



Arborist Report

Ballina High School

project no: **10806.5**
date: **Monday, 05 December 2016**
revision: **draft**



date: 03-12-16
project no: 10816.5
site: 37-49 Swift Street, Ballina
council: Ballina Shire Council
proposal: School Redevelopment

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1 introduction

NSW Department of Education C/- EJE Architecture has engaged Terras Landscape Architects to undertake an inspection and assessment of trees located within the Ballina High School grounds that are within or in close proximity to proposed building and landscape works

The subject trees have been assessed in relation to Useful Life Expectancy (ULE) and Tree AZ.

The purpose of this arborist's report is to identify the impacts upon those trees located within the construction area.

2 assessing arborist

Terras Landscape Architects
(Landscape Architects and Consulting Arborists)

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AQF Level	5

3 client

Client: NSW Department of Education C/- EJE Architecture

Client's Representative: Kathy Gresham

Address: 412 King Street, Newcastle

4 methodology

The site was first visited on the 28th and 29th of November 2016 whereby recordings and assessments were made.

The following methods have been employed in preparing this report:

- Visual Tree Inspection (VTA) (Mattheck & Breloer, 1994) was undertaken. 102 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 3.
- Tree Protection Zones (TPZ) and Structural Root Zones (SRZ) were calculated from the Australian Standard 4970-2009 *Protection of trees on development sites*. Refer to Appendix 5.
- Retention value of trees was determined using Tree A-Z version 10.10-ANZ. Refer to Appendix 4 for an explanation of Tree A-Z.

No below ground inspections or analyses was undertaken in the root zone or on soil depths although where surface roots were visible, inspections were made.

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

5 site

The site located on Swift Street Ballina contains school buildings, car parking, external paved areas and open turf areas. Most of the school's boundaries are planted with a line of trees. These consist mainly of *Melaleuca quinquenervia* (Broad Leaved Paperbark). The site is flat and can be flood prone during heavy, consistent rain events.



FIGURE 1: APPROXIMATE SUBJECT SITE BOUNDARY OUTLINED IN RED. SUBJECT TREE CIRCLED GREEN. [Source: NearMap: 2016-12-05, used under licence]

6 tree assessment

A visual tree assessment was undertaken on the 28th and 29th of November 2016 the results of which have been included in Appendix 2.

The majority of the trees found on the school campus consist of *Melaleuca quinquenervia* (Broad Leaved Paperbark). These are located along the school's boundaries and along the main entry path leading to the administration building. The majority of these trees are healthy and well structured. A small number of them are suppressed due to the relatively close planting centres. A few have structural issues due to bark inclusions which is a common trait in the species.



FIGURE 2: *Melaleuca quinquenervia* ALONG THE CHERRY STREET FRONTAGE. (TREES 53 – 62)

There are 4 *Cinnamomum camphora* (Camphor Laurel) present within the study area. These are listed as a Class 4 Noxious Weed within the Ballina Shire Council's LEP. The assessed Camphor Laurels are large trees located near the entry to the existing administration building and contribute to the amenity of the school grounds.

There are 4 very large *Ficus obliqua* (Small Leaved Fig) within the study area. 3 of the Figs are located in close proximity to each other in a quadrangle area. The trees are planted in relatively small gardens surrounded by concrete pavement. There appears to be little damage to the surrounding pavement. These are the most significant trees on the site. 1 other of the Figs is located in a prominent position on the corner of Cherry and Swift Streets.



FIGURE 3: *Cinnamomum camphora* (TREE 17) LOCATED NEAR THE ENTRY TO THE EXISTING ADMINISTRATION BUILDING.



FIGURE 4: THE LARGE *Ficus obliqua* LOCATED WITH THE QUADRANGLE. (TREES 23, 24 AND 25)

The remaining trees consist of a mixture of native and exotic species. The most notable being *Toona ciliata* (Red Cedar) and *Delonix regia* (Poinciana). Tree 89, a Poinciana, is also a significant tree due to its desirable form and large canopy spread. Tree 89 is located in the quadrangle area and cannot be seen from surrounding streets.



FIGURE 5: TREE 89 A *Delonix regia* IS ONE OF THE MORE SIGNIFICANT TREES WITHIN THE SCHOOL'S GROUNDS.

7 impacts of development

62 of the 102 trees assessed will require removal for the proposed works. 44 of these trees are rated as A Trees. The remaining 18 trees proposed for removal are rated as Z Trees. Of the trees to be retained 33 are rated as A Trees. The remaining 7 seven to be retained are rated as Z trees.

A number of trees are located within or in very close proximity to proposed buildings and other facilities such as multi purpose sports courts and pedestrian links. Proposed filling to reduce flooding will also affect a number of trees.

The 4 most significant trees, *Ficus obliqua* are to be retained along with most of the *Melaleuca quinquenervia* that line the school's boundaries. The significant *Delonix regia*, Tree 89, will require removal due to site filling and other development work.

8 recommendations

- Trees to be retained are to be protected in accordance with AS4970 *Protection of trees on development sites*. Protective fencing and other tree protection measures are to be put in place prior to any site or demolition works. Refer to Appendix 1 for Tree Protection Zones (TPZs).
- Protective fencing may be temporarily removed to allow for works within the TPZs. Fencing is to be reinstated as soon as the works are complete.

- A number of structures such as blade walls and pathways are shown within the TPZs of a number of retained trees. It is imperative that footing and pavement design does not alter the existing ground level too much within TPZs with strip footings and the like. All proposals for construction that intrude into TPZs should be submitted to consulting arborist for review and comment.
- Demolition of existing structures, particularly pavement around the Fig Trees is to be done in a manner that does not compact soils or damages any surface roots that are likely to be found under the pavement.
- Trees that are to be removed within close proximity to those that are to be retained are to be dismantled and stump ground to 200mm below existing ground levels. The use of machinery to pull trees out has the potential to damage the the root system of surrounding trees.
- Undertake appropriate replacement plantings on site in accordance with approved landscape plans.
- A number of retained trees require crown maintenance:-
 - Tree 2: remove dead leader located on the southern side of the canopy.
 - Tree 5: requires a reduction in end weight on the long lateral leader hanging over the existing car park.
 - Tree 22: remove hanging branch.
 - Tree 25: crown maintenance to remove dead wood.
 - Tree 36: crown maintenance to remove dead wood.
 - Tree 83: remove dead lower limbs.
- All tree removal and pruning works be carried out by and/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*.



9 references

- | | |
|-----------------------------------|---|
| Ballina Shire Council | <i>Ballina Shire Development Control Plan 2012, Chapter 2a - Vegetation Management.</i> |
| Barrell Tree Consultancy | <i>Tree AZ Version 10.10-ANZ (2010)</i> |
| Costello, L.R.
Jones, K. S. | <i>Reducing Infrastructure Damage By Tree Roots (A Compendium of Strategies)</i> WCISA, Porterville, 2003. |
| Draper, D.
Richards, P.A. | <i>Dictionary for Managing Trees in Urban Environments.</i> CSIRO, Collingwood Vic, 2009. |
| Link Tree System Ltd. Barrell, J. | <i>Arboricultural Journal 1993, Vol. 17pp. 33-46, 01/03/98</i> |
| Matheck, C.
Breloer, H. | <i>The Body Language of Trees: A Handbook for Failure Analysis.</i> TSO, London, England. |
| Matheny, N. Clark, J.R. | <i>Trees and Development (A Technical Guide to Preservation of Trees During Land Development)</i> ISA, Illinois, 1998 |
| Standards Australia | <i>Australian Standard AS 4970 Protection of Trees on Development Sites.</i> (December 2008) |





Appendix 1: tree protection zones/site plan





LEGEND

- EXISTING TREES TO BE REMOVED
- EXISTING TREES TO BE RETAINED
- STRUCTURAL ROOT ZONE (SRZ)
- A RATED TREE (TREE WORTHY OF CONSIDERATION FOR RETENTION)
- Z RATED TREE (TREE NOT WORTHY OF BEING A DESIGN CONSTRAINT)

RADIUS OF TREES SHOWN AS TREE PROTECTION ZONES. TREE PROTECTION ZONES AND STRUCTURAL ROOT ZONES HAVE BEEN CALCULATED FROM AS 4970 PROTECTION OF TREES ON DEVELOPMENT SITES.

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A	05.12.16	ISSUE FOR DA	SGK	PW							
rev no:	date:	comments:	by:	verified:	rev no:	date:	comments:	by:	verified:		
15										300mm ON ORIGINAL A3	

PROJECT:
BALLINA HIGH SCHOOL

CLIENT:
NSW DEPARTMENT OF EDUCATION

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SITE:
37 - 49 SWIFT STREET, BALLINA NSW 2478

DRAWING:
TREE PROTECTION ZONES/SITE PLAN



WORK TO FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS, LEVELS ON SITE PRIOR TO ORDERING MATERIALS OR COMPLETION OF WORKSHOP DRAWINGS.			
drawn: SGK	scale: 1:800@A3	no in set: 1/1	date: 02/12/16
phase: DA	project no: 10806.5	DWG no: ARB-01 A	revision no:



Appendix 2: Tree Assessment Summary



FIELD ASSESSMENT SHEET

PROJECT: BALLINA HIGH SCHOOL

DECEMBER 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH (DAB) mm	SPREAD [M]				ULE	TREE AZ	STRUCTURE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
1	Melaleuca quinquenervia	Broad Leaved Paperbark	M	17	420 (600)	2	4	5	4	1A	A1	AV	AV	HEALTHY TREE.
2	Melaleuca quinquenervia	Broad Leaved Paperbark	M	17	760 (890)	6	5	3	6	2D	A2	F	AV	REMOVE DEAD LEADER FROM SOUTHERN SIDE.
3	Melaleuca quinquenervia	Broad Leaved Paperbark	M	18	840 (820)	9	6	3	5	2D	A2	F	AV	CO-DOMINANT LEADERS WITH MINOR BARK INCLUSION.
4	Melaleuca quinquenervia	Broad Leaved Paperbark	M	17	800 (820)	8	5	5	2	3D	Z9	F	AV	MINOR BARK INCLUSION AT LOWEST BRANCH JUNCTION.
5	Melaleuca quinquenervia	Broad Leaved Paperbark	M	18	1250 (1320)	10	5	6	8	3D	Z9	F	AV	AREA OF DECAY IN THE BASE OF THE TRUNK. REQUIRES A REDUCTION IN END WEIGHT ON LONG LEADER OVER EXISTING CAR PARK.
6	Melaleuca quinquenervia	Broad Leaved Paperbark	M	18	420 530 480 (1200)	3	3	3	3	2A	A2	F	AV	VERY UPRIGHT HABIT.
7	Cinnamomum camphora	Camphor Laurel	M	19	1200 (1220)	12	4	8	3	2C	Z11	AV	AV	HEALTHY TREE LISTED AS A NOXIOUS WEED WITHIN THE BALLINA SHIRE COUNCIL LEP. MODERATE SIZED DEAD WOOD.
8	Melaleuca quinquenervia	Broad Leaved Paperbark	M	18	680 290 (750)	6	3	5	3	1A	A1	AV	AV	HEALTHY TREE.
9	Melaleuca quinquenervia	Broad Leaved Paperbark	M	15	420 450 (820)	3	3	5	2	1A	A1	AV	AV	HEALTHY TREE.
10	Cinnamomum camphora	Camphor Laurel	M	16	840 (880)	8	5	6	4	2C	Z11	AV	AV	LISTED AS A NOXIOUS WEED WITHIN THE BALLINA SHIRE COUNCIL LEP. MINOR DEAD WOOD.
11	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	300 360 320 (710)	4	4	5	2	2D	A2	F	AV	TRI-DOMINANT TREE WITH A MINOR BARK INCLUSION.

* MULTI TRUNKED. BASAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND									
AGE CLASS	Y	YOUNG SAPLING/HAS NOT REACHED 1 st ADULT FORM	SM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT	M	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OM	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS	
STRUCTURE	P	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	EXCELLENT SOME MINOR FAULTS/LOW-MOD RISK OF MINOR FAILURES	
HEALTH	P	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	EXCELLENT NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD	
RETENTION	TREES TO BE RETAINED				TREES TO BE REMOVED			THREATENED TREE	

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No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH (DAB) mm	SPREAD [M]				ULE	TREE AZ	STRUCT URE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
12	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	300 490 550 (1210)	8	3	6	4	2D	A2	AV	AV	MINOR DEAD WOOD.
13	Cinnamomum camphora	Camphor Laurel	M	17	690 (780)	10	6	9	6	2D	A2	F	AV	HEALTHY TREE LISTED AS A NOXIOUS WEED WITHIN THE BALLINA SHIRE COUNCIL LEP. MODERATE SIZED DEAD WOOD.
14	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	390 420 (720)	10	1	7	4	2D	A2	F	AV	MINOR DEAD WOOD.
15	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	620 (680)	8	4	7	4	4D	Z5	P	F	MAJOR BARK INCLUSION LOWER TRUNK.
16	Cinnamomum camphora	Camphor Laurel	M	16	1250 (1300)	7	8	11	9	2D	A2	F	AV	HEALTHY TREE LISTED AS A NOXIOUS WEED WITHIN THE BALLINA SHIRE COUNCIL LEP. MINOR DEAD WOOD.
17	Cinnamomum camphora	Camphor Laurel	M	16	820 (910)	7	7	7	3	2D	A2	F	AV	HEALTHY TREE LISTED AS A NOXIOUS WEED WITHIN THE BALLINA SHIRE COUNCIL LEP. MINOR DEAD WOOD. TREE APPEARS TO HAVE BEEN POLLARDED AT AN EARLIER STAGE.
18	Brachychiton acerifolius	Flame Tree	M	14	450 (560)	6	3	4	4	1A	A1	AV	AV	HEALTHY TREE.
19	Acacia species	Wattle	M	17	250 290	5	3	4	4	2A	A2	AV	AV	2 LEADERS ARISING AT GROUND LEVEL.
20	Citherexylum spinosum	Fiddlewood	M	14	300 220 220 200	6	7	6	6	2D	A2	F	F	TWIGGY DEAD WOOD THROUGHOUT CANOPY.
21	Thevetia peruviana	Yellow Oleander	M	6	210 210 (320)	6	7	6	6	3C	Z11	P	F	LEAN TO THE SOUTH. NORTHERN LEADERS HAS PREVIOUSLY FAILED OR BEEN REMOVED. POISONOUS SPECIES.
22	Ficus obliqua	Small Leaved Fig	M	17	1790 (1390)	15	15	6	18	1A	A1	AV	AV	HEALTHY TREE. MODERATELY SIZED HANGING BRANCH.

* MULTI TRUNKED. BASAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND															
AGE CLASS	Y	YOUNG SAPLING/HAS NOT REACHED 1 st ADULT FORM			SM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT			M	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD			OM	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAULTS	
STRUCTURE	P	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	EXCELLENT SOME MINOR FAULTS/LOW-MOD RISK OF MINOR FAILURES	
HEALTH	P	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	EXCELLENT NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD	
RETENTION	TREES TO BE RETAINED					TREES TO BE REMOVED					THREATENED TREE				

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DECEMBER 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH (DAB) mm	SPREAD [M]				ULE	TREE AZ	STRUCT URE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
23	<i>Araucaria heterophylla</i>	Norfolk Island Pine	M	24	720 (750)	5	5	5	5	1A	A1	AV	AV	FOLIAGE LOCATED ABOVE ADJACENT FIGS. IT APPEARS THE MAIN LEADER HAS FAILED PREVIOUSLY, HOWEVER NEW GROWTH APPEARS SOUND.
24	<i>Ficus obliqua</i>	Small Leaved Fig	M	17	1630 (1630)	12	16	6	17	1A	A1	AV	AV	HEALTHY TREE
25	<i>Ficus obliqua</i>	Small Leaved Fig	M	17	1660 (1660)	7	17	16	15	1A	A1	AV	AV	HEALTHY TREE, MINOR DEAD WOOD.
26	<i>Toona ciliata</i>	Red Cedar	M	17	690 (790)	4	5	4	8	1A	A1	AV	AV	HEALTHY TREE.
27	<i>Toona ciliata</i>	Red Cedar	M	14	510 (600)	4	4	6	6	1A	A1	AV	AV	HEALTHY TREE.
28	<i>Melaleuca leucadendra</i>	Weeping Paperbark	M	14	340 220 (450)	3	3	4	3	1A	A1	AV	AV	HEALTHY TREE.
29	<i>Delonix regia</i>	Poinciana	M	12	370 (450)	7	7	7	7	2D	A2	F	F	SUPPRESSED TREE WITH MINOR DEAD WOOD.
30	<i>Unidentified Tree</i>		M	17	800 (950)	5	7	7	7	1A	A1	AV	AV	UNIDENTIFIED TREE CURRENTLY DECIDUATING.
31	<i>Delonix regia</i>	Poinciana	M	6	200 220 (420)	3	0	4	6	3A	Z10	F	F	SUPPRESSED TREE LEANING TO THE WEST.
32	<i>Unidentified Tree</i>		M	17	700 (820)	3	6	5	7	1A	A1	AV	AV	SAME SPECIES AS TREE 30.
33	<i>Delonix regia</i>	Poinciana	M	7	520 (610)	7	7	7	7	1A	A1	AV	AV	HEALTHY TREE WITH MINOR DEAD WOOD.
34	<i>Melaleuca quinquenervia</i>	Broad Leaved Paperbark	M	16	710 (800)	6	3	6	6	3D	Z9	F	AV	BARK INCLUSION AT FIRST LEADER JUNCTION.
35	<i>Melaleuca quinquenervia</i>	Broad Leaved Paperbark	M	16	420 1100 (1210)	6	2	7	3	3D	Z9	F	AV	MINOR BARK INCLUSION AT FIRST LEADER JUNCTION.

* MULTI TRUNKED. BASAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND									
AGE CLASS	Y	YOUNG SAPLING/HAS NOT REACHED 1 st ADULT FORM	SM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT	M	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OM	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAULTS	
STRUCTURE	P	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	EXCELLENT SOME MINOR FAULTS/LOW-MOD RISK OF MINOR FAILURES	
HEALTH	P	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	EXCELLENT NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD	
RETENTION	TREES TO BE RETAINED				TREES TO BE REMOVED			THREATENED TREE	

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PROJECT: BALLINA HIGH SCHOOL

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No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH (DAB) mm	SPREAD [M]				ULE	TREE AZ	STRUCTURE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
36	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	1150 (1280)	6	4	8	8	3D	Z9	F	AV	FAILED BRANCH STUBS, MODERATE SIZED DEAD WOOD AND CROSSING BRANCHES.
37	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	350 420 350 (680)	5	4	4	2	3D	Z9	F	AV	MINOR BARK INCLUSION IN LOWER LEADER JUNCTION. AERIAL ROOTS GROWING INTO THE INCLUSION.
38	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	910 (990)	6	2	5	3	2A	A2	F	AV	HEALTHY TREE.
39	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	1200 (1200)	6	3	6	2	2A	A2	F	AV	HEALTHY TREE.
40	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	690 (650)	6	5	4	2	2A	A2	F	AV	MINOR BARK INCLUSION.
41	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	550 420 (900)	4	4	6	6	2A	A2	F	AV	HEALTHY TREE.
42	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	350 (390)	3	3	3	3	1A	A1	AV	AV	HEALTHY TREE.
43	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	380 370 (730)	3	2	3	5	1A	A1	AV	AV	HEALTHY TREE.
44	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	350 430 (850)	3	3	6	5	2A	A2	F	AV	POORLY PRUNED DUE TO ADJACENT POWERLINES.
45	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	350 (390)	1	4	2	3	2A	A2	F	AV	POORLY PRUNED DUE TO ADJACENT POWERLINES.
46	Melaleuca quinquenervia	Broad Leaved Paperbark	M	14	300 470 (490)	4	3	3	3	2A	A2	F	AV	POORLY PRUNED DUE TO ADJACENT POWERLINES.
47	Melaleuca quinquenervia	Broad Leaved Paperbark	M	17	800 (860)	4	4	3	5	2A	A2	F	AV	POORLY PRUNED DUE TO ADJACENT POWERLINES.
48	Melaleuca quinquenervia	Broad Leaved Paperbark	M	17	810	2	4	5	6	2A	A2	F	AV	POORLY PRUNED DUE TO ADJACENT

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LEGEND									
AGE CLASS	Y	YOUNG SAPLING/HAS NOT REACHED 1 st ADULT FORM	SM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT	M	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OM	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS	
STRUCTURE	P	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	EXCELLENT SOME MINOR FAULTS/LOW-MOD RISK OF MINOR FAILURES	
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RETENTION	TREES TO BE RETAINED				TREES TO BE REMOVED			THREATENED TREE	

FIELD ASSESSMENT SHEET

PROJECT: BALLINA HIGH SCHOOL

DECEMBER 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH (DAB) mm	SPREAD [M]				ULE	TREE AZ	STRUCT URE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
					(820)									POWERLINES.
49	Melaleuca quinquenervia	Broad Leaved Paperbark	M	14	720 (730)	4	4	4	4	2A	A2	F	AV	HEALTHY TREE.
50	Melia azedarach	White Cedar	M	8	200 (210)	5	5	0	0	3D	Z9	P	F	SUPPRESSED BY ADJACENT FIGS. LEANING TO THE EAST.
51	Eucalyptus species	Gum tree	M	18	350 (390)	3	3	3	3	1A	A1	AV	AV	MINOR DEAD WOOD.
52	Eucalyptus robusta	Swamp Mahogany	M	18	410 (460)	6	4	3	3	1A	A1	AV	AV	HEALTHY TREE.
53	Melaleuca quinquenervia	Broad Leaved Paperbark	M	14	560 (610)	4	6	3	6	1A	A1	AV	AV	HEALTHY TREE.
54	Melaleuca quinquenervia	Broad Leaved Paperbark	M	15	780 (700)	4	4	4	4	1A	A1	AV	AV	HEALTHY TREE.
55	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	520 (630)	2	4	5	5	1A	A1	AV	AV	HEALTHY TREE.
56	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	710 (710)	4	4	2	4	1A	A1	AV	AV	HEALTHY TREE.
57	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	700 (760)	3	3	3	4	1A	A1	AV	AV	HEALTHY TREE.
58	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	840 (930)	4	4	2	4	1A	A1	AV	AV	HEALTHY TREE.
59	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	690 (720)	3	4	4	5	1A	A1	AV	AV	HEALTHY TREE.
60	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	530 (630)	3	4	3	5	2D	A2	F	AV	MINOR BARK INCLUSION.
61	Melaleuca quinquenervia	Broad Leaved Paperbark	M	7	180 230 (360)	3	2	2	2	3D	Z9	F	F	SUPPRESSED BY SURROUNDING TREES.
62	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	840 (850)	5	4	4	3	2D	A2	F	AV	MINOR BARK INCLUSION MAIN SCAFFOLD BRANCH JUNCTION ON SOUTHERN SIDE.

* MULTI TRUNKED. BASAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND														
AGE CLASS	Y	YOUNG SAPLING/HAS NOT REACHED 1 st ADULT FORM			SM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT			M	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD			OM	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS
STRUCTURE	P	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	EXCELLENT SOME MINOR FAULTS/LOW-MOD RISK OF MINOR FAILURES
HEALTH	P	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	EXCELLENT NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD
RETENTION		TREES TO BE RETAINED				TREES TO BE REMOVED					THREATENED TREE			

FIELD ASSESSMENT SHEET

PROJECT: BALLINA HIGH SCHOOL

DECEMBER 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH (DAB) mm	SPREAD [M]				ULE	TREE AZ	STRUCT URE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
63	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	390 (460)	3	3	4	4	1A	A1	AV	AV	HEATHY TREE.
64	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	840 (850)	3	4	3	6	1A	A1	AV	AV	MODERATELY SIZED HANGING BRANCH.
65	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	320 (340)	2	2	2	2	2A	A2	F	F	SLIGHTLY SUPPRESSED TREE.
66	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	320 450 455 (910)	3	7	2	6	2D	A2	F	AV	MINOR BARK INCLUSION.
67	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	280 300 (450)	2	3	2	6	2A	A2	F	AV	HEALTHY TREE.
68	Melaleuca quinquenervia	Broad Leaved Paperbark	M	17	470 500 550 410 (1510)	4	8	6	7	3D	Z9	F	F	SUSPECT LOWER BRANCH ATTACHMENT WITH AERIAL ROOT GROWING WITHIN.
69	Araucaria heterophylla	Norfolk Island Pine	M	25	620 (720)	5	5	5	5	1A	A1	AV	AV	CLOSE PROXIMITY TO TREE 70.
70	Ficus obliqua	Small Leaved Fig	M	16	1550 (1610)	7	8	10	10	1A	A1	AV	AV	HEALTHY TREE.
71	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	210 250	2	2	2	2	3D	Z11	F	F	SUPPRESSED BY ADJACENT TREES.
72	Melaleuca quinquenervia	Broad Leaved Paperbark	M	8	200 110 230 (380)	3	2	2	2	3D	Z11	F	F	SUPPRESSED BY ADJACENT TREES.
73	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	840 (910)	6	2	6	2	3D	Z9	F	AV	BARK INCLUSION WITHIN CO-DOMINANT LEADER JUNCTION. AERIAL ROOT GROWING WITHIN THE INCLUSION.

* MULTI TRUNKED. BASAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND									
AGE CLASS	Y	YOUNG SAPLING/HAS NOT REACHED 1 st ADULT FORM	SM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT	M	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OM	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS	
STRUCTURE	P	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	EXCELLENT SOME MINOR FAULTS/LOW-MOD RISK OF MINOR FAILURES	
HEALTH	P	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	EXCELLENT NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD	
RETENTION	TREES TO BE RETAINED				TREES TO BE REMOVED			THREATENED TREE	

FIELD ASSESSMENT SHEET

PROJECT: BALLINA HIGH SCHOOL

DECEMBER 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH (DAB) mm	SPREAD [M]				ULE	TREE AZ	STRUCT URE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
74	Melaleuca quinquenervia	Broad Leaved Paperbark	M	14	320 (360)	2	2	4	2	2A	A2	F	F	SLIGHTLY SUPPRESSED TREE.
75	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	510 300 (730)	3	3	6	4	1A	A1	AV	AV	HEALTHY TREE.
76	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	490 (570)	3	3	4	3	2D	A2	F	AV	MINOR BARK INCLUSION AT CO-DOMINANT LEADER JUNCTION.
77	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	420 520 320 (910)	10	3	8	3	1A	A1	AV	AV	HEALTHY TREE.
78	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	1200 (1320)	9	3	8	3	2A	A2	F	AV	HEALTHY TREE.
79	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	860 (860)	8	3	3	6	1A	A1	AV	AV	HEALTHY TREE.
80	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	710 430 (1010)	4	4	4	4	1A	A1	AV	AV	HEALTHY TREE.
81	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	390 420 (710)	4	4	4	4	1A	A1	AV	AV	HEALTHY TREE
82	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	420 460 (720)	1	3	5	3	3D	Z9	F	AV	BARK INCLUSION AT CO-DOMINANT LEADER JUNCTION.
83	Araucaria heterophylla	Norfolk Island Pine	M	25	720 (810)	5	5	5	5	2D	A2	F	AV	NUMEROUS LOWER DEAD LIMBS REQUIRE REMOVAL.
84	Melaleuca quinquenervia	Broad Leaved Paperbark	M	12	300X3 420 (650)	4	2	6	2	1A	A1	AV	AV	HEALTHY TREE.
85	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	510 (600)	2	2	4	2	1A	A1	AV	AV	HEALTHY TREE.

* MULTI TRUNKED. BASAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND									
AGE CLASS	Y	YOUNG SAPLING/HAS NOT REACHED 1 st ADULT FORM	SM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT	M	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OM	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS	
STRUCTURE	P	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	EXCELLENT SOME MINOR FAULTS/LOW-MOD RISK OF MINOR FAILURES	
HEALTH	P	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	EXCELLENT NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD	
RETENTION	TREES TO BE RETAINED				TREES TO BE REMOVED			THREATENED TREE	

FIELD ASSESSMENT SHEET

PROJECT: BALLINA HIGH SCHOOL

DECEMBER 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH (DAB) mm	SPREAD [M]				ULE	TREE AZ	STRUCT URE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
86	Melaleuca quinquenervia	Broad Leaved Paperbark	M	16	420 300 (790)	6	6	4	2	3D	Z9	F	AV	BARK INCLUSION
87	Syzygium species	Lilly Pilly	M	8	210 (300)	2	0	2	2	3C	Z2	F	F	GROWING UP AGAINST BUILDING.
88	Callistemon species	Bottlebrush	M	9	200 (240)	5	2	2	2	3C	Z2	F	F	IN CLOSE PROXIMITY TO BUILDING.
89	Delonix regia	Poinciana	M	6	620 630 (840)	9	9	9	9	1A	A1	AV	AV	HEALTHY TREE OF GOOD FORM.
90	Cupressus species	Conifer	M	14	350 470 (830)	4	2	2	2	3A	Z4	F	F	DECLINING TREE.
91	Delonix regia	Poinciana	M	12	640 (790)	5	4	4	4	2D	A2	F	AV	SOME DECAY IN LOWER TRUNK FROM LOSS OF A MAIN SCAFFOLD BRANCH.
92	Cupressus species	Conifer	M	14	610 (620)	2	2	2	2	3A	Z4	F	F	DECLINING TREE WITH A LARGE AMOUNT OF DEAD WOOD.
93	Cupressus species	Conifer	M	14	530 420 (980)	6	7	7	7	2D	A2	F	F	MINOR DEAD WOOD.
94	Brachychiton rupestris	Queensland Bottle Tree	M	16	740 (700)	3	3	3	3	1A	A1	AV	AV	HEALTHY TREE.
95	Brachychiton acerifolius	Flame Tree	M	16	520 (540)	4	4	4	4	1A	A1	AV	AV	HEALTHY TREE.
96	Cupaniopsis anacardioides	Tuckeroo	M	15	210 (230)	2	0	2	2	3D	Z11	F	F	SUPPRESSED BY SURROUNDING TREES.
97	Melaleuca quinquenervia	Broad Leaved Paperbark	M	18	1110 (1150)	8	8	8	8	2A	A2	AV	AV	HEALTHY TREE.
98	Eucalyptus robusta	Swamp Mahogany	M	16	380 (430)	7	7	6	6	1A	A1	AV	AV	HEALTHY TREE.

* MULTI TRUNKED. BASAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND									
AGE CLASS	Y	YOUNG SAPLING/HAS NOT REACHED 1 st ADULT FORM	SM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT	M	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OM	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS	
STRUCTURE	P	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	EXCELLENT SOME MINOR FAULTS/LOW-MOD RISK OF MINOR FAILURES	
HEALTH	P	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	EXCELLENT NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD	
RETENTION	TREES TO BE RETAINED				TREES TO BE REMOVED			THREATENED TREE	

FIELD ASSESSMENT SHEET

PROJECT: BALLINA HIGH SCHOOL

DECEMBER 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH (DAB) mm	SPREAD [M]				ULE	TREE AZ	STRUCT URE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
99	<i>Tristaniopsis laurina</i>	Water Gum	M	7	4X150 (430)	5	5	5	5	1A	A1	AV	AV	HEALTHY TREE.
100	<i>Eucalyptus botryoides</i>	Bangalay	M	15	320 350 310 (520)	5	7	6	4	1A	A1	AV	AV	HEALTHY TREE.
101	<i>Tristaniopsis laurina</i>	Water Gum	M	6	2X210	3	3	3	3	1A	A1	AV	AV	HEALTHY TREE.
102	<i>Corymbia torelliana</i>	Cadaghi	M	16	510 (570)	6	8	5	8	1A	A1	AV	AV	HEALTHY TREE. LISTED AS AN UNDESIRABLE SPECIES WITHIN BALLINA SHIRE COUNCIL'S DCP

* MULTI TRUNKED. BASAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND									
AGE CLASS	Y	YOUNG SAPLING/HAS NOT REACHED 1 st ADULT FORM	SM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT	M	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OM	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS	
STRUCTURE	P	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	EXCELLENT SOME MINOR FAULTS/LOW-MOD RISK OF MINOR FAILURES	
HEALTH	P	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	EXCELLENT NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD	
RETENTION	TREES TO BE RETAINED				TREES TO BE REMOVED			THREATENED TREE	



Appendix 3: Useful Life Expectancy (ULE)



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



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 reduced 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 from 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



Appendix 5:

Extract from AS4970



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.

$TPZ = DBH \times 12$

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

3.3.1 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



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

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

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.