Project No: EDI/EMU/14 Report No: EDI/EMU/AIA/C

ARBORICULTURAL IMPACT ASSESSMENT
TREE PROTECTION SPECIFICATION

Edinglassie Village
Great Western Highway & Emerald Street
Emu Plains

Prepared for: UnitingCare Aging

27th March 2018
Revision C

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1.0 INTRODUCTION

1.1 Background

1.1.1 This Arboricultural Impact Assessment Report and Tree Protection Specification was prepared for Morrison Design Partnership, on behalf of the UnitingCare Aging, in relation to the proposed Edinglassie Village redevelopment. The purpose of this Report is to determine the impact of the proposed works on the trees, and where appropriate, recommend the use of sensitive construction methods to minimise adverse impacts.

1.1.2 It is understood this is staged development with the works subject to this Report restricted to the north-eastern corner of the site. This Report addresses Trees 1-29, 40, 41, 46-53, 54-58, 100, 102-108, 119 and 120 only. For consistency, the tree numbers used within this Report correlates with the Preliminary Arboricultural Report (Report No: EDI/EMU/PAR/B) prepared by TreeiQ in October 2014. This Arboricultural Impact Assessment and Tree Protection Specification should be read in conjunction with the aforementioned treeiQ Arboricultural Report.

1.1.3 In preparing this report, author is aware of and has taken into account the objectives of Penrith City Council's *Development Control Plan 2010 (C2 Vegetation Management), Australian Standard 4970 Protection of Trees on Development Sites (2009), Australian Standard 4373 Pruning of Amenity Trees (2007), Australian Standard 2303 Tree Stock for Landscape Use (2015)* and *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016).*

Refer to Methodology **(Appendix 1)**

1.1.4 This impact assessment is based on an assessment of the following supplied documentation/plans only:

- Uniting Edinglaassie Community Centre (Preliminary) Sketch Series DA001-DA706 (Rev A) – prepared by Morrison Design Partnership, dated 16.03.18
- Masterplan 01 (Rev A) - prepared by Taylor Brammer, dated 20.03.18
- Detail Plan 02 (Rev A) - prepared by Taylor Brammer, dated 20.03.18
- Dementia Court 03 (Rev A) - prepared by Taylor Brammer, dated 20.03.18
- Community Court 04 (Rev A) - prepared by Taylor Brammer, dated 20.03.18
- Church Precinct 05 (Rev A) - prepared by Taylor Brammer, dated 20.03.18
- Tree Register 06 (Rev A) - prepared by Taylor Brammer, dated 20.03.18
- Planting Plan 07 (Rev A) - prepared by Taylor Brammer, dated 20.03.18
- Sections 08 (Rev P2) - prepared by Taylor Brammer, dated 05.03.18

Refer to Plans **(Appendix 2)**

2.0 RESULTS

2.1 The Site

2.1.1 The Edinglassie Village is bound by the Great Western Highway to the north, Emerald Street to the east, Troy Street to the west, and Emu Plains Public School to the south. For the purpose of this Report the site comprises of an area in the north-eastern corner of Edinglassie Village.

2.1.2 The site contains a complex of mainly single storey buildings and a sandstone chapel. Landscaped/garden areas are located throughout, particularly along the northern boundary. The site is generally level with a number of isolated landscaped/turfed mounds in landscaped areas.

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2.2 The Proposal

2.2.1 The proposal includes the demolition of a number of existing buildings and the construction of a new Residential Aged Care Facility (RACF).

Refer to Plans **(Appendix 2)**

2.3 The Trees

2.3.1 An assessment of the trees was undertaken in preparation of the Preliminary Arboricultural Report (Report No: EDI/EMU/PAR/B) prepared by TreeiQ in October 2014. Information relating to individual tree assessment is contained within the Tree Assessment Schedule **(Appendix 3).**

2.3.2 Site vegetation contains a mix of locally indigenous and Australian native species such as *Corymbia* spp. (Corymbia species), *Casuarina cunninghamiana* (She-Oak), *Callistemon* spp. (Bottlebrush species) and *Eucalyptus* spp. (Eucalyptus species). A range of exotic species are also present at the site including *Acer palmatum* (Japanese Maple), *Jacaranda mimosifolia* (Jacaranda), *Magnolia* x *soulangiana* (Saucer Magnolia) and *Plumeria acutifolia* (Frangipani).

2.3.3 In general, the trees are of good to fair health and structural condition. As is to be expected with any relatively large population of mature trees, some trees with a reduced health and/or structural defects of varying degrees of severity have been identified. Poor tree management and landscape maintenance practices (such lopping for line clearance) and the general challenges of the urban environment have also reduced the quality and value of some the trees.

2.3.4 The age structure of the canopy cover at the site is very uniform with the majority of trees being in the mature phase of growth.

2.3.5 None of the trees are listed on Council's Register of Significant Trees & Vegetation.[1]

2.3.6 A search of the BioNet Atlas of NSW Wildlife Database was undertaken in March 2018. No individual threatened tree species listed within this database for the area were identified during the current field investigations of the site.[2] The ecological significance and habitat value of the trees has not been assessed and is beyond the scope of this report.

3.0 ARBORICULTURAL IMPACT ASSESSMENT

3.1 Trees to be removed

3.1.1 The supplied plans show that twenty-five (25) trees will need to be removed to accommodate the proposed development. This includes nine (9) trees with a Retention Value of *Priority for Retention,* nine (9) trees with a Retention Value of *Consider for Retention,* six (6) trees with a Retention Value of *Consider for Removal* and one (1) tree with a Retention Value of *Priority for Removal*.

[1] Penrith City Council (2006), *Register of Significant Trees & Gardens*
[2] NSW Office of Environment and Heritage (2011), *BioNet Atlas of NSW Wildlife Database*

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3.1.2 Table 1: Trees to be removed

Priority for Retention	Consider for Retention	Consider for Removal	Priority for Removal
23, 27, 29, 36, 54, 55, 56, 57 & 58	3, 4, 5, 13, 17, 18, 26, 102 & 104	2, 14, 15, 16, 25 & 103	24

3.2 Trees to be retained

3.2.1 The supplied plans show that thirty-seven (37) trees are to be retained as part of the proposed development. This includes ten (10) trees with a Retention Value of *Priority for Retention,* twenty-four (24) trees with a Retention Value of *Consider for Retention,* two (2) trees with a Retention Value of *Consider for Removal* and one (1) tree with a Retention Value of *Priority for Removal*.

3.2.2 Table 2: Trees to be retained

Priority for Retention	Consider for Retention	Consider for Removal	Priority for Removal
6, 7, 21, 22, 34, 35, 38, 39, 40 & 105	1, 8, 9, 10, 11, 19, 20, 28, 32, 33, 37, 41, 46, 47, 49, 50, 51, 52, 53, 100, 107, 108, 119 & 120	12 & 106	48

3.2.3 Works are proposed within the Tree Protection Zone (TPZ) areas of ten (10) trees to be retained as discussed below.

3.3 Minor Encroachment

3.3.1 The supplied plans show that works are proposed within the TPZ areas of Trees 6, 21, 22, 28, 34, 53, 107 and 108. As the encroachment into the individual TPZ area is less than 10%, the extent of work represents *Minor Encroachments* as defined by *Australian Standard 4970-2009 Protection of Trees on Development Sites* (AS-4970). A *Minor Encroachment* is considered acceptable by AS-4970 when it is compensated for elsewhere and contiguous within the TPZ. The encroachments into TPZ areas should be compensated for by extending the TPZ in areas not subject to encroachment.

3.4 Major Encroachment

3.4.1 The supplied plans also show that works are proposed within the TPZ areas of Trees 1 and 32. The extent of work represents *Major Encroachments* as defined by AS-4970.

3.4.2 Tree 1

The supplied plans show works within the TPZ of Tree 1 includes the construction of a driveway and crossover, and a footpath. Clause 3.3.4 outlines that tree species and tolerance to root disturbance should be considered when determining the potential impact of the encroachment. Anecdotally, *Jacaranda mimosifolia* (Jacaranda) has a proven record for use within the built environment and is able to withstand alterations to site conditions. As an individual component, the proposed driveway and crossover represents less than 10% of the TPZ and should not significantly impact the tree.

3.4.3 Tree sensitive excavation (hand/hydrovac/airspade/compact excavator) and root pruning should be undertaken along the line of the driveway and crossover within TPZ prior to the commencement of mechanical excavation to prevent shattering of roots by excavation equipment. No over excavation into TPZ should be undertaken.

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3.4.4 The proposed footpath is located closer to the tree than the driveway and crossover. Therefore, the footpath and sub base materials (where required) should be installed above existing grade. Pegs to secure temporary formwork (where required) should be installed as to avoid roots. Ground levels may be locally raised at the footpath edges however existing levels within 1m of tree's trunk should be maintained.

3.4.5 Tree 32

The supplied plans show works within the TPZ of Tree 32 includes the construction of the north-western wing of the RACF. Clause 3.3.4 of the AS-4970 outlines that tree species and tolerance to root disturbance should be considered when determining the potential impact of the encroachment. Anecdotally, *Jacaranda mimosifolia* (Jacaranda) has a proven record for use within the built environment and is able to withstand alterations to site conditions. Therefore, with the implementation of best practice tree protection measures, an encroachment of approximately 18% on one side of the TPZ should not significantly impact the tree.

3.4.6 Tree sensitive excavation (hand/hydrovac/airspade/compact excavator) and root pruning should be undertaken along the line of the building within TPZ prior to the commencement of mechanical excavation to prevent shattering of roots by excavation equipment. No over excavation into TPZ areas should be undertaken.

3.5.1 Other Works within TPZ Areas

3.5.1 Demolition Works

Demolition works within the TPZ areas should be supervised by the Project Arborist and utilise tree sensitive methods. Where possible, existing underground structures and sub-base materials should be left in situ and reused.

3.5.2 Underground Services

Underground services and site infrastructure within the TPZ areas should be installed using tree sensitive methods (hand/hydrovac/airspade) with the services/infrastructure located around/below roots (>25mmø) or as determined by the Project Arborist.

3.5.3 Landscape Planting & Turf

Plant/turf installation within the TPZ areas should be undertaken using hand tools and roots (>25mmø) should be protected. No mechanical cultivation/ripping of soils should be undertaken within the TPZ areas. Excavation and installation of imported soil mixes should be excluded from the TPZ areas other than the installation of soil conditioners to a maximum depth of 50mm above the existing soil profile.

3.6 Pruning

3.6.1 The supplied plans show that Trees 1 and 32 will need to be pruned for vehicular and building clearance. In addition, Trees 21, 22 and 28 may require minimal pruning to provide clearance for building/scaffolding/hoarding erection. Refer to Tables 3-5.

3.6.2 Table 3: Tree 1 (*Jacaranda mimosifolia* - Jacaranda)

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
N	1st	200mm	2.5m	Prune to increase vertical clearance above driveway	1

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3.6.3 Table 4: Tree 21 (*Casuarina cunninghamiana* – She Oak)

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate No.
S	Higher order branches	<75mm	2.5m	Prune where required for building/scaffolding clearance	2

3.6.4 Table 5: Tree 22 (*Casuarina cunninghamiana* – She Oak)

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate no.
SW	1st	100mm	5.5m	Prune where required for building/scaffolding clearance	3
W	1st	120mm	10m	As above	3
S	1st	120mm	11.5m	As above	3

3.6.5 Table 6: Tree 28 (*Jacaranda mimosifolia* - Jacaranda)

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate no.
SE & E	Higher order branches	<75mm	5.5m	Prune where required for building/scaffolding clearance	4

3.6.6 Table 7: Tree 32 (*Jacaranda mimosifolia* - Jacaranda)

Branch Orientation	Order of Branch	Branch Diameter	Height Above Grade	Comments	Plate no.
S	1st	250mm	1.5m	Prune for building/scaffolding clearance	5
S	2nd	150mm	2.5m	As above	5
S	3rd	120mm	8m	As above	5

3.6.7 Provision should be made within the design so that additional pruning is not required. Where additional clearance is required, branches may be temporarily pushed or tied. Where branches cannot be pushed or tied back without damage, scaffolding/hoarding should be modified and constructed around branches (with appropriate branch protection installed as required).

3.6.8 Deadwood greater 25mmø should be removed from the crowns of the trees.

3.6.9 Pruning works should be carried out by a Practising Arborist. The Practising Arborist should hold a minimum qualification equivalent (using the Australian Qualifications Framework) of Level 3 or above, in Arboriculture or its recognised equivalent. The Practising Arborist should have a minimum of 3 years' experience in practical Arboriculture. Pruning work should be undertaken in accordance with *Australian Standard 4373: Pruning of Amenity Trees (2007), Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)* and other applicable legislation and codes.

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3.7 Replacement Planting

3.7.1 The proposed development includes the provision of new tree planting across the site. This tree planting would help to diversify the age structure of trees on site which is currently very uniform and help off-set the loss of canopy cover and amenity resultant from the tree removal.

3.7.2 Replacement planting should be supplied in accordance with *Australian Standard 2303 (2015) Tree Stock for Landscape Use.*

3.8 Ongoing Management of Trees to be Retained

3.8.1 A number of the trees to be retained are large specimens which were identified as having structural defects and/or or significant deadwood present in their crowns at the time of assessment. Refer to Tree Assessment Schedule **(Appendix 3).**

3.8.2 Ongoing monitoring and maintenance (including deadwood removal) should be undertaken especially for trees which are situated in close proximity to 'high target' areas (i.e. areas of frequent use/vulnerable structures).

4.0 CONCLUSION

4.1 Site vegetation contains a mix of locally indigenous, Australian native and exotic species. This Report addresses are Trees 1-29, 40, 41, 46-53, 54-58, 100, 102-108, 119 and 120 only.

4.2 The proposal includes the demolition of a number of existing buildings and the construction of a new RACF.

4.3 The supplied plans show that twenty-five (25) trees (Trees 2-5, 13-18, 23-27, 29, 36, 54-58 & 102-104) will need to be removed to accommodate the proposed development.

4.4 The supplied plans show that thirty-seven (37) trees (Trees 1, 6-12, 19-22, 28, 32-35, 37-41, 46-53, 100, 105-108, 119 & 120) are to be retained as part of the proposed development. Works are proposed within the TPZ areas of Trees 1 and 32, and tree sensitive construction methods as outlined within Section 3.4.2-3.4.6 should be used within their TPZ areas. Trees to be retained should be protected in accordance within Tree Protection Specification **(Appendix 5)**.

4.5 The supplied plans show that Trees 1, 21, 22, 28 and 32 will need to be pruned for building clearance and construction access. Pruning work should be undertaken in accordance with *Australian Standard 4373: Pruning of Amenity Trees (2007), Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)* and other applicable legislation and codes.

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5.0 LIMITATIONS & DISCLAIMER

TreeiQ takes care to obtain information from reliable sources. However, TreeiQ can neither guarantee nor be responsible for the accuracy of information provided by others. Plans, diagrams, graphs and photographs in this Arboricultural Report are visual aids only and are not necessarily to scale. This Report provides recommendations relating to tree management only. Advice should be sought from appropriately qualified consultants regarding design/construction/ecological/heritage etc issues.

This Report has been prepared for exclusive use by the client. This Report shall not be used by others or for any other reason outside its intended target or without the prior written consent of TreeiQ. Unauthorised alteration or separate use of any section of the Report invalidates the Report.

Many factors may contribute to tree failure and cannot always be predicted. TreeiQ takes care to accurately assess tree health and structural condition. However, a tree's internal structural condition may not always correlate to visible external indicators. There is no warranty or guarantee, expressed or implied that problems or deficiencies regarding the trees or site may not arise in the future. Information contained in this report covers only the trees assessed and reflects the condition of the trees at the time of inspection. Additional information regarding the methodology used in the preparation of this Report is attached as Appendix 1. A comprehensive tree risk assessment and management plan for the trees is beyond the scope of this Report.

Reference should be made to any relevant legislation including Tree Management Controls. All recommendations contained within this Report are subject to approval from the relevant Consent Authority.

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7.0 APPENDICES

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Appendix 1: Methodology

1.1 **Site Inspection**: This report was determined as a result of a comprehensive site inspection during October 2014. A follow up site inspection was undertaken in March 2018.

1.2 **Visual Tree Assessment (VTA)**: The subject tree(s) was assessed using the Visual Tree Assessment criteria and notes as described in *The Body Language of Trees – A Handbook for Failure Analysis.*[3] The inspection was limited to a visual examination of the subject tree(s) from ground level only. The inspection was limited to a visual examination of the subject tree(s) from ground level only. No internal diagnostic or tissue testing was undertaken as part of this assessment. Trees outside the subject site were assessed from the property boundaries only.

1.3 **Tree Dimensions**: The dimensions of the subject tree(s) are approximate only.

1.4 **Tree Locations:** The location of the subject tree(s) was determined from the supplied plans.

1.5 **Trees & Development**: Tree Protection Zones, Tree Protection Measures and Sensitive Construction Methods for the subject tree were based on methods outlined in *Australian Standard 4970-2009 Protection of Trees on Development Sites*.

The *Tree Protection Zone* (TPZ) is described in AS-4970 as a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

The *Structural Root Zone* (SRZ) is described in AS-4970 as the area around the base of a tree required for the tree's stability in the ground. Severance of structural roots within the SRZ is not recommended as it may lead to the destabilisation and/or demise of the tree.

In some cases it may be possible to encroach into or make variations to the theoretical TPZ. A *Minor Encroachment* is less than 10% of the area of the TPZ and is outside the SRZ. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. A *Major Encroachment* is greater than 10% of the TPZ or inside the SRZ. In this situation the Project Arborist must demonstrate that the tree would remain viable. This may require root investigation by non-destructive methods or the use of sensitive construction methods.

1.6 **Tree Health**: The health of the subject tree(s) was determined by assessing:

I. Foliage size and colour
II. Pest and disease infestation
III. Extension growth
IV. Crown density
V. Deadwood size and volume
VI. Presence of epicormic growth

1.7 **Tree Structural Condition**: The structural condition of the subject tree(s) was assessed by:

I. Assessment of branching structure
(i.e co-dominant/bark inclusions, crossing branches, branch taper, terminal loading, previous branch failures)
II. Visible evidence of structural defects or instability
(i.e root plate movement, wounds, decay, cavities, fungal brackets, adaptive growth)
III. Evidence of previous pruning or physical damage
(root severance/damage, lopping, flush-cutting, lions tailing, mechanical damage)

1.8 **Useful Life Expectancy (ULE)**: The ULE is an estimate of the longevity of the subject tree(s) in its growing environment. The ULE is modified where necessary to take in consideration tree(s) health, structural condition and site suitability. The tree(s) has been allocated one of the following ULE categories (Modified from Barrell, 2001):

I. 40 years +
II. 15-40 years
III. 5-15 years
IV. Less than 5 years

[3] Mattheck & Breloer (2003)

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1.9 **Landscape Significance**: Landscape Significance was determined by assessing the combination of the cultural, environmental and aesthetic values of the subject tree(s). Whilst these values are subjective, a rating of high, moderate, low or insignificant has been allocated to the tree(s). This provides a relative value of the tree's Landscape Significance which may aid in determining its Retention Value. If the tree(s) can be categorized into more than one value, the higher value has been allocated.

Landscape Significance	Description
Very High	The subject tree is listed as a Heritage Item under the *Local Environmental Plan* with a local or state level of significance.
	The subject tree is listed on Council's Significant Tree Register or is considered to meet the criteria for significance assessment of trees and/or landscapes by a suitably qualified professional. The criteria are based on general principles outlines in the Burra Charter and on criteria from the Register of the National Estate.
	The subject tree is a remnant tree.
High	The subject tree creates a 'sense of place' or is considered 'landmark' tree.
	The subject tree is of local, cultural or historical importance or is widely known.
	The subject tree has been identified by a suitably qualified professional as a species scheduled as a Threatened or Vulnerable Species or forms part of an Endangered Ecological Community associated with the subject site, as defined under the provisions of the *Threatened Species Conservation Act* 1995 (NSW) or the *Environmental Protection and Biodiversity Conservation Act* 1999.
	The subject tree is known to provide habitat to a threatened species.
	The subject tree is an excellent representative of the species in terms of aesthetic value.
	The subject tree is of significant size, scale or makes a significant contribution to the canopy cover of the locality.
	The subject tree forms part of the curtilage of a heritage item with a known or documented association with that item.
Moderate	The subject tree makes a positive contribution to the visual character or amenity of the area.
	The subject tree provides a specific function such as screening or minimising the scale of a building.
	The subject tree has a known habitat value.
	The subject tree is a good representative of the species in terms of aesthetic value.
Low	The subject tree is an environmental pest species or is exempt under the provisions of the local Council's Tree Management Controls
	The subject tree makes little or no contribution to the amenity of the locality.
	The subject tree is a poor representative of the species in terms of aesthetic value.
Insignificant	The subject tree is declared a Noxious Weed under the Noxious Weeds Act

1.10 **Retention Value**: Retention Value was based on the subject tree's Useful Life Expectancy and Landscape Significance. The Retention Value was modified where necessary to take in consideration the subject tree's health, structural condition and site suitability. The subject tree(s) has been allocated one of the following Retention Values:

I. Priority for Retention
II. Consider for Retention
III. Consider for Removal
IV. Priority for Removal

ULE		Landscape Significance			
	Very High	High	Moderate	Low	Insignificant
40 years +	Priority for Retention	Priority for Retention		Consider for Removal	Priority for Removal
15-40 years		Priority for Retention	Consider for Retention		
5-15 years		Consider for Retention			
Less than 5 years	Consider for Removal	Priority for Removal			

The above table has been modified from the Footprint Green Tree Significance and Retention Value Matrix.

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Appendix 2: Plans

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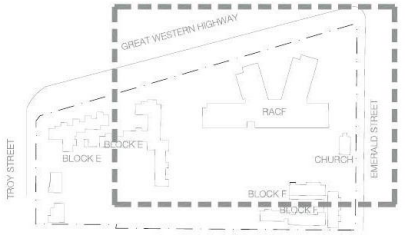

KEY PLAN

TREE REGISTER

NO.	SPECIES	HEIGHT
1	*Jacaranda mimosifolia* (Jacaranda)	10
2	*Callistemon viminalis* (Weeping Bottlebrush)	5
3	*Callistemon salignus* (White Bottlebrush)	7
4	*Callistemon viminalis* (Weeping Bottlebrush)	9
5	*Corymbia maculata* (Spotted Gum)	14
6	*Corymbia maculata* (Spotted Gum)	20
7	*Jacaranda mimosifolia* (Jacaranda)	10
8	*Eucalyptus sideroxylon* (Mugga Ironbark)	19
9	*Casuarina cunninghamiana* (She-Oak)	24
10	*Casuarina cunninghamiana* (She-Oak)	13
11	*Casuarina cunninghamiana* (She-Oak)	9
12	*Eucalyptus sideroxylon* (Mugga Ironbark)	7
13	*Callistemon viminalis* (Weeping Bottlebrush)	5
14	*Magnolia* x *soulangiana* (Saucer Magnolia)	3
15	*Cyathea cooperi* (Coin Spot Fern)	3
16	*Plumeria acutifolia* (Frangipani)	3
17	*Acer palmatum* (Japanese Maple)	4
18	*Acer palmatum* (Japanese Maple)	4
19	*Jacaranda mimosifolia* (Jacaranda)	10
20	*Jacaranda mimosifolia* (Jacaranda)	11
21	*Casuarina cunninghamiana* (She-Oak)	20
22	*Casuarina cunninghamiana* (She-Oak)	20
23	*Casuarina cunninghamiana* (She-Oak)	22
24	*Casuarina cunninghamiana* (She-Oak)	13
25	*Casuarina cunninghamiana* (She-Oak)	16
26	*Casuarina cunninghamiana* (She-Oak)	17
27	*Casuarina cunninghamiana* (She-Oak)	24
28	*Jacaranda mimosifolia* (Jacaranda)	15
29	*Corymbia maculata* (Spotted Gum)	14
30	Tree Removed	
31	Tree Removed	
32	*Jacaranda mimosifolia* (Jacaranda)	12
33	*Corymbia maculata* (Spotted Gum)	16
34	*Casuarina cunninghamiana* (She-Oak)	19
35	*Casuarina cunninghamiana* (She-Oak)	18
36	*Casuarina cunninghamiana* (She-Oak)	18
37	*Casuarina cunninghamiana* (She-Oak)	10
38	*Corymbia maculata* (Spotted Gum)	174
39	*Corymbia maculata* (Spotted Gum)	22
40	*Corymbia maculata* (Spotted Gum)	7
41	Eucalyptus spp. (Gum Tree)	13
42	*Corymbia maculata* (Spotted Gum)	6
43	Melaleuca quinquenarvia (Paper Bark)	18
44	Corymbia citridora (lemon scenten gum)	22
45	*Corymbia maculata* (Spotted Gum)	18
46	Eucalyptus sideroxylon (Mugga Ironbark)	18
47	Eucalyptus sideroxylon (Mugga Ironbark)	18
48	Eucalyptus saligna (Sydney blue gum)	20
49	Casuarina cunninghamiana (She-Oak)	12
50	Angophora costata (Sydney red gum)	9
51	Melaleuca quinquenarvia (Paper Bark)	9
52	Eucalyptus tereticornis (Forest Red Gum)	13
53	Corymbia maculata (Spotted Gum)	15
54	*Corymbia maculata* (Spotted Gum)	13
55	*Corymbia maculata* (Spotted Gum)	16
56	*Corymbia maculata* (Spotted Gum)	16
57	*Corymbia maculata* (Spotted Gum)	16
58	*Corymbia maculata* (Spotted Gum)	17
102	*Callistemon viminalis* (Weeping Bottlebrush)	6
103	*Callistemon citrinus* (Crimson Bottlebrush)	3
104	*Callistemon viminalis* (Weeping Bottlebrush)	7
105	*Eucalyptus tereticornis* (Forest Red Gum)	15
106	*Callistemon salignus* (White Bottlebrush)	4
107	*Eucalyptus* spp. (Gum Tree)	10
108	*Schinus molle* var. *areira* (Peppercorn Tree)	9
110	*Callistemon salignus* (White Bottlebrush)	6
119	*Callistemon salignus* (White Bottlebrush)	4
120	*Callistemon salignus* (White Bottlebrush)	5

SCALE 1:250 @ A1

LEGEND

SITE BOUNDARY — EXISTING CONTOUR

EXISTING TREE RETAINED — EXISTING TREE REMOVED

project: Edinglassie RACF
client: Uniting
date 20.03.2018
revision: A
drawn: AL
checked: DMT

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Appendix 3: Tree Assessment Schedule

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
1	*Jacaranda mimosifolia* (Jacaranda)	450 300 600	10	8	Good	Good	Small (<25mm) & medium (25-75mm) diameter epicormic growth in low volumes. Co-dominant inclusion, minor. Pruned/lopped for line clearance.	15-40	Moderate	Consider for Retention	9.6	3.1	Retain. Major Encroachment. Pavement. Use tree sensitive construction methods.
2	*Callistemon viminalis* (Weeping Bottlebrush)	150 100	5	3	Good	Good	Partially suppressed. Crossing branches.	5-15	Low	Consider for Removal	2.4	1.7	Remove. Driveway.
3	*Callistemon salignus* (White Bottlebrush)	200 100 150 150 150	7	3	Good	Fair	Branch inclusion/s, minor. Wound/s, early stages of decay. Pruned/lopped for line clearance.	5-15	Moderate	Consider for Retention	4.2	2.2	Remove. Driveway.
4	*Callistemon viminalis* (Weeping Bottlebrush)	300 300	9	6	Good	Good	Crown density 75-100%. Small (<25mm) diameter deadwood in low volumes. Wound/s, early stages of decay.	5-15	Moderate	Consider for Retention	4.8	2.3	Remove. Carpark.
5	*Corymbia maculata* (Spotted Gum)	450	14	5	Good	Good	Crown density 75-100%. Small (<25mm) diameter deadwood in low volumes.	15-40	High	Consider for Retention	5.4	2.4	Remove. Carpark.
6	*Corymbia maculata* (Spotted Gum)	500	20	5	Good	Good		40+	High	Priority for Retention	6	2.5	Retain. Minor Encroachment. Carpark.
7	*Jacaranda mimosifolia* (Jacaranda)	350	10	6	Good	Good		40+	Moderate	Priority for Retention	4.2	2.2	Retain. No works in TPZ.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
8	*Eucalyptus sideroxylon* (Mugga Ironbark)	500	19	6	Good	Good	Crown density 75-95%. Small (<25mm) and medium (25-75mm) diameter deadwood in low volumes. Wound/s, early stages of decay. Small (<25mm) epicormic growth in moderate volumes.	15-40	High	Consider for Retention	6	2.5	Retain. No works in TPZ.
9	*Casuarina cunninghamiana* (She-Oak)	500	24	9	Good	Fair	Wound/s, advanced stages of decay at base of first order branch. Recommend internal diagnostic testing if tree is to be retained.	5-15	High	Consider for Retention	6	2.5	Retain. No works in TPZ.
10	*Casuarina cunninghamiana* (She-Oak)	400	13	4	Good	Good	Partially suppressed. Medium (25-75mm) diameter deadwood in low volumes.	15-40	Moderate	Consider for Retention	4.8	2.3	Retain. No works in TPZ.
11	*Casuarina cunninghamiana* (She-Oak)	300	9	4	Good	Fair	Partially suppressed. Previous branch failure/s. Wound/s, advanced stages of decay.	5-15	Moderate	Consider for Retention	3.6	2	Retain. No works in TPZ.
12	*Eucalyptus sideroxylon* (Mugga Ironbark)	150	7	3	Good	Good	Partially suppressed. Phototropic lean, slight.	15-40	Low	Consider for Removal	2	1.5	Retain. No works in TPZ.
13	*Callistemon viminalis* (Weeping Bottlebrush)	300	5	3	Good	Good	Branch inclusion/s, minor.	5-15	Moderate	Consider for Retention	3.6	2	Remove. Pavement.
14	*Magnolia* x *soulangiana* (Saucer Magnolia)	75 75 75 75	3	2	Good	Good		15-40	Low	Consider for Removal	2	1.5	Remove. Landscape Treatment.
15	*Cyathea cooperi* (Coin Spot Fern)	75	3	2	Good	Good		15-40	Low	Consider for Removal	2	1.5	Remove. Building footprint.
16	*Plumeria acutifolia* (Frangipani)	200 at grade	3	2	Good	Fair	Group of 2. Wound/s, early stages of decay.	15-40	Low	Consider for Removal	2.4	1.7	Remove. Building footprint.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
17	*Acer palmatum* (Japanese Maple)	350 at grade	4	5	Good	Fair	Wound/s, early stages of decay. Branch inclusion/s, minor. Borer. Co-dominant inclusion.	5-15	Moderate	Consider for Retention	4.2	2.2	Remove. Building footprint.
18	*Acer palmatum* (Japanese Maple)	300 at grade	4	3	Good	Good	Partially suppressed. Wound/s, early stages of decay.	5-15	Moderate	Consider for Retention	3.6	2	Remove. Building footprint.
19	*Jacaranda mimosifolia* (Jacaranda)	350 300 250	10	6	Good	Good	Pruned/lopped for line clearance. Previous branch failure/s. Wound/s, early stages of decay. Small (<25mm) epicormic growth in moderate volumes. Roots damaging adjacent sandstone retaining wall.	15-40	Moderate	Consider for Retention	6	2.5	Retain. No works in TPZ.
20	*Jacaranda mimosifolia* (Jacaranda)	300 400	11	7	Good	Good	Pruned/lopped for line clearance. Small (<25mm) & medium (25-75mm) diameter epicormic growth in moderate volumes. Wound/s, early stages of decay.	15-40	Moderate	Consider for Retention	6	2.5	Retain. No works in TPZ.
21	*Casuarina cunninghamiana* (She-Oak)	750	20	6	Good	Good	Partially suppressed. Small (<25mm) diameter deadwood in low volumes.	15-40	High	Priority for Retention	9	3	Retain. Minor Encroachment. Building footprint.
22	*Casuarina cunninghamiana* (She-Oak)	600	20	6	Good	Good	Partially suppressed. Wound/s, early stages of decay. Previous branch failure/s. Branch inclusion/s, minor.	15-40	High	Priority for Retention	7.2	2.7	Retain. Minor Encroachment. Building footprint.
23	*Casuarina cunninghamiana* (She-Oak)	500	22	7	Good	Good	Previous branch failure/s. Wound/s, early stages of decay. Small (<25mm) diameter deadwood in low volumes.	15-40	High	Priority for Retention	6	2.5	Remove. Building footprint.
24	*Casuarina cunninghamiana* (She-Oak)	250	13	3	Fair	Fair	Crown density 0-25%. Etiolated form.	5-15	Low	Priority for Removal	3	1.9	Remove. Building footprint.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
25	*Casuarina cunninghamiana* (She-Oak)	200	16	2	Fair	Fair	Crown density 0-25%. Etiolated form.	5-15	Low	Consider for Removal	2.4	1.7	Remove. Building footprint.
26	*Casuarina cunninghamiana* (She-Oak)	300	17	6	Good	Good	Phototropic lean, slight. Partially suppressed. Medium (25-75mm) diameter deadwood in low volumes.	5-15	Moderate	Consider for Retention	3.6	2	Remove. Building footprint.
27	*Casuarina cunninghamiana* (She-Oak)	500	24	5	Good	Good	Small (<25mm) diameter deadwood in low volumes.	15-40	High	Priority for Retention	6	2.5	Remove. Building footprint.
28	*Jacaranda mimosifolia* (Jacaranda)	350 300	15	6	Good	Fair	Pruned/lopped for line clearance. Co-dominant inclusion. Small (<25mm) & medium (25-75mm) diameter epicormic growth in moderate volumes. Wound/s, early stages of decay.	5-15	Moderate	Consider for Retention	5.4	2.4	Retain. Minor Encroachment. Wall & Landscape Treatment.
29	*Corymbia maculata* (Spotted Gum)	450	14	4	Good	Good	Small (<25mm) diameter deadwood in low volumes. Partially suppressed.	40+	Moderate	Priority for Retention	5.4	2.4	Remove. Landscape treatment.
32	*Jacaranda mimosifolia* (Jacaranda)	550	12	6	Good	Fair	Co-dominant inclusion. Small (<25mm) & medium diameter (25-75mm) epicormic growth in low volumes. Wound/s, early stages of decay.	5-15	Moderate	Consider for Retention	6.6	2.6	Retain. Major Encroachment. Building footprint.
33	*Corymbia maculata* (Spotted Gum)	350	16	4	Good	Fair	Medium (25-75mm) diameter deadwood in low volumes. Cable girdling trunk. Recommend cable removal if tree is to be retained.	5-15	Moderate	Consider for Retention	4.2	2.2	Retain. No works in TPZ.
34	*Casuarina cunninghamiana* (She-Oak)	450	19	4	Good	Good	Partially suppressed. Medium (25-75mm) diameter deadwood in low volumes.	15-40	High	Priority for Retention	5.4	2.4	Retain. Minor Encroachment. Landscape Treatment.
35	*Casuarina cunninghamiana* (She-Oak)	500	18	5	Good	Good	Partially suppressed. Medium (25-75mm) diameter deadwood in low volumes.	15-40	High	Priority for Retention	6	2.5	Retain. No works in TPZ.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
36	*Casuarina cunninghamiana* (She-Oak)	400	18	4	Good	Good	Partially suppressed. Small (<25mm) diameter deadwood in low volumes.	15-40	High	Priority for Retention	4.8	2.3	Remove. Landscape Treatment.
37	*Casuarina cunninghamiana* (She-Oak)	150	10	3	Good	Good	Heavily suppressed.	5-15	Moderate	Consider for Retention	2	1.5	Retain. No works in TPZ.
38	*Corymbia maculata* (Spotted Gum)	350	174	4	Good	Fair	Trunk wound/s, early stages of decay. Partially suppressed.	15-40	High	Priority for Retention	4.2	2.2	Retain. No works in TPZ.
39	*Corymbia maculata* (Spotted Gum)	750	22	6	Good	Good	Wound/s, early stages of decay. Medium (25-75mm) diameter deadwood in low volumes.	40+	High	Priority for Retention	9	3	Retain. No works in TPZ.
40	*Corymbia maculata* (Spotted Gum)	600	22	9	Good	Good	Small (<25mm) & medium (25-75mm) diameter deadwood in low volumes.	40+	High	Priority for Retention	7.2	2.7	Retain. No works in TPZ.
41	*Eucalyptus* spp. (Gum Tree)	250	7	4	Good	Fair	Wound/s, early stages of decay. Partially suppressed. Trunk cavities, minor.	5-15	Moderate	Consider for Retention	3	1.9	Retain. No works in TPZ.
46	*Eucalyptus sideroxylon* (Mugga Ironbark)	350	18	4	Fair	Good	Crown density 50-75%. Small (<25mm) diameter deadwood in low volumes. Partially suppressed.	5-15	High	Consider for Retention	4.2	2.2	Retain. No works in TPZ.
47	*Eucalyptus sideroxylon* (Mugga Ironbark)	500	18	8	Fair	Good	Crown density 50-75%. Partially suppressed.	5-15	High	Consider for Retention	6	2.5	Retain. No works in TPZ.
48	*Eucalyptus saligna* (Sydney Blue Gum)	600	20	11	Good	Poor	Crown density 75-100%. Medium (25-75mm) diameter deadwood in low volumes. Basal wound, advanced stages of decay. Wound/s, advanced stages of decay. Borer.	<5	High	Priority for Removal	7.2	2.7	Retain. No works in TPZ.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
49	*Casuarina cunninghamiana* (She-Oak)	250	12	4	Good	Good	Partially suppressed.	15-40	Moderate	Consider for Retention	3	1.9	Retain. No works in TPZ.
50	*Angophora costata* (Sydney Red Gum)	250	9	5	Fair	Good	Crown density 50-75%. Partially suppressed. Small (<25mm) diameter deadwood. in low volumes.	15-40	Moderate	Consider for Retention	3	1.9	Retain. No works in TPZ.
51	*Melaleuca quinquenervia* (Broad Leaf Paperbark)	300	9	3	Good	Fair	Co-dominant inclusion. Partially suppressed.	15-40	Moderate	Consider for Retention	3.6	2	Retain. No works in TPZ.
52	*Eucalyptus tereticornis* (Forest Red Gum)	400	13	3	Good	Good	Small (<25mm) diameter deadwood in low volumes. Small (<25mm) epicormic growth. in low volumes.	15-40	Moderate	Consider for Retention	4.8	2.3	Retain. No works in TPZ.
53	*Corymbia maculata* (Spotted Gum)	500	15	7	Fair	Good	Crown density 50-75%. Small (<25mm) diameter deadwood in moderate volumes.	5-15	Moderate	Consider for Retention	6	2.5	Retain. Minor Encroachment. Pavement.
54	*Corymbia maculata* (Spotted Gum)	450	13	8	Good	Good	Small (<25mm) diameter deadwood in low volumes.	40+	High	Priority for Retention	5.4	2.4	Remove. Landscape Treatment.
55	*Corymbia maculata* (Spotted Gum)	550	16	6	Good	Good	Crown density 75-100%. Small (<25mm) diameter deadwood in moderate volumes. mistletoe in crown.	15-40	High	Priority for Retention	6.6	2.6	Remove. Building footprint.
56	*Corymbia maculata* (Spotted Gum)	550	16	7	Good	Good	Small (<25mm) diameter deadwood in low volumes.	40+	High	Priority for Retention	6.6	2.6	Remove. Building footprint.
57	*Corymbia maculata* (Spotted Gum)	350	16	5	Good	Good	Partially suppressed. Adaptive growth.	40+	High	Priority for Retention	4.2	2.2	Remove. Building footprint.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
58	*Corymbia maculata* (Spotted Gum)	500	17	6	Good	Good	Medium (25-75mm) diameter deadwood in low volumes.	40+	High	Priority for Retention	6	2.5	Remove. Building footprint.
100	*Cupressus sempervirens* 'Stricta' (Fastigiate Mediterranean Cypress)	200	8	1	Good	Good	Group of 2.	15-40	Moderate	Consider for Retention	2.4	1.7	Retain. No works in TPZ.
102	*Callistemon viminalis* (Weeping Bottlebrush)	250	6	3	Good	Good	Wound/s, no visible signs of decay. Small (<25mm) epicormic growth in low volumes.	5-15	Moderate	Consider for Retention	3	1.9	Remove. Carpark.
103	*Callistemon citrinus* (Crimson Bottlebrush)	200 at grade	3	2	Good	Fair		5-15	Low	Consider for Removal	2.4	1.7	Remove. Carpark.
104	*Callistemon viminalis* (Weeping Bottlebrush)	300 200 200	7	4	Good	Fair	Co-dominant inclusion. Wound/s, early stages of decay.	5-15	Moderate	Consider for Retention	4.8	2.3	Remove. Carpark.
105	*Eucalyptus tereticornis* (Forest Red Gum)	550	15	7	Good	Fair	Crown density 75-100%. Large (>75mm) diameter deadwood in low volumes. Recommend aerial inspection of branch inclusion at 7m if tree is to be retained.	15-40	High	Priority for Retention	6.6	2.6	Retain. No works in TPZ.
106	*Callistemon salignus* (White Bottlebrush)	200 max	4	2	Good	Fair	Group of 4. Branch inclusion/s, minor.	5-15	Low	Consider for Removal	2.4	1.7	Retain. No works in TPZ.
107	*Eucalyptus* spp. (Gum Tree)	500	10	7	Good	Good	Medium (25-75mm) epicormic growth in low volumes. Medium (25-75mm) diameter deadwood in low volumes. Branch inclusion/s, minor.	15-40	Moderate	Consider for Retention	6	2.5	Retain. Minor Encroachment. Pump Room.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
108	*Schinus molle* var. *areira* (Peppercorn Tree)	800	9	6	Good	Good	Trunk cavity, major. Small (<25mm) diameter deadwood in moderate volumnes. Recommend internal diamnostic testing if tree is retained.	5-15	Moderate	Consider for Retention	9.6	3.1	Retain. Minor Encroachment. Pump Room.
119	*Callistemon salignus* (White Bottlebrush)	250	4	3	Good	Fair	Pruned/lopped for line clearance.	5-15	Moderate	Consider for Retention	3	1.9	Retain. No works in TPZ.
120	*Callistemon salignus* (White Bottlebrush)	350	5	4	Good	Poor	Pruned/lopped for line clearance.	5-15	Moderate	Consider for Retention	4.2	2.2	Retain. No works in TPZ.

Appendix 4: Plates

Plate 1: Showing pruning, Tree 1

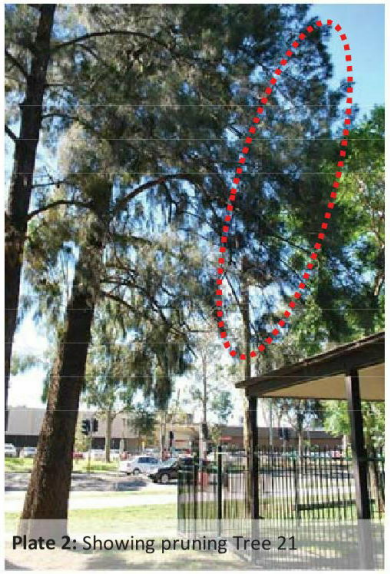

Plate 2: Showing pruning Tree 21

Plate 3: Showing pruning Tree 22

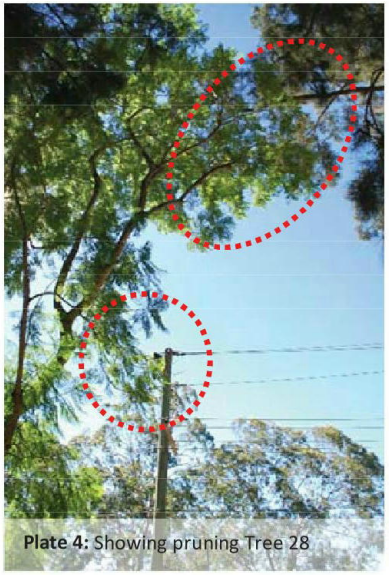

Plate 4: Showing pruning Tree 28

Plate 5: Showing pruning Tree 32

Appendix 5: Tree Protection Specification

1.0 Appointment of Project Arborist

A Project Arborist shall be engaged prior the commencement of work on-site and monitor compliance with the protection measures. The Project Arborist shall inspect the tree protection measures and Compliance Certification shall be prepared by the Project Arborist for review by the Principal Certifying Authority prior to the release of the Compliance Certificate.

The Project Arborist shall have a minimum qualification equivalent (using the Australian Qualifications Framework) of NSW TAFE Certificate Level 5 or above in Arboriculture.

The site specific requirement for mulching, irrigation, the location of tree protection fencing and temporary access, and other specific tree protection measures shall be confirmed through consultation between the Head Contractor/Project Manager and the Project Arborist prior to the commencement of works.

1.1 Compliance

Contractors and site workers shall receive a copy of these specifications a minimum of 3 working days prior to commencing work on-site. Contractors and site workers undertaking works within the Tree Protection Zone shall sign the site log confirming they have read and understand these specifications, prior to undertaking works on-site.

1.2 Tree Protection Zone

The tree to be retained shall be protected prior and during construction from activities that may result in an adverse effect on their health or structural condition. The area within the Tree Protection Zone (TPZ) shall exclude the following activities, unless otherwise stated:-

- Modification of existing soil levels, excavations and trenching
- Mechanical removal of vegetation
- Movement of natural rock
- Storage of materials, plant or equipment or erection of site sheds
- Affixing of signage or hoarding to the trees
- Preparation of building materials, refueling or disposal of waste materials and chemicals
- Lighting fires
- Movement of pedestrian or vehicular traffic
- Temporary or permanent location of services, or the works required for their installation
- Any other activities that may cause damage to the tree

NOTE: If access, encroachment or incursion into the TPZ is deemed essential, prior authorisation is required by the Project Arborist.

1.3 Tree Protection Fencing

TPZ fencing shall be located at perimeter of the TPZ. Refer to Tree Assessment Schedule **(Appendix 3)**. The exact location of the fencing shall be confirmed through consultation between the Head Contractor/Project Manager and the Project Arborist prior to the commencement of works. Fencing may be setback to allow for demolition/construction access and for the installation of pavements only where appropriate ground protection is installed and approved by the Project Arborist.

As a minimum, the Tree Protection Fence shall consist of 1.8m high wire mesh panels supported by concrete feet. Panels shall be fastened together and supported to prevent sideways movement. The tree shall not be damaged during the installation of the Tree Protection Fencing. Refer to Typical Tree Protection Details (3) **(Appendix 6)**.

1.4 Signage

Signs identifying the TPZ should be placed around the edge of the TPZ and be visible from within the development site. The lettering on the sign should comply with *Australian Standard - 1319 (1994) Safety signs for the occupational environment*. The signage shall be installed prior to the commencement of works on-site and shall be maintained in good condition for the duration of the development period.

1.5 Site Management

Materials, waste storage, and temporary services shall not be located within the TPZ.

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1.6 Scaffolding

Where possible, scaffolding shall not be located within the TPZ. Scaffolding shall not be in contact with the tree. As necessary, this shall be achieved by erecting scaffolding around branches. Branches shall be tied back and protected as deemed necessary by the Project Arborist. Refer to Typical Tree Protection Details (5) **(Appendix 6)**.

1.7 Ground Protection

To protect the underlying soil from compaction, machinery movements shall be restricted to areas of existing pavement or from areas of temporary ground protection such as ground mats or steel road plates. Refer to Typical Tree Protection Details (3) **(Appendix 6).**

1.8 Works within the Tree Protection Zones

In some cases works within the TPZ may be authorized by the determining authority. **These works shall be supervised by the Project Arborist**. When undertaking works within the TPZ, care should be taken to avoid damage to the tree's root system, trunks and lower branches.

If roots (>25mmø) are encountered during the demolition, excavation and construction works, these roots must be retained in an undamaged condition and advice sought from the Project Arborist. Adjustment of final levels and design shall remain flexible to enable the retention of roots (>25mmø) where deemed necessary by the Project Arborist.

1.9 Structure & Pavement Demolition

Demolition of existing structures/pavement within the TPZ shall be supervised by the Project Arborist. Machinery is to be excluded from the TPZ unless operating from the existing slabs, pavements or areas of ground protection (refer to Section 1.6). Machinery should not contact the tree's roots, trunk, branches and crown.

Where deemed necessary by the Project Arborist, structures shall be shattered with a hand-operated pneumatic/electric breaker to minimise disturbance to the tree's roots, and demolition waste removed by hand.

The existing pavement shall be carefully lifted to minimise damage to the underlying soil profile (or sub-base materials) and to prevent damage to tree roots. Wherever possible, existing sub-base materials shall remain in-situ.

When removing slab sections within TPZ, machinery shall work backwards out of the TPZ to ensure machinery remains on un-demolished sections of slab at all times. Wherever possible, footings or elements below grade shall be retained to minimise disturbance to the tree's roots.

If roots (>25mmø) are encountered during the demolition works, these roots must be retained in an undamaged condition and advice sought from the Project Arborist. Exposed roots shall be protected from direct sunlight, drying out and extremes of temperature by covering with a 10mm thick jute geotextile fabric. The geotextile fabric shall be kept in a damp condition at all times. Where the Project Arborist determines that the tree is using underground elements (i.e footings, pipes, rocks etc.) for support, these elements shall be left in-situ.

1.10 Building & DrivewayConstruction

Tree sensitive excavation (hand/hydrovac/airspade/compact excavator) and root pruning should be undertaken along the line of the building/driveway cross over within or adjacent to TPZ areas prior to the commencement of mechanical excavation to prevent shattering of roots by excavation equipment. No over excavation into TPZ areas should be undertaken. Refer to Section 1.15.

1.11 Pavement Installation

New pavements (including sub-base materials) within TPZ areas shall be installed above or at existing grade and utilise existing sub-base layers where possible. Pavement sub-base layers shall be either, thinned or finished pavement levels amended as required to enable the retention of significant roots (as determined by the Project Arborist).

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1.12 Underground Services

Underground service installation within the TPZ shall be supervised by the Project Arborist.

The installation of underground services shall be located outside of the TPZ. Where this is not possible, they shall be installed using either hydrovac or hand excavation methods with the services installed around/below roots (>25mmø, or as determined by the Project Arborist).

Alternatively, boring methods may be used for underground service installation where the installation depth is greater than 1500mm below existing grade. Excavations for starting and receiving pits for boring equipment shall be located outside of the TPZ or located to avoid roots (>25mmø, or as determined by the Project Arborist).

1.13 Plant/Turf Installation

Plant installation within TPZ areas shall be undertaken using hand tools and roots (>25mmø) shall be protected. No mechanical cultivation/ripping of soils shall be undertaken within TPZ areas.

Landscape planting shall be completed in the final stage of the development works and tree protection fencing and trunk protection shall remain in place until these works are due to commence.

1.15 Excavations, Root Protection & Root Pruning

All excavation works (including root investigations) within TPZ areas shall supervised by the Project Arborist and utilise tree sensitive methods. These methods include hand, airspade or hydrovac excavation. Where approved by the Project Arborist, excavation using compact machinery fitted with a flat bladed bucket is permissible. Unless specified otherwise, excavation using compact machinery shall be undertaken in small increments, guided by a spotter who is to look for and prevent damage to roots (>25mmø).

Exposed roots shall be protected from direct sunlight, drying out and extremes of temperature by covering with a 10mm thick jute mat, followed by a layer of plastic membrane. Coverings shall be weighted to secure them in place. The mat shall be kept in a damp condition at all times.

No over-excavation, battering or benching shall be undertaken beyond the footprint of any structure unless approved by the Project Arborist. Hand excavation and root pruning shall be undertaken along the excavation line prior to the commencement of mechanical excavation to prevent tearing and shattering damage to the roots from excavation equipment.

Roots (>25mmø) shall be pruned by the Project Arborist only. Roots (<25mmø) may be pruned by the Principal Contractor. Root pruning shall be undertaken with clean, sharp secateurs or a pruning saw to ensure a smooth wound face, free from tears. Damaged roots shall be pruned behind the damaged tissues with the final cut made to an undamaged part of the root.

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Appendix 6: Typical Tree Protection Details

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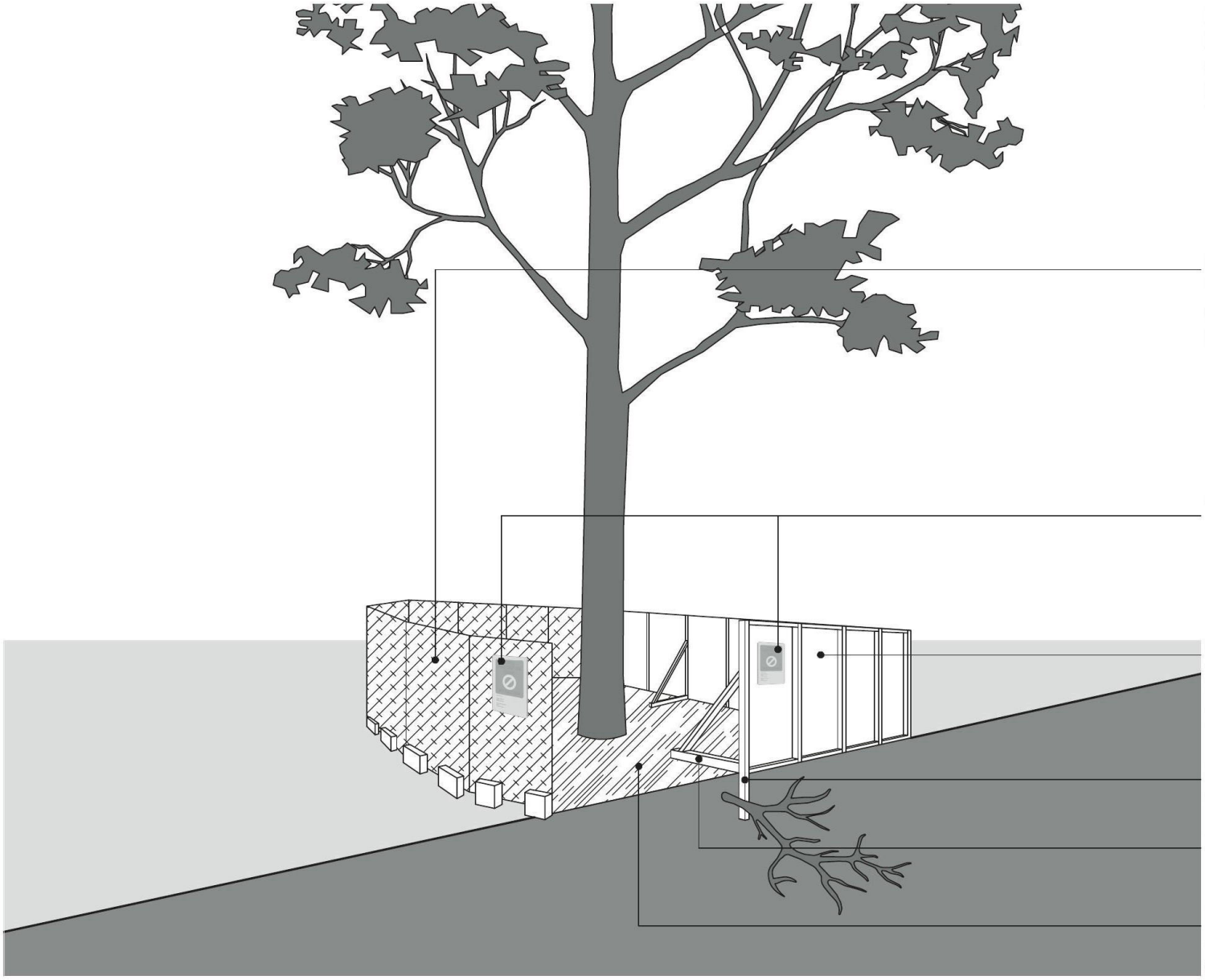


Note:
No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.

Option 1 - Fencing
1.8m high chain wire mesh panels with shade cloth attached (if required), held in place with concrete feet.

Tree Protection Zone (TPZ) sign

Option 2 - Fencing
Plywood or wooden panel paling fence. This type of fencing material also prevents building materials or soil entering the TPZ.

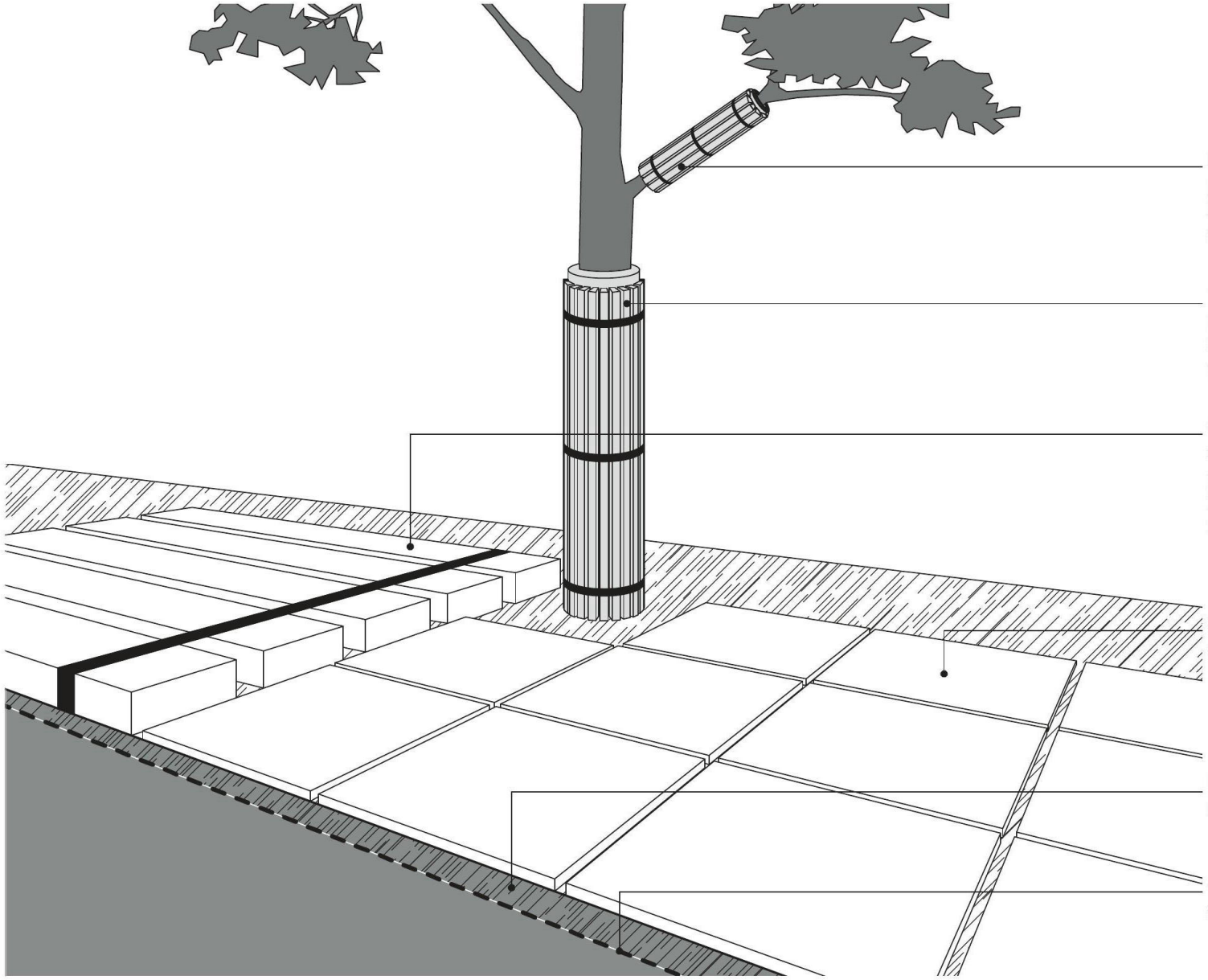
Installation of supports should avoid damaging roots.

Bracing is permissible within the TPZ.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer installed across surface of TPZ.

03 Tree Protection Fencing

Not to Scale



Branch Protection - use boards and padding to prevent damage to bark on branch. Boards are to be strapped, not screwed or nailed to the branch.

Trunk Protection - use boards and padding to prevent damage to bark (minimum 2m). Boards are to be strapped, not screwed or nailed to the trunk.

Ground Protection - use device strapped over mulch or aggregate layer. Ground protection device should be of a suitable thickness to prevent soil compaction and root damage.

Steel plates (or approved equivalent) with or without mulch or aggregate layer below.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer.

Geotextile fabric underneath mulch or aggregate layer.

04 Examples of Branch, Trunk and Ground Protection Not to Scale

Branches may require pruning to erect scaffolding. Pruning may be subject to local regulations. Flexible branches should be tied back in preference to pruning.

Minimum 1.8m high hoarding. Temporary fencing may be incorporated into scaffolding as either containment screening or as hoarding.

Note:
If excavation is required for installation of support post for fencing, the Project Arborist should assess any pruning of roots greater than 20mm diameter.

Scaffold planks

Boards or plywood to be installed over mulch or aggregate layer for any areas requiring access within the TPZ.

Soleplate over geotextile. No excavation for soleplate within TPZ.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer within TPZ.

Geotextile fabric

05 Indicative Scaffolding within a Tree Protection Zone (TPZ) Not to Scale