Appendix G13
Aboricultural Impact Assessment

Environmental Impact Statement

for Alterations and Additions to

St Philip's Christian College, Cessnock

Arboricultural Impact Assessment

Figure 1 Trees 7 – 10 *Eucalyptus moluccana* adjacent to the site entry

Site Address: 10 Lomas Lane Nulkaba, NSW

Client: St Philips Christian College

Date: October 2021

Prepared by Ian Hills - Associate Diploma Horticulture
Certificate III Arboriculture
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1.0 Summary

Accurate Tree Assessment has been commissioned by St Philips Christian College (the client) to provide an assessment of development impact for twenty-three (23) trees located around the entrance to the property at 10 Lomas Lane Nulkaba, NSW in conjunction with the State Significant Development Application (SSD) for proposed to alterations and additions to the School's Cessnock Campus.

The property is zoned RU2 Rural Landscape; the property is mainly cleared with areas of lawn, gardens and hardstand making up the landscape. Native vegetation which includes the subject trees is subject to the provisions of the Local Land Services Amendment Act 2016.

Conclusions

The proposed construction of the bus turning area necessitates the removal of nine (9) of the twenty-three (23) trees subject of this report.

The removal of nine (9) endemic native trees will cause a minor environmental and landscape amenity impact that can be offset by replacement planting.

The retention of fourteen (14) trees will require the implementation of protection measure meeting the provisions of the Australian Standard AS4970-2009, Protection of Trees on Development Sites.

Recommendations

That Trees 6 to 14 are approved for removal to facilitate the proposed development in its current form subject to the provision of compensatory replacement planting of endemic native trees within the boundary of the subject site.

That all tree work is carried out by a suitably qualified and insured contracting arborist, in accordance with the Safework NSW Draft Code of Practice for Tree Works and Australian Standard AS4373-2007, "Pruning of Amenity Trees".

That trees 1 to 5 and 15 to 23 are retained and protected by the installation of protective fencing and armouring of the trunks as detailed in Section 4 of AS4970-2009, Protection of Trees on Development Sites as detailed at sections 9.0, 9.1 and appendices 12.3a – 12.3.b of this report

That all tree protection measures, are implemented prior to the commencement of works and maintained in serviceable condition for the duration of the project.

2.0 Disclaimer

This report is to be read and considered in its entirety. The subject trees were inspected from the ground using Visual Tree Assessment methodology. No aerial investigations, underground or internal investigations were undertaken. It is the responsibility of the client to implement all recommendations contained in this report.

The assessment is made having regard for the prevailing site conditions; and does not account for the effects that extreme weather events may have on trees.

Information contained in this report reflects the condition of the trees at the time of the inspection. As trees are living organisms their condition will change over time, there is no guarantee that problems or deficiencies of the subject trees may not arise in the future. It must be accepted that living near trees involves some level of risk.

No investigation into the presence on the site of threatened or endangered species of shrubs, groundcovers, grasses, herbs, or orchids has been undertaken.

This report is for the use of the client, their contractors, and Cessnock City Council to assist in determining the tree management measures to be undertaken in conjunction with the proposed development. Distribution to other parties is not permitted except with the express permission of the author, Ian Hills.

3.0 Brief

Accurate Tree Assessment has been commissioned by St Philips Christian College (the client) to provide an assessment of development impact for twenty-three (23) trees located around the entrance to the property at 10 Lomas Lane Nulkaba, NSW in conjunction with the State Significant Development Application (SSD) for proposed to alterations and additions to the School's Cessnock Campus.

4.0 Method

A site inspection was carried out on 15 October 2021; the assessment of the trees was made using Visual Tree Assessment (VTA) procedure (Matheny & Clark, 1994), (Mattheck & Breloer, 2004) having regard for the provisions of AS4970-2009, '*Protection of Trees on Development Sites'*.

Tree height was determined using a Nikon Forestry Pro™ hypsometer. Tree canopy spread was estimated. The DBH was determined using a standard arboricultural diameter tape.

Trees have been tagged and allocated a number which is marked on the survey plan provided and will be used as reference throughout this report.

4.1. Documents

The following document(s) have been reviewed in the preparation of this assessment:

- Survey Plan prepared by Marshall Scott, Ref. No. 22972, DWG 22972-DET.DWG, dated 23 July 2021 (Appendix 12.2)

- Proposed Site Plan prepared by SHAC Architecture, Project No. 4347, Drawing No. SSD-3004, Revision F, dated 15 September 2021 (appendix 12.3)

5.0 Site Conditions

The property is zoned RU2 Rural Landscape; the property is mainly cleared with areas of lawn, gardens and hardstand making up the landscape. The subject trees are remnant native species representative of the Cumberland Plain Woodland Endangered Ecological Community which is protected under the NSW Biodiversity Conservation Act 2016 (BCA) and the provisions of the Local Land Services Amendment Act 2016. (LLS)

The development site is approximately 9ha and has a Northerly aspect.

According to data from the Office of Environment and Heritage the soil landscape is mapped as Branxton (Sl5601bx), which has the following characteristics:

> "This landscape covers undulating low hills and rises with many small creek flats, extending over a large area between Singleton and Cessnock. The main soils are Yellow Podzolic Soils on mid-slopes with Red Podzolic Soils on crests. Yellow Soloths occur on lower slopes and in drainage lines. Alluvial Soils occur in some creeks with Siliceous Sands on flats within large valleys. Some acid topsoil problems are encountered in the area. (NSW Environment and Heritage, 2021)

The natural soil profile has been disturbed by construction and is likely to contain proprietary soil mixes associated with landscaping of the site

According to climate data from the weather station at Cessnock Airport, which is approximately 2 kilometres from the site, the district experiences frequent occurrences of winds over 40km/h with North-westerly winds prevailing (Willy Weather, 2021), the subject trees are exposed to winds from all directions.

Figure 2 Proposed worksite location (Sixmaps, 2021)

6.0 Tree Assessment

No	Common Name	Species	DBH (M)	TPZ (M)	SRZ (M)	HEIGHT (M)	SPREAD (M)	Vigour	Age Class	SULE	Comments
1	Grey Box	*Eucalyptus moluccana*	0.66	7.92	2.85	20	18	g	m	2a	Minor deadwood noted, canopy bias to South, co-dominant trunks from 3 metres, reaction wood below union
2	Grey Box	*Eucalyptus moluccana*	0.53	6.36	2.80	20	12	av	m	2a	Minor deadwood noted suppressed by nearby trees
3	Forest Red Gum	*Eucalyptus tereticornis*	0.35	4.2	2.25	12	8	av	sm	3a	Minor deadwood noted suppressed by nearby trees
4	Forest Red Gum	*Eucalyptus tereticornis*	0.36	4.32	2.25	14	8	g	sm	2a	Minor deadwood noted suppressed by nearby trees
5	Forest Red Gum	*Eucalyptus tereticornis*	0.42	5.04	2.47	18	14	g	m	2a	Minor deadwood noted, canopy bias to North. Superficial wound on trunk at 1 metre
6	Forest Red Gum	*Eucalyptus tereticornis*	0.4	4.8	2.43	15	11	g	m	2a	Minor deadwood noted, canopy bias to North.
7	Grey Box	*Eucalyptus moluccana*	0.56	6.72	2.81	20	11	g	m	2a	Minor deadwood noted, canopy bias to South
8	Grey Box	*Eucalyptus moluccana*	0.38	4.56	2.43	18	10	g	m	2a	Minor deadwood noted, otherwise appears structurally sound
9	Grey Box	*Eucalyptus moluccana*	0.5	6	2.74	18	9	av	m	3a	Sparse canopy, wound seam at base
10	Grey Box	*Eucalyptus moluccana*	0.31	3.72	2.37	12	5	av	sm	2a	Minor deadwood noted suppressed by nearby trees
11	Grey Box	*Eucalyptus moluccana*	0.15	2	1.61	8	2	g	j	2a	Appears structurally sound
12	Forest Red Gum	*Eucalyptus tereticornis*	0.38	4.56	2.37	16	9	g	m	2a	Minor deadwood noted, otherwise appears structurally sound
13	Forest Red Gum	*Eucalyptus tereticornis*	0.68	8.16	2.67	16	11	av	m	3a	Minor deadwood noted, included fork union at 1.5 metres
14	Forest Red Gum	*Eucalyptus tereticornis*	0.2	2.4	1.85	10	2	av	sm	2a	Minor deadwood noted suppressed by nearby trees

No	Common Name	Species	DBH (M)	TPZ (M)	SRZ (M)	HEIGHT (M)	SPREAD (M)	Vigour	Age Class	SULE	Comments
15	Forest Red Gum	*Eucalyptus tereticornis*	0.56	6.72	2.78	18	16	g	m	2a	Minor deadwood noted, canopy bias to North.
16	Forest Red Gum	*Eucalyptus tereticornis*	.48, .12	5.88	2.63	16	12	g	m	2a	Minor deadwood noted, otherwise appears structurally sound
17	Forest Red Gum	*Eucalyptus tereticornis*	0.25	3	2.00	9	1	p	om	4a	Damaged, entire canopy comprised of epicormic growth
18	Grey Box	*Eucalyptus moluccana*	0.1	2	1.68	5	1	g	j	1a	Appears structurally sound
19	Forest Red Gum	*Eucalyptus tereticornis*	0	3.12	2.13	14	9	av	m	2a	Sparse canopy, minor deadwood noted
20	Forest Red Gum	*Eucalyptus tereticornis*	0.31	3.72	2.37	16	9	g	m	2a	Minor deadwood noted, canopy bias to South
21	Forest Red Gum	*Eucalyptus tereticornis*	0.2	2.4	1.94	9	4	g	sm	2a	Minor deadwood noted, otherwise appears structurally sound
22	Forest Red Gum	*Eucalyptus tereticornis*	0.1	2	1.50	3	1	g	j	1a	Appears structurally sound
23	Forest Red Gum	*Eucalyptus tereticornis*	.33, .37	6	2.59	12	9	g	m	1a	Co-dominant trunks from base, no included bark, appears structurally sound

DBH – Trunk diameter at 1.4 metres
Vigour - P = Poor, F = Fair, Av = Average, G =Good
Age class – J = Juvenile, SM =Semi-mature M = Mature, OM= Over mature

TPZ = Tree Protection Zone (calculated in accordance with AS4970)
SRZ = Structural Root Zone (calculated in accordance with AS4970)
SULE = Safe Useful Life Expectancy (Barrel, J. 1993-5) Appendix 12.1

7.0 Tree Retention Value

No.	Species	Health and Vigour	Condition	Suitability	Sustainability	Landscape rating	Retention Value	Encroachment level*	Proposal
1	*Eucalyptus moluccana*	Good	Good	High	15-40 years	2	High	*12% TPZ	Retention
2	*Eucalyptus moluccana*	Average	Good	High	15-40 years	2	High	*25% TPZ *2% SRZ	Retention
3	*Eucalyptus tereticornis*	Average	Good	High	5-15 years	3	Moderate	*14% TPZ	Retention
4	*Eucalyptus tereticornis*	Good	Good	High	15-40 years	2	High	*15% TPZ/SRZ	Retention
5	*Eucalyptus tereticornis*	Good	Good	High	15-40 years	2	High	*31% TPZ *13%SRZ	Retention
6	*Eucalyptus tereticornis*	Good	Good	High	15-40 years	2	High	30% TPZ 13%SRZ	Removal
7	*Eucalyptus moluccana*	Good	Good	High	15-40 years	2	High	50% TPZ 50% SRZ	Removal
8	*Eucalyptus moluccana*	Good	Good	High	15-40 years	2	High	60% TPZ/SRZ	Removal
9	*Eucalyptus moluccana*	Average	Good	High	5-15 years	3	Moderate	100% TPZ/SRZ	Removal
10	*Eucalyptus moluccana*	Average	Good	High	15-40 years	2	High	65% TPZ/SRZ	Removal
11	*Eucalyptus moluccana*	Good	Good	High	15-40 years	2	High	100% TPZ/SRZ	Removal
12	*Eucalyptus tereticornis*	Good	Good	High	15-40 years	2	High	57% TPZ/SRZ	Removal
13	*Eucalyptus tereticornis*	Average	Good	High	5-15 years	3	Moderate	40% TPZ 22%SRZ	Retention
14	*Eucalyptus tereticornis*	Average	Good	High	15-40 years	2	High	19% TPZ 11% SRZ	Retention
15	*Eucalyptus tereticornis*	Good	Good	High	15-40 years	2	High	11% TPZ	Retention
16	*Eucalyptus tereticornis*	Good	Good	High	15-40 years	2	High	18% TPZ	Retention
17	*Eucalyptus tereticornis*	Poor	Poor	High	< 5years	4	Very low	10% TPZ	Retention

No.	Species	Health and Vigour	Condition	Suitability	Sustainability	Landscape rating	Retention Value	Encroachment level*	Proposal
18	*Eucalyptus moluccana*	Good	Good	High	40+ years	2	High	Nil	Retention
19	*Eucalyptus tereticornis*	Average	Good	High	15-40 years	2	High	Nil	Retention
20	*Eucalyptus tereticornis*	Good	Good	High	15-40 years	2	High	Nil	Retention
21	*Eucalyptus tereticornis*	Good	Good	High	15-40 years	2	High	*26% TPZ 18% SRZ	Retention
22	*Eucalyptus tereticornis*	Good	Good	High	40+ years	2	High	*19% TPZ SRZ 10%	Retention
23	*Eucalyptus tereticornis*	Good	Good	High	40+ years	1	High	*29% TPZ 6%SRZ	Retention

Health and Vigour – based on production of new growth and wound occlusion Av = Average, P = Poor, F = Fair.
Condition – based on structural faults or diseases or provides comparison to an archetypal example of the species.
Suitability - High = adequate space to accommodate future growth and good growing conditions, Medium = inadequate space and good growing conditions, Low = inadequate space and poor growing conditions.
Retention Value – combines Landscape significance and sustainability to rank the trees value (Refer Appendix 12.5)
***existing encroachment**

8.0 Development impact

All parts of a tree may be damaged by construction activities, and the effects of damage are often cumulative meaning that seemingly minor damage to the tree can have adverse effects that may not become apparent until well after the project has been completed.

Crown damage often occurs when machinery impacts branches of the tree resulting in a loss of foliage. As the foliage is where the tree produces the sugars required for healthy growth it therefore stands to reason that any loss of foliage will affect the tree's ability to function normally.

In addition, when branches are torn or improperly pruned the tree's ability to recover is affected and pathogens that cause wood decay or disease have an increased opportunity to penetrate the trees natural defenses.

Trunk damage is usually caused by mechanical impact, and again wounding predisposes the tree to infection by pathogens.

Root damage is the most common cause of damage to trees on development sites, and often has the most serious effects as it commonly goes un-noticed for some time. Damage can be caused by mechanical factors such as tearing during excavation, as well as factors such as chemical contamination, changes in hydrology and altering gaseous exchange rates by filling, and compaction during movement of equipment.

Australian Standard 4970, *Protection of Trees on Development Sites* was adopted in 2009 to provide Arborists and the construction industry with a guide to assist in the preservation of retained trees on all types of development sites.

To assist professionals working to protect trees the Standard proposes the following:

> "Tree Protection Zone - A specified area above and below ground level at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.
>
> *Structural Root Zone – The area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres.*
>
> *This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be much larger."* (Ref. AS4970-2009)

Minor encroachment of the TPZ is sometimes unavoidable and at levels less than 10% of the total TPZ area can be tolerated if there is scope to increase the area of the TPZ contiguously about the unaffected perimeter. Where encroachment exceeds 10% further investigation will be required to determine the measures required to offset the incursion. Encroachment of the SRZ is not recommended as tree health and condition will almost certainly be adversely affected.

9.0 Discussion

The impact of the proposed development on the twenty-three (23) trees subject of this report is assessed in conjunction with the site plan provided, that details demolition construction of a new bus turning area from Lomas Lane.

Trees 1-2 *Eucalyptus moluccana* and 3-5 *Eucalyptus tereticornis* are located West of the existing pedestrian entrance in an area of garden that is proposed for retention in conjunction with the proposed development. The trees are subject to existing encroachments from the compacted gravel path ranging from 12% to 31 % of the TPZ's and 0% to 13 % of the SRZ's.

The trees are set back from the proposed road works and are unlikely to be adversely affected by impacts caused by the construction. If the pedestrian walkway is to be removed, consideration should be given to the use of tree sensitive work methods to protect tree roots which are likely to be located just beneath the surface. For example, breaking up of the surface is to be carried out using small capacity equipment under close supervision rather than ripping with a grader or dozer.

During removal of the path (if applicable) the trunks of trees are to be protected by armouring whereby timber slats are attached around the trunks over a layer of padding to create a protective shell in accordance with the provisions of Section 4 of AS4970 as detailed at appendix 12.3.b.

Prior to the commencement of the proposed road works an exclusion zone is to be established around the trees using temporary fencing panels to protect them from mechanical impacts, as well as restricting the storage of materials and equipment. The fencing is to be installed at the perimeter of the combined TPZ in accordance with the provisions of Section 4 of AS4970 as detailed at appendix 12.3.a.

The proposed bus turning area will support frequent use by heavy vehicles and therefore will be constructed to a high standard requiring a deep and highly compacted subgrade which will impact trees 6 to 14.

Trees 6, 13 and 14 *Eucalyptus tereticornis* are located to the East and West of the proposed road works and will be subject to encroachments ranging from 19% to 40% of the TPZ's and 11% to 22% of the SRZ's. This is considered to be a major and unsustainable level of encroachment and the trees are therefore proposed to be removed in favour of the proposed development.

Trees 7, 8, 9, 10, 11 *Eucalyptus moluccana* and 12 *Eucalyptus tereticornis* are located within the plan area of the proposed roadway and cannot be retained in conjunction with the current design which takes advantage of existing gates and compacted gravel roadways. These trees are also proposed for removal to allow the development to proceed as planned.

The proposed removal of nine (9) established native trees will have a minor environmental and landscape amenity impact which can be offset by the planting of additional trees in suitable positions within the boundary of the subject site. Preference should be given to the planting of the same endemic species as those proposed for removal which are sourced from natural provenance. There are many trees on the site from which seed could be collected and raised to maturity for future use on the site.

Trees 15 to 20 are set back from the edge of the proposed roadway, only the larger Trees 15 and 16 *Eucalyptus tereticornis* are subject to encroachment which is calculated at 11% and 18% respectively and can be managed by the implementation of protection measures meeting the requirements of AS4970.

As with the retained trees noted above protective fencing will be installed to create an exclusion zone round the whole group to restrict access and provide a buffer between the trees and the work area.

Trees 21 to 23 *Eucalyptus tereticornis* are located close to the edge of the existing roadway which will be retained, so no increase in the level of encroachment is expected. The trunks of the trees are to be protected by armouring as detailed above and at appendix 12.3.b.

Minor pruning of branches may be required to provide construction clearance and is preferable to tearing or breaking of branches, minor pruning (less than 10% of branches) is unlikely to have any adverse effects on the viability of the trees.

Pruning is to be carried out in accordance with the provisions of AS4373-2007, Pruning of Amenity Trees by a suitably qualified and insured contracting arborist.

9.1 Tree Protection

General conditions relating to the protection of retained trees includes, but is not limited to the following activities:

Site establishment

- trees have been identified by tagging and/or numbering on the contract plan.
- protective fencing is erected at the perimeter of the respective TPZ, the fenced areas are to be included on the landscape plan and marked as a "no go zone"
- staff are to be made aware of tree protection measures during induction to the site
- the area of the TPZ should be mulched using 100mm depth of organic material, mulch must be kept clear of the base of tree trunks
- fencing is to include signage clearly denoting the TPZ as a "no go zone"

During construction

- tree protection measures are to be maintained in serviceable condition
- no storage of equipment or materials is permitted within the TPZ, no cement wasting, or other pollutants must be allowed to enter the TPZ
- damage to any part of a protected tree is to be reported to the certifying arborist for assessment and remediation
- if services must pass through an established TPZ excavation is to be carried out by hand
- no roots are to be severed within an established TPZ, except under the supervision of an AQF5 arborist

Post construction

- protective fencing is to be removed from site
- at 6-month intervals (for up to 18 months following completion) retained trees are to be inspected by the certifying arborist for signs of decline.
- steps can be taken to improve growing conditions if required such as decompaction of soil, introduction of irrigation
- general maintenance pruning can be undertaken (in accordance with AS4373-2007) to remove deadwood or other defective branches up to 10% of the total canopy area of retained trees if required

10.0 Conclusions

The proposed construction of the bus turning area necessitates the removal of nine (9) of the twenty-three (23) trees subject of this report.

The removal of nine (9) endemic native trees will cause a minor environmental and landscape amenity impact that can be offset by replacement planting.

The retention of fourteen (14) trees will require the implementation of protection measure meeting the provisions of the Australian Standard AS4970-2009, Protection of Trees on Development Sites.

11.0 Recommendations

That Trees 6 to 14 are approved for removal to facilitate the proposed development in its current form subject to the provision of compensatory replacement planting of endemic native trees within the boundary of the subject site.

That all tree work is carried out by a suitably qualified and insured contracting arborist, in accordance with the Safework NSW Draft Code of Practice for Tree Works and Australian Standard AS4373-2007, “Pruning of Amenity Trees”.

That trees 1 to 5 and 15 to 23 are retained and protected by the installation of protective fencing and armouring of the trunks as detailed in Section 4 of AS4970-2009, Protection of Trees on Development Sites as detailed at sections 9.0 and 9.1 and appendices 12.3a – 12.3.b of this report

That all tree protection measures, are implemented prior to the commencement of works and maintained in serviceable condition for the duration of the project.

Ian Hills - Principal Arborist
Accurate Tree Assessment

QTRA
Registered User

Arboriculture Australia 2021 MEMBER

Figure 3 Trees 6 – 7 will be subject to encroachment from construction of the proposed roadway

Figure 4 Trees 8- 10 will be subject to encroachment from construction of the proposed roadway

Figure 5 Trees 11 - 14 will be subject to encroachment from construction of the proposed roadway

Figure 6 Trees 16 – 20 will be retained in conjunction with the proposed development

Figure 7 Trees 21-22 *Eucalyptus tereticornis* are proposed for retention

Figure 8 Tree 23 *Eucalyptus tereticornis* is proposed for retention

12.0 Appendices

12.1. Safe Useful Life Expectancy Categories

1: Long SULE: Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.
(a) Structurally sound trees located in positions that can accommodate future growth.
(b) Trees that could be made suitable for retention in the long term by remedial tree care.
(c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.

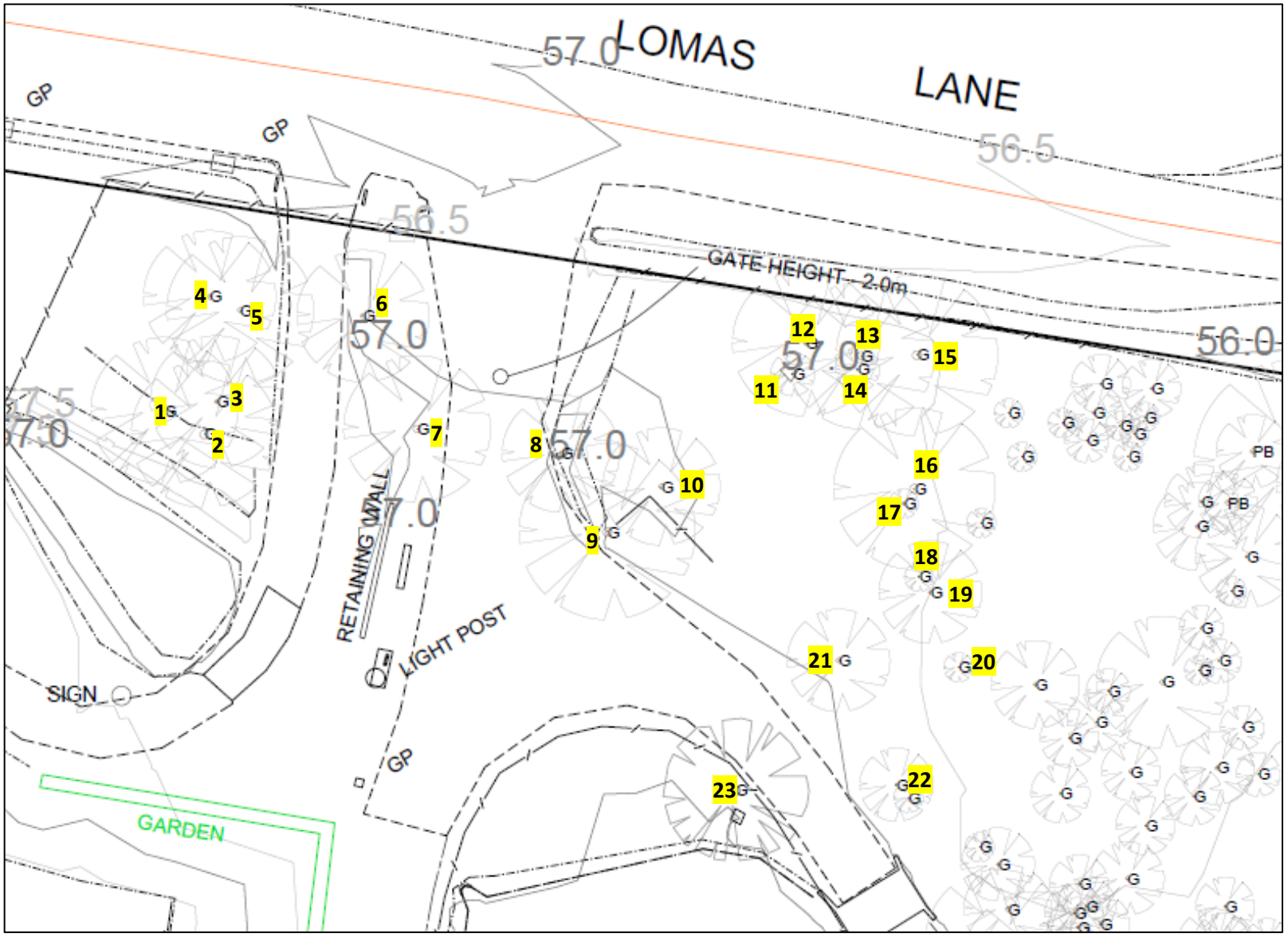
2: Medium SULE: Trees that appeared to be retainable at the time of assessment for 15–40 years with an acceptable level of risk.
(a) Trees that may only live between 15 and 40 more years.
(b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons.
(c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
(d) Trees that could be made suitable for retention in the medium term by remedial tree care.

3: Short SULE: Trees that appeared to be retainable at the time of assessment for 5–15 years with an acceptable level of risk.
(a) Trees that may only live between 5 and 15 more years.
(b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
(c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
(d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.

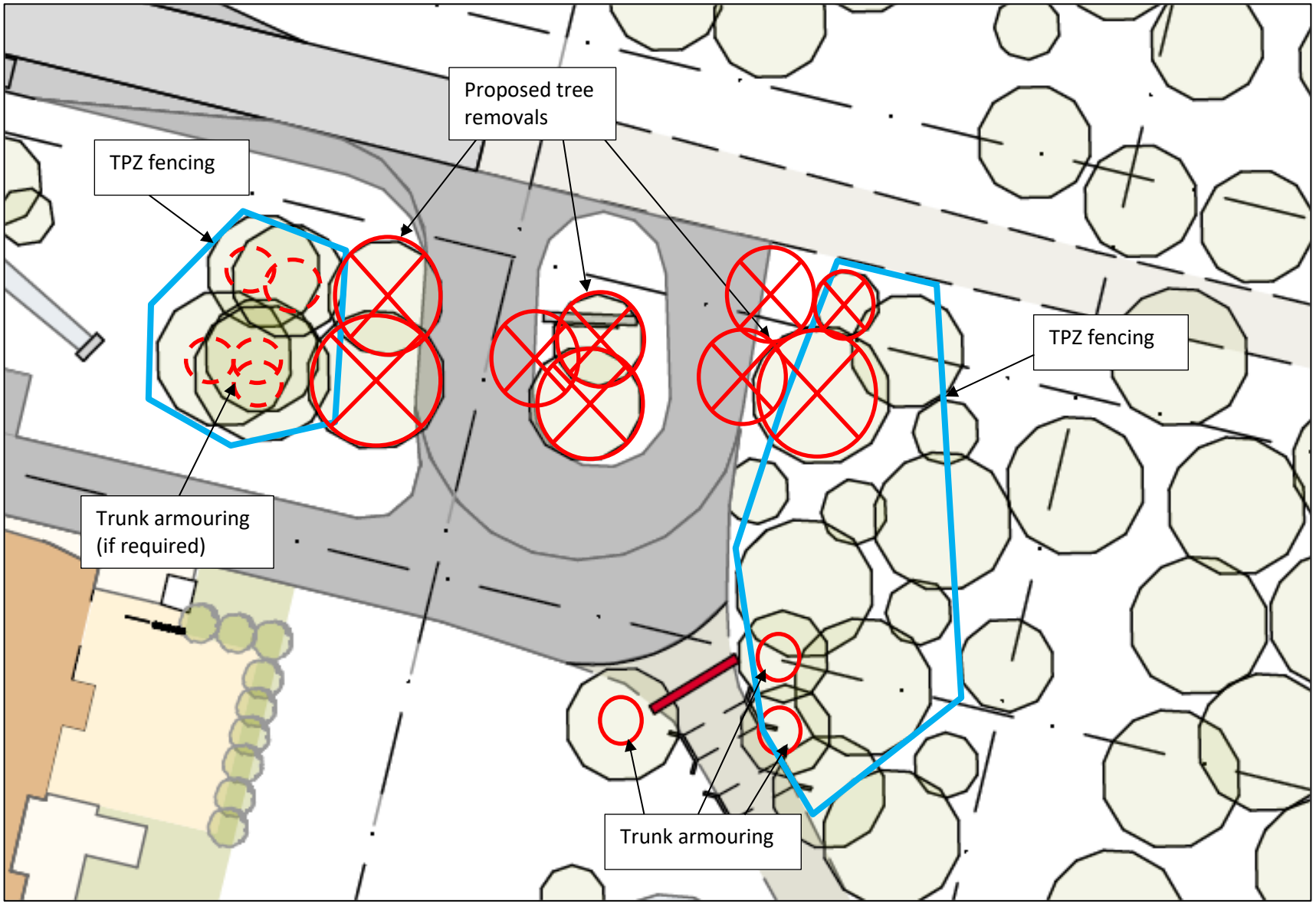
4: Remove: Trees that should be removed within the next 5 years.
(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
(b) Dangerous trees because of instability or recent loss of adjacent trees.
(c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
(d) Damaged trees that are clearly not safe to retain.
(e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
(f) Trees that are damaging or may cause damage to existing structures within 5 years.
(g) Trees that will become dangerous after removal of other trees for the reasons given in (a)to(f)
(h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment could be retained subject to regular review.

5: Small, young, or regularly pruned: Trees that can be reliably moved or replaced.
(a) Small trees less than 5m in height.
(b) Young trees less than 15 years old but over 5m in height.
(c) Formal hedges and trees intended for regular pruning to artificially control growth.

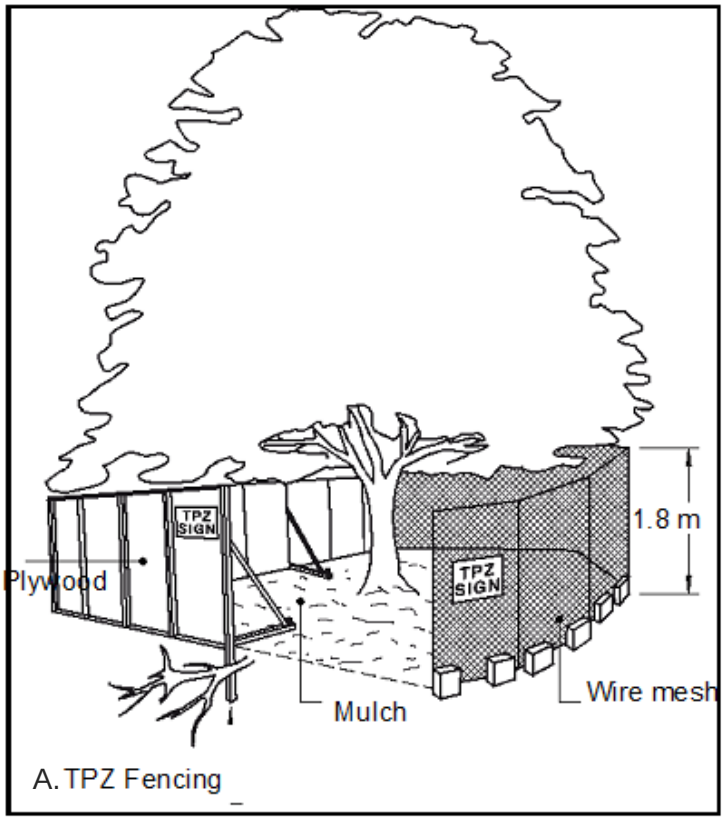
12.2 Survey Plan (extract)



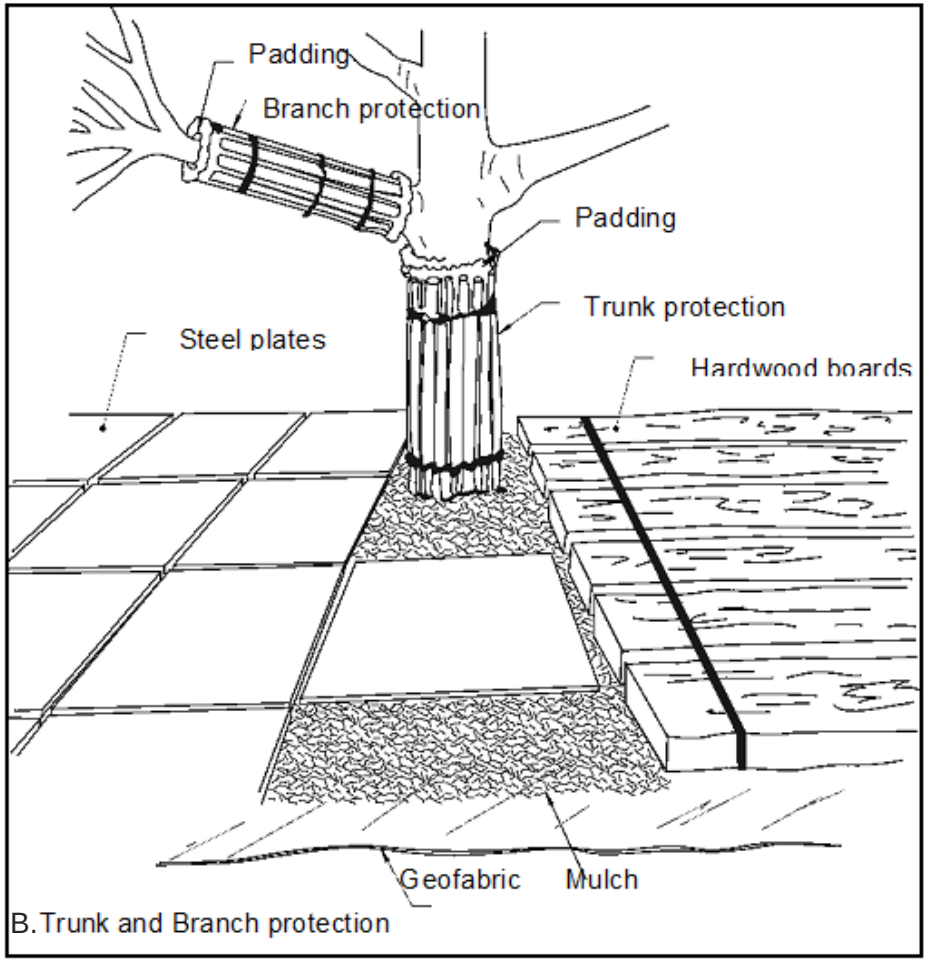
12.2 Site Plan + Tree Protection



12.3 Tree, Trunk and Branch Protection Methods (Source AS4970-2009)

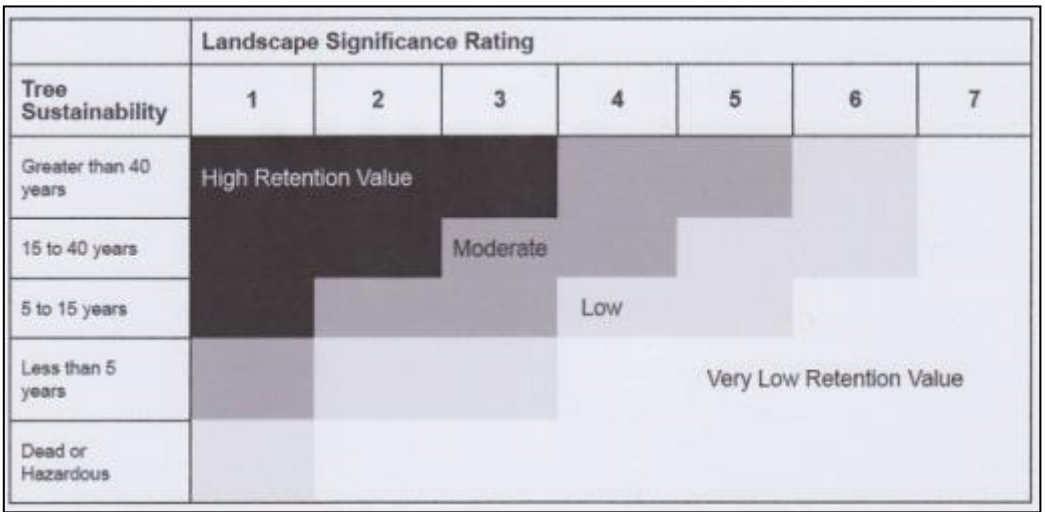


A. TPZ Fencing



B. Trunk and Branch protection

12.3 Calculating Tree retention Value



(Source NUFTM) Modified by A Morton from Couston and Howden (2001) Tree retention values table Footprint Green Pty Ltd Australia)

12.4 References

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12.5 Qualifications – Ian Hills

Associate Diploma Horticulture	Ryde TAFE 1984
AQF3 Horticulture (Arboriculture)	Ourimbah TAFE 1998
AQF5 Diploma Horticulture (Arboriculture)	Kurri Kurri TAFE 2009 (Dux) Cert No. 5934155
QTRA Registered User 2083	December 2013
QTRA Advanced User 4469	March 2018
Working with Children Check Number	WWC1780469E
National Coordinated Criminal History Check Certificate	CAD5579CB8
QTRA Advanced User 4469	March 2020