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TREE PROTECTION REPORT

Location:

**Capital City Trail
Rushall Station Bypass
Fitzroy North**

Our Ref.1980.2.TPR

Report prepared by:

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Report commissioned by:

City of Yarra

1 September 2014

1 Introduction

1.1 Objectives

This Tree Protection Report should assist with the design of the Rushall Station Bypass section of the Capital City Trail. It also outlines the protection requirements for trees that may be affected by works. This report will provide the following information for trees likely to be affected:

1. Introduction.

Tree details and plans

2. Tree species and other relevant details of trees recommended for removal and of trees recommended for retention and protection.
3. A plan showing tree locations with trees numbered.

Protection during earthworks and construction

4. All necessary tree protection measures, and processes for their initiation and management, to ensure that trees worth retaining are not damaged during all stages of the project including earthworks and construction.
5. Contact details of the project arborist and timing of inspections by the project arborist.

Post-construction

6. Ongoing maintenance requirements of the trees.
7. Ongoing tree protection requirements.
8. Other relevant recommendations.

1.2 Background

The Rushall Station Bypass section of the Capital City Trail will be constructed alongside Rushall Railway Station, along the Merri Creek embankment.

Woody plants adjacent to the proposed bypass were assessed for this report. All are Australian native trees and shrubs, mostly indigenous species that appear to have been planted to revegetate the area.

This Tree Protection Report provides details of trees that are recommended for removal because of their poor health or poor structural condition, and specifies the protection measures that are required for minimising impacts on trees that are recommended for retention.

1.3 Methodology

Tree height and crown spread were measured with laser equipment. The diameters of tree stems at breast height (DBH) were measured 1.4 metres above ground level or, for multi-stemmed trees, calculated from the total stem area at that height.

Tree health and structure were assessed visually from the ground using Visual Tree Assessment (VTA) methods and hazard identification methods described by Harris, Clark & Matheny (2003), Lonsdale (1999), Matheny & Clark (1998) and Mattheck & Breloer (1994).

Tree Protection Zones were calculated according to the Australian Standard: *Protection of Trees on Development Sites* (AS4970–2009).

All assessed trees were numbered for this report and their locations are indicated on a site survey plan (refer to Appendix A).

1.4 Tree damage

Trees can be affected during development in several ways. Direct damage to roots through trenching and site cuts can remove absorbing roots and sever structural roots. Root activity can be inhibited by various activities: soil compaction in the root zone; sealing the soil surface; or adding soil fill over roots. These activities limit the amount of oxygen and moisture that may reach the roots, and without which roots cannot function. This will lead to drought stress and even death, and may take several years to become evident in the crown. Tree trunks and branches are easily damaged by machinery during works. Damage to trees can be sudden and irreversible. It is important that trees are properly protected throughout all stages of the project.

TREE DETAILS AND PLANS

2 Tree details

Seventy five trees were assessed for this report.

Table 1 on the following page lists 38 trees that were assessed as being unworthy of retention.

Following that, Table 2 lists 37 trees that were assessed as being worthy of retention.

Figures 1 & 2, below, illustrate sections of the site.



Figure 1. Trees beside the existing track.



Figure 2. Trees beside the existing track.

The trees listed below in Table 1 were assessed as being unsuitable for retention due to their poor health, their poor structural condition, or both. However, several trees listed in the table are small and will not pose risk to pedestrians or cyclists. Therefore, such trees could be retained if the proposed pathway does not disrupt their root systems.

Table 1. Details of trees recommended for removal.

Tree #	Species	Origin	Height (m)	DBH (cm)	Maturity	Health	Structure	Significance	SRZ (m)	TPZ (m)
6	<i>Acacia implexa</i>	I	4	10	I	Good	Poor	Low	1.5	2.0
7	<i>Eucalyptus viminalis</i>	I	6	30	S	Good	Poor	Low	2.0	3.6
8	<i>Acacia implexa</i>	I	8	31	M	Poor	Poor	Low	2.0	3.7
9	<i>Acacia implexa</i>	I	9	24	M	Poor	Poor	Low	1.8	2.9
10	<i>Eucalyptus camaldulensis</i>	I	18	58	M	Good	Poor	Medium	2.6	7.0
13	<i>Acacia implexa</i>	I	4	10	M	Fair	Poor	Low	1.5	2.0
14	<i>Acacia implexa</i>	I	3	5	I	Fair	Poor	Low	1.5	2.0
15	<i>Bursaria spinosa</i>	I	3	12	M	Good	Poor	Low	1.5	2.0
17	<i>Acacia implexa</i>	I	8	30	M	Fair	Poor	Low	2.0	3.6
18	<i>Acacia implexa</i>	I	5	14	S	Poor	Fair	Low	1.5	2.0
20	<i>Bursaria spinosa</i>	I	4	10	S	Poor	Fair	Low	1.5	2.0
22	<i>Acacia implexa</i>	I	5	25	M	Poor	Poor	Low	1.8	3.0
23	<i>Acacia implexa</i>	I	3	10	S	Good	Poor	Low	1.5	2.0
24	<i>Allocasuarina verticillata</i>	I	7	18	S	Poor	Poor	Low	1.6	2.2
25	<i>Acacia implexa</i>	I	3	20	S	Poor	Poor	Low	1.7	2.4
26	<i>Acacia implexa</i>	I	3	20	S	Fair	Poor	Low	1.7	2.4
28	<i>Eucalyptus camaldulensis</i>	I	8	22	S	Fair	Poor	Low	1.8	2.6
30	<i>Acacia implexa</i>	I	6	24	M	Fair	Poor	Low	1.8	2.9
35	<i>Eucalyptus botryoides</i>	V	8	19	I	Good	Poor	Low	1.6	2.3
36	<i>Acacia implexa</i>	I	4	6	S	Good	Poor	Low	1.5	2.0
41	<i>Acacia implexa</i>	I	4	10	S	Good	Poor	Low	1.5	2.0
42	<i>Acacia implexa</i>	I	6	21	M	Good	Poor	Low	1.7	2.5
44	<i>Eucalyptus botryoides</i>	V	4	5	S	Good	Poor	Low	1.5	2.0
45	<i>Allocasuarina verticillata</i>	I	3	10	I	Fair	Poor	Low	1.5	2.0
46	<i>Eucalyptus camaldulensis</i>	I	15	36	M	Good	Poor	Medium	2.2	4.3
47	<i>Eucalyptus botryoides</i>	V	12	60	M	Good	Poor	Medium	2.7	7.2
48	<i>Eucalyptus camaldulensis</i>	I	10	27	S	Good	Poor	Medium	1.9	3.2
49	<i>Eucalyptus camaldulensis</i>	I	4	8	I	Good	Poor	Low	1.5	2.0
50	<i>Eucalyptus camaldulensis</i>	I	8	21	S	Poor	Poor	Low	1.7	2.5
52	<i>Eucalyptus camaldulensis</i>	I	14	32	S	Good	Poor	Medium	2.1	3.8
54	<i>Eucalyptus camaldulensis</i>	I	14	38	S	Good	Poor	Medium	2.2	4.6
56	<i>Eucalyptus camaldulensis</i>	I	4	6	I	Good	Poor	Low	1.5	2.0
63	<i>Eucalyptus camaldulensis</i>	I	5	12	I	Good	Poor	Low	1.5	2.0
68	<i>Eucalyptus ovata</i>	I	6	40	M	Good	Poor	Low	2.3	4.8
69	<i>Allocasuarina verticillata</i>	I	8	26	M	Fair	Poor	Low	1.9	3.1
70	<i>Allocasuarina verticillata</i>	I	11	42	M	Good	Poor	Medium	2.3	5.0
71	<i>Acacia pycnantha</i>	I	5	35	M	Fair	Poor	Low	2.1	4.2
73	<i>Eucalyptus camaldulensis</i>	I	15	46	S	Good	Poor	Medium	2.4	5.5

The Tree Protection Zone (TPZ) radius required to protect each tree is shown in the table. The TPZ radius is measured from the centre of a tree's stem and gives a circular area, above- and below-ground, that is set aside to protect a tree's roots and crown from site development works. The TPZ incorporates the Structural Root Zone (SRZ) and ensures that tree viability and stability are protected from construction disturbance. Encroachment by site works into a maximum of 10% of a TPZ is regarded as minor encroachment and is therefore acceptable according to AS4970–2009, but the encroachment must be outside the SRZ.

The trees listed below in Table 2 were assessed as being worthy of retention. Retained trees will require protection measures as outlined in this report. The larger trees, rated as having *High* (Tree 72) or *Medium* significance in the landscape, should be given priority for retention and protection over those rated as having *Low* significance.

Table 2. Details of trees recommended for retention.

Tree #	Species	Origin	Height (m)	DBH (cm)	Maturity	Health	Structure	Significance	Retention Rating	SRZ (m)	TPZ (m)
1	<i>Eucalyptus camaldulensis</i>	I	10	34	I	Good	Fair	Medium	Medium	2.1	4.1
2	<i>Eucalyptus camaldulensis</i>	I	16	57	M	Good	Fair	Medium	Medium	2.6	6.8
3	<i>Acacia implexa</i>	I	6	12	I	Fair	Fair	Low	Low	1.5	2.0
4	<i>Acacia implexa</i>	I	4	10	I	Good	Good	Low	Low	1.5	2.0
5	<i>Acacia implexa</i>	I	6	16	S	Good	Fair	Low	Low	1.5	2.0
11	<i>Acacia implexa</i>	I	9	26	M	Fair	Fair	Medium	Medium	1.9	3.1
12	<i>Eucalyptus camaldulensis</i>	I	10	20	S	Good	Good	Medium	Medium	1.7	2.4
16	<i>Bursaria spinosa</i>	I	5	20	M	Fair	Fair	Low	Low	1.7	2.4
19	<i>Acacia implexa</i>	I	8	29	M	Fair	Good	Low	Low	2.0	3.5
21	<i>Bursaria spinosa</i>	I	5	12	S	Fair	Fair	Low	Low	1.5	2.0
27	<i>Eucalyptus camaldulensis</i>	I	10	19	S	Good	Fair	Medium	Medium	1.6	2.3
29	<i>Eucalyptus botryoides</i>	V	14	58	M	Good	Good	Medium	Medium	2.6	7.0
31	<i>Acacia implexa</i>	I	4	13	S	Fair	Fair	Low	Low	1.5	2.0
32	<i>Bursaria spinosa</i>	I	5	10	S	Good	Fair	Low	Low	1.5	2.0
33	<i>Bursaria spinosa</i>	I	4	7	S	Good	Fair	Low	Low	1.5	2.0
34	<i>Bursaria spinosa</i>	I	4	16	M	Fair	Fair	Low	Low	1.5	2.0
37	<i>Acacia implexa</i>	I	3	9	I	Good	Fair	Low	Low	1.5	2.0
38	<i>Bursaria spinosa</i>	I	3	20	M	Fair	Fair	Low	Low	1.7	2.4
39	<i>Bursaria spinosa</i>	I	5	10	S	Fair	Fair	Low	Low	1.5	2.0
40	<i>Eucalyptus camaldulensis</i>	I	7	13	I	Good	Fair	Low	Low	1.5	2.0
43	<i>Eucalyptus camaldulensis</i>	I	10	25	S	Good	Good	Medium	Medium	1.8	3.0
51	<i>Eucalyptus camaldulensis</i>	I	10	24	S	Good	Fair	Medium	Medium	1.8	2.9
53	<i>Eucalyptus camaldulensis</i>	I	10	36	S	Good	Good	Medium	Medium	2.2	4.3
55	<i>Eucalyptus camaldulensis</i>	I	14	38	S	Fair	Fair	Medium	Medium	2.2	4.6
57	<i>Eucalyptus botryoides</i>	V	14	56	M	Good	Fair	Medium	Medium	2.6	6.7
58	<i>Eucalyptus camaldulensis</i>	I	15	27	S	Good	Fair	Medium	Medium	1.9	3.2
59	<i>Allocasuarina verticillata</i>	I	4	5	I	Fair	Fair	Low	Low	1.5	2.0
60	<i>Acacia implexa</i>	I	5	13	S	Good	Good	Low	Low	1.5	2.0
61	<i>Eucalyptus leucoxylon</i> 'Rosea'	A	7	33	M	Good	Fair	Low	Low	2.1	4.0
62	<i>Acacia implexa</i>	I	4	5	S	Good	Good	Low	Low	1.5	2.0
64	<i>Eucalyptus camaldulensis</i>	I	6	26	S	Fair	Fair	Low	Low	1.9	3.1
65	<i>Eucalyptus viminalis</i>	I	18	78	M	Good	Fair	Medium	Medium	3.0	9.4
66	<i>Eucalyptus viminalis</i>	I	16	84	M	Good	Fair	Medium	Medium	3.1	10.1
67	<i>Acacia pycnantha</i>	I	5	5	S	Good	Fair	Low	Low	1.5	2.0
72	<i>Eucalyptus camaldulensis</i>	I	21	76	M	Good	Fair	High	High	2.9	9.1
74	<i>Eucalyptus camaldulensis</i>	I	14	55	M	Good	Fair	Medium	Medium	2.6	6.6
75	<i>Eucalyptus melliodora</i>	I	14	52	M	Good	Fair	Medium	Medium	2.5	6.2

The Tree Protection Zone (TPZ) radius required to protect each tree is shown in the table. The TPZ radius is measured from the centre of a tree's stem and gives a circular area, above- and below-ground, that is set aside to protect a tree's roots and crown from site development works. The TPZ incorporates the Structural Root Zone (SRZ) and ensures that tree viability and stability are protected from construction disturbance. Encroachment by site works into a maximum of 10% of a TPZ is regarded as minor encroachment and is therefore acceptable according to AS4970–2009, but the encroachment must be outside the SRZ.

3 Tree plans

For site plans showing tree numbers, see Appendix A.

PROTECTION DURING CONSTRUCTION

4 Tree protection measures

4.1 Roles, Responsibilities and Reporting

Project Arborist – shall be engaged by and report to the project Contractor. The Project Arborist shall have a minimum of five years' industry experience and minimum Australian Qualifications Framework Level Five (AQF Level 5) training in arboriculture.

Pruning Arborist – shall be employed by and report to the Contractor. The Pruning Arborist shall have a minimum of two years' industry experience and minimum AQF Level 3 training in arboriculture.

Responsibilities and reporting for each role are set out within this document and the contract documents.

4.2 Program for tree protection

The following table stipulates tree protection actions at various stages of the project.

Table 3. Tree protection program.

Stage	Description	Responsible person	Date	Sign
PRE-CONSTRUCTION				
Tree removals	Mark trees for removal. Remove trees as per endorsed plans. Works to be done by suitably qualified arborists (min. AQF Lvl 3) with suitable insurances in accordance with WorkSafe Victoria's <i>Working Safely with Trees</i>.	Project Arborist Project Manager Project Manager		

Stage	Description	Responsible person	Date	Sign
Tree pruning	Determine extent of pruning required for trail clearance and work zones. Prune trees for clearance to trail and work zones. Works to be done by suitably qualified arborists (min. AQF Lvl 3) with suitable insurances in accordance with AS4373 <i>Pruning of Amenity Trees</i> and WorkSafe Victoria's <i>Working Safely with Trees</i>.	Project Arborist and Project Manager Site Manager Site Manager		
Tree protection	Erect tree protection fencing as indicated on Tree Protection Plan. Fencing and signage shall comply with AS4970 <i>Protection of trees on development sites</i> (see sections 4.4 & 4.5).	Project Manager to organise.		
	Install trunk and branch protection as directed by the Project Arborist, as shown in section 4.6.	Project Manager to organise.		
	Carry out vegetation removal and earthworks within Tree Protection Zone as per endorsed plans under the supervision of the Project Arborist.	Project Manager to organise.		
	Apply a 75mm layer of coarse organic mulch such as woodchip over TPZs.	Project Manager to organise.		
	Establish ground protection within work zones and TPZs with mulch and rumble boards as shown in section 4.7.	Project Manager to organise.		
	Once all tree protection measures above are in place, the Project Arborist is to inspect and sign off.	Project Manager to organise. Project Arborist to inspect and sign off.		
Site induction	All principal contractors to attend tree protection induction	Project Manager to organise. Project Arborist to attend and sign off.		
CONSTRUCTION	The Site Manager and the Project Arborist shall meet prior to construction to determine which parts of the works within TPZs will require supervision by the arborist.	Site Manager to organise. Project Arborist to attend and sign off.		

	During construction, activities that may damage the trees (see section 4.3) are not to occur within TPZs.			
	During extended dry periods, apply irrigation to root zones as directed by the Project Arborist.	Site Manager to organise. Project Arborist to attend and sign off.		
	Any excavation works within TPZs are to be supervised by the Project Arborist. Any roots encountered are to be cut cleanly with a saw.	Site Manager to organise. Project Arborist to attend and sign off.		
	If tree protection fencing and other protection measures must be relocated to allow works to proceed, this must be done with approval of, and under the supervision of, the Project Arborist.	Site Manager to organise. Project Arborist to inspect and sign off.		
	If scaffolding is required within TPZ, ground protection must be installed and the Project Arborist must supervise any branch tying or pruning that is required.	Site Manager to organise. Project Arborist to inspect and sign off.		
	Once all works are completed, protective fencing is to be removed	Site Manager to organise. Project Arborist to inspect and sign off.		

4.3 Restricted activities within the TPZ

Activities excluded from the TPZ include but are not limited to—

- (a) machine excavation including trenching (unless on approved plans);
- (b) excavation for silt fencing;
- (c) cultivation;
- (d) storage;
- (e) preparation of chemicals, including preparation of cement products;
- (f) parking of vehicles and plant;
- (g) refuelling;
- (h) dumping of waste;
- (i) wash down and cleaning of equipment;
- (j) placement of fill;
- (k) lighting of fires;
- (l) soil level changes (unless on approved plans);
- (m) temporary or permanent installation of utilities and signs, and
- (n) physical damage to the tree.

4.4 Fencing

Temporary tree protection fencing

Fencing should be a minimum 1.8 metre high wire mesh or equivalent fence supported on concrete pads as per AS4687. The following diagram from AS4970 indicates suitable fencing.

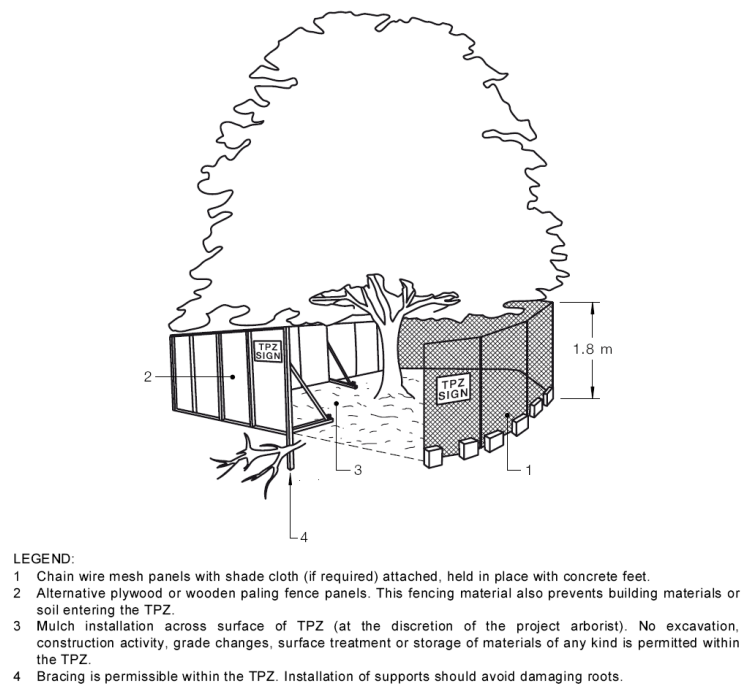


Figure 3. Tree protection fencing. (From AS4970)

4.5 Signs

Figure 4, taken from AS4970, indicates a suitable sign. Signs must be placed on any mesh TPZ fencing at regular intervals so that a sign can be viewed from any angle outside the TPZ.



Figure 4. Tree protection sign. (From AS4970)

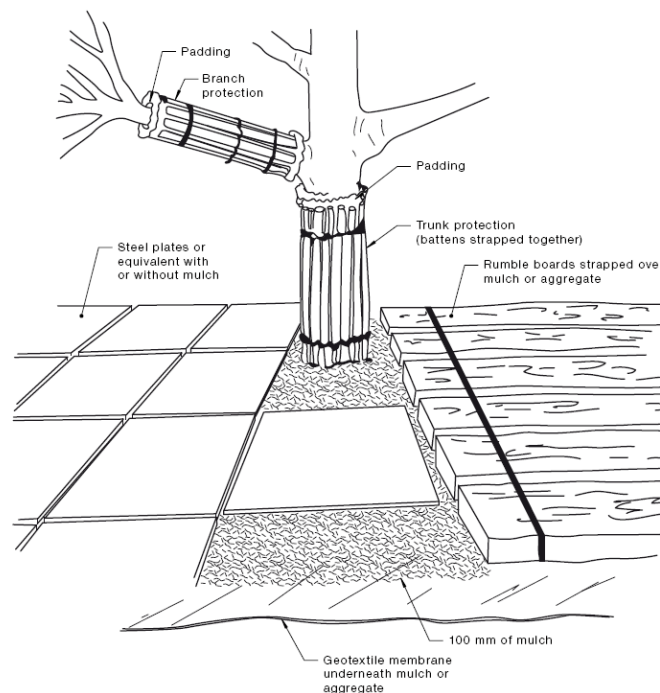
4.6 Trunk and branch protection

Where works will be occurring near retained trees, install protection to the trunk and branches of trees as shown below in Figure 5. A minimum height of 2 m is recommended. Hessian or other padding is to be placed beneath strapped battens to protect the trunk and branches from physical damage.

Do not attach temporary powerlines, stays, guys and the like to the tree. Do not drive nails into the trunks or branches.

4.7 Ground protection in areas of temporary access

Because temporary access will pass within TPZs, ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction within TPZs. In areas of temporary construction access over TPZs, install a layer of a permeable membrane such as geotextile fabric beneath a layer of mulch or single-grade (no fines) crushed rock. Finally, cover this with a layer of strapped rumble boards or manufactured rumble plate as per Figures 5 & 6.



NOTES:

- 1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
- 2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

Figure 5. Trunk, branch and ground protection. (From AS4970)

4.8 Tree removals

Tree removals shall proceed without damage to trees being retained. Where a stump-grinder is used to remove material below-ground, the extent of grinding shall be minimised to the tree stump only, so that nearby roots of trees being retained are not damaged.

4.9 Pruning

Prior to construction works, trees adjacent to the path shall be pruned by the Contractor's qualified arborists (minimum AQF level 3) to provide clearance for construction. The Contractor's project arborist shall approve the extent of pruning required for construction and advise the Contract Superintendent of approval for any further tree removals required if pruning cannot achieve sufficient clearance. All pruning (of the roots or canopy) shall comply with AS4373.

4.10 Path within TPZs of trees

If the proposed path has to be constructed within the TPZ of a tree that is to be retained the path must be placed on the existing soil grade, without excavation.

Alternatively, the potential impact on roots is to be investigated by using a method of soil excavation that does not damage roots (e.g., Airspade). This is to be supervised by the project arborist who will advise whether roots may be severed or if no further excavation is to occur.

5 Contact details and arborist inspections

5.1 Contacts

Below is a list of contact numbers to be retained by the principal contractor, sub-contractors, council's arborist or planning officer, the project arborist and the arboricultural company that carries out pruning works. This list must be completed and distributed to the Superintendent, the Surveillance Manager, Project Manager, Site manager, principal contractor, council's officer and the consulting arborist.

If any part of a tree (above or below ground) is damaged during site works, or if any changes occur within the Tree Protection Zone, the consulting arborist must be contacted immediately. The consulting arborist must have the authority to shut down site works if tree protection measures outlined in this report are breached in such a way that the trees' viability may be compromised.

Project Arborist	Tree Dimensions
Contact	Clive Sorrell
Mobile	0401 461 573
Phone	(03) 9489 2564
Email	clive@treedimensions.com.au

Pruning Arborist
Contact
Mobile
Phone
Email

5.2 Schedule of Arborist's Inspections

The project arborist is to be engaged by the contractor to carry out the following inspections and any further consultancy required during the project.

1. The project arborist will inspect the site once pre-construction works are complete, before any site works begin. *This visit should include a meeting with the project manager to clarify the requirements of tree protection.*
2. The project arborist will inspect the site on a weekly basis throughout the project.
3. If roots are encountered during approved excavation works, the project arborist must be contacted and will attend the site to provide advice.
4. The project arborist will inspect the site once all works are completed.
5. It is the responsibility of the Project Manager to contact the project arborist at appropriate times to organise these inspections.
6. Further inspections can be requested during construction if any problems with the tree are encountered.

Project Arborist inspection schedule	Completed
Before tree removal and pruning to mark trees for removal and specify tree pruning	
Pre-demolition, once protection measures are in place	
Site induction to explain tree protection requirements	
Weekly inspections throughout project	
When works within the TPZ may affect trees	
At completion of works before fencing is removed	

5.3 Format of Arborist Reports

A brief report will be provided immediately following all inspections to record if all protection requirements have been satisfied. *Reports will be forwarded to the Principal's Superintendent and Surveillance manager as well as the Project Manager and Site Manager.* The reports will include the following:

- Date of the report.
- Name of the person who wrote the report.
- Date of relevant site inspections.
- Observations made during site inspections.
- Details of any damage to the tree or breaches of conditions.
- Other relevant details such as any communication between the arborist and other parties.
- Relevant photos.
- Any recommendations necessary to ensure ongoing viability of the trees.

POST-CONSTRUCTION REQUIREMENTS

6 Ongoing maintenance

Once works are completed, the trees shall be inspected periodically by the project arborist.

7 Other recommendations

Throughout the project, successful tree protection relies on good communication between all parties involved.

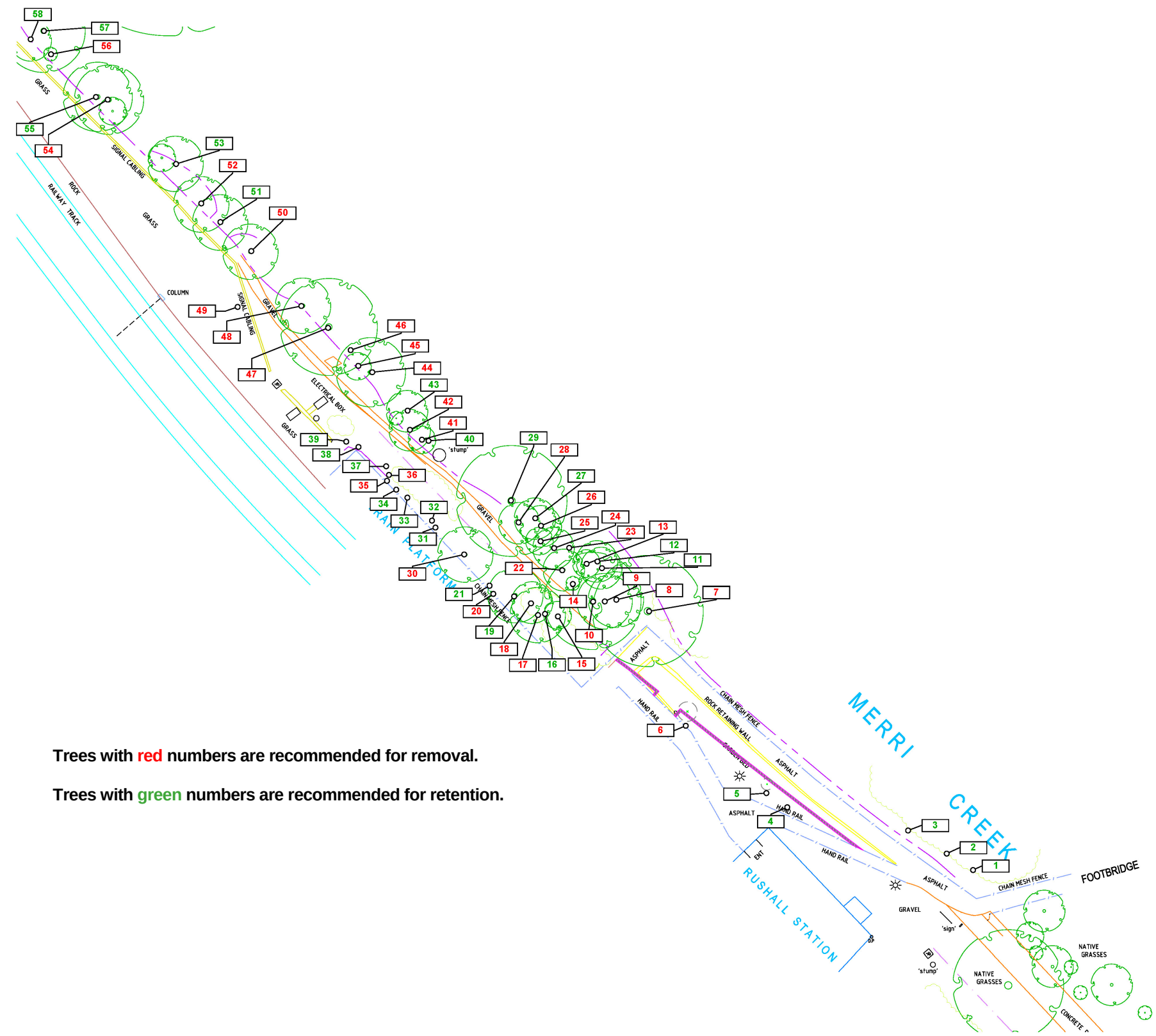
References

Standards Australia. Australian Standard AS4373–2007: *Pruning of Amenity Trees*. Sydney, NSW, Australia.

Standards Australia. Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*. Sydney, NSW, Australia.

Worksafe Victoria. 2001. *Working Safely with Trees: Recommended practices for the amenity tree industry*. Victorian Workcover Authority.

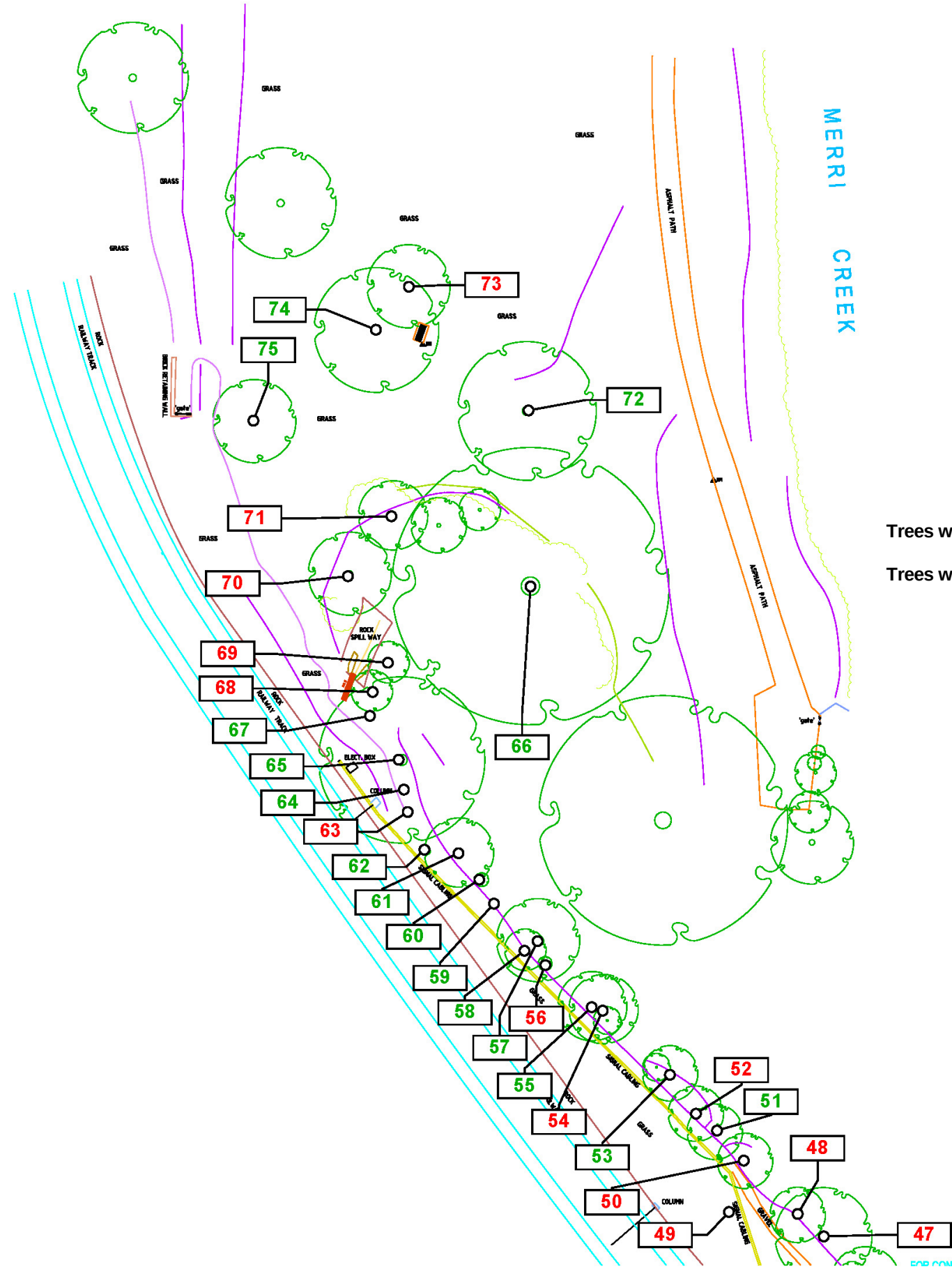
APPENDIX A – Plans with trees numbered



Trees with red numbers are recommended for removal.

Trees with green numbers are recommended for retention.

APPENDIX A – Plans with trees numbered



Trees with red numbers are recommended for removal.
Trees with green numbers are recommended for retention.