



TREE MANAGEMENT CONSULTING ARBORICULTURISTS

**PRELIMINARY ARBORICULTURAL
ASSESSMENT**

**– PLANNING PROPOSAL –
DEFERRED AREA 15**

for

Killara Golf Club
556 Pacific Highway
KILLARA NSW 2065

SITE ADDRESS

DEFERRED AREA 15
KILLARA GOLF COURSE
KILLARA NSW

MAY 2016

Prepared by Catriona Mackenzie

Accredited member of

INSTITUTE OF AUSTRALIAN



CONSULTING ARBORICULTURISTS ®

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1 INTRODUCTION

- 1.1 This Preliminary Arboricultural Assessment (PAA) was commissioned by Mr David Gazzoli, Manager of the Killara Golf Club, on behalf of the owners of the subject site. "The site" is the area referred to as Deferred Area 15, comprised of approximately 4.7 hectares of developed land, including the clubhouse, tees, greens, fairways, tennis courts, bowling greens, paved areas, and adjoining properties to the east as illustrated in the figure below.



Figure 1—Showing the proposed zone boundaries within the Council Deferred Zoning Boundary (Deferred Area 15 of KLEP)

- 1.2 This report is to accompany a planning proposal to Ku-ring-gai Council for the proposed rezoning of the site to R4 High Density Residential and R2 Low Density Residential.
- 1.3 The purpose of this PAA is to identify the prominent and high landscape significance trees in the area captured within the Deferred Area boundary illustrated above, and identify the probable removal and retention of trees associated with the projected future development of the site.

- 1.4** This PAA provides guidelines for planning and designing built elements in proximity to existing trees to be retained.
- 1.5** Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible; however, I can neither guarantee nor be responsible for the accuracy of information provided by others.
- 1.6** This PAA is not intended as an assessment of any impacts on trees by any proposed future development of the site, other than the current planning proposal.
- 1.7** This report is not intended to be a comprehensive tree *risk* assessment, nor is it intended as a development or construction impact assessment or tree protection specification.

2 METHODOLOGY

- 2.1** In preparation for this PAA, ground level, limited, *visual tree assessments*¹ of one hundred (100) trees were undertaken by Catriona Mackenzie (AQF5 arboriculturist) and Mark Jamieson (AQF4 horticulturist) on 22 March, 2016. Inspection details of these trees are provided in Appendix C—*Schedule of Assessed Trees*.
- 2.2** Tree heights were measured where possible with a Nikon Forestry Pro laser rangefinder, and canopy spreads were visually estimated or measured with a Leica Distometer laser measurer. Unless otherwise noted in Appendix C, all trunk diameters were measured at 1.4 metres above ground level (DBH) using a Yamiyo diameter tape.
- 2.3** Field observations were written down at the time of site visit and tree inspections, and photographs of the site and trees taken using a Canon EOS1000D digital SLR and/or iphone 5 cameras.
- 2.4** No *aerial inspections*, *root mapping* or woody tissue testing were undertaken as part of this tree assessment. Information contained in this tree report covers only the trees that were examined and reflects the condition of those trees at the time of inspection.
- 2.5** Plans and documents referenced for the preparation of this report include:
- Detail Survey, Ref. No. 96111/33B, Sheet 2 of 6, dated June 2008, by YSCO Geomatics.
 - Arborist's Report, Volume 2, dated February, 2011 by Australian Tree Consultants Pty Ltd;
 - Arboricultural Development Impact Report, dated December 2011, by Urban Forestry Australia.
 - Ku-ring-gai Local Environment Plan 2015 (KLEP) Schedules and Maps, Clauses 5.9, 5.9AA.
 - AS4970-2009 *Protection of trees on development sites*, Standards Australia.
- 2.6** The subject trees are shown on marked up excerpts of the site survey. These plans are attached as Appendix D—Tree Location Plans.

¹ Visual Tree Assessment (VTA) is a procedure of defect analysis developed by Mattheck and Breloer (1994) that uses the growth response and form of trees to detect defects.

3 OBSERVATIONS AND DISCUSSION

3.1 Assessed Trees—Species Recorded

3.1.1 Approximately (100) trees were assessed and included in this report. Details of these are included in the Schedule of Assessed Trees – Appendix C.

3.1.2 The main, indigenous canopy tree species found on the site are consistent with the Blue Gum High Forest (BGHF) Endangered Ecological Community. Of the 100 assessed trees, the following fifty-seven (57) are considered indigenous (or are known to be associated with BGHF vegetation communities):

- Forty-three (43) *Eucalyptus saligna* (Sydney Blue Gum)—43%,
- Six (6) *Angophora floribunda* (Rough-barked Apple),
- Three (3) *Callistemon salignus* (Willow Bottlebrush),
- Two (2) *Eucalyptus pilularis* (Blackbutt),
- One (1) *Casuarina cunninghamiana* (River She-oak),
- One (1) *Corymbia eximia* (Yellow Bloodwood),
- One (1) *Syzygium paniculatum* (Magenta Cherry).

3.1.3 The remaining forty-three (43) assessed trees are considered to be introduced Australian native species, or exotic (non-Australian) species:

- Twelve (12) *Melaleuca quinquenervia* (Broad-leaved Paperbark),
- Twelve (12) *Araucaria cunninghamii* (Hoop Pine),
- Nine (9) *Araucaria bidwillii* (Bunya Pine),
- Five (5) *Archontophoenix alexandrae* (Alexandra Palm),
- Three (3) *Eucalyptus micocorys* (Tallowwood),
- One (1) *Corymbia citriodora* (Lemon-scented Gum) and
- One (1) *Cedrus deodara* (Deodar Cedar),

3.2 Projected Tree Removal

3.2.1 Trees removed would include the majority of trees concentrated in the site interior, as these would normally pose the greatest constraints on future site development and yield. As the trees are relatively mature, they have correspondingly greater *Tree Protection Zone* (TPZ) offsets. The retention of trees near site perimeters presents the greatest opportunities for successful retention.

- 3.2.2 Tree removals may be minimised by ensuring arboricultural advice and assistance is sought during planning and design stages, rather than retrospective advice.
- 3.2.3 Where possible, communal open space areas should try to incorporate existing significant trees or tree groups. If tree offsets are respected and maintained, it is quite possible many of the larger, mature trees can be retained subject to normal risk assessment and management under changed conditions.

3.3 Potential Impacts on Trees Proposed for Retention

- 3.3.1 Under the Australian Standard 4970-2009 *Protection of trees on development sites* (AS4970), encroachments less than 10% of the *Tree Protection Zone* (TPZ) are considered to be minor. There are no specifications provided in AS4970 for potential impacts of 10% or greater. The 10% figure is taken to be a threshold and trigger where arboricultural investigations into TPZ encroachments beyond this figure need to be considered.
- 3.3.2 Provision for the TPZ offsets of trees to be retained will be required at detailed design stage. Tree impact encroachments will need to be quantified and, if necessary, changes to footprints for internal roads, paths, ancillary structures, services and building offsets to trees may be required. Refer to Appendix C for those TPZ offsets.
- 3.5.3 It is possible a number of trees mainly concentrated to the site perimeters could be successfully retained subject to advanced impact assessment and possible 'massaging' of the design to consider high retention values trees in locations where retention would not relate to major 'sterilisation' of the site for future development.

4 PRELIMINARY GUIDELINES FOR PLANNING AND DESIGN

4.1 Minimising Impacts on Trees to be Retained

4.1.1 Generally, potential impacts from site development can be summarised as follows;

- Incursions (i.e. excavation or filling over existing ground, grading and removing of topsoils) into the root zones of trees resulting in loss of fine feeder roots, or severing of structural woody roots.
- Structural branch loss through close proximity of structures to trees.
- Significant changes to surrounding soil levels which can affect soil hydrology and tree root health.

4.1.2 Where tree retention is desired, the *Tree Protection Zone* (TPZ) of an individual tree is estimated at 12 times the stem diameter, or the outer extent of the *canopy dripline* (whichever is the greater). The Schedule of Assessed Trees—Appendix C, provides the Tree Protection Zone offsets for each tree.

4.1.3 Where buildings may be proposed in proximity to trees, it is prudent to add an additional 2m to this TPZ setback on the building side of the tree to ensure construction scaffolding can be accommodated without excessive removal of foliage and branches. Where trees have very high crowns (e.g. well above the proposed finished roof line) this additional setback may be reduced following further arboricultural assessment of impacts on individual trees near proposed development.

4.1.3 To facilitate adequate protection of tree root zones and tree crowns, separate appraisal of each development area (e.g. proposed construction and future site access points and construction areas in proximity to trees to be retained) should be carried out. A suitably qualified arboriculturist (i.e. a minimum Australian Qualification Framework Level 5 [Diploma] in arboriculture) must be advised prior to any development proposed to occur within the TPZ offset of those trees to enable specific assessment and protection recommendations. Refer to Appendix C for the TPZ offset for each tree.

4.1.4 Without any specific root zone investigation the entire TPZ is to be kept entirely free of any development works, e.g. changes to existing ground levels, use of machinery, stockpiling, etc.

- 4.1.5 On no account would any works be approved within the *Structural Root Zone* (SRZ) of a tree without prior root investigation and the approval of the site arboriculturist or Council.
- 4.1.6 Wherever possible all major utilities and service corridors are to be located away from trees, and preferably outside the TPZ of trees to be retained.

5 CONCLUSIONS

- One hundred (100) mostly high landscape significance trees were assessed to provide base arboricultural data to assist with the planning proposal.
- It is anticipated many worthy trees can be retained, particularly at site perimeters or where sensitive design can incorporate stands of trees to create natural areas for community use.
- Liaising with an arboriculturist early in the planning, design and review stages is crucial to the successful retention of trees to be retained.

Report prepared by Catriona Mackenzie

May, 2016




Accredited member of
INSTITUTE OF AUSTRALIAN
I A C A
CONSULTING ARBORICULTURISTS ®



Catriona Mackenzie

Consulting arboriculturist, horticulturist and landscape designer.

Tree Risk Assessment Qualified (TRAQ) 2014

Certificate of Horticulture *Honours*

Diploma of Horticulture (Arboriculture) *Distinction*

Associate Diploma of Applied Science (Landscape) *Distinction*

Member of the Australian Institute of Horticulture

Member of the International Society of Arboriculture Australian Chapter

Founding Member of the Institute of Australian Consulting Arboriculturists

6 BIBLIOGRAPHY

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Barrell, J (1995) *Pre-development Tree Assessment from Trees and Building Sites*, Eds. Watson & Neely, International Society of Arboriculture, Illinois.

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APPENDIX A
TERMS AND DEFINITIONS



TERMS AND DEFINITIONS

The following relates to terms or abbreviations that may have been used in this report and provides the reader with a detailed explanation of those terms.

Aerial inspection Where the subject tree is climbed by a professional tree worker or arborist specifically to inspect and assess the upper stem and crown of the tree for signs or symptoms of defects, disease, etc.

Aerial roots Above ground, adventitious roots generally formed on stems and/or branches. Depending on plant species these roots perform a specific function, e.g. support, access to oxygen, vegetative propagation, as a parasite, etc.

Age classes

- Y** *Young* refers to a well-established but juvenile tree
- SM** *Semi-mature* refers to a tree at growth stages between immaturity and full size
- EM** *Early-mature* refers to a tree that is more or less full sized and vigorously growing.
- M** *Mature* refers to a full sized tree with some capacity for further growth
- LM** *Late Mature* refers to a full sized tree with little capacity for growth, not yet about to enter decline
- OM** *Over-mature* refers to a tree about to enter decline or already declining.

Bracket fungus The rigid fruiting body of some fungus species, especially those associated with live trees or the decay of wood. The structure is often bracket shaped, usually protruding from the roots, trunk or branches of the host tree when the fungus matures. The fruiting body may be ephemeral or persist for many years, and may be solitary or gregarious.

Branch failure The structural collapse of a branch that is physically weakened by wounding or from the actions of pests diseases, or overcome by loading forces in excess of its load-bearing capacity.

Condition refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

Crown All the parts of a tree arising above the trunk where it terminates by its division forming branches, e.g. the branches, leaves, flowers and fruit: or the total amount of foliage supported by branches.

Deadwood refers to any whole limb that no longer contains living tissues (e.g. live leaves and/or bark). Some dead wood is common in a number of tree species.

Diameter at Breast Height (DBH) refers to the tree trunk diameter at breast height, i.e. at 1.4m above ground level.

Dieback Death of growth tips/shoots and partial limbs, generally from tip to base. Dieback is often an indicator of stress and tree health.

Epicormic Shoots which arise from adventitious or latent buds. These shoots often have a weak point of attachment. They are often a response to stress in the tree. Epicormic growth/shoots are generally a survival mechanism, often indicating the presence of a current, or past stress event such as fire, excessive pruning, drought, etc.

Inclusion - the pattern of development at branch or stem junctions where bark is turned inward rather than pushed out. This fault is located at the point where the stems/branches meet. This is normally a genetic fault and potentially a weak point of attachment as the bark obstructs healthy tissue from joining together to strengthen the joint.

Lopping Cutting between branch unions (not to branch collars), or at internodes on a tree, with the final cut leaving a stub. Lopping may result in dieback of the stub and can create infection courts for disease or pest attack.

Risk is the combination of the likelihood of an event and the severity of the potential consequences.

Root Mapping The exploratory process of recording the location of roots usually in reference to a datum point where depth, root diameter, root orientation and distance from trunk to existing or proposed structures are measured. It may be slightly invasive (disturbs or displaces soil to locate but not damage roots, e.g. hand excavation, or use of air or water knife), or non-invasive (does not disturb soil, e.g. ground penetrating radar).

Scaffold branch/root A primary structural branch of the crown or primary structural root of the tree.

Structural Root Zone (SRZ) Refers to the radial distance in metres, measured from the centre of the tree stem, which defines the critical area required to maintain stability of the tree. Only thorough investigation into the location of structural roots within this area can identify whether any minor incursions into this protection zone are feasible. Note: The SRZ is calculated on the diameter measured immediately above the root/stem buttress (DAB). Where this measurement is not taken in the field, it is calculated by adding 12.5% to the stem diameter at breast height (DBH). (Based on averages calculated from DBH and DAB measurements taken from 20 mature Brush Box and Camphor Laurel). Note: The SRZ may not be symmetrical in shape/area where there is existing obstruction or confinement to lateral root growth, e.g. structures such as walls, rocky outcrops, etc).

Suppressed In crown class, trees which have been overtopped and whose crown development is restricted from above.

Tree Protection Zone (TPZ). Refers to the radial distance in metres, measured from the centre of the tree stem which defines the *tree protection zone* for a tree to be retained. This is generally the minimum distance from the center of the tree trunk where protective fencing or barriers are to be installed to create an exclusion zone. The TPZ surrounding a tree aids the tree's ability to cope with disturbances associated with construction works. Tree protection involves minimising root damage that is caused by activities such as construction. Tree protection also reduces the chance of a tree's decline in health or death and the possibly damage to structural stability of the tree from root damage.

To limit damage to the tree, protection within a specified distance of the tree's trunk must be maintained throughout the proposed development works. No excavation, stockpiling of building materials or the use of machinery is permitted within the TPZ. Note: In many circumstances the tree root zone does not occupy a symmetrically radial area from the trunk, but may be an irregular area due to the presence of obstructions to root spread or inhospitable growing conditions.

Vigour (syn. health) refers to the tree's health as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

APPENDIX B

LANDSCAPE SIGNIFICANCE RATING



Landscape Significance

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

Tree Significance - Assessment Criteria



1. High Significance in landscape

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa *in situ* - tree is appropriate to the site conditions.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

APPENDIX C

SCHEDULE OF ASSESSED TREES



SCHEDULE OF ASSESSED TREES**CLUB ENTRY, CARPARK AREAS, PART HOLE 18 FAIRWAY (SECTION 1)**

Adopted and modified from Arborist's Report, Volume 2: Club House Paddock, by Australian Tree Consultants, 25 February 2011.

Tree No.	Genus and species Common Name	Ht (m)	Sp (m)	DBH (mm)	Observations/Comments	SRZ† (m)	TPZ† (m)	TPZ (area)	LSR
CP-5	<i>Eucalyptus microcorys</i> Tallowwood	22	15	1200	Introduced native species. Street frontage—prominent tree.	3.8	14.4	651	H
CP-8	<i>Eucalyptus microcorys</i> Tallowwood	25	16	800	Introduced native species. Street frontage—prominent tree.	3.2	9.6	290	H
CP-15	<i>Corymbia citriodora</i> Lemon-scented Gum	16	12	350	Introduced native species.	2.3	4.2	55	M
CP-18	<i>Eucalyptus saligna</i> Sydney Blue Gum	23	23	1350	Overpruned. Tip dieback. Decline of major scaffold to N. Pavement lifting.	4	15	707	H
CP-39	<i>Eucalyptus saligna</i> Sydney Blue Gum	22	16	725	Locally indigenous and keystone species of BGHF.	3.1	8.8	241	H
CP-40	<i>Eucalyptus saligna</i> Sydney Blue Gum	15	10	300	Locally indigenous and keystone species of BGHF.	2.8	6.6	137	M
CP-41	<i>Eucalyptus saligna</i> Sydney Blue Gum	12	5	225	Locally indigenous and keystone species of BGHF.	2.3	4.2	55	M
CP-43	<i>Eucalyptus saligna</i> Sydney Blue Gum	18	9	350	Locally indigenous and keystone species of BGHF.	2.3	4.2	55	M
CP-45	<i>Eucalyptus saligna</i> Sydney Blue Gum	25	20	725	Locally indigenous and keystone species of BGH. Lean 15–18°.	3.1	8.8	241	H
CP-47	<i>Eucalyptus saligna</i> Sydney Blue Gum	25	20	775	Locally indigenous and keystone species of BGHF. Massive pavement upheaval in carpark—roots clearly visible.	3.1	9.4	272	H
CP-52	<i>Corymbia eximia</i> Yellow Bloodwood	7–8	45	250	Introduced native species. Stem lean to north.	2.1	3.0	28	L
CP-62	<i>Eucalyptus saligna</i> Sydney Blue Gum	18	10	400	Locally indigenous and keystone species of BGHF.	2.5	4.8	72	H
CP-67	<i>Eucalyptus saligna</i> Sydney Blue Gum	30	28	1200	Locally indigenous and keystone species of BGHF. Deadwood and wounds.	2.7	6	113	H

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Tree No.	Genus and species Common Name	Ht (m)	Sp (m)	DBH (mm)	Observations/Comments	SRZ† (m)	TPZ† (m)	TPZ (area)	LSR
CP-87–100	<i>Eucalyptus saligna</i> Sydney Blue Gum and <i>Angophora floribunda</i> Rough-barked Apple	10–35	6–22	400–700	Locally indigenous species. Grouped together. (10 SBG, 3 x AF and 1 x <i>Grevillea robusta</i> [Silky Oak]) Some smaller trees suppressed.	3.1	8.4	222	H
CP-117	<i>Eucalyptus saligna</i> Sydney Blue Gum	20	12	575	Locally indigenous and keystone species of BGHF. Lopped. Branch failures. Wall cracking.	2.9	7	152	H
CP-118	<i>Cinnamomum camphora</i> Camphor Laurel	-	-	-	Environmental weed species.	-	-	-	-
CP-120	<i>Eucalyptus saligna</i> Sydney Blue Gum	18	14	650	Locally indigenous and keystone species of BGHF. Lifting pavement and garden edging.	2.9	7.8	191	H
CP-122	<i>Eucalyptus microcorys</i> Tallowood	24	16	825	Introduced native species.	3.3	9.9	308	H
AA	<i>Eucalyptus saligna</i> Sydney Blue Gum	30	32	1150	Locally indigenous and keystone species of BGHF. Not shown on 2009 tree audit. Appears to straddle boundary with 1 Fiddens Wharf Road. Low volume deadwood up to 200mm Ø. Possible cavity N side @ 13m or so, and some branch anomalies noted.	3.7	13.8	598	H
AB	<i>Eucalyptus saligna</i> Sydney Blue Gum	20	12	400	Locally indigenous and keystone species of BGHF. Not shown survey or 2009 tree audit. About 1.8m from kerb.	2.5	4.8	72	H
AC	<i>Eucalyptus saligna</i> Sydney Blue Gum	30	22	1200	Locally indigenous and keystone species of BGHF. Not shown on 2009 tree audit–straddles boundary. Lopped. Over carpark. Hollows. Lorikeets nesting in tree.	3.8	14.4	651	H
AD	<i>Eucalyptus saligna</i> Sydney Blue Gum	30	26	1525	Locally indigenous and keystone species of BGHF. Very large, prominent tree. We believe incorrectly identified as 118 Camphor Laurel which is actually at edge of bitumen.	4.1	15	707	H
H1-188–200	<i>Araucaria bidwillii</i> Bunya Pine <i>Araucaria cunninghamii</i> Hoop Pine	20–30	10–14	500–700	Introduced native species. Large, isolated group of trees between H1 and H18 fairways.	3.1	8.4	222	H
H1-202–209	<i>Araucaria bidwillii</i> Bunya Pine <i>Araucaria cunninghamii</i> Hoop Pine	18–25	8–15	550–800	Introduced native species. Large, isolated group of trees near Hole 1 tees.	3.2	9.6	290	H
H18-153	<i>Syzygium paniculatum</i> Magenta Cherry	15	16	600	Locally indigenous species. Some epicormic growth and old branch failures.	2.8	7.2	163	H

Tree No.	Genus and species Common Name	Ht (m)	Sp (m)	DBH (mm)	Observations/Comments	SRZ† (m)	TPZ† (m)	TPZ (area)	LSR
H18-156	<i>Cedrus deodara</i> Deodar Cedar	20	18	750	Introduced exotic species.	3.1	9.0	255	H
H18-158	<i>Eucalyptus saligna</i> Sydney Blue Gum	25	20	1200	Locally indigenous and keystone species of BGHF. Decay, cavities, deadwood, previous branch failures.	3.8	14.4	651	
H18-159	<i>Eucalyptus saligna</i> Sydney Blue Gum	30	20	1100	Locally indigenous and keystone species of BGHF. Decay, cavities, deadwood, previous branch failures.	3.7	13.2	547	
H18-160-164	<i>Archontophoenix alexandrae</i> Alexandra Palm	8-16	4-5	200-300	Introduced native species. Group of five palms.	NA	3.5	39	M

SCHEDULE OF ASSESSED TREES

TENNIS COURTS, BOWLING GREENS, PART HOLE 1 FAIRWAY (SECTION 2)

Tree No.	Genus and species Common Name	Ht (m)	Sp (m)	DBH (mm)	Observations/Comments	SRZ† (m)	TPZ† (m)	TPZ (area)	LSR
1	<i>Callistemon salignus</i> Willow Bottlebrush	13	8	400	Locally indigenous species. Root damage.	3.9	15	707	H
2	<i>Callistemon salignus</i> Willow Bottlebrush	13	8	350	Locally indigenous species. Root damage. Tip dieback.	2.9	7	152	H
4	<i>Callistemon salignus</i> Willow Bottlebrush	12	8	350	Locally indigenous species.	2.9	7.8	191	H
23-26, 28, 29	<i>Eucalyptus saligna</i> Sydney Blue Gum	10-20	5-10	200-500	Locally indigenous species. (6 trees). Root damage.	2.7	6.0	113	M
27	<i>Eucalyptus saligna</i> Sydney Blue Gum	15	10	900	Locally indigenous species. Root damage. Tip dieback.	3.4	10.8	3.4	H
30	<i>Eucalyptus saligna</i> Sydney Blue Gum	25	15	700	Locally indigenous species.	3.4	11	3.4	H
31	<i>Eucalyptus saligna</i> Sydney Blue Gum	16	15	600	Locally indigenous and keystone species of BGHF.	2.8	7.2	163	H
36	<i>Eucalyptus saligna</i> Sydney Blue Gum	17	8	350	Locally indigenous and keystone species of BGHF. Large, prominent tree.	2.3	4.2	55	H

Tree No.	Genus and species Common Name	Ht (m)	Sp (m)	DBH (mm)	Observations/Comments	SRZ† (m)	TPZ† (m)	TPZ (area)	LSR
37-48	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	9-16	5-12	300-600	Visually prominent tree group (12 trees).	2.8	7.2	163	H
49	<i>Eucalyptus saligna</i> Sydney Blue Gum	23	20	875	Locally indigenous and keystone species of BGHF.	3.4	10.6	350	H
51	<i>Eucalyptus saligna</i> Sydney Blue Gum	28	18	1125	Locally indigenous and keystone species of BGHF. Large, prominent tree.	3.6	13.5	573	H
128	<i>Eucalyptus pilularis</i> Blackbutt	30	20	1350	Locally indigenous and keystone species of BGHF. Large, prominent tree.	4	15	707	H
132	<i>Casuarina cunninghamiana</i> River She-oak	22	12	475	Introduced native species. Large, visually prominent tree.	3.1	9.0	255	H
139	<i>Corymbia citriodora</i> Lemon-scented Gum	22	10	550	Introduced native species. Incorrectly identified as <i>Angophora costata</i> .	2.8	6.6	137	M
H1-8	<i>Eucalyptus pilularis</i> Blackbutt	28	20	1150	Locally indigenous species.	3.7	13.8	598	H
H1-15	<i>Eucalyptus saligna</i> Sydney Blue Gum	20	12	550	Locally indigenous and keystone species of BGHF.	2.8	6.6	137	H
H1-16	<i>Eucalyptus saligna</i> Sydney Blue Gum	26	16	1000	Locally indigenous and keystone species of BGHF.	3.5	12.0	452	H
H1-18	<i>Angophora floribunda</i> Rough-barked Apple	20	10	600	Locally indigenous species.	2.8	7.2	163	H
H1-19	<i>Eucalyptus saligna</i> Sydney Blue Gum	30	23	1100	Locally indigenous and keystone species of BGHF.	3.7	13.2	547	H
H1-20	<i>Eucalyptus saligna</i> Sydney Blue Gum	30	20	950	Locally indigenous and keystone species of BGHF.	3.4	11.4	408	H

CP=Carpark, H1 = Hole 1, H18 = Hole 18, etc.

LANDSCAPE SIGNIFICANCE RATING—Refer to Appendix B for definitions.



† Notional radial offset of a symmetrical, unrestricted root system – subject to change depending on site conditions affecting tree root growth.

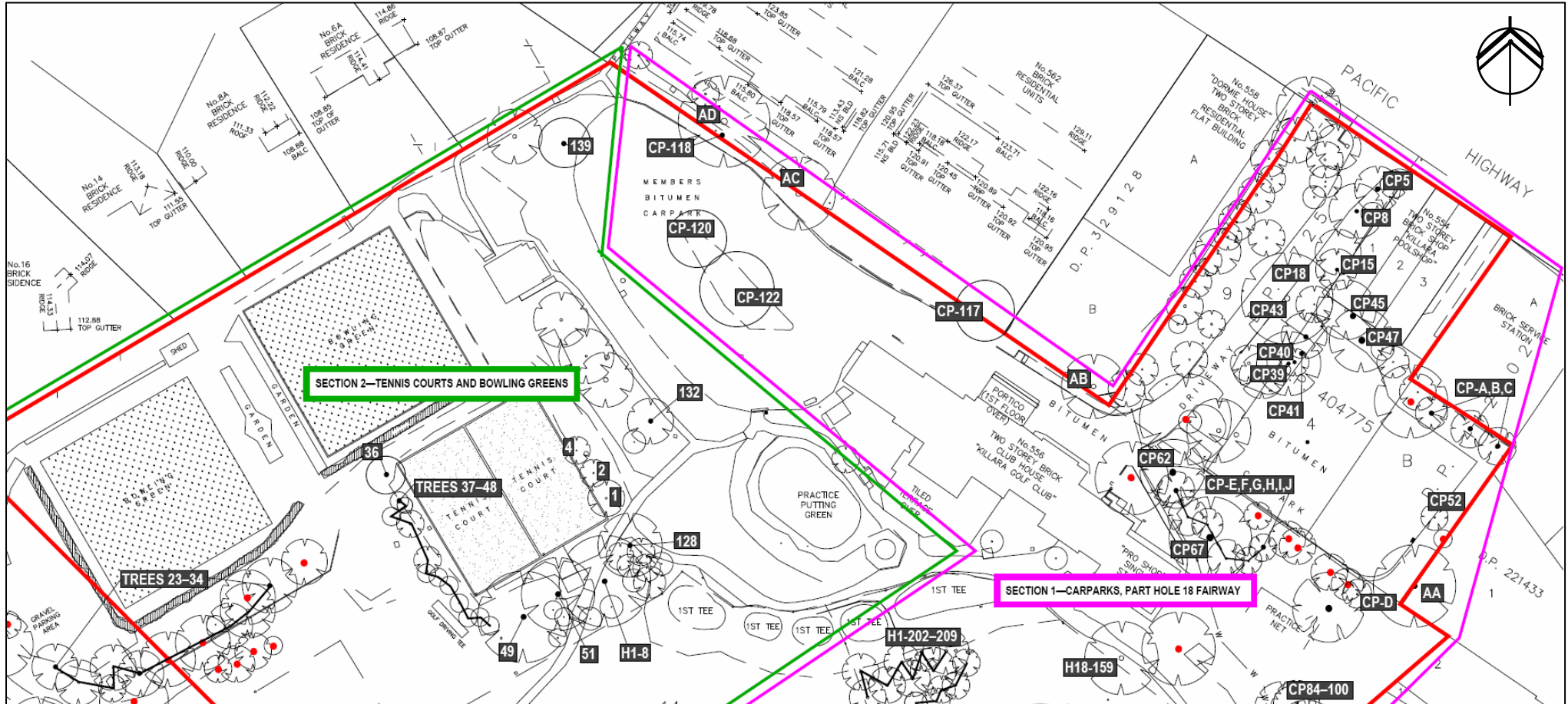
LEGEND

- H** refers to the approximate height of a tree in metres, from base of stem to top of tree crown.
- Sp** refers to the approximate and average spread in metres of branches/canopy (the 'crown') of a tree.
- DBH** refers to the approximate diameter of tree stem at breast height i.e. 1.4 metres above ground (unless otherwise noted), and expressed in millimetres.
- Age** refer to Appendix A -Terms and Definitions for more detail.
- V** refers to the tree's vigour (health). L – Low vigour, N – normal vigour, P = poor vigour. Refer to Appendix A -Terms and Definitions for more detail.
- C** refers to the tree's structural condition. F = fair condition, G = good condition, P = poor condition. Refer to Appendix A -Terms and Definitions for more detail.
- LSR** The *Landscape Significance Rating* considers the importance of the tree as a result of its prominence in the landscape and its amenity value, from the point of public benefit. Refer to Appendix B for more detail.
- SRZ†** Structural Root Zone (SRZ) refers to the critical radial offset in metres from the centre of the tree's stem required to maintain stability of the tree. The SRZ is calculated on the diameter measured immediately above the root buttress or flare (DAB). Where this measurement is not taken in the field, it is calculated by adding 12.5% to the stem diameter at breast height (DBH). Refer to Appendix A -Terms and Definitions for more detail.
- TPZ†** Tree Protection Zone (TPZ) refers to the *tree protection zones* for trees to be retained. The measurement given is a radial offset in metres from the centre of the tree's stem. Refer to Appendix A -Terms and Definitions for more detail.
- TPZ (area)** refers to the square metres occupied by the TPZ. Unless otherwise approved, no greater than 10% of this area is to be encroached upon by any works, including cut and/or fill.

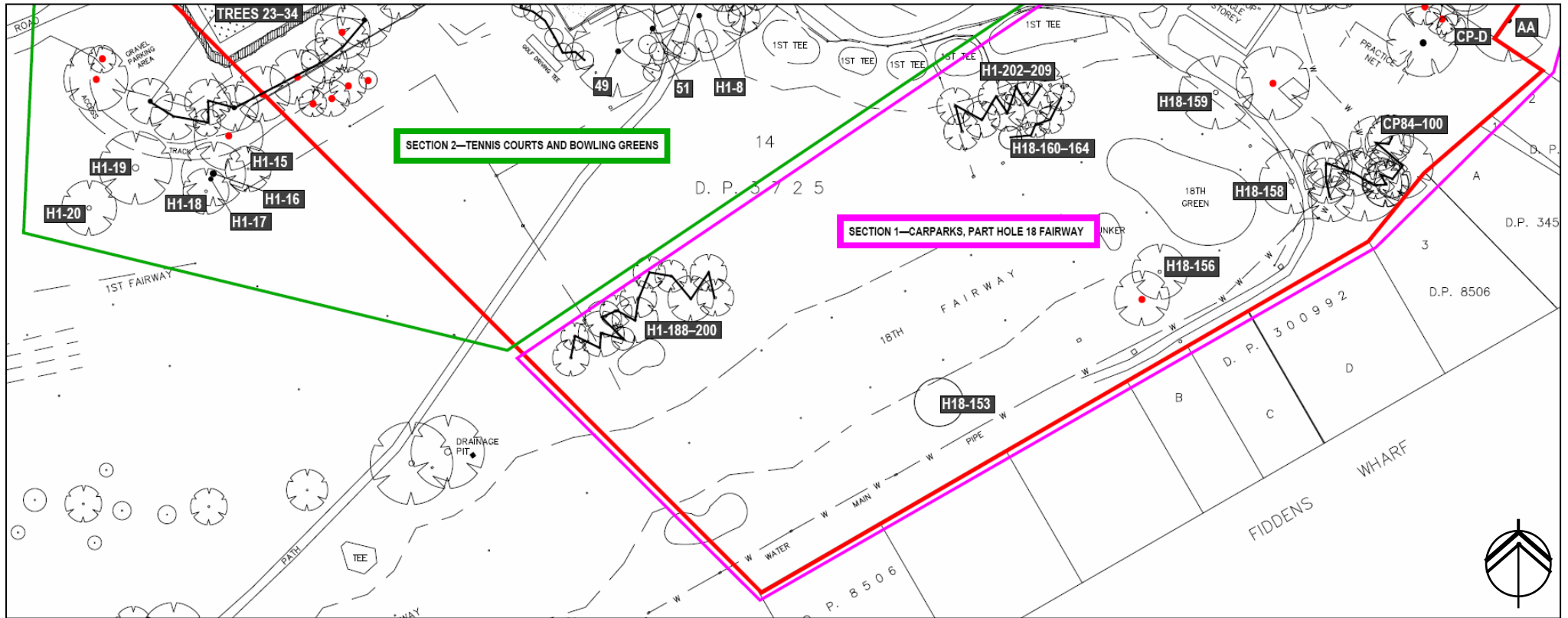
APPENDIX D
TREE LOCATION PLANS



TREE LOCATION PLANS



Note: Excerpt of survey 96111/33B by YSCO Geomatics.
 This plan is not to scale.
 Red dots identify trees removed/not present.
 Marked-up, and trees added, by C. Mackenzie



Note: Excerpt of survey 96111/33B by YSCO Geomatics.

This plan is not to scale.

Red dots identify trees removed/not present.

Marked-up, and trees added, by C. Mackenzie

APPENDIX E
SITE PHOTOGRAPHS





View from carpark adjoining clubhouse, looking over tennis courts towards row of Paperbarks and Blue Gums beyond.



Looking towards carpark adjoining clubhouse; Tallowwood and Blue Gum in central garden bed.



From upper carpark looking down towards practice nets. Sydney Blue Gum CP-67 in middle ground.



From upper carpark, looking southeast towards Sydney Blue Gum AA on boundary.



From upper carpark, looking northeast towards Sydney Blue Gums CP-A, B and C.



Looking east towards Bunya pines and Hoop pines H1-202-209.



From tennis courts, looking east towards Blackbutts 128 (left, arrowed) and H1-8 (right).



Looking southwest from tennis courts, towards Sydney Blue Gums H1-15, 16, 18, 19 and 20.



At left—
Lower carpark, looking northeast at Sydney Blue Gum AC. Note the lorikeet emerging from hollow at base of previously lopped limb.

—Below
Looking northeast towards the tennis courts and the row of Broad-leaved Paperbarks 37–48.

