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For

Heather Stewart

Site location

Cnr Reserve & Balcombe Road, Beaumaris

Report type

Arboricultural Construction Impact Assessment

Prepared by

Aaron Pabst

Diploma of Arboriculture (Dip.Arb.)

and

Roger Greenwood

B. App. Sci. (Hort)
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Thursday, 24 November 2016

Ref: 4068 161208 CIR Stewart Cnr Reserve & Balcombe Beaumaris Rds

Table of contents

1. Summary

This report was commissioned by Heather Stewart on behalf of Beaumaris Conservation Society Inc. to assess the condition of 35 trees located on or adjacent to Cnr Reserve and Balcombe Road, Beaumaris and to evaluate the impacts on these trees arising from the proposed development on this site.

Of these trees:

1. One tree (T153) is recommended for removal irrespective of development of the site.
2. Five trees will not be impacted under the revised plans.
3. Twenty-nine trees will be impacted by the proposed development.
    a. Ten of these trees are agreed to be removed.

2. Document control

File reference	File type	Modifications	Date
4068 161129	*CIR*	Original document. Construction impact assessment for 46 trees.	29/11/2016
4068 161205	*CIR*	Inclusion of T268 and T269 to report. Elimination of trees 246, 247, 249, 258, 501, 502, 503 & 504	06/12/2016
4068 161208	*CIR*	Discussion of "*10.15 Gareth Avenue Trees*" and "*10.16 Reserve Road Trees*" Included Roger Greenwood as author of report (previously omitted).	08/12/2016

3. Introduction

This report was commissioned by Heather Stewart on behalf of Beaumaris Conservation Society Inc. to assess the condition of 35 trees located on or adjacent to Cnr Reserve and Balcombe Road, Beaumaris and to evaluate the impacts on these trees arising from the proposed development on this site.

Specifically the report addresses the following issues:

- The health and structural condition of the trees.
- The suitability of these trees for retention on the site in light of the proposed development.
- The impact of the development on these trees.
- Recommendations for the protection of these trees.

This report is based, in part, on the plans provided and the accuracy of these plans is assumed. Inaccuracies in the plans provided may invalidate all or parts of this report.

The location of services within the site is not known and the possible effects of these on the retained trees is not included within this report.

The site was inspected by Aaron Pabst of this office on 02/11/2016 and 16/11/2016.

4. Documents reviewed

The following documents were reviewed in the preparation of this report.

Date	Title	Author	Company
15/11/2015	Proposed Site Plan	Not stated	Clarke Hopkins Architects

5. Scope

All of those trees that are marked for removal and considered significant to the site, and that are located either on the site or within four metres of the site boundaries are addressed in this report.

Significant trees are generally those that are greater than five metres in height and/or with a Diameter at Breast Height (DBH) of greater than 15 cm.

6. Site context

This site is located within a Public Use Zone within the municipal area of Bayside.

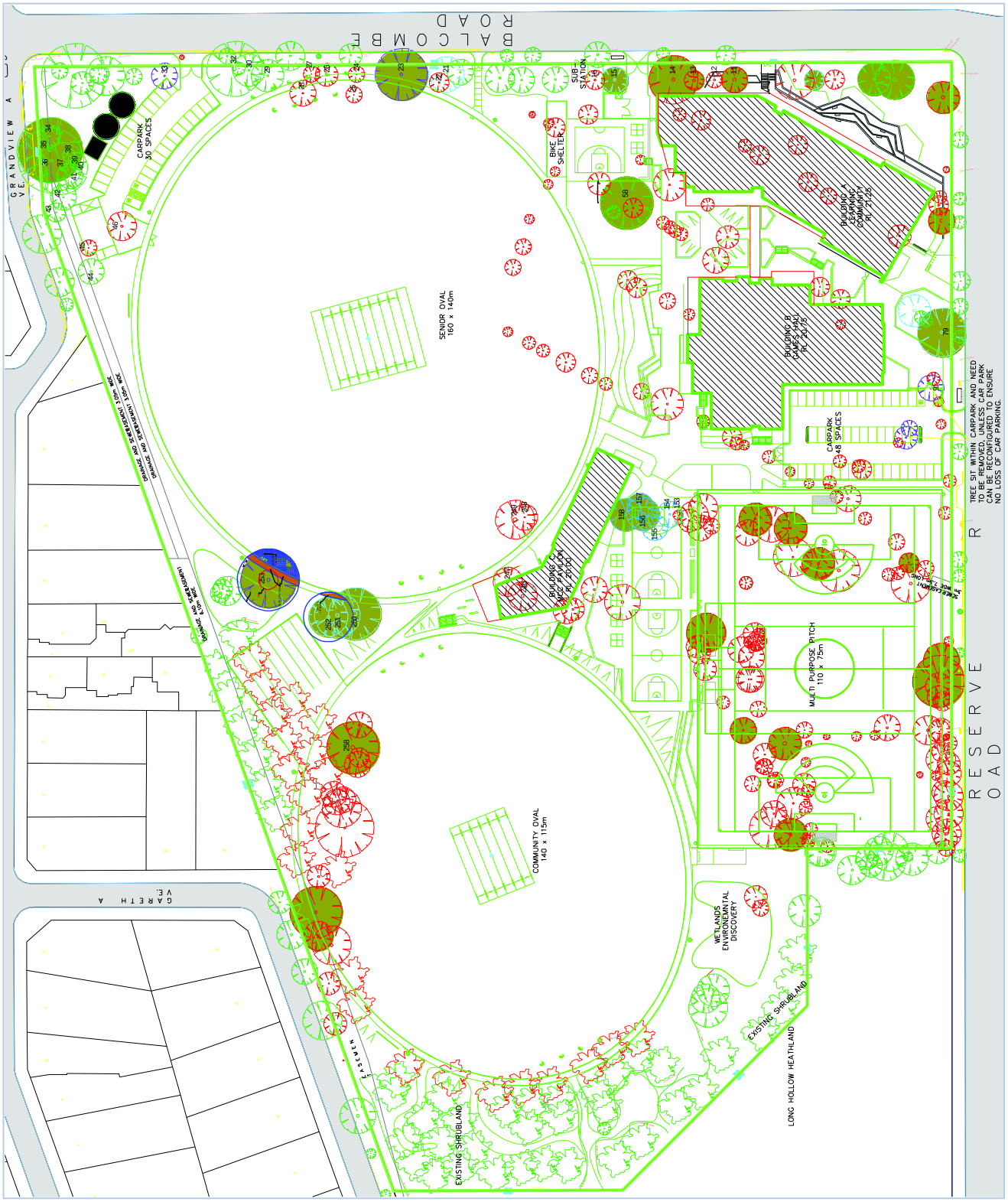
The following town planning overlays are applicable to this site:

1. Design and Development Overlay – Schedule 2 (DDO2).
2. Special Building Overlay (SBO).
3. Vegetation Protection Overlay – Schedule 3 (VPO3).
    a. This overlay pertains to the oruning and removal of trees. However it is understood that the Dept. of Education is exempt from such overlays.

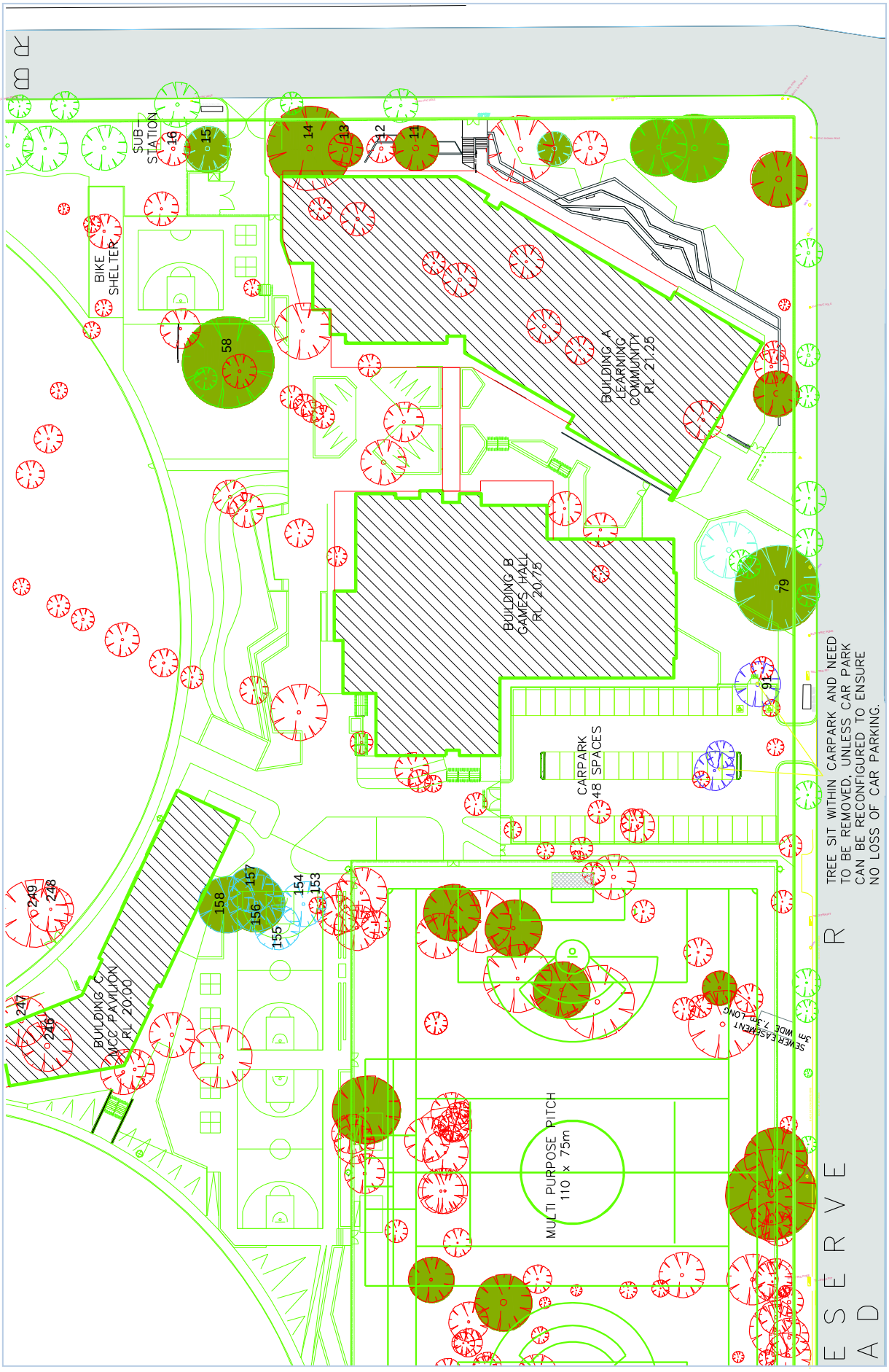
7. Notes

1. The column label "**ID"** is used in all the tables throughout this report. This refers to the tree identification number and to the tree numbering found on the "Site plan". This number is the same as the **"Tree ID"** found in the "Tree data" section of the report.
2. Only those trees that were marked for removal within the existing plans and considered valuable by the client were assessed as part of this report
3. The tree numbers within this report have been matched to those of the report previously carried out by Tree Dimensions for clarity.
    a. Only those trees that have been assessed as part of this report are numbered on the attached Site Plan.

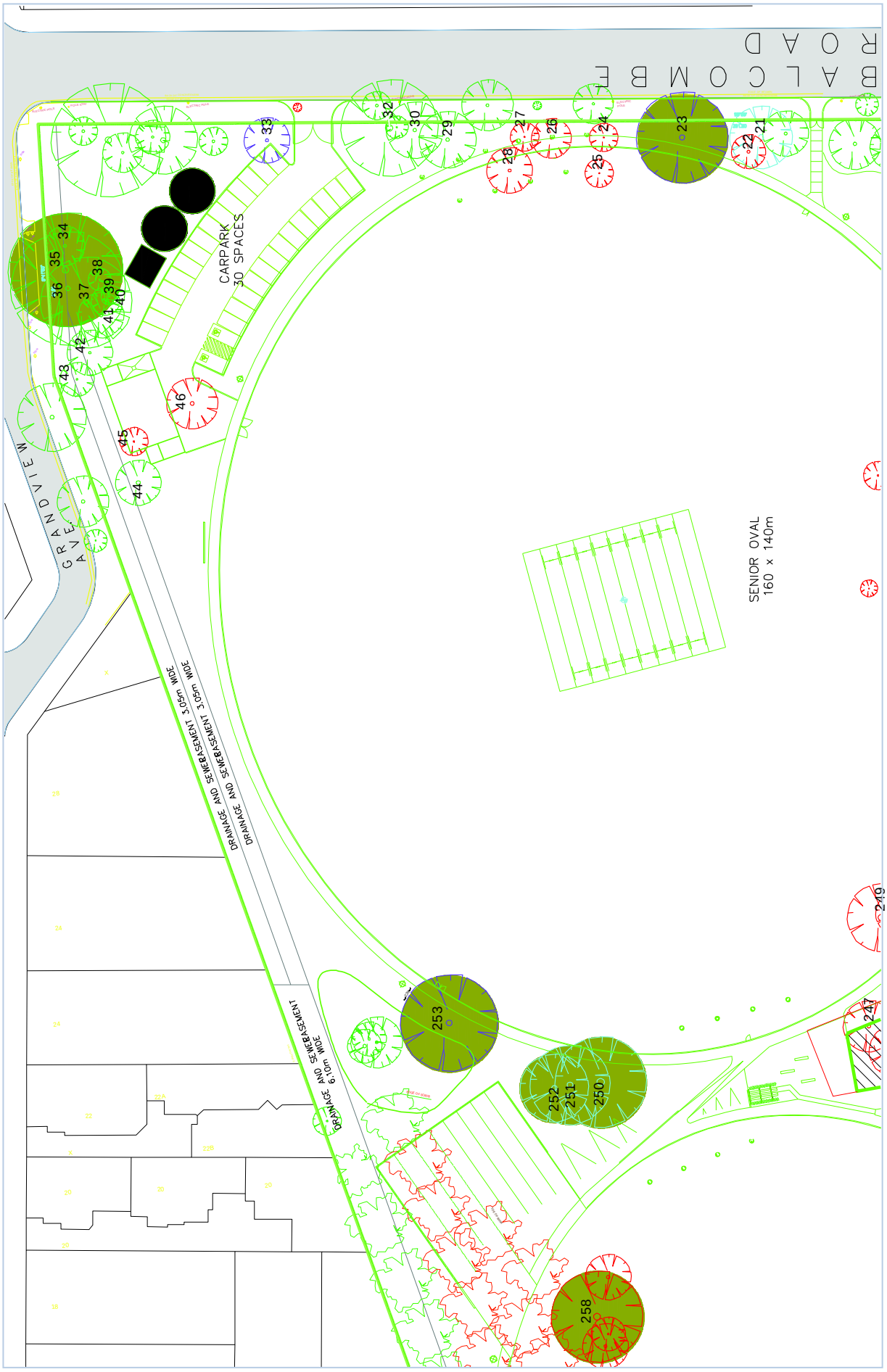
8. Site plan – proposed



8.1. Site plan – eastern inset



8.2. Site plan – western inset



9.Tree summary data

This table contains a summary of data pertaining to all trees shown and numbered on the enclosed feature and levels survey.

Underlined and italicised species names have not been assessed. Generally these trees are <5m tall, not found or stumps. The construction impact values are blank for these records.

1. **Retention value**: The retention value of the tree to the site.
    a. Tree number and species name are **Bold** for High and Very high values trees.
2. **Retained:** Indicates whether the tree is proposed to be retained on the site.
3. **Construction impact:** Indicates the impact of the proposed development on the tree.
    a. **None:** Works do not intrude onto the tree's TPZ.
    b. **Low:** Construction intrusion is less than 10% of TPZ and contiguous area exists to compensate for any loss.
    c. **Moderate:** Construction intrusion exceeds 10% of TPZ but construction methods or other factors make tree retention possible.
    d. **High:** Construction intrusion is excessive and tree retention is not possible within the development as currently proposed.
    e. **Blank:** Tree has not been assessed.
4. **Location:** Whether the tree is located on the site or adjacent to the site.
    a. **Site:** the tree is located on the site.
    b. **Off site:** the tree is located on land adjoining the site.
        i. Trees in this category should generally be preserved without significant impact.

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:
11	**Corymbia maculata**	High	Removed	High	Site	2.7	6.5
12	Eucalyptus botryoides	Low	Removed	High	Site	2.6	6.1
13	**Corymbia maculata**	High	Removed	High	Site	2.9	8.3
14	Eucalyptus botryoides	Moderate	Removed	High	Site	3.2	11
15	**Corymbia maculata**	High	Retained	Moderate	Site	3.1	10
16	Eucalyptus botryoides	Low	Removed	Moderate	Site	2.4	5.0
21	Eucalyptus leucoxylon	Moderate	Retained	Moderate	Site	3.1	10
23	**Eucalyptus saligna**	High	Retained	Moderate	Site	2.8	7.4
24	Eucalyptus leucoxylon	Low	Removed	High	Site	1.7	2.6
25	Melaleuca styphelioides	Low	Removed	High	Site	1.9	3.2
26	Eucalyptus leucoxylon	Low	Removed	High	Site	1.9	3.4
28	Eucalyptus camaldulensis	Low	Removed	High	Site	2.1	4
29	Eucalyptus leucoxylon	Moderate	Retained	Moderate	Site	2.6	6
30	Eucalyptus camaldulensis	Low	Retained	Moderate	Site	2.2	4.3
32	Eucalyptus camaldulensis	Moderate	Retained	None	Site	3.3	12
33	Eucalyptus leucoxylon	Low	Retained	High	Site	2.2	4.2
35	**Eucalyptus saligna**	High	Retained	None	Site	3	9.4
36	**Eucalyptus saligna**	High	Retained	None	Site	2.8	7.1

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:
37	Eucalyptus leucoxylon	Moderate	Retained	None	Site	2.7	6.8
44	Melaleuca styphelioides	Low	Retained	Moderate	Site	2.4	5.2
46	Eucalyptus pryoriana	Moderate	Removed	High	Site	2.9	7.8
58	Liquidambar styraciflua	Moderate	Retained	Moderate	Site	2.5	5.4
79	**Eucalyptus bicostata**	High	Retained	Moderate	Site	3.1	11
91	Eucalyptus nicholii	Moderate	Retained	Moderate	Site	2.8	7.6
153	Eucalyptus camaldulensis	Remove.	Retained	Moderate	Site	1.7	2.6
154	Eucalyptus camaldulensis	Moderate	Retained	Moderate	Site	2.4	5.0
155	Eucalyptus camaldulensis	Moderate	Retained	Moderate	Site	2.3	4.7
156	Eucalyptus camaldulensis	Moderate	Retained	Moderate	Site	2.4	5.0
157	Eucalyptus camaldulensis	Moderate	Retained	Moderate	Site	2.6	5.9
158	Eucalyptus camaldulensis	Moderate	Retained	Moderate	Site	2.5	5.4
250	**Eucalyptus camaldulensis**	High	Retained	High	Site	3.5	14
251	**Eucalyptus camaldulensis**	High	Retained	High	Site	3.1	10
252	**Eucalyptus camaldulensis**	High	Retained	High	Site	2.8	7.6
253	**Eucalyptus camaldulensis**	High	Retained	High	Site	3	9.5
268	Eucalyptus pryoriana	Moderate	Retained	High	Site	2.8	7.6

Total number of tree/s referred to in this report(Total): 35

10. Construction impact

The following trees are regarded as being suitable for retention and are located within close proximity to elements of the proposed development. The successful retention of those trees that are proposed to be retained may require additional care and the adoption of the following recommendations.

Note: ***Construction Proximity*** of 0.1 indicates construction over or immediately adjacent to the tree.

ID	Genus / species	DBH	SRZ	TPZ	TPZ	ConP	Ret Value	Retained?
The following 10 tree/s are shown as Removed on the plans provided.								
11	*Corymbia maculata*	54	2.7	6.5	= TPZ	3.8	High	Removed
12	*Eucalyptus botryoides*	51	2.6	6.1	= TPZ	3.8	Low	Removed
13	*Corymbia maculata*	69	2.9	8.3	= TPZ	3.8	High	Removed
14	*Eucalyptus botryoides*	94	3.2	11.3	= TPZ	3.8	Moderate	Removed
16	*Eucalyptus botryoides*	42	2.4	5.0	= TPZ	2.2	Low	Removed
24	*Eucalyptus leucoxylon*	22	1.7	2.6	= TPZ	0.1	Low	Removed
25	*Melaleuca styphelioides*	27	1.9	3.2	= TPZ	0.1	Low	Removed
26	*Eucalyptus leucoxylon*	28	1.9	3.4	= TPZ	0.1	Low	Removed
28	*Eucalyptus camaldulensis*	33	2.1	4.0	= TPZ	0.1	Low	Removed
46	*Eucalyptus pryoriana*	65	2.9	7.8	= TPZ	0.1	Moderate	Removed
The following 19 tree/s are shown as Retained on the plans provided.								
15	*Corymbia maculata*	84	3.1	10.1	= TPZ	3.4	High	Retained
21	*Eucalyptus leucoxylon*	84	3.1	10.1	= TPZ	5.5	Moderate	Retained
23	*Eucalyptus saligna*	62	2.8	7.4	= TPZ	1.4	High	Retained
29	*Eucalyptus leucoxylon*	50	2.6	6.0	= TPZ	4.3	Moderate	Retained
32	*Eucalyptus camaldulensis*	101	3.3	12.1	= TPZ	10.6	Moderate	Retained
33	*Eucalyptus leucoxylon*	35	2.2	4.2	= TPZ	0.6	Low	Retained
44	*Melaleuca styphelioides*	43	2.4	5.2	= TPZ	0.1	Low	Retained
79	*Eucalyptus bicostata*	88	3.1	10.6	= TPZ	5.9	High	Retained
91	*Eucalyptus nicholii*	63	2.8	7.6	= TPZ	5.9	Moderate	Retained
154	*Eucalyptus camaldulensis*	42	2.4	5.0	= TPZ	0.1	Moderate	Retained
155	*Eucalyptus camaldulensis*	39	2.3	4.7	= TPZ	0.1	Moderate	Retained
156	*Eucalyptus camaldulensis*	42	2.4	5.0	= TPZ	0.1	Moderate	Retained
157	*Eucalyptus camaldulensis*	49	2.6	5.9	= TPZ	0.1	Moderate	Retained
158	*Eucalyptus camaldulensis*	45	2.5	5.4	= TPZ	4.32	Moderate	Retained
250	*Eucalyptus camaldulensis*	119	3.5	14.3	= TPZ	3.6	High	Retained
251	*Eucalyptus camaldulensis*	84	3.1	10.1	= TPZ	4.9	High	Retained
252	*Eucalyptus camaldulensis*	63	2.8	7.6	= TPZ	6	High	Retained
253	*Eucalyptus camaldulensis*	79	3	9.5	= TPZ	2.3	High	Retained
268	*Eucalyptus pryoriana*	63	2.8	7.6	= TPZ	0.1	Moderate	Retained

SRZ: Structural Root Zone. TPZ: Tree Protection Zone. mTPZ: Tree Protection Zone.(Canopy) ConP: Construction Proximity.

Number of trees in this section (total): 29

10.1. Tree 15

This tree is a located along the Balcombe Road boundary, to the north of the subject site.

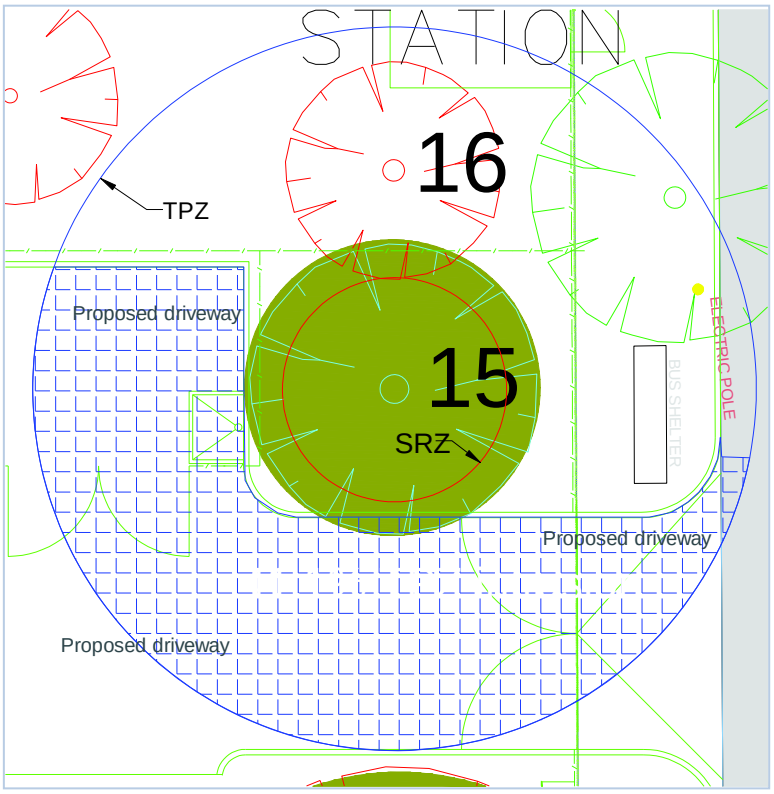


Figure 1: TPZ intrusion for Tree 15

A crossover and driveway is proposed to be constructed to the east of this tree, occupying approximately 41.1% of this trees Tree Protection Zone (TPZ) – Figure 1.

This tree has sufficient contiguous soil for to compensate for the proposed intrusion.

Under *AS4970 (2009) Protection of Trees on Development Sites* this is considered to be a major intrusion and it must be demonstrated that the tree will remain viable.

An encroachment of 10% is allowed within *AS4970 (2009) Protection of Trees on Development Sites*. Were excavation be limited to the area of the crossover adjacent to the gutter to meet council specifications, and the remainder of the driveway constructed at or above existing grade, this would limit the impacts to significant roots from this tree. Excavation or backfilling should not exceed 100mm and the sections of driveway within the TPZ should be constructed on a base of geotextile fabric, Geoweb and ~100mm of crushed rock or a similar system that will reduce soil compaction.

Should the grade not be altered significantly within the TPZ as suggested, and excavation within the TPZ not exceed 10% of the total area of the TPZ, this tree would remain viable alongside the proposed development.

Should more severe works be required within the TPZ a non-destructive root investigation would be required to ascertain the size and quantity of roots within the area proposed for the driveway.

Provided the recommendations of this report can be adopted and effectively implemented, this tree will remain viable alongside the proposed development.

10.2. Tree 21

This tree is located adjacent to the Balcombe Road boundary of the subject site.

An oval and walking track is proposed to be constructed to the south of this tree which would occupy a combined 15.8% of this trees TPZ (Figure 2).

Given that a considerable section of this trees TPZ is occupied by the poor growing conditions beneath Balcombe Road, it is likely that the tree has an asymmetrical root plate, with a higher proportion of roots in the area of the proposed oval to the south of the tree.

Under *AS4970 (2009) Protection of Trees on Development Sites* this is considered to be a major intrusion and it must be demonstrated that the tree will remain viable.

Under the current plans the footpath will occupy approximately 7.6% of this trees TPZ. This path will be constructed from crushed rock and installed at approximately existing grade and as such will have little effect on any tree roots within this area.

The oval is to be excavated to a depth of 0.5 metres to allow the installation of irrigation.

Given that the tree is expected to have an higher proportion of its root mass within this area, it would be advisable to avoid excavation within this trees TPZ, and install the irrigation outside of this area.

If possible, the sprinkler systems should be directed into this area to allow the watering of turf without requiring the destruction of tree roots present within this area.

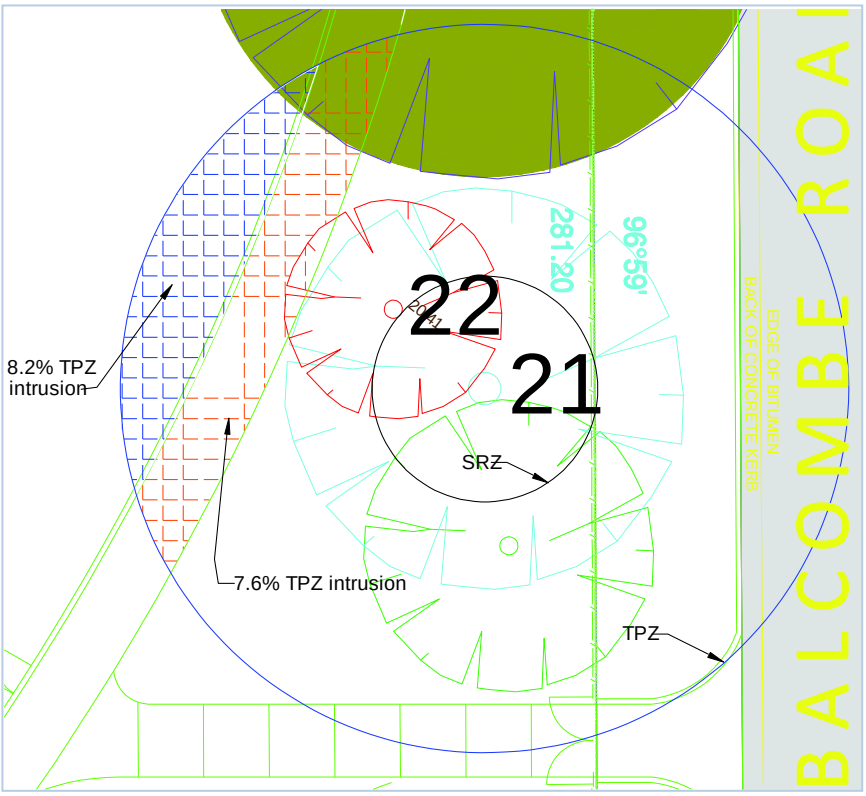


Figure 2: TPZ intrusion for Tree 21

Provided the recommendations of this report are adopted and effectively implemented, this tree will remain viable alongside the proposed development.

10.3. Tree 23

This tree is located adjacent to the northern Balcombe road site boundary.

It is proposed that a gravel walking track and oval be installed to the south of this tree which would occupy approximately 37.9% of this trees TPZ (Figure 3).

This tree has ample contiguous soil volume to compensate for the proposed intrusion.

AS4970 (2009) Protection of Trees on Development Sites defines this as a major intrusion and it must be demonstrated that the tree will remain viable alongside the development.

The footpath is proposed to cross through this trees Structural Root Zone (SRZ). However as the path is to be created from crushed rock, the construction will not have a significant impact upon the root system of this tree.

Given this trees position in relation to Balcombe road, there is likely to be a high quantify of root mass to the south of the tree. Accordingly, the proposed 0.5 metre deep excavation within the oval is expected to negatively impact upon the health and longevity of the tree.

However were this excavation to be excluded from within the TPZ and any sprinklers required for watering turf be directed into this area from outside the TPZ, this tree would be expected to tolerate the impact to its roots system.

This tree will remain viable within the proposed development provided the recommendations of this report can be adopted.

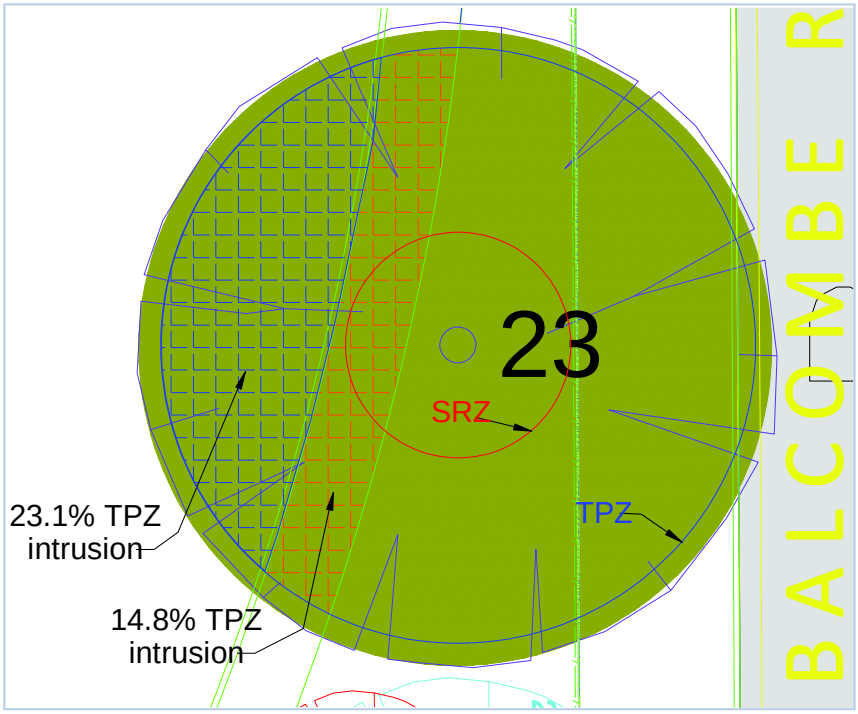


Figure 3: TPZ intrusion for Tree 23

10.4. Tree 32

This tree is located adjacent at the Balcombe Road boundary to the western side of the subject site.

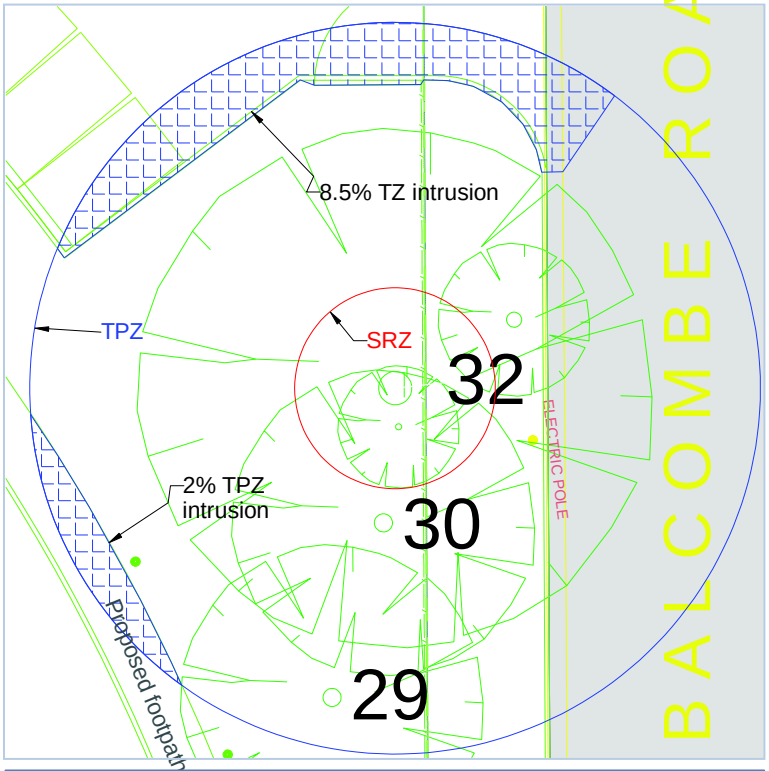


Figure 4: TPZ intrusion for Tree 32

It is proposed that a carpark be constructed to the west of the tree, and a footpath be installed to the south.

There is ample contiguous soil volume available to the tree to compensate for this intrusion.

The walking track will occupy approximately 2% of this trees TPZ, and given that the path will be constructed of crushed rock it will have little impact on existing roots provided that it is installed at roughly existing grade.

Given that the walking track is not likely to have an impact upon the tree roots and is not considered an intrusion, the 8.5% intrusion for the proposed carpark falls below the 10% allowed under *AS4970 (2009) Protection of Trees on Development Sites,* and is therefore unlikely to effect the health or longevity of this tree.

This tree will remain viable alongside the proposed development.

10.5. Tree 33

This tree is located within the north-western aspect of the subject site.

A carpark is proposed to be installed immediately to the south if this tree (Figure 5). The carpark would occupy approximately 20.4% of this tree TPZ, and 16.8% of the trees SRZ.

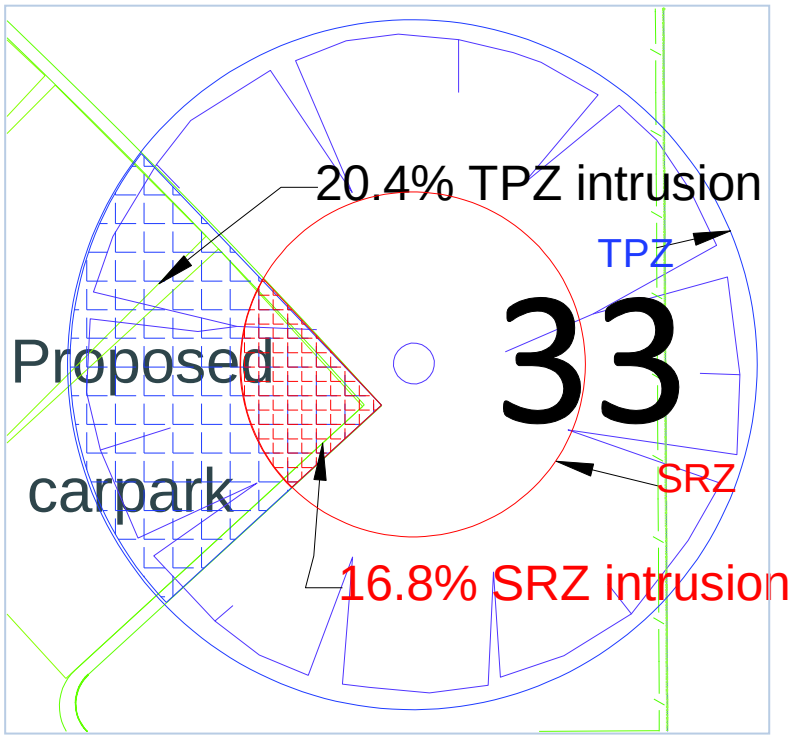


Figure 5: TPZ intrusion for Tree 33

The tree has ample contiguous soil volume into which it may extend its root system to compensate for this intrusion.

Under *AS4970 (2009) Protection of Trees on Development Sites,* this is considered a major intrusion and it must be demonstrated that the tree will remain viable alongside the proposed development.

Should the carpark be constructed at or above existing grade, and measures were undertaken to protect the roots and soil profile within the TPZ, this tree would remain viable within the proposed development.

Measures would be undertaken to protect against soil compaction and root damage, such as Geoweb cells per earlier recommendations.

If constructing at or above existing grade is not a viable option, then the nearest carpark would need to be sacrificed to successfully retain this tree.

Should neither of these options be selected, the tree will not remain viable alongside the proposed car park and should be removed.

This tree will remain viable alongside the proposed development provided the recommendations of this report are adopted and effectively implemented.

10.6. Tree 44

This tree is located adjacent to the Grandview Avenue frontage of the subject site.

The proposed carpark will occupy approximately 1.8% of this trees TPZ.

This tree has unlimited contiguous soil volume into which it might extend its root system to compensate for this intrusion.

Under *AS4970 (2009) Protection of Trees on Development Sites* this is considered a minor intrusion, and will not significantly impact the health or longevity of this tree.

This tree will remain viable alongside the proposed development of the site.

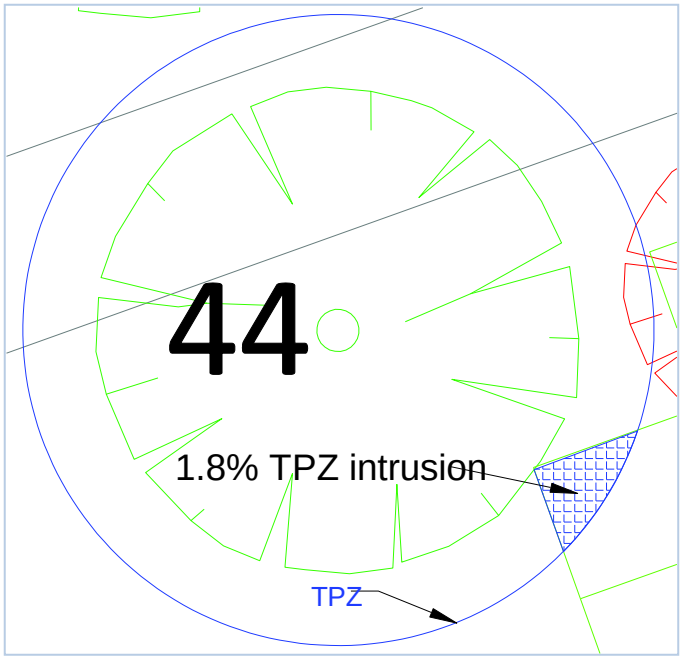


Figure 6: TPZ intrusion for Tree 44

10.7. Tree 58

This tree is within the area in which demolition works have commenced.

The Tree Protection Fencing for this tree is currently inadequate and should be repaired to comply with the intrusions within the initial Tree Dimensions report.

10.8. Tree 79

This tree is located adjacent to the Reserve Road boundary, to the eastern side of the site.

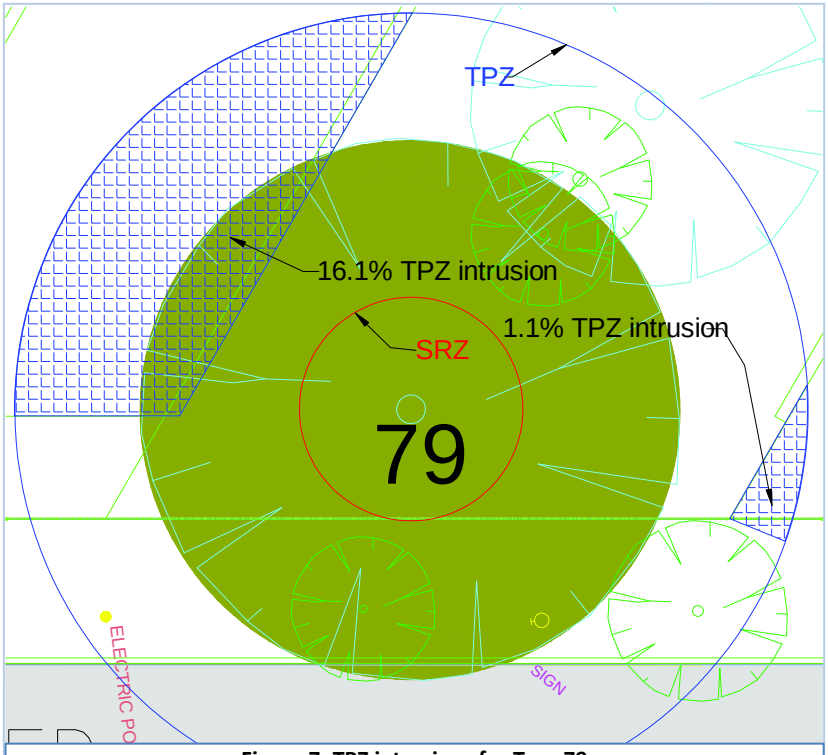


Figure 7: TPZ intrusions for Tree 79

Retaining walls to the north and south of this tree will occupy approximately 17.2% of this trees TPZ (Figure 7).

This tree has sufficient contiguous soil into which it may extend its root system to compensate for this loss of soil volume.

AS4970 (2009) Protection of Trees on Development Sites defines this as a major intrusion and it must be demonstrated that the tree will remain viable.

Mature trees of this species are not known for being

tolerant to soil disturbance and root loss as is typical during development.

To ensure the health and longevity of this tree, the southern retaining wall must be excluded from the TPZ. Should any more than 10% of this trees TPZ be occupied or disturbed by excavating to depths greater than 100mm, or backfilled more than 200mm, this tree may not remain viable alongside the proposed development.

Should the southern retaining wall be moved outside the TPZ, this tree will remain viable alongside the proposed development.

10.9. Tree 91

This tree is located within the eastern, Reserve Road frontage of the site.

The proposed carpark and associated footpaths will fall directly over this tree.

Accordingly this tree cannot be retained under the currently plans.

However, were the soccer pitch to the south be reduced in size as to allow to carpark to move a minimum of 2.5 metres to the south, then root sensitive construction methods could be adopted to ensure the viability of this tree.

A permeable Geoweb system (or similar) should be placed over the areas of TPZ and be constructed upon to reduce soil compaction, and to allow the movement of water and oxygen into the soil.

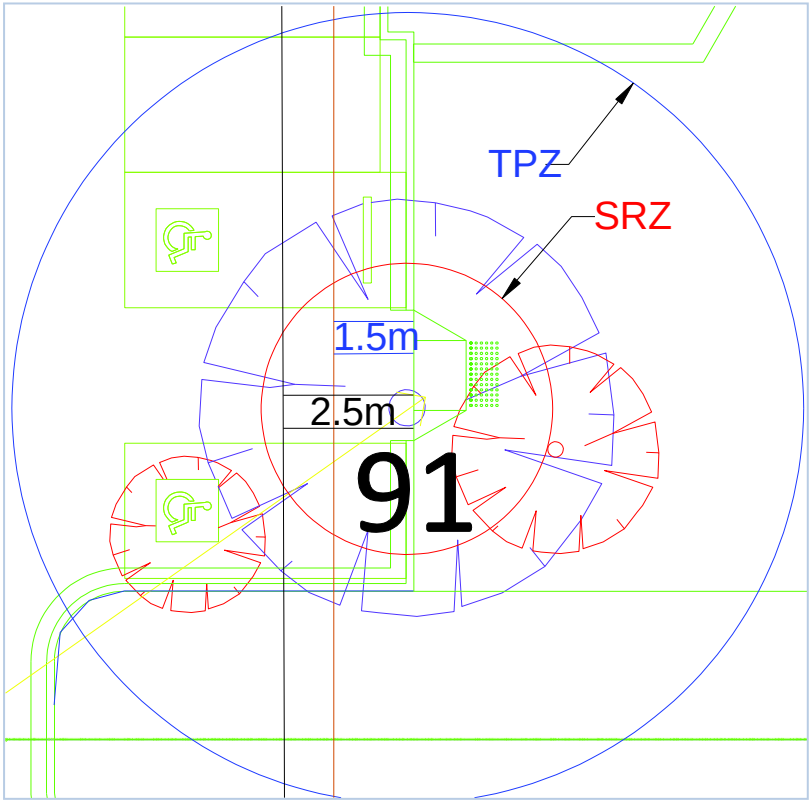


Figure 8: TPZ intrusion for Tree 91

Provided the recommendations of this report are adopted and effectively implemented, this tree will remain viable alongside the proposed development.

10.10.Trees 153 – 158

These six trees are currently growing in a group to the eastern side of the site.

Under the original plans these tree lay within the footprint of the proposed netball court, or the adjacent retaining wall and could not be retained (Figure 9).

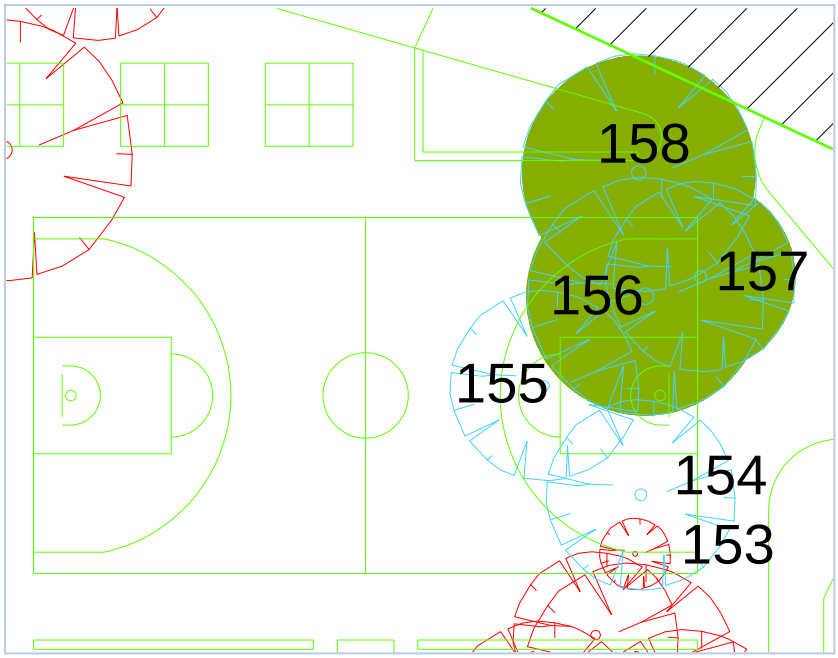


Figure 9: Original plans

However a redesign to reduce the netball court to a half court was created by the project architect, Sindy Kwok of Clarke Hopkins Clarke.

This redesign will allow for the retention of these Red Gums as no change to grade will be required, and the retaining wall has been relocated (Figure 10).

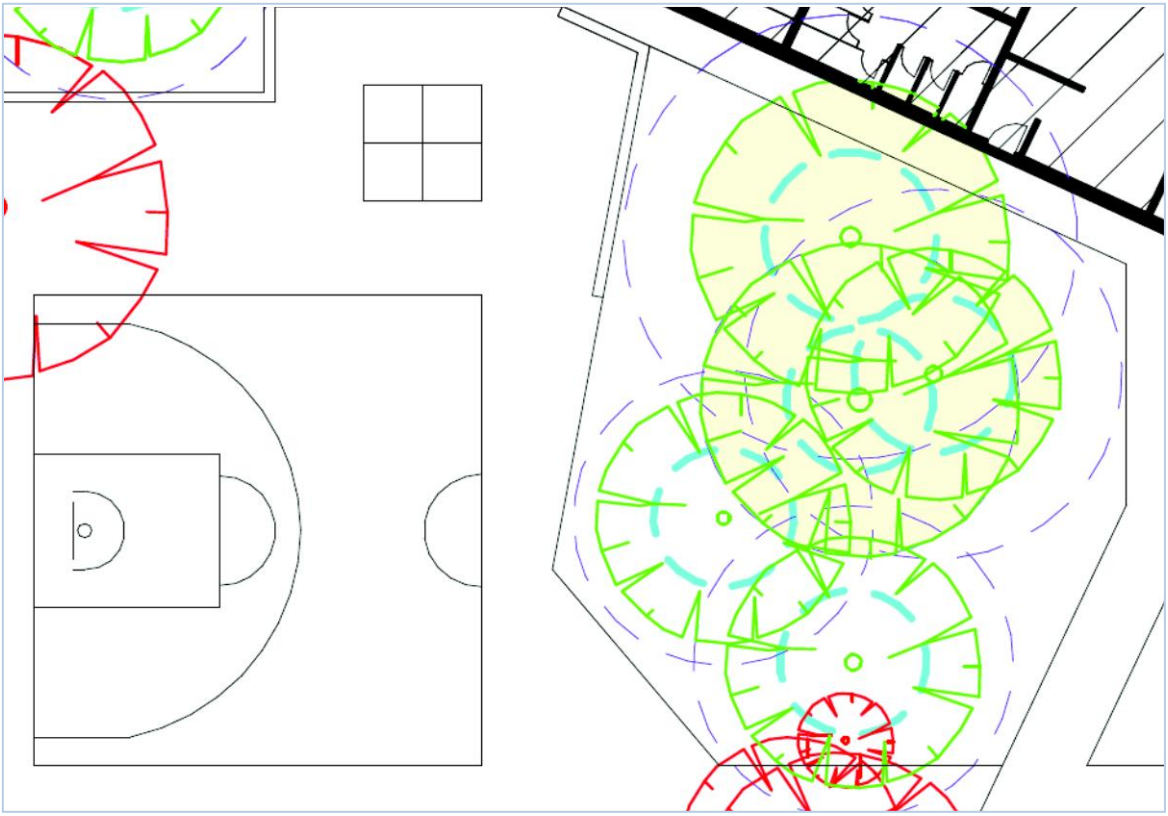


Figure10: Amended plans to allow retention of trees

These trees are currently under significant stress from possum predation. To ensure to successful retention of these trees the trunks should be possum banded, and the canopies lifted to exclude possums from the canopy.

10.11.Tree 250 and Tree 251

These trees are located between the two existing ovals on site.

The proposed main (northern) oval and footpath will occupy approximately 32.1% of the TPZ of Tree 250 (Figure 11), and 38.4% of the TPZ of Tree 251 (Figure 12).

The proposed footpath will occupy 8.1% and 9.7% of the respective TPZ's of these trees.

These trees have ample contiguous soil volume which may be exploited by the root systems to compensate for the proposed intrusions.

Under *AS4970 (2009) Protection of Trees on Development Sites* this is considered a major intrusion and it must be demonstrated that the tree will remain viable within the proposed development.

As the footpath is to be constructed of crushed rock at or above existing grade, the installation of the path is not expected to have a significant impact upon the health or longevity of either tree.

It is currently planned that the oval be excavated to a minimum depth of 0.5 metres to allow the installation of irrigation systems.

The removal of the roots within the soil profile will likely have a detrimental effect upon the health and longevity of these trees.

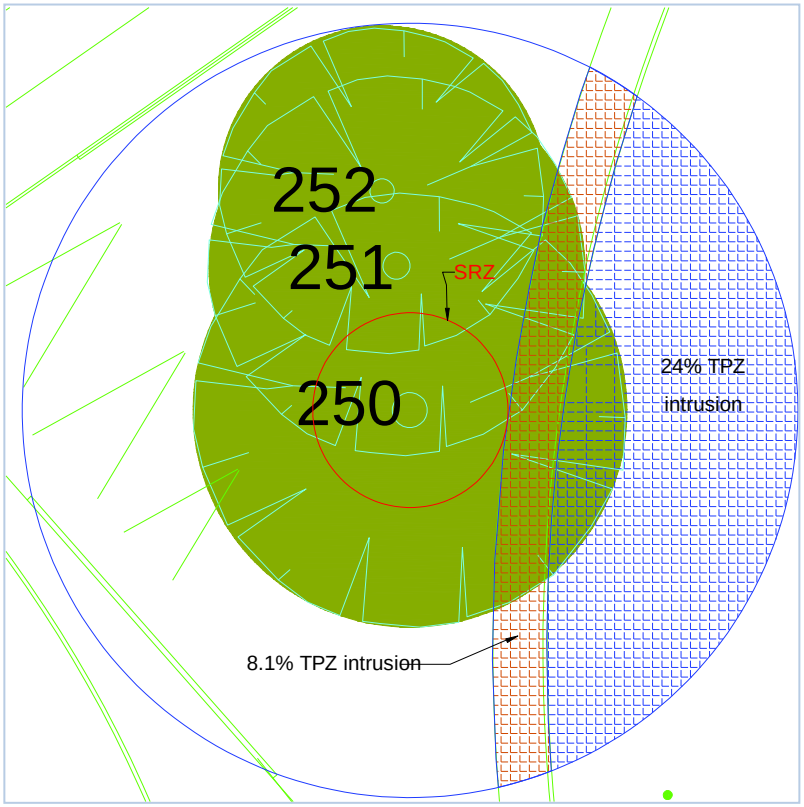


Figure 11: TPZ intrusion for Tree 250

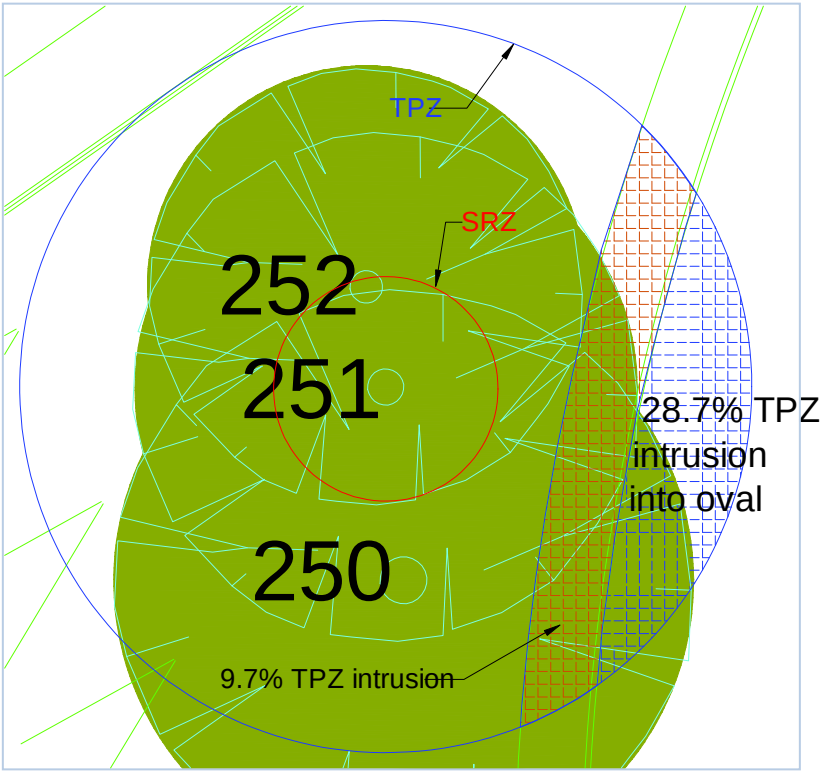


Figure 129: TPZ intrusion for Tree 251

Should the excavation take place outside of the TPZ's of these trees, they will remain viable alongside the installation of the oval.

If possible, it is advised that any turf within the TPZ of these trees could be serviced by sprinklers facing inwards towards them, thus removing the need for root damage.

These trees will remain viable alongside the proposed development provided the recommendations of this report are adopted and effectively implemented.

10.12.Tree 252

This tree is located between the two existing ovals on site.

The proposed footpath encircling the main oval will occupy approximately 5% of this trees TPZ.

This tree has unlimited contiguous soil volume into which it may extend its root system to compensate for this intrusion.

Under *AS4970 (2009) Protection of Trees on Development Sites,* this is defined as a minor intrusion and is not expected to impact significantly upon the health or longevity of this tree.

This tree will remain viable within the proposed development.

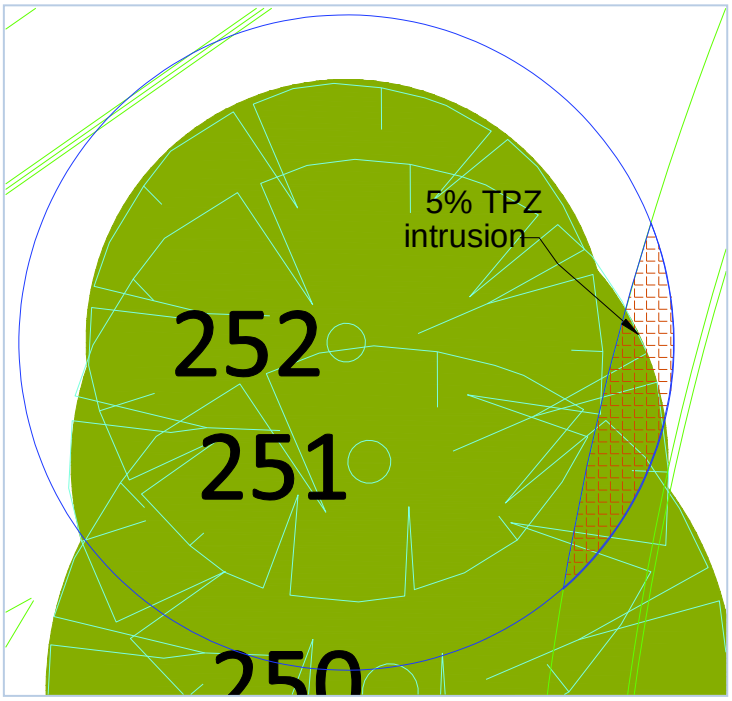


Figure 10: Tree 252 TPZ intrusion

10.13.Tree 253

This tree is located to the south west of the existing main oval.

The proposed footpath and oval will occupy approximately 34% of this trees TPZ (Figure 14).

This tree has abundant contiguous soil volume which may be exploited by the root system to compensate for the proposed intrusion.

Under *AS4970 (2009) Protection of Trees on Development Sites* this is considered to be a major intrusion and it must be demonstrated that the tree will remain viable alongside the proposed development.

11.3% of the TPZ will be occupied by the footpath. As this is to be constructed of crushed rock at or above existing grade, the installation of this path is likely to have little impact to the roots of this tree.

The proposed oval will occupy approximately 22.7% of this trees TPZ. Under the current plans this area will be excavated to a depth of 0.5 meters, effectively removing any tree roots within this area.

However was the irrigation to be installed outside of the TPZ with sprinklers facing inwards to service the turf within the TPZ, the actual impacts to tree roots in the area will be negligible. Accordingly, there will be little to no impact to the health or longevity of this tree from the development.

This tree will remain viable alongside the proposed development provided the recommendations of this report are adopted and effectively implemented.

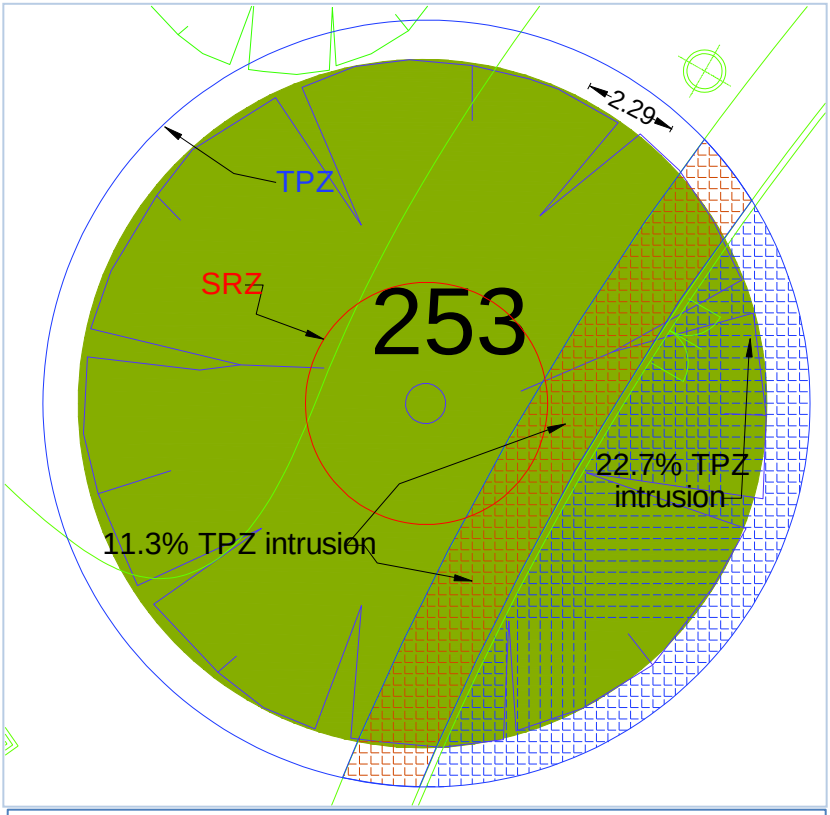


Figure 11: TPZ intrusion for Tree 253

10.14.Tree 268 and Tree 269

These trees are located near to the Gareth Avenue boundary to the site.

These trees are marked as removed under the current plans as the proposed development of the sports oval to the east of Gareth Avenue will fall over or directly adjacent to these trees.

However should the outer boundary of the sports oval be moved approximately 5.8 metres east by either shrinking or moving the footprint of the oval as illustrated in Figure 12, these trees could be retained alongside the proposed development.

The suggested relocation of the oval would reduce the impacts to T268 to approximately 10%, and see no impact to the TPZ of T269.

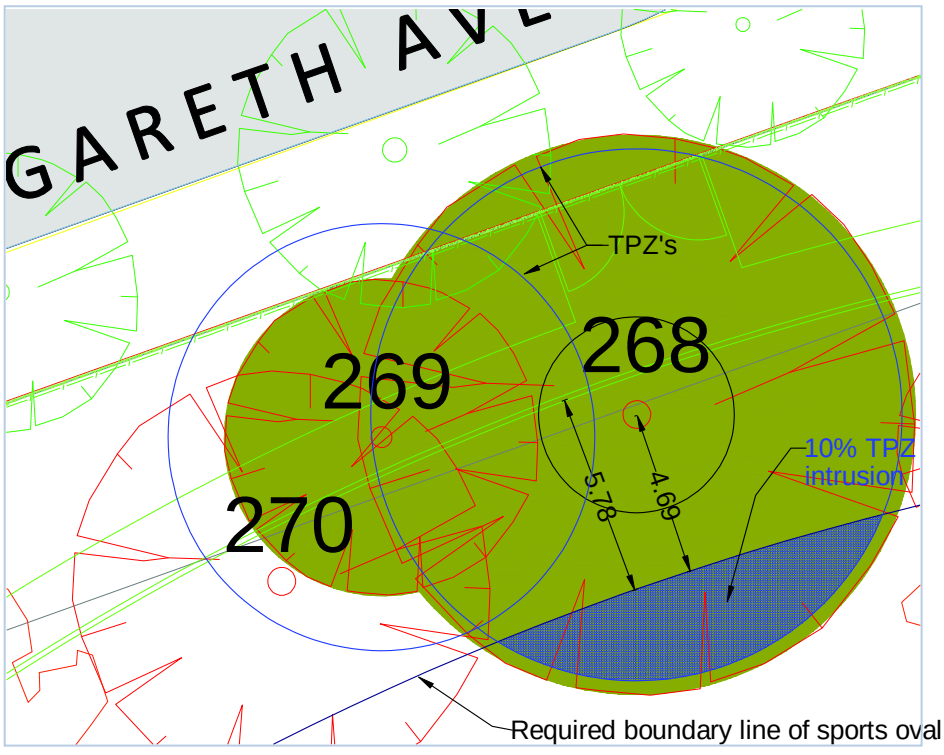


Figure 12: Required shift of sports oval to allow retention of T268 and 269

Provided that no excavation greater than 100mm is required in the construction of the oval, the oval will need only be required to clear the Structural Root Zones of these trees. In this case the oval would only need move approximately 3.9 metres to clear the SRZ of T268. Should excavation deeper than 100mm be required in the construction of the oval this will not be a viable option.

Should a greater encroachment than the 10% illustrated in Figure 12 be required to the TPZ's of these trees in the construction of the sports oval, it will need to be demonstrated that the trees will remain viable. Therefore a non-destructive tree root investigation will be required to ascertain the size and quantity of roots present within the footprint of the oval.

Non-destructive root investigations on this site should be carried out using hand tools or AirSpade compressed air only. Hydro excavation can cause significant damage to roots reducing the trees ability to uptake water and nutrients, as well as allowing the entry of pathogens into the root system.

There trees will remain viable within the proposed development provided the recommendations of this report are adopted and effectively implemented.

10.15.Tea Trees at Gareth Avenue frontage

A cluster of *Leptospemum sp.* (Tea Trees) are growing along the western boundary of the site, adjacent to Gareth Avenue.

Many of these are proposed to be removed and are marked in red in Figure 13.

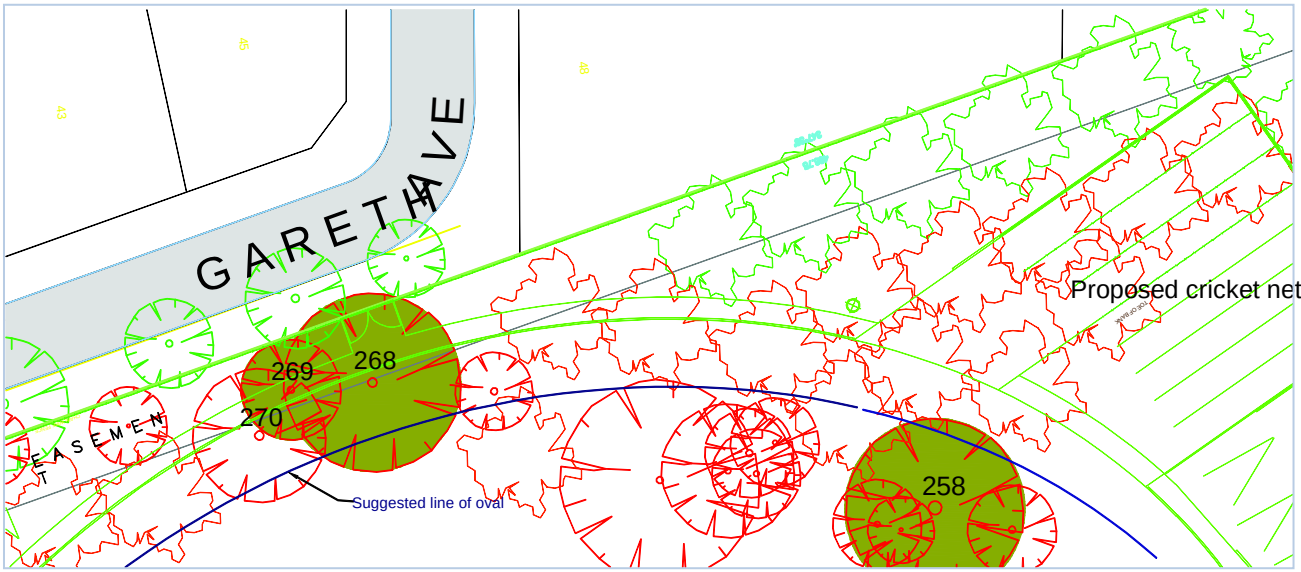


Figure 13: Tea Trees proposed to be removed (red) and retained (green) at Gareth Ave frontage

There are many Tea Trees not marked on the plans provided. Accordingly the tree locations in Figure 13 are used as a guide only.

Under the current plans the footprint of the proposed oval will fall directly over many of these Tea Tree making their retention unfeasible.

It has been proposed that should the outer boundary of the oval be moved approximately 5.8 metres to the east that Tree 268 and Tree 269 could be retained.

It is expected that some of these trees would be within the area proposed for the walking track around the oval and may require removal. However should the suggested 5.8 metre change to the plans occur the majority of the Tea Trees within this area could be retained.

10.16.Reserve Road frontage

There is a group of trees growing at the east of the site, adjacent to Reserve road.

It is proposed that a multi-purpose pitch be constructed immediately to the west of or directly upon these trees (Figure 14).f

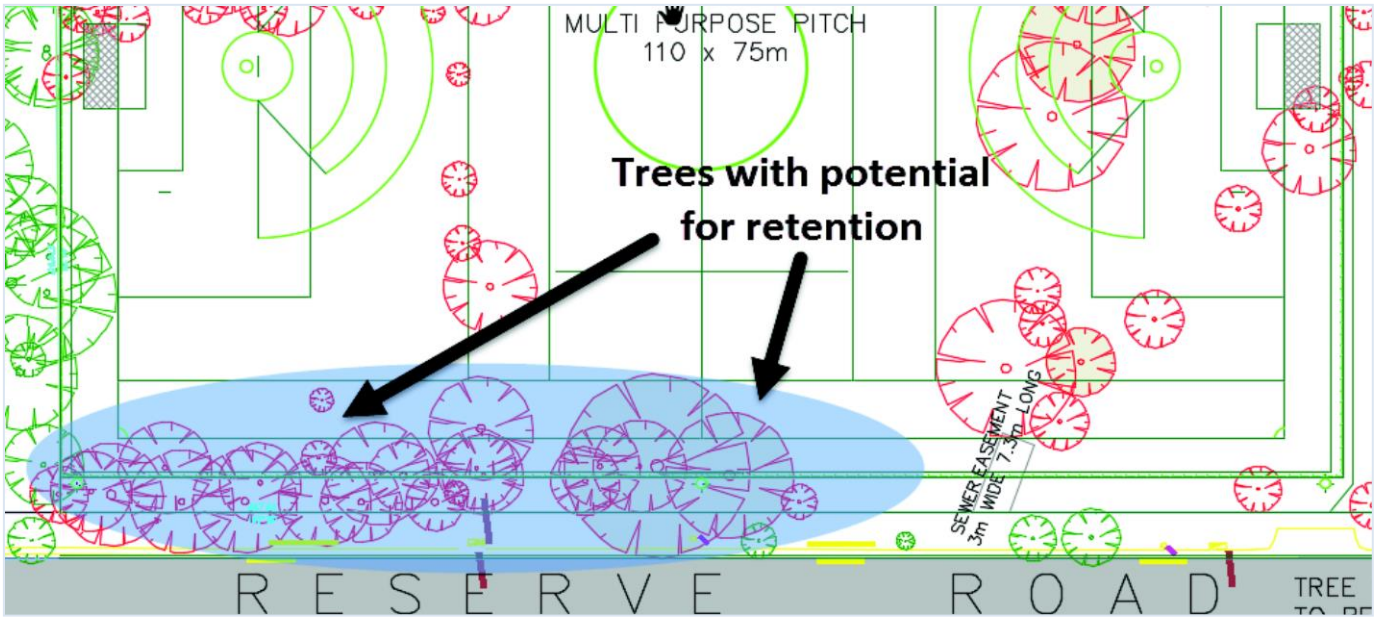


Figure 14: Tree with potential to be retained at Reserve Road Frontage

No data has been recorded detailing the dimensions and TPZ measurements of these trees. As such precise set-back requirements could not be determined to establish the distances required to ensure the viability of each tree. However based on a visual estimation of tree sizes and the locations of the trees shaded blue in Figure 14, a *minimum* set-back of 3 metres from the currently proposed eastern border of the multi-purpose pitch would be required to retain the smaller trees.

It may be necessary to relocate or shrink the pitch in excess of 6 metres to the west to ensure the retention of the larger trees in this stand.

Should the proposed pitch be moved or shrunk, some or all of these trees could be retained, dependant on tree size and the extent of the set-back.

11. Recommendations

The following recommendations should be adopted to ensure the successful retention of those trees that are proposed to be retained.

1. A Tree Management Plan should be created to inform construction within the TPZ of retained trees.

11.1. Tree 15

2. Construct crossover and driveway at or above existing grade

11.2. Trees 21, 23, 250, 251, 252, 253

3. Avoid excavating within the TPZ for the installation of irrigation services.
    a. Any irrigation required within the TPZ of retained trees could be directed in for outside.

11.3. Tree 33

4. Construct car park by root sensitive means OR remove nearest car parking space.

11.4. Tree 58

5. Restore the Tree Protection Fencing to compliance.

11.5. Tree 79

6. Move southern retaining wall outside of the TPZ.

11.6. Tree 91

7. Reduce size of soccer field and shift car park to the south to allow retention of tree.

11.7. Trees 153 - 158

8. Reduce proposed netball court to half court, and relocate proposed retaining wall to allow retention of six trees.

11.8. Tree 268 and Tree 269

9. Reduce size of oval or move oval to ensure a maximum TPZ encroachment of 10%.
    a. Should no significant excavation be required in the construction of the oval, the oval need only clear the SRZ's.

11.9. Gareth Avenue Tea Trees

10. Reduce oval size to allow the retention of this stand of Tea Trees.

11.10. Reserve Road Trees

11. Reduce size of, or relocate proposed multi-purpose pitch to allow the retention of this stand of trees.
    a. Exact set-back cannot be calculated until data for these trees is captures.

12. Construction – no impact

The following trees are regarded as being suitable for retention and are unlikely to suffer any significant impact from the proposed development.

While significant care may be required to successfully retain these trees, no modification of the plans or special precautions are likely to be required to ensure this outcome. If these trees are to be retained then they should be protected during construction as outlined in Section 18 - Tree Protection Guidelines.

ID	Genus / species	DBH	SRZ	TPZ:	mTPZ	ConP	Ret Value	Retained
The following 5 tree/s are shown as Retained on the plans provided.								
30	*Eucalyptus camaldulensis*	36	2.2	4.3	= TPZ	8.2	Low	Retained
35	*Eucalyptus saligna*	78	3	9.4	= TPZ	10.5	High	Retained
36	*Eucalyptus saligna*	59	2.8	7.1	= TPZ	10.1	High	Retained
37	*Eucalyptus leucoxylon*	57	2.7	6.8	= TPZ	8.4	Moderate	Retained
58	*Liquidambar styraciflua*	45	2.5	5.4	= TPZ	6.65	Moderate	Retained
SRZ: Structural Root Zone. TPZ: Tree Protection Zone. mTPZ: Tree Protection Zone.(Canopy) ConP: Construction Proximity.								
Number of trees in this section Total):		5						

13. Trees shown as removed

The following trees are shown as removed on the plans provided.

ID	Genus / species	Common name	ULE	Ret value
The retention value for the following 2 tree/s is High				
11	*Corymbia maculata*	Spotted Gum	15 - 25	High
13	*Corymbia maculata*	Spotted Gum	25 - 50	High
The retention value for the following 6 tree/s is Low				
12	*Eucalyptus botryoides*	Southern Mahogany	5 - 15	Low
16	*Eucalyptus botryoides*	Southern Mahogany	5 - 15	Low
24	*Eucalyptus leucoxylon*	Yellow Gum	15 - 25	Low
25	*Melaleuca styphelioides*	Prickly Paperbark	15 - 25	Low
26	*Eucalyptus leucoxylon*	Yellow Gum	15 - 25	Low
28	*Eucalyptus camaldulensis*	River Red Gum	25 - 50	Low
The retention value for the following 2 tree/s is Moderate				
14	*Eucalyptus botryoides*	Southern Mahogany	15 - 25	Moderate
46	*Eucalyptus pryoriana*	Gippsland Manna Gum	25 - 50	Moderate
Number of tree/s in this section (Total): 10				

14. Trees recommended for removal

The following trees are recommended for removal generally on the basis of poor, or worse, health and/or structure.

ID	Genus / species	Common name	ULE	Reason:	Ret value
The following 1 tree/s are shown as Retained on the plans provided.					
153	*Eucalyptus camaldulensis*	River Red Gum	15 - 25	N/A.	Remove.
Number of tree/s in this section (Total): 1					

15. Works required

The following section pertains to those trees that are recommended for retention (Retention recommendation).

If any of these trees are retained then the listed works should be performed as per the Priority section of the Explanation of Terms. The recommended works are of a general nature only and should be reviewed following the completion of the project.

ID	Genus / species	Works Required	Priority:
21	*Eucalyptus leucoxylon*	Root investigation	N/A
30	*Eucalyptus camaldulensis*		N/A
44	*Melaleuca styphelioides*		N/A
58	*Liquidambar styraciflua*		N/A
79	*Eucalyptus bicostata*	Investigate viability of constructing path at or above existing	N/A
268	*Eucalyptus pryoriana*		N/A
23	*Eucalyptus saligna*	> 50mm dead wood.	Moderate
36	*Eucalyptus saligna*	Remedial pruning to improve structure. Cable bifurcated	Moderate
15	*Corymbia maculata*	> 50mm dead wood.	Low
29	*Eucalyptus leucoxylon*	> 50mm dead wood.	Low
32	*Eucalyptus camaldulensis*	> 50mm dead wood. Weight reduce.	Low
35	*Eucalyptus saligna*	Mulch	Low
37	*Eucalyptus leucoxylon*	Mulch	Low
153	*Eucalyptus camaldulensis*	Possum guard and canopy lift	Low
154	*Eucalyptus camaldulensis*	Possum guard and canopy lift	Low
155	*Eucalyptus camaldulensis*	Possum guard and canopy lift	Low
156	*Eucalyptus camaldulensis*	Possum guard and canopy lift	Low
157	*Eucalyptus camaldulensis*	Possum guard and canopy lift	Low
158	*Eucalyptus camaldulensis*	Possum guard and canopy lift	Low
250	*Eucalyptus camaldulensis*	> 50mm dead wood.	Low
251	*Eucalyptus camaldulensis*	> 50mm dead wood.	Low
252	*Eucalyptus camaldulensis*	> 50mm dead wood.	Low
253	*Eucalyptus camaldulensis*	> 50mm dead wood.	Low
Number of trees in this section (Total):	23		

16. References

Coder, K.D 1996, Construction Damage Assessments, University of Georgia. http://www.forestry.uga.edu/warnell/service/library/for96-039a/index.html

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Hitchmough, J. D. 1994, *Urban Landscape Management*, Inkata Press, Chatswood, NSW.

Society for Growing Australian Plants Maroondah, 1991, *Flora of Melbourne*, *a guide to the indigenous plants of the greater Melbourne area,* Society for Growing Australian Plants, Maroondah.

Mattheck, C. & Breleor, H., 1994, *The body language of trees*, The Stationery Office, London, UK.

Standards Australia, 2009, *AS 4970 - 2009 Protection of trees on development sites*, Standards Australia, Sydney.

17. Appendix 1 - Tree protection guidelines

The following tree protection guidelines should be observed as appropriate. Where it is not possible to comply with these recommendations alternative arrangements should be decided with a qualified arborist.

1. A site specific Tree Protection Report should be commissioned prior to the commencement of construction to guide construction activity around any retained trees on or adjacent to the site.
2. Clearly marked as being retained on the site to avoid confusion during the tree removal phase.
3. The stumps of removed trees should be ground out rather than pulled to avoid injury to adjacent trees.
4. Construction specifications should include the plan location of those trees that are to be retained.
5. Penalties should be included in the construction specifications for damage to trees that are to be retained.
6. The trees to be retained should be enclosed with a 1.8 meter high chain link fence supported on steel posts driven 0.6 meters into the ground.

    6.1. Tree protection fencing should be established as shown.

        6.1.1. If tree protection fencing is not detailed in the report it should enclose, at a minimum, the entire **Structural Root Zone** and as much of the **Tree Protection Zone** as possible.

    6.2. Access should be provided by a single gate that should be kept locked at all times except when required for tree inspection or maintenance.

    6.3. Tree protection fencing should be installed following the removal of trees and prior to any other works being commenced.

    6.4. The area inside the fence should be mulched to a depth of 0.15 meters with general arboricultural wood chip mulch or similar.

7. Where construction clearance is required and areas of the Tree Protection Zone cannot be fenced the ground in these areas should be protected from compaction with **Ground Protection.**

   7.1. **Ground Protection** can consist of any constructed platform that prevents point loads on the soil within the Tree Protection Zone. These could include:

      7.1.1. Industrial pallets joined together to form a platform.

      7.1.2. 12 mm plywood joined together to form a platform.

      7.1.3. Planks of timber joined together to form a platform.

   7.2. **Ground Protection** should be constructed with sufficient strength to allow it to survive the entire construction process.

   7.3. **Ground Protection** should be installed following the removal of trees and prior to any other works being commenced.

8. Excavation within the **Structural Root Zone** should be avoided unless absolutely necessary.

   8.1. Any excavation within the **Structural Root Zone** should be performed by hand.

   8.2. Any excavation within or tunnelling under the **Structural Root Zone** should be supervised by a qualified arborist.

   8.3. Any roots encountered from the retained trees should be pruned carefully and cleanly, preferably back to a branch root.

   8.4. Before any roots are pruned the effect of such pruning on the health and structural stability of the tree should be evaluated by a qualified arborist.

9. Excavation within the **Tree Protection Zone** should be avoided where possible.

   9.1. Any excavation within the **Tree Protection Zone** should be performed carefully to minimise root injury.

   9.2. Any roots encountered from the retained trees should be pruned carefully and cleanly, preferably back to a branch root.

   9.3. Before any excavation occurs the effect of such excavation on the health and structural stability of the tree should be evaluated by a qualified arborist.

10. Concrete and other washout or waste disposal areas should be kept well away from trees to be retained.

11. Where automatic irrigation systems are installed the amount of irrigation that is applied should be checked against the requirements of the existing trees on the site.

12. Any pruning works that are required to facilitate construction should be performed by a qualified arborist.

Adapted from Harris, Clark and Matheny (2004)

Tree ID: 11

Genus / species: *Corymbia maculata* Spotted Gum Evergreen

Height (m):	23	**Structure:**	Fair	**Retention value:**	High
Width (m):	12	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	54 Estimated	**Maturity:**	Mature	**Form:**	Fair
Origin:	Victorian	**ULE (years):**	15 - 25	**Amenity value:**	High
Retained?:	Removed	**Priority:**	N/A		

Works Required:

SRZ (m): 2.7 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 6.5 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 3.8 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 12

Genus / species: *Eucalyptus botryoides* Southern Mahogany Evergreen

Height (m):	24	**Structure:**	Poor	**Retention value:**	Low
Width (m):	10	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	51 Estimated	**Maturity:**	Mature	**Form:**	Poor
Origin:	Victorian	**ULE (years):**	5 - 15	**Amenity value:**	Moderate
Retained?:	Removed	**Priority:**	Moderate		

Works Required: > 50mm dead wood.

SRZ (m): 2.6 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 6.1 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 3.8 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 13

Genus / species: *Corymbia maculata* Spotted Gum Evergreen

Height (m):	22	**Structure:**	Fair	**Retention value:**	High
Width (m):	15	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	69 Estimated	**Maturity:**	Mature	**Form:**	Fair
Origin:	Victorian	**ULE (years):**	25 - 50	**Amenity value:**	High
Retained?:	Removed	**Priority:**	Low		

Works Required: > 50mm dead wood.

SRZ (m): 2.9 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 8.3 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 3.8 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 14

Genus / species: *Eucalyptus botryoides* Southern Mahogany Evergreen

Height (m):	23	**Structure:**	Fair	**Retention value:**	Moderate
Width (m):	10	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	94 Estimated	**Maturity:**	Mature	**Form:**	Good
Origin:	Victorian	**ULE (years):**	15 - 25	**Amenity value:**	Moderate
Retained?:	Removed	**Priority:**	N/A		

Works Required:

SRZ (m): 3.2 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 11.3 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 3.8 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 15

Genus / species: *Corymbia maculata* Spotted Gum Evergreen

Height (m):	20	**Structure:**	Good	**Retention value:**	High
Width (m):	12	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	84 Estimated	**Maturity:**	Mature	**Form:**	Good
Origin:	Victorian	**ULE (years):**	25 - 50	**Amenity value:**	High
Retained?:	Retained	**Priority:**	Low		

Works Required: > 50mm dead wood.

SRZ (m): 3.1 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 10.1 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 3.4 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 16

Genus / species: *Eucalyptus botryoides* Southern Mahogany Evergreen

Height (m):	20	**Structure:**	Poor	**Retention value:**	Low
Width (m):	11	**Health:**	Poor	**Reason:**	N/A.
DBH (cm):	42 Estimated	**Maturity:**	Over mature	**Form:**	Poor
Origin:	Victorian	**ULE (years):**	5 - 15	**Amenity value:**	Moderate
Retained?:	Removed	**Priority:**	Moderate		

Works Required: > 50mm dead wood.Remove hanging limb/s.

SRZ (m): 2.4 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 5.0 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 2.2 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 21

Genus / species: *Eucalyptus leucoxylon* Yellow Gum Evergreen

Height (m):	10	**Structure:**	Fair	**Retention value:**	Moderate
Width (m):	11	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	84 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	N/A		

Works Required: Root investigation

SRZ (m): 3.1 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 10.1 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 5.5 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 23

Genus / species: *Eucalyptus saligna* Sydney Blue Gum Evergreen

Height (m):	21	**Structure:**	Good	**Retention value:**	High
Width (m):	17	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	62 Measured	**Maturity:**	Mature	**Form:**	Good
Origin:	Australian	**ULE (years):**	25 - 50	**Amenity value:**	High
Retained?:	Retained	**Priority:**	Moderate		

Works Required: > 50mm dead wood.

SRZ (m): 2.8 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 7.4 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 1.4 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 24

Genus / species: *Eucalyptus leucoxylon* Yellow Gum Evergreen

Height (m):	6	**Structure:**	Fair	**Retention value:**	Low
Width (m):	5	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	22 Measured	**Maturity:**	Imature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	15 - 25	**Amenity value:**	Low
Retained?:	Removed	**Priority:**	N/A		

Works Required:

SRZ (m):	***1.7***	AS 4970-2009 Protection of trees on development sites (Radius)
TPZ (m):	***2.6***	AS 4970-2009 Protection of trees on development sites (Radius)
mTPZ (m):	***= TPZ***	Modification to TPZ to protect the tree canopy as required
Construction Proximity:	***0.1***	0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 25

Genus / species: *Melaleuca styphelioides* Prickly Paperbark Evergreen

Height (m):	6	**Structure:**	Fair	**Retention value:**	Low
Width (m):	6	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	27 Measured	**Maturity:**	Imature	**Form:**	Fair
Origin:	Australian	**ULE (years):**	15 - 25	**Amenity value:**	Low
Retained?:	Removed	**Priority:**	Very low		

Works Required: > 50mm dead wood.

SRZ (m):	***1.9***	AS 4970-2009 Protection of trees on development sites (Radius)
TPZ (m):	***3.2***	AS 4970-2009 Protection of trees on development sites (Radius)
mTPZ (m):	***= TPZ***	Modification to TPZ to protect the tree canopy as required
Construction Proximity:	***0.1***	0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 26

Genus / species: *Eucalyptus leucoxylon* Yellow Gum Evergreen

Height (m):	8	**Structure:**	Fair	**Retention value:**	Low
Width (m):	6	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	28 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	15 - 25	**Amenity value:**	Low
Retained?:	Removed	**Priority:**	N/A		

Works Required:

SRZ (m):	***1.9***	AS 4970-2009 Protection of trees on development sites (Radius)
TPZ (m):	***3.4***	AS 4970-2009 Protection of trees on development sites (Radius)
mTPZ (m):	***= TPZ***	Modification to TPZ to protect the tree canopy as required
Construction Proximity:	***0.1***	0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 28

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	8	**Structure:**	Fair	**Retention value:**	Low
Width (m):	7	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	33 Measured	**Maturity:**	Imature	**Form:**	Good
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	Low
Retained?:	Removed	**Priority:**	N/A		

Works Required:

SRZ (m):	***2.1***	AS 4970-2009 Protection of trees on development sites (Radius)
TPZ (m):	***4.0***	AS 4970-2009 Protection of trees on development sites (Radius)
mTPZ (m):	***= TPZ***	Modification to TPZ to protect the tree canopy as required
Construction Proximity:	***0.1***	0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 29

Genus / species: *Eucalyptus leucoxylon* Yellow Gum Evergreen

Height (m):	10	**Structure:**	Fair	**Retention value:**	Moderate
Width (m):	11	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	50 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	15 - 25	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	Low		

Works Required: > 50mm dead wood.

SRZ (m):	***2.6***	AS 4970-2009 Protection of trees on development sites (Radius)
TPZ (m):	***6.0***	AS 4970-2009 Protection of trees on development sites (Radius)
mTPZ (m):	***= TPZ***	Modification to TPZ to protect the tree canopy as required
Construction Proximity:	***4.3***	0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 30

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	7	**Structure:**	Fair	**Retention value:**	Low
Width (m):	8	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	36 Measured	**Maturity:**	Mature	**Form:**	Poor
Origin:	Melbourne	**ULE (years):**	15 - 25	**Amenity value:**	Low
Retained?:	Retained	**Priority:**	N/A		

Works Required:

SRZ (m):	***2.2***	AS 4970-2009 Protection of trees on development sites (Radius)
TPZ (m):	***4.3***	AS 4970-2009 Protection of trees on development sites (Radius)
mTPZ (m):	***= TPZ***	Modification to TPZ to protect the tree canopy as required
Construction Proximity:	***8.2***	0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 32

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	11	**Structure:**	Fair	**Retention value:**	Moderate
Width (m):	14	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	101 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	15 - 25	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	Low		

Works Required: > 50mm dead wood. Weight reduce.

SRZ (m): 3.3 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 12.1 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 10.6 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 33

Genus / species: *Eucalyptus leucoxylon* Yellow Gum Evergreen

Height (m):	10	**Structure:**	Fair	**Retention value:**	Low
Width (m):	8	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	35 Measured	**Maturity:**	Mature	**Form:**	Poor
Origin:	Melbourne	**ULE (years):**	15 - 25	**Amenity value:**	Low
Retained?:	Retained	**Priority:**	N/A		

Works Required:

SRZ (m): 2.2 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 4.2 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 0.6 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 35

Genus / species: *Eucalyptus saligna* Sydney Blue Gum Evergreen

Height (m):	22	**Structure:**	Good	**Retention value:**	High
Width (m):	16	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	78 Measured	**Maturity:**	Mature	**Form:**	Good
Origin:	Australian	**ULE (years):**	25 - 50	**Amenity value:**	High
Retained?:	Retained	**Priority:**	Low		

Works Required: Mulch

SRZ (m): 3 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 9.4 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 10.5 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 36

Genus / species: *Eucalyptus saligna* Sydney Blue Gum Evergreen

Height (m):	23	**Structure:**	Fair	**Retention value:**	High
Width (m):	16	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	59 Measured	**Maturity:**	Mature	**Form:**	Good
Origin:	Australian	**ULE (years):**	25 - 50	**Amenity value:**	High
Retained?:	Retained	**Priority:**	Moderate		

Works Required: Remedial pruning to improve structure. Cable bifurcated stems. Mulch.

SRZ (m): 2.8 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 7.1 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 10.1 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 37

Genus / species: *Eucalyptus leucoxylon* Yellow Gum Evergreen

Height (m):	15	**Structure:**	Fair	**Retention value:**	Moderate
Width (m):	15	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	57 Measured	**Maturity:**	Mature	**Form:**	Poor
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	Low		

Works Required: Mulch

SRZ (m): 2.7 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 6.8 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 8.4 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 44

Genus / species: *Melaleuca styphelioides* Prickly Paperbark Evergreen

Height (m):	8	**Structure:**	Fair	**Retention value:**	Low
Width (m):	10	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	43 Measured	**Maturity:**	Mature	**Form:**	Good
Origin:	Australian	**ULE (years):**	25 - 50	**Amenity value:**	Low
Retained?:	Retained	**Priority:**	N/A		

Works Required:

SRZ (m): 2.4 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 5.2 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 0.1 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 46

Genus / species: *Eucalyptus pryoriana* Gippsland Manna Gum Evergreen

Height (m):	12	**Structure:**	Poor	**Retention value:**	Moderate
Width (m):	13	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	65 Measured	**Maturity:**	Mature	**Form:**	Good
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	Moderate
Retained?:	Removed	**Priority:**	N/A		

Works Required:

SRZ (m):	***2.9***	AS 4970-2009 Protection of trees on development sites (Radius)
TPZ (m):	***7.8***	AS 4970-2009 Protection of trees on development sites (Radius)
mTPZ (m):	***= TPZ***	Modification to TPZ to protect the tree canopy as required
Construction Proximity:	***0.1***	0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 58

Genus / species: *Liquidambar styraciflua* Liquidambar Deciduous

Height (m):	15	**Structure:**	Good	**Retention value:**	Moderate
Width (m):	15	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	45 Estimated	**Maturity:**	Mature	**Form:**	Good
Origin:	Exotic	**ULE (years):**	25 - 50	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	N/A		

Works Required:

SRZ (m):	***2.5***	AS 4970-2009 Protection of trees on development sites (Radius)
TPZ (m):	***5.4***	AS 4970-2009 Protection of trees on development sites (Radius)
mTPZ (m):	***= TPZ***	Modification to TPZ to protect the tree canopy as required
Construction Proximity:	***6.65***	0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 79

Genus / species: *Eucalyptus bicostata* Eurabbie Evergreen

Height (m):	17	**Structure:**	Fair	**Retention value:**	High
Width (m):	11	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	88 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Australian	**ULE (years):**	25 - 50	**Amenity value:**	High
Retained?:	Retained	**Priority:**	N/A		

Works Required: Investigate viability of constructing path at or above existing grade to preserve roots.

SRZ (m):	***3.1***	AS 4970-2009 Protection of trees on development sites (Radius)
TPZ (m):	***10.6***	AS 4970-2009 Protection of trees on development sites (Radius)
mTPZ (m):	***= TPZ***	Modification to TPZ to protect the tree canopy as required
Construction Proximity:	***5.9***	0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 91

Genus / species: *Eucalyptus nicholii* Willow Leaf Peppermint Evergreen

Height (m):	12	**Structure:**	Good	**Retention value:**	Moderate
Width (m):	12	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	63 Measured	**Maturity:**	Mature	**Form:**	Good
Origin:	Australian	**ULE (years):**	25 - 50	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	N/A		

Works Required:

SRZ (m):	***2.8***	AS 4970-2009 Protection of trees on development sites (Radius)
TPZ (m):	***7.6***	AS 4970-2009 Protection of trees on development sites (Radius)
mTPZ (m):	***= TPZ***	Modification to TPZ to protect the tree canopy as required
Construction Proximity:	***5.9***	0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 153

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	5	**Structure:**	Poor	**Retention value:**	Remove.
Width (m):	5	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	22 Measured	**Maturity:**	Imature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	15 - 25	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	Low		

Works Required: Possum guard and canopy lift

SRZ (m):	***1.7***	AS 4970-2009 Protection of trees on development sites (Radius)
TPZ (m):	***2.6***	AS 4970-2009 Protection of trees on development sites (Radius)
mTPZ (m):	***= TPZ***	Modification to TPZ to protect the tree canopy as required
Construction Proximity:	***0.1***	0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 154

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	11	**Structure:**	Fair	**Retention value:**	Moderate
Width (m):	8	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	42 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	Low		

Works Required: Possum guard and canopy lift

SRZ (m):	***2.4***	AS 4970-2009 Protection of trees on development sites (Radius)
TPZ (m):	***5.0***	AS 4970-2009 Protection of trees on development sites (Radius)
mTPZ (m):	***= TPZ***	Modification to TPZ to protect the tree canopy as required
Construction Proximity:	***0.1***	0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 155

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	8	**Structure:**	Fair	**Retention value:**	Moderate
Width (m):	7	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	39 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	Low		

Works Required: Possum guard and canopy lift

SRZ (m): 2.3 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 4.7 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 0.1 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 156

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	13	**Structure:**	Fair	**Retention value:**	Moderate
Width (m):	10	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	42 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	Low		

Works Required: Possum guard and canopy lift

SRZ (m): 2.4 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 5.0 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 0.1 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 157

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	13	**Structure:**	Fair	**Retention value:**	Moderate
Width (m):	10	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	49 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	Low		

Works Required: Possum guard and canopy lift

SRZ (m): 2.6 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 5.9 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 0.1 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 158

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	10	**Structure:**	Fair	**Retention value:**	Moderate
Width (m):	8	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	45 Estimated	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	Low		

Works Required: Possum guard and canopy lift

SRZ (m): 2.5 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 5.4 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 4.32 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 250

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	17	**Structure:**	Fair	**Retention value:**	High
Width (m):	20	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	119 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	High
Retained?:	Retained	**Priority:**	Low		

Works Required: > 50mm dead wood.

SRZ (m): 3.5 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 14.3 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 3.6 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 251

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	11	**Structure:**	Fair	**Retention value:**	High
Width (m):	13	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	84 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	High
Retained?:	Retained	**Priority:**	Low		

Works Required: > 50mm dead wood.

SRZ (m): 3.1 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 10.1 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 4.9 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 252

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	16	**Structure:**	Good	**Retention value:**	High
Width (m):	21	**Health:**	Good	**Reason:**	N/A.
DBH (cm):	63 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	High
Retained?:	Retained	**Priority:**	Low		

Works Required: > 50mm dead wood.

SRZ (m): 2.8 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 7.6 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 6 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 253

Genus / species: *Eucalyptus camaldulensis* River Red Gum Evergreen

Height (m):	0	**Structure:**	Fair	**Retention value:**	High
Width (m):	16	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	79 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	25 - 50	**Amenity value:**	High
Retained?:	Retained	**Priority:**	Low		

Works Required: > 50mm dead wood.

SRZ (m): 3 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 9.5 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 2.3 0.1 indicates construction over or immediately adjacent to the tree

Tree ID: 268

Genus / species: *Eucalyptus pryoriana* Gippsland Manna Gum Evergreen

Height (m):	15	**Structure:**	Fair	**Retention value:**	Moderate
Width (m):	15	**Health:**	Fair	**Reason:**	N/A.
DBH (cm):	63 Measured	**Maturity:**	Mature	**Form:**	Fair
Origin:	Melbourne	**ULE (years):**	15 - 25	**Amenity value:**	Moderate
Retained?:	Retained	**Priority:**	N/A		

Works Required:

SRZ (m): 2.8 AS 4970-2009 Protection of trees on development sites (Radius)

TPZ (m): 7.6 AS 4970-2009 Protection of trees on development sites (Radius)

mTPZ (m): = TPZ Modification to TPZ to protect the tree canopy as required

Construction Proximity: 0.1 0.1 indicates construction over or immediately adjacent to the tree

19. Appendix 3 – Arboricultural information

The following sections are presented to provide an introduction to the process of tree root system protection. A trees root system is the critical element to be protected during the development process and if the trees roots are adequately protected then the rest of the tree will generally survive without significant injury.

19.1. Root plate estimation

One of the primary purposes of this report is to estimate the impact of the development on the trees on this site. This is mainly achieved by estimating the extent of the root plate area of the trees that are proposed to be retained and the proportion of this area that is likely to be excised or affected during the construction process.

In this report two elements of the tree root area are described. These are:

19.1.1. Structural Root Zone

This is an estimate of the radius that is likely to encompass the major scaffold roots of the tree. These roots are critical to anchoring the tree and damage to these roots will increase the risk of entire tree failure (i.e. uprooting). This radius is based on AS 4970-2009.

19.1.2. Tree Protection Zone

This is an estimate of the radius that is likely to encompass enough of the smaller absorbing roots to allow the tree to obtain sufficient nutrients and water to allow it to survive in the long term. This is radius is based on AS 4970-2009 and is based on the size of the tree.

Estimation of the likely root plate radius for both methods are based on the DBH (Diameter at Breast Height) of each tree. This is usually measured but where the tree is inaccessible or has numerous trunks a visual estimation may be used. Whether the DBH is estimated or measured is noted within the ”Tree Data” section of the report.

The two elements of each trees’ root zone is transposed over the site survey and building footprint and the degree of root injury is calculated from this.

19.2. Tree rooting patterns

Contrary to common belief, trees usually have a broad flat plate of roots that may extend 1.5 – 3 times the radius of the canopy (Harris, Matheny & Clark, 1999; Coder, 1996; Hitchmough, 1994). Relatively few trees have deep roots and Harris, Matheny and Clark (2004) note that most tree roots will be found in the top 1.0 metre of the soil profile.

While the models used to approximate the size of tree root plates assume a uniformly radial root system, in highly disturbed urban soils root systems often develop in a highly asymmetric manner (Matheny & Clarke, 2004). This may require the modification of the models used where it is likely that the root system is asymmetric.

19.3. Construction impacts

Construction in the vicinity of trees can have several negative impacts on their health, longevity and structural stability. Harris, Matheny and Clark (2004) note that some level of tree root injury or root zone change is almost inevitable during construction around trees and maintain that the goal of tree preservation is to reduce the injury or change to a level that will enable the long term preservation of the retained trees.

Negative impacts can include:

- Root severance from trenching and grading activities. Damage to the transport and absorbing root system may deprive the tree of the ability to absorb nutrients and water and damage to the structural scaffold roots that support the tree may result in instability and uprooting. Depending on the percentage of the root plate affected and proximity to the tree, the affects can range from minor degradation of health through to total root plate failure (i.e. uprooting).
- Compaction and root injury. Most trees require a well aerated and friable soil to allow normal physiological processes to occur and to allow root growth. Soil compaction from pedestrian or vehicular traffic can result in direct injury to the roots, indirect injury through soil drainage changes, reduced soil aeration or decreased soil penetrability. If severe enough soil compaction can lead to a rapid decline in many tree species and may eventually result in instability and uprooting.
- Changes in drainage patterns. Changes in drainage patterns may result from hard surfacing, trenching, land shaping and other construction activities. These can result in either drought stress or waterlogging, both of which can cause a rapid decline in trees and may result in instability and uprooting.

20. Appendix 4 - AS 4970 -*2009*

This report generally conforms to *AS 4970 – 2009 Protection of Trees on Development Sites* except in the following areas.

1. AS 4970 notes that the project arborist should verify the accuracy of feature survey for the subject site.
    a. This is generally not feasible and the feature survey is taken as being an accurate representation of the features of the site.
    b. However if trees are found on the site that are not represented in the feature survey then these trees will be added to the report plans based on a visual estimation of their location.
        i. Accordingly the location of these trees may not be sufficiently accurate for the purposes of the report.
        ii. The location of these trees should verified by a qualified surveyor where appropriate.
2. *AS 4970-2009 Protection of Trees on Development Sites* makes no differentiation between the Tree Protection Zone (TPZ) derived from the trees DBH and the modified TPZ derived from the trees canopy where it extends past the DBH derived TPZ. As the two forms of TPZ are independent a differentiation between the two forms of TPZ needs to be made. In this report:
    a. "TPZ" refers to the DBH derived Tree Protection Zone (12 x DBH) and "mTPZ" pertains to the TPZ where it is modified to account for a canopy that extends beyond the DBH derived TPZ.
    b. The modified Tree Protection Zone (mTPZ) for all trees is taken as being identical to the Tree Protection Zone (TPZ) except where the canopy of the tree extends beyond the TPZ. Where this is the case the TPZ is shown on the site plans and any tree canopy impacts are addressed as required within the report. Otherwise the mTPZ is recorded within this report as "= TPZ".

21. Appendix 5 - Explanation of terms

The assessment of Health, Structure, Condition, U.L.E. (Useful Life Expectancy), Origin, Maturity, Form and Retention value are based on the following definitions. In the case of health and structure these definitions encompass only the more common indicators for these assessments. Other indicators not included in these definitions may lead to the ascribing of a particular health or structure category.

21.1. Origin

The notation of "Origin" is based on the following categories.

Category	Description
Melbourne	Native to the greater Melbourne metropolitan area as defined by Flora of Melbourne (S. G. A. P. M., 1991).
Victorian	Native to Victoria but not the greater Melbourne Metropolitan area.
Australian	Native to Australia but not Victoria.
Exotic	Not native to Australia.

21.2. Maturity

The notation of "Maturity" is based on the following categories.

Category	Description
Immature	Less than 20% of the life expectancy for that tree.
Mature	20 – 80% of the life expectancy for that tree.
Over mature	> 80% of the life expectancy for that tree.

21.3. Works required

The works required listed in this report are of a general nature only and should be reviewed following the completion of any works on the site.

Where a tree is recommended for removal (Recommendation) it is not listed in the Works required section of the report.

21.4. Priority

The priority accorded particular works is based on a projected increased site usage following the completion of a development on the site. The priority is of a general nature only and should be reviewed following the completion of any works on the site.

"Priority" is based on the following categories.

Category	Description
➢ **N/A.**	No tree works are required
➢ **Very low**	Tree works are optional and could be performed at any time..
➢ **Low**	Works should be performed within five years.
➢ **Moderate**	Works should be performed within 3 years.
➢ **High**	Works should be performed within 12 months.
➢ **Urgent**	Works should be performed immediately.

21.5. Retention value (RV)

The Retention value ascribed to each tree in this report is not definitive and should be used as a guide only. Many factors influence the comparative value of a tree and a number of these factors are outside the scope of arboricultural assessment. These factors cannot therefore be addressed in a single rating system.

Retention value is comprised of two parts. These are the Amenity Value of the tree rated as Very Low to Very high and the Useful Life Expectancy (ULE) of the tree.

The Amenity Value of the tree relates to the contribution of the tree to the aesthetic amenity of the area. The primary determinants of amenity value are tree health, size and form.

The Amenity Value is then modified by the ULE of the tree with short ULE values reducing the RV of the tree and long ULE values increasing the RV of the tree.

Trees that are listed on a register of heritage or significant trees are not accommodated within this rating system as these values are often independent from the arboricultural attributes of the tree. Heritage and significant trees may be ascribed a very low retention value despite their listing on any register. Where known, any heritage or significant register listing it will be noted in the report.

RV is assessed on each tree as a single entity. The value of a group of trees is not considered in this context and each tree within the group will be assessed as an individual.

Amenity value is based on the following categories and is ascribed an Amenity Value Value (AVV) ranging from 2 - 10.

Category	Example	AVV
➢ **Very high**	Generally a very large tree that exhibits excellent health and/or form or a tree that is listed on a heritage or significant tree register.	10
➢ **High**	Generally a large tree that exhibits good health and/or form.	8
➢ **Medium**	Generally a medium tree that exhibits good health and/or form. May be a large tree that exhibits fair health and/or form.	6
➢ **Low**	Generally a small tree that exhibits good health and/or form. May be a large or medium tree that exhibits fair or poor health and/or form.	4
➢ **Very low**	Generally a small tree that exhibits poor health and/or form. May be a large or medium tree that exhibits poor, or worse, health and/or form.	2

U.L.E. is based on the following categories each of which have a modifier (ULEM) ranging from 0 – 12.

Category	Example	ULEM
➢ **0**	The tree is dead or almost dead or constitutes an immediate and unacceptable hazard.	0
➢ **0 – 5**	The tree is unlikely to provide useful amenity for longer than 5 years. The tree is in serious decline, poses an unacceptable hazard and/or requires a level of maintenance disproportionate with its' value.	4
➢ **5 – 15**	The tree is unlikely to provide useful amenity for longer than 15 years. The tree may be in serious decline, be a very short lived species, present a moderately elevated hazard and/or require high levels of maintenance.	7
➢ **15 – 25**	The tree is unlikely to provide useful amenity for longer than 25 years. The tree may be in moderate decline, a short lived species, present a slightly elevated hazard and/or require moderate levels of maintenance.	10

➢ **25 – 50**	The tree is likely to provide useful amenity for up to 50 years. The tree may be in fair to good condition, have a moderate life-span, present a low to moderate level of hazard and/or require moderate levels of maintenance.	11
➢ **> 50**	The tree is likely to provide useful amenity for greater than 50 years. The tree may be in good to excellent condition, a long lived species, present a low level of hazard and/or require low levels of maintenance.	12

RV is then derived from the multiplication of AVV by ULEM and the resulting score is categorised as Very high to Very low.

Category	**Example**	**RV value**
➢ **Very high**	Every effort should be made to preserve trees in this category	96 - 120
➢ **High**	These trees should be retained if at all possible	72 - 95
➢ **Moderate**	These trees should be retained if they do not overly constrain development on the site.	48 - 71
➢ **Low**	These trees should not create a material constraint on development of the site. These trees should be removed where they conflict with development of the site.	24 - 47
➢ **Very low**	Generally a small tree that exhibits poor health and/or form. May be a large or medium tree that exhibits poor, or worse, health and/or form. These trees should generally be removed.	1 – 23
➢ **Remove**	These trees are not suitable for retention within the site and are recommended to be removed.	0

21.6. Health

Pertains to the health and growth potential of the tree.

The notation of "Health" is based on the following categories.

Category	Example
➢ **Good**	Crown full, with good foliage density. Foliage is entire with average colour, minimal or no pathogen damage. Above average growth indicators such as extension growth, leaf size and canopy density. Little or no canopy die-back. Generally no dead wood on the perimeter of the canopy. Good wound wood development. **Tree exhibits above average health and no works are required.**
➢ **Fair**	Tree may have more than 30% dead wood, or may have minor canopy dieback. Foliage density may be slightly below average for the species. Foliage colour may be slightly lower than average and some discolouration may be present. Typical growth indicators, e.g. extension growth, leaf size, canopy density for species in location. Average wound wood development. **The tree exhibits below average health and remedial works may be employed to improve health.**
➢ **Poor**	Tree may have more than 30% dead wood and canopy die back may be present. Leaves may be discoloured and/or distorted, often small, and excessive epicormic growth may be present. Pathogens and/or stress agents may be present that could lead, or are leading to, the decline of tree. Poor wound wood development. **The tree exhibits low health and remedial works or removal may be required.**
➢ **Very poor**	The tree has more than 30% dead wood. Extensive canopy die back is present. Canopy is very sparse. Pathogens and/or stress agents are present that are leading to the decline of the tree. Very poor wound wood development. **The tree exhibits very low health and remedial works or removal are required.**
➢ **Dead**	**Tree is dead and generally should be removed.**

21.7. Structure

Pertains to the physical structure of the tree including the main scaffold branches and roots. Structure includes those attributes that may influence the probability of major trunk, root or limb failure.

The notation of "Structure" is based on the following categories.

Category	Example
➢ **Good**	The tree has a well-defined and balanced crown. Branch unions appear to be strong with no defects evident in the trunk or the branches. The tree is unlikely to suffer trunk or branch failure under normal conditions. **The tree is considered a good example of the species with a well-developed form.**
➢ **Fair**	The tree has some minor problems in the structure of the crown. The crown may be slightly out of balance and some branch unions may exhibit minor structural faults or have the potential to create faults. If the tree is single trunked, this may be on a slight lean or be exhibiting minor defects. **These defects are not likely to result in catastrophic trunk or branch failure although some branch failure may occur under normal conditions.**
➢ **Poor**	The tree has significant problems in the structure of the scaffold limbs or trunk. It may be lop-sided or have few branches on one side or have large gaps in the crown. Large branches may be rubbing or crossing over. Branch unions may be poor, and faults at the point of attachment or along the branches may be evident. The tree may have a substantial lean. The tree may have suffered significant root damage. The tree may have some degree of basal or trunk damage. **These defects may predispose the tree to major trunk or branch failure.**
➢ **Very poor**	The tree has some very significant problems in the structure of the crown. It may be lop-sided or have few branches on one side or have large gaps in the crown. Branches may be rubbing or crossing over and causing damage to each other. Branch unions may be poor, and faults at the point of attachment or along the branches may be evident. The tree may have a substantial lean. The tree may have suffered major root damage. The tree may have extensive basal or trunk damage. **These defects are likely to predispose the tree to trunk or scaffold limb failure.**

21.8. U.L.E. (Useful Life Expectancy)

U.L.E. pertains to the span of time that the tree might reasonably be expected to provide useful amenity value with an acceptable level of safety at an acceptable cost. Depending on the situation, available financial resources and other factors, two identical trees may be accorded different longevity ratings.

The notation of U.L.E. is based on the following categories.

Category	Example
➢ **0**	The tree is dead or almost dead or constitutes an immediate and unacceptable hazard. **The tree should generally be removed unless other considerations require its' retention.**
➢ **0 – 5**	The tree is unlikely to provide useful amenity for longer than 5 years. The tree is in serious decline, poses an unacceptable hazard and/or requires a level of maintenance disproportionate with its' value. **The tree should generally be removed unless other considerations require its' retention.**
➢ **5 – 15**	The tree is unlikely to provide useful amenity for longer than 15 years. The tree may be in serious decline, be a very short lived species, present a moderately elevated hazard and/or require high levels of maintenance. **The tree could be retained or removed depending on the situation.**
➢ **15 – 25**	The tree is unlikely to provide useful amenity for longer than 25 years. The tree may be in moderate decline, be a short lived species, present a slightly elevated hazard and/or require moderate levels of maintenance. **The tree should generally be retained unless other factors dictate its' removal.**
➢ **25 – 50**	The tree is likely to provide useful amenity for up to 50 years. The tree may be in fair to good condition, have a moderate life-span, present a low to moderate level of hazard and/or require moderate levels of maintenance. **The tree should generally be retained unless other factors dictate its' removal.**
➢ **> 50**	The tree is likely to provide useful amenity for greater than 50 years. The tree may be in good to excellent condition, a long lived species, present a low level of hazard and/or require low levels of maintenance. **The tree should generally be retained unless other factors dictate its' removal.**

22. Form

The notation of "Form" pertains to the aesthetic qualities of the trees live canopy. Generally good form is indicative of a symmetrical, well-balanced canopy although this is dependent on the particular species. Some species naturally develop an asymmetric canopy and in this case a highly irregular canopy might be described as good.

The form of a tree is considered assuming that the tree stands in isolation from any surrounding trees. This may mean that a group of trees that exhibit good form as a group, may be described as having poor form as individuals.

The notation of "Form" is based on the following categories.

Category	Example
➢ **Very good**	An outstanding specimen of that species. Generally a very evenly balanced and symmetrical canopy with no deformation. If the development of that species is naturally irregular then an outstanding specimen of that species.
➢ **Good**	A good specimen of that species. Generally a well balanced and symmetrical canopy with minor deformation. If the development of that species is naturally irregular then a good specimen of that species.
➢ **Fair**	An average specimen of that species. Generally a balanced canopy with some minor to moderate asymmetry. If the development of that species is naturally irregular then an average specimen of that species.
➢ **Poor**	A below average specimen of that species. Generally a moderate to high degree of asymmetry. If the development of that species is naturally irregular then a poor specimen of that species.
➢ **Very poor**	A very poor specimen of that species. Generally a high to extreme degree of asymmetry. If the development of that species is naturally irregular then a very poor specimen of that species.

23. Glossary / notes

Tree Protection Zone (TPZ)	Is based on AS 4970-2009 *Protection of trees on development sites* and defines the soil volume that is likely to be required to encompass enough of the trees absorbing root system to ensure the long term survival of the tree. The radius specified as the TPZ is an estimate of the minimum distance from the tree that excavation or other activities that might result in root damage should occur to avoid negative impacts on the health and longevity of the tree. AS 4970 states that intrusion of up to 10% of the surface area of the TPZ may occur without further assessment or analysis.
Structural Root Zone (SRZ)	Is based on AS 4970-2009 (Protection of trees on development sites) and defines the likely spread of the trees scaffold root system. These roots are the primary anchoring roots for the tree and damage to these roots may render the tree liable to uprooting. SRZ is based on measurement of the trunk above the root flair (AS 4970) However in this report SRZ is based on the measured or estimated DBH and there should be taken as an estimate only. Additional measurement may be required if construction near the SRZ is expected to occur.
Modified Tree Protection Zone (mTPZ)	Is based on the TPZ and includes any requirement to protect the above ground parts of the tree that project beyond the TPZ. However generally the mTPZ will be equal to the TPZ. TPZ extension beyond the TPZ to protect the tree canopy will be shown on the site plan but will not be reflected in the TPZ radius measurements quoted in this report.
DBH (Diameter at Breast Height)	Is the diameter of the tree at approximately 1.4 meters above ground level. Where a trunk is divided at or near 1.4 meters above ground the DBH is generally measured at the narrowest point of the trunk between ground level and 1.4 meters. Alternatively, where a higher level of accuracy is required with multi stemmed trees, DBH is derived from the combined cross sectional area of all trunks. The DBH of all accessible trees is measured unless otherwise stated in the Tree Data section of this report. The DBH of trees on adjoining properties is measured where access can be readily gained to the property, otherwise it is estimated.
Measured	Indicates whether the DBH has been measured or estimated. DBH may be estimated for small low value multi stem trees or trees that are inaccessible.
Retained?	Indicates whether the tree is shown as being removed or retained on the plans provided. This is generally derived from the site plans provided but the removal or retention of trees might be communicated by other means.

Recommendation reason	Pertains to the reason that removal or retention or other works are recommended. Other than trees on adjoining properties or road reserves a reason for retention is usually not given. In this case N/A is used.
Height & width	Tree height is generally measured for moderate, high and very high value trees and is measured with an Impulse Laser infrared range finder. The height of low and very low value trees is usually estimated. Canopy width is estimated unless otherwise stated.
Genus / species	The identification of trees is based on accessible visual characteristics and given that key identifying features are often not available at the time of assessment the accuracy of identification is not guaranteed. Where the species of any tree is not known, **sp.** is used.

24. Practice Note VCAT 2 — Expert Evidence

24.1. Name & address of consultant

Aaron Pabst of 1 Como Street, Emerald, Victoria, 3782.

24.2. Qualifications & experience

Aaron Pabst has the following qualifications and experience:

- Certificate III in Horticulture (Arboriculture)
- Diploma of Arboriculture (Dip.Arb.)

24.3. Area of expertise

Aaron Pabst provides specialist technical advice in the field of arboriculture. This includes the provision of technical expertise relating to problem diagnosis, management programs, tree appraisal and valuation and the relationship between trees and built structures.

24.4. Expertise to report

Aaron Pabst has, by training, education, experience and research, considerable knowledge relating to the care, maintenance and management of trees in a wide variety of contexts.

Significant areas of operation and expertise include the provision of tree and built structure conflict reports, hazard assessment, tree condition appraisal and broad scale tree inventories.

Considerable effort is expended in research to remain current with the latest advances in all areas relating to tree care.

24.5. Declaration

"I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance which I regard as relevant have to my knowledge been withheld from the Tribunal."

25. Assumptions & limiting conditions

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Yours sincerely,

Aaron Pabst
Diploma of Arboriculture (Dip.Arb.)