CIVICA | ArborSafe

Software Solutions for Tree Inventory Management

Arboricultural Impact Assessment

NSW Department of Education
Kingswood Public School
46-54 Second Avenue
Kingswood NSW

14 May 2025

Assessment and report by:

Sita Bresnihan	Dip. Arb., AQF Level 5
Zac Gethin-Damon	Grad cert. (Arb), AQF Level 5

Job No: 06338v3

06338v3

14 May 2025

Gina Sant
Group Leader
NSW Department of Education
8/259 George Street
Sydney NSW 2000

Arboricultural Impact Assessment Report regarding 33 trees located within the vicinity of the proposed development at Kingswood Public School, 46-54 Second Avenue, Kingswood

Dear Gina,

We are pleased to provide the following Arboricultural Impact Assessment Report for 33 trees within the grounds of Kingswood Public School.

Complete use of this report is authorised under the conditions limiting its use as stated in Appendix A Item 7 of "*Arboricultural Reporting Assumptions and Limiting Conditions".*

Should you have any queries relating to this report, its recommendations, or the options considered please do not hesitate to contact us on 1300 272 671.

Regards,

Sita Bresnihan
Consulting Arborist
Dip. Arb., AQF Level 5

Version	Date	Author	Rationale
1	11 April 2025	Sita Bresnihan	First Issue
2	16 April 2025	Sita Bresnihan	Client markup
3	14 May 2025	Sita Bresnihan	REF queries

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1 Executive summary

1.1 This Arboricultural Impact Assessment Report has been prepared to accompany a Review of Environmental Factors (REF) for the Department of Education (DoE) for upgrades to Kingswood Public School (the activity) under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act) and State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP TI).

1.2 This document has been prepared in accordance with the Guidelines for Division 5.1 assessments (the Guidelines) by the Department of Planning, Housing and Infrastructure.

1.3 This report examines and takes into account the relevant environmental factors in the Guidelines and Environmental Planning and Assessment Regulations 2021 under Section 170, Section 171 and Section 171A of the EP&A Regulation.

1.4 The following is an Arboricultural Impact Assessment Report regarding 33 trees located within the grounds of Kingswood Public School. The subject site was identified by NSW Department of Education (hereinafter referred to as the client) as possessing trees that may be impacted upon by proposed development works.

1.5 In part, the project scope was to nominate the subject trees that are suitable for retention/preservation, or require removal to facilitate the proposed development works, as well as identify and reduce potential conflicts between the subject trees and proposed site development. Accurate information on the area required for tree retention and methods/techniques suitable for tree protection during demolition and/or construction have been provided.

1.6 Twenty-six trees were recommended for retention, with site exclusion being the main protection measure to be employed and minimal impacts and long-term negative impacts envisaged.

1.7 Seven trees, numbered 23, 26, 162, 163, 191, 192 and 193, have specific protection measures over and above the recommended generic measures. These include project arborist involvement during initial excavation works within the TPZ, restrictions on machinery use within the TPZ area and enhancement of the growing environment within the TPZ area.

1.8 Trees 162, 163, 191, 192 and 193 require protection specifically to mitigate the impact of machine access outlined in the Traffic Management Plan.

1.9 Tree retention status in relation to the proposed development (refer to Section 5.5 for full details of Retention Value categories):

RV	Description	Total	Remove	Retain	
			located within development footprint	**with specific protection**	**with generic protection**
A	High retention value trees	5			7, 36, 37, 54, 59
B	Moderate retention value trees	9	27, 29, 35	23, 26, 192, 193	66, 160
C	Low retention value trees	17	28, 30, 34	162, 163, 191	6, 60, 72, 159, 169, 171, 172, 173, 174, 177, 178
U	Trees to be removed irrespective of proposed development	2	33		168

1.10 Mitigation Measures:

Mitigation Name	When is Mitigation Measure to be complied with	Mitigation Measure	Reason for Mitigation Measure
Tree Protection Zones	Prior to the commencement of any works. During demolition and construction works.	Tree protection measures include a range of: • Activities restricted within the TPZ • Protective fencing • Trunk and ground protection • Tree protection signage • Involvement from the project arborist • Project milestones • Compliance reporting Tree protection measures to be implemented in accordance with Australian Standard AS 4970–2009: *Protection of Trees on Development Sites.*	Protection of trees on development sites. Ensuring the future viability of site trees within the landscape.

2 Introduction

2.1 Civica ArborSafe was engaged by Gina Sant on behalf of the client to complete an Arboricultural Impact Assessment (AIA) Report on 33 trees located within or adjacent to the Kingswood Public School. The project site is located at 46-54 Second Avenue, Kingswood and is legally described as Lot 172 in Deposited Plan (DP) 839785. Kingswood Public School is located on the southern side of Second Avenue.

2.2 This AIA has been prepared to accompany a Review of Environmental Factors (REF) for the Department of Education (DoE) for upgrades to Kingswood Public School (the activity) under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act) and State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP TI).

2.3 This document has been prepared in accordance with the Guidelines for Division 5.1 assessments (the Guidelines) by the Department of Planning, Housing and Infrastructure.

2.4 This report examines and takes into account the relevant environmental factors in the Guidelines and Environmental Planning and Assessment Regulations 2021 under Section 170, Section 171 and Section 171A of the EP&A Regulation.

2.5 The proposed activity for upgrades to Kingswood Public School includes:

- One (1) new single storey classroom building comprising eight (8) general learning spaces (GLS), two (2) learning commons areas, two (2) multi-purpose spaces and a verandah along the eastern side of the building;
- The construction of a covered walkway that will provide a connection between the proposed classroom building and an existing covered outdoor learning area (COLA) to the north east of the proposed building; and
- Removal of existing portable classroom buildings containing ten (10) classrooms

2.6 The report was intended to provide information on the subject trees and how they may be impacted upon by the proposed development works. Report findings and recommendations are based upon guidance provided within the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*.

2.7 Observations and recommendations are based upon information provided by the client and an arborist site visit.

3 Scope

3.1 Carry out a visual assessment of the nominated trees located within the vicinity of the proposed development works, including trees located within neighbouring properties and/or council administered road verges where necessary.

3.2 Provide an objective appraisal of the subject trees in relation to their species, estimated age, health, structural condition, useful life expectancy (ULE) and viability within the existing landscape.

3.3 Based on the findings of the visual assessment, provide independent recommendations on the retention value of the subject trees.

3.4 Identify the subject trees that are retainable or require removal to facilitate the proposed development as shown in the plans provided.

3.5 Identify and reduce potential conflicts between the retainable subject trees and the proposed site development by providing accurate information on the area required for successful tree retention and methods/techniques suitable for tree protection during demolition and/or construction.

4 Methodology

4.1 Data collection

4.1.1 Zac Gethin-Damon of Civica ArborSafe carried out a site inspection of the subject trees on 28 March 2025.

4.1.2 Trees that are the subject of this report (Figure 4) were identified during discussions with the client, reviewing relevant supplied development documentation and reviewing the description of a non-exempt 'Tree' as identified within the Penrith City Council relevant documentation.

4.1.3 In accordance with the tree management policy of the consent authority, Penrith City Council, this report includes all trees on-site that meet the following criteria: *a living perennial plant with a height of 3.5 metres or more, or a trunk diameter exceeding 100 millimetres measured at 1400 millimetres above ground level. Additionally, trees, gardens, or native vegetation listed as Significant Trees and Gardens under the council's policies* have also been included in the report (Penrith City Council, 2025). Small trees and shrubs have been excluded based on their species, current size, potential future growth, and likely contribution to the local amenity.

4.1.4 The subject trees were inspected from the ground using the initial component of Visual Tree Assessment (VTA) (Mattheck, 1994). No foliage or soil samples were taken and no aerial, underground or internal investigations were undertaken.

4.1.5 Tree height and crown spread were estimated and have been provided in a variety of ranges of 5-10 metre increments. Trunk diameter at breast height (DBH) and trunk diameter at the root crown (DRC) were measured with a diameter tape and provided to the nearest centimetre. The physical dimensions of trees located on neighbouring properties have been estimated due to restricted access.

4.1.6 Tree protection zone (TPZ) encroachment calculations are based upon measurements obtained from using PDF measuring tools and/or scale ruler and/or measurement descriptions from the assessing arborists against plans showing surveyed tree locations.

4.1.7 It is important to note that TPZ is a theoretical calculation and can be influenced by existing physical constraints such as buildings, drainage channels, retaining walls, etc. (Standards Australia, 2009)

4.1.8 Environmental and heritage information was sourced from NSW Government SEED website. The source of all information in this regard has been referenced accordingly.

4.1.9 Data collected on site was analysed alongside the supplied development documentation and plans by Sita Bresnihan, following which relevant findings and recommendations were formulated and collated into report format.

4.1.10 Tree protection zones (TPZ) and structural root zones (SRZ) were calculated in accordance with the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*.

4.1.11 Retention values have been determined based upon a modified version of the British Standard BS 5837–2012: *Trees in Relation to Design, Demolition and Construction*.

4.1.12 All photographs were taken at the time of the site inspection by the inspecting arborist and may have been altered for brightness, contrast, or have been cropped.

4.1.13 Plans of the existing site and of the proposed development were provided to Civica ArborSafe in March 2025.

4.1.14 No proposed underground service locations have been reviewed in the preparation of this report.

5 Observations

5.1 Proposed construction

5.1.1 The proposed activity for upgrades to Kingswood Public School (Figure 1) includes:

- One (1) new single storey classroom building comprising eight (8) general learning spaces (GLS), two (2) learning commons areas, two (2) multi-purpose spaces and a verandah along the eastern side of the building;
- The construction of a covered walkway that will provide a connection between the proposed classroom building and an existing covered outdoor learning area (COLA) to the north east of the proposed building; and
- Removal of existing portable classroom buildings containing ten (10) classrooms.

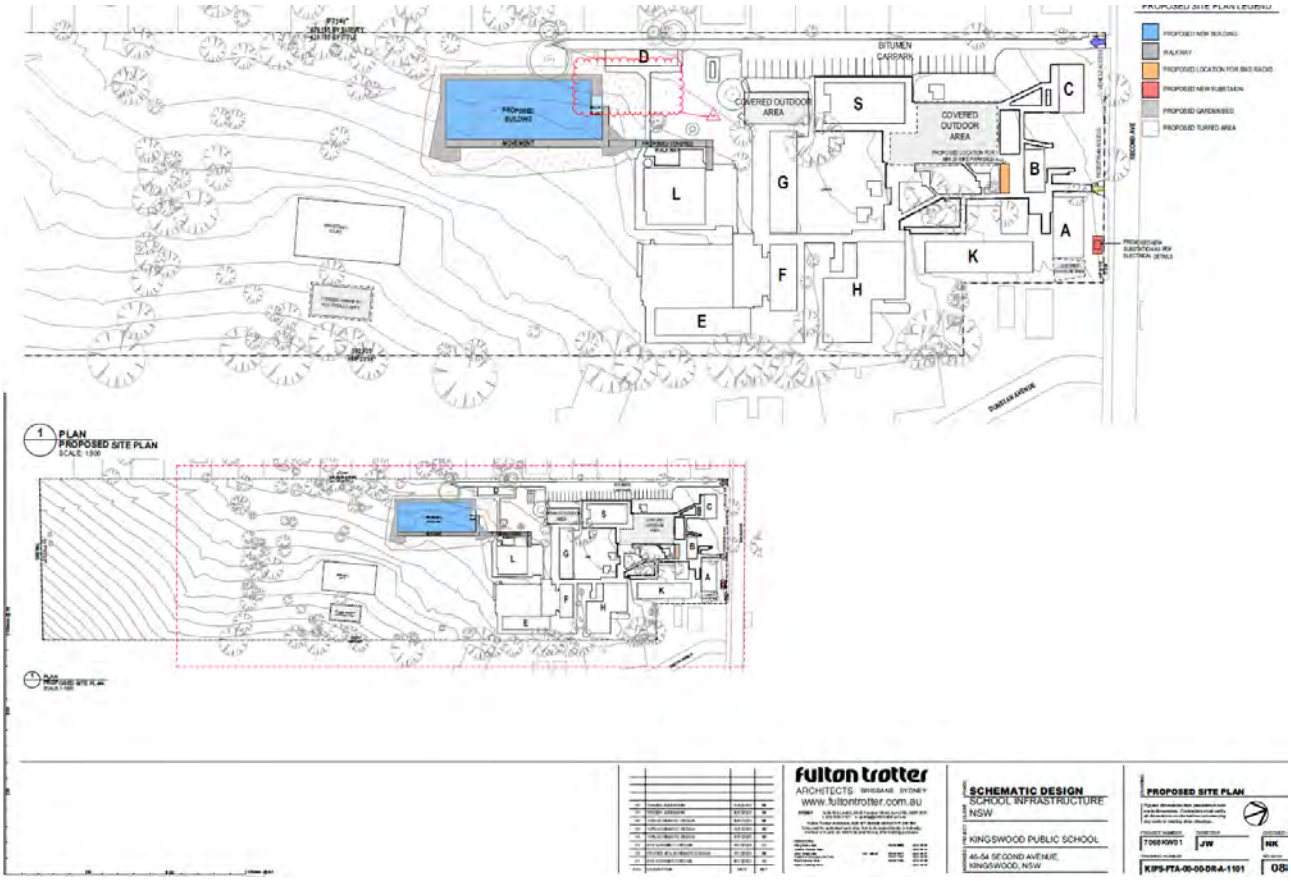


Figure 1. Excerpt from Proposed Site Plan (Dwg. No. KIPS-FTA-00-00-DR-A-1101, Rev. 8). Fulton Trotter, 21 February 2025.

5.1.2 Plans of the existing site and of the proposed development were provided to Civica ArborSafe in March 2025 and include (but are not limited to):

- Proposed Site Plan, Dwg. No. KIPS-FTA-00-00-DR-A-1101, Rev. 8. Fulton Trotter, 21 February 2025.
- Staging Plan, Dwg. No. KIPS-FTA-00-00-DR-A-1501, Rev. 8. Fulton Trotter, 21 February 2025.
- Landscape Plan 1, Dwg. No. KIPS-GIL-00-00-DR-L-3001, Rev. K. Ground Ink, 24 February 2025.

5.2 Location

5.2.1 The project site is located at 46-54 Second Avenue, Kingswood and is legally described as Lot 172 in Deposited Plan (DP) 839785. Kingswood Public School is located on the southern side of Second Avenue (Figure 2), which formed part of the Penrith City Council Local Government Area (LGA).

Figure 2. Whole site image (location). Red lines delineate the site and area containing the subject trees that may be impacted by the proposed development works. Nearmap, 2024.

5.3 The subject trees

5.3.1 The subject trees (Figure 4) have been numbered in line with the existing ArborSite tree numbering system. Trees can be identified on site using white tree tags which are typically located approximately 2.0 metres from ground level on the south side of the trunk. Trees located on neighbouring properties or council administered road verges may not have been tagged.

5.3.2 As the subject trees form part of a whole site (101 trees) ongoing annual site inspection and management within the ArborSafe software that began in 2013, trees were numbered between Tree 6 and Tree 193 but are not necessarily sequential. The last site inspection, prior to the development site assessment, was in October 2024 conducted by Civica ArborSafe consultant arborist Libby Percival.

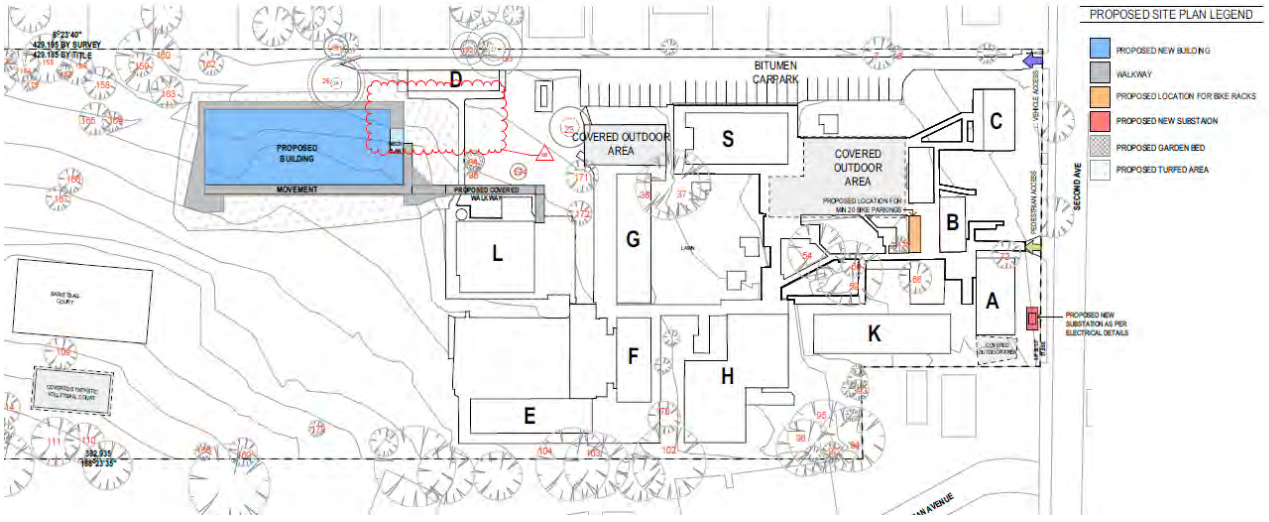


Figure 3. Arborist markup of excerpt from Proposed Site Plan (Dwg. No. KIPS-FTA-00-00-DR-A-1101, Rev. 8). Fulton Trotter, 21 February 2025 (including ArborSite tree numbers as labelled in this report). April 2025

5.3.3 The majority of trees were assessed as planted specimens or potentially self-sown from local provenance seed. Although *Eucalyptus moluccana* (Grey Box), an indigenous species, was identified, their status as remnant trees remains unverified and is outside the scope of this report, however they do form part of a remnant critically endangered ecological community (CEEC) as identified in section 5.7.

5.3.4 The tree population consists predominantly of semi-mature Australian native species. Indigenous species observed on the site include *Eucalyptus moluccana* and *Casuarina cunninghamiana* (River She-oak).

5.3.5 Thirteen species were identified across the site with the most prevalent being *Eucalyptus moluccana* *Callistemon viminalis* (Weeping Bottlebrush) and *Corymbia maculata* (Spotted Gum).

5.3.6 Seventeen of the subject trees were state natives, nine of which were species indigenous to the local area, with another ten native to Australia and the remaining six being exotic species.

5.3.7 The treescape was relatively young with 14 (42.4%) of the existing surveyed trees rated as Semi-mature and a further ten trees (30.3%) being in the Young/Juvenile age category. Nine trees (27.3%) were rated as Mature specimens.

5.3.8 The overall health and structure of the campus trees was assessed as ranging from good to fair.

Figure 4. Site map showing the subject trees. Note that icon colour indicates a tree's current risk rating (not Retention Value). Tree attributes can be obtained from Appendix E – Tree Assessment Data. ArborSite, March 2025.

CONSEQUENCE	PROBABILITY				
	A. No Detectable Threat	B. Failure Unlikely	C. Failure Possible	D. Failure Likely	E. Failure Certain
1. Minor	A1 NEGLIGIBLE	B1 VERY LOW	C1 LOW	D1 MEDIUM	E1 MEDIUM
2. Moderate	A2 VERY LOW	B2 LOW	C2 MEDIUM	D2 MEDIUM	E2 HIGH
3. Serious	A3 LOW	B3 MEDIUM	C3 MEDIUM	D3 HIGH	E3 URGENT
4. Extreme	A4 MEDIUM	B4 MEDIUM	C4 HIGH	D4 URGENT	E4 CRITICAL

Figure 5. The ArborSafe Tree Risk Assessment Matrix using probability of tree failure and consequence of failure to derive tree risk. ArborSafe, 2020.

Figure 6. An image showing the growing environment around Tree 26 and Tree 27. Zac Gethin-Damon, March 2025.

Figure 7. Trees 30, 33, 34, 35. Zac Gethin-Damon, March 2025.

5.4 Tree retention values

5.4.1 Tree retention values have been determined based upon a modified version of the British Standard BS 5837–2012: *Trees in Relation to Design, Demolition and Construction*. This standard categorises tree retention value, based upon an assessment of a tree's quality (health and structure) and useful life expectancy, into one of four categories – A, B, C and U. Refer to Appendix C for further details.

5.4.2 Other criteria such as a tree's physical dimensions, age class, location and its amenity, heritage and/or environmental significance and potential replacement time were also considered. A breakdown of the attributes required for classification in each category can be obtained from Appendix C.

5.4.3 In relation to development applications, relevant consent authorities will generally consider:

- **Category A Retention Value** trees as significant and alterations to the design proposal and/or specific protection measures are generally recommended to facilitate successful tree retention post project completion.
- **Category B Retention Value** trees as a site constraint consideration. Trees in this retention category warrant proportional design consideration and amendment to ensure their viable retention post project completion.
- **Category C Retention Value** trees are not considered a site constraint and do not generally warrant design consideration or amendment.
- **Category U Retention Value** trees are considered a site opportunity, as such trees are generally of poor arboricultural quality and normally recommended for removal irrespective of proposed development.

Category	Tree numbers
A	7, 36, 37, 54, 59
B	23, 26, 27, 29, 35, 66, 160, 192, 193
C	6, 28, 30, 34, 60, 72, 159, 162, 163, 169, 171, 172, 173, 174, 177, 178, 191
U	33, 168

5.5 Heritage status

5.5.1 The proposed development site had no trees identified as being of national, state or local heritage significance (Figure 7) (NSW Government, n.d.)

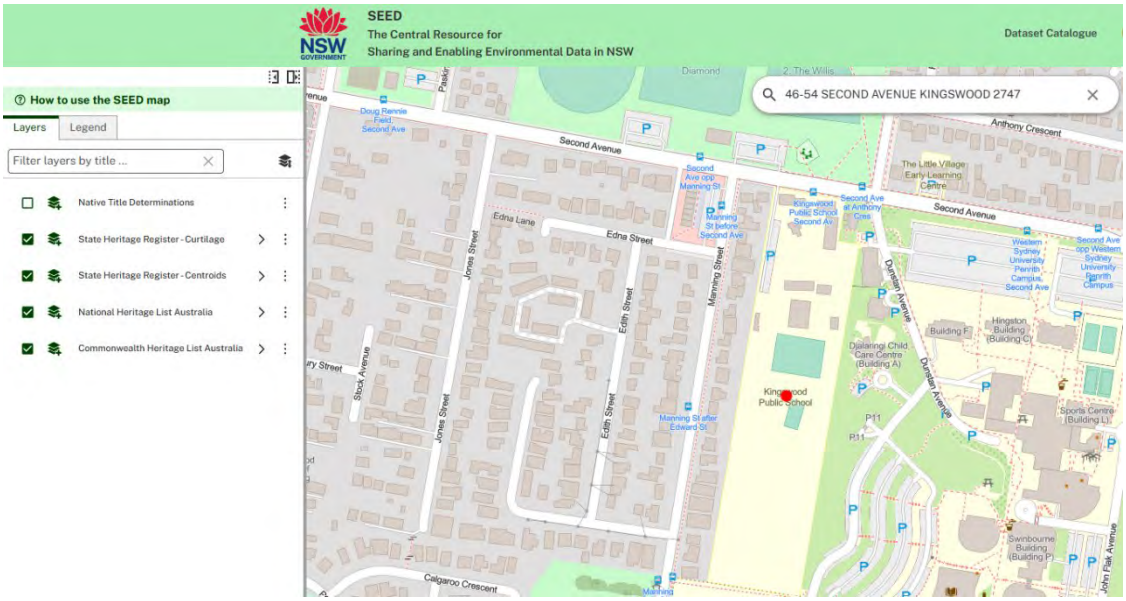


Figure 8. Heritage overlay. NSW Government, April 2025.

5.6 Botanic and environmental status

5.6.1 A review of the NSW Government SEED database indicated that areas within the school grounds were designated as a Critically Endangered Ecological Community (CEEC) (Figure 8). The ArborSite whole-site tree assessment identified fifty-seven *Eucalyptus moluccana* (Grey Box) specimens within this CEEC protected area. While this ecological community is located outside the primary construction zone, Trees 159, 160, 162, 163, 168, and 169 (Figure 9) which are included in this report, are located nearby and will have generic protection controls included in the recommendations.

Figure 9. Image of EEC/Seed map of Critically Endangered Ecological Community (CEEC). NSW Government, April 2025.

Figure 10. *Location of Eucalyptus moluccana* (Grey Box) included in this report, within the listed Critically Endangered Ecological Community (CEEC). ArborSite, 2025.

6 Discussion

6.1 Determining TPZ encroachment

6.1.1 Major encroachment. As per the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*, a major encroachment into the TPZ of any tree is considered to occur when it is beyond 10% of the total TPZ area.

6.1.2 Trees with major encroachment may require removal or, in certain instances, be retained with specific protection requirements throughout the construction stage.

6.1.3 Minor encroachment. Under the aforementioned standard, a minor encroachment is determined as being less than 10% of the total TPZ area. Trees with minor encroachment may be retained with specific, generic or no protection requirements throughout the construction stage.

6.1.4 No encroachment. Trees with no encroachment may be retained with generic or no protection requirements throughout the construction stage.

6.1.5 For the purposes of this report, trees to be removed or retained have been identified as those:

- Requiring removal due to a level of encroachment into their TPZ that would likely result in a detrimental impact upon their future health and/or stability
- Retainable and requiring specific protection requirements throughout construction (i.e. generic requirements plus a combination of arborist supervision and careful construction methods within their TPZ)
- Retainable and requiring generic tree protection measures only (i.e. protective fencing and restriction of activities within the TPZ)

6.2 Impact of proposed development

6.2.1 A review of the proposed design has been undertaken in the context of tree retention and removal across the site.

6.2.2 The main development impact which affects trees, but not necessarily to the point of requiring immediate removal, is significant root damage/severance due to major TPZ encroachment. Root damage/severance largely occurs due to two main impacts – soil compaction (compacting existing site soil to build on or installing additional fill to raise soil levels) and/or direct root severance (excavation for service installation or lowering surface levels).

6.2.3 Negative tree impacts can manifest as either a reduction in health and/or vigour due to root loss (absorption and/or transport roots) resulting in a reduction in water and nutrient absorption capability or on tree stability if larger roots are impacted. Ultimately, the outcome for the trees depends on a number of variable factors including species, age, current health, TPZ encroachment percentage, soil type, topography, previous site use and the proposed design and construction methodology.

6.2.4 Compacted soils, especially artificially compacted soils, such as those commonly found under driveways or building platforms, have a higher bulk density down to a deeper level of subsoil. Bulk density is the term used for describing the weight of soil per unit volume. The broad engineering thinking is that the higher the density the more stable the road surface due to less soil movement in expansion, contraction, or compression. A higher bulk density is produced by compacting the soil to reduce available pore space between the soil particles.

6.2.5 The effect of compacted soils on plants is somewhat influenced by soil type but generally a reduction in soil pore space reduces the available area for oxygen and water within the soil profile. A reduction in available soil water and/or oxygen inhibits root activity within the soil, as they are essential for root elongation and growth, and the lack of these properties is considered a major limiting factor. Due to this reason, existing infrastructure, such as roads, situated in close proximity to the base of trees can act as root barriers thereby affecting the shape of the TPZ and allowing closer works than would otherwise be permitted.

6.2.6 The impact of significant soil level rises across the TPZ generally occurs over a longer time frame, as the stored energy can still be utilised and shifted within the tree even if the long-term use of the affected root is limited, than if the roots were directly severed. Soil level rises generally allows the tree more time to react to the changed growing environment whereas root severance has the same effect, reduction in root function and capability, but on an instantaneous time scale where there is no time for the tree to adjust.

6.2.7 The assumption of allowable encroachment and minimal long-term health or structural impacts to trees rely on a combination of the following being used – root sensitive construction methods being adhered to within the TPZ, minimal excavation within the TPZ to limit root severance (i.e. construction placed outside the TPZ where possible), fill rather than excavation utilised to affect level changes where possible (i.e. to minimise root severance and allow the tree's root system time to adjust), no construction occurring within the SRZ, compensatory area being available around the unimpacted aspects of the trees, and the enhancement of the existing TPZ area (i.e. mulched, soil conditioning and irrigation when required).

6.2.8 Seven trees will be affected by direct conflict with the proposed construction footprint and would require removal under the current design.

6.2.9 A further seven trees have major encroachment and will require specific protections.

6.2.10 Nineteen trees have no impact and can be retained with generic protection.

7 Tree protection and management recommendations

7.1 Tree removal

7.1.1 Seven trees would require removal, based on the supplied design proposal, to facilitate the development (Figure 10 and 11).

Recommendation	Category A High retention value		Category B Moderate retention value		Category C Low Retention value		Category U No retention value	
	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers
Remove for development	0		3	27, 29, 35	3	28, 30, 34	1	33

Figure 11. Site map showing trees requiring removal to facilitate development. ArborSite, March 2025.

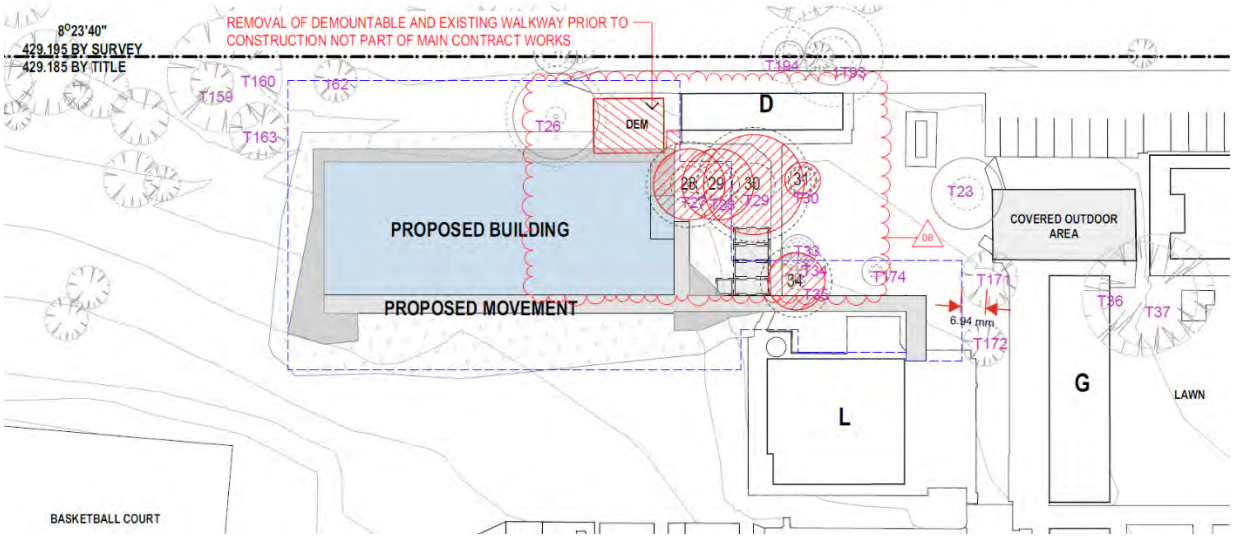


Figure 12. Arborist markup of Staging Plan, Dwg. No. KIPS-FTA-00-00-DR-A-1501, Rev. 8 (including ArborSite tree numbers (in purple) as labelled in this report). Fulton Trotter, 21 February 2025.

7.2 Offset tree planting

7.2.1 Offset plantings must reflect the number of subject trees removed and the initial loss of amenity and biomass at a ratio of 1:1, or a rate designated by the responsible authority. Replacement trees are to be sourced from a reputable supplier and planted after the completion of all proposed works and at a time of year conducive to successful tree planting and establishment.

7.2.2 Replacement tree species must suit their location on the site in terms of their potential physical dimensions at maturity and their tolerance(s) to the surrounding environmental conditions e.g. water and climate sensitive selections. To avoid unethical or unprofessional species selection and/or their placement within the landscape, replacement species must be selected in consultation with a consulting arborist, who can also assist in implementing successful tree planting and establishment techniques.

7.2.3 Replacement tree species must have the genetic potential to reach physical dimensions at maturity that are comparable to those trees which have been removed.

7.2.4 A mixture of family, genus and species within the replacement tree planting list is considered desirable to help build resilience within the overall tree population on site, and surrounding area.

7.2.5 Newly planted trees will likely require maintenance and after planting care for a period of 2–3 years to ensure successful establishment. Plantings which fail during the establishment period are to be removed and replaced like for like.

7.2.6 Maintenance schedules may include (but not be limited to) watering, mulching, staking, guarding and formative pruning.

7.3 Tree retention

7.3.1 Twenty-six trees were recommended for retention with generic (Figure 13), and in some cases specific protection measures (Figure 14) during construction to ensure they remain viable following the completion of works.

Recommendation	Category A High retention value		Category B Moderate retention value		Category C Low Retention value		Category U No retention value	
	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers
Retain with specific protection requirements	0		4	23, 26, 192, 193	3	162, 163, 191	0	
Retain with generic protection requirements	5	7, 36, 37, 54, 59	2	66, 160	11	6, 60, 72, 159, 169, 171, 172, 173, 174, 177, 178	1	168

Figure 13. Site map showing all retained trees requiring generic/specific protection measures. ArborSite, March 2025.

7.4 Specific protection measures

Figure 14. Site map showing tree requiring specific protection measures. ArborSite, March 2025.

7.4.1 Trees 23 and 26 have proposed demolition and/or construction works within a portion of their TPZ.

7.4.2 In the event of excavation occurring, and which exceeds 10 percent of the TPZ, it is to be carried out under arborist supervision and/or with the consent of the project arborist.

7.4.3 ArborSite Tree 26 has landscaping works within 20 percent of the TPZ and 5 percent of the SRZ (Figure 15).

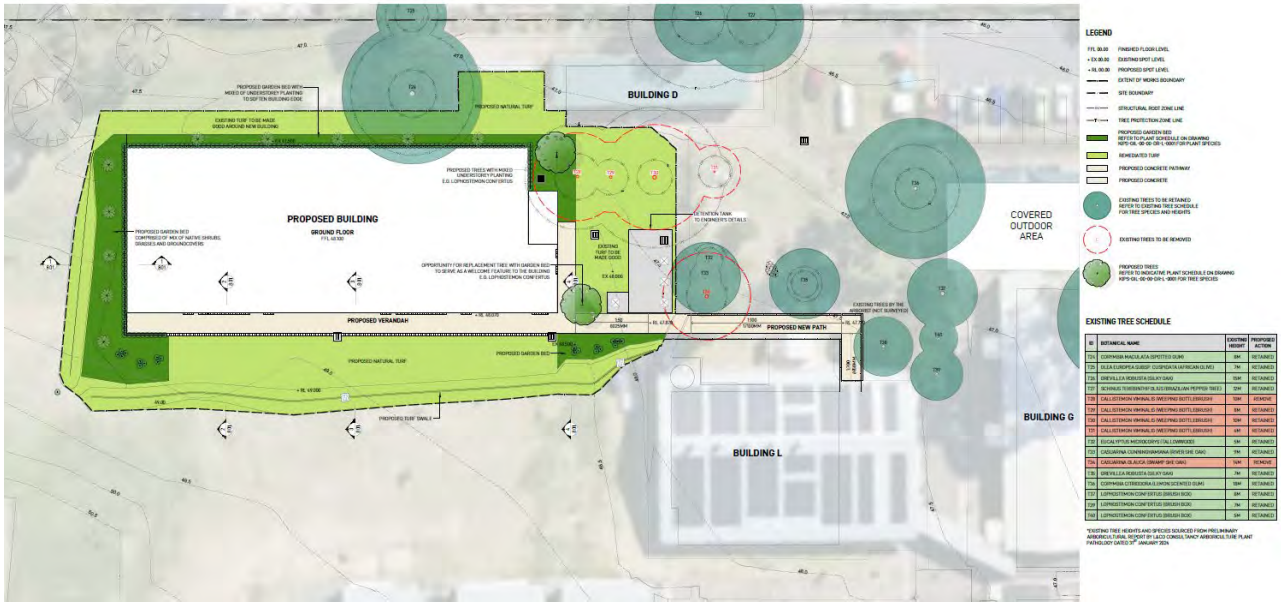


Figure 15. Detail from, Landscape Plan 1, Dwg. No. KIPS-GIL-00-00-DR-L-3001, Rev. K. Ground Ink, 24 February 2025.

7.4.4 Trees 26, 162, 163, 191, 192, and 193 are likely to be impacted by the proposed machinery access route detailed in the site's Traffic Management Plan. The proximity of this access path to the trees' root zones increases the risk of root disturbance, soil compaction, and potential canopy damage. Appropriate tree protection measures should be implemented to mitigate these impacts.

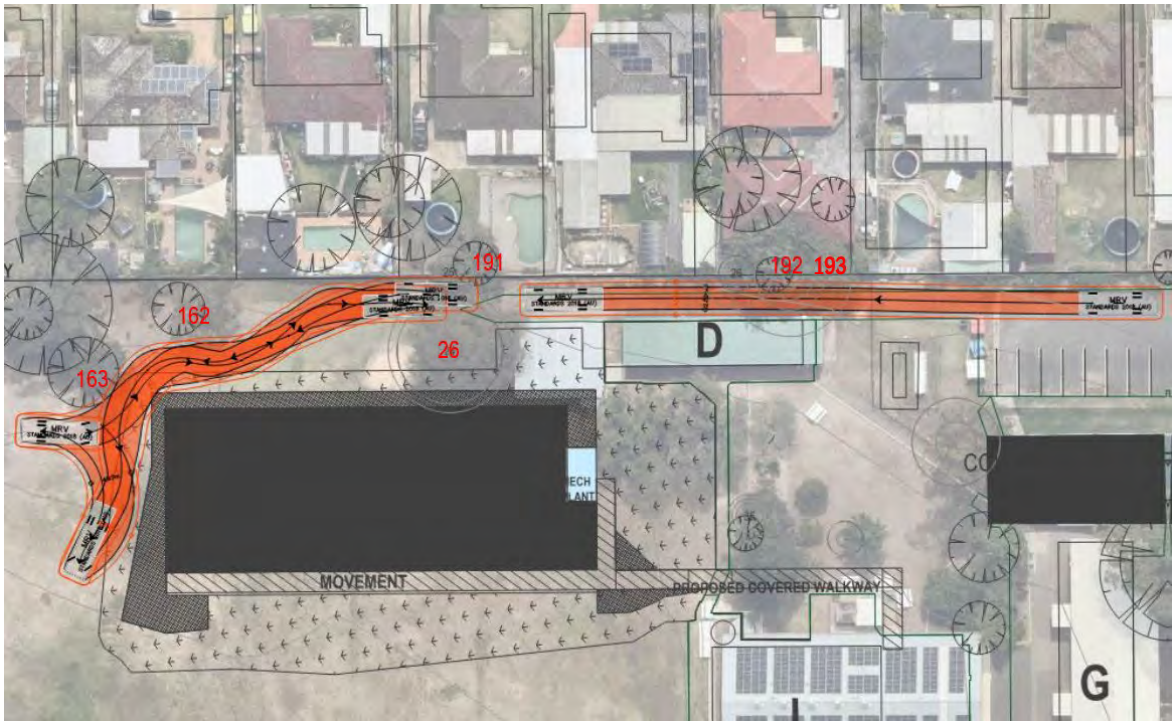


Figure 16. MRV Internal Circulation – Construction Traffic Management Plan. TTW, April 2025.

7.4.5 Trees 191, 193 and 193 are located in the properties adjacent the construction site. The presence of a bitumen driveway already provides a degree of ground protection by minimising soil compaction and direct root disturbance from construction access.

7.4.6 If the existing driveway is to remain and be used for site access, ensure that no additional excavation or widening occurs within the TPZ. Vehicle movement should be confined strictly to the existing hard surface, with clear marking of access routes to prevent encroachment into unpaved TPZ areas

7.4.7 Where machinery access within or near the TPZ is unavoidable, install ground protection systems such as heavy-duty mats, geocells (e.g. GEOWEB), or layers of mulch and plywood to distribute loads and prevent soil compaction and root damage.

7.4.8 It is recommended that any proposed excavation commence at the outer extent of the TPZ and move inwards to minimise root damage/severance to the subject trees.

7.4.9 Where soil excavations represent a TPZ incursion in excess of 10 percent, or are proposed to occur within the SRZ, exploratory, root sensitive excavation techniques will invariably be recommended such as:

- Excavation using a high-pressure water jet and vacuum truck
- Excavation using an air spade with vacuum truck
- Excavation by hand

7.4.10 Where exploratory excavation(s) identifies significant root mass, a modification to the proposed design and/or a revision of individual tree retention/removal status may be required.

7.4.11 Roots discovered are to be treated with care and minor roots (<30-40mm in diameter) pruned with a sharp, sterile handsaw or secateurs.

7.4.12 All significant roots (>30-40mm in diameter) are to be preserved/protected from desiccation, recorded, photographed and reported to the project arborist for review. At the discretion of the project arborist they may decide that retention of such roots is required for the sake of future tree health or may determine such roots can be pruned without any significant impact on future health.

7.4.13 Other proposed surfacing within the TPZ is to be installed above the existing grade and be of a permeable nature to allow the passage of air and moisture into the soil profile. If the surfacing is to be load bearing, a geogrid/web or similar such design is to be incorporated to ensure the soil profile within the TPZ does not become compacted.

7.5 Pre-construction tree care

7.5.1 Undertake remedial pruning (by a qualified arborist) to remove deadwood or branches at risk of damage, in accordance with the Australian Standard AS 4373–2007: *Pruning of Amenity Trees*.

7.5.2 Apply a thick layer of mulch (75–200 mm) over the root zone to buffer against compaction and improve soil conditions.

7.5.3 Provide supplemental watering and, if necessary, fertilisation to support tree health before and during construction, especially in periods of drought.

7.6 Generic protection and reporting measures

7.6.1 All subject trees designated for retention require generic protection during the demolition and/or construction stage. Tree protection measures include a range of:

- Activities restricted within the TPZ
- Protective fencing
- Trunk and ground protection
- Tree protection signage
- Involvement from the project arborist
- Project milestones
- Compliance reporting

7.7 Activities prohibited within the TPZ

- Machine excavation including trenching
- Storage
- Preparation of chemicals, including cement products
- Parking of vehicles and plant
- Refueling
- Dumping of waste
- Wash down and cleaning of equipment
- Placement of fill
- Lighting of fires
- Soil level changes
- Temporary or permanent installation of utilities and signs
- Physical damage to the tree

7.8 Protective fencing specification

7.8.1 Tree protective protection fencing is to be installed at the designated TPZ or maximum practicable extent as directed by the project arborist. As a guide fencing is to be erected as per the image below before any machinery or materials are brought to site and before commencement of works (including demolition).

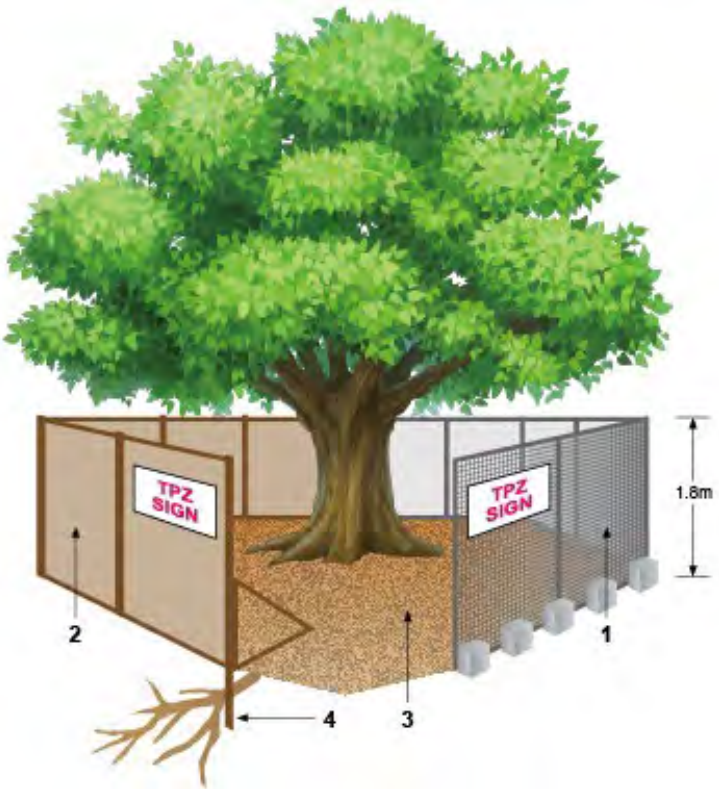
7.8.2 In some areas of the site (i.e. protection of trees on neighbouring properties) existing boundary fencing and/or external site fencing may be used as an alternative to protective fencing.

7.8.3 Once erected, tree protection fencing must not be removed or altered without approval from the project arborist and/or the responsible authority and is to be secured to restrict unauthorised access.

7.8.4 Tree protection fencing is to be a minimum of 1.8 metres high and mesh or wire between posts must be highly visible. Fence posts and supports should have a diameter greater than 20 millimetres and should ideally be freestanding, otherwise be located clear of tree roots.

7.8.5 Tree protection fencing must remain intact throughout all proposed construction works and must only be dismantled after their conclusion. The temporary dismantling of tree protection fencing must only be done with the authorisation of the project arborist and/or the responsible authority.

7.8.6 The subject trees themselves must also not to be used as a billboard to support advertising material. Affixing nails or screws into the trunks of trees to display signs of any type is not a recommended practice in the successful retention of trees.



Legend:
1. Chain wire mesh panels with shade cloth attached (if required), held in place with concrete feet
2. Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ
3. Mulch installation across surface of TPZ (at discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage materials of any kind are permitted within the TPZ
4. Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

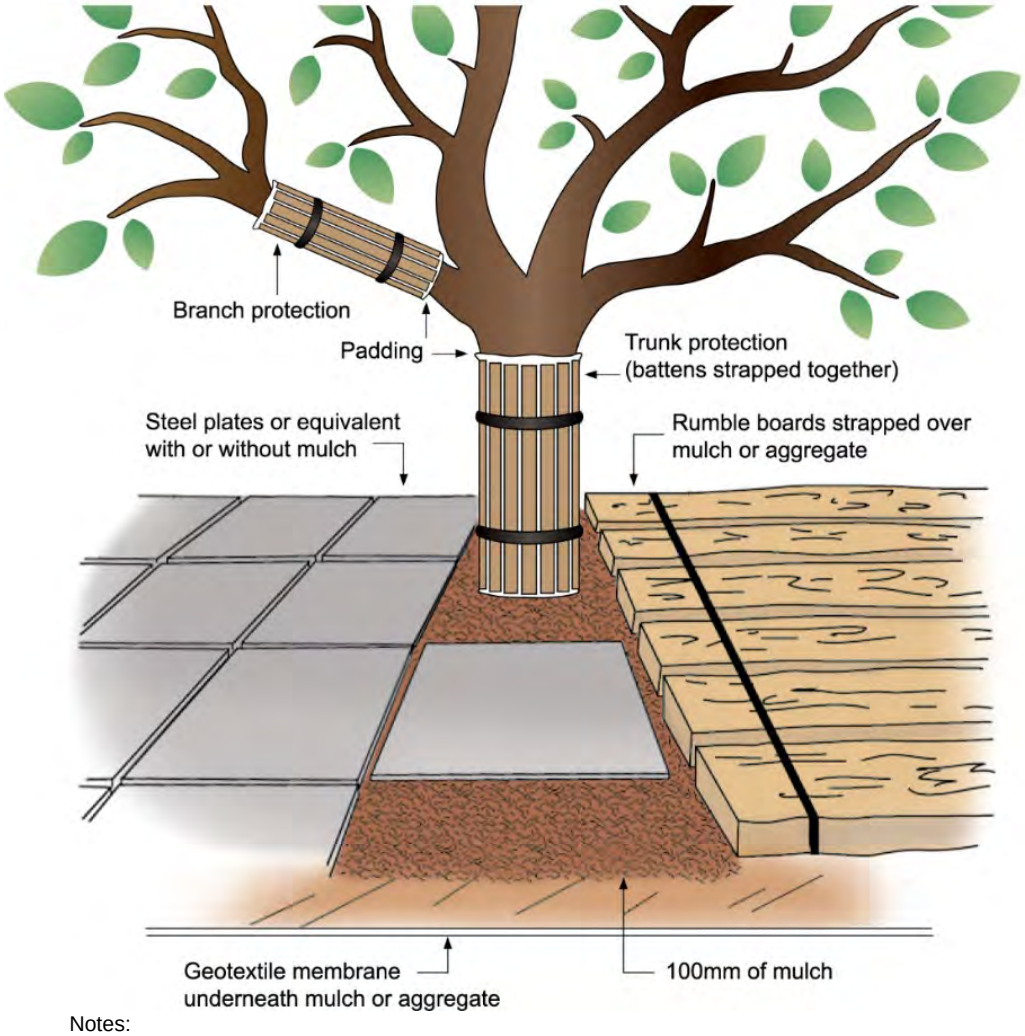
Figure 17. Depicts standard fencing techniques. AS 4970–2009

7.9 Trunk and ground protection

7.9.1 Where proposed works are within the TPZ of retained subject trees, standard protective fencing may not always be a viable method of protection. In these instances trunk protection and/or ground protection should be installed prior to the commencement of site establishment and remain in place until after all proposed works have been completed.

7.9.2 Where construction access into the TPZ of retained subject trees cannot be avoided, the root zone of each affected tree must be protected using steel plates or rumble boards strapped over mulch/aggregate until such a time as permanent, above-ground surfacing (cellular confinement system or similar) is installed.

7.9.3 Trunk and ground protection is to be undertaken in accordance with the Australian Standard AS 4790–2009: *Protection of Trees on Development Sites* as per the image below.



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 18. Depicts trunk and ground protection techniques. AS 4970–2009.

7.10 Tree protection signs

7.10.1 Signs identifying the TPZ (Figure 18) are to be placed at approximate 10 metres intervals around the edge of the TPZ fencing and must be visible from within the development site.

Figure 19. Depicts an example of a tree protection sign. AS 4970–2009

7.11 Proposed pruning

7.11.1 It is anticipated that minor pruning only will be required, largely centred on reduction or crown lifting to facilitate site access during construction, of no greater than 10 percent of any one trees' total crown area. Such pruning is considered to have minimal long term health impact to the tree.

7.11.2 To ensure that a high standard of works is achieved, all tree pruning and/or removal works must be completed in accordance with the Australian Standard AS 4373–2007: *Pruning of Amenity Trees* and be undertaken by a suitably qualified arborist (minimum AQF Level 3).

7.11.3 Branch reduction pruning (where required) must focus on the removal of smaller diameter branches where feasible and remove no greater than 10 percent of total crown mass. Branches no greater than 50mm in diameter are to be removed unless specifically approved by the project arborist.

7.12 Project arborist

7.12.1 A project arborist must be commissioned to oversee all tree protection measures, approved works within TPZ's (where necessary) and complete regular monitoring and compliance certification.

7.12.2 The project arborist must be suitably experienced and competent in arboriculture, having acquired through training, a minimum qualification in this field under the Australian Qualification Framework (AQF) of Level 5, or an equivalent.

7.12.3 Regular site inspections are to be conducted by the project arborist at several, key points during the project to ensure all tree protection recommendations are being adhered to during demolition and/or construction. Such inspections will also allow for any alterations in tree health and/or additional tree protection or remediation measures to be identified and addressed.

7.13 Project milestones

7.13.1 The following visits and milestones are recommended as a guide as to when on-site inspections by the project arborist are required:

Item	Purpose of Visit	Timing of Visit(s)	Prerequisites
1	Pre-start induction	Following sign-off from Item 1. Contractor to provide a minimum of five (5) days' advance notice for this visit.	Prior to commencement of works. All parties involved in the project to attend.
2	Supervision of works in TPZ's, including all regrading and excavations	Whenever there is work planned to be performed within the TPZ's. Contractor to provide a minimum of five (5) days' advance notice for such visits.	
3	Regular site inspections	Minimum frequency monthly for the duration of the project.	The checklist must be completed by the project arborist at each site inspection and be signed by both parties.
4	Final sign off	Following completion of all works.	Practical completion of works and prior to tree protection removal.

7.14 Compliance reporting

7.14.1 Following each site inspection, the project arborist is to prepare a report detailing the health and structural condition of the subject trees designated for retention. These reports should certify whether the works are being undertaken in accordance with the consent/conditions relating to tree protection and management.

7.14.2 These reports should contain photographic evidence (where applicable) to demonstrate that all tree protection and management recommendations are being carried out as specified.

7.14.3 Matters to be monitored and contained in these reports must include tree health and structural condition, the appropriateness and effectiveness of tree protection measures and any potential impact(s) on retained subject trees relating to conducted works which may arise from changes to the endorsed plans.

7.14.4 After completion, the reports shall be submitted to the project manager (as well as the clients' nominated representative where required).

7.14.5 If any tree protection conditions are found to have been breached, clear remedial action specifications must be specified, and the responsible authority notified.

7.15 Underground service installation

7.15.1 The installation of underground services (including drainage) must not encroach within the TPZ of any retained subject tree unless authorised by the project arborist and/or the responsible authority in which case underground boring will invariably be recommended.

7.15.2 The boring of services is to occur at a minimum depth of 800 millimetres (top of pipe) below the existing grade for trees with a trunk DBH of <100 centimetres, 950 millimetres for trees with a trunk DBH of 100–150 centimetres and 1100 millimetres for trees with a trunk DBH of >150 centimetres.

7.15.3 To minimise soil disturbance associated with service installation, communal service lines must be used where appropriate. The entry and exit pits for boring must also be positioned outside the designated TPZ for each tree.

7.16 Additional excavation/trenching within TPZ's

7.16.1 In the event additional excavation is required within the TPZ of subject trees designated for retention/preservation, this is only to be conducted with the express consent of the project arborist and/or the responsible authority.

7.16.2 Upon review these excavations may be required to be conducted using techniques that are sensitive to tree roots to avoid unnecessary damage.

7.17 Plant health care

7.17.1 When managing a tree affected by development incursions within its TPZ, plant tonic and growth stimulant drenching may be required. Plant tonic and growth stimulant drenching is the process of adding diluted products directly to the root area of a tree to promote and assist trees to cope with loss of roots during the development process. They also assist trees to provide better resistance to sap sucking insects and fungal attack/disease and improve the establishment of beneficial microbial populations and nutrient uptake.

7.18 Irrigation

7.18.1 Regular checks are required to ensure retained trees are receiving the correct amount of water. The majority of a tree's fine water absorbing roots are located in the top 10–30 centimetres of soil. To undertake a basic soil moisture test, a small hole to a depth of approximately 40 centimetres at the dripline of the tree. If the soil is moist at this depth, water is not needed. Slow irrigation that provides an even coverage and targets the absorbing roots is the key to successful irrigation and encourages a deeper tree root system. Irrigation near the trunk is unnecessary as for most trees there are generally fewer water absorbing roots in this area. Irrigating the soil from half-way between the trunk and the dripline as well as beyond the dripline will provide water where it will most effectively be used.

7.18.2 Preferably, trees should be watered during the cooler evening and early morning period when temperatures are lower, humidity is higher, and the air is calmer thereby reducing water evaporation from the soil surface. Irrigation in the middle of the day is not harmful to most trees however it is less efficient.

7.18.3 Avoid watering trees during peak, daytime temperatures to minimise evaporation and potential foliar damage.

7.19 Mulching

7.19.1 Mulching regulates soil moisture and temperature levels, suppresses weeds, minimises soil compaction and reduces run off during periods of heavy rain. Acquiring wood chip mulch from programmed tree works (and by purchasing it from local tree contractors) is a proactive way to improve the growing conditions around trees that ultimately will result in improved tree health and vitality.

7.19.2 Mulch should aim to cover an area at least as large as a tree's crown projection (and preferably larger) for it to be effective. It should also be laid at a uniform thickness of 75–100 millimetres and kept clear of the trunk. Mulch should also be placed over damp to wet soil and never over dry soil. Application during the cooler months of the year is ideal. In areas where grass exists where you wish to mulch, spray the grass first with a non-selective herbicide and allow it to wilt and die before placement. This practice will negate grass growing up through the mulch over time.

7.19.3 Mulching within the crown projection of trees not only improves long term tree and soil health but also acts to reduce tree risk potential by reducing targets that may pass and/or congregate under their crowns. This in turn will minimise the likelihood of injury in the event of unanticipated branch failure.

8 References

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Appendix A. Arboricultural reporting assumptions and limiting conditions

1. Any legal description provided to the consultant is assumed to be correct. Any titles and ownership of any property are assumed to be good. No responsibility is assumed for matters legal in character.

2. It is assumed that any property/project is not in violation of any applicable codes, ordinances, statutes or other government regulations.

3. Care has been taken to obtain all information from reliable sources. All data has been verified in so far as possible, however, the consultant can neither guarantee nor be responsible for the accuracy of the information provided by others.

4. The consultant shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.

5. Loss or alteration of any part of this report invalidates the entire report.

6. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by anyone but the person to whom it is addressed, without the prior written consent of the consultant.

7. Neither all nor any part of the contents of this report, nor any copy thereof, shall be used for any purpose by anyone but the person to whom it is addressed, without the written consent of the consultant. Nor shall it be conveyed by anyone, including the Client, to the public through advertising, public relations, news, sales or other media, without the written consent of the consultant.

8. This report and any values expressed herein represent the opinion of the consultant and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.

9. Sketches, diagrams, graphs and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys unless expressed otherwise.

10. Information contained in this report covers only those items that were examined and reflect the condition of those items at the time of inspection.

11. Inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee expressed or implied that the problems or deficiencies of the plants or property in question may not arise in the future.

Appendix B. Explanation of tree assessment terms

Tree number: Refers to the individual identification number assigned within the ArborSafe software to each assessed tree on the site and the number which appears on the tree's tag.

Tree location: Refers to the easting and northing coordinates assigned to the location of the tree as obtained from the geo-referenced aerial image within the ArborSafe software.

Tree species: Provides the botanic name (genus, species, sub-species, variety and cultivar where applicable) in accordance with the International Code of Botanical Nomenclature (ICBN), and the accepted common name.

Trees in group: The number of trees encompassing a collective assessment of more than one tree. Typically grouped trees have similar attributes that can be encompassed within one data record.

Height: The estimated range in metres attributed to the tree from its base to the highest point of the canopy. Where required height will be estimated to the nearest metre.

Diameter at Breast Height (DBH): Refers to the tree's estimated trunk diameter measured 1.4m from ground level for a single trunked tree. These estimates increase in 50mm increments. Where required DBH will be measured to give an accurate measurement for single trunked trees, trees with multiple trunks, significant root buttressing, bifurcating close to ground level or trunk defects and will be measured as per the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*.

Tree Protection Zone (TPZ): A specified area above and below ground and at a given distance measured radially away from the centre of the tree's trunk and which is set aside for the protection of its roots and crown. It is the area required to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development. The radius of the TPZ is calculated by multiplying its DBH by 12. TPZ radius = DBH × 12. (Note "Breast Height" is nominally measured as 1.4m from ground level). TPZ is a theoretical calculation and can be influenced by existing physical constraints such as buildings, drainage channels, retaining walls, etc. (Standards Australia, 2009).

Structural Root Zone (SRZ): The area close to the base of a tree required for the tree's anchorage and 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. SRZ radius = (D × 50)0.42 × 0.64 (Standards Australia, 2009).

Canopy spread: The estimated range in metres attributed to the spread of the tree's canopy on its widest axis. Where required crown spread will be estimated to the nearest metre.

Origin: Refers to the origin of the species and its type.

Category	Description
Indigenous	Occurs naturally in the local area and is native to a given region or ecosystem.
State Native	Occurs naturally within State but is not indigenous.
Australian Native	Occurs naturally within Australia and its territories but is not a State native or indigenous.
Exotic Evergreen	Occurs naturally outside of Australia and its territories and typically retains its leaves throughout the year.
Exotic Deciduous	Occurs naturally outside of Australia and its territories and typically loses its leaves at least once a year.

Health: Refers to the health and vigour of the tree.

Category	Description
Excellent	Canopy full with even foliage density throughout, leaves are entire and are of an excellent size and colour for the species with no visible pathogen damage. Excellent growth indicators, e.g. seasonal extension growth. Exceptional specimen.
Good	Canopy full with minor variations in foliage density throughout, leaves are entire and are of good size and colour for the species with minimal or no visible pathogen damage. Good growth indicators, none or minimal deadwood.
Fair	Canopy with moderate variations in foliage density throughout, leaves not entire with reduced size and/or atypical in colour, moderate pathogen damage. Reduced growth indicators, visible amounts of deadwood, may contain epicormic growth.
Poor	Canopy density significantly reduced throughout, leaves are not entire, are significantly reduced in size and/or are discoloured, significant pathogen damage. Significant amounts of deadwood and/or epicormic growth, noticeable dieback of branch tips, possibly extensive.
Dead	No live plant material observed throughout the canopy, bark may be visibly delaminating from the trunk and/or branches.

Age: Refers to the life cycle of the tree.

Category	Description
Young	Newly planted small tree not fully established may be capable of being transplanted or easily replaced.
Juvenile	Tree is small in terms of its potential physical size and has not reached its full reproductive ability.
Semi-mature	Tree in active growth phase of life cycle and has not yet attained an expected maximum physical size for its species and/or its location.
Mature	Tree has reached an expected maximum physical size for the species and/or location and is showing a reduction in the rate of seasonal extension growth.
Senescent	Tree is approaching the end of its life cycle and is exhibiting a reduction in vigour often evidenced by natural deterioration in health and structure.

Structure: Refers to the structure of the tree from roots to crown.

Category	Description
Good	Sound branch attachments with no visible structural defects, e.g. included bark or acute angled unions. No visible wounds to the trunk and/or root plate. No fungal pathogens present.
Fair	Minor structural defects present, e.g. apical leaders sharing common union(s). Minor damage to structural roots. Small wounds present where decay could begin. No fungal pathogens present.
Poor	Moderate structural defects present, including bifurcations with included bark with union failure likely within 0–5 years. Wounding evident with cavities and/or decay present. Damage to structural roots.
Hazardous	Significant structural defects with failure imminent (3–6 months). Defects may include active splits and/or partial branch or root plate failures. Tree requires immediate arboricultural works to alleviate the associated risk.

Useful Life Expectancy (ULE): Useful life expectancy refers to an expected period of time the tree can be retained within the landscape before its amenity value declines to a point where it may detract from the appearance of the landscape and/or presents a greater risk and/or more hazards to people and/or property. ULE values consider tree species, current age, health, structure and location. ULE values are based on the tree at the time of assessment and do not consider future changes within the tree's location and environment which may influence the ULE value.

Category
0 Years
<5 Years
5–10 Years
10–15 Years
15–25 Years
25–50 Years
>50 Years

Defects: Visual observations made of the presenting defects of the tree and its growing environment that are, or have the capacity to impact upon, the health, structural condition and/or the useful life expectancy of the tree. Defects may include adverse physical traits or conditions, signs of structural weaknesses, plant disease and/or pest damage, tree impacts to assets or soil related issues.

Tree significance: Includes environmental, social or historical reasons why the tree is significant to the site. The tree may also be rare under cultivation or have a rare or localised natural distribution.

Arborist actions: A list of arboricultural and/or plant health care works that are aimed at maintaining or improving the tree's health, structural condition or form. Actions may also directly or indirectly reduce the risk potential of the tree such as via the removal of a particular branch or the moving of infrastructure from under its canopy.

Appendix C. Tree retention values

Based upon a modified version of the British Standard BS 5837–2012: *Trees in relation to design, demolition and construction* – recommendations.

Category and definition	Criteria (including sub-categories where appropriate)		
	1. Arboricultural qualities	**2. Landscape qualities**	**3. Cultural and environmental values**
Category A			
Trees of High Quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years.	Trees that are particularly good examples of their species, especially if rare or unusual (in the wild or under cultivation); or those that are important components of groups or avenues.	Trees or groups of significant visual importance as arboricultural and/or landscape features. (e.g. feature and landmark trees).	Trees, groups or plant communities of significant conservation, historical, commemorative or other value (e.g. remnant trees, aboriginal scar trees, critically endangered plant communities, trees listed specifically within a Heritage statement of significance).
Category B			
Trees of Moderate Quality with an estimated remaining life expectancy of 15–25 years and of dimensions and prominence that cannot be readily replaced within 10 years.	Trees that might be included within Category A but are downgraded because of diminished condition such that they are unlikely to be suitable for retention beyond 25 years.	Trees that are visible from surrounding properties and/or the street but make little visual contribution to the wider locality.	Trees with conservation or other cultural value (trees within conservation areas or landscapes described within a statement of significance, locally indigenous species).
Category C			
Trees of Low Quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable.	Trees of very limited value or such impaired condition that they do not qualify in higher categories.	Trees offering low or only temporary/transient landscape benefits.	Trees with no material conservation or other cultural value.
Category U			
Trees in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than 5 years.	Trees that have a severe structural defect that are not remediable such that their failure is expected within 12 months. Trees that will become unviable after removal of other Category U trees (e.g. where for whatever reason the loss of companion shelter cannot be mitigated by pruning). Trees that are dead or are showing signs of significant, immediate and irreversible overall decline. Trees infected with pathogens of significance to the health and or safety of other trees nearby Low quality trees suppressing adjacent trees of better quality. Noxious weeds or species categorised as weeds within the local area. Note: Category U trees can have existing or potential conservation value* which might make it desirable to preserve.		

* Where trees would otherwise be categorised as U, B or C but have significant identifiable conservation, heritage or landscape value even though only for the short term, they may be upgraded, although they might be suitable for retention only.

Tree quality

		Health**			
		Excellent/ Good	Fair	Poor	Dead
Structure	Good	A	B	C	U
	Fair	B	B	C	U
	Poor	C	C	U	U
	Hazard *	U	U	U	U

* Structural hazard that cannot be remediated through mitigation works to enable safe retention.

** Trees of short term reduced health that can be remediated via basic, low cost plant health care works (e.g. mulching, irrigation etc.) may be designated in a higher health rating to ensure correct retention value nomination.

Category A	Typically trees in this category are of high quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years. The tree may make significant amenity contributions to the landscape and may make high environmental contributions. In some cases, trees within this category may not meet the above criteria, however possess significant heritage or ecological value. Trees of this retention value warrant design consideration and amendment to ensure their viable retention.
Category B	Typically trees in this category are of moderate quality with an estimated remaining life expectancy of 15–25 years and prominence of size dimensions that cannot be readily replaced within 10 years. They may make moderate amenity contributions to the landscape and make low/moderate environmental contributions. Trees with this retention value warrant lesser design consideration in an attempt to allow for their retention.
Category C	Trees in this category are of low quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable, may have poor health and/or structure, are easily replaceable, or are of undesirable species and do not warrant design consideration.
Category U	Trees in this category are found to be in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than five years. These trees may be dead and/or of a species recognised as a weed that resulted in them being unretainable.

Appendix D. Plant health care and mulching

Guide to plant health tonics and root growth stimulants

Considering the varying sizes of trees in common urban landscapes, it is suggested that an application volume of combined water and product solution of 80–150L for small to medium sized trees (5-10m height), 150–250L for medium to large sized trees (10-20m height) and 250–400L for large to very large sized trees (+20m height). Note: a lesser volume of total mixed product could be used if a more concentrated mix is drenched and water irrigation used to further drench the area and therefore dilute the stronger mix application.

The following product recommendations have been based on previous successful works undertaken by ArborSafe. The information provided is to be used as a general guide only, depending on your tree species, health or location. We recommend you always refer to the manufacturers label before applying any product. You may need to further consult with ArborSafe or your Project Arborist to develop a more specific program for your tree needs.

- **Soil conditioner** concentrate such as Kelpro, Seasol or similar 600–800mL/100L of water.
  A concentration of beneficial nutrients stimulating plant growth and root establishment, ideal for trees under stress.
- **Nitrogen boost** concentrate such as Nitrosol liquid plant food or similar 300mL/100L of water.
  A general-purpose fertiliser that contains a nitrogen boost (the most abundantly used element for tree growth).
  NB: Care must be taken when applying general fertiliser, particularly where plants can be affected by phosphorus toxicity e.g. many Australian native plants.
- **Root bio stimulant** concentrate such as Auxinone or similar 400mL/100L of water.
  A scientific blend of hormone root growth stimulants and vitamins assisting in the regeneration of roots.
- **Microbial formulation** concentrate such as Noculate Liquid or similar 500mL/100L of water.
  Generally containing strains of beneficial soil microorganisms, humic acid, kelp, essential amino acids, vitamins, biotin, folic acid and natural sugars designed to enhance the establishment of beneficial microbial populations.
- **Carbohydrate energy source** such as Molasses 500–800mL/100L of water.
  Molasses is the by-product of sugar refining. It contains all the nutrients from the raw sugarcane plant and is a carbohydrate energy source that feeds soil microorganisms and increases microbial activity.
- **Surfactant/wetting agent** (optional) such as Dispatch (Liquid) 200–300ml/100L of water.
  Improves the infiltration and penetration of applied water and irrigation.

We recommend you always refer to the manufacturer's label before applying any product using the above as a guide only.

Guide to mulching and maintenance for established trees

The benefits of correctly applying mulch are often underestimated, extending the useful life expectancy (ULE) of newly planted, young trees and established trees alike. Maintaining a soil environment that is conducive to root growth, development and function is vital in long-term tree retention and viability. This guide provides information on appropriate maintenance practices around the base of trees, including mulching, and the restriction of activities that may cause damage to tree roots and/or trunks.

Why mulch?

Mulching is a plant health care action which can be undertaken to improve plant and soil health (Figure 20), as well as overall landscape aesthetics. Placing an organic (or sometimes inorganic) material on the soil surface reduces the level of direct sunlight contact. Mulching should not be confused with composting which involves incorporating organic matter such as composts or manures into the soil profile. All plants in their natural ecologies (except for some arid and coastal ecologies) are naturally mulched by the falling of leaves, bark, flowers and other organic material.

This action is of great importance in successful cultivation of plants as it:

- assists in the regulation of soil moisture and temperature levels
- helps to suppress weeds
- amends and prevents soil compaction
- reduces water run-off during periods of heavy rain
- promotes soil-microbes and beneficial soil bacteria
- retains ground water content
- prevents lawn mower and vehicle damage to roots
- acts to reduce tree risk by decreasing the number of targets that pass and/or congregate under tree canopies; this in turn minimises the likelihood of injury in the event of a branch failure
- improves the visual aesthetics of the landscape.

Mulch is best comprised of organic materials such as wood chips, leaf litter, straw or hay, as these will degrade over time. Long-term mulching improves soil health and structure as it encourages the activities of earthworms, microflora and beneficial fungi. The addition of inorganic mulch may be useful for drainage qualities, load bearing surfaces, or to prevent root damage, but will not provide the ongoing improvements to soil health.

Figure 20. An excellent example of how to mulch a young tree. Lachlan Andrews, September 2015.

How to mulch

- Apply mulch to damp soil, as placing mulch over dry soil makes it difficult to rehydrate. Applying during the cooler months of the year is an ideal time.
- If mulching on top of a pre-existing grass area, grass or weeds must first be hand weeded and/or sprayed with a non-selective herbicide and left to wilt and die before applying mulch.
- Mulch should be applied at a uniform thickness of 75–100mm and re-applied approximately every 12 months. Do not place mulch up against the trunk of a tree as the damp mulch can cause bark to decay.
- Apply over a wide area, at least as large as a tree's crown projection (preferably larger) where practical, within and outside the current root mass to encourage lateral root development and expansion.
- Wood chip mulch (such as that generated from wood chippers) is considered an ideal mulch for landscape use as it contains a wide variety of materials that are of different sizes (such as bark, foliage and timber), is relatively cheap to purchase, and can be obtained in large quantities. Stockpiling of mulch after tree contractors have conducted works at a site is a way of generating 'free' mulch and ensuring that plant material from tree pruning and/or removals is recycled on site, not imported from external suppliers, saving costs and making the site more self-sustaining.
- The use of mulch made from pine bark or red gum chips are discouraged as they seldom degrade and therefore do not add nutrition to the soil profile. The uniform particle size and resin content can provide an impervious layer to water as well as retarding gaseous exchange.
- Mulching within the canopy areas of larger trees (Figure 21) can not only improve long-term tree health but can also act to reduce tree risk by decreasing the number of targets that pass and/or congregate under their canopies. This in turn will minimise the likelihood of injury in the event of a branch failure.
- When using wood chip mulch, ensure that if it has been made from live plant material that is stored and allowed to compost for between 3 and 6 months prior to use. Never apply fresh, 'green' mulch around trees as this can induce what is called the nitrogen drawdown, which can result in the removal of nitrogen from the soil resulting in plants with nutrient deficiencies.

Types of mulch and uses

All mulch is beneficial however these benefits can be maximised using different mulches for specific applications. Our arborists can provide guidance on mulch for specific applications or purposes.

Coarse mulch or wood chip mulch (such as that generated from wood chippers) is considered an ideal mulch for landscape use as it contains a wide variety of materials that are of different sizes (such as bark, foliage and wood), is relatively cheap to purchase, and can be obtained in large quantities. Stockpiling of mulch after tree contractors have conducted works at a site is economical and mitigates biosecurity risks associated with importing products.

Coarse mulch high in pine bark or red gum chips interlocks together and is ideal for areas prone to wind and water erosion. The larger particles can take longer to degrade, reducing amendment to the soil profile, however, extending the lifespan of particles.

Fine mulch or re-ground mulch is wood chip which has been processed multiple times (up to three) to create a fine product. Fine mulch is more readily available for degradation and will provide soil amendments sooner. The uniform particle size provides a more aesthetic product, however, depending on particle size it can be impervious to water as well as retarding gaseous exchange.

When using wood chip mulch, ensure that if it has been made from live plant material, it is stored and allowed to compost for between 3 to 6 months prior to use. Never apply fresh, 'green' mulch around trees as this can induce what is called *nitrogen drawdown*, which can result in the removal of nitrogen from the soil, resulting in plants with nutrient deficiencies.

For further information refer to the Australian Standard AS 4454–2012: *Composts, Soil Conditioners and Mulches*.

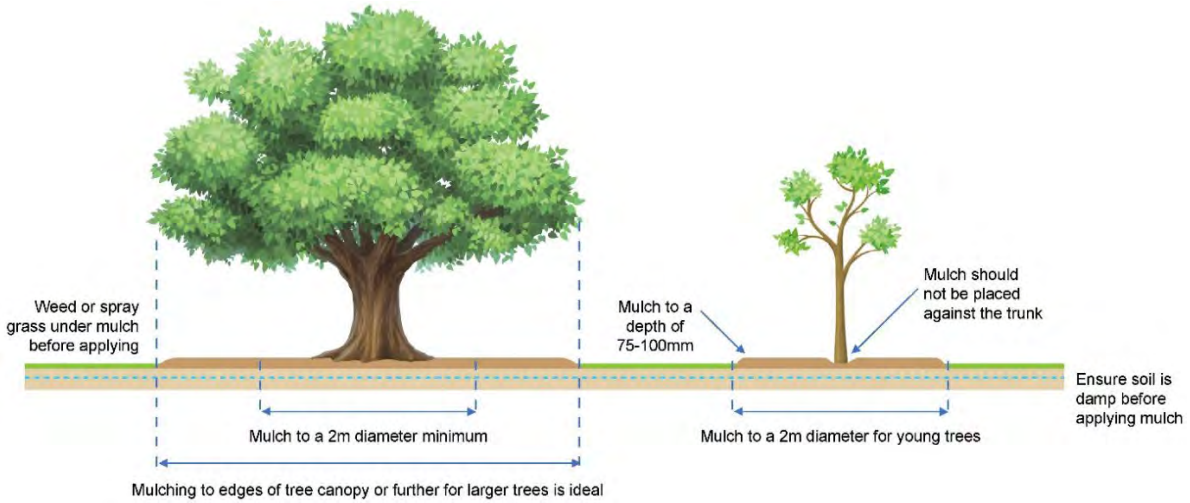

Figure 21. Mulching established and young trees. ArborSafe Australia, 2020.

Root and trunk damage

The function of tree roots is primarily to provide water and nutrient uptake for the tree, provide stability through structural roots that anchor it to the ground and as a means of food and nutrient storage. Damage to tree roots can lead to a reduction to any or all of these functions.

Damage to tree roots (Figure 22 and Figure 23) and the lower portion of a tree's trunk is a common and often unnecessary occurrence that can lead to the entry of decay fungi into a tree's structural framework. Once present, decay may develop in larger structural roots and/or the base of the trunk, which can result in a reduction in tree health and in severe cases even compromise stability.

Works such as trenching and excavation are often the cause of root damage to trees. Refer to ArborSafe's Guide – Tree protection during construction or the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites* for things to consider when performing construction activities near trees.

Everyday activities such as grass cutting via mowing or brush cutters can result in serious root damage or wounding to the lower trunk. Young trees with their trunks damaged by machinery often need replacing, while damage to the trunks and/or surface roots of established trees is not only detrimental to tree health but can also result in costly repairs to machinery.

Another advantage to mulching around the trunk and root crown is that it limits damage to both parts from mowing equipment. This in turn reduces mechanical damage and compaction.

Figure 22. An example of damage to tree roots caused via mowing. Luke Dawson, June 2017.

Figure 23. Image showing wound caused to upper portion of surface root by mower. Luke Dawson, June 2017.

How to avoid root and trunk damage

The following points serve to highlight ways to avoid damage to tree roots and trunks caused via grass cutting activities:

- Mulching around young and established trees negates the need for brush cutter and/or lawn mower use around the base of a tree. Mulching therefore not only creates a barrier between tree roots and trunk that are susceptible to damage, it improves soil condition, minimises soil compaction and decreases the total area required for mowing.
- Where mulching is not feasible, raising the cutting height of mowers and maintaining grass at a greater height can avoid unnecessary 'scalping' of roots and damage to mowers/blades.
- Where surface roots are located away from the trunk and in a location where neither the application of mulch nor the raising of mower height is inappropriate, it may be possible to raise the soil grade directly around the root/s to minimise damage. It is important that the application of new material does not result in significant changes to the soil profile that may inadvertently damage roots. Material applied should be permeable and allow the development of turf which will protect the roots. Coarse sand or a planting mix with a high sand to organic matter ratio (e.g. 80/20 mix) spread at a depth of 75–100mm could suitably protect the surface root from damage, while allowing turf to redevelop within the area.
- Civica ArborSafe is able to answer any questions regarding the material, depth and method of application to be used to ensure the tree/s remain viable for the long-term.

Appendix E. Tree assessment data

Tree no.	Easting (GDA94)	Northing (GDA94)	Botanic Name	Common Name	Origin	Trees in group	DBH Total (cm)	DRB (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy (m)	Health	Structure	Age	TLE (Yrs.)	Defects	Significance	Development Phase	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
6	289433.34	6261662.23	*Cupressus sempervirens*	Italian Cypress	Exotic Evergreen	1	25	29	**3.0**	28.27	**2.0**	5-10	<5	Fair	Good	Semi-Mature	15-25	Deadwood/stubs < 30mm; Dieback; Mechanical damage;	Amenity value/shade; Screen value; Attractive landscape feature;			C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
7	289432.02	6261655.85	*Jacaranda mimosifolia*	Jacaranda	Exotic Deciduous	1	35	40	**4.2**	55.42	**2.3**	10-15	5-10	Good	Good	Semi-Mature	15-25	Co-dominant stems; Deadwood/stubs > 30mm; Epicormic growth; Previous failure(s);	Amenity value/shade; Attractive landscape feature;	Remove deadwood/stubs > 30mm;		A	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
23	289439.92	6261580.33	*Corymbia citriodora*	Lemon-scented Gum	Australian Native	1	44	51	**5.3**	87.58	**2.5**	15-20	10-15	Good	Good	Semi-Mature	25-50	Deadwood/stubs > 30mm; Exposed root(s); Hanger(s); Resin exudation/kino; Soil compaction;	Amenity value/shade; Attractive landscape feature;	Mulching; Remove all deadwood/stubs; Remove hanging limb(s); Remove selective branches;	Tree in vicinity of proposed building works.	B	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
26	289420.19	6261524.93	*Corymbia citriodora*	Lemon-scented Gum	Australian Native	1	58	67	**7.0**	152.18	**2.8**	15-20	10-15	Good	Good	Semi-Mature	25-50	Deadwood/stubs < 30mm; Exposed root(s); Mechanical damage; Mechanical damage to root(s); Resin exudation/kino; Soil compaction; Wound(s);	Amenity value/shade; Attractive landscape feature;	Mulching;	Tree in vicinity of proposed building works. Impacted by the movement of machinery required for site access.	B	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
27	289431.74	6261541.9	*Callistemon viminalis*	Weeping Bottlebrush	State Native	1	75	79	**9.0**	254.47	**3.0**	5-10	10-15	Good	Fair	Mature	10-15	Co-dominant stems; Crossing/rubbing branches; Deadwood/stubs > 30mm; Epicormic growth; Included bark; Mechanical damage to root(s); Poor pruning; Previous failure(s); Soil compaction;	Amenity value/shade; Within group; Attractive landscape feature;	Monitor; Mulching; Remove all deadwood/stubs; Remove selective branches;	Tree in vicinity of proposed building works.	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
28	289432.47	6261547.46	*Callistemon viminalis*	Weeping Bottlebrush	State Native	1	27	31	**3.2**	32.98	**2.0**	5-10	5-10	Fair	Fair	Mature	10-15	Co-dominant stems; Deadwood/stubs > 30mm; Dieback; Epicormic growth; Exposed root(s); Mechanical damage to root(s); Soil compaction; Suppressed;	Amenity value/shade; Within group;	Mulching; Remove all deadwood/stubs;	Tree in vicinity of proposed building works.	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
29	289433.17	6261552.2	*Callistemon viminalis*	Weeping Bottlebrush	State Native	1	70	95	**8.4**	221.67	**3.2**	5-10	10-15	Good	Poor	Mature	10-15	Co-dominant stems; Deadwood/stubs > 60mm; Dieback; Exposed root(s); Included bark; Mechanical damage to root(s); Poor pruning; Previous failure(s); Soil compaction; Wound(s);	Amenity value/shade; Within group; Attractive landscape feature;	Mulching; Remove all deadwood/stubs;	Tree in vicinity of proposed building works.	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
30	289433.54	6261556.41	*Callistemon viminalis*	Weeping Bottlebrush	State Native	1	30	35	**3.6**	40.72	**2.1**	5-10	5-10	Fair	Good	Semi-Mature	15-25	Co-dominant stems; Deadwood/stubs < 30mm; Wound(s);	Amenity value/shade; Attractive landscape feature;		Tree in vicinity of proposed building works.	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
33	289443.1	6261554.22	*Eucalyptus microcorys*	Tallowwood	State Native	1	20	23	**2.4**	18.10	**1.8**	<5	<5	Good	Poor	Juvenile	<5	Co-dominant stems; Epicormic growth;	Amenity value/shade;	Removal - poor specimen; Remove stump;	Tree in vicinity of proposed building works.	U	1,2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
34	289446.47	6261553.85	*Casuarina cunninghamiana*	River She-oak	Indigenous	1	26	30	**3.1**	30.58	**2.0**	10-15	<5	Good	Good	Semi-Mature	25-50	Suckers;	Amenity value/shade; Attractive landscape feature;	Prune suckers;	Tree in vicinity of proposed building works.	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
35	289449.31	6261553.4	*Casuarina cunninghamiana*	River She-oak	Indigenous	1	45	67	**5.4**	91.61	**2.8**	10-15	5-10	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Crossing/rubbing branches; Deadwood/stubs > 30mm; Hanger(s); Included bark;	Amenity value/shade; Attractive landscape feature;	End weight reduction; Mulching; Remove hanging limb(s);	Tree in vicinity of proposed building works.	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
36	289456.89	6261601.57	*Corymbia maculata*	Spotted Gum	Australian Native	1	59	68	**7.1**	157.48	**2.8**	20-30	15-20	Good	Good	Mature	25-50	Deadwood/stubs > 60mm; Exposed root(s); Hanger(s); Mechanical damage to root(s); Previous failure(s); Soil compaction; Suppressed;	Amenity value/shade; Attractive landscape feature;	Mulching; Remove all deadwood/stubs; Remove hanging limb(s);		A	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
37	289457.49	6261605.25	*Corymbia maculata*	Spotted Gum	Australian Native	1	74	85	**8.9**	247.73	**3.1**	20-30	10-15	Good	Good	Mature	>50	Deadwood/stubs < 30mm; Soil compaction;	Amenity value/shade; Attractive landscape feature;	Mulching;		A	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
54	289478.55	6261634.97	*Corymbia maculata*	Spotted Gum	Australian Native	1	60	69	**7.2**	162.86	**2.8**	20-30	10-15	Good	Good	Mature	25-50	Deadwood/stubs > 30mm; Exposed root(s); Mechanical damage to root(s); Soil compaction;	Amenity value/shade; Attractive landscape feature;	Mulching; Remove deadwood/stubs > 30mm;		A	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
59	289485.37	6261645.3	*Corymbia maculata*	Spotted Gum	Australian Native	1	68	78	**8.2**	209.18	**3.0**	20-30	15-20	Good	Good	Mature	>50	Co-dominant stems; Crossing/rubbing branches; Deadwood/stubs > 30mm; Exposed root(s); Hanger(s); Mechanical damage to root(s);	Amenity value/shade; Attractive landscape feature; Significant due to age/size;	Mulching; Remove deadwood/stubs > 30mm; Remove hanging limb(s); Remove selective branches;		A	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
60	289483.44	6261645.41	*Jacaranda mimosifolia*	Jacaranda	Exotic Deciduous	1	25	29	**3.0**	28.27	**2.0**	5-10	5-10	Good	Good	Semi-Mature	15-25	Co-dominant stems; Epicormic growth; Hanger(s);	Amenity value/shade; Attractive landscape feature;	Remove hanging limb(s);		C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
66	289488.02	6261658.67	*Casuarina cunninghamiana*	River She-oak	Indigenous	1	50	58	**6.0**	113.10	**2.6**	15-20	5-10	Good	Fair	Mature	25-50	Co-dominant stems; Deadwood/stubs < 30mm; Epicormic growth; Included bark; Previous failure(s);	Amenity value/shade; Attractive landscape feature;	Remove epicormic growth;		B	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
72	289485.54	6261681.21	*Callistemon viminalis*	Weeping Bottlebrush	State Native	1	25	29	**3.0**	28.27	**2.0**	5-10	5-10	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Epicormic growth; Included bark; Poor pruning;	Amenity value/shade; Attractive landscape feature;	Remove selective deadwood/stubs; Shape from infrastructure; Uplift for pedestrian access;		C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
159	289409.18	6261477.67	*Eucalyptus moluccana*	Grey Box	Indigenous	1	28	32	**3.4**	35.47	**2.1**	10-15	5-10	Good	Fair	Semi-Mature	10-15	Deadwood/stubs > 30mm; Epicormic growth; Included bark; Suppressed;	Amenity value/shade; Within group;	Mulching; Remove deadwood/stubs > 30mm;	Tree in vicinity of proposed building works.	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
160	289407.51	6261479.06	*Eucalyptus moluccana*	Grey Box	Indigenous	1	50	58	**6.0**	113.10	**2.6**	10-15	10-15	Good	Fair	Mature	>50	Co-dominant stems; Deadwood/stubs > 60mm; Epicormic growth; Exposed root(s); Mechanical damage to root(s);	Amenity value/shade; Within group; Attractive landscape feature;	Mulching; Remove deadwood/stubs > 30mm;	Tree in vicinity of proposed building works.	B	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
162	289412.24	6261494.62	*Eucalyptus moluccana*	Grey Box	Indigenous	1	25	29	**3.0**	28.27	**2.0**	5-10	<5	Good	Fair	Juvenile	15-25	Crossing/rubbing branches; Deadwood/stubs > 30mm; Dieback; Epicormic growth; Hanger(s); Previous failure(s); Wound(s);	Amenity value/shade;	Formative pruning; Mulching; Remove all deadwood/stubs; Remove epicormic growth; Remove hanging limb(s);	Tree in vicinity of proposed building works. Impacted by the movement of machinery required for site access.	C	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
163	289417.27	6261483.09	*Eucalyptus moluccana*	Grey Box	Indigenous	1	30	35	**3.6**	40.72	**2.1**	5-10	5-10	Good	Fair	Juvenile	25-50	Co-dominant stems; Epicormic growth;	Amenity value/shade;	Mulching;	Tree in vicinity of proposed building works. Impacted by the movement of machinery required for site access.	C	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
168	289504.91	6261478.55	*Eucalyptus moluccana*	Grey Box	Indigenous	1	25	29	**3.0**	28.27	**2.0**	5-10	<5	Good	Poor	Juvenile	10-15	Co-dominant stems; Deadwood/stubs < 30mm; Exposed root(s); Included bark; Resin exudation/kino;	Amenity value/shade; Attractive landscape feature;	Removal - poor specimen; Remove stump;	Tree in vicinity of proposed demountable removal works.	U	1,2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
169	289505.65	6261489.95	*Eucalyptus moluccana*	Grey Box	Indigenous	1	40	46	**4.8**	72.38	**2.4**	10-15	5-10	Good	Good	Semi-Mature	>50	Co-dominant stems; Deadwood/stubs > 30mm;	Amenity value/shade; Attractive landscape feature;	Mulching; Remove deadwood/stubs > 30mm;	Tree in vicinity of proposed demountable removal works.	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
171	289452.15	6261580.52	*Lophostemon confertus*	Queensland Box	Australian Native	1	20	23	**2.4**	18.10	**1.8**	5-10	5-10	Good	Good	Juvenile	>50	Poor pruning;	Amenity value/shade; Attractive landscape feature;	Remove selective branches;		C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
172	289459.59	6261577.04	*Lophostemon confertus*	Queensland Box	Australian Native	1	15	17	**2.0**	12.57	**1.6**	5-10	5-10	Fair	Good	Juvenile	>50	Co-dominant stems; Epicormic growth; Poor pruning;	Amenity value/shade; Attractive landscape feature;	Remove selective branches; Shape from infrastructure;		C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
173	289457.33	6261580.42	*Lophostemon confertus*	Queensland Box	Australian Native	1	15	17	**2.0**	12.57	**1.6**	<5	<5	Fair	Fair	Juvenile	25-50	Co-dominant stems; Deadwood/stubs < 30mm; Poor pruning;	Amenity value/shade; Attractive landscape feature;			C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
174	289448.34	6261565.51	*Grevillea robusta*	Silky Oak	State Native	1	15	17	**2.0**	12.57	**1.6**	5-10	5-10	Good	Good	Juvenile	25-50	Exposed root(s);	Amenity value/shade; Attractive landscape feature;	Mulching;	Tree in vicinity of proposed building works.	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
177	289479.88	6261657.15	*Corymbia maculata*	Spotted Gum	Australian Native	1	10	12	**2.0**	12.57	**1.5**	5-10	<5	Good	Good	Juvenile	>50		Amenity value/shade;			C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
178	289504.18	6261505.68	*Eucalyptus sideroxylon*	Red Ironbark	State Native	1	25	29	**3.0**	28.27	**2.0**	5-10	5-10	Good	Good	Juvenile	>50	Co-dominant stems; Parasitic plant/mistletoe; Poor pruning; Resin exudation/kino;	Amenity value/shade; Attractive landscape feature;		Tree in vicinity of proposed demountable removal works.	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).

Tree no.	Easting (GDA94)	Northing (GDA94)	Botanic Name	Common Name	Origin	Trees in group	DBH Total (cm)	DRB (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy (m)	Health	Structure	Age	TLE (Yrs.)	Defects	Significance	Development Phase	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
191	289410.56	6261525.26	*Olea africana*	African Olive	Exotic Evergreen	1	40	46	**4.8**	72.38	**2.4**	5-10	5-10	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Crossing/rubbing branches; Epicormic growth; Undesirable species;	Amenity value/shade; Weed;		Tree in vicinity of proposed building works. Impacted by the movement of machinery required for site access.	C	3	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
192	289415.65	6261558.27	*Schinus terebinthifolius*	Brazilian Pepper Tree	Exotic Evergreen	1	60	69	**7.2**	162.86	**2.8**	10-15	10-15	Good	Fair	Semi-Mature	25-50	Co-dominant stems; Parasitic plant/mistletoe; Undesirable species;	Amenity value/shade; Weed;		Tree in vicinity of proposed building works. Impacted by the movement of machinery required for site access. Tree located in neighbouring property. VTA limited to subject site. Inspection of crown exceeded by ~2.5m over school grounds.	B	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
193	289416.73	6261565.07	*Schinus terebinthifolius*	Brazilian Pepper Tree	Exotic Evergreen	1	35	40	**4.2**	55.42	**2.3**	5-10	5-10	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Parasitic plant/mistletoe; Undesirable species;	Amenity value/shade; Weed;	Uplift for pedestrian access;	Tree in vicinity of proposed building works. Impacted by the movement of machinery required for site access. Tree located in neighbouring property. VTA limited to subject site. Crown raise to ~2.5m over school grounds.	B	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).

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