



8-12 UNIVERSITY AVENUE MACQUARIE UNIVERSITY ARBORICULTURAL IMPACT ASSESSMENT

PREPARED FOR:

**MACQUARIE UNIVERSITY
C/- CADENCE PROJECT MANAGEMENT**

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14/03/17	Issued Client Comment	AM	AS
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Executive Summary

This report was commissioned by Macquarie University to form part of the Review of Environmental Factors (REF) for the Early Works Planning Application within the University campus. The aim of this report is to provide an assessment of the impacts of the proposed development on 195 trees and eight groups of trees, of which 111 are to be removed and 84 are to be retained.

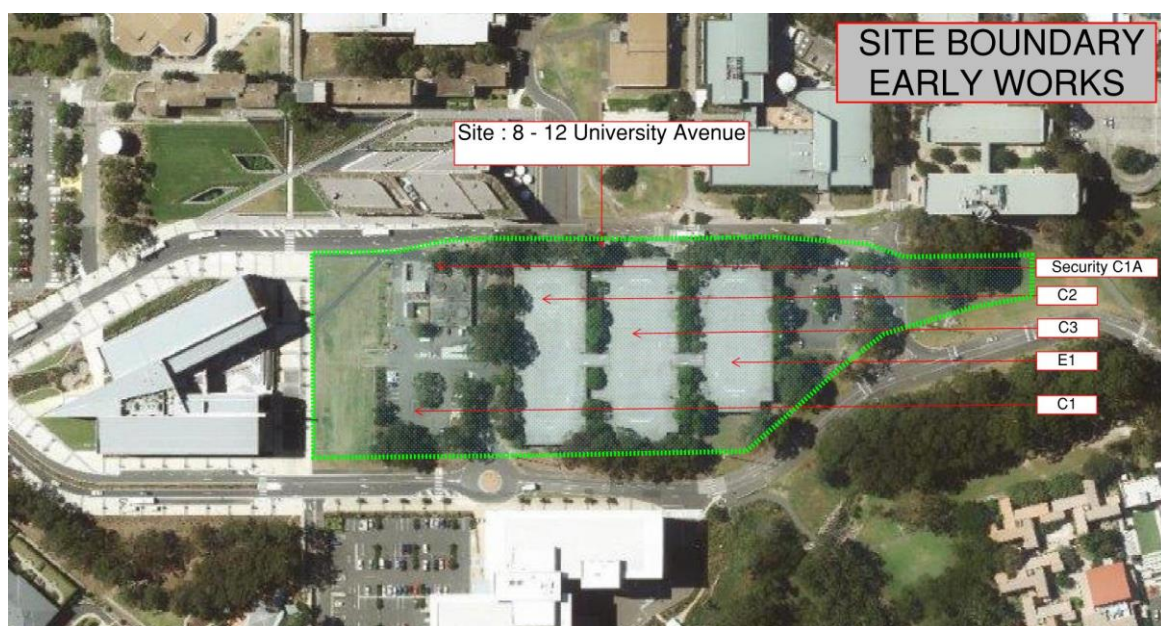
This report collates and presents information collected by Andrew Morrison and Luke Davis on the 24/11/16 and on the 23/02/17. The data collected is located at **7. Tree Survey Table** (page 15) also see **8. Tree Survey Table Notes** (page 26) for notes relating to tree survey table.

Generally the site's vegetation was observed to have a majority native tree canopy, with a mixed native and exotic groundcover layer. The existing surveyed trees are shown at **9. Tree Location Plan** (page 30).

The proposed development will involve:

- Site establishment and protection of adjoining property where required;
- Protection, diversion and/or temporary establishment of services and infrastructure as required;
- Erection of perimeter fencing, hoarding, gantry, scaffolding and site accommodation;
- Establishment of temporary access and pedestrian arrangements;
- Tree removal;
- Demolition of C2, C3, E1, Security Building C1a, decommissioned sub-station and capping/ augmentation of redundant services;
- Demolition of the service tunnel within the footprint of the 8 – 12 building; and will
- Accommodate the Main Works and future public domain landscape works.

This will involve the demolition of existing structures on site. The extent of site works is shown below and illustrated at **9. Tree Location Plan** (page 30).



Early Works – Site Boundary

In consideration of the data collected recommendations are provided for the removal or retention of trees including specific tree protection measures required to reduce the anticipated impacts from the proposed construction on those trees proposed to be retained. This report specifically recommends:

- A Tree Protection Plan, specifying construction offset details as necessary, required tree protection measures (including barriers), tree sensitive construction methods and arboricultural supervision of construction and tree care should be prepared by the project arborist and implemented for all retained trees on site.
- Trees to be removed must be removed by appropriately qualified personnel in a manner which complies with AS4373 and in a manner which protects nearby retained trees.

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1. Introduction

This report was commissioned by Macquarie University to form part of the Review of Environmental Factors (REF) for the Early Works Planning Application within the University campus. The aim of this report is to provide an assessment of the impacts of the proposed development on 195 trees and eight groups of trees, of which 111 are to be removed and 84 are to be retained.

This report collates and presents information collected by Andrew Morrison and Luke Davis on the 24/11/16 and on the 23/02/17. The data collected is located at **7. Tree Survey Table** (page 15) also see **8. Tree Survey Table Notes** (page 26) for notes relating to tree survey table.

2. Methodology

2.1. Limitations

Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible. However Andrew Morrison - Consulting Arborist can neither guarantee nor be responsible for the accuracy of information provided by others. Unless stated otherwise:

- Information contained in this report covers only the tree/s examined and reflects the health and structure of the tree at the time of inspection. The documented, observations, results, recommendations and conclusions given may vary after the site visit due to environmental conditions. Liability will not be accepted for damage to person or property as a result of natural processes, unforeseeable actions or occurrences.
- The inspection was limited to visual examination from the base of the subject tree without dissection, excavation, probing or coring (unless specifically noted otherwise).
- There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject tree may not arise in the future.

2.2. Site Inspection

A visual inspection of the tree/s was performed from ground level, data collected includes:

- Genus, Species, Common Name;
- Height, Width, DBH (Diameter at Breast Height), DRB (Diameter above Root Buttress);
- Age and Health;
- Amenity and Ecological Value;
- Crown Form and Condition;
- Visible Defects or Evidence of Wounding.

2.3. Measurement

- Tree locations are supplied on the client supplied survey plan or triangulated using a measuring tape.

- Diameter at breast height (DBH) and Diameter above Root Buttress (DRB) are measured using a diameter tape.
- Height is measured using a clinometer.
- Canopy width is estimated using a measured stride paced out on site.
- Structural Root Zone (SRZ) and Tree Protection Zone (TPZ) radii are measured (in accordance with AS 4970-2009) from the centre of the trunk.
- Development impact/setback is measured from the nearest face of the trunk to the face of the structure in Auto CAD using the perpendicular distance function. Generally this is measured without detailed foundation design.

2.4. Recording Data

Data collected is collated in the tree survey table located at **7. Tree Survey Table** (page 15). The tree survey table contains abbreviations for terms describing the trees characteristics; explanatory notes pertaining to these are located at **8. Tree Survey Table Notes** (page 26).

The physical data for tree locations, crown width and DRB is schematically described in **9. Tree Location Plan** (page 30).

2.5. Reference Documents

The report was written in coordination with:

- Survey Plan prepared by LTS Lockely Pty Ltd Revision D, dated 06/07/16.
- Site Demolition Plan prepared by Cadence Australia Revision A, dated 16/02/17.
- Stormwater Plan prepared by Enstruct Pty Ltd Revision A, dated 23/02/17.
- Landscape Plan prepared by Aspect Studios Revision B, dated 09/02/17.
- Statement of Ecological Significance, prepared by Lesryk Environmental, dated 18/03/17.
- The Australian Standard for the Protection of Trees on Development Sites (AS 4970 – 2009).

2.6. Council Tree Preservation Order

Ryde City Council defines a tree as:

- a) Any tree, whether on private or public land (land owned or under the care, control and management of the City of Ryde), with a height greater than 5 metres and a trunk circumference of 450mm at 1.4 metres above ground level.
- b) Native vegetation within defined 'Urban Bushland' (refer to map).
- c) Trees which are prominent or have landmark qualities due to their height, size, position and age.
- d) Trees which are part of an important wildlife habitat, refuge or corridor.
- e) Native bushland subject to controls under State Environmental Planning Policy 19.
- f) Trees on the City of Ryde Significant Tree Register.

The following trees are exempt from the City of Ryde TPO:

- i. Trees that are within 3m of an approved detached building and any associated building, as measured from the outside of the tree, at 1.4m from the ground.
- ii. The removal of dead or dying tree/s, as long as the trees are not a threatened species habitat.
- iii. Tree(s) posing an immediate danger, e.g. after a storm.
- iv. Tree(s) that have been declared noxious weeds in the local government area of the City of Ryde under the Noxious Weeds Act 1993 or an undesirable species in accordance with the TPO list.

Tree works on a tree on land owned by the Macquarie University are exempt from the Ryde DCP, 2014.

2.7. Determining a tree's significance

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. When determining a tree's significance within the landscape context, the following questions are asked of each tree. Significance may be expressed in increments of High, Medium or Low. For a High rating the majority (≥ 4) of the answers will be yes; for a Medium rating half ($=3$) of the answers will be yes; and for the Low rating the minority of answers will be yes (≤ 2).

1. Is the tree a locally native remnant; an endangered species; a part of an endangered ecological community; or does the tree provide critical habitat for an endangered species?
2. Is the tree of botanical interest; listed as a heritage item under the Federal State or Local Regulations?
3. Is the tree visually prominent in the locality?
4. Is the tree well structured?
5. Is the tree in good health and does it display signs of good vigour?
6. Is the tree typically formed for the species?
7. Is the tree located in a position that will accommodate future growth?

3. Observations

3.1. Site Description

The site is several contiguous lots located at 8-12 University Avenue. It currently contains a series of single and multi-level car parks, driveways, security building and gardens. The site has a general easterly aspect.

3.2. Soil Landscape Map

The soils in this area are from the Lucas Heights soil landscape group ³. They are characterised by moderately deep 50-150 cm hard setting yellow podzolic soils and yellow soloths, with yellow earths on the outer edges.

Generally the landscape is characterised by gently undulating crests and ridges on plateau surfaces of the Mittagong formation with alternating bands of shale and fine-grained sandstones. There is local relief to 30 m with slope gradients of <10%, and rock outcrops are absent ³.

These soils are limited by low soil fertility, low available water capacity and stony soil. The critical soil characteristics of this soil type for trees growing on this site include low fertility, and low water capacity ³.

3.3. Native Vegetation Map

The original vegetation community is mapped as Turpentine Ironbark Margin Forest.

This endangered ecological community^{13, 14} is dominated by *Eucalyptus punctata* and *Syncarpia glomulifera* with a sparse stratum of small trees including *Acacia parramattensis* and *Pittosporum undulatum*. A variety of tree species occur more sporadically, including *Corymbia gummifera* and *E. globoidea*.

The shrub stratum is usually relatively sparse and features mesic species such as *Polyscias sambucifolia*, *Breynia oblongifolia* and *Notelaea longifolia* as well as some sclerophyllous species such as *Leucopogon juniperinus* ^{13, 14}.

The ground stratum is frequently dense and dominated by a range of grass species including *Entolasia marginata*, *E. stricta*, *Panicum simile*, *Themeda australis*, *Microlaena stipoides* var. *stipoides*, *Echinopogon caespitosus* var. *caespitosus* and *Oplismenus aemulus*. A variety of herb species are also represented. Frequently recorded species include *Pratia purpurascens*, *Gonocarpus tetragynus*, *Dianella caerulea*, *Dichondra repens* and *Pseuderanthemum variable*^{13, 14}.

Turpentine Ironbark Margin Forest, is listed as endangered under the Threatened Species Conservation Act 1995. There appears to be species representative of this vegetation community located on this site.

Further comment on species representative of original vegetation communities found on site is found in *Statement of Ecological Significance*, prepared by Lesryk Environmental, dated 18/03/17.

3.4. Summary of site inspection data

Generally the site's vegetation was observed to have a majority native tree canopy, with a mixed native and exotic groundcover layer. The existing surveyed trees are shown at **9. Tree Location Plan** (page 30).

3.5. Summary of Proposed Development

The proposed development will involve:

- Site establishment and protection of adjoining property where required;
- Protection, diversion and/or temporary establishment of services and infrastructure as required;
- Erection of perimeter fencing, hoarding, gantry, scaffolding and site accommodation;
- Establishment of temporary access and pedestrian arrangements;
- Tree removal;
- Demolition of C2, C3, E1, Security Building C1a, decommissioned sub-station and capping/ augmentation of redundant services;
- Demolition of the service tunnel within the footprint of the 8 – 12 building; and will

- Accommodate the Main Works and future public domain landscape works.

This will involve the demolition of existing structures on site. The extent of site works is shown below and illustrated at **9. Tree Location Plan** (page 30).

3.6. Summary of tree impacts - Tree significance and encroachment matrix

The matrix below gives a brief overview summary of tree significance and level of encroachment from the proposed development of numbered trees.

ENCROACHMENT WITHIN TPZ					
Numbering of trees as shown on Tree Location Plan					
TREE LANDSCAPE SIGNIFICANCE		No Impact	Minor Encroachment	Major Encroachment	Within Development Footprint
	High	-	-	48	99
	Medium	49(M-H), 112, 113, 133, 134, 135, 136, 139, 142, 149, 150, 151, 152(M-H), 154 (M-H), 156(M-H), 157(M-H), 163, 164, 167, 168(M-H), 169(M-H), 170(M-H), 171 (M-H), 172(M-H), 173(M-H), 174(M-H), 175(M-H), 176(M-H), 177(M-H), 178(M-H), 179(M-H), 180(M-H), 181 (M-H), 182(M-H), 183(M-H), 184(M-H), 185(M-H), 186(M-H), 187(M-H), 188(M-H), 189(M-H), 190(M-H) & 191 (M-H)	158	117 & 118(M-H)	3, 5, 6, 8, 9(M-H), 13(M-H), 14, 16(M-H), 17(M-H), 22, 23, 24, 26, 27, 29, 34, 37, 38, 39(M-H), 44, 87(M-H), 88, 92, 95, 96, 97, 98 & 104(M-H)
	Low Low-Medium is indicated as L-M	50, 110, 111, 114, 115, 119, 129(L-M), 130(L-M), 131(L-M), 132(L-M), 137(L-M), 138(L-M), 140, 141, 143(L-M), 144(L-M), 145(L-M), 146(L-M), 147(L-M), 148(L-M), 153(L-M), 155, 159(L-M), 160(L-M), 161(L-M), 162, 165(L-M), 166 & 192	-	51(L-M), 52(L-M), 53(L-M), 54, 56, 70, 76, 109 & 120	1, 2, 4, 7, 10(L-M), 11(L-M), 12, 15, 18, 18A, 19, 20, 21, 25, 28, 30, 31, 32, 33, 35, 36, 40, 41, 41A, 42, 43, 45, 46, 47, 55, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 77, 78, 79, 80, 81, 82, 83, 84, 84A, 85, 86, 89(L-M), 90(L-M), 91(L-M), 93, 94(L-M), 100, 101, 102(L-M), 103, 105, 106, 107, 108, 116(L-M), 121, 122, 123, 124(L-M), 125, 126, 127 & 128
	Total Number of trees	73	1	12	109

4. Discussion

4.1. Tree Protection Zone (TPZ)

The TPZ is a radial area extending outwards from the centre of the trunk equal to the DBH x 12. This area shall be protected by a TPF (see below). For all trees to be retained a TPZ is to be created and maintained.

The TPZ function is primarily to protect the root zone by restricting access however the canopy of the tree shall also be protected from damage or injury. The Project Arborist shall approve the extent of the TPZ.

The TPZ shall be mulched to a depth of 75mm with an approved organic mulch. Supplementary watering shall be provided in dry periods to reduce water or construction stress, particularly to those trees which may have incurred root disturbance.

In the TPZ the following activities shall be excluded:

- Excavation, compaction or disturbance of the existing soil.
- The movement or storage of materials, waste or fill.
- Movement or storage of plant, machinery, equipment or vehicles.
- Any activity likely to damage the trunk, crown or root system.
- Scaffolding.

4.2. Trees with a Minor TPZ Encroachment

The proposed construction encroaches within the TPZ by 10% or less.

- Tree 38 is located 3.84m from the area of proposed fill storage providing a 3.9% encroachment within the TPZ. This tree is considered to be of medium significance and is suitable for retention. It is also located within the proposed public domain landscaped area. We understand site and landscape design constraints are likely to allow the retention of this tree and Tree 39.
- Tree 158 is located 5.21m from the proposed area of fill storage providing a 6.7% fill encroachment within the TPZ. This tree is considered to be of medium significance and is suitable for retention. The fill encroachment will provide a low level of impact which is sustainable by the tree.

4.3. Trees with a Major TPZ Encroachment

The proposed construction encroaches within the TPZ by more than 10%.

- Tree 48 is located 6.91m from the multi-level car park that is to be demolished providing an 11.3% encroachment within the TPZ and 9.89m from the proposed area of fill storage providing a 2.4% fill encroachment within the TPZ. There is also anticipated possible crown impact from demolishing upper level of carpark. This is a remnant tree, indigenous to the native vegetation of the area and is considered to be of high significance. It should be retained and protected.

A Tree Protection Plan, specifying tree protection measures (including barriers), tree sensitive construction methods and arboricultural supervision of

construction and tree care should be prepared by the project arborist and implemented for this and all retained trees.

- Trees 52 and 53 are located 4.76m and 2.73m from the proposed area of fill storage providing fill encroachments of 10.1% and 24.1% respectively within the TPZ. These trees are considered to be of low to medium significance however occur as a group and their size and location contributes to the landscape and may be considered for retention and incorporation into the proposed landscape plan.

If it is intended to retain these trees, construction offsets, tree protection measures (including barriers), tree sensitive construction methods and arboricultural supervision of construction and tree care should be included in the Tree Protection Plan (see Tree 48).

- Tree 117 is located 3.65m from the proposed area of fill storage providing a 14.1% fill encroachment within the TPZ. This tree is considered to be of medium significance and is suitable for retention. This fill encroachment would provide a low to moderate level of impact which is sustainable by the tree, if works are undertaken in a manner that minimises impact to the tree and asphalt retained in place as described for Tree 118 (below).
- Tree 118 is located 3.83m from the proposed area of fill storage providing a 17.4% fill encroachment within the TPZ. This tree is to be of medium to high significance and is suitable for retention. While this is a major encroachment, this would provide a moderate level of impact which is sustainable by the tree, if undertaken in a manner that minimises impact to the tree. This would be outlined in a Tree Protection Plan.
- Tree 120 is located 2.18m from the proposed area of fill storage providing fill encroachment of 20% respectively within the TPZ. This tree is considered to be of low significance however has been identified by Macquarie University as endemic and to be retained and protected. It should therefore be protected as described under Tree 118, above.
- All other Low and Low-Medium significance trees: Refer to data sheet. These should not be considered a constraint to the development.

4.4. Trees within the development footprint

- Tree 99 is located within the proposed development footprint. This tree is considered to be of high significance however, extensive redesign of the proposed development layout would be required to retain this tree. It cannot be retained if the development is approved in its current form.
- Trees 3, 5, 6, 8, 13(M-H), 14, 16(M-H), 17(M-H), 22, 23, 24, 26, 27, 29, 34, 36, 37, 38, 39(M-H), 44, 87(M-H), 88, 92, 95, 96, 97, 98 & 104(M-H) are located within the proposed landscaped area. These tree are considered to be of medium or medium to high significance, however it is untenable to retain these trees.
- Tree 9(M-H) is located within the landscaped 'linear park' to the north of the proposed building. It is of high significance, suitable for retention and has been indicated for retention in the landscape plans.
- Trees 11 (Low-Medium significance) is located within the landscaped area - *linear park* to the north of the proposed building. It is of low-medium and low

significance respectively but has been indicated for retention in the landscape plans.

If it is intended to retain this tree, construction offsets, tree protection measures (including barriers), tree sensitive construction methods and arboricultural supervision of construction and tree care should be included in the Tree Protection Plan (see Tree 48)..

- All other Low and Low-Medium significance trees: Refer to data sheet. These should not be considered a constraint to the development.

4.5. Other Tree Comments

- Trees 49(M-H), 112, 113, 133, 134, 135, 136, 139, 142, 149, 150, 151, 152(M-H), 154 (M-H), 156(M-H), 157(M-H), 163, 164, 167, 168(M-H), 169(M-H), 170(M-H), 171(M-H), 172(M-H), 173(M-H), 174(M-H), 175(M-H), 176(M-H), 177(M-H), 178(M-H), 179(M-H), 180(M-H), 181(M-H), 182(M-H), 183(M-H), 184(M-H), 185(M-H), 186(M-H), 187(M-H), 188(M-H), 189(M-H), 190(M-H) & 191(M-H) are located in positions that will allow their retention without impact from the proposed development.
- Trees 50, 110, 111, 114, 115, 116(L-M), 119, 129(L-M), 130(L-M), 131(L-M), 132(L-M), 137(L-M), 138(L-M), 140, 141, 143(L-M), 144(L-M), 145(L-M), 146(L-M), 147(L-M), 148(L-M), 153(L-M), 155, 159(L-M), 160(L-M), 161(L-M), 162, 165(L-M), 166 & 192 are located in positions that will allow their retention without impact from the proposed development.
- Juvenile understory trees on site that are saplings, self-sown and small in height and DBH in comparison to the other existing trees, have been identified in Groups A, B, C, D, E, F, G & H. These groups are located in areas that are within the proposed development footprint or where they will be unsustainable due to construction impacts. They are considered to be of low significance and should not be considered a constraint on the development.

5. Recommendations

In consideration of the data collected recommendations are provided for the removal or retention of trees including specific tree protection measures required to reduce the anticipated impacts from the proposed construction on those trees proposed to be retained. This report specifically recommends:

- A Tree Protection Plan, specifying construction offset details as necessary, required tree protection measures (including barriers), tree sensitive construction methods and arboricultural supervision of construction and tree care should be prepared by the project arborist and implemented for all retained trees on site.
- Trees to be removed must be removed by appropriately qualified personnel in a manner which complies with AS4373 and in a manner which protects nearby retained trees.

6. Tree Management

6.1. Tree Management Objectives

The general tree management objectives include:

- Appointment of a Project Arborist who has a minimum Level 5 AQF Arboriculture qualification and experience in managing trees on construction sites.
- Installation of additional root, trunk and branch protection as required to protect retained trees where minor encroachments within the TPZ are anticipated.
- The installation of a Tree Protection Fence to enclose and protect the TPZ.
- Monitoring, inspection and certification of tree protection as per the below hold points.

6.2. Management Objective Priorities

The prioritisation of the above objectives is integral for the successful management of site trees:

1. Protection of the TPZ of retained trees;
2. Protection of the trunk and branches of retained trees;
3. Reduction of stress related to construction impacts;
4. The ongoing viability of retained trees after practical completion.

6.3. Hold Points, Inspection and Certification

To ensure the tree protection plan is implemented hold points (**HP**) should be specified in an included schedule of works). Once each stage is reached the work will be inspected and certified by the Project Arborist and the next stage may commence.

Alterations to this schedule may be required due to necessity however this shall be through consultation with the Project Arborist only.

7. Tree Survey Table

No impact	Minor encroachment	Major encroachment	Within development footprint	Within future public domain works	Within storage of site fill footprint
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NO#	Genus	Species	Common Name	Height	Spread	Trunk Dia	Trunk Dia 2	Trunk Dia 3	Trunk Dia 4	DBH	DRB	SRZ	TPZ	Age	Health	Crown	Signifi- cance	Am	Eco	Form	Development Setback and Encroachment	Comments
1	Eucalyptus	nicholii	Willow Peppermint	18	8	510				510	550	2575	6120	M	P	F	L	L	M	CD, U	Within development footprint - landscape	Epicormics, less than 50% live crown
2	Ficus	benjamina 'exotica'	Weeping Fig	8	9	380				380	380	2204	4560	SM	G	Av	L	L	M	CD, M, B	Within development footprint - landscape	Not on survey. Multi trunked at 1m from base
3	Eucalyptus	grandis	Flooded Gum	21	10	360				360	450	2366	4320	SM	Av	Av	M	M	M	D, U	Within development footprint - landscape	Not on survey. Minor leaf infestation
4	Callistemon	viminialis	Weeping Bottlebrush	6	4	205				205	250	1849	2460	M	Av	Av	L	L	M	U, CD	Within development footprint - landscape	Not on survey
5	Eucalyptus	grandis	Flooded Gum	20	7	240				240	350	2129	2880	SM	F	Av	M	M	M	U, CD	Within development footprint - landscape	Not on survey. Leaf infestation
6	Eucalyptus	grandis	Flooded Gum	20	7	260				260	350	2129	3120	SM	F	Av	M	M	M	U, CD	Within development footprint - landscape	Not on survey. Leaf infestation
7	Citharexylum	spinosum	Fiddlewood	6	5	120	130			177	350	2129	2124	SM	Av	Av	L	L	L	M, CD, B	Within development footprint - landscape	Not on survey
8	Eucalyptus	pilularis	Blackbutt	15	7	280				280	350	2129	3360	SM	G	Av	M	M	M	U, CD	Within development footprint - landscape	Not on survey. 1m from existing footpath
9	Eucalyptus	grandis	Flooded Gum	28	14	590				590	660	2779	7080	M	Av	F-Av	M-H	M-H	M	U, D, B	Within development footprint - landscape	Previous structural root prune 250mm in diameter, 1m W from trunk for recent footpath construction. Footpath is located 2m from the centre of the trunk. Canopy somewhat sparse. Epicormics to 6.2m long in mid-upper crown. Less than 5% deadwood up to 60mm in diameter. Leaf infestation
10	Eucalyptus	pilularis	Blackbutt	13	8	200	200			283	450	2366	3396	SM	G	G	L-M	M	M	M, CD	Within development footprint - landscape	Ivy growing on trunk up to 3m
11	Eucalyptus	grandis	Flooded Gum	15	10	400				400	430	2322	4800	SM	Av	Av	L-M	M	M	CD, B	Within development footprint - landscape	Crown somewhat sparse. 70% of crown extends 6m over carpark C2
12	Eucalyptus	grandis	Flooded Gum	12	6	220				220	240	1817	2640	SM	P-F	P	L	L	M	CD, Su, CS	Within development footprint - landscape	Sparse asymmetrical crown. Deadwood up to 80mm. Epicormics 100% of crown, to 1.0m length.
13	Eucalyptus	grandis	Flooded Gum	29	11	450				450	500	2474	5400	SM	G	G	M-H	M	M	U, CD	Within development footprint - landscape	Previous branch failure at N, 6m and 12m. Tree forks at 10m. Atypical/unusual bulging at branch collars
14	Eucalyptus	grandis	Flooded Gum	24	7	310				310	350	2129	3720	SM	Av	F-Av	M	M	M	U, CD	Within development footprint - landscape	Epicormics to 600mm in length. Deadwood to 100mm in diameter, less than 5% of crown
15	Eucalyptus	grandis	Flooded Gum	21	8	260				260	310	2024	3120	SM	F-Av	F-Av	L	M	M	CS, Su	Within development footprint - landscape	Upper trunk lean to N. Leaf infestation and scale
16	Eucalyptus	grandis	Flooded Gum	29	11	430				430	460	2388	5160	SM-M	Av	F-Av	M-H	M	M	U, CD	Within development footprint - landscape	Tear outs at 6m NE and 9m NE. Epicormics
17	Eucalyptus	grandis	Flooded Gum	26	16	490				490	600	2670	5880	SM-M	Av	Av	M-H	M	M	U, CD, B	Within development footprint - landscape	Exposed lateral roots to 3m NW. Leaf infestation. Previous branch failures 50mm in diameter
18	Lophostemon	confertus	Brush Box	8	6	235				235	255	1864	2820	SM	F	F	L	M	M	U, Dome, CD	Within development footprint - landscape	Deadwood less than 10% of crown
18A	Eucalyptus	pilularis	Blackbutt	9	4	100				100	120	1358	1200	J-SM	F	F-Av	L	L	L	U, CD	Within development footprint - landscape	Not on survey. Located 4m E of T18. Potential for future growth
19	Lophostemon	confertus	Brush Box	8	8	365				365	380	2204	4380	SM	P	P-F	L	M	M	U, Dome, M, CD	Within development footprint - landscape	Multi trunked at 1.5m from base. Sparse crown. Deadwood 40% of crown, up to 10mm in diameter
20	Lophostemon	confertus	Brush Box	9	3	170	110			203	285	1953	2436	SM	P	P-F	L	L	L	U, M, CD	Within development footprint - landscape	Multi trunked at 1m from base of trunk
21	Eucalyptus	pilularis	Blackbutt	11	5	165				165	180	1611	1980	J-SM	F	F-Av	L	L	L	U, CD	Within development footprint - landscape	Not on scale. 2.5m SE of T21 and in line with T22. Potential for future growth
22	Eucalyptus	grandis	Flooded Gum	18	9	260				260	310	2024	3120	SM	Av	F	M	M	M	U, CD, B	Within development footprint - landscape	Deadwood less than 5% of crown, up to 10mm in diameter

No impact	Minor encroachment	Major encroachment	Within development footprint	Within future public domain works	Within storage of site fill footprint
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NO#	Genus	Species	Common Name	Height	Spread	Trunk Dia	Trunk Dia 2	Trunk Dia 3	Trunk Dia 4	DBH	DRB	SRZ	TPZ	Age	Health	Crown	Signifi- cance	Am	Eco	Form	Development Setback and Encroachment	Comments
23	Eucalyptus	grandis	Flooded Gum	20	16	360				360	410	2276	4320	SM-M	F-Av	F	M	M	M	Su, CD, M, Sp	Within development footprint - future public domain works	Multi trunked at 4.5m to 3 scaffolds which are growing at 30° angles. Epicormic growth up to 2.5m length in lower crown. Atypical crown structure. Deadwood less than 5% of crown, up to 60mm in diameter. Exposed lateral root 4m, 300mm in diameter, N
24	Eucalyptus	grandis	Flooded Gum	24	12	335				335	405	2264	4020	SM	F-Av	F	M	M	M	U, CD	Within development footprint - future public domain works	Epicormics up to 1m in length. Deadwood less than 5% of crown, up to 40mm in diameter
25	Eucalyptus	grandis	Flooded Gum	20	16	320				320	325	2064	3840	SM	F	F	L	M	M	V, M, CD	Within development footprint - future public domain works	Multi trunked at 1.5m from base, 3 stubs at this point. Sparse crown. Branches extend over Carpark E1 up to 6m S
26	Eucalyptus	grandis	Flooded Gum	26	7	310				310	345	2117	3720	SM	Av-G	Av	M	M	M	U, CD	Within development footprint - future public domain works	Forest form
27	Eucalyptus	grandis	Flooded Gum	16	6	270				270	330	2077	3240	SM	Av-G	Av	M	M	M	U, CD	Within development footprint - future public domain works	Slightly suppressed from T26. Lateral branch at 500mm from base of trunk
28	Eucalyptus	grandis	Flooded Gum	18	8	260				260	400	2252	3120	SM	Av	P-F	L	M	M	U, CD, M	Within development footprint - future public domain works	Multi trunked at 800mm from base of trunk. Deadwood less than 5% of crown, up to 50mm in diameter
29	Eucalyptus	grandis	Flooded Gum	20	6	310				310	350	2129	3720	SM	F-Av	Av	M	M	M	U, CD	Within development footprint - future public domain works	Epicormics 40% of crown up to 1m in length
30	Eucalyptus	grandis	Flooded Gum	19	3	235				235	290	1968	2820	SM	F	P-F	L	M	M	U, CD	Within development footprint - future public domain works	Forest form. Epicormics
31	Eucalyptus	grandis	Flooded Gum	18	4	220				220	265	1895	2640	SM	Av	P-F	L	M	M	U, CD	Within development footprint - future public domain works	Forest form. Epicormics
32	Eucalyptus	grandis	Flooded Gum	16	4	190				190	220	1752	2280	SM	F	P	L	M	M	U, CD	Within development footprint - future public domain works	Forest form. Epicormics. Lean in upper crown to W
33	Eucalyptus	grandis	Flooded Gum	16	3	135				135	170	1572	1620	J-SM	P-F	P-F	L	L	M	U, CD, Su	Within development footprint - future public domain works	Not on survey. Epicormics up to 1m 50% of crown. Potential for future growth
34	Eucalyptus	grandis	Flooded Gum	27	9	390				390	440	2344	4680	SM	G	G	M	M	M	U, CD, U, CD, Su	Within development footprint - future public domain works	Previous tear-out at 18m. Previous branch failures. Few deadwood stubs 30mm in diameter, 300mm in length. Slight skew to NW in upper crown
35	Eucalyptus	grandis	Flooded Gum	21	3	220				220	240	1817	2640	SM	F	F	L	M	M	U, CD	Within development footprint - future public domain works	Forest form
36	Eucalyptus	grandis	Flooded Gum	18	5	205				205	240	1817	2460	SM	F	F	L	M	M	U, CD	Within development footprint - future public domain works	Forest form
37	Eucalyptus	grandis	Flooded Gum	27	8	310				310	380	2204	3720	SM-M	Av	F-Av	M	M	M	U, CD	Within development footprint - future public domain works	Epicormics 10% of crown. Deadwood stubs/ deadwood less than 5% of crown. Longest dead wood branch at 5m from base of trunk, up to 1m in length
38	Eucalyptus	grandis	Flooded Gum	27	10	410				410	490	2453	4920	M	Av	Av	M	M	M	U, CD, B	Within development footprint - future public domain works. Located 3.84m from storage of site fill providing a minor (3.9%) encroachment within the TPZ	Epicormics less than 5% of crown. Previous failures
39	Eucalyptus	grandis	Flooded Gum	30	10	530				530	600	2670	6360	M	Av	Av	M-H	M	M	U, D	Within development footprint - future public domain works. Located 1.69m from storage of site fill providing a major (26.1%) encroachment within the TPZ and encroachment within the SRZ	Epicormics less than 5% of crown. Previous failures. Deadwood less than 5% of crown 30mm in diameter. Previous tear out at 15m E
40	Tristaniopsis	laurina	Water Gum	13	8	150	220	140		301	390	2228	3612	M	F	F	L	M	L	CD, B, M	Within development footprint - storage of site fill	

No impact	Minor encroachment	Major encroachment	Within development footprint	Within future public domain works	Within storage of site fill footprint
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NO#	Genus	Species	Common Name	Height	Spread	Trunk Dia	Trunk Dia 2	Trunk Dia 3	Trunk Dia 4	DBH	DRB	SRZ	TPZ	Age	Health	Crown	Signifi- cance	Am	Eco	Form	Development Setback and Encroachment	Comments
41	<i>Tristania</i>	<i>laurina</i>	Water Gum	13	7	220	145	165		311	330	2077	3732	M	F	F	L	M	L	CD, B, M	Within development footprint - storage of site fill	
41A	<i>Tristania</i>	<i>laurina</i>	Water Gum	13	6	100	130	50		172	250	1849	2064	M	F	F	L	M	L	CD, M, B	Within development footprint - storage of site fill	Not on survey, 1m NE of tree 41
42	<i>Tristania</i>	<i>laurina</i>	Water Gum	12	7	240	130			273	250	1849	3276	M	F	F	L	M	L	CD, M, B	Within development footprint - storage of site fill	
43	<i>Lophostemon</i>	<i>confertus</i>	Brush Box	14	8	245				245	280	1939	2940	SM	G	Av	L	M	M	CD, B	Within development footprint - storage of site fill	Native tree 4m in height, 4m to N
44	<i>Eucalyptus</i>	<i>grandis</i>	Flooded Gum	25	10	320				320	390	2228	3840	SM	G	Av	M	M	M	CD, U, B	Within development footprint - storage of site fill	Epicormics less than 10% of crown
45	<i>Lophostemon</i>	<i>confertus</i>	Brush Box	15	7	220				220	270	1910	2640	SM	Av	Av	L	M	M	U, CD	Within development footprint - storage of site fill	
46	<i>Tristania</i>	<i>laurina</i>	Water Gum	8	8	110	110	110		191	210	1718	2292	SM	F	F	L	L	L	CD	Within development footprint - storage of site fill	
47	<i>Lophostemon</i>	<i>confertus</i>	Brush Box	12	5	185				185	220	1752	2220	SM	G	G	L	M	M	U, CD	Within development footprint - storage of site fill	Deadwood less than 5% of crown, up to 10mm in diameter
48	<i>Syncarpia</i>	<i>glomulifera</i>	Turpentine Tree	21	18	410	430	750		957	1460	3879	11484	M	G	Av-G	H	H	H	M, CD, Spr, B	Located 6.91m from the multi-level car park to be demolished providing an 11.3% encroachment within the TPZ and 9.89m from the proposed area of fill storage providing a 2.4% fill encroachment within the TPZ. Anticipated possible crown impact from demolishing upper level of carpark.	Remnant tree, First order branching at 2m and 3m. Deadwood less than 5% of crown. Two trunks: trunk on W forks at 1m
49	<i>Angophora</i>	<i>costata</i>	Smooth-barked Apple	25	16	610				610	690	2832	7320	M	G	Av-G	M-H	H	H	U, CD, B	No impact	Deadwood less than 5% of crown, up to 40mm in diameter. Crossing branches. Larger dead branches at 1.8m and 7m from base of trunk, 1.8m in length and 100mm in diameter
50	<i>Eucalyptus</i>	<i>camaldulensis</i>	River Red Gum	17	5	170				170	200	1683	2040	SM	P-F	P	L	L	L	U, L	No impact	Sparse crown. Forest form - poor height over diameter ratio
51	<i>Eucalyptus</i>	<i>nicholii</i>	Willow Peppermint	30	10	780				780	910	3181	9360	M	F	P-F	L-M	M	M	CD, B	Located 0.43m from the proposed area of fill storage providing a 38.0% fill encroachment within the TPZ and encroachment within the SRZ.	Deadwood and epicormics throughout crown, up to 100mm in diameter. Compact soil at base of tree. Epicormics growing from lower trunk- 9m long, 100-200mm in diameter
52	<i>Eucalyptus</i>	<i>nicholii</i>	Willow Peppermint	21	15	660				660	770	2965	7920	M-OM	F	P-F	L-M	M	M	CD, B	Located 4.76m from the proposed area of fill storage providing a 10.1% fill encroachment within the TPZ .	Deadwood and epicormics throughout crown, up to 100mm in diameter. Compact soil at base of tree
53	<i>Eucalyptus</i>	<i>nicholii</i>	Willow Peppermint	32	15	795				795	910	3181	9540	M-OM	F	P-F	L-M	M	M	CD, B	Located 2.73m from the proposed area of fill storage providing a 24.1% fill encroachment within the TPZ .	Deadwood and epicormics throughout crown, up to 100mm in diameter. Compact soil at base of tree. Exposed damaged root 2m NE: 100mm in diameter, 300mm in length
54	<i>Lophostemon</i>	<i>confertus</i>	Brush Box	16	5	300				300	320	2051	3600	SM	F	F	L	M	M	CD	Located 1.26m from the proposed landscaped area providing a 25.5% unknown level change encroachment within the TPZ and encroachment within the SRZ .	Located between carpark buildings C3 and E1
55	<i>Eucalyptus</i>	<i>pilularis</i>	Blackbutt	18	4	200				200	215	1735	2400	SM	G	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1

No impact	Minor encroachment	Major encroachment	Within development footprint	Within future public domain works	Within storage of site fill footprint
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NO#	Genus	Species	Common Name	Height	Spread	Trunk Dia	Trunk Dia 2	Trunk Dia 3	Trunk Dia 4	DBH	DRB	SRZ	TPZ	Age	Health	Crown	Signifi- cance	Am	Eco	Form	Development Setback and Encroachment	Comments
56	Lophostemon	confertus	Brush Box	17	5	300				300	320	2051	3600	SM	F	F	L	M	M	U, CD	Located 0.31m from the proposed landscaped area and 2.34m from fill storage providing a combined major (49.5%) unknown level change encroachment within the TPZ and encroachment within the SRZ .	Located between carpark buildings C3 and E1
57	Lophostemon	confertus	Brush Box	17	12	450				450	460	2388	5400	SM	F	F	L	M	M	U, CD	Within development footprint - driveway	Located between carpark buildings C3 and E1
58	Lophostemon	confertus	Brush Box	19	7	330				330	350	2129	3960	SM	F	F	L	M	M	U, CD	Within development footprint - storage of site fill	Located between carpark buildings C3 and E1
59	Lophostemon	confertus	Brush Box	19	9	420				420	440	2344	5040	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
60	Lophostemon	confertus	Brush Box	17	5	200				200	250	1849	2400	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
61	Lophostemon	confertus	Brush Box	15	6	300				300	320	2051	3600	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
62	Lophostemon	confertus	Brush Box	16	6	300				300	320	2051	3600	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
63	Lophostemon	confertus	Brush Box	19	8	450				450	460	2388	5400	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
64	Lophostemon	confertus	Brush Box	18	7	200				200	220	1752	2400	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
65	Lophostemon	confertus	Brush Box	15	7	350				350	400	2252	4200	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
66	Lophostemon	confertus	Brush Box	15	6	200				200	225	1769	2400	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
67	Lophostemon	confertus	Brush Box	16	6	300				300	320	2051	3600	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
68	Lophostemon	confertus	Brush Box	15	4	200				200	220	1752	2400	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
69	Lophostemon	confertus	Brush Box	18	6	310				310	330	2077	3720	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
70	Lophostemon	confertus	Brush Box	13	6	200				200	215	1735	2400	SM	F	F	L	M	M	L, CD	Located 0.52m from the proposed landscaped area and 0.98m from fill storage providing a major 55.8% unknown level change encroachment within the TPZ and encroachment within the SRZ .	Located between carpark buildings C3 and E1
71	Lophostemon	confertus	Brush Box	17	6	300				300	320	2051	3600	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
72	Lophostemon	confertus	Brush Box	15	9	350				350	390	2228	4200	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
73	Lophostemon	confertus	Brush Box	15	7	300				300	320	2051	3600	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
74	Lophostemon	confertus	Brush Box	14	7	310				310	320	2051	3720	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
75	Lophostemon	confertus	Brush Box	13	7	380				380	400	2252	4560	SM	F	F	L	M	M	U, CD	Within development footprint - landscape	Located between carpark buildings C3 and E1
76	Lophostemon	confertus	Brush Box	15	3	200				200	230	1785	2400	SM	F	F	L	M	M	U, CD	Located 0.22m from the proposed landscaped area of fill storage providing unknown level change encroachment within the TPZ and 1.35m from stored fill providing a combined major (53.3%) encroachment and encroachment within the SRZ .	Located between carpark buildings C3 and E1
77	Lophostemon	confertus	Brush Box	16	9	600				600	610	2689	7200	M	F	F	L	M	M	U, CD	Within development footprint - basement	Located between carpark buildings C3 and C2

No impact	Minor encroachment	Major encroachment	Within development footprint	Within future public domain works	Within storage of site fill footprint
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NO#	Genus	Species	Common Name	Height	Spread	Trunk Dia	Trunk Dia 2	Trunk Dia 3	Trunk Dia 4	DBH	DRB	SRZ	TPZ	Age	Health	Crown	Signifi- cance	Am	Eco	Form	Development Setback and Encroachment	Comments
78	Lophostemon	confertus	Brush Box	18	10	600				600	610	2689	7200	M	F	F	L	M	M	U, CD	Within development footprint - basement	Located between carpark buildings C3 and C2
79	Lophostemon	confertus	Brush Box	16	10	600				600	610	2689	7200	M	F	F	L	M	M	U	Within development footprint - basement	Located between carpark buildings C3 and C2
80	Lophostemon	confertus	Brush Box	19	8	300				300	350	2129	3600	SM	F	F	L	M	M	U, CD	Within development footprint - basement	Located between carpark buildings C3 and C2
81	Lophostemon	confertus	Brush Box	19	9	420				420	440	2344	5040	SM	F	F	L	M	M	U, CD	Within development footprint - basement	Located between carpark buildings C3 and C2
82	Lophostemon	confertus	Brush Box	19	10	480				480	500	2474	5760	SM	F	F	L	M	M	U, CD	Within development footprint - basement	Located between carpark buildings C3 and C2
83	Lophostemon	confertus	Brush Box	10	8	450				450	470	2410	5400	SM	F	F	L	M	M	U, CD	Within development footprint - basement	Located between carpark buildings C3 and C2
84	Lophostemon	confertus	Brush Box	11	6	400				400	420	2299	4800	SM	F	F	L	M	M	U, CD	Within development footprint - basement	Located between carpark buildings C3 and C2
84A	Eucalyptus	grandis	Flooded Gum	12	5	130				130	145	1471	1560	J	Av-G	Av-G	L	M	M	U	Within development footprint - basement	Not on survey. Potential for future growth. 2.5m S from corner of C2 carpark wall
85	Lophostemon	confertus	Brush Box	13	8	260	200	295		442	465	2399	5304	SM-M	Av	F	L	L	L	M, B, CD	Within development footprint - basement	Previous decay within 2m up from base of trunk. Exposed roots
86	Lophostemon	confertus	Brush Box	13	9	210	190	280		399	470	2410	4788	SM-M	Av	F	L	L	L	M, B, CD	Within development footprint - basement	Previous decay within 2m up from base of trunk. Exposed roots
87	Grevillea	robusta	Silky Oak	18	7	460				460	550	2575	5520	M	G	G	M-H	L	M	U, B	Within development footprint - basement	Mechanical damage to roots near base of trunk. Good root buttress
88	Eucalyptus	grandis	Flooded Gum	24	9	350				350	410	2276	4200	M	G	Av-G	M	M	M	U, D, B, M, CD, V	Within development footprint - basement	Deadwood less than 5% of crown
89	Melaleuca	bracteata 'Revolution Green'	Black Tea-tree	9	6	140	140	140	140	280	410	2276	3360	SM-M	G	G	L-M	M	M	V	Within development footprint - basement	Not on Survey. Multi trunked from the base
90	Eucalyptus	pilularis	Blackbutt	10	5	290				290	330	2077	3480	SM	Av	F	L-M	L-M	M	L, CD	Within development footprint - basement	Not on survey. Tree leaning E over carpark building C2
91	Eucalyptus	pilularis	Blackbutt	10	5	290				290	330	2077	3480	SM	Av	F	L-M	L-M	M	L, CD	Within development footprint - basement	Not on survey. Tree leaning E over carpark building C2
92	Eucalyptus	pilularis	Blackbutt	26	10	550				550	610	2689	6600	M	Av	G	M	M	M	CD, U, M, CD, Sup	Within development footprint - basement	First order branch at 1.5m NW
93	Melaleuca	bracteata 'Revolution Green'	Black Tea-tree	8	3	100	120			157	240	1817	1884	SM	Av	G	L	L-M	L-M		Within development footprint - basement	Not on survey. Multi trunked from base
94	Eucalyptus	pilularis	Blackbutt	20	10	410				410	480	2431	4920	M	Av	G	L-M	M	M	L, CD, B	Within development footprint - basement	-
95	Eucalyptus	pilularis	Blackbutt	21	9	380				380	480	2431	4560	SM	Av	L	M	M-H	M	U, CD	Within development footprint - basement	-
96	Eucalyptus	grandis	Flooded Gum	20	11	335				335	365	2167	4020	SM	Av	L	M	M-H	M	U, CD	Within development footprint - basement	-
97	Eucalyptus	grandis	Flooded Gum	28	11	430				430	480	2431	5160	M	Av	G	M	M-H	M	U, CD	Within development footprint - basement	-
98	Eucalyptus	grandis	Flooded Gum	20	13	390				390	490	2453	4680	M	Av	G	M	M-H	M	U, CD, B	Within development footprint - basement	-
99	Eucalyptus	grandis	Flooded Gum	35	15	710				710	745	2925	8520	M	G	G	H	H	M	D, U, B	Within development footprint - basement	Base of trunk is located 2.5m from carpark entrance roadway. Dominant tree in the stand/walkway area. Previous branch failures. Minor deadwood less than 5% of crown. Previous tear out at 5m, N
100	Eucalyptus	pilularis	Blackbutt	20	10	480				480	530	2535	5760	SM-M	F	F	L	L-M	M	L, Sup	Within development footprint - basement	Lean/crown skew to W
101	Lophostemon	confertus	Brush Box	15	10	200	200	140	150	350	320	2051	4200	SM-M	F-Av	F-Av	L	M	L	CD, M	Within development footprint - basement	Located 1m from carpark building C2. Multi trunked at 1m from base of trunk
102	Corymbia	eximia	Yellow Bloodwood	16	3	250				250	300	1996	3000	SM	Av	Av	L-M	M	M	U, CD	Within development footprint - basement	Forest form
103	Lophostemon	confertus	Brush Box	12	9	315				315	400	2252	3780	SM	Av	F-Av	L	L-M	L	M, CD, B	Within development footprint - basement	Deadwood throughout crown
104	Corymbia	eximia	Yellow Bloodwood	18	5	440				440	500	2474	5280	SM-M	G	Av	M-H	M	M	U, D	Within development footprint - basement	Deadwood less than 5% of crown

No impact	Minor encroachment	Major encroachment	Within development footprint	Within future public domain works	Within storage of site fill footprint
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NO#	Genus	Species	Common Name	Height	Spread	Trunk Dia	Trunk Dia 2	Trunk Dia 3	Trunk Dia 4	DBH	DRB	SRZ	TPZ	Age	Health	Crown	Signifi- cance	Am	Eco	Form	Development Setback and Encroachment	Comments
105	Lophostemon	confertus	Brush Box	10	5	170	200			263	300	1996	3156	SM	F	F	L	L-M	L	M, CD	Within development footprint - basement	Multi trunked at 800mm from base of trunk
106	Eucalyptus	robusta	Swamp Mahogany	13	5	310				310	320	2051	3720	SM	F	F	L	L-M	L	M, CD	Within development footprint - basement	Multi trunked at 1.5m from base of trunk
107	Eucalyptus	piperita	Sydney Peppermint	15	3	340				340	370	2180	4080	SM	P-F	F	L	L-M	L	M, CD	Within development footprint - basement	Bracket fungus at 1m, N
108	Eucalyptus	robusta	Swamp Mahogany	13	5	330				330	380	2204	3960	SM	F	F	L	L-M	L	M, CD	Within development footprint - basement	Deadwood less than 5% of crown
109	Eucalyptus	spp.		15	2.5	215				215	270	1910	2580	SM	P	F	L	L	M	U, Pole	Located 1.47m from the proposed area of fill storage providing a major (13.1%) fill encroachment within the TPZ .	Pest activity evident on foliage
110	Corymbia	gummifera	Red Bloodwood	9	4	210				210	260	1879	2520	SM	P-F	P	L	L	M	U	No impact	Some deadwood. Majority of crown is epicormics. Identified by Macquarie University as endemic and to be retained .
111	Eucalyptus	racemosa	Scribbly Gum	9	8	330				330	410	2276	3960	SM	Av	F-Av	L	L-M	H	L, M, CD	No impact	Multi trunked at 2.2m. Lean to E
112	Syncarpia	glomulifera	Turpentine Tree	9	8	420				420	470	2410	5040	SM	Av-G	Av	M	M	H	CD	No impact	Growing in rock/sandstone boulder area. Co-dominant with T113.
113	Syncarpia	glomulifera	Turpentine Tree	9	8.5	260	530			591	880	3136	7092	SM	Av-G	Av-G	M	M	H	CD, M	No impact	Growing in rock/sandstone boulder area. Co-dominant with T112. Multi trunked from the base or 2 separate trees growing in very close proximity to each other
114	Corymbia	eximia	Yellow Bloodwood	14	13	440				440	500	2474	5280	M	F	P	L	L	M	CD, M	No impact	Multi trunked at 3m. Deadwood and epicormics. Identified by Macquarie University as endemic and to be retained and protected.
115	Corymbia	eximia	Yellow Bloodwood	15	8	385	140			410	550	2575	4920	M	P	P	L	L	M	CD, M	No impact	Sucker at base. Dieback and deadwood. Majority of crown is epicormic growth. Identified by Macquarie University as endemic and to be retained .
116	Eucalyptus	spp.		20	7	290				290	350	2129	3480	SM	Av	Av-G	L-M	L-M	M	U, CD	Within development footprint - storage of site fill	Sign nailed to trunk. Minor epicormic growth. Vertical cracks in bark form base of trunk up to 2m of trunk. Exposed damages woody root on W near base of tree. Good 'future' tree
117	Eucalyptus	maidenii	Maiden's Gum	18	15	705				705	790	2997	8460	M	Av	Av	M	M	M	B, CD	Located 3.65m from the proposed area of fill storage providing a major (14.1%) fill encroachment within the TPZ	Minor deadwood and very minor epicormics. Good tree
118	Eucalyptus	racemosa	Scribbly Gum	18	20	660				660	720	2883	7920	M	Av	G	M-H	M	H	CD, M	Located 3.83m from the proposed area of fill storage providing a major (17.4%) fill encroachment within the TPZ	Multi trunked at 1.8m. Exposed woody root on W side. Great crown structure for species
119	Corymbia	gummifera	Red Bloodwood	10	7	180				180	220	1752	2160	J-SM	F	F	L	L-M	M	CD, Su	No impact	University as endemic and to be retained and protected.
120	Eucalyptus	racemosa	Scribbly Gum	14	14	310	310			439	470	2410	5268	SM	F	F	L	L-M	M	M, CD	Located 2.18m from the proposed area of fill storage providing a major (22.0%) fill encroachment within the TPZ	Multi trunked at 1m. Minor deadwood. Exposed woody roots on E side near road. Identified by Macquarie University as endemic and to be retained .
121	Corymbia	gummifera	Red Bloodwood	12	9	315				315	315	2037	3780	SM	Av	F-Av	L	M	M	U, CD	Within development footprint - storage of site fill	Epicormics. Good tree given its location
122	Eucalyptus	grandis	Flooded Gum	18	5	240				240	300	1996	2880	SM	Av	Av	L	M	M	U, CD	Within development footprint - storage of site fill	Forest form
123	Platanus	spp.	Plane Tree	9	3	190				190	230	1785	2280	J	P	P	L	L	L	Su	Within development footprint - storage of site fill	Poor specimen
124	Eucalyptus	grandis	Flooded Gum	22	13	360				360	410	2276	4320	SM	Av-G	Av	L-M	M	M	U, CD	Within development footprint - future public domain works	Recent branch failure at 8.5m, N. Forest form

No impact	Minor encroachment	Major encroachment	Within development footprint	Within future public domain works	Within storage of site fill footprint
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NO#	Genus	Species	Common Name	Height	Spread	Trunk Dia	Trunk Dia 2	Trunk Dia 3	Trunk Dia 4	DBH	DRB	SRZ	TPZ	Age	Health	Crown	Signifi- cance	Am	Eco	Form	Development Setback and Encroachment	Comments
125	Corymbia	citriodora	Lemon-scented Gum	22	4	255				255	310	2024	3060	SM	Av	F	L	M	M	U, CD	Within development footprint - future public domain works	Forest form
126	Lophostemon	confertus	Brush Box	11	6	170	170	140	225	358	410	2276	4296	SM	G	Av	L	H	M	CD, B	Within development footprint - storage of site fill	Located in the middle of the carpark. Exposed woody roots
127	Lophostemon	confertus	Brush Box	11	6	345				345	450	2366	4140	SM	G	Av	L	H	M	CD, B	Within development footprint - storage of site fill	Located in the middle of the carpark. Exposed woody roots
128	Acacia	fimbriata	Brisbane Golden Wattle	14	5	205				205	260	1879	2460	SM	G	G	L	M	M	D, U	Within development footprint - future public domain works	Not on survey. Good tree
129	Corymbia	citriodora	Lemon-scented Gum	10	10	305				305	395	2240	3660	SM-M	F	P-F	L-M	H	M	CS, CD, M	No impact	Multi trunked at 2.5m. Sucker at base. First order branch at 5m W
130	Eucalyptus	crebra	Narrow-leaved Ironbark	15	6	250				250	290	1968	3000	SM	F	P	L-M	H	M	CD, CS, Su	No impact	Epicormics, minor deadwood
131	Eucalyptus	crebra	Narrow-leaved Ironbark	20	7	270				270	280	1939	3240	SM	F	F	L-M	H	M	CD, CS, Su	No impact	-
132	Eucalyptus	crebra	Narrow-leaved Ironbark	12	4	180				180	220	1752	2160	SM	F	F	L-M	H	M	CD, CS, Su	No impact	-
133	Eucalyptus	crebra	Narrow-leaved Ironbark	20	6	270				270	310	2024	3240	SM	Av	Av	M	H	M	CD, U	No impact	Minor deadwood. Forest form
134	Corymbia	citriodora	Lemon-scented Gum	22	6	335				335	420	2299	4020	M	Av	Av	M	H	M	CD, U	No impact	Sucker at base. Forest form
135	Eucalyptus	crebra	Narrow-leaved Ironbark	25	6	240				240	280	1939	2880	SM	Av	Av	M	H	M	CD, U	No impact	Minor deadwood. Forest form
136	Eucalyptus	crebra	Narrow-leaved Ironbark	25	7	360				360	420	2299	4320	SM-M	Av	Av	M	H	M	CD, U	No impact	Deadwood branches 12m up trunk
137	Eucalyptus	crebra	Narrow-leaved Ironbark	7	2	110				110	130	1405	1320	J	Av	P	L-M	H	M	CD, U, Su	No impact	-
138	Eucalyptus	crebra	Narrow-leaved Ironbark	7	2	110				110	130	1405	1320	J	Av	P	L-M	H	M	CD, U, Su	No impact	-
139	Eucalyptus	crebra	Narrow-leaved Ironbark	20	4	225				225	255	1864	2700	SM	Av	AV	M	H	M	CD, U	No impact	Epicormics, deadwood
140	Eucalyptus	crebra	Narrow-leaved Ironbark	7	2					0		0	0				L		M	CD, U, Su	No impact	Dead tree
141	Eucalyptus	crebra	Narrow-leaved Ironbark	8	2	110				110	130	1405	1320	J	P	P	L	L	M	CD, U, Su	No impact	Top half of tree is dead, epicormic growth up trunk to 4m
142	Corymbia	citriodora	Lemon-scented Gum	20	16	270				270	330	2077	3240	M	Av	F-Av	M	H	M	CD, U, M	No impact	Multi trunked at 9m
143	Eucalyptus	crebra	Narrow-leaved Ironbark	18	10	240				240	280	1939	2880	SM	Av	F	L-M	H	M	CD, CS	No impact	6m C. citriodora sapling at base (80 DBH)
144	Eucalyptus	crebra	Narrow-leaved Ironbark	20	3	170				170	190	1647	2040	J-SM	Av	F	L-M	H	M	CD, U	No impact	Forest form. Very sparse crown
145	Eucalyptus	crebra	Narrow-leaved Ironbark	20	5	300				300	340	2104	3600	SM-M	Av	F-Av	L-M	H	M	CD, U	No impact	Epicormics at base, deadwood
146	Eucalyptus	crebra	Narrow-leaved Ironbark	12	3	170				170	190	1647	2040	J-SM	Av	Av	L-M	H	M	CD, U	No impact	Epicormics and some branch dieback
147	Eucalyptus	crebra	Narrow-leaved Ironbark	20	3	170				170	190	1647	2040	J-SM	Av	F	L-M	H	M	CD, U	No impact	Epicormics and some branch dieback
148	Eucalyptus	crebra	Narrow-leaved Ironbark	20	5	240				240	280	1939	2880	SM	Av	Av	L-M	H	M	CD, CS, L	No impact	Slight lean
149	Corymbia	citriodora	Lemon-scented Gum	20	14	325				325	425	2310	3900	SM-M	Av	Av	M	H	M	CD, U	No impact	Two dead branches within bottom 5m of trunk
150	Eucalyptus	crebra	Narrow-leaved Ironbark	18	15	385				385	460	2388	4620	M	Av	Av	M	H	M	CD, B	No impact	Minor twiggy deadwood. Epicormics. Previously crown raised to 6m
151	Corymbia	citriodora	Lemon-scented Gum	20	15	360				360	430	2322	4320	M	Av	Av	M	H	M	CD, CS, M	No impact	Multi trunked at 2m
152	Eucalyptus	crebra	Narrow-leaved Ironbark	20	11	455				455	550	2575	5460	M	Av	Av	M-H	H	M	CD, M	No impact	Multi trunked at 9m. Minor deadwood, epicormics

No impact	Minor encroachment	Major encroachment	Within development footprint	Within future public domain works	Within storage of site fill footprint
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NO#	Genus	Species	Common Name	Height	Spread	Trunk Dia	Trunk Dia 2	Trunk Dia 3	Trunk Dia 4	DBH	DRB	SRZ	TPZ	Age	Health	Crown	Signifi- cance	Am	Eco	Form	Development Setback and Encroachment	Comments
153	Corymbia	citriodora	Lemon-scented Gum	17	8	185				185	255	1864	2220	SM	Av	Av	L-M	H	M	CD, L	No impact	Serpentine branches/trunk structure
154	Eucalyptus	crebra	Narrow-leaved Ironbark	20	13	420				420	510	2494	5040	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor deadwood
155	Eucalyptus	crebra	Narrow-leaved Ironbark	17	8	220				220	250	1849	2640	SM	F	P	L	H	M	CD, Su	No impact	Deadwood, epicormics. Poor overall structure
156	Eucalyptus	crebra	Narrow-leaved Ironbark	20	13	455				455	600	2670	5460	M	G	G	M-H	H	M	CD	No impact	Not on survey. Kino evident on base of trunk. Good buttress for species. Very good tree
157	Eucalyptus	crebra	Narrow-leaved Ironbark	22	7	360				360	400	2252	4320	SM-M	Av	Av	M-H	H	M	CD	No impact	Minor deadwood
158	Corymbia	citriodora	Lemon-scented Gum	20	16	370	270	325	270	624	1015	3330	7488	M	Av	F-Av	M	H	M	CD, M	Located 5.21m from the proposed area of fill storage providing a minor (6.7%) fill encroachment within the TPZ .	Located on the perimeter of forest of trees. Major deadwood in canopy. Multi trunked from base/previously lopped or possibly 2-3 trees planted too close together as seedlings. Dead sucker from base
159	Eucalyptus	crebra	Narrow-leaved Ironbark	22	7	295				295	340	2104	3540	SM-M	Av	F-Av	L-M	H	M	CD, U	No impact	Minor deadwood, minor epicormic growth
160	Corymbia	citriodora	Lemon-scented Gum	22	5	140				140	190	1647	1680	J-SM	Av-G	Av-G	L-M	H	M	CD, M	No impact	Multi trunked at 3m
161	Corymbia	citriodora	Lemon-scented Gum	22	9	280				280	350	2129	3360	SM-M	Av	Av	L-M	H	M	CD, U	No impact	Good buttress. Dead branch at 12-13m, 4m in length, 60mm in diameter
162	Eucalyptus	crebra	Narrow-leaved Ironbark	16	1.5	140				140	165	1553	1680	J	P-F	P	L	L	M	CD, Su	No impact	90% of the crown is epicormic growth
163	Eucalyptus	crebra	Narrow-leaved Ironbark	22	7	250				250	290	1968	3000	SM	Av	Av	M	H	M	CD, U	No impact	Minor deadwood. C.citriodora near base, less than 5m in height
164	Eucalyptus	crebra	Narrow-leaved Ironbark	22	5	320				320	390	2228	3840	SM	Av	Av	M	H	M	CD, U	No impact	Forest form
165	Eucalyptus	crebra	Narrow-leaved Ironbark	22	4	220				220	270	1910	2640	SM	Av	F	L-M	H	M	CD, U	No impact	Deadwood and twiggy dieback
166	Eucalyptus	crebra	Narrow-leaved Ironbark	6	2	80				80	100	1258	960	J	F	P	L	L	M	Su	No impact	Not on survey
167	Eucalyptus	crebra	Narrow-leaved Ironbark	22	3	220				220	270	1910	2640	SM	Av	AV	M	H	M	CD, U, M	No impact	Multi trunked at 5m. Twiggy dieback, epicormics. Forest form
168	Eucalyptus	microcorys	Tallowwood	30	9	470				470	560	2594	5640	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
169	Eucalyptus	microcorys	Tallowwood	30	9	460				460	530	2535	5520	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
170	Eucalyptus	microcorys	Tallowwood	30	9	470				470	590	2652	5640	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
171	Eucalyptus	microcorys	Tallowwood	30	9	370				370	470	2410	4440	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
172	Eucalyptus	microcorys	Tallowwood	30	9	350				350	370	2180	4200	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
173	Eucalyptus	microcorys	Tallowwood	30	9	290				290	360	2155	3480	M	Av-G	Av	M-H	H	M	CD, U, M	No impact	Multi trunked at 6m. Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
174	Eucalyptus	microcorys	Tallowwood	30	9	530				530	640	2744	6360	M	Av-G	Av	M-H	H	M	CD, U	No impact	Lateral branches at S: 1m, 2.2m and 3.2m. Deadwood less than 90mm in diameter, less than 5% of crown
175	Eucalyptus	microcorys	Tallowwood	30	9	460				460	550	2575	5520	M	Av-G	Av	M-H	H	M	CD, U	No impact	Deadwood less than 90mm in diameter, less than 5% of crown

No impact	Minor encroachment	Major encroachment	Within development footprint	Within future public domain works	Within storage of site fill footprint
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NO#	Genus	Species	Common Name	Height	Spread	Trunk Dia	Trunk Dia 2	Trunk Dia 3	Trunk Dia 4	DBH	DRB	SRZ	TPZ	Age	Health	Crown	Signifi- cance	Am	Eco	Form	Development Setback and Encroachment	Comments
176	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	9	580				580	740	2916	6960	M	Av-G	Av	M-H	H	M	CD, U	No impact	Deadwood less than 90mm in diameter, less than 5% of crown
177	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	9	640				640	680	2814	7680	M	Av-G	Av	M-H	H	M	CD, U, M	No impact	Multi trunked at 2m. Deadwood less than 90mm in diameter, less than 5% of crown
178	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	9	350				350	440	2344	4200	SM-M	Av-G	Av	M-H	H	M	CD, U, M	No impact	Multi trunked at 6.5m. Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
179	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	420				420	490	2453	5040	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
180	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	400				400	520	2515	4800	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
181	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	360				360	440	2344	4320	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
182	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	360				360	440	2344	4320	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
183	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	360				360	440	2344	4320	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
184	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	360				360	440	2344	4320	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
185	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	315				315	400	2252	3780	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
186	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	315				315	400	2252	3780	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
187	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	315				315	400	2252	3780	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
188	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	330				330	470	2410	3960	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
189	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	430				430	600	2670	5160	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
190	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	330				330	470	2410	3960	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
191	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood	30	6	330				330	470	2410	3960	M	Av-G	Av	M-H	H	M	CD, U	No impact	Minor epicormics, minor deadwood; less than 50mm in diameter, less than 5% of crown. Forest form
192	<i>Eucalyptus</i>	<i>microcorys</i>	Tallowwood												DEAD		L	L	M		No impact	Dead tree

No impact	Minor encroachment	Major encroachment	Within development footprint	Within future public domain works	Within storage of site fill footprint
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NO#	Genus	Species	Common Name	Height	Spread	Trunk Dia	Trunk Dia 2	Trunk Dia 3	Trunk Dia 4	DBH	DRB	SRZ	TPZ	Age	Health	Crown	Signifi- cance	Am	Eco	Form	Development Setback and Encroachment	Comments
Group A		10 saplings to 10m, DBH to 120mm. Self-sown	<i>Eucalyptus</i> spp. and <i>Acacia parramattensis</i> .																			Understorey between Tree 10 and Tree 17
Group B		7 x saplings up to 14m, DBH to 150mm. Self-sown	<i>Eucalyptus saligna</i> .																			Understorey between Tree 18 and Tree 21
Group C		20 x saplings up to 10m, DBH to 150mm. Self-sown	<i>Acacia parramattensis</i> .																			Understorey between Tree 23 and Tree 39
Group D		16 x juvenile trees up to 10-12m, DBH 100-200mm. Planted and self-sown	<i>Eucalyptus</i> spp.																			
Group E		5 x 4-5m planted	<i>Acacia melanoxylon</i>																			DBH 100-150mm
Group F		13 x saplings to 12m, DBH 080-110mm. Self-sown	<i>Eucalyptus pilularis</i> , <i>Acacia Melanoxylon</i> , <i>Acacia parramattensis</i> and <i>Acacia elata</i> .																			Understorey between Tree 91 and Tree 100
Group G		3 x saplings to 10m, DBH to 100mm. 2 x	<i>Eucalyptus pilularis</i>																			1 x <i>Acacia parramattensis</i> . Understorey between Tree 101 and Tree 104
Group H		4 x saplings to 10m, DBH to 100mm. 1 x	<i>Eucalyptus elata</i>																			and 3 x <i>Eucalyptus pilularis</i> . Understorey between Tree 105 and Tree 108

8. Tree Survey Table Notes

8.1. Genus, Species and Common Name

The botanical and common name of each tree is identified and recorded.
Occasionally the exact species name is unknown; sp. is recorded to indicate this.

8.2. Height, Spread, Trunk Dia, DBH and DRB

- The tree's height and spread is recorded in metres.
- The tree **DBH** is recorded in millimetres. DBH is an abbreviation of Diameter (of the trunk) measured at Breast Height (or 1.2m from the base of the trunk). If more than one trunk is present the DBH is calculated in accordance with AS4970-2009 Protection of Trees on Development Sites.
- If the tree has multiple trunks multiple trunks each trunk DBH (**Trunk Dia**) will be recorded individually.
- The tree **DRB** is recorded in millimetres. DRB is an abbreviation of Diameter (of the trunk) measured above the Root Buttress. It is required to calculate the SRZ in accordance with AS4970-2009 Protection of Trees on Development Sites when there is major encroachment within the TPZ, ie. greater than 10% is encroached upon or if there is an encroachment within the SRZ.

8.3. Age

The age class of each tree is estimated as either:

- **J** – Juvenile, a young sapling, easily replaced from nursery stock.
- **SM** - Semi Mature, a tree that has not grown to mature size.
- **M** - Mature, a tree that has reached mature size and will slowly increase in size over time.
- **OM** - Over Mature, a tree that has been mature for a long period and is beginning to display signs of decline, e.g. large dead branches.
- **S** - Senescent, an over mature tree that is now in decline.

8.4. Health and Vigour

The trees health and vigour is recorded as a measurement of:

- **G** - Good the tree does not appear stressed with no excessive dieback, insect infestation, decay, dead wood or epicormic shoots.
- **Avg** - Average Health the tree appears stressed and have some crown dieback, and/or a few epicormic shoots, and/or some dead wood in the crown and some new growth at branch tips. These trees may benefit from remediation of the growing environment to reduce stress and return it to good health.
- **F** - Fair the tree may have areas of crown dieback, and/or epicormic shoots, and/or areas of decay, and/or reduced new growth at branch tips. These trees have been stressed for a short period of time, remediation of the growing environment may improve the trees health.
- **P** - Poor the tree may have large areas of crown dieback, and/or many epicormic shoots, and/or reduced new growth at branch tips. These trees have been stressed for a long time, remediation of the growing environment would not return the tree to good health.

- **D** – Dead the tree is dead

8.5. Crown Condition

The crown condition of each tree is assessed and recorded as either:

- **G** - Good Condition: the tree appears to have no visible indication of inherent structural defects.
- **Avg** - Average Condition: the tree has minor structural defects which may be corrected with remedial works or pruning, allowing the tree to return to Good Condition.
- **F** - Fair Condition: the tree has visible structural defects such as (but not limited to) dead branches, and/or an unbalanced crown, and/or leaning trunk and/or areas of decay. These trees do not demonstrate the typical form of their species, or have been damaged or have begun to deteriorate. Remedial works or pruning may return the tree to Average Condition.
- **P** - Poor Condition: the tree has significant structural defects such as (but not limited to) very large dead branches, and/or extremely unbalanced crown, and/or subsiding trunk and/or large areas of decay. These trees do not demonstrate the typical form of their species, or have been severely damaged or have deteriorated significantly. Remedial pruning would not return the tree to Fair Condition.

8.6. Significance

Measured as High, Medium or Low, see **2.7. Determining a tree's significance** (page 7).

8.7. Amenity Value

Amenity value is a subjective measurement based on the tree's contribution to the landscape, it may be based on the tree's visual form, however it also includes non visual attributes such as provision of shade for a seat, screening of poor views or for privacy, or if it has historical significance. The amenity value is recorded as:

- **H** - High, the trees form is an excellent example of its species and it makes a great specimen and/or it has other attributes such screening, or is historical significance. These trees are visually prominent and valuable to the community or public domain.
- **M** - Medium, the tree may have an altered form and/or it has attributes that provides amenity to local residents only.
- **L** – Low, the tree is not a good specimen and it does not provide substantial benefit to local residents or the community.

8.8. Ecological Value

Ecological value is a measurement of the trees contribution to the environment. It is determined by the trees area of origin, its potential to provide habitat to native fauna and its potential to become an environmental pest. The ecological value is recorded as:

- **H** - High, the tree is locally native or remnant and/or it has habitat value for native fauna.
- **M** - Medium the tree is native but not locally native.

- **L** - Low, the tree is not native and/or it may be a listed nuisance or weed species.
- **Ha** – Habitat, is the tree valued by fauna for food (ie. foliage fruit or sap) or shelter (ie. nesting, roosting, dray or hollow).

8.9. Form

The form, structure or shape of each tree is assessed and recorded as either one or a combination of several of the below terms; **(U)** Upright, **(B)** Broad, **(C)** Conical, **(Sh)** Shrub, **(CS)** Crown Shy (also referenced is the adjacent dominant tree canopy ie. **T4**), **(V)** Vase, **(D)** Dome, **(P)** Palm, **(S)** Spreading, **(L)** Leaning or **(BM)** Basal Multi Trunked.

Crown form may also be assessed in accordance with the relationship with the neighbouring tree and recorded as either: **S** - Suppressed, the crown is located beneath another larger crown and is leaning away (Crown Shy); **CD** - Codominant, the crown is adjacent to another crown of similar size, their crown areas may appear joined; **D** - Dominant, the crown is above other lower crowns; **E** - Emergent, the crown emerges from a lower canopy formed by other dominant or codominant crowns.

8.10. Defects

The presence of one or a combination of several defects is recorded **(W)** Wound, **(D)** Decay, **(F)** Fungus, **(B)** Bulge, **(FB)** Fibre Buckling, **(C)** Cracks, **(S)** Split, **(H)** Hollow, **(DB)** Die Back, **(E)** Epicormic shoots, **(DW)** Dead Wood, **(I)** Inclusion, **(CA)** Cavities, **(PF)** Previous Failure, **(R)** Root Damage, **(P)** Pruning wound, **(PD)** Pests and diseases, **(ST)** Storm Damage.

8.11. SRZ (Structural Root Zone)

The SRZ is a radial area extending outwards from the centre of the trunk. This area contains the majority of the structural woody roots. This area is responsible primarily for stability. Root damage or root loss within this zone greatly increases the opportunity for decay fungi to ingress into the heartwood, causing internal decay in addition to destabilising the tree's structural integrity. The SRZ is calculated as follows (This calculation is derived from the Australian Standard 4970 – 2009 Protection of Trees on Development Sites):

$$\text{SRZ (Radius)} = (D \times 50)^{0.42} \times 0.64$$

8.12. TPZ (Tree Protection Zone)

The TPZ is a circular area with a radius measured by multiplying the DBH by twelve (12), or a circular area the size of the tree's drip line whichever is greater. This area contains the majority of the essential structural and feeder roots responsible for stability, gaseous exchange and water and nutrient uptake. Excavation, back filling, compaction or other disturbance should not occur in this area.

The TPZ is used to identify the minimum area required for the safe retention of a given tree. This calculation is derived from the Australian Standard 4970 – 2009 Protection of Trees on Development Sites. An incursion to 10% within the TPZ is potentially acceptable if no other option is available. A major encroachment (in excess of 10%) is required to be clearly justified by the project Arborist and compensated for elsewhere. Justification methodology may vary depending on site or the individual tree's health, vigour and ability to withstand disturbance and may require root investigation.

8.13. Development Setback / Impact

The successful retention of trees on construction sites is dependent on the adequate allocation and management of the space above, below and around trees to be retained.

The trunk and canopy of trees to be retained must be protected to ensure the trunk and branches are not damaged during construction. The removal of bark and / or branches allows the potential ingress of micro organisms which may cause decay. Similarly the removal of bark restricts the tree's ability to distribute water, mineral ions and glucose.

It is essential to prevent the disturbance of the soil beneath the drip line of each tree, because this is the area where oxygen, water and mineral ions are absorbed by tree roots. Oxygen, water and mineral ions are essential for healthy plant growth. If soil becomes compacted, the ability of roots to function correctly is greatly reduced. Similarly the removal or damage of roots will reduce the ability of roots to function correctly. Woody roots provide stability for the tree and they also transport nutrients to the leaves.

The potential implications of removing or damaging roots are threefold:

1. The risk of whole tree failure is increased, as tree roots anchor and stabilise the tree. Woody roots are developed to assist in the support of the tree in prevailing wind, with these roots removed wind throw may occur, which would result in the mass failure of the tree.
2. The ability of the tree to absorb and transfer the essential nutrients, oxygen and water from the soil to the leaves is greatly affected. This will place the tree under stress and reduce the tree's ability to photosynthesise, and in turn cause the tree to use up stored energy reserves. These energy reserves are used to fight infection and insect attack, for new growth, maintenance of existing tissues and also for healing wounds. Once energy reserves become depleted a tree is much more susceptible to drought, disease and pest attack.
3. Open wounds are sites by which decay-causing pathogens can enter the tree. The severance or damage of woody roots creates sites where pathogens may gain ingress. Whilst the effect of decay may not be immediately apparent, the long term health and structure of the tree will be compromised.

8.14. Comments

Comments generally relate to the suitability for retention. The comments allow for a brief notation of other factors relevant to the assessment of the tree.

9. Tree Location Plan

LEGEND

Existing levels
To be removed / demolished
Area to be removed / demolished - E02, E03, E04

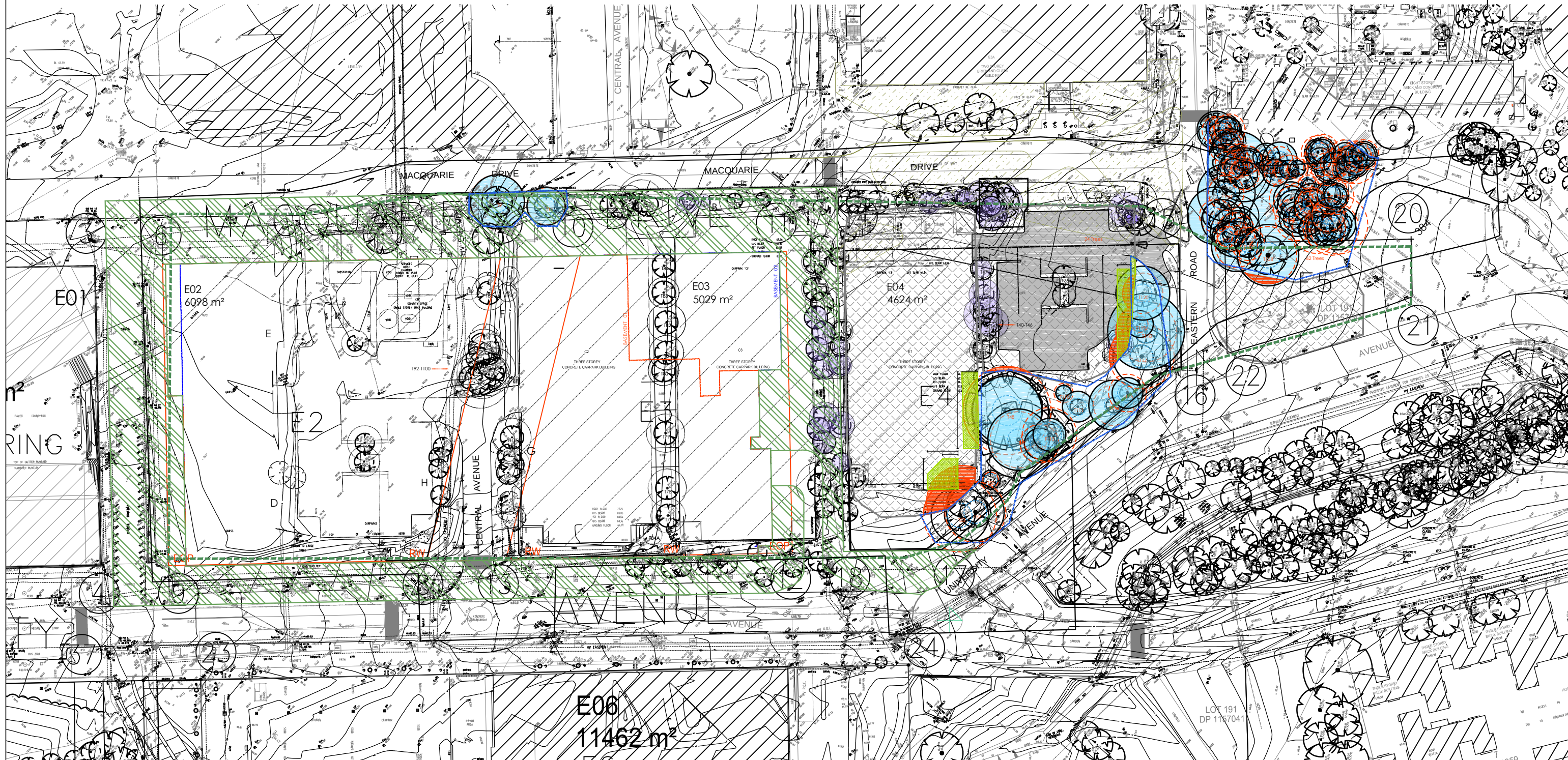
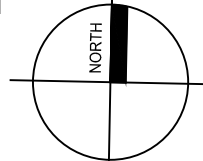
Indicative crown spread
Existing tree
Trunk diameter
Tree Protection Zone
Structural Root Zone

Extent of Stage One works
Proposed landscaping
Future landscaping

Areas of fill/spoil storage
Existing hardstand in E04
Indicative tree protection - fencing - subject to revision by consent authority in liaison with building contractor and project arborist

Recommended area of existing asphalt and garden to be retained to protect trees
Encroachment into Tree Protection Zone - fill
Encroachment into Tree Protection Zone

Existing tree - to be retained
Assessed tree within development footprint - to be removed



I	Revised indicative stockpile plans	AM	19-01-18
F	Revised hatching Tree 12	MD	30-03-17
E	Revised tree protection fencing	MD	27-03-17
D	Revised title block and tree status	MD	
Rev	Revision Description	Chk	Date

DO NOT SCALE from this drawing. Use given dimensions only.
Check all dimensions on the job prior to commencement of shop drawings or fabrication. Any discrepancies are to be referred to the Architect/Engineer/Designer prior to commencement of work



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2. Verify all measurements on site.
3. Notify ecodesign of any inconsistencies.
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Project
8 - 12 UNIVERSITY AVENUE
MACQUARIE UNIVERSITY

Drawing
TREE LOCATION PLAN

Drawing No. T - 01

Scales N.T.S. @ A1 Drawn AM Checked MD

Revision
Project No.
Plot Date

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