillata	Drooping Sheoak	1
Eucalyptus botryoides	Mahogany gum	7
Eucalyptus globulus	Blue gum	5
Eucalyptus gomphocephala	Tuart	6
Eucalyptus leucoxylon	Yellow gum	5
Eucalyptus ovata	Swamp gum	1
Eucalyptus utilis	Coastal moort	1
Eucalyptus viminalis	Manna gum	4
Melaleuca armillaris	Giant Honey myrtle	1

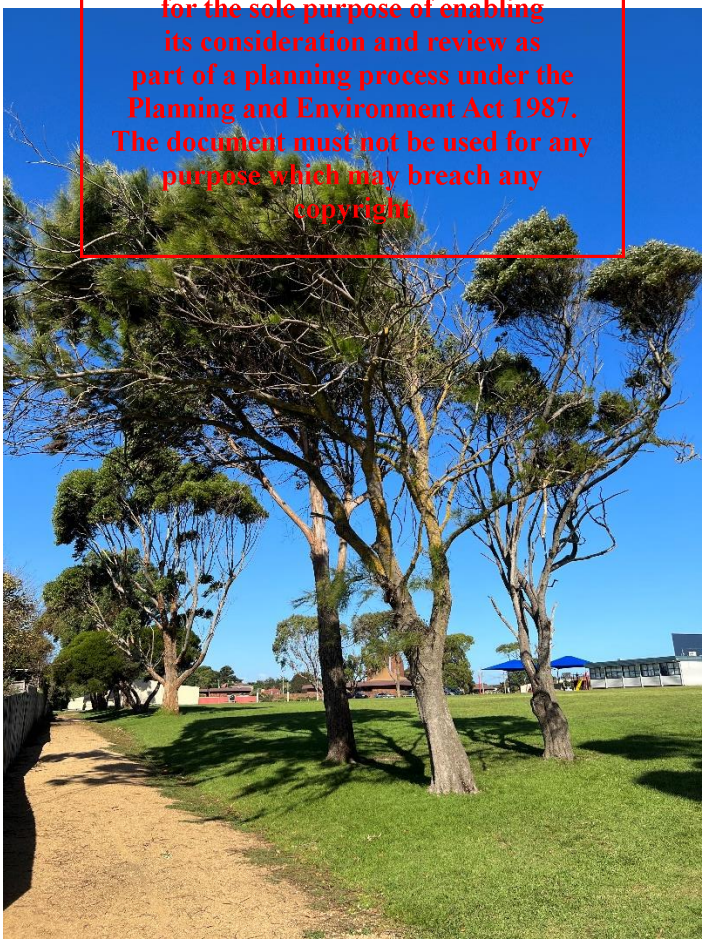

Figure 2. View of the subject site from the northwest corner.

3.3. Tree Health

The majority of tree assessed have 'fair' to 'poor' health, this is primarily due to previous past poor pruning techniques. Lopping or topping, while primarily affecting tree structure places trees under stress due to sudden canopy loss, wounds trees experience when being lopped can become sites for secondary infections or decay. In conjunction with the lopping, turf cover may be affecting trees health as well. In relation to water absorption capacity, grass is a very effective plant competitor. Collectively the root systems of both the trees and grass share the same soil depth within the soil profile. Research indicates turf can absorb >60% of all precipitation – thereby effectively leaving only >40% of percolating moisture available to other plants (in this case, the trees around the site), meaning even established trees may suffer water stress due to soil moisture deficits.

Table 2. Tree health composition.

Health	Tree Count
Fair	18
Fair- Poor	8
Good	6
Poor	2

3.4. Tree Structure

The assessed tree's structure rating was generally viewed as ' Fair' to ' Fair – Poor' as mentioned in tree health, the trees have been subjected to lopping at some stage. Lopping as opposed to target pruning exposes trees to infection, which can result in extensive decay and hazardous epicormic growth which in time lopped trees can become a high hazard (see figure 3). Other trees suffered from borer infestation and decay affecting limb and wood structure. one tree has evidence of root decay and longitude splitting (see Figure 4).

Table 3. Tree structure composition.

Structure	Tree Count
Fair	14
Fair - Poor	14
Poor	6

Figure 2. Examples of lopped canopies on Tree 21 and 22. (yellow line indicating lopped re-growth)

Figure 3. Decay of tree 12.

3.5. Useful Life Expectancy

Useful Life Expectancy (ULE) of trees is a guide used as an approximation as to how long a tree can be successfully managed within the landscape before the cost of management outweighs its ecological or amenity value. Generally, trees beyond corrective pruning or mitigating measures are reflected with shorter ULE's.

Table 4. Useful life expectancy composition.

ULE	Tree Count
0 years	1
10-19 years	8
1-4 years	4
5-9 years	21

4. Risk Assessments

A risk assessment has been completed for each tree in addition to assessing the health and condition, the risk assessment helps guide managing risk by prioritising short term works for individual trees as part of a long-term management plan. The adopted risk methodology used was the Quantified Tree Risk Assessment (QTRA) version 2015. The risk assessment is described in Appendix 4, in short, the method is broken down into the following parts: Probability of Failure (PF), Size of Likely Part Failure (FS) and Target Occupancy (TO).

These three parts are used to generate a numeric value (i.e., 1, 1,000,000 one in million chance of occurrence) for chance of occurrence to attribute a level of risk to each tree. The lower the numeric rating (such as 1/ 1,000) the higher chance of risk, whereas a greater numeric rating indicates the unlikelihood of occurrence (such as 1 / 500,000).

Table 5: QTRA Advisory Risk Thresholds (QTRA 2021)

Threshold:	Description:	Action:
	Unacceptable Risk will not ordinarily be tolerated	Control the risk
1/1 000		
	Unacceptable (where imposed on others) Risk will not ordinarily be tolerated	Control the risk Review the risk
	Tolerable (by agreement) Risk 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 Review the risk
1/ 10 000		
	Tolerable (where imposed on others) Risk are tolerable if ALARP	Assess costs and benefits of risk control Control the risk only where a significant benefit might be achieved at a reasonable cost Review the risk
1/ 1 000 000		
	Broadly Acceptable Risk is already ALARP	No action required. Review the risk

The QTRA methodology does not necessarily predict what will or will not happen to a tree at any given time, but an estimate of the risk from any particular tree hazard. It is used as a guide for the prioritisation works within groups of trees.

4.1. Summary of Tree Risk

When assessing trees, it is important to establish the difference between a hazard (any tree that can cause harm) and their risk (how great the chance the hazard will happen).

Accepting varying levels risk with any tree must be comprehended, as there is no way of removing all risk, short of removing all trees from a site, this said, even after works have been recommended and completed to leave a low level of residual risk, wherever trees are present, people, property, and activities are potentially at risk of injury, damage or disruption. All trees have the potential to become an unacceptable risk at some point (Dunster 2017).

Of the trees assessed the following risk profiles are summarised into these categories:

'Broadly acceptable' – 35 trees

'Tolerable' Risk are tolerable if ALARP – 9 trees

5. Recommended Works

Works have been recommended for twenty-nine (29) trees to reduce risk and promote longevity. For many of the lopped specimen's works have been recommended to increase their current structure rating. Some trees require complete removal as structural defects or their health have decline to a point remediating works aren't viable solutions. Any pruning works recommended, should be carried out in accordance of AS 4373 – 2007 *Pruning of Amenity Trees*, with a qualified arborist (AQF Level 3) overseeing the works.

Of the trees assessed , two (2) are high priority works:

- These works require removal.

Seven (7) trees assessed have moderate priority works recommended:

- Works include codominant reductions , removal and formative pruning

Nineteen (19) trees assessed have low priority works recommended:

- Works predominately include formative pruning and epicormic management.

Carry out works within works priority timeframes outlined in Appendix 5.

5.1. Works Priority

The following table is as a guide for works completion timeframes.

Table 5. Works priority timeframes.

Works Priority:	Timeframe:
Urgent	Complete as soon as possible
High	Works recommendations should be completed within 3 -6 months
Moderate	Works recommendations should be completed within 6 – 18 months
Low	Works recommendations should be carried out within 18 – 24 months or subject to adequate funding.

6. Conclusions

Carters Tree Services was engaged by Our Lady Help of Christian School to undertake a targeted tree risk assessment and prepare a report for tree within subject area at 2 Selby Rd, Warrnambool, Vic.

A total of thirty-four (34) trees were requiring assessment as directed by the school's representative. Of the assessed trees, nine (9) present a risk greater then 'broadly acceptable'. Past poor pruning practices carried out on many of the trees have decreased their structural integrity and ULE. Including works purposed for current risk, works have been recommended for twenty-eight (28) trees, these works are recommended to aid increasing tree structure and longevity.

7. Further Recommendations

Trees are consistently altering organisms, heavily influenced by environmental factors biotic and abiotic influences. Inspections should be undertaken to periodically to ensure trees and people co-exist amicably. The below timeframes outline inspection processes which should be adopted to ensure potential hazards are assessed and identified.

Inspection / Audit Procedure

- 1st year.

Initial audit and provide report, inclusive of reviewing of all necessary trees, recommending, and prioritising works where applicable.

- 2nd year.

Review report and complete works where required.

- 3rd year.

Audit trees and provide report, review all trees, recommend, and prioritise works where applicable.

7. References

AS 4373, 2007 *Australian Standard, Pruning Amenity Trees,* 2nd Edition, Standards Australia

AS 4970, 2009 *Australian Standard, Protection of Trees on Development Sites,* Standards Australia

Dunster, J., Smiley, E., Matheny, N. and Lilly, S. (n.d.). *Tree risk assessment manual*.

Environment, D., 1995. *The Body Language of Trees: A Handbook for Failure Analysis (Research for Amenity Trees)*. Stationery Office Books.

Harris, R., Clark, J. and Matheny, N. (2010). *Arboriculture*. Upper Saddle River, N.J.: Prentice Hall.

Hirons, A. and Thomas, P., n.d. (2018). *Applied tree biology*

L., A., 1991. *Modern Arboriculture*. Shigo & Trees Associates, LLC.

Mattheck, C. (2007). *Updated field guide for visual tree assessment*. Karlsruhe: Forschungszentrum Karlsruhe.

Appendices

Appendix 1. Data Collection Definitions

1.1. Botanical Name

The botanical name or binominal name of a plant consists of the *genus* name followed by the *species* name.

Genus is the classificational term used for grouping one or a number of closely related species, all of which share the generic name.

Species is the basic unit in the classification of plants. A species is the specific type of plant within the larger grouping of a genus.

1.2. Common Name

The colloquial and informal name of a plant.

1.3. Origin

The naturally occurring origin of a plant.

Indigenous	The plant occurs naturally within the localized environment.
Vic Native	The plant occurs naturally within Victoria, outside of the localized environment.
Native	The plant occurs naturally within Australia, outside of Victoria.
Exotic	The plant occurs naturally outside of Australia.

1.4. Age

The general age of a plant, as determined by the consulting arborist.

Juvenile	The plant has been recently planted and is still establishing in the current environment.	J
Semi- Mature	The plant is established in its current environment and is actively growing.	SM
Mature	The plant has reached the expected size for the species and location.	M
Senescent	The plant is over-mature and is in decline.	S
Dead	The plant is dead and can no longer respond to changes in its environment.	D

1.5. Health

The general health and vigour of the plant, as determined by the arborist.

Very Good	The plant is exemplary of the species and performing to its full potential.	VG
Good	Foliage of plant is entire, with good colour, very little sign of pathogens and of good density. Growth indicators are good i.e. Extension growth of twigs and wound wood development. Minimal or no canopy die back (deadwood).	G
Fair	The plant is showing one or more of the following symptoms; < 25% dead wood, minor canopy die back, foliage generally with good colour though some imperfections may be present. Minor pathogen damage present, with growth indicators such as leaf size, canopy density and twig extension growth typical for the species in this location.	F
Fair - Poor	Tree presents a combination of characteristics of both *Fair* and *Poor*.	FP
Poor	Tree is showing one or more of the following symptoms of tree decline; > 25% deadwood, canopy die back is observable, discoloured or distorted leaves. Pathogens present, stress symptoms are observable as reduced leaf size, extension growth and canopy density.	P
Very Poor	Tree is in severe decline, > 55% deadwood, very little foliage, possibly epicormic shoots, minimal extension growth.	VP
Dead	The plant is dead and can no longer respond to changes in its environment.	D

1.6. Structure

The structural integrity of the plant, as determined by the arborist.

Good	Trunk and scaffold branches show good taper and attachment with minor or no structural defects. Tree is a good example of the species with a well-developed form showing no obvious root problems or pests and diseases.	G
Fair	Tree shows some minor structural defects or minor damage to trunk e.g. bark missing, there could be cavities present. Minimal damage to structural roots. Tree could be seen as typical for this species.	F
Fair - Poor	Tree presents a combination of characteristics of both *Fair* and *Poor*.	FP
Poor	There are major structural defects, damage to trunk or bark missing. Co-dominant stems could be present or poor structure with likely points of failure. Girdling or damaged roots obvious. Tree is structurally problematic.	P
Hazardous	Tree has a high likelihood of failure within the short term.	H

1.7. Significance

The significance rating is used to determine the significance of trees in the local area. Some trees identified in local areas may be considered for the National or State register. Many trees of significance will already be registered with eh National Trust. The ratings represent the opinion of the consultant.

Trees can be considered in a local area if they fall into one or more the categories:

- Exceptional size
- Rare
- Very old
- Unusual shape or form
- Aboriginal culture value
- Historic value
- Exceptional example of the species
- Outstanding feature in the landscape
- Habitat value
- Erosion control
- Providing high amenity or planted in memorial of event or person

High	The tree can be described by one or more of the following statements; • The tree is rare, ecologically important or botanically significant. • The tree is associated with historical, commemorative or sentimental value. • The tree is an important feature of the site and is visually remarkable.	H
Moderate	The tree does not fulfil the criteria for *high significance* and can be described by <u>all</u> of the following statements; • The tree is a desirable species for the area. • The tree is established in an appropriate location. • The tree is in reasonable health/vigour and of sound structure. • The tree could be replaced within 10 - 25 years with an advanced nursery specimen.	M
Low	The tree does not fulfil the criteria for *high significance* and can be described by one or more of the following statements; • *The tree could be replaced within ten years with an advanced nursery specimen.* • *The tree is an undesirable or weed species in the area.* • *The tree is in an inappropriate location, or requires onerous management.* • *The tree is creating a nuisance or impacting on a fixed asset.* • *The tree is dead, declining or adversely affected by pest/disease.* • *The tree has developed a defective form or structural fault(s).*	L

1.8. Useful Life Expectancy (ULE)

The extent of time that the plant is expected to continue to positively contribute to the landscape, as determined by the arborist.

0 Years	Trees that are dead, in severe decline, hazardous, impacting a fixed asset, presenting an obstruction, posing weed potential or a combination of these characteristics. Should be considered for immediate removal.	1
< 5 Years	Trees that will require removal in the next 5 years for any of the reasons listed above.	2
5 – 10 Years	Trees that appear to be retainable for the next 5 – 10 years.	3
10 – 20 Years	Trees that appear to be retainable for the next 10 – 20 years.	4
20 – 30 Years	Trees that appear to be retainable for the next 20 – 30 years.	5
> 30 Years	Trees that appear to be retainable for more than 30 years.	6

Appendix 2. Works Descriptors

The following are general used works descriptors and may not pertain to a tree where particular works has been recommended i.e., *removal of northern stem.*

Removal

Complete removal of tree, stump to be either poisoned or ground to prevent regrowth.

Codominant removal / reduction

Codominant trunks are a common reason for reducing a tree's structure rating. In normal development, branches attach to the trunk of the tree via a series of interlocking wood fibres. As the tree grows, fibres from the branch are 'overlaid' by fibres from the trunk and then branch fibres overlay the trunk fibres (Shigo 1991).
One or more codominant stems are to be removed / reduced to allow an apical leader to gain dominance. These works will improve structure of tree and reduce likelihood of failure. Works to be completed by qualified arborist.

Epicormic Management / removal

Epicormic regrowth selectively removed /reduce for canopy. Works to be undertaken by qualified arborist. Follow risk reduction pruning guidelines.

Canopy uplift

Pruning of lower tier branches to allow access and area around base of tree. Pedestrian uplifts to 3m high, vehicles anywhere from 4m - 7m based on requirements.

Structural pruning

This pruning aims to alleviate existing faults. Faults may relate to weak or included bark branch unions, crossing / rubbing branches and damaged limbs. Works should be undertaken by qualified arborist with understanding of natural pruning targets.

Risk reduction pruning.

Reduction of overextended and heavily weighted limbs can reduce likelihood of failure. Selective pruning to natural viable targets should be undertaken. Care should be taken to prevent 'lion tailing' of branches. Pruning of large problematic deadwood , shortened of decayed / hollowed limbs where required.

Branches / limbs that are pruned need to be pruned to viable options. Reduction is best accomplished by cutting limbs back to their point of origin or back to a lateral branch capable of sustaining the remaining limb. Works to be carried out by qualified arborist.

Deadwood removal

Removal of deadwood to >50mm diameter through canopy. Works to be undertaken by a qualified arborist.

Weight Reduction

Pruning works undertaken to alleviate weight on leaning tree, branches selectively pruned on weighted side. All pruning cuts made to viable targets with total canopy loss equalling no more than one third of the trees original total canopy. Works to be carried out by a qualified arborist.

Appendix 3. Visual Tree Assessment (VTA) Methodology

The assessment is from the ground level only, assessing key arboricultural features and the biomechanical integrity of the tree. This including visual structural defects, unusual growth characteristics, decay, visible root zone issues, and for visual signs of general poor health such as necrotic foliage, canopy vigour, epicormic growth, parasitic growth attachment, insect and other pathological infestation.
A visual assessment of the surrounding environment is also undertaken, including presence and proximity of powerlines and other services, buildings, fences, water service locations, adjoining developments (existing or proposed) and other environmental, cultural and land-use aspects that may impact on the physical integrity of the tree, or that in turn may be affected by the tree.
An initial field guide assessment is carried out by completing the 'Visual Tree Assessment Guide'. This guide has been completed as a field guide using recognised VTA principles and typical tree defects and other physical properties. The guide divides the tree system into 5 integrated and essential components that are assessed individually:

- Root Zone
- Trunk Zone
- Branch to Truck Zone
- Canopy Zone
- Tree Form

Each zone is listed with several typical defects and know hazards to look for during the assessment. The list is a general guide designed to prompt the assessor to identify key aspects of the tree systems and to any potential issues that may present hazards. The assessment is not limited to the criteria on this field guide as many issues of poor health may not be visible without advanced equipment and assessment. If a tree exhibits other issues not included on this field guide, they need to be included in final report.

Following the field assessment of each of the five tree zones, a risk rating and a hazard-abatement score is allocated to each of the zones. The tree in its entirety is then given an overall risk rating and recommended hazard- abatement measures. If any of the seven main defects categories of high risk are identified, those defects are noted in the final assessment and the form a key determining factor in the overall evaluation of the tree and associated actions that may be required. In general, if the root zone does not pass the assessment, a recommendation for tree removal is made, the other four zones may be able to have remedial works carried out to remove or reduce those risk to an acceptable level.

Depending on the outcome of the initial root assessment, a further assessment of the root zone may be required by the way of a 'root mapping report', if the assessor is not satisfied with the root zone integrity. The root mapping report examines in detail, the underground root structure using non-invasive methods to determine the integrity of the root zone.

The assessment involves discussion and analysis of the positive and negative social aspects between the tree and those living in proximity of the tree. To ensure a long-term harmonious relationship between both, it is important to assess and place a value on the relevant social issues that can be applied to determine a final, quantified outcome.

The VTA method interprets biotic and abiotic physical factors and physiological indicators found in / on / within trees.

Mattheck, C. and Breloer, H. (1994). *The Body Language of Trees*

Appendix 4. Risk Assessment Descriptors

Target

Target Range	Property	Human (not in vehicles)		Vehicle Traffic	Ranges of Values. (probability of occupation of $1,500 000)
1	$3,400,000 – >$340,000 (£2 000,000 >£200,000)	Occupation: Pedestrians & cyclists:	Constant – 2.5 hours/day 720/hour – 73/hour	26 000 – 2 700 @ 110kph (68mph) 32,000 – 3 300 @ 80kph (50mph) 47 000 – 4 800 @ 50kph (32mph)	1/1 – >1/10
2	$340,000 – >$34,000	Occupation: Pedestrians & cyclists:	2.4 hours/day – 15 min/day 72/hour – 8/hour	2 600 – 270 @ 110kph (68mph) 3 200 – 330 @ 80kph (50mph) 4 700 – 480 @ 50kph (32mph)	1/10 – >1/100
3	$34,000 – >$3,400	Occupation: Pedestrians & cyclists:	14 min/day – 2 min/day 7/hour – 2/hour	260 – 27 @ 110kph (68mph) 320 – 33 @ 80kph (50mph) 470 – 48 @ 50kph (32mph)	1/100 – >1/1,000
4	$3,400 – >$340	Occupation: Pedestrians & cyclists:	1 min/day – 2 min/week 1/hour – 3/day	26 – 4 @ 110kph (68mph) 32 – 4 @ 80kph (50mph) 47 – 6 @ 50kph (32mph)	1/1,000 – >1/10,000
5	$340 – >$34	Occupation: Pedestrians & cyclists:	1 min/week – 1 min/month 2/day – 2/week	3 – 1 @ 110kph (68mph) 3 – 1 @ 80kph (50mph) 5 – 1 @ 50kph (32mph)	1/10,000 – >1/100,000
6	$34 – $3	Occupation: Pedestrians & cyclists:	<1 min/month – 0.5 min/year 1/week – 6/year	None	1/100,000 – 1/1,000,000

Vehicle, pedestrian, and property Targets are categorised by their frequency of use or their monetary value. The probability of a vehicle or pedestrian occupying a Target area in Target Range 4 is between the upper and lower limits of 1/1,000 and >1/10,000 (column 5). Using the VOSL $3,400,000, the property repair or replacement value for Target Range 4 is $3,400- >$340.

Probability of Failure

Probability of Failure Range	Probability
1	1/1 - >1/10
2	1/10 - >1/100
3	1/100 - >1/1,000
4	1/1,000 - >1/10,000
5	1/10,000 – >1/100,000
6	1/100,000 – >1/1,000,000
7	1/1,000,000 – 1/10,000,000

The probability that the tree or branch will fail within the coming year.

Size of Failure

Size Range	Size of tree or branch	Impact potential
1	> 450mm (>18") dia.	1/1 - >1/2
2	260mm (10 1/2") dia. - 450mm (18") dia.	½ - >1/8.6
3	110mm (4 1/2") dia. - 250mm (10") dia.	1/8.6 – 1/82
4	25mm (1") dia. - 100mm (4") dia.	1/82 – 1/ 2500

Range 1 is based on a diameter of 600mm.

This report was drafted by Carters Tree Services, it is intended use is for the consideration.

Appendix 5. Works Recommendations

Tree ID	Botanical Name	Common Name	Health	Structure	Maturity	Height (m)	Spread (m)	Observations	Comments	Action required	QTRA Risk Rating	Priority
1	*Eucalyptus leucoxylon*	Yellow gum	Fair-Poor	Fair - Poor	Mature	9	9	Hangars	Sparse canopy, previous wounding, multiply previous failures	Formative prune	1/ 1,000,000	Low
2	*Eucalyptus gomphocephala*	Tuart	Fair	Fair - Poor	Mature	15	10	Codominant	Multiply codominant unions, poor specimen	Removal	1/ 400,000	Moderate
3	*Eucalyptus gomphocephala*	Tuart	Fair	Fair - Poor	Semi-Mature	7	12	Codominant	Splitting at base, partially occluded	Removal	1/ 400,000	High
4	*Eucalyptus leucoxylon*	Yellow gum	Fair-Poor	Poor	Senescent	11	10	Lopped	Lopped canopy, in decline	Formative prune	1/ 1,000,000	Low
6	*Eucalyptus botryoides*	Mahogany	Good	Fair - Poor	Mature	12	10	Codominant	3 codominant unions	Codominant reduce/remove	1/ 1,000,000	Low
7	*Eucalyptus globulus*	Blue gum 'compacta'	Poor	Poor	Senescent	10	8	Deadwood	In decline, shaded by neighbouring mahogany	Removal	1/ 1,000,000	Low
9	*Eucalyptus globulus*	Blue gum	Fair	Fair	Mature	8	7	Codominant	Eastern codominant stem has borer	Codominant reduce/remove	1/ 1,000,000	Low
10	*Eucalyptus gomphocephala*	Tuart	Fair-Poor	Fair - Poor	Mature	11	10	Lopped	Root scalping on 3 large roots, leaf necrosis	Epicormic management	1/ 1,000,000	Low
12	*Eucalyptus botryoides*	Mahogany	Good	Poor	Mature	11	8	Decay	Trunk decay on southern side, borer actively present in sound wood	Removal	1/ 40,000	High
13	*Eucalyptus botryoides*	Mahogany	Fair	Fair - Poor	Mature	9	6	Lopped		Epicormic management	1/ 1,000,000	Low
14	*Acacia melanoxylon*	Blackwood	Poor	Poor	Senescent	7	5	Deadwood		Removal	1/ 1,000,000	Low
15	*Allocasuarina verticillata*	She oak	Fair-Poor	Fair - Poor	Mature	7	9	Deadwood	Southern wind causing decline & lean	Formative prune	1/ 1,000,000	Low
16	*Eucalyptus botryoides*	Mahogany	Fair-Poor	Fair - Poor	Mature	12	8	Lopped	Large number of dead stubs	Remove deadwood >50mm	1/ 1,000,000	Low
17	*Eucalyptus ovata*	Swamp gum	Fair-Poor	Poor	Mature	6	4	Lopped		Removal	1/ 1,000,000	Low
18	*Eucalyptus botryoides*	Mahogany	Fair	Fair - Poor	Mature	11	12	Lopped	Bracket fungi, exposed root from grade change	Formative prune	1/ 100,000	Moderate
19	*Eucalyptus botryoides*	Mahogany	Fair-Poor	Fair - Poor	Mature	12	5	Lopped	In decline	Removal	1/ 1,000,000	Low
21	*Eucalyptus gomphocephala*	Tuart	Fair	Poor	Mature	12	10	Lopped	Failed branches through canopy,	Formative prune	1/ 400,000	Moderate
22	*Eucalyptus gomphocephala*	Tuart	Fair	Fair	Mature	8	7	Lopped	Decay from lopping	Epicormic management	1/ 1,000,000	Low
23	*Eucalyptus globulus*	Blue gum	Good	Fair	Mature	8	6	Codominant	Young tree will tolerate pruning	Codominant reduce/remove	1/ 400,000	Moderate

Tree ID	Botanical Name	Common Name	Health	Structure	Maturity	Height (m)	Spread (m)	Observations	Comments	Action required	QTRA Risk Rating	Priority
24	*Eucalyptus leucoxylon*	Yellow gum	Fair-Poor	Fair - Poor	Mature	10	12	Lopped	Reduce branches over playground	Epicormic management	1/ 400,000	Moderate
25	*Eucalyptus leucoxylon*	Yellow gum	Fair	Fair	Mature	6	10	Lean	Leaning over residential	Formative prune	1/ 1,000,000	Low
26	*Agonis flexuosa*	Agonis	Good	Fair	Mature	8	12		Leaning over residential	Property/infrastructure prune, Prune defect	1/ 1,000,000	Low
27	*Eucalyptus globulus*	Blue gum	Fair	Fair - Poor	Mature	7	6	Codominant	Leaning over residential	Structural prune	1/ 1,000,000	Low
28	*Agonis flexuosa*	Agonis	Good	Fair	Mature	6	7	Codominant	Girdled roots	Formative prune	1/ 1,000,000	Low
29	*Eucalyptus viminalis*	Blackwood	Fair	Fair - Poor	Mature	9	6	Codominant		Removal	1/ 1,000,000	Low
32	*Eucalyptus viminalis*	Manna gum	Fair	Fair	Mature	13	12			Remove deadwood >50mm	1/ 1,000,000	Low
33	*Eucalyptus gomphocephala*	Tuart	Fair	Fair - Poor	Mature	12	14	Codominant	Large codominant protruding over residential	Codominant reduce/remove	1/ 400,000	Moderate
34	*Eucalyptus globulus*	Blue gum 'compacta'	Fair	Fair	Mature	10	12	Bracket Fungi	Dead stem with fungi on east of tree	Risk reduction prune	1/ 400,000	Moderate

Appendix 6. Tree Data

Tree ID	Botanical Name	Common Name	Origin	Health	Structure	Maturity	Height (m)	Spread (m)	DBH (m)	ULE	TPZ
1	*Eucalyptus leucoxylon*	Yellow gum	Vic Native	Fair- Poor	Fair - Poor	Mature	9	9	0.81	5-9 years	9.72
2	*Eucalyptus gomphocephala*	Tuart	Native	Fair	Fair - Poor	Mature	15	10	0.57	5-9 years	6.84
3	*Eucalyptus gomphocephala*	Tuart	Native	Fair	Fair - Poor	Semi- Mature	7	12	0.45	10-19 years	5.4
4	*Eucalyptus leucoxylon*	Yellow gum	Vic Native	Fair- Poor	Poor	Senescent	11	10	0.88	5-9 years	10.56
5	*Eucalyptus leucoxylon*	Yellow gum	Vic Native	Fair	Fair	Mature	8	12	0.77	10-19 years	9.24
6	*Eucalyptus botryoides*	Mahogany	Native	Good	Fair - Poor	Mature	12	10	0.48	10-19 years	5.76
7	*Eucalyptus globulus*	Blue gum 'compacta'	Native	Poor	Poor	Senescent	10	8	0.87	1-4 years	10.44
8	*Eucalyptus botryoides*	Mahogany	Native	Good	Fair	Mature	10	11	0.62	10-19 years	7.44
9	*Eucalyptus globulus*	Blue gum	Native	Fair	Fair	Mature	8	7	0.57	5-9 years	6.84
10	*Eucalyptus gomphocephala*	Tuart	Native	Fair- Poor	Fair - Poor	Mature	11	10	0.6	5-9 years	7.2
11	*Melaleuca armillaris*	Giant honey myrtle	Vic Native	Fair	Fair	Mature	6	9	0.64	5-9 years	7.68
12	*Eucalyptus botryoides*	Mahogany	Native	Good	Poor	Mature	11	8	0.62	5-9 years	7.44
13	*Eucalyptus botryoides*	Mahogany	Native	Fair	Fair - Poor	Mature	9	6	0.53	5-9 years	6.36
14	*Acacia melanoxylon*	Blackwood	Vic Native	Poor	Poor	Senescent	7	5	0.48	0 years	5.76
15	*Allocasurina verticillata*	She oak	Vic Native	Fair- Poor	Fair - Poor	Mature	7	9	0.51	5-9 years	6.12
16	*Eucalyptus botryoides*	Mahogany	Native	Fair- Poor	Fair - Poor	Mature	12	8	0.64	5-9 years	7.68
17	*Eucalyptus ovata*	Swamp gum	Vic Native	Fair- Poor	Poor	Mature	6	4	0.42	5-9 years	5.04
18	*Eucalyptus botryoides*	Mahogany	Native	Fair	Fair - Poor	Mature	11	12	1.04	1-4 years	12.48
19	*Eucalyptus botryoides*	Mahogany	Native	Fair- Poor	Fair - Poor	Mature	12	5	0.39	1-4 years	4.68
20	*Eucalyptus utilis*	Moort	Vic Native	Fair	Fair	Mature	5	7	0.26	5-9 years	3.12
21	*Eucalyptus gomphocephala*	Tuart	Native	Fair	Poor	Mature	12	10	0.83	5-9 years	9.96
22	*Eucalyptus gomphocephala*	Tuart	Native	Fair	Fair	Mature	8	7	0.74	5-9 years	8.88
23	*Eucalyptus globulus*	Blue gum	Native	Good	Fair	Mature	8	6	0.51	5-9 years	6.12
24	*Eucalyptus leucoxylon*	Yellow gum	Vic Native	Fair- Poor	Fair - Poor	Mature	10	12	0.6	5-9 years	7.2
25	*Eucalyptus leucoxylon*	Yellow gum	Vic Native	Fair	Fair	Mature	6	10	0.39	5-9 years	4.68
26	*Agonis flexuosa*	Agonis	Vic Native	Good	Fair	Mature	8	12	0.53	10-19 years	6.36
27	*Eucalyptus globulus*	Blue gum	Native	Fair	Fair - Poor	Mature	7	6	0.54	5-9 years	6.48
28	*Agonis flexuosa*	Agonis	Native	Good	Fair	Mature	6	7	0.45	5-9 years	5.4

Tree ID	Botanical Name	Common Name	Origin	Health	Structure	Maturity	Height (m)	Spread (m)	DBH (m)	ULE	TPZ
29	*Eucalyptus viminalis*	Blackwood	Vic Native	Fair	Fair - Poor	Mature	9	6	0.37	1-4 years	4.44
30	*Eucalyptus viminalis*	Manna gum	Vic Native	Fair	Fair	Mature	12	12	0.68	5-9 years	8.16
31	*Eucalyptus viminalis*	Manna gum	Vic Native	Fair	Fair	Mature	12	10	0.8	10-19 years	9.6
32	*Eucalyptus viminalis*	Manna gum	Vic Native	Fair	Fair	Mature	13	12	0.7	10-19 years	8.4
33	*Eucalyptus gomphocephala*	Tuart	Native	Fair	Fair - Poor	Mature	12	14	0.77	10-19 years	9.24
34	*Eucalyptus globulus*	Blue gum 'compacta'	Native	Fair	Fair	Mature	10	12	1.32	5-9 years	15.84

Appendix 7. Tree Protection Zones

For trees to successfully be sustained throughout any development process it is imperative consideration is given towards the tree's root systems to ensure future vitality. Tree growing requirements and underground root systems, grow subjective to their environment, species profile, water tables and various other factors. The unpredictable nature of trees and their growth, though hard to accurately ascertain must be considered. A Tree Protection Zone (TPZ) is formulated by measuring the Diameter at Brest Height (DBH) and multiplying that figure by 12 (DBH x 12 = TPZ).

The successful retention of trees on any particular site will require the commitment and understanding of all parties involved in the development process. The most important activity, after determining the trees that will be retained is the implementation of a TPZ.

The intention of tree protection zones is to:

• mitigate tree hazards.
• provide adequate root space to sustain the health and aesthetics of the tree into the future.
• minimise changes to the trees growing environment, which is particularly important for mature specimens.
• minimise physical damage to the root system, canopy and trunk.

Existing infrastructure around some trees may be within the TPZ or root plate radius. The roots of some trees may have grown in response to the site conditions and therefore if existing hard surfaces and building alignments are utilised in new designs the impacts on the trees should be minimal. Hard barriers, existing buildings, previous earth works all can cause inhabitations of a symmetrical root system.

The Structural Root Zones is formulated utilising AS 4970 – 2009, these roots are responsible for ensuring stability of the entire tree structure. Damage to these can resonate well beyond the immediate point of impact through the lower orders of roots. A tree cannot sustain loss of structural root systems and be expected to remain viable within their environment, nor expected to remain structurally sound as day-to-day stressors can incur complete failure typically related to abiotic factors such as wind loading.

Name of the consultant:

I am contactable to answer questions arising from this report.

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