



TREE MANAGEMENT CONSULTING ARBORICULTURISTS

ARBORICULTURAL IMPACT ASSESSMENT

for

SH Gosford Residential Pty Ltd
26-30 Mann Street
GOSFORD NSW 2250

SITE ADDRESS

NORTH TOWER
CENTRAL COAST QUARTER
26-30 MANN STREET
GOSFORD

AUGUST 2021

Prepared by
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INSTITUTE OF AUSTRALIAN
CONSULTING ARBORICULTURISTS



ACCREDITED MEMBER™

CONTENTS

1	INTRODUCTION	3
2	METHODOLOGY	5
3	OBSERVATIONS AND DISCUSSION	6
	3.1 Assessed Trees	6
	3.2 Proposed Removal of Prescribed Trees	6
	3.3 Potential Impacts on Trees Proposed for Retention	8
4	CONCLUSIONS	11
5	RECOMMENDATIONS	12
	5.1 Tree Removal	12
	5.2 Project Arboriculturist	12
	5.3 Preliminary Recommendations	12
	5.4 Tree Protection – General Recommendations	13
	5.5 General Arboricultural Advice	13
6	BIBLIOGRAPHY	14

APPENDIX A Terms and Definitions

APPENDIX B Tree Retention Value Assessment

APPENDIX C Tree Protection Devices

APPENDIX D Schedule of Assessed Trees

APPENDIX E Tree Location Plan

1 INTRODUCTION

- 1.1** This Arboricultural Impact Assessment (AIA) prepared by Urban Forestry Australia (UFA) was commissioned by Frank Katsanevas, on behalf of SH Gosford Residential Pty Ltd. This AIA should be read in conjunction with the overarching AIA by UFA, dated December 2019.
- 1.2** The site is identified as Lot 111 DP 1265226, Lot 469 DP 8210731 and Lots 2 – 7 in D.P. 14761, and known as 26 – 30 Mann Street, Gosford, New South Wales.
- 1.3** This AIA is to be submitted to the Department of Planning, Industry and Environment (DPIE) on behalf of the SH Gosford Residential and in support of an application for SSD application number 23588910 at 26-30 Mann Street, Gosford. The SSDA seeks consent for:
- Demolition of the existing retaining wall on site.
 - Removal of three trees located at the site interface with Baker Street.
 - Excavation to a depth of approximately 1.3m to accommodate the proposed ground floor structure.
 - Earthworks to level the site in readiness for the proposed building.
 - Construction of a 25-storey (26 level) mixed-use building, comprising:
 - 621sqm of retail GFA.
 - 136 apartments, equating to 13,263sqm of residential GFA.
 - Four parking levels for 183 cars, with vehicular access from Baker Street.
 - Storage areas and services.
 - Communal open space.
 - Publicly accessible through site link, including stairs, walkways, public lift, public art and landscaping.
- 1.4** This AIA report addresses the impact the proposed North Tower component of the development will have on four (4) assessed trees on or adjacent to the site and includes addressing Condition C.11 of approval SSD 10114, 24 August 2020 (as follows), where applicable to this proposal.

The Port Jackson Fig Tree

C11. Future development application(s) shall include an Arboricultural Impact Assessment (AIA) prepared generally in accordance with the recommendations of the '*Arboricultural Impact Assessment*' prepared by Urban Forestry Australia and dated December 2019. The AIA shall:

- a) detail the retention of the existing Port Jackson Fig tree, located adjacent to the intersection of Vaughan Avenue and Mann Street
- b) demonstrate the location, excavation and construction of the basement would not adversely encroach on the roots of the Port Jackson Fig tree or impact on that tree's vigour or structural condition
- c) provide detail of the protection of the Port Jackson Fig tree during construction phase of the development including management and mitigation measures.

- 1.4 The purpose of this report is to assess the *vigour* and *condition* of the surveyed trees and identify the potential impacts the proposed development may have on those trees to be retained in proximity to the works.
- 1.5 This report gives recommendations for tree retention or removal and provides guidelines for tree protection and maintenance.
- 1.6 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.
- 1.7 This AIA is not intended as an assessment of any impacts on trees by any proposed future development of the site other than the current development application.
- 1.8 This report is not intended to be a comprehensive tree *risk* assessment; however, the report may make recommendations, where appropriate, for further assessment, treatment or testing of trees where potential structural problems have been identified, or where below ground investigation may be required.

2 METHODOLOGY

- 2.1** In preparation for this report, ground level, *visual tree assessments*¹ of twenty-four (24) trees, including some trees on the adjoining Gosford Waterfront Park (under construction), were undertaken by Urban Forestry Australia, on 21 and 27 August and 9 December 2019. Inspection details of these trees are provided in Appendix D—*Schedule of Assessed Trees*.
- 2.2** This AIA takes account of the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 and prescribed trees pursuant to Part 6.6 *Tree and Vegetation Management* of the Gosford Development Control Plan 2013 (GDGP).
- 2.3** Tree heights and canopy spreads were visually estimated or measured using a Nikon ForestryPro Laser measurer. Unless otherwise noted in Appendix D, all trunk diameters were measured at approximately 1.4 metres above ground level (“the DBH”), using a Yamiyo diameter tape.
- 2.4** Field observations were written down, and photographs of the site and trees were taken using an iPhone 6 and/or Canon EOS SLR digital camera.
- 2.5** 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.
- 2.6** Plans and documents referenced for the preparation of this report include:
- Survey Plans, Dwg No. DETL-001/C, Sheets 1 – 3, dated 30/08/19, prepared by Veris Surveyors.
 - DKO Architects Plan Set Revision A dated August 2021
 - AS4970-2009 *Protection of trees on development sites*, Standards Australia.
 - Schedule 5 Environmental Heritage of the Gosford Local Environment Plan 2014.
- 2.7** No hydraulic service or landscape plans have been reviewed in preparation of this report.
- 2.8** All of the site trees, including those subjects of this report, are shown on a marked-up excerpt of the survey plan. This marked-up plan is attached at Appendix E—Tree Location Plan.

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

3.1.1 The four (4) trees subject of this report are Trees 6, 19, 20 and 21. Details of these are included in the Schedule of Assessed Trees—Appendix D.

3.1.2 The subject trees and their respective *Retention Values* (RV) are identified in Table 1, below. Note: Refer to Appendix B for the methodology used to assess the Retention Value of a tree.

Table 1—Tree Identification and Retention Value, where **L** = Low, **M** = Medium, **H** = High.

Tree No.	Genus & species Common Name	RV	Tree No.	Genus & species Common Name	RV
6	<i>Ficus rubiginosa</i> Port Jackson Fig	H	20	<i>Lophostemon confertus</i> Brush Box	H
19	<i>Lophostemon confertus</i> Brush Box	M	21	<i>Lophostemon confertus</i> Brush Box	H

3.1.3 Species conservation status—No species of assessed tree is subject of threatened conservation status under Australian and/or State Government legislation (i.e. NSW *Biodiversity Conservation Act 2016*, and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*).

3.2 Proposed Removal of Prescribed Trees

3.2.1 Three of the subject trees are located on the adjoining Gosford Waterfront Park and are proposed to be removed to facilitate the architectural and landscape transition between the North Tower and the Park.

- Trees 19, 20 and 21 — (3 x Brush Boxes).

These trees are directly impacted by the proposal.



Figure 1
Looking southwest towards Brush Box trees 19, 20 and 21.



Figure 2
Looking east from Gosford Waterfront Park towards Brush Box trees T21 and T20 on the site (T19 is out of frame to right) The trees stand in the footprint of the proposed pedestrian through link from the park to Mann Street.
Photo supplied.

3.3 Potential Impacts on Trees Proposed for Retention

- 3.3.1 Tree 6 (Port Jackson Fig) at the southeast corner of the site is proposed to be retained.
- 3.3.2 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. No specifications are provided in AS4970 for potential impacts of 10% or greater. This 10% is interpreted as the threshold figure, and the trigger where arboricultural investigations into TPZ encroachments beyond this figure need to be considered.
- 3.3.3 The potential extent of root zone impacts to protected trees to be retained can be generally rated using the *Impact Level Rating* (“ILR”) Table 3.

Table 3: Guideline to the rating of impacts on trees to be retained.

Based on discussions with executive members of the Institute of Australian Consulting Arboriculturists.

IMPACT LEVEL RATING	
O	0 – 0.9% of root zone impacted – no impact of significance
L	1 to 10% of root zone impacted – low (minor) level of impact
L - M	>10 to 15% of root zone impacted – low (minor) to moderate level of impact
M	>15 to 20% of root zone impacted – moderate level of impact
M – H	>20 to 25% of root zone impacted – moderate to high level of impact
H	>25 to 35% of root zone impacted – high level of impact
S	>35% of root zone impacted – significant level of impact

- 3.3.4 As this tree has an already substantial percentage of its 15m radius ‘notional’ TPZ covered by road surface, as well as several services running through its TPZ, the tree must have compensatory ground contiguous with its root zone to maintain tree health. This compensatory area is in line with recommendations at 3.3.3 of the Australian Standard 4970-2009 *Protection of trees on development sites*.
- 3.3.5 The area identified as required for the protection and on-going viability of the tree is known as the Designated Tree Protection Zone (DTPZ) and differs from the notional TPZ illustrated in **Figure 3**. In addition, works cannot include bulk excavation within or at the edge of the tree’s Structural Root Zone due to the likelihood structural support roots are encountered and severed, potentially affecting the tree’s anchorage in the ground.

- 3.3.6 It is noted this tree will not be affected by any works proposed as part of this SSDA 23588910. The estimated TPZ encroachment referred to in **Figure 3** relates to a future stage of the development. Figure 3 is included to demonstrate consideration has been given to Condition C.11 of approval SSDA 10114 where all future development applications must include an Arboricultural Impact Assessment of the tree. As noted, this current SSDA 23588910 would not result in any works taking place in proximity to the tree.

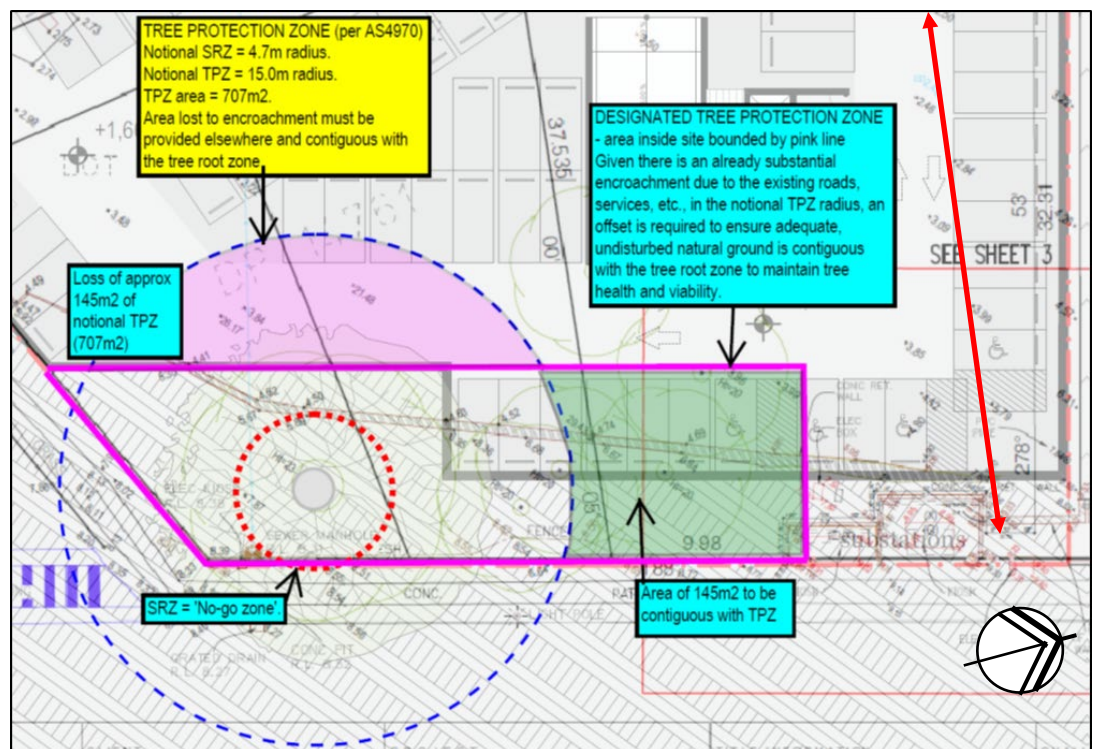


Figure 3

Illustrates the SRZ (inner, red dotted circle) and notional TPZ (outer, blue dotted circle) offsets for the subject fig tree. Proposed encroachment to west (pink, shaded area) and compensatory area (green shaded area) required to offsets loss of TPZ. The double ended, red arrow identifies the approximate through link alignment, well outside the DTPZ of Tree 6. Excerpt of P4 GF plan with survey excerpt overlay, marked up by C. Mackenzie. Not to scale.

- 3.3.7 **Figure 4**, over, illustrates the tree in its location adjacent to Mann Street. The works proposed under the SSDA will take place well beyond the notional and designated Tree Protection Zones of the tree, as illustrated above in **Figure 3**.



Figure 4

Location of Tree 6 adjacent to Mann Street.

4 CONCLUSIONS

- Four (4) trees are the subject of this Arboricultural Impact Assessment. Of these:
 - Three (3) off-site Brush Box trees will be impacted by the proposal and require removal—Trees 19, 20 and 21.
 - One (1) prescribed site tree is proposed to be retained and protected —Tree 6 (Port Jackson Fig), noting the Designated Tree Protection Zone sits wholly outside the extent of works area.
- No assessed tree on the site or on adjoining properties was identified as an endangered species.
- No assessed tree on the site or on adjoining properties was identified as, or associated with, a heritage item.
- It is my opinion the current proposal will not have an adverse impact on retention of Tree 6 provided appropriate protection measures are installed at the offsets illustrated in Figure 3, or at a minimum no less than 28m north of the tree (which is beyond the DTPZ), to ensure no inadvertent construction activities occur over the DTPZ.
- A high level of arboricultural management will be required to ensure tree protection is strictly adhered to during site development.
- Provided the tree protection measures of this report are adopted (including periodical arboricultural inspections) and as there are no works in the vicinity of Tree 6, it is highly unlikely any decline or removal of the tree will result from this development proposal.

5 RECOMMENDATIONS

5.1 Tree Removal

- 5.1.1 Authority approval (e.g. by Consent) must be obtained prior to any undertaking to remove Trees 19, 20 and 21.
- 5.1.2 Tree removals are to be undertaken in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998).

5.2 Project Arboriculturist

- 5.2.1 A Project Arboriculturist (PA) shall be engaged prior to works commencing on the site, including demolition of structures, site clearing and the like.
- 5.2.2 The PA must have a minimum Australian Qualification Framework Level 5 (AQF5) or above in Arboriculture.
- 5.2.3 Duties of the PA shall include, but not be limited to:
 - Liaising with the Project Manager/Head Contractor/Site Manager to confirm the tree protection fencing locations, construction access, and other specific tree protection requirements prior to site works commencing.
 - Inspection of Tree Protection Devices and supervision of works as recommended in this report or as specified in any Conditions of Consent associated with an approved development application.
 - Provision of Compliance Certification as and when required.

5.3 Preliminary Recommendations

- 5.3.1 Design changes within or close to the tree's notional of designated Tree Protection Zone shall be reviewed by a competent arboriculturist with a minimum AQF5 in arboriculture.
- 5.3.2 The existing crib wall is to remain in place within the notional Tree Protection Zone offset (i.e. within a 15m radius of the tree).
- 5.3.3 No works whatsoever are to occur within the Designated Tree Protection Zone (i.e. the tree protection area identified in Figure 3) without the approval of the Project Arborist.

- 5.3.5 Pruning of the tree must only be undertaken by qualified tree workers with a minimum AQF 3 in arboriculturist. All pruning must be undertaken to Australian Standard 4373-2007 Pruning of amenity trees.

5.4 Tree Protection

5.4.1 The Tree Protection is to be in accordance with the following:

- Tree Protection Devices (TPD) may include mulching, tree guards and other devices other than fencing.
- The TPD must be in place prior to any site works commencing, including clearing, demolition or grading.
- The most appropriate fencing for tree protection is 1.8m chainlink with 50mm metal pole supports. During installation, care must be taken to avoid damage to significant roots. The practicality of providing this fencing on this site must be addressed by the arboriculturist.
- Locate large primary roots by careful removal of soil within the fencing area. **Do not drive any posts or pickets into tree roots.** Replace soil back over tree roots.
- It is recommended that the arboriculturist provide written certification that the TPD is/are installed and will satisfy tree protection requirements.
- Nothing should occur inside the tree protection fenced areas, so therefore all access to personnel and machinery, storage of fuel, chemicals, cement or site sheds is prohibited.
- Signage should explain exclusion from the area defined by TPD and carry a contact name for access or advice (see Appendix E – Tree Protection Devices).
- The TPD cannot be removed, altered, or relocated without the project arborists' prior assessment and approval.

5.5 General Arboricultural Advice

- Any concerns raised regarding the protection of Tree 6, including any signs of stress (such as leaf loss) or large structural branch failures must be brought to the attention of the Project Arborist for assessment and advice.

Report prepared by Catriona Mackenzie

August 2021.



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6 BIBLIOGRAPHY

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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.

Age classes

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

Buttress A flange of adaptive wood occurring at a junction of a trunk and root or trunk and branch in response to loading.

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.

Crown raise pruning Pruning technique where lower limbs are removed, thereby lifting the overall crown above the ground.

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. measured at 1.4 m 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.

Form refers to the crown shape of the tree as influenced by the availability or restriction of space and light, or other contributing factors within its environment. Crown form may be determined by tree shape, species and habit and described as Dominant, Codominant, Intermediate, Emergent, Forest and Suppressed, as well as Forest Form or Open Grown. May also be described qualitatively as Good Form or Poor Form.

Growth crack / split Longitudinal crack/split that may develop as a rupture in the bark from normal growth. Longitudinal crack/split that may develop in the trunk of some fast growing palms.

Habit The shape of a tree when its growth is unencumbered by constraints for space and light, e.g. idealized by an isolated field grown specimen with consideration of the species and the type of environment in which it evolved e.g. rainforest, open forest, etc.

Habitat A habitat is an ecological or environmental area that is inhabited by a particular species of animal, plant or other type of organism. It is the natural environment in which an organism lives, or the physical environment that

surrounds (influences and is utilised by) a species population. In restoration ecology of native plant communities or habitats, some invasive species create monotypic stands that replace and/or prevent other species, especially indigenous ones, from growing there.

Health (syn. vigour) 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.

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.

Indigenous Native to an area, and not introduced.

Impact Level Rating (ILR) refers to the estimated percentage of the Tree Protection Zone (TPZ) affected by development impacts. These figures may vary due to the specific conditions and constraints on a particular site, tree species tolerance to impacts, age, vigour, condition of the tree, etc.

IMPACT LEVEL RATING	
0	0 – 0.9% of root zone impacted – no impact of significance
L	1 to 10% of root zone impacted – low (minor) level of impact
L - M	>10 to 15% of root zone impacted – low (minor) to moderate level of impact
M	>15 to 20% of root zone impacted – moderate level of impact
M – H	>20 to 25% of root zone impacted – moderate to high level of impact
H	>25 to 35% of root zone impacted – high level of impact
S	>35% of root zone impacted – significant level of impact

Note: This is a general guide only. These figures may vary due to the specific conditions and constraints on a particular site, tree species tolerance to impacts, age, vigour, condition of the tree, etc.

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.

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). 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).

Snub-nosed rib Adaptive wood formed over a crack, included bark or enclosed bark and may be a round edged (snub-nosed) rib where a broad convex swelling is formed over the crack by the addition of new growth increments, and the cracking is slowed or prevented from developing further (Or, may be a sharp-edged rib as an elongated protuberance where a crack continues to develop).

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

Sweep A curve in the trunk, generally near the ground. This usually occurs when a tree is partially wind thrown when young, but then stabilises itself and straightens due to reaction wood. Stem sweep can also be a naturally developed feature of some tree species. e.g. *Araucaria columnaris* (Cook Pine), that has no relationship to a defect or partial windthrow.

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.

Tree Risk Assessment is the systematic process to identify, analyze, and evaluate tree risk. A tree risk rating of Low, Moderate, High or Extreme is derived by categorising or quantifying both the *likelihood* (probability) of tree or tree part(s) failure and impact on a target(s) and the severity of consequences of the impact on the target(s).

USEFUL LIFE EXPECTANCY (ULE) In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. ULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner. ULE categories are easily verifiable by experienced personnel without great disparity. A tree's ULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give the life expectancy); then by economics (i.e. cost of maintenance - retaining trees at an excessive management cost is not normally acceptable); and finally, effects on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population). ULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short ULE may at present be making a contribution to the landscape, but their value to the local amenity will decrease rapidly towards the end of this period, prior to them being removed for safety or aesthetic reasons. For details of ULE categories see Appendix B, modified from Barrell 2001.

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.

Woody roots usually used in reference to the first order roots i.e. structural (anchor) roots and woody lateral roots within the Structural Root Zone. Damage, disturbance to, or severing of these roots can compromise the stability of the tree.

APPENDIX B

TREE RETENTION VALUE ASSESSMENT



APPENDIX B—TREE RETENTION VALUE ASSESSMENT

Part 1 of 3—Useful Life Expectancy (ULE)

In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. ULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner. ULE categories are easily verifiable by experienced personnel without great disparity. A tree's ULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give the life expectancy); then by economics (i.e. cost of maintenance - retaining trees at an excessive management cost is not normally acceptable); and finally, effects on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population). ULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short ULE may at present be making a contribution to the landscape, but their value to the local amenity will decrease rapidly towards the end of this period, prior to them being removed for safety or aesthetic reasons.

ULE categories (modified from Barrell 2001) The five categories and their sub-groups are as follows:

- 1. Long ULE** - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - 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 which would warrant extraordinary efforts to secure their long term retention
- 2. Medium ULE** - tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - A. trees which may only live from 15 to 40 years
 - B. trees which may live for more than 40 years but would be removed for safety or nuisance reasons
 - C. trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - D. trees which could be made suitable for retention in the medium term by remedial care
- 3. Short ULE** - 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 which may only live from 5 to 15 years
 - B. trees which may live for more than 15 years but would be removed for safety or nuisance reasons
 - C. trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - D. trees which require substantial remediation and are only suitable for retention in the short term
- 4. Removal** - trees which should be removed within the next 5 years.
 - A. dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
 - 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 which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.
 - F. trees which are damaging or may cause damage to existing structures within the next 5 years.
 - G. trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).
 - H. trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
- 5. Small, young or regularly pruned** - Trees that can be reliably moved or replaced.
 - A. small trees less than 5m in height.
 - B. young trees less than 15 years old but over 5m in height.
 - C. formal hedges and trees intended for regular pruning to artificially control growth

Part 2 of 3—IACA Significance of a Tree, Assessment Rating System (STARS)©

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.

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 <i>in situ</i> - 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 a form typical or atypical for the species
The tree is a planted locally indigenous or a common species with its taxa commonly planted in the 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 and/or below ground influences, reducing its ability to reach dimensions typical for the taxa <i>in situ</i> .
3. LOW SIGNIFICANCE IN LANDSCAPE
The tree is in fair-poor condition and good or low vigour
The tree has a form atypical for 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 <i>in situ</i> - 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.

The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge. In the development of this document IACA acknowledges the contribution and original concept of the Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd and Andrew Morton in June 2001.

Part 3 of 3—Tree Retention Value Priority Matrix

		SIGNIFICANCE															
		1. High				2. Medium				3. Low							
		Significance in landscape				Significance in landscape				Significance in landscape				Environmental pest / Noxious weed species		Hazardous / Irreversible decline	
ESTIMATED LIFE EXPECTANCY	1. Long >40 years																
	2. Medium 15–40 years																
	3. Short <1–15 years																
	Dead																

LEGEND FOR MATRIX ASSESSMENT



	Priority for Retention (High) -These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by AS4970 <i>Protection of trees on development sites</i> . Tree sensitive construction measures must be implemented e.g. pier and beam etc. if works are to proceed within the Tree Protection Zone.
	Consider for Retention (Medium) -These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for Removal (Low) -These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Consider for Removal (Low) -These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.

IACA, 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

REFERENCES

Australia ICOMOS Inc. 1999, *The Burra Charter – The Australian ICOMOS Charter for Places of Cultural Significance*, International Council of Monuments and Sites, www.icomos.org/australia

Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.

Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au

APPENDIX C

TREE PROTECTION DEVICES



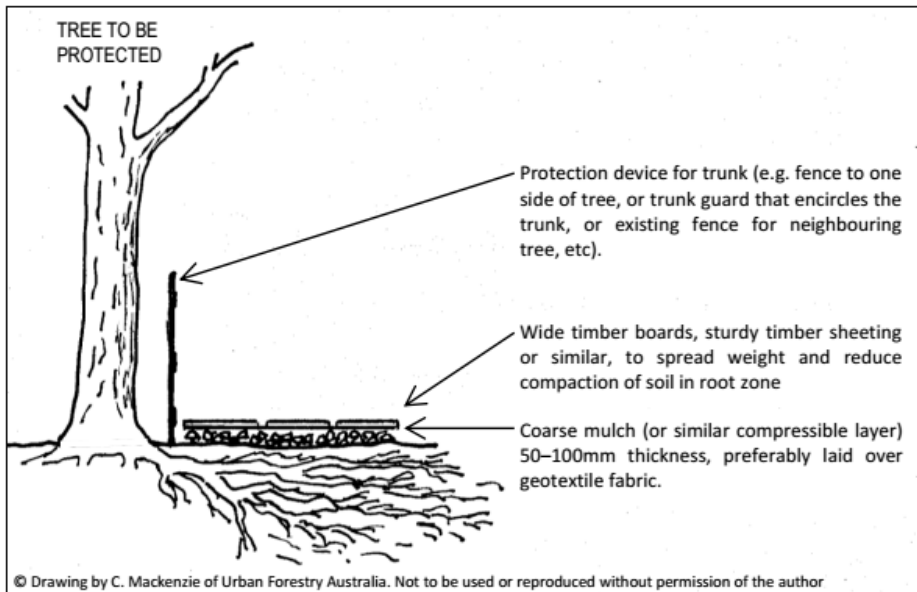


Figure 1
A method of reducing risk of root damage and soil compaction within the tree's Structural Root Zone.

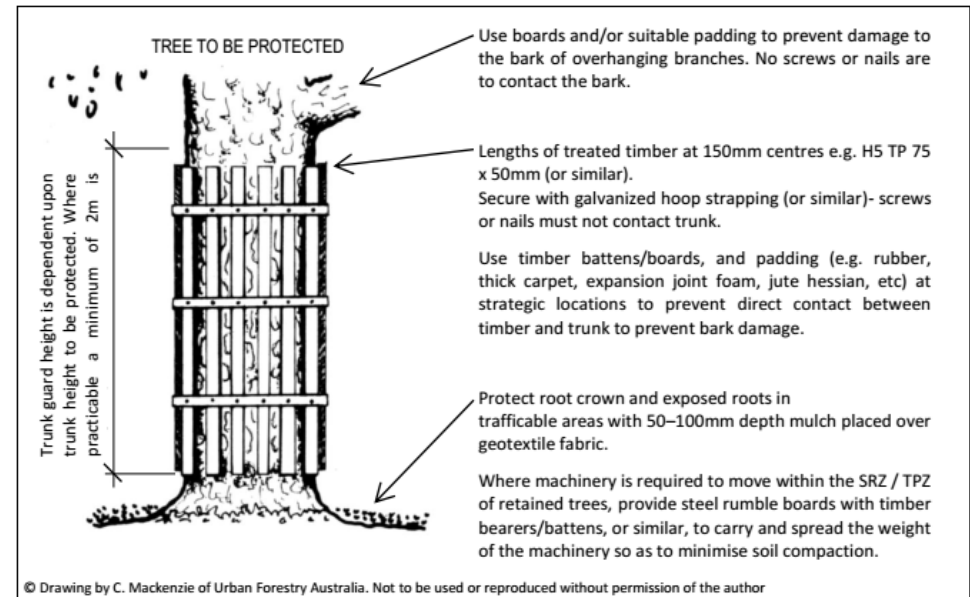


Figure 2
Example of tree trunk and tree branch protection.

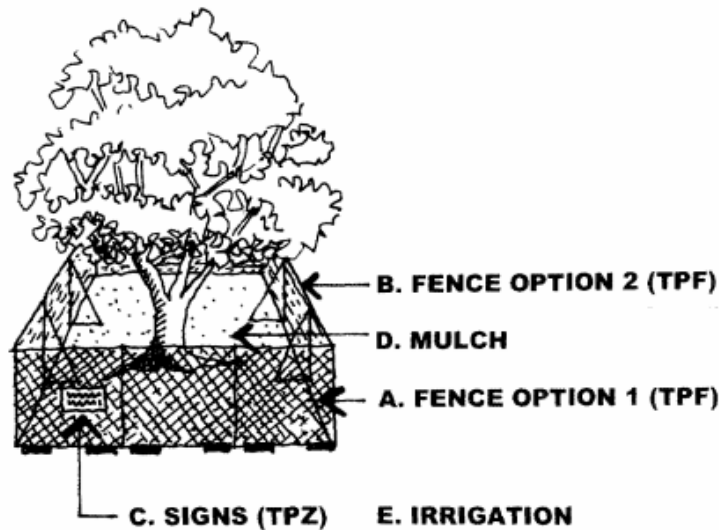


Figure 3

TREE PROTECTIVE FENCING (TPF)

A. Fence Option 1 (TPF)

1.8 metre high chain wire mesh panels with shade cloth attached if required, to be held in place with concrete blocks.

B. Fence Option 2 (TPF)

1.8 metre high plywood or wooden panel/paling fence (prevents soil or building contaminants from coming under fence when panels are laid flush to ground).

C. Signs (TPZ)

Tree Protection Zone Signs

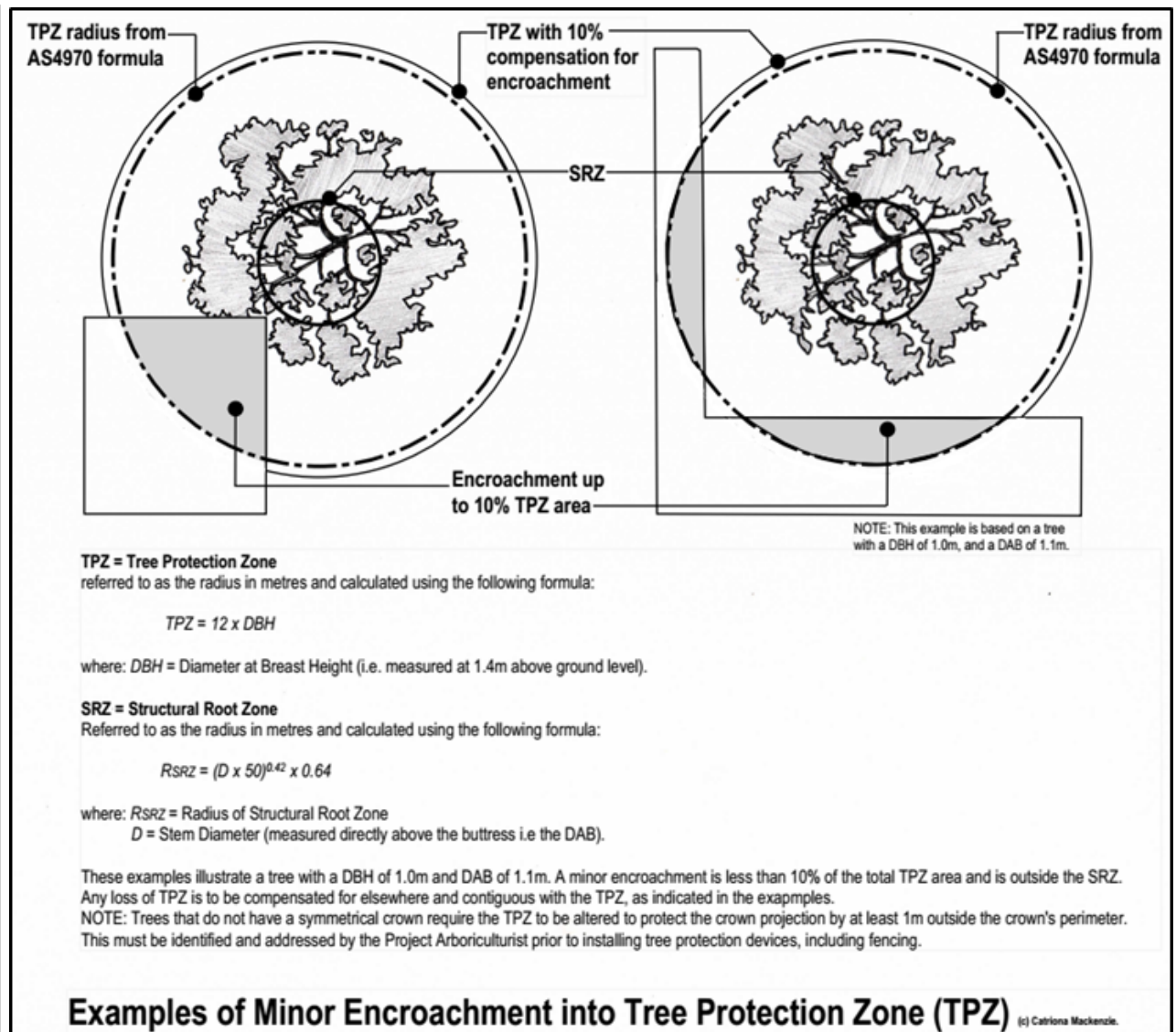
D. Mulch

50mm to 100mm thick layer of organic mulch, or aggregate, installed across surface area of TPZ.

E. Irrigation

Irrigation to arborist's advice.

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Include the Project Arboriculturist's details in the 'Contact' panel.

APPENDIX D

SCHEDULE OF ASSESSED TREES

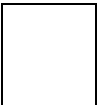


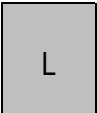

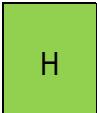


Schedule of Assessed Trees—26 Mann Street, Gosford—December 2019

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Observations/Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
1	<i>Lophostemon confertus</i> Brush Box	19	7	575	M	G	F-G	Introduced Australian native species. Codominant stems @ 6m. Close to edge of bank, otherwise no special problems observed at time of inspection.	2D	M	M	2.8	7.0	152.0
2	<i>Casuarina cunninghamiana</i> River She-oak	19	9	450	EM	F-G	F	Locally indigenous species. Heavily croen raised. 100mm Ø branch failure to N. Codominant stems @ approx. 11m AGL. Bark splits / anomaly @ 8m AGL.	2D	M	M	2.5	5.4	92.0
3	<i>Eucalyptus microcorys</i> Tallowwood	23-24	10	650	M	G	G	No special problems observed at time of inspection.	2A	H	H	2.9	7.8	191.0
4	<i>Eucalyptus pilularis</i> Blackbutt	9	12	NA	OM	F	P	Large old bole previously cut down, with epicormic stems/limbs arising and biased over public path. No structural crown.	4A	L	L	NA	NA	NA
5	<i>Lophostemon confertus</i> Brush Box	18	8	375	EM	G	F-G	Introduced Australian native species. Some suppression and bias over public path/road. Ivy up stem can hide defects.	2D	M	M	2.4	4.5	64.0
6	<i>Ficus rubiginosa</i> Port Jackson Fig	22-23	25	2350	M	G	F-G	Locally indigenous species. Noted a mature eucalypt (possibly Blackbutt growing at the base N side, and a Hills Weeping Fig growing up S side.	1A	H	H	4.7	15	707
7	<i>Eucalyptus haemastoma</i> Scribbly Gum	12	6	400	EM	G	F-G	Locally indigenous species. Pronounced lean to SW. Minor Ø deadwood.	2D	M	M	2.4	4.8	72.0
8	<i>Hymenosporum flavum</i> Native Frangipani	11	5	150	SM	G	G	Introduced Australian native species. Slightly suppressed to NE by fig's crown. No other special problems observed at time of inspection.	2A	L	M	1.6	1.8	10.0
9	<i>Phoenix canariensis</i> Canary Island Date Palm	6	8	*1000+	SM	G	F-G	Introduced exotic palm species. Probably self-sown. Poor location on edge of wall. Non-prescribed tree - exempt from authority approval to remove.	2B	L	L	NA	NA	NA
10	<i>Cinnamomum camphora</i> Camphor Laurel	13	7	*1000+	M	P	P	Introduced exotic weed. Heavily lopped in the past, with extensive crown decline and only 1 or 2 secondary branches with live foliage. Non-prescribed tree - exempt from authority approval to remove.	4A	L	L	NA	NA	NA
11	<i>Phoenix canariensis</i> Canary Island Date Palm	5	8	*1000+	SM	G	F-G	Very close to wall and directly behind T10. Probably self-sown. Non-prescribed tree - exempt from authority approval to remove.	2B	L	L	NA	NA	NA
12	<i>Cinnamomum camphora</i> Camphor Laurel	17	16	*575	OM	P	P	Introduced exotic weed. Extensive crown decline (virtually dead). non-prescribed tree - exempt from authority approval to remove.	4A	L	L	NA	NA	NA

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Observations/Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
13	<i>Phoenix canariensis</i> Canary Island Date Palm	5-6	8	*1000+	SM	G	F-G	Introduced exotic palm species. Probably self-sown. Non-prescribed tree - exempt from authority approval to remove.	2B	L	L	NA	NA	NA
14	<i>Eucalyptus microcorys</i> Tallowwood	18	12	525	EM	G	G	Introduced Australian native species. Compacted soils and pavements E and W. No other special problems observed at time of inspection.	1A	H	H	2.7	6.3	124.0
15	<i>Waterhousea floribunda</i> Weeping Lilly Pilly	7	6-7	*375 AB (325)	SM	G	G	Introduced Australian native species. Multi-stemmed at base. If retained and allowed to grow tall will require some corrective / formative pruning.	2D	L	M	2.2	3.9	48.0
16	<i>Syzygium luehmannii</i> Riberry	7	5	*200 AB (175)	EM	G	G	Introduced Australian native species. Low branching. No special problems observed at time of inspection.	2A	L	M	1.8	2.1	14.0
17	<i>Syzygium luehmannii</i> Riberry	7	5	*300 AB (275)	EM	G	G?	Introduced Australian native species. Limited inspection – fenced off and outside subject site boundary.	2A	L	M	2.1	3.3	35.0
18	<i>Lophostemon confertus</i> Brush Box	14	6	*325	EM	G	G?	Introduced Australian native species. Limited inspection – fenced off and outside subject site boundary. Surface roots. Pavements over root zone.	2A?	M	H	2.2	3.9	48.0
19	<i>Lophostemon confertus</i> Brush Box	8	5	100 + 150 (225)	SM	G	F-G	Introduced Australian native species. Poorly pruned. Pavements over root zone. No other special problems observed at time of inspection.	2A	L	M	1.9	2.7	23.0
20	<i>Lophostemon confertus</i> Brush Box	12	7	625	M	G	G	Introduced Australian native species. Poorly pruned. Pavements over root zone. No other special problems observed at time of inspection.	2A	M	H	2.9	7.6	180.0
21	<i>Lophostemon confertus</i> Brush Box	14	12	525 + 600 (950)	M	G	G	Introduced Australian native species. Codominant stems @ 1.2m AGL. Minor deadwood. Pavements over root zone.	2A	H	H	3.4	11.4	408.3
22	<i>Lophostemon confertus</i> Brush Box	15	7	*575	EM	G	G?	Introduced Australian native species. Limited inspection – fenced off and outside subject site boundary. Roots heaving asphalt in site.	2A?	M	H?	2.8	7.0	152.0
23	<i>Lophostemon confertus</i> Brush Box	17	10	*925 AB (850)	M	G	G?	Introduced Australian native species. Limited inspection – fenced off and outside subject site boundary. Service pit to 1m NE. Asphalt heaving near pit.	2A?	H	H?	3.3	10.2	327.0
24	<i>Lophostemon confertus</i> Brush Box	15	9	*750	M	G	G?	Introduced Australian native species. Limited inspection – fenced off and outside subject site boundary. Codominant stems @ 1.9m AGL. Stems tight/squeezing. Roots heaving asphalt.	2A?	M	H?	3.1	9.0	255.0

KEY

	Prescribed trees to be retained		Prescribed trees proposed to be removed.		Non-prescribed trees exempt from tree preservation controls under GDCP.
	LOW Retention Value-These trees are not considered important for retention.		MEDIUM Retention Value-These trees may be retained and protected.		HIGH Retention Value -These trees are considered important for retention and should be retained and protected.

DETAILS FOR HEADINGS AND SYMBOLS USED IN TREE SCHEDULE

* Denotes those situations where the tree's Diameter at Breast Height (DBH) has been *visually* estimated (usually adjoining trees or those that are hard to access and/or physically measure).

() The numerical figure in parentheses is the calculated DBH for a multiple stemmed tree, using the AS4970 formula, *or*, is the calculated DBH where the measurement cannot be made at the standard 1.4m above ground level, e.g. where the diameter of the stem is measured at ground level (DGL) or above the buttress (DAB). All calculated figures are rounded up to the nearest 25mm to determine the tree's TPZ offsets. NOTE: According to clause 3.2 of AS4970, the TPZ of palms, other monocots, cycads and tree ferns should not be less than 1m outside the crown projection. The TPZ is not based on the palm's trunk diameter. The AS4970 formula for calculating the SRZ of a tree does not apply to palms, other monocots, cycads and tree ferns.

AB—The trunk/stem diameter measured above the buttress (i.e. root and trunk confluence), using a diameter tape

DGL—The trunk/stem diameter measured at ground level, using a diameter tape.

AGL—above ground level.

GL—at ground level.

? —a tentative result due to inspection limitations, e.g. limited visual access to an adjoining tree preventing an 'in-the-round' inspection, very dense vegetation obscuring tree parts or preventing visual access, or a tree that requires more detailed assessment, such as an aerial inspection, decay diagnostic tests, pathology tests, etc.

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/or average diameter spread in metres of branches/canopy (the 'crown') of a tree N/S = North to South spread, E/W = East to West spread.

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) Refer to Appendix A -Terms and Definitions for more detail.

C refers to the tree's structural condition. Refer to Appendix A -Terms and Definitions for more detail.

ULE refers to the estimated *Useful Life Expectancy* of a tree. Refer to Appendices A and B for details.

TSR The *Tree Significance Rating* considers the importance of the tree as a result of its prominence in the landscape and its amenity value, Refer to Appendix B for more detail.

RV Refers to the retention value of a tree, based on the tree's ULE *and* tree's TSR. Refer to Appendix B – Significance of a Tree Assessment Rating for more detail.

SRZ Structural Root Zone (SRZ) refers to the critical area required to maintain stability of the tree. Refer to Appendix A -Terms and Definitions for more detail.

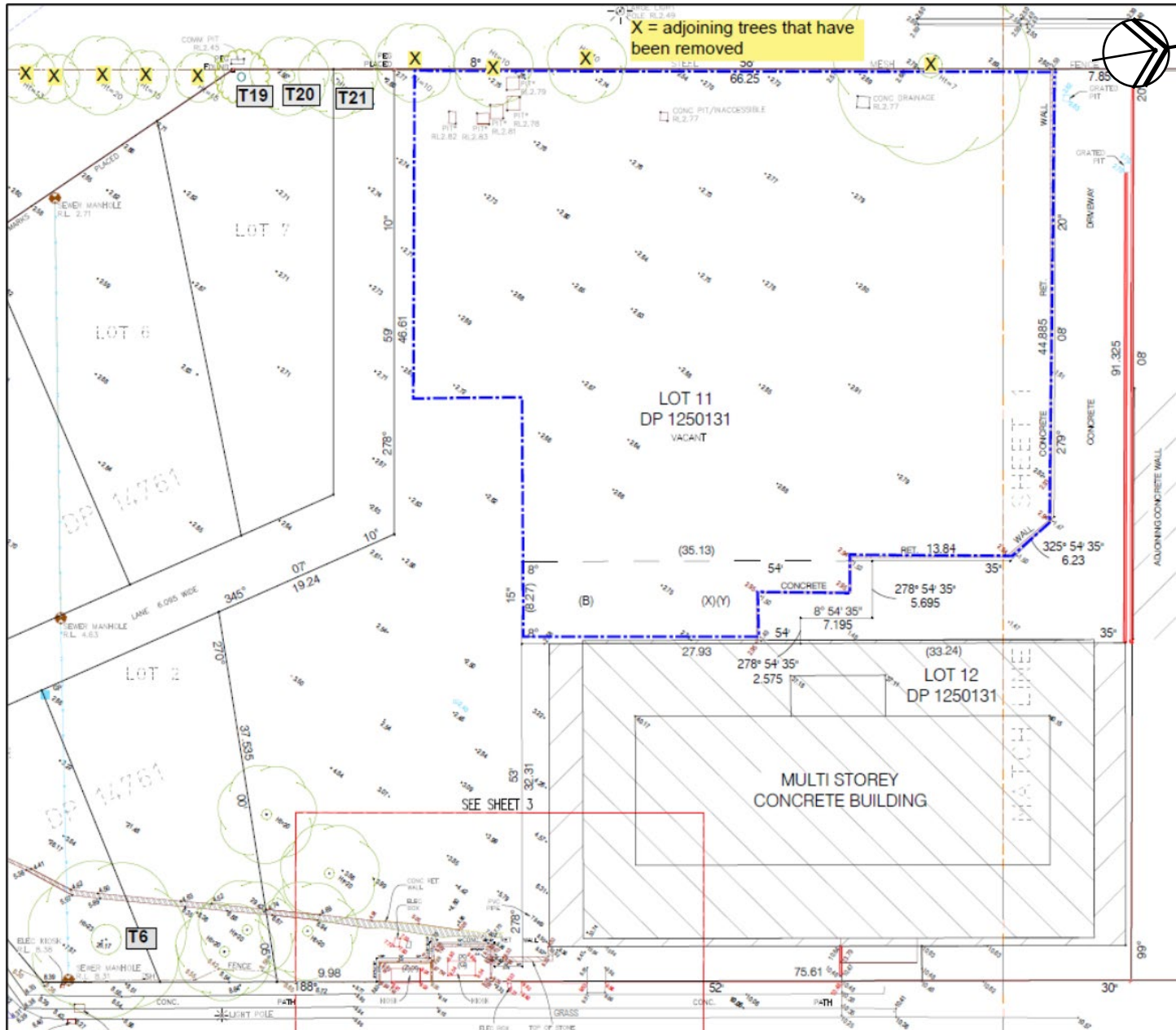
TPZ Tree Protection Zone (TPZ) refers to the *tree protection zones* for trees to be retained. Refer to Appendix A -Terms and Definitions for more detail.

TPZ area the calculated area within the TPZ radius.

APPENDIX E

TREE LOCATION PLAN





TREE LOCATION PLAN

Excerpt of Veris survey plan Sheet 2 DETL-001/A.
Approximate boundary of North Tower development footprint.

'X' marks adjoining trees already removed.
Not to scale. Marked up by C. Mackenzie.