



ARBORICULTURAL IMPACT ASSESSMENT REPORT

Prepared for: Realside 170 Pac Pty Ltd
Site Address: 170 Pacific Highway, Greenwich
Report Date: 23 June 2025



Photograph #1: Shows 170 Pacific Highway, Greenwich
(Photo courtesy of Google Street View)

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INTRODUCTION

We confirm that we have inspected the above site on Friday, 7th March 2025 and now report as follows:

This Arboricultural Impact Assessment has been prepared by Scott Gatenby of Apex Tree & Garden Experts for *Realside 170 Pac Pty Ltd* to accompany a Regionally Significant Development Application (DA) for a mixed-use development (including seniors housing) at 170 Pacific Highway, Greenwich, within the Lane Cove Local Government Area (LGA).

The DA seeks consent for the adaptive reuse of the existing commercial building and additions to facilitate a mixed use development comprising ground floor commercial premises and seniors housing independent living units (ILUs) above. Specifically, the DA seeks development consent for:

- partial demolition and adaptive reuse of the existing 5 storey commercial building and basement
- construction of 5 additional storeys totalling 10 storeys; which will accommodate 48 ILUs and rooftop communal open space
- ground floor residential amenities including a pool and gym
- ground floor commercial
- car parking spaces across the basement and at-grade
- associated landscaping works

The proposal seeks to utilise the incentive controls under Chapter 3, Part 5, Division 3, Section 87 of the *State Environmental Planning Policy (Housing) 2021* (Housing SEPP) to achieve 3.8m additional building height and 15% additional FSR.

A Planning Proposal will be submitted to Lane Cove Council to support the proposed amendments to the *Lane Cove Local Environmental Plan 2009* (LCLEP 2009) to amend Schedule 1, Additional Permitted Uses to permit the development of *seniors housing* on the site.

Subject site

The site is located in Greenwich within the Lane Cove LGA. The site has an area of 2,434m². The land is legally described as Lot 1 in DP 716649.

The site is currently occupied by a commercial office building and a ground floor health care facility, with vehicle access and onsite parking provided via Elcedo Lane at the rear of the site.

The site is an irregular shape, with a primary street frontage (approximately 33m in length) to the Pacific Highway and a rear frontage to Elcedo Lane.

The site is zoned E2 Commercial Core under the *Lane Cove Local Environmental Plan 2009*, with relevant controls listed below:

- Height of Buildings: 25m
- Floor Space Ratio: 3.1:1

The site does not contain any local heritage items or conservation areas under the LCLEP 2009, however is located in close proximity to the Gore Hill Cemetery, which is identified as a Stage Heritage Item (SHR 01491).

The location of the site is provided at Figure 1.

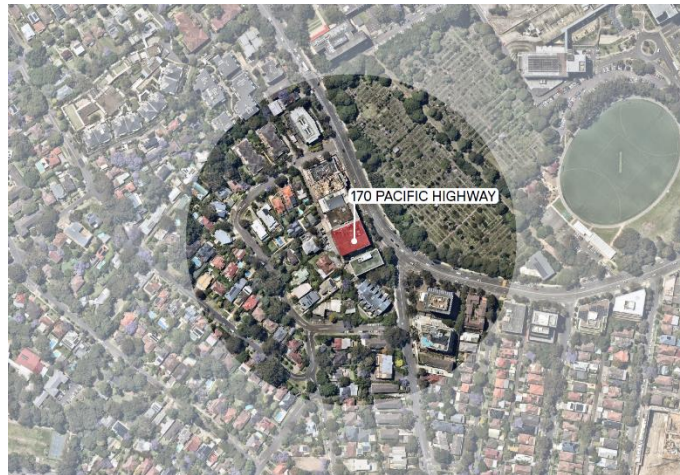


Figure 1 Site location (Source: WMK Architecture)

Surrounding context

The surrounding locality includes a variety of land uses and built form typologies along the Pacific Highway corridor. The surrounding context is detailed below:

North: Immediately north of the site is well established medium - high-density mixed-use buildings along the Pacific Highway and lower scale residential development. This includes the seniors living and mixed-use development at 178-192 Pacific Highway, which is currently under construction. To the northwest of the site is the North Shore Specialist Day hospital, including various hotels ranging up to 4-5 storeys in height.

East: To the east of the site is the State heritage item of Gore Hill Cemetery, and Gore Hill Park, along with the Royal North Shore Hospital. Further to the site's east is the St Leonards train station. There is also the proposed seniors living development at 126 Pacific Highway, which is also zoned E2 Commercial Core.

South: To the site's immediate south is a multi-storey commercial building at 154 Pacific Highway. Further to the south are medium and lower density dwellings within the R2 zones and higher density buildings in the R4 zone. To the southwest of the site is Greenwich Hospital, and Greenwich Primary School. The site is also within a 1km of proximity of Wollstonecraft station further to the south.

West: Development to the west comprises lower density single storey residential within the R2 zone. Further to the site's west is the C2 zoned land of 'Lane Cove Bushland Park'. There has recently been a Planning Proposal to permit seniors housing and both height and FSR amendments at 274 & 274A Longueville Road, Lane Cove.

The site is located approximately 700m from the St Leonard's town centre, which is identified as a health and education precinct in the *Greater Sydney Region Plan* and *North District Plan*. This precinct comprises the Royal North Shore Hospital, North Shore Private Hospital and a wide range of specialist health services. The site is highly accessible to a range of health services.

The site is well-serviced by public transport with a bus stop located at the Pacific Highway after Bellevue Avenue, immediately north of the site offering a range of routes. The site is located within 700m of St Leonard's train station to the east and Wollstonecraft train station 1km to the south.

There are three heritage items located in close proximity to the site, two local items are within the Lane Cove LGA and one stage heritage item within the Willoughby LGA. These include:

'House – I13' – Located 8 Bellevue Avenue, Greenwich – Lane Cove LGA

'House – I14' – Located at 14 Bellevue Avenue, Greenwich – Lane Cove LGA

'Gore Hill Memorial Cemetery' – SHR 01491 – 211 Pacific Highway, St Leonard's – Willoughby LGA.

The surrounding locality is included below in Figure 2.



Figure 2 Surrounding Locality (Source: WMK Architecture)

TREE REPORT

There are numerous trees which have the potential to be impacted by the development and these trees are the subject of this Arboricultural Impact Assessment report. These trees are listed in our Tree Survey Table (below) and their approximate locations can be seen on the marked-up RPS AAP Consulting Pty Ltd Utility Survey plan, located at Appendix A.

The trees have been inspected by ground-based observations using Visual Tree Assessment techniques (VTA). VTA undertaken by tree professionals is a recognised systematic method of identifying tree characteristics and hazard potential.

TREE SURVEY

(~) = approximately

Tree No.	Genus Species (Common Name)	Height (~ m)	Canopy Spread (~ m)	Dbh (~ mm)	Vigour	Form	U L E	Signif Rating	Worthy of Retention Y/N	TPZ (~ m)	SRZ (~ m)	Comments
1	Melaleuca quinquenervia (Broad-Leaved Paperbark)	15	10	650	F	F (typical)	L	2	Y	7.8	3.3	- Street tree - Limited root area
2	Melaleuca quinquenervia (Broad-Leaved Paperbark)	14	8	550	F	F-G	L	2	Y	6.6	2.8	- Street tree - Stem inclusion @ ~ 7 metres in height - Limited root area
3	Melaleuca quinquenervia (Broad-Leaved Paperbark)	17	7	500	F	F	L	2	Y	6.0	2.5	- Street tree - Limited root area - Trunk rubbing on power lines
4	Melaleuca quinquenervia (Broad-Leaved Paperbark)	8	9	900	F	F	L	2	Y	10.8	4.5	- Street tree - Limited root area
5	Magnolia grandiflora 'Teddy Bear' (Teddy Bear Magnolia)	6	2.5	80mm	G	G	L	3	Y	N/A	N/A	- Growing in planter box in front setback - Provides ground floor screening from the Pacific Highway - Proposed to be removed and replaced with other species
6	Magnolia grandiflora 'Teddy Bear' (Teddy Bear Magnolia)	6	2.5	80mm	G	G	L	3	Y	N/A	N/A	- Growing in planter box in front setback - Provides ground floor screening from the Pacific Highway - Proposed to be removed and replaced with other species
7	Magnolia grandiflora 'Teddy Bear' (Teddy Bear Magnolia)	6	2.5	80mm	G	G	L	3	Y	N/A	N/A	- Growing in planter box in front setback - Provides ground floor screening from the Pacific Highway - Proposed to be removed and replaced with other species
8	Magnolia grandiflora 'Teddy Bear' (Teddy Bear Magnolia)	6	2.5	80mm	G	G	L	3	Y	N/A	N/A	- Growing in planter box in front setback - Provides ground floor screening from the Pacific Highway - Proposed to be removed and replaced with other species

Tree No.	Genus Species (Common Name)	Height (~ m)	Canopy Spread (~ m)	Dbh (~ mm)	Vigour	Form	U L E	Signif Rating	Worthy of Retention Y/N	TPZ (~ m)	SRZ (~ m)	• Comments
9	Magnolia grandiflora 'Teddy Bear' (Teddy Bear Magnolia)	6	2.5	80mm	G	G	L	3	Y	N/A	N/A	• Growing in planter box in front setback • Provides ground floor screening from the Pacific Highway • Proposed to be removed and replaced with other species
10	Magnolia grandiflora 'Teddy Bear' (Teddy Bear Magnolia)	6	2.5	80mm	G	G	L	3	Y	N/A	N/A	• Growing in planter box in front setback • Provides ground floor screening from the Pacific Highway • Proposed to be removed and replaced with other species
11	Strelitzia nicolai (Giant Bird of Paradise)	9	9 (entire clump)	Up to 150mm	G	G	L	3	Y	To dripline	N/A	• 13+ stems • Growing in garden bed on the southeastern side of the building • Proposed to be removed
12	Elaeocarpus reticulatus (Blueberry Ash)	7	5	120	G	F	L	3	N	2.0 (min)	1.5 (min)	• Suppressed • Growth habit and lean towards building • Rubbing on building • Growing in garden bed on the southeastern side of the building • Proposed to be removed
13	Elaeocarpus reticulatus (Blueberry Ash)	12	8	250	G	G	L	3	N	3.0	1.5 (min)	• Growing in garden bed on the southeastern side of the building • Proposed to be removed
14	Elaeocarpus reticulatus (Blueberry Ash)	8	5	120	F-G	F	L	3	N	2.0 (min)	1.5 (min)	• Growing in garden bed on the southeastern side of the building • Proposed to be retained • Will need tree protection measures
15	Waterhousea floribunda (Weeping Lilly Pilly)	15	7	350	G	G	L	3	Y	4.2	1.8	• Growing in garden bed on the southeastern side of the building • Good specimen • Proposed to be retained • Will need tree protection measures

Tree No.	Genus Species (Common Name)	Height (~ m)	Canopy Spread (~ m)	Dbh (~ mm)	Vigour	Form	U L E	Signif Rating	Worthy of Retention Y/N	TPZ (~ m)	SRZ (~ m)	Comments
16	Pittosporum undulatum (Pittosporum)	7	5	120	F	F	L	4	N	N/A	N/A	• Growing in garden bed on the southeastern side of the building • Suppressed • Proposed to be removed
17	Pittosporum undulatum (Pittosporum)	9	6	250	F-G	F-G	M	3	N	N/A	N/A	• Located in a ~ 5 x 8 metre planter bed in the carpark at the southern end of the building • Proposed to be removed
18	Howea forsteriana (Kentia Palm)	9	4	120	G	G	L	2	Y	N/A	N/A	• Located in neighbouring property (14a Bellevue Avenue) • Sufficiently distant such that it will not be affected by the development
19	Harpephyllum caffrum (Kaffir Plum)	13	9	400	F-G	G	L	2	Y	4.8	2.0	• Located in neighbouring property (14a Bellevue Avenue) • Pruned for building clearance on #14a side • Located 400mm from existing boundary retaining wall • Overhanging the boundary by ~ 4 metres • Overgrazed by possums • Low branch may be impacted by construction

20	Eucalyptus scoparia (Willow Gum)	23	14	500	F-G	F-G	M	2	Y	6.0	2.5	• Located in neighbouring property (14a Bellevue Avenue) • Bracket fungus between 4 – 7 metres in height • Located 900mm from existing boundary retaining wall • Overhanging the boundary by ~ 8 metres • Deadwood to ~ 50mm over carpark • Branches overhanging the boundary may be impacted by construction • Requires reduction pruning and deadwooding over carpark
21	Callistemon viminalis (Weeping Bottlebrush)	5	4	2x60 1x70	G	F	L	2	Y	N/A	N/A	• Neighbour's tree located in 14a Bellevue Avenue • Overhangs driveway by ~ 1.5 metres • Will require reduction pruning for vehicle clearance
22	Eucalyptus scoparia (Willow Gum)	11	9	450	G	G	L	2	Y	N/A	N/A	• Neighbour's tree located in 14a Bellevue Avenue • Requires minor reduction pruning of 2 – 3 branch ends to a maximum branch diameter of 50mm for driveway clearance

Refer to Appendix E for the 'Key to Abbreviations used in Tree Survey Tables.

Trees #1 - #4: **Melaleuca quinquenervia** (Broad-Leaved Paperbark)

These are Council owned trees which are located on the Pacific Highway footpath at the front of the site. They are growing close to the kerb and gutter.

The fair health rating of all four specimens is likely to be the result of a restricted root area, both towards the Pacific Highway and towards the building at #170.

All trees have been crown lifted to give clearance to the road way and footpath but have not been formatively pruned to remove branches / trunks with included (weak) attachment points.

A small proportion of the canopy of the trees is growing over the front boundary line, however the proposed building is set back approximately 5 metres from this boundary and, as such not pruning of these trees will be required.

The front of the proposed building is in a similar alignment to the existing building and, as such, is outside the dripline of Trees #1 - #4 and means that building works contained within the front boundary will not affect the canopies of the trees.

There is also an existing masonry planter box with its front alignment along the front boundary. This planter box contains Trees #5 - #10. The foundations for this planter box and other masonry structures are likely to have acted as a root barrier for Trees #1 - #4 and are likely to have prevented the roots from these trees growing into the property.

This means that any excavation and building works that are to be carried out to the front of the property are unlikely to have a significant impact on these trees. There is enough room at the front of the property for protective devices such as scaffolding to be erected without impacting the canopies of the trees.

The trees are also adjacent to a 'No Stopping' zone and, as such, there will be no vehicular access to the site from this frontage.

The trunks of the trees should still be protected during the development with trunk protection, in accordance with Australian Standard AS-4970. We also recommend that the small garden beds around the base of the trunks be topped up with mulch to a depth of ~ 100mm.



Photographs #2 & #3: Shows Trees #1, #2 & #3



Photographs #4 & #5: Shows Trees #3 & #4

Trees #5 - #10: **Magnolia grandiflora 'Teddy Bear'** (Teddy Bear Magnolia) x 6

These semi-mature specimens and the garden bed in which they are growing are proposed to be removed as part of the development.



Photograph #6: Show Trees #5 - #10 in the raised garden bed on the Pacific Highway frontage

It is proposed to continue to have a commercial tenancy on the ground floor. To improve access to the tenancy and along the front of the building, the existing garden bed and the trees within it is proposed to be removed. This will also improve sight lines into the ground floor of building.

The marked-up plan provided by the project's Landscape Architect shows the extent of the demolition of the existing planter box that would be required to open up access to the doorway of the ground floor commercial premises. This would result in the partial demolition of the planter box in which the Magnolias are currently growing and the removal of a significant amount of soil volume. This would result in the removal of one or two Magnolias and negatively affect the health of at least two more. The trees are currently attractive due to their uniform size and any poor health of some of them would significantly detract from their appearance.

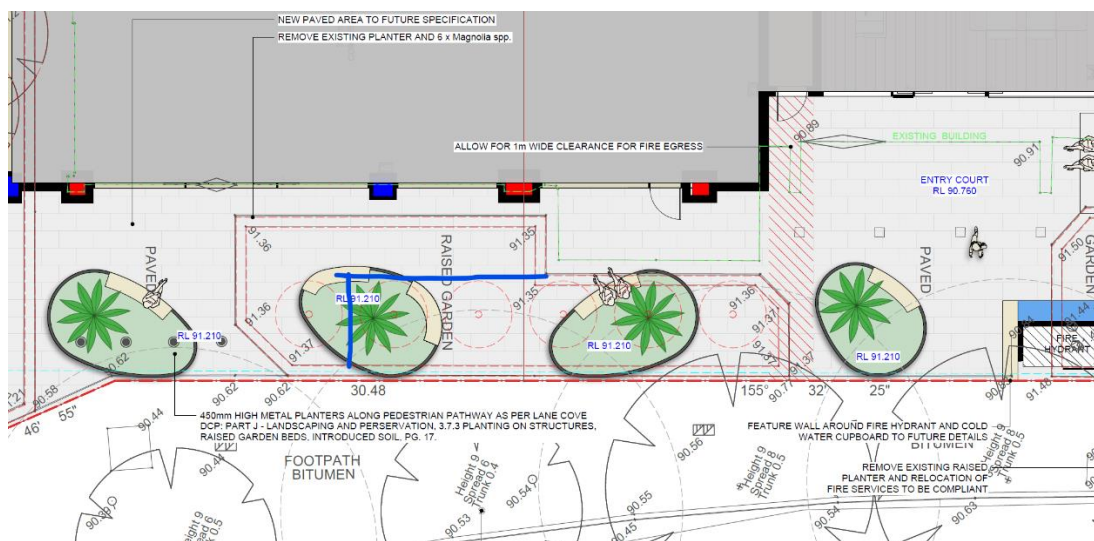


Diagram #1: The blue line shows the approximate line

The large rectangular garden bed will be replaced with four egg-shaped planter boxes, each containing a *Doryanthes excelsa* (Gynea Lily).

Trees #11 - #16: **Strelitzia nicolai** (Giant Bird of Paradise), **Elaeocarpus reticulatus** (Blueberry Ash) x 3, **Waterhousea floribunda** (Weeping Lilly Pilly) & **Pittosporum undulatum** (Pittosporum)

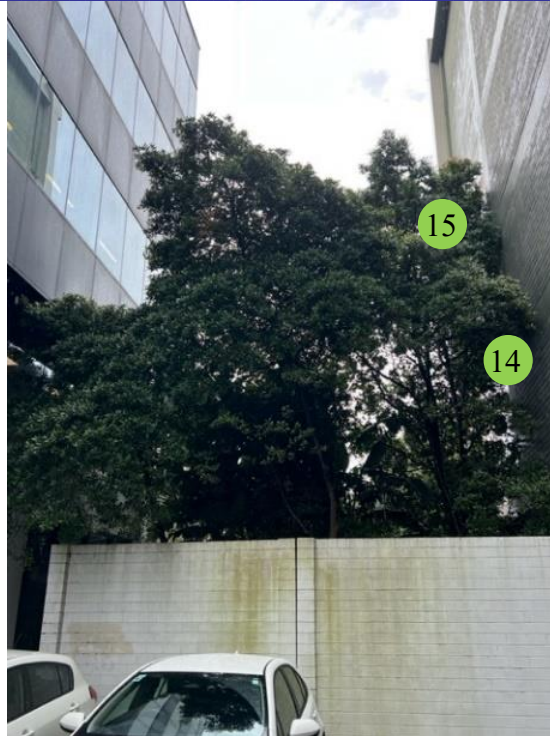
These trees are located on the left hand side of the building and form a dense coppice of small trees and palms.

There are six trees in this area, including the *Strelitzia nicolai* (Giant Bird of Paradise) clump. The Giant Bird of Paradise (Tree #11), the provides over half of the screening and greenery from the Pacific Highway view line.



Photograph #7: Shows the coppice of trees on the left hand side of the building from the footpath on the Pacific Highway frontage

Trees #11, #12, #13 and #16 are proposed to be removed to accommodate the new building line which is closer to the left hand side boundary, the replacement of the Ausgrid substation and the relocation of the masonry dividing wall at the western end of this garden bed. Additionally, a new set of stairs leading down to the basement carpark is proposed to be built behind this wall. There is also a new garden proposed adjacent to the boundary on the western side of this wall.



Photograph #8: Shows the coppice of trees on the left hand side of the building from the rear carpark

Trees #14 (Blueberry Ash) and #15 (Weeping Lilly Pilly) are proposed to be retained as they are somewhat distant from the proposed works. These trees will need to be protected during the development.

Tree protection should consist of a fenced area of at least five metres (width) by 7.5 metres (length). The approximate location of this fencing can be seen at Appendix A. This area must be fenced and mulched with leaf mulch prior to works commencing. Leaf mulch must be applied to a depth of 150mm over the entire TPZ.

The TPZ must not be used as a construction zone or breached for any reason (trenching etc). Please refer to Appendix B and C.

Minor pruning of Trees #14 and #15 will also be required for building clearance (to the neighbouring building at 156-158 Pacific Highway) and should be carried out at the same time as the installation of tree protection measures, together with the removal of deadwood and stubs.



Photograph #9: Shows Trees #14 & #15, which are proposed to be retained

Tree #17: *Pittosporum undulatum* (Pittosporum)

This tree is proposed to be removed to allow for the installation of a fire services storage tank in the basement below this location. This tree is in fair to good health only (as can be seen by its thin canopy density), most likely due to limited soil volume in the garden bed in which it is growing. This would limit this tree's useful life expectancy to the medium term only.

It is a common species and is proposed to be replaced with another tree in the garden bed closer to the front of the property (and adjacent to the stairs to the basement). The replacement tree species is a *Stenocarpus sinuatus* (Queensland Wheel of Fire).



Photograph #10: Shows Tree #17, which is proposed to be removed

Trees #18 - #22: **Howea forsteriana** (Kentia Palm), **Harpephyllum caffrum** (Kaffir Plum), **Eucalyptus scoparia** (Willow Gum) x 2 & **Callistemon viminalis** (Weeping Bottlebrush)

These trees are growing adjacent to the basement carparking wall but within the garden beds at 14a Bellevue Avenue.

There is an existing substantial concrete retaining wall along the boundary between the properties, which also forms the western wall of the basement and ground level car parks and the ramp to the basement. The retaining wall and basement ramp are proposed to be retained, which means that root and lower trunk disturbance / damage cannot occur.

Some of the trees do have a portion of their canopies overhanging the carpark at #170 which have the potential to be impacted by building works and machinery. I recommend that there be minor reduction pruning of the longer branches overhanging the carpark be carried out to reduce canopy overhang over the carpark and to help prevent damage to longer branch ends during construction. This is mainly pertinent to Trees #19, #20 and #21, the Kaffir Plum, the large Willow Gum and the Callistemon overhanging the ramp to the basement.

The recommended pruning would equate to less than 5% of canopy volume of Trees #19 and #20 and approximately 20% of Tree #21. The greater percentage of pruning recommended for Tree #21 is because it has a large proportion of its canopy low over the ramp to the basement. The deadwood contained on the canopy over the carpark should also be removed at the same time for property damage considerations.

All pruning must be carried out to Australian Standard AS-4373 and not by construction staff. Branches must not be cut to the boundary line.



Photograph #11: Shows Trees #19 & #20 in the neighbouring property at 14a Bellevue Avenue



Photograph #12: Shows Trees #21 & #22 in the neighbouring property at 14a Bellevue Avenue

Of note for Tree #20 (the large Willow Gum) is the presence of a scar on the main trunk at a height of four to seven metres above ground level in #14a. This scar and the uncorticated bark surrounding it indicates that the tree has been colonised by a Bracket fungus. If left untreated, the progression of decay into the trunk can increase the chance of trunk failure at this point. The tree is in an exposed (high) location, which further increases this chance. The tree can be treated to slow / halt the progression of the Bracket fungus so I recommend that the neighbours be notified so that they have the opportunity to address this issue.

The current plans show the removal of the western tandem car parking spaces and the replacement with a garden bed which contains five *Tristanopsis laurina* (Water Gum). These are quite small tree species and consideration could be given to installing tree species with better form (i.e. not multi-trunked with included / weak attachment points), colour (perhaps some deciduous in front of the Kaffir Plum) and able to attain a greater height. The Water Gums could, at best, attain a height of approximately four metres in the longer term, especially since the cultivars now available are multi-stemmed dwarf varieties that have a high water requirement to grow properly, especially in the limited soil volume in which they will be growing.

DISCUSSION & RECOMMENDATIONS

Trees #1 - #4, the four existing medium sized Broad Leafed Paperbarks on the Pacific Highway footpath, are proposed to be retained.

Trees #5 - #10, the six Teddy Bear Magnolias in the garden bed at the front of the building, are proposed to be replaced with four egg-shaped raised planters containing *Gyneria* Lilys. For these plants to become successfully established, irrigation will need to be installed in each of the garden beds.

Trees #11, #12, #13 and #16, the Giant Bird of Paradise, Blueberry Ash (x 2) and a small *Pittosporum*, are proposed to be removed. These are the specimens closest to the existing building and the substation, which is proposed to be replaced. The new building line is closer to these trees, which will require their removal.

Two trees in this garden bed (Trees #14, a small Blueberry Ash and Tree #15, a larger Weeping Lilly Pilly) are proposed to be retained. They have the potential to be retained with appropriate tree protection measures and maintenance during construction. There are numerous ground covers and strappy plants proposed for this garden bed, however it is large enough to accommodate an additional two trees closer to the Pacific Highway. Mass planting of ground covers and strappy plants will tend to have a deleterious effect on existing trees (and any new trees) through root competition and over-crowding.

It should be planned to have wide mulched areas between isolated clumps of these plants so that all of them have room to grow in this garden into the medium term. This is important as it is the only deep soil planting area on the site.

A Queensland Wheel of Fire tree is proposed to be planted in the western end of this garden bed. This is a good choice as it will withstand the western sun, provided it has adequate moisture.

The five trees along the western boundary that are growing within #14a (Trees #18 - #22, the Kentia Palm, Kaffir Plum, Willow Gum x 2 and the Callistemon), are protected by various structures, both above and below ground. This means that there is only the limited possibility of damage to branches over the existing carpark by construction machinery (i.e. craned materials etc) and so the trees are unlikely to be affected. Notwithstanding this, I recommend that longer branches growing over the boundary line be reduction pruned to give slightly more clearance and eliminate property damage hazards by the removal of deadwood.

There are five trees to be planted in a raised garden bed along this western boundary and my comments in relation to this are noted above.

There are various Tree ferns and other low-light ferns plants proposed for atrium garden on the northern side of the building.

The rooftop area is proposed to have three Banksia integrifolia installed in the northern side garden bed. These are a larger growing tree species and will need adequate soil volume and moisture levels to be viable into the medium term as it is an exposed location.

There are numerous trees in the neighbouring properties along Elcedo Lane, however these are mainly hedge species that have been trimmed more-or-less along the roadway and the development will have no impact on these large shrubs / trees. There is other developments occurring on this roadway which has not caused damage to these trees.

TREE PROTECTION

The trees must be protected in accordance with Australian Standard AS4970-2009 'Protection of Trees on Development Sites' and as per the 'General Guidelines for the Protection of Trees on Construction Sites', at Appendix B. Please also see Appendix C for 'Tree Protection Requirements' and Appendix D for details of 'Trunk & Root Zone Protection', if required.

Of particular note are the following tree protection requirements:

1. Tree protection measures for the trees to be retained on or adjacent to the site must be in place before any machinery is brought onto the site and before any demolition commences and must remain in place for the duration of works, until landscaping commences.
2. The tree protection must not be moved or altered without the approval of the Project Arborist.
3. Monthly site visits by the Project Arborist will be required to monitor compliance with the tree protection requirements.

4. Mulch must be installed across all TPZs to a depth of 150mm and kept topped up to this depth for the duration of the works.
5. All construction activities are excluded from the TPZ or if required within the TPZ, must be under the supervision of the Project Arborist.



We are grateful for the opportunity to assess your trees. Our professional business thrives on recommendations and would be pleased if you could assist us in this way. If you have any further questions, please do not hesitate to contact our office.

Yours faithfully,


SCOTT GATENBY
Managing Director

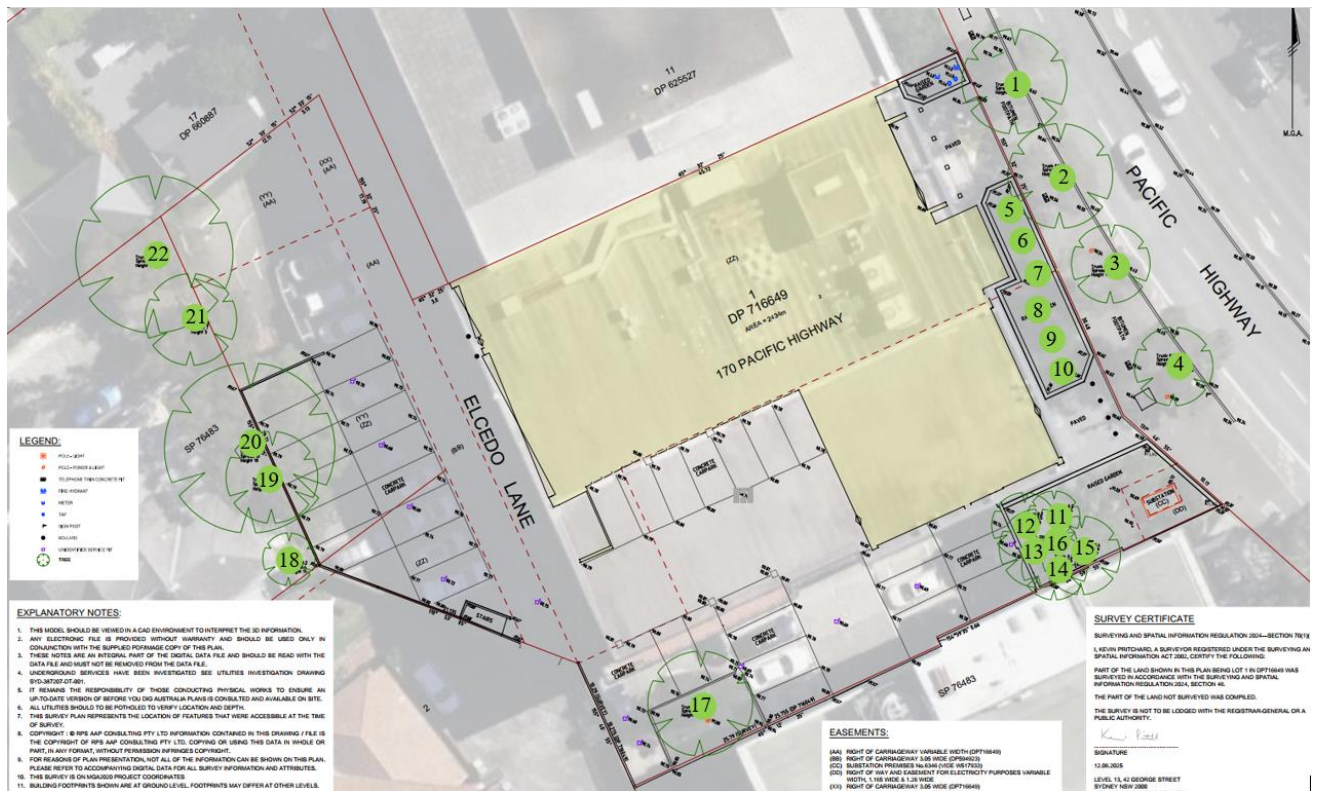
WAIVER/LIMITATIONS

The findings of this report are based upon and limited to visual examination of the subject tree from ground level without any climbing, internal testing or exploratory excavation. Whilst the author provides comments on likely future hazards, this report does not claim to be exhaustive in its assessment of any potential hazards, or of any factors contributing to such hazards. If further practical investigation is required for any reason, including in response to any perceived or unresolved issue, then additional investigations or inspections can be undertaken if requested.

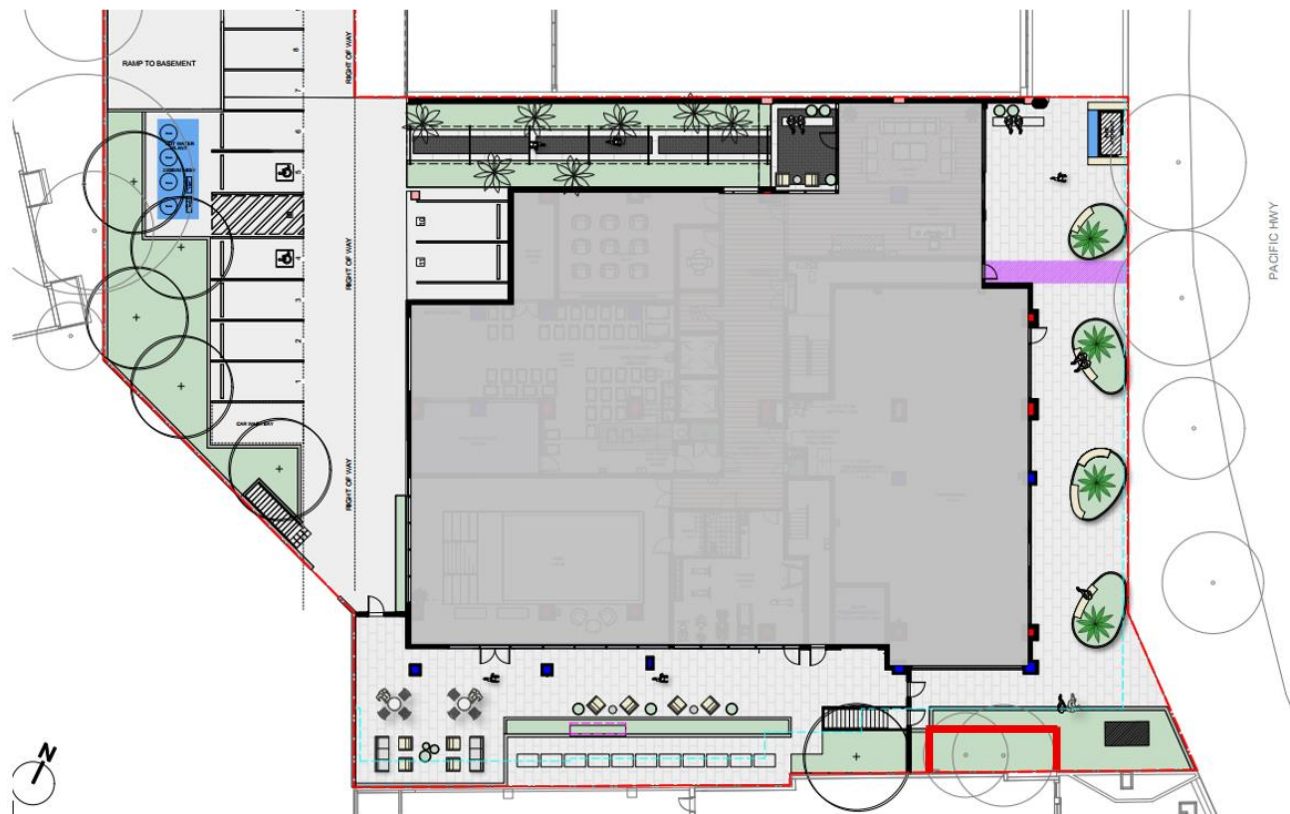
This report reflects the health and structure of the tree at the time of inspection. Apex Tree & Garden Experts cannot guarantee that a tree will be healthy and safe under all circumstances or for a specified period of time. There is no guarantee that problems or defects with the assessed tree, will not arise in the future. Liability will not be accepted for damage to person or property as a result of failure of the assessed tree.

This report has been prepared for the exclusive use of the client. Apex Tree & Garden Experts does not accept any responsibility for its use by any other party. This report must be read in its entirety. No part of this report may be referred to, verbally or in writing, unless taken in full context of the whole report.

SITE PLAN SHOWING TREE NUMBERS & APPROXIMATE TREE LOCATIONS



SITE PLAN SHOWING TREE PROTECTION FENCING



(Thick red lines indicate approximate location of tree protection fencing)

General Guidelines for the Protection of Trees on Construction Sites

(Blended from AS4970-2009 Section 4)

- The Australian Standard AS4970 Protection of Trees on Development Sites allows for a Tree Protection Zone (TPZ) calculated as 12 x the diameter of the trunk at breast height. There can be mitigating factors which would allow development closer than this which must be determined by a Level 5 Consulting Arborist.
- The area around the base of the tree should be fenced off to at least the original drip line as a Tree Protection Zone (TPZ) or as specified by a suitably qualified arborist. The fence should not be able to be easily moved and should represent a significant barrier to prevent construction works being carried out within the fenced area.
- Signage should be attached to the tree protection fencing denoting that this is a Tree Protection Zone which must not be encroached upon. The sign should contain the name and contact number of the Site Arborist and the relevant council authority to be contacted should damage to the trees occur. The signage is to remain in place for the duration of the construction period.
- Site personnel must be made aware of tree requirements and protection measures.
- The location of stockpiles, construction work areas and vehicle parking should be designed to be remote from trees and must not occur within the TPZ.
- The TPZ must not be used for pedestrian or vehicular activity, as soil compaction and trunk damage can often result.
- Building and excavation materials must not be stored within the fenced TPZ as this can exclude water and oxygen and compact the soil.
- Cement washes, fuel and other chemicals must not be washed into the root area of trees. Waste must not be dumped in the TPZ and fires must not be lit within the TPZ.
- Underground services should be designed to use common trenches as far away from tree roots as possible. No trenches should be dug within the Tree Protection Zone (TPZ) of the tree including the excavation for silt fencing.
- It is strongly recommended the TPZ within the dripline of any tree affected by construction have the soil decompacted via pressure injection. This process allows the trees to more extensively use the smaller remaining root area. By decompacting, aerating and improving the nutrient status of the soil around the tree, many of the negative effects of building activities can be countered.
- Regular supervision of tree protection measures should be carried out on at least a monthly basis.
- The area underneath the tree within the TPZ must be mulched with quality leaf/brush mulch to a depth of approximately 100 mm - 150 mm before any works begin.
- We recommend that these trees be lightly fertilized with complete plant fertilizer.

- The site arborist is to supervise and treat any exposed tree root/s during excavation. Roots over approximately 40 mm should be cleanly cut prior to excavation machinery digging up any roots. Do not allow excavation vehicles or equipment to rip at or remove roots along the face of the excavation adjacent to trees. In the event the vehicles 'grab' at roots during works, the machinery operator must stop work immediately and allow the roots to be cut before continuing.
- Hand excavation is required when excavation is to be done within the Critical Root Zone.
- Original soil levels should be maintained, and cuts and fills should not be allowed near trees except under supervision by a suitably qualified site arborist. This includes activities during the installation of new landscaping.
- If the tree/s are to be pruned the removal of foliage should be limited to approximately 20% of full canopy, as the tree needs its foliage to produce food for itself. Over thinning will stress the tree and render it less able to grow into its new environment.
- The tree should be trimmed according to the Australian Standard AS4373-2007. No topping of trees should ever take place.
- Any pruning work should include the removal of major deadwood and rubbing branches from the tree as a matter of course.
- During the construction period the tree should be watered during dry spells e.g. 2-3 weeks without adequate rainfall. The root zone should be thoroughly watered and then left to drain. If it is seen to be a problem in allocating time for site staff to water trees, an automatically timed dripline watering system should be installed.
- In the event of any tree becoming damaged for any reason during the construction period a consulting arborist shall be engaged to inspect and provide advice on any remedial action to minimise any adverse impact. Such remedial action shall be implemented as soon as practicable and certified by the site arborist.

TREE PROTECTION MEASURES – PRE-CONSTRUCTION

1. General

All tree protection works shall be carried out before excavation, grading and site works commence. Tree protection works shall be inspected and approved by an AQF Level 5 Arborist (Project Arborist) prior to construction works commencing.

Storage of materials, mixing of materials, vehicle parking, disposal of liquids, machinery repairs and refuelling, site office and sheds, and the lighting of fires, stockpiling of soil, rubble or any debris shall not be carried out within the TPZ of trees to be retained.

No backfilling shall occur within the TPZ of trees to be retained.

Please also refer to the ‘General Guidelines for the Protection of Trees on Construction Sites’ at Appendix B.

2. Project Arborist

Prior to all site works commencing, a Project Arborist is to be appointed with the responsibility of implementing all Tree Protection Measures in this report as well as compliance with AS4970-2009 Protection of Trees on Development Sites.

The supervising Project Arborist must inspect the tree protection measures and maintain a record throughout the construction process. As a minimum, an inspection must be undertaken at each hold point listed below:

Hold Point	Task	Responsibility	Certification	Timing of Inspection
1	Establishment of tree protection	Principal Contractor	Project Arborist	Prior to the issue of the Construction Certificate
2	Supervise all excavation works within the TPZ	Principal Contractor	Project Arborist	As required prior to the works proceeding adjacent to the tree(s)
3	Periodic inspection of tree(s)	Principal Contractor	Project Arborist	As required (usually following any works within or near to the TPZ) and/or monthly
4	Final Inspection of trees	Principal Contractor	Project Arborist	Prior to the issue of the Occupation Certificate

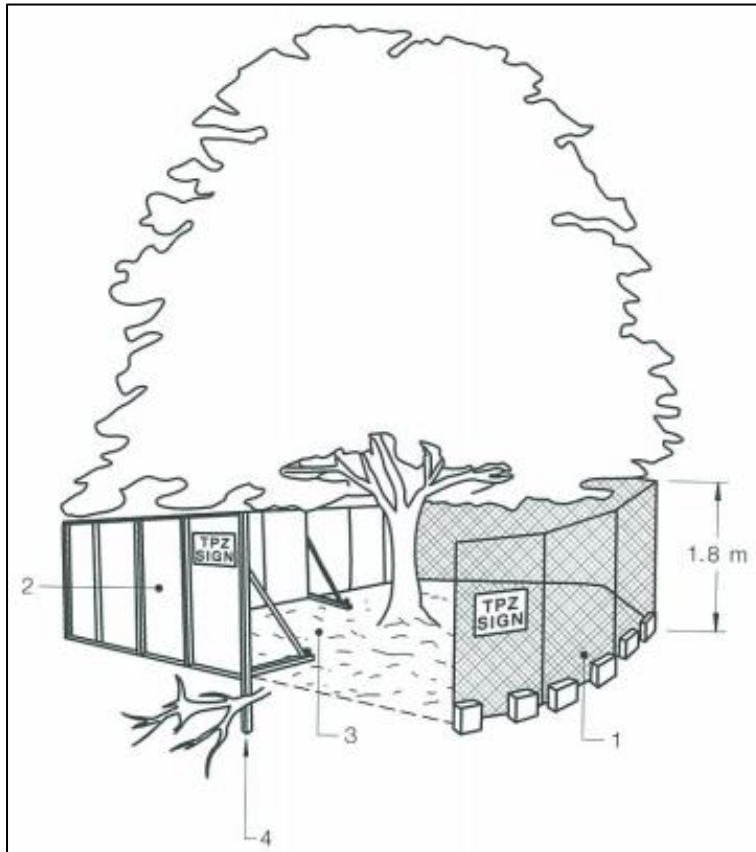
3. Tree Protection Fence

Protective Fencing is to be installed, as per AS-4970 or as noted above to the full extent of the TPZ(s) within the site prior to any materials being brought on site or before any site, civil works or construction works commence. The fence shall enclose a sufficient area so as to prevent damage to the TPZ. This fence must remain unbreeched until all works around the tree have been finalised.

The tree protection fence to comprise either 1800mm high chain wire mesh or 2.4m x 1.8m temporary fence panels fixed to 50mm diameter galvanised steel posts or star pickets, driven into the ground. Panels, if used, should be securely fixed top and bottom to avoid separation. Refer to the diagram below and Appendix C for further tree protection fencing guidelines.

Diagram #1: Tree Protection Fencing

(From: Australian Standard AS-4970-2009)



LEGEND:

1.Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.

2.Alternative plywood or wooden paling 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 must avoid damaging roots

4. Mulch

Install mulch to the extent of all tree protection fencing.

Use a leaf mulch conforming to AS-4454 which is free of deleterious and extraneous matter such as soil, weeds, sticks and stones and consisting of a minimum of 90% recycled content compliant with AS-4454 (1999) and AS-4419 (1998). (All trees marked as to be removed on the proposed development are to be chipped and reused for this purpose.)

Place mulch evenly and to a depth of at least 100mm.

5. Signage

Prior to works commencing, tree protection signage is to be attached to each tree protection zone, displayed in a prominent position. Refer to Appendix C & D for further instruction re signage.

6. Trunk and Branch Protection

If trunk and branch protection is to be installed, the trunk and branches in the lower canopy are to be protected by wrapping 2 layers of hessian or carpet underfelt around the trunk and branches, then metal strapping secures 38 x 50 x 2000mm timber battens together around the trunk or branch (do not nail or screw to the trunk or branches). The number of battens to be used is as required to encircle the trunk and the battens are to extend to the base of the tree, as shown in Appendix D)

All trunk and branch protection is to be to the direction and approval of the Project Arborist.

7. Excavation within Tree Protection Area

No excavation is to be carried out within the TPZ(s) of the retained tree(s) without the permission and supervision of the Project Arborist

TREE PROTECTION MEASURES - DURING CONSTRUCTION

1. Maintenance of Pre-Construction Tree Protection Measures

The Pre-Construction Tree Protection Measures identified above are to be maintained in good and serviceable condition throughout the construction period.

All Tree Protection Measures are to be in accordance *AS4970-2009 Protection of Trees on Development Sites*.

2. Possible Contaminants

Do not store or otherwise place bulk materials and harmful materials under or near trees.

3. Physical Damage

Prevent damage to tree. Do not attach stays, guys and the like to trees. No personnel, plant, machinery or materials are to be allowed within the tree protection fencing.

4. Compaction

No filling or compaction shall occur over tree roots zones within tree protection fenced areas. Where construction occurs close to or the TPZ of trees to be retained it shall be necessary to install protection to avoid compaction of the ground surface. Techniques such as rumble boards or plywood sheets over mulch can be used where vehicle or pedestrian traffic occurs. Load spreading boards should be placed beneath scaffolding feet within the TPZ.

5. Trenching

Should any trenching be required within the TPZ(s) the Project Arborist must assess and investigate alternatives. This trenching work may need to be carried out by hand and under the supervision of the Project Arborist.

6. Irrigation/Watering

A permanent water point (tap) must be installed at the edge of the TPZ(s) so as to allow irrigation to the tree(s).

Soil moisture levels are to be adequately maintained such that the tree(s) to be retained and protected will need to be watered during dry spells. A dry spell could be defined as at least 14 days with no significant natural rainfall (i.e. <10mm).

Watering should be deep but infrequent and a good rule of thumb would be to slowly water the area beneath the dripline of the tree for 2 -3 hours every 10 – 14 days. Moisture levels should be checked on a regular basis to ensure that the soil is not dried out or waterlogged.

A temporary irrigation system with a battery-powered timer must be installed so that watering of the tree(s) can occur without input from anyone other than the Project Arborist checking the irrigation and timer. Spray irrigation should be used rather than drip irrigation as the latter does not provide a complete wetting pattern and therefore only small areas of the tree's available root area can be reached by this method.

TREE PROTECTION ZONE REQUIREMENTS.

Tree Protection Zones (TPZs) must be set out before the commencement of construction works.

According to AS 4970-2009 'Protection of Trees on Development Sites', activities excluded from the TPZ include but are not limited to the following:

- Machine excavation, including trenching
- Excavation for silt fencing
- Cultivation
- Storage
- Preparation of chemicals, including preparation of cement products
- Parking of vehicles and plant machinery/equipment
- Refuelling
- Dumping of waste
- Wash down and cleaning of equipment
- Placement of fill
- Lighting of fires
- Soil level changes
- Temporary or permanent installation of utilities and signs
- Physical damage to the tree(s)

Source: Australian Standards AS 4970-2009 Protection of Trees on Development Sites.

SIGNAGE

A 600mm x 450mm prohibition sign, complying with AS1319 stating:

"NO ENTRY - TREE PROTECTION ZONE"

and including contact details of the site foreman is to be attached to the fence to be visible from all sectors of the site, and remain in place until all construction has been completed.



TREE PROTECTION FENCING METHODS:

Tree protection fencing panels must be a minimum of 1.8 metres in height and be held in place with locking clamps and star pickets between each panel. The star pickets must be driven into the ground to a depth of at least 300mm. (See picture below). This is to help create a sturdy and relatively immovable tree protection fence. Plastic or concrete temporary fence bases (feet) are NOT acceptable. All temporary fencing should also comply with AS 4687-2007 'Temporary Fencing and Hoarding'.



APPENDIX D:

TREE TRUNK AND ROOT ZONE PROTECTION

A continuous Tree Protection Fence shall be erected around the perimeter of the Tree Protection Zone (TPZ).

The Tree Protection Fence shall be a minimum of 1800mm high chain link or steel mesh secured by 2400mm star pickets or 50mm Ø GWI pipe anchor posts driven 600mm into the ground. This is so that the fencing cannot be breached or moved. Commercially available 1.8 x 2.4 metre pipe framed mesh fencing panels, affixed as above, can also be used.

NB: The use of fencing supported by concrete, plastic or similar bases to support the TPZ fencing is not acceptable.

On construction sites with wind blown dust and debris, attach shade cloth or similar geotextile fabric to cover the fence panels and screen the TPZ from contamination.

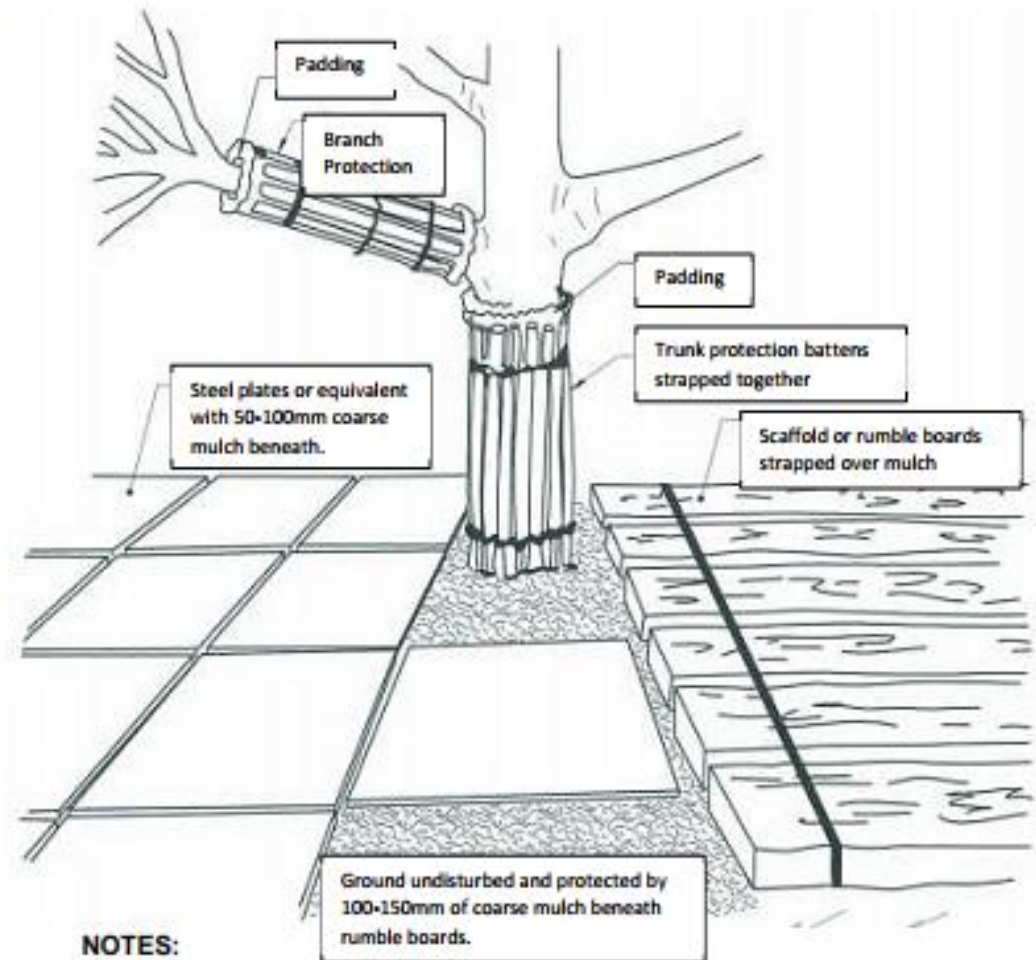
The Tree Protection Fence shall be installed prior to any demolition, clearing, grading or construction work, and remain in place in functioning condition until all construction has been completed.

PROHIBITIONS

No persons, material, equipment, or disposal of solid, liquid or chemical waste – including concrete cleanup waste, painters waste and similar – is permitted within the tree protection zone.

SIGNAGE

A 600mm x 450mm prohibition sign complying with AS1319 stating **"NO ENTRY - TREE PROTECTION ZONE"** and including contact details of the site foreman is to be attached to the fence to be visible from all sectors of the site, and remain in place until all construction has been completed

**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 into the trunk.
2. Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

APPENDIX E. DEFINITIONS

Diameter at Breast Height (dbh).

Tree trunk diameter measured (in mm) at breast height (1.3metres above ground level)

Canopy Spread.

Average canopy diameter in metres

Vigour/Health.

The general appearance of the above ground sections of the tree at the time of inspection. Ratings are Good (G), Fair (F) and Poor (P) or combinations of two (eg. F-G)

Form.

The general shape of the tree, taking into consideration growth patterns which may affect the health, safety or longevity of a tree. Ratings are Good (G), Fair (F) and Poor (P) or combinations of two (eg. F-G)

Terms that may be used in relation to Tree Age and Size.

Sapling:	A juvenile tree in the early growing stage
Semi-mature:	The tree is still actively growing in size
Mature:	The developmental growing stage is complete, and the tree is near full size
Over-mature:	The tree will not increase significantly in size and is likely to go into slow decline over ensuing years

Useful Life Expectancy (ULE).

A systematic tree assessment procedure which gives a length of time that the Arborist gauges a particular tree can be retained with an acceptable level of risk based on the information available at the time of the inspection.

ULE Ratings

Long	Retainable for 40 years or more with an acceptable level of risk
Medium	Retainable for 16-39 years with an acceptable level of risk
Short	Retainable for 5-15years
Removal	Tree requiring immediate removal due to imminent hazard or absolute unsuitability

Significance Rating Scale

The Significance Rating Scale is a site specific evaluation of a tree relative to its setting. The Arborist applies the rating by considering numerous factors including tree species, weed species, remnant trees, native trees, cultural significance in the landscape, tree health, visible defects, form, setting, age, longevity, commonality etc.

The Significance Rating indicates the relative importance of the tree and gives a general idea of whether a tree is worthy of retention and maintenance or if removal and replacement should be considered.

The categories of the Significance Rating Scale are as follows:

- | | |
|---------------------------------|--|
| 1. Most significant: | Warrants retention and design modifications and Tree Protection Zone (TPZ) to ensure this. |
| 2. Significant: | Warrants retention and remedial pruning, treatments and design modifications. |
| 3. Somewhat significant: | Warrants retention if no design changes are needed; or warrants removal if excessive pruning or treatment is required. |
| 4. Least significant: | Removal would not result in any loss of site amenity. Can include weed species. |
| 5. Hazardous: | Must be removed irrespective of any development. |

Tree Protection Zone (TPZ):

The radial distance required to be fenced off and remain undisturbed for the duration of the development so the tree and its root zone can be protected. (AS-4970: Min TPZ = 2m; Max = 15m)

Structural Root Zone (SRZ):

The area considered essential for tree stability: loss of roots in this area are likely to cause the tree to become unstable in the ground. (AS-4970: The SRZ for trees with less than 0.15 dbh will be 1.5m)