Travers

bushfire & ecology

Tree Assessment Report

Amendments to
SSD Approval SSD-9741
(Section 4.55 Application)
1 Sirius Road
Lane Cove West

February 2020
REF: (18AWE02UT)

Tree Assessment Report

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(S4.55 Application)

1 Sirius Road
Lane Cove West

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Disclaimer:

This report has been prepared to provide advice to the client on matters pertaining to the particular and specific development proposal as advised by the client and / or their authorised representatives. This report can be used by the client only for its intended purpose and for that purpose only. Should any other use of the advice be made by any person, including the client, then this firm advises that the advice should not be relied upon. The report and its attachments should be read as a whole and no individual part of the report or its attachments should be interpreted without reference to the entire report.

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. In addition we have not been supplied with a cut and fill plan. Therefore the impacts of the cut and fill required for the project has been estimated to the best of our ability.

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Executive Summary

This tree assessment report (TAR) has been prepared by *Travers bushfire & ecology* to assess the condition and significance of trees, and trees impacted by proposed works, within Lot 1 DP 1151370, Number 1 Sirius Road, Lane Cove West, in the Lane Cove local government area (LGA). This TAR has been updated for proposed Amendments to SSD Approval SSD-9741.

A safe useful life expectancy (SULE) and Tree AZ assessment was conducted on 8th and10th December, 2018. This tree assessment report has been prepared in accordance with Australian Standard *AS4970 (2009) – Amendment No. 1 2010*.

Proposed works

The proposed works are for a multi storey building to house a data centre with associated infrastructure such as emergency generators, services and car parking. These works may involve, in certain places: bulk earthworks such as cut and fill, level changes; re-shaping, reinforcement and stabilisation of any cut rock face and installation of stormwater infrastructure.

Impact of the proposed development on trees

An assessment of all trees equal to or greater than 15cm Diameter at Breast Height (DBH) was undertaken. A total of one-hundred and seventy-one (171) trees were assessed within the site.

It is noted that the SULE assessment identifies that ninety-five (95) of the observed trees (55.55%) had a SULE condition rating of 1 or 2 (good condition). Thirty-five (35) of the assessed trees (20.47%) had a SULE rating of 4, that is, in poor condition.

The proposed works will remove eighty four (84) trees within the impact area regardless of their SULE rating. The breakdown is as follows:

- Trees removed within or immediately adjacent to the impact area, regardless of SULE rating – 84/171 trees = 49.12%
- Trees removed for poor SULE rating (3b, 3c, 4a-4f) – 34/171 trees = 19.88%,
- Trees removed that are exotic / weed species – 9/171 = 5.26%
- Retained trees – 44/171 = 25.73%

Tree protection zones (TPZ) are to be implemented for any retained tree in accordance with Australian Standard *AS4970* (Section 4). This report defines the Structural Root Zone (SRZ), Tree Protection Zone (TPZ) and other protection measures required for trees to be retained also in accordance with Australian Standard *AS4970*.

Threatened ecological communities

The majority of the trees present within the study area are commensurate with Plant Community Type (PCT) 1776 – Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast. This plant community type (PCT 1776) is not commensurate with any Threatened Ecological Community (TEC) listed under the NSW *BC Act* (2016) or the Commonwealth *EPBC Act* (1999).

Visually significant trees

Twenty-nine (29) trees within the study area are visually prominent trees primarily due to their size and being ‘larger than most’ of the trees observed. Twenty (20) of these trees are to be removed either due to poor health or because they are located within or closely adjacent to the development footprint.

Hollow-bearing trees

Twelve (12) trees were found to contain a variety of small cracks, splits or hollows that may support roosting/breeding habitat for hollow-dependent threatened fauna species. Eight (8) hollow-bearing trees are identified to be removed either due to poor health or because they are located within or closely adjacent to the development footprint.

Heritage trees

The Lane Cove Local Environment Plan (LEP) 2015 does not list or map any trees of heritage conservation significance within the vicinity of the study area. An additional search of the National heritage tree register found that no nationally listed heritage trees were located in the locality. Trees may however be included into a tree significance register if the specimen displays cultural, historic, scientific and/or aesthetic value. No trees present on site are considered appropriate for nomination to the significant tree register.

List of abbreviations

AS 4970	Protection of trees on a development site
APZ	asset protection zone
BC Act	*Biodiversity Conservation Act 2016*
BPA	bushfire protection assessment
CRZ	critical root zone
DCP	Development Control Plan
DOEE	Commonwealth Department of Environment & Energy
EEC	endangered ecological community
EPBC Act	*Environment Protection and Biodiversity Conservation Act*
ha	hectares
HTA	habitat tree assessment
IPA	inner protection area
LEP	local environment plan
LGA	local government area
m	metres
NES	national environmental significance
OPA	outer protection area
PBP	*Planning for bush fire protection 2006*
SRZ	structural root zone
SULE	safe useful life expectancy
TPO	tree preservation order
TPZ	tree protection zone
TRRP	tree retention and removal plan
TSC Act	*Threatened Species Conservation Act 1995*

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Attached Schedules

Background 1

This tree assessment report has been prepared by *Travers bushfire & ecology* to assess the condition and significance of trees, and trees impacted by proposed works, within Lot 1 DP 1151370, Number 1 Sirius Road, Lane Cove West, in the Lane Cove local government area (LGA). This TAR has been updated in January 2020 for proposed Amendments to SSD Approval SSD-9741.

The area subject to detailed survey effort is identified in Figures 1 and 2 and will hereafter be referred to as the 'study area'.

The tree condition assessment is based on the SULE (Barrell, 1993) and TreeAZ (Barrell 2010) classifications. The purpose of this report is to classify the existing condition of the trees within the study area and to identify those being impacted by the proposed development.

1.1 Proposed development

The proposed works are to reform the ground surface which may involve areas of cut and fill, and to construct a multi-storey building for the purposes of housing a data centre. This building will include carparking, services such as power, emergency generators, water and sewage. These works may involve, in certain places: bulk earthworks such as cut and fill, level changes; re-shaping, reinforcement and stabilisation of any cut rock face and installation of stormwater infrastructure.

1.1.1 Proposed Amendments to SSD Approval SSD-9741:

The proposed modifications to the original SSD approval are a product of a change in essential infrastructure equipment associated with the project. The original proposed scheme included Medium Voltage emergency generators which provide backup power supplies to the site in the event of a major disruption to the authority supply. The proposed modifications replace the MV generators with Low Voltage generators. The direct outcome of this replacement is an increase in the number of generators required to effectively power the entire site. In addition to the increase in generator numbers and associated flow on effects, the revised drawings include other modifications to the original scheme.

In summary, the proposed changes include;

- Previous building phases A, B and C, have been rationalised into 2 phases; buildings A and B.

- External plant platforms revised to suit the increase in generator numbers. The increase has necessitated additional levels to the external plant and equipment platforms. Increase from two to four levels on the west; five levels to the north; and 6 levels to the east. The footprint area has increased slightly to accommodate the required numbers. Overall height of the plant platforms aligns with existing parapet levels on the building. Overall numbers of generators increased from 80 to 116. The LV generators are smaller in physical size and capacity.

- Diesel fuel storage, originally located externally as approved under SSD-9741; has been located within the building on level 1. These consist of 16 individual steel tanks located on the northern side of level 1. The diesel store will be bunded to contain any potential fuel leaks or spills.

- In addition to the increase in generators, all previous switchgear and power train units have also been transferred to the external plant decks. This allows the western zone in level 1 to be deleted with the exception of the Diesel store. The zone in the eastern end will be utilised for additional data halls. The addition of data halls to L1 will require the lowest level to be set at rl.8.40, previously 9.90.

- Relocation of required carparking to the west and north faces of the building. Carparking moved to allow for water storage tanks at western end of carparking area.

- Provision of safety barrier to north and south faces of the roof level. Due to proximity of mechanical plant, perforated screens added to prevent potential falls.

- Goods lift (one off) extended to service roof area, to facilitate maintenance access.

- Passenger lift added to southern side to facilitate pedestrian access to all levels.

- Minor position adjustment to western fire trail to accommodate revised plant platforms.

There are no impacts on the previous approach for landscaping works. Civil works with regard to stormwater management remains unchanged, bulk excavation levels adjusted to suit levels associated with platform modifications and L1 modifications.

The proposed amendments have no material change in outcome for vegetation management works surrounding the site. We note that a power easement is now on the plans to the South western corner of the site which restricts the planting to native grasses within that easement (total area of impact being 200m^2). The VMP has been amended accordingly.

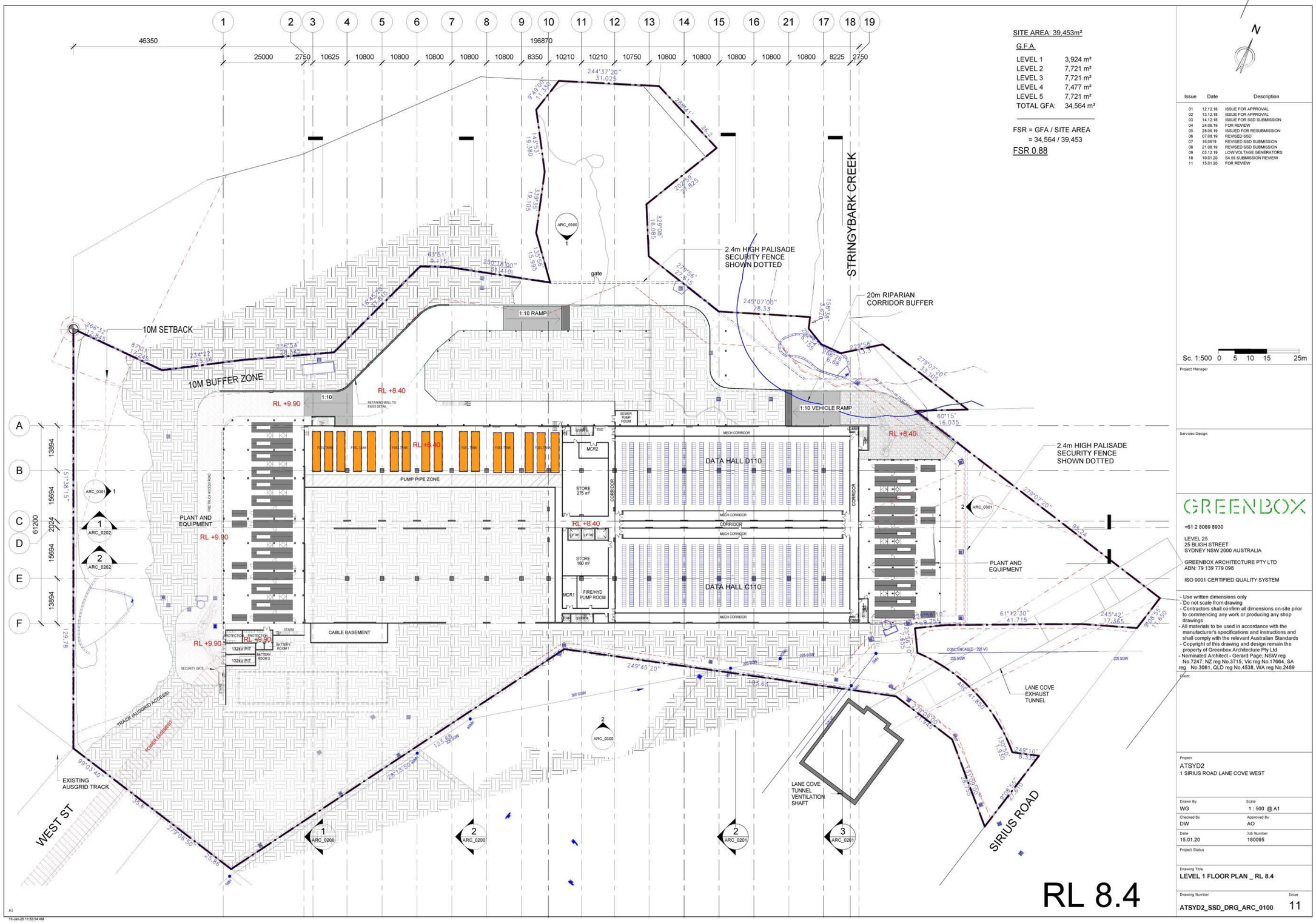


Figure 1 – Basement and Level 1 Layout ***(Source: Greenbox Architecture Pty Ltd, dated 15/01/2020)***

Figure 2 – Tree assessment study area

Survey Methods 2

2.1 Tree survey and condition assessment

Tree survey and assessment of the study area was conducted on 8th and 10th December, 2018. Tree inspections and assessment were undertaken in accordance with Australian Standard *AS4970 (2009)-Amendment 1 (2010).*

The aim of this tree assessment is to assess the condition and significance of trees within the study area, map the locations and determine which trees will be impacted by the proposed development.

The following survey and assessment was undertaken:

- a tree condition assessment
- a health assessment (SULE rating) of the trees
- an assessment of the significance of individual trees
- compilation of this report detailing the results of the above assessments

Trees with diameter at breast height (DBH) greater than 15cm were assessed. The tree assessment data is provided within Schedule 1, the location and number of each tree is shown in Schedule 2 and a description of terminology used is provided as Schedule 3.

The management requirements for maintaining safe trees (pruning, thinning etc.) was also considered in determining the health rating, therefore health ratings given to trees within this report assumes that appropriate maintenance will be provided by a qualified arborist during the life of the assessed trees. Incorrect or absent tree maintenance can significantly accelerate tree decline and increase hazard potential.

2.2 Identification of tree species

The identification of tree species is undertaken using available field guides and botanical texts. For any unidentifiable species a qualified and experienced botanist was utilised to confirm the tree identification. In some cases exotic species may be identified to family name only. Samples may be sent off to the Royal Botanic Gardens should a potential threatened or rare species be present and where the identification is not clear. Further samples may be required during flowering and fruiting seasons of the tree to confirm the identification.

2.3 Structural faults and decay

Visible evidence of structural defects and evidence of decay is briefly assessed during tree inspections. Structural defects are categorised into (Matheny & Clark 1994):

- root defects – including but not limited to suspect root rot, root exposure, root pruning or restriction

- trunk defects – including but not limited to evidence of decay, structural damage, *Phytophthora* and bracket fungi, excessive lean, borer damage, hollows, cracks, deadwood and multiple attachments

- crown defects - including but not limited to poor taper, bow or sweep, forks, multiple attachments, excessive end weight, cracks, splits, hangers, girdling, wounds, decay, cavities, conks, mushroom or bracket fungi, bleeding/sap flow, hollows, deadwood, borers, termites, ants, cankers, balls, burls and previous failures

Visible evidence of structural defects or decay are noted during inspections however we advise that the individual trees require detailed assessment if they are located or are to be retained in close proximity to buildings, proposed works or within proposed curtilage areas.

Overall tree health is an indicator of the life of the tree but sometimes hidden structural defects or decay can cause immediate structural failure when a tree is stressed due to high winds, lightning strikes or other natural impacts.

Structural defects or decay are not always visible from the exterior and may only become evident after damage has been caused. In the event that structural faults are detected, such as caused by hollows, fungal or termite attack, then internal diagnostic testing of the trees structural integrity is recommended.

Internal Diagnostic Testing (IDT) can be undertaken by Resistograph® to determine the trees structural integrity by measuring the location, extent and positioning of internal decay at the defects detected.

Travers bushfire & ecology advises that specialist advice should be sought for any trees in close proximity to any proposed works or if a structural assessment is required to determine the extent of structural faults and decay for tree retention or removal purposes.

Survey Results 3

A total of one-hundred and seventy-one (171) trees with a DBH greater than 15cm were assessed within the study area (see Schedule 1). Trees were numbered with labels T-G001, T-L001 and T-r001 and each series was incremented by one number per tree. A metal tag embossed with the tree number was placed on the trunk for re-identification during future works.

3.1 Threatened ecological communities (TECs)

The vegetation within the study area contains patches of forest dominated by *Angophora costata* (Sydney Red Gum), *Eucalyptus piperita* (Sydney Peppermint) and *Eucalyptus resinifera* (Red Mahogany). *Corymbia gummifera* (Red Bloodwood) and *Eucalyptus pilularis* (Blackbutt) also occurred sporadically within the vegetation community which can be assigned to plant community type (PCT) 1776 – Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast. PCT 1776 is not commensurate with any Threatened Ecological Community (TEC) under the NSW *BC Act* (2016). PCT 1776 is also not commensurate with any TEC listed under the Commonwealth *EPBC Act* (1999).

3.2 Council's significant tree register

The Lane Cove LEP (2009) heritage map was inspected for any heritage trees within the study area; no heritage listed trees were recorded within the site. There is however a listed archaeological site which adjoins the north-eastern boundary of the subject site.

A check of the National historic tree database found no listed historical or significant trees within the locality. Trees may however be included into a tree significance register if the specimen displays cultural, historic, scientific and/or aesthetic value. No trees present on site are considered appropriate for nomination to the significant tree register.

3.3 Visually prominent trees

Twenty-nine (29) trees within the study area are visually prominent trees primarily due to their size and being 'larger than most' of the trees observed. Twenty (20) of these trees require removal due to the development or being within close proximity and having poor health.

Given the presence of trees comparable in size throughout the wider locality and within adjoining riparian corridors, the removal of these trees will not be significant with regard to local amenity and ecology. If any of these trees are desired to be retained, an AQ5 qualified arborist must be engaged to undertake individual assessments to determine the feasibility of retention.

3.4 Hollow bearing trees

Twelve (12) trees were found to contain a variety of small cracks, splits or hollows that may support roosting/breeding habitat for hollow-dependent threatened fauna species. It is unknown if any hollows are occupied by native fauna.

The proposal will require the removal of eight (8) hollow-bearing trees which collectively have twenty-three (23) hollows of varying sizes. Twenty-four (24) compensatory nest boxes are to be installed at least 1 month prior to the commencement of tree removal works to ensure replacement roosting habitat is available prior to the commencement of tree felling works. These nest boxes can be comprised of re-used hollows from felled trees, with the remainder made up by constructed Nest Boxes. Details regarding the installation of nest boxes and re-used hollows is provided within the Vegetation Management Plan produced by *Travers bushfire and ecology* (Ref: 18AWE02V, January 2020).

Any hollow-bearing tree identified for removal will require supervision by a fauna ecologist at the time of removal to effectively recover any residing fauna, particularly threatened species, if present.

Table 3.1 – Summary of hollow-bearing trees

Tree No	Scientific Name	DBH (cm)	Spread (m)	Height (m)	Vigour (%)	Habitat tree category	Hollows & other habitat features recorded	Retain / Remove
T-G008	*Angophora costata*	21	4	10	70	Cat-3	1x 0–5cm	Remove Development
T-G026	Dead Stag	45,45	8	15	0	Cat-3	5x 0–5cm trunk cracks	Remove Poor health
T-G038	Dead Stag	44	3	12	0	Cat-2	2x 0–5cm branch spouts	Remove Poor health
T-G040	*Eucalyptus sclerophylla*	61	12	24	75	Cat-3	1x 5–10cm trunk hollow	Retain
T-G041	*Eucalyptus sclerophylla*	87	20	28	75	Cat-3	2x 0–5cm branch spouts	Retain
T-G057	*Eucalyptus piperita*	120,38	24	28	75	Cat-3	2x 0–5cm trunk & broken branch 1x 5–10cm broken branch	Remove Development
T-G066	Dead Stag	81	8	12	0	Cat-1	2x 0–5cm broken branch, 2x 5–10cm broken branch, 1x 10–15cm broken branch 2x 15–20cm broken branch	Retain
T-G084	Dead Stag	47	6	18	0	Cat-3	3x 0–5cm broken branches 1x 5–10cm branch hollow	Remove Poor health

Tree No	Scientific Name	DBH (cm)	Spread (m)	Height (m)	Vigour (%)	Habitat tree category	Hollows & other habitat features recorded	Retain / Remove
T-G088	*Eucalyptus piperita*	110,47	20	24	70	Cat-1	2x 0–5cm branch spouts 1x 5–10cm trunk hollow 1x 15–20cm broken branch	Retain
T-G123	Dead Stag	55	12	22	0	Cat-2	1x 0–5cm broken branch, 2x 5–10cm broken branch, 1x 10–15cm broken branch	Remove Poor health
T-L001	*Eucalyptus pilularis*	88	17	27	60	Cat-2	2x 5–10cm broken branch, 2x 10–15cm broken branch	Remove Development
T-L018	*Eucalyptus umbra*	94	26	32	65	Cat-3	1x 5–10cm branch hollow	Remove Development

3.5 SULE rating

An assessment of the attributes and health of each tree is contained in Schedule 1. Where trees have been downgraded with respect to health, a comment as to the reasons for the downgrade is generally provided. A summary of SULE results in provided in the following table:

Table 3.2 – Summary of SULE ratings

SULE Rating	No of Trees assessed	Proportion of trees assessed
1a	6	3.51%
1b	2	1.17%
1c	0	0.00%
2a	72	42.11%
2b	5	2.92%
2c	1	0.58%
2d	9	5.26%
3a	7	4.09%
3b	27	15.79%
3c	7	4.09%
3d	0	0.00%
4a	20	11.70%
4b	0	0.00%
4c	14	8.19%
4d	0	0.00%
4e	1	0.58%
4f	0	0.00%
Total	171	100.0%

Eight (8) of the observed trees (4.68%) had a SULE rating of 1. These trees are in excellent condition and are retainable for more than 40 years with an acceptable level of risk.

Eighty-seven (87) of the observed trees (50.88%) had a SULE condition rating of 2. These trees are in good condition and are retainable for 15 - 40 years with an acceptable level of risk.

Twenty (20) trees were found to be dead, dying or otherwise declining, these trees were given a SULE rating of 4a. There were fifteen (15) additional trees with significant structural weaknesses such as heavily leaning trunk or exposed decaying wood, these trees subsequently received a SULE rating of 4c or 4e as indicated in Schedule 1.

Trees with a SULE rating of 4 are in poor condition and should be removed if they pose a threat to life or property within the future development. However, some of these trees will be retained within the more remote parts of the site as they do not pose a threat. These trees are located well away from the proposed development footprint and any pedestrian curtilage areas, and they contain hollows suitable for fauna use. These trees are unlikely to cause loss of life or property at these locations and they are to be retained in order to preserve some fauna habitat within the site and to minimise tree removal.

Other trees of lower health or vigor, or with less significant damage have been given a SULE of 3 as they may have potential safety concerns now or in the near future, despite the potential for them to remain alive for up to fifteen (15) years or more.

Trees with defects that may be retained in the short to medium term following remedial work have been rated 2d. These include trees with minor defects, overhanging branches or large amounts of deadwood that may be treated or corrected though remedial care.

Various other defects related to poor health were observed for different trees and generally, where a tree's health has been downgraded the reasons are provided in the comments column in Schedule 1.

Tree Removal & Impacts

4

4.1 Removal of trees due to condition

In assessing the removal of trees for a proposed development, trees assessed with a SULE rating of 3b, and 4a-4f are generally recommended for removal based on a short life expectancy, are dangerous or in a very poor condition. This is particularly the case of trees in close proximity to adjoining dwellings or site assets.

Thirty four (34) trees or 19.88% of the assessed trees are recommended for removal due to their poor condition.

The following table is a summary of trees proposed for removal and retention:

Table 4.1 – Trees to be removed or retained

Trees removed within the development impact area regardless of SULE rating	84	49.12%
Trees removed for very poor condition SULE 3b, 3c or 4a-f	34	19.88%
Trees removed for being exotic / weed species	9	5.26%
Trees retained	44	25.73%
Total	171	100.00%

4.2 Removal of trees due to proposed development

Eighty four (84) or 49.12% of the trees within the study area are proposed for removal, regardless of their SULE rating, as they are located within or in close proximity to the impact area.

4.3 Impact assessment

The development of the site is anticipated to require the removal of eighty four (84) trees (49.12%) within the study area regardless of their SULE rating.

A further thirty four (34) trees or 19.88% of the assessed trees are recommended for removal due to their poor condition (SULE ratings 3b, 3c, and 4a-f).

A further nine (9) trees (5.26%) will be removed as they are exotic or weed species. This is to improve the natural biodiversity and health of the retained native vegetation.

Based on the above approach the proposed development results in the removal of one hundred and twenty-seven (127) or 74.26% of the trees observed within the site. Forty-four (44) trees (25.73%) located within the study area are to be retained.

Twelve (12) hollow-bearing trees were observed within the study area. Eight (8) of these trees are identified to be removed. If any tree with a hollow is found and identified for removal, then supervision by a fauna ecologist at the time of removal is recommended to effectively recover and relocate any residing fauna, particularly threatened species, if present.

Three hollow-bearing trees will be retained in areas that are well separated from the proposed development footprint and where these trees will not pose a direct threat to life and property. This is to reduce the number of trees removed and to preserve habitat for fauna.

For all trees that are to be retained, it is recommended that Tree Protection Zones (TPZ) are to be implemented for any retained tree in accordance with Australian Standard *AS4970* (Section 5.1).

Tree Protection Guidelines 5

The following sections provide guidance as to the expected TPZs required for trees to be retained within the development site, or affected by associated works. TPZs consist of:

(a) Tree protection zone (TPZ) which aims to protect the full extent of the tree, and
(b) Structural root zone (SRZ) which aims to define the critical root zone (CRZ) for the tree without causing fatal damage to the tree.

These are generic guidelines and any tree specific advice and management is required to assess impacts on trees that are affecting more than 10% of the tree protection zone or have suspected structural damage.

5.1 Tree protection measures

To determine the SRZ, the following is applied in accordance with Australian Standard *AS4970 – 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 m, 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.

Table 5.1 – Estimated TPZ for trees

DBH (cm)	TPZ (m)
15	1.8
20	2.4
25	3
30	3.6
35	4.2
40	4.8
45	5.4

Table 5.1 – Estimated TPZ for trees

DBH (cm)	TPZ (m)
50	6
55	6.6
60	7.2
65	7.8
70	8.4
75	9
80	9.6
85	10.2
90	10.8
95	11.4
100	12
105	12.6
110	13.2
115	13.8
120	14.4
150	18
200	24
250	30

Table 5.2 – Estimated SRZ for trees

BD (cm)	SRZ (m)
15	1.49
20	1.68
25	1.85
30	2
35	2.13
40	2.25
45	2.37
50	2.47
55	2.57
60	2.67
65	2.76
70	2.85
75	2.93
80	3.01
85	3.09
90	3.17
95	3.24
100	3.31
105	3.38
110	3.44
115	3.51

120	3.57
150	3.92
200	4.43
250	4.86
300	5.25

The SRZ and TPZ calculated for each of the trees assessed within the study area are provided in Schedule 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 should be conducted at 3, 6, 9 and 12 months and then 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:

i. 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 3).

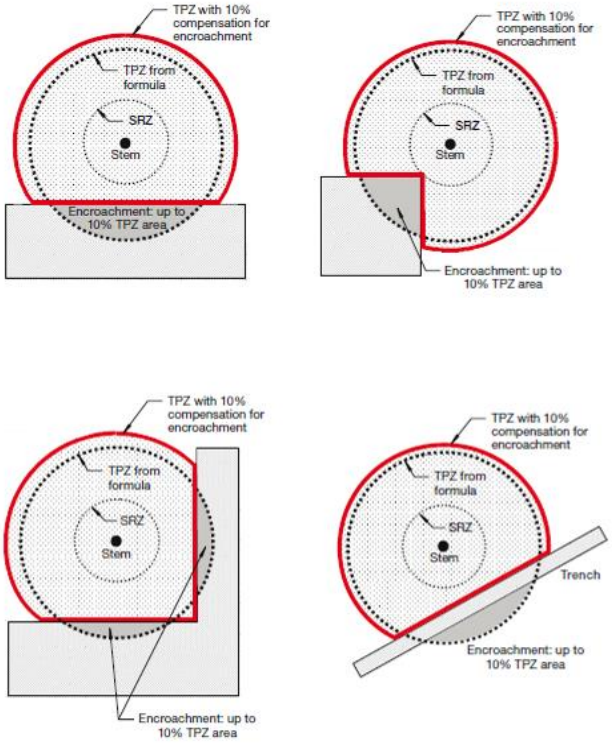


Figure 3 - Minor encroachment on TPZ and 10% compensation for encroachment (Source AS 4970-2009)

ii. 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.

iii. 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.

iv. Stumps are to be ground not dozed or dug out unless they impact on the installation of services, roads or building works.

v. All excavation including but not limited to trenches, footings and major earth movement are to be avoided within TPZ's.

vi. Stockpiling materials and soils within TPZs is to be avoided.

vii. All machinery and vehicles are to be excluded from TPZs during all operations.

viii. 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.

ix. The following activities prohibited within TPZs includes but are 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
- 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.

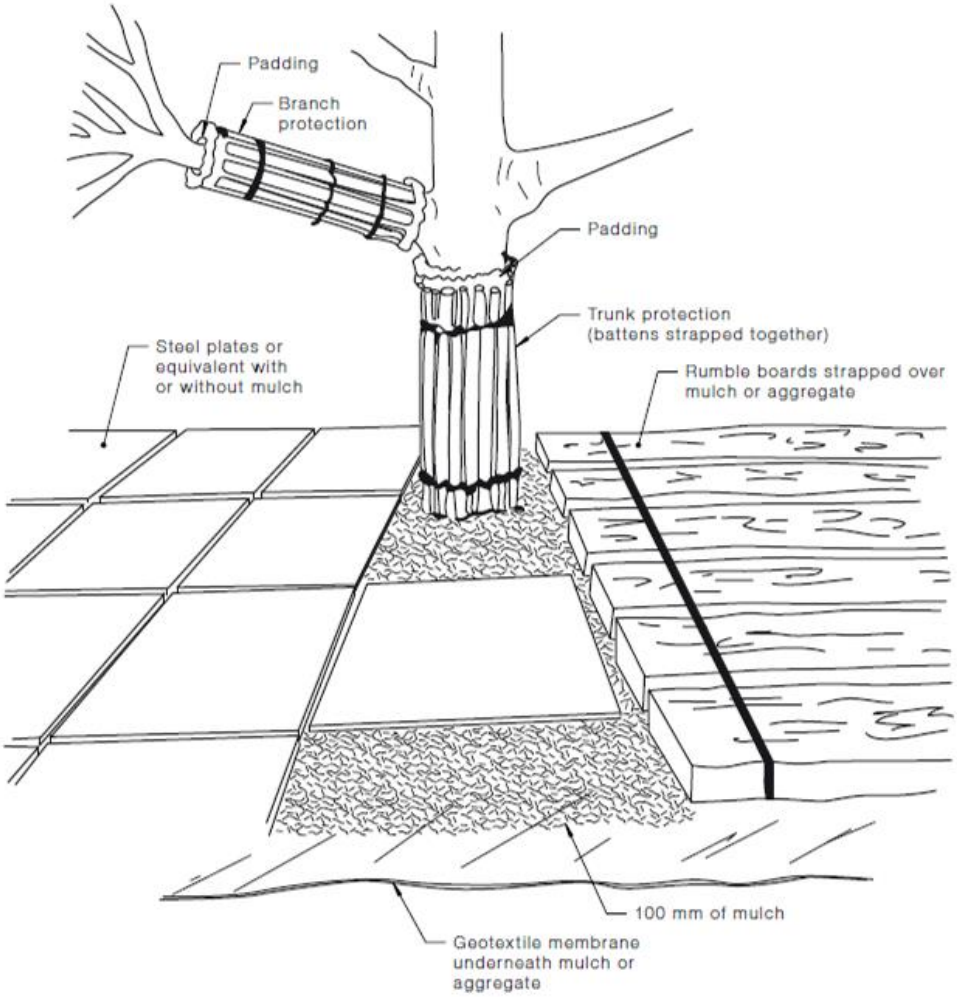
xi. Where advised by the arborist, trunk and branch protection (Figure 4) is to be installed to a minimum height of 2 m using materials and positioning as advised by an appointed arborist.

xii. Where advised by the arborist, other temporary root protection measures (Figure 4) 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.

xiii. Scaffolding is to be erected outside of the TPZ, where unavoidable protection measures are to be specified by the appointed arborist.

xiv. 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.

xv. If pruning is required it is to be undertaken by an arborist in accordance with AS4373 to prevent structural damage, disease and poor form.



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 4 - Examples of trunk, branch and ground protection as per AS4970- 2009

5.2 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 into the tree protection zone (TPZ).

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 Tree Protection Zone (TPZ) shall be placed at 10 metre 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. It is recommended that the TPZ barrier fencing be installed as shown in Schedule 2 – Tree Assessment Plan. Any works within the mapped tree protection zones 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.

Conclusions & Recommendations 6

6.1 Conclusions

An assessment of all trees equal or greater than 15cm Diameter at Breast Height (DBH) was undertaken. A total of one-hundred and seventy-one (171) trees were assessed within the site. The development of the site is anticipated to require the removal of eighty four (84) or 49.12% of the trees observed and assessed. A further thirty four (34) trees or 19.88% of the assessed trees are recommended for removal due to their poor condition. In addition, a further nine (9) trees (5.26%) will be removed as they are exotic or weed species that have a high potential to invade and dominate the existing native vegetation within the site. Therefore, in total, the current proposal will require the removal of one hundred and twenty-seven (127) (74.26%) and the retention of forty-four (44) (25.73%) of the trees assessed within the site.

It is noted that the SULE assessment identifies that ninety-five (95) of the observed trees (55.55%) had a SULE condition rating of 1 or 2 (good condition). Seventy-six (76) of the assessed trees (44.44%) had a SULE rating of 3, or 4a to 4f and are in a poor or unsafe condition.

For any trees that are to be retained, it is recommended that Tree Protection Zones (TPZ) are to be implemented for any retained tree in accordance with Australian Standard *AS4970* (section 5.1).

6.2 Recommended tree protection strategies

To minimise impacts in local ecology and to maintain a stand of healthy trees within a broad scale development, the following recommendations apply:

- Aim to retain hollow bearing trees of good condition wherever possible throughout the landscape in order to retain fauna habitat
- Preferentially remove dangerous or poor condition trees and examine development layouts to maximise tree retention
- Consider the placement of services to avoid or minimise tree removal or damage to tree protection zones
- Remove suppressed or otherwise poor condition trees to reduce bushfire fuel loads
- Actively replant native trees commensurate with previously occurring vegetation types within the study area as per an approved Vegetation Management Plan (VMP) to maximise local amenity within the development, to consolidate any retained native vegetation within the locality and to provide suitable habitat, with connectivity for locally occurring native fauna.

6.3 Recommended tree protection measures

In the event that trees are retained under the ultimate development proposal, appropriate tree protection measures should be implemented including:

i. In the event that trees can be retained it is considered that an AQ5 qualified arborist be engaged to manage any construction works within the TPZ and to identify any other mitigation measures to maintain or improve their condition where the works proposed impact on more than 10% of the TPZ.

ii. TPZs in close proximity to proposed works should be adequately marked and sign-posted. Signage identifying the TPZ shall be placed at 10 metre intervals along the TPZ barrier fencing. These signs will face towards the development site and shall have lettering that complies with *AS 1319*. TPZ fencing and signage should be inspected on a regular basis and maintained in good condition.

iii. All trees nominated for removal are to be removed 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 soil compaction to retained trees. Such works should be supervised by a qualified arborist.

iv. Stumps are to be ground, not dozed or dug out unless they impact on the installation of services, roads or building works.

v. All trenches, footings and major earth movement are to avoid TPZs.

vi. Stockpiling materials and soils within TPZs is forbidden.

vii. Machinery and other vehicles are to avoid TPZs during all operations.

viii. Any trenching or construction works unavoidably undertaken within TPZs should be witnessed, supervised and recorded (photographed and documented) by an AQ5 qualified arborist who will specify any works to be undertaken to avoid or remediate damage to trees.

6.4 Recommended revegetation works

A vegetation management plan (VMP) has been prepared which has been integrated with proposed works and landscaping. An additional fifty-three (53) trees are proposed to be replanted within the subject site. When combined with the forty-four (44) retained trees, the total number of trees within the subject site will be ninety-seven (97). The tree species proposed for replanting are to be derived from PCT 1776 – Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast. However, these landscape plantings also need to be species suitable for the intended use of the site and to comply with the requirements of bushfire Asset Protection Zones (APZs).

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Schedule 1

Tree Assessment Data Table

Tag No.	Common name	Scientific name	DBH (cm)	Calc DBH (cm)	BD (cm)	Height (m)	Spread (m)	Vigour (%)	SULE	AZTree rating	STARS life expectancy	STARS signif	STARS retention value	TPZ Radius (m)	SRZ Radius (m)	Ret/ Rem	Reason for removal	Vis Signif	Habitat Tree	Comment
T-G001	Camphor Laurel	*Cinnamomum camphora*	21	21	23	8	6	75	2a	A1	15-40yrs	Low	Very low	2.52	1.79	Remove	Development			
T-G002	Narrow-leaved Paperbark	*Melaleuca linariifolia*	64	64	66	13	7	55	3a	A1	5-15yrs	Low	Low	7.68	2.78	Remove	Development			
T-G003	Red Bloodwood	*Corymbia gummifera*	36	36	39	20	8	70	3b	Z5	15-40yrs	Low	Low	4.32	2.23	Remove	Development			Rot in trunk
T-G004	Smooth-barked Apple	*Angophora costata*	24	24	26	15	6	70	2a	A1	15-40yrs	Medium	Medium	2.88	1.88	Remove	Development			
T-G005	Sydney Peppermint	*Eucalyptus piperita*	48	48	54	22	12	70	3b	Z6	15-40yrs	Low	Low	5.76	2.55	Remove	Development			Trunk at 45deg, termites
T-G006	Sydney Peppermint	*Eucalyptus piperita*	85	85	100	28	18	80	4c	Z5	15-40yrs	Low	Low	10.20	3.31	Remove	Poor Health	V1		Exposed wood and rot at base
T-G007	Smooth-barked Apple	*Angophora costata*	38	38	50	12	8	70	2a	A1	15-40yrs	Medium	Medium	4.56	2.47	Remove	Development			
T-G008	Smooth-barked Apple	*Angophora costata*	21	21	22	10	4	70	2a	A1	15-40yrs	Low	Low	2.52	1.75	Remove	Development		Cat-3	
T-G009	Red Bloodwood	*Corymbia gummifera*	19	19	21	10	4	75	2a	A1	15-40yrs	Medium	Medium	2.28	1.72	Remove	Development			
T-G010	Smooth-barked Apple	*Angophora costata*	53	53	58	25	17	80	2a	A1	>40yrs	High	High	6.36	2.63	Remove	Development	V2		
T-G011	Dead Stag	Dead Stag	18	18	30	6	1	0	4a	Z4	<5yrs	Low	Very low	2.16	2.00	Remove	Poor Health			
T-G012	Smooth-barked Apple	*Angophora costata*	31	31	32	22	10	75	2a	A1	15-40yrs	Medium	Medium	3.72	2.05	Remove	Development			
T-G013	Dead Stag	Dead Stag	21	21	22	5	1	0	4a	Z4	<15yrs	Low	Very low	2.52	1.75	Remove	Poor Health			
T-G014	Red Bloodwood	*Corymbia gummifera*	44	44	48	25	12	75	2a	A1	15-40yrs	High	High	5.28	2.43	Remove	Development			
T-G015	Dead Stag	Dead Stag	22	22	24	15	8	60	3b	Z6	15-40yrs	Low	Low	2.64	1.82	Remove	Development			Overhanging crown
T-G016	Parramatta Wattle	*Acacia parramattensis*	18	18	20	15	6	75	2a	A1	15-40yrs	Low	Low	2.16	1.68	Remove	Development			
T-G017	Sydney Peppermint	*Eucalyptus piperita*	56	56	60	26	18	70	3b	Z5	15-40yrs	Low	Low	6.72	2.67	Remove	Development	V2		Rot at base, trunk at 60deg
T-G018	Smooth-barked Apple	*Angophora costata*	42	42	45	28	15	75	2a	A1	15-40yrs	High	High	5.04	2.37	Remove	Development	V2		
T-G019	Black She-oak	*Allocasuarina littoralis*	28	28	32	12	5	75	3b	Z5	15-40yrs	Low	Low	3.36	2.05	Remove	Development			Termites in base
T-G020	Smooth-barked Apple	*Angophora costata*	35	35	35	20	16	70	2a	A1	15-40yrs	Medium	Medium	4.20	2.13	Remove	Development			
T-G021	Smooth-barked Apple	*Angophora costata*	18	18	19	10	4	60	2a	A1	15-40yrs	Low	Low	2.16	1.65	Remove	Development			
T-G022	Cheese Tree	*Glochidion ferdinandi*	26	26	27	17	8	80	2a	A1	15-40yrs	High	High	3.12	1.91	Remove	Development			
T-G023	Cheese Tree	*Glochidion ferdinandi*	16	16	18	8	6	75	2a	A1	15-40yrs	Low	Medium	1.92	1.61	Remove	Development			
T-G024	Dead Stag	Dead Stag	17	17	18	4	1	0	4a	Z4	<5yrs	Low	Very low	2.04	1.61	Remove	Poor Health			
T-G025	Camphor Laurel	*Cinnamomum camphora*	18	18	20	9	4	70	2a	Z3	15-40yrs	Low	Very low	2.16	1.68	Remove	Development			
T-G026	Dead Stag	Dead Stag	45,45	64	0	15	8	0	4a	Z4	<5yrs	Low	Very low	7.64	2.74	Remove	Poor Health		Cat-3	
T-G027	Cheese Tree	*Glochidion ferdinandi*	26,24	35	0	20	16	75	2a	A1	15-40yrs	Medium	Medium	4.25	2.13	Remove	Development			
T-G028	Cheese Tree	*Glochidion ferdinandi*	20	20	23	20	6	70	3b	Z6	15-40yrs	Low	Low	2.40	1.79	Remove	Development			Exposed wood and rot at base
T-G029	Cheese Tree	*Glochidion ferdinandi*	28	28	30	20	12	80	2a	A1	15-40yrs	Medium	Medium	3.36	2.00	Remove	Development			
T-G030	Red Mahogany	*Eucalyptus resinifera*	28	28	30	14	7	70	2a	A1	15-40yrs	Medium	Medium	3.36	2.00	Remove	Development			
T-G031	Dead Stag	Dead Stag	23	23	25	6	2	0	4a	Z4	<5yrs	Low	Very low	2.76	1.85	Remove	Poor Health			
T-G032	Dead Stag	Dead Stag	29	29	30	10	4	0	4a	Z4	<5yrs	Low	Very low	3.48	2.00	Remove	Poor Health			
T-G033	Cheese Tree	*Glochidion ferdinandi*	16	16	16	14	5	75	2a	A1	15-40yrs	Low	Medium	1.92	1.53	Retain				
T-G034	Dead Stag	Dead Stag	26	26	28	8	1	0	4a	Z4	<5yrs	Low	Very low	3.12	1.94	Remove	Poor Health			
T-G035	Cheese Tree	*Glochidion ferdinandi*	17	17	18	14	3	70	2a	Z4	15-40yrs	Low	Low	2.04	1.61	Retain				
T-G036	Camphor Laurel	*Cinnamomum camphora*	17	17	19	8	7	75	2a	Z3	15-40yrs	Low	Very low	2.04	1.65	Remove	Exotic			
T-G037	Smooth-barked Apple	*Angophora costata*	135	135	135	20	15	75	2a	A1	15-40yrs	High	High	16.20	3.75	Retain		V2		
T-G038	Dead Stag	Dead Stag	44	44	48	12	3	0	4a	Z4	<5yrs	Low	Very low	5.28	2.43	Remove	Poor Health		Cat-2	
T-G039	Black She-oak	*Allocasuarina littoralis*	18	18	20	7	5	75	2a	A1	15-40yrs	Medium	Medium	2.16	1.68	Retain				
T-G040	Hard-leaved Scribbly Gum	*Eucalyptus sclerophylla*	61	61	70	24	12	75	3b	Z9	15-40yrs	Low	Low	7.32	2.85	Retain		V2	Cat-3	Exposed wood and rot at base
T-G041	Hard-leaved Scribbly Gum	*Eucalyptus sclerophylla*	87	87	95	28	20	75	2b	Z9	>40yrs	Medium	Medium	10.44	3.24	Retain		V1	Cat-3	Exposed wood and rot at 3m
T-G042	Cheese Tree	*Glochidion ferdinandi*	21,15	26	35	8	8	75	2a	A1	15-40yrs	Medium	Medium	3.10	2.13	Retain				
T-G043	Smooth-barked Apple	*Angophora costata*	54	54	58	20	18	75	2a	A1	15-40yrs	High	High	6.48	2.63	Retain				
T-G044	Red Mahogany	*Eucalyptus resinifera*	37	37	37	18	8	70	2d	A2	15-40yrs	Medium	Medium	4.44	2.18	Retain				Medium deadwood
T-G045	Dead Stag	Dead Stag	27	27	28	5	1	0	4a	Z4	<5yrs	Low	Very low	3.24	1.94	Remove	Poor Health			
T-G046	Smooth-barked Apple	*Angophora costata*	40	40	40	20	12	70	2d	A2	15-40yrs	Low	Low	4.80	2.25	Retain				Medium deadwood

Tag No.	Common name	Scientific name	DBH (cm)	Calc DBH (cm)	BD (cm)	Height (m)	Spread (m)	Vigour (%)	SULE	AZTree rating	STARS life expectancy	STARS signif	STARS retention value	TPZ Radius (m)	SRZ Radius (m)	Ret/ Rem	Reason for removal	Vis Signif	Habitat Tree	Comment
T-G047	Smooth-barked Apple	*Angophora costata*	19	19	20	18	6	60	3c	Z1	15-40yrs	Low	Low	2.28	1.68	Retain				Severely leaning crown
T-G048	Smooth-barked Apple	*Angophora costata*	37	37	39	14	8	65	2a	A1	15-40yrs	Low	Medium	4.44	2.23	Retain				
T-G049	Camphor Laurel	*Cinnamomum camphora*	23	23	26	10	6	75	2a	Z3	15-40yrs	Low	Very low	2.76	1.88	Remove	Exotic			
T-G050	Cheese Tree	*Glochidion ferdinandi*	30	30	25	8	8	75	2a	A1	15-40yrs	Medium	Medium	3.60	1.85	Retain				
T-G051	Red Mahogany	*Eucalyptus resinifera*	25	25	27	12	4	55	4a	Z4	<5yrs	Low	Very low	3.00	1.91	Retain				Declining
T-G052	Camphor Laurel	*Cinnamomum camphora*	25	25	28	13	7	75	2a	Z3	15-40yrs	Low	Very low	3.00	1.94	Remove	Exotic			
T-G053	Black She-oak	*Allocasuarina littoralis*	27	27	30	10	3	60	4c	Z5	<5yrs	Low	Very low	3.24	2.00	Remove	Poor Health			Rot in trunk
T-G054	Red Mahogany	*Eucalyptus resinifera*	26	26	28	10	6	70	2a	A1	15-40yrs	Medium	Medium	3.12	1.94	Remove	Development			
T-G055	Red Mahogany	*Eucalyptus resinifera*	28	28	30	10	6	70	2a	A1	15-40yrs	Medium	Medium	3.36	2.00	Remove	Development			
T-G056	Red Mahogany	*Eucalyptus resinifera*	18	18	20	8	3	70	2a	A1	15-40yrs	Low	Medium	2.16	1.68	Remove	Development			
T-G057	Sydney peppermint	*Eucalyptus piperita*	120,38	126	160	28	24	75	2d	A2	15-40yrs	High	High	15.10	4.03	Remove	Development	V1	Cat-3	Medium deadwood
T-G058	Red bloodwood	*Corymbia gummifera*	25,18	31	35	14	8	75	2a	A1	15-40yrs	Medium	Medium	3.70	2.13	Remove	Development			
T-G059	Parramatta Wattle	*Acacia parramattensis*	18	18	20	6	4	50	4a	Z4	<5yrs	Low	Very low	2.16	1.68	Remove	Poor Health			Declining
T-G060	Parramatta Wattle	*Acacia parramattensis*	18	18	20	10	4	50	4a	Z4	<5yrs	Low	Very low	2.16	1.68	Remove	Poor Health			
T-G061	Sydney Peppermint	*Eucalyptus piperita*	51	51	55	22	18	70	2a	A1	15-40yrs	High	High	6.12	2.57	Remove	Development	V3		
T-G062	White Stringybark	*Eucalyptus globoidea*	28,20	34	35	15	8	80	2d	A2	15-40yrs	Low	Medium	4.13	2.13	Remove	Development			Divided leader
T-G063	Swamp Oak	*Casuarina glauca*	36	36	39	17	6	75	2a	A1	15-40yrs	Medium	Medium	4.32	2.23	Remove	Development			
T-G064	Red Mahogany	*Eucalyptus resinifera*	36	36	38	20	8	70	2a	A1	15-40yrs	Medium	Medium	4.32	2.20	Retain				
T-G065	Red Mahogany	*Eucalyptus resinifera*	46	46	49	22	10	60	2a	A1	15-40yrs	Medium	Medium	5.52	2.45	Retain				
T-G066	Dead Stag	Dead Stag	81	81	86	12	8	0	4a	Z4	<5yrs	Low	Low	9.72	3.11	Retain			Cat-1	
T-G067	Smooth-barked Apple	*Angophora costata*	38	38	40	12	10	70	2a	A1	15-40yrs	Medium	Medium	4.56	2.25	Retain				
T-G068	Smooth-barked Apple	*Angophora costata*	36	36	36	10	7	65	2a	A1	15-40yrs	Low	Low	4.32	2.15	Retain				
T-G069	Red Mahogany	*Eucalyptus resinifera*	31,17	35	0	12	8	70	2d	A2	15-40yrs	Medium	Medium	4.24	2.13	Retain				Small trunk badly pruned & damaged
T-G070	Red Mahogany	*Eucalyptus resinifera*	41	41	41	12	12	70	3a	A1	5-15yrs	Low	Low	4.92	2.28	Retain				Burl at 2m, exposed wood and 5m
T-G071	Red Mahogany	*Eucalyptus resinifera*	46	46	48	16	12	75	1b	A2	15-40yrs	Medium	Medium	5.52	2.43	Retain				Divided leader
T-G072	Large-leaved Privet	*Ligustrum lucidum*	18,10	21	20	6	4	70	2a	Z3	15-40yrs	Low	Very low	2.47	1.68	Remove	Exotic			
T-G073	Camphor Laurel	*Cinnamomum camphora*	33	33	45	6	7	65	3b	Z3	15-40yrs	Low	Very low	3.96	2.37	Remove	Exotic			
T-G074	Hard-leaved Scribbly Gum	*Eucalyptus sclerophylla*	31	31	36	8	5	70	4c	Z6	15-40yrs	Low	Very low	3.72	2.15	Remove	Poor Health			Trunk at 60deg
T-G075	Hard-leaved Scribbly Gum	*Eucalyptus sclerophylla*	41	41	43	16	12	75	4c	Z6	<5yrs	Low	Very low	4.92	2.32	Remove	Poor Health			Trunk at 60deg
T-G076	Hard-leaved Scribbly Gum	*Eucalyptus sclerophylla*	111	111	110	24	20	75	3b	Z9	15-40yrs	Low	Medium	13.32	3.44	Retain		V1		Divided leader, exposed wood at base, burls kino
T-G077	Parramatta Wattle	*Acacia parramattensis*	23	23	25	15	4	70	3a	A1	5-15yrs	Low	Low	2.76	1.85	Retain				
T-G078	Red Mahogany	*Eucalyptus resinifera*	37	37	38	16	10	75	2a	A1	15-40yrs	Medium	Medium	4.44	2.20	Retain				
T-G079	Smooth-barked Apple	*Angophora costata*	23	23	25	10	4	65	2a	A1	15-40yrs	Medium	Medium	2.76	1.85	Retain				
T-G080	Smooth-barked Apple	*Angophora costata*	44	44	45	16	15	75	3b	Z6	15-40yrs	Low	Low	5.28	2.37	Remove	Development			Trunk at 60deg
T-G081	Smooth-barked Apple	*Angophora costata*	42	42	45	20	18	75	2a	A1	15-40yrs	High	High	5.04	2.37	Remove	Development	V3		
T-G082	Smooth-barked Apple	*Angophora costata*	26	26	30	8	8	65	4c	Z5	<5yrs	Low	Very low	3.12	2.00	Remove	Poor Health			Trunk at 45deg, damaged close to base
T-G083	-	*Eucalyptus sp.*	17	17	18	7	3	80	2a	A1	15-40yrs	Medium	High	2.04	1.61	Remove	Development			
T-G084	Dead Stag	Dead Stag	47	47	49	18	6	0	4a	Z4	<5yrs	Low	Very low	5.64	2.45	Remove	Poor Health		Cat-3	
T-G085	Smooth-barked Apple	*Angophora costata*	24	24	26	9	8	65	4c	Z5	<5yrs	Low	Very low	2.88	1.88	Remove	Poor Health			Trunk at 30deg, unstable
T-G086	Smooth-barked Apple	*Angophora costata*	43	43	47	24	20	75	2a	A1	15-40yrs	High	High	5.16	2.41	Remove	Development	V2		
T-G087	White Stringybark	*Eucalyptus globoidea*	47	47	50	24	12	75	2a	A1	15-40yrs	Medium	Medium	5.64	2.47	Retain				
T-G088	Sydney Peppermint	*Eucalyptus piperita*	110,47	120	160	24	20	70	4c	Z5	15-40yrs	Low	Very low	14.35	4.03	Retain		V1	Cat-1	Cavity & rot at base, divided leader, large deadwood
T-G089	Smooth-barked Apple	*Angophora costata*	21,20	29	35	8	3	70	3b	Z9	15-40yrs	Low	Very low	3.48	2.13	Remove	Poor Health			Divided leader
T-G090	Sydney Peppermint	*Eucalyptus piperita*	42	42	46	24	17	70	4c	Z5	15-40yrs	Low	Very low	5.04	2.39	Remove	Development	V2		Trunk at 60deg

Tag No.	Common name	Scientific name	DBH (cm)	Calc DBH (cm)	BD (cm)	Height (m)	Spread (m)	Vigour (%)	SULE	AZTree rating	STARS life expectancy	STARS signif	STARS retention value	TPZ Radius (m)	SRZ Radius (m)	Ret/ Rem	Reason for removal	Vis Signif	Habitat Tree	Comment
T-G091	Smooth-barked Apple	*Angophora costata*	38	38	40	23	10	70	2a	A1	15-40yrs	Medium	Medium	4.56	2.25	Remove	Development			
T-G092	Smooth-barked Apple	*Angophora costata*	42	42	46	18	8	70	2a	A1	15-40yrs	Medium	Medium	5.04	2.39	Retain				
T-G093	Sydney Peppermint	*Eucalyptus piperita*	30	30	35	18	6	65	3b	Z9	15-40yrs	Low	Very low	3.60	2.13	Remove	Development			Exposed wood and rot at base
T-G094	Sydney Peppermint	*Eucalyptus piperita*	58	58	58	24	20	75	2a	A1	15-40yrs	High	High	6.96	2.63	Remove	Development	V2		
T-G095	Sydney Peppermint	*Eucalyptus piperita*	106	106	106	24	20	70	3b	Z9	15-40yrs	Low	Low	12.72	3.39	Remove	Development	V1		Divided leader, termites
T-G096	Smooth-barked Apple	*Angophora costata*	42	42	45	20	15	75	2a	A1	15-40yrs	High	High	5.04	2.37	Retain				
T-G097	Sydney Peppermint	*Eucalyptus piperita*	31,24	39	50	14	8	60	4c	Z5	5-15yrs	Low	Very low	4.70	2.47	Remove	Poor Health			Divided leader, termites
T-G098	Smooth-barked Apple	*Angophora costata*	46	46	50	20	16	75	2d	A2	15-40yrs	High	High	5.52	2.47	Remove	APZ / Dev			Crown off center
T-G099	Sydney Peppermint	*Eucalyptus piperita*	19	19	21	10	3	70	3b	Z9	15-40yrs	Low	Very low	2.28	1.72	Remove	APZ / Dev			Termites
T-G100	Smooth-barked Apple	*Angophora costata*	31	31	34	20	8	70	2a	A1	15-40yrs	Medium	Medium	3.72	2.10	Retain				
T-G101	Smooth-barked Apple	*Angophora costata*	49,39	63	90	22	20	75	2d	A2	15-40yrs	Medium	Medium	7.52	3.17	Retain		V3		Smaller trunk at 60deg
T-G102	Smooth-barked Apple	*Angophora costata*	46	46	50	24	16	75	2a	A1	15-40yrs	High	High	5.52	2.47	Retain		V2		
T-G103	Sydney Peppermint	*Eucalyptus piperita*	32	32	38	18	9	70	3b	Z9	15-40yrs	Low	Low	3.84	2.20	Retain				Termites
T-G104	Smooth-barked Apple	*Angophora costata*	96	96	120	30	25	75	3b	Z9	15-40yrs	Low	Low	11.52	3.57	Remove	Development	V1		Termites, large deadwood
T-G105	Sydney Peppermint	*Eucalyptus piperita*	66,32	73	80	22	15	70	4c	Z5	<5yrs	Low	Very low	8.80	3.01	Remove	Poor Health	V3		Exposed wood and termites
T-G106	Sydney Peppermint	*Eucalyptus piperita*	29	29	34	16	5	75	3a	A1	5-15yrs	Medium	Medium	3.48	2.10	Remove	Development			Exposed wood but no rot at base
T-G107	Sydney Peppermint	*Eucalyptus piperita*	53	53	65	18	12	70	3b	Z9	15-40yrs	Low	Low	6.36	2.76	Remove	Development			Trunk bowed with stress marks
T-G108	Smooth-barked Apple	*Angophora costata*	25	25	27	20	6	65	2a	A1	15-40yrs	Low	Low	3.00	1.91	Retain				
T-G109	Black She-oak	*Allocasuarina littoralis*	19	19	22	8	3	10	4a	Z4	<5yrs	Low	Very low	2.28	1.75	Retain				
T-G110	Sydney Peppermint	*Eucalyptus piperita*	53	53	58	22	18	70	4c	Z5	<5yrs	Low	Very low	6.36	2.63	Remove	Poor Health	V3		Termites
T-G111	Smooth-barked Apple	*Angophora costata*	22	22	26	15	4	55	3b	Z9	15-40yrs	Low	Very low	2.64	1.88	Remove	Poor Health			Termites in base
T-G112	Red Mahogany	*Eucalyptus resinifera*	26	26	28	19	6	70	3b	Z9	15-40yrs	Low	Low	3.12	1.94	Remove	Development			Termites, medium deadwood
T-G113	Smooth-barked Apple	*Angophora costata*	34	34	35	22	9	75	2a	A1	15-40yrs	Medium	Medium	4.08	2.13	Remove	Development			
T-G114	Red Mahogany	*Eucalyptus resinifera*	26	26	28	12	5	70	3b	Z1	15-40yrs	Low	Low	3.12	1.94	Remove	Development			Exposed wood and termites at base
T-G115	Sydney Peppermint	*Eucalyptus piperita*	34	34	36	20	6	75	2a	A1	15-40yrs	High	High	4.08	2.15	Remove	Development			
T-G116	Red Mahogany	*Eucalyptus resinifera*	60	60	63	30	18	75	4c	Z5	<5yrs	Low	Very low	7.20	2.73	Remove	Poor Health	V1		Termites
T-G117	Smooth-barked Apple	*Angophora costata*	22	22	26	17	5	65	2a	A1	15-40yrs	Low	Medium	2.64	1.88	Remove	Development			
T-G118	Smooth-barked Apple	*Angophora costata*	28	28	0	15	5	70	3b	Z9	15-40yrs	Low	Low	3.36	0.00	Remove	Development			Bowed & leaning trunk
T-G119	Red Mahogany	*Eucalyptus resinifera*	28	28	30	16	8	70	3b	Z9	15-40yrs	Low	Low	3.36	2.00	Remove	Development			Termites
T-G120	Sydney Peppermint	*Eucalyptus piperita*	38	38	50	20	10	75	4c	Z5	<5yrs	Low	Low	4.56	2.47	Remove	Poor Health			Termites in trunk, exposed wood
T-G121	Red Bloodwood	*Corymbia gummifera*	29	29	31	20	6	65	3b	Z9	15-40yrs	Low	Low	3.48	2.02	Remove	Development			Exposed wood and termites in base
T-G122	Smooth-barked Apple	*Angophora costata*	26	26	28	17	5	70	2a	A1	15-40yrs	Medium	Medium	3.12	1.94	Remove	Development			
T-G123	Dead Stag	*Dead Stag*	55	55	60	22	12	0	4a	Z4	<5yrs	Low	Very low	6.60	2.67	Remove	Poor Health		Cat-2	
T-G124	Smooth-barked Apple	*Angophora costata*	60	60	70	24	20	75	2a	A1	15-40yrs	High	High	7.20	2.85	Remove	Development	V1		
T-L001	Blackbutt	*Eucalyptus pilularis*	88	88	119	27	17	60	3b	Z5	15-40yrs	High	Medium	10.56	3.56	Remove	Development	V1	Cat-2	Very large, visually prominent. Basal cavity
T-L002	Smooth-barked Apple	*Angophora costata*	60	60	86	23	7	45	3c	Z6	5-15yrs	Low	Low	7.20	3.11	Remove	Poor Health	V3		Strong southerly lean
T-L003	Broad-leaved White Mahogany	*Eucalyptus umbra*	36	36	43	20	4.5	55	2a	A1	15-40yrs	Low	Low	4.32	2.32	Remove	Development			Moderately suppressed but no structural defects
T-L004	Smooth-barked Apple	*Angophora costata*	73	73	75	28	11	65	2a	A2	15-40yrs	Medium	Medium	8.76	2.93	Remove	Development			Moderate to heavy suppression on eastern side
T-L005	Smooth-barked Apple	*Angophora costata*	83	83	94	27	13	70	1b	A2	>40yrs	High	High	9.96	3.22	Remove	Development	V2		Minor suppression and minor deadwood
T-L006	Smooth-barked Apple	*Angophora costata*	45	45	54	26	8	85	1a	A1	>40yrs	High	High	5.40	2.55	Remove	Development			Good health and form
T-L007	Broad-leaved White Mahogany	*Eucalyptus umbra*	40,28	49	63	23	5	40	3c	Z1	15-40yrs	Low	Low	5.86	2.73	Remove	Development			Poor form and heavily suppressed
T-L008	Broad-leaved White Mahogany	*Eucalyptus umbra*	57	57	74	27	7	40	3c	Z1	15-40yrs	Low	Low	6.84	2.92	Remove	Development			Poor form, moderate deadwood and moderately suppressed

Tag No.	Common name	Scientific name	DBH (cm)	Calc DBH (cm)	BD (cm)	Height (m)	Spread (m)	Vigour (%)	SULE	AZTree rating	STARS life expectancy	STARS signif	STARS retention value	TPZ Radius (m)	SRZ Radius (m)	Ret/ Rem	Reason for removal	Vis Signif	Habitat Tree	Comment
T-L009	Dead Stag	Dead stag	35,28	45	48	16	3	0	4a	Z4	<5yrs	Low	Very low	5.38	2.43	Remove	Poor Health			Dead
T-L010	Smooth-barked Apple	*Angophora costata*	34	34	37	26	7	70	1a	A1	>40yrs	Medium	Medium	4.08	2.18	Remove	Development			Good health and moderate form. Slightly suppressed
T-L011	Smooth-barked Apple	*Angophora costata*	37,24	44	47	30	8	80	1a	A1	>40yrs	High	Medium	5.29	2.41	Remove	Development			Good health and form
T-L012	Dead Stag	Dead stag	63	63	73	28	4	0	4a	Z4	<5yrs	Low	Very low	7.56	2.90	Remove	Poor Health	V2		Dead
T-L013	Smooth-barked Apple	*Angophora costata*	41	41	85	16	8	60	3b	Z4	<5yrs	Low	Very low	4.92	3.09	Remove	Poor Health			Basal damage with exposed wood, slightly suppressed, small deadwood
T-L014	Red Mahogany	*Eucalyptus resinifera*	47	47	59	25	8	60	2c	A2	15-40yrs	Low	Low	5.64	2.65	Remove	Development			Canopy off centre, small deadwood
T-L015	Smooth-barked Apple	*Angophora costata*	32	32	36	17	4	20	4c	Z4	5-15yrs	Low	Very low	3.84	2.15	Remove	Poor Health			Main branches dead, epicormic growth, large deadwood
T-L016	Green Wattle	*Acacia irrorata*	19	19	24	12	4	50	3a	Z3	5-15yrs	Low	Very low	2.28	1.82	Remove	Development			Damage at 1.5m, exposed wood, suppressed, lots small deadwood
T-L017	Smooth-barked Apple	*Angophora costata*	34	34	39	23	12	80	2a	A1	15-40yrs	Low	Medium	4.08	2.23	Remove	Development			
T-L018	Broad-leaved White Mahogany	*Eucalyptus umbra*	94	94	98	32	26	65	2a	A2	15-40yrs	Medium	Medium	11.28	3.28	Remove	Development	V1	Cat-3	Medium deadwood
T-L019	Cheese Tree	*Glochidion ferdinandi*	16,10	19	47	9	4	85	2a	A1	15-40yrs	Medium	Medium	2.26	2.41	Remove	Development			
T-L020	Black She-oak	*Allocasuarina littoralis*	27	27	38	12	11	75	2b	Z5	15-40yrs	Medium	Low	3.24	2.20	Remove	Development			
T-L021	Dead Stag	Dead Stag	25	25	30	15	11	0	4a	Z4	<5yrs	Low	Very low	3.00	2.00	Remove	Poor Health			
T-L022	Red Mahogany	*Eucalyptus resinifera*	52	52	58	22	14	65	2d	Z4	15-40yrs	Medium	Low	6.24	2.63	Remove	Development			Medium deadwood, minor suppression
T-L023	Hickory Wattle	*Acacia implexa*	23,20	30	43	12	10	30	4e	Z4	15-40yrs	Medium	Low	3.66	2.32	Remove	Poor Health			Lots deadwood, interfering with wires, borers in trunks
T-L024	Smooth-barked Apple	*Angophora costata*	49	49	57	32	12	65	2d	A2	15-40yrs	Medium	Medium	5.88	2.61	Remove	Development			Small deadwood, 5 deg lean to N
T-L025	Large-leaved Privet	*Ligustrum lucidum*	17	17	20	12	4	80	2a	Z3	15-40yrs	Medium	Medium	2.04	1.68	Remove	Development			
T-L026	Large-leaved Privet	*Ligustrum lucidum*	29	29	33	13	4	90	2a	Z3	15-40yrs	Low	Very low	3.48	2.08	Remove	Development			
T-L027	Small-leaved Privet	*Ligustrum sinense*	17,17	24	33	8	7	65	2b	Z3	15-40yrs	Low	Very low	2.88	2.08	Remove	Development			Large lean, very suppressed
T-L028	Black Locust	*Gleditsea tricanthos*	34	34	41	17	7	70	2a	Z3	15-40yrs	Low	Low	4.08	2.28	Remove	Development			Moderate form, non-native species
T-L029	Black Locust	*Gleditsea tricanthos*	26	26	34	13	6	60	3c	Z3	15-40yrs	Low	Low	3.12	2.10	Remove	Exotic			Leaning and suppressed. Non-native species
T-L030	Large-leaved Privet	*Ligustrum lucidum*	21,12,9	26	31	13	6	60	3a	Z3	5-15yrs	Low	Very low	3.10	2.02	Remove	Development			Minor decay on lower trunks. Weed species
T-L031	Large-leaved Privet	*Ligustrum lucidum*	24	24	33	13	5	75	2a	Z3	15-40yrs	Low	Very low	2.88	2.08	Remove	Exotic			Good form but weed species
T-L032	Smooth-barked Apple	*Angophora costata*	76	76	94	33	14	75	1a	A2	>40yrs	High	High	9.12	3.22	Retain		V2		Good form. Minor deadwood
T-L033	Cheese Tree	*Glochidion ferdinandi*	27	27	34	13	4	65	3b	Z1	15-40yrs	Low	Very low	3.24	2.10	Retain				Decay near base. Possible borers
T-L034	Port Jackson Fig	*Ficus rubiginosa*	31	31	64	12	7	80	1a	A1	>40yrs	Medium	Medium	3.72	2.74	Retain				May be visually prominent in the future. Good health and form
T-L035	Dead Stag	Dead Stag	47	47	63	4.5	0.5	0	4a	Z4	<15yrs	Medium	Very low	5.64	2.73	Remove	Poor Health			Dead
T-L036	Smooth-barked Apple	*Angophora costata*	41,39	57	90	32	12	65	2a	A2	15-40yrs	High	Medium	6.79	3.17	Retain				Minor suppression and deadwood
T-L037	Camphor Laurel	*Cinnamomum camphora*	24	24	28	14	7	50	3c	Z3	15-40yrs	Low	Low	2.88	1.94	Remove	Exotic			Poor form. Moderately suppressed
T-L038	Cheese Tree	*Glochidion ferdinandi*	19,13	23	26	13	4.5	70	2a	A2	15-40yrs	Medium	Low	2.76	1.88	Retain				Minor deadwood
T-L039	Smooth-barked Apple	*Angophora costata*	21	21	30	20	6	75	1a	A1	>40yrs	Medium	High	2.52	2.00	Retain				Minor suppression
T-L040	Smooth-barked Apple	*Angophora costata*	45	45	57	29	11	60	2b	A2	15-40yrs	Medium	Medium	5.40	2.61	Retain				Moderately suppressed
T-L041	Camphor Laurel	*Cinnamomum camphora*	15	15	19	16	5	55	2b	Z3	>40yrs	Medium	Low	1.80	1.65	Remove	Exotic			Twisted trunk. Poor form
T-L042	Red Bloodwood	*Corymbia gummifera*	43,37,36	67	117	28	11	40	3a	Z5	5-15yrs	Medium	Low	8.06	3.53	Retain				Half of tree is dead
T-R001	Smooth-barked Apple	*Angophora costata*	51	51	56	22	10	70	3b	Z5	15-40yrs	Low	Low	6.12	2.59	Remove	Development			Exposed wood 0-1m
T-R002	River Sheoak	*Casuarina cunninghamiana*	27	27	35	23	7	90	2a	A1	15-40yrs	Medium	Medium	3.24	2.13	Remove	Development			
T-R003	River Sheoak	*Casuarina cunninghamiana*	15	15	22	18	4	60	3c	Z1	15-40yrs	Medium	Low	1.80	1.75	Remove	Development			Suppressed by neighbours
T-R004	River Sheoak	*Casuarina cunninghamiana*	21	21	33	15	8	85	2a	A1	15-40yrs	Medium	Medium	2.52	2.08	Remove	Development			

Tag No.	Common name	Scientific name	DBH (cm)	Calc DBH (cm)	BD (cm)	Height (m)	Spread (m)	Vigour (%)	SULE	AZTree rating	STARS life expectancy	STARS signif	STARS retention value	TPZ Radius (m)	SRZ Radius (m)	Ret/ Rem	Reason for removal	Vis Signif	Habitat Tree	Comment
T-R005	Swamp Oak	*Casuarina glauca*	20	20	23	12	3	75	2a	A1	15-40yrs	Low	Low	2.40	1.79	Remove	Development			

Note 1: Visual Significance

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

Note – The above limits are only a guide - Visual significance is also governed by the average tree dimensions within any specific vegetation type at any given locality

Note 2: Habitat Trees

The habitat trees recorded within the study area fall under one of three categories:

Category 1: Significant habitat trees (high):
- Large hollow 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

Note 3: SULE Rating (refer to detailed breakdown in Schedule 4)

1A to 1C	Trees that appear to be retainable at the time of assessment with more than 40 years life expectancy with acceptable risk.
2A to 2D	Trees that appear to be retainable at the time of assessment with 15-40 years life expectancy with acceptable risk.
3A to 3D	Trees that appear to be retainable at the time of assessment with 5-15 years life expectancy with acceptable risk.
4A to 4F	Trees with a high level of risk and should be removed within 5 years.

Note 4: TreeAZ rating (refer to detailed breakdown in Schedule 5)

A1 to A4	Important trees suitable for retention for more than 10 years and worthy of being a material constraint
Z1 to Z3	Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species
Z4 to Z6	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
Z7 to Z8	Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people
Z9 to Z12	Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population

Schedule 2

SULE Assessment Plan

DISCLAIMER: ATSYD2_SSD_ARC_0104_LEVEL _5_FLOORPLAN_ RL31_8_DWG_11.dwg is not georeferenced. It has been aligned to other, georeferenced CAD linework relating to this project. Verification by a registered surveyor is required prior to finalisation.

EASEMENT

EASEMENT

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)*

Legend

- Subject site (source: CAD)
- Asset Protection Zone (APZ)
- Tree Protection Fence

Proposed Infrastructure

- Data hall
- Generator platform
- Substation
- GIS
- Firetrail
- Track (AUSGRID access)
- Driveway

Riparian corridor

- 20m buffer
- 40m buffer

Habitat Tree

- Cat-1
- Cat-2
- Cat-3

- Visually significant tree
- Trees to retain (56)
- Trees to remove (115)

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
1 Sirius Road, Lane Cove West
18AWE02_T002

DATE & ISSUE NUMBER
3/02/2020
Issue 1
AH

SCALE & COORDINATE SYSTEM
1:1,200 @A3
GDA 1994 MGA Zone 56

TITLE

Tree Assessment Plan

Document Path: N:\GIS STORAGE\N Drive\18AWE02_SiriusRd_LaneCoveWest\MXDs\18AWE02_T002.mxd

Travers bushfire & ecology

Schedule 3

SULE Ratings and Terminology

SULE Ratings and Terminology

SULE (an acronym for **safe useful life expectancy**). Particular consideration is given to the following points when making the final SULE assessment for each tree;

- obvious past influences (suppression)
- present health and condition, and future potential in current position
- estimated age at assessment in relation to the life expectancy for the species
- observed and potential structural defects which may influence potential life expectancy
- potential remedial work which may allow retention in the existing location.

An outline of the four relevant SULE categories and their subgroups used in this report is as follows:

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1 Long **SULE** (trees that appear to be retainable at the time of assessment for more than 40 years with an acceptable level of risk)

A A structurally sound tree, located where potential future growth can be accommodated.
B A damaged or defective tree that could be made suitable in the long term (40+ years), where remedial care is given.
C A tree of particular significance (historical / commemorative merit or rarity) that warrants extensive efforts in securing long term retention.

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2 Medium **SULE** (trees that appear to be retainable at the time of assessment, for 15–40 years with an acceptable level of risk)

A A tree predicted to only live between 15 and 40 years
B A tree that may live for more than 40 years, but should be removed to prevent safety or nuisance problems
C A tree that may live for more than 40 years, but should be removed to prevent competition with more suitable individuals, or to provide space for new planting
D A damaged or defective tree that could be made suitable in the medium term (15-40 years), where remedial care is given.

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3 Short **SULE** (trees that appear to be retainable at the time of assessment for 5–15 years with an acceptable level of risk)

A A tree predicted to only live between 5–15 years
B A tree that may live for more than 15 years, but should be removed to prevent safety or nuisance problems
C A tree that may live for more than 15 years, but should be removed to prevent competition with more suitable individuals or to provide space for new planting
D A damaged or defective tree that could only be made suitable in the short term (5–15 years), and would require significant remedial work.

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4 **Removals** (Trees with a high level of risk that should be removed within the next 5 years)

A A dead, dying, suppressed or declining tree

B A dangerous tree made so through instability or recent loss of neighbouring trees

C A dangerous tree made so through structural defects (cavities, decay, included bark, wounds or poor form)

D A damaged tree that is clearly not safe to retain

E A tree that is damaging, or may cause damage, to existing structures within 5 years

F A tree that will become dangerous after removal of neighbouring trees for the reasons given in A to E.

SULE ratings given to any tree in this report assumes that appropriate maintenance (if required) will be provided by a qualified arborist. Incorrect tree work practices can significantly accelerate tree suppression and increase hazard potential

EXPLANATION OF TERMINOLOGY USED

DBH - An acronym for bole or trunk diameter at breast height (1.4m from ground level).

Health - An indication of the vigour of a tree and is determined by the observed crown colour, density, presence of insect attack, the percentage of dead or dying branches and the amount of epicormic growth. The health of the canopy and that of the root system is interdependent and significant loss of tree vigour can result through both root and canopy (pruning, suppression) damage.

Suppressed, unhealthy trees have reduced ability to initiate internal defence systems (by the process of compartmentalisation) thus predisposing them to attack by insects and pathogenic decay organisms which increase the potential to drop dangerous branches.

Cambium - The part of the tree situated between the bark and the true wood of a tree. This area is where the tree transports water, nutrients and waste products to and from the roots and leaves. It is this area that is targeted when “ring-barking” a tree in order to disrupt the nutrient transport system of the tree and cause its death.

Condition - An evaluation of the structural integrity of a tree, including defects that may affect the useful life of an otherwise healthy individual. Such influencing factors include cavities and decay, weak unions between branches or trunks and faults of form or habit.

Fungal Attack - Many fungi have evolved to break down wood and return its nutrients to the biocycle of the environment. Fungi usually gain access to the wood through the actions of borers, or from physical damage resulting in exposed wood. Trees suffering from fungal attack may be severely weakened on a structural basis but may not show any external signs of the weakness. This can result in a catastrophic structural failure of a branch or trunk when subjected to stress such as a windy day.

Kino - A dark reddish exudate, rich in polyphenols (tannins), developed in the cambial region of eucalypts often as a result of injury; incorrectly called gum (Boland *et.al.* 1992).

Deadwood - The mature crown of a eucalypt maintains itself by the continual production of new crown units, which die in turn. Thus there will always be some dead branches in a healthy mature crown (Florence, 1996). Minor deadwood refers to dead branchlets, Major deadwood refers to main branches from the trunk.

Schedule 4

TreeAZ Ratings and Terminology

TreeAZ Categories

(Version 10.10-ANZ)

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
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.