



## **Tree Health & Condition Assessment Report**

**Site: 57 Stock Route, MANSFIELD.**

**Prepared for: Millar Merrigan.**

**Prepared by: Paul Jones**

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**22 April 2025: V1**

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# 1. INTRODUCTION

## 1.1 BACKGROUND

1.1.1 This Arboricultural Condition Report was prepared for **Millar Merrigan Land Development Consultants** in relation to a proposed residential lifestyle development at **57 Stock Route, Mansfield.**

1.1.2 In preparing this report, the writer is aware of and has considered the objectives of the Australian Standard *AS4970 Protection of Trees on Development Sites (2009)*.

1.1.3 The following documentation/plans were viewed in preparation of this report:

- Aerial Map. **(Appendix 2).**
- Proposed Concept Plan. **(Appendix 3).**

## 1.2 AIMS

The aims of this report are to.

- Undertake a ground-based 360-degree visual inspection of the requested trees.
- To assess the health and structural condition of the mature trees within the subject site to assist the developers in determining whether the trees are viable for retention within the proposed setting.
- Record individual tree characteristics which include tree species, origin, age, dimensions, health, structural condition, and useful life expectancy.
- Attribute an Arboricultural Retention Value to each tree assessed.
- Provide Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) radius measurements for planning purposes.

There is no warranty or guarantee, expressed or implied that problems or deficiencies regarding the subject trees or the subject site may not arise in the future. Information contained in this report covers only the subject trees assessed and reflects the condition of the subject trees at the time of inspection.

- Details of individual tree assessments can be found in **Appendix 1 Tree Assessment Table.**
- Details of the subject site and tree locations can be found in **Appendix 2 & 3.**
- Guidelines for Tree Protection Zone fencing can be found in **Appendix 5.**

### 1.3 THE SITE

The site is zoned a **General Residential Zone – Schedule 1 (GRZ1)** of the Mansfield Planning Scheme.

### 1.4 THE PROPOSAL

The supplied plans show it is proposed to subdivide the subject site into a residential lifestyle village development. (Appendix 3).

### 1.5 THE TREES

An assessment of forty (40) individual trees along with a group of approximately fifty (50) trees was undertaken on the 16<sup>th</sup> of April 2025. Refer **Appendix 1 Tree Data Table** in this report to review the findings.

- 68 trees (including the 50 trees in TG40) appear to be an externally owned (Third Party).
- Trees within the subject site with a Low Retention Value (Consider for Removal) – a total of 6 trees, Trees 8, 10, 11, 12, 13 & 19.
- Trees with a Moderate Retention Value (Consider for Retention) – a total of 7 trees, Trees 3, 4, 5, 6, 7, 20 & 23.
- Trees with a High Retention Value (Priority for Retention) – a total of 9 trees and they are Trees 1, 2, 9, 14, 15, 16, 21, 22A & 22B.

### 1.6 DISCUSSION

The most dominant tree species onsite is the *Eucalyptus camaldulensis subsp. camaldulensis* (River Red Gum) and, in my professional opinion, consideration should be undertaken regarding the suitability of the retention of a large maturing River Red Gum tree where within a retirement village.

The River Red Gum is generally, a tree to 25-40 m tall, with a broad spreading crown. It has bark that is smooth to small branches or with basal loose grey persistent flakes of rough bark, or thicker slabs on older trees; smooth bark white, cream and pale grey with yellow, pink or brown patches; branchlets non-glaucous.

As the tree matures it can develop buttress roots from its very thick trunk. *Eucalyptus camaldulensis* is the most widespread and best-known of the Australian eucalypts. As the common name would suggest it is generally found along waterways and on floodplains. Despite this, it is a very adaptable tree and will grow in a wide variety of soils and conditions.

*Eucalyptus camaldulensis* is the most widespread species of eucalypt in Australia, occurring in every mainland State. It is notably a smooth-barked tree along streams whether of permanent, seasonal or intermittent flow. (Euclid 4<sup>th</sup> edition, 2020).

*Subsp. camaldulensis* is distinguished from all other subspecies by the opercula, which are strongly beaked, stamens which are inflexed or irregularly flexed in bud, and the non-glaucous, green, narrowly lanceolate juvenile leaves. (Euclid 4<sup>th</sup> edition, 2020).

It is often said that this species drops branches with a greater propensity than other species and that the rate and type of branch drop are unpredictable. There have been a number of recent court cases where this species has been described as a notorious branch dropper and is regularly recommended for removal due to its reputation. This type of statement does not appear to be based on research or documented evidence but rather on anecdotal evidence and as such is potentially flawed. Anecdotal evidence from people who are looking at trees in an ad hoc manner is likely to result in an above-average number of trees with problems. (Marcus Lodge, Treenet 2007)

Therefore, when retaining a large River Red Gum, it's important to consider the ongoing regular inspections (minimum 5 yearly inspections) of the trees canopy along with the need to undertake crown maintenance to reduce the risk of large, very heavy branches failing needs to be considered. Also important to consider what fixed structures or high pedestrian traffic flows such as pathways, seating, etc. that are to be located under the trees canopy.

## 1.7 TREE PHOTOS



**Figure 1:** Showing Tree 1



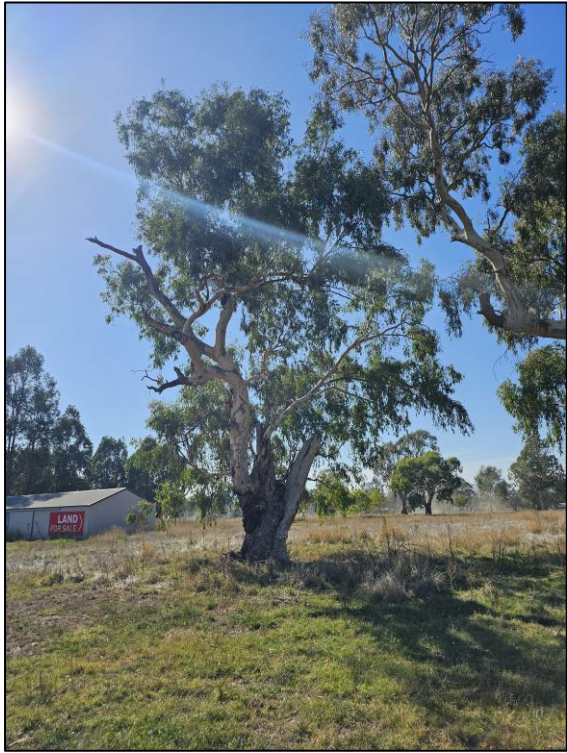
**Figure 2:** Showing Tree 2.



**Figure 3:** Showing Trees 3, 4 & 5.



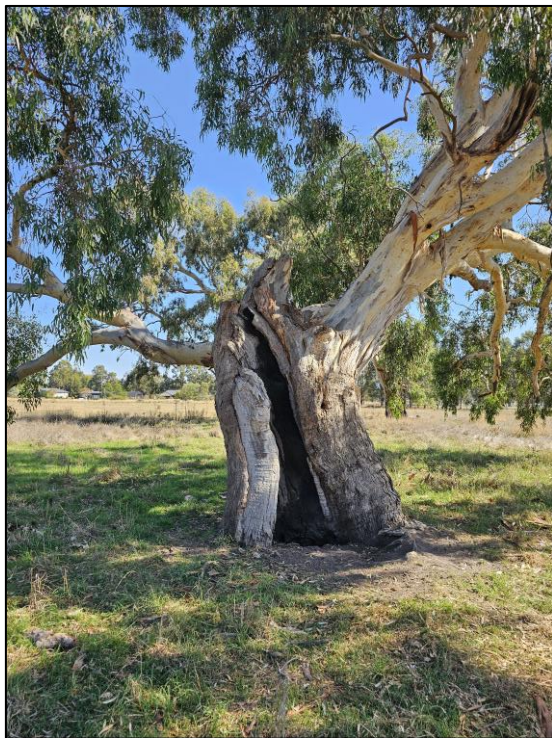
**Figure 4:** Showing Trees 6 & 7.



**Figure 5:** Showing Tree 8



**Figure 6:** Showing Tree 9.



**Figure 7:** Showing Tree 10



**Figure 8:** Showing Tree 11



**Figure 9:** Showing Trees 12 & 13



**Figure 10:** Showing Tree 13



**Figure 11:** Showing Tree 14



**Figure 12:** Showing Tree 16



**Figure 13:** Showing Tree 17



**Figure 14:** Showing Tree 18



**Figure 15:** Showing Tree 19



**Figure 16:** Showing Tree 20



**Figure 17:** Showing Tree 21



**Figure 18:** Showing Tree 22A



**Figure 19:** Showing Tree 22B



**Figure 20:** Showing Tree 23



**Figure 21:** Showing Tree 24



**Figure 22:** Showing Tree 25



**Figure 23:** Showing Tree 39



**Figure 24:** Showing Trees 30, 29, 28, 27 & 26



**Figure 25:** Showing Trees 32, 31 & 30



**Figure 26:** Showing Trees 35 & 34



**Figure 27:** Showing Trees 38, 37 & 36



**Figure 28:** Showing Tree Group 40.

## 2. RECOMMENDATIONS

2.1 The protection of all trees that are to be retained, including those trees owned by Third Parties, will need to be applied during the demolition and construction phases of the project. Care must be undertaken during the demolition and construction stages to ensure that the Tree Protection Zones (TPZ) are not affected. Please follow the **Tree Protection Guides**, where practicable, refer to **Appendix 5** of this report.

**Note:** These guidelines do not constitute a **Construction Impact Assessment (CIA)** report or a **Tree Protection & Management Plan (TPMP)** that may be used for certification purposes. The relevant authority will determine the need for such a report or the need for a Tree Protection Plan.

Please feel free to contact me to discuss any questions you or a Council Representative may have arising from this report.

No part of this report should be reproduced unless in full.

Sincerely,



**Paul Jones** – *Dip. Arb. (Cert. V.); Cert. IV Hort. (Arb.) Melb. Uni.*

Consultant Arborist - 0499 333 102

## APPENDIX 1: TREE ASSESSMENT TABLE

Tree #	Botanical Name (Common Name)	Origin	Age	Height (m)	Spread (m)	DBH (cm)	TPZ (m)	TPZ area (m <sup>2</sup> )	DaB (cm)	SRZ (m)	Health	Structure	ULE (years)	Retention Value	Comments
1	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	26	18	196	15.0	706.9	220	4.6	Fair/ Good	Fair/ Good	Long	High	Tree appears in fair to good condition overall. Observed history of large first order lower lateral branch failures. No obvious signs of significant structural faults in the main trunk bole and main scaffold leaders. Low volume smaller deadwood, good vigour.
2	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	15	17	162	15.0	706.9	190	4.3	Fair/ Good	Fair/ Good	Long	High	Tree appears in fair to good condition overall with a wide spreading form. Low volume epicormic shoots, with low volume deadwood. Observed history of several lower lateral 2 <sup>nd</sup> & 3 <sup>rd</sup> order dead branch failures although no significant structural issues or defects within the main trunk bole and main scaffold leaders, fair to good vigour.
3	<i>Platanus x acerifolia</i> (London Plane)	Exotic	Semi-mature	7	4	18	2.2	14.7	20	1.7	Good	Good	Long	Mod.	
4	<i>Platanus x acerifolia</i> (London Plane)	Exotic	Semi-mature	7	4	19	2.3	16.3	20	1.7	Good	Good	Long	Mod.	
5	<i>Platanus x acerifolia</i> (London Plane)	Exotic	Semi-mature	8	4	22	2.6	21.9	25	1.8	Good	Good	Long	Mod.	
6	<i>Platanus x acerifolia</i> (London Plane)	Exotic	Semi-mature	7	5	21	2.5	20.0	25	1.8	Good	Good	Long	Mod.	
7	<i>Platanus x acerifolia</i> (London Plane)	Exotic	Semi-mature	8	5	25	3.0	28.3	30	2.0	Good	Good	Long	Mod.	
8	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	16	9	157	15.0	706.9	180	4.2	Poor/ Fair	Poor	Short	Low	Tree appears highly stressed, mod to high volume epicormic shoots, low volume deadwood. Crown is predominately epicormic regrowth off an old stump.
9	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	14	17	130	15.0	706.9	170	4.1	Fair/ Good	Fair/ Good	Long	High	Tree appears in fair to good condition overall with a wide spreading crown. Low volume epicormic shoots, with low to moderate volume deadwood. No significant structural issues or defects within the main trunk bole and main scaffold leaders, fair to good vigour.
10	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	12	21	151	15.0	709.9	185	4.3	Fair	Poor	Short	Low	Tree appears highly stressed, mod to high volume epicormic shoots, low volume deadwood. Has lost the main central leader some years ago.
11	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	18	20	141	15.0	706.9	170	4.1	Poor/ Fair	Poor	Short	Low	Tree appears highly stressed, mod to high volume epicormic shoots, mod volume deadwood. History of large primary branch failures. Large cavity inn lower trunk, significant cambial dieback lower trunk.

Tree #	Botanical Name (Common Name)	Origin	Age	Height (m)	Spread (m)	DBH (cm)	TPZ (m)	TPZ area (m <sup>2</sup> )	DaB (cm)	SRZ (m)	Health	Structure	ULE (years)	Retention Value	Comments
12	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	20	12	182	15.0	706.9	210	4.5	Poor	Fair	Short	Low	Moderate volume deadwood, High volume epicormic shoots, history of large branch failures although trunk bole sound.
13	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	10	11	147	15.0	706.9	170	4.1	Poor/ Fair	Fair	Short	Low	Central leader has failed some years ago, crown consist predominately of epicormic shoots and deadwood throughout.
14	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	21	16	156	15.0	706.9	180	4.2	Good	Good	Long	High	Tree appears in fair to good condition overall. No obvious signs of significant structural faults in the main trunk bole and main scaffold leaders. Low volume smaller deadwood, good vigour.
15	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	22	20	181	15.0	706.9	210	4.5	Fair	Fair/ Good	Long	High	Somewhat sparse canopy. Observed history of 2 <sup>nd</sup> & 3 <sup>rd</sup> order branch failures, low volume epicormic shoots, medium volume deadwood up to 200mm in diameter, although main trunk bole sound.
16	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	25	19	187	15.0	706.9	210	4.5	Good	Good	Long	High	Tree appears in fair to good condition overall. No obvious signs of significant structural faults in the main trunk bole and main scaffold leaders. Low volume smaller deadwood, good vigour.
17	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	18	14	154	15.0	706.9	170	4.1	Fair/ Good	Good	Long	High	Neighbours tree, maybe impact on by any proposed road upgrade works.
18	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	15	16	169	15.0	706.9	180	4.2	Fair/ Good	Good	Long	High	Neighbours tree, maybe impact on by any proposed road upgrade works.
19	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	18	14	140	15.0	706.9	200	4.4	Poor/ Fair	Fair	Short	Low	Low volume deadwood, High volume epicormic shoots, cambial dieback on lower trunk – appears stressed.
20	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	22	17	142	15.0	706.9	190	4.3	Poor/ Fair	Fair	Med.	Mod.	Sparse canopy cover, moderate to high volume epicormic shoots, moderate volume deadwood, Sound within main trunk bole and sound main scaffold attachment.
21	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	26	21	186	15.0	706.9	220	4.6	Fair	Fair/ Good	Long	High	Tree appears in fair to good condition overall. Low volume epicormic shoots, with low to moderate volume deadwood. No significant structural issues or defects within the main trunk bole and main scaffold leaders.
22A	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	27	20	170	15.0	706.9	190	4.3	Fair	Fair/ Good	Long	High	Tree appears in fair to good condition overall. Low volume epicormic shoots, with low to moderate volume deadwood. No significant structural issues or defects within the main trunk bole and main scaffold leaders.
22B	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	22	18	155	15.0	706.9	170	4.1	Fair	Fair/ Good	Long	High	Tree appears in fair to good condition overall. Low to moderate volume epicormic shoots, with low volume deadwood. No significant structural issues or defects within the main trunk bole and main scaffold leaders. Infested with Lerp/Psyllid.
23	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	24	18	190	15.0	706.9	210	4.5	Poor/ Fair	Fair	Med.	Mod.	Sparse canopy cover, moderate to high volume epicormic shoots, moderate volume deadwood, Sound within main trunk bole and sound main scaffold attachment.

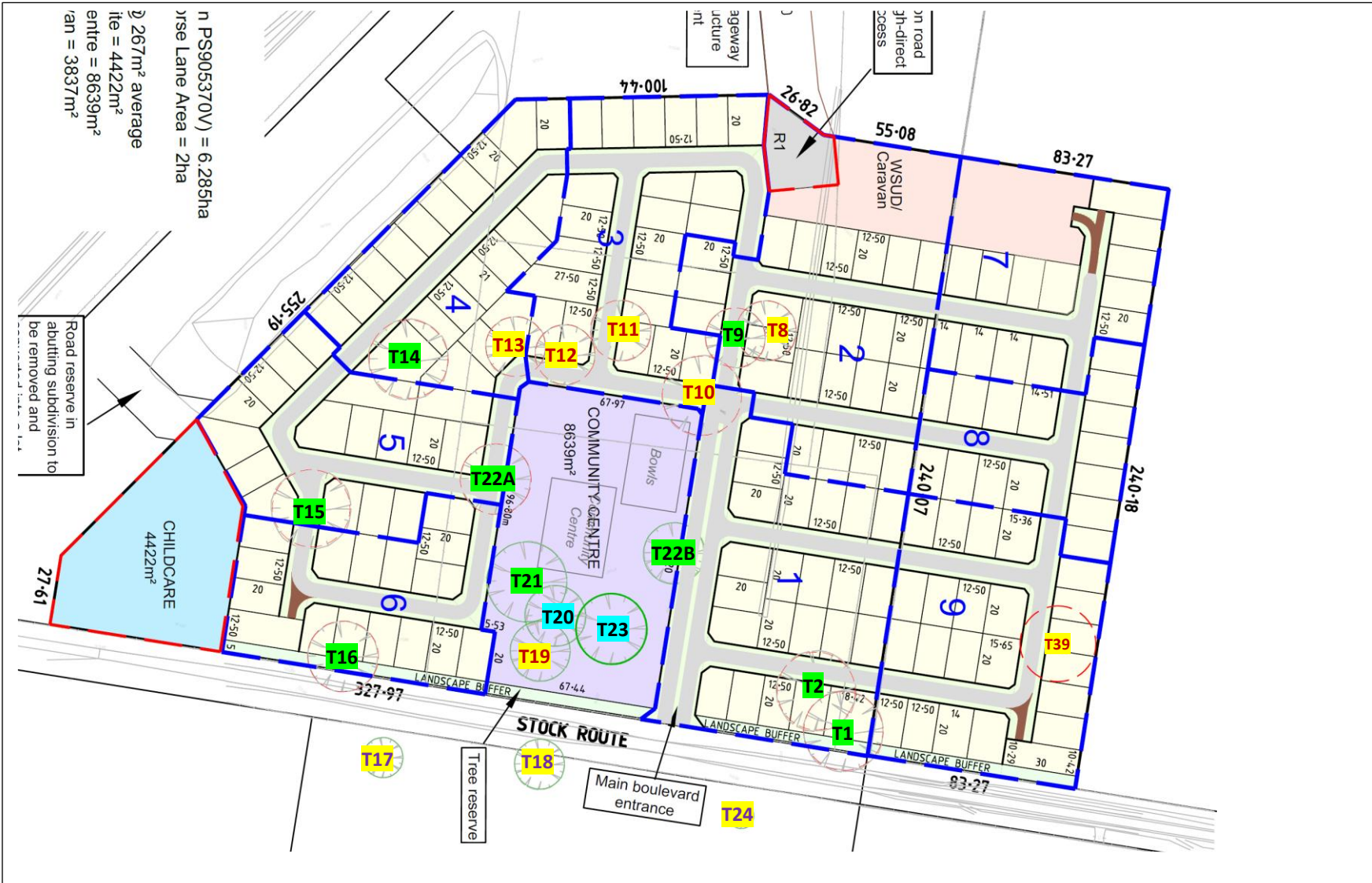
Tree #	Botanical Name (Common Name)	Origin	Age	Height (m)	Spread (m)	DBH (cm)	TPZ (m)	TPZ area (m <sup>2</sup> )	DaB (cm)	SRZ (m)	Health	Structure	ULE (years)	Retention Value	Comments
24	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	27	14	180	15.0	706.9	210	4.5	Fair	Fair/ Good	Long	High	Neighbours tree, maybe impact on by any proposed road upgrade works.
25	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Semi-mature	10	8	58	7.0	152.2	70	2.8	Fair/ Good	Good	Long	High	Within the Road Reserve.
26	<i>Eucalyptus melliodora</i> (Yellow Box)	Vic. Native	Semi-mature	12	9	44, 38, 29	7.8	191.1	80	3.0	Good	Fair/ Good	Long	High	Neighbours tree
27	<i>Eucalyptus melliodora</i> (Yellow Box)	Vic. Native	Semi-mature	9	7	28	3.4	35.5	30	2.0	Good	Fair	Long	Mod.	Neighbours tree
28	<i>Eucalyptus melliodora</i> (Yellow Box)	Vic. Native	Semi-mature	12	8	34	4.1	52.3	40	2.3	Good	Good	Long	High	Neighbours tree
29	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Semi-mature	14	7	46	5.5	95.7	50	2.5	Good	Good	Long	High	Neighbours tree
30	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Semi-mature	11	5	23	2.8	23.9	30	2.0	Poor	Fair	Short	Low	Neighbours tree
31	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Semi-mature	15	12	53	6.4	127.1	70	2.8	Good	Good	Long	High	Neighbours tree
32	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Semi-mature	14	9	51	6.1	117.7	70	2.8	Good	Good	Long	High	Neighbours tree
33	<i>Eucalyptus baueriana</i> (Blue Box)	Vic. Native	Semi-mature	8	7	39	4.7	68.8	50	2.5	Fair/ Good	Good	Long	High	Neighbours tree
34	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	14	10	61	7.3	168.3	70	2.8	Good	Good	Long	High	Neighbours tree
35	<i>Eucalyptus baueriana</i> (Blue Box)	Vic. Native	Semi-mature	9	9	37, 22	5.2	83.6	50	2.5	Good	Fair	Long	Mod.	Neighbours tree

Tree #	Botanical Name (Common Name)	Origin	Age	Height (m)	Spread (m)	DBH (cm)	TPZ (m)	TPZ area (m <sup>2</sup> )	DaB (cm)	SRZ (m)	Health	Structure	ULE (years)	Retention Value	Comments
36	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	15	10	62	7.4	173.9	70	2.8	Good	Good	Long	High	Neighbours tree
37	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Semi-mature	11	12	32, 39	6.0	114.9	60	2.7	Fair/ Good	Fair	Med.	Mod.	Neighbours tree
38	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Semi-mature	8	7	36	4.3	58.6	40	2.3	Fair/ Good	Good	Long	High	Neighbours tree
39	<i>Eucalyptus camaldulensis</i> (River Red Gum)	Indig.	Mature	18	20	176	15.0	706.9	190	4.3	Poor/ Fair	Fair	Short	Low	Neighbours Tree - Tree appears in decline, sparse canopy cover, structurally sound in the main trunk although moderate volume epicormic shoots and large deadwood and with poor vigour, poor twig growth. Upper half of canopy showing more dieback than lower half.
TG40	<i>Eucalyptus globulos subsp. bicostata</i> (Eurabbie)	Vic. Native	Semi-mature	17	6	40	4.8	72.4	50	2.5	Fair	Good	Long	High	Group of approximately 50 trees planted along the fence line within the adjoining property in rows about 3 deep. They range in heights from 12 to 17m with an average canopy spread of 6 to 7m. Their DBH @ 1.4m above ground is up to 40cm. Their overall condition ranges from fair to good with just the single dead tree observed. Their structure is generally sound and are predominately single trunk specimens.

**APPENDIX 2: TREE LOCATION PLAN/AERIAL VIEW**



### APPENDIX 3: PROPOSED CONCEPT PLAN



## APPENDIX 4: ASSESSMENT TERMS & DEFINITIONS

### TREE ASSESSMENT DESCRIPTORS:

#### Age

<b>Young:</b>	Juvenile tree recently planted.
<b>Semi-mature:</b>	Tree still growing
<b>Maturing:</b>	Specimen is reaching expected size in current situation
<b>Senescent:</b>	Tree is over mature and appears in decline
<b>Dead:</b>	Tree is dead

#### Form

<b>Symmetric:</b>	Canopy full and symmetrical
<b>Asymmetric:</b>	Minor asymmetry or suppression. Considered typical for species in situation.
<b>Modified:</b>	Canopy suppressed, major asymmetry. Stump re-growth. Hedged, pollarded, pruned for powerline clearance, etc.

#### Health

<b>Good:</b>	Crown full, good density, foliage entire, with good colour, minimal or no pathogen damage. Good growth indicators, e.g. extension growth. No or minimal canopy dieback. Good wound-wood and callus formation.
<b>Fair:</b>	Tree is exhibiting one or more of the following symptoms: Tree has <30% deadwood. Or can have minor canopy dieback. Foliage generally with good colour, some discolouration may be present, minor pathogen damage present. Typical growth indicators, e.g. extension growth, leaf size, canopy density for species in location may be slightly abnormal.
<b>Poor:</b>	Tree has >30% deadwood. Canopy dieback present. Discoloured or distorted leaves and/or excessive epicormic re-growth. Pathogen is present and/or stress symptoms that could lead to or are contributing to the decline of tree.
<b>Dead:</b>	Tree is dead.

#### Structure

<b>Good:</b>	Good Branch attachment and/or no minor structural defects. Trunk and scaffold branches sound or only minor damage. Good trunk and scaffold branch taper. No branch or over extension. No damage to structural roots and/or good buttressing present. No obvious root pests or diseases.
<b>Fair:</b>	History of minor (second and/or third order) branch failures. Some minor structural defects and/or minimal damage to trunk. Bark missing. Cavities could be present. Minimal or no damage to structural roots. Typical structure for species. Minor bark included unions.
<b>Poor:</b>	Major structural defects and/or trunk damaged and/or missing bark. Large cavities and/or girdling or damaged roots that are problematic. History of major (first order) branch failures. Significant included bark unions.
<b>Hazardous:</b>	Tree poses immediate hazard potential that should be rectified as soon as possible.

**USEFUL LIFE EXPECTANCY**

Useful Life Expectancy (ULE) means that in a planning context the length of time a tree can be maintained as a useful amenity and not a liability is by far the most important long-term consideration. ULE is contingent on many obvious management assumptions and the fundamental principles of public safety and usefulness in the landscape. Trees are a renewable resource. Weed species are generally assigned a lower ULE regardless of their condition and the replacement of such trees is preferable.

<b>Exceeded/Hazardous</b>	Tree maybe dead or very advanced stage of decline. Tree may exhibit major structural faults. Tree maybe in a stage of imminent failure with high risk potential that cannot be remedied.
<b>Short (&lt;10 years)</b>	Tree appears in an advanced stage of decline. Crown is likely to be less than 50% typical density. Crown may be mostly epicormic growth. Dieback of large limbs is common. Tree maybe over-mature and senescing. Heightened risk potential. Tree has outgrown or at maturity will most likely become too large within the site constraints. Maybe a species of low material constraint that can be readily replaced with an advanced nursery stock. Maybe a weed species. Consider tree removal and replacement tree/s should be planted.
<b>Medium (10-40 years)</b>	Tree appears in early decline. Crown density is less than typical and epicormic growth is likely to be present. The crown may still be mostly entire, but some dieback is likely to be evident. Dieback may include large limbs. Over-maturing and senescing or early decline symptoms may be present in short-lived species.
<b>Long (40+ years)</b>	Tree displaying normal growth characteristics. Generally juvenile and semi-mature trees exhibiting normal growth characteristics, could also be maturing, long lived species. Tree well suited to the site.

## ARBORICULTURAL RETENTION VALUE

The Retention Value is determined as a result of the collation of the data set (species, size, health, structure, form and site conditions etc.) in relation to the following retention descriptors:

<b><u>High</u> – Retain &amp; Protect</b>	A tree in good overall condition that has the potential to positively contribute to the landscape in the mid to long term if appropriately managed. Species is suited to its existing site conditions. Ideally, trees with a high retention value should be retained and incorporated into the development. The tree is worthy of material constraint.
<b><u>Moderate</u> - Retain if possible</b>	A tree with beneficial attributes and suited to the site and, if practical, designs should be altered to accommodate this tree. The tree is likely to tolerate changes in its environment. Remedial works may be required but tree should remain viable within reasonable limits. The tree may tolerate being transplanted.
<b><u>Low</u> – Not worth retraining</b>	The tree is not worthy of material constraint and can be readily replaced.  The tree may be in poor to fair health and/or structure, dead, diseased, in an advanced stage of decline and unlikely to recover, senescent or just not suitable for this site. The tree has outgrown or at maturity will become too large within the site constraints and become problematic. Trees that have a “Low” retention value are likely to require removal prior to any development works.
<b><u>NIL</u> – Hazardous and/or Weed Species</b>	A tree with severe health and/or structural defects that cannot be rectified through reasonably practicable arboricultural works and therefore potentially hazardous to nearby structures or people.  The tree is classed as a noxious or environmental weed species and is detrimental to the environment. Trees that have “No” retention value are likely to require immediate removal.  Tree may be inter-dependent with surrounding trees and will be unable to be retained once adjacent shelter trees are removed.
<b><u>Third Party</u> – Retain &amp; Protect</b>	The tree is located outside the subject site. It may be owned by a private entity or a public body. The tree has been assessed on the assumption that its owner requires retention of the tree. Discussions with the relevant owner, ideally prior to any development works, may result in the removal of the subject tree.

## TREE ASSESSMENT DEFINITIONS:

- Aerial inspection:** Where the subject tree is climbed by a professional tree worker or arborist specifically to inspect and assess the upper stem and crown of the tree for signs or symptoms of defects, disease, etc.
- Amenity:** Amenity relates to the trees biological, functional and aesthetic characteristics within an urban environment. (Hitchmough, 1994)
- Co-dominant:** Refers to stems or branches equal in size and relative importance.
- Compression wood:** Type of reaction wood produced by conifers on the underside of branches and leaning trunks.
- Condition:** Refers to the tree’s form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

<b>Dead wood:</b>	Refers to any whole limb that no longer contains living tissues (e.g. live leaves and/or bark). Some dead wood is common in a number of tree species.
<b>Decay:</b>	Process of degradation of woody tissues by fungi or bacteria through decomposition of cellulose and lignin. There are numerous types of decay that affect different types of tissues, spread at different rates and have different effect on both the tree's health and structural integrity.
<b>Diameter at Breast Height (DBH):</b>	Refers to the tree trunk diameter at breast height (1.4 meters above ground level)
<b>Dieback:</b>	Death of growth tips/shoots and partial limbs, generally from tip to base. Die back is often an indicator of stress and tree health.
<b>Epicormic Shoots:</b>	Which arise from adventitious or latent buds. These shoots often have a weak point of attachment. They are often a response to stress in the tree. Epicormic growth/shoots are generally a survival mechanism, often indicating the presence of a current or past stress event such as fire, pruning, drought, etc.
<b>Hazard:</b>	Refers to anything with the potential to harm health, life or property.
<b>Health:</b>	Refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.
<b>Included bark:</b>	Refers the pattern of development at branch or stem junctions where bark is turned inward rather than pushed out. This fault is located at the point where the stems/branches meet. This is normally a genetic fault and potentially a weak point of attachment as the bark obstructs healthy tissue from joining together to strengthen the joint.
<b>Retention Value:</b>	Relates to the combination of the tree condition factors (Form, Health, Structure)
<b>Scaffold branch/root:</b>	A primary structural branch of the crown or primary structural root of the tree.
<b>Structural Root Zone (SRZ):</b>	This zone is often the location of the tree's structural support roots. The SRZ is the area required for tree stability. Excavation within this area may seriously destabilize the tree. The SRZ only needs to be calculated when encroachment into the TPZ is proposed. Fully elevated construction within this area is possible with specific root zone assessment. The minimum SRZ given will never be less than 1.5 metres for a tree with a stem diameter less than 150mm.
<b>Suppressed:</b>	In crown class, trees which have been overtopped and whose crown development is restricted from above.

- Tension wood:** Type of reaction wood produced by broad-leaved tree species which forms on the upper side of branches, stems and leaning trunks.
- Topping or heading:** Refers to a non-acceptable pruning practice that results in the removal of terminal growth leaving a cut stub end. Topping causes serious damage to the tree.
- Tree Protection Zone (TPZ):** Generally, the minimum distance from the center of the tree trunk where protective fencing or barriers are to be installed to create an exclusion zone. **The TPZ** surrounding a tree aids the tree's ability to cope with disturbances associated with construction works. Tree protection involves minimising root damage that is caused by activities such as construction. Tree protection also reduces the chance of a tree's decline in health or death and the possibly damage to structural stability of the tree from root damage. To limit damage to the tree, protection within a specified distance of the tree's trunk must be maintained throughout the proposed development works. No excavation, stockpiling of building materials or the use of machinery is permitted within the Tree Protection Zone (TPZ).
- Visual Tree Assessment (VTA):** A procedure of defect analysis developed by Mattheck and Breloer (1994) that uses the growth response and form of trees to detect defects.

## APPENDIX 5: TREE PROTECTION GUIDELINES

### Tree Protection Background

Each tree is assessed individually for their tree protection requirements based upon the Australian Standard AS4970-2009 Protection of trees on development sites. The protection requirements are calculated based upon trunk diameter of the tree measured at breast height (1.4m above ground). These calculations produce what is referred to in this report as the Tree Protection Zone (TPZ) and is provided as a measurement in meters in a radius of the trunk.

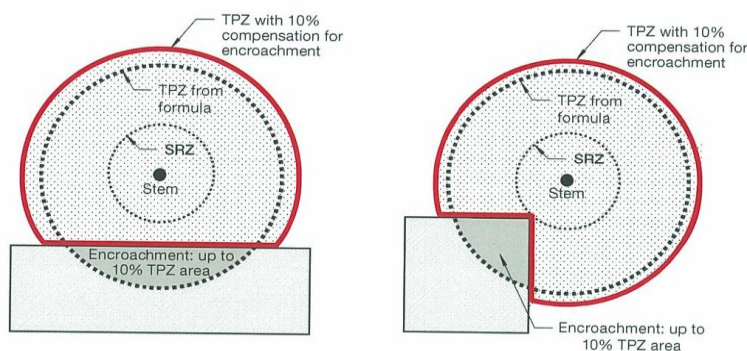
The TPZ is the zone in which protective measures should be applied in order to protect the tree/s whilst maintaining the current levels of health and vigour.

Determination of the structural root zone is provided as the Structural Root Zone (SRZ). The structural root zone calculations of the tree, based upon the Australian Standard AS4970-2009. The SRZ determines the minimum distance around the tree in which the structural stability of the tree can be maintained.

It's important to note that the SRZ only determines the root plate area or the zone of rapid taper. Excavation within this area will not only cause decline in tree vigour but may also cause catastrophic tree failure (Coder 1996).

Often it is difficult to protect the entire TPZ due to site constraints. In such events it is imperative that condition and species tolerance to disturbance are evaluated in conjunction with the site characteristics. Helliwell (1985) and Harris (1999) identified that a healthy tree may tolerate removal of up to one-third of its roots and possibly up to 50% in some cases, although stability may be compromised at this level of root loss.

In situations where the TPZ of a tree to be retained will be in close proximity to a proposed development or where there will be encroachment into the TPZ of a tree, a specific tree protection management plan should be developed. This plan provides prescriptive measures to protect trees on development sites.



## Tree Protection Measures

The following requirements are only provided for basic guidance with the design phase for a project. These guidelines do not constitute a specific **Tree Management Plan (TMP)**.

1. A tree protective fence should be installed at the recommend distance allocated for each tree that is to be retained. The fence should ideally be located, as a minimum, at the TPZ distance provided (**Refer Appendix 8 TPZ Fencing Plan**).
2. The protection fence must be rigid (i.e. chainmesh temporary fencing panel) and must be a minimum of 1.8 meters high. Fencing should be firmly attached to a removable concrete or similar base.
3. In cases where the TPZ cannot be entirely fenced, it is recommended that ground protection is used. Specific ground protection requirements will form part of a tree protection management plan that should be developed for each tree to be retained.
4. No soil levels must be altered within the fenced TPZ area, no heavy machinery can pass within this area and no spoil, chemicals, building materials or refuse should be stored within this area. Nothing whatsoever should be attached to the tree (except tape to identify the tree to be protected).
5. The area within the tree protection fence should be covered with a layer of organic composted mulch to a depth of 50-100mm prior to the commencement of the project.
6. The tree protective fencing should be installed prior to any works (including demolition) commencing on site and should remain in place until all development work is completed. The protective fencing should be located at the prescribed distances and clearly signed with **"TREE PROTECTION ZONE- Keep Out"** and fixed to the TPZ fencing.
7. An area should be designated on site, which is at least a distance of 10 meters away from any tree protection zones of any tree to be retained, where all building materials, chemicals etc. can be stored throughout the proposed development.
8. Open trenching for underground services located within the recommended TPZ must be avoided. Should there be no alternative for service location; the services must be bored underneath the TPZ with the use of non-destructive boring methods to the satisfaction of the Relevant Authority.
9. Soil moisture during construction should be maintained. Water is to be applied at a volume and frequency required to maintain turgor and leaf retention and encourage healthy root development.
10. If pruning works are recommended the pruning must be carried out in accordance with the Australian Standard AS4373-2007 – Pruning of amenity trees and should be performed by a qualified practicing Arborist (Min. Cert 3 Arb.). If pruning works are to be undertaken, then these works should be carried out prior to any construction works beginning on site.

## APPENDIX 6: CONSTRAINTS

- **Tree Assessment** is based on external visual examination from ground level only. No internal decay diagnostic equipment was used, no excavation of the root plate undertaken, and no samples removed for further analysis unless otherwise stated.
- **Risk Assessment** is provided only as an estimation of the potential of the tree(s) listed in this report as to their probability to cause damage to people and / or property and cannot be considered to constitute a prediction of future events.
- Recommendations contained in this report are based on the measurements and observations prevalent at the time of inspection. Future changes or site development may render this report and recommendation invalid.
- Care has been taken to obtain all information from reliable sources. All data has been verified in so far as possible, however, *Arb Inspect Tree Risk Management Services Pty Ltd* can neither guarantee nor be responsible for the accuracy of the information provided by third parties.
- Any legal description, titles and ownership of any property provided to the *Consulting Arborist* are assumed to be correct. No responsibility is assumed for matters legal in character.
- Maps, diagrams and photographs in this report are included as visual aids. They cannot be considered to be to scale and are not intended to be used to locate trees or in the place of structural and / or architectural plans.
- Loss or alteration of any part of this report invalidates the entire report.
- Possession of this report or a copy thereof does not imply right of publication or use for any purpose by anyone but the person to whom it was commissioned by, without the prior written consent of *Arb Inspect Tree Risk Management Services Pty Ltd*
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