



R 16/112

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Report **Tree Impact Assessment Report**
38,40 Orth St & 1,3,5 Hargrave St
Kingswood, NSW 2747

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20-05-2016



1.0 Executive Summary

This report has been prepared for Pamada Construction at the request of Mark Dixon; the purpose of the report is to describe findings of an investigation relating to the health and condition of trees for DA at 38, 40 Orth Street & 1, 3, 5 Hargrave Street Kingswood, NSW 2747.

Only large trees have been examined during the course of this investigation. All individual trees examined are identified in the body of the report and tagged with a white tag and numbered as per this report. Smaller trees and shrubs have not been included but these may be considered later if required.

Site orientation occurred on the 18th May 2016. On this occasion a Basic Assessment occurred as per International Society of Arboricultural (ISA) Tree Risk Assessment Qualifications (TRAQ). This is a visible assessment from the ground using a steel probe and a rubber mallet (used to be call VTA) Visible Tree Assessment.

Trees are long lived woody perennial plant than can grow greater than 7 meters in height with one or relatively few main stems with a Diameter at Breast Height (DBH) greater than 150mm approx.

Documents sighted:

16225 - Hargrave & Orth Street Kingswood - DETAIL SURVEY

Following assessments of evidence gained during the project it is recommended that that the development be approved under the following conditions:

- That trees 1, 3, 11, 12, 13, 14 and 16 be retained and TPZ and trunk protection be installed during construction
- That trees all other trees can be considered for removal
- That a landscape plan be developed
- That the tree Protection Schedule be adopted

Angophora Consulting Arborist can provide a site arborist for this project.



Frederick Janes

Director/Senior Consultant

Angophora Consulting Arborist

Dip of Horticulture (Arboriculture)

20th May 2016

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Visual Tree Assessments (VTA) was done from the ground. Not all tree defects may be visible from the ground. This VTA did not include diagnostic testing of the trees leaves or trunks. No testing was done of any of the trees root systems.

This is an arboriculture, not an ecological report. If remnant endemic vegetation exists, a “Threatened Species Seven Part Test” by a qualified ecologist may be required.

Arboriculturists cannot detect every condition that could possibly lead to the structural failure of a tree. Living trees are dynamic organisms subject to attack by disease, insects, fungi and other forces of nature.

Arboriculturists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Any recommended remedial treatments, like any medication, cannot be guaranteed. Trees will always pose some degree of risk. The only option for eliminating all associated risks from trees is the removal of all trees.

4.0 Assumptions:

- Site plans, diagrams, graphs and photographs in this report, intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.
- There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question will not arise in the future.
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- Information in this report covers only those items that were examined in accordance with the Terms of Reference, and reflects the condition of those items that were examined at the time of the inspection.
- The inspection is limited to visual examination of accessible components unless otherwise stated in the "Methodology" section of this report.
- The trees were assessed using the Visual Tree Assessment (VTA) method. The inspection is limited to a visual examination from the ground without tree dissection or soil excavation. Consent will be sought with the client to carry out any tree dissection or soil excavation if required. All measurements are approximate only. Any opinions or recommendations are the opinions of the assessing Arborist.



5.0 Introduction

This report was prepared by Angophora Consulting Arborist, Frederick Janes, Senior Consulting Arborist, for Pamada Construction at the request of Mark Dixon; the purpose of the report is to describe findings of an investigation relating to the health and condition of trees for DA at 38, 40 Orth Street & 1, 3, 5 Hargrave Street Kingswood, NSW 2747.

5.1 The Aims of this report are to:

- Evaluate the viability of the Trees
- Recommend either to remove the Trees any remedial treatment
- Recommend Tree Protection Zones when appropriate

6.0 Report

6.1 Methodology

On the 18th May 2016 site inspections was conducted. On this occasion a Basic Assessment (formerly VTA; Visible Tree Assessment) occurred. It is a visible assessment from the ground using a steel probe and a rubber mallet as per International Society of Arboricultural (ISA) Tree Risk Assessment Qualifications (TRAQ). The inspection is limited to a visual examination from the ground without tree dissection or soil excavation for structural defects, health of the tree, the foliage condition, any insect damage visible from the outside, a rubber mallet was also used to sound the trunks detecting for any hollows that may be heard.

Consent will be sought with the client to carry out any tree dissection or soil excavation if required. All measurements are approximate only. Any opinions or recommendations represent the opinions of the assessing Arborist only.

There was no instrument used to test the soundness of the trunk.

6.2 Location

The trees are located at 38, 40 Orth Street & 1, 3, 5 Hargrave Street Kingswood, NSW 2747. UBD Sydney and the Blue Mountains Street Directory (2015) Map 164, A, 13



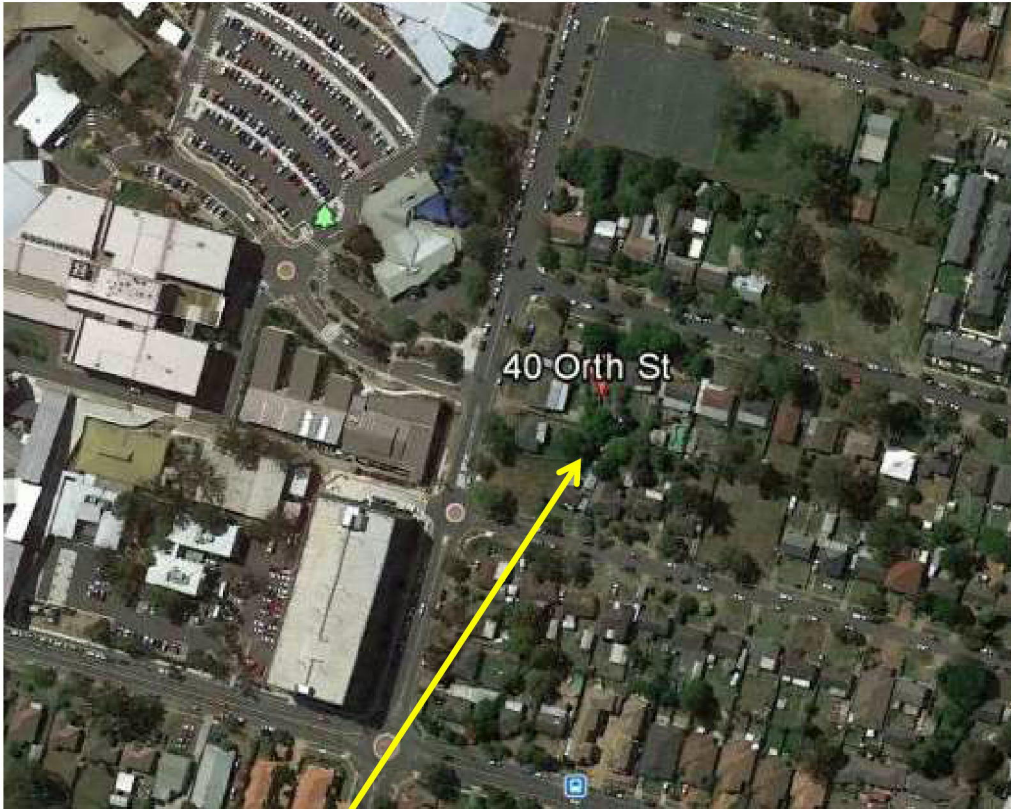


Figure 1 Approximate location of trees

6.3 Photos



Photo 1 Tree 1





Photo 2 Tree 2



Photo 3 Tree 3





Photo 4 Tree 4



Photo 5 Tree 5





Photo 6 Tree 7



Photo 7 Tree 8





Photo 8 Tree 9



Photo 9 Tree 10





Photo 10 Trees 12, 13 and 14



Photo 11 Tree 12 has a union of two trunks growing together





Photo 12 Tree 17 has a had a recent branch failure/tear out



Photo 13 Tree 18





Photo 14 Tree 19



Photo 15 Tree 19 top is dead and has had some branches fail



6.4 Tree Protection Zone (TPZ)

Tree Protection Zone Generally the minimum distance from the centre 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 Tree Protection Zone (TPZ). Using the Australian standard Protection of Trees on Development sites AS 4970-2009 (Incorporating Amendment no 1) $TPZ = DBH \times 12$ a TPZ is also based on the age of the tree, young, middle aged or mature, and the tree's vigour.

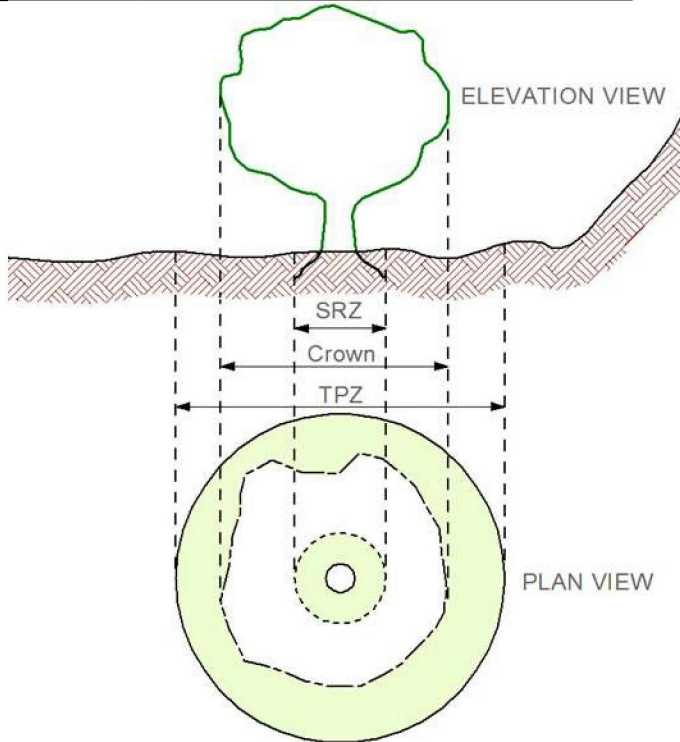
Structure Root Zone (SRZ) Refers to a radial offset measured from the edge of the trunk. This zone is often the location of the tree's structural support roots. Excavation within this area may seriously destabilize the tree. Fully elevated construction within this area is possible with specific root zone assessment, only when prescribed by a suitably qualified consulting arborist. As per Australian standard Protection of Trees on Development sites AS 4970-2009

Critical Root Zone (CRZ): Refers to a radial offset measured from the edge of the trunk. This zone is often the location of the tree's structural support roots. Excavation within this area may seriously destabilize the tree. Fully elevated construction within this area is possible with specific root zone assessment. CRZ distances are always rounded up to the closest 0.5 metre. The minimum CRZ given will never be less than 1.5 metres for a tree with a stem diameter less than 200mm. Trees with a DBH of greater than 300mm, the CRZ measurement could be achieved on one side of the TPZ by 10%, only when prescribed by a suitably qualified consulting arborist. As per Australian standard Protection of Trees on Development sites AS 4970-2009

Tree No	TPZ Rounded up	SRZ Rounded up	CRZ
1	5.29	2.35	3.70
2	6.74	2.6	4.72
3	2.84	1.81	1.99
4	4.75	2.24	3.33
5	5.4	2.37	3.78
6	4.20	1.47	2.94
7	4.44	2.18	3.11
8	2.44	1.69	1.71
9	5.21	2.33	3.65
10	2.66	1.76	1.86
11	3.71	2.02	2.60
12	4.97	2.29	3.48
13	5.46	2.377	3.82
14	3.77	2.04	2.64
15	2.4	1.68	1.68



Tree No	TPZ Rounded up	SRZ Rounded up	CRZ
16	2.75	1.78	1.92
17	4.24	2.14	2.97
18	8.68	2.89	6.07
19	8.4	2.85	5.88



6.5 Development impact upon trees

The sites are residential properties and it is proposed to construct for residential flat building of some 100 apartments, this development will directly impact upon 12 of the tree assessed.

Most of these trees except for trees, 9 and 18 are insignificant trees due to size, age health or structure.

Trees 1, 3, 11, 12, 13, 14 and 16 are on the council nature strip and will need to be retained and protected during construction

At the time of this report no development plan was sighted

7.0 Site Arborist

7.1 The Arborist who has prepared the Tree Management Plan becomes the Site Arborist. The site Arborist shall have a minimum Diploma level qualification in Arboriculture (AQF level 5) and a minimum of five (5) years industry experience in the field of Arboriculture. It would also be desirable to be a current member of a respected association of Arboriculture such as Arboriculture Australia and/or International society of Arborist. (ISA)



7.2 The site Arborist will monitor the trees, which are being retained, supervise tree protection measures and advise Council and the applicant in a timely manner if problems arise.

7.3 The site Arborist will carry out Site inspections as required and record results:

7.4 Inspections shall be conducted by the site Arborist as per the tree protection schedule

8.0 Establishing Tree Protection Zones

8.1 The Tree Protection Zone (TPZ) is a radial distance measured from the centre of the trunk of a retained or protected tree. The importance TPZ is to protect the tree from damage during construction this includes their trunk, foliage, roots branches.

8.2 The TPZ has been calculated for each tree to be retained on site specified in Australian standard Protection of Trees on Development sites AS 4970-2009 (Incorporating Amendment no 1)

9.0 Tree Protection Fencing

9.1 A protective fence shall be installed prior to the commencement of any work on-site (including demolition, earthworks or land clearing and installation of site sheds) and shall be maintained in good condition for the whole period of construction.

9.2 The fence shall be built of temporary wire panels 1.8 meters high, supported by steel stakes or concrete blocks and secured together with bolted brackets to restrict sideways movement the fence shall be covered in shade cloth. Where a number of TPZ run together a single continuous fence may be installed.

Tree Protection fences shall not be moved or relocated without prior approval of the site Arborist. (This is considered as a breach of the consent and may attract a large fine from council)

10.0 Tree Protection Signage

10.1. Tree Protection Fences are to be display clear signs indicating the reasons for the fence at 20 meter intervals to prevent unauthorised movement of plant, machinery, depositing of soil, storage of materials or site works to the Tree Protection Zone

10.2 The signage shall measure 1200mm x 600mm and be worded as follows

<p style="text-align: center;">TREE PROTECTION ZONE</p> <p style="text-align: center;">Trees within this Tree Protection Zone are monitored by Frederick Janes CONSULTING ARBORIST as a condition of council consent</p> <p style="text-align: center;">To prevent disturbance of soil or damage to tree roots NO ACCESS STORAGE OF MATERIALS OR SITE WORKS SHALL BE PERMITTED WITHIN THIS AREA</p> <p style="text-align: center;">No work shall be undertaken within this area without prior approval of the Project Manager under the supervision of the Site Arborist.</p> <p style="text-align: center;">For more information on the importance of tree Protection or any matter regarding Arboriculture please contact the site Arborist on 0418 966 488</p>



11.0 Recommendations

Following assessments of evidence gained during the project it is recommended that that the development be approved under the following conditions:

- That trees 1, 3, 11, 12, 13, 14 and 16 be retained and TPZ and trunk protection be installed during construction
- That trees all other trees can be considered for removal
- That a landscape plan be developed
- That the tree Protection Schedule be adopted

Angophora Consulting Arborist can provide a site arborist for this project.

12.0 References

Matheny, Nelda, P & Clark, James R (1994) Evaluation of Hazard trees in urban areas International Society of Arboriculture

Mattheck. C & Breloer. H (1994) The Body Language of Tress. The Stationery Office England

Shigo Alex L (2008) A New Tree Biology and Dictionary. Sherwin Dodge Printers, New Hampshire

Draper Danny B & Richards Peter A (2009) Dictionary for managing Trees in Urban Environments. CSIRO Publishing.

Lonsdale, David, (2006) Principles of Tree Hazard Assessment and Management. The Stationary Office

Smiley, E Thomas, Matheny, Nelda, and Lily Sharon, (2011) Best management Practice Tree risk assessment Martin Graphics, Champaign, Illinois, USA International Society of Arboriculture

Dr Alex Shigo (1998) Science of tree care CD Arboricultural Australia

Australian Standard Protection of Trees on Development sites AS 4970-2009



13.0 Curriculum Vitae

Name	Frederick Janes
Company	Angophora Consulting Arborist
Position in Company	Consulting Arborist
Qualifications	Diploma in Horticulture (Arboriculture) Level 5 (December 2006 Cert no RTF 50203) Bachelor of Adult Education (May 2000) Certificate IV Training and Assessing (2014) Senior First aid Certificate (2014) OH&S Induction Training (Green card) Feb 2006 Chemical Application AQF3 (2014) NSW Drivers License Light Rigid (LR) Motor cycle (R) Elevated Work Platform (October 2011) Tree Risk Assessment Qualifications (ISA TRAQ) June 2014 Diploma in Arboriculture (2015)
Memberships	Arboriculture Australia International Society of Arboriculture
Awards	National Medal (1998) First clasp (2009)
Areas of expertise	Trees on development sites Trees appraisals and risk assessments Tree reports and surveys Tree maintenance schedules Powerlines vegetation bushfire surveys Planting and pruning education programs Community education and project mediation

Experience

- Fifteen years extensive experience in the Arboriculture industry, firstly, as the principal of an Arborist company and, more recently, as a Consulting Arborist.
- Preparation of professional Arborist reports and conducting works for a range of public sector agencies, including the University of Western Sydney, Blue Mountains City Council, Nepean Hospital, Integral Energy and the Department of Defence Housing and a number of construction companies.
- Provided Arborist advice and services to private residents throughout NSW.
- In 2009 was invited to Victoria by Sp Austnet Aust and commissioned to assess damaged trees along power lines in the bush-fire damaged areas of Kinglake, Kinglake West, Flowerdale, Marysville and Beechwood. The work included an Audit of all trees within reach of the powerlines and conducting hazard ratings for all these trees.
- Mid 2009 was commissioned by Sp Austnet to conduct secondary assessments of the fire damaged areas of Kinglake, Kinglake West, Flowerdale, Marysville and Beechwood.



- Conducted an audit and tree assessment of Woods Point area where a bush fire had damaged many trees in 2006.
- In 2010 commissioned by Integral Energy to assess pruning standards across Integral Energy distribution network designing and implementing a Pruning Audit form based on the Australian Standard AS 4373 Pruning of amenity trees (2007) to be used by Integral Energy and their stakeholders to assess pruning standards.
- Extensive experience in the use of Picus Sonic Tomograph on trees that after a visible tree assessment indicated that there may be structural defects affecting the stability of the tree. Produced reports providing proof of the structural integrity of the tree for the client, councils and other interest parties.
- Extensive experience with the Land and Environment court of NSW
- 2011 commissioned by Integral Energy as their Vegetation Environments Specialist conducting independent assessments of Environment issues such as Review of Environmental factors and Conservation Risk Assessments including identifying significant flora species, aboriginal heritage items and historic heritage items.
- Developed a 2 days course for their Tree Management Officers in identifying tree structural defects.
- In December 2011 was commissioned to assess trees as part of the continuing investigation by the Environment Protection Authority (EPA) and Holroyd City Council into the cause of the Girraween dieback incident that has affected over 200 residents and Business this project was completed in November 2012.
- Finalist in the 2013 Blue Mountains Business awards
- 2014 Commissioned by many Public and High Schools from Emu Plains to Bathurst and Oberon to carry out trees hazards and risk Audit of their campuses
- Finalist in the 2014 Blue Mountains Business awards in Business Ethics and Excellence in Innovation
- Finalist in the 2015 Blue Mountains Business awards in Business Ethics



14.0 Terms and Abbreviations and Definitions

Abbreviation Meaning

APTA - Arboriculturists Preliminary Tree Assessment
AV - Amenity Value
CPZ - Canopy Protection Zone
DBH - Diameter at Breast Height
EP&AA - Act Environmental Planning & Assessment Act (1979)
EV - Environmental Value
g/l - ground level
HV - Heritage Value
LSR - Landscape Significance Rating
RPZ - Root Protection Zone
RV - Retention Value
SRZ - Structural Root Zone
S.U.L.E. Safe useful life expectancy
TMG - Tree Management Guidelines
TBMP - Tree and Bushland Management Provision
TMP - Tree Protection Measures
TPA - Tree Protection Plan
TPZ - Tree Protection Zone
TRV - Tree Retention Zone
UFTM - Urban Forest Technical Meeting
VTA - Visual Tree Assessment

Definitions

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.

Co-dominant: Refers to stems or branches equal in size and relative importance.

Compression wood: Type of reaction wood produced by conifers on the underside of branches and leaning trunks.

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.

Critical Root Zone

(CRZ): Refers to a radial offset measured from the edge of the trunk. This zone is often the location of the tree's structural support roots. Excavation within this area may seriously destabilize the tree. Fully elevated



construction within this area is possible with specific root zone assessment. CRZ distances are always rounded up to the closest 0.5 metre. The minimum CRZ given will never be less than 1.5 metres for a tree with a stem diameter less than 200mm. Trees with a DBH of greater than 300mm, the CRZ measurement could be achieved on one side of the TPZ by 10%, only when prescribed by a suitably qualified consulting arborist. As per Australian standard Protection of Trees on Development sites AS 4970-2009 (Incorporating Amendment no 1')

Dead wood: 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.

Decay: Process of degradation of woody tissues by fungi or bacteria through decomposition of cellulose and lignin. There are numerous types of decay that affect different types of tissues, spread at different rates and have different affect on both the tree's health and structural integrity.

Diameter at Breast Height

(DBH): Refers to the tree trunk diameter at breast height (1.4 metres above ground level)

Dieback: Death of growth tips/shoots and partial limbs, generally from tip to base. Die back 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, pruning, drought, etc.

Hazard: Refers to anything with the potential to harm health, life or property.

Health: Refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Included bark: Refers 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.

Retention Value: Retention value relates to the combination of the tree condition factors (Form, Health & Structure), and also conveys an amenity value.



Amenity relates to the trees biological, functional and aesthetic characteristics within an urban environment. (Hitchmough, 1994)

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

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

Tension wood: Type of reaction wood produced by broad-leaved tree species which forms on the upper side of branches, stems and leaning trunks.

Topping or heading: Refers to a non-acceptable pruning practice that result in the removal of terminal growth leaving a cut stub end. Topping causes serious damage to the tree.

Tree Protection Zone

(TPZ): Generally the minimum distance from the centre 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 Tree Protection Zone (TPZ). Using the Australian standard Protection of Trees on Development sites AS 4970-2009 (Incorporating Amendment no 1`) $TPZ = DBH \times 12$ a TPZ is also based on the age of the tree, young, middle aged or mature, and the tree's vigour.

Visual Tree Assessment

(VTA): A procedure of defect analysis developed by Mattheck and Breloer (1994) that uses the growth response and form of trees to detect defects.



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

TYPE:

Indigenous (IND) Australian Native (AN) Exotic (E) Environmental Weed (EW)

AGE:

Immature (IM): Juvenile tree
Semi-mature (SM): Tree still growing
Mature (M): Specimen has reached expected size in current situation.
Over-mature/ Senescent (OM): Tree is over mature and in decline.
Dead (D): Tree is dead

FORM:

Good (G): Canopy full and symmetrical.
Fair (F): Minor asymmetry, or suppression. Considered typical for species in situation.
Poor (P): Canopy suppressed, major asymmetry. Stump re-growth.

HEALTH:

Good (G): Crown full, with good density. Foliage entire with good colour, minimal or no pathogen damage. Good growth indicators, e.g. extension growth. No or minimal canopy dieback. Good wound-wood development.
Fair (F): Tree is exhibiting one or more of the following symptoms; Tree has <30% dead wood, or can have minor canopy dieback; Foliage generally with good colour, some discolouration may be present, minor pathogen damage present. Typical growth indicators, e, g. extension growth, leaf size, canopy density for species in location may be slightly abnormal.
Poor (P): Tree has >30% dead wood. Canopy die-back present. Discoloured or distorted leaves, and/or excessive Epicormic growth. Pathogen is present and/or stress symptoms that could lead to or are leading to decline of tree.
Dead (D): Tree is dead.

STRUCTURE:

Good (G): Good branch attachment and/or no minor structural defects. Trunk and scaffold branches sound or only minor damage. Good trunk and scaffold branch taper. No branch over extension. No damage to structural roots and/or good buttressing present.
 No obvious root pests or diseases.
Fair (F): Some minor structural defects and/or minor damage to trunk. Bark missing. Cavities could be present. Minimal or no damage to structural roots. Typical structure for species.



- Poor (P):** Major structural defects and/or trunk damaged and/or missing bark. Large cavities, and/or girdling or damaged roots that are problematic.
- Very Poor/
Hazardous (VP):** Tree poses immediate hazard potential that should be rectified as soon as possible.

GENERAL CONDITION:

Describes a tree or group of trees in a broad term of convenient précis that considers all of these Tree Descriptors as mentioned in Tree Assessment Table (Appendix 4).



15.0 Safe Useful Life Expectancy (S.U.L.E) RATING

Safe Useful Life Expectancy rating (S.U.L.E) means that in a planning context the length of time a tree could be maintained as a useful amenity and not a liability. S.U.L.E is contingent on a number of obvious management assumptions and the fundamental principles of public safety and usefulness in the landscape. Trees are a renewable resource.

The FIVE ratings and their sub-groups are as follows:

1. LONG S.U.L.E - tree appeared retainable at the time of assessment for more than 40 years with an acceptable degree of risk, assuming reasonable maintenance. Retention of these trees is highly desirable:
 - A. Structurally sound trees located in positions that can accommodate future growth
 - B. Trees which could be made suitable for long term retention by remedial care
 - C. Trees of special significance for Historical commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention which would warrant extraordinary efforts to secure their long term retention
2. MEDIUM S.U.L.E – Trees that appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance. Retention of these trees is generally desirable:
 - A. Trees which could be may only live between 15 and 40 more years
 - B. Trees that may live for more than 40 years but would need to be removed for safety or nuisance reasons.
 - C. Trees that may live for more than 40 years but should be removed to prevent interference with more suitable individuals or to provide space for new plantings.
 - D. Trees that should be made suitable for retention in the medium term by remedial care.
3. SHORT S.U.L.E - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:
 - A. Trees that may only live for 5 to 15 more years.
 - B. Trees that may live for more than 15 years but would need to be removed for safety or nuisance reasons.
 - C. Trees that may live for more than 15 years but should be removed to prevent interference with more suitable individuals or to provide space for new plantings.
 - D. Trees that require substantial remedial care and are only suitable for retention in the short term
4. REMOVE – trees that should be removed in the next 5 years:
 - A. Dead, dying, suppressed or declining trees through disease or inhospitable conditions or may be regarded or classified as an environmental weed species.
 - B. Dangerous trees through instability or recent loss of adjacent trees
 - C. Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
 - D. Damaged trees that are clearly not safe to retain.
 - E. Trees that may live for more than 5 years but should be removed to prevent interference with more suitable individuals or to provide space for new plantings.
 - F. Trees that may cause damage to existing structures within 5 years.
 - G. Tress that will become dangerous after removal of other trees for reasons given in 1A-



5. SMALL, YOUNG OR REGULARLY CLIPPED – Trees that can be reliably transplanted or replaced
- A. Small trees less than 5 meters in height
 - B. Young trees less than 15 years old but over 5 meters in height
 - C. Trees that have been regularly pruned to artificially control growth



16.2 Attachment 2 Tree Assessment Table,

Details of trees assessed

TYPE = Tree Species Type (IND – Indigenous; EX – Exotic; PN – Planted Native, NL_ Non Local Native).

AGE= Trees estimated age (OM- Over-mature; M- Mature; SM-Semi-mature; IM-Immature; D- Dead).

H = estimated tree height in metres;

C = estimated tree canopy spread in metres N-S x E-W;

DBH = trunk diameter measured in centimetres at 1.4m above ground (unless otherwise stated);

H = trees overall health;

S = trees overall structural condition;

GC = trees general condition overall;



Tree No	Species	Type	Age	DBH in mm	Height in Meters	Canopy in Meters	H	S	GC	Comments	S.U.L.E
1	<i>Lophostemon confertus</i> , Brush Box	PN	M	441	8	11	Good	Fair	Fair	In front of 1 Hargrave St. On Council land. Pruned from powerlines. Defect on roadside of tree.	1B
2	<i>Liquidambar styraciflua</i> , Liquid amber	EX	M	562	16	13	Good	Good	Good	In backyard of 1 Hargrave St.	1B
3	<i>Lophostemon confertus</i> , Brush Box	PN	M	237	8	11	Good	Fair	Fair	In front of 3 Hargrave St. On Council land.	1B
4	<i>Liquidambar styraciflua</i> , Liquid amber	EX	SM	396	10	8	Good	Good	Good	On 3 Hargrave St.	1B
5	Deciduous tree. No leaves or fruit to ID	EX	M	450	13	8	Good	Fair	Fair	Defect & decay in trunks.	1B
6	<i>Jacaranda mimosifolia</i> Jacaranda	EX	M	114+ 283+ 199	13	9	Good	Fair	Fair	On 3 Hargrave St	1B
7	<i>Melaleuca quinquenervia</i> , broad-leaved paperback	IND	M	220+ 218	7	6	Good	Fair	Fair	Poor junction. 5 Hargrave St.	1B
8	<i>Pyrus calleryana</i> , Flowering Pear Tree	EX	SM	203	7	6	Good	Good	Good	5 Hargrave St.	1B
9	<i>Melaleuca quinquenervia</i> , broad-leaved paperback	IND	M	434	10	10	Good	Good	Good	5 Hargrave St.	1B
10	<i>Pyrus calleryana</i> , Flowering Pear Tree	EX	SM	222	9	7	Good	Good	Good	5 Hargrave St.	1B
11	<i>Lophostemon confertus</i> , Brush Box	PN	M	309	9	7	Good	Good	Good	On Council land. Outside 36 Orth St	1B
12	<i>Quercus palustris</i> Pin oak	EX	M	414	14	8	Good	Fair	Fair	On Council land. Outside 36 Orth St	1B

Tree No	Species	Type	Age	DBH in mm	Height in Meters	Canopy in Meters	H	S	GC	Comments	S.U.L.E
13	<i>Liquidambar styraciflua</i> , Liquid amber	EX	M	455	14	9	Good	Good	Good	On Council land. Outside 38 Orth St	1B
14	<i>Lophostemon confertus</i> , Brush Box	PN	M	314	13	5	Good	Good	Good	On Council land. Outside 38 Orth St	1B
15	<i>Prunus serrulata</i> Flowering cherry tree	EX	M	Multi-trunk	6	5	Fair	Fair	Fair	Over mature. In backyard of 38 Orth St.	1B
16	<i>Lophostemon confertus</i> , Brush Box	PN	M	229	12	7	Good	Good	Good	On Council land. Outside 40 Orth St	1B
17	<i>Lophostemon confertus</i> , Brush Box	PN	M	353	12	8	Good	Fair	Fair	Tear out in trunk. On Council land. Outside 40 Orth St	1B
18	<i>Liquidambar styraciflua</i> , Liquid amber	EX	M	723	14	12	Good	Fair	Fair	Abnormal swelling at base. Several inclusions at junctions. On 40 Orth St.	1B
19	Deciduous tree. No known ID	EX	M	700	14	9	Fair	Fair	Fair	Over mature. Tear outs evident + deadwood. On 40 Orth St.	4A



16.3 Attachment 3 Quantifying Heritage Ecological and Amenity value

Age = Trees estimated age (OM- Over-mature; M- Mature; SM-Semi-mature; IM- Immature; D- Dead).

Heritage tree: Tree listed on the NSW Heritage registered

Significant tree or Tree scape: Tree/s listed on council's significant tree register or a tree of such age and presence designated by the consulting arborist AQF level 5 worth extra precautions to retain.

Ecological A tree that is a remnant tree of the area I.E. *Eucalyptus saligna* Sydney Blue Gum
Using the Matrix below to give an Amenity Value

Age	OM	M	SM	Exotic	Dead
Heritage tree	Medium	High	Medium	Low	Very low
Significant tree	Medium	High	Medium	Low	Very low
Ecological	Medium	High	Medium	Low	Very low

Obstructions

Power lines = P1

Fences = F

Buildings = B

Mitigation Options

Retain re-assess after construction
Install T.P.Z Fencing
Retain /Reassess 3 months after construction
consider for Removal
Install T.P.Z Fencing/Trunk protection

Tree No	Tree Age	Heritage, ecological, Amenity Value	Mitigation Options	Mitigation option 2	Residual risk	Obstructions
1	M	Eco-Low	Retain re-assess after construction	Install T.P.Z Fencing/Trunk protection	Powerlines	
2	M	Eco-Low	consider for Removal		Fence	
3	M	Eco-Low	Retain re-assess after construction	Install T.P.Z Fencing/Trunk protection	Powerlines	
4	SM	Eco-Low	consider for Removal		Fence	
5	M	Eco-Low	consider for Removal			
6	M	Eco-Low	consider for Removal		Fence	
7	M	Eco-Medium	consider for Removal			
8	SM	Eco-Low	consider for Removal			
9	M	Eco-High	consider for Removal			
10	SM	Eco-Low	consider for Removal			
11	M	Eco-Low	Retain re-assess after construction	Install T.P.Z Fencing/Trunk protection		
12	M	Eco-Low	Retain re-assess after construction	Install T.P.Z Fencing/Trunk protection		
13	M	Eco-Low	Retain re-assess after construction	Install T.P.Z Fencing/Trunk protection		
14	M	Eco-Low	Retain re-assess after construction	Install T.P.Z Fencing/Trunk protection		
15	M	Eco-Low	consider for Removal			
16	M	Eco-Low	Retain re-assess after construction	Install T.P.Z Fencing/Trunk protection		
17	M	Eco-Low	Retain re-assess after construction	Install T.P.Z Fencing/Trunk protection		
18	M	Eco-Low	consider for Removal			
19	M	Eco-Low	consider for Removal			



16.4 Attachment 4 Tree Protection Schedule (to be amended if necessary once Development is approved)

To be signed by the Project Arborist on completion of each task.

Action	Date	Signed
Preparation		
Appoint appropriate Arboricultural expert to oversee tree protection measures as required during the development project.		
Delegate member of site construction team as Tree Protection Representative. (N.B. This person will be responsible for ensuring that the protective fencing is inspected on a daily basis during site establishment and construction.)		
Ensure that Tree Protection Schedule is available, has been read and fully understood, checking any queries with retained Arborist.		
Ensure that Tree Protection Induction Sheets are available to be read and signed by all site contractors.		
Display Tree Protection Plan laminated on Site Office wall.		

Action	Date	Signed
First Phase – site establishment		
Retained Arborist to establish layout of protective fencing for retained and protected trees and mark all trees to be retained.		
Project manager to verify each tree to be retained and marked by the Project Arborist.		

Action	Date	Signed
First Phase – site establishment		
Prune trees. <i>This process will be appropriately supervised by the retained Arboriculturalist and according to Australian Standard 4373-1996 Pruning of Amenity Trees and the Work Cover Code of Practice for the Amenity Tree Industry.</i>		
Install specified TPZ fencing around Trees. <i>This process will be appropriately supervised by the retained Arboriculturalist.</i>		
Project Arborist or developer to supply and install Tree Protection Area signs and a Prohibited Activities sign near Trees		



HOLD POINT – REPORTING STAGE

Initial tree work

Tree Protection Fencing with signs correctly in place

Mulch correctly installed

The project Arborist should certify the works on completion.

Action	Date	Signed
Site establishment and construction		
Undertake earthworks all outside of TPZ/CRZ		
Project Arborist to irrigate, improve soil, check mulch protection levels and weed if necessary		
If in unlikely event that tree roots are uncovered near the TPZ/CRZ the Arborist will sever the roots clinically		
Install scaffold board ground protection within or near the TPZ. <i>This process will be appropriately supervised by the retained Arboriculturalist</i>		
Once all of the main construction activities are completed, and scaffold etc. removed, the protective fencing can be removed. This should be carried out by hand. Heavy vehicles or plant should not be allowed within the tree protection zone between the new buildings and the trees. <i>This process will be appropriately supervised by the retained Arboriculturalist</i>		
On the completion of construction, contact retained Arboriculturalist to inspect the Tree Protection Zone.		

REPORTING STAGE: Final certification

The Arborist should assess the condition of the tree and its growing environment, and make recommendations for any necessary remedial actions.

WEEKLY INSPECTION ITEMS

Action	Date	Signed
Check presence and condition of Tree protection fencing, signs, soil moisture, and tree condition		
Ensure that no personnel, fuels, chemicals or other materials are allowed into the Tree Protection Area		
Ensure no access equipment, including scaffolding, is allowed into the Tree Protection Area		
Scaffolding should include appropriate netting and ground boards to prevent debris from falling into the Tree Protection Area		
In the eventuality of a transgression of these conditions, contact the retained Arboriculturalist to establish whether any appropriate remedial action should be taken		

