Arboricultural Impact Assessment

PREPARED FOR:
JCDecaux

PROPERTY:
Help Street, Chatswood NSW 2067

PREPARED BY:
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DATE / REF: 9th August 2022 / AIA-22-651 (Rev.1)

1 Summary

a) JCDecaux has commissioned this report for the proposed installation of a digital advertising sign on the south-west-corner of Help Street and Orchard Road

b) Subject site resides in the Local Government Area (LGA) of Willoughby City Council however the consenting authority is Department of Planning and Environment

c) This report has been revised in order to address an issue raised in the public submissions noted in 'Help Street, Chatswood Digital Advertising Signage (DA 22/7252) Request for Additional Information' letter dated 28 July 2022, the issues to be addressed are;

"Clarification whether the proposal will require removal of any vegetation surrounding the sign, and
Submission of an Arboriculture Report, prepared by a suitably qualified person, assessing the impact of the proposal (including construction works) on the tree in vicinity of the sign"

d) Site visits were undertaken on Thursday, 14th April and Tuesday, 26th July 2022

e) This report concerns a single specimen tree, Tree 1 *Magnolia grandiflora* cultivar, which is a street tree in a highly visible, well-maintained raised-garden bed on the south west corner of Help St and Orchard Rd, this tree-species chosen is part of the Willoughby City Council Street Tree Masterplan (2014) in the Chatswood CBD precinct

f) The arborist has rated Tree 1 as having a high-significance and long-ULE, giving it a high STARS-retention value

g) Updated survey and proposal plans were tendered (Dennis Bunt dated 28/06/22) and an updated tree-assessment has been undertaken, signage has been moved further away from Tree 1, the distance is estimated at 3.4m from centre of trunk (see Figure 3)

h) Crown of Tree 1 is estimated to be 5.3m at point of signage installation which would require selective pruning[1] of approximately two metres (2m) from two lower branches, thence ongoing pruning/hedging behind signage is expected to be required

1 x 110mm diameter, 5.3m long branch at 1.5m in height travelling to the east
1 x 150mm diameter, 5.3m long branch at 1.55m in height travelling to the north

i) Installation is outside the SRZ of Tree 1 so larger, stability-crucial roots are not expected

j) TPZ of Tree 1 is encroached upon by proposed installation of signage by an estimated 2% which is a minor encroachment under AS4970-2009 and not expected to provide any impact

1.1 Tree Protection

If Tree 1 were to be retained and proposal was to be approved, then

[1] AS4373-2007 Pruning of amenity trees – clause 7.2.4 Selective Pruning

1.2 Mulching

a) Mulch shall be installed prior to the commencement of works on site and shall not be stockpiled within the TPZ

b) The TPZ of Tree 1 shall be mulched with chunky gap-graded bark (>5mm particle size with no-fines) certified under AS4454—2012 *Composts, soil conditioners and mulches* and shall be maintained at a depth of 50-100mm for the duration of the project

c) Mulch shall be kept 100mm away from trunk to avoid pathogens

d) Mulch shall be spread by hand to avoid soil root disturbance and compaction of fine absorbing roots

1.3 Pruning

a) Tree 1 requires selective pruning[2], approximately two metres (2m) from two lower branches shall be pruned by AQF level 3 arborists prior to works

1 x 110mm diameter, 5.3m long branch at 1.5m in height travelling to the east
1 x 150mm diameter, 5.3m long branch at 1.55m in height travelling to the north

b) Approximately two metres (2m) from two lower branches shall be pruned by AQF level 3 arborists prior to works

c) Pruning shall be supervised by an AQF level 5 project/supervising arborist

d) Further pruning/hedging may be required and shall be at the discretion of, and directed by project/supervising arborist

1.4 Hand Excavation

a) Removal of existing low-hedging plants (*Duranta sp. & Strelitzia sp.*) shall be done using hand tools in order not to damage underlying roots of Tree 1

b) Removal of existing low-hedging plants shall be supervised by an AQF level 5 project/supervising arborist

c) If roots from Tree 1 are encountered they shall be cleanly cut

1.5 Tree Sensitive Construction Techniques

a) Clause 2.3.4 of AS4970-2009 outlines that tree sensitive design and construction methods can be used to minimise the impact of an encroachment.

b) To minimise the impact of works on retained trees, isolated pier footings shall be used

c) Installation shall be supervised by an AQF level 5 project/supervising arborist

d) If roots from Tree 1 are encountered they shall be cleanly cut

[2] AS4373-2007 Pruning of amenity trees – clause 7.2.4 Selective Pruning

1.6 Power-Source

a) Trenching for power was not noted on supplied plans

b) Ideally the necessity for trenching-excavation through the TPZ/SRZ of Tree 1 shall be avoided

c) JCDecaux has indicated that trenching for electrical cables will be undertaken on the inside edge of the existing concrete planter wall reducing potential impact

d) Excavation for electrical cables shall be using non-destructive methods, i.e. hand-excavation or other non-destructive means and shall be limited

e) Power-source installation shall be supervised by an AQF level 5 project/supervising arborist

f) Electrical conduits may be threaded under and over roots larger than 50mm in diameter (if encountered) under the direction of the Project/Supervising Arborist

a) A supervising/project arborist (minimum AQF Level 5) shall be enlisted and engaged throughout the construction process from prior to demolition

b) Monitoring and compliance certification shall be carried out by the supervising/project arborist at critical stages of construction (hold points) with the principal contractor (site manager) and records kept on site

c) A hard-copy of Australian Standard AS4970–2009 Protection of trees on development sites shall be available on site at all times3

d) On completion of the final design, a scaled Tree Protection Plan (diagramme) shall be prepared as per AS4970-2009 to outline the detailed tree protection measures, tree sensitive demolition and construction requirements in diagrammatic form to inform site workers

[3] available at saiglobal.com

2 Contents

2.1 Figures

3 Introduction

a) JCDecaux has commissioned this report for the proposed installation of a digital advertising sign on the south-west-corner of Help Street and Orchard Road

b) Subject site resides in the Local Government Area (LGA) of Willoughby City Council however the consenting authority is Department of Planning and Environment

c) This report concerns a single specimen tree which appears to be a street tree in a highly visible, well-maintained raised-garden bed on the south-west-corner of Help St and Orchard Rd

d) This report will address the:

a.	species identification, dimensions and condition	see 'Tree Data & Assessment'
b.	significance/retention value (ULE and STARS ratings [4])	see 'Tree Data & Assessment'
c.	ULE/ELE of the existing trees	see 'Tree Data & Assessment'
d.	required Tree Protection Zones for each tree	see 'Tree Data & Assessment'
e.	impact upon all trees within the vicinity of proposal	see 'Discussion'
f.	review of the likely underground and aerial services that may impact trees	see 'Discussion'
g.	design changes, construction techniques, etc.	see 'Tree Protection Specifications'
h.	construction considerations/details for footings and driveways	see 'Tree Protection Specifications'

[4] See Appendices

4 Disclaimer

a) The author is acting independently of and not as an advocate for the tree-owner

b) This report reflects the expert opinion of the author and has been prepared in accordance with Division 2 of Part 31 of the Uniform Civil Procedure Rules and the Expert Witness Code of Conduct in Schedule 7 of the Uniform Civil Procedure Rules (UCPR)[5]

c) The author receives no commission to prune or remove trees, which is/are the subject of this report. The author has no affiliations with utility arborists involved in pruning and/or removal of trees. As such, the author can provide impartial and fair advice concerning tree condition, tree care, risk mitigation and reduction pruning, etc. free of conflict of interest

d) All care has been taken to assess potential risk but trees are always inherently dangerous. The tree(s) referred to in this report are living entities and are therefore subject to natural processes. They will also be subject to changes to their environment caused by human activities and exceptional weather conditions

e) The inspection undertaken by our qualified staff relies on visual attributes of tree vitality and structure which can be assessed from a ground based inspection (VTA). Hidden defects which are not readily visible may not be detected. We therefore cannot wholly guarantee the condition of the trees inspected beyond what can be reasonably assessed from a ground based assessment.

f) No aerial or subterranean inspections were carried out and unseen structural weakness may exist within roots, trunk or branches

g) Any protection or preservation methods recommended are not a guarantee of tree survival or safety but are designed to improve vitality and reduce risk. Timely inspections and reports are necessary to monitor a trees' condition. No responsibility is accepted for damage or injury caused by trees and no responsibility is accepted if the recommendations in this report are not followed

h) This report is to be utilised in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report, may only be used where the whole of the original report (or a copy) is referenced in, and directly attached to that submission, report or presentation

i) All content of this report remains the property of the author unless otherwise stated (IP)[6]

[5] http://www5.austlii.edu.au/au/legis/nsw/consol_reg/ucpr2005305/sch7.html
[6] ipaustralia.gov.au

5 Methodology

a) The following tree assessment was undertaken using International Society of Arboriculture (ISA) guidelines

   a. Species were identified using known attributes (e.g. capsules, bud shape & size)
   b. Height was measured using a Haglöf EC II-D clinometer
   c. DBH at 1.4m was measured using a Yamayo 'Million' diameter tape
   d. Crown spread measurement was paced out
   e. Vitality was estimated from foliage cover, visible wound occlusion, presence/absence of fungal activity, sap bleed, etc.
   f. All plan data was verified on site using a compass and measuring tape
   g. TPZs/SRZs were scaled onto plans and encroachments calculated using ArborCAD software

b) A visual inspection of the condition and structure of tree(s) was done from the ground based on accepted industry practice; Visual Tree Assessment (VTA)7

   No aerial inspection, or exploratory excavation was undertaken unless noted

c) Trees are discussed herein in order of 'ownership' priority, that is;

   a. Street Trees and Neighbouring Trees are dealt with first as these are neighbouring-assets, having a high-priority and must generally be protected

   b. Site Trees are dealt with lastly as the client 'owns' these trees and these are the trees over which client has most 'control'

d) All tree works should comply with Australian Standards;

   a. AS4970-2009 Protection of trees on development sites
   b. AS4373-2007 Pruning amenity trees

e) This report has been prepared considering the following;

   a. Commonwealth Environment Protection Biodiversity Conservation Act 1999 (EPBC Act)
   b. NSW Biodiversity Conservation Act 2016 (BC Act)
   c. Environmental Planning and Assessment Act 1979 No 203 (EP & A Act)
   d. Environmental Planning and Assessment Regulation 2000
   e. State Environmental Planning Policy 2017 (Vegetation in Non-Urban Areas)
   f. NSW Government Planning Portal (https://www.planningportal.nsw.gov.au)
   g. Willoughby Local Environmental Plan 2012 clause 5.9 (WLEP 2012)
   h. Willoughby Development Control Plan - Part C.9 Preservation of Trees or vegetation (WDCP).
   i. Willoughby City Council Urban Tree Management Policy (10 November 2014)
   j. Vegetation Management Policy (10 February 2020)
   k. Willoughby Street Tree Master Plan (October 2014)
   l. Vegetation Management Guidelines (05/03/2020)

[7] Claus Mattheck and Helge Breloer, *The Body Language of Trees a Handbook for Failure Analysis.* (London: The Stationary Office, 1994) p.118

5.1 Documentation Provided and Limitations

All dimensions and grades referenced in this report are interpreted from the following documents which the client has tendered as the latest documents available, including the establishment of tree locations in relation to proposal

Survey

Drawn by:	C.M.S. Surveyors Pty Limited	Ph. 02 9971 4802
Date:	24/01/2021	
Ref. No.:	19499detail issue 1	
Title:	survey plan showing details of proposed signage location – garden near railway bridge over help street	

Design

Drawn by:	Dennis Bunt Consulting Engineers Pty Ltd	Ph. 9451 3455
Date:	28/06/22	
Job No.:	21318 issue D	
Title:	proposed digital sign general arrangement & site plan	

Note on design

Utility services (e.g. AUSGRID, Sydney Water, etc.), plans were not available at time of writing and may need clarification prior to commencement of works

6 Tree Location Plan

Tree 1 denotes a prescribed tree included & discussed herein

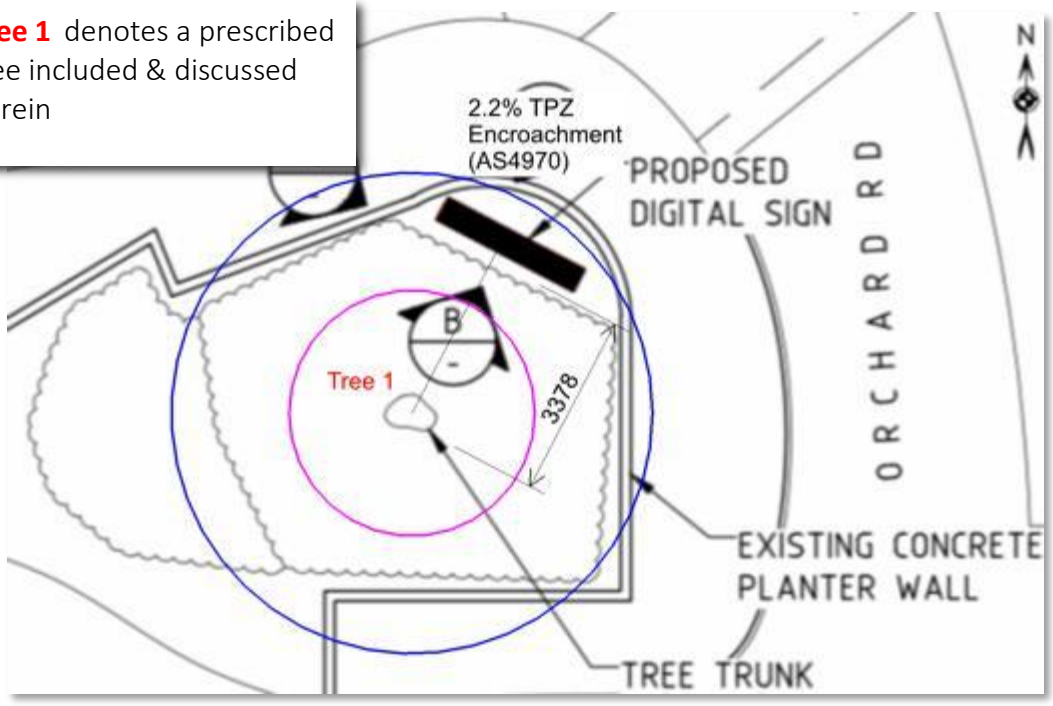


FIGURE 1 NTS. BASED ON DENNIS BUNT DATED 28/06/22

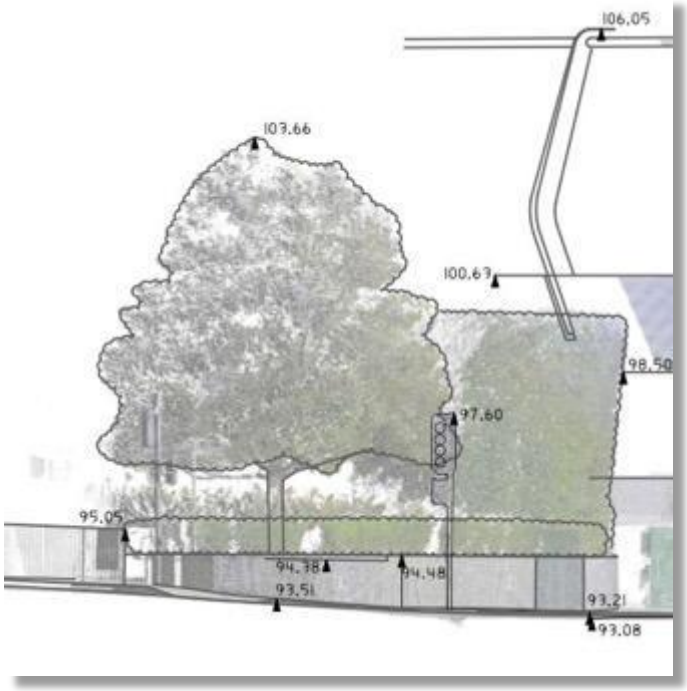


FIGURE 2 NTS. TREE 1 FROM THE NORTH-EAST (C.M.S. SURVEYORS PTY LIMITED DATED 24/01/2021)

7 Tree Data & Assessment[8]

Tree #	Species & Origin	Height	DBH	Vitality	Age	Crown		TPZ	SRZ	ULE	STARS	Notes
						Spread	Class					
1	*Magnolia grandiflora* 'Exmouth' 'Exmouth' Southern Magnolia Exotic	10	0.37	N	M	NS 10 EW 12	D	4.4	2.3	A1	HIGH	Chatswood CBD precinct street tree[9]
Tree Assessment		This tree displays typical form for the species Tree 1 resides in a highly visible, well-maintained raised-garden bed on the south-west-corner of Help St and Orchard Rd This species forms part of a consistent, planned, integrated and highly visual planting throughout the Chatswood CBD precinct										

Superscript Key (when applied)

A. Incomplete identification due to insufficient available plant material
B. Diameter taken below 1.4m due to early stem bifurcation
C. Estimation due to limited access, etc.
D. Deciduous species, void of leaf at the time of assessment
E. Further assessment required to determine accurate rating

[8] all measurements in metres (m), see Glossary/References for definitions
[9] Willoughby Street Tree Master Plan (October 2014)

8 Impact Assessment: Discussion

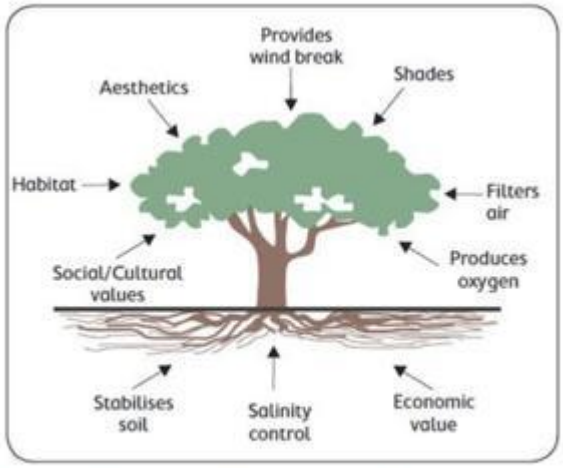
This report concerns a single specimen tree, Tree 1 *Magnolia grandiflora* cultivar, which is a street tree in a highly visible, well-maintained raised-garden bed on the south west corner of Help St and Orchard Rd, the species chosen is part of the Willoughby Council Chatswood CBD precinct Street Tree Master Plan

The impacted specimen tree is a resilient species chosen deliberately for its "high tolerance to urban spaces (i.e. hard paved surfaces, microclimatic extremes, pollutants, etc.)" (Willoughby Street Tree Master Plan, 2014)

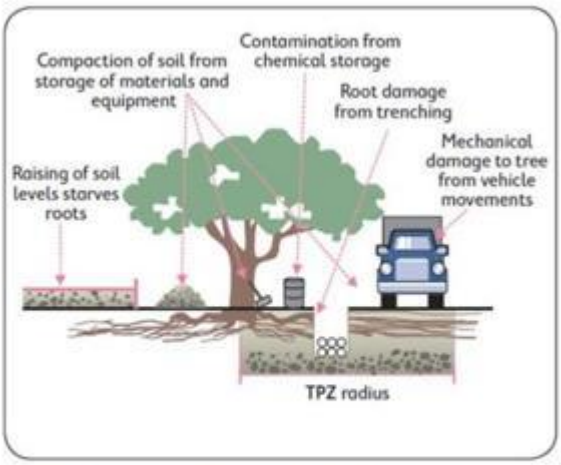
Tree 1 is a mature, healthy specimen in good condition without defects, pest or diseases and perhaps it's known "high tolerance to urban spaces" may extend to root and crown pruning

According to the Australian Standard AS4970-2009 Protection of trees on development sites, a minor encroachment of up to 10% into the TPZ (Tree Protection Zone) is not expected to provide any impact, provided the percentage encroachment is compensated for elsewhere and contiguous to the TPZ

A major encroachment into the TPZ is one greater than 10% and can adversely affect the tree via loss of fibrous root system, loss of ability to absorb nutrients/water and loss of respiration capabilities, etc.



Vegetation provides a range of benefits



Activities undertaken within the TPZ can impact a tree's health and stability

Furthermore, a proposal which encroaches into the SRZ (Structural Root Zone) may result in the loss of structural roots and may destabilise the tree

If the SRZ is to be encroached upon, prior/further exploratory excavation would be necessary to guide design and minimise root severance[10]

[10] See Glossary/References & AS4970 for further explanation of TPZ and SRZ

8.1 Discussion of Expected Impacts

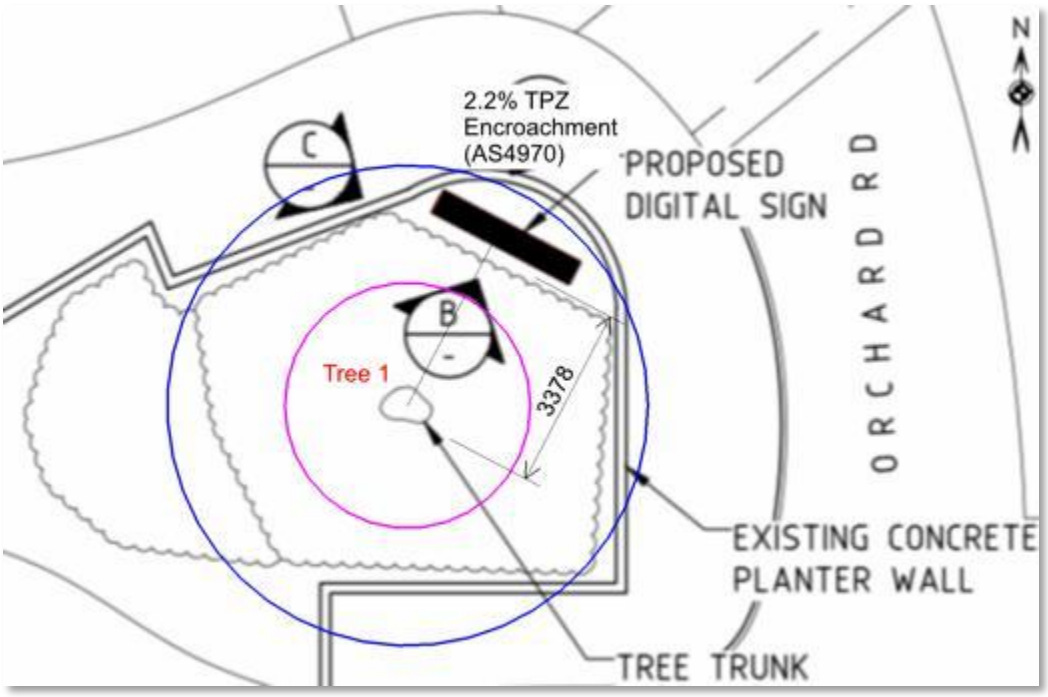


figure 3 not to scale. showing nominal TPZs and SRZs (TPZ **blue** circles, SRZ pink circles) in relation to proposal (based on Dennis Bunt dated 28/06/22)

8.2 Discussion of Impacts upon Tree 1

a) Updated proposal plans were tendered (Dennis Bunt dated 28/06/22) – signage has been moved further away from Tree 1, the distance is estimated at 3.4m from centre of trunk (see Figure 3) and tree-assessment has been updated

b) Crown of Tree 1 is estimated to be 5.3m at point of signage installation which would require selective pruning[11] of approximately two metres (2m) from two lower branches, thence ongoing pruning (hedging) behind signage is expected to be required

   1 x 110mm diameter, 5.3m long branch at 1.5m in height travelling to the east
   1 x 150mm diameter, 5.3m long branch at 1.55m in height travelling to the north

c) Construction techniques have also been clarified consisting of a single 0.75m diameter pier with 1m diameter cap at ground level

d) Installation is not within the SRZ of Tree 1, so larger stability-crucial roots are not expected to be impacted

e) TPZ of Tree 1 is encroached upon by proposed installation of signage by an estimated 2% which is a minor encroachment under AS4970-2009 and not expected to provide any impact

[11] AS4373-2007 Pruning of amenity trees – clause 7.2.4 Selective Pruning

8.3 Other Vegetation

a) This arborist report concerns impacts upon a single street tree, Tree 1, however DA 22/7252 RFI letter dated 28 July 2022 concerns "any vegetation surrounding the sign"

b) Supplied plans show that there is a 'gap' between signage and existing masonry planter box retaining wall, currently there is a double-row of exotic low-hedge plantings; *Duranta sp. & Strelitzia sp.* in this location

c) Whilst the current hedge plantings are expected to require removal for installation, transplant of the existing plants or replacement-plantings in-front of sign are expected to be possible here

8.4 Discussion of Unknown Impacts

a) Trenching for power was not noted on supplied plans and could not be assessed

b) Heat, light and other potential electromagnetic emission levels are unknown, other unknown impacts upon life-processes are possible in close proximity to digital signage, these require further discussion

8.5 Discussion of Roots

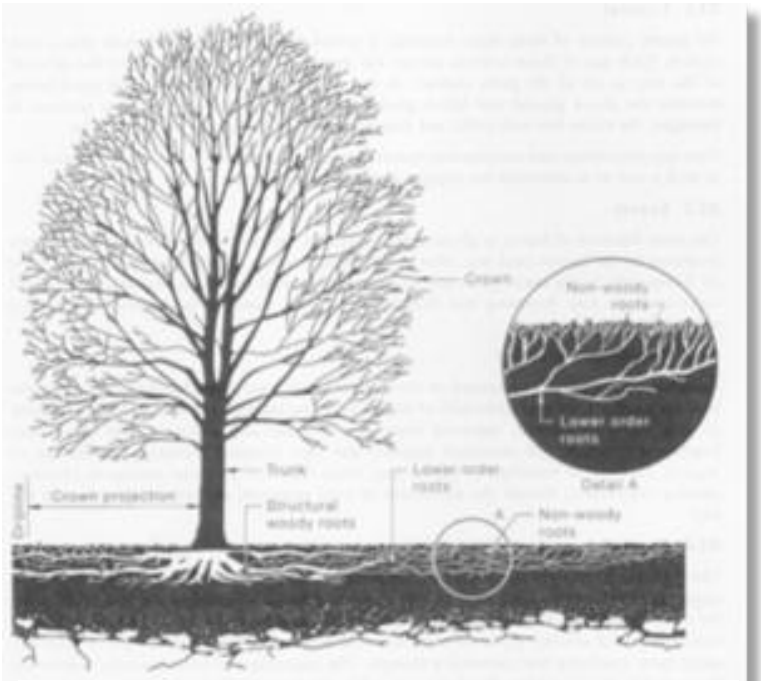


figure 4 Structure of tree roots in a normal growing environment (AS4970-2009 Appendix B p.26)

a) In an undisturbed environment it is expected that roots extend outward from the trunk and occupy irregularly shaped areas four to seven times larger than the crown area with an average diameter of two or more times the height of the tree depending on surrounding rocks, soil and topography

b) As a general assumption, due to increasing deficiency of oxygen with depth, roots are not expected below one metre, again greatly influenced by soil-type and topography

9 Tree Protection: Specifications

If Tree 1 were to be retained and proposal was to be approved, then

9.1 Mulching

a) Mulch shall be installed prior to the commencement of works on site and shall not be stockpiled within the TPZ

b) The TPZ of Tree 1 shall be mulched with chunky gap-graded bark (>5mm particle size with no-fines) certified under AS4454—2012 *Composts, soil conditioners and mulches* and shall be maintained at a depth of 50-100mm for the duration of the project

c) Mulch shall be kept 100mm away from trunk to avoid pathogens

d) Mulch shall be spread by hand to avoid soil root disturbance and compaction of fine absorbing roots

9.2 Pruning

a) Tree 1 requires selective pruning[12], approximately two metres (2m) from two lower branches shall be pruned by AQF level 3 arborists prior to works

1 x 110mm diameter, 5.3m long branch at 1.5m in height travelling to the east
1 x 150mm diameter, 5.3m long branch at 1.55m in height travelling to the north

b) Approximately two metres (2m) from two lower branches shall be pruned by AQF level 3 arborists prior to works

c) Pruning shall be supervised by an AQF level 5 project/supervising arborist

d) Further pruning/hedging may be required and shall be at the discretion of, and directed by project/supervising arborist

9.3 Hand Excavation

a) Removal of existing low-hedging plants (*Duranta sp. & Strelitzia sp*.) shall be done using hand tools in order not to damage underlying roots of Tree 1

b) Removal of existing low-hedging plants shall be supervised by an AQF level 5 project/supervising arborist

c) If roots from Tree 1 are encountered they shall be cleanly cut

9.4 Tree Sensitive Construction Techniques

a) Clause 2.3.4 of AS4970-2009 outlines that tree sensitive design and construction methods can be used to minimise the impact of an encroachment.

b) To minimise the impact of works on retained trees, isolated pier footing shall be used

[12] AS4373-2007 Pruning of amenity trees – clause 7.2.4 Selective Pruning

c) Installation shall be supervised by an AQF level 5 project/supervising arborist

d) If roots greater than 50mm from Tree 1 are encountered they shall be cleanly cut

9.5 Power-Source

a) Trenching for power was not noted on supplied plans

b) Ideally the necessity for trenching-excavation through the TPZ/SRZ of Tree 1 shall be avoided

c) JCDecaux has indicated that trenching for electrical cables will be undertaken on the inside edge of the existing concrete planter wall reducing potential impact

d) Excavation for electrical cables shall be using non-destructive methods, i.e. hand-excavation or other non-destructive means and shall be limited

e) Power-source installation shall be supervised by an AQF level 5 project/supervising arborist

f) Electrical conduits shall be threaded under and over roots larger than 50mm in diameter (if encountered) under the direction of the Project/Supervising Arborist

10 Activities Restricted Within TPZs

- Vehicular traverse of any kind
- Machine excavation including trenching
- Cultivation
- Preparation of chemicals, including cement products
- Refuelling
- Wash down and cleaning of equipment
- Lighting of fires
- Temporary or permanent installation of utilities and signs
- Physical damage to any part of a tree
- Excavation for silt fencing
- Storage
- Parking of vehicles or plant
- Dumping of waste
- Placement of fill
- Soil level changes, and

11 Root Protection within TPZ of Retained Trees

The area within the TPZ of retained trees shall be irrigated using existing drip-irrigation fortnightly for 4-continuous hours weekly

11.1 Unavoidable Excavation within the TPZ - Root Protection

a) Excavations within the TPZ of retained trees shall be avoided wherever possible

b) Excavations within the TPZ shall be supervised by the Project/Supervising Arborist

c) All excavation work within the TPZ shall utilise methods so that root systems are preserved intact and undamaged

d) Cutting structural roots (>50mm ø) within the Structural Root Zone (SRZ) is not recommended as it may lead to tree destabilisation

e) Methods permitted to protect tree roots; hand tools, hydraulic (air-spade/knife), or hydro-vacuum excavation technology

f) Roots to be pruned shall be cleanly cut to ensure a smooth wound face, free from tears with sharp tools such as secateurs, hand or chainsaws

g) Pruned roots shall be immediately treated with a suitable Trichoderma based seedling inoculant product such as TriD25 mixed with a plant rooting product containing the active constituents Indol-3-yl-Butric Acid (IBA) and/or 1-Naphthylacetic Acid (NAA)

h) Any exposed roots and excavation face shall be protected from direct sunlight, drying out and extremes of temperature by covering with a 10mm thick jute mat and kept moist at all times

11.2 Pruning of Retained Trees - Crown Protection

a) All pruning shall be carried out by AQF level 3 qualified arborists, i.e. branch and root pruning shall not be carried out by other contractors

b) All pruning shall comply with AS4373–2007 *Pruning of amenity trees*

c) Pruning shall be supervised by the Project/Supervising Arborist

12 Monitoring, Certification and Hold Points

a) A hard copy of Australian Standard AS4970–2009 Protection of trees on development sites[13] shall be available on site at all times

b) A Project/Supervising Arborist (PA, minimum AQF Level 5) shall be enlisted and engaged throughout construction process prior to demolition

c) The Project/Supervising Arborist shall inspect and document with Certificates of Compliance to the certifying authority (PCA) as in Section 5 'Monitoring and Certification' of AS4970–2009

Hold Point	Task	Responsibility to notify PA	Certification	Timing of Inspection
1	Supervise works proposed within Tree Protection Zones (TPZ)	Principal Contractor	Project Arborist (PA)	As required prior to works proceeding adjacent to retained trees
2	Inspection of trees	Principal Contractor	Project Arborist (PA)	During construction period
3	Final inspection of trees	Principal Contractor	Project Arborist (PA)	Prior to issue of Occupation Certificate

For further clarification or explanation of this report, please feel free to contact the author

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[13] available at saiglobal.com

13 Glossary and References

AA	Arboriculture Australia (arboriculture.org.au) The peak national organisation promoting and representing tree workers, arborists, professional tree management and urban forestry
Age	Y = Young M = Mature O = Over Mature
AQF	Australian Qualification Framework
Australian Standards;	(available for purchase at infostore.saiglobal.com)
AS2303-2018	Tree stock for landscape use
AS4373-2007	Pruning of amenity trees
AS4454-2012	Composts, soil conditioners and mulches
AS4970-2009	Protection of trees on development sites
Crown Class	D = Dominant C = Co-dominant S = Suppressed F = Forest Class I = Intermediate
DBH	Diameter at Breast Height (approx. 1.4 metres above ground level)
IACA	Institute of Australian Consulting Arborists (iaca.org.au) Aims to foster practice and research in support of the Consulting Arboriculturist
ISA	International Society of Arboriculture (isa-arbor.com) Through research, technology, and education promotes the professional practice of arboriculture and fosters a greater worldwide awareness of the benefits of trees
Origin	the natural occurrence of tree species as referenced in Forest Trees of Australia (Boland et al. 2006):
Endemic:	natural occurrence to the area the species is located (and possibly other areas)
Exotic:	naturally occurs in another country but not in Australia
Native:	does not naturally occur within the area the species is located but is found elsewhere in Australia
Remnant:	natural occurrence within area, and part of the natural planting
Project Arborist	AQF level 5 arborist retained throughout the construction process to ensure the protection of trees (also Supervising Arborist, AS4970-2009, clause 1.4.4)
SRZ	Structural Root Zone; disturbance within this area may affect tree stability (SRZ = D x50)$^{0.42}$ x 0.64 is a radius measured from the centre of trunk (NOTE: 'D' is "diameter above buttress", not DBH. AS4970-2009 pp. 11-14,)
TPZ	Tree Protection Zone; a tree may remain viable with minimal disturbance in this area, depends on underlying soil, existing structures, etc. TPZ = DBH x 12 is a radius measured from the centre of trunk (AS4970-2009 pp. 11-14)
Vitality	Ability of a tree to sustain life processes, independent of the condition of the tree but may impact upon it H = High N = Normal L = Low
VTA	Visual Tree Assessment (Mattheck & Breloer, 1994)

after Jeremy Barrell, 2009
barrelltreecare.co.uk

APPENDIX 1: Expected/Useful Life Expectancy Categories (ELE/ULE)

	1. Long	2. Medium	3. Short	4. Removal	5. Move or Replace
	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk	**Trees that appeared to be retainable at the time of assessment for 15 – 40 years with an acceptable level of risk**	**Trees that appeared to be retainable at the time of assessment for 5 – 15 years with an acceptable level of risk**	**Trees that should be removed within the next 5 years**	**Trees which can be reliably moved or replaced**
A	Structurally sound trees located in positions that can accommodate future growth	Trees that may only live between 15 and 40 years	Trees that may only live between 5 and 15 more years	Dead, dying, suppressed or declining trees through disease or inhospitable conditions	Small trees less than 5m in height
B	Trees that could be made suitable for retention in the long term by remedial tree care	Trees that may live for more than 40 years but would be removed for safety or nuisance reasons	Trees that may live for more than 15 years but would be removed for safety or nuisance reasons	Dangerous trees through instability on recent loss of adjacent trees	Young trees less than 15 years old but over 5m in heights
C	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention	Trees that may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting	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 planting	Damaged trees through structural defects including cavities, decay, included bark, wounds or poor form	Trees that have been pruned to artificially control growth
D		Trees that could be made suitable for retention in the medium term by remedial tree care	Trees that require substantial remedial tree care and are only suitable for retention in the short term	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 are damaging or may cause damage to existing structures within 5 years	
G				Trees that will become dangerous after removal of other trees for reasons given in (A) to (F)	

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APPENDIX 2: Significance of a Tree Assessment Rating System (STARS)©

STEP 1: determine the 'Tree Significance in the Landscape'

a minimum of three (3) criteria are required to be classified in that 'significance-group'

1. High Significance

1. The tree is in good condition and good vitality
2. The tree has a form typical for the species
3. The tree is a remnant or is a planted locally indigenous (endemic) specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
4. The tree is listed as a Heritage Item, Threatened Species or part of an Endangered Ecological Community or listed on Council's Significant Tree Register
5. 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
6. The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
7. 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

e) The tree is in fair-good condition and good or low vitality
f) The tree has form typical or atypical of the species
g) The tree is a planted locally indigenous (endemic) or a common species with its taxa commonly planted in the local area
h) The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
i) The tree provides a fair contribution to the visual character and amenity of the local area
j) 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

a) The tree is in fair-poor condition and good or low vitality
b) The tree has form atypical of the species
c) The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings
d) The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
e) 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
f) 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
g) The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
h) The tree has a wound or defect that has potential to become structurally unsound

a minimum of three (3) criteria are required to be classified in that 'significance-group'

4. Low Significance (cont.)

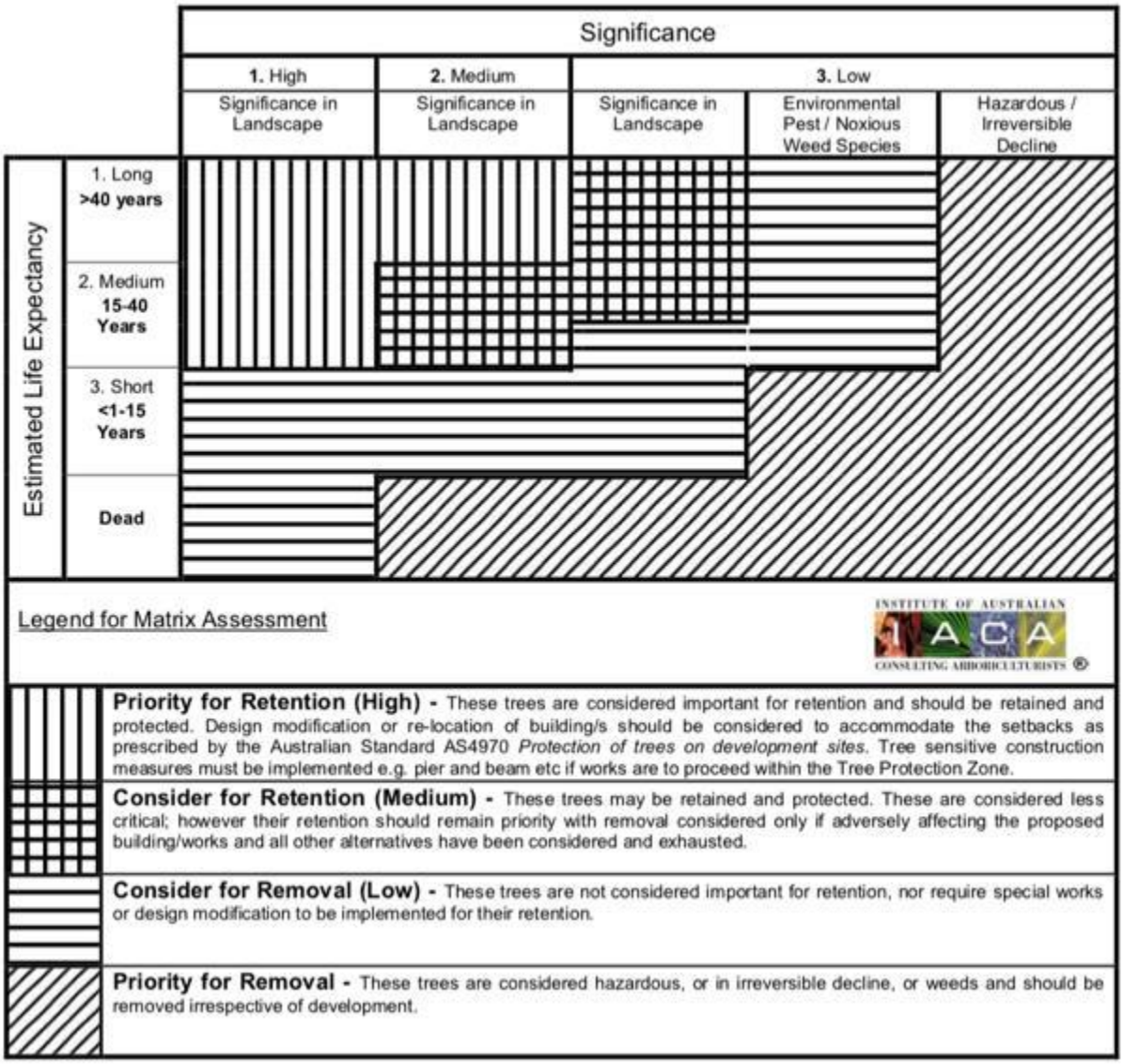
Environmental Pest / Weed Species

The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties

Hazardous / Irreversible Decline

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

STEP 2: Determine 'STARS Tree Retention Value' (ELE x Significance)



NOTES:

a) After categorisation into a 'significance grouping' (Step 1), this is combined with the ELE (estimated life expectancy) using matrix to determine a STARS Tree Retention Value priority (Step 2)
b) The assessment criteria are for individual trees, however, can be applied to a monocultural stand in its entirety
c) Applicable to private trees, neighbouring trees and street trees are rated as 'HIGH' as retention/removal is not an option