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4 June 2014

Lake Macquarie City Council
Box 1906
HRMC NSW 2310

Attention: Michelle Bisson **Our Ref: 12260**

Dear Michelle,

RE: DA 1892/2013 – 40-48 BURTON ROAD, MOUNT HUTTON

I refer to the above application, and your email dated 27 May 2014. In relation to the matters raised, please find the following advice and attached updated details to address these issues.

Waste
The garbage bins are located close to the front of each villa so that the older residents of the village will be able to easily manoeuvre bins to the front for pickup, rather than manoeuvring them up narrow side setbacks. The proposed bins will be screened with a slatted screen as detailed in the attached plans prepared by Terras Landscape Architects.

With regard to waste servicing of the development, the site planning and road layout in the current plans was designed to allow for servicing by Council's waste collection services. I note that the referral response from Waste Collection notes that Council could provide garbage collection services subject to:

- A suitable agreement being entered into in regard to the use of private road by Council's contractor.
- Sufficient space being available for location of bins to be collected.
- The road pavement being constructed to allow for heavy vehicle access.

The applicant is prepared to enter into the necessary agreement with Council. There are suitable areas alongside the internal roads for temporary storage of bins, and the roads (and bridges) will be constructed to take heavy vehicles. We also note the concerns raised over the potential for parking along the frontages of the internal roads. Parking is not permitted in these areas and visitor parking areas are provided within the development. The nature of the use does not generally give rise to a high visitor parking demand and this is not considered to be an issue for the development.

With regard to Waste Management for the recreation centre, we note that the plans indicate that a bin storage area has been provided behind the delivery bay with a large area to provide storage of bulk bins and/or MGB's as required.

The issue of the requirement for an additional cool room was discussed with Council's Officer, Stefanie King. The kitchen and bar areas are not a commercial operation and are available for use by the residents for organised activities. There is not expected to be large volumes of food waste produced. Where the kitchen will prepare home delivered meals for the residents, these will be pre-

packed and only involve pre-heating. Where food waste is produced from events organised for or by the residents, appropriate health requirements will be met, including daily disposal of food wastes if necessary. Given the likely infrequent nature of such activities, the construction of a second dedicated cool room for waste is not considered feasible or necessary.

Trees
Please find enclosed:

- an updated arborists report; and
- an additional sheet in the Landscape Plans, showing the trees proposed to be removed/retained.

Landscape
Please find enclosed updated landscaping plans including the following information:

- Fencing plan with changes made as per Council comments; and
- Tree planting details as recommended by Council.

With regard to the existing fence to Ducks Crossing and the northern boundary of the site, we have spoken with the owners who have asked that the existing colorbond fence be retained or replaced to maintain the visual privacy between the sites.

Legal
The requested legal advice is being prepared.

Signage
The landscape plan includes details of the proposed signage on Sheet 08 which details the provision of metal lettering spelling out "ELEEBANA SHORES" a top the post and rail fencing at the front entry.

If you require any additional information, please contact the undersigned on (02) 6555 2178.

Yours faithfully

GAVIN MABERLY-SMITH
Coastplan Group Pty Ltd
email: gavin@coastplan.com.au

Enc

terras
landscape architects

Arborist Report

Eleebana Shores Retirement Village

Issue B

terras
landscape architects

date: 2/06/2014
project no: 9861.5
site: 40 & 48 Burton Road, Eleebana
council: Lake Macquarie City Council
proposal: Demolition of two existing residential dwellings and construction of a retirement village.

table of contents

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1 introduction

Eleebana Shores Retirement Living Pty Ltd have engaged Terras Landscape Architects to undertake an inspection and assessment of 46 trees located along the Burton Road frontage.

The subject trees have been assessed in relation to the proposed stormwater detention swales located along the proposed developments frontage and maintaining the existing streetscape.

2 assessing arborist

Shaun King
Terras Landscape Architects ABN: 67 129 348 842
412 King Street, Newcastle, NSW. 2300
Phone 02 4929 4926 Mobile 0408 716 471
Email: sking@terras.com.au
Qualifications: Diploma of Horticulture (Landscape Design)
Diploma of Horticulture (Arboriculture) AQF level 5
Certificate No. C0045006,
Arboriculture Australia -Registered Consulting Arborist

3 client

Client: Eleebana Shores Retirement Living Pty Ltd
P.O. Box 90 Hallidays Point, NSW 2430

4 methodology

The site was visited on the 17th of October 2013. The following methods have been employed in preparing this report

- Visual Tree Inspection (VTA) (Mattheck & Breloer, 1994) was undertaken. 46 trees were inspected and assessed from the ground. The visual tree inspection included all visible above ground parts of the tree including exposed roots, trunk, branches and foliage.
- An assessment of Useful Life Expectancy (ULE) (Barrell 1993). ULE categories give an indication of the useful life expectancy of a tree. Several factors are taken into consideration in determining ULE ratings such as, location, species, age, health and structure of the tree. Refer to Appendix 4.
- Tree Protection Zones (TPZ) and Structural Root Zones (SRZ) were calculated from the Australian Standard 4970-2009 Protection of Trees on Development Sites.
- Retention value of trees was determined using Tree A-Z version 10.10-ANZ

No below ground inspections or analyses was undertaken in the rootzone or on soil depths.

No internal inspections or tissue analyses was undertaken on the subject trees.

5 site

Located on Burton Road, Eleebana the subject site consists of 2 lots located on the eastern side of Burton Road. The 2 lots contain single storey residences and a number of outbuildings.

The topography of the site is relatively level with a slight slope toward the northwestern boundary.

Soil type consists of Warners Bay (wa) as defined by the Department of Land and Water (Matthei, 1995).

Figure 1: Subject site boundary outlined in blue. Tree assessment study area shaded red.

6 tree assessment

A visual tree assessment was undertaken on the of 17th of October 2013. Refer to appendix 2 for further statistical information.

Tree 1 *Angophora costata* Smooth Barked Apple ULE Rating 1A Tree AZ Rating A1
Relatively sparsely foliaged tree located on boundary.

Tree 2 *Casuarina cunninghamiana* River She Oak ULE Rating 2A Tree AZ Rating A2
Tree's 2 through to 15 form a row along the western boundary of Lot 11. Tree 2 is of average health with some minor issues such as dead wood, stubs and hanging branches present.

Tree 3 *Casuarina cunninghamiana* River She Oak ULE Rating 4B Tree AZ Rating Z4
Main trunk failure at 3m. This has led to poor form.

Tree 4 *Casuarina cunninghamiana* River She Oak ULE Rating 2D Tree AZ Rating A2
Suppressed tree, relatively small trunk diameter as compared to the other Casuarina's.

Tree 5 ***Casuarina cunninghamiana*** **River She Oak ULE Rating 2D Tree AZ Rating A2**
Large amount of twiggy dead wood throughout the canopy,

Tree 6 ***Casuarina cunninghamiana*** **River She Oak ULE Rating 2A Tree AZ Rating A2**
Minor deadwood present.

Tree 7 ***Casuarina cunninghamiana*** **River She Oak ULE Rating 4A Tree AZ Rating Z4**
Dead tree. Tree should be removed and replaced.

Tree 8 ***Casuarina cunninghamiana*** **River She Oak ULE Rating 1A Tree AZ Rating A1**
Healthy Tree

Tree 9 ***Melaleuca species*** **Paperbark ULE Rating 2A Tree AZ Rating A2**
Small tree suppressed by surrounding Casuarinas.

Tree 10 ***Casuarina cunninghamiana*** **River She Oak ULE Rating 2A Tree AZ Rating A2**
Minor dead wood present.

Tree 11 ***Casuarina cunninghamiana*** **River She Oak ULE Rating 1A Tree AZ Rating A1**
Healthy tree.

Tree 12 ***Casuarina cunninghamiana*** **River She Oak ULE Rating 2D Tree AZ Rating A2**
Girdling root and significant mechanical damage to exposed roots.

Tree 13 ***Casuarina cunninghamiana*** **River She Oak ULE Rating 2D Tree AZ Rating A2**
Large amount of dead wood and a sparse canopy.

Tree 14 ***Casuarina cunninghamiana*** **River She Oak ULE Rating 1A Tree AZ Rating A1**
Minor dead wood.

Tree 15 ***Casuarina cunninghamiana*** **River She Oak ULE Rating 1A Tree AZ Rating A1**
Healthy tree.

Figure 2: Trees 2 to 15 along the Burton Road frontage.

Figure 3: Tree 3 with trunk failure.

Figure 4: Tree 7

Tree 16 ***Melaleuca quinquenervia*** **Paperbark ULE Rating 1A Tree AZ Rating A1**
Small multi trunked tree.

Tree 17 ***Casuarina glauca*** **Swamp She Oak ULE Rating 2D Tree AZ Rating A2**
Included bark located at union of co-dominant trunks. Suckering around base.

Tree 18 ***Eucalyptus robusta*** **Swamp Mahogany ULE Rating 2D Tree AZ Rating A2**
Minor die back in the upper canopy. Moderate amount of dead wood present.

Tree 19 ***Eucalyptus botryoides*** **Bangalay ULE Rating 1A Tree AZ Rating A1**
Healthy large tree.

Tree 20 ***Eucalyptus umbra*** **Broad Leaved White Mahogany ULE Rating 2D Tree AZ Rating A2**

Moderate amount of dead wood present. Mechanical damage to exposed roots.

Tree 21 ***Casuarina glauca*** **Swamp She Oak ULE Rating 3A Tree AZ Rating Z10**

Small suppressed tree.

Tree 22 ***Angophora costata*** **Smooth Barked Apple ULE Rating 2D Tree AZ Rating A2**

Tree located in street verge. Sparse canopy and a moderate amount of dead wood.

Figure 5: Tree 23

Tree 23 ***Eucalyptus umbra*** **Broad Leaved White Mahogany ULE Rating 4B Tree AZ Rating Z10**

Located in street verge. Small stunted tree of very poor form.

Tree 24 ***Eucalyptus umbra*** **Broad Leaved White Mahogany ULE Rating 4B Tree AZ Rating Z10**

Trees 24, 25 and 26 are growing against each other. All 3 trees require removal. Tree 24 is suppressed and has a poor structural form.

Figure 6: Trees 24, 25 and 26 all growing in nvery close proximity.

Figure 7: Trees 24, 25 and 26.

Tree 25 ***Eucalyptus piperita*** **Sydney Peppermint ULE Rating 4D Tree AZ Rating ZZ**
Over mature tree in decline. Large amount of decay throughout the tree. Many past branch failures evident. Hollow present in branch failure wound. This tree should be removed.

Tree 26 ***Corymbia gummifera*** **Red Bloodwwod ULE Rating 4D Tree AZ Rating ZZ**
Growing against tree 25, has a severe lean to the south developed through phototropism. Lean overhangs residential power supply lines. Tree should be removed.

Figure 8: Tree 26 leaning to the south over powerlines.

Tree 27 ***Angophora costata*** **Smooth Barked Apple ULE Rating 3D Tree AZ Rating Z10**
Suppressed small tree.

Tree 28 ***Angophora costata*** **Smooth Barked Apple ULE Rating 3D Tree AZ Rating Z10**
Large wound located at the base of the trunk. Co-dominant leaders.

Figure 9: Tree 28 large wound to lower trunk.

Tree 29 ***Eucalyptus capitellata*** **Brown Stringy Bark ULE Rating 2D Tree AZ Rating A2**
Minor dead wood.

Tree 30 ***Eucalyptus umbra*** **Broad Leaved White Mahogany ULE Rating 2A Tree AZ Rating A2**
Small tree located in a group.

Tree 31 ***Corymbia gummifera*** **Red Bloodwood ULE Rating 1A Tree AZ Rating A1**
Co-dominant leaders. Located in group.

Tree 32 ***Dead Tree*** **ULE Rating 4B Tree AZ Rating Z4**

Tree 33 ***Eucalyptus umbra*** **Broad Leaved White Mahogany ULE Rating 2D Tree AZ Rating A2**
Dead wood and crossing branches.

Tree 34 ***Angophora costata*** **Smooth Barked Apple ULE Rating 2A Tree AZ Rating A2**
Minor dead wood.

Tree 35 ***Angophora costata*** **Smooth Barked Apple ULE Rating 2A Tree AZ Rating A2**
Minor dead wood.

Tree 36 ***Eucalyptus umbra*** **Broad Leaved White Mahogany ULE Rating 4B Tree AZ Rating Z10**
Stunted tree of poor vigour.

Tree 37 ***Angophora costata*** **Smooth Barked Apple ULE Rating 2D Tree AZ Rating A2**
Large wound to first scaffold branch.

Tree 38 ***Eucalyptus capitellata*** **Brown Stringy Bark ULE Rating 4B Tree AZ Rating Z10**
Stunted tree of poor form and vigour.

Tree 39 ***Callistemon saligna*** **Bottlebrush ULE Rating 3D Tree AZ Rating Z10**
Small multi trunked tree.

Tree 40 ***Dead Tree*** **ULE Rating 4B Tree AZ Rating Z10**

Tree 41 ***Eucalyptus umbra Broad leaved White Mahogany*** **ULE Rating 2D Tree AZ Rating A2**
Dead wood, poor vigour.

Tree 42 ***Eucalyptus umbra Broad leaved White Mahogany*** **ULE Rating 2D Tree AZ Rating A2**
Wounding to scaffold branch, dead wood.

Tree 43 ***Angophora costata*** **Smooth Barked Apple ULE Rating 3D Tree AZ Rating Z9**
Sparse canopy, large wounds extend from the trunk base and up scaffold branches.

7 impacts of development

The revised site layout will enable the retention of a number of trees along the Burton Road frontage. The proposed entry points and 3.5m drainage swale will require the removal of a number of trees. It is propsed to remove those trees with a Z rating even if they are unaffected by the proposed works as they are of poor quality. These trees will be replaced within the proposed landscape works.
Of the 46 trees assessed, 15 Z trees will be removed and 18 A trees will be removed. 13 A trees will be retained.

8 recommendations

- Trees to be dismantled and mulched with the mulch being utilised in the proposed landscape works. Any residual mulch to be disposed of in an appropriate manner offsite
- Ensure all tree removal work is carried out by or supervised by a qualified tree worker (AQF Level 3 or equivalent) in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry, 1998.
- Trees to be retained are to be protected in accordance with AS4970-2009 Protection of Trees on Development Sites. This is to include but not limited to the erection of self-supporting temporary protective fencing.
- Undertake appropriate NATSPEC quality replacement plantings to replace lost canopy cover and amenity. Refer to landscape drawings prepared by Terras Landscape Architects forr the proposed species and planting locations.

9 references

Barrell Tree Consultancy	*Tree AZ Version 10.10-ANZ* (2010)
Costello, L.R. Jones, K. S.	*Reducing Infrastructure Damage By Tree Roots (A Compendium of Strategies)* WCISA, Porterville, 2003.
Lake Macquarie City Council	*Lake Macquarie City Council Draft Tree Preservation Guidelines-July 2013*
Lake Macquarie City Council	*Lake Macquarie City development Control Plan 2013*
Draper, D. Richards, P.A.	*Dictionary for Managing Trees in Urban Environments.* CSIRO, Collingwood Vic, 2009.
Link Tree System Ltd. Barrell, J.	Arboricultural Journal 1993, Vol. 17pp. 33-46, 01/03/98
Matheck, C. Breloer, H.	*The Body Language of Trees: A Handbook for Failure Analysis.*TSO, London, England.
Matheny, N. Clark, J.R.	*Trees and Development (A Technical Guide to Preservation of Trees During Land Development)* ISA, Illinois, 1998
Standards Australia	Australian Standard *AS 4970 Protection of Trees on Development Sites.* (December 2008)

10 appendix 1 retention values drawings

LEGEND

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NOTE: TREE RADIUS
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OF TREES ON DEVE

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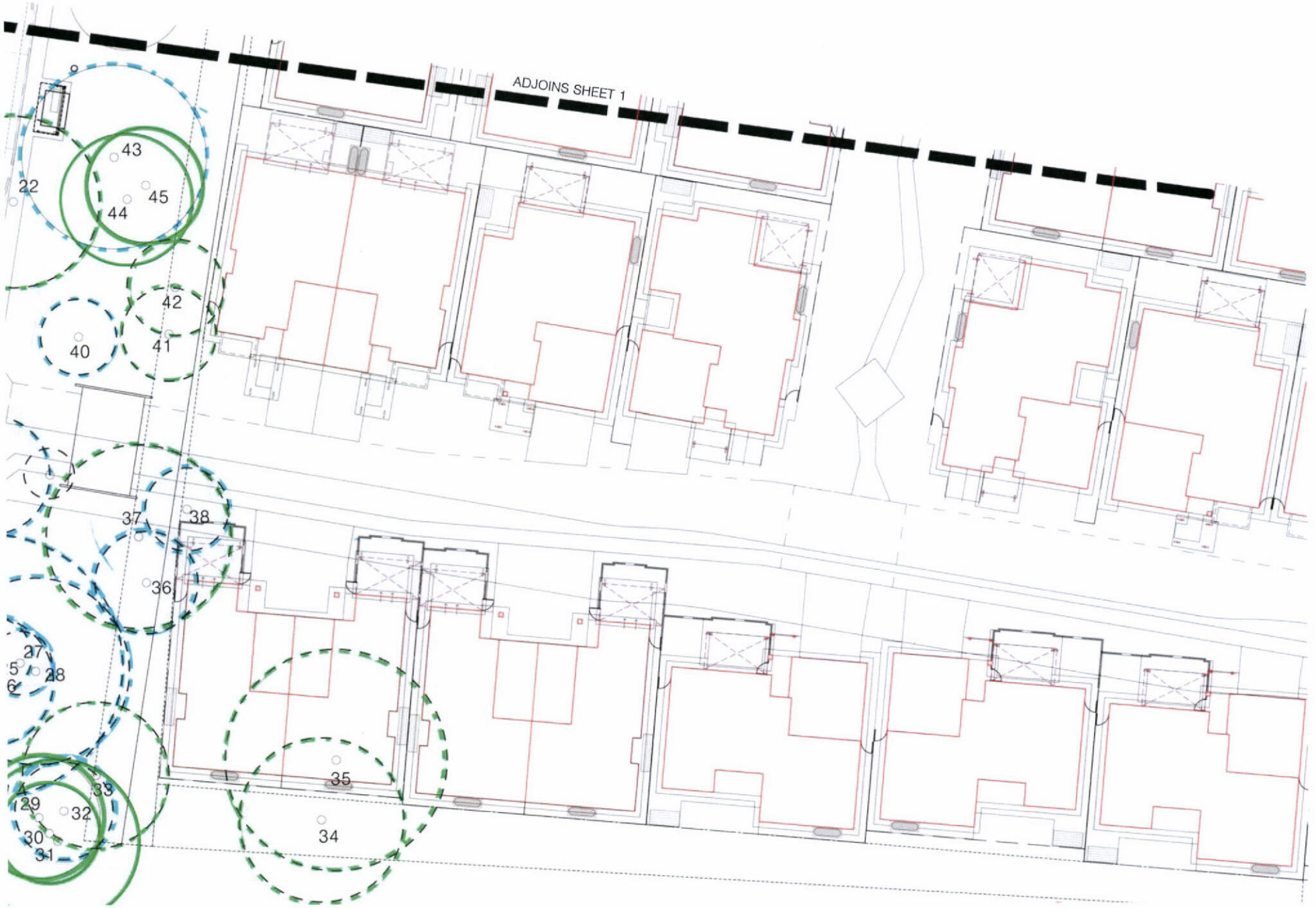

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11 appendix 2 tree assessment schedule

costata	Smooth Barked Apple	M	16	280	4	3	4	6	1A	A1	F	F	SPARSELY FOIAGED TREE LOCATED ON BOUND
unninghamiana	River She Oak	M	18	510	4	4	4	4	2A	A2	AV	AVG	HANGING BRANCH, DEAD STUBS
unninghamiana	River She Oak	M	12	310	2	4	4	4	4B	Z4	P	P	FAILED TREE, FAILURE LOCATED 3 METRES UP T
unninghamiana	River She Oak	M	12	155	2	2	2	2	2D	A2	F	F	SUPPRESSED TREE
unninghamiana	River She Oak	M	15	345	4	4	4	4	2D	A2	F	F	LARGE AMOUNT OF TWIGGY DEAD WOOD
unninghamiana	River She Oak	M	15	315	4	5	3	4	2D	A2	F	F	MINOR DEAD WOOD
									4A	Z4			DEAD TREE
unninghamiana	River She Oak	M	15	310	1	4	4	3	1A	A1	AV	AV	HEALTHY SMALL TREE
pecies	Melaleuca	M	6	150* 150*	1	2	2	2	2A	A2	F	F	SMALL SUPPRESSED TREE
unninghamiana	River She Oak	M	17	420	4	2	2	4	2A	A2	AV	AV	MINOR DEAD WOOD
unninghamiana	River She Oak	M	17	550	3	5	3	6	1A	A1	AV	AV	HEALTHY6 TREE
unninghamiana	River She Oak	M	17	465	3	6	3	6	2D	A2	F	AV	GIRDLED ROOT, MECHANICAL DAMAGE TO EXPO
unninghamiana	River She Oak	M	16	390	3	3	2	5	2D	A2	F	F	DEAD WOOD AND SPARSE CANOPY
unninghamiana	River She Oak	M	16	315	3	3	3	3	1A	A1	AV	AV	MINOR DEAD WOOD
unninghamiana	River She Oak	M	17	390	3	4	7	6	1A	A1	AV	AV	HEALTHY TREE
uinquenervia	Paper Bark	M	16	300* 360* 280*	3	3	3	3	1A	A1	F	AV	MULTI TRUNKED TREE
lauca	Swamp She Oak	M	16	400	2	3	2	3	2D	A2	F	AV	INCLUDED BARK, SUCKERING
obusta	Swamp Mahogany	M	17	360	6	6	5	4	2D	A2	AV	F	CANOPY DIE BACK, DEAD WOOD
otryoides	Bangalay	M	16	700	10	12	10	12	1A	A1	AV	AV	
umbra	Broad Leaved White Mahogany	M	17	595	6	10	12	10	2D	A2	F	F	DEAD WOOD, MECHANICAL DAMAGE TO EXPOSI
lauca	Swamp She Oak	M	8	280	3	3	3	3	3A	Z10	F	F	SMALL SUPPRESSED TREE
costata	Smooth Barked Apple	M	19	570	6	7	6	7	2D	A2	F	F	LOCATED IN STREE VERGE, SPARSE CANOPY, D
umbra	Broad Leaved White Mahogany	M	4	210* 220* 250*	1	2	1	1	4B	Z10	P	P	LOCATED IN STREET VERGE, SMALL STUNTED TR
umbra	Broad Leaved White Mahogany	M	7	180* 180*	3	2	0	3	4B	Z10	P	P	LOCATED AGAINST TREE 25, SUPPRESSED
piperita	Sydney Peppermint	OM	12	870	5	6	9	6	4D	ZZ	P	P	LOCATED IN STREET VERGE, MAJOR DECAY THR PAST FAILURES EVIDENT
ummifera	Red Bloodwood	M	14	430	0	2	10	10	4D	ZZ	P	F	AGAINST TREE 25, SEVERE LEAN TO THE SOUTH

umbra	Broad Leaved White Mahogany	M	17	485	5	4	4	4	2D	A2	F	AV	DEAD WOOD, CROSSING BRANCHES
costata	Smooth Barked Apple	M	19	545	4	5	6	6	2A	A2	AV	AV	MINOR DEAD WOOD
costata	Smooth Barked Apple	M	21	735	6	7	6	5	2A	A2	AV	AV	MINOR DEAD WOOD
species	Stringy Bark	M	7	340	3	2	3	1	4B	Z10	P	P	STUNTED TREE
costata	Smooth Barked Apple	M	18	610	5	4	7	4	2D	A2	F	F	DAMAGE TO MAJOR SCAFFOLD BRANCH WHICH
capitellata	Brown Stringy Bark	M	6	275	0	1	0	0	4B	Z10	P	P	STUNTED, POOR FORM AND HEALTH
salignus	Bottlebrush	M	6	120* 160* 120* 130*	3	3	3	3	3D 4B	Z10 Z4	F	F	SMALL MULTI TRUNKED TREE
umbra	Broad Leaved White Mahogany	M	16	310	3	3	5	3	2D	A2	F	F	DEAD WOOD, POOR VIGOUR
umbra	Broad Leaved White Mahogany	M	16	320	5	4	2	5	2D	A2	F	F	WOUND TO BRANCH, DEAD WOOD
costata	Smooth Barked Apple	M	19	610	7	8	10	10	3D	Z9	F	F	SPARSE CANOPY, LARGE WOUNDS ON LOWER T
umbra	Broad Leaved White Mahogany	M	18	440	3	4	6	4	2D	A2	F	F	DEAD WOOD
ummifera	Red Bloodwood	M	14	270* 270*	3	4	3	6	1A	A1	AV	AV	CO-DOMINANT TREE, MINOR DEAD WOOD
typheloides	Prickly Leaved Paper Bark	M	6	150	3	3	3	3	1A	A1	AV	AV	ROW OF SMALL TREES LOCATED ALONG BOUND

SAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND

YOUNG SAPLING/HAS NOT REACHED 1ST ADULT FORM	SM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT	M	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OM	OVER-MATURE LGE DBH, LGE BRANCH FA	
POOR NUMEROUS STRUCTURAL FAULTS/HIGH RISK OF SEVERE FAILURE	F	FAIR STRUCTURAL FAULTS PRESENT /MODERATE RISK OF SEVERE FAILURE	Av	AVERAGE SOME MINOR FAULTS /MODERATE RISK FOR MAJOR FAILURE	Ex	EXCEL SOME MINOR FAULTS/LOW-MC	
POOR SIG. SIGNS OF LOST VIGOUR EG DIEBACK, REDUCED CANOPY	F	FAIR SIGNS OF REDUCED VIGOUR EG LEAF UNDER STRESS, STUNTING	Av	AVERAGE LOCALISED PATCHES OF LOST VIGOUR/NOT WIDESPREAD	Ex	EXCEL NO EVIDENCE OF STRESS/SIGNS	

TREES TO BE RETAINED | TREES TO BE REMOVED | THREATENED TREE

12 appendix 3 useful life expectancy (ule) categories

ULE CLASSIFICATIONS

1	LONG ULE : GREATER THAN 40 YEARS [>40] TREES THAT APPEAR TO BE RETAINABLE WITH AN ACCEPTABLE LEVEL OF RISK FOR MORE THAN 40 YEARS
A	Structurally sound trees located in positions that can accommodate future growth.
B	Storm damaged or defective trees that could be made suitable for retention by remedial tree surgery.
C	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.

2	MEDIUM ULE : MORE THAN 15 YEARS, LESS THAN 40 YEARS [15 - 40] TREES THAT APPEAR TO BE RETAINABLE WITH AN ACCEPTABLE LEVEL OF RISK FOR 15 TO 40 YEARS
A	Trees that may only live between 15 and 40 more years
B	Trees that may live for more than 40 years but would be removed to allow the safe development of more suitable individuals
C	Trees that may live for more than 40 years but would be removed during the course of normal management for safety or nuisance reasons
D	Storm damaged or defective trees that can be made suitable for retention by remedial work

3	SHORT ULE : MORE THAN 5 YEARS, LESS THAN 15 YEARS [5 -15] TREES THAT APPEAR TO BE RETAINABLE WITH AN ACCEPTABLE LEVEL OF RISK FOR 5 TO 15 YEARS
A	Trees that may only live between 5 and 15 more years
B	Trees that may live for more than 15 years but would be removed to allow the safe development of more suitable individuals
C	Trees that may live for more than 15 years but would be removed during the course of normal management for safety or nuisance reasons
D	Storm damaged or defective trees that require substantial remedial work to make safe, and are only suitable for retention in the short term

4	REMOVE : LESS THAN 5 YEARS [<5] TREES WITH A HIGH LEVEL OF RISK THAT WOULD NEED REMOVING WITHIN THE NEXT 5 YEARS
A	Dead trees
B	Dying or suppressed and declining trees through disease or inhospitable conditions
C	Dangerous trees through instability or recent loss of adjacent trees
D	Dangerous trees through structural defects, including cavities, decay, included bark, wounds or poor form
E	Damaged trees that are considered unsafe to retain
F	Trees that will become dangerous after removal of others for the reasons given in A to E

REFERENCE: **LINK TREE SYSTEM LTD. JEREMY BARRELL, ARBORICULTURAL JOURNAL 1993, VOL. 17PP. 33-46, 01/03/98**

terras

13 appendix 4 tree AZ categories

TREE A-Z CATEGORIES

CATEGORY Z: UNIMPORTANT TREES NOT WORTHY OF BEING A MATERIAL CONSTRAINT	
Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species.	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection.
Z2	Too close to a building i.e. exempt from legal protection because of proximity.
Z3	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure **cannot** be satisfactorily reduced by reasonable remediation care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions.
Z6	Instability, i.e. poor anchorage and/or increased exposure.
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognised court or tribunal would be likely to authorise removal, i.e. dominance, debris and/or interference.
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognised court or tribunal would be likely to authorise removal, i.e. severe structural damage to surfacing and buildings.
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where high risk of failure can be **temporarily** reduces by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions.
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings and/or poor architectural framework.
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference and/or suppression.
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance.

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

CATEGORY A: IMPORTANT TREES SUITABLE FOR RETENTION FOR MORE THAN 10 YEARS AND WORTHY OF BEING A MATERIAL CONSTRAINT	
A1	No significant defects and could be retained with minimal remedial care.
A2	Minor defects that could be addressed remedial care and/or work to adjacent trees.
A3	Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years.
A4	Trees that may be worthy of legal protection form ecological reasons (Advisory requiring specialist assessment)

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

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

14 appendix 5 extract from AS 4970-2009

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Extract from AS 4970:2009

3.1 Tree Protection Zone (TPZ)

The tree protection zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

3.2 Determining the TPZ

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12.

TPZ = DBH x 12

DBH = trunk diameter measured at 1.4 metres above ground.

Radius is measured from the centre of the stem at ground level.

A TPZ should not be less than 2m nor greater than 15m (except where crown protection is required).

The TPZ of palms and other monocots, cycads and tree ferns should not be less than 1 metre outside of the crown projection.

3.3 Variations to the TPZ

3.31 General

It may be possible to encroach into or make variations to the standard TPZ. Encroachment includes excavation, compacted fill and machine trenching.

3.3.2 Minor Encroachment

If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. Variations must be made by the project arborist considering relevant factors listed in clause 3.3.4.

3.3.2 Major Encroachment

If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ, the project arborist must demonstrate that the tree would remain viable. The area lost to the encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non destructive methods and consider relevant factors listed in clause 3.3.4.

3.3.5 Structural Root Zone

The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree.

The SRZ only needs to be calculated when major encroachment into the TPZ is proposed.

There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks or footings. An indicative SRZ radius can be determined from the trunk

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diameter measured immediately above the root buttress using the following formula. Root investigation may provide more information on the extent of these roots

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

where

D = trunk diameter, in metres, measured above the root buttress

The SRZ for trees with trunk diameters less than 0.15 will be 1.5 metres.

15 appendix 6 glossary of arboricultural terminology

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Glossary of Arboricultural Terminology

Basal:	The lower trunk area of the tree.
Bracket:	Generally rigid bracket shaped fruiting body of wood decaying fungi.
Branch Collar:	The swollen ring of growth formed around the base of the branch by the successive layers of each growth increment of the branch and the supporting branch or trunk to which it is connected growing and intertwining around its edges.
Canopy:	An area of connected crowns, plural for crown.
Chloritic:	Yellowing of leaves due to some macro or micro nutrients such as Nitrogen or Iron.
Co-dominant Branch:	Stems or trunks of similar proportions eminating from the same position on the main stem or trunk.
Compaction:	Compaction of soils causing roots to die because of lack of pore space needed for oxygen or water storage within the soil.
Crown:	The part of the tree containing leaves and branches.
Crown Clean:	Pruning that preserves the size and structure of the tree while maintaining crown volume.
Decay:	Degeneration of of tissue by pathogens or micro-organisms
Decurrent:	Trees that lack a central leader, the crown being made up of numerous branches.
Decline:	Diminishing vitality of a tree.
Dripline:	The area formed by the width of the crown projected directly onto the ground beneath it, forming an imaginary line.
DBH:	Diameter of the trunk at Breast Height, measured at 1.4 metres above ground level.
Epicormic Growth:	A survivial response, shoots occuring from latent or adventitious buds as a result of stress. Generally have a weaker form of attachment.
Excurrent:	Trees that have a strong central leader.
Girdling Root:	A root that encircles the trunk, impeding growth and support.
Included bark:	Inwardly formed bark imbedded between the union of branches, branches and trunk or co-dominant branches.
Kino:	A dark brown or red exudate produced by trees particularly Eucalypts. Kino forms when cells are injured or infected.
Leader:	Dominant stem, particularly found on excurrent trees.
pH:	A measure of the acidity (0-7) or alkalinity (7-14) of the soil. 7 is neutral.
Phloem:	Outer conductive tissue located just beneath the bark, carries sugars and other nutrtients.
Phototropic:	Directional growth movement towards light.
Root Crown:	Area where trunk and root plate meet generally just around ground level.

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Scaffold Branches:	Structural or main branches connected to the trunk.
Secondary Branching:	Branch network connected to scaffold branches.
Senescence:	The ageing process, the changes that occur between maturity and death.
Structural Roots:	Large woody roots that support and anchor the tree.
Structural Root Zone (SRZ):	Minimum radial distance around a tree and its root plate providing strength and stability to the tree.
Tree Protection Zone:	An area of protection around the tree generally used on construction sites.
Windthrow:	Uplifting of the entire tree and rootplate as a result of strong winds.
Xylem:	Woody conductive tissue located inside the Phloem that translocates water and other solutes in an upward direction to the crown.