

119-129 Princes Highway, Kogarah NSW 2217

1 South Street, Kogarah NSW 2217

2 Hogben St, Kogarah NSW 2217

Arboricultural Impact Assessment

Prepared for Akalan



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ACKNOWLEDGEMENTS

This document has been prepared by Arbor Express Pty Ltd with support from Akalan

Disclaimer

I do not assume responsibility for liability associated with the tree on/or adjacent to this project site, the future demise and/or any damage which may result therefrom. They take care to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others. I cannot be held responsible for any consequences as result of work carried out outside specifications, not in compliance with Australian Standards or by inappropriately qualified staff. If further investigations such as, aerial, drill and root tests are recommended, the report shall not be considered final until all investigations have been completed as further defects may be found. I have made every effort to accurately identify the current tree health and hazards. Results may or may not correlate to actual tree structural integrity. There are many factors that may contribute to limb or total tree failure, not all these symptoms are visible. There can be hidden defects that may result in a failure even though it would seem that other, more obvious defects would be the likely cause of failure. All standing trees have an element of unpredictable risk. The inspection was limited to a visual ground examination of the tree, without aerial inspections and below ground excavations. The assessments are limited and do not include specialized analysis. No internal diagnostics, aerial inspection and pathology test were conducted. Sketches, diagrams, graphs and photographs in this report, being intended as visual aids, are not necessarily to scale.

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Abbreviations

Abbreviation	Description
AE	Arbor Express
AIA	Arboricultural Impact Assessment
AQF	Australian Qualifications Framework
AS	Australian Standards
C	Canopy
DAB	Diameter Above Buttress
DBH	Diameter at Breast Height
H	Height
m	Metre
mm	Millimetre
NDE	Non-Destructive Excavation
NO	Number
NSW	New South Wales
SRZ	Structural Root Zone
TPP	Tree Protection Plan
TPZ	Tree Protection Zone
VTA	Visual Tree Assessment

1. Introduction

This AIA has been prepared for Akalan in relation to a proposed development at 119-129 Princes Highway, Kogarah NSW 2217, 1 South Street, Kogarah NSW 2217, 2 Hogben St, Kogarah NSW 2217, 1 South Street Kogarah NSW 2217. The address of the subject site is in Table 1 and mapped in Figure 1. The purpose of this report is to:

- Identify the trees within the site and adjacent surrounding area that are likely to be affected by the proposed development.
- Undertake a visual tree assessment of the subject trees.
- Assess the current overall health and condition of the subject trees.
- Evaluate the retention value of the subject trees.
- Identify trees to be removed, retained or transplanted.
- Determine the likely impacts of trees to be retained.
- Recommend tree protection measures to minimise the impacts to retained trees.
- Preparation of a tree protection plan for trees to be retained (if applicable).

1.1 Purpose of this Report

This AIA report has been prepared on behalf of Akalan Projects Pty Ltd in support of a State Significant Development Application (SSDA) submitted to the Department of Planning, Housing and Infrastructure (DPHI) under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act 1979).

The SSDA seeks approval for the expansion of the St George Private Hospital. Specifically, the SSDA seeks consent for two components: the first being the erection of a health services facility (hospital), and the second relating to upgrades to the main hospital campus, including a new emergency department.

For reporting purposes, the site subject to the new health services facility (hospital) is referred to herein as the 'clinical tower site' and the main hospital campus is referred to as such.

This report provides an assessment of trees and responds to the Secretary's Environmental Assessment Requirements (SEARs) issued by DPHI on 30 June 2025 in relation to the project.

1.2 Site Location and Context

The sites are in the Georges River Local Government Area (LGA), within the Kogarah town centre.

The clinical tower site is adjoined to the south by an existing multi-storey health services facility, which forms part of the St George Private Hospital campus. South Street separates this facility from the main hospital campus, though a connecting sky-bridge provides pedestrian access between the buildings. Further west is the St George Public Hospital, and other surrounding development comprises a mix of commercial premises (typically at ground floor) and medium and high-density residential premises.

On the opposite (eastern) side of Princes Highway is a mix of educational premises including Moorfield Girls High School, James Cook Boys Technology High School, St George High School, and a TAFE NSW campus. Surrounding development on this side of Princes Highway primarily constitutes low density residential premises.

Kogarah Train Station is south-west of the site, approximately 500m away. There is a pedestrian bridge that extends from Hogben Street over the Princes Highway, which provides direct access to the eastern side of the highway.

The sites are approximately 1.7km from Brighton Le Sands Beach, and approximately 3.5km from Sydney Airport. Refer to **Error! Reference source not found.** for a site context map.

Features of the subject site are tabulated below.

Table 1: Development site

Criteria	Description
Street address	119-129 Princes Highway, Kogarah NSW 2217
	1 South Street, Kogarah NSW 2217
	2 Hogben St, Kogarah NSW 2217
Local government area	Georges River Council
Land zoning	SP2: Infrastructure, MU1: Mixed Use
Biodiversity values map	The site is not in a high biodiversity area
10/50 entitlement	The site does not have a 10/50 entitlement

Figure 1: Location



1.3 Site Description

Clinical Tower Site

The proposed new health services facility (hospital) will be located on land that is bound by three road frontages, being Princes Highway to the east (a classified road), Hogben Street to the north, and Bank Lane to the west. This site comprises eight adjoining allotments of land, known as 119 – 129 Princes Highway, Kogarah, and 2 Hogben Street, Kogarah.

The site currently accommodates a hard-stand parking lot, providing approximately 76 car parking spaces and a two-storey commercial premises (subject to separate demolition), which is attached to the existing multi-storey health services facility at 2 South Street, Kogarah.

Refer to Figure 1 for a site aerial excerpt.



Figure 1. Site Aerial Extract

Source: Metro Map, modified by Patch

Main Hospital Campus

The existing hospital is located at 1 South Street, Kogarah which is also known as 1A South Street, Kogarah. This site is bound by two road frontages, being South Street to the north and Princes Highway (a classified road) to the east.

The site accommodates the St George Private Hospital's main campus, with vehicular access provided off South Street. Refer to Figure 2 for a site aerial excerpt.

1.4 Overview of Proposed Development

The SSDA seeks approval for the expansion of the St George Private Hospital. Specifically, the SSDA seeks consent for two components: the first being the erection of a health services facility (hospital), and the second relating to upgrades to the main hospital campus, including a new emergency department.

In summary, approval for the following is sought for the clinical tower site:

- Site preparation works and bulk earthworks, including tree clearing;
- Construction of a seven (7) storey health services facility (hospital) equating to a total GFA of 9,952sqm;
- Construction of a five (5) level basement carpark including a radiation oncology unit, providing a total of 241 parking spaces;
- Ancillary office, amenities, and loading dock provisions;
- Basement storage and a substation; and
- Landscaping works.



Figure 2. Main Hospital Site Aerial Extract
Source: Metro Map, modified by Patch

1.5 SEARs Relevant to this Report

This AIA report has been prepared to respond to the SEARs issued for the St George Private Hospital Expansion project. The SEARs that are relevant to this tree assessment, and where they are addressed within this report, are detailed below.

Table 1. SEARs for [Insert Discipline]		
Issue and Assessment Requirements	Documentation	Response
SEARs Item 8	Arboricultural Impact Assessment Report	33 trees have been identified, and removal of 33 trees is recommended for facilitating the proposed development

2. Method

Visual Tree Assessment

The subject trees were assessed in accordance with a stage one visual tree assessment (VTA) as formulated by Mattheck and Breloer (1994)¹, and practices consistent with modern arboriculture.

A total of 33 subject trees were inspected on 18 July 2025.

A field vegetation survey was not considered necessary for the main hospital site as part of this assessment. A desktop review of recent aerial imagery, site plans, and available vegetation mapping confirms that the areas proposed for the ED works are predominantly highly modified and developed, containing no mature trees or native vegetation within or adjacent to the works area, but only limited managed landscaping and exotic vegetation of negligible ecological or arboricultural value. The proposed works are confined to previously disturbed and maintained areas, with no remnant native vegetation or significant trees identified within or immediately adjacent to the project footprint.

One tree located along the western boundary of the main hospital site is proposed for removal to facilitate the construction of the ambulance entry and exit driveway. The tree is identified as a *Cupressus × leylandii* (Leyland Cypress), an ornamental species commonly used in landscape plantings. Given its low retention value, lack of ecological significance, and absence of contribution to the broader landscape character, its removal is considered acceptable to accommodate the proposed works.

On this basis, the potential for impact on existing vegetation or ecological values is considered minimal, and no further field-based investigation or detailed vegetation assessment is required for this component of the SSDA.

The following limitations apply to this methodology:

- Trees were inspected from ground level.
- These assessments did not include aerial (climbing) inspections, soil sampling, or root excavations.
- The canopy spread was measured either by estimation or pacing, and the longest span was recorded.
- The height of each tree was estimated.
- Trees were inspected within limits of site access.
- No aerial inspections or root mapping was undertaken.
- Trees located on adjacent properties or in restricted areas were not fully visually inspected, so any defects or abnormalities may not have been documented.
- Tree identification relied on broad taxonomical features visible from ground level at the time of inspection.

Retention Values

The retention value is the value of retaining a tree or group of trees and is assessed based on a blend of environmental, cultural, physical, and social factors.

¹ Field Guide for Visual Tree Assessment (VTA) by Mattheck, C., and Breloer, H. Arboricultural Journal, Vol 18 pp 1-23 (1994).

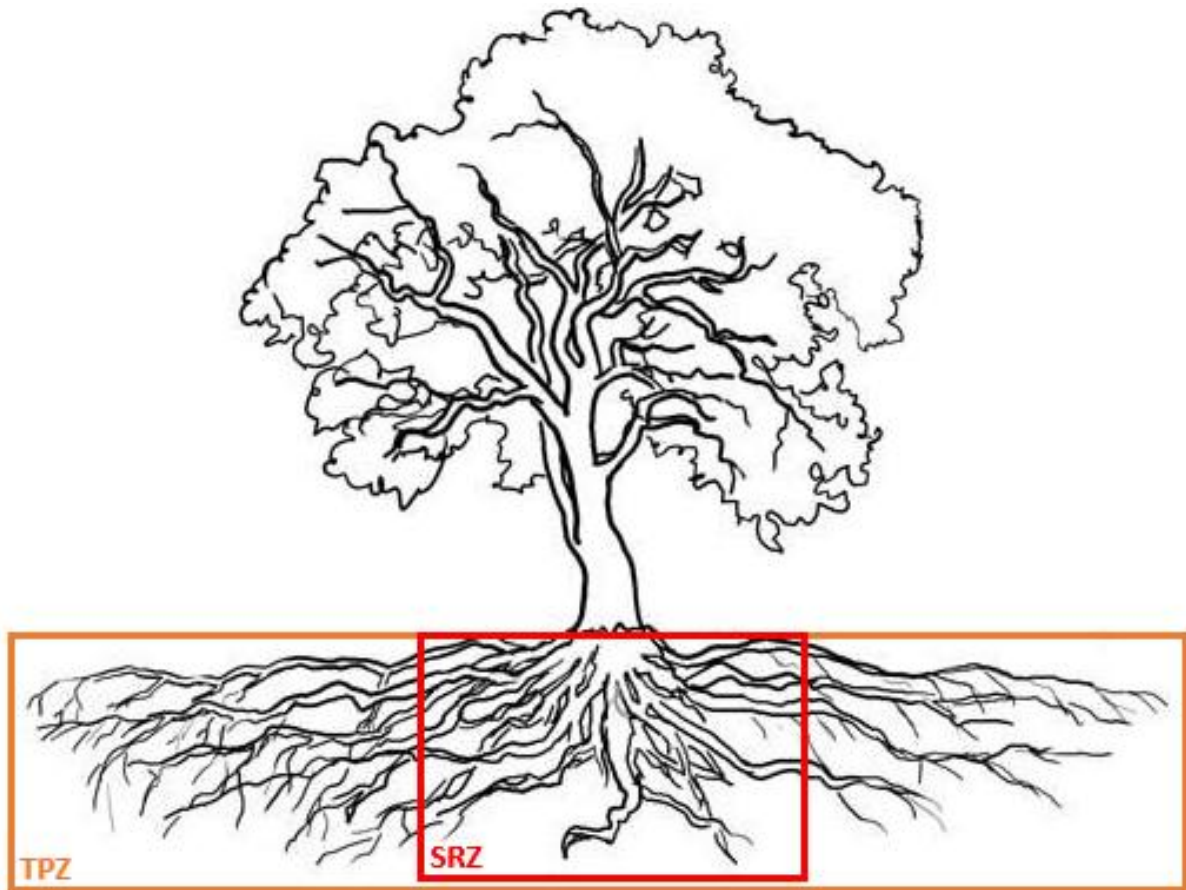
- **High:** These trees are deemed worthy of preservation, and their retention should be prioritized. Proposed site designs and the positioning of buildings and infrastructure should take into account the Tree Protection Zones (TPZs) to mitigate any negative effects. Additionally, the extent of the canopy, especially concerning high-rise development, should be taken into consideration. Significantly pruning the trees to accommodate building envelopes or temporary scaffolding is typically not acceptable.
- **Medium:** Retaining these trees is desirable. They should be preserved as part of any proposed development, if feasible. However, these trees are considered less crucial for retention. If their removal becomes necessary, replacement planting should be contemplated in alignment with the Council's Tree Replacement Policy to offset any loss of amenity.
- **Low:** These trees lack significant ecological, heritage, or amenity value, or such values are greatly diminished due to their Safe Useful Life Expectancy (SULE). Therefore, these trees should not be viewed as hindrances to the future development of the site.
- **Very Low:** These trees are regarded as potentially hazardous, very poor specimens, or may even qualify as environmental or noxious weeds. Consequently, their removal is recommended irrespective of any proposed development considerations.

Protection Zones

Tree Protection Zone (TPZ): The Tree Protection Zone (TPZ) is fundamental for safeguarding trees on development sites. It encompasses both the root and crown spread, creating a protected space free from construction disturbances to preserve the tree's health and viability.

Structural Root Zone (SRZ): The Structural Root Zone (SRZ) defines the space essential for maintaining tree stability, often requiring a larger area to sustain the tree's health. Calculating the SRZ becomes necessary when substantial encroachment into a Tree Protection Zone (TPZ) is proposed. Further analysis through root investigations can provide valuable insights into the extent of these roots.

Figure 2: Tree Protection Zone and Structural Root Zone

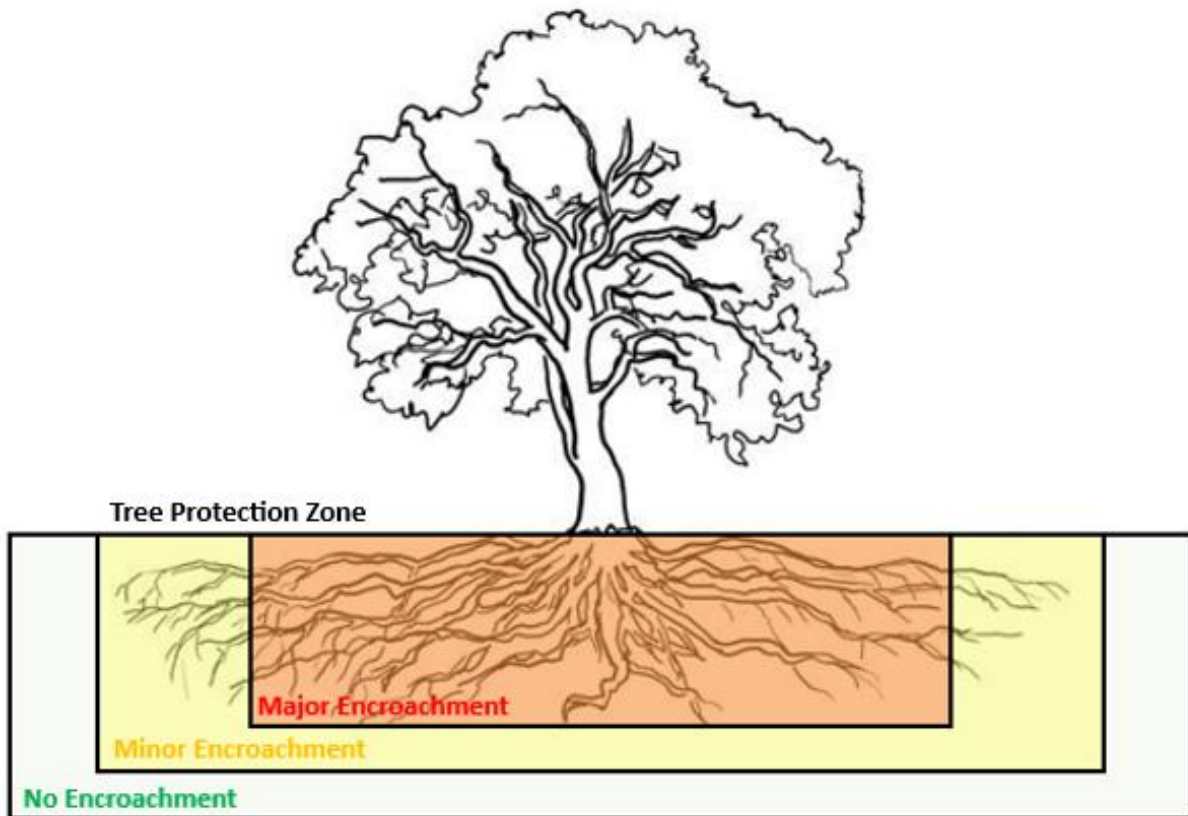


Impact Assessment

Development activities should be undertaken outside of Tree Protection Zones as much as possible. However, it's recognized that complete avoidance is not always feasible, and some encroachment within these zones may occur due to various reasons. Australian Standard AS 4970-2009, "*Protection of trees on development sites*," offers guidelines for managing such encroachments without necessitating extensive tree management and protection measures. Encroachment parameters are categorized as follows:

- **Minor encroachment:** Detailed root investigations should not be necessary if the proposed encroachment is less than 10% of the TPZ and outside of the SRZ. However, the area lost to this encroachment should be compensated for elsewhere, contiguous with the TPZ.
- **Major encroachment:** If the proposed encroachment exceeds 10% of the TPZ, it is imperative to show that the tree(s) can still thrive. The lost area due to this encroachment should be offset elsewhere, maintaining continuity with the TPZ. Non-destructive root investigations may be necessary for any planned works within this area.

Figure 3: Tree Protection Zone Encroachments



3. Tree Schedule

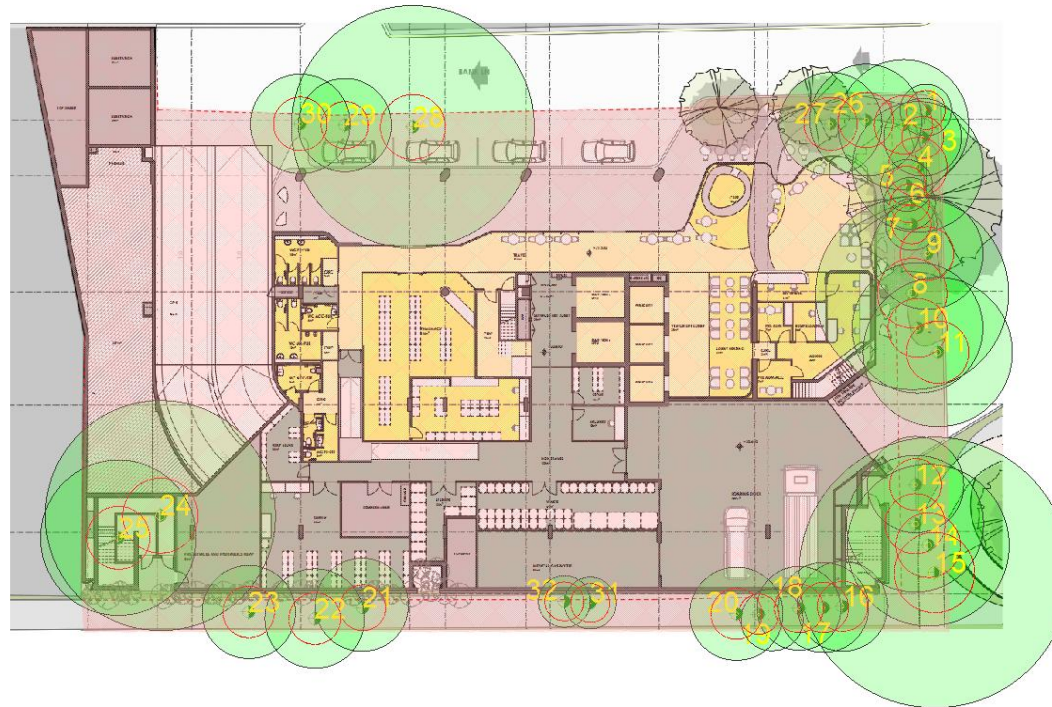
Tree #	Botanical Name (Common Name)	Height (m)	Canopy (m)	DBH (mm)	DAB (mm)	TPZ (m)	SRZ (m)	TPZ Encroachment	SULE	Retention Value	Action	Notes
1	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	6	4	130	140	2.00	1.50	100% - Located within the footprint	3D	Low	Remove	Fair heath and structural condition
2	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	12	7	400	420	4.80	2.30	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
3	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	7	4	182	250	2.20	1.85	100% - Located within the footprint	3D	Low	Remove	Fair heath and structural condition, multi stem (combined DBH)
4	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	13	6	410	420	4.92	2.30	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
5	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	7	3	100	110	2.00	1.50	100% - Located within the footprint	3D	Low	Remove	Fair heath and structural condition
6	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	7	3	110	120	2.00	1.50	100% - Located within the footprint	3D	Low	Remove	Fair heath and structural condition
7	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	7	3	130	140	2.00	1.50	100% - Located within the footprint	3D	Moderate	Remove	Fair heath and structural condition
8	<i>Eucalyptus saligna</i> (Sydney Blue Gum)	13	6	610	620	7.32	2.71	100% - Located within the footprint	2D	Low	Remove	Fair heath and structural condition
9	<i>Eucalyptus saligna</i> (Sydney Blue Gum)	10	5	326	360	3.90	2.15	100% - Located within the footprint	4B	Moderate	Remove	Poor health or structural condition, broken branches, multi stem (combined DBH)
10	<i>Allocasuarina verticillata</i>	11	5	410	420	4.92	2.30	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition

Tree #	Botanical Name (Common Name)	Height (m)	Canopy (m)	DBH (mm)	DAB (mm)	TPZ (m)	SRZ (m)	TPZ Encroachment	SULE	Retention Value	Action	Notes
	(Drooping She-Oak)											
11	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	11	5	470	480	5.64	2.43	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
12	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	11	6	300	310	3.60	2.02	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
13	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	11	5	430	440	5.16	2.34	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
14	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	15	5	510	520	6.12	2.51	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
15	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	12	7	860	870	10.32	3.12	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
16	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	6	4	280	290	3.36	1.97	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
17	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	12	5	280	290	3.36	1.97	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
18	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	10	4	260	270	3.12	1.91	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
19	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	11	4	164	200	2.00	1.68	100% - Located within the footprint	2D	Low	Remove	Fair heath and structural condition, multi stem (combined DBH)
20	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	12	5	290	300	3.48	2.00	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition

Tree #	Botanical Name (Common Name)	Height (m)	Canopy (m)	DBH (mm)	DAB (mm)	TPZ (m)	SRZ (m)	TPZ Encroachment	SULE	Retention Value	Action	Notes
21	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	7	4	227	300	2.70	2.00	100% - Located within the footprint	2D	Low	Remove	Fair heath and structural condition, multi stem (combined DBH)
22	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	8	4	300	320	3.60	2.05	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
23	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	7	4	299	300	3.60	2.00	100% - Located within the footprint	2D	Low	Remove	Fair heath and structural condition, multi stem (combined DBH)
24	<i>Corymbia maculata</i> (Spotted Gum)	9	5	730	740	8.76	2.92	100% - Located within the footprint	2D	High	Remove	Fair heath and structural condition, wound
25	<i>Corymbia maculata</i> (Spotted Gum)	6	4	480	500	5.76	2.47	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition, wound
26	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	12	5	350	360	4.20	2.15	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
27	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	12	6	320	330	3.84	2.08	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition
28	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	13	8	516	780	6.20	2.98	100% - Located within the footprint	2D	Moderate	Remove	Fair heath and structural condition, multi stem (combined DBH)
29	<i>Melaleuca viminalis</i> (Weeping Bottlebrush)	7	5	241	300	2.90	2.00	100% - Located within the footprint	3A	Low	Remove	Fair heath and structural condition, multi stem (combined DBH)
30	<i>Melaleuca viminalis</i> (Weeping Bottlebrush)	7	5	325	320	3.90	2.05	100% - Located within the footprint	3A	Low	Remove	Fair heath and structural condition, multi stem (combined DBH)
31	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	5	3	100	110	2.00	1.50	100% - Located within the footprint	3A	Low	Remove	Fair heath and structural condition

Tree #	Botanical Name (Common Name)	Height (m)	Canopy (m)	DBH (mm)	DAB (mm)	TPZ (m)	SRZ (m)	TPZ Encroachment	SULE	Retention Value	Action	Notes
32	<i>Allocasuarina verticillata</i> (Drooping She-Oak)	6	3	100	120	2.00	1.50	100% - Located within the footprint	3A	Low	Remove	Fair heath and structural condition
33	<i>Cupressus x leylandii</i> (Leyland Cypress)	6	2	300	310	3.60	2.00	100% - Located within the footprint	2A	Low	Remove	Fair heath and structural condition

4. Arboricultural Impact Assessment



Legend

- Tree Protection Zone  Tree Protection Zone Encroachment 
- Structural Root Zone 

5. Site Photos

Photo 1: Trees 1-11



Photo 2: Trees 12-15



Photo 3: Trees 16-20



Photo 4: Trees 21-25

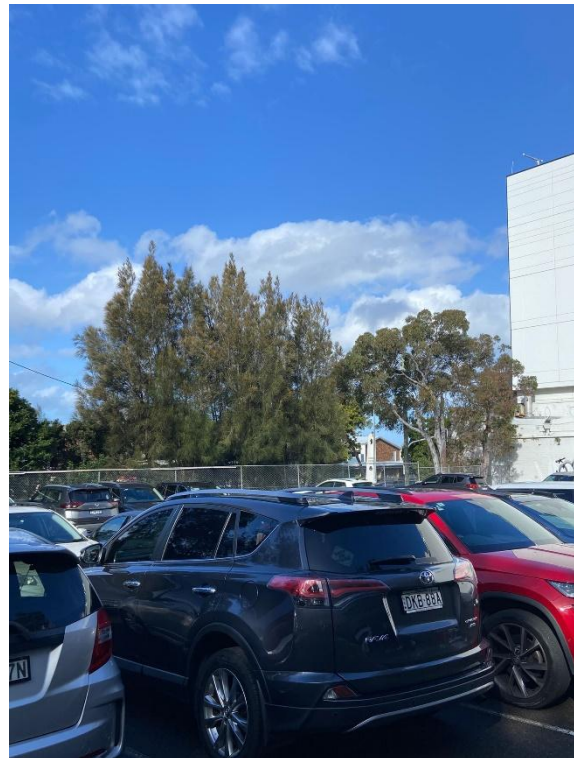


Photo 5: Trees 26 & 27



Photo 6: Trees 28-30



6. Recommendations

Tree Removal

Trees 1-33 are located within the footprint of the development and must be removed for the development to proceed. They will need to be removed for the development to proceed. Due to the extent of the Tree Protection Zone (TPZ) overlapping with the proposed works area—resulting in 100% encroachment—retention is not feasible without substantial redesign. Such redesign would be impractical within the context of the current development layout.

Accordingly, removal is recommended to facilitate the development, with consideration given to implementing suitable replacement planting to offset the loss of canopy cover in accordance with council policy.

7. References

- Barrell, J. 2001. 'SULE: Its use and status into the new millennium', in *Management of mature trees, Proceedings of the 4th NAAA Tree Management Seminar*, NAAA, Sydney.
- Brooker M.I.H, Kleinig D.A. 2006. *Field Guide to Eucalypts*. Volume 1, South-eastern Australia, 3rd ed
Blooming Books, Melbourne
- Draper, B. and Richards, P., 2009. *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.
- Harris, R.W., Matheny, N.P., and Clark, J.R., 1999. *Arboriculture: integrated management of landscape trees, shrubs, and vines*, Prentice Hall, Upper Saddle River, New Jersey.
- Mattheck, C. and Breloer, H. 1994. 'Field Guide for Visual Tree Assessment' *Arboricultural Journal*, Vol 18 pp 1-23.
- Mattheck, C. 2007. *Updated Field Guide for Visual Tree Assessment*. Karlsruhe: Forschungszentrum Karlsruhe. IACA 2010.
- Robinson L, 2003. *Field Guide to the Native Plants of Sydney*, 3rd ed, Kangaroo Press, East Roseville NSW
- Standards Australia 2003. *Composition, Soil and Mulches, AS 4454 (2003)*, Standards Australia, Sydney.
- Standards Australia 2007. *Australian Standard: Pruning of amenity trees, AS 4373 (2007)*, Standards Australia, Sydney.
- Standards Australia 2009. *Australian Standard: Protection of trees on development sites, AS 4970 (2009)*. Standards Australia, Sydney.

Appendix A: Glossary of Terms

Abiotic - Pertaining to non-living agents, e.g. environmental factors.

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree.

Branch:

- Primary. A first order branch arising from a stem.
- Lateral. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches.
- Sub-lateral. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs.

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base.

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally.

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria.

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region.

Condition - An indication of the physiological condition of the tree. Where the term 'condition' is used in a report, it should not be taken as an indication of the stability of the tree.

Crown/Canopy - The main foliage bearing section of the tree.

Crown lifting - The removal of limbs and small branches to a specified height above ground level.

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape.

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress.

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment.

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips.

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms.

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified.

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard.

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot.

Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood.

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact.

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end and is thus liable to snap due to end- loading.

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it.

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs.

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth).

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage.

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature.

SRZ (Structural Root Zone) - The area around the base of the tree required for the tree's stability in the ground.

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it.

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem.

Vigour - The expression of carbohydrate expenditure to growth (in trees).

Appendix B: Retention Value

Evaluating Sustainability and Landscape Significance to Determine Retention Value	
Retention Value	Criteria and Categories
High	These trees are considered to be worthy of preservation. As such, careful consideration should be given to their retention as a priority. Proposed site design and placement of buildings and infrastructure should consider the TPZ to minimize any adverse impact. In addition to TPZs, the extent of the canopy should also be considered, particularly in relation to a high-rise development. Significant pruning of the trees to accommodate the building envelope or temporary scaffolding is generally not acceptable.
Moderate	The retention of these trees is desirable. These trees should be retained as part of any proposed development, if possible; however, these trees are considered to be less critical for retention. If these trees must be removed, replacement planting should be considered in accordance with Council's Tree Replacement Policy to compensate for loss of amenity.
Low	These trees are not considered to be worthy of any special measures to ensure their preservation, due to current health, condition or suitability. They do not have any special ecological, heritage or amenity value, or these values are substantially diminished due to their SULE. These trees should not be considered as a constraint to future development of the site.
Very Low	These trees are considered to be potentially hazardous or very poor specimens or may be environmental or noxious weeds. The removal of these trees is therefore recommended regardless of the implications of any proposed development.

Appendix C: Safe Useful Life Expectancy (SULE)

	1 LONG SULE	2 MEDIUM SULE	3 SHORT SULE	4 REMOVALS	5 MOVED OR REPLACED
	Long: appeared to be retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance.	Medium: appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance.	Short: appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance.	Removal: trees which should be removed within the next 5 years.	Moved or Replaced: Trees which can be readily moved or replaced.
A	Structurally sound trees located in positions that can accommodate future growth.	Trees that may only live between 15 and 40 more 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 5 metres (m) in height.
B	Trees that could be made suitable for long-term retention 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 damage, structural defect, instability or recent toss of adjacent trees.	Young trees less than 15 years old but over 5m in height.
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 should 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.	Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form.	Trees that have been regularly 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	

	1 LONG SULE	2 MEDIUM SULE	3 SHORT SULE	4 REMOVALS	5 MOVED OR REPLACED
				provide space for new planting.	
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 the reasons given in A) to F).	

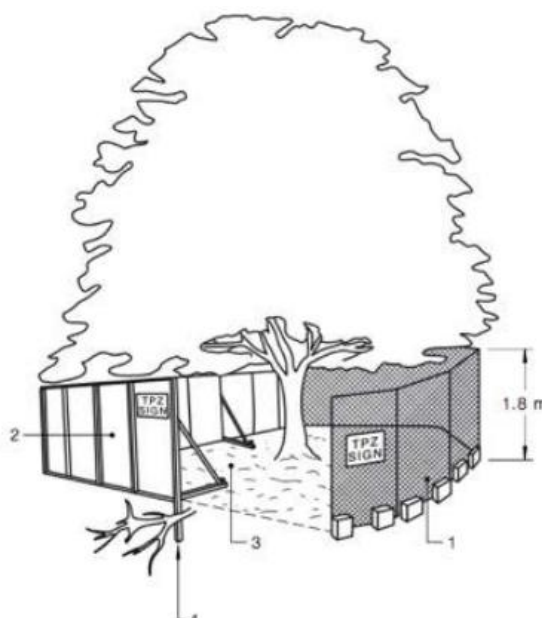
Appendix D: Tree Protection Guidelines

The following tree protection guidelines must be implemented during the construction period if no tree specific recommendations are detailed.

Tree Protection Zone Establishment

Prior to the introduction of any machinery or materials onto the site, and before initiating any works such as bulk earthworks, fencing should be installed. Once in place, any alterations or removal of protective fencing must receive approval from the project arborist. Access to the TPZ must be restricted by securing it appropriately. The establishment and management of the Tree Protection Zone should adhere to the following guidelines:

- 1) Specify the trees within and around the subject allotment that are slated for preservation and protection during the development process. This could involve trees on neighboring properties as well as street trees.
- 2) The Tree Protection Zone radius should align with the calculation specified in the Individual Tree Data and Imagery.
- 3) Please locate and mark the alignment of protective fencing. This alignment may differ from the actual TPZ radius, taking into account areas where acceptable encroachment is permitted (determined in consultation with the project arborist) and site access needs. Protective fencing is necessary only within the subject allotment, assuming appropriate boundary fencing is already installed.
- 4) Set up protective fencing as depicted in the accompanying image. Adhere to the relevant fencing requirements outlined in AS 4687 for temporary fencing and hoardings. Additionally, affix shade cloth or a similar material to mitigate the transfer of dust, particulate matter, and liquids into the protected area.



Legend:

1. Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2. Alternative plywood or wooden palling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3. Mulch installation across surface of TPZ (at the discretion of the Project Arborist). No excavation construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4. Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

Protection when works within the tree protection zone is required

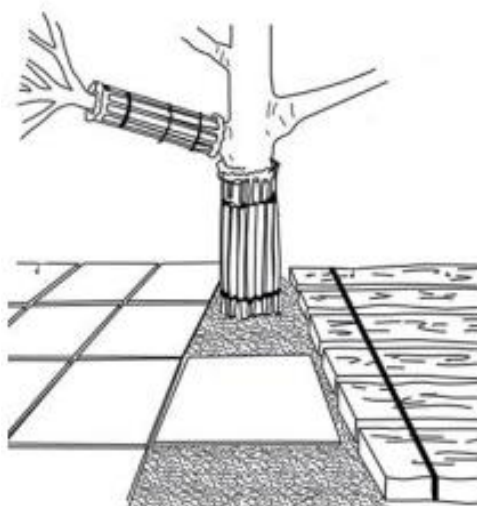
If the fencing has been reduced from the full TPZ radius to accommodate vehicle or machinery access, it's crucial to implement heavy-duty ground protection and trunk protection. This measure is essential to support the passage of vehicles like excavators, cranes, pier drilling machinery, hydro-excavation trucks, and other necessary equipment.

The heavy-duty ground protection includes:

- 1) A layer of geotextile fabric on top of the natural ground.
- 2) Cover the geotextile with a 100mm thick layer of organic mulch.
- 3) Install ground protection on top of the organic mulch (Bog mat or timber battens)

Trunk protection will include protection to the trunk and branches of trees as shown below. A minimum height of 2m is recommended.

- 1) Install breathable padding or hessian around the trunk of the tree.
- 2) Install closely spaced timber battens around the trunk, with the top edge protecting the trunk/bark by the padding/hessian. Secure with strapping

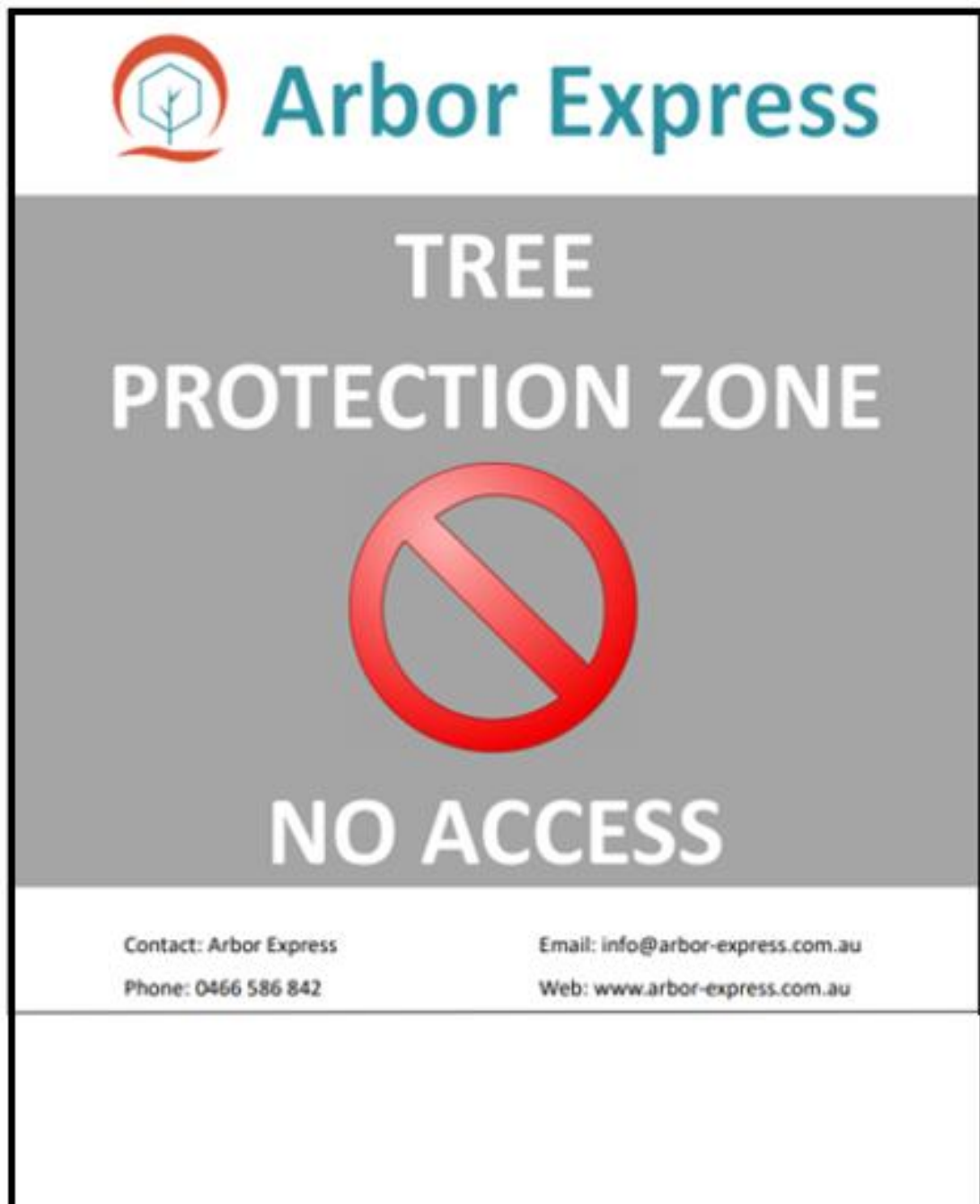
**Notes:**

1. For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
2. Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

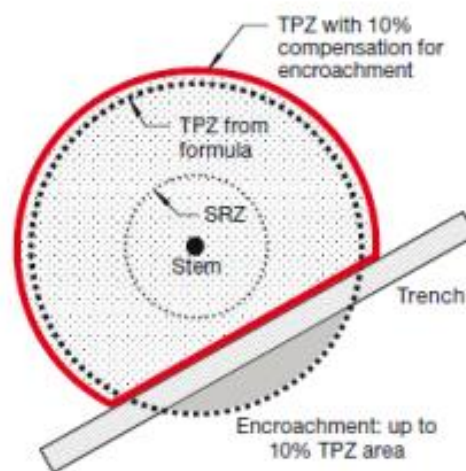
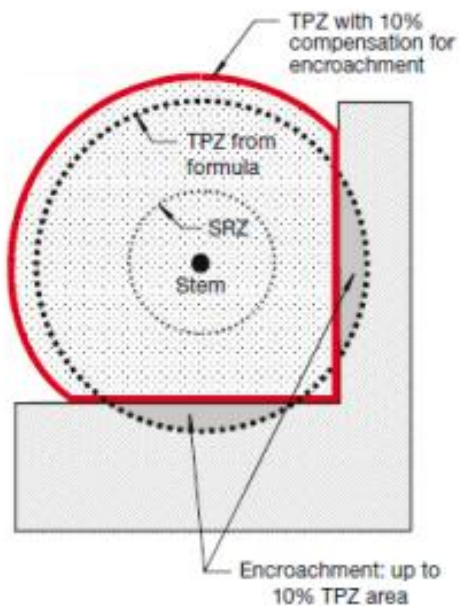
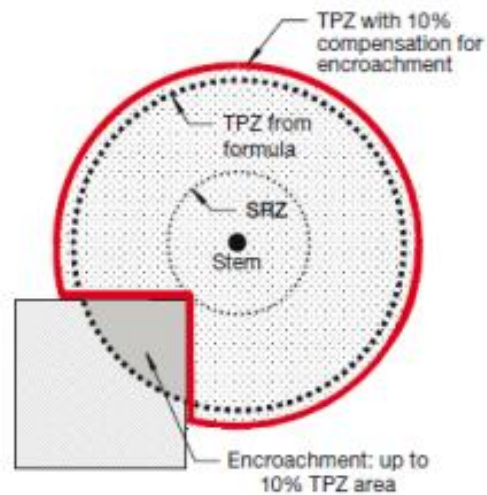
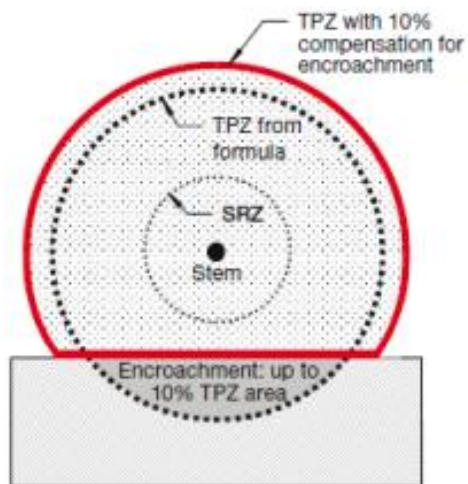
Underground Services

Whenever feasible, route all underground services away from the TPZ. If installing underground services within the TPZ becomes unavoidable, utilize non-intrusive methods such as horizontal directional drilling (HDD), non-destructive excavation (NDE) techniques like hydro-vacuum or Air Spade, or manually excavated trenches. Ensure that horizontal drilling or boring is carried out at a depth of at least 600 mm below grade. It's important to note that trenching for services is classified as "excavation." The project arborist should assess the potential impacts of drilling and bore pits on retained trees.

Example of a Tree Protection Sign



Appendix E: Encroachment into the Tree Protection Zones





Locations

- Sydney
- NSW South Coast (Wollongong to Bega)
- NSW Central Coast (Gosford to Newcastle)
- Southern Highlands
- Blue Mountains
- Canberra and Queanbeyan
- Regional NSW

Services

- Arborist Reports for Developments
- Tree Root Mapping
- Project Arborist
- Tree Health and Safety Assessments
- Tree Structural Testing (Resistograph)
- Flora & Fauna Assessments and Project Ecologist
- Vegetation Management Plans

Contact Us

- 0466 586 842
- Info@arbor-express.com.au