

Tree Assessment Report

Cronulla High School, Corner Elouera Road and Captain Cook Drive, Cronulla



Prepared for: **MBB Group**
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 Date: **6 February 2023**

Proposed works

This report has been prepared by *Travers bushfire & ecology* to assess the condition of trees located within Cronulla High School, refer to Figure 1. The proposed development is for an upgrade of Cronulla High School, located on the corner of Captain Cook Drive and Bate Bay Road, Cronulla. These works will involve the removal of some existing demountable classrooms, construction of new buildings and car parks with associated infrastructure such as power, communications, water and stormwater. This Report is based on Master Plan Option 3 for the assessment of impacts and constraints, as shown in Figure 2A and staging plans, Figure 2B. The majority of tree removal will be at the rear or NE side of building A for placement of the demountable.

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Background

Tree survey and assessment was conducted on site on 1 June 2022 to assess 113 trees (T1 to T114, T042 was missed) and determine those that may be impacted by the proposed works in Master Plan Option 3. A Tree Assessment Report was prepared by *Travers bushfire and ecology* on 21 December 2020. This Report overrides the 2020 Tree Report – all trees have been reassessed and retagged. Assessment was undertaken in accordance with Australian Standard AS4970 (2009) - Amendment 1 (2010). The locations of all trees have been mapped.

The following survey, assessment and measurements were undertaken with accompanying map figures:

- Tree condition, height, diameter at breast height (DBH), basal diameter (BD), canopy spread and vigour
- Health assessment and useful life expectancy (ULE rating) in order to identify the relative condition of each tree and in particular those that are assessed as dangerous
- Tree AZ assessment
- Assessment of the significance of individual trees using STARS
- Tree retention and removal status and plans.

Trees with diameter at breast height (DBH) of 150 mm or greater were assessed. A metal tag embossed with the tree number (e.g., T001) was attached to each tree. The location of each tree was plotted using a handheld Trimble GPS unit (subject to GPS accuracy at the time of survey).



Figure 1 – Subject Site

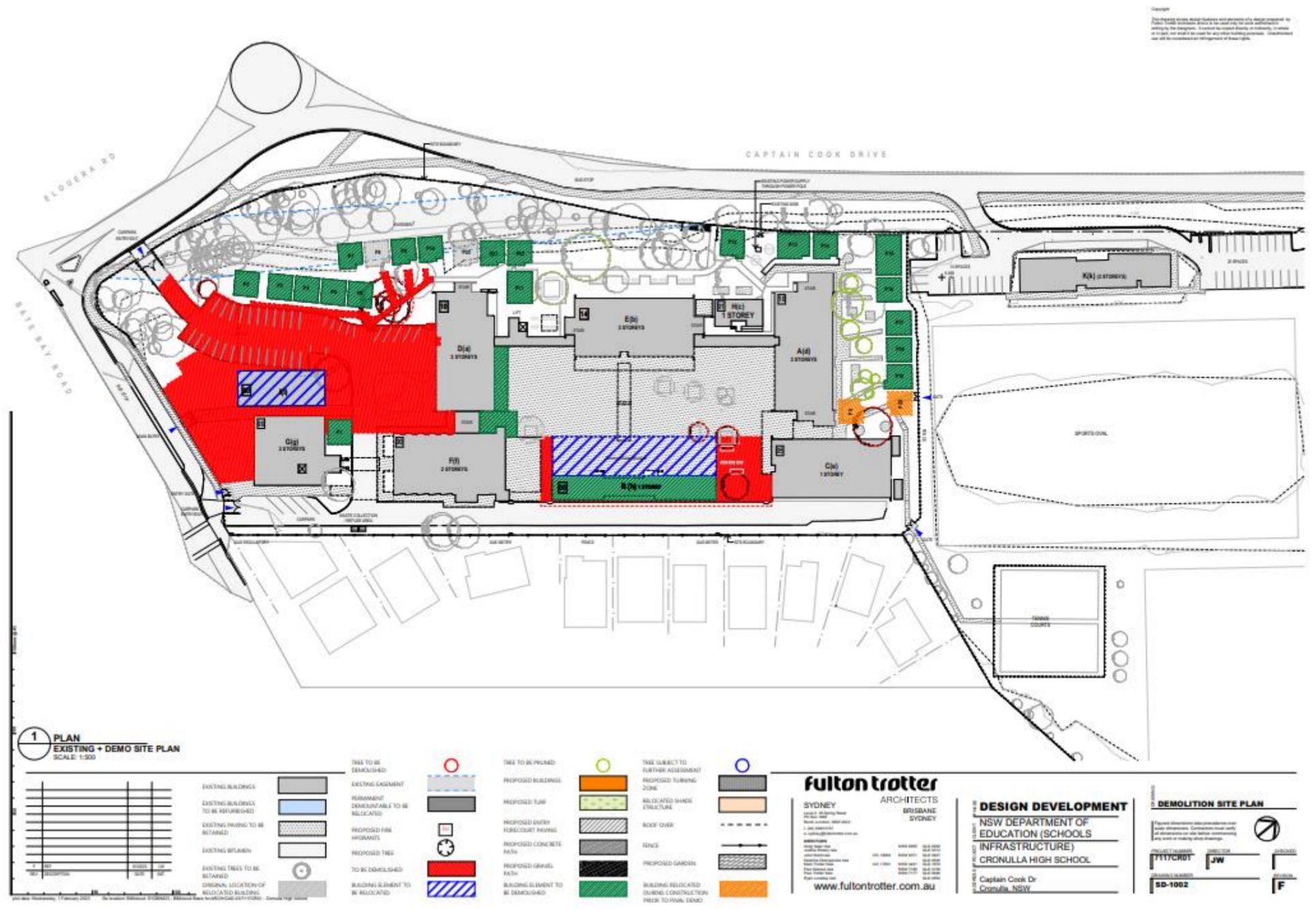
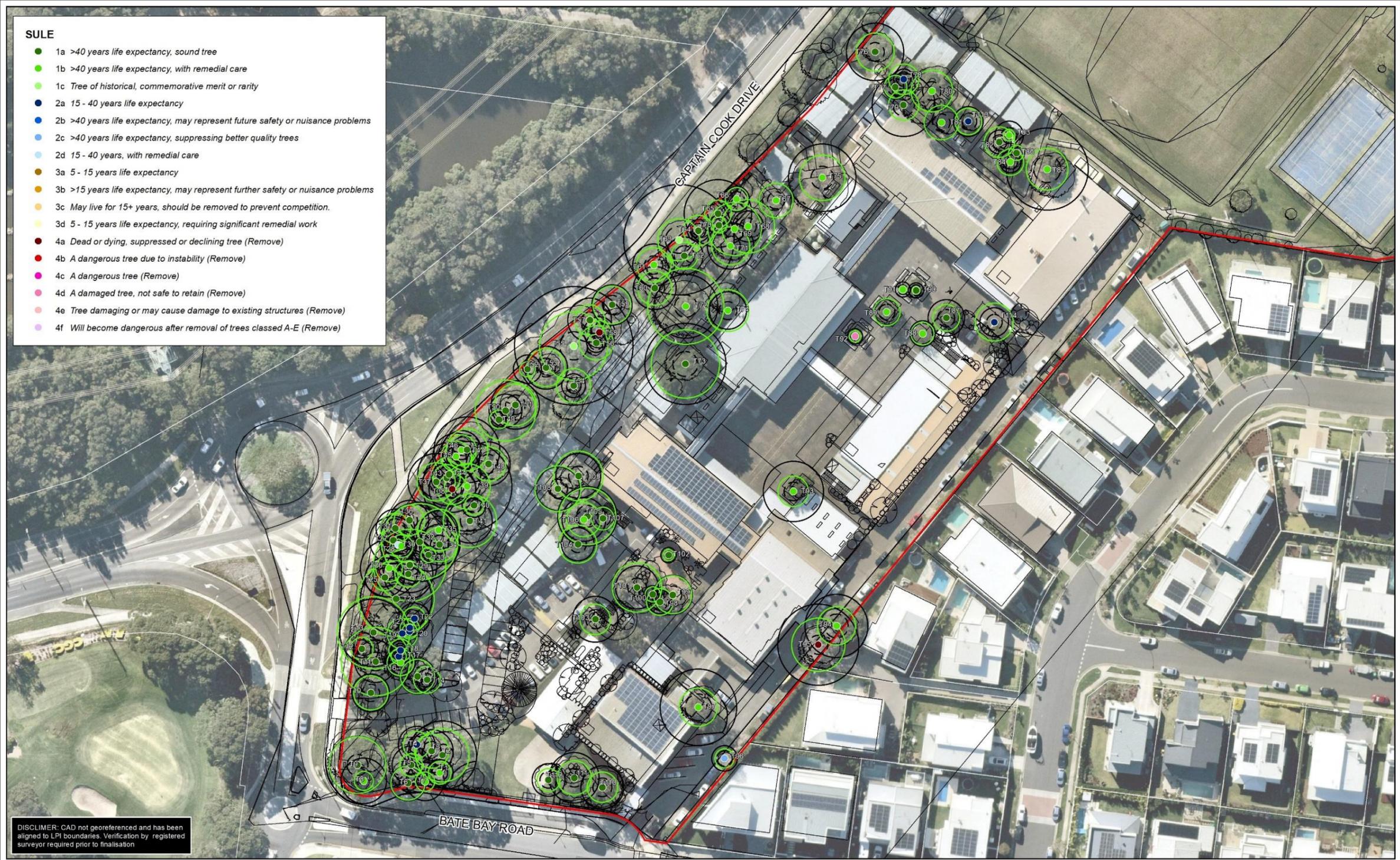


Figure 2A -Proposed Demolition Plan (Fulton Trotter Architects, 07/02/2023)



- SULE**
- 1a >40 years life expectancy, sound tree
 - 1b >40 years life expectancy, with remedial care
 - 1c Tree of historical, commemorative merit or rarity
 - 2a 15 - 40 years life expectancy
 - 2b >40 years life expectancy, may represent future safety or nuisance problems
 - 2c >40 years life expectancy, suppressing better quality trees
 - 2d 15 - 40 years, with remedial care
 - 3a 5 - 15 years life expectancy
 - 3b >15 years life expectancy, may represent further safety or nuisance problems
 - 3c May live for 15+ years, should be removed to prevent competition.
 - 3d 5 - 15 years life expectancy, requiring significant remedial work
 - 4a Dead or dying, suppressed or declining tree (Remove)
 - 4b A dangerous tree due to instability (Remove)
 - 4c A dangerous tree (Remove)
 - 4d A damaged tree, not safe to retain (Remove)
 - 4e Tree damaging or may cause damage to existing structures (Remove)
 - 4f Will become dangerous after removal of trees classed A-E (Remove)

DISCLAIMER: CAD not georeferenced and has been aligned to LPI boundaries. Verification by registered surveyor required prior to finalisation

Legend

- ▭ Site boundary (source:LPI)
- Tree Protection Zone (TPZ)
- Canopy
- Structural Root Zone (SRZ)

Aerial source: Nearmap

0 20 40 m

↑

Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

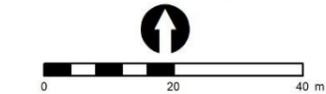
PROJECT & MXD REFERENCE Captain Cook Dr, Cronulla 22MBB02_T001	DATE & ISSUE NUMBER 14/09/2022 Issue 1	SCALE & COORDINATE SYSTEM 1:900 @A3 GDA2020 MGA Zone 56
TITLE Figure 3 - ULE Assessment Plan		
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DISCLAIMER: CAD not georeferenced and has been aligned to LPI boundaries. Verification by registered surveyor required prior to finalisation

- Legend**
- Site boundary (source:LPI)
 - Canopy
 - ▲ A tree
 - Z tree



Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

PROJECT & MXD REFERENCE
 Captain Cook Dr, Cronulla
 22MBB02_T002

DATE & ISSUE NUMBER
 14/09/2022
 Issue 1

SCALE & COORDINATE SYSTEM
 1:900 @A3
 GDA2020 MGA Zone 56

TITLE
Figure 4 - AZ Plan

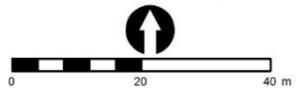


DISCLAIMER: CAD not georeferenced and has been aligned to LPI boundaries. Verification by registered surveyor required prior to finalisation



T65 & T70 may require removal under the power supply act

- Legend**
- Site boundary (source:LPI)
 - Retain tree (103)
 - Tree Protection Zone (TPZ)
 - Proposed building
 - Remove tree (10)
 - Structural Root Zone (SRZ)
 - Tree



Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

PROJECT & MXD REFERENCE
 Captain Cook Dr, Cronulla
 22MBB02_T003

DATE & ISSUE NUMBER
 20/01/2023
 Issue 1

SCALE & COORDINATE SYSTEM
 1:900 @A3
 GDA2020 MGA Zone 56

TITLE
Figure 5 - Removal and Retention Plan



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Scale at A3 dwg no. Rev. 1.0 Sheet 6 of 19

Project
Arboricultural Impact Assessment
 Cronulla High School

Date
6 February 2023

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TREE CONDITION AND LIFE EXPECTANCY

Condition

The assessment of tree condition is undertaken by visual inspection of the tree and takes into account the condition of the roots, trunk, branches, foliage, previous pruning, pests, disease, nesting hollows, fauna scratching's, previous damage and the surrounding environment that may influence the condition of the tree.

Useful life expectancy (ULE)

The condition information is used to determine the Useful Life Expectancy (ULE) of each tree and takes into account the age of the tree, the life span of the species, local environmental conditions, recent climatic conditions, estimated life expectancy, the location of the tree and safety of persons and property.

The ULE methodology takes into account whether a tree can be retained with an acceptable level of risk based on the information available at the time of inspection. An ULE assessment is not static as it relates to the tree's health and the surrounding conditions. Whilst it is recognised that changes to the tree's condition will affect the assessment, changes to the surrounding environment may result in changes to the ULE assessment.

Table 1 – Useful Life Expectancy (ULE) (Barrell, 2009)

Category	Description
1	Long, Life span greater than 40 years
2	Medium, Life span from 15 to 40 years
3	Short, Life span from 5 to 15 years
4	Remove, should be removed within 5 years

TREE SIGNIFICANCE

Environmental significance

Trees need to be considered with regard to the overall environment and are subject to specific legislation such as:

- *Biodiversity Conservation Act (NSW) 2016,*
- *Environmental Protection and Biodiversity Conservation Act (Commonwealth) 1999,* and
- *Biosecurity Act (NSW) 2015*
- *Environmental Pest Species*

Biodiversity Conservation Act (NSW) 2016

No observed trees are listed under schedules of the Act as threatened. Based on the vegetation associations on site and local vegetation mapping, it does not appear that the remnant vegetation is part of a threatened ecological community.

Environmental Protection and Biodiversity Conservation Act (Commonwealth) 1999

The Schedules of the *EPBC Act* list a number of species and ecological communities that are classified as critically endangered, endangered or vulnerable. The *EPBC Act* requires the preparation of an impact assessment if an activity or development is likely to have an effect on species or ecological communities listed in the schedules of the *EPBC Act*.

Biosecurity Act (NSW) 2015

There are a number of pest or exotic species that are listed within specific regions within the *NSW Biosecurity Act*. These listings contain detailed descriptions of each listed species, their habitat and reproductive attributes and the recommended control or eradication methods as well as actions required with regard to reporting, transport, or sale of each species.

Environmental Pest Species

There are a number of environmental pest species that are not listed in the *BC Act* (2016), the *EPBC Act* (1999), or the *Biosecurity Act* (2015). These species commonly cause problems within or adjacent to developed or urban areas. These species can have aggressive, fast growing, or fast reproduction attributes which replaces other species. They can have destructive root systems which cause damage to pipes, structures, foundations, and services. Some environmental pest species can be undesirable within natural bushland areas by degrading and / or dominating habitats and reducing natural biodiversity. Environmental pest species are not classified as noxious but are recognised by Councils and other authorities as pest species and in many cases are exempt from protection under Council's Tree Preservation Orders.

Habitat trees

In general, if any hollows are observed in specific trees during the arboricultural impact assessment, they are noted in the tree health data table (see Attachment 1). Hollow-bearing trees are typically given a rating with regard to the numbers and sizes of tree hollows present. Habitat trees are given a classification as follows:

Category 1: Significant habitat trees (high): Large hollow/s suitable for cockatoos or large forest owls >30cm and/or Trees containing two (2) or more good quality medium hollows 10-30cm and/or >8 small hollows.

Category 2: Significant habitat trees (moderate) Trees containing one medium hollow 10-30cm and/or 3-8 small hollows.

Category 3: Remaining hollow bearing trees generally containing small or low numbers of hollows.

Landscape significance

The Institute of Australian Consulting Arboriculturists (IACA) have established a Significance of a Tree, Assessment Rating System (STARS) to assess the landscape significance of a tree. The rating system utilises structured qualitative criteria to assist in determining the retention value for a tree. There are two phases to the STARS Assessment. The first is an assessment of tree attributes with respect to High, Medium and Low Significance. Subsequently, the Tree Retention Value matrix shown on the Attachment 3 is used to determine the priority for removal and retention.

The significance of a tree with regard to the landscape is generally assessed as one of the following:

- Significant – Prominent from a broad landscape perspective;
- High – Prominent from a neighbourhood perspective
- Medium – prominent from adjacent areas surrounding the site, and
- Low – prominent from a site perspective only.

Once the landscape significance of an individual tree has been assessed, the retention value can be determined. A breakdown of the tree significance and retention values are provided in Attachment 2.

Visual significance

Visually significant trees are assessed with respect to the average attribute values of other trees in the wider locality. A tree with well above average height, girth or spread is considered to be 'of Visual Significance'. The visual significance of a specific tree can also consider other parameters such as girth, canopy spread, health, aesthetic appearance, or location (e.g., on a hilltop, or as the centrepiece of a formal garden) of the tree. These parameters can also occur in combinations (e.g., height, spread and good form in a prominent location) for each tree.

Visual Significance ratings for a tall open forest averaging 22 metres tall (typical of the coastal areas of NSW between Wollongong and Port Stephens) are as follows:

V1 High significance typically >25m height/ >20m spread / >600mm DBH - Large emergent tree

V2 Moderate significance generally 15-25m height/ >10m spread / >600mm DBH – Prominent tree typically with a large spread

V3 Low significance >10m height / >10m spread / >600mm DBH – Typically a visually attractive low tree with large spread and DBH

DEVELOPMENT PLANNING AND TREE PROTECTION ZONES

Tree protection setbacks

Development footprints which impact on more than 10% of a Tree Protection Zone (TPZ) will usually require the removal of that tree. Development footprints shall be located away from retained trees such that adequate clearances are provided for the Tree Protection Zone (TPZ).

Disturbance within the TPZ can be detrimental to the tree's root system and in turn affect the stability, health and condition of the tree.

Major encroachments into tree protection zones

Where the proposed development activity is greater than the 10% loss of TPZ area (m²), the activity is considered to be a major encroachment into the TPZ.

Where major encroachments are to occur within the TPZ of trees intended to be retained, it must be demonstrated that the works or activities will not have any significant impact upon the health and

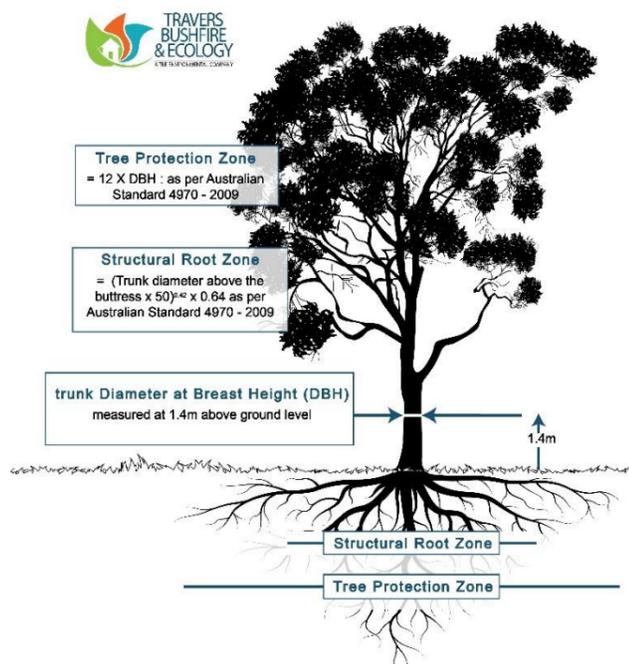


Figure 6 - Typical diagram of a tree protection zone and structural root zone of a tree
(Source: AS4970-2009)

condition of the tree. To demonstrate this, detailed root mapping investigation by non-invasive methods may be necessary. Other factors such as age class, health, vigour, trunk lean, disturbance tolerance of the species, and building design may need to be taken into account in the arboricultural assessment.

Where major encroachments are proposed to occur into the TPZ then the Structural Root Zone (SRZ) of the tree will also be taken into account and avoided if possible.

Where trees have multiple trunks, an assessment needs to consider the number and diameter of each trunk. Based upon the *Australian Standard for Protection of Trees on Development Sites*, AS 4970-2009, the Diameter at Breast Height (DBH) of multi-trunk trees is calculated by:

$$DBH = \sqrt{(DBH_1)^2 + (DBH_2)^2 + (DBH_3)^2}$$

Development design and tree protection zones

Where trees are proposed for retention, the development footprint must avoid the TPZ around trees. This TPZ is set aside for the protection of the tree (or group of trees) as it is essential for the stability and longevity of the tree. Existing soil levels should be retained within the TPZ. The TPZ should be delineated by a temporary fence during the construction phase of the project.

Based upon the *Australian Standard for Protection of Trees on Development Sites* (AS4970-2009), the radius of the TPZ for a single tree is calculated as: TPZ = 12 x DBH.

Developments within the tree protection zone

Minor encroachments into tree protection zones

Based upon AS4970-2009 some minor encroachments can occur within the calculated TPZ provided that:

- NOTE: No more than 10% of the area (m²) of the TPZ is removed
- NOTE: The area to be removed is outside the SRZ, and
- NOTE: The area (m²) to be removed or disturbed is compensated by increasing the TPZ radius in other directions so that there is no net loss in area (m²) of the original calculated Tree Protection Zone (TPZ).

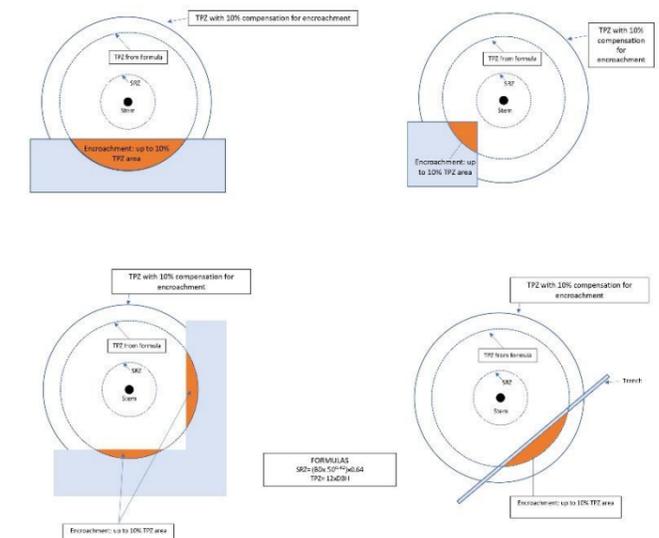


Figure 7 - Minor encroachment on TPZ and 10% compensation for encroachment
(Source AS 4970-2009)

TREE PROTECTION MEASURES

To determine the SRZ and TPZ, the following is applied in accordance with Australian Standard AS 4970 – 2009 – Amendment 1-2010.

The tree protection zone (TPZ) radius is measured by the DBH x 12 (Australian Standard AS 4970 – 2009), where the DBH is the trunk diameter measured at 1.4m above the ground. A TPZ should not be less than 2m or greater than 15m (except where crown protection is required). Clause 3.3 covers variations to the TPZ. The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1m outside the crown projection.

The structural root zone (SRZ) is the area which is required to maintain a tree's stability. The SRZ is measured as:

SRZ radius = $(BD \times 50)^{0.42} \times 0.64$ where BD is the basal trunk diameter, in metres, measured above the root buttress. If BD is 50cm, then the SRZ would be 2.47m.

During the survey, DBH was measured for each tree to allow for TPZ to be calculated should the tree be retained as part of the future landscaping.

The SRZ and TPZ calculated for each of the trees assessed within the study area are provided in Attachment 1.

When working in close proximity of any tree to be retained or the nominated TPZ located within or adjacent to potential development areas, the following general management principles should be adopted:

- earthworks around subject trees are to be undertaken in the presence of an AQ5-certified arborist who may provide additional on-site advice
- machine digging within the root mass of the subject tree (or trees) is to be minimised and, where possible, replaced by hand digging
- any exposed roots of the subject tree should be wrapped and protected during exposure and be replaced in a similar position prior to disturbance
- inspection of retained trees by an AQ5-certified arborist should be conducted annually to 3 years after development completion.

Any retained tree on site will require protection both during and after development construction, applying the following tree protection guidelines:

The following guidelines are proposed in relation to any trees that may be retained within or adjacent to the proposed works area:

- Installation of a TPZ will be required surrounding any retained tree or group of trees. This TPZ can generally be provided by preserving an area equivalent to that shown in Schedule 1. A SRZ will apply to all retained trees in close proximity to work areas. No more than 10% of the TPZ should be impacted by earthworks with no infiltration into the SRZ. The TPZ is to be compensated elsewhere on the impacted tree to compensate for the loss of small areas of the TPZ. This is achieved by increasing the TPZ to an equivalent area to the area of impacted TPZ (Figure 10).
- Trees to be retained, and in close proximity to any works, are to be protected by temporary fencing. Such temporary fencing can be constructed from

plastic mesh, post and wire or temporary chain link fence panels. All fence posts and supports are to be located clear of the roots and have sufficient strength to support the fence without bending or collapsing. TPZs in close proximity to proposed works are to be marked and sign-posted. The protection fencing is not to be removed or altered without the approval of an appointed arborist. TPZ fencing is to be inspected on a regular basis and maintained in good condition.

- All trees nominated for removal are to be removed only after the temporary fencing of the trees to be retained has been completed and prior to any construction activity or bulk earthworks. Approved tree removal operations in the vicinity of retained trees are to be undertaken in a manner that avoids canopy or root damage and / or soil compaction to any TPZ associated with any retained tree. Such works should be supervised by a qualified arborist.
- Stumps are to be ground not dozed or dug out unless they impact on the installation of services, roads or building works.
- All excavation including but not limited to trenches, footings and major earth movement are to be avoided within TPZs.
- Stockpiling materials and soils within TPZs are to be avoided.
- All machinery and vehicles are to be excluded from TPZs during all operations.
- Where the proposed works are likely to cause excessive dust generation, the tree is to be protected with shade cloth on the tree protection fence to minimise dust collection on the leaves.
- The following activities prohibited within TPZs includes but is not limited to:
 - machine excavation (including trenching)
 - excavation for silt fencing
 - cultivation
 - storage
 - preparation of chemicals, including cement products
 - parking of vehicles or plant
 - refuelling
 - dumping of waste
 - refuelling
 - wash down or cleaning of equipment
 - placement of fill
 - lighting of fires
 - soil level changes
 - temporary or permanent installation of signs
 - Physical damage to trees.

x. Any works undertaken within TPZs are to be supervised and certified (photographed and documented) by a qualified arborist.

xi. Where advised by the arborist, trunk, and branch protection (Figure 11) is to be installed to a minimum height of 2m using materials and positioning as advised by an appointed arborist.

xii. Where advised by the arborist, other temporary root protection measures (Figure 11) such as thick mulch (50-100mm deep) or crushed rock below rumble boards, are to be installed to prevent root damage and soil compaction within the TPZ.

- Scaffolding is to be erected outside of the TPZ, where unavoidable, protection measures are to be specified by the appointed arborist.
- All services are to be routed outside of the TPZ. Where not possible the arborist will specify directional drilling (at least 600mm deep) or manual excavation to avoid impacted on the insitu roots subject to the works and potential root damage.
- If pruning is required it is to be undertaken by an arborist in accordance with AS4373 to prevent structural damage, disease, and poor form.

General tree protection measures during construction

Prior to earthworks or construction, the removal of the trees identified for removal should be undertaken with particular attention given to ensure that no damage occurs to any part of the retained trees such as canopy foliage, branches, trunk or SRZ.

Prior to demolition or earthworks, secure protective fencing is to be erected around individual trees or groups of trees that have been identified as being retained. This fencing shall be located no closer than the extent of the TPZ of each retained tree (refer to the Tree Retention and Removal Plan). Where the structure to be demolished is within the TPZ the protective fencing shall be aligned to be a maximum of 0.5m away from the structure to be demolished.

Where the approved construction footprints encroach into the TPZ, protective fencing must be aligned no further than 0.5 metre away from the proposed structure or footprint.

The purpose of the fencing is to protect the tree roots, trunk and branches, and to minimise detrimental impacts on the trees during demolition and construction. Fencing shall be 1.8m high chain mesh material securely fixed to steel supporting posts with top and bottom strainer top or steel pipe rails. Chain-link fencing panels are acceptable but must have connectors top and bottom to each adjoining panel.

The site supervisor shall ensure that at all times during site works that no activities, stockpiles, storage, disposal of materials, vehicle access or vehicle and machinery parking shall take place within the areas encompassed by the tree protection fencing. The site supervisor shall also ensure that the protective fences remain secure throughout the development work period. Construction scaffolding can be erected within the tree protection fencing provided that each of the weight distribution points are spread over a minimum of 2m² and these points are over existing soil levels to avoid soil compaction.

Trees shall be inspected at regular intervals by the project arborist or at critical stages during the demolition and construction stages to identify signs of stress and recommend remedial action such as mulching and irrigation.

Specific excavation for services that require critical fall (e.g., sewer, stormwater) may be undertaken within the tree protection fencing provided that trenching is dug using hand tools, thrust or directional boring or vacuum excavation, and tree roots are not severed unless they spatially conflict with

the installed pipes. This work within the tree protection fencing must be carried out under the instructions from an experienced and suitably qualified project arborist.

All access within the tree protection fencing for temporary and permanent works must be carried out under the instruction of an experienced and suitably qualified project arborist.

Tree protection fencing must remain in a functional condition throughout the demolition and construction works and can only be removed to allow for works identified in the landscape plan.

Landscape works in the vicinity of retained trees must be sympathetic to tree retention and existing ground levels within the TPZ. The natural ground contours and depth within TPZs located outside of the construction or earthworks footprint must remain unchanged.

Any tree damage that occurs to trees or tree roots during site works is to be treated by an experienced and suitably qualified arborist. Where branch pruning works are required, all pruning works including the removal of deadwood are to be undertaken in accordance with Australian Standard AS 4373-1996 – *Pruning of Amenity Trees* and the work is to be undertaken by an experienced and suitably qualified arborist.

Tree protection fencing

Temporary tree protection fencing should be erected before any machinery or materials are brought onto the site and before the commencement of works (including demolition and bulk earthworks). Once erected, protective fencing must not be removed or altered without approval by the project arborist. The fencing is to be fully secured to restrict access onto the protected root zone.

AS4687 specifies applicable fencing requirements. Installed construction fencing on the recommended alignment of the TPZ fencing can be installed as part of the protective fencing.

For construction crews, signage identifying the TPZ shall be placed at 10m intervals along the TPZ barrier fencing. These signs will face towards the development site and shall have lettering that complies with AS1319. These signs will also specify the severe penalties for harming the TPZ in any way.

TPZ barrier fencing is to be inspected on a regular basis and maintained in good condition. Any works within the mapped TPZs is to be supervised (for excavation works) or under the direction of an AQ5 qualified arborist to limit damage to root zones and to install additional root, trunk, and branch protection measures.



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Scale at A3

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1.0

Sheet of

8 19

Project
Arbicultural Impact
Assessment
Cronulla High School

Date
6 February 2023

Ref
22MBB02

CONCLUSIONS

This report has been prepared to assess the condition of a number of trees for the proposed upgrade of Cronulla High School, located on the corner of Captain Cook Drive and Bate Bay Road, Cronulla. These works will involve the removal of some existing demountable classrooms, construction of new buildings and car parks with associated infrastructure such as power, communications, water and stormwater. The assessments carried out in this report are based on the Australian Standard AS4970-2009 – *Protection of Trees on Development Sites*. The terminology used in this report is also consistent with that used in the AS4970-2009.

This report has been commissioned by MBB Group.

The site is located within the Sutherland Shire Council LGA, south of Captain Cook Drive.

The site is currently utilised by the Department of Education as a High School.

Of the 113 trees considered in this report and based upon the development plans provided, this report has determined that:

- 10 trees require removal to facilitate the proposed plans, and
- 103 trees may be retained based on condition.

Table 3 - Summary of the 103 trees to be retained (Number of trees)							
		Listed in Biodiversity Cons. Act	Env Pest (Exempt from TPO)	Low Landscape Significance	Medium Landscape Significance	High Landscape Significance	Significant Landscape Trees
Condition	SULE 1			17	47	26	
	SULE 2			1	8		
	SULE 3						
	SULE 4			4			

Table 2 - Summary of the 10 trees to be removed (Number of trees)							
		Listed in Biodiversity Cons. Act	Env Pest (Exempt from TPO)	Low Landscape Significance	Medium Landscape Significance	High Landscape Significance	Significant Landscape Trees
Condition	SULE 1			5	2	1	
	SULE 2				2		
	SULE 3						
	SULE 4						

Tree 73 is a highly significant tree and should be retained. It exists within a contained garden bed. Although the new modular classroom sits on top of the trees TPZ with only minor excavations. The classroom is to be placed above the ground with any excavations conducted by hand and supervised by the AQF5 arborist, this should allow sufficient infiltration from rainwater for the tree to remain healthy. It is recommended that further risk assessments are conducted by an AQF5 arborist, on a 12-month interval for a minimum of the preceding 5 years post construction. This is to ensure the trees health has not been compromised by the new construction. The tree will require crown raising prior to construction to compensate for the new dwelling.

The demountable classrooms west of trees 108 & 109 are being removed, as well as the concrete footpaths which intersect these trees TPZs.

Works proposed around these trees are as follows, new Building L proposes a slab on ground with piers east of tree 108 and a newly aligned footpath. Note that the existing building D remains unchanged. A new footpath can be constructed at or above NGLs, however must be aligned outside the SRZ of both specimens. A fenced tree protection zone shall be erected around tree 108 & 109 for the duration of the works. Trees 104 & 107 exist wholly within the development footprint and should be removed with tree replacement ratio of 4:1 planted on the site.

The new proposed car park has an extensive amount of cut and fill around its periphery and is realigned further to the west. The existing driveway alignment is being utilised, with revised levels within it. The cut and fill in the southwest corner of the proposed driveway will require the removal of tree 14, with tree replacement ratio of 4:1 planted on the site. Tree 15 is an endemic *Eucalyptus botryoides* and is able to be retained with tree protection implemented.

Trees 87, 88 & T114 all *Cupaniopsis anacardioides* Tuckeroo. To retain any of these trees, the proposal would require substantial architectural redesign, these trees removal of these trees will be required with a replacement ratio of 4:1 planted on the site

Trees 64,65,66,68,69 & 70 are in proximity of the proposed power supply substation. Tree removal associated with the new substation does not form part of the subject DA as these works are being undertaken via a separate approval pathway under Chapter 2, Clause 2.44 of the Transport, and Infrastructure SEPP

Any new trenching or boring required as part of drainage works must be revised to occur outside of TPZs of trees to be retained. Where this is impossible the lines shall be hand dug under supervision of the AQF5 Project Arborist.

Recommendations

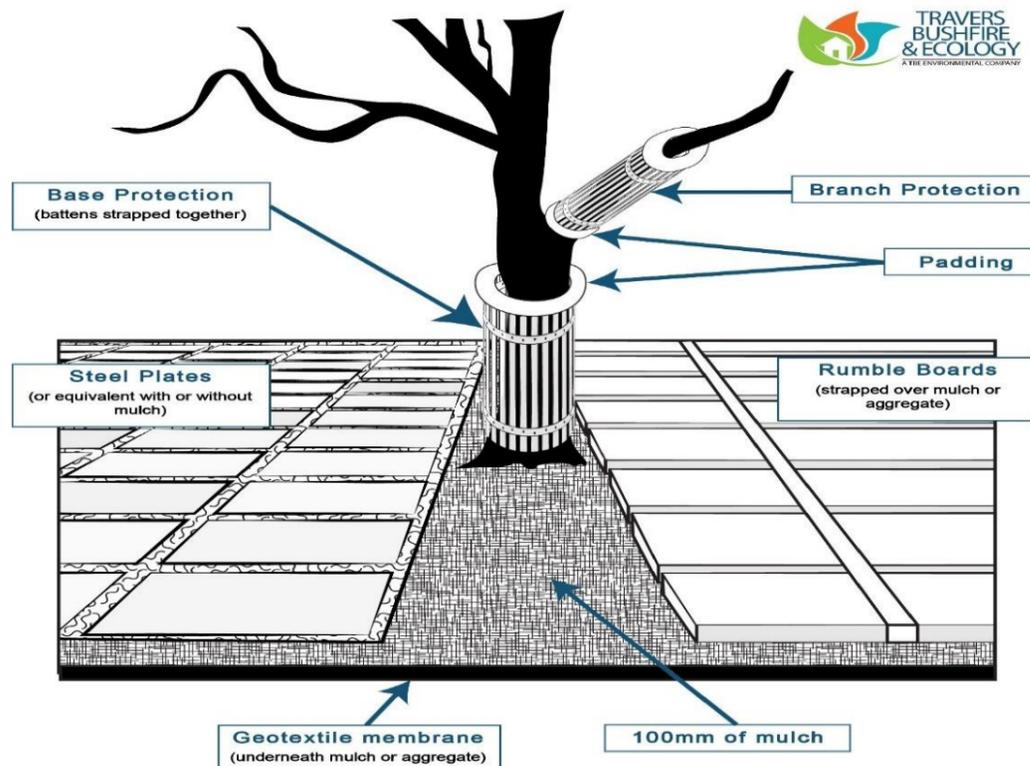
Provided that all Tree Protection Measures are implemented and works are carried out in a sensitive manner it is considered that the proposed development will not have a significant impact on the long-term health of any retained tree. It is envisaged that trees in the proposed courtyard including trees 98 & 103, can be retained as they are in existing garden beds that can be protected during construction works.

Trees 110 & 112, may be impacted by pavement however can be retained. There is to be no mechanical excavations conducted inside these trees TPZ. All excavations around these trees are to be conducted by hand and supervised by the project AQF5 arborist.

Selective pruning of trees 77,79,81,82,83,84, 86 & 113 are to be conducted, to accommodate the site demountable classrooms. All pruning works are to be performed by an AQF3 trade's arborist, directed by the project arborist as required. Whilst the proposed location to move the demountable classrooms may impede on the SRZ of adjoining trees, if demountable classrooms are placed above the ground, this should allow sufficient infiltration from rainwater for trees to remain healthy throughout the duration of construction.

Tree 85 *Eucalyptus botryoides* is in decline. Tree 85 should be removed with tree replacement ratio of 4:1 planted on the site, based on poor or declining health.

Tree 72 is clear of the new modular classroom and no effects on the trees SRZ or TPZ can be expected, as the modular classroom is expected to be supported on piers. However, the tree may require pruning of the south extending leader to accommodate the classroom.



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 nails or screwed.
- 2) Rumble boards should be of a suitable thickness to prevent soils compaction and root damage.

Figure 8 - Examples of Trunk, Branch and Ground Protection as per AS4970-2009



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Cronulla High School

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ATTACHMENT 1 – TREE ASSESSMENT DATA TABLE

Tag No.	Common Name	Scientific Name	DBH (cm)	Calc DBH (cm)	BD (cm)	Height (m)	Spread (m)	Vigour %	ULE	Trees AZ	STARS Life Expect.	STARS signif.	STARS retain value	TPZ Radius (m)	SRZ Radius (m)	Retain / Remove	Reason for Removal	Habitat Tree	Comment
T001	Bloodwood	Corymbia gummifera	29	29.00	33	10	6	80	1b	A2	15-40yrs	High	High	3.480	2.077	Retain			Good overall condition and structure, wound at 1m on east trunk.
T002	Bangalay	Eucalyptus botryoides	47,59	75.00	74	17	14	90	1a	A1	>40yrs	High	High	9.000	2.916	Retain			Very good overall condition and structure.
T003	Bangalay	Eucalyptus botryoides	47	47.00	53	14	9	95	1a	A1	>40yrs	High	High	5.640	2.535	Retain			Very good overall condition and structure, scaf at base of crown pruned.
T004	Bangalay	Eucalyptus botryoides	40	40.00	37	10	7	90	2a	A2	15-40yrs	Medium	Medium	4.800	2.180	Retain			Average condition and structure, 2 x old flush cuts of scafs, 30% epicormic growth.
T005	Coast Banksia	Banksia integrifolia	42	42.00	46	8	6	95	1a	A1	>40yrs	High	High	5.040	2.388	Retain			Very good overall condition and structure, wound at 1m on east side of trunk.
T006	Bangalay	Eucalyptus botryoides	39	39.00	41	13	9	95	1a	A1	>40yrs	High	High	4.680	2.276	Retain			Very good condition and structure, 1 x tear out observed.
T007	Bangalay	Eucalyptus botryoides	42	42.00	40	9	5	85	1b	A2	>40yrs	Medium	High	5.040	2.252	Retain			Good condition and structure, wound at 1.7m on north side of trunk 1 m long with good wound wood and bracket fungi at wound, several old tear outs. Recommend tree be monitored.
T008	Bangalay	Eucalyptus botryoides	27,42	50.00	46	8	5	90	1b	A2	>40yrs	Medium	High	6.000	2.388	Retain			Good structure, good condition, wound at 2.2m on eastern side of trunk with bracket fungi at wound.
T009	Bangalay	Eucalyptus botryoides	63	63.00	66	19	15	95	1a	A1	>40yrs	High	High	7.560	2.779	Retain			Very good condition and structure, pruned for adjacent overhead service wires, 1 x rubbing limb on lower crown.
T010	Bangalay	Eucalyptus botryoides	41	41.00	43	9	9	90	1a	A1	>40yrs	Medium	High	4.920	2.322	Retain			Very good overall condition and structure.
T011	Bangalay	Eucalyptus botryoides	46	46.00	49	22	18	95	1a	A1	>40yrs	High	High	5.520	2.453	Retain			Very good overall condition and structure, old wound at 3m on east side of trunk with bracket fungi.
T012	Willow Myrtle	Agonis flexuosa	24,27	36.00	46	5	6	90	1a	A1	>40yrs	Medium	High	4.320	2.388	Retain			Good condition and structure, codominant, pruned for adjacent overhead service wires.
T013	Bangalay	Eucalyptus botryoides	74	74.00	79	24	19	95	1a	A1	>40yrs	High	High	8.880	2.997	Retain			Very good overall condition and structure, pruned for adjacent overhead service wire.

Tag No.	Common Name	Scientific Name	DBH (cm)	Calc DBH (cm)	BD (cm)	Height (m)	Spread (m)	Vigour %	ULE	Trees AZ	STARS Life Expect.	STARS signif.	STARS retain value	TPZ Radius (m)	SRZ Radius (m)	Retain / Remove	Reason for Removal	Habitat Tree	Comment
T014	Bangalay	<i>Eucalyptus botryooides</i>	15,12,12	23.00	20	5	7	85	1a	A1	>40yrs	Medium	Medium	2.760	1.683	Remove	Development footprint		Average condition, good structure, multistem at base of crown, a bit stunted.
T015	Bangalay	<i>Eucalyptus botryooides</i>	39	39.00	41	11	9	90	1a	A1	>40yrs	Medium	Medium	4.680	2.276	Retain			Very good overall condition and structure, phototropic.
T016	Bracelet Honey-myrtle	<i>Melaleuca armillaris</i>	15,12,16,18,7	32.00	81	8	7	85	1b	A2	15-40yrs	Medium	Medium	3.840	3.029	Retain			Average condition, multi stem, on slope, 5% local deadwood.
T017	Bracelet Honey-myrtle	<i>Melaleuca armillaris</i>	23	23.00	27	8	4	65	2a	A2	15-40yrs	Medium	Medium	2.760	1.910	Retain			Average condition and structure, 50% local deadwood.
T018	Bracelet Honey-myrtle	<i>Melaleuca armillaris</i>	15,15	21.00	24	8	6	65	2a	A2	15-40yrs	Medium	Medium	2.520	1.817	Retain			Average condition and structure, 50% local deadwood.
T019	Bracelet Honey-myrtle	<i>Melaleuca armillaris</i>	16,21,18	32.00	30	8	8	65	2a	A2	15-40yrs	Medium	Medium	3.840	1.996	Retain			Average condition and structure, 35% local deadwood.
T020	Bracelet Honey-myrtle	<i>Melaleuca armillaris</i>	18	18.00	29	7	4	65	2a	A2	15-40yrs	Medium	Medium	2.160	1.968	Retain			Average condition and structure, 2 x old pruning wounds at base.
T021	Bracelet Honey-myrtle	<i>Melaleuca armillaris</i>	23	23.00	25	6	5	65	2a	A2	15-40yrs	Medium	Medium	2.760	1.849	Retain			Average condition and structure, 30% local deadwood.
T022	Bracelet Honey-myrtle	<i>Melaleuca armillaris</i>	25,23	34.00	37	8	6	75	2a	A1	15-40yrs	Medium	Medium	4.080	2.180	Retain			Average condition and structure, multistem, old pruning at base, 30% local deadwood.
T023	Wallangarra White Gum	<i>Eucalyptus scoparia</i>	78	78.00	133	17	20	75	1a	A1	>40yrs	High	High	9.360	3.730	Retain			Average condition, good structure, codominant at crown, old scafs on east leader pruned, evidence of regular previous pruning, 25% dieback, raised roots some with mower damage.
T024	Coast Banksia	<i>Banksia integrifolia</i>	39,8,36	54.00	72	7	7	85	1a	A1	>40yrs	Low	High	6.480	2.883	Retain			Good condition and structure, multistem, scaf pruned on east side, western leader torn out, a few other old tear outs.
T025	Willow Myrtle	<i>Agonis flexuosa</i>	43	43.00	49	6	7	90	1a	A1	>40yrs	Low	High	5.160	2.453	Retain			Very good overall condition and structure, epicormic growth at base - possibly an old wound.
T026	Willow Myrtle	<i>Agonis flexuosa</i>	43,38,26	63.00	64	7	7	65	1b	A2	15-40yrs	Low	Medium	7.560	2.744	Retain			Average condition, good structure, codominant, scafs on western side pruned, northern scaf is large old flush cut at base full of active borer -had a dig, cannot tell if carpenter ant or termites.
T027	Willow Myrtle	<i>Agonis flexuosa</i>	52	52.00	44	7	6	85	1a	A1	>40yrs	Low	High	6.240	2.344	Retain		Yes	Good condition, average structure, pruned for adjacent overhead service wires, heavily pruned overall, Tawny Frogmouth Owl in tree.

Tag No.	Common Name	Scientific Name	DBH (cm)	Calc DBH (cm)	BD (cm)	Height (m)	Spread (m)	Vigour %	ULE	Trees AZ	STARS Life Expect.	STARS signif.	STARS retain value	TPZ Radius (m)	SRZ Radius (m)	Retain / Remove	Reason for Removal	Habitat Tree	Comment
T028	Willow Myrtle	Agonis flexuosa	29	29.00	49	6	3	90	2d	Z10	15-40yrs	Low	Medium	3.480	2.453	Retain			Average condition, poor structure, was multistem but heavily pruned.
T029	Tallowood	Eucalyptus microcorys	60	60.00	66	25	19	90	1a	A1	>40yrs	High	High	7.200	2.779	Retain			Very good condition and structure, a few tear outs - some clean cut.
T030	Broad-leaved Paperbark	Melaleuca quinquenervia	33	33.00	30	9	6	70	1b	A1	>40yrs	Low	High	3.960	1.996	Retain			Average condition and structure, codominant, 25% dieback.
T031	Willow Myrtle	Agonis flexuosa	42	42.00	53	6	8	90	1a	A2	>40yrs	Low	Medium	5.040	2.535	Retain			Average condition and structure, 1 x scaf pruned scaf for overhead service wires.
T032	Bangalay	Eucalyptus botryoides	87	87.00	92	30	20	90	1a	A1	>40yrs	High	High	10.440	3.195	Retain			Excellent condition and structure, 2 x western scafs pruned.
T033	Broad-leaved Paperbark	Melaleuca quinquenervia	36	36.00	40	7	4	70	1a	A1	>40yrs	Low	High	4.320	2.252	Retain			Average condition, good structure, some dieback starting.
T034	Coast Teatree	Leptospermum laevigatum	33,31	45.00	48	6	9	75	1a	A1	>40yrs	Medium	High	5.400	2.431	Retain			Good condition and structure, codominant, likely a remnant tree, phototropic, horizontal habit.
T035	Coast Teatree	Leptospermum laevigatum	20,26,18,19	42.00	121	6	11	65	1b	A1	15-40yrs	Medium	High	5.040	3.585	Retain			Average condition, good structure, horizontal habit, 30% local deadwood.
T036	Broad-leaved Paperbark	Leptospermum quinquenervia	28,32	43.00	37	9	8	65	1a	A1	>40yrs	Low	High	5.160	2.180	Retain			Codominant, old scaf flush cut on eastern side of trunk, a few old tear outs.
T037	Willow Myrtle	Agonis flexuosa	48,39	62.00	165	7	10	85	1a	A1	>40yrs	Medium	High	7.440	4.084	Retain			Good condition and structure, west scaf pruned at base of trunk, several old tear outs.
T038	Willow Myrtle	Agonis flexuosa	39,21,25	51.00	48	8	8	35	4a	Z4	5-15yrs	Low	Low	6.120	2.431	Retain			Multistem, dieback establishing, recommend tree be monitored.
T039	Willow Myrtle	Agonis flexuosa	98	98.00	112	12	12	80	1b	A2	>40yrs	Medium	High	11.760	3.471	Retain			Good condition and structure, scaf on northern side of trunk flush cut.
T040	Broad-leaved Paperbark	Melaleuca quinquenervia	26	26.00	28	9	5	90	1a	A1	>40yrs	Low	High	3.120	1.939	Retain			Very good condition and structure.
T041	Bangalay	Eucalyptus botryoides	49	49.00	53	15	14	85	1a	A1	>40yrs	Medium	High	5.880	2.535	Retain			Good condition, excellent structure, scaf on eastern side flush cut.



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Tag No.	Common Name	Scientific Name	DBH (cm)	Calc DBH (cm)	BD (cm)	Height (m)	Spread (m)	Vigour %	ULE	Trees AZ	STARS Life Expect.	STARS signif.	STARS retain value	TPZ Radius (m)	SRZ Radius (m)	Retain / Remove	Reason for Removal	Habitat Tree	Comment
T043	Willow Myrtle	Agonis flexuosa	34	34.00	39	7	7	85	1a	A1	>40yrs	Low	High	4.080	2.228	Retain			Good condition, average structure, northern scafs pruned.
T044	Willow Myrtle	Agonis flexuosa	36,38,15,13,41	69.00	55	11	9	90	1a	A1	>40yrs	Medium	High	8.280	2.575	Retain			Very good condition and structure, multistem, old pruning wounds, some epicormic growth at base of trunk.
T045	Willow Myrtle	Agonis flexuosa	51	51.00	59	8	8	90	1b	A2	>40yrs	Low	High	6.120	2.652	Retain			Good condition and structure, old codominant leader on west pruned, old stem on trunk torn out leaving a large wound with borer.
T046	Willow Myrtle	Agonis flexuosa	43	43.00	50	6	8	80	1b	A2	>40yrs	Medium	Medium	5.160	2.474	Retain			Good condition, average structure, phototropic, pruning at 2.5m, 25% epicormic growth.
T047	Coast Banksia	Banksia integrifolia	53,49	72.00	145	10	11	95	1a	A1	>40yrs	Medium	High	8.640	3.868	Retain			Excellent condition and structure, western scaf pruned.
T048	Bangalay	Eucalyptus botryoides	48	48.00	50	12	9	95	1a	A1	>40yrs	High	High	5.760	2.474	Retain			Very good condition and structure, some pruning of lower branches previously.
T049	Swamp Oak	Casuarina glauca	22	22.00	29	7	5	85	1a	A1	>40yrs	Low	High	2.640	1.968	Retain			Very good condition and structure, phototropic.
T050	Bangalay	Eucalyptus botryoides	36	36.00	39	22	16	95	1a	A1	>40yrs	High	High	4.320	2.228	Retain			Very good condition and structure, 2% local deadwood, 5% epicormic growth, otherwise great tree.
T051	Tallowwood	Eucalyptus microcorys	53	53.00	56	14	11	95	1a	A1	>40yrs	Medium	High	6.360	2.594	Retain			Very good condition and structure, phototropic.
T052	bottle brush	Callistemon viminalis	22,22	31.00	28	7	4	90	1a	A1	>40yrs	Medium	High	3.720	1.939	Retain			Codominant, pruned for overhead service wires.
T053	Bangalay	Eucalyptus botryoides	47	47.00	50	20	10	90	1a	A1	>40yrs	High	High	5.640	2.474	Retain			Excellent condition and structure.
T054	Tallowwood	Eucalyptus microcorys	26	26.00	29	15	9	95	1a	A1	>40yrs	Medium	High	3.120	1.968	Retain			Very good condition and structure, some lower limbs pruned, very close to fence.
T055	Coast Banksia	Banksia integrifolia	79,79,49,46	130.00	129	19	18	95	1c	A4	>40yrs	High	High	15.600	3.683	Retain			Excellent condition and structure, a few old tea routs have clean cut, old tear out at 1m on west leader, good wound wood.
T056	Spotted Gum	Corymbia maculata	21	21.00	24	20	9	95	1a	A1	>40yrs	High	High	2.520	1.817	Retain			Very good condition and structure.



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T057	Bangalay	Eucalyptus botryoides	48	48.00	34	16	8	95	1a	A1	>40yrs	Medium	High	5.760	2.104	Retain			Very good condition and structure.
T058	Wallangarra White Gum	Eucalyptus scoparia	34	34.00	41	15	6	25	4a	Z4	<5yrs	Low	Low	4.080	2.276	Retain			In decline.
T059	Old-man Banksia	Banksia serrata	44	44.00	52	8	10	100	1a	A1	>40yrs	Medium	High	5.280	2.515	Retain			Excellent condition and structure.
T060	Bangalay	Eucalyptus botryoides	47	47.00	56	19	9	95	1a	A1	>40yrs	Medium	High	5.640	2.594	Retain			Very good condition and structure, old epi prune stub at 1m on south trunk.
T061	Bangalay	Eucalyptus botryoides	46	46.00	47	16	9	75	1b	A1	>40yrs	Medium	High	5.520	2.410	Retain			Good condition, average structure, likely due to termites - indicated by mudding and 35% epicormic growth.
T062	Coast Banksia	Banksia integrifolia	41	41.00	59	7	7	90	1a	A1	>40yrs	Low	High	4.920	2.652	Retain			Good condition and structure, old codominant pruned but good wound wood.
T063	Coast Banksia	Banksia integrifolia	91,79	121.00	117	14	11	75	1c	A4	>40yrs	High	High	14.520	3.535	Retain			Codominant and detaching at branch union but tree appears stable based on push yeast and sediment build up in branch union, fire char on trunk, north leader in decline plus previous
T064	Bangalay	Eucalyptus botryoides	24	24.00	27	14	8	90	1a	A1	>40yrs	Medium	High	2.880	1.910	Retain	Close to Substation Development footprint		Good condition and structure, old pruning at 2m.
T065	Bangalay	Eucalyptus botryoides	74	74.00	63	14	7	95	1a	A1	>40yrs	High	High	8.880	2.726	Retain	Close to Substation Development footprint		Very good condition and structure, west scap pruned for overhead service wires.
T066	Bangalay	Eucalyptus botryoides	28	28.00	30	12	6	90	1b	A1	>40yrs	Medium	High	3.360	1.996	Retain	Close to Substation Development footprint		Very good condition and structure, phototropic, pruned at 2.5m, 3m and 3.5m.
T067	Spotted Gum	Corymbia maculata	38	38.00	39	17	9	40	1b	A2	>40yrs	Medium	High	4.560	2.228	Retain			Average condition, good structure, good wound wood and occlusion, adjacent a new path with dieback that side i.e., east.
T068	Bangalay	Eucalyptus botryoides	34	34.00	38	29	14	95	1b	A1	>40yrs	High	High	4.080	2.204	Retain	Close to Substation Development footprint		Very good condition and structure, several pruned branches.
T069	Bangalay	Eucalyptus botryoides	58	58.00	63	28	14	80	1b	A2	>40yrs	High	High	6.960	2.726	Retain	Close to Substation Development footprint		Excellent condition and structure, dieback in lower crown due to adjacent new path.
T070	Coast Banksia	Banksia integrifolia	19,12	22.00	24	4	4	90	1a	A1	>40yrs	Medium	Medium	2.640	1.817	Retain	Close to Substation Development footprint		Very good condition and structure.

Tag No.	Common Name	Scientific Name	DBH (cm)	Calc DBH (cm)	BD (cm)	Height (m)	Spread (m)	Vigour %	ULE	Trees AZ	STARS Life Expect.	STARS signif.	STARS retain value	TPZ Radius (m)	SRZ Radius (m)	Retain / Remove	Reason for Removal	Habitat Tree	Comment
T071	Bloodwood	Corymbia gummifera	51	51.00	54	18	10	85	1b	A2	>40yrs	High	High	6.120	2.555	Retain			Very good condition and structure, minor dieback from adjacent new path.
T072	Tallowwood	Eucalyptus microcorys	70	70.00	75	32	20	95	1b	A1	>40yrs	High	High	8.400	2.933	Retain	Relocation of modular structure – building I(i) Will require pruning		Very good condition and structure, 2x scaff at 4m are dead, minor local deadwood on lower branches.
T073	Norfolk Island Pine	Araucaria heterophylla	89	89.00	99	19	18	100	1a	A1	>40yrs	High	High	10.680	3.295	Retain	Relocation of modular structure – building I(i) Will require pruning		Excellent condition and structure, growing in square bed therefore protected, lower underneath branches present in average condition.
T074	Brushbox	Lophostemon confertus	41	41.00	45	16	11	95	1b	A1	>40yrs	Medium	High	4.920	2.366	Retain			Very good overall, nice thick foliage in canopy, approx. 50cm from footpath.
T075	Mugga Ironbark	Eucalyptus sideroxylon	74	74.00	77	8	12	70	1b	A2	>40yrs	High	High	8.880	2.965	Retain			Good condition, excellent structure, stressed from adjacent new paths and compacted soils from pedestrian traffic. Recommend tree health be improved.
T076	Bangalay	Eucalyptus botryoides	63	63.00	49	22	10	95	1a	A1	>40yrs	High	High	7.560	2.453	Retain			Excellent condition, good structure, codominant with inclusion and elephants' ear on west side but no sign of splitting at branch union.
T077	Bangalay	Eucalyptus botryoides	27	27.00	36	8	6	85	1a	A1	>40yrs	Medium	High	3.240	2.155	Retain	Demountable structure selective Pruning		Very good condition and structure.
T078	Old-man Banksia	Banksia serrata	10,20	22.00	28	5	8	35	2a	A2	15-40yrs	Medium	High	2.640	1.939	Retain	Demountable structure selective Pruning		Tree is mature, codominant, a few borer holes and wounds expected for its age, compaction and new adjacent paths have likely caused stress. Recommend improve tree health or will
T079	Bangalay	Eucalyptus botryoides	69	69.00	70	15	8	90	1a	A1	>40yrs	Medium	High	8.280	2.849	Retain	Demountable structure selective Pruning		Good condition and structure.
T080	Bangalay	Eucalyptus botryoides	46	46.00	49	17	11	90	1b	A1	>40yrs	Medium	Medium	5.520	2.453	Retain	Demountable structure selective Pruning		Very good overall condition and structure, close to footpath, local deadwood to the western side (1 small branch).
T081	Bangalay	Eucalyptus botryoides	37	37.00	42	9	9	80	1b	A1	>40yrs	High	High	4.440	2.299	Retain	Demountable structure selective Pruning		Very good overall condition and structure, likely has new adjacent path stress and soil compaction stress.
T082	River Red Gum	Eucalyptus camaldulensis	26	26.00	28	13	8	95	1a	A1	>40yrs	Medium	Medium	3.120	1.939	Retain	Demountable structure selective Pruning		Very good condition and structure.
T083	Coast Banksia	Banksia integrifolia	31	31.00	32	5	3	85	1b	A2	>40yrs	High	High	3.720	2.051	Retain	Demountable structure selective Pruning		Good condition, average structure, codominant, included east leader tear out, few other tear outs.



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Tag No.	Common Name	Scientific Name	DBH (cm)	Calc DBH (cm)	BD (cm)	Height (m)	Spread (m)	Vigour %	ULE	Trees AZ	STARS Life Expect.	STARS signif.	STARS retain value	TPZ Radius (m)	SRZ Radius (m)	Retain / Remove	Reason for Removal	Habitat Tree	Comment
T084	Bangalay	Eucalyptus botryoides	23	23.00	27	7	7	90	1b	A1	>40yrs	Medium	Medium	2.760	1.910	Retain	Relocation of demountable structure Pruning		Good condition and structure, approx. 10cm from path.
T085	Bangalay	Eucalyptus botryoides	82,36	90.00	118	13	11	75	1b	A2	>40yrs	High	Low	10.800	3.548	Remove	Health and condition		Tree is in decline.
T086	Coast Banksia	Banksia integrifolia	16,7	17.00	35	3	4	85	1a	A1	>40yrs	Medium	Medium	2.040	2.129	Retain	Demountable structure selective Pruning		Good condition and structure, wound wood at base.
T087	Tuckeroo	Cupaniopsis anacaroides	18,19,21,21	40.00	40	5	7	90	1a	A1	>40yrs	Low	Medium	4.800	2.252	Remove	Development footprint		Juvenile tree, average condition, and structure.
T088	Tuckeroo	Cupaniopsis anacaroides	15,10,11,10,11,10	28.00	66	5	6	80	1b	A1	>40yrs	Low	Medium	3.360	2.779	Remove	Development footprint		Average condition, poor structure – multistemmed.
T089	Tuckeroo	Cupaniopsis anacaroides	28	28.00	33	6	7	75	1b	A1	>40yrs	Low	Medium	3.360	2.077	Retain			Juvenile tree, average condition, and structure.
T090	Tuckeroo	Cupaniopsis anacaroides	10	10.00	13	2	2	90	1a	A1	>40yrs	Low	Medium	2.000	1.405	Retain			Juvenile tree, average condition, and structure.
T091	Tuckeroo	Cupaniopsis anacaroides	9	9.00	10	2	2	65	1b	A1	>40yrs	Low	Medium	2.000	1.258	Retain			Juvenile tree, average condition, and structure.
T092	Tuckeroo	Cupaniopsis anacaroides	13	13.00	14	3	3	85	4d	Z5	15-40yrs	Low	Medium	2.000	1.449	Retain			Juvenile tree has lost a scaf, tree requires removal and replacement.
T093	Brushbox	Lophostemon confertus	66	66.00	48	7	8	65	1b	A2	15-40yrs	Low	High	7.920	2.431	Retain			Tree is growing in a large raised planter box style garden bed, dieback is establishing (25%), 1 x scaf is dead. Updated design of shade structure to retain the tree.
T094	Willow Myrtle	Agonis flexuosa	55,22,36	69.00	86	7	10	85	1b	A2	>40yrs	Medium	High	8.280	3.106	Retain			Good condition and structure.
T095	Bangalay	Eucalyptus botryoides	48,39,56, 30	89.00	51	11	14	10	4c	Z4	5-15yrs	Low	Low	10.680	2.494	Retain			In decline.
T096	Eucalyptus sp.	Eucalyptus sp.	28	28.00	31	9	5	65	2c	Z10	15-40yrs	Medium	Low	3.360	2.024	Retain			Average condition and structure, scaf tear out low in crown, dieback in upper crown.
T097	Willow Myrtle	Agonis flexuosa	48,49,37	84.00	116	12	10	60	1b	A2	>40yrs	Medium	Medium	10.080	3.522	Retain			Average condition, good structure, lignotuber at base, epicormic growth on east scaf.

Tag No.	Common Name	Scientific Name	DBH (cm)	Calc DBH (cm)	BD (cm)	Height (m)	Spread (m)	Vigour %	ULE	Trees AZ	STARS Life Expect.	STARS signif.	STARS retain value	TPZ Radius (m)	SRZ Radius (m)	Retain / Remove	Reason for Removal	Habitat Tree	Comment
T098	Bangalay	Eucalyptus botryoides	26	26.00	33	7	7	90	1a	A1	>40yrs	Medium	High	3.120	2.077	Retain			Good condition and structure.
T099	Spotted Gum	Corymbia maculata	43	43.00	44	9	10	85	1a	A1	>40yrs	Medium	High	5.160	2.344	Retain			Good condition and structure.
T100	Bangalay	Eucalyptus botryoides	19	19.00	20	8	4	95	1a	A1	>40yrs	Medium	High	2.280	1.683	Retain			Good condition and structure, juvenile tree.
T101	Spotted Gum	Corymbia maculata	47	47.00	49	14	13	85	1a	A1	>40yrs	Medium	High	5.640	2.453	Retain			Good condition, average structure.
T102	Eucalyptus sp.	Eucalyptus sp.	15	15.00	18	5	3	100	1a	A1	>40yrs	Medium	High	2.000	1.611	Retain			Good condition and structure.
T103	Norfolk Island Pine	Araucaria heterophylla	50	50.00	52	20	8	95	1a	A1	>40yrs	Medium	High	6.000	2.515	Remove	Development footprint		Very good condition and structure.
T104	Bangalay	Eucalyptus botryoides	36	36.00	38	18	10	90	1a	A1	>40yrs	Medium	High	4.320	2.204	Remove	Building Footprint		Very good condition and structure, lower scafs pruned.
T105	Bangalay	Eucalyptus botryoides	65	65.00	69	18	15	96	1a	A1	>40yrs	Medium	High	7.800	2.832	Remove	Building Footprint		Very good condition and structure, epicormic growth in lower crow.
T106	Bangalay	Eucalyptus botryoides	39,28	48.00	37	15	9	80	1b	A2	>40yrs	Medium	High	5.760	2.180	Remove	Building Footprint		Good condition and structure.
T107	Bangalay	Eucalyptus botryoides	26	26.00	29	9	6	85	1a	A2	>40yrs	Medium	High	3.120	1.968	Remove	Building Footprint		Good condition and structure.
T108	Tallowwood	Eucalyptus microcorys	48	48.00	51	19	12	95	1a	A1	>40yrs	Medium	High	5.760	2.494	Retain	Protection required		Very good condition and structure.
T109	Broad-leaved Paperbark	Melaleuca quinquenervia	49	49.00	54	18	13	95	1a	A1	>40yrs	High	High	5.880	2.555	Retain	Protection Required		Very good condition, good structure, codominant with inclusion but attachment presents secure.
T110	Swamp Oak	Casuarina glauca	47	47.00	49	10	8	95	1a	A1	>40yrs	Medium	High	5.640	2.453	Retain	Protection Required		Very good condition and structure, phototropic - leaning north but self-correcting.
T111	Swamp Oak	Casuarina glauca	55	55.00	49	11	9	95	1a	A1	>40yrs	Medium	High	6.600	2.453	Retain	Protection Required		Excellent condition and structure, old scaf flush cut on west at 1.8m on trunk.
T112	Swamp Oak	Casuarina glauca	36	36.00	39	9	6	85	1a	A1	>40yrs	Medium	High	4.320	2.228	Retain	Protection Required		Good condition, very good structure.



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T113	Old Man Banksia	<i>Banksia serrata</i>	16,18,22	33	38	12	7	80	2a	A1	15-40yrs	Medium	Medium	3.91	2.20	Retain	Demountable structure selective Pruning		3x trunks at 0.3m, exposed wood at base
T114	Tuckeroo	<i>Cupaniopsis anacardioides</i>	15,15,18,7,10,7,5	32	32	13	10	90	2a	A1	15-40yrs	Medium	Medium	3.79	2.05	Remove	Development footprint		



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Tree Retention Value – Priority Matrix

		Significance				
		1. High	2. Medium	3. Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1. Long >40 years					
	2. Medium 15-40 Years					
	3. Short <1-15 Years					
	Dead					

Legend for Matrix Assessment	
	Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 <i>Protection of trees on development sites</i> . Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.
	Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for Removal (Low) - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.



Tree Significance - Assessment Criteria

1. High Significance in landscape

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa *in situ* - tree is appropriate to the site conditions.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

Attachment 4 - Tree AZ Categories

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species

- Z1** Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
- Z2** Too close to a building, i.e. exempt from legal protection because of proximity, etc
- Z3** Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc

High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure

- Z4** Dead, dying, diseased or declining
Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
- Z5** Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
- Z6** Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people
- Z7** Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
- Z8** Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc

Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population

- Z9** Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
- Z10** Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
- Z11** Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
- Z12** Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

- A1** No significant defects and could be retained with minimal remedial care
- A2** Minor defects that could be addressed by remedial care and/or work to adjacent trees
- A3** Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
- A4** Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)

NOTE: Category A1 trees that are already large and exceptional, or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.

TreeAZ is designed by Barrell Tree Consultancy (www.barrelltreecare.co.uk) and is reproduced with their permission

Attachment 5 – Useful Life Expectancy (ULE)

(Source: Jeremy Barrell 2009 www.Barrelltreecare.co.uk)

	1 – Long	2 – Medium	3 – Short	4 – Removal	5 – Moved or Replaced
A	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk	Trees that appeared to be retainable at the time of assessment for 15 – 40 years with an acceptable level of risk	Trees that appeared to be retainable at the time of assessment for 5 – 15 years with an acceptable level of risk	Trees that should be removed within the next 5 years	Trees which can be reliably removed or replaced
B	Structurally sound trees located in positions that can accommodate future growth	Trees that may only live between 15 and 40 years	Trees that may only live between 5 and 15 years	Dead, dying, suppressed or declining trees through disease or inhospitable conditions	Small trees less than 5m in height
C	Trees that could be made suitable for retention in the long term by remedial care	Trees that may live for more than 40 years but would be removed for safety or nuisance reasons	Trees that may live for more than 15 years but would be removed for safety or nuisance reasons	Damaged trees through structural defects including cavities, decay, included bark, wounds or poor form	Trees that have been pruned to artificially control growth
D		Trees that could be made suitable for retention in the medium term by remedial care	Trees that require substantial remedial tree care and are only suitable for retention in the short term	Damaged trees that are clearly not safe to retain	
E				Trees that may live for more than 5 years but should be removed to prevent interference with more suitable individuals or to provide space for new plantings	
F				Trees that are damaging or may cause damage to existing structures within 5 years	
G				Trees that will become dangerous after removal of other trees for reasons given in (A) to (F)	



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