



Tree Report
Cochlear Global Headquarters
Macquarie Park
For
DEM (Australia) Pty Ltd
March 2008

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Introduction

It is proposed to construct an office building on the site at Lot 181 and 182 in DP 1112777 University Avenue Macquarie Park. Several trees are located near and within the footprint and some would be affected by the proposed construction. This report assesses the trees on the site and comments on the effects of the proposal.

The site

The site is approximately triangular with the long axis aligned east/west. The north boundary is to University Avenue and the other boundaries are defined by lands of Macquarie University. The land is generally level with mounding in some areas and a slope down to the creek which flows along part of the southeast boundary. Most of the site consists of a large carpark with parking bays separated by 'nature strips' planted with large trees.

Soils are loams and clay loams of the Glenorie soil landscape derived from the underlying Wianamatta Shale parent rock (Chapman & Murphy 1989). Soil profiles have probably been profoundly disturbed by bulk earthworks during construction of the carpark. Site vegetation consists of scattered or grouped canopy trees, with an understorey of rough turfgrass or hard surfacing.

Present state of the trees

The site trees are assessed in Table 1 below; tree numbers are noted on the plan attached. Trees were inspected from the ground only and no aerial or subterranean inspections were carried out.

Two groups of large trees near the northern boundary of the site are not located on the survey plan. The locations of these trees have been estimated and noted on the plans attached. Several trees in these groups have been identified with numbered tags to facilitate future survey works.

The site trees are nearly all planted landscape specimens, mainly well grown and semimature or approaching maturity. Trees planted on the mounds are in good health although some are of poor form due to overcrowding and suppression. Three

trees are infested by heartwood disease, indicated by the presence of fungal fruit bodies on the trunks. A few trees are potentially hazardous due to likelihood of scaffold failures in the presence of frequent targets. Trees in the carpark 'nature strips' are likely to have reduced life expectancy due to the proximity of sealed surfaces within the root zones and consequent curtailing of root system expansion, although at present they are in good vigour with no indication of impending decline.

None of the former vegetation community of the area exists on the site; most of the tree species present are native to other areas and are not indigenous to the site, with the possible exception of *Syncarpia glomulifera* (Turpentine) (two individuals), *Eucalyptus resinifera* (Red Mahogany) (one individual) and *Angophora costata* (Sydney Red Gum) (one individual).

Effect of the proposed development

The footprints of the proposed building and carpark cover almost the entire site, leaving a small triangular area of open space to the east.

All trees noted in Table 1 below are proposed for removal, with the exception of a few individuals located to the east of the building footprint:

- Tree 48 *Morus nigra* (Mulberry)
- Tree 49 *Syncarpia glomulifera* (Turpentine)
- Tree 50 *Angophora costata* (Sydney Red Gum)
- Tree 51 *Eucalyptus resinifera* (Red Mahogany)
- Tree 52 *Syncarpia glomulifera* (Turpentine)

Tree 9 *Eucalyptus nicholii* (Narrow-leaved Black Peppermint) and Tree 16 *Eucalyptus scoparia* (Wallangarra White Gum) are both poor examples of commonly planted species; although considered vulnerable in their native habitats in northern NSW, both species have been extensively planted in urban horticulture for many years. Any examples noted within 10kms of the site would have been planted. These two specimens are in poor and declining health and condition and would be removed within a few years irrespective of the proposed development.

Conclusions

The trees are mainly planted specimens of semimature to mature age class. They are generally in good health although some individuals have been deformed by close planting and others have been infected by fungal heartwood disease.

The proposed development would entail the removal of most of the site trees with the exception of a few to the east of the proposed building footprint.



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Consulting Arborist

References

- Barrell, J. 1993, 'Preplanning Tree Surveys: Safe Useful Life Expectancy (SULE) is the Natural Progression', *Arboricultural Journal* 17:1, February 1993, pp. 33-46.
- Barrell, J. 1995, 'Pre-development Tree Assessments', in *Trees & Building Sites, Proceedings of an International Conference Held in the Interest of Developing a Scientific Basis for Managing Trees in Proximity to Buildings*, International Society of Arboriculture, Illinois, USA, pp. 132-142.
- Chapman, G.A. & Murphy, C.L. 1989, *Soil Landscapes of the Sydney 1:100 000 Map Sheet*, Soil Conservation Service of NSW, Sydney.

Tree protection during construction

The following measures should be undertaken to reduce the possible effects of construction on the trees.

Services should be designed so that no trenching is required within 5m of the trees.

Excavation in the vicinity of trees should be done initially by hand. Any roots encountered <50mm in diameter should be cut cleanly with a hand saw. Any roots encountered >50mm in diameter should be retained intact and referred to the site arborist for advice.

Prior to the start of construction trees should be fenced (in groups where possible) to a radius of 5m from each trunk except where access is required for construction, to form tree protection zones.

Where access is required within these radii for building purposes, the fence should be set back 1.5m from the building face and the soil surface between the fence and the building should be protected by plywood sheets or strapped planking.

Trunks should be armoured with 2m lengths of 50x100mm hardwood timbers spaced at 150mm centres and secured by 8 gauge wires or steel strapping at 300mm spacing. The trunk protection should be maintained intact until the completion of all work on the site.

Fences should be chainlink 1.8m high supported by steel posts. Signage should be displayed on the fence as follows:

THIS IS A TREE PROTECTION AREA - NO ENTRY IS PERMITTED UNLESS
AUTHORISED - PENALTIES APPLY- ENQUIRIES TO THE SITE MANAGER

There should be no pedestrian or vehicular access to the tree protection zones. No building activities should take place within the tree protection zones, including storage or stockpiling. Runoff from the site should not be allowed to enter the tree protection zones.

The soil surface within the tree protection zones should be mulched with a layer of composted organic material (Vitagrow Landcure or similar) to a depth of 100mm.

A site arborist should supervise any activities in the vicinity of trees, including fencing, excavation and root pruning, and make periodic visits and reports to monitor the state of the trees.

At the end of construction all retained trees should be pruned to remove deadwood and weak branches. All pruning should be done in accordance with AS4373 Pruning of Amenity Trees.

Table 1: Site trees

Note: bf= below fork

Tree no	Species	Approx trunk dbh mm	Approx height m	Approx crown spread m	Health	Condition	SULE	Comment	Effect of proposed development
1	<i>Eucalyptus grandis</i> (Flooded Gum)	600	25	12	Good	Good	1B	Broken lower branches	Removal
2	<i>Acacia binervia</i> (Coast Myall)	300 bf	5	6	Poor	Poor	3C	Declining Suppressed	Removal
3	<i>Eucalyptus grandis</i> (Flooded Gum)	500	25	15	Good	Fair	2D	Branch breakages Cockatoo damage in fork	Removal
4	<i>Eucalyptus grandis</i> (Flooded Gum)	400	18	12	Good	Fair	2D	One-sided crown Codominant crown Overhanging branches	Removal
5	<i>Eucalyptus grandis</i> (Flooded Gum)	300	20	10	Good	Poor	3B	Trunk wounds possibly <i>Armillaria luteobubalina</i> root disease	Removal
6	<i>Acacia binervia</i> (Coast Myall)	150	6	6	Fair	Poor	3C	Suppressed Lopped lower branches	Removal
7	<i>Eucalyptus grandis</i> (Flooded Gum)	400	20	12	Good	Poor	3B	Extensive surface root system injured by mowing	Removal
8	<i>Acacia binervia</i> (Coast Myall)	300 bf	6	6	Fair	Poor	3C	Codominant crown with weak trunk junction Suppressed	Removal

Tree no	Species	Approx trunk dbh mm	Approx height m	Approx crown spread m	Health	Condition	SULE	Comment	Effect of proposed development
9	<i>Eucalyptus nicholii</i> (Narrow-leaved Black Peppermint)	100	5	4	Poor	Poor	4A	Leaning Declining Suppressed	Removal
10	<i>Eucalyptus elata</i> (River Peppermint)	150 x 4	10	12	Fair	Poor	3C	Weak trunk junctions at base Suppressed	Removal
11	<i>Eucalyptus elata</i> (River Peppermint)	600	15	12	Good	Good	2A	Codominant upper crown	Removal
12	<i>Eucalyptus elata</i> (River Peppermint)	300 bf	10	6	Good	Fair	3D	Leaning Weak trunk junction at 1m height Suppressed	Removal
13	<i>Eucalyptus saligna</i> (Sydney Blue Gum)	1000	20	15	Good	Fair	2D	Codominant crown Weak trunk junction at base with big ears defect	Removal
14	<i>Angophora costata</i> (Sydney Red Gum)	300 bf	15	10	Good	Fair	3D	Suppressed Overhanging footpath Codominant crown	Removal
15	<i>Eucalyptus elata</i> (River Peppermint)	750 bf	10	10	Fair	Poor	4B	Leaning Suppressed Hazardous	Removal
16	<i>Eucalyptus scoparia</i> (Wallangarra White Gum)	250	12	5	Poor	Poor	4A	Crown dieback Declining	Removal
17	<i>Liquidambar styraciflua</i> (Liquidambar)	200	8	5	Good	Good	1A	Good specimen	Removal
18	<i>Eucalyptus elata</i> (River Peppermint)	250	15	8	Good	Poor	4B	Leaning Root system injured to tension side Hazardous	Removal
19	<i>Eucalyptus elata</i> (River Peppermint)	500	18	10	Fair	Fair	2D	Trunk wound	Removal
20	<i>Eucalyptus microcorys</i> (Tallowwood)	500	15	12	Good	Fair	2D	Weak trunk/branch junctions	Removal

Tree no	Species	Approx trunk dbh mm	Approx height m	Approx crown spread m	Health	Condition	SULE	Comment	Effect of proposed development
21	<i>Eucalyptus saligna</i> (Sydney Blue Gum)	300	15	8	Good	Fair	2D	One-sided crown overhanging footpath	Removal
22	<i>Corymbia eximia</i> (Yellow Bloodwood)	300	12	8	Good	Fair	2D	One-sided crown overhanging footpath	Removal
23	<i>Corymbia eximia</i> (Yellow Bloodwood)	250	12	5	Good	Fair	2D	Suppressed	Removal
24	<i>Eucalyptus botryoides</i> (Bangalay)	500	20	12	Poor	Poor	4B	Fungal fruit body in lower trunk Epicormic shoots Declining Hazardous	Removal
25	<i>Eucalyptus botryoides</i> (Bangalay)	400	20	15	Fair	Poor	4B	Fungal fruit body in lower trunk Epicormic shoots Hazardous	Removal
26	<i>Eucalyptus botryoides</i> (Bangalay)	400 bf	15	12	Fair	Fair	2D	Suppressed	Removal
27	<i>Eucalyptus botryoides</i> (Bangalay)	750 bf	20	18	Good	Fair	2D	Codominant crown Stub in junction	Removal
28	<i>Corymbia eximia</i> (Yellow Bloodwood)	150	5	3	Poor	Poor	4A	Dying	Removal
29	<i>Corymbia eximia</i> (Yellow Bloodwood)	300	15	6	Good	Fair	3D	Codominant crown Soil compaction in root zone Branch breakage in upper crown	Removal
30	<i>Eucalyptus sideroxylon</i> (Mugga Ironbark)	200	6	5	Fair	Fair	2D	Sparse crown	Removal
31	<i>Melaleuca armillaris</i> (Bracelet Honey Myrtle)	100	5	4	Good	Fair	3C	Codominant crown with weak trunk junction	Removal

Tree no	Species	Approx trunk dbh mm	Approx height m	Approx crown spread m	Health	Condition	SULE	Comment	Effect of proposed development
31a	<i>Eucalyptus botryoides</i> (Bangalay)	300	15	8	Good	Fair	2D	Leaning	Removal
31b	<i>Eucalyptus botryoides</i> (Bangalay)	300	15	8	Good	Fair	2D	Leaning	Removal
31c	<i>Eucalyptus botryoides</i> (Bangalay)	250	12	10	Good	Fair	2D	Leaning Suppressed	Removal
32	<i>Liquidambar styraciflua</i> (Liquidambar)	300	12	6	Fair	Good	1A	Good specimen	Removal
32a	<i>Eucalyptus microcorys</i> (Tallowwood)	400	20	15	Good	Fair	2D	Codominant crown with weak trunk junction at 5m height	Removal
32b	<i>Eucalyptus microcorys</i> (Tallowwood)	400	16	8	Good	Fair	1A	One-sided crown	Removal
32c	<i>Eucalyptus microcorys</i> (Tallowwood)	400	16	8	Good	Fair	1A	One-sided crown	Removal
33	<i>Eucalyptus grandis</i> (Flooded Gum)	300	15	8	Good	Good	1A	Good specimen	Removal
34	<i>Eucalyptus grandis</i> (Flooded Gum)	400	18	15	Good	Good	1A	Good specimen	Removal
35	<i>Eucalyptus grandis</i> (Flooded Gum)	300	15	8	Good	Good	1A	Good specimen	Removal
35a	<i>Eucalyptus grandis</i> (Flooded Gum)	400	16	8	Good	Fair	2D	Overhanging playground	Removal
36	<i>Eucalyptus grandis</i> (Flooded Gum)	400	18	15	Good	Good	1A	Good specimen	Removal
36a	<i>Eucalyptus grandis</i> (Flooded Gum)	400	16	10	Good	Good	1A	Good specimen	Removal
37	<i>Eucalyptus grandis</i> (Flooded Gum)	500	20	12	Good	Fair	2D	Root system confined by carpark on 2 sides	Removal

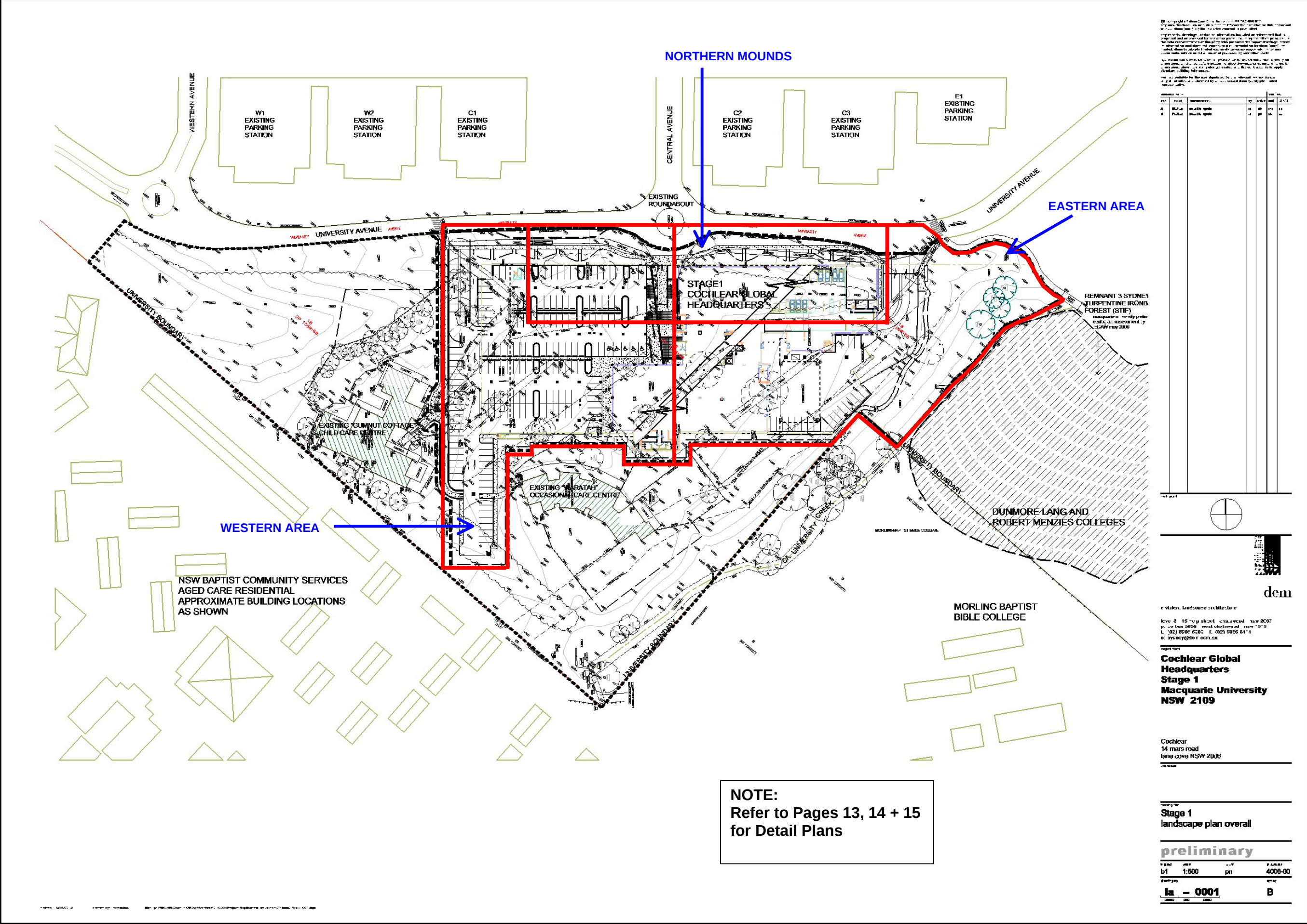
Tree no	Species	Approx trunk dbh mm	Approx height m	Approx crown spread m	Health	Condition	SULE	Comment	Effect of proposed development
38	<i>Eucalyptus grandis</i> (Flooded Gum)	400	15	12	Good	Fair	2D	One-sided crown Branch breakage	Removal
39	<i>Eucalyptus grandis</i> (Flooded Gum)	400	15	8	Good	Fair	2D	One-sided crown Bulge at trunk base Root system confined by carpark	Removal
40	<i>Eucalyptus grandis</i> (Flooded Gum)	400	18	10	Good	Fair	2D	Root system confined by carpark	Removal
40a	<i>Eucalyptus grandis</i> (Flooded Gum)	300	14	6	Good	Poor	3D	Suppressed Branch breakage Root system confined by carpark	Removal
40b	<i>Eucalyptus grandis</i> (Flooded Gum)	400	16	15	Good	Fair	2D	Codominant crown with crack below fork Branch breakage Root system confined by carpark	Removal
40c	<i>Eucalyptus grandis</i> (Flooded Gum)	300	16	6	Good	Good	2A	Good specimen Root system confined by carpark	Removal
41	<i>Eucalyptus grandis</i> (Flooded Gum)	250	10	6	Good	Poor	3D	Suppressed Poor form	Removal
42	<i>Eucalyptus grandis</i> (Flooded Gum)	500	16	12	Good	Fair	2D	Root system confined by carpark on 2 sides	Removal
43	<i>Eucalyptus grandis</i> (Flooded Gum)	400	15	15	Good	Fair	2D	Codominant crown Root system confined by carpark on 2 sides	Removal
44	Removed								
44a	Unidentified <i>Eucalyptus</i> sp.	200	10	6	Poor	Poor	4A	Declining	Removal

Tree no	Species	Approx trunk dbh mm	Approx height m	Approx crown spread m	Health	Condition	SULE	Comment	Effect of proposed development
45	<i>Eucalyptus grandis</i> (Flooded Gum)	500	18	18	Good	Fair	2D	Codominant crown x 4 stems Broken branches in lower crown Long branches overhanging carpark	Removal
46	<i>Eucalyptus grandis</i> (Flooded Gum)	400	20	15	Good	Fair	2D	Codominant crown Root system confined on 2 sides	Removal
47	<i>Eucalyptus grandis</i> (Flooded Gum)	1500 bf	20	20	Good	Fair	3D	Codominant crown Major dead branch with decay in main trunk Fungal fruit body in wound	Removal
48	<i>Morus nigra</i> (Mulberry)	500 400 250 150 x 3	12	16	Good	Fair	3D	Failed codominant junction at base	Retention
49	<i>Syncarpia glomulifera</i> (Turpentine)	1000 400	18	8	Fair	Fair	2D	Codominant crown with weak trunk junction at base Crown dieback	Retention
50	<i>Angophora costata</i> (Sydney Red Gum)	400	15	8	Poor	Poor	4A	Crown severe dieback Declining	Retention
51	<i>Eucalyptus resinifera</i> (Red Mahogany)	400	18	8	Good	Fair	2A	Leaning	Retention
52	<i>Syncarpia glomulifera</i> (Turpentine)	600	15	12	Good	Fair	2A	Codominant crown	Retention

Table 2: SULE categories (after Barrell 1995)

	1	2	3	4
	Long: Appeared to be retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance.	Medium: appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance.	Short: appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance.	Transient: trees which should be removed within the next 5 years.
A	Structurally sound trees located in positions that can accommodate future growth.	Trees which may only live between 15 and 40 years.	Trees which may only live between 5 and 15 years.	Dead, dying, suppressed or declining trees.
B	Trees which could be made suitable for long-term retention by remedial care.	Trees which may live for more than 40 years but would be removed for safety or nuisance reasons.	Trees which may live for more than 15 years but would be removed for safety or nuisance reasons.	Dangerous trees through damage, structural defect, instability or recent loss of adjacent trees. Urgent removal may be required if near assets.
C	Trees of special significance which would warrant extraordinary efforts to secure their long-term retention.	Trees which may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees which may live for more than 5 years but should be removed to prevent interference with more suitable individuals or to provide space for new planting.
D		Trees which could be made suitable for retention in the medium term by remedial care.	Trees which require substantial remediation and are only suitable for retention in the short term.	Trees which are damaging or may cause damage to existing structures within the next 5 years.

Tree location plans
Nts



Northern mounds

Trees not located by survey

