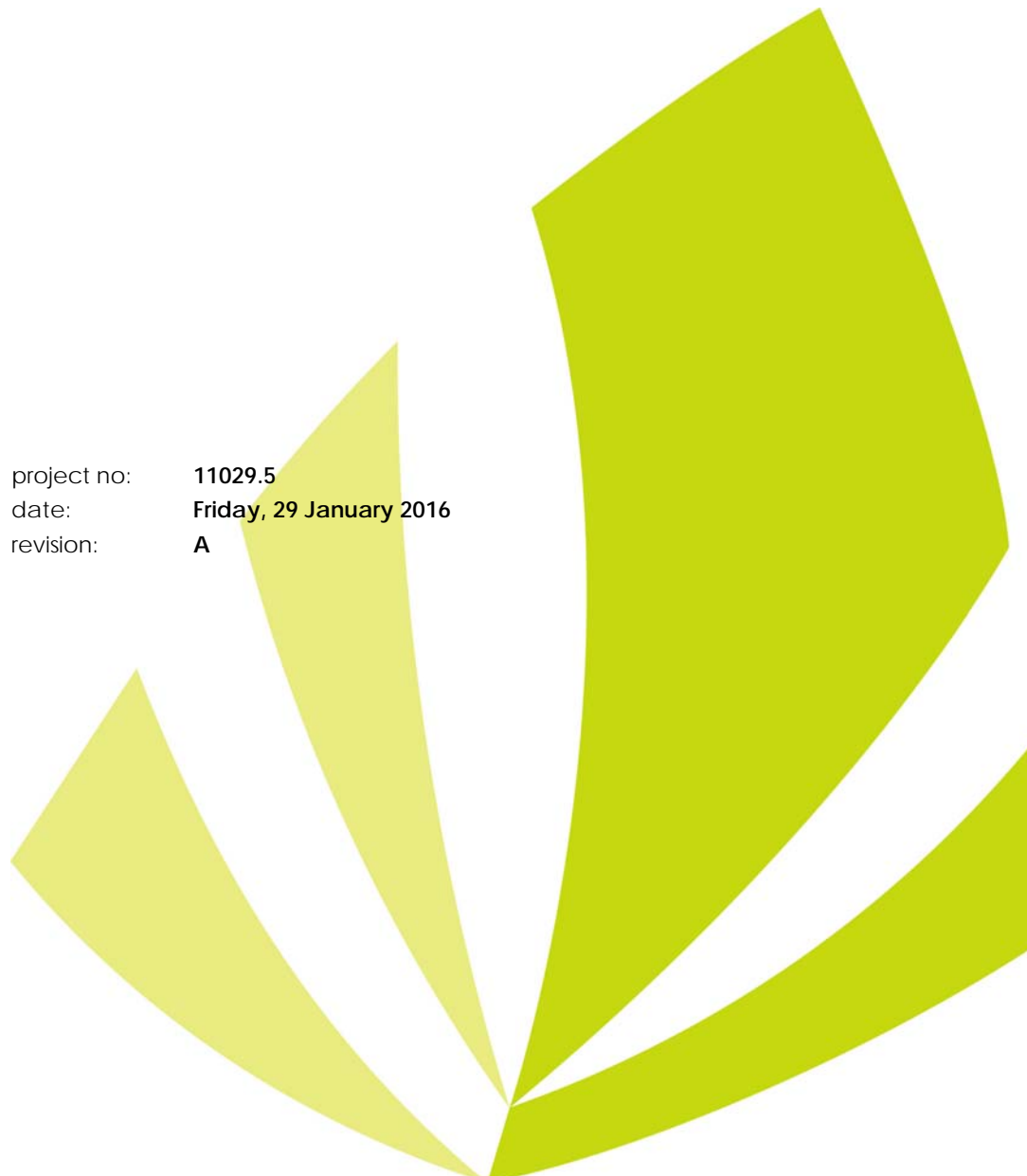




Arborist Report

Hunter Sports High

project no: 11029.5
date: Friday, 29 January 2016
revision: A






date: 29-01-2016
project no: 11029.5
site: Pacific Highway, Gateshead
council: Lake Macquarie City Council
proposal: Major Capital Works Upgrade

table of contents

1	introduction.....	3
2	assessing arborist	3
3	client.....	3
4	methodology	4
5	site	4
6	the proposal	6
7	tree assessment	6
8	impacts of development.....	6
9	recommendations	7
10	references	9
Appendix 1:	Arborist – Site Plan/tree protection plan.....	10
Appendix 2:	Tree Assessment Summary.....	11
Appendix 3:	Useful Life Expectancy (ULE).....	12
Appendix 4:	Tree AZ Categories	13
Appendix 5:	Extract from AS 4970	14



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1 introduction

NSW Government Public Works has engaged Terras Landscape Architects to undertake an inspection and assessment of trees within the area earmarked for major capital works within the Hunter Sports High School Campus.

The subject trees have been assessed in relation to Useful Life Expectancy (ULE), Tree AZ and LMCC's Tree Preservation and Native Vegetation Management Guidelines and Significant Tree Register.

The purpose of this arborist's report is to identify and record relevant data pertaining to trees located within the nominated site. Further, it includes an impact assessment on how the proposed development may affect the trees and where suitable, provide recommendations for the management of trees to be retained both during and after construction.

2 assessing arborist

Terras Landscape Architects
(Landscape Architects and Consulting Arborists)

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ABN: 67 129 348 842

Name:	Shaun King
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Mobile:	0408 716 471
email:	sking@terras.com.au
Qualifications:	Dip. Hort. (Landscape Design) Dip Hort. (Arboriculture) Cert No. C0045006
AQF Level	5

3 client

Client: NSW Government Public Works
Address: 117 Bull Street, Newcastle West 2302

4 methodology

The site was first visited on 18th January, 2016 whereby initial recordings and assessments were made.

The following methods have been employed in preparing this report:

- Visual Tree Inspection (VTA) (Mattheck & Breloer, 1994) was undertaken. Approximately 120 trees were inspected and assessed from the ground. Some trees were grouped together due to their semi maturity and close proximity to each other. 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.

A review of LMCC's Register of Significant trees was also undertaken and revealed that there were no significant trees occurring within the site.

5 site

As noted earlier, the site is located off the western side of the Pacific Highway at Gateshead. The study area consists of the north eastern section of the campus in and around existing buildings and car parks.

The topography of the site is gently sloping from north to south.

The site currently comprises of remnant native trees, planted native and exotic trees. The main remnant species consist of *Angophora costata*, *Corymbia gumifera* and *Eucalyptus capitellata*. There is no connectivity to surrounding bushland.

Understorey varies from turf, shrubs in garden beds and gravel within informal car parking areas.



FIGURE 1: APPROXIMATE STUDY AREA OUTLINED IN RED. [Source: NearMap: 2016-01-28 used under licence]



FIGURE 2: TREES WITHIN THE INFORMAL CAR PARKING AREA WHICH IS TO BE RETAINED.



6 the proposal

A number of existing buildings are to be demolished and new buildings constructed in stages. Formalised landscape areas are also proposed in and around the new buildings.

7 tree assessment

A visual tree assessment was undertaken on the of 18th of January 2016 the results of which have been included in Appendix 2.

Trees located within the development site were assessed. None of the trees assessed are listed on Lake Macquarie City Council's Significant Tree Register.

The area around the existing car park and eastern boundary generally consists of remnant trees that are growing in relatively close proximity to each other. As can be expected in this situation many of the trees exhibit less than perfect form with crown asymmetry, suppression and poor branch structure being the predominant problem caused by phototropism. A number of trees along the eastern boundary have also been pruned significantly due to nearby overhead powerlines.

In other areas of the school the majority of trees have been planted and consist of locally occurring native species, non local native species and exotics.

Applying Tree **AZ** ratings to the subject trees, there are 32 **Z** trees and 90 **A** trees. **A** trees are considered suitable for retention for more than 10 years and are worthy of being a material constraint.

Z trees are considered unimportant and not worthy of retention.

As can be seen by the **AZ** ratings the majority of trees are **A** trees and are healthy with an anticipated life expectancy of greater than 15 years (i.e. ULE ratings of 1 & 2) some with minor defects and problems that could be treated with proper tree management should it be desired.

A number of trees are not protected under Lake Macquarie City Council's DCP 2014 due to them not being a native of NSW. These have not necessarily been designated as Z trees.

8 impacts of development

Based on the proposed development footprint and level changes 80 trees will require removal. Of these 80 trees 56 are rated as A trees, this includes tree 38 which consists of a clump of 19 semi-mature trees. 24 Z trees will also require removal.

A further 7 trees with a Z rating should be removed due to their low ULE rating and the potential risk they pose. These trees are 4, 6, 33, 36, 46, 75 and 78.

1 A rated tree not affected by proposed works, tree 69 (*Eucalyptus robusta*) is proposed for removal. Currently tree 69 forms part of a group planting, however all the other trees in the group are shown to be removed. Tree 69 does not have a very attractive form which will be magnified by the removal of the other trees. New plantings are proposed in this area to compensate.

With the proposed retention of the existing informal car park a greater number of trees can now be retained, however pruning out dead wood and other poorly structured branches should be undertaken on retained trees to reduce the risk of injury or damage.



FIGURE 3: A NUMBER OF TREES NOT AFFECTED BY WORKS SHOULD BE REMOVED SUCH AS TREE 33 WHICH IS LOCATED WITHIN THE INFORMAL CAR PARK AREA.

9 recommendations

- Undertake appropriate replacement plantings on site to replace lost canopy cover and amenity trees. Refer to landscape DA documentation by Terras Landscape Architects for proposed planting locations and species.
- That trees earmarked for removal 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. Refer to appendices 1 and 2 for proposed tree removal.



- That all tree removal work be 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.
- That 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.



10 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 Tree Preservation Guidelines- revision 2-2015*
- Lake Macquarie City Council *Lake Macquarie City development Control Plan 2014*
- 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)*





Appendix 1: Arborist – Site Plan/tree protection plan






site plan

hunter sports high school

01

january 2016

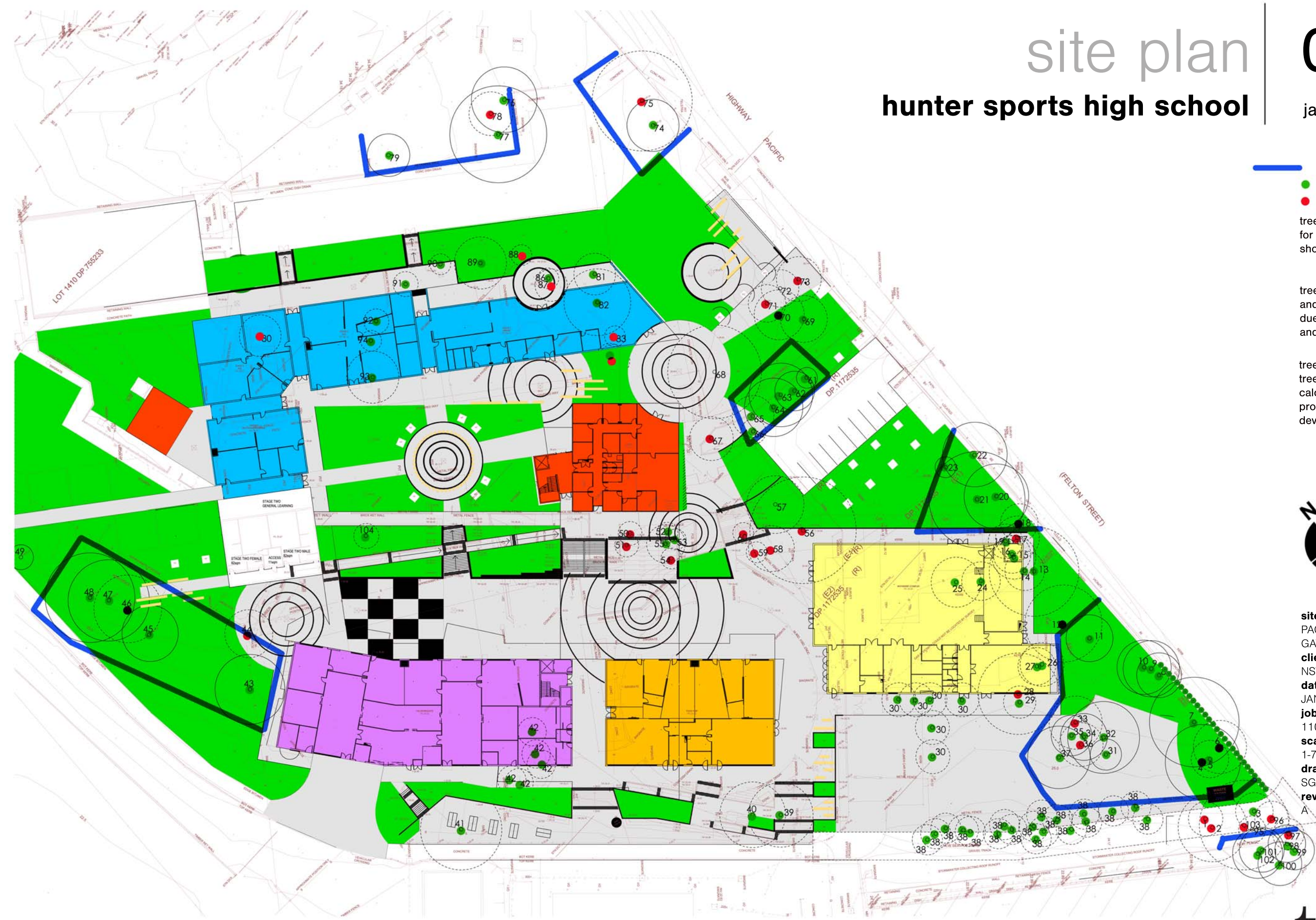
-  protective fencing refer to sheet-02
 -  a rated tree
 -  z rated tree
- trees requiring removal for the proposed works shown dashed.

trees 4, 6, 33, 36, 46, 75 and 78 should also be removed due to their low useful life expectancy and risk factor.

tree radius indicates the tree protection zone as calculated from as 4970 protection of trees on development sites.



site details:
 PACIFIC HIGHWAY,
 GATESHEAD
client:
 NSW PUBLIC WORKS
date:
 JANUARY 2016
job number:
 11029.5
scale:
 1-700 @ A3
drawn:
 SGK
rev. number:
 A

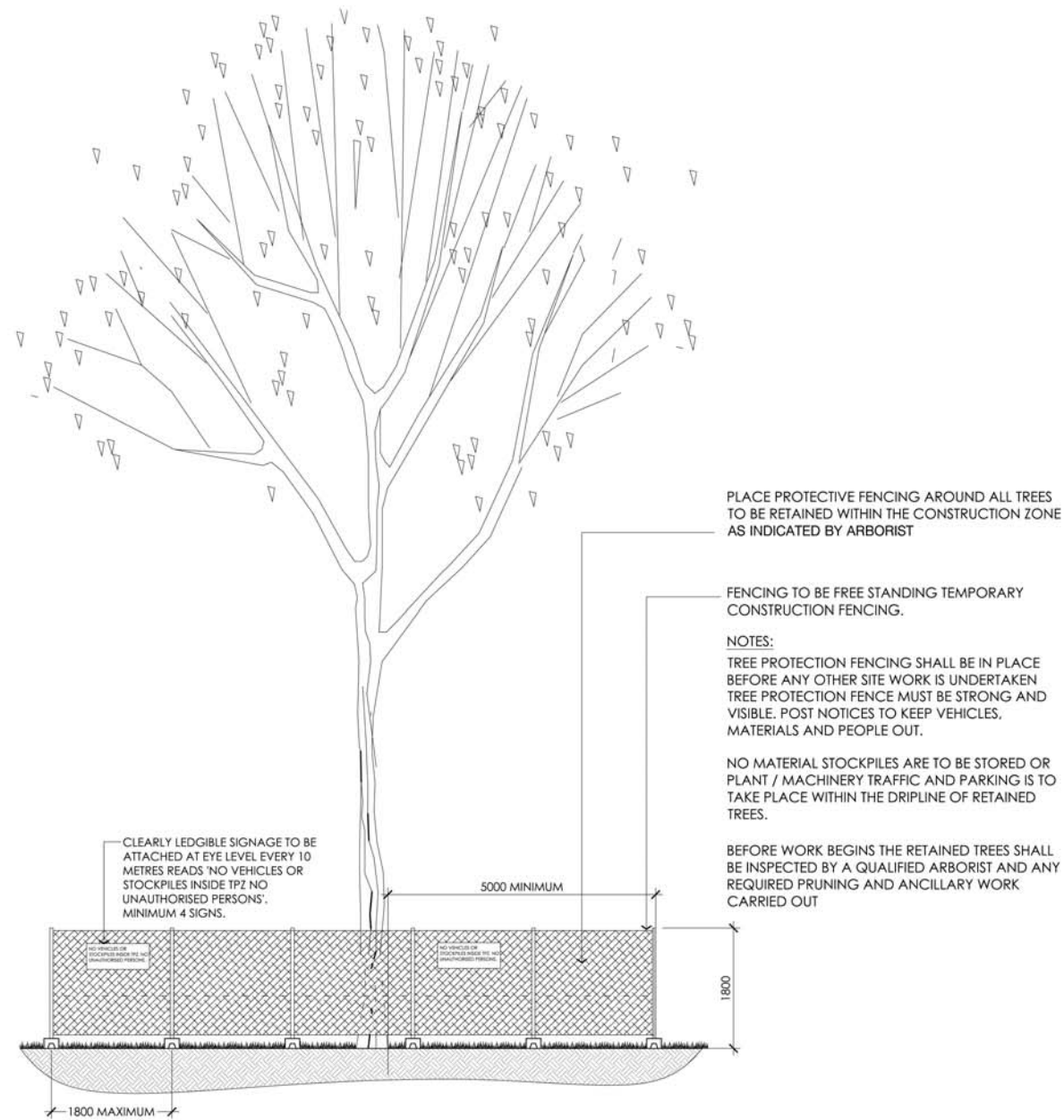


tree protection plan

hunter sports high school

02

january 2016



TREE PROTECTION ZONES (TPZ) ARE TO BE SET UP USING SELF SUPPORTING PROTECTIVE FENCING EQUAL TO AUSTRALIAN TEMPORARY FENCING MESH CONSTRUCTION FENCING PANELS 1800MM HIGH BY 2100MM LONG. THESE ARE TO BE INSTALLED PRIOR TO ANY PRELIMINARY SITE WORK INCLUDING ERECTION OF SITE SHEDS. FENCING IS TO REMAIN IN PLACE DURING THE CONSTRUCTION PHASE UNTIL THE CONTRACTOR HAS REACHED PRACTICAL COMPLETION OF THE PROJECT AT WHICH TIME THE TREES SHALL BE RE-ASSESSED BY A QUALIFIED ARBORIST TO DETERMINE THE TREES CONDITION. SIGNAGE IS TO BE PLACED ON THE FENCING WITH CLEAR AND LEGIBLE INFORMATION INDICATING THAT THE FENCED AREA IS A TREE PROTECTION ZONE AND THERE IS TO BE NO UNAUTHORISED ACCESS. ANY TRENCHING OR EXCAVATION THAT IS LIKELY TO OCCUR WITHIN THE TPZ OF THE NOMINATED TREES IS TO BE UNDERTAKEN WITH A QUALIFIED ARBORIST IN ATTENDANCE SO POTENTIAL DAMAGE TO ROOTS OR CANOPY CAN BE ASSESSED.

RESTRICTED ACTIVITIES WITHIN TPZ

- STORAGE OF MATERIALS
- PREPARATION OF CHEMICALS INCLUDING CEMENT, GLUE OR PAINT PRODUCTS
- PARKING OF VEHICLES OR MACHINERY
- CLEANING OF EQUIPMENT
- REFUELLING
- DUMPING OR STORAGE OF WASTE
- TEMPORARY OR PERMANENT INSTALLATION OF UTILITIES OR SIGNS
- LIGHTING OF FIRES
- SOIL LEVEL CHANGES
- PLACEMENT OF FILL MATERIAL



site details:
 PACIFIC HIGHWAY,
 GATESHEAD
client:
 NSW PUBLIC WORKS
date:
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 10367.5
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 nts @ A3
drawn:
 SGK
rev. number:
 A



Appendix 2: Tree Assessment Summary



FIELD ASSESSMENT SHEET

PROJECT: HUNTER SPORTS HIGH

JANUARY 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH [MM]	SPREAD [M]				ULE	TREE AZ	STRUCTURE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
1	<i>Angophora costata</i>	Smooth Barked Apple	SM	6	250 200	1	3	1	0	4B	Z10	P	P	SUPPRESSED TREE
2	<i>Eucalyptus piperita</i>	Sydney Peppermint	M	17	550	5	5	3	2	3D	Z10	P	P	LARGE AMOUNT OF DEAD WOOD, SEVERELY PRUNED DUE TO NEARBY OVERHEAD POWERLINES.
3	<i>Angophora costata</i>	Smooth Barked Apple	M	16	300	3	3	2	3	2D	A2	F	F	MINOR DEAD WOOD.
4	<i>Eucalyptus capitellata</i>	Brown Stringy Bark	M	17	600	8	2	4	7	3D	Z10	F	P	LARGE AMOUNT OF DEAD WOOD AND DIEBACK.
5	<i>Corymbia gummifera</i>	Red Bloodwood	M	16	300 200	3	3	3	3	1A	A1	F	AV	GROUP OF SAPLINGS
6	<i>Angophora costata</i>	Smooth Barked Apple	M	6	280 320	2	1	2	1	4D	Z5	P	P	LARGE WOUND WITH DECAY. SEVERELY PRUNED DUE TO NEARBY OVERHEAD POWERLINES.
7	<i>Angophora costata</i>	Smooth Barked Apple	M	19	720	7	3	5	7	2A	A2	AV	AV	
8	<i>Angophora costata</i>	Smooth Barked Apple	M	15	220 290	1	2	4	5	2A	A2	AV	AV	
9	<i>Corymbia gummifera</i>	Red Bloodwood	M	16	450	6	1	5	6	2A	A2	AV	AV	
10	<i>Angophora costata</i>	Smooth Barked Apple	M	16	440	7	2	4	7	2D	A2	AV	AV	MINOR DEAD WOOD.
11	<i>Corymbia gummifera</i>	Red Bloodwood	M	17	380	4	4	4	4	2A	A2	AV	AV	
12	<i>Eucalyptus capitellata</i>	Brown Stringy Bark	M	15	3X360	5	3	2	4	4D	Z5	P	P	TRI-DOMINANT TREE WITH POOR BASAL ATTACHMENTS, WOUNDING TO BASE AND LARGE SIZED DEAD WOOD.
13	<i>Angophora costata</i>	Smooth Barked Apple	M	20	760	8	4	8	8	2A	A2	AV	AV	MINOR DEAD WOOD
14	<i>Angophora costata</i>	Smooth Barked Apple	M	16	320	4	2	5	6	1A	A1	AV	AV	
15	<i>Corymbia gummifera</i>	Red Bloodwood	M	16	350	4	4	3	6	1A	A1	AV	AV	
16	<i>Corymbia gummifera</i>	Red Bloodwood	M	18	300	6	2	2	6	1A	A1	AV	AV	
17	<i>Eucalyptus capitellata</i>	Brown Stringy Bark	M	13	350	3	4	1	1	4D	Z5	P	P	WOUNDING AND DECAY IN MAIN LEADER WITH TERMITE NEST ATTACHED AT THIS POINT.
18	<i>Eucalyptus capitellata</i>	Brown Stringy Bark	M	9	300	1	1	0	0	4B	Z10	P	P	STUNTED SUPPRESSED TREE. POORLY PRUNED DUE TO NEARBY OVERHEAD

* 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 FAILTS/HIGH RISK OF SEVERE FAILURE	F	FAIR STRUCTURAL FAILTS PRESENT /MODERATE RISK OF SEVERE FAILURE	Av	AVERAGE SOME MINOR FAILTS /MODERATE RISK FOR MAJOR FAILURE	Ex	EXCELLENT SOME MINOR FAILTS/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: HUNTER SPORTS HIGH

JANUARY 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH [MM]	SPREAD [M]				ULE	TREE AZ	STRUCTURE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
														POWERLINES.
19	<i>Angophora costata</i>	Smooth Barked Apple	M	14	180 210	2	2	1	3	1A	A1	AV	AV	MINOR DEAD WOOD.
20	<i>Angophora costata</i>	Smooth Barked Apple	M	20	300 430	6	2	4	7	2D	A2	AV	AV	MINOR DEAD WOOD.
21	<i>Corymbia gummifera</i>	Red Bloodwood	M	19	500 590	8	5	10	9	2D	A2	F	AV	SOME END WEIGHT ISSUES ON LONG LATERAL LEADERS. TRI-DOMINANT AT BASE.
22	<i>Eucalyptus piperita</i>	Sydney Peppermint	M	15	300 290 290	7	1	2	4	2D	A2	F	AV	PRUNED DUE TO NEARBY OVERHEAD POWERLINES.
23	<i>Callistemon species</i>	Bottlebrush	M	4	100 100	2	2	2	2	1A	A1	AV	AV	
24	<i>Melaleuca quinquenervia</i>	Paperbark	M	8	310	3	3	3	3	1A	A1	AV	AV	
25	<i>Eucalyptus species</i>	Gum tree	M	11	400	5	3	2	5	2D	A2	F	F	SPARSE CANOPY AND MINOR DEAD WOOD.
26	<i>Eucalyptus capitellata</i>	Brown Stringy Bark	M	15	350	3	3	3	3	2D	A2	F	F	LARGE AMOUNT OF DEAD WOOD.
27	<i>Angophora costata</i>	Smooth Barked Apple	M	15	300	6	3	5	6	1A	A1	AV	AV	
28	<i>Eucalyptus capitellata</i>	Brown Stringy Bark	OM	15	460 400	6	2	5	5	4B	Z4	P	P	LITTLE LIVE CANOPY LEFT. LARGE SIZED DEAD WOOD AND CANOPY DIE-BACK.
29	<i>Angophora costata</i>	Smooth Barked Apple	M	10	260	0	3	5	4	1A	A1	AV	AV	
30	<i>Harpephyllum caffrum</i>	Kaffir Plum	SM	5	250	3	3	3	3	1A	A1	AV	AV	GROUP OF 6 TREES.
31	<i>Corymbia gummifera</i>	Red Bloodwood	M	13	250	0	1	4	4	2D	A2	F	F	SUPPRESSED TREE.
32	<i>Eucalyptus capitellata</i>	Brown Stringy Bark	M	14	580	10	6	6	4	2D	A2	F	F	DEAD WOOD AND HANGING BRANCHES.
33	<i>Eucalyptus capitellata</i>	Brown Stringy Bark	OM	16	220 370	4	1	1	4	4B	Z4	P	P	CANOPY DIE-BACK, SPARSE FOLIAGE AND LARGE AMOUNT OF DEAD WOOD.
34	<i>Corymbia gummifera</i>	Red Bloodwood	M	18	380	4	4	4	4	1A	A1	AV	AV	
35	<i>Corymbia gummifera</i>	Red Bloodwood	M	13	280 180	4	2	1	5	2D	A2	F	F	SUPPRESSED
36	<i>Corymbia gummifera</i>	Red Bloodwood	M	9	200 290	2	1	3	3	4D	Z5	P	P	POORLY STRUCTURED TREE WITH POOR LEADER ATTACHMENTS. LARGE SIZED DEAD WOOD AND LITTLE LIVE CANOPY.

* MULTI TRUNKED. BASAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND

AGE CLASS	Y SAPLING/HAS NOT REACHED 1 st ADULT FORM	SM DBH < 300mm/APPROACHING FULL HEIGHT	M DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OM LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS
STRUCTURE	P NUMEROUS STRUCTURAL FAILTS/HIGH RISK OF SEVERE FAILURE	F STRUCTURAL FAILTS PRESENT /MODERATE RISK OF SEVERE FAILURE	Av SOME MINOR FAILTS /MODERATE RISK FOR MAJOR FAILURE	Ex SOME MINOR FAILTS/LOW-MOD RISK OF MINOR FAILURES
HEALTH	P SIG. SIGNS OF LOST VIGOUR EG DIEBACK, REDUCED CANOPY	F SIGNS OF REDUCED VIGOUR EG LEAF UNDER STRESS, STUNTING	Av LOCALISED PATCHES OF LOST VIGOUR/NOT WIDESPREAD	Ex NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD
RETENTION	TREES TO BE RETAINED		TREES TO BE REMOVED	THREATENED TREE

FIELD ASSESSMENT SHEET

PROJECT: HUNTER SPORTS HIGH

JANUARY 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH [MM]	SPREAD [M]				ULE	TREE AZ	STRUCTURE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
37	<i>Corymbia gummifera</i>	Red Bloodwood	M	17	500	6	1	6	8	2D	A2	F	A	ASYMMETRIC TREE WITH A LEAN TO THE WEST. LARGE SIZED DEAD WOOD.
38	<i>Eucalyptus species</i>	Gum Tree	SM	9	VARIE S	3	3	3	3	1A	A1	AV	AV	ROW OF 19 SEMI MATURE TREES.
39	<i>Eucalyptus microcorys</i>	Tallow Wood	M	17	520	5	5	5	5	1A	A1	AV	AV	
40	<i>Eucalyptus saligna</i>	Bluegum	M	16	530	5	5	5	5	1A	A1	AV	AV	MINOR DEAD WOOD
41	<i>Eucalyptus saligna</i>	Bluegum	M	16	650	7	7	7	7	1A	A1	AV	AV	MINOR DEAD WOOD
42	<i>Callistemon sp</i>	Bottlebrush	M	5	VARIE S					1A	A1	AV	AV	GROUP OF SMALL TREES AGAINST BUILDING.
43	<i>Eucalyptus saligna</i>	Bluegum	M	18	560	8	9	6	7	2D	A2	F	F	STORM DAMAGED TREE WITH HANGING BRANCHES. MINOR DIEBACK IN THE UPPER CANOPY.
44	<i>Eucalyptus saligna</i>	Bluegum	M	8	390	3	3	3	3	3D	Z10	F	F	STUNTED TREE WITH A FAILED MAIN LEADER. LOTS OF TWIGY DEAD WOOD.
45	<i>Corymbia gummifera</i>	Red Bloodwood	M	17	450	4	5	5	5	1A	A1	AV	AV	MINOR DEAD WOOD.
46	<i>Eucalyptus haemastoma</i>	Scribbly Gum	M	15	400 370	3	6	3	3	3D	Z10	P	F	SUPPRESSED TREE WITH A FAILED LEADER. LARGE SIZED DEAD WOOD AND A LARGE WOUND TO THE TRUNK.
47	<i>Angophora costata</i>	Smooth Barked Apple	M	17	650	6	8	4	5	2D	A2	AV	AV	DEAD WOOD.
48	<i>Angophora costata</i>	Smooth Barked Apple	M	10	300	3	3	3	3	1A	A1	AV	AV	CODOMINANT LEADERS
49	<i>Lophostemon confertus</i>	Brushbox	SM	5	100 90 200	2	2	2	2	1A	A1	F	AV	SMALL MULTI TRUNKED TREE.
50	<i>Sygarus romanzoffiana</i>	Cocos Palm	M							3B	Z1			
51	<i>Sygarus romanzoffiana</i>	Cocos Palm	M							3B	Z1			
52	<i>Washingtonia filifera</i>	Cotton Palm	M	12		1	1	1	1	1A	A1	AV	AV	
53	<i>Washingtonia filifera</i>	Cotton Palm	M	12		1	1	1	1	1A	A2	AV	AV	
54	<i>Sygarus romanzoffiana</i>	Cocos Palm	M							3B	Z1			
55	<i>Corymbia torelliana</i>	Cadagi	M	14	310	5	5	5	5	1A	A1	AV	AV	MINOR DEAD WOOD AND POOR PAST PRUNING WITH BRANCH STUBS REMAINING.
56	<i>Eucalyptus nicholai</i>	Peppermint	M	16	850	7	7	7	6	3D	Z10	F	F	LARGE AMOUNT OF DEAD WOOD AND DIE

* MULTI TRUNKED. BASAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND

AGE CLASS	Y	SM	M	OM
	YOUNG SAPLING/HAS NOT REACHED 1 st ADULT FORM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS
STRUCTURE	P	F	Av	Ex
	POOR NUMEROUS STRUCTURAL FAULTS/HIGH RISK OF SEVERE FAILURE	FAIR STRUCTURAL FAULTS PRESENT /MODERATE RISK OF SEVERE FAILURE	AVERAGE SOME MINOR FAULTS /MODERATE RISK FOR MAJOR FAILURE	EXCELLENT SOME MINOR FAULTS/LOW-MOD RISK OF MINOR FAILURES
HEALTH	P	F	Av	Ex
	POOR SIG. SIGNS OF LOST VIGOUR EG DIEBACK, REDUCED CANOPY	FAIR SIGNS OF REDUCED VIGOUR EG LEAF UNDER STRESS, STUNTING	AVERAGE LOCALISED PATCHES OF LOST VIGOUR/NOT WIDESPREAD	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: HUNTER SPORTS HIGH

JANUARY 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH [MM]	SPREAD [M]				ULE	TREE AZ	STRUCTURE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
														BACK. HANGING BRANCHES.
57	<i>Corymbia maculata</i>	Spotted Gum	M	16	460	6	3	5	5	1A	A1	AV	AV	SMALL WOUND TO THE BASE OF THE TRUNK.
58	<i>Eucalyptus paniculata</i>	Iron Bark	M	13	370	2	0	4	4	3D	Z10	F	F	SUPPRESSED ASYMMETRIC TREE WITH A MODERATE LEAN TO THE WEST.
59	<i>Sygarus romanzoffiana</i>	Cocos Palm	M	16						3B	Z1			
60	<i>Sygarus romanzoffiana</i>	Cocos Palm	M	15						3B	Z1			
61	<i>Angophora costata</i>	Smooth Barked Apple	SM	9	150	4	3	1	1	1A	A1	AV	AV	SMALL TREE
62	<i>Angophora costata</i>	Smooth Barked Apple	M	17	320	6	6	2	2	2A	A2	F	F	LARGE WOUND TO THE BASE OF THE TRUNK, HOWEVER NO DECAY DETECTED.
63	<i>Araucaria cunninghamii</i>	Brown Stringy Bark	M	20	370 360	5	5	5	5	1A	A1	AV	AV	CO-DOMINANT TREE.
64	<i>Angophora costata</i>	Smooth Barked Apple	M	19	470	7	2	2	5	1A	A1	AV	AV	MINOR DEAD WOOD.
65	<i>Angophora costata</i>	Smooth Barked Apple	M	19	340	6	3	5	7	1A	A1	AV	AV	
66	<i>Eucalyptus species</i>	Gum Tree	SM	15	200	4	1	4	4	1A	A1	AV	AV	SMALL HANGING BRANCH.
67	<i>Cupressus species</i>	Conifer	M	8	150 280 120	1	1	1	1	3B	Z1	F	P	DECLINING TREE WITH SPARSE FOLIAGE.
68	<i>Lophostemon confertus</i>	Brush Box	M	18	750	4	4	4	4	1A	A1	AV	AV	CO-DOMINANT LEADERS.
69	<i>Eucalyptus robusta</i>	Swamp Mahogany	M	15	380	4	6	4	2	2A	A2	F	F	MINOR DEAD WOOD
70	<i>Eucalyptus robusta</i>	Swamp Mahogany	M	17	400	6	4	1	4	3D	Z10	F	P	SPARSE CANOPY WITH A LARGE AMOUNT OF DEAD WOOD. HANGING BRANCH.
71	<i>Eucalyptus robusta</i>	Swamp Mahogany	M	15	300	3	2	1	2	3D	Z10	F	F	MODERATE AMOUNT OF DEAD WOOD AND SOME CANOPY DIE BACK.
72	<i>Eucalyptus robusta</i>	Swamp Mahogany	M	14	300	5	4	1	4	2A	A2	F	F	
73	<i>Corymbia gummifera</i>	Red Bloodwood	M	15	360	1	1	0	1	4B	Z4	P	P	FOLIAGE CONSISTS OF EPICORMIC GROWTH.
74	<i>Corymbia citriodora</i>	Lemon Scented Gum	M	19	420	4	2	7	4	2D	A2	AV	AV	MINOR DEAD WOOD. PRUNED DUE TO NEARBY OVERHEAD POWERLINES.
75	<i>Eucalyptus species</i>	Gum Tree	M	20	800	10	3	5	6	3D	Z10	F	F	LARGE AMOUNT OF DEAD WOOD AND

* MULTI TRUNKED. BASAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND

AGE CLASS	Y SAPLING/HAS NOT REACHED 1 st ADULT FORM	SM DBH < 300mm/APPROACHING FULL HEIGHT	M DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OM LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS
STRUCTURE	P NUMEROUS STRUCTURAL FAILTS/HIGH RISK OF SEVERE FAILURE	F STRUCTURAL FAILTS PRESENT /MODERATE RISK OF SEVERE FAILURE	Av SOME MINOR FAILTS /MODERATE RISK FOR MAJOR FAILURE	Ex SOME MINOR FAILTS/LOW-MOD RISK OF MINOR FAILURES
HEALTH	P SIG. SIGNS OF LOST VIGOUR EG DIEBACK, REDUCED CANOPY	F SIGNS OF REDUCED VIGOUR EG LEAF UNDER STRESS, STUNTING	Av LOCALISED PATCHES OF LOST VIGOUR/NOT WIDESPREAD	Ex NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD
RETENTION	TREES TO BE RETAINED		TREES TO BE REMOVED	THREATENED TREE

FIELD ASSESSMENT SHEET

PROJECT: HUNTER SPORTS HIGH

JANUARY 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH [MM]	SPREAD [M]				ULE	TREE AZ	STRUCTURE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
														EPICORMIC GROWTH. LARGE FAILED BRANCH STUBS.
76	<i>Corymbia maculata</i>	Spotted Gum	M	20	420 320	8	6	5	8	2A	A2	AV	AV	2 HANGING BRANCHES.
77	<i>Eucalyptus globulus</i>	Tasmanian Blue Gum	M	19	780	6	5	7	8	2D	A2	F	F	MODERATE AMOUNT OF DEAD WOOD.
78	<i>Lophostemon confertus</i>	Brush Box	SM	10	250 250	2	2	2	2	3D	Z10	P	AV	CO-DOMINANT LEADERS WITH BARK INCLUSION.
79	<i>Agonis flexuosa</i>	Willow Myrtle	M	4	200X3	3	3	3	3	1A	A1	AV	AV	SMALL MULTI TRUNKED TREE.
80	<i>Cinnamomum camphora</i>	Camphor Laurel	M	10	100X2 0	3	3	3	3	3B	Z1	P	AV	THICKET
81	<i>Brachychiton acerifolius</i>	Flame Tree	M	13	380	3	3	3	3	1A	A1	AV	AV	LOCATED NEAR BUILDINGS.
82	<i>Eucalyptus species</i>	Gum Tree	M	17	250 430 200	7	8	6	4	2D	A2	F	F	2 MINOR LEADERS HAVE A POOR ATTACHMENT AND STRUCTURE.
83	<i>Callistemon species</i>	Bottlebrush	OM	4	150	2	1	1	1	4B	Z4	P	P	SPARSE AND ALMOST DEAD.
84	<i>Callistemon species</i>	Bottlebrush	M	5	150X3	3	2	3	2	4B	Z4	F	P	SPARSE
85	<i>Tristaniopsis laurina</i>	Watergum	M	6	120 150	3	1	3	3	1A	A1	AV	AV	
86	<i>Melaleuca stypheloides</i>	Prickly Leaved Paperbark	SM	4	100	2	2	2	2	1A	A1	AV	AV	
87	<i>Allocasuarina torulosa</i>	Forest She Oak	M	14	260	2	2	2	2	3C	Z2	AV	AV	WITHIN 300MM OF BUILDING.
88	<i>Acacia species</i>	Wattle	OM	5	50	2	2	2	2	4B	Z10	P	P	SPARSE DECLINING TREE.
89	<i>Corymbia gummifera</i>	Red Bloodwood	M	16	420	7	8	3	4	2D	A2	AV	AV	NUMBER OF HANGING BRANCHES.
90	<i>Callistemon species</i>	Bottlebrush	M	4	90	2	2	2	2	2A	A2	F	F	
91	<i>Callistemon species</i>	Bottlebrush	M	5	200	2	3	2	1	1A	A1	AV	AV	
92	<i>Eucalyptus saligna</i>	Bluegum	SM	13	200	5	2	4	4	1A	A1	AV	AV	ON A LEAN TO THE WEST, NO EVIDENCE OF ROOT PLATE FAILURE.
93	<i>Lophostemon confertus</i>	Brushbox	M	13	420	5	4	4	5	2A	A2	AV	AV	IN A SMALL RAISED PLANTER.
94	<i>Acacia species</i>	Wattle	M	3	4X70	3	2	2	2	2A	A2	AV	AV	SOME TWIGGY DEAD WOOD.
95	<i>Angophora costata</i>	Smooth Barked Apple	M	6	220	2	1	2	2	2D	A2	F	F	
96	<i>Corymbia gummifera</i>	Red Bloodwood	M	9	200	2	1	2	3	3D	Z10	F	F	PRUNED DUE TO NEARBY OVERHEAD

* MULTI TRUNKED. BASAL DIAMETER MEASURED IMMEDIATELY ABOVE ROOT FLARE

LEGEND

AGE CLASS	Y	SM	M	OM
	YOUNG SAPLING/HAS NOT REACHED 1 st ADULT FORM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS
STRUCTURE	P NUMEROUS STRUCTURAL FAILTS/HIGH RISK OF SEVERE FAILURE	F STRUCTURAL FAILTS PRESENT /MODERATE RISK OF SEVERE FAILURE	Av SOME MINOR FAILTS /MODERATE RISK FOR MAJOR FAILURE	Ex SOME MINOR FAILTS/LOW-MOD RISK OF MINOR FAILURES
HEALTH	P SIG. SIGNS OF LOST VIGOUR EG DIEBACK, REDUCED CANOPY	F SIGNS OF REDUCED VIGOUR EG LEAF UNDER STRESS, STUNTING	Av LOCALISED PATCHES OF LOST VIGOUR/NOT WIDESPREAD	Ex NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD
RETENTION	TREES TO BE RETAINED		TREES TO BE REMOVED	THREATENED TREE

FIELD ASSESSMENT SHEET

PROJECT: HUNTER SPORTS HIGH

JANUARY 2016

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH [MM]	SPREAD [M]				ULE	TREE AZ	STRUCTURE	HEALTH	COMMENTS
						NORTH	EAST	SOUTH	WEST					
					200									POWERLINES
97	<i>Eucalyptus haemastoma</i>	Scribbly Bark	M	10	250	3	1	3	1	3D	Z10	F	F	PRUNED DUE TO NEARBY OVERHEAD POWERLINES.
98	<i>Angophora costata</i>	Smooth Barked Apple	M	14	300	3	3	2	1	2D	A2	F	F	
99	<i>Corymbia gummifera</i>	Red Bloodwood	M	14	320	2	3	4	4	2D	A2	F	F	
100	<i>Angophora costata</i>	Smooth Barked Apple	M	12	350	3	4	4	2	2D	A2	F	F	
101	<i>Angophora costata</i>	Smooth Barked Apple	M	16	360	4	5	4	4	2D	A2	F	F	
102	<i>Corymbia gummifera</i>	Red Bloodwood	M	16	400	3	3	4	5	2D	A2	F	F	
103	<i>Angophora costata</i>	Smooth Barked Apple	M	18	700	5	6	4	6	2D	A2	F	F	
104	<i>Banksia serrata</i>	<i>Banksia</i>	M	5	200	2	3	2	1	1A	A1	AV	AV	

* 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 FAILTS/HIGH RISK OF SEVERE FAILURE	F	FAIR STRUCTURAL FAILTS PRESENT /MODERATE RISK OF SEVERE FAILURE	Av	AVERAGE SOME MINOR FAILTS /MODERATE RISK FOR MAJOR FAILURE	Ex	EXCELLENT SOME MINOR FAILTS/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 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



Appendix 5: Extract from AS 4970



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.